CKD

General Purpose Valves

Direct acting type | Pilot operated type | Air operated type

Motorized ball valve | Life Science

Related products for water | Gas combustion system

Automatic watering control device | Special fluid control valve

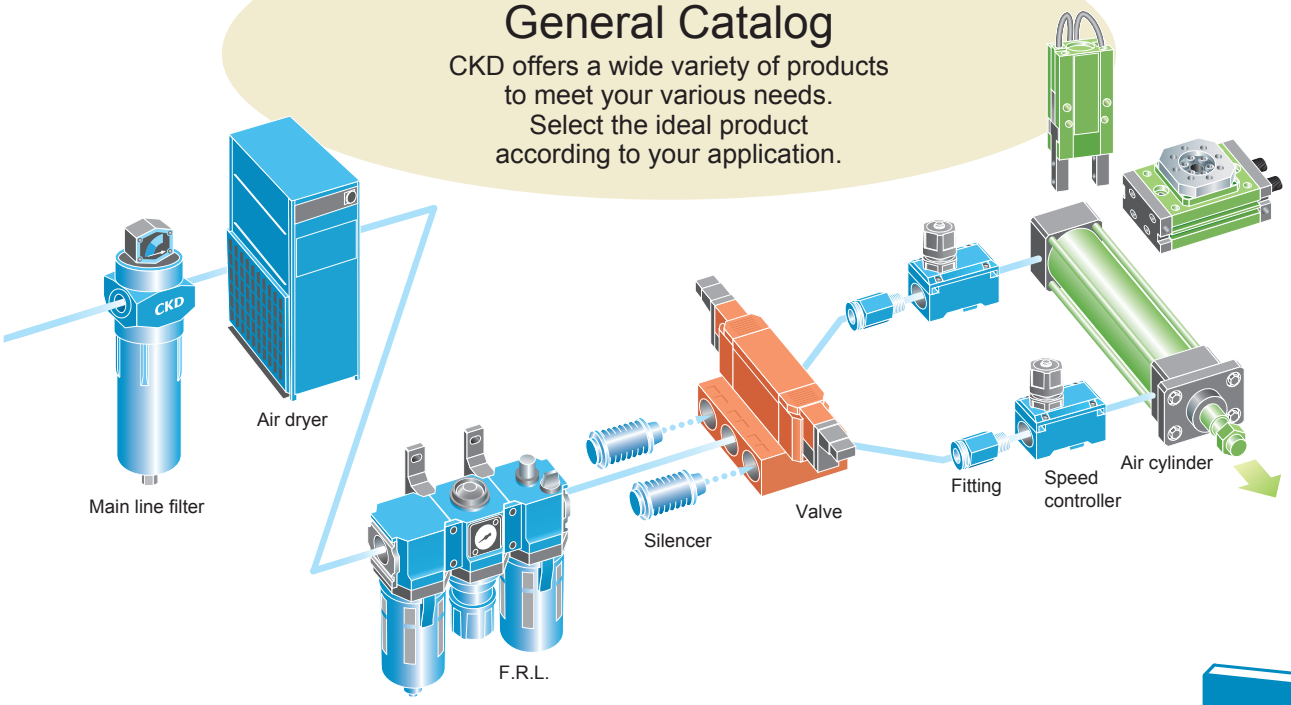
Vol. 9

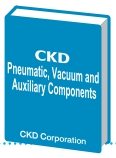
Ver. 2

Catalog No. CB-03-1SA-9

Guide to CKD Components General Catalog

CKD offers a wide variety of products
to meet your various needs.
Select the ideal product
according to your application.

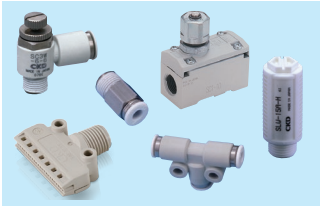




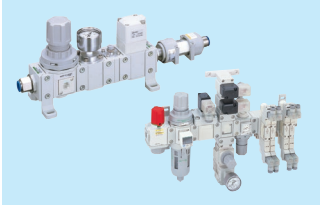
Pneumatic, Vacuum and Auxiliary Components

F.R.L. units
Modular design (F.R.L.)
Drain separator
Anti-bacterial / bacteria-removing filter
Compact regulator / Filter regulator
Large bore size filter / Regulator
Precision regulator
Mechanical pressure switch
Residual pressure exhaust valve
Adapter/joiner
Pressure gauge
Vacuum filter / Regulator
Clean filter / Regulator
Electro pneumatic regulator

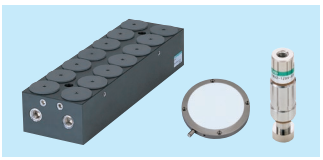
Pneumatic auxiliary components
Speed controller
Silencer
Auxiliary valve
Fitting/tube
Air blow nozzle



Air unit components
Clean air unit
Air unit



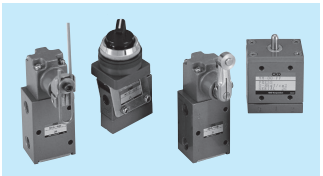
Precision components
Glass float module
Precise suction plate
Magnetic spring buffer



Pressure sensors
Electronic pressure switch
Contact/close contact check/ cutting tool breakage detection switch
Air sensor
Pressure switch for coolant

Sensor/controller components
Gas flow sensor
Gas flow controllers
Water flow rate sensor

Total air systems
Total air system (detector/circuit device)
γ system (PLC components/ signal control components)

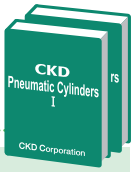


Gas generator
Nitrogen gas extraction unit
Oxygen concentration monitor

Main line units
Air dryer
High polymer membrane Air dryer unit
Main line filter
Drain discharger

● Catalogs for chemical liquids for semiconductors and valves for process gases are also available.

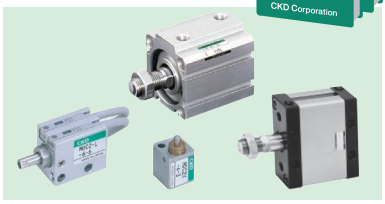
Pneumatic Cylinders Ⅰ and Ⅱ

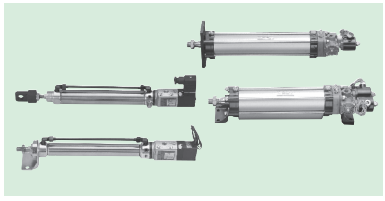


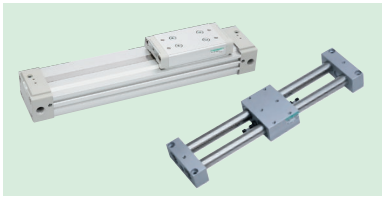
Pneumatic Cylinders Ⅰ

- Standard
- With valve
- Space saving structure
- Rodless type
- Related products
  - Shock absorber
  - Free joint
  - Simplified floating joint
  - Speed controller
- Cylinder switches


Standard

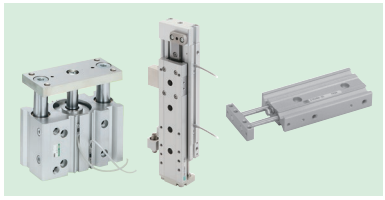

Space saving structure

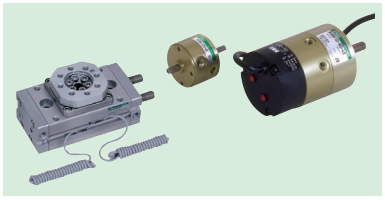

With valve

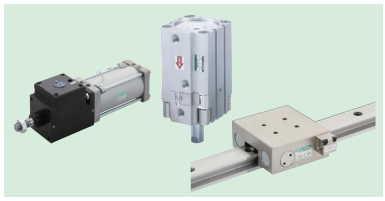

Rodless

Pneumatic Cylinders Ⅱ

- Combined functions
- Braking and position locking
- High speed
- Special type
- Oscillation/rotation drive
- Modular unit
- Length measuring function
- Hands/chucks
- Related products
  - Shock absorber
  - Free joint
  - Simplified floating joint
  - Speed controller
- Cylinder switches

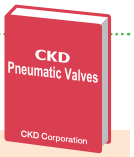

Combined functions


Oscillation/rotation drive

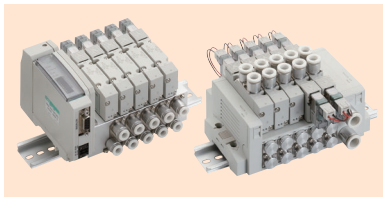

With brake/position locking

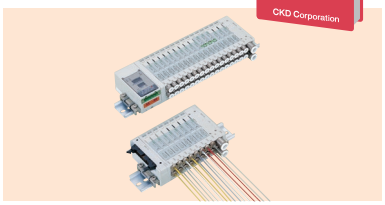

Hand/chuck

Pneumatic Valves

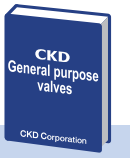


- Pilot operated
- Direct acting
- Explosion-proof
- Manual selector
- Related products

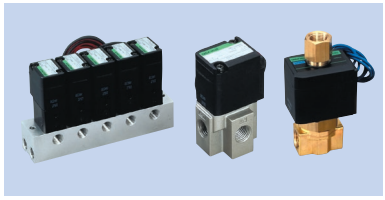

3, 4, 5-port pilot operated valve


Reduced wiring valve

General Purpose Valves



- 2, 3-port solenoid valves for various fluid control
  - Direct acting 2, 3-port solenoid valve
  - Pilot operated 2-port solenoid valve
  - Air driven 2, 3-port valve
  - Motorized ball valve
  - Components for Life Science
  - Related products for water
  - Gas combustion system
  - Automatic watering control device
  - Products for outdoor use
  - Special fluid control valve

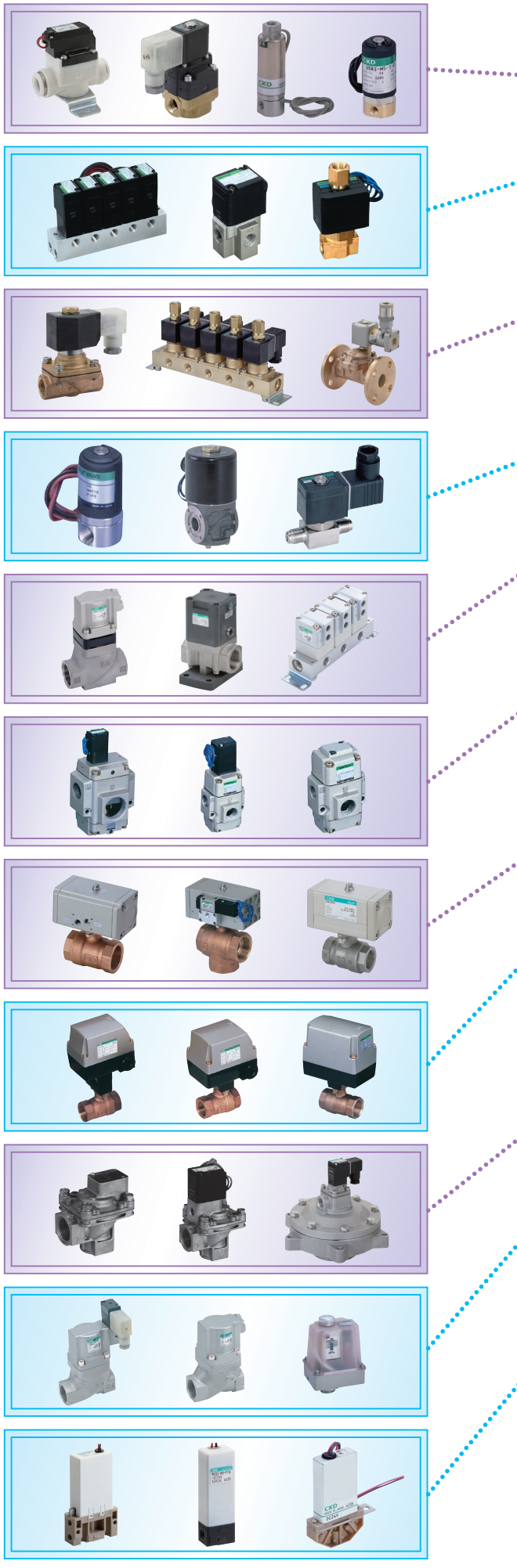

2, 3-port direct acting solenoid valve


2-port air operated valve

Index units (Index Drive)

- Roller gear cam units
- Parallel cam units
- Pick and place units
- Direct drive actuators
- Drivers/controllers/dedicated terminals

I N D E X



From the CKD website,
catalogs and CAD data (2D/3D-CAD)
can be downloaded.
https://www.ckd.co.jp/kiki/en/

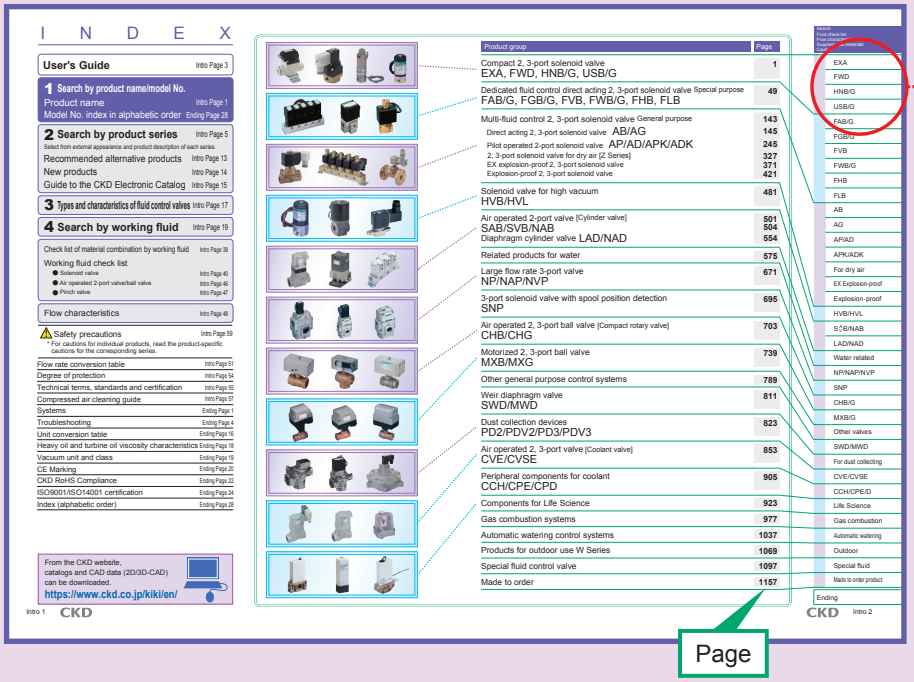
User's Guide (How to browse/use the catalog)

Quickly search for and select a desired product using methods **1** to **4**.

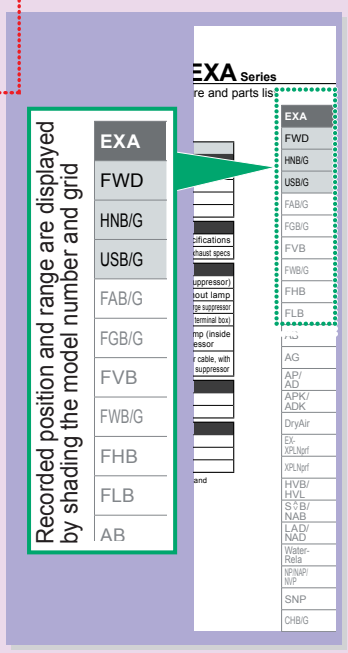
1 Searching by product name/model No.

If the product name/model No. are already determined, the desired series page can be found.

From INDEX



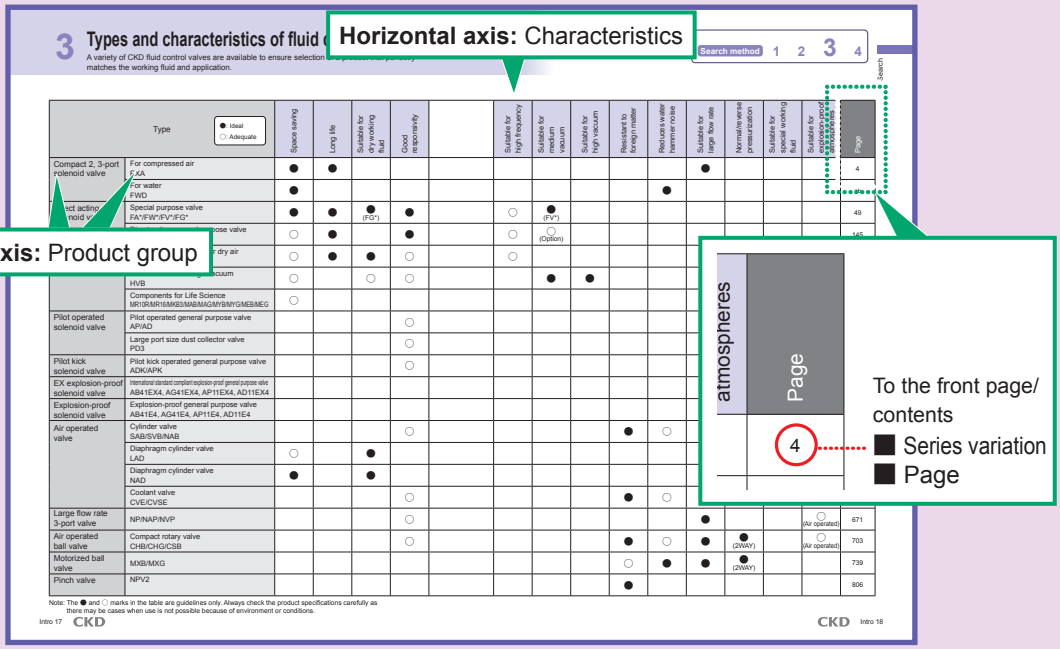
From page side indices



3 Searching by type and characteristics of fluid control valves

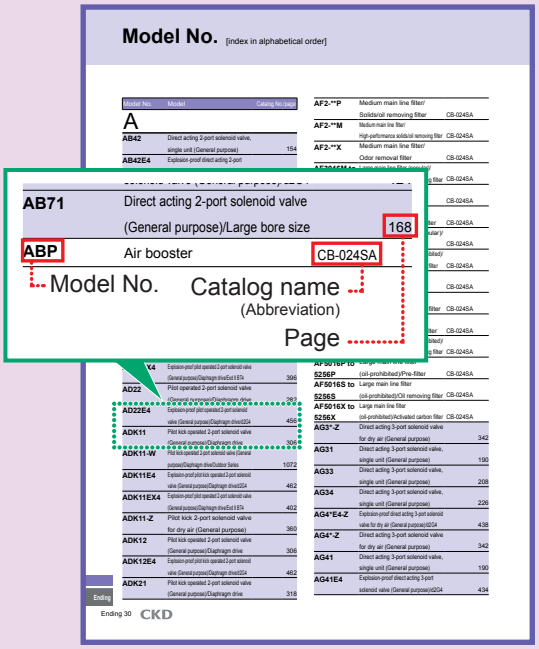
Intro Pages 17 to 18

A variety of CKD fluid control valves are available to ensure selection of a product that perfectly matches the working fluid and application.



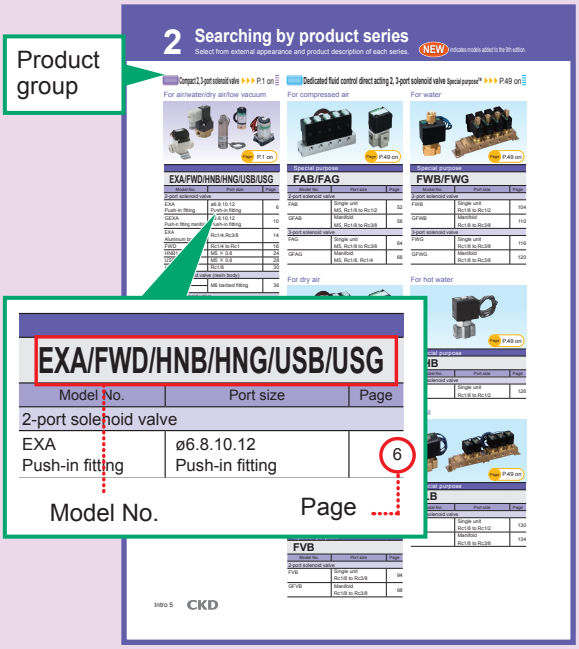
Ending Pages 28 to 55

● In alphabetical order



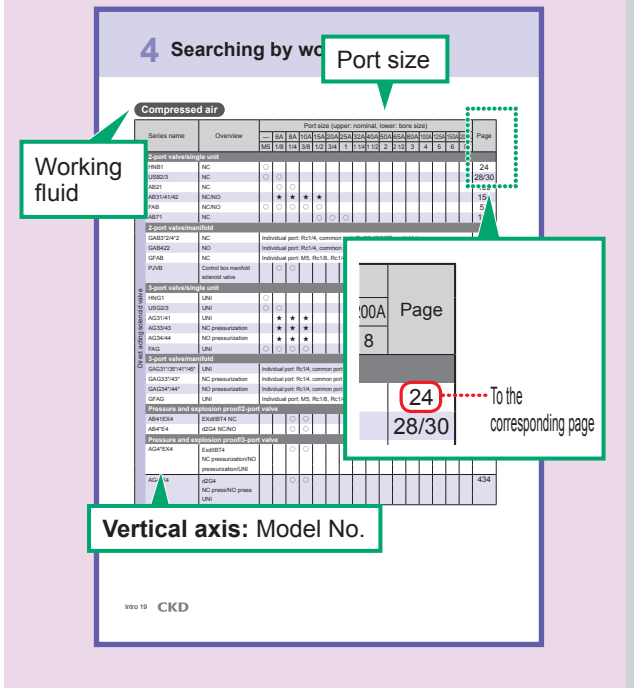
2 Searching by product series Intro Pages 5 to 12

If the product's series name is already determined, the desired series page can be found.



4 Searching by working fluid Intro Pages 19 to 38

If the working fluid is already determined, the desired product can be looked up.



Icons (marks)

For easier use of the catalog, each item is marked and compatible items are indicated in the text.

Mark	Meaning	Details
CAD	CAD data is available for items with CAD marks in dimensions.	Intro Page 15
CE	European Standards compliant products.	Ending Page 20
RoHS	RoHS-compliant products.	Ending Page 22

2 Searching by product series

Select from external appearance and product description of each series.

NEW indicates models added to the 9th edition.

Compact 2, 3-port solenoid valve P.1 on

For air/water/dry air/low vacuum

Page P.1 on

EXA/FWD/HNB/HNG/USB/USG

Model No.	Port size	Page
2-port solenoid valve		
EXA Push-in fitting	ø6.8.10.12 Push-in fitting	6
GEXA Push-in fitting manifold	ø6.8.10.12 Push-in fitting	10
EXA Aluminum body	Rc1/4,Rc3/8	14
FWD	Rc1/4 to Rc1	16
HNB1	M5 × 0.8	24
USB2	M5 × 0.8	28
USB3	Rc1/8	30
2-port solenoid valve (resin body)		
USB2 USB3	M6 barbed fitting	36
3-port solenoid valve		
HNG1	M5 × 0.8	26
USG2	M5 × 0.8	32
USG3	Rc1/8	34
3-port solenoid valve (resin body)		
USG2 USG3	M6 barbed fitting 1/4-28UNF	36

Dedicated fluid control direct acting 2, 3-port solenoid valve Special purpose P.49 on

For compressed air

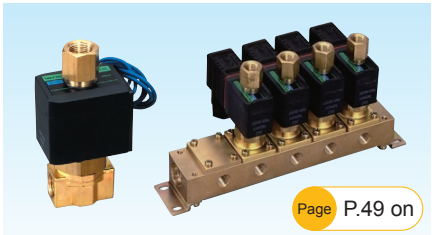
Page P.49 on

Special purpose

FAB/FAG

Model No.	Port size	Page
2-port solenoid valve		
FAB	Single unit M5, Rc1/8 to Rc1/2	52
GFAB	Manifold M5, Rc1/8 to Rc3/8	58
3-port solenoid valve		
FAG	Single unit M5, Rc1/8 to Rc3/8	64
GFAG	Manifold M5, Rc1/8, Rc1/4	68

For water



Page P.49 on

Special purpose

FWB/FWG

Model No.	Port size	Page
2-port solenoid valve		
FWB	Single unit Rc1/8 to Rc1/2	104
GFWB	Manifold Rc1/8 to Rc3/8	110
3-port solenoid valve		
FWG	Single unit Rc1/8 to Rc3/8	116
GFWG	Manifold Rc1/8 to Rc3/8	120

For dry air

Page P.49 on

Special purpose

FGB/FGG

Model No.	Port size	Page
2-port solenoid valve		
FGB	Single unit Rc1/8 to Rc1/2	74
GFGB	Manifold Rc1/8 to Rc3/8	78
3-port solenoid valve		
FGG	Single unit Rc1/8 to Rc3/8	84
GFGG	Manifold Rc1/8, Rc1/4	88

For hot water

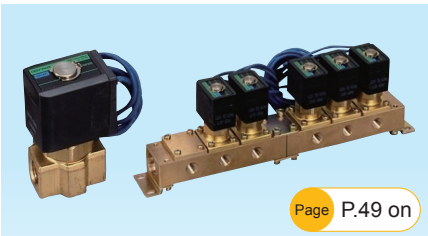
Page P.49 on

Special purpose

FHB

Model No.	Port size	Page
2-port solenoid valve		
FHB	Single unit Rc1/8 to Rc1/2	126

For medium vacuum



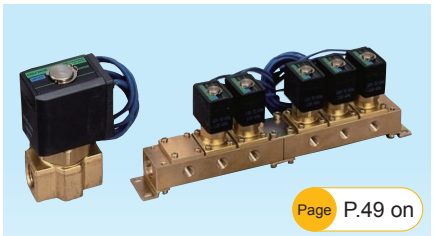
Page P.49 on

Special purpose

FVB

Model No.	Port size	Page
2-port solenoid valve		
FVB	Single unit Rc1/8 to Rc3/8	94
GFVB	Manifold Rc1/8 to Rc3/8	98

For oil



Page P.49 on

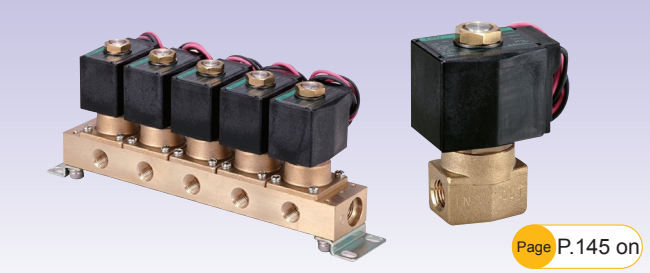
Special purpose

FLB

Model No.	Port size	Page
2-port solenoid valve		
FLB	Single unit Rc1/8 to Rc1/2	130
GFLB	Manifold Rc1/8 to Rc3/8	134

Multi-type fluid control 2, 3-port solenoid valve General purpose ▶▶▶ P.143 on

Direct acting 2-port solenoid valve
For air/low vacuum/water/kerosene/oil



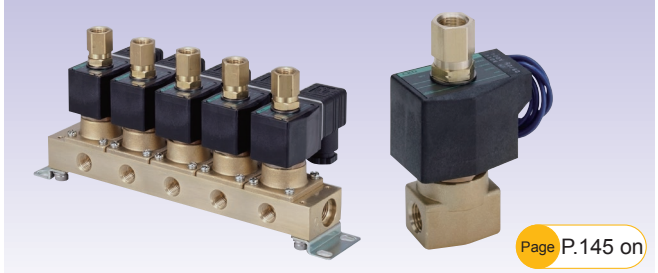
Page P.145 on

General purpose

AB

Model No.	Port size/orifice size	Actuation category	Page
Single valve			
AB21	Rc1/8, Rc1/4	NC	150
AB31/41	Rc1/8 to Rc1/2	NC	154
AB42	Rc1/4, Rc3/8	NO	154
AB71 (Large bore size)	Rc1/2 to Rc1	NC	168
Manifold			
GAB3*2/4*2	ø1.5 to ø7.0	NC	172
Manifold/actuator			
GAB422	ø1.5 to ø7.0	NO	182

Direct acting 3-port solenoid valve
For air/low vacuum/water/kerosene/oil



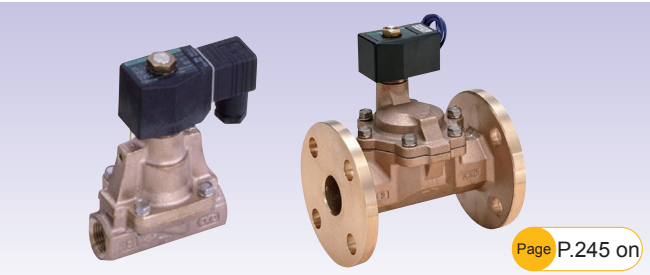
Page P.145 on

General purpose

AG

Model No.	Port size	Actuation category	Page
Single valve			
AG31/41	Rc1/8 to Rc3/8	Universal	190
AG33/43	Rc1/8 to Rc3/8	NC pressurization	208
AG34/44	Rc1/8 to Rc3/8	NO pressurization	226
Manifold			
GAG31*/35*	Rc1/8 to Rc3/8	Universal	198
GAG41*/45*			
GAG33*/43*	Rc1/8 to Rc3/8	NC pressurization	216
GAG34*/44*	Rc1/8 to Rc3/8	NO pressurization	234

Pilot operated 2-port solenoid valve
For air/water/kerosene/oil



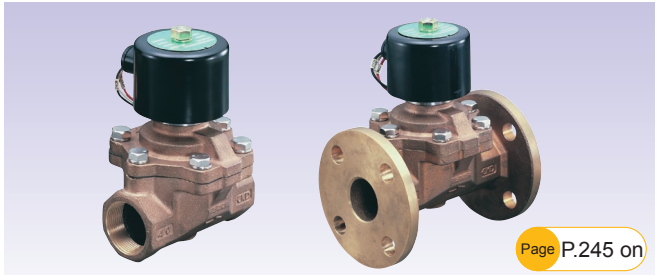
Page P.245 on

General purpose

AP/AD

Model No.	Port size	Actuation category	Page
Single valve/piston drive			
AP11/12	Rc1/4 to Rc1	NC/NO	252
AP21/22	Rc1¼ to Rc2 32 to 50 flange	NC/NO	262
Single valve/diaphragm drive			
AD11/12	Rc1/4 to Rc1	NC/NO	272
AD21/22	Rc1¼ to Rc2 32 to 50 flange	NC/NO	282

Pilot kick 2-port solenoid valve
For air/low vacuum/water/kerosene/oil



Page P.245 on

General purpose

APK/ADK

Model No.	Port size	Actuation category	Page
Single valve/piston drive			
APK11	Rc1/4 to Rc1	NC	292
APK21	Rc1¼ to Rc2 32, 40, 50 Flange	NC	300
Single valve/diaphragm drive			
ADK11/12	Rc1/4 to Rc1	NC/NO	306
ADK21	Rc1¼ to Rc2 32, 40, 50 Flange	NC	318

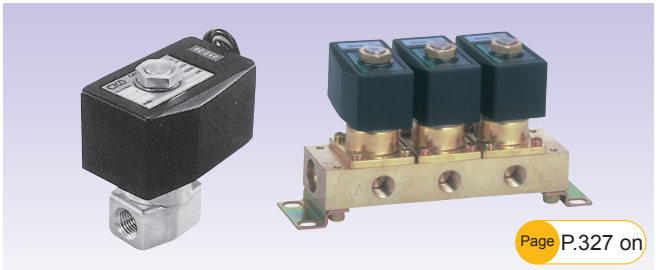
2 Searching by product series

Select from external appearance and product description of each series.

NEW indicates models added to the 9th edition.

2, 3-port solenoid valve for dry air General purpose ▶▶▶ P.327 on

Direct acting/pilot kick 2, 3-port solenoid valve
For dry air/inert gas/low vacuum



Page P.327 on

General purpose

AB*-Z/AG*-Z/ADK11-Z

Model No.	Port size	Actuation category	Page
Direct acting 2-port solenoid valve, discrete valve			
AB31/41-Z	Rc1/8 to Rc1/2	NC	332
Direct acting 2-port valve, manifold			
GAB312/412-Z		NC	338
GAB352/452-Z		NC	338
Direct acting 3-port solenoid valve, discrete valve			
AG31/41-Z	Rc1/8 to Rc3/8	Universal	342
AG33/43-Z	Rc1/8 to Rc3/8	NC pressurization	342
AG34/44-Z	Rc1/8 to Rc3/8	NO pressurization	342
Direct acting 3-port valve, manifold			
GAG31*/41*-Z		Universal	348
GAG35*/45*-Z		Universal	348
GAG33*/43*-Z		NC pressurization	352
GAG34*/44*-Z		NO pressurization	356
Pilot kick 2-port solenoid valve			
ADK11-Z	Rc1/4 to Rc1	NC	360

EX Explosion-proof multi-type fluid control 2, 3-port solenoid valve General purpose ▶▶▶ P.371 on

Explosion-proof direct acting 2, 3-port solenoid valve
For air/low vacuum/water/kerosene/oil/steam

Page P.371 on

General purpose

AB*EX4/AG*EX4/AB*EX2

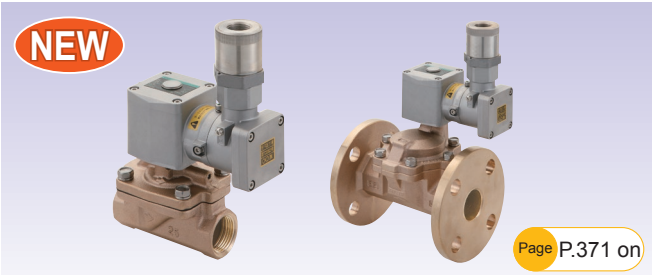
■ Pressure and explosion proof structure ExdIIBT4

Model No.	Port size	Actuation category	Page
2-port solenoid valve			
AB41/42EX4	Rc1/4, Rc3/8	NC	374
3-port solenoid valve			
AG41/43/44EX4	Rc1/4, Rc3/8	Universal/ NC pressurization/ NO pressurization	378

■ Pressure and explosion proof structure ExdIIBT2

Model No.	Port size	Actuation category	Page
2-port solenoid valve			
AB41EX2	Rc1/4, Rc3/8	NC	406

Explosion-proof pilot operated/pilot kick 2-port solenoid valve
For air/low vacuum/water/kerosene/oil/steam



Page P.371 on

General purpose

AP*EX4/AD*EX4/AP*EX2/ADK*EX4

■ Pressure and explosion proof structure ExdIIBT4

Model No.	Port size	Actuation category	Page
Piston drive			
AP11EX4	Rc1/2 to Rc1	NC	382
AP21EX4	Rc1 1/4 to Rc2 32, 40, 50 Flange	NC	386
Diaphragm drive			
AD11EX4	Rc1/2 to Rc1	NC	392
AD21EX4	Rc1 1/4 to Rc2 32, 40, 50 Flange	NC	396
ADK11EX4	Rc1/2 to Rc1	NC	402

■ Pressure and explosion proof structure ExdIIBT2

Model No.	Port size	Actuation category	Page
Piston drive			
AP11EX2	Rc1/2 to Rc1	NC	410
AP21EX2	Rc1 1/4 to Rc2 32, 40, 50 Flange	NC	414

Explosion-proof multi-type fluid control 2, 3-port solenoid valve General purpose ▶▶▶ P.421 on

Explosion-proof direct acting 2, 3-port solenoid valve
For air/low vacuum/water/kerosene/oil/steam

Page P.421 on

General purpose

AB*E4/AG*E4/AB*E2

■ Pressure and explosion proof structure d2G4

Model No.	Port size	Actuation category	Page
2-port solenoid valve			
AB41/42E4	Rc1/4, Rc3/8	NC/NO	424
AB41E4-Z	Rc1/4 / Rc3/8	NC	430
3-port solenoid valve			
AG41/43/44E4	Rc1/4, Rc3/8	Universal/ NC pressurization/ NO pressurization	434
AG4*E4-Z	Rc1/4, Rc3/8	Universal/ NC pressurization/ NO pressurization	438

■ Pressure and explosion proof structure d2G2

Model No.	Port size	Actuation category	Page
2-port solenoid valve			
AB41E2	Rc1/4, Rc3/8	NC	466

Explosion-proof pilot operated/pilot kick 2-port solenoid valve
For air/low vacuum/water/kerosene/oil/steam

Page P.421 on

General purpose

AP*E4/AD*E4/AP*E2/ADK*E4

■ Pressure and explosion proof structure d2G4

Model No.	Port size	Actuation category	Page
Piston drive			
AP11/12E4	Rc1/2 to Rc1	NC/NO	442
AP21/22E4	Rc1 1/4 to Rc2 32, 40, 50 Flange	NC/NO	446
Diaphragm drive			
AD11/12E4	Rc1/2 to Rc1	NC/NO	452
AD21/22E4	Rc1 1/4 to Rc2 32, 40, 50 Flange	NC/NO	456
ADK11/12E4	Rc1/2 to Rc1	NC/NO	462

■ Pressure and explosion proof structure d2G2

Model No.	Port size	Actuation category	Page
Piston drive			
AP11/12E2	Rc1/2 to Rc1	NC/NO	470
AP21/22E2	Rc1 1/4 to Rc2 32, 40, 50 Flange	NC/NO	474

Solenoid valve for high vacuum ▶▶▶ P.481 on

For air/vacuum/inert gas/nitrogen

Page P.481 on

HVB/HVL

Model No.	Working fluid	Page
HVB212/312/412/512	Vacuum/inert gas	484
HVB112		490
HVB612/712		492
HVL12	Air/nitrogen	496

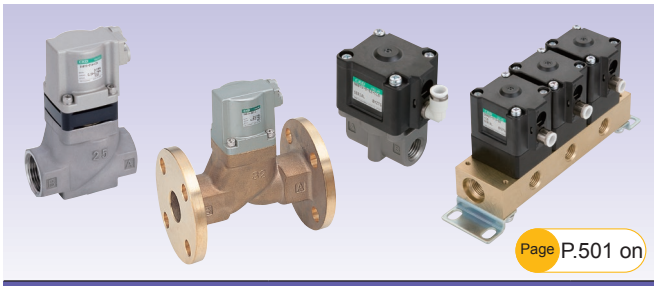
2 Searching by product series

Select from external appearance and product description of each series.

NEW indicates models added to the 9th edition.

Air operated 2-port valve (cylinder valve) ▶▶▶ P.501 on

For air/water/gas/low vacuum/steam



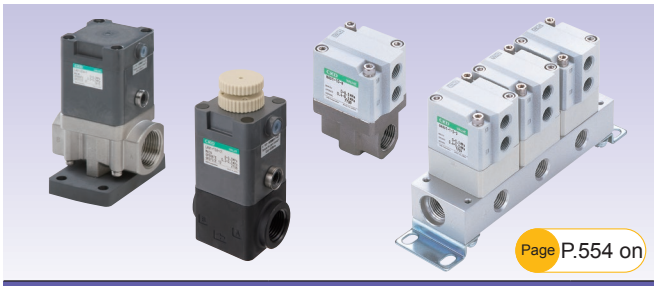
Page P.501 on

Cylinder valve

SAB/SVB/NAB

Model No.	Working fluid	Page
Air operated		
SAB*W	Water/liquid	506
SAB*A	Air/gas	510
SAB*V	Low vacuum/air/water	514
SAB*S	Steam/water/air	518
With solenoid valve		
SVB*W	Water/liquid	522
SVB*A	Air/inert gas	530
SVB*V	Low vacuum/air/water	534
SVB*S	Steam/water/air	538
Compact air operated		
NAB* (compact)	Air/gas/water	544
GNAB* (manifold)		548
NAB*V (compact)	Low vacuum/air/water	544
GNAB*V (manifold)		548

Diaphragm
For air/water/gas/low vacuum



Page P.554 on

Cylinder valve

LAD/NAD

Model No.	Working fluid	Page
Single unit		
LAD*	Pure water/water/air/N_2 gas	556
NAD*	Air/gas/water	560
NAD*V	Low vacuum	560
Manifold		
GNAD*	Air/gas/water	562
GNAD*V	Low vacuum	562

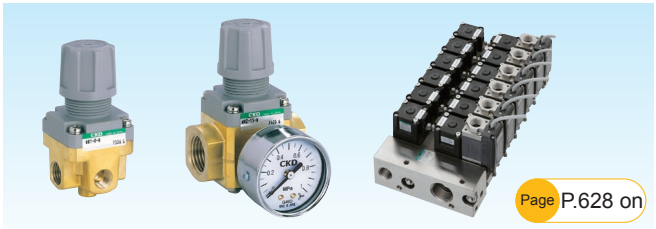
Related products for water ▶▶▶ P.575 on

Page P.595 on

Capacitance flow sensor

WFC

Model No.	Model	Page
WFC	Capacitance flow sensor	595



Page P.628 on

Regulator for water, etc.

WR* / YS/A / WXU

Model No.	Model	Page
WR1/WR2	Regulator for water	628
YS	Y shaped strainer	632
A	Cable gland	1173
WXU	Integrated unit for water control	636

Page P.577 on

Flow sensor for water FLUEREX

WFK2/WFK

Model No.	Model	Page
WFK2	Karman vortex flow rate sensor for water	577
WFK3000	Karman vortex flow rate sensor for water	611

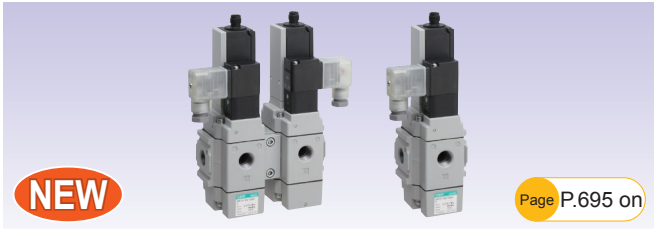
Large flow rate 3-port valve P.671 on

Page P.671 on

Pilot operated solenoid valve/external pilot operated air drive poppet valve

NP/NAP/NVP

Model No.	Working fluid	Page
Internal pilot with solenoid valve		
NP13/14	Air	674
Air operated 3-port valve air operated		
NAP11	Air/low vacuum	680
Air operated 3-port valve with solenoid valve		
NVP11	Air/low vacuum	684



NEW

Page P.695 on

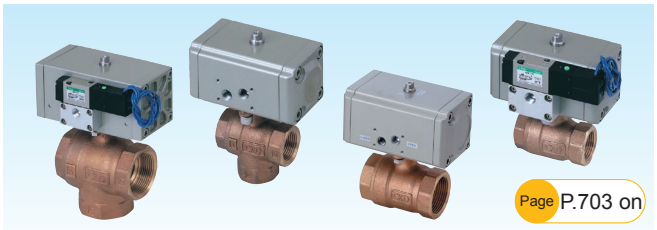
3-port solenoid valve with spool position detection

SNP

Model No.	Working fluid	Page
SNP	Compressed air	696

Air operated 2, 3-port ball valve (compact rotary valve) P.703 on

For water/air/oil/steam



Page P.703 on

Compact rotary valve

CHB/CHG

Model No.	Working fluid	Number of ports	Page
Air operated			
CHB/CHBF (double acting)	Water/air/oil	2	706
CHB-R/CHBF-R* (single acting)		2	706
CHG (double acting)		3	712
CHG-R (single acting)		3	712
With solenoid valve			
CHB-V/CHBF-V (double acting)	Water/air/oil	2	718
CHB-X/CHBF-X (single acting)		2	718
CHG-V (double acting)		3	724
CHG-X (single acting)		3	724
Air operated/oil-prohibited specifications			
CHB (double acting)	Water/air	2	706
CHB-R (single acting)		2	706
CHG (double acting)		3	712
CHG-R (single acting)		3	712
Solenoid valve built-in/oil-prohibited specifications			
CHB-V (double acting)	Water/air	2	718
CHB-X (single acting)		2	718
CHG-V (double acting)		3	724
CHG-X (single acting)		3	724
For steam			
CSB/CSBF (double acting)	Steam/water	2	732
CSB-R/CSBF-R* (single acting)		2	732

Motorized 2-, 3-port ball valve P.739 on

For water/air/oil/steam

Page P.739 on

MXB/MXG

Model No.	Working fluid	Number of ports	Page
Standard			
MXB1/MXB1F	Water/air/oil	2	742
MXG1		3	746
Standard/relay			
MXB1D/MXB1DF	Water/air/oil	2	750
MXG1D		3	754
Oil-prohibited specifications			
MXB1-N	Water/air	2	758
MXG1-N		3	762
Oil-prohibited specifications/with relay			
MXB1D-N	Water/air	2	758
MXG1D-N		3	762
For steam			
MSB1/MSB1F	Steam/water	2	766
For steam/with relay			
MSB1D/MSB1DF	Steam/water	2	770
Proportional control			
MXBC2	Water	2	774
MXGC2		3	774
Miniature			
MHB4	Water/air/oil	2	778
MHG4		3	778

Other general purpose control systems P.789 on

NEW

Page P.789 on

Solenoid valve/pinch valve

SPK/PVS/KZV3/PK*/NPV2/HPV

Model	Working fluid	Number of ports	Page
Pilot operated 2-port solenoid valve			
KZV3	Steam/water/oil	2	792
PVS	Steam/water/air	2	798
Pilot kick 2-port solenoid valve			
SPK	Steam	2	790
PKA	Air	2	800
PKW	Water	2	802
PKS	Steam	2	804
Pinch valve			
NPV2	Gas/water/sludge/powder	2	806
HPV	Water/sludge/powder	2	807

2 Searching by product series

Select from external appearance and product description of each series.

NEW indicates models added to the 9th edition.

Weir diaphragm valve ▶▶▶ P.811 on

NEW

Page P.811 on

SWD/MWD

Model	Working fluid	Page
SWD	Water/pure water/chemical liquids (liquids that do not corrode wetted part materials)	814
MWD	Water/pure water/chemical liquids (liquids that do not corrode wetted part materials)	816

Air operated 2, 3-port valve (coolant valve) ▶▶▶ P.853 on

For coolant control

Page P.853 on

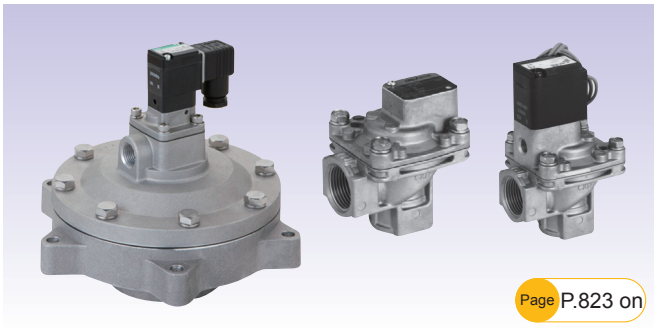
Coolant valve

CVE/CVSE

Model	Pressure	Classification	Page
For low pressure 2-port			
CVE2/CVE22-05	0.5 MPa	Air operated	856
CVE2/CVE22-10	1.0 MPa	Air operated	856
CVSE2/CVSE22-05	0.5 MPa	With solenoid valve	856
CVSE2/CVSE22-10	1.0 MPa	With solenoid valve	856
For medium pressure 2-port			
CVE2/CVE22-16	1.6 MPa	Air operated	866
CVE2/CVE22-30	3.0 MPa	Air operated	866
CVSE2/CVSE22-16	1.6 MPa	With solenoid valve	866
CVSE2/CVSE22-30	3.0 MPa	With solenoid valve	866
For high pressure 2-port			
CVE2/CVE22-70	7.0 MPa	Air operated	874
CVSE2/CVSE22-70	7.0 MPa	With solenoid valve	874
For medium-high pressure 3-port			
CVE3-35	3.5 MPa	Air operated	880
CVE3-70	7.0 MPa	Air operated	880
CVSE3-35	3.5 MPa	With solenoid valve	880
CVSE3-70	7.0 MPa	With solenoid valve	880
For low pressure 3-port			
CV3E-03	0.3 MPa	Air operated	892
CVS3E-03	0.3 MPa	With solenoid valve	892
Modular coolant valve 2-port			
GCVE2	0.5 MPa 1.0 MPa 1.6 MPa	Air operated	894
GCVSE2		With solenoid valve	894

Dust collection devices ▶▶▶ P.823 on

Large port size dust collector valve



Page P.823 on

Large port size dust collector valve

PD2/PD3

Model	Classification	Page
Air operated 2-port valve		
PD3	Pilot operated	824
PD2	Pilot operated	836
Solenoid valve built-in 2-port valve		
PDV3	Pilot operated	824
PDV2	Pilot operated	836
PJVB	Direct acting	842
PDVE4	Explosion-proof direct acting (Explosion proof structure: d2G4)	844
Controller		
OMC2	Output step No.: 6, 10	848

Peripheral components for coolant ▶▶▶ P.905 on

Check valve/sensors/pressure sensor

Page P.905 on

CCH/CPE/CPD

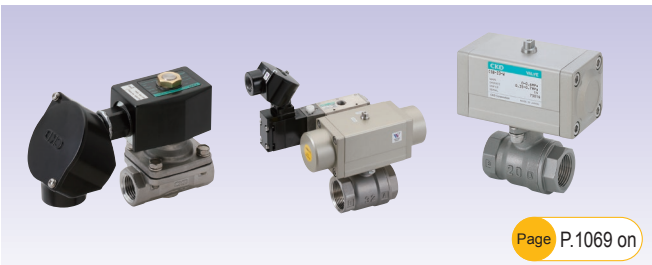
Model No.	Features	Page
CCH	Check valve	906
CPE	Mechanical pressure switch (for low pressure)	908
CPD	Electronic pressure switch (with digital display)	910

Components for Life Science ▶▶▶ P.923 on

For water/pure water/chemical liquids

Model No.	Port size	Seal/body material	Page
Metal-free 2-port solenoid valve			
MR10R	M5, M6, 1/4-28UNF	FKM/PEEK	927
MR16	M6, 1/4-28UNF	FKM/PEEK / EPDM/PEEK	932
MKB3	M6, 1/4-28UNF	FKM/PPS / EPDM/PPS	937
MAB1	M6	PTFE/PTFE	940
MYB1	M6	FKM/PPS	943
MYB2	Rc1/8	FKM/PPS	946
MYB3	Rc1/8 to Rc3/8	FKM/PPS	949
MEB2	Rc1/8	PTFE+FKM/PPS	952
MJB3	Tube connection porting I.D. x O.D. = ø4 x ø8	FKM/PPS / PSU	955
EMB21	Rc1/4	PTFE/PTFE	957
EMB41	Rc3/8	PTFE/PTFE	959
EMB51	Rc3/8, Rc1/2	PTFE/PTFE	959
HMTB1	ø2 barbed fitting	NBR/FKM/EPDM/PPS	962
Metal-free 3-port solenoid valve			
MR10R	M5, M6, 1/4-28UNF	FKM/PEEK	927
MR16	M6, 1/4-28UNF	FKM/PEEK / EPDM/PEEK	932
MAG1	M6	PTFE/PTFE	940
MYG1	M6	FKM/PPS	943
MYG2	Rc1/8	FKM/PPS	946
MYG3	Rc1/8 to Rc3/8	FKM/PPS	949
MEG2	Rc1/8	PTFE+FKM/PPS	952
HMTG1	ø2 barbed fitting	NBR/FKM/EPDM/PPS	962
High corrosion resistant 2-port solenoid valve			
UMB1	Stainless steel pipe with O.D. ø1.26 x I.D. ø0.9	FKM/SUS304 or equiv.	965
HB11	M5	NBR/SUS316	967
HB21	Rc1/8		
HB31	Rc1/8, Rc1/4		
HB41	Rc1/4, Rc3/8		
High corrosion resistant 3-port solenoid valve			
UMG1	Stainless steel pipe with O.D. ø1.26 x I.D. ø0.9	FKM/SUS304 or equiv.	965
Fine pinch valve (2-port)			
HYN	M5	For silicone tube	971

For outdoor use ▶▶▶ P.1069 on



Model No.	Model	Page
ADK11-W	Pilot kick 2-port solenoid valve	1072
CHB-W/CHB-WR*	Air operated 2-port ball valve	1076
CHG-W/CHG-WR*	Air operated 3-port ball valve	1080
CHB-WV1/CHB-WX1	Air operated 2-port ball valve	1084
CHG-WV1/CHG-WX1	Air operated 3-port ball valve	1088
CSB-W/CSB-WR*	Air operated 2-port ball valve	1092

Gas combustion systems ▶▶▶ P.977 on

Direct acting valve for gas, combination valve

Model No.	Model	Page
GHV	Gas combination valve	980
GAV		984
DSG	Solenoid valve	986
DSG-W		990
VNA		992
VLA		998
VNA-R/RH		1002
VNR		1006
TAC-25	Medium pressure gas safety shutoff control system	1008
VNM		1012
VLM		1014
C25N-B		1016
VNM-25-K	Safety shut off valve	1018
HK1	Motorized valve	2020
HS		1024
GASB	Ball valve	1028

Automatic watering control systems ▶▶▶ P.1037 on

Watering for urban greenery, golf courses, playground, protected horticulture, farmlands, etc.

Model No.	Model	Page
RSC-S5	Controller	1040
RSC-G		1042
RSC-1WP		1044
RSC-1WP-C		1046
RSC-1WP-H		1047
RSC-2WP		1048
RS-6	Rain sensor	1050
RSV-K	Solenoid valve	1052
GSV2		1056
GSV		1058
RSV-W		1062

Special fluid control valve ▶▶▶ P.1097 on

Model	Working fluid	Page
AMD**3R	Chemical liquids/water/air/N_2 gas	1098
LGD	Inert gas/process gas	1150

Recommended alternative products

Production and catalog listing of the series below have been discontinued. Select recommended alternative products instead.

Products already discontinued or to be discontinued in near future	Recommended alternative product
Pilot operated 2-port solenoid valve for compressed air FAD	**Pilot operated 2-port solenoid valve for compressed air** **EXA/ADK11**
Direct acting 2-port solenoid valve for compressed air FAPB	**Pilot operated 2-port solenoid valve for compressed air** **EXA**
Fine rotary valve FR*	**Air operated ball valve** **CHB/CHG**
Gas combustion systems GSB	**Gas combustion systems** **GASB**
Explosion-proof direct acting 3-port solenoid valve LCE	**Explosion-proof direct acting 3-port solenoid valve** **AG41E4**
Direct acting 3-port solenoid valve LV	**Direct acting 3-port solenoid valve** **AG41**
Motorized 2-port ball valve for high corrosion resistance MXB1-C	**Motorized 2-port ball valve** **MXB1 option E/W**
Motorized 2-port ball valve with high corrosion resistance relay MXB1D-C	**Motorized 2-port ball valve** **MXB1D option E/W**
Explosion-proof pilot operated 2-port solenoid valve PVSE*	**Explosion-proof pilot operated 2-port solenoid valve** **AP11E4/E2,AP21E4/E2**
Karman vortex flow rate sensor for water FLUEREX WFK5000, 6000, 7000	**Karman vortex flow rate sensor for water FLUEREX** **WFK2**
Metal-free 2, 3-port solenoid valve for chemical liquids MR10	**Metal-free 2, 3-port solenoid valve for chemical liquids** **MR10R**
Gas shut off valve MN	**Gas shut off valve** **DSG/VNA**
Automatic pinch valve APV	We apologize. No alternative product is available.
Self-reset 2-port valve MHBR	
Manual pinch valve SPV	

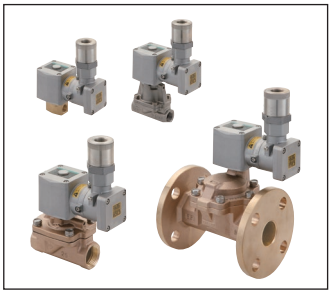
Products no longer listed
Solenoid valve for high vacuum HVB41
Miniature 2, 3-port valve MHB3/MHG3
Solenoid valve for high vacuum HVL42
Direct acting 2-port valve LLO
2-port solenoid valve M
Solenoid ball valve MHBP
Automatic watering control systems WHL11
Watering controller RSC-W-2WP

New products

The new series below are now available.

■ Explosion-proof 2, 3-port solenoid valve

EX Series



■ Capacitance electromagnetic flow sensor

WFC Series

■ 3-port solenoid valve with spool position detection

SNP Series

■ Pilot operated 2-port solenoid valve

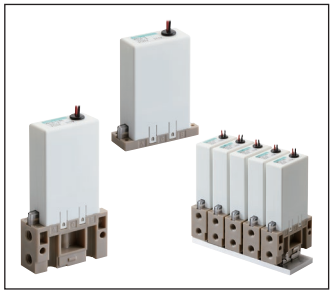
KZV3 Series

■ Weir diaphragm valve

SWD/MWD Series

■ Metal-free 2, 3-port solenoid valve

MR16 Series



■ Metal-free 2-port solenoid valve

MKB3 Series

■ Automatic watering controller

RSC-1WP-C Series

■ Air operated valve for chemical liquids

AMD part 3R Series

■ Valve for process gas

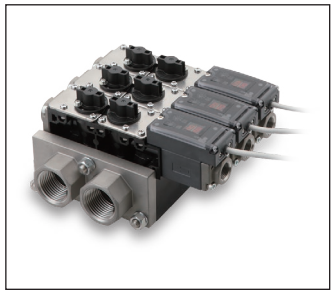
LGD Series

■ Karman vortex flow rate sensor for water FLUEREX

WFK2 Series

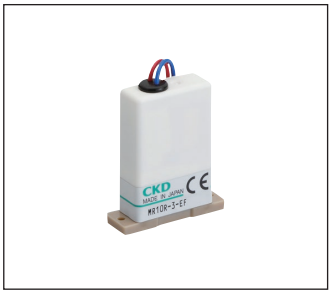
■ Integrated unit for water control

WXU Series



■ Compact metal-free 2, 3-port solenoid valve

MR10R Series



■ Resin solenoid valve for automatic watering

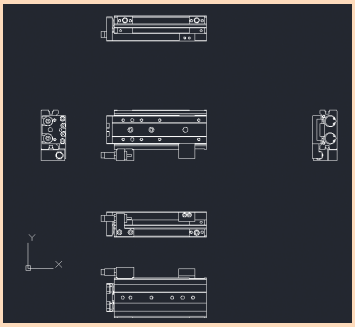
GSV2 Series

Guide to CKD's CAD data

How to use CKD's CAD data

CKD's CAD data is provided as follows for your use in CAD design.

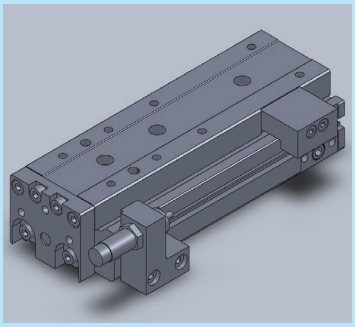
2D CAD data



Types of compatible CAD

- DXF
- Dedicated CAD types

3D CAD data



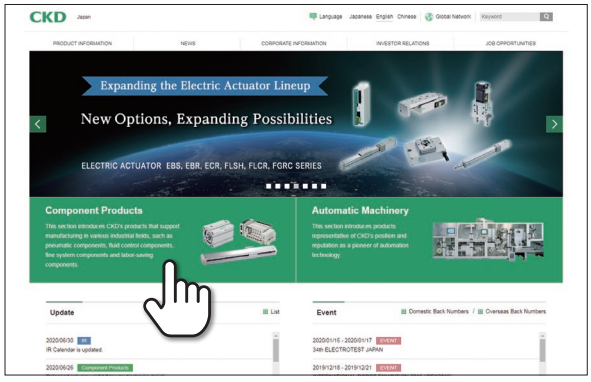
Types of compatible CAD

- DXF
- IGES
- SAT
- Parasolid
- Dedicated CAD types

Homepage

Catalog PDFs and CAD data of CKD products are available for download.

https://www.ckd.co.jp/english/



For PDF and DXF data of the general catalogs

CKD Website Component Products > Materials: Download digital catalogs/catalog PDFs

For PDF and DXF data of new products

CKD Website Component Products > Search for a product from the product list

For 2D/3D CAD data

CKD Website Component Products > Materials: Download 2D CAD data/3D CAD data

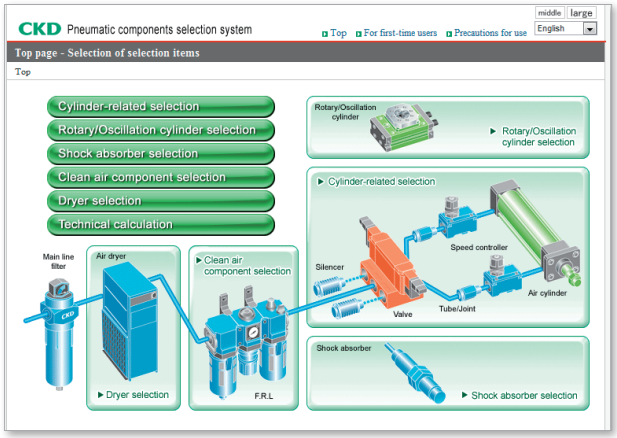
Guide to the model selection system

How to use the model selection system

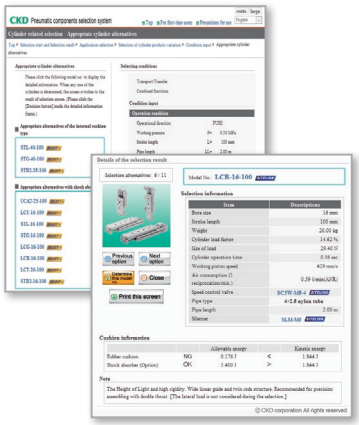
The CKD system supports selection of the following items.
For your use during model selection and design.

Available systems

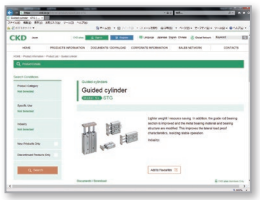
- Cylinder selection
- Rotary/oscillating cylinder selection
- Shock absorber selection
- Clean air (F.R.L.) component selection
- Dryer selection
- Technical calculations

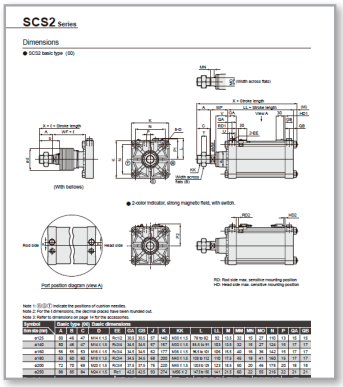


Selection results are linked with catalog PDFs and CAD data!

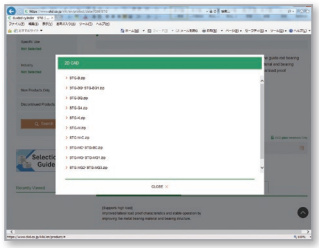


Selection results



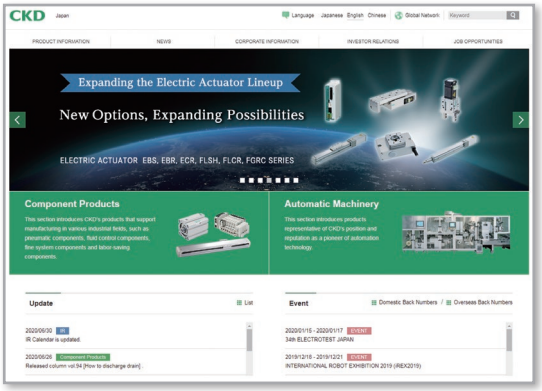


Catalog PDF



2D CAD

Registration not required - available at any time!



A variety of services such as CKD product catalogs, PDFs, CAD data, and model selection are available. Feel free to try them.

https://www.ckd.co.jp/english

3 Types and characteristics of fluid control valves

A variety of CKD fluid control valves are available to ensure selection of a product that perfectly matches the working fluid and application.

Type (●: Ideal ○: Adequate)		Space saving	Long life	Suitable for dry working fluid	Good responsivity	
Compact 2, 3-port solenoid valve	For compressed air EXA	●	●			
	For water FWD	●				
Direct acting solenoid valve	Special purpose valve FA*/FW*/FV*/FG*	●	●	● (FG*)	●	
	Direct acting general purpose valve AB/AG	○	●		●	
	General purpose valve for dry air AB*-Z/AG*-Z	○	●	●	○	
	Solenoid valve for high vacuum HVB	○		○	○	
	Components for Life Science MR10R/MR16/MKB3/MAB/MAG/MYB/MYG/MEB/MEG	○				
Pilot operated solenoid valve	Pilot operated general purpose valve AP/AD				○	
	Large port size dust collector valve PD3				○	
Pilot kick solenoid valve	Pilot kick operated general purpose valve ADK/APK				○	
EX explosion-proof solenoid valve	International standard compliant explosion-proof general purpose valve AB41EX4, AG41EX4, AP11EX4, AD11EX4					
Explosion-proof solenoid valve	Explosion-proof general purpose valve AB41E4, AG41E4, AP11E4, AD11E4					
Air operated valve	Cylinder valve SAB/SVB/NAB				○	
	Diaphragm cylinder valve LAD	○		●		
	Diaphragm cylinder valve NAD	●		●		
	Coolant valve CVE/CVSE				○	
Large flow rate 3-port valve	NP/NAP/NVP				○	
Air operated ball valve	Compact rotary valve CHB/CHG/CSB				○	
Motorized ball valve	MXB/MXG					
Pinch valve	NPV2					

Note: The ● and ○ marks in the table are guidelines only. Always check the product specifications carefully as there may be cases when use is not possible because of environment or conditions.

	Suitable for high frequency	Suitable for medium vacuum	Suitable for high vacuum	Resistant to foreign matter	Reduces water hammer noise	Suitable for large flow rate	Normal/reverse pressurization	Suitable for special working fluid	Suitable for explosion-proof atmospheres	Page
						●				4
					●					16
	○	● (FV*)								49
	○	○ (Option)								145
	○									327
		●	●			○	○			481
								●		923
						○				245
						○				778
						○				245
									●	371
									●	421
				●	○	○	○		○ (Air operated)	506
						●		●	○	556
						○		●	○	560
				●	○	○		●	○ (Air operated)	853
						●			○ (Air operated)	671
				●	○	●	● (2WAY)		○ (Air operated)	703
				○	●	●	● (2WAY)			739
				●						806

4 Searching by working fluid

Compressed air

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port valve/single unit**																		
	HNB1	NC	○																24
	USB2/3	NC	○	○															28/30
	AB21	NC		○	○														150
	AB31/41/42	NC/NO		★	★	★	★												154
	FAB	NC/NO	○	○	○	○	○												52
	AB71	NC					○	○	○										168
	2-port valve/manifold																		
	GAB3*2/4*2	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																172
	GAB422	NO	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																182
	GFAB	NC	Individual port: M5, Rc1/8, Rc1/4, common port: Rc1/8, Rc3/8																58
	PJVB	Control box manifold solenoid valve		○	○														842
	3-port valve/single unit																		
	HNG1	UNI	○																26
	USG2/3	UNI	○	○															32/34
	AG31/41	UNI		★	★	★													190
	AG33/43	NC pressurization		★	★	★													208
	AG34/44	NO pressurization		★	★	★													226
	FAG	UNI	○	○	○	○													64
	3-port valve/manifold																		
	GAG31*/35*/41*/45*	UNI	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																198
	GAG33*/43*	NC pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																216
	GAG34*/44*	NO pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																234
	GFAG	UNI	Individual port: M5, Rc1/8, Rc1/4, common port: Rc1/8, Rc1/4																68
	Pressure and explosion proof/2-port valve																		
	AB41EX4	EXdIIBT4 NC			○	○													374
	AB4*E4	d2G4 NC/NO			○	○													424
	Pressure and explosion proof/3-port valve																		
	AG4*EX4	ExdIIBT4 NC pressurization/NO pressurization/UNI			○	○													378
	AG4*E4	d2G4 NC press/NO press UNI			○	○													434

Compressed air | Water | Hot water | Dry air | Steam | Oil/kerosene | Low/medium vacuum | High vacuum | Coolant | Solvent | Inert gas | Sludge/powder/chemicals | Process gas | Chemical liquid/pure water | Gas | Controller, etc.

	Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Pilot operated solenoid valve	**2-port valve/single unit**																		
	EXA	NC	Push-in fitting ø6, ø8, ø10, ø12																6
	EXA Aluminum body	NC			○	○													14
	AP11/21	Piston drive NC			★	★	★	★	★	◑	◑	◑							252/262
	AD11/21	Diaphragm drive/NC			★	★	★	★	★	◑	◑	◑							272/282
	AP12/22	Piston drive NO			★	★	★	★	★	◑	◑	◑							252/262
	AD12/22	Diaphragm drive/NO					★	★	★	◑	◑	◑							272/282
	PD3/PDV3	Diaphragm drive						○	○		○		○	○					824
		NC for dust collector																	
	PD2/PDV2	Diaphragm drive										○							836
		NC for dust collector																	
	PVS	Piston drive NC/NO					○	○	○	●	●	●	●	●					798
	2-port valve/manifold																		
	GEXA	NC	Push-in fitting ø6, ø8, ø10, ø12																10
	3-port valve																		
	NP13/14	Piston drive NC/NO				○	○	○	○	○	○	○							674
	Pressure and explosion proof/2-port valve																		
	AP11EX4	EXdIIBT4 NC					○	○	○										382
	AP21EX4	EXdIIBT4 NC								◑	◑	◑							386
	AD11EX4	EXdIIBT4 NC					○	○	○										392
	AD21EX4	EXdIIBT4 NC								◑	◑	◑							396
	AP11E4	d2G4 NC					○	○	○										442
	AP21E4	d2G4 NC								◑	◑	◑							446
	AP12E4	d2G4 NO					○	○	○										442
	AP22E4	d2G4 NO								◑	◑	◑							446
	AD11E4	d2G4 NC					○	○	○										452
	AD21E4	d2G4 NC								◑	◑	◑							456
	AD12E4	d2G4 NO					○	○	○										452
	AD22E4	d2G4 NO								◑	◑	◑							456
	PDVE4	d2G4 NC						○	○		○	○							844
Pilot kick solenoid valve	**2-port valve**																		
	APK11	Piston drive NC			★	★	★	★	★										292
	APK21	Piston drive NC								◑	◑	◑							300
	ADK11	Diaphragm drive NC			★	★	★	★	★										306
	ADK21	Diaphragm drive NC								◑	◑	◑							318
	ADK12	Diaphragm drive NO					★	★	★										306
	PKA	Piston drive NC					○	○	○	●	●	●							800
	Pressure and explosion proof/2-port valve																		
	ADK11EX4	EXdIIBT4 NC					○	○	○										402
	ADK11E4	d2G4 NC					○	○	○										462
	ADK12E4	d2G4 NO					○	○	○										462

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column ★: Rc, G and NPT ○: Rc ●: Flange ◑: Rc and flange

4 Searching by working fluid

Compressed air

	Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Air operated ball valve	**2-port valve**																		
	CHB/CHB-R*	NC/NO/CO				○	○	○	○	○	○	○							706
	CHB-V*/X*	With solenoid valve NC/NO/CO				○	○	○	○	○	○	○							718
	3-port valve																		
	CHG/CHG-R*	NC/NO/CO					○	○	○	○	○	○							712
	CHG-V*/X*	With solenoid valve NC/NO/CO					○	○	○	○	○	○							724
Air operated valve	**2-port valve/single unit**																		
	SAB*A	Air operated valve NC/NO/CO			○	○	○	○	○	◑	◑	◑	●	●					510
	SVB*A	With solenoid valve NC/NO			○	○	○	○	○	◑	◑	◑	●	●					530
	SAB*S	Air operated valve NC/NO/CO			○	○	○	○	○	◑	◑	◑							518
	SVB*S	With solenoid valve NC/NO			○	○	○	○	○	◑	◑	◑							538
	NAB* (compact)	Air operated valve NC/NO/CO			○	○													544
	2-port valve/manifold																		
	GNAB*	NC/NO/CO	Individual port: Rc1/4, common port: Rc3/8																548
	3-port valve																		
	NAP11	Air operated valve UNI				○	○	○	○	○	○	○							680
	NVP11	With solenoid valve UNI				○	○	○	○	○	○	○							684
Air operated diaphragm valve	**2-port valve/single unit**																		
	LAD	NC/NO/CO				○	○	○	○										556
	NAD	NC/NO/CO				○													560
	2-port valve/manifold																		
	GNAD	NC/NO/CO				○													562
Motor driven ball valve	**2-port valve**																		
	MXB1					○	○	○	○	○	○	○							742
	MXB1D	With relay				○	○	○	○	○	○	○							750
	MHB4	Miniature				○	○	○											778
	3-port valve																		
	MHG4	Miniature				○	○	○											778
	MXG1						○	○	○	○	○	○							746
	MXG1D	With relay					○	○	○	○	○	○							754
Others	**2-port valve**																		
	NPV2	Direct pressure automatic pinch valve							●		●	●	●	●	●				806
	Manual 2-port valve																		
	HPV	Pinch valve							●		●	●	●	●	●				807

Compressed air Water Hot water Dry air Steam Oil/kerosene Low/medium vacuum
High vacuum Coolant Solvent Inert gas Sludge/powder/chemicals
Process gas Chemical liquid/pure water Gas Controller, etc.

Water

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port valve/single unit**																		
	UMB1	NC	Stainless steel pipe with O.D. ø1.26 x I.D. ø0.9																965
	HYN	NC/NO	Silicone tube (ø2 x ø0.5, ø3 x ø1, ø5 x ø3, ø8 x ø6)																971
	HMTB1	NC	ø2 barbed fitting																962
	HNB1	NC	○																24
	USB2/3	NC	○	○															28/30
	AB21	NC		○	○														150
	HB11/21/31/41	NC	○	○	○	○													967
	AB31/41/42	NC/NO		★	★	★	★												154
	FWB	NC/NO		○	○	○	○												104
	AB71	NC					○	○	○										168
	MAB1	NC Resin valve	M6																940
	MEB2	NC Resin valve		○															952
	MYB1/2/3	NC Resin valve	M6	○	○	○													943/946/949
	MJB3	NC	Tube connection porting I.D. x O.D. = ø4 x ø8																955
	EMB21/41/51	NC Resin valve			○	○	○	ø10 x ø8 PFA tube connection											957/959
	2-port valve/manifold																		
	GAB3*2/4*2	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																172
	GAB422	NO	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																182
	GFWB	NC	Individual port: Rc1/8, Rc1/4, common port: Rc1/4, Rc3/8																110
	3-port valve/single unit																		
	UMG1	UNI	Stainless steel pipe with O.D. ø1.26 x I.D. ø0.9																965
	HMTG1	UNI	ø2 barbed fitting																962
	HYN	UNI	Silicone tube (ø2 x ø0.5, ø3 x ø1, ø5 x ø3, ø8 x ø6)																971
	HNG1	UNI	○																26
	USG2/3	UNI	○	○															32/34
	AG31/41	UNI		★	★	★													190
	AG33/43	NC pressurization		★	★	★													208
	AG34/44	NO pressurization		★	★	★													226
	FWG	UNI		○	○	○													116
	MAG1	UNI Resin valve	M6																940
	MEG2	UNI Resin valve		○															952
	MYG1/2/3	UNI Resin valve	M6	○	○	○													943/946/949
	3-port valve/manifold																		
	GAG31*/35*/41*/45*	UNI	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																198
	GAG33*/43*	NC pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																216
	GAG34*/44*	NO pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																234
	GFWG	UNI	Individual port: Rc1/8, Rc1/4, common port: Rc1/4, Rc3/8, NO port: Rc1/8, Rc1/4																120

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column ★ : Rc, G and NPT ☆ :R ○ : Rc ● : Flange ◑: Rc and flange

4 Searching by working fluid

Water

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**Pressure and explosion proof/2-port valve**																		
	AB4*E4	d2G4 NC/NO			○	○													424
	AB41E2	d2G2 NC			○	○													466
	Pressure and explosion proof/3-port valve																		
	AG4*E4	d2G4 NC press/NO press UNI			○	○													434
Pilot operated solenoid valve	**2-port valve/single unit**																		
	FWD	NC			☆	☆	☆	☆	☆										18
	AP11/21	Piston drive NC			★	★	★	★	★	◑	◑	◑							252/262
	AD11/21	Diaphragm drive/NC			★	★	★	★	★	◑	◑	◑							272/282
	AP12/22	Piston drive NO			★	★	★	★	★	◑	◑	◑							252/262
	AD12/22	Diaphragm drive/NO					★	★	★	◑	◑	◑							272/282
	PVS	Piston drive NC/NO					○	○	○	●	●	●	●	●					798
	RSV-W	Diaphragm drive/NC/latch					○	○	○	○	○	○							1062
	RSV (for agricultural water)	Diaphragm drive/NC/latch						○	○	○	◑	◑	◑	◑	●				1052
	GSV (for agricultural water)	Diaphragm drive/NC/latch							○			○							1058
	GSV2 (for agricultural water)	Diaphragm drive/NC/latch						○	○		○	○							1056
	Pressure and explosion proof/2-port valve																		
	AP11EX4	EXdIIBT4 NC					○	○	○										382
	AP21EX4	EXdIIBT4 NC								◑	◑	◑							386
	AD11EX4	EXdIIBT4 NC					○	○	○										392
	AD21EX4	EXdIIBT4 NC								◑	◑	◑							396
	AP11E4	d2G4 NC					○	○	○										442
	AP21E4	d2G4 NC								◑	◑	◑							446
	AP12E4	d2G4 NO					○	○	○										442
	AP22E4	d2G4 NO								◑	◑	◑							446
	AD11E4	d2G4 NC					○	○	○										452
	AD21E4	d2G4 NC								◑	◑	◑							456
	AD12E4	d2G4 NO					○	○	○										452
	AD22E4	d2G4 NO								◑	◑	◑							456
Pilot kick solenoid valve	**2-port valve**																		
	APK11	Piston drive NC			★	★	★	★	★										292
	APK21	Piston drive NC								◑	◑	◑							300
	ADK11	Diaphragm drive/NC			★	★	★	★	★										306
	ADK21	Diaphragm drive/NC								◑	◑	◑							318
	ADK12	Diaphragm drive/NO					★	★	★										306
	PKW	Piston drive NC					○	○	○	●	●	●							802
	Pressure and explosion proof/2-port valve																		
	ADK11EX4	EXdIIBT4 NC					○	○	○										402
	ADK11E4	d2G4 NC					○	○	○										462
	ADK12E4	d2G4 NO					○	○	○										462

Compressed air | Water | Hot water | Dry air | Steam | Oil/kerosene | Low/medium vacuum
High vacuum | Coolant | Solvent | Inert gas | Sludge/powder/chemicals
Process gas | Chemical liquid/pure water | Gas | Controller, etc.

	Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Air operated ball valve	**2-port valve**																		
	CHB/CHB-R*	NC/NO/CO				○	○	○	○	○	○	○							706
	CHB-V*/X*	With solenoid valve NC/NO/CO				○	○	○	○	○	○	○							718
	3-port valve																		
	CHG/CHG-R*	NC/NO/CO					○	○	○	○	○	○							712
	CHG-V*/X*	With solenoid valve NC/NO/CO					○	○	○	○	○	○							724
Air operated valve	**2-port valve/single unit**																		
	SAB*W	Air operated valve NC/NO/CO			○	○	○	○	○	◑	◑	◑	●	●					506
	SVB*W	With solenoid valve NC/NO			○	○	○	○	○	◑	◑	◑	●	●					522
	SAB*S	Air operated valve NC/NO/CO			○	○	○	○	○	◑	◑	◑							518
	SVB*S	With solenoid valve NC/NO			○	○	○	○	○	◑	◑	◑							538
	NAB* (compact)	Air operated valve NC/NO/CO			○	○													544
	2-port valve/manifold																		
	GNAB*	NC/NO/CO	Individual port: Rc1/4, common port: Rc3/8																548
Air operated diaphragm valve	**2-port valve/single unit**																		
	LAD	NC/NO/CO				○	○	○	○										556
	NAD	NC/NO/CO				○													560
	2-port valve/manifold																		
	GNAD	NC/NO/CO				○													562
Motor driven ball valve	**2-port valve**																		
	MHB4	Miniature				○	○	○											778
	MXBC2	Proportional control valve				○	○	○	○										774
	MXB1	Standard				○	○	○	○	○	○	○							742
	MXB1D	With relay				○	○	○	○	○	○	○							750
	3-port valve																		
	MHG4	Miniature				○	○	○											778
	MXGC2	Proportional control valve					○	○	○										774
	MXG1	Standard					○	○	○	○	○	○							746
	MXG1D	With relay					○	○	○	○	○	○							754
Others	**2-port valve**																		
	NPV2	Direct pressure automatic pinch valve							●		●	●	●	●	●				806
	Manual 2-port valve																		
	HPV	Pinch valve							●		●	●	●	●	●				807

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column ★: Rc, G and NPT ○: Rc ●: Flange ◑: Rc and flange

4 Searching by working fluid

Hot water

	Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port valve/single unit**																		
	AB31/41/42	NC/NO		★	★	★	★												154
	FHB	NC		○	○	○	○												126
	2-port valve/manifold																		
	GAB3*2/4*2	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																172
	GAB422	NO	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																182
	3-port valve/single unit																		
	AG31/41	UNI		★	★	★													190
	AG33/43	NC pressurization		★	★	★													208
	AG34/44	NO pressurization		★	★	★													226
	3-port valve/manifold																		
	GAG31*/35*/41*/45*	UNI	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																198
	GAG33*/43*	NC pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																216
	GAG34*/44*	NO pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																234
	Pressure and explosion proof/2-port valve																		
	AB41EX2	EXdIIBT2 NC			○	○													406
	AB41E2	d2G2 NC			○	○													466
Pilot operated solenoid valve	**2-port valve**																		
	AP11/21	Piston drive NC			★	★	★	★	★	◑	◑	◑							252/262
	AD11/21	Diaphragm drive/NC			★	★	★	★	★	◑	◑	◑							272/282
	AP12/22	Piston drive NO			★	★	★	★	★	◑	◑	◑							252/262
	AD12/22	Diaphragm drive/NO					★	★	★	◑	◑	◑							272/282
	Pressure and explosion proof/2-port valve																		
	AP11EX2	EXdIIBT2 NC					○	○	○										410
	AP21EX2	EXdIIBT2 NC								◑	◑	◑							414
	AP11E2	d2G2 NC					○	○	○										470
	AP12E2	d2G2 NO					○	○	○										470
	AP21E2	d2G2 NC								◑	◑	◑							474
	AP22E2	d2G2 NO								◑	◑	◑							474
Pilot kick solenoid valve	**2-port valve**																		
	APK11	Piston drive/NC			★	★	★	★	★										292
	APK21	Piston drive/NC								◑	◑	◑							300
	ADK11	Diaphragm drive/NC					★	★	★										306
	ADK12	Diaphragm drive/NO					★	★	★										306
Air operated ball valve	**2-port valve**																		
	CHB/CHB-R*	NC/NO/CO				○	○	○	○	○	○	○							706
	CHB-V*/X*	With solenoid valve NC/NO/CO				○	○	○	○	○	○	○							718
	CSB	NC/NO/CO				○	○	○	○	○	○	○							732
	CSBF	NC/NO/CO					○	○	○	○	○								732
	3-port valve																		
	CHG/CHG-R*	NC/NO/CO					○	○	○	○	○	○							712
	CHG-V*/X*	With solenoid valve NC/NO/CO					○	○	○	○	○	○							724
Air operated Valve	**2-port valve**																		
	SAB*W	Air operated valve NC/NO/CO			○	○	○	○	○	◑	◑	◑	●	●					506
	SAB*S	Air operated valve NC/NO/CO			○	○	○	○	○	◑	◑	◑							518
	SVB*S	With solenoid valve NC/NO			○	○	○	○	○	◑	◑	◑							538

Compressed air Water **Hot water** Dry air Steam Oil/kerosene Low/medium vacuum
High vacuum Coolant Solvent Inert gas Sludge/powder/chemicals
Process gas Chemical liquid/pure water Gas Controller, etc.

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Motor driven ball valve	**2-port valve**																		
	MHB4	Miniature				○	○	○											778
	MXBC2	Proportional control valve				○	○	○	○										774
	MXB1	Standard				○	○	○	○	○	○	○							742
	MXB1D	With relay				○	○	○	○	○	○	○							750
	MSB1					○	○	○	○	○	○	○							766
	MSB1D	With relay				○	○	○	○	○	○	○							770
	3-port valve																		
	MHG4	Miniature				○	○	○											778
	MXGC2	Proportional control ball valve				○	○	○	○										774
	MXG1	Standard					○	○	○	○	○	○							746
	MXG1D	With relay					○	○	○	○	○	○							754

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column ★: Rc, G and NPT ○: Rc ●: Flange ◑: Rc and flange

4 Searching by working fluid

Dry air

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port valve/single unit**																		
	AB31/41-Z	NC		★	★	★	★												332
	FGB	NC/NO		○	○	○	○												74
	2-port valve/manifold																		
	GAB3*2/4*2-Z	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																338
	GFGB	NC	Individual port: Rc1/8, Rc1/4, common port: Rc1/8, Rc3/8																78
	3-port valve/single unit																		
	AG3*/4*-Z	NC pressurization/NO pressurization UNI		★	★	★													342
	FGG	UNI/NC pressurization		○	○	○													84
	3-port valve/manifold																		
	GFGG	UNI	Individual port: Rc1/8, Rc1/4, common port: Rc1/8, Rc1/4																88
	Pressure and explosion proof/2-port valve																		
	AB41E4-Z	d2G4 NC			○	○													430
	Pressure and explosion proof/3-port valve																		
	AG4*E4-Z	d2G4 NC press/NO press UNI			○	○													438
Air operated diaphragm valve	**2-port valve/single unit**																		
	LAD	NC/NO/CO				○	○	○	○										556
	NAD	NC/NO/CO				○													560
	2-port valve/manifold																		
	GNAD	NC/NO/CO				○													562
Others	**Pilot kick 2-port solenoid valve**																		
	ADK11-Z	Diaphragm drive/NC			★	★	★	★	★										360

Steam

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port valve/single unit**																		
	AB31/41/42	NC/NO		★	★	★													154
	2-port valve/manifold																		
	GAB3*2/4*2	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																172
	GAB422	NO	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																182
	3-port valve/single unit																		
	AG31/41	UNI		★	★	★													190
	AG33/43	NC pressurization		★	★	★													208
	AG34/44	NO pressurization		★	★	★													226
	3-port valve/manifold																		
	GAG31*/35*/41*/45*	UNI	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																198
	GAG33*/43*	NC pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																216
	GAG34*/44*	NO pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																234
	Pressure and explosion proof/2-port valve																		
	AB41EX2	EXdIIBT2 NC			○	○													406
	AB41E2	d2G2 NC			○	○													466
Pilot operated solenoid valve	**2-port valve**																		
	AP11/21	Piston drive/NC			★	★	★	★	★	◑	◑	◑							252/262
	AP12/22	Piston drive/NO			★	★	★	★	★	◑	◑	◑							252/262
	PVS	Piston drive/NC/NO					○	○	○	●	●	●	●	●					798
	Pressure and explosion proof/2-port valve																		
	AP11EX2	EXdIIBT2 NC					○	○	○										410
	AP21EX2	EXdIIBT2 NC								◑	◑	◑							414
	AP11E2	d2G2 NC					○	○	○										470
	AP12E2	d2G2 NO					○	○	○										470
	AP21E2	d2G2 NC								◑	◑	◑							474
	AP22E2	d2G2 NO								◑	◑	◑							474
Others	**Pilot kick 2-port solenoid valve**																		
	APK11	Piston drive/NC			★	★	★	★	★										292
	APK21	Piston drive/NC								◑	◑	◑							300
	SPK	NC					○	○	○										790
	PKS	Piston drive/NC					○	○	○	●	●	●							804
	KZV3	100/200 VAC compatible NC					○	○	○	○	○	○							792
	External pilot operated valve/2-port valve																		
	SAB*S	Air operated valve NC/NO/CO			○	○	○	○	○	◑	◑	◑							518
	SVB*S	With solenoid valve NC/NO			○	○	○	○	○	◑	◑	◑							538
	Motorized ball valve																		
	MSB1	Standard				○	○	○	○	○	○	○							766
	MSB1D	With relay				○	○	○	○	○	○	○							770
	Air operated ball valve																		
	CSB	NC/NO/CO				○	○	○	○	○	○	○							732
	CSBF	NC/NO/CO					○	○	○	○	○								732

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting

* Port size column ★ : Rc, G and NPT ○ : Rc ● : Flange ◑: Rc and flange

4 Searching by working fluid

Oil/kerosene

⚠ Check that working fluid viscosity is within the product's specified range when making a selection.

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port valve/single unit**																		
	USB2/3	NC	○	○															28/30
	AB21	NC		○	○														150
	AB31/41/42	NC/NO		★	★	★	★												154
	FLB	NC		○	○	○	○												130
	AB71	NC					○	○	○										168
	2-port valve/manifold																		
	GAB3*2/4*2	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																172
	GAB422	NO	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																182
	GFLB	NC	Individual port: Rc1/8, Rc1/4, common port: Rc1/4, Rc3/8																134
	3-port valve/single unit																		
	USG2/3	UNI	○	○															32/34
	AG31/41	UNI		★	★	★													190
	AG33/43	NC pressurization		★	★	★													208
	AG34/44	NO pressurization		★	★	★													226
	3-port valve/manifold																		
	GAG31*/35*/41*/45*	UNI	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																198
	GAG33*/43*	NC pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																216
	GAG34*/44*	NO pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																234
	Pressure and explosion proof/2-port valve																		
	AB41EX4	EXdIIBT4 NC			○	○													374
	AB4*E4	d2G4 NC/NO			○	○													424
	Pressure and explosion proof/3-port valve																		
	AG4*EX4	ExdIIBT4 NC pressurization/NO pressurization/UNI			○	○													378
	AG4*E4	d2G4 NC pressurization/ NO pressurization UNI			○	○													434
Pilot operated solenoid valve	**2-port valve**																		
	AP11/21	Piston drive NC			★	★	★	★	★	◑	◑	◑							252/262
	AD11/21	Diaphragm drive/NC			★	★	★	★	★	◑	◑	◑							272/282
	AP12/22	Piston drive NO			★	★	★	★	★	◑	◑	◑							252/262
	AD12/22	Diaphragm drive/NO					★	★	★	◑	◑	◑							272/282
	Pressure and explosion proof/2-port valve																		
	AP11EX4	EXdIIBT4 NC					○	○	○										382
	AP21EX4	EXdIIBT4 NC								◑	◑	◑							386
	AD11EX4	EXdIIBT4 NC					○	○	○										392
	AD21EX4	EXdIIBT4 NC								◑	◑	◑							396
	AP11E4	d2G4 NC					○	○	○	◑	◑	◑							442
	AP21E4	d2G4 NC								◑	◑	◑							446
	AP12E4	d2G4 NO					○	○	○	◑	◑	◑							442
	AP22E4	d2G4 NO								◑	◑	◑							446
	AD11E4	d2G4 NC					○	○	○	◑	◑	◑							452
	AD21E4	d2G4 NC								◑	◑	◑							456
	AD12E4	d2G4 NO					○	○	○	◑	◑	◑							452
	AD22E4	d2G4 NO								◑	◑	◑							456

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Pilot kick solenoid valve	**2-port valve**																		
	APK11	Piston drive NC			★	★	★	★	★										292
	APK21	Piston drive NC								◑	◑	◑							300
	ADK11	Diaphragm drive/NC			★	★	★	★	★										306
	ADK21	Diaphragm drive/NC								◑	◑	◑							318
	ADK12	Diaphragm drive/NO					★	★	★										306
	Pressure and explosion proof/2-port valve																		
	ADK11EX4	EXdIIBT4 NC					○	○	○										402
	ADK11E4	d2G4 NC					○	○	○										462
	ADK12E4	d2G4 NO					○	○	○										462
Air operated ball valve	**2-port valve**																		
	CHB/CHB-R*	NC/NO/CO				○	○	○	○	○	○	○							706
	CHB-V*/X*	With solenoid valve NC/NO/CO				○	○	○	○	○	○	○							718
	3-port valve																		
	CHG/CHG-R*	NC/NO/CO					○	○	○	○	○	○							712
	CHG-V*/X*	With solenoid valve NC/NO/CO					○	○	○	○	○	○							724
Motor driven ball valve	**2-port valve**																		
	MHB4	Miniature				○	○	○											778
	MXB1	Standard				○	○	○	○	○	○	○							742
	MXB1D	With relay				○	○	○	○	○	○	○							750
	3-port valve																		
	MHG4	Miniature				○	○	○											778
	MXG1	Standard					○	○	○	○	○	○							746
	MXG1D	With relay					○	○	○	○	○	○							754

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column ★ : Rc, G and NPT ○ : Rc ● : Flange ◑: Rc and flange

4 Searching by working fluid

Low/medium vacuum

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port valve/single unit**																		
	USB2/3	NC	○	○															28/30
	AB31/41/42	NC/NO		★	★	★	★												154
	FGB	NC		○	○	○	○												74
	FVB	NC		○	○	○													94
	2-port valve/manifold																		
	GAB3*2/4*2	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																172
	GAB422	NO	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																182
	GFGB	NC	Individual port: Rc1/8, Rc1/4, common port: Rc1/8, Rc3/8																78
	GFVB	NC	Individual port: Rc1/8, Rc1/4, common port: Rc1/8, Rc1/4																98
	3-port valve/single unit																		
	USG2/3	UNI	○	○															32/34
	AG31/41	UNI		★	★	★													190
	AG33/43	NC pressurization		★	★	★													208
	AG34/44	NO pressurization		★	★	★													226
	FGG	UNI/NC pressurization		○	○	○													84
	3-port valve/manifold																		
	GAG31*/35*/41*/45*	UNI	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																198
	GAG33*/43*	NC pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																216
	GAG34*/44*	NO pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																234
	Pressure and explosion proof/2-port valve																		
	AB41EX4	EXdIIBT4 NC			○	○													374
	AB4*E4	d2G4 NC/NO			○	○													424
	Pressure and explosion proof/3-port valve																		
	AG4*EX4	ExdIIBT4 NC pressurization/NO pressurization/UNI			○	○													378
	AG4*E4	d2G4 NC press/NO press UNI			○	○													434
Pilot kick solenoid valve	**2-port valve**																		
	APK11	Piston drive NC			★	★	★	★	★										292
	APK21	Piston drive NC								◑	◑	◑							300
	ADK11	Diaphragm drive/NC			★	★	★	★	★										306
	ADK21	Diaphragm drive/NC								◑	◑	◑							318
	ADK12	Diaphragm drive/NO					★	★	★										306
	PKA	Piston drive NC					○	○	○	●	●	●							800
	Pressure and explosion proof/2-port valve																		
	ADK11E4	d2G4 NC					○	○	○										462
	ADK12E4	d2G4 NO					○	○	○										462

Compressed air Water Hot water Dry air Steam Oil/kerosene Low/medium vacuum
High vacuum Coolant Solvent Inert gas Sludge/powder/chemicals
Process gas Chemical liquid/pure water Gas Controller, etc.

	Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Air operated valve	**2-port valve/single unit**																		
	SAB*V	Air operated valve/NC/NO/CO			○	○	○	○	○	◑	◑	◑							514
	SVB*V	With solenoid valve/NC/NO			○	○	○	○	○	◑	◑	◑							534
	NAB*V (compact)	Air operated valve/NC/NO/CO			○	○													544
	2-port valve/manifold																		
	GNAB*V	NC/NO/CO	Individual port: Rc1/4, common port: Rc3/8																548
	3-port valve/single unit																		
	NAP11	Air operated valve/UNI				○	○	○	○	○	○	○							680
	NVP11	With solenoid valve/UNI				○	○	○	○	○	○	○							684
Air operated diaphragm valve	**2-port valve/single unit**																		
	NAD*V	NC/NO/CO				○													560
	2-port valve/manifold																		
	GNAD*V	NC/NO/CO				○													562

High vacuum

Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
		—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
		M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve/2-port valve																		
HVB212/312/412/512	NC		☆	☆	☆													484
HVB112	NC		▲															490
HVB612/712	NC				ø48 ●	ø52 ●												492
External pilot operated valve/2-port valve																		
AVB	Air operated valve							NW		NW	NW		NW					Ending Page 3

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column: ★: Rc, G and NPT ○: Rc ●: Flange ◑: Rc and flange ▲: NPT NW: Clamp fitting for vacuum
☆: NPT and JXR male and double barbed fitting

4 Searching by working fluid

Coolant

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Air operated valve	**Air operated/2-port valve**																		
	CVE2-***-05	NC/NO 0.5 MPa				○	○	○	○	◑	◑	◑	●	●					856
	CVE2-***-10	NC/NO 1.0 MPa				○	○	○	○	◑	◑	◑	●	●					856
	CVE2-***-16	NC/NO 1.6 MPa				○	○	○	○										866
	CVE2-***-30	NC/NO 3.0 MPa				○	○	○	○										866
	CVE2-***-70	NC/NO 7.0 MPa				○	○	○	○										874
	Air operated (with solenoid valve)/2-port valve																		
	CVSE2-***-05	NC/NO 0.5 MPa				○	○	○	○	◑	◑	◑	●	●					856
	CVSE2-***-10	NC/NO 1.0 MPa				○	○	○	○	◑	◑	◑	●	●					856
	CVSE2-***-16	NC/NO 1.6 MPa				○	○	○	○										866
	CVSE2-***-30	NC/NO 3.0 MPa				○	○	○	○										866
	CVSE2-***-70	NC/NO 7.0 MPa				○	○	○	○										874
	Air operated/3-port valve																		
	CVE3-***-35	3.5 MPa				○	○	○	○	○	○	○							880
	CVE3-***-70	7.0 MPa				○	○	○	○										880
	Air operated (with solenoid valve)/3-port valve																		
	CVSE3-***-35	3.5 MPa				○	○	○	○	○	○	○							880
	CVSE3-***-70	7.0 MPa				○	○	○	○										880

Solvent-based

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port solenoid valve/single unit**																		
	AB21	NC		○	○														150
	AB31/41/42	NC/NO		★	★	★	★												154
	2-port solenoid valve/manifold																		
	GAB3*2/4*2	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																172
	GAB422	NO	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																182
	3-port solenoid valve/single unit																		
	AG31/41	UNI		★	★	★													190
	AG33/43	NC pressurization		★	★	★													208
	3-port solenoid valve/manifold																		
	GAG31*/35*/41*/45*	UNI	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																198
	GAG33*/43*	NC pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																216
	Pressure and explosion proof/2-port valve																		
	AB4*E4	d2G4 NC/NO			○	○													424
	AB41E2	d2G2 NC			○	○													466
	Pressure and explosion proof/3-port valve																		
	AG4*E4	d2G4 NC press/NO press UNI			○	○													434

	Series name	Overview	Port size (upper: nominal, lower: bore size)															Description Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Pilot operated solenoid valve	**2-port valve**																		
	AP11/21	Piston drive NC			★	★	★	★	★	◑	◑	◑							252/262
	AD11/21	Diaphragm drive/NC			★	★	★	★	★	◑	◑	◑							272/282
	AP12/22	Piston drive NO			★	★	★	★	★	◑	◑	◑							252/262
	AD12/22	Diaphragm drive/NO					★	★	★	◑	◑	◑							272/282
	Pressure and explosion proof/2-port valve																		
	AP11E4/AP11E2	d2G4, d2G2 NC					○	○	○	◑	◑	◑							442/470
	AP21E4/AP21E2	d2G4, d2G2 NC								◑	◑	◑							446/474
	AP12E4/AP12E2	d2G4, d2G2 NO					○	○	○	◑	◑	◑							442/470
	AP22E4/AP22E2	d2G4, d2G2 NO								◑	◑	◑							446/474
	AD11E4	d2G4 NC					○	○	○	◑	◑	◑							452
	AD21E4	d2G4 NC								◑	◑	◑							456
	AD12E4	d2G4 NO					○	○	○	◑	◑	◑							452
	AD22E4	d2G4 NO								◑	◑	◑							456
Pilot kick solenoid valve	**2-port valve**																		
	APK11	Piston drive NC			★	★	★	★	★										292
	APK21	Piston drive NC								◑	◑	◑							300
	ADK11	Diaphragm drive/NC			★	★	★	★	★										306
	ADK21	Diaphragm drive/NC								◑	◑	◑							318
	ADK12	Diaphragm drive/NO					★	★	★										306
	Pressure and explosion proof/2-port valve																		
	ADK11E4	d2G4 NC					○	○	○										462
	ADK12E4	d2G4 NO					○	○	○										462
	External pilot operated valve/2-port valve																		
	SAB*S	Air operated valve/NC/NO/CO			○	○	○	○	○	◑	◑	◑							518
Others	**Air operated diaphragm cylinder valve**																		
	LAD	NC/NO/CO				○	○	○	○										556
	NAD	NC/NO/CO				○													560

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column ★ : Rc, G and NPT ○ : Rc ● : Flange ◑: Rc and flange

4 Searching by working fluid

Inert gas

	Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Solenoid valve	**Direct acting 2-port valve/single unit**																		
	AB31/41-Z	NC		★	★	★	★												332
	FGB	NC		○	○	○	○												74
	HVL12	N2/OFF delay solenoid valve		○	Fitting	NW	NW												496
	Direct acting 2-port valve/manifold																		
	GAB3*2/4*2-Z	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																338
	GFGB	NC	Individual port: Rc1/8, Rc1/4, common port: Rc1/8, Rc3/8																78
	Direct acting 3-port valve/single unit																		
	AG3*/4*-Z	NC press/NO press/UNI		★	★	★													342
	FGG	UNI/NC pressurization		○	○	○													84
	Direct acting 3-port valve/manifold																		
	GFGG	UNI	Individual port: Rc1/8, Rc1/4, common port: Rc1/8, Rc1/4																88
	Direct acting pressure and explosion proof/2-port valve																		
	AB41E4-Z	d2G4 NC			○	○													430
	Direct acting pressure and explosion proof/3-port valve																		
	AG4*E4-Z	d2G4 NC press/NO press UNI			○	○													438
	Pilot kick/2-port valve																		
	ADK11-Z	Diaphragm drive/NC			★	★	★	★	★										360
Air operated valve	**2-port valve/single unit**																		
	SAB*A	Air operated valve/NC/NO/CO			○	○	○	○	○				●	●					510
	SVB*A	With solenoid valve/NC/NO			○	○	○	○	○				●	●					530
	NAB* (compact)	Air operated valve/NC/NO/CO			○	○													544
	NPV2	Direct pressure automatic pinch valve							●		●	●	●	●	●				806
	AMDZ*/0*	Gas contact fluororesin		○						Fittings with O.D. ø3, ø6, 1/8" and 1/4"									Ending Page 2
	AMD0*2	Gas contact fluororesin		○	Fittings with O.D. ø6, ø6.35 and 1/4"														Ending Page 2
	AMDZ*3R	Gas contact fluororesin	Fittings with O.D. ø6, 1/8" and 1/4"																1098
	AMD0*3R	Gas contact fluororesin	Fittings with O.D. ø6, ø8, ø10, 1/4" and 3/8"																1100
	AMD3*3R	Gas contact fluororesin	Fittings with O.D. ø10, ø12, 3/8" and 1/2"																1104
	AMD4*3R	Gas contact fluororesin	Fittings with O.D. 3/4"																1108
	AMD5*3R	Gas contact fluororesin	Fittings with O.D. ø25 and 1"																1112
	2-port valve/manifold																		
	GNAB*	Manifold NC/NO/CO	Individual port: Rc1/4, common port: Rc3/8																548
	3-port valve																		
	AMGZ0/00	Gas contact fluororesin	Fittings with O.D. ø3, ø6, 1/8" and 1/4"																Ending Page 2
	AMGZ03R	Gas contact fluororesin	Fittings with O.D. ø6 and 1/4"																1116
	AMG003R	Gas contact fluororesin	Fittings with O.D. ø6, ø8, ø10, 1/4" and 3/8"																1118
	AMG*03R	Gas contact fluororesin	Fittings with O.D. ø10, ø12, ø25, 3/8", 1/2", 3/4" and 1"																1122
	Manual valve/2-port valve																		
	HPV	Pinch valve							●		●	●	●	●	●				807
	MMD303RN	Gas contact fluororesin	Fittings with O.D. ø10, ø12, 3/8" and 1/2"																Ending Page 2
	MMD403RN	Gas contact fluororesin	Fittings with O.D. 3/4"																Ending Page 2
	MMD503RN	Gas contact fluororesin	Fittings with O.D. ø25 and 1"																Ending Page 2
	Regulator																		
	PYM10	Nitrogen/stainless steel body		○	○														Ending Page 2
Others	**Air operated diaphragm cylinder valve**																		
	LAD	NC/NO/CO				○	○	○	○										556
	NAD	NC/NO/CO				○													560

Compressed air Water Hot water Dry air Steam Oil/kerosene Low/medium vacuum
High vacuum Coolant Solvent Inert gas Sludge/powder/chemicals
Process gas Chemical liquid/pure water Gas Controller, etc.

Sludge/powder/chemicals

Series name	Overview	Port size (upper: nominal, lower: bore size)															Page
		—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
		M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
External pilot operated valve 2-port valve																		
NPV2	Direct pressure automatic pinch valve							●		●	●	●	●	●				806
Manual valve 2-port valve																		
HPV	Pinch valve							●		●	●	●	●	●				807

Process gas

Series name	Overview	Port size	Description Page
External pilot operated valve 2-port valve			
AGD0*R	Air operated valve/NC/NO	1/4" JXR male fitting/female fitting	Ending Page 3
AGD**R	Air operated valve/NC/NO	1/4" JXR male fitting/female fitting, 1/4" double barbed fitting, 3/8" JXR male fitting/female fitting, 3/8" double barbed fitting	Ending Page 3
LGD**	Air operated valve/NC/NO	1/4" JXR male fitting equivalent/female fitting equivalent, 1/4" double barbed fitting, 1/2" JXR male fitting equivalent/female fitting equivalent (3/8" compatibility), 3/8" double barbed fitting, 1/2" double barbed fitting	1150
Manual valve			
OGD*0R	90° rotation snap action type	1/4" JXR male fitting/female fitting, 1/4" double barbed fitting, 3/8" JXR male fitting/female fitting, 3/8" double barbed fitting	Ending Page 3
MGD*0R	270° rotation	1/4" JXR male fitting/female fitting, 1/4" double barbed fitting, 3/8" JXR male fitting/female fitting, 3/8" double barbed fitting	Ending Page 3
LGD*0	180° rotation	1/4" JXR male fitting equivalent/female fitting equivalent, 1/4" double barbed fitting, 1/2" JXR male fitting equivalent/female fitting equivalent (3/8" compatibility), 3/8" double barbed fitting, 1/2" double barbed fitting	1153

* Overview column: NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column: ★ : Rc, G and NPT ○ : Rc ● : Flange ◑: Rc and flange NW: Clamp fitting for vacuum

4 Searching by working fluid

Chemical liquid/pure water

	Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
			—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
			M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Direct acting solenoid valve	**2-port valve**																		
	USB resin body	NC	M6, barbed fitting (compatible tube size ø6 x ø4)																36
	UMB1	NC	Stainless steel pipe with O.D. ø1.26 x I.D. ø0.9																965
	HB11/21/31/41	NC	○	○	○	○													967
	HMTB1	NC	ø2 barbed fitting																962
	MR10R	NC/NO	M5, M6, 1/4-28UNF																927
	MAB1	NC	M6																940
	MEB2	NC		○															952
	MYB1/2/3	NC	M6	○	○	○													943/946/949
	EMB21	NC			○														957
	EMB41/51	NC				○	○	ø10 x ø8 PFA tube connection											959
	3-port valve																		
	USG resin body	UNI	M6, barbed fitting (compatible tube size ø6 x ø4)																36
	UMG1	UNI	Stainless steel pipe with O.D. ø1.26 x I.D. ø0.9																965
	HMTG1	UNI	ø2 Barbed fitting																962
	MR10R	UNI	M5, M6, 1/4-28UNF																927
	MAG1	UNI	M6																940
	MEG2	UNI		○															952
	MYG1/2/3	UNI	M6	○	○	○													943/946/949
	HYN	NC pressurization/NO pressurization UNI	Silicone tube (ø2 x ø0.5 / ø3 x ø1 / ø5 x ø3 / ø8 x ø6)																971
Air operated diaphragm valve	**2-port valve/single unit**																		
	LAD	NC/NO/CO				○	○	○	○										556
	NAD	NC/NO/CO				○													560
	2-port valve/manifold																		
	GNAD	NC/NO/CO				○													562
Air operated diaphragm valve	**2-port valve**																		
	AMDZ*/0*	Air operated valve/NC/NO/CO		○						Fittings with O.D. ø3, ø6, 1/8" and 1/4"									Ending Page 2
	AMSZ2/AMS022	Drip prevention valve		○	Fittings with O.D. ø3, ø6, 1/8" and 1/4"														Ending Page 2
	AMDSZ0/AMDS00	Air operated valve/ drip prevention valve integrated	Fittings with O.D. ø3, ø6, 1/8" and 1/4"																Ending Page 2 Ending Page 2
	AMDZ*3R	Wetted part fluororesin	Fittings with O.D. ø6, 1/8" and 1/4"																1098
	AMD0*3R	Wetted part fluororesin	Fittings with O.D. ø6, ø8, ø10, 1/4" and 3/8"																1100
	AMD3*3R	Wetted part fluororesin	Fittings with O.D. ø10, ø12, 3/8" and 1/2"																1104
	AMD4*3R	Wetted part fluororesin	Fittings with O.D. 3/4"																1108
	AMD5*3R	Wetted part fluororesin	Fittings with O.D. ø25 and 1"																1112
	3-port valve																		
	AMGZ0/00	Wetted part fluororesin	Fittings with O.D. ø3, ø6, 1/8" and 1/4"																Ending Page 2
	AMGZ03R	Wetted part fluororesin	Fittings with O.D. ø6 and 1/4"																1116
	AMG003R	Wetted part fluororesin	Fittings with O.D. ø6, ø8, ø10, 1/4" and 3/8"																1118
	AMG*03R	Wetted part fluororesin	Fittings with O.D. ø10, ø12, ø25, 3/8", 1/2", 3/4" and 1"																1122
Manual valve	**2-port valve**																		
	MMD303RN	Wetted part fluororesin	Fittings with O.D. ø10, ø12, 3/8" and 1/2"																Ending Page 2
	MMD403RN	Wetted part fluororesin	Fittings with O.D. 3/4"																Ending Page 2
	MMD503RN	Wetted part fluororesin	Fittings with O.D. ø25 and 1"																Ending Page 2
Others	**Regulator**																		
	PYM10	Stainless steel body		○	○														Ending Page 2
	PMP*02	Wetted part fluororesin	Fittings with O.D. ø6, ø10, 1/4", 3/8", 1/2", 3/4" and 1"																Ending Page 2
	Level switch																		
	KML50/60/703	Various fluids surface level switch																	Ending Page 2

Compressed air Water Hot water Dry air Steam Oil/kerosene Low/medium vacuum
High vacuum Coolant Solvent Inert gas Sludge/powder/chemicals
Process gas Chemical liquid/pure water Gas Controller, etc.

Combustion gas

Series name	Overview	Port size (upper: nominal, lower: bore size)																Page
		—	6A	8A	10A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	
		M5	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
2-port valve/single unit																		
AB31/41/42	NC/NO		★	★	★	★												154
2-port valve/manifold																		
GAB3*2/4*2	NC	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																172
GAB422	NO	Individual port: Rc1/4, common port: Rc3/8 (G/NPT available)																182
3-port valve/single unit																		
AG31/41	UNI		★	★	★													190
AG33/43	NC pressurization		★	★	★													208
AG34/44	NO pressurization		★	★	★													226
3-port valve/manifold																		
GAG31*/35*/41*/45*	UNI	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																198
GAG33*/43*	NC pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																216
GAG34*/44*	NO pressurization	Individual port: Rc1/4, common port: Rc3/8, NO port: Rc1/8, Rc1/4, Rc3/8 (G/NPT available)																234
Gas combination valve																		
GHV	Low pressure/intermediate pressure							◎	◎	◎	◎							980
GAV	Low pressure						◎	◎	◎	◎								984
Solenoid valve																		
DSG	Low pressure					◎	◎	◎										986
DSG-W	Low pressure						◎	◎										990
VNA	Low pressure/intermediate pressure					◎	◎	◎	◎	◎	◎	◎						992
VLA	Low pressure/intermediate pressure					◎	◎	◎	◎	◎	◎	◎						998
VNA-R/RH	Low press/interm press/med press						◎	◎	◎	◎								1002
VNR	Low pressure/intermediate pressure					◎	◎	◎	◎	◎								1006
Medium pressure gas safety shutoff control system																		
TAC-25	Medium pressure							IN side ●		OUT side ●								1008
VNM	Low press/interm press/med press							●										1012
VLM	Low press/interm press/med press							●										1014
C25N-B	Medium pressure							IN side ●		OUT side ●								1016
Safety shut off valve																		
VNM-25-K	Low press/interm press/med press							●										1018
Motorized valve																		
HK1	Low press/interm press/med press									◉	◉	◉	●	▲	▲	▲	▲	1020
HS	Low press/interm press/med press										●		●					1024
Ball valve																		
GASB	Low press/interm press/med press										●		●	●				1028

* Port size column: ◎ : RP ● : JIS flange ▲ : DIN flange ◉ : RP and JIS flange

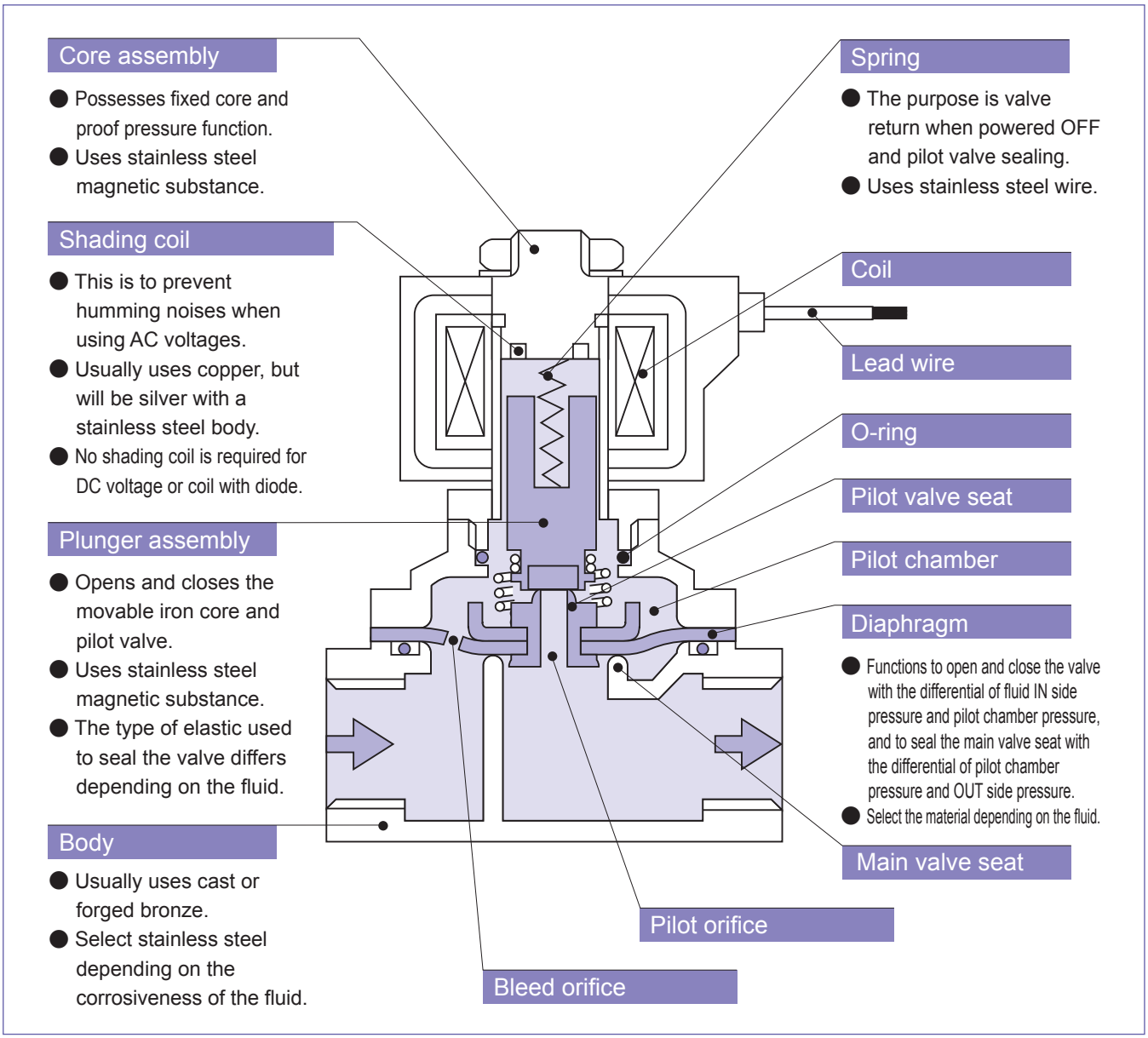
Controller, etc.

Series name	Applications	Page
RSC-S5	Automatic watering controller (solar power type) for golf course, greenbelts, farmlands, etc.	1040
RSC-G	Automatic watering controller (commercial power type) for greenbelts, parks, playgrounds, etc.	1042
RSC-1WP	Battery operated watering controller	1044
OMC2	Sequential fluid control components for large port size dust collector valve (PD3/PDV3)	848
RS-6	Rain sensor (automatically detects rainfall of 6 mm or more. No power unit is required.)	1050
RSC-2WP	Automatic watering controller for golf courses, greenbelts, parks, farmlands, etc.	1048

* Overview column : NC: NC (open when energized) NO: NO (closed when energized) NC pressurization: NC pressurization type
NO pressurization: NO pressurization type NC: NC (normally closed) type NO: NO (normally open) type UNI: Universal CO: Double acting
* Port size column: ★ : Rc, G and NPT ☆ :R ○ : Rc ● : Flange ◑: Rc and flange

Check list of material combination by working fluid

The CKD fluid control valves can be used with many different gases and liquids; the fluid wetted parts are shown below.
The effect of these fluids on the material must be carefully considered when selecting the model.
Refer to the working fluid check list for each valve.



Working fluid check list	Page
● Multi-type fluid control 2, 3-port solenoid valve	Intro Page 40
● For air operated 2-port valves (cylinder valves)	Intro Page 46
For air operated 2, 3-port ball valves (compact rotary valve)	
For motorized 2, 3-port ball valves	
● Pinch valve	Intro Page 47

* The above figure shows the pilot kick diaphragm drive NC (open when energized) 2-port valve (ADK11 Series).

Working fluid check list ❶

For multi-type fluid control 2, 3-port solenoid valves

⚠ CAUTION

This check list displays guidelines for typical corrosion resistance, and does not guarantee the solenoid valve performance. During actual use, there are unpredictable elements. As there may be cases when general specifications do not apply, check the compatibility as needed and take the necessary safety measures on the equipment before use.

[Indicates the compatibility of sealant material, body material and working fluid.]

A Acetaldehyde to A Aqueous potassium chloride ●: Usable ▲: Usable with conditions ×: Unusable

Fluid name	Fluid properties (Displays the state of the raw material even if the fluid indicates water solubility)	Material combination: [Body material] Copper alloy/Bronze – [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	[Body material] Stainless steel – [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	Note on model No. selection
A Acetaldehyde	Liquid	×	×	×	●	×	×	×	●	Flammable liquid. If explosion proof is specified by the surrounding environment, select explosion proof (d2G4).
Acetone	Liquid	×	×	●	●	×	×	●	●	Flammable liquid. If explosion proof is specified by the surrounding environment, select explosion proof (d2G4).
Acetylene	Gas	×	×	×	×	▲	▲	×	▲	Highly explosive gas. Contact CKD during model selection. If explosion proof (d3G2) is specified, CKD solenoid valves cannot be used. Instead use an air operated.
Acrylic/nitriles	Liquid	×	×	×	×	×	×	●	●	Highly flammable liquid. Toxic substance. Contact CKD during model selection.
AE solvent	Liquid (powder)	×	×	×	×	×	×	×	×	Cement hardener.
Ammonia	Gas	×	×	×	×	×	×	▲	▲	Specify a coil with a diode or the DC voltage model. (*1)
Amyl alcohols	Liquid	×	●	●	●	×	●	●	●	Ethylene propylene rubber is more suitable than fluoro-rubber.
Aniline	Liquid	×	×	×	×	×	●	●	●	Organic solvents used in paints or dyes.
Aqueous ammonia	Liquid	×	×	×	×	×	×	▲	▲	Same as above. AKA: Ammonium hydroxide.
Aqueous ammonium chloride	(Crystal)	×	×	×	×	×	×	×	×	Solenoid valves not suitable. Select a completely resin air operated valve.
Aqueous ammonium sulfate	(Solid)	×	×	×	×	×	×	×	×	AKA: Ammonium sulfate. Nitrogen fertilizer.
Aqueous calcium hydroxide	(Solid)	×	×	×	×	●	●	●	●	AKA: Slaked lime. Used as a neutralizing agent for wastewater treatment. Take note of viscosity. Strong alkali. This resists dissolving in water, so may not be appropriate for solenoid use if it leaves grains behind.
Aqueous copper sulfate	(Solid)	×	×	×	×	×	×	×	×	Used in agricultural chemicals, pigments, and copper plating.
Aqueous magnesium chloride	(Crystal)	×	×	×	×	×	×	×	×	Cannot be used with metal.
Aqueous nickel sulfate	(Solid)	×	×	×	×	×	×	×	×	Used as a nickel plating solution.
Aqueous potassium chloride	(Crystal)	×	×	×	×	×	×	×	×	Cannot be used with metal.

*1: AG, AB42, AP12, AP22, AD12, AD22, explosion-proof (excluding ADK) and PVS cannot be used even with a coil with diode or DC voltage.

Working fluid check list ❶

For multi-type fluid control 2, 3-port solenoid valves

[Indicates the compatibility of sealant material, body material and working fluid.]

A Aqueous potassium cyanide to B Butyl alcohol ●: Usable ▲: Usable with conditions ×: Unusable

Fluid name	Fluid properties (Displays the state of the raw material even if the fluid indicates water solubility)	Material combination [Body material] Copper alloy/Bronze [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	[Body material] Stainless steel [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	Note on model No. selection
A Aqueous potassium cyanide		×	×	×	×	●	●	●	●	AKA: Cyanide potash. A poisonous chemical used in plating solutions.
Aqueous potassium dichromate	(Solid)	×	×	×	×	×	●	●	●	-
Aqueous potassium permanganate	(Crystal)	×	×	×	×	×	×	×	●	Used for analysis. Strong oxidant. Take care when using as crystals may form as it dries out.
Aqueous silver nitrate	(Solid)	×	×	×	×	▲	▲	▲	▲	Used for analysis or as a photosensitive developing agent. Specify a coil with a diode or the DC voltage model. (*1)
Aqueous sodium bicarbonate	(Solid)	×	×	×	×	●	●	●	●	AKA: baking soda. Used as a food additive.
Aqueous sodium silicate	(Crystal)	●	●	●	●	●	●	●	●	AKA: waterglass. Used in phosphate-free detergents. Take note of viscosity and concentration. Select stainless steel for high concentrations, as it is classified as an alkaline aqueous solution.
Aqueous sodium sulfate	(Solid)	×	×	×	×	×	×	×	×	AKA: Aqueous sodium sulfide.
Argon	Gas	●	●	●	●	●	●	●	●	This is an inert gas so there is no corrosion. Specify oil-prohibited specifications. Select a dry air AB type solenoid (option code: Z) or a FGB special purpose valve.
B Benzine	Liquid	×	×	×	●	×	×	×	●	Solvent. Volatile. Flammable liquid. This forms an explosive gas when mixed with air. Contact CKD during model selection.
Benzol	Liquid	×	×	×	●	×	×	×	●	AKA: Benzene. Flammable liquid. Harmful substance. Limited to use in environments with well-equipped exhaust equipment. Contact CKD during model selection.
Brake fluid	Liquid	×	×	●	●	×	×	●	●	-
Butane gas	Gas	●	●	×	●	●	●	×	●	If explosion proof is specified by the surrounding environment, select explosion proof (d2G2) or (d2G4). This is a custom-made product as it generates sticky material. Refer to Intro Page 45 "⚠Using general purpose valves with flammable gas".
Butyl acetate	Liquid	×	×	×	●	×	×	×	●	Flammable liquid. Acute toxic substance. Contact CKD about usage.
Butyl alcohol	Liquid	×	●	●	●	×	●	●	●	AKA: Butanol. If explosion proof is specified by the surrounding environment, select explosion proof (d2G2) or (d2G4). Flammable liquid. Contact CKD during model selection.

*1: AG, AB42, AP12, AP22, AD12, AD22, explosion-proof (excluding ADK) and PVS cannot be used even with a coil with diode or DC voltage.

⚠ CAUTION

This check list displays guidelines for typical corrosion resistance, and does not guarantee the solenoid valve performance. During actual use, there are unpredictable elements. As there may be cases when general specifications do not apply, check the compatibility as needed and take the necessary safety measures on the equipment before use.

[Indicates the compatibility of sealant material, body material and working fluid.]

C Carbon dioxide to E Ethylene oxide gas

●: Usable ▲: Usable with conditions ×: Unusable

Fluid name	Fluid properties (Displays the state of the raw material even if the fluid indicates water solubility)	Material combination: [Body material] Copper alloy/Bronze [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	[Body material] Stainless steel [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	Note on model No. selection
C Carbon dioxide	Gas	●	●	●	●	●	●	●	●	-
Carbon tetrachloride	Liquid	×	×	×	●	×	×	×	●	Flame retardant. A solvent for dry cleaning. Acute toxic substance.
Carbonated water	Liquid	●	●	●	●	●	●	●	●	-
Castor oil	Non-drying	×	×	×	×	●	●	×	●	Used as a laxative. Vegetable oils.
Caustic soda	(Solid)	×	×	×	×	●	×	●	●	Take care when using as crystals may form as the fluid dries out. (Crystals may adhere to the OUT side of the valve, causing it to lock)
Chloroform	Liquid	×	×	×	●	×	×	×	●	AKA: Trichloromethane. Acute toxic substance. Contact CKD about usage.
City gas	Gas	●	●	×	●	●	●	×	●	We recommend a GASREX valve. Refer to Intro Page 45 "⚠Using general purpose valves with flammable gas".
Cottonseed oil	Semi-drying	×	●	×	●	×	●	×	●	For food products.
Cresol	Solid (liquid)	×	×	×	×	×	●	×	●	Disinfectant. AKA: Methyl phenol.
D Dichloride benzene	Liquid (solid)	×	×	×	●	×	×	×	●	AKA: Dichlorobenzene.
Dimethyl silicone oil	Liquid	●	●	●	●	●	●	●	●	In general, this is known as silicone oil.
Dry air	Gas	●	●	●	●	●	●	●	●	Select an AB type solenoid valve for dry air (option code: Z).
E Ethyl acetate	Liquid	×	×	×	●	×	×	×	●	A solvent for paint. If explosion proof is specified by the surrounding environment, select explosion proof (d2G2) or (d2G4).
Ethyl alcohol (industrial)	Liquid	×	×	●	●	×	×	●	●	AKA: Ethanol. If explosion proof is specified by the surrounding environment, select explosion proof (d2G2) or (d2G4).
Ethyl alcohol (pure)	Liquid	×	●	●	●	×	●	●	●	
Ethyl ether	Liquid	×	×	×	●	×	×	×	●	In general, these are known as ethers.
Ethylene chloride	Gas	×	×	×	×	×	×	×	●	AKA: Ethyl chloride. Requires dry conditions. Select a CKD air operated valve for chemical liquids if moisture is present. Flammable gas. Contact CKD during model selection.
Ethylene glycol	Liquid	●	●	●	●	●	●	●	●	Used as anti-freeze.
Ethylene oxide gas	Gas	×	×	×	×	×	×	×	×	AKA: E.O.G. Boils into gas at 10.4°C. Explosive gas.

Working fluid check list ❶

For multi-type fluid control 2, 3-port solenoid valves

[Indicates the compatibility of sealant material, body material and working fluid.]

F Formalin to K Kerosene

●: Usable ▲: Usable with conditions ×: Unusable

Fluid name		Fluid properties (Displays the state of the raw material even if the fluid indicates water solubility)	Material combination [Body material] Copper alloy/Bronze [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	[Body material] Stainless steel [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	Note on model No. selection
F	Formalin	(Gas)	×	×	×	×	×	×	●	●	AKA: Formaldehyde.
Freon gas	R23	Liquid and gas	×	×	×	●	×	×	×	●	AKA: HFC23
	R32		×	×	●	●	×	×	●	●	AKA: HFC32
	R125		●	×	●	●	●	×	●	●	AKA: HFC125
	R134a		×	×	×	●	×	×	×	●	AKA: HFC134a
	R143a		●	×	●	●	●	×	●	●	AKA: HFC143a
	R404A		×	×	×	●	×	×	×	●	For HFC125/143a/134a mixtures
	R407C		×	×	×	●	×	×	×	●	For HFC32/125/134a mixtures
	R407E		×	×	×	●	×	×	×	●	For HFC32/125/134a mixtures
	R410A		×	×	●	●	×	×	●	●	For HFC32/125 mixtures
	R507A		●	×	●	●	●	×	●	●	For HFC125/143a mixtures
G	Gasoline	Liquid	×	▲	×	●	×	▲	×	●	Contact CKD during model selection, as it cannot be used even with fluoro-rubber in some cases.
	Glycerin	Liquid	●	●	●	●	●	●	●	●	Take note of viscosity. For direct acting 2-port valves, the fluid viscosity must be 50 mm2/s or less. Pilot operated solenoid valves cannot be used.
H	Heavy oil A	Liquid	▲	●	×	●	▲	●	×	●	Take care when selecting the sealant if an additive has been added.* 2
	Heavy oil B	Liquid	●	●	×	●	●	●	×	●	-
	Heavy oil C	Liquid	×	●	×	●	×	●	×	●	Take note of viscosity. We recommend the LLO solenoid for heavy oil.
	Helium	Gas	●	●	●	●	●	●	●	●	Inert gas. Non-corrosive.
	Heptane	Liquid	●	●	×	●	●	●	×	●	Flammable liquid. Contact CKD during model selection.
	Hexanol	Liquid	×	●	●	●	×	●	●	●	AKA: Hexyl alcohol.
	Hydrogen	Gas	●	●	●	●	●	●	●	●	This forms an explosive gas combination when mixed with air. Explosion proof (d3G1) specifications are not available. Contact CKD during model selection.
	Hydrogen peroxide solution	Liquid	×	×	×	×	×	×	×	▲	Oxidant. Used in disinfectants and sterilization agents. Usually 30 to 50% water soluble. Specify a coil with a diode or the DC voltage model. (*1)
	Hydrogen sulfide solution	Water + gas	×	×	×	×	×	×	×	×	Select a completely resin air operated valve.
I	Isopropyl acetate	Liquid	×	×	×	●	×	×	×	●	Flammable liquid. Acute toxic substance. Contact CKD about usage. Paint solvent.
	Isopropyl alcohol	Liquid	●	●	●	●	●	●	●	●	AKA: IPA. Used in semiconductor washers.
K	Kerosene	Liquid	●	●	×	●	●	●	×	●	AKA: kerosene. Jet fuel is known as kerosene.

*1: AG, AB42, AP12, AP22, AD12, AD22, explosion-proof (excluding ADK) and PVS have a shading coil and cannot be used even with a coil with diode or DC voltage.

*2: High calorie heavy oil A is increasingly used for small boilers, etc.
Nitrile rubber cannot be used with “high-calorie heavy oil A”.

⚠CAUTION

This check list displays guidelines for typical corrosion resistance, and does not guarantee the solenoid valve performance. During actual use, there are unpredictable elements. As there may be cases when general specifications do not apply, check the compatibility as needed and take the necessary safety measures on the equipment before use.

[Indicates the compatibility of sealant material, body material and working fluid.]
●: Usable ▲: Usable with conditions ×: Unusable

L Lacquer to O Oxygen

Fluid name	Fluid properties (Displays the state of the raw material even if the fluid indicates water solubility)	Material combination: [Body material] Copper alloy/Bronze – [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	[Body material] Stainless steel – [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	Note on model No. selection
L Lacquer	Liquid	×	×	×	●	×	×	×	●	If explosion proof is specified by the surrounding environment, select explosion proof (d2G2) or (d2G4).
Lactic acid	Liquid	×	×	×	×	×	●	●	●	Used for brewing or drinking.
Light oil	Liquid	●	●	×	●	●	●	×	●	-
Linseed oil		×	×	×	×	●	●	×	●	Take note of viscosity. For direct acting 2-port valves, the fluid viscosity must be 50 mm2/s or less. Pilot operated solenoid valves cannot be used.
M Methane gas	Gas	●	●	×	●	●	●	×	●	Refer to Intro Page 45 "⚠Using general purpose valves with flammable gas".
Methyl acetate	Liquid	×	×	×	●	×	×	×	●	Flammable liquid. Acute toxic substance. Contact CKD about usage.
Methyl alcohol	Liquid	×	×	●	●	×	×	●	●	AKA: Methanol. Flammable liquid. Acute toxic substance. Contact CKD during model selection.
Methyl chloride	Gas	×	×	×	×	×	×	×	●	AKA: Chloromethane. Boils into gas at -23°C. Requires dry conditions. Select a CKD air operated valve for chemical liquids if moisture is present. Contact CKD during model selection.
Methyl ether	Gas	×	×	×	●	×	×	×	●	-
Methyl ethyl ketone	Liquid	×	×	●	●	×	×	●	●	AKA: MEK. Highly flammable liquid. Limited to use in environments with well-equipped exhaust equipment. Contact CKD during model selection.
Methylene chloride	Liquid	×	×	×	×	×	×	×	●	AKA: Dichloromethane. Contact CKD during model selection.
N Naphtha	Liquid	×	×	×	●	×	×	×	●	-
Natural gas	Gas	●	●	×	●	●	●	×	●	AKA: LNG. Specific gravity: 0.65. We recommend a GASREX/AB/AG valve. Refer to Intro Page 45 "⚠Using general purpose valves with flammable gas".
Nitric acid 30%	Liquid	×	×	×	×	×	×	×	×	Solenoid valves cannot be used. We recommend a CKD air operated valve for chemical liquids.
Nitrogen	Gas	●	●	●	●	●	●	●	●	Inert gas. Non-corrosive. Oil-prohibited specifications. We recommend an AB type solenoid valve for dry air (option code: Z) or an FGB special purpose valve.
O Oxygen	Gas	×	●	●	●	×	●	●	●	Oil-prohibited treatment is required as it may spontaneously ignite when exposed to oil. Contact CKD during model selection.

Working fluid check list ❶

For multi-type fluid control 2, 3-port solenoid valves

[Indicates the compatibility of sealant material, body material and working fluid.]

O Ozone (several ppm or less) to V Vacuum (medium vacuum)　●: Usable　▲: Usable with conditions　×: Unusable

	Fluid name	Fluid properties (Displays the state of the raw material even if the fluid indicates water solubility)	Material combination [Body material] Copper alloy/Bronze [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	[Body material] Stainless steel [Sealant material] Nitrile rubber	Fluoro rubber	Ethylene propylene	Tetrafluoroethylene resin	Note on model No. selection
O	Ozone (several ppm or less)	Gas	×	×	×	×	×	▲	▲	▲	Specify a coil with a diode or the DC voltage model. (*1)
P	Perchloroethylene	Liquid	×	×	×	×	×	●	×	●	AKA: Ethylene tetrachloride. Limited to use in environments with well-equipped exhaust equipment for acutely poisonous materials. A volatile solvent for dry cleaning. Contact CKD during model selection.
	Phenol	(Crystal)	×	×	×	×	×	●	×	●	Used as a disinfectant and local anesthetic.
	Phosphoric acid	Liquid	×	×	×	×	×	×	×	×	-
	Propane gas	Gas	●	●	×	●	●	●	×	●	This is a custom-made product as it generates sticky material. We recommend a GASREX valve. Refer to Intro Page 45 "⚠Using general purpose valves with flammable gas".
	Propyl alcohol	Liquid	×	●	●	●	×	●	●	●	-
S	Sodium acetate	(Solid)	●	●	×	●	●	●	×	●	Dye.
	Sodium borate	(Crystal)	×	×	×	×	●	●	●	●	AKA: Borax.
	Sodium hydroxide (30% or more)	(Solid)	×	×	×	×	×	×	●	●	Same as above. Same conditions.
	Sodium hydroxide (below 30%)(AKA: caustic soda)	(Solid)	×	×	×	×	●	×	●	●	Take care when using as crystals may form as the fluid dries out. (Crystals may adhere to the OUT side of the valve, causing it to lock)
	Sodium perchlorate	Liquid	×	×	×	×	×	×	×	●	AKA: Perchlorate soda. Cannot be used with rubber.
T	Table vinegar	Liquid	×	×	×	×	×	×	×	×	AKA: vinegar. This falls under the same conditions as "acetic acid".
	Tannic acid	(powder)	×	×	×	×	●	●	●	●	-
	Toluene	Liquid	×	×	×	●	×	×	×	●	If explosion proof is specified by the surrounding environment, select explosion proof (d2G2) or (d2G4). Note that it is volatile and take care with temperatures. Flammable liquid. Acute toxic substance. Contact CKD during model selection.
	Trichloroethane	Liquid	×	×	×	▲	×	×	×	●	The corrosiveness increases when mixed with water.
	Trichloroethylene	Liquid	×	×	×	▲	×	×	×	●	AKA: Trichlene. Acute toxic substance. Contact CKD during model selection.
	Turpentine	Liquid	●	●	×	●	●	●	×	●	Rosin oil. Used in solvents and pharmaceutical products. Ignition point: 35°C.
V	Vacuum (high vacuum)	-	×	×	×	×	×	×	×	×	We recommend a valve for high vacuum (HVB type).
	Vacuum (medium vacuum)	-	●	●	×	×	●	●	×	×	We recommend a special purpose valve for medium vacuum (FVB).

*1: AG, AB42, AP12, AP22, AD12, AD22, explosion-proof (excluding ADK) and PVS have a shading coil and cannot be used even with a coil with diode or DC voltage.

⚠Using general purpose valves with flammable gas

When using with combustible gas, install an evaporator or provide drainage measures (raise the piping, install a trap, etc.) so that the liquefied gas does not enter the solenoid valve. Observe the laws and periodic inspections set forth for each gas device.
When using LPG (butane gas, propane gas), standard parts may not be available depending on the gas properties. Contact CKD to select the optimum model.

Working fluid check list ❷

- For air operated 2-port valves (cylinder valves)
- For motorized 2-port ball valves
- For air operated 2, 3-port ball valves (compact rotary valves)

⚠CAUTION

This check list displays guidelines for typical corrosion resistance, and does not guarantee the valve performance. During actual use, there are unpredictable elements. There may be cases when general specifications do not apply, and since only certain greases can be used for initial lubrication of moving parts, which depend on the fluid or application, check the compatibility as needed and take the necessary safety measures on the equipment before use.

●: Usable ▲: Usable with conditions ×: Unusable -: No usage examples
*1: Usable with conditions means that use is possible if conditions given in ( ) after the fluid names are satisfied.

Material combination		Sub-plate material	-								Copper alloy		Stainless steel		Aluminum	
		Body material	Copper alloy/Bronze				Stainless steel				Polypropylene resin		Stainless steel		Polypropylene resin	
Fluid name		Sealant	NBR	FKM	PTFE	EPDM	NBR	FKM	PTFE	EPDM	NBR	FKM	NBR	FKM	NBR	FKM
A	Acetylene (Use an air operated for explosion proof specifications.)		×	×	×	×	●	●	●	×	×	×	●	●	×	×
	AE solvent		▲	▲	▲	×	●	●	●	×	▲	▲	●	●	×	×
	Aqueous sodium silicate		●	●	●	●	●	●	●	●	●	●	●	●	-	-
	Argon		●	●	●	-	●	●	●	-	●	●	●	●	●	●
C	Carbon dioxide		●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Carbonated water		-	-	-	-	▲	▲	▲	●	-	-	▲	▲	×	×
	Cresol		-	-	-	-	×	●	●	×	×	●	×	●	×	×
E	Ethylene glycol		●	●	●	●	●	●	●	●	●	●	●	●	●	●
G	Gasoline (pure gasoline)		×	▲	●	×	×	▲	●	×	×	×	×	▲	×	×
	Glycerin		-	-	-	-	●	●	●	●	●	●	●	●	-	-
H	H2 gas (not for high temp. Use air operated for explo-proof specs)		●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Heavy oil A (FKM is recommended if it contains additives)		▲	●	●	×	▲	●	●	×	▲	●	▲	●	-	-
	Heavy oil B		●	●	●	×	●	●	●	×	●	●	●	●	-	-
	Heavy oil C		×	●	●	×	×	●	●	×	×	●	×	●	-	-
K	Kerosene		●	●	●	×	●	●	●	×	●	●	●	●	-	-
L	Light oil		●	●	●	×	●	●	●	×	●	●	●	●	●	●
	Linseed oil		×	×	×	-	●	●	●	×	×	×	●	●	-	-
N	Natural gas		●	●	●	-	●	●	●	-	●	●	●	●	●	●
	Nitrogen gas		●	●	●	●	●	●	●	●	●	●	●	●	●	●
O	Ozone (low concentration. Several ppm or less)		×	×	×	×	×	▲	●	▲	×	▲	×	▲	-	-
P	Propane gas		●	●	●	×	●	●	●	×	●	●	●	●	●	●
	Pure water		-	-	-	-	×	●	●	-	-	-	×	●	×	×
S	Silicone oil		×	●	●	-	×	●	●	-	×	●	×	●	×	●
	Soapy water		-	-	-	-	●	●	●	●	-	-	●	●	×	×
	Sodium hydroxide		×	×	×	×	▲	×	●	●	×	×	▲	×	×	×
With/without options for each model ☆: Standard products ○: Option available	Cylinder valve	NAB1/2/3	☆	○	-	-	○	○	-	-	-	-	-	-	-	-
		NAB1V/2V/3V	☆	○	-	-	○	○	-	-	-	-	-	-	-	-
		GNAB1/2/3	-	-	-	-	-	-	-	-	☆	○	○	○	○	○
		GNAB1V/2V/3V	-	-	-	-	-	-	-	-	☆	○	○	○	○	○
		SAB1/2/3, SVB1/2	☆	○	-	○	☆	○	-	○	-	-	-	-	-	-
		SAB1S/2S/3S, SVB1S/2S	-	-	☆	-	-	-	☆	-	-	-	-	-	-	-
	Compact rotary valve	CHB	-	☆	-	-	-	☆	-	-						
		CHG	-	☆	-	-	-	☆	-	-						
	Motorized ball valve	MXB1/MSB1	-	☆	-	-	-	☆	-	-						
		MXG1	-	☆	-	-	-	☆	-	-						
		MHB4	-	☆	-	-	-	-	-	-						
		MHG4	-	☆	-	-	-	-	-	-						

Working fluid check list ❸

For pinch valve

⚠CAUTION

This check list displays guidelines for typical corrosion resistance, and does not guarantee the solenoid valve performance. During actual use, there are unpredictable elements. As there may be cases when general specifications do not apply, check the compatibility as needed and take the necessary safety measures on the equipment before use.

Rubber sleeve chemical resistance

●: Barely degrades ▲: May degrade but can be used depending on conditions
×: Degrades, unusable Test temperature shown in parentheses, 60 = 60°C RT = Room Temperature

	Chemical name	Chemical formula	Concentration	Rubber sleeve	
				Natural rubber	Chloroprene rubber
A	Acetic acid	CH_3COOH	30%	×(RT)	×
	Acetone	CH_3COCH_3		×(RT)	×(RT)
	Alum	$K_2SO_4Al_2(SO_4)$	Each conc.	●(60)	●(70)
	Aluminum chloride	$AlCl_3$	Each conc.	●(60)	●(70)
	Ammonium chloride	NH_4Cl	27%	●(60)	●(70)
	Ammonium nitrate	NH_4NO_2		×(RT)	●(70)
	Aqueous ammonia	NH_4OH	30%	×(60)	●(70)
	Asbestos			●	●
B	Barium chloride	$BaCl_2$ / $2H_2O$		●(60)	●(65)
	Bleach (Calcium hypochlorite)	$Ca(ClO)_2$		×(60)	×(RT)
	Butyl cellulose			●(RT)	▲(RT)
C	Calcium	Ca		●	●
	Carbolic acid	C_6H_5OH		×(RT)	×(RT)
	Carbonic acid	H_2CO_3	Each conc.	●(60)	●(70)
	Caustic potash	KOH	25%	●(40)	●(70)
	Caustic soda	NaOH	50%	▲(RT)	●(RT)
	Cement			●	●
	Chromic acid	H_2CrO_4	10%	×(RT)	×(RT)
	Citric acid	$C_3H_4(OH)_3(CO_2H)_3$	10%	●(60)	●(70)
	Cottonseed oil			×(RT)	▲(60)
D	Developing solution			●(60)	▲(65)
E	Ethanol	C_2H_3OH		●(RT)	●(RT)
	Ethylene glycol	CH_2OHCH_2OH		●(RT)	●(RT)
F	Fatty acid			▲(RT)	×
	Formic acid	HCOOH		×(RT)	▲(RT)
G	Glue			●(60)	●(RT)
	Glycerin			●(RT)	●(RT)
	Grains			●	●
H	Hydrochloric acid	HCl	20%	×(80)	×(70)
	Hydrochloric acid	HCl	35%	▲(RT)	▲(RT)
	Hydrofluoric acid	HF	10%	●(RT)	●(RT)
	Hydrofluoric acid		40%	×(RT)	×(RT)
	Hydrogen sulfide solution	H_2S	Each conc.	×(60)	×(60)
	Hydroquinone	$C_6H_4(OH)_2$		●(RT)	●(RT)
L	Lactic acid	$CH_3CH(OH)COOH$	25%	●(RT)	●(60)

	Chemical name	Chemical formula	Concentration	Rubber sleeve	
				Natural rubber	Chloroprene rubber
L	Lime powder			●	●
M	Magnesium hydroxide	$Mg(OH)_2$		●(60)	●(65)
	Malic acid	$HOOCH_2CHOHCOOH$		●	▲(65)
	Methanol	OH_3OH		●(RT)	●(RT)
N	Nitric acid	HNO_3	10%	×(RT)	×(RT)
	Nitric acid	HNO_3	20%	×(RT)	×(RT)
	Nitric acid	HNO_3	30%	×(RT)	×(RT)
	Nitric acid 15%, hydrofluoric acid 6%	HNO_3 15% / HF 6%		▲(RT)	▲(RT)
O	Olive oil			×(RT)	▲(RT)
	Oxalic acid	$HO_2H{\cdot}CO_2H$	20%	▲(RT)	▲(RT)
P	Palm oil			×(RT)	●(RT)
	Phosphoric acid	H_3PO_4	80%	×(60)	▲(70)
	Phosphoric acid soda	Na_3PO_4	Each conc.	●(60)	●(70)
	Picric acid	$HOC_6H_2(NO2)_3$	10%	×(RT)	×(RT)
	Plating solution			×	×
	Potassium chlorate	$KClC_3$	Each conc.	●(60)	●(70)
	Potassium dichromate	$K_2Cr_2O_7$	Each conc.	×(RT)	●(RT)
	Potassium sulfide	K_2S	Each conc.	●(60)	●(70)
	Pulp			●	●
R	Raw nitrate solution			●(RT)	●(70)
S	Sewage			▲(RT)	●(RT)
	Soap			●(RT)	●(70)
	Sodium bicarbonate	$NaHCO_3$	Each conc.	●(60)	●(70)
	Sodium carbonate	Na_2CO_3	Each conc.	●(60)	●(70)
	Sodium chloride	NaCl		●(60)	●(70)
	Sodium cyanide	NaCN	Each conc.	●(60)	●(70)
	Sodium dichromate			●(RT)	●(RT)
	Sodium sulfate	Na_2SO_4		●(60)	●(70)
	Sulfur	S		×	●
	Sulfur dioxide	SO_2		▲(RT)	▲(RT)
	Sulfuric acid	H_2SO_4	20%	●(RT)	●(70)
	Sulfuric acid	H_2SO_4	50%	▲(RT)	×(RT)
	Sulfurous acid	H_2SO_3	10%	▲(RT)	×(RT)
T	Tartaric acid	$(CHOH{\cdot}COOH)_2$	50%	×(60)	×(70)
Z	Zinc sulfate	$ZnSO_4{\cdot}7H_2O$		●(60)	●(65)

The chemical resistance of the pinch valve may differ according to the working conditions, so its usability cannot be easily determined. Use this table as the initial selection guide. Note that improvements may be required depending on the test results.

Flow characteristics display method

1. Flow characteristics display

The catalog specifications indicate the flow rate as follows.

Components	Display	Unit	Standards
Pneumatic components	New JIS compliant indication	C, b	ISO 6358:1989 "Pneumatic fluid power - Components using compressible fluids - Determination of flow-rate characteristics" JIS B 8390:2000 (ISO 6358 translation)
	Conventional indication	S	JIS B 8373:1993 "Pneumatic 2-port solenoid valves" JIS B 8374:1993 "Pneumatic 3-port solenoid valves" JIS B 8375:1993 "Pneumatic 4, 5-port solenoid valves" JIS B 8379:1995 "Pneumatic noise reduction device"
		Cv	ANSI(NFPA)T3. 21. 3:1990
Fluid control components	New JIS compliant indication	Cv	IEC 60534-2-3: 1997 "Industrial Process Control Valves - Part 2: Flow rate - Part 3: Test Procedure" JIS B 2005-2-3: 2004 (IEC 60534-2-3 translation) JIS B 8471: 2004 "Solenoids for water" JIS B 8472: 1994 "Solenoids for steam" JIS B 8473: 1994 "Solenoids for fuel"
	Conventional indication		

2. Pneumatic components description

The flow characteristics of the pneumatic components were conventionally indicated with the effective cross-sectional area S and flow coefficient Cv. However, JIS was revised (JIS B 8390:2000), and these are now indicated with the sonic conductance C and critical pressure ratio b.

- Sonic conductance C: Value obtained by dividing the passage weight flow of the component in the choke flow by the sum of the upstream absolute pressure and standard state density. (sonic conductance) S ≈ 5.0 C (Conventional sizing is possible with C.)
- Critical pressure ratio b: Pressure ratio at which choked flow results if smaller than this value (downstream pressure/upstream pressure) (critical pressure ratio)
- Effective cross-sectional area S (mm^2): The value of the ideal restricted cross-sectional area without friction or compressed flow, calculated from the pressure changes inside the air tank when the choked flow is released from the components mounted on the air tank.

* Choked flow: Flow at which upstream pressure is higher than downstream pressure, and speeds at certain sections of components reach acoustic velocity. The fluid's mass flow rate is proportional to the upstream pressure, and is not dependent on downstream pressure.

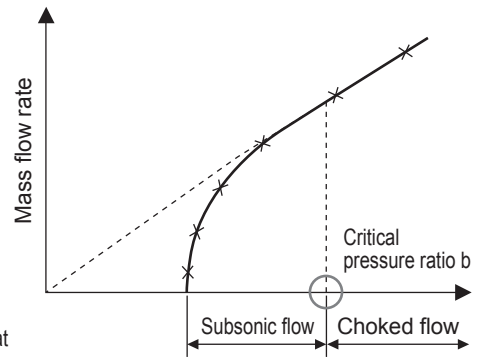


Fig. 1 Mass flow rate characteristics for upstream pressure

Flow rate formula

Depending on the actual unit, they are shown as follows.

Choked flow when $\frac{P_2+0.1}{P_1+0.1} \leq b$

$$Q=120\times C(P_1+0.1)\sqrt{\frac{293}{273+t}} \quad \cdots\cdots\cdots\cdots\cdots\cdots(1)$$

Subsonic flow when $\frac{P_2+0.1}{P_1+0.1} > b$

$$Q=600\times C(P_1+0.1)\sqrt{1-\left[\frac{\frac{P_2+0.1}{P_1+0.1}-b}{1-b}\right]^2}\sqrt{\frac{293}{273+t}} \quad \cdots\cdots\cdots\cdots\cdots\cdots(2)$$

Q : Air flow rate [dm^3/min(ANR)], SI unit dm^3 (cubic decimeter) can also be expressed with ℓ (liter). $1dm^3 = 1$ ℓ
C : Sonic conductance [$dm^3/(s\cdot bar)$]
b : Critical pressure ratio [-]
P_1 : Upstream pressure [MPa]
P_2 : Downstream pressure [MPa]
t : Temperature [°C]

When calculating with effective cross-sectional area S, substitute value C obtained with C = S/5 in the above formula.
For subsonic flow, substitute b = 0.5 in formula (2).

Flow characteristics display method

3. Fluid control components description

The flow characteristics of the fluid control valves were indicated by flow coefficient Cv. To comply with former IEC Standards, there was a move to indicate them with flow coefficient Av to unify indications into SI units. However, the Av value was eliminated from the control valve flow coefficient with "JIS B 2005-2-3:2004" revisions, so that only Kv and Cv are used. Thus, the Cv indication is still used to indicate the flow characteristics of fluid control valves. For Av values, converted values are listed for reference as needed.

● Flow coefficient Cv: This is a non-SI control valve flow coefficient, but is used commonly throughout the world. US gal value which indicates 40 to 100°F city water flow rate per minute passing through the valve (device under test) at pressure differential of 1 psi.

$$Cv=Q\sqrt{\frac{\rho}{\rho w}\frac{1}{\triangle P}} \quad \cdots\cdots\cdots\cdots\cdots (3)$$

Cv : Flow coefficient
Q : Flow rate [US gal/min.] (1 US gal/min. = 6,309 x 10^{-5} m^3/s)
ρ : Fluid concentration [lb/ft^3] (lb/ft^3 = 16,018 kg/m^3)
ρw : 40°F to 100°F (4°C to 38°C) water concentration [lb/ft^3]
△ P : Pressure differential [psi] (1 psi = 6.8948 kPa)

● Flow coefficient Av: Value which indicates city water flow rate passing through the valve (device under test) in m^3/s unit at pressure difference 1 Pa. Calculated with the following formula:

$$Av=Q\sqrt{\frac{\rho}{\triangle P}} \quad \cdots\cdots\cdots\cdots\cdots (4)$$

Av : Flow coefficient [m^2]
Q : Flow rate [m^3/s]
ρ : Fluid concentration [kg/m^3]
△ P : Pressure differential [Pa]

Flow rate formula

Depending on the actual unit, they are shown as follows.

● Flow coefficient Cv

For liquids:

$$Q=45.16\ Cv\sqrt{\frac{\triangle P}{G}} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots (5)$$

Cv : Flow coefficient
Q : Flow rate [ℓ /min]
△ P: Pressure difference [MPa]
G : Specific gravity [water G = 1]

For steam:

For $P_2 \leq \frac{P_1}{2}$ $\quad W=\frac{97\ Cv\ P_1}{K} \quad \cdots\cdots\cdots\cdots (6)$

For $P_2 > \frac{P_1}{2}$ $\quad W=\frac{194\ Cv\sqrt{(P_1-P_2)P_2}}{K} \quad \cdots\cdots\cdots (7)$

Cv : Flow coefficient
W : Weight [kg/h]
P_1 : Primary side absolute pressure [MPa]
P_2 : Secondary side absolute pressure [MPa]
K : (1 + 0.0013 ts) ts: Degree of superheat
(Saturation steam K = 1)

Flow rate formula

Depending on the actual unit, they are shown as follows.

● Flow coefficient Av

For liquids:

$$Q=1.9\times10^{6}Av\sqrt{\frac{\triangle P}{G}} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots(8)$$

Q : Flow rate [ℓ/min]
Av : Flow coefficient [m^2]
△ P: Pressure difference [MPa]
G : Specific gravity [water = 1]

For steam:

$$Q=8.1\times10^{6}\,Av\sqrt{\triangle P\,(P_2+0.1)} \quad \cdots\cdots\cdots(9)$$

Q : Weight [kg/h]
Av : Flow coefficient [m^2]
△ P: Pressure difference [MPa]
P_1 : Upstream pressure [MPa]: $\triangle P = P_1 - P_2$
P_2 : Downstream pressure [MPa]

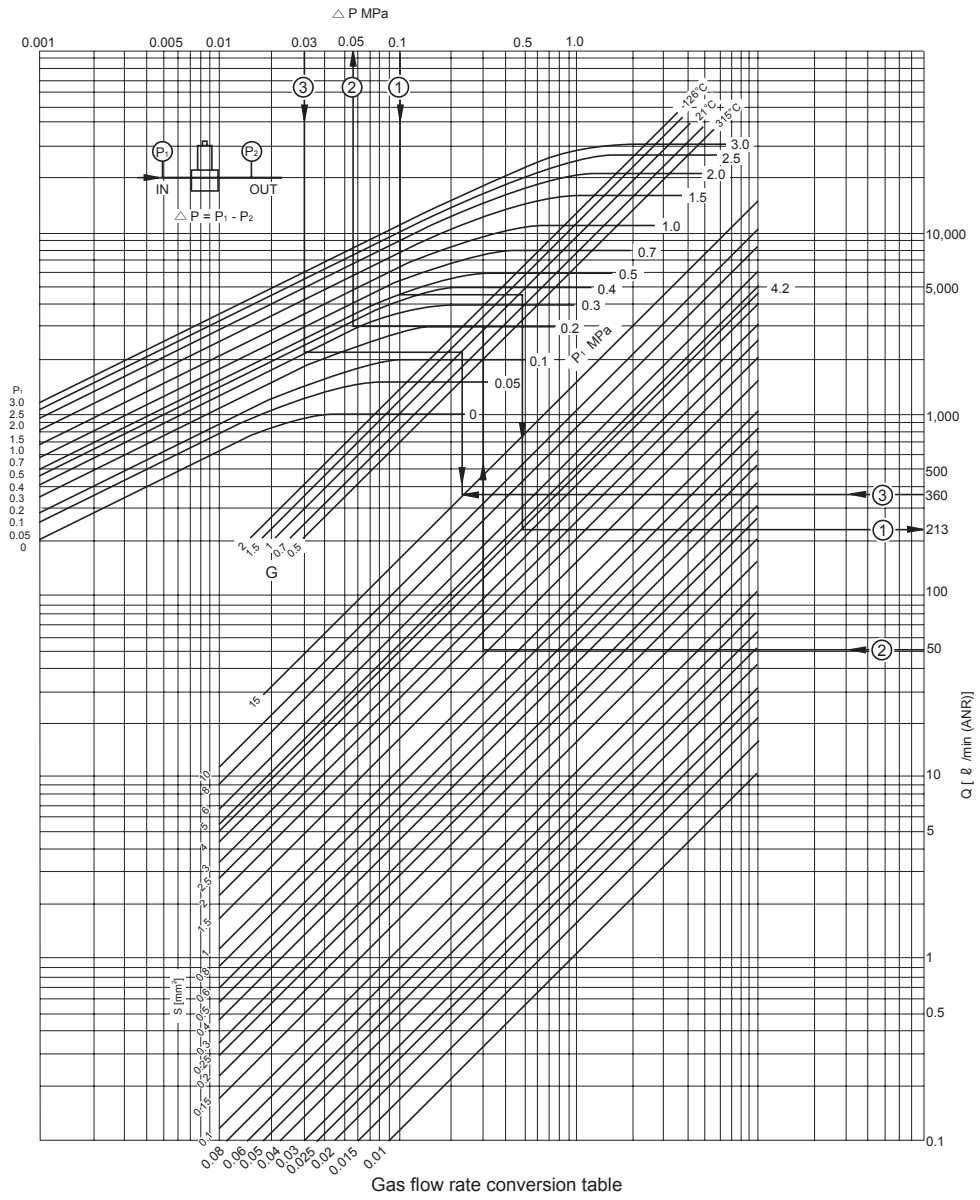
Flow coefficient conversion

$$Av=28\times10^{-6}\ Kv=24\times10^{-6}\ Cv \quad \cdots\cdots\cdots\cdots(10)$$

Kv : Value which indicates 5 to 40°C city water flow rate passing through the valve in m^3/h unit at pressure difference 1 bar.
Cv : Value which indicates 60°F city water flow rate passing through the valve in US gal/min. unit at pressure difference 1 lbf/in^2 (psi).
The Kv and Cv for air use different calculation methods, so the values do not match.

Flow rate conversion table — 1

Air



Gas flow rate conversion table

● Example 1:
The flow rate when air is passed through with (S = 4.2 mm^2) P_1 = 0.5 MPa, P_2 = 0.4MPa (△ P = P_1 - P_2 = 0.1 MPa) is

Q=213 ℓ /min(ANR)

● Example 2:
The pressure loss when air is passed through a S = 1.5 mm^2 valve at 50 ℓ /min. (ANR) at P_1 = 0.3 MPa is

△P=0.057 MPa

● Example 3:
What should the valve's effective cross-sectional area be to attain a 360 ℓ /min. (ANR) flow rate at P_1 = 0.3 MPa and △ P = 0.03 MPa ?

S=15

*1: The table shows the effective cross-sectional area (S) up to 15. If this value is exceeded, multiply the effective cross-sectional area (S) and flow rate proportionally.
Example: If the effective cross-sectional area (S) is 20, refer to 2 and multiply the flow rate by 10.

Flow rate calculation method

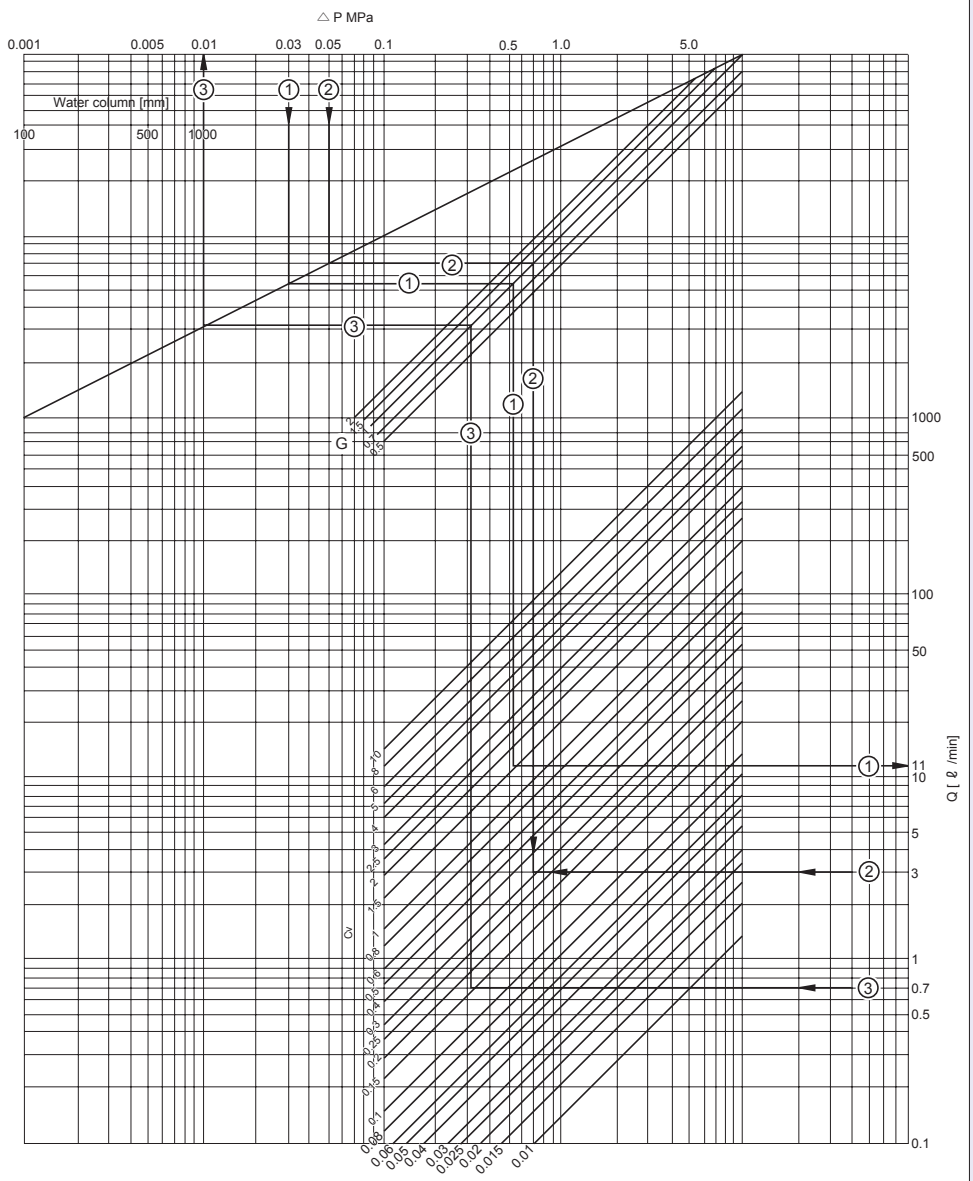
When calculating from effective sectional area
SI units

● $P_1 \geq 1.89\ P_2$: (acoustic velocity)
$Q=113.2 \times S \times P_1$

● $P_1 \leq 1.89\ P_2$: (subsonic velocity)
$Q=226.4 \times S \times \sqrt{P_2(P_1-P_2)}$

Q : Flow rate ℓ /min (ANR)
P_1 : Primary side absolute pressure MPa(abs)
P_2 : Secondary side absolute pressure MPa(abs)
S : Effective cross-sectional area mm^2

Water



Liquid flow rate conversion table

● Example 1:
What is the flow rate when water (specific gravity =1) is passed through a Cv = 1.5 valve at △P = 0.03 MPa (P_1 - P_2)?

Q=11 ℓ/min

● Example 2:
Cv when water (specific gravity = 1) is passed at 3 ℓ/min. at △P = 0.05 MPa

Cv=0.3

● Example 3:
Pressure loss when water (specific gravity = 1) is passed through a Cv = 0.15 valve at 0.7 ℓ/min

P=0.01 MPa

*1: The table shows Cv up to 10. If this value is exceeded, multiply the Cv and flow rate Q proportionally.
Example: If the Cv is 15, refer to 1.5 and multiply the flow rate by 10.

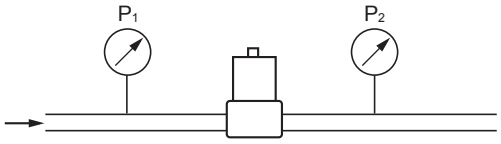
Flow rate calculation method

SI units

$$Q=45.16Cv\frac{\sqrt{P_1-P_2}}{\sqrt{G}}$$

Q : Flow rate ℓ/min

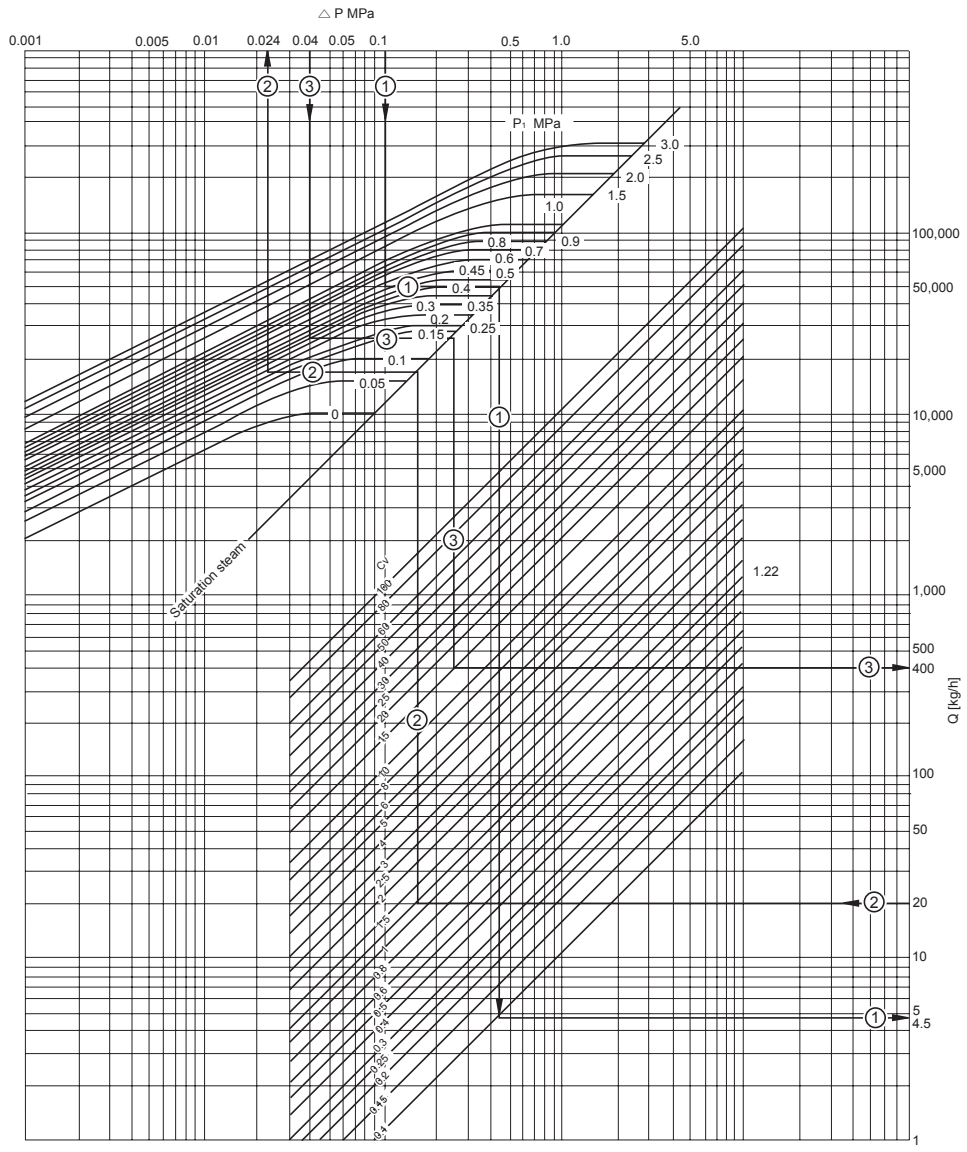
P_1 : Primary side pressure MPa
P_2 : Secondary side pressure MPa
G : Specific gravity (water = 1)
Cv: Flow coefficient



Pressure loss
△P
$\triangle P=P_1-P_2$

Flow rate conversion table — ❷

Steam



Steam flow rate conversion table

● Example 1:
For solenoid valves with flow coefficient Cv = 0.1
P_1=0.5 MPa,
P_2=0.4 MPa
What is the flow rate when saturated steam is passed through (P = P_1 - P_2 = 0.1 MPa)?

Q=4.5 kg/h

● Example 2:
What is the pressure loss when steam is passed through a Cv = 1.22 valve at 20 kg/h at P_1 = 0.2 MPa?

P=0.02 MPa

● Example 3:
What flow rate is attained when a Cv = 150 valve is used at P_1 = 0.3 MPa and P = 0.04 MPa?

Q=4300 kg/h

Note: The table shows Cv up to 100.
If this value is exceeded, multiply the Cv and flow rate Q proportionally.
Example: If Cv is 150, refer to 15 and multiply the flow rate by 10.

Flow rate calculation method

$$W = \frac{97CvP_1}{K} \qquad \text{For } P_2 \leq \frac{P_1}{2}$$

$$W = \frac{194Cv\sqrt{(P_1-P_2)P_2}}{K} \qquad \text{For } P_2 > \frac{P_1}{2}$$

W : Flow rate [kg/h]
P_1 : Primary side absolute pressure MPa (abs)
P_2 : Secondary side absolute pressure MPa (abs)
K : (1 + 0.0013 ts) ts: Degree of superheat
(Saturation steam: K = 1)

Degree of protection

● Degree of protection

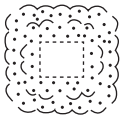
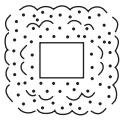
■ IEC (International Electrotechnical Commission) standards (IEC60529)

■ JIS C 0920 : 2003

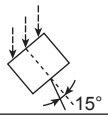
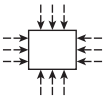
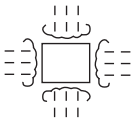
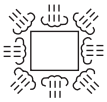
IP-□ □

Protection characteristic codes (International Protection)

1st characteristic No. (degree of protection for foreign solid matter)

1st charact No.	Degree of protection	
0	No protection	Without protection
1	 ø50 mm	Protection against inflow of solids 50 mm and over in diameter
2	 ø12.5 mm	Protection against inflow of solids 12.5 mm and over in diameter
3	 2.5 mm	Protection against inflow of solids 2.5 mm and over in diameter
4	 1 mm	Protection against inflow of solids 1.0 mm and over in diameter
5	Dust-proof 	No inflow of dust at levels adversely affecting normal device operation or safety
6	Dust resistant 	No inflow of dust

2nd characteristic No. (degree of protection for water entry)

2nd charact No.	Degree of protection	
0	No protection	
1	Protection against water dripping 	No harmful effects from water dripping vertically.
2	Protection against dripping water tilted at an angle of up to 15°  15°	Water dripping vertically has no adverse effect when the product is tilted at an angle of up to 15° from its normal position.
3	Protection for watering 	Water falling as a spray at any angle up to 60° from the vertical has no adverse effect.
4	Protection against splashing water 	Water splashing against the product from any direction has no adverse effect.
5	Protection against water jets 	No harmful effects occur even when water is sprayed with nozzles from all directions.
6	Protection against powerful jets 	Water projected in powerful jets against the product from any direction has no adverse effect.
7	Protection against immersion 	Water will not enter the product even when it is immersed in water under defined conditions.
8	Protection against immersion 	The product can be used for continuous immersion in water.

Technical terms, standards and certification

Glossary

[Max. working pressure]

The max. working pressure means the maximum pressure that allows normal operation of the solenoid valve.

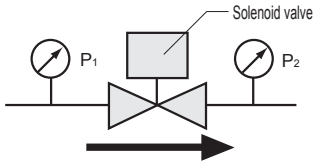
[Max. working pressure differential]

The max. working pressure differential refers to the allowable pressure at which the solenoid valve can be operated safely and accurately. This is the max. pressure differential between input pressure (P1) and output pressure (P2).

[Min. working pressure differential]

The min. working pressure differential refers to the min. pressure difference between inlet pressure (P1) and outlet pressure (P2) required to operate the solenoid valve safely and accurately. With the pilot operated solenoid valve, a pressure higher than the min. working pressure differential is required to open and close the valve. (Does not operate at zero pressure differential.)

▼ For example, if the max. working pressure is 2.0 MPa, the max. working pressure differential 0.7 MPa and the min. working pressure differential 0.03 MPa, operation is possible when the inlet pressure is 2.0 MPa and outlet pressure from 1.3 to 1.97 MPa.



$P_1 - P_2 = \triangle P$
P_1 = Inlet pressure (primary side)
P_2 = Outlet pressure (secondary side)
$\triangle P$ = Max. working pressure differential or min. working pressure differential

[Current value]

The apparent power and power consumption are indicated. Calculate the current as below.

● For alternating current: The apparent power values when starting (rush power) and during holding are indicated. Use the following formula to calculate the starting current (rush current) and holding current (steady current).

$$\text{Current value (A)} = \frac{\text{Apparent power (VA)}}{\text{Voltage (V)}}$$

● For direct current: The power consumption is indicated. Use the following formula to calculate the holding current (steady current).

$$\text{Current value (A)} = \frac{\text{Power consumption (W)}}{\text{Voltage (V)}}$$

[Ambient / fluid temperatures limits]

The solenoid valve's ambient / fluid temperatures are limited by the materials that configure the solenoid valve. These values are particularly determined by the heat proof temperature for the valve sealant material and coil thermal class. Refer to the detailed specifications for the working temperature range of each model.

[Oil-prohibited]

For the oil-prohibited products listed in this catalog, the wetted parts are cleaned before assembly.

Selection criteria for explosion-proof solenoid valves

Danger zones

Areas where explosive gases and air mix at a high enough level to cause an explosion or fire are called danger zones. These zones are classified into Class 0 zones, Class 1 zones and Class 2 zones according to the time and frequency at which the dangerous atmosphere is reached. The explosion-proof structure that can be used is determined according to these classes.

Class 0 zone

Zones where a dangerous atmosphere is or could be continuously generated, and where the concentration of explosive gas is maintained continuously or for a long time above the lower limit for explosions.

Example A: The open space above a flammable fluid inside a container or tank
Example B: Inside a combustible gas container or tank
Example C: Near flammable fluid in an open container

Class 1 zone

(1) Zones where explosive gas could accumulate to a dangerous concentration during normal operations such as the opening/closing of the lid for removing the product or operation of the safety valve, etc.
(2) Zones where explosive gases are likely to accumulate to dangerous concentrations during repair or maintenance or due to leakage, etc.

Example A: Near the opening of a tank lorry or drum can when filling the container with flammable fluid
Example B: Near the access opening when a pressure relief valve operates and discharges explosive gas
Example C: Near the opening of a gas vent in a tank
Example D: Near the access opening when releasing explosive gas for inspection or repair work
Example E: When explosive gas could be released indoors or in a poorly ventilated area
Example F: Inside the shell above the roof of the floating roof tank.
Example G: Zones where explosive gas could leak, and where gas could accumulate further in pits, etc.

Class 2 zone

(1) Zones where combustible gases or flammable fluids are regularly handled, but where the gases and fluids are sealed in a container or equipment, and where the gases and fluids could leak to dangerous concentrations only if the container or equipment breaks by accident or due to misoperation.
(2) Zones where measures to prevent the accumulation of explosive gases are taken with a reliable mechanical ventilation device, but where explosive gases could accumulate to dangerous concentrations if the ventilation device fails.
(3) Zones near or adjacent to a Class 1 zone where explosive gases could infiltrate at a dangerous concentration.

Example A: Zones where explosive gases could leak out if the explosive gas storage container is damaged due to corrosion, etc.
Example B: Zones where operator error could lead to explosive gas leakages or abnormal reactions causing high pressures and high temperatures, destroying the equipment and leaking explosive gases.
Example C: Zones where explosive gases could stagnate and cause a dangerous atmosphere if the forced ventilation system fails.

Explosive gas and explosion-proof structure

The degree of explosive gas danger is classified according to the ignitability and flame-proof grade. Gases with an equivalent risk are grouped into one group, and explosion-proof structure standards are set for each group.
Codes to indicate the type, flame-proof grade and ignitability must be indicated in this order on the electrical components of explosion-proof structures. These codes indicate which flame-proof grade and ignitability class the electrical components have been manufactured for, and which gases can be used.
For the example of explosion-proof solenoid valve of d2G4

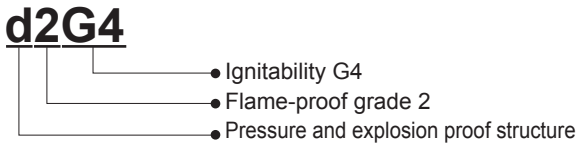


Table 2 indicates the classification of gases with a danger category of G4 ignitability to Grade 2 explosibility that are compatible with the product. Less dangerous gases are also listed that are guaranteed to be flame-proof.
Ignitability refers to the degree of igniting risk, and is classified into five grades according to the igniting point. The codes shown in Table 1 are used. Higher numbers indicate a higher risk that the gas will ignite at low igniting temperatures.
Flame-proof grade refers to the risk of fire leaping to the exterior from small gaps. The level is classified into three grades according to the gap, and the codes shown in Table 1 are used. It can be said that this flame-proof grade expresses the size of the explosive energy. Higher numbers indicate more dangerous gases with higher explosive energy that can cause flames to pass through small gaps and leap to the exterior.

Types of explosion-proof structures

The following six types of explosion-proof structures are available according to the type of device, type of explosive gas and danger zone, etc., Use the structure that matches the application.

(1) Pressure and explosion proof structure
(2) Internal pressure and explosion proof structure
(3) Hydraulic explosion proof structure
(4) Essential safety explosion-proof structure
(5) Increased safety explosion-proof structure
(6) Special explosion-proof structure

The CKD explosion-proof solenoid valves incorporate a pressure and explosion-proof structure having the highest safety and reliability within this type.

Selection procedure for explosion proof solenoid valves

(1) Identify the type of the explosive gas.
(2) Determine the flame-proof grade and ignitability of the explosive gas with Table 2.
(3) Determine the danger zone class.
(4) Determine the type of explosion-proof structure according to the danger zone class.

Class 0 —— Essential safety explosion-proof structure
Class 1 —— Pressure and explosion proof structure, essential safety explosion proof structure
Class 2 —— Pressure and explosion proof structure, increased safety explosion proof structure, essential safety explosion proof structure

(5) Determine the explosion-proof performance.
(6) By determining the application, working fluid, fluid pressure, flow rate, port size, voltage, etc., in the same manner as general purpose solenoid valve selection, the required solenoid valve can be determined.

Note

There are various limits applied to the explosion-proof solenoid valves. When placing an order, verification must be obtained from a verifying agency each time the structure is changed. This will delay the delivery schedule, and can increase costs. Thus, use of the standard parts is recommended.
Do not disassemble or modify the delivered parts since they are already approved. If the part must be disassembled or modified, contact CKD.

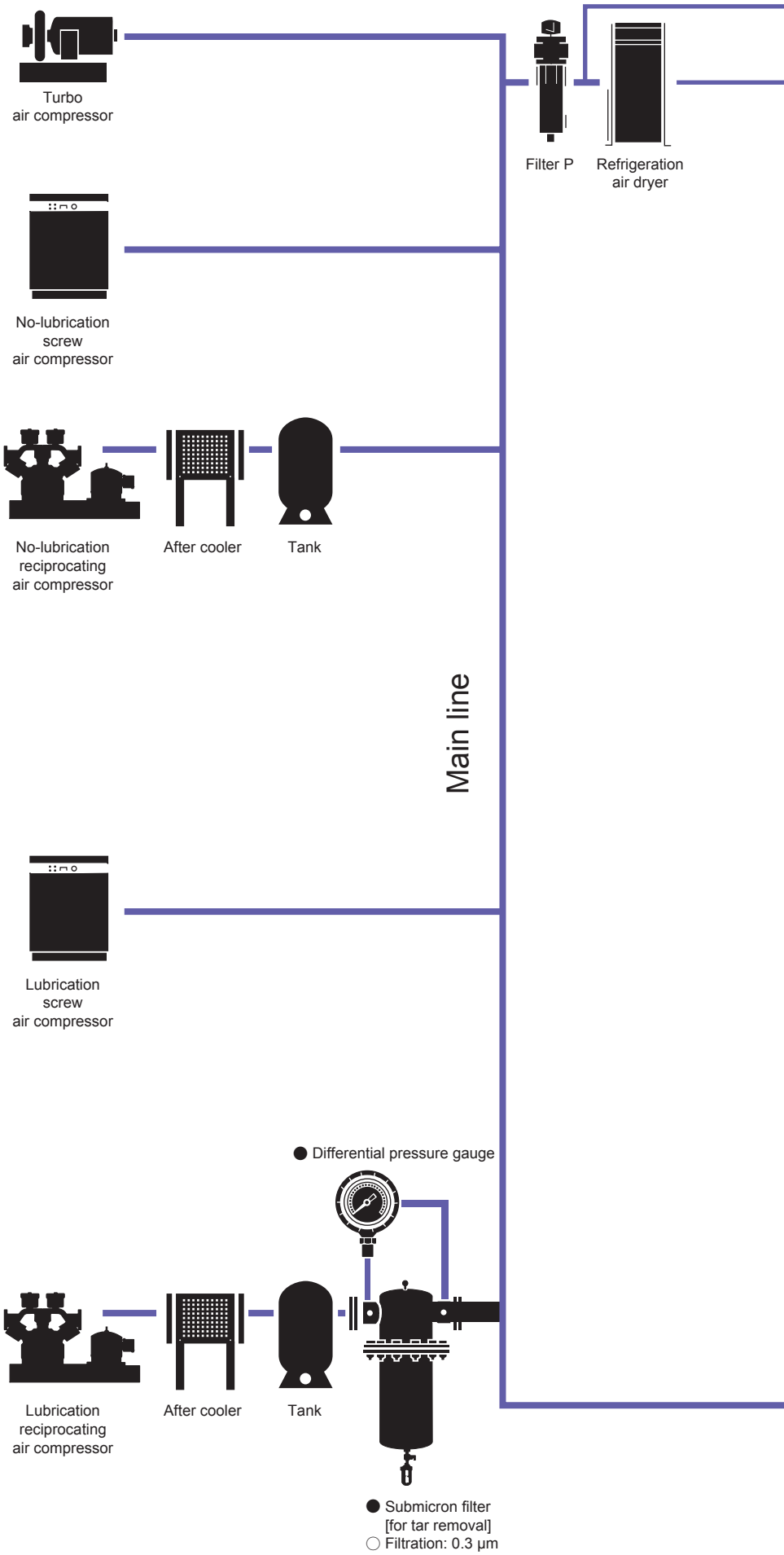
Table 1

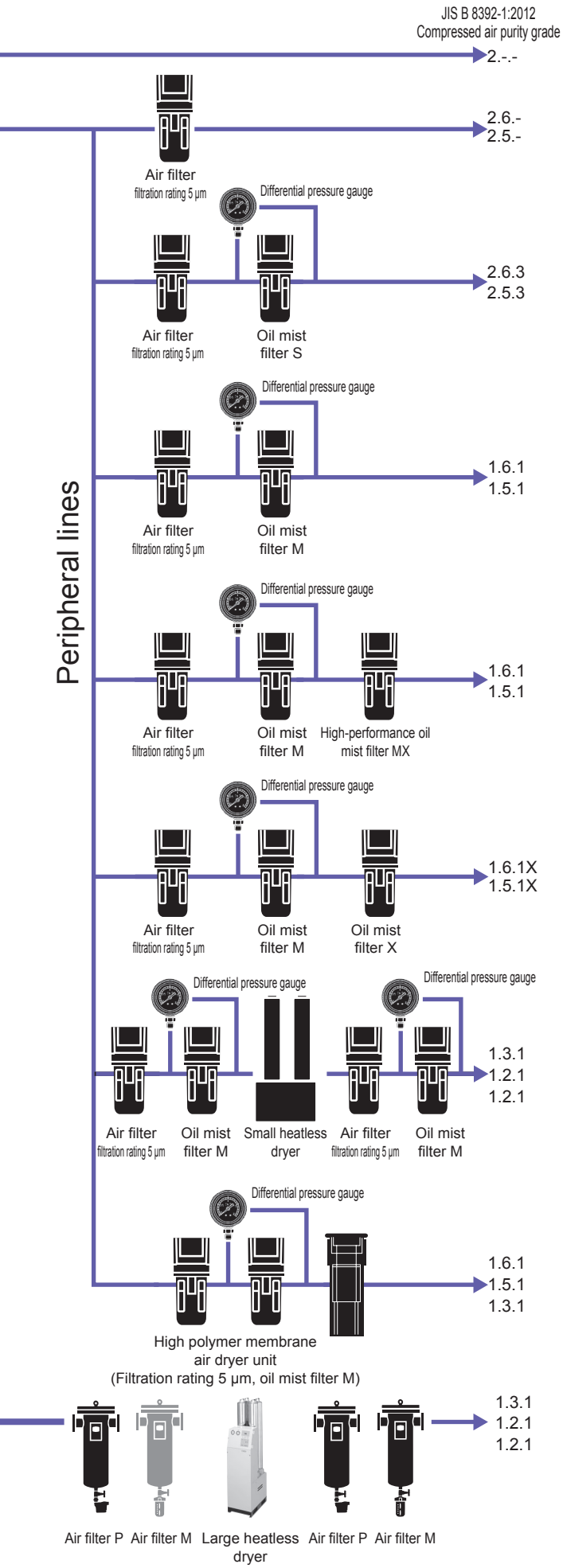
	Description	Code
Ignitability	Ignitability G1	G1
	" G2	G2
	" G3	G3
	" G4	G4
	" G5	G5
Flame-proof grade	Flame-proof grade 1	1
	" 2	2
	" 3	3

Table 2

Flame-proof grade	Ignitability				
	G1	G2	G3	G4	G5
1	Acetone Ammonia Carbon monoxide Ethane Acetic acid Ethyl acetate Toluene Propane Benzene Methanol Methane	Ethanol Isopentyl acetate 1-butanol butane Non-aqueous acetic acid	Gasoline Hexane	Acetaldehyde Ethyl ether	
2	Coal gas	Ethylene Ethylene oxide	Isoprene		
3	Water gas Hydrogen	Acetylene			Carbon disulfide

Compressed air cleaning guide





JIS B 8392-1:2012 Compressed air purity grade	Impurities in compressed air: Solids (nominal value)	Moisture	2ndary side oil conc (21°C)	Odor		Applications	General pneumatic	Dry air
2.-.-	1 µm	-	-	-	Remove water drops/ dust particles	· Construction, civil engineering machinery · Air for cleaning (dry air not required)	●	
2.6.3	0.3 µm	Pressure dew point 10°C	0.5 mg/m³	-	General dry air	· Air tool · Air drill · Air screwdriver · Air grinder · Labor-saving device · Pneumatic jigs and tools · Air chuck · Air vice · Precision part cleaning air blow	●	
2.5.3		Pressure dew point 7°C						
1.6.1	0.01 µm	Pressure dew point 10°C	0.01 mg/m³	-	Oil-free clean dry air	· Instrumentation · Measurement · Logic control · Luxury painting · Precision mining industry		●
1.5.1		Pressure dew point 7°C						
1.6.1	0.01 µm	Pressure dew point 10°C	0.001 mg/m³	-	Ultra-oil-free clean dry air	· Precise measurement · Luxury painting		●
1.5.1		Pressure dew point 7°C						
1.6.1	0.01 µm	Pressure dew point 10°C	0.003 mg/m³	None	Odorless air	· Food industry · Pharmaceutical industry · Stirring/ transportation/drying · Packing/brewing air		●
1.5.1		Pressure dew point 7°C						
1.3.1	0.01 µm	Pressure dew point -20°C	0.01 mg/m³	-	Ultra dry air	· Drying computer rooms · Drying furnace gas · Ozone generator · Drying the insulation gas of a high-voltage generator · Drying the air supply of a high-voltage breaker · Central control instrumentation		●
1.2.1		Pressure dew point -40°C						
1.2.1		Pressure dew point -60°C						

*1: The system No. is based on the class below.
X in the table below indicates odor removal. "-" indicates no specification.

*2: The table shows the highest compressed air purity grade that can be achieved by the CKD clean air system. The grade varies depending on the condition at the filter inlet.

JIS B 8392-1:2012 Compressed air purity grade

Grade	Solid particle: Max. number of particles per 1 m³ for particle diameter d (µm) 0.1 < d ≤ 0.5	0.5 < d ≤ 1.0	1.0 < d ≤ 5.0	Mass concentration Cp mg/m³	Humidity and moisture: Pressure dew point °C	Water concentration Cw g/m³	Oil: Total oil concentration mg/m³
0	Conditions stricter than Grade 1 to be specified by user or supplier.						
1	≤ 20,000	≤ 400	≤ 10	-	≤ -70	-	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	-	≤ -40	-	≤ 0.1
3	-	≤ 90,000	≤ 1,000	-	≤ -20	-	≤ 1
4	-	-	≤ 10,000	-	≤ +3	-	≤ 5
5	-	-	≤ 100,000	-	≤ +7	-	-
6	-	-	-	0 < Cp ≤ 5	≤ +10	-	-
7	-	-	-	5 < Cp ≤ 10	-	Cw ≤ 0.5	-
8	-	-	-	-	-	0.5 < Cw ≤ 5	-
9	-	-	-	-	-	5 < Cw ≤ 10	-
X	-	-	-	Cp>10	-	Cw>10	>5

JIS B 8392-1:2003 has been revised to JIS B 8392-1:2012.

For example,

What is Grade 1:2:1?

- Solid particles 0.1 to 0.5 µm are 20,000 particles or less, 0.5 to 1.0 µm are 400 particles or less, and 1.0 to 5.0 µm are 10 particles or less
- Pressure dew point -40°C or less
- Oil concentration 0.01 mg/m³ or less.

Safety Precautions

Be sure to read this section before use.

When designing and manufacturing equipment using CKD products, the manufacturer is obligated to ensure that the safety of the mechanism, pneumatic control circuit and/or water control circuit and the system that runs the electrical controls are secured.
It is important to select, use, handle and maintain CKD products appropriately to ensure their safe usage.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠ WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience.

2 Use this product in accordance with specifications.

This product must be used within its stated specifications. In addition, never modify or additionally machine this product.
This product is intended for use in general industrial machinery equipment or parts. It is not intended for use outdoors (except for products with outdoor specifications) or for use under the following conditions or environments. (Note that this product can be used when CKD is consulted prior to its usage and the customer consents to CKD product specifications. The customer should provide safety measures to avoid danger in the event of problems.)

❶ Use for applications requiring safety, including nuclear energy, railways, aircraft, marine vessels, vehicles, medical devices, devices or applications in contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
❷ Use for applications where life or assets could be significantly affected, and special safety measures are required.

3 Observe organization standards and regulations, etc., related to the safety of the device design and control, etc.

ISO4414,JIS B 8370(Pneumatic fluid power - General rules and safety requirements for systems and their components)
JFPS2008(Principles for pneumatic cylinder selection and use)
Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of the entire system related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn OFF the energy source (air supply or water supply), and turn OFF power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure to secure system safety, such as pop-out prevention measures.

5 Observe the warnings and cautions on the following pages to prevent accidents.

■ Precautions are ranked as “DANGER”, “WARNING”, and “CAUTION” in this section.

⚠ DANGER: In the case where the product operation is mishandled and/or when the urgency of a dangerous situation is high, it may lead to fatalities or serious injuries.

⚠ WARNING: A dangerous situation may occur if handling is mistaken, leading to fatal or serious injuries.

⚠ CAUTION: A dangerous situation may occur if handling is mistaken, leading to minor injuries or property damage.

Note that some items indicated with “CAUTION” may lead to serious results depending on the conditions.
All items contain important information and must be observed.

Warranty

1 Warranty period

The product specified herein is warranted for one (1) year from the date of delivery to the location specified by the customer.

2 Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified above, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.

However, following failures are excluded from this warranty:

1) Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or the Instruction Manual.
2) Failure caused by use of the product exceeding its durability (cycles, distance, time, etc.) or caused by consumable parts.
3) Failure not caused by the product.
4) Failure caused by use not intended for the product.
5) Failure caused by modifications/alterations or repairs not carried out by CKD.
6) Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
7) Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

Note: For details on the durability and consumable parts, contact your nearest CKD sales office.

3 Compatibility check

The customer is responsible for confirming the compatibility of CKD products with the customer's systems, machines and equipment.

Precautions for export

1 Security Trade Control

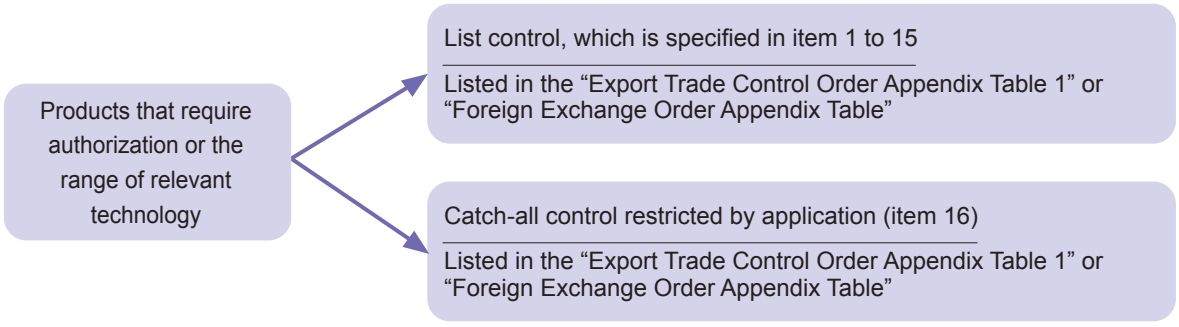
The products in this catalog and their related technologies may require approval before export or provision.

For the sake of maintaining world peace and safety, there may be cases in which approval under the Foreign Exchange and Foreign Trade Control Law is required in advance, depending on the country to where the product or related technology is being exported or provided.

The scope of products and related technologies requiring approval are listed in the Export Trade Control Order Appendix Table 1 or Foreign Exchange Order Appendix Table.

The Export Trade Control Order Appendix Table 1 and Foreign Exchange Order Appendix Table contain the following two types of information.

· "List controls" specified for items 1 to 15
· "Catch-all controls" that do not indicate specifications by item, but restriction by application (Section 16)



An application for approval is received by the Security Export Licensing Division of the Ministry of Economy, Trade and Industry or local bureaus of the Ministry of Economy, Trade and Industry.

2 Products and related technologies in this catalog

The products and related technologies in this catalog are subject to the catch-all control of the Foreign Exchange and Foreign Trade Control Law.

When exporting or providing the products or related technologies in this catalog, ensure that they are not used for arms or weapons.

3 Contact

Contact your local CKD Sales Office for information on the Security Trade Control of products and related technologies in this catalog.

Safety precautions

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Design/selection

1. Safety design

⚠WARNING

■ This product cannot be used as an emergency shutoff valve.
The valves listed in this catalog are not designed as valves to ensure safety such as emergency shutoff valves. When using in such a system, always take separate measures that will ensure safety.

■ Take measures to prevent physical harm or property damage in the event of failure of this product.

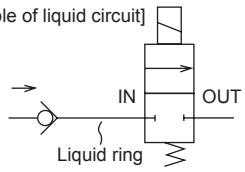
⚠CAUTION

■ Leakage current from other fluid control components
When using a PLC with a CR circuit to absorb the surge voltage generated from switching elements, etc., the leakage current could adversely affect the operation of the solenoid valve. Keep leakage current to less than the value given in the safety precautions for each product in this catalog or the value given for each product.

■ Min. working pressure differential
Use the pilot valve at a pressure higher than the min. working pressure differential within the specifications listed in this catalog.

■ Liquid ring
When liquid is to be passed, and a circuit of the liquid seal is formed, the pressure could rise due to changes in the temperature and operation may be disabled; some products may also suffer damage to parts. Prevent a liquid ring circuit by providing a relief valve in the system.

[Example of liquid circuit]



■ Vibration
Install this product in a place not subject to vibration.

2. Working fluid

⚠WARNING

■ Working fluids

(1) Do not use any fluid other than the working fluids specified in the catalog.
(2) Before starting use, check the compatibility between the product and working fluid with the working fluid check list (Intro Pages 39 to 47).
(3) Depending on the water quality, the copper alloy body could corrode due to the degalvanizing phenomenon. This may lead to internal leakage. Carry out a periodic inspection every six months, and replace with a stainless steel body if any abnormalities are found.
(4) Depending on the model, internal parts may wear when the valve operates. Caution is required because wear chips could enter the secondary side of the valve.
(5) If rust must be avoided, select a component whose metal sections are not wetted.

■ Quality of fluid
Iron rust and debris in the fluid can cause operation faults or leaks and deteriorate product performance. Provide measures to remove foreign matter.

■ Fluid temperature
Use the product within the fluid temperature range.

3. Working environment

⚠WARNING

■ Only explosion-proof solenoid valves and air operated valves can be used in an explosive atmosphere.
Select either an explosion-proof solenoid valve or air operated valve for use within an explosive atmosphere.

■ When using with AC voltage, a thrumming noise may be heard depending on the working conditions.
If the thrumming noise is a problem because of the working environment, select a coil with a diode or DC voltage.

■ Do not use this product in a corrosive gas atmosphere or an atmosphere that could affect the component materials.

■ Do not use this product near a heat generating source or in a location where it may be exposed to radiant heat.

■ Use this product within the specified ambient temperature range.

■ When using this product in a cold climate, take the necessary measures to prevent freezing.
When wrapping insulation around the solenoid valve, etc., do not wrap around the coil section.

■ Take appropriate safeguards according to the degree of protection listed in the catalog specifications.
Consult with CKD when using outdoors.

■ Take appropriate safeguards when using this product in places where oil or welding spatter, etc. could come in contact with it.

4. Securing of space

⚠CAUTION

■ Securing maintenance space
Secure sufficient space for maintenance and inspection.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Mounting, installation and adjustment

1. Installation

⚠CAUTION

- Be sure to read the instruction manual thoroughly before installing the product.
- In the case of models with solenoid valves, do not apply external force to the coil during installation.
- After installation, check for leaks from pipes, for proper wire connections and that the product is installed correctly.

2. Piping

⚠CAUTION

- Observe the effective thread length for the piping threads.
  Chamfer the end of the thread section by approx. a half-pitch.
- Before piping, flush the inside of the pipe with 0.3 MPa of air, and remove foreign matter such as dirt, metal chips, rust and sealing tape.
- If excessive sealant (sealing tape, gel-type sealant) is applied when piping, it could enter the product and cause malfunctions.
- When applying or wrapping sealant on the piping material, apply or wind it from the pipe end along the thread section, and leave 1.5 to 2 threads uncovered.
- Dirt or foreign matter in fluid could prevent the product from functioning correctly.
  Install an 80 mesh or more filter for water flow, and a 5 μm or less filter for air flow.
- Make sure not to use the wrong supply port when connecting the pipes to the product.
- Install a by-pass circuit and use an elbow union for piping to simplify the maintenance and repair work.
- When controlling fluid in a tank, pipe at a level slightly above the bottom of the tank.
- When using steam for the working fluid, provide piping that prevents drainage from accumulating on the primary side of the solenoid valve. Otherwise, malfunction will occur.
- Refer to the table below for the piping tightening torque.

[When body is aluminum]

Piping nominal diameter	Recommended piping tightening torque (Nm)
Rc1/8	7 to 9
Rc1/4	12 to 14
Rc3/8	22 to 24
Rc1/2	28 to 30
Rc3/4	31 to 33
Rc1	36 to 38
Rc1 1/4	40 to 42
Rc1 1/2	48 to 50
Rc2	54 to 56

[When the body material is other than aluminum]

Piping nominal diameter	Recommended piping tightening torque (Nm)
Rc1/8	18 to 20
Rc1/4	23 to 25
Rc3/8	31 to 33
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86
Rc1 1/4	97 to 100
Rc1 1/2	104 to 108
Rc2	132 to 136
Rc2 1/2	146 to 150

Note: For NPT threads, values recommended for Rc threads with the same size apply.

[When using a push-in fitting for pneumatic use]

Port thread	Recommended tightening torque values (Nm)
M3	0.3 to 0.6
M5	1 to 1.5
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18
Rc3/4	19 to 40
Rc1	41 to 70

3. Wiring

⚠CAUTION

- Use with the allowable voltage range. Usage outside the allowable voltage range may lead to malfunction or coil damage.
- Provide a circuit breaker, such as a fuse, on the control circuit to protect electrical equipment.
- If the electric circuit system is vulnerable to solenoid surge, use a solenoid with a surge suppressor (optional), or insert a surge absorber, etc., in parallel to the solenoid. (Note that this does not apply to the motorized ball valve series.)
- As a guide, use a wire with a nominal cross section of 0.5 mm^2 or more. Make sure that excessive force is not applied to the lead wire.
- When using an explosion-proof solenoid valve, follow the Recommended Practices for Explosion-protected Electrical Installations in General Industries when wiring.
- Use of a switching circuit which does not generate contact chattering will increase the durability of the solenoid valves and motor driven valves.

Use/maintenance

1. Maintenance and inspection

⚠ WARNING

- Do not touch coils or actuators with hands or body while the power is ON or immediately after it is turned OFF.
  The solenoid valve coil and actuator will heat up when energized. Depending on the product, direct contact could cause burns and so use caution.

- Do not touch the electrical wiring connections (bare, live parts) with hands or body when they are energized. There is a risk of electric shock.
  Touching electrical wiring connections while power is on may lead to electrical shock.

- Use this product under the max. working pressure and max. working pressure differential.

- To ensure ideal use, inspect the product every six months. This frequency varies with the frequency of use.

⚠ CAUTION

- Do not use valves as footing or place any heavy objects on top of the valves.

- If the product is continuously energized or not frequently used, periodically inspect it since malfunction may occur depending on the use condition.

- If the product has been out of use for one month or more, perform a test run before starting the actual operation.

- Carefully read the instruction manual before starting maintenance.

- Always turn the power OFF and release any fluids or pressure before starting maintenance.

- Pay attention to clogging of the strainer and filter.

2. Disassembly/assembly

⚠ CAUTION

- When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent. (Note that the rubber parts must be replaced. There is a risk of expansion.)

- When the product will not be used for one month or more after using water or hot water, completely remove any water or hot water left in the product. Water or hot water residue will cause rusting and may lead to malfunction or leaks.
  If residual water cannot be eliminated, operate the valve several times a day and pass water through to ensure ideal use.

- Contact CKD with questions about repair parts, etc.

How to connect terminal box

■ Compact terminal box (G1/4), compact terminal box with lamp (G1/4)

①Use the following cabtyre cable.

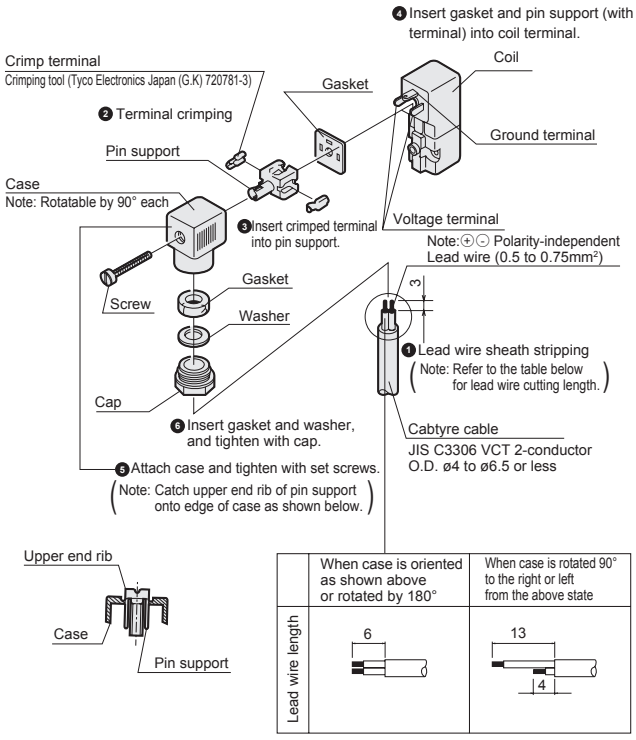
· Cable O.D.: ø4 to ø6.5 · Nominal sectional area: 0.5 to 0.75 mm^2

②Put the crimp terminal on the cabtyre cable's lead wire, and crimp the terminal with the designated tool.

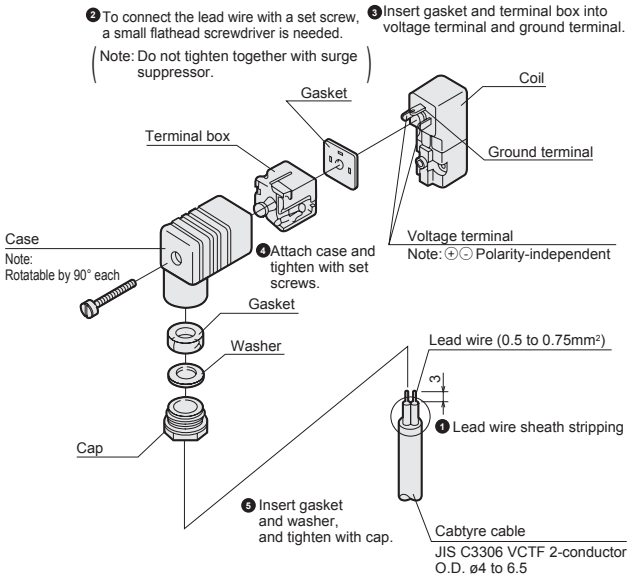
(A crimp terminal is not required for a terminal box with lamp.)

③Tighten the screws with the following tightening torque.

· Set screw tightening torque: 0.3 N·m



Wire with steps ❶ to ❻.
[For compact terminal box (G1/4)]



*The orientation of the cord can be changed by removing the terminal block from the case, rotating it by 90°, and then replacing the block into the case.

Wire with steps ❶ to ❺.
[For compact terminal box with light (G1/4)]

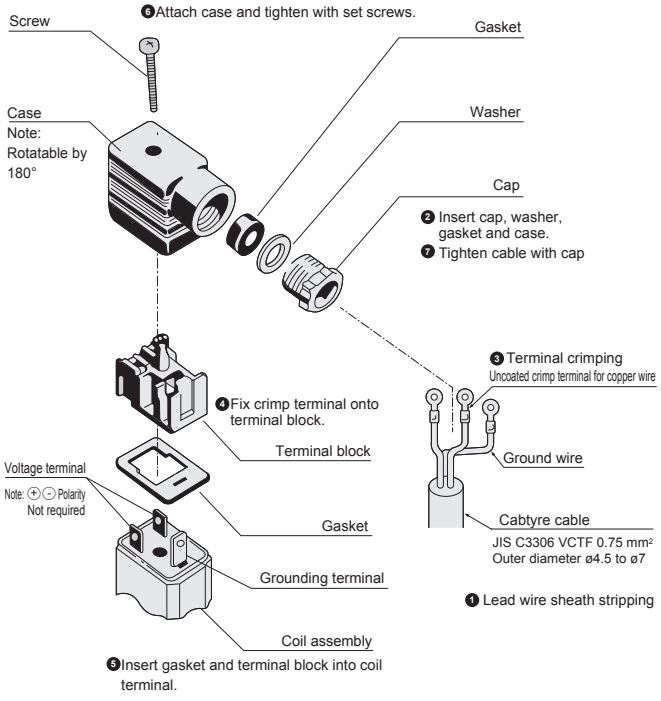
How to connect terminal box

■ DIN terminal box (Pg9), DIN terminal box with lamp (Pg9)

(1) Use the following cabtyre cable.
·Cable O.D.: ø4.5 to ø7 · Nominal sectional area: 0.75 mm^2

(2) Put the crimp terminal for copper wire on the cabtyre cable's lead wire and crimp the terminal. The terminal box thread size is M3.

(3) Tighten the screws with the following tightening torque.
· Set screw tightening torque: 0.5 N·m ·Terminal screw tightening torque: 0.5 N·m



Wire with steps ❶ to ❼.

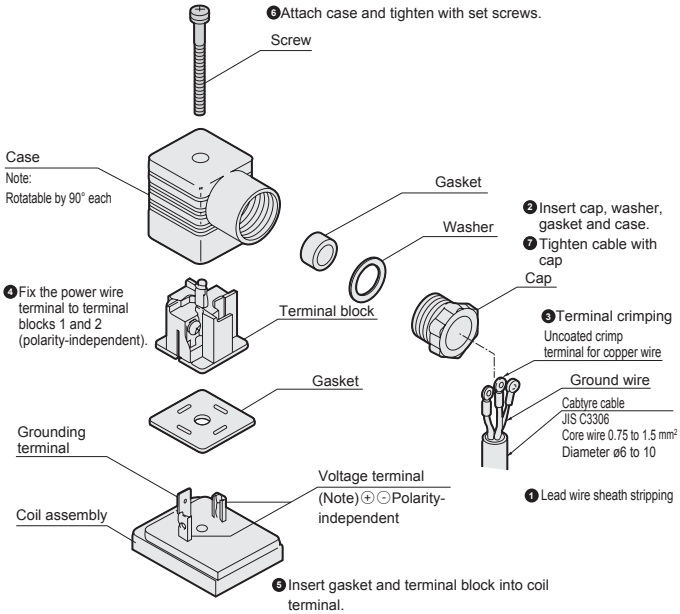
*The orientation of the cord can be changed by removing the terminal block from the case, rotating it by 180°, and then replacing the block into the case.

■ DIN terminal box (Pg11, G1/2), DIN terminal box with lamp (Pg11)

(1) Use the following cabtyre cable.
·Cable O.D.: ø6 to ø10 · Nominal sectional area: 0.5 to 1.5 mm^2

(2) Put the crimp terminal for copper wire on the cabtyre cable's lead wire and crimp the terminal. The terminal box thread size is M3.

(3) Tighten the screws with the following tightening torque.
· Set screw tightening torque: 0.5 N·m ·Terminal screw tightening torque: 0.5 N·m



Wire with steps ❶ to ❼.

*The orientation of the cord can be changed by removing the terminal block from the case, rotating it by 90°, and then replacing the block into the case.

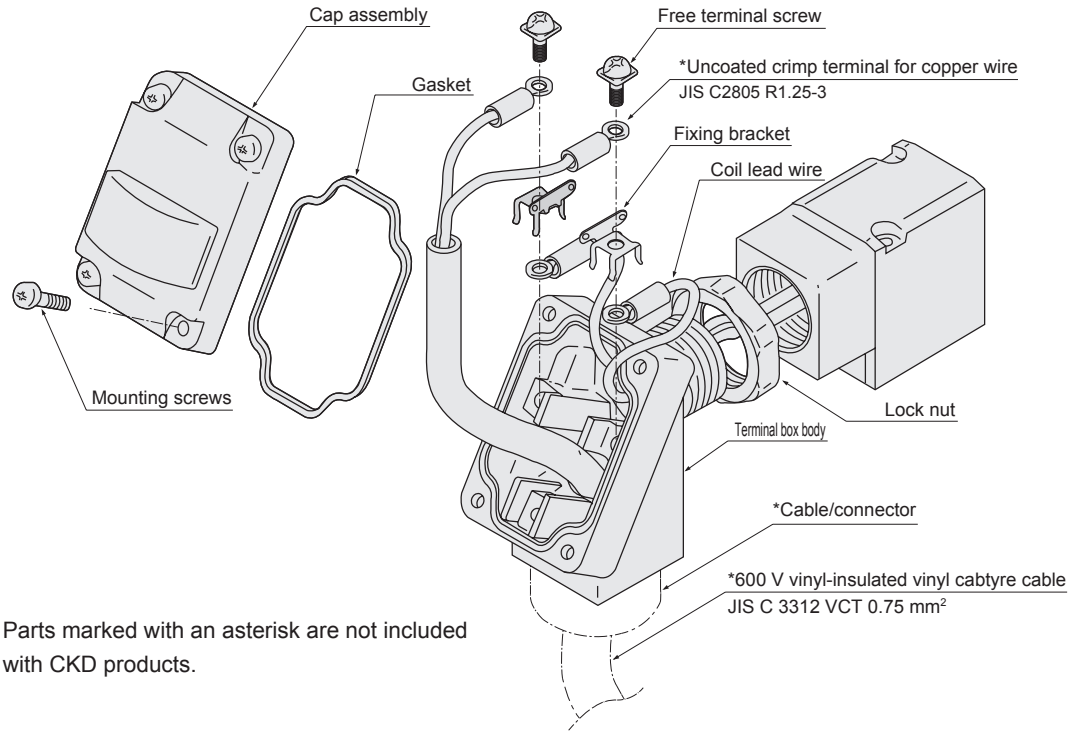
How to connect terminal box

■ T type terminal box (G1/2), T type terminal box with lamp (G1/2)

(1) Use the following cabtyre cable.
· Nominal sectional area: 0.75 mm^2

(2) Put the crimp terminal for copper wire on the cabtyre cable's lead wire and crimp the terminal. The terminal box thread size is M3.

(3) Tighten the screws with the following tightening torque.
· Mounting screw tightening torque: 0.5 N·m
· Terminal screw tightening torque: 0.5 N·m



Parts marked with an asterisk are not included with CKD products.

* Changing the orientation of T type terminal box

Use the following steps to change the orientation of the T type terminal box from the default state.

(1) Hold the width across flats (25 width) of the T type terminal box with a tool (adjustable wrench, wrench, etc.), and loosen it by turning counterclockwise.

(2) Loosen the lock nut.

(3) Rotate the T type terminal box clockwise to approx. 15° before the required position.

(4) Tighten the lock nut to the coil side by hand until it is lightly tightened.

(5) Hold the width across flats of the T type terminal box with a tool, and rotate it (approx. 15°) to tighten it to the required position.

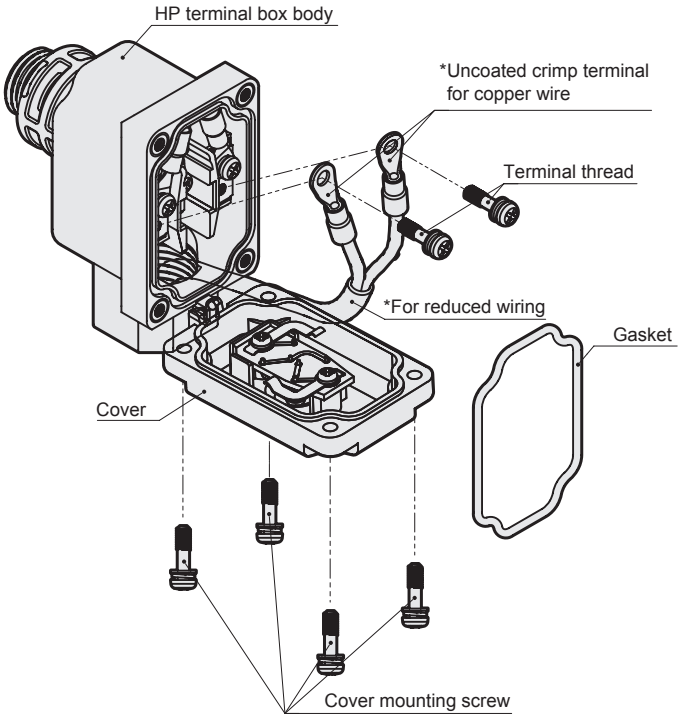
Note: When further tightening the terminal box to change the orientation from the default position, rotate it within 1/2 turn.

How to connect terminal box

■ How to connect HP terminal box

(1) Put the crimp terminal for copper wire on the electric wire and crimp the terminal.

(2) The terminal screw size is M3.
Tighten the screws with the following tightening torque.
· Cover mounting screw tightening torque: 0.5 N·m
· Terminal screw tightening torque: 0.5 N·m



Parts marked with an asterisk are not included with CKD products.

(3) The wiring will be as follows according to the number of lead wires from the coil.

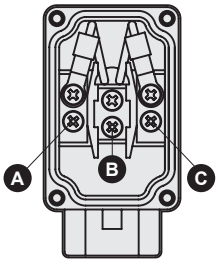
(i) For two lead wires
Wire to the A terminal and C terminal on the terminal board. Polarity-independent except in case of (ii)

(ii) For DC voltage terminal box with light and two lead wires
There is polarity, so wire the "⊖" pole to the terminal board's A terminal and the "⊕" pole to the C terminal.

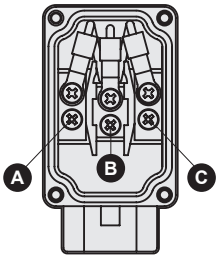
(iii) For three lead wires
The operating frequency
· For 50 Hz: A terminal and C terminal
· For 60 Hz: A terminal and B terminal

[Wiring diagram]

For two lead wires



For three lead wires



EXA/FWD/ HNB/G1/USB/G2/USB/G3

Compact 2, 3-port solenoid valve

■ **For compressed air/water/dry air/low vacuum [1.33 x 10^2 Pa(abs)]**

CONTENTS

⚠ Always read the precautions in the Introduction and on page 40 before use.

Series variation

Compact 2, 3-port solenoid valve

No. of ports	Model		Configuration	Actuation category	
2-port		EXA Push-in fitting	Single unit	NC (open when energized)	
		GEXA Push-in fitting	Manifold	NC (open when energized)	
		EXA Aluminum body	Single unit	NC (open when energized)	
		FWD	Single unit	NC (open when energized)	
		HNB1	Single unit	NC (open when energized)	
		USB2	Single unit	NC (open when energized)	
		USB3	Single unit	NC (open when energized)	
3-port		HNG1	Single unit	Universal	
		USG2	Single unit	Universal	
		USG3	Single unit	Universal	
2-port/3-port		US (resin body)	Single unit	NC (open when energized)/ universal	

	Port size	Working fluid	Page
	ø6, 8, 10, 12 push-in fitting	Compressed air	6
	ø6, 8, 10, 12 push-in fitting	Compressed air	10
	Rc1/4,Rc3/8	Compressed air	14
	Rc1/4 Rc3/8 Rc1/2 Rc3/4 Rc1	Water	16
	M5	Compressed air/water/dry air/low vacuum (1.33 × 10^2 Pa(abs))	24
	M5	Compressed air/water/dry air/low vacuum (1.33 × 10^2 Pa(abs))	28
	Rc1/8	Compressed air/water/dry air/low vacuum (1.33 × 10^2 Pa(abs))	30
	M5	Compressed air/water/dry air/low vacuum (1.33 × 10^2 Pa(abs))	26
	M5	Compressed air/water/dry air/low vacuum (1.33 × 10^2 Pa(abs))	32
	Rc1/8	Compressed air/water/dry air/low vacuum (1.33 × 10^2 Pa(abs))	34
	M6, barbed fitting, 1/4-28UNF	Compressed air/water/pure water/dry air/ low vacuum (1.33 × 10^2 Pa(abs))	36

What we can do to save

Flow rate

450ℓ/min or more

(ø6 fitting Primary pressure: 0.5 MPa Secondary pressure: Estimated value at atmospheric release*)

Power consumption

0.6W

Oil-prohibited type

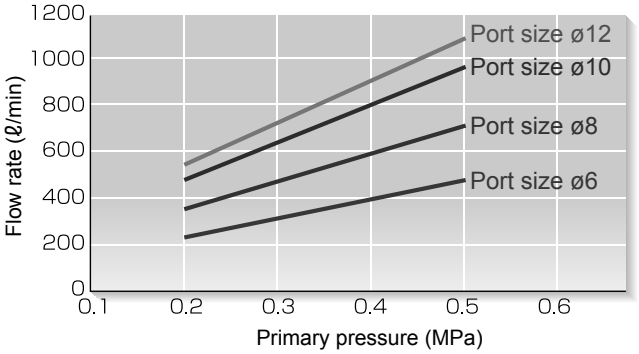
Ideal for an environment not suited to oil

Achieves large flow rate and low power consumption

Employs a pilot actuator with a low power consumption (0.6 W) 3-way valve, enabling a large flow rate and low power consumption. (PC direct drive available)

Downsizing device port size contributes to energy saving.

Flow rate at secondary atmospheric pressure release



Push-in fittings are standard

The use of a body with push-in fitting contributes to reduced work hours.

Now available as screw-type (aluminum body) compatible.

Compatible connections
- Push-in fitting: **ø6, ø8, ø10, ø12**
- Screw-in: **Rc1/4, Rc3/8**

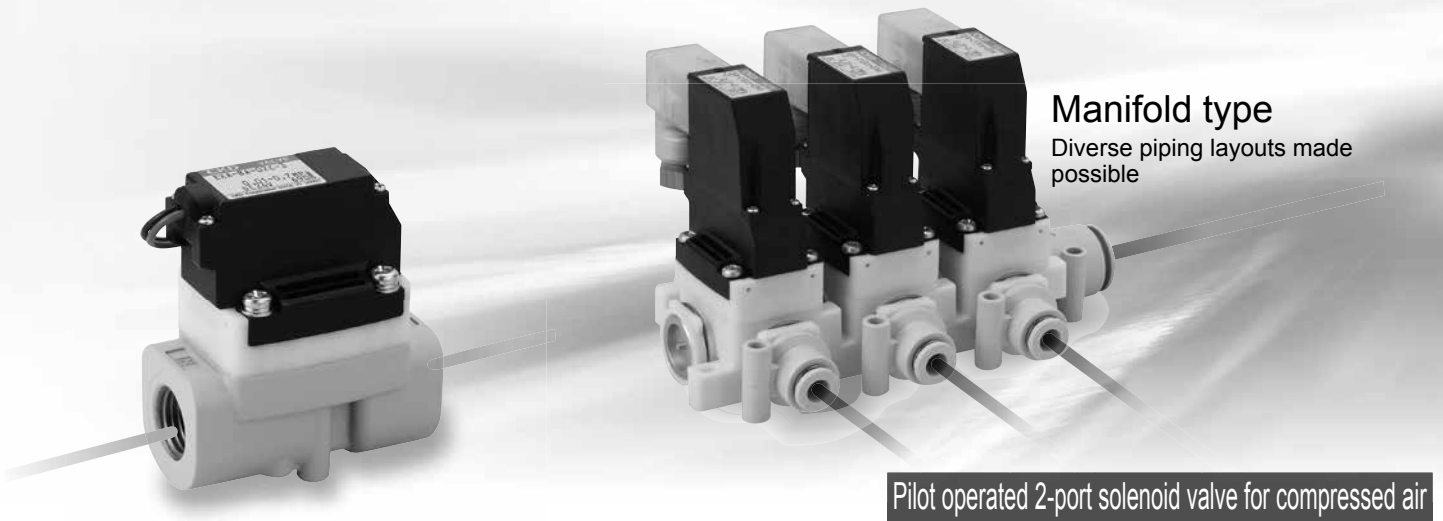
Compact and lightweight

The use of our proprietary pilot type enables a far more compact coil actuator.

Weight reduction is also achieved by using resin for the body.

*** Flow rate varies according to piping/pressure conditions. Check with the actual device/equipment and be sure to refer to pages 40 to 45 before use.**

energy for air blow



Manifold type
Diverse piping layouts made possible

Aluminum body

Pilot operated 2-port solenoid valve for compressed air

EXA Series

Wide variety of options and variations

Options

1 DIN terminal box with M12 connector cable available (24 VDC only)

2 Oil-prohibited specifications (grease-free) compatible

3 Aluminum body ($Rc^{1}/_{4}$, $Rc^{3}/_{8}$)

* Refer to page 44 for oil-prohibited specifications.

Variations

1 Lineup of manifolds
Lightweight, compact manifold with resin body, changeable IN port.

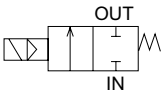
Pilot operated 2-port solenoid valve for compressed air

EXA Series

- NC (open when energized)
- Port size: Push-in fitting ø6, ø8, ø10, ø12
- Diaphragm drive

JIS symbol

- NC (open when energized)



Specifications

Item	EXA-C6	EXA-C8	EXA-C10	EXA-C12
Working fluid	Compressed air			
Working pressure differential MPa	0.01 (≈1.7 psi, 0.1 bar) to 0.7 (≈100 psi, 7 bar)			
Max. working pressure MPa	0.7 (≈100 psi, 7 bar)			
Proof pressure (water pressure) MPa	1.05 (≈150 psi, 10.5 bar)			
Fluid temperature °C	0 (32°F) to 55 (131°F) (no freezing)			
Ambient temperature °C	-5 (23°F) to 55 (131°F)			
Atmosphere	Place free of corrosive gas/explosive gas and not exposed to water			
Valve structure	Pilot operated diaphragm drive			
Internal leakage cm^3/min	2 or less			
External leakage cm^3/min	2 or less			
Mounting orientation	Unrestricted			
Port size	Push-in fitting ø6	Push-in fitting ø8	Push-in fitting ø10	Push-in fitting ø12
C[$dm^3/(s \cdot bar)$]	1.6	3.0	3.3	3.6
b	0.45	0.33	0.26	0.20
Weight *1 g	56	57	68	69
Electrical specifications				
Rated voltage	100 VAC(50/60 Hz), 24 VDC, 12 VDC *2			
Apparent power VA	1.2			
Power consumption W DC	0.6			
Thermal class	Class 130 (B)			
Degree of protection (IEC standard: 529)	Lead wire: IPX0, with DIN terminal box: IPX5			

*1 : Weight with the DIN terminal box is +20 g.
*2 : The voltage fluctuation range is ±10%.

How to order

EXA - C6 - 0 2C B - 1

Model No.

Ⓐ Connected tube outer diameter

Ⓑ Sealant

Ⓒ Coil option

Ⓓ Other options

Ⓔ Voltage

[Example of model No.]
EXA-C6-02CB-1
Model : Compact air blow valve EXA

Ⓐ Connected tube outer diameter : ø6
Ⓑ Sealant : H-NBR
Ⓒ Coil option : Lead wire
Ⓓ Other options : With mounting plate
Ⓔ Voltage : 100 VAC

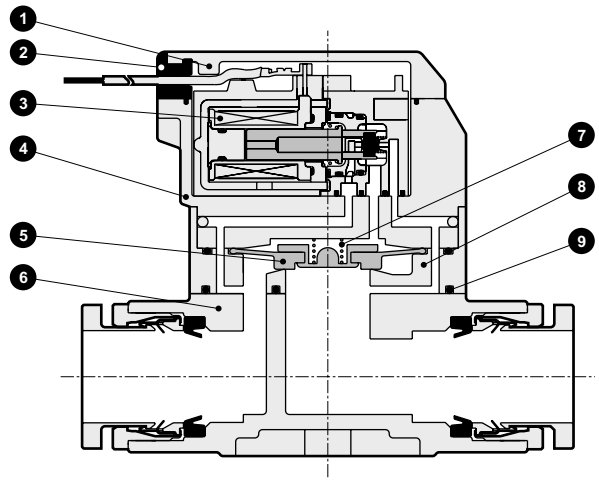
Code		Description
Ⓐ Connected tube outer diameter		
C6		ø6
C8		ø8
C10		ø10
C12		ø12
Ⓑ Sealant		
0		H-NBR, internal exhaust specifications
H		H-NBR, oil-prohibited specs, internal exhaust specs
Ⓒ Coil option *1		
2C	**Standard**	Lead wire (without lamp/surge suppressor)
2G	**Option**	DIN terminal box (Pg7), without lamp
2GS		DIN terminal box (Pg7), without lamp/with surge suppressor
2H		DIN terminal box (Pg7), with lamp (inside terminal box)
2HS		DIN terminal box (Pg7), with lamp (inside terminal box)/with surge suppressor
2KS		DIN terminal box, with M12 connector cable, with lamp (inside terminal box)/with surge suppressor
Ⓓ Other options		
Blank		None
B		With mounting plate
Ⓔ Voltage *1		
1		100 VAC
3		24 VDC
4		12 VDC

*1 : Refer to the table below for the available coil option and voltage combinations.

Coil option	Voltage		
	1	3	4
2C	●	●	●
2G	●		
2GS		●	●
2H	●		
2HS		●	●
2KS		●	

Select from the combinations indicated with ● above.

Internal structure and parts list



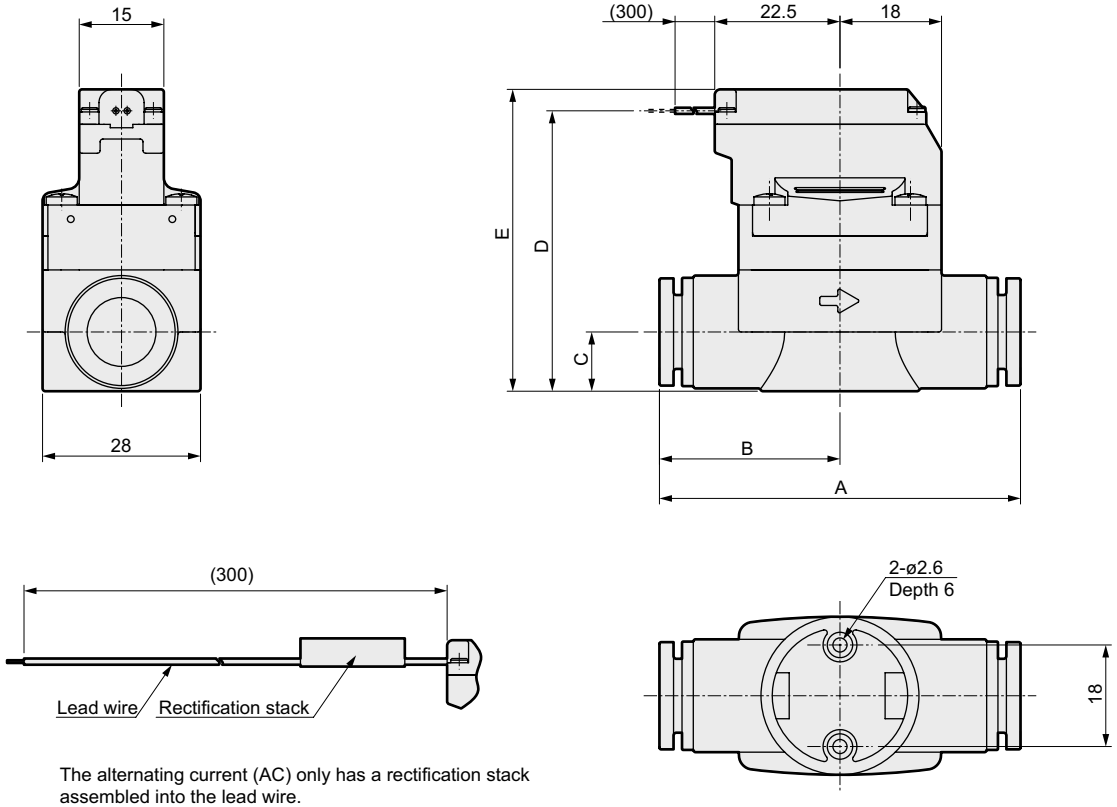
Cannot be disassembled

No.	Part name	Material	
1	Cover (*1)	PBT	Polybutylene terephthalate
2	Bush	NBR	Nitrile rubber
3	Coil assembly	-	-
4	Body	PPS	Polyphenylene sulfide
5	Diaphragm assembly	H-NBR/PPS	Hydrogenated nitrile rubber/ polyphenylene sulfide
6	Main body	PBT	Polybutylene terephthalate
7	Spring	SUS	Stainless steel
8	Valve body	PBT	Polybutylene terephthalate
9	Gasket	H-NBR	Hydrogenated nitrile rubber

*1 : PA66 and polyamide are used when the DIN terminal box is attached.

Dimensions CAD

● Lead wire
EXA-*-*2C



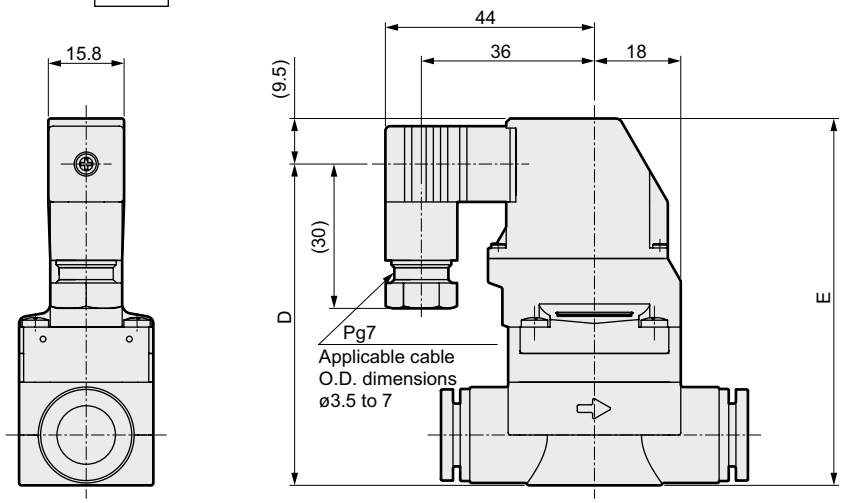
The alternating current (AC) only has a rectification stack assembled into the lead wire.

Model No.	A	B	C	D	E
EXA-C6	52	28	8	45	48.5
EXA-C8	53	28.5	8	45	48.5
EXA-C10	62	31	11.5	51	54.5
EXA-C12	64	32	11.5	51	54.5

* The figure indicates port size ø10 dimensions.

Optional dimensions

● DIN terminal box (Pg7)
EXA-*-* 2G / 2GS / 2H / 2HS

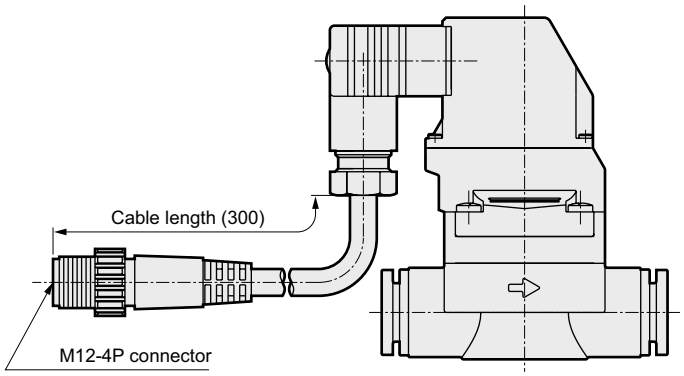


Model	D	E
EXA-C6	62	71.5
EXA-C8	62	71.5
EXA-C10	68	77.5
EXA-C12	68	77.5

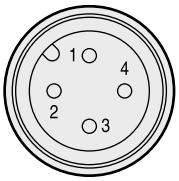
* The figure indicates port size ø10 dimensions.

Optional dimensions

- With DIN terminal box, with M12 connector cable, with lamp
  EXA-*-*2KS



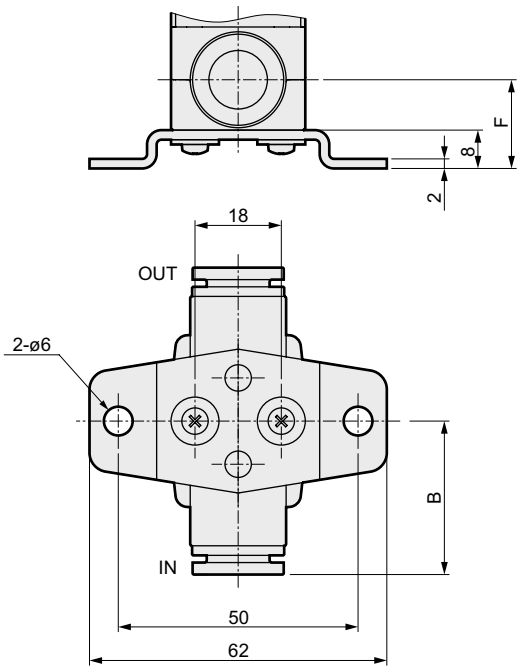
Connector pin array



PIN No.	Applications
1PIN	(Not used)
2PIN	(Not used)
3PIN	Power supply -
4PIN	Power supply +

- With mounting plate
  EXA-*-**B

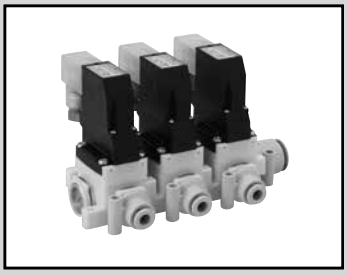
Material: Steel
Zinc plated



* Contact CKD for details about discrete mounting plate orders.

Model No.	B	F
EXA-C6	28	16
EXA-C8	28.5	16
EXA-C10	31	19.5
EXA-C12	32	19.5

* The figure indicates port size ø10 dimensions.



Pilot operated 2-port solenoid valve for compressed air, manifold

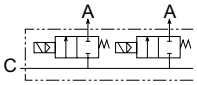
GEXA Series

- NC (open when energized)
- Port size: Push-in fitting ø6, ø8, ø10, ø12
- Diaphragm drive

CE RoHS

JIS symbol

- NC (open when energized)
  Common supply/
  C port pressurization



Specifications

Item	GEXA-□C6	GEXA-□C8	GEXA-□C10	GEXA-□C12
Working fluid	Compressed air			
Working pressure differential MPa	0.01 (≈1.5 psi, 0.1 bar) to 0.7 (≈100 psi, 7 bar)			
Max. working pressure MPa	0.7 (≈100 psi, 7 bar)			
Proof pressure (water pressure) MPa	1.05 (≈150 psi, 10.5 bar)			
Fluid temperature °C	0 (32°F) to 55 (131°F) (no freezing)			
Ambient temperature °C	-5 (23°F) to 55 (131°F)			
Atmosphere	Place free of corrosive gas/explosive gas and not exposed to water			
Valve structure	Pilot operated diaphragm drive			
Internal leakage cm^3/min	2 or less (per station)			
External leakage cm^3/min	3 or less (per station)			
Mounting orientation	Unrestricted			
A port size (C port: Push-in fitting ø10, ø12)	Push-in fitting ø6	Push-in fitting ø8	Push-in fitting ø10	Push-in fitting ø12
C value	1.6	3.0	3.3	3.6
b	0.36	0.24	0.18	0.16
Electrical specifications				
Rated voltage	100 VAC(50/60 Hz), 24 VDC, 12 VDC *1			
Apparent power VA	1.2			
Power consumption W DC	0.6			
Thermal class	Class 130 (B)			
Degree of protection (IEC standard: 529)	Lead wire: IPX0, with DIN terminal box: IPX5			

*1 : The voltage fluctuation range is ±10%.

For internal structure, refer to page 7.

How to order

GEXA - C10 C8 - 3 - 0 2HS - 3

Model No.

Ⓐ C-port connected tube outer diameter

Ⓑ A-port connected tube outer diameter

Ⓒ Manifold station No.

Ⓓ Sealant/ pilot operated combination

Ⓔ Coil option

Ⓕ Voltage

[Example of model No.]
GEXA-C10C8-3-02HS-3

Ⓐ C-port connected tube outer diameter : ø10
Ⓑ A-port connected tube outer diameter : ø8
Ⓒ Manifold station No. : 3 stations
Ⓓ Sealant/pilot operated combination : H-NBR/Internal exhaust specifications
Ⓔ Coil option : DIN terminal box (Pg7) With lamp/surge suppressor (inside terminal box)
Ⓕ Voltage : 24 VDC

Code	Description
Ⓐ C-port connected tube outer diameter	
C10	ø10
C12	ø12
Ⓑ A-port connected tube outer diameter	
C6	ø6
C8	ø8
C10	ø10
C12	ø12
Ⓒ Manifold station No.	
2 to 5	2 stations to 5 stations
Ⓓ Sealant/pilot operated combination	
0	H-NBR/internal exhaust specifications

Ⓔ Coil option *1		
2C	**Standard**	Lead wire (without lamp/surge suppressor)
2G	**Option**	DIN terminal box (Pg7), without lamp
2GS		DIN terminal box (Pg7), without lamp/with surge suppressor
2H		DIN terminal box (Pg7), with lamp (inside terminal box)
2HS		DIN terminal box (Pg7), with lamp/surge suppressor (inside terminal box)
2KS		DIN terminal box, with M12 connector cable, with lamp/surge suppressor (inside terminal box)

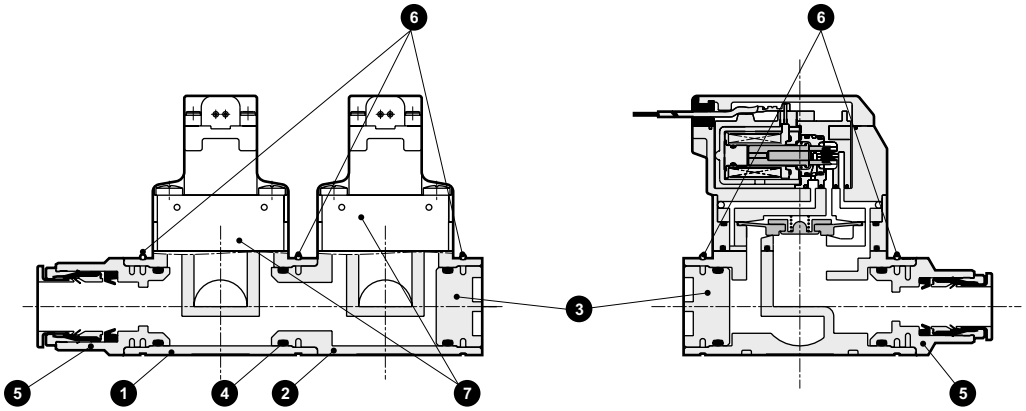
Ⓕ Voltage *1	
1	100 VAC
3	24 VDC
4	12 VDC

*1 : Refer to the table below for the available coil option and voltage combinations.

Coil option	Voltage 1	3	4
2C	●	●	●
2G	●		
2GS		●	●
2H	●		
2HS		●	●
2KS		●	

Select from the combinations indicated with ● above.

Internal structure and parts list



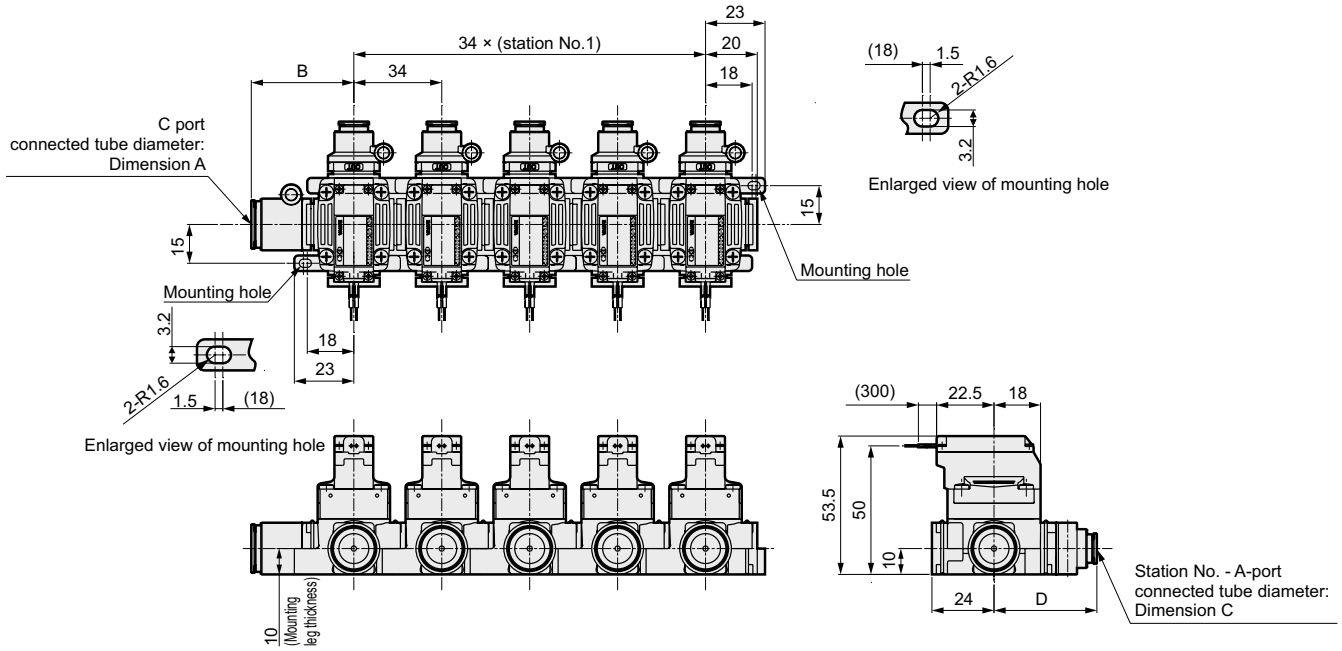
No.	Part name	Material	
1	Block body A	PBT	Polybutylene terephthalate
2	Block body B	PBT	Polybutylene terephthalate
3	Plug assembly	A6063, NBR	Aluminum, nitrile rubber
4	O-ring	NBR	Nitrile rubber
5	Fitting assembly	PBT, C3604, NBR	Polybutylene terephthalate/copper alloy/nitrile rubber
6	Stopper ring	SUS	Stainless steel
7	EXA Actuator assembly	-	(Refer to the internal structure diagram on page 7)

Cannot be disassembled

* This figure shows a 2-station.

Dimensions CAD

● Lead wire
GEXA-**-*-*2C

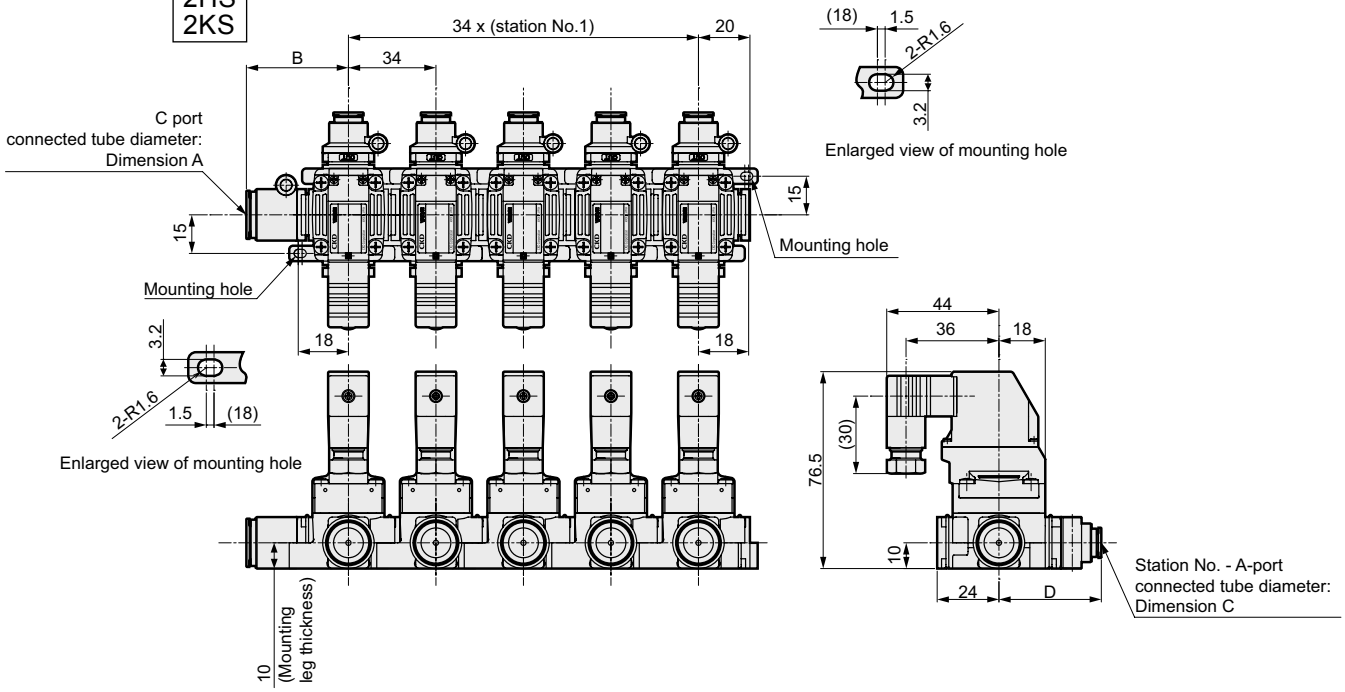


Model No.	A	B	C	D
GEXA-C10C6	ø10	38	ø6	40
GEXA-C10C8			ø8	
GEXA-C10C10			ø10	42
GEXA-C10C12			ø12	44
GEXA-C12C6	ø12	40	ø6	40
GEXA-C12C8			ø8	
GEXA-C12C10			ø10	42
GEXA-C12C12			ø12	44

Dimensions CAD

● DIN terminal box

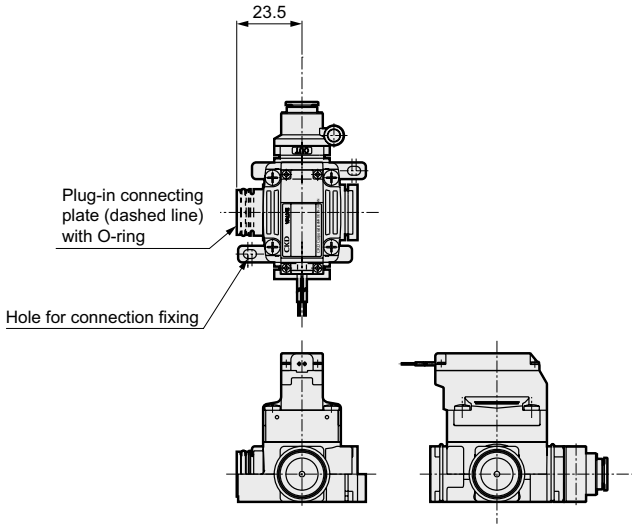
GEXA-**-*-* 2G / 2GS / 2H / 2HS / 2KS



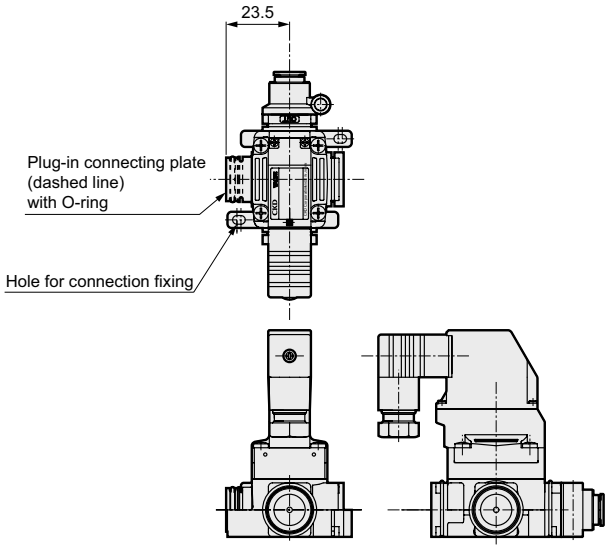
Model No.	A	B	C	D
GEXA-C10C6	ø10	38	ø6	40
GEXA-C10C8			ø8	
GEXA-C10C10			ø10	42
GEXA-C10C12			ø12	44
GEXA-C12C6	ø12	40	ø6	40
GEXA-C12C8			ø8	
GEXA-C12C10			ø10	42
GEXA-C12C12			ø12	44

● Single item dimensions for expanding manifold stations (model No.: GEXA-CX C6 / C8 / C10 / C12 -ⒹⒺ-Ⓕ-KIT)

● Lead wire



● DIN terminal box



*1 : For parts other than those above and dimensions after connecting, refer to pages 12 and 13 for the manifold dimensions.
*2 : The following components are attached.
Stopper pin: 1 pc., fixing screw for connecting: 2 pcs
*3 : If you are considering increasing the number of stations, contact CKD for details.

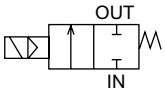
Pilot operated 2-port solenoid valve for compressed air

EXA Series Aluminum body

- NC (open when energized)
- Port size: Rc1/4, 3/8

JIS symbol

- NC (open when energized)



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		EXA-8A	EXA-10A
Working fluid		Compressed air	
Working pressure differential	MPa	0.01 (≈1.5 psi, 0.1 bar) to 0.7 (≈101 psi, 7 bar)	
Max. working pressure	MPa	0.7 (≈101 psi, 7 bar)	
Proof pressure (water pressure)	MPa	1.05 (≈152 psi, 10 bar)	
Fluid temperature	°C	0 (32°F) to 55 (131°F) (no freezing)	
Ambient temperature	°C	-5 (23°F) to 55 (131°F)	
Atmosphere		Place free of corrosive gas/explosive gas and not exposed to water	
Valve structure		Pilot operated diaphragm drive	
Internal leakage	cm^3/min	2 or less	
External leakage	cm^3/min	2 or less	
Mounting orientation		Unrestricted	
Port size		Rc1/4	Rc3/8
C[dm^3/(s·bar)]		4.5	4.7
b		0.18	0.17
Weight *1	g	56	57
Electrical specifications			
Rated voltage		100 VAC (50/60 Hz), 24 VDC, 12 VDC *2	
Apparent power	VA	1.2	
Power consumption	W DC	0.6	
Thermal class		Class 130 (B)	
Degree of protection (IEC standard: 529)		Lead wire: IPX0, with DIN terminal box: IPX5	

*1: Weight with the DIN terminal box is +20 g.
*2: The voltage fluctuation range is ±10%.

How to order

EXA - 8A - 0 2C B - 1

Model No. | Ⓐ Port size | Ⓑ Sealant material | Ⓒ Coil option | Ⓓ Other options | Ⓔ Voltage

[Example of model No.]
EXA-8A-02CB-1
Model: Compact air blow valve EXA
Aluminum body
Ⓐ Port size : Rc1/4
Ⓑ Sealant material
: H-NBR, internal exhaust specification
Ⓒ Coil option : Lead wire
Ⓓ Other options : Mounting plate
Ⓔ Voltage : 100 VAC

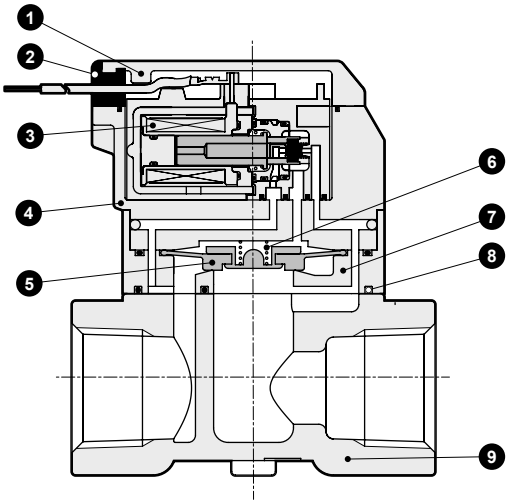
Coil option	Voltage 1	3	4
2C	●	●	●
2G	●		
2GS		●	●
2H	●		
2HS		●	●
2KS		●	

Select from the combinations indicated with ● above.

Code	Description
Ⓐ Port size	
8A	Rc1/4
8G	G1/4
8 N	1/4NPT
10A	Rc3/8
10G	G3/8
10 N	3/8NPT
Ⓑ Sealant material	
0	H-NBR, internal exhaust specifications
Ⓒ Coil option *1	
2C	**Standard** Lead wire (without lamp/surge suppressor)
2G	**Option** DIN terminal box (Pg7), without lamp
2GS	DIN terminal box (Pg7), without lamp/with surge suppressor
2H	DIN terminal box (Pg7), with lamp (inside terminal box)
2HS	DIN terminal box (Pg7), with lamp (inside terminal box)/with surge suppressor
2KS	DIN terminal box with M12 connector cable, with lamp (inside terminal box)/with surge suppressor
Ⓓ Other options	
Blank	None
B	With mounting plate
Ⓔ Voltage *1	
1	100 VAC
3	24 VDC
4	12 VDC

*1: Refer to the table on the left for the available coil option and voltage combinations.

Internal structure and parts list



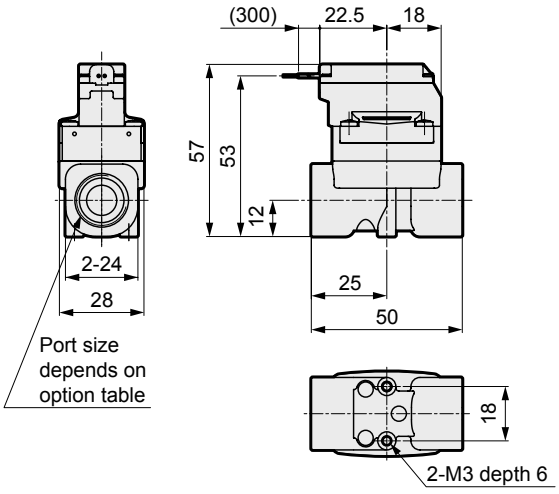
No.	Part name	Material	
1	Cover (*1)	PBT	Polybutylene terephthalate
2	Bush	NBR	Nitrile rubber
3	Coil assembly	-	-
4	Stuffing	PPS	Polyphenylene sulfide
5	Diaphragm assembly	H-NBR/PPS	Hydrogenated nitrile rubber/polyphenylene sulfide
6	Spring	SUS	Stainless steel
7	Valve body	PBT	Polybutylene terephthalate
8	Gasket	H-NBR	Hydrogenated nitrile rubber
9	Body	ADC12	Aluminum

*1: PA66 and polyamide are used when the DIN terminal box is attached.

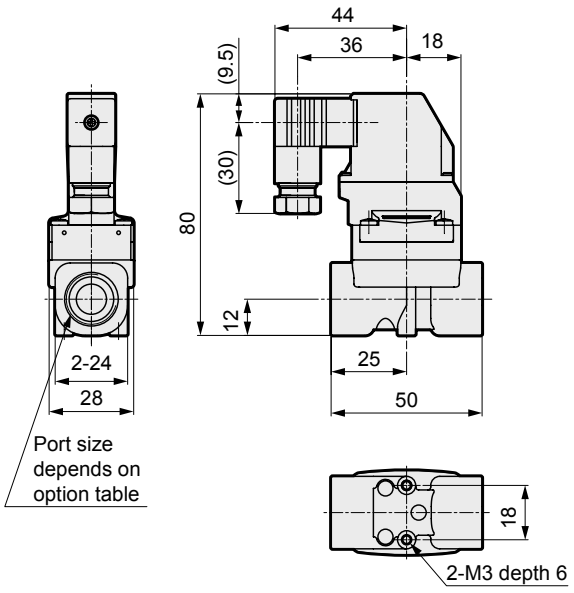
Cannot be disassembled

Dimensions

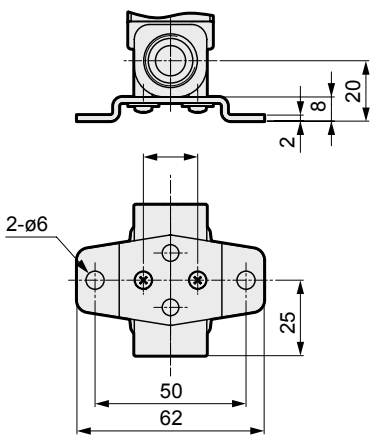
● Lead wire



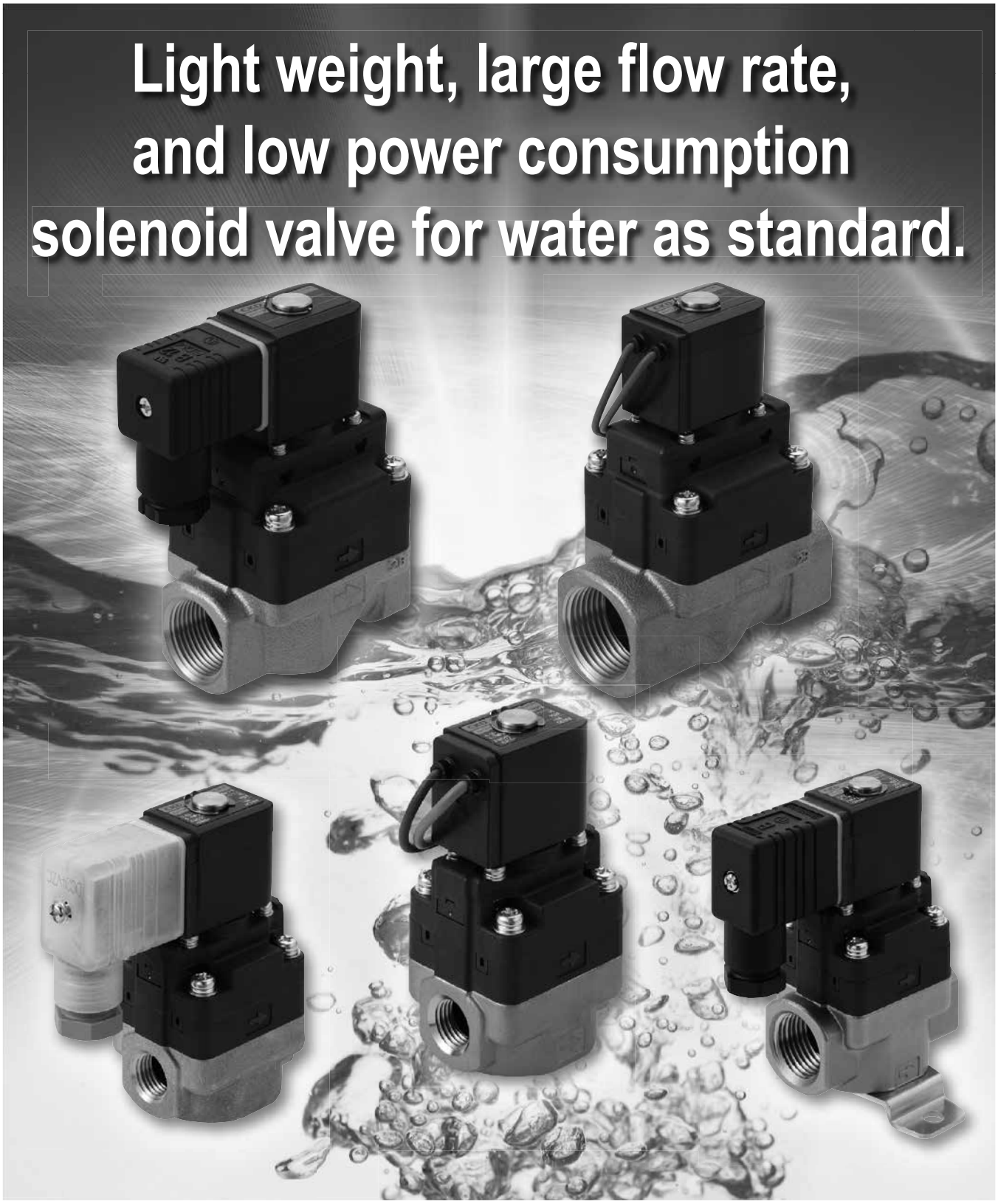
● DIN terminal box



● With mounting plate



Light weight, large flow rate, and low power consumption solenoid valve for water as standard.



FWD Series

CKD

Fluoro rubber diaphragm added to expand applications! CKD's solenoid valves dedicated for water

Port sizes
8A to 25A
compatible

Ecology

Low power consumption

Power consumption

Realizes **4 W** ! (DC)

Compact and lightweight

1/3 smaller than general purpose solenoid valves
In-house comparison

Product size

56 × 38 × 91 mm
(15A)

Weight

390 g (15A)

Dedicated design for water

Improved corrosion resistance

Improved corrosion resistance with the adoption of special anti-corrosive magnetic substance

Body material

Selectable from copper alloy (bronze) and stainless steel

Sealant

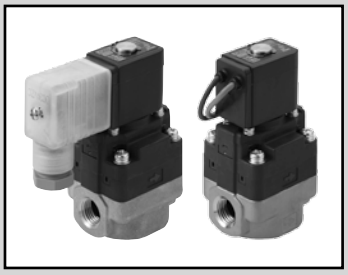
Selectable from nitrile rubber (NBR) and fluoro rubber (FKM)

Large flow rate

Adopting a special-profile diaphragm

Realized large flow rate with a compact body with the adoption of a special-profile diaphragm

Cv 6.0 (15A)



Compact pilot operated solenoid valve for water

FWD Series

- NC (open when energized)
- Port size: Rc1/4 to Rc1

Specifications

Item		FWD11-8A	FWD11-10A	FWD11-15A	FWD11-20A	FWD11-25A
Actuation		NC (open when energized)				
Working fluid		Water (excluding sewage, agricultural water, liquid manure and antifreeze liquid)				
Working pressure differential	MPa	0.02 (≈2.9 psi, 0.2 bar) to 0.7 (≈100 psi, 7 bar)				
Max. working pressure	MPa	0.7 (≈100 psi, 7 bar)				
Proof pressure (water pressure)	MPa	1.05 (≈150 psi, 10.5 bar)				
Fluid temperature	°C	5 (41°F) to 60 (140°F) (no freezing)				
Ambient temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)				
Atmosphere		Place free of corrosive gas and explosive gas				
Valve structure		Pilot operated poppet, diaphragm drive				
Valve seat leakage	cm^3/min	0 (water pressure) (*1)				
Mounting orientation		Unrestricted				
Degree of protection		IPX5				
Port size		Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1
Orifice size	mm	15 (*2)			22 (*2)	
Cv		2.8	4.2	6.0	11.0	12.0
Weight	g	340	320	390	730	950
Rated voltage		100 VAC 50/60 Hz, 200 VAC 50/60 Hz, 24 VDC				
Voltage fluctuation range		Rated voltage ±10%				
Apparent power	VA	When holding (50/60 Hz): 5/4, when starting (50/60 Hz): 9/8			When holding (50/60 Hz): 9.5/7, when starting (50/60 Hz): 23/20	
Power consumption	W	AC(50/60 Hz):2.7/2, DC:4			AC(50/60 Hz):4/3.2, DC:4	
Thermal class		Class 130 (B)				

*1 : Valve seat leakage of 0 cm^3/min means that no water drop leak is observed for one minute.
*2 : Orifice size means the size of valve seat.

How to order

FWD11 - 15 A - 0 2GS B - AC100V

- FWD11 — Model No.
- 15 — Ⓐ Port size
- A — Ⓑ Thread
- 0 — Ⓒ Body/sealant combination
- 2GS — Ⓓ Coil option
- B — Ⓔ Mounting plate
- AC100V — Ⓕ Rated voltage *2

Code	Description
Ⓐ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
Ⓑ Thread	
A	Rc thread
G	G thread
N	NPT thread
Ⓒ Body/sealant combination	
0	Copper alloy (port size: 8, 10, 15)/PPS Bronze (port size: 20, 25) — NBR
B	Copper alloy (port size: 8, 10, 15)/PPS Bronze (port size: 20, 25) — FKM
D	Stainless steel/PPS — NBR
E	Stainless steel/PPS — FKM
Ⓓ Coil option	
2C	Grommet lead wire
2CS	Grommet lead wire with surge suppressor
2G	With DIN terminal box (*1)
2GS	DIN terminal box/with surge suppressor (*1)
2H	DIN terminal box/with lamp (*1)
2HS	DIN terminal box/with lamp/surge suppressor (*1)
Ⓔ Mounting plate	
Blank	None
B	Mounting plate (port size: 8, 10 and 15 only)
Ⓕ Rated voltage	
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz, 220 VAC 60 Hz
DC24V	24 VDC

Precautions for model No. selection

*1 : Pg9 for port sizes 8, 10 and 15, and Pg11 for 20 and 25.
*2 : Rated voltages of 110 VAC, 50/60 Hz and 220 VAC, 50/60 Hz are also available. Contact CKD for details.

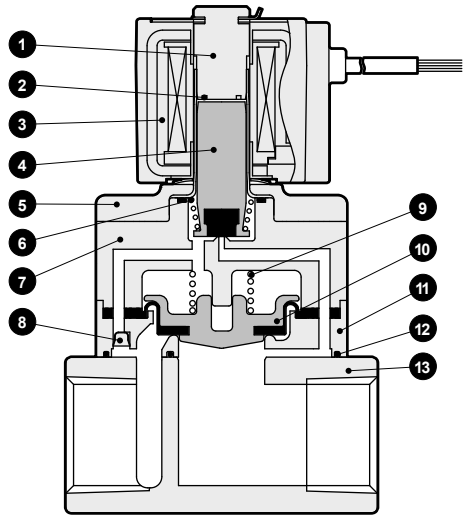
[Example of model No.]

FWD11-15A-02GSB-AC100V

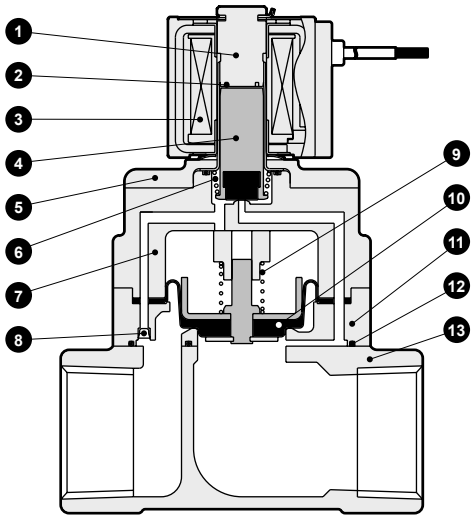
Ⓐ Port size : 1/2
Ⓑ Thread : Rc thread
Ⓒ Body/sealant combination : Copper alloy/PPS, NBR
Ⓓ Coil option : With DIN terminal box/surge suppressor (Pg9)
Ⓔ Mounting plate : With mounting plate
Ⓕ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

Internal structure and parts list

● FWD11-8/10/15



● FWD11-20/25



No.	Part name	Material		No.	Part name	Material	
1	Core assembly	SUS	Stainless steel	8	Filter	SUS	Stainless steel
2	Shading coil *1	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)	9	Valve spring	SUS	Stainless steel
3	Coil	–	–	10	Diaphragm assembly	Port size: 8, 10, 15; PPS/NBR (FKM)	Polyphenylene sulfide/ nitrile rubber (fluoro rubber)
4	Plunger	SUS/NBR (FKM)	Stainless steel, nitrile rubber (fluoro rubber)			Port size: 20, 25; SUS/NBR (FKM)	Stainless steel, nitrile rubber (fluoro rubber)
5	Holder plate	PPS	Polyphenylene sulfide	11	Valve body	PPS	Polyphenylene sulfide
6	Plunger spring	SUS	Stainless steel	12	Gasket	NBR (FKM)	Nitrile rubber (fluoro rubber)
7	Stuffing assembly	PPS/SUS/NBR (FKM)	Polyphenylene sulfide/Stainless steel, nitrile rubber (fluoro rubber)	13	Main body	Port size: 8, 10, 15; C3771 (SCS13)	Copper alloy (stainless steel)
						Port size: 20, 25; CAC408 (SCS13)	Copper alloy (stainless steel)

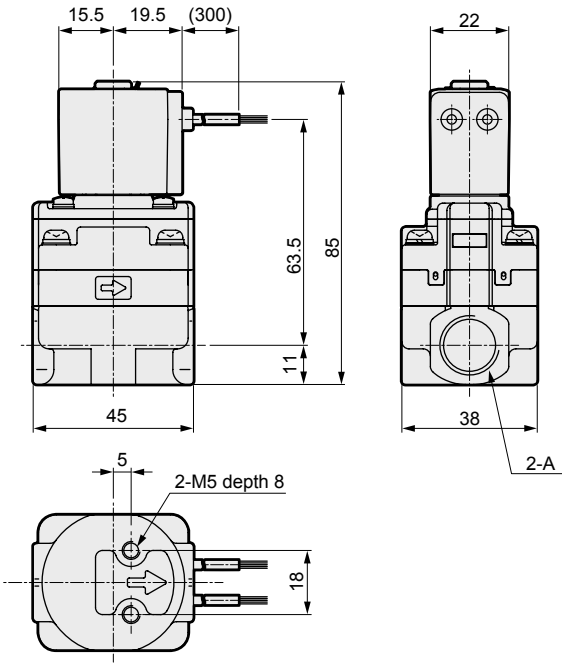
( ) shows options.
*1: No shading coil is used for DC coil.

Note: Screws are steel.

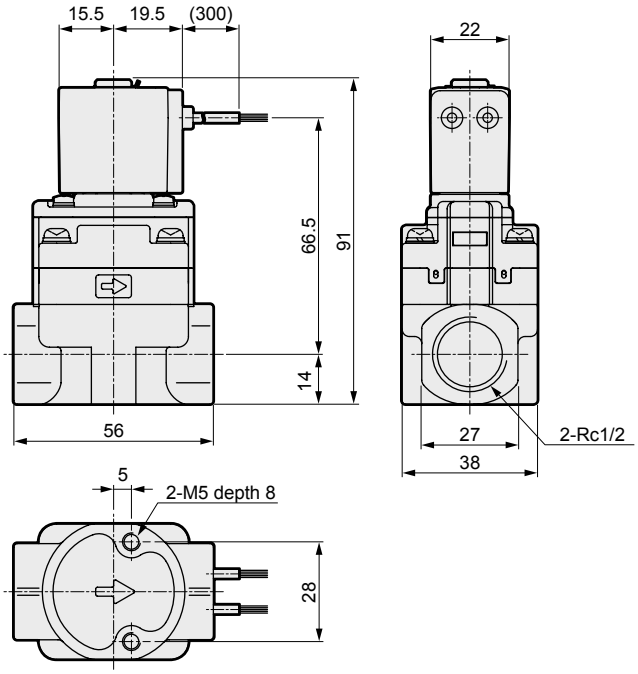
Dimensions (port size: 8A, 10A, 15A)

● Grommet lead wire

FWD11-8A/10A-*2C



FWD11-15A-*2C

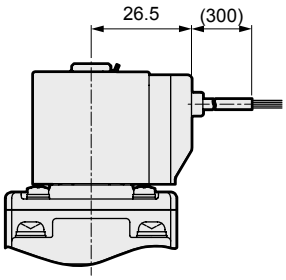


Model No.	A
FWD11-8A	Rc1/4
FWD11-10A	Rc3/8

Optional dimensions (port size: 8A, 10A, 15A)

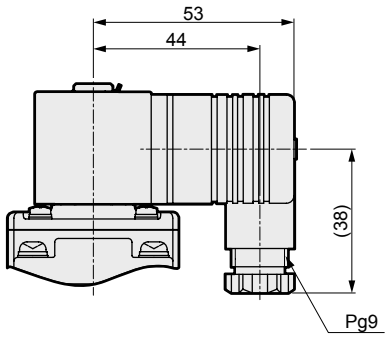
● Grommet lead wire with surge suppressor

FWD11-8A/10A/15A-*2CS



● With DIN terminal box

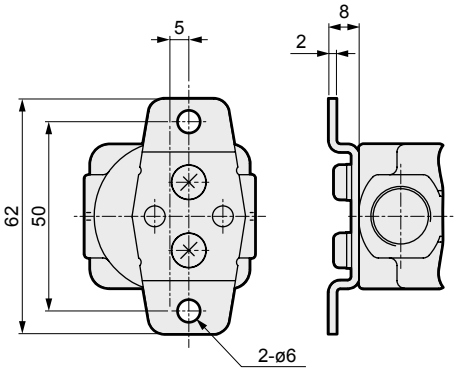
FWD11-8A/10A/15A-*2G/2GS/2H/2HS



● Mounting plate

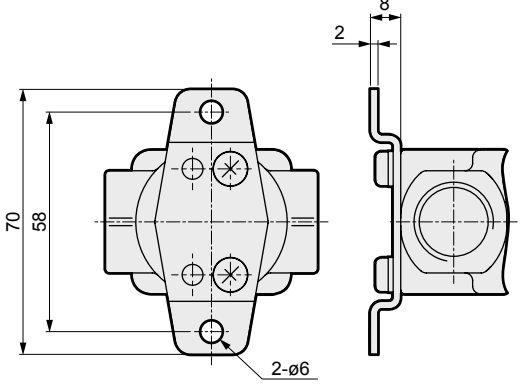
FWD11-8A/10A-**B

Material: Steel
Zinc plated



FWD11-15A-**B

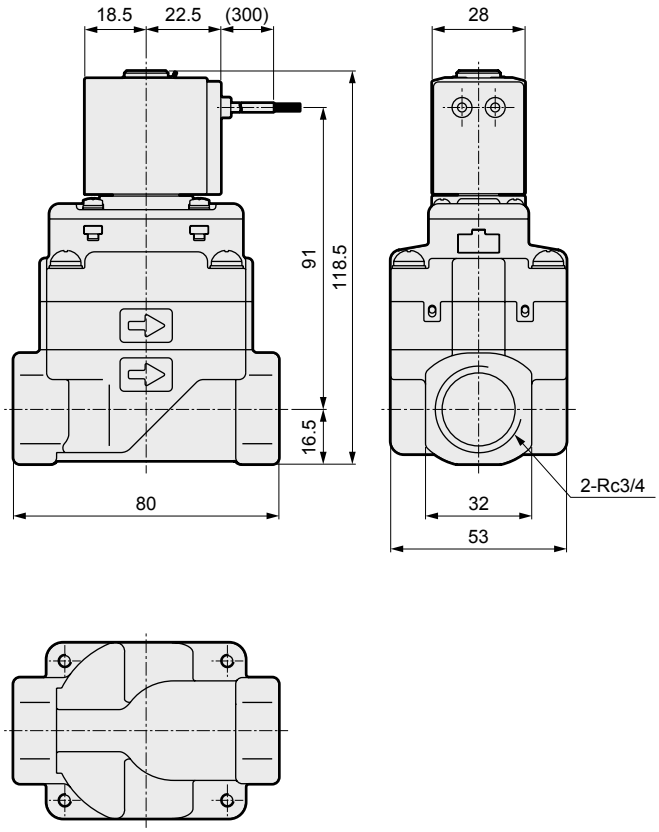
Material: Steel
Zinc plated



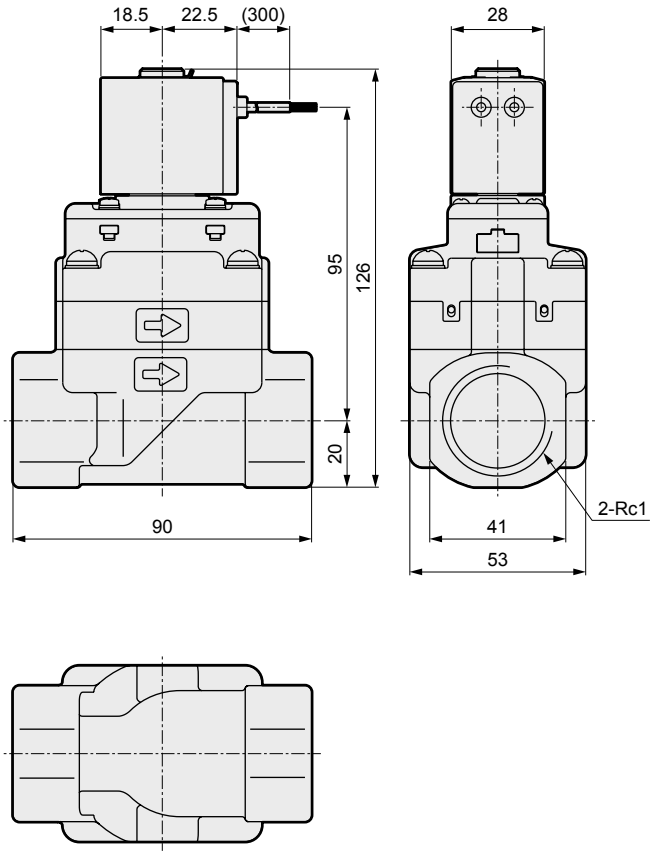
Dimensions (port size 20A, 25A)

● Grommet lead wire

FWD11-20A-*2C



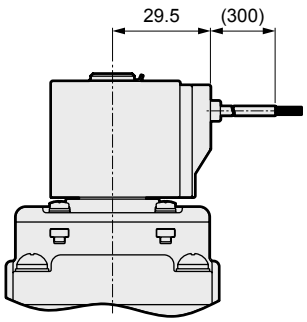
FWD11-25A-*2C



Optional dimensions (port size: 20A, 25A)

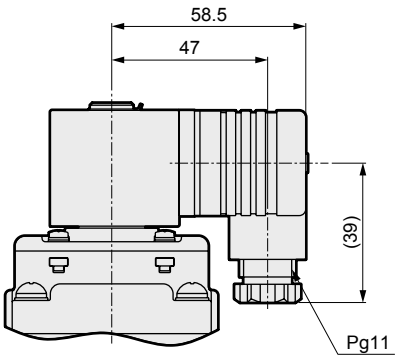
● Grommet lead wire with surge suppressor

FWD11-20A/25A-*2CS



● With DIN terminal box

FWD11-20A/25A-*2G/2GS/2H/2HS



MEMO

Compact direct acting 2-port solenoid valve

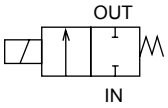
HNB1 Series

- NC (open when energized)
- Port size: M5

RoHS CAD

JIS symbol

● NC (open when energized)



Specifications

Item	HNB1-M5
Working fluid	Air/water/dry air/low vacuum [1.33 × 10^2 Pa(abs)]
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 0.7 (≈100 psi, 7 bar)
Proof pressure (water pressure) MPa	1.0 (≈150 psi, 10 bar)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F) (no freezing)
Valve seat leakage cm^3/min	0 (water pressure)
Mounting orientation	Unrestricted
Weight g	43
Port size	M5
Orifice size mm	1.0
Cv	0.03
C[dm^3/(s·bar)]	0.11
b	0.34
Electrical specifications	
Rated voltage	24 VDC (Option 12 VDC)
Voltage fluctuation range	±10%
Power consumption W	2.5
Leakage current mA	1 or less
Thermal class	Class 130 (B)

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

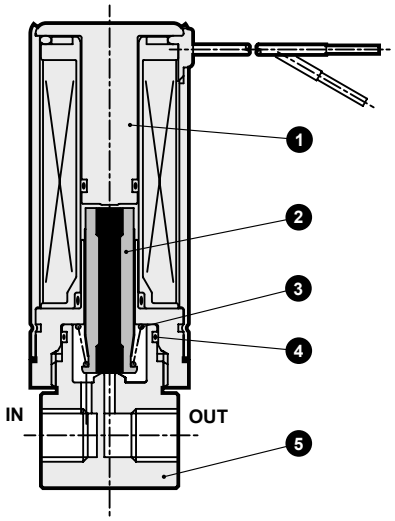
HNB1 - M5 - DC24V

- HNB1: Model No.
- M5: Port size M5
- DC24V: Ⓐ Rated voltage

Code	Description
Ⓐ **Rated voltage**	
DC24V	24 VDC
DC12V	12 VDC

Internal structure and parts list

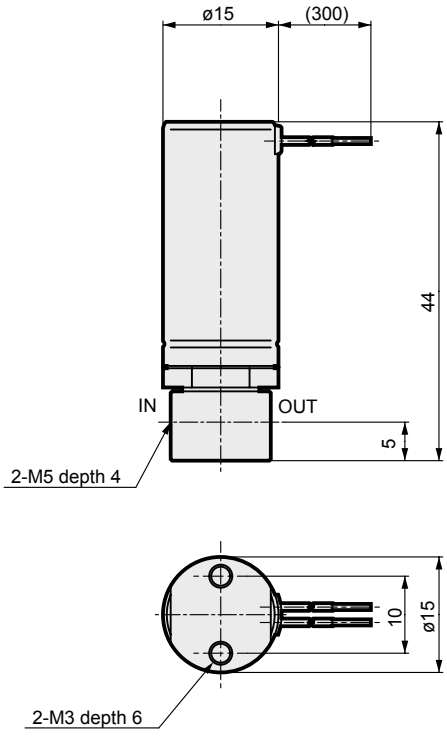
● HNB1



No.	Part name	Material	
1	Core assembly	PPS, STKM, SUS	Resin, stainless steel
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber
3	Spring	SUS304	Stainless steel
4	O-ring	NBR	Nitrile rubber
5	Body	SUS303	Stainless steel

Dimensions CAD

● HNB1



Compact direct acting 3-port solenoid valve

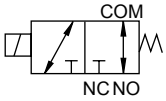
HNG1 Series

- Universal
- Port size: M5

RoHS CAD

JIS symbol

● Universal



Specifications

1 MPa = 10 bar

Item	HNG1-M5
Working fluid	Air/water/dry air/low vacuum [1.33 × 10^2 Pa(abs)]
Working pressure differential MPa	0 (≈0 psi) to 0.7 (≈100 psi) (0 (≈0 psi) to 0.3 (≈44 psi) when NO pressurized)
Proof pressure (water pressure) MPa	1.0 (≈150 psi, 10 bar)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F) (no freezing)
Valve seat leakage cm^3/min	0 (water pressure)
Mounting orientation	Unrestricted
Weight g	46
Port size	M5
Orifice size mm	1.0
Cv	0.03
C[dm^3/(s·bar)]	0.11
b	0.34
Electrical specifications	
Rated voltage	24 VDC (Option 12 VDC)
Voltage fluctuation range	±10%
Power consumption W	2.5
Leakage current mA	1 or less
Thermal class	Class 130 (B)

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

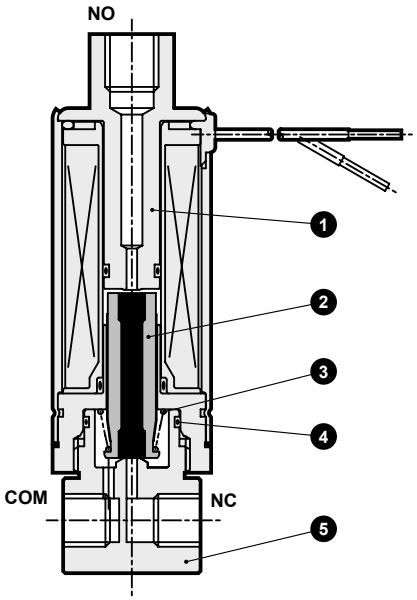
HNG1 - M5 - DC24V

- HNG1: Model No.
- M5: Port size M5
- DC24V: Ⓐ Rated voltage

Code	Description
Ⓐ **Rated voltage**	
DC24V	24 VDC
DC12V	12 VDC

Internal structure and parts list

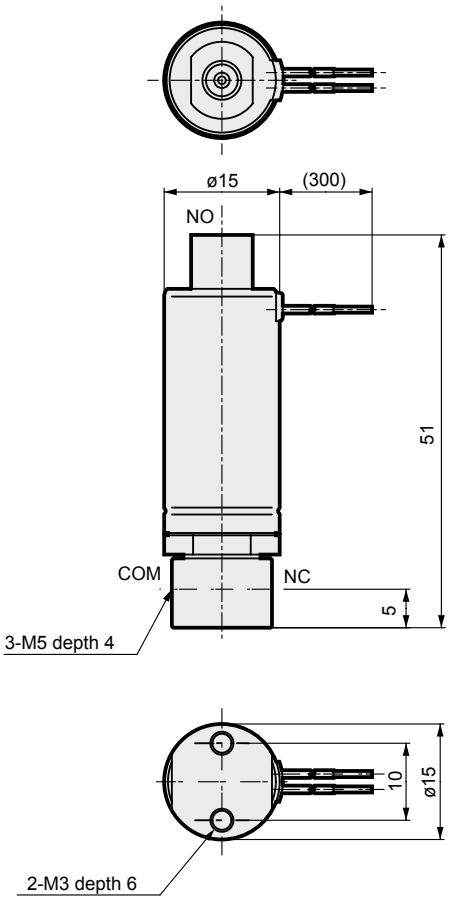
● HNG1



No.	Part name	Material	
1	Core assembly	PPS, STKM, SUS	Resin, stainless steel
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber
3	Spring	SUS304	Stainless steel
4	O-ring	NBR	Nitrile rubber
5	Body	SUS303	Stainless steel

Dimensions CAD

● HNG1



Compact direct acting 2-port solenoid valve

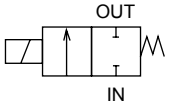
USB2 Series

- NC (open when energized)
- Port size: M5

RoHS CAD

JIS symbol

- NC (open when energized)



Specifications

Item		USB2-M5-1	USB2-M5-2
Working fluid		Air, water, dry air, low vacuum [1.33 x 10^2 Pa(abs)]	
Working pressure differential	MPa	0 (≈0 psi, 0 bar) to 0.7 (≈100 psi, 7 bar)	0 (≈0 psi, 0 bar) to 0.3 (≈44 psi, 3 bar)
Proof pressure (water pressure)	MPa	1.5 (≈220 psi, 15 bar)	
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature	°C	-20 (-4°F) to 50 (122°F)	
Valve seat leakage	cm^3/min	0.2 or less (air)	
Mounting orientation		Unrestricted	
Weight	kg	0.07	
Port size		M5	M5
Orifice size	mm	1	1.5
Cv		0.03	0.06
C[dm^3/(s·bar)]		0.13	0.28
b		0.57	0.46
Electrical specifications			
Rated voltage		12 VDC, 24 VDC (Option: 100 VAC 50/60 Hz, 200 VAC 50/60 Hz)	
Voltage fluctuation range		±10%	
Power consumption W	DC	3	
	AC	4	
Thermal class		Class 130 (B)	

*1 : If the solenoid valve will remain inactive for long periods when using water, the HB Series high corrosion proof solenoid valve (page 967) is recommended.
*2 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*3 : When using at low vacuum, vacuum the OUT port side.

How to order

USB2 - M5 - 1 - 0 - DC24V

- USB2 — Model No.
- M5 — Port size M5
- 1 — Ⓐ Orifice
- 0 — Ⓑ Body/sealant combination
- DC24V — Ⓒ Voltage

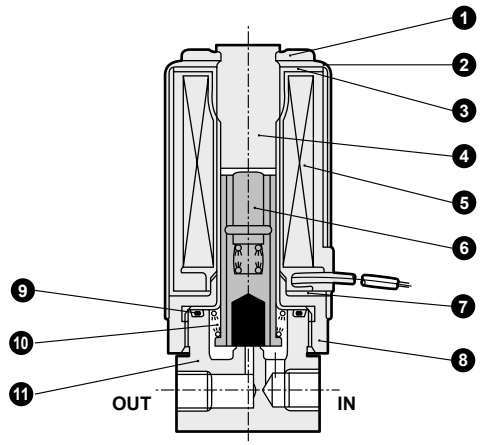
Code	Description
Ⓐ Orifice	
1	ø1.0
2	ø1.5

Ⓑ Body/sealant combination	Body	Seal	Treatment
Blank	Stainless steel	Nitrile rubber	-
L			Oil-prohibited
0	Copper alloy		-

Ⓒ Voltage		
DC12V	Standard	12 VDC
DC24V		24 VDC
AC100V	Option	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz

Internal structure and parts list

● USB2-M5

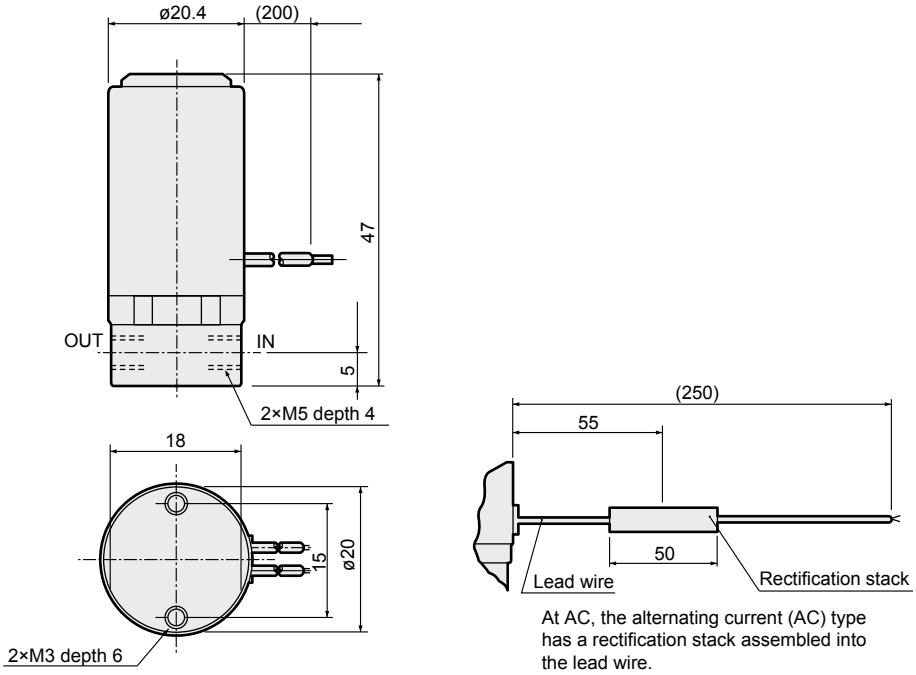


No.	Part name	Material	
1	Clip	PBT	Polybutylene terephthalate
2	Bonnet	SPC	Steel
3	Sub core	SPC	Steel
4	Core assembly	SUS405 or equiv., SUS316	Stainless steel
5	Coil assembly	-	-
6	Plunger assembly	SUS405 or equiv., SUS303, NBR	Stainless steel, nitrile rubber
7	Wave washer	S65CM	Steel
8	Core B	SUM22	Free-cutting steel
9	O-ring	NBR	Nitrile rubber
10	Plunger spring	SUS304	Stainless steel
11	Body	SUS303(C3604)	Stainless steel (copper alloy)

( ) shows options.

Dimensions CAD

● USB2-M5



At AC, the alternating current (AC) type has a rectification stack assembled into the lead wire.

Compact direct acting 2-port solenoid valve

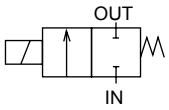
USB3 Series

- NC (open when energized)
- Working fluids: Air, water, dry air, low vacuum
- Port size: Rc1/8

RoHS CAD

JIS symbol

● NC (open when energized)



Specifications

1 MPa = 10 bar

Item		USB3-6-1	USB3-6-2	USB3-6-3
Working fluid		Air, water, dry air, low vacuum [1.33 x 10^2 Pa(abs)]		
Working pressure differential	MPa	0 (≈0 psi) to 0.9 (≈130 psi)	0 (≈0 psi) to 0.4 (≈58 psi)	0 (≈0 psi) to 0.1 (≈15 psi)
Proof pressure (water pressure)	MPa	2 (≈290 psi, 20 bar)		
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)		
Ambient temperature	°C	-20 (-4°F) to 50 (122°F)		
Valve seat leakage	cm^3/min	0.2 or less (air)		
Mounting orientation		Unrestricted		
Weight	kg	0.13		
Port size		Rc1/8	Rc1/8	Rc1/8
Orifice size	mm	1.6	2.3	3.2
Cv		0.09	0.18	0.3
C[dm^3/(s·bar)]		0.34	0.64	1.2
b		0.56	0.51	0.48
Electrical specifications				
Rated voltage		12 VDC, 24 VDC (Option: 100 VAC 50/60 Hz, 200 VAC 50/60 Hz)		
Voltage fluctuation range		±10%		
Power consumption W	DC	4		
	AC	4		
Thermal class		Class 120 (E) (molded coil: class 130 (B))		

*1 : If the solenoid valve will remain inactive for long periods when using water, the HB Series high corrosion proof solenoid valve (page 967) is recommended.
*2 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*3 : When using at low vacuum, vacuum the OUT port side.

How to order

USB3 - 6 - 1 - B - DC24V

- 6 — Port size Rc1/8
- USB3 — Model No.
- 1 — Ⓐ Orifice size
- B — Ⓑ Body/sealant/coil combination
- DC24V — Ⓒ Rated voltage

Code	Description
Ⓐ Orifice size	
1	ø1.6
2	ø2.3
3	ø3.2

Ⓑ Body/sealant/coil combination

		Body	Seal	Coil	Treatment
Blank	Std.	Copper alloy	Nitrile rubber	Taped	-
B	Option		Fluoro rubber	Molded coil	Vacuum inspection (Note)
V					
D		Stainless steel	Nitrile rubber		-
E					
W			Fluoro rubber		Vacuum inspection (Note)
H		Copper alloy	Nitrile rubber	Taped	Oil-prohibited
J			Fluoro rubber	Molded coil	
L		Stainless steel	Nitrile rubber		
M			Fluoro rubber		

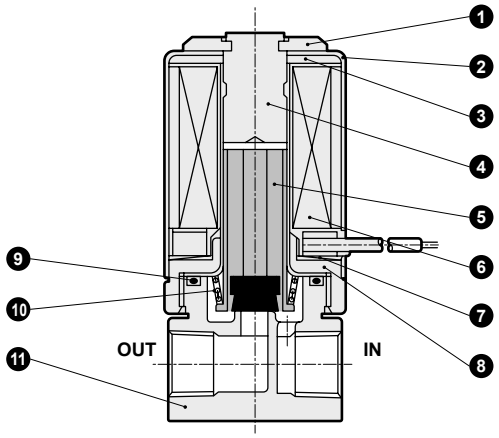
Ⓒ Rated voltage

DC12V	Standard	12 VDC
DC24V		24 VDC
AC100V	Option	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz

(Note) For option codes "V" and "W", vacuum is inspected at "leakage rate: 1.33 x 10^{-6} Pa·m^3/s or less".

Internal structure and parts list

● USB3-6

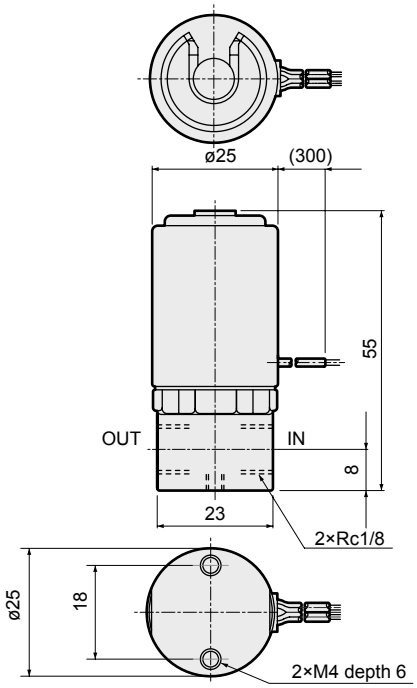


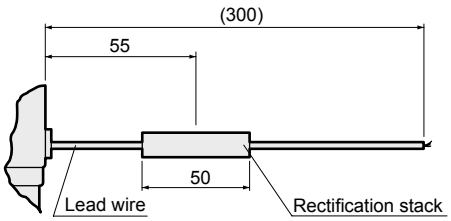
No.	Part name	Material	
1	Clip	PBT	Polybutylene terephthalate
2	Bonnet	SPC	Steel
3	Bonnet piece	SPC	Steel
4	Core assembly	SUS316, SUS405 or equivalent	Stainless steel
5	Plunger assembly	SUS405 or equivalent, NBR (FKM)	Stainless steel, nitrile rubber (fluoro rubber)
6	Coil assembly	-	-
7	Wave washer	S65CM	Steel
8	Core B	SUM22	Free-cutting steel
9	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
10	Plunger spring	SUS304	Stainless steel
11	Body	C3604(SUS303)	Copper alloy (stainless steel)

( ) shows options.

Dimensions CAD

● USB3-6





At AC, the alternating current (AC) has a rectification stack assembled into the lead wire.

Compact direct acting 3-port solenoid valve

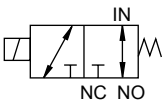
USG2 Series

- Universal
- Working fluids: Air, water, dry air, low vacuum
- Port size: M5

RoHS CAD

JIS symbol

● Universal



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		USG2-M5-1	USG2-M5-2
Working fluid		Air, water, dry air, low vacuum [1.33 x 10^2 Pa(abs)]	
Working pressure differential	MPa	0 to 0.7 (0 to 0.3 when NO pressurized)	0 to 0.3 (0 to 0.1 when NO pressurized)
Proof pressure	MPa	1.5 (≈220 psi, 15 bar)	
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature	°C	-20 (-4°F) to 50 (122°F)	
Valve seat leakage	cm^3/min	0.2 or less (pneumatic pressure)	
Mounting orientation		Unrestricted	
Weight	kg	0.07	
Port size		M5	M5
Orifice size	mm	1	1.5
Cv		0.03	0.06
C[dm^3/(s·bar)]		0.13	0.28
b		0.57	0.46
Electrical specifications			
Rated voltage		12 VDC, 24 VDC (Option: 100 VAC 50/60 Hz, 200 VAC 50/60 Hz)	
Voltage fluctuation range		±10%	
Power consumption	W DC	3	
	W AC	4	
Thermal class		Class 130 (B)	

*1 : Contact CKD if the solenoid valve will remain inactive for long periods when using water.
*2 : When using in a continuously energized state, contact CKD.
*3 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

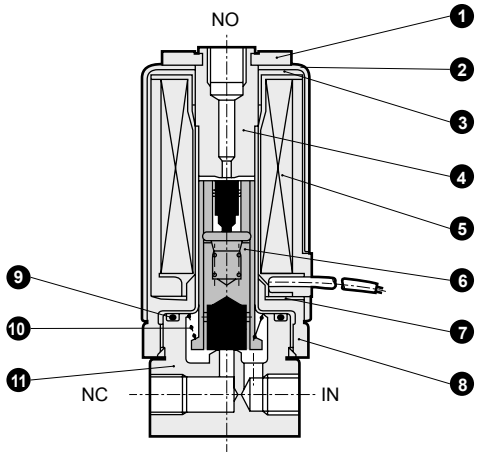
USG2 - M5 - 1 - 0 - DC24V

- USG2 — Model No.
- M5 — Port size M5
- 1 — Ⓐ Orifice size
- 0 — Ⓑ Body/sealant combination
- DC24V — Ⓒ Rated voltage

Code	Description	
Ⓐ Orifice size		
1	ø1.0	
2	ø1.5	
Ⓑ Body/sealant combination		
	Body	Seal
Blank	Stainless steel	Nitrile rubber
0	Copper alloy	Nitrile rubber
Ⓒ Rated voltage		
DC12V	Standard	12 VDC
DC24V	Standard	24 VDC
AC100V	Option	100 VAC 50/60 Hz
AC200V	Option	200 VAC 50/60 Hz

Internal structure and parts list

● USG2-M5

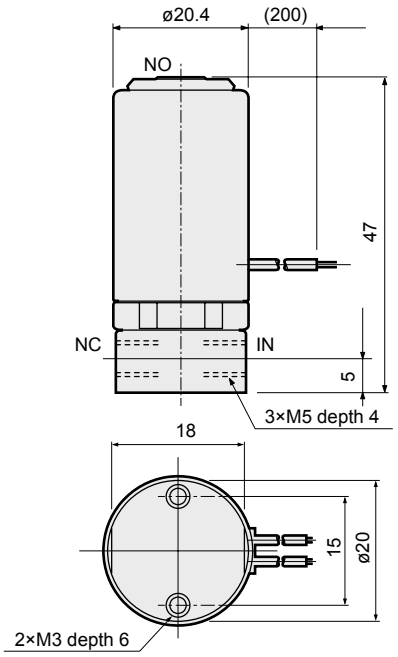


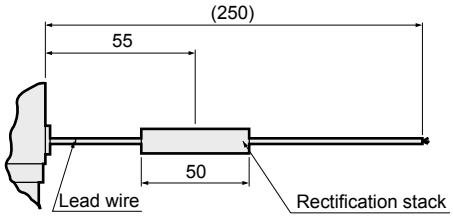
No.	Part name	Material	
1	Clip	PBT	Polybutylene terephthalate
2	Bonnet	SPC	Steel
3	Sub core	SPC	Steel
4	Core assembly	SUS316, SUS405 or equivalent	Stainless steel
5	Coil assembly	-	-
6	Plunger assembly	SUS405 or equivalent, NBR	Stainless steel, nitrile rubber
7	Wave washer	S65CM	Steel
8	Core B	SUM22	Free-cutting steel
9	O-ring	NBR	Nitrile rubber
10	Plunger spring	SUS304	Stainless steel
11	Body	SUS303(C3604)	Stainless steel (copper alloy)

( ) shows options.

Dimensions CAD

● USG2-M5





At AC, the alternating current (AC) has a rectification stack assembled into the lead wire.

Compact direct acting 3-port solenoid valve

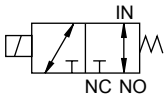
USG3 Series

- Universal
- Working fluids: Air, water, dry air, low vacuum
- Port size: Rc1/8

RoHS CAD

JIS symbol

● Universal



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		USG3-6-1	USG3-6-2
Working fluid		Air, water, dry air, low vacuum [1.33 x 10^2 Pa(abs)]	
Working pressure differential	MPa	0 to 0.7 (0 to 0.3 when NO pressurized)	0 to 0.3 (0 to 0.1 when NO pressurized)
Proof pressure	MPa	2 (≈290 psi, 20 bar)	
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature	°C	-20 (-4°F) to 50 (122°F)	
Valve seat leakage	cm^3/min	0.2 or less (air)	
Mounting orientation		Unrestricted	
Weight	kg	0.14	
Port size		Rc1/8	Rc1/8
Orifice size	mm	1.2	1.8
Cv		0.05	0.1
C[dm^3/(s·bar)]		0.19	0.42
b		0.57	0.5
Electrical specifications			
Rated voltage		12 VDC, 24 VDC (Option: 100 VAC 50/60 Hz, 200 VAC 50/60 Hz)	
Voltage fluctuation range		±10%	
Power consumption W	DC	4	
	AC	4	
Thermal class		Class 120 (E) (molded coil: class 130 (B))	

*1 : Contact CKD if the solenoid valve will remain inactive for long periods when using water.
*2 : When using in a continuously energized state, select FKM for the sealant material.
*3 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

USG3 - 6 - 1 - B - DC24V

- Model No.
- Port size: Rc1/8
- Ⓐ Orifice size
- Ⓑ Body/sealant/coil combination
- Ⓒ Rated voltage

Code	Description
Ⓐ Orifice size	
1	ø1.2
2	ø1.8

Ⓑ Body/sealant/coil combination

		Body	Seal	Coil	Treatment
Blank	Std.	Copper alloy	Nitrile rubber	Taped	-
B	Option		Fluoro rubber	Molded coil	
V					Vacuum inspection(Note)
D		Stainless steel	Nitrile rubber		-
E			Fluoro rubber		
W					Vacuum inspection(Note)
H		Copper alloy	Nitrile rubber	Taped	Oil-prohibited
J			Fluoro rubber	Molded coil	
L		Stainless steel	Nitrile rubber		
M			Fluoro rubber		

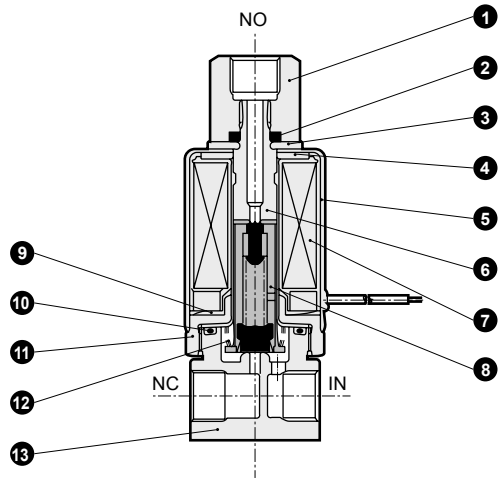
Ⓒ Rated voltage

DC12V	Standard	12 VDC
DC24V		24 VDC
AC100V	Option	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz

(Note) : For option codes "V" and "W", vacuum is inspected at "leakage rate: 1.33 x 10^{-6} Pa·m^3/s or less".

Internal structure and parts list

● USG3-6

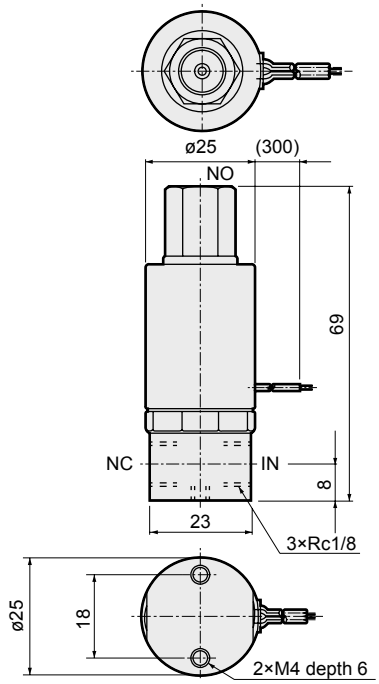


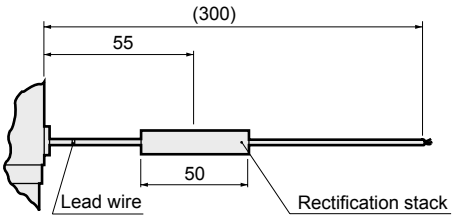
No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
3	Washer	SPC	Steel
4	Bonnet piece	SPC	Steel
5	Bonnet	SPC	Steel
6	Core assembly	SUS316, SUS405 or equivalent	Stainless steel
7	Coil assembly	-	-
8	Plunger assembly	SUS405 or equivalent, NBR (FKM)	Stainless steel, nitrile rubber (fluoro rubber)
9	Wave washer	S65CM	Steel
10	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
11	Core B	SUM22	Free-cutting steel
12	Plunger spring	SUS304	Stainless steel
13	Body	C3604(SUS303)	Copper alloy (stainless steel)

( ) shows options.

Dimensions CAD

● USG3-6





At AC, the alternating current (AC) has a rectification stack assembled into the lead wire.

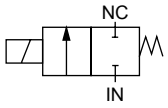
Compact direct acting 2, 3-port solenoid valve

US (resin body) Series

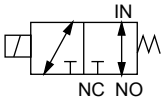
- NC (open when energized), universal
- Port size: M6, barbed fitting (compatible tube size ø6 x ø4), 1/4-28UNF

JIS symbol

● USB (2-port valve)
: NC (open when energized)



● USG (3-port valve)
: Universal



Common specifications

Item	USB/USG
Working fluid	Refer to the working fluid in individual specifications.
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 0.9 (≈100 psi, 9 bar) (refer to max. working pressure differential in individual specifications.)
Proof pressure MPa	1.5 (≈220 psi, 15 bar) (US*2), 2 (≈290 psi, 20 bar) (US*3) (water pressure)
Fluid temperature °C	0 (32°F) to 60 (140°F) (no freezing)
Ambient temperature °C	0 (32°F) to 50 (122°F)
Thermal class	Class 130 (B)
Atmosphere	No explosive or corrosive atmospheres
Valve seat leakage cm^3/min	0.2 or less (in air)
Port size	1/4-28UNF M6/barbed fitting (compatible tube size ø6 x ø4)
Mounting orientation	Unrestricted
Rated voltage	24 VDC/12 VDC
Treatment	Oil-prohibited

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Working fluid	Orifice size [mm]	Cv	C[$dm^3/(s \cdot bar)$]	b	Max. working press diff [MPa]	Power consumption [W]
2-port valve (Item Ⓔ Wetted metal material: 2 (equivalent to SUS316))							
USB2- * -1	Water/pure water (*1)	1	0.03	0.13	0.36	0.6	3
-2		1.5	0.06	0.27	0.28	0.3	3
USB3- * -1		1.6	0.08	0.32	0.30	0.7	4
-2		2.3	0.13	0.45	0.30	0.3	4
3-port valve (Item Ⓔ Wetted metal material: 2 (equivalent to SUS316))							
USG2- * -1	Water/pure water (*1)	1	0.03	0.13	0.36	0.6 (NO press'ed 0.2)	3
-2		1.5	0.06	0.27	0.28	0.3 (NO press'ed 0.1)	3
USG3- * -1		1.6	0.08	0.32	0.30	0.2 (NO press'ed 0.08)	4
2-port valve (Item Ⓔ Wetted metal material: 1 (equivalent to SUS405))							
USB2- * -1	Air/water/ dry air/low vacuum [1.33 x 10^2 Pa(abs)] (*1)	1	0.03	0.13	0.36	0.7	3
-2		1.5	0.06	0.27	0.28	0.3	3
USB3- * -1		1.6	0.08	0.32	0.30	0.9	4
-2		2.3	0.13	0.45	0.30	0.3	4
3-port valve (Item Ⓔ Wetted metal material: 1 (equivalent to SUS405))							
USG2- * -1	Air/water/ dry air/low vacuum [1.33 x 10^2 Pa(abs)] (*1)	1	0.03	0.13	0.36	0.7 (0.3 for NO)	3
-2		1.5	0.06	0.27	0.28	0.3 (NO press'ed 0.1)	3
USG3- * -1		1.6	0.08	0.32	0.30	0.3 (NO press'ed 0.1)	4

*1 : Check the compatibility between the wetted part material and working fluid before using chemical liquid for washing.
*2 : When using a 3-port valve in a continuously energized state, select FKM for the sealant material.
*3 : Effective cross-sectional area "S" and sonic conductance "C" are converted as S ≈ 5.0 x C.
*4 : When using a 2-port valve at low vacuum, vacuum the NC port side.

How to order

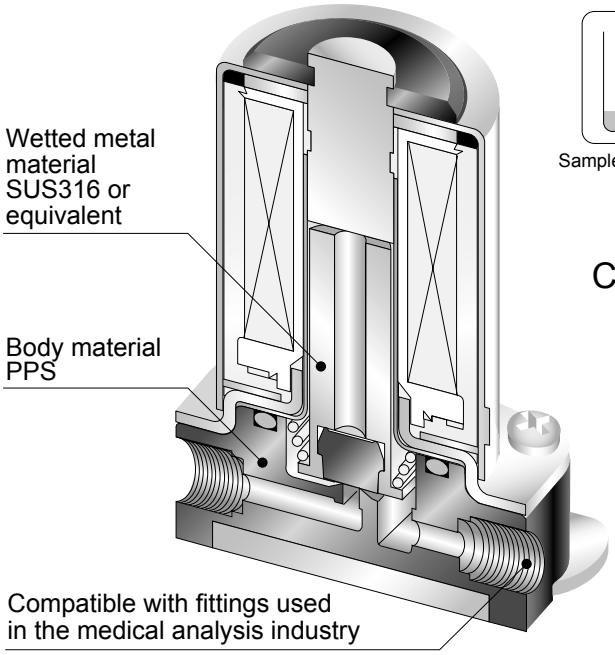
USB2 - M6 - 1 - S 2 - DC24V

Ⓐ Model No.
Ⓑ Port size
Ⓒ Orifice size
Ⓓ Body/sealant
Ⓔ Wetted metal material
(*2)
Ⓕ Voltage

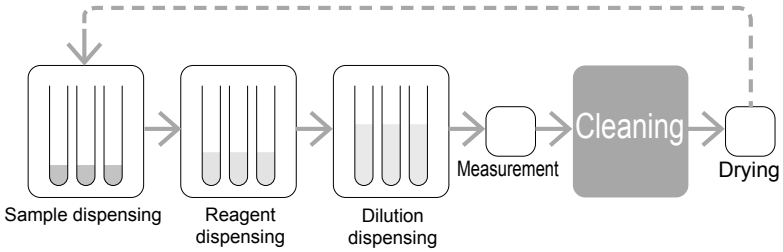
Code	Description	Ⓐ Model No. 2-port valve USB2	2-port valve USB3	3-port valve USG2	3-port valve USG3
Ⓑ Port size					
M6	M6	●	●	●(*1)	●
T6	Barbed fitting	●	●	●	●
4U	1/4-28UNF	●			
Ⓒ Orifice size					
1	Refer to text at right	ø1	ø1.6	ø1	ø1.6
2	Refer to text at right	ø1.5	ø2.3	ø1.5	
Ⓓ Body/sealant					
	Body / Seal				
G	PPS / NBR	●	●	●	●
S	PPS / FKM	●	●	●	●
Ⓔ Wetted metal material					
1	SUS405 or equiv.	●	●	●	●
2	SUS316 or equiv.	●	●	●	●
Ⓕ Voltage					
	12 VDC	●	●	●	●
	24 VDC	●	●	●	●

⚠ Precautions for model No. selection

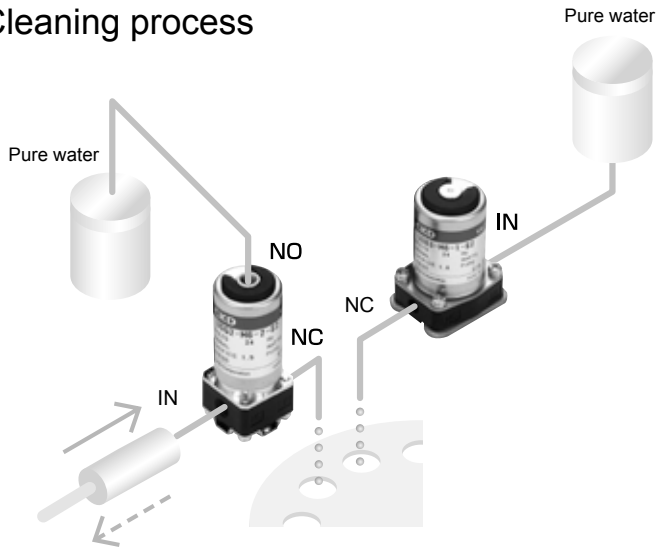
*1 : NO port of USG2 is M5.
*2 : For voltages other than 12 or 24 VDC, contact CKD.



Applications

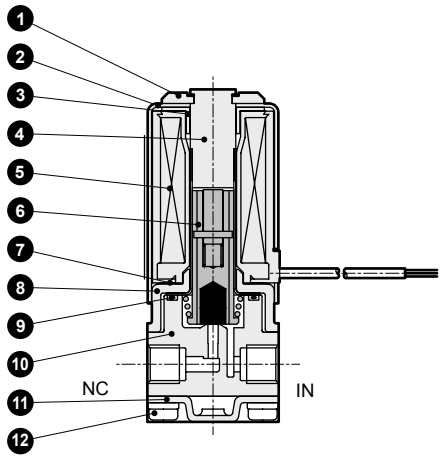


Cleaning process

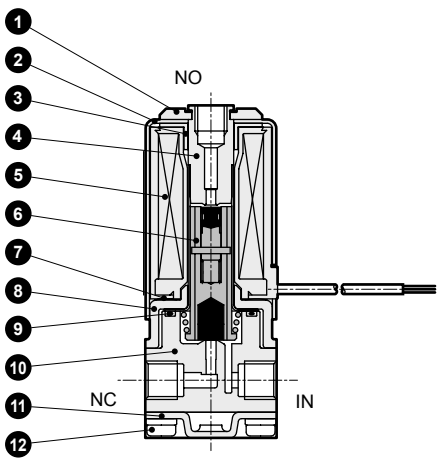


Internal structure and parts list

● USB2



● USG2

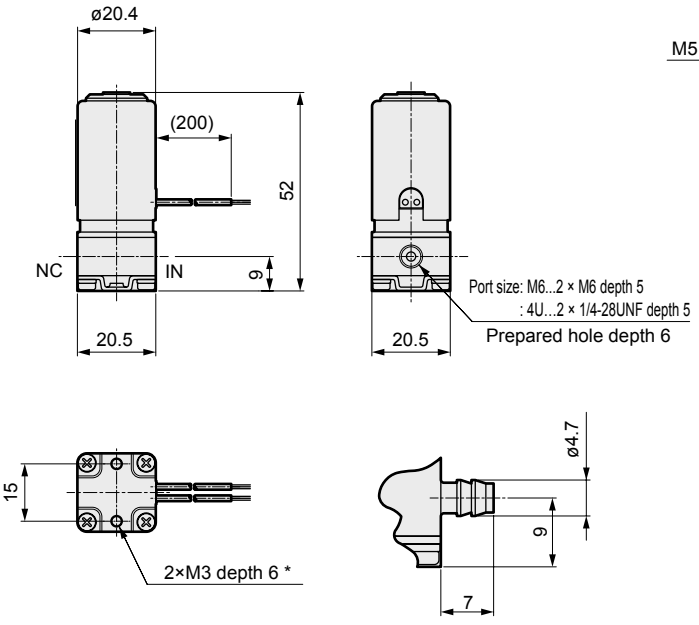


No.	Part name	Material	No.	Part name	Material
1	Clip	PBT	7	Wave washer	S65C
2	Bonnet	SPC	8	Core B	SPC
3	Sub core	SPC	9	O-ring	NBR(FKM)
4	Core assembly	SUS316 or equivalent (SUS405 or equivalent), SUS316L	10	Body	PPS
5	Coil assembly	-	11	Retainer plate	SPC
6	Plunger assembly	SUS316 or equivalent (SUS405 or equivalent), NBR (FKM)	12	Pan head machine screw	SWRM

Materials in ( ) are selectable based on options.

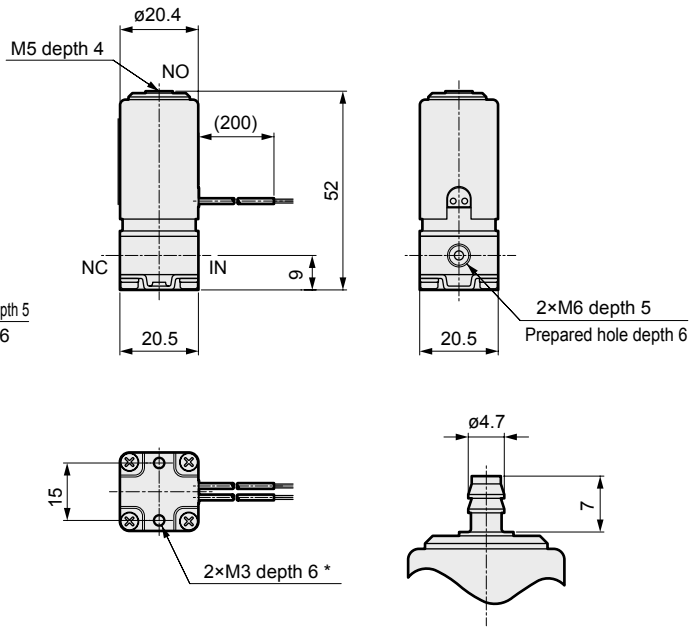
Dimensions

● USB2



[For option code "T6"]
Barbed fitting dimensions

● USG2

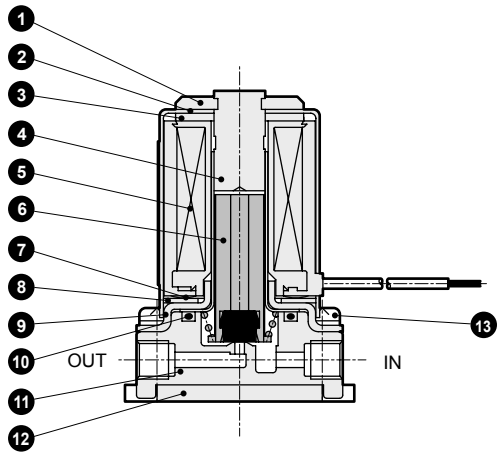


[For option code "T6"]
Barbed fitting dimensions of NO port
(IN, NC ports are the same as the 2-port valve)

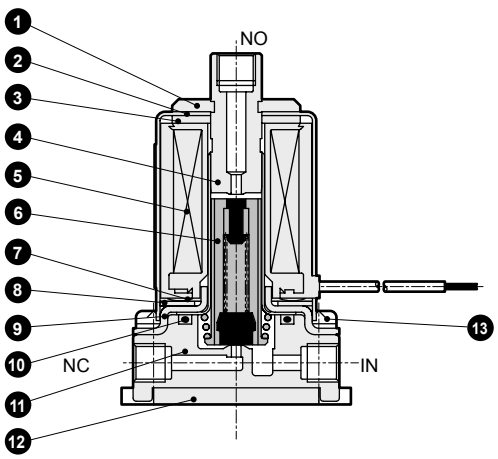
* Keep the product screw insertion depth to within 6 mm.

Internal structure and parts list

● USB3



● USG3

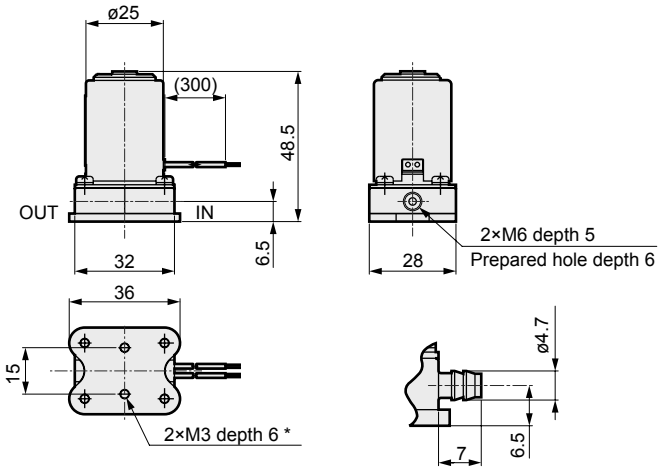


No.	Part name	Material	No.	Part name	Material
1	Clip	PBT	8	Sub core	SPC
2	Bonnet	SPC	9	Core B	SPC
3	Bonnet piece	SPC	10	O-ring	NBR(FKM)
4	Core assembly	SUS316 or equivalent (SUS405 or equivalent), SUS316	11	Body	PPS
5	Coil assembly	-	12	Retainer plate	SPC
6	Plunger assembly	SUS316 or equivalent (SUS405 or equivalent), NBR (FKM)	13	Pan head machine screw	SWRM
7	Wave washer	S65C			

Materials in ( ) are selectable based on options.

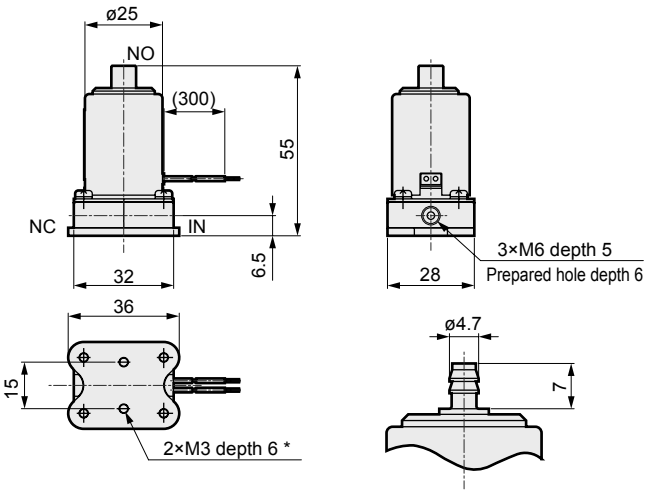
Dimensions

● USB3



[For option code "T6"]
Barbed fitting dimensions

● USG3



[For option code "T6"]
Barbed fitting dimensions of NO port
(COM, NC ports are the same as the 2-port valve)

* Keep the product screw insertion depth to within 6 mm.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.
Read safety precautions in “Air Unit CXU Series (Catalog No. CC-901A)” as well.

Product-specific cautions : Pilot operated 2-port solenoid valve for compressed air EXA Series

Design/selection

1. Checking the specifications

⚠WARNING

■Use the product in the range of conditions specified for the product.
Use with pressure or temperature exceeding the specifications range may result in damage or operation faults.
(Refer to specifications)
To use fluids other than compressed air, contact CKD.

■Working fluids
Active gases cannot be used, so contact CKD when these applications are required.

■If the product is used under conditions where the pressure differential between the primary side and secondary side while the valve is open is below 0.01 MPa, the diaphragm may vibrate, resulting in a short service life. When using under conditions where there is a chance that the differential pressure or flow rate can become very small as described below, contact CKD for details.

- When the primary or secondary side of solenoid valve has a needle valve
- When multiple solenoid valves piped in parallel are opened simultaneously
  (Differential pressure between primary and secondary sides does not develop due to the drop in solenoid valve source pressure.)

2. Safety design

⚠WARNING

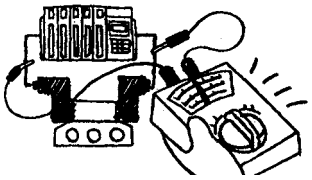
■Take measures to prevent physical harm or property damage in the event of failure of this product.

⚠CAUTION

■Check leakage current to prevent malfunction caused by leakage current from other fluid control components.

- When using a programmable controller, leakage current may affect the solenoid valve and cause malfunction. Note that the values that are affected by leakage current depend on the solenoid valve.

Programmable controller



Using 100 VAC	2.0 mA or less
Using 12 VDC	1.5 mA or less
Using 24 VDC	1.8 mA or less

■Observe the following precautions when using nylon tubes or urethane tubes for piping material.

- Use flame-resistant tubes where spatter could scatter.
- When using the standard push-in fitting on the spiral tube, fix the base of the tube with a hose band. Rotation may occur, causing a reduction in holding force.

3. Working environment

■Use clean air.

- Do not use the compressed air if it contains chemicals, synthetic oils containing organic solvents, salt, or corrosive gas, as it can cause damage and/or operation failure.
- The ozone content in the compressed air should be 0.1 ppm or below. A higher ozone content may cause malfunction and leakage.

■Protection characteristics (IPX5) of DIN terminal box connection
IPX5 (IEC60529 [IEC529:1989-11]) standards are applied to the test. Avoid use in conditions where water or coolant directly contacts the valve.

Explanation of IPX5 protection characteristic codes and test method

● Degree of protection

Note: IP-X5 is based on the following testing method.

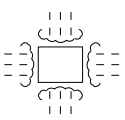
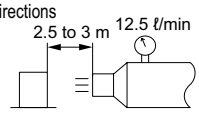
■ IEC (International Electrotechnical Commission) standards (IEC60529 [IEC529:1989-11])

IP - □ □

Protection characteristic codes (International Protection)

1st characteristic No.
(degree of protection for foreign solid matter)

2nd characteristic No. (degree of protection for water entry)

Grade	Degree of protection		Overview of test method (fresh water is used)
5	Protection against water jets 	No harmful effects occur even when water is sprayed with nozzles from all directions.	The sample (exterior) is exposed to water jetting of 1 m² per minute for a total of 3 minutes or more from all directions with the testing equipment in the figure below.  Water discharge nozzle bore size: ø6.3 mm

4. Durability

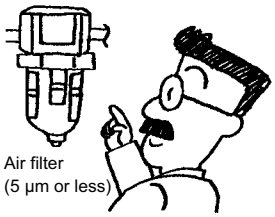
⚠WARNING

■Using the solenoid valve with continuous energizing can cause a deterioration of performance. Contact CKD when using the solenoid valve under such conditions.

5. Pneumatic source

⚠CAUTION

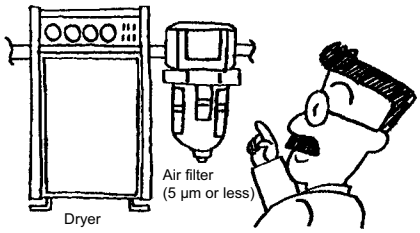
■Install a pneumatic filter just before the pneumatic component in the circuit.



■Do not supply anything other than compressed air.

■Use clean compressed air that does not contain corrosive gases.

■Use dry compressed air that does not cause moisture inside the piping.



- Moisture will occur if the temperature drops in the pneumatic piping or pneumatic components.
- Operation failure could occur if moisture enters the air flow path of pneumatic components and temporarily blocks passage.
- Moisture could cause rust, making the pneumatic components fail.

■Use compressed air that does not contain oil oxides, tar, carbon, etc., from the air compressor.

- If oil oxides, tar, or carbon enter the pneumatic components and solidify, resistance at the sliding section will increase, leading to operation failure.

■Use compressed air that does not contain solid foreign matter.

- Any solid foreign matter in the compressed air can enter the pneumatic components and cause wear, locking or internal leakage in the sliding parts.

6. Surge suppressor

⚠CAUTION

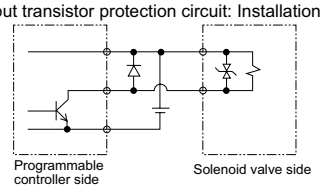
■The surge suppressor attached to the solenoid valve is intended to protect the output contacts for the solenoid valve drive. There is no significant protection for the other peripheral devices, and devices could be damaged or could malfunction due to a surge. As well, surges generated by other devices may be absorbed and cause damage such as burning. Note the following points.

- The surge suppressor functions to limit solenoid valve surge voltage, which can reach several hundred volts, to a low voltage level that the output contact can withstand. Depending on the output circuit used, this may be insufficient and could result in damage or malfunction. Check whether the surge suppressor can be used within the surge voltage limit of the solenoid valve in use, the output device's withstand pressure and circuit structure, and by the degree of return delay time. When necessary, provide other surge countermeasures. CKD's solenoid valve with surge suppressor can counter inverse voltage surge which occurs when the valve is turned OFF to the level shown in the table below.

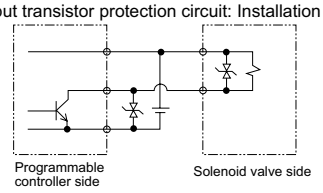
Specification voltage	Inverse voltage when OFF
12 VDC	Approx. 27 V
24 VDC	Approx. 47 V

- If the output unit is an NPN, a surge voltage equaling the voltage shown in the table above plus the power supply voltage may be applied to the output transistor.

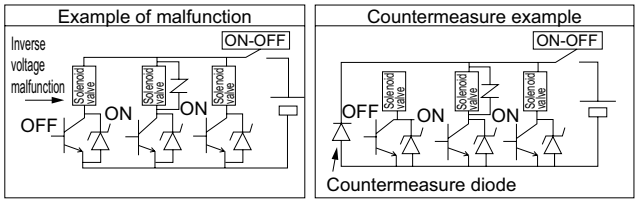
[Output transistor protection circuit: Installation example 1]



[Output transistor protection circuit: Installation example 2]



- If another device or solenoid valve is connected in parallel to the solenoid valve, the inverse voltage surge generated when the valve is OFF would apply to those devices. Even in the case of a solenoid valve with 24 VDC surge suppressor, a surge voltage may reach negative tens of volts for some models. This inverse voltage may cause damage or malfunction to other components connected in parallel. Avoid parallel connection of devices susceptible to inverse polarity voltages, e.g., LED indicators. When driving several solenoid valves in parallel, the surge from other solenoid valves may enter the surge suppressor of one solenoid valve, and it may burn depending on the current value. When driving several solenoid valves with surge suppressors in parallel, surge current could concentrate at the surge suppressor with the lowest limit voltage and cause similar burning. Due to the variations in surge suppressor limit voltage that exist even among solenoid valves of the same model No., in the worst case the surge suppressor may burn out. Avoid driving multiple solenoid valves in parallel.



- The surge suppressor incorporated in the solenoid valve will often be short-circuited if it is damaged by overvoltage or overcurrent from other solenoid valves. Where there is a failed surge suppressor, if a large current flows when the output is ON, in the worst case scenario, the output circuit or solenoid valve could be damaged or ignited. Do not continue energizing in a state of failure. Additionally, to prevent large currents from continuing to flow, connect an overcurrent protection circuit to the power supply and drive circuit, or use a power supply with overcurrent protection.

7. 100 VAC specifications

⚠CAUTION

■The 100 VAC specification has a built-in full-wave rectifier circuit.

Depending on the SSR used to turn ON/OFF the solenoid valve, recovery failure of the valve may result.
Use caution when selecting SSRs. (Consulting the manufacturer of the relay or PLC is recommended.)

Mounting, installation and adjustment

1. Installation

⚠WARNING

■When mounting a valve, do not use a mounting method that relies on support from the piping.
- Mount and fix the valve body.

■After mounting, do not clean or paint with water or solvent.
- Otherwise some resin parts may be damaged.

■Do not remove the solenoid valve package until you are ready to connect to the piping.
- Removing the package before starting piping work may cause foreign matter to enter inside the solenoid valve from the piping port, resulting in failure or malfunction.

■Make sure that there is no torsion, tension or moment load applied to the fitting or the tube.

■Check that tubing is not worn or damaged.
- Tubing could collapse, rupture, or become dislocated.

2. Pre-operation confirmation

⚠CAUTION

■When supplying compressed air after connecting pipes, do not suddenly apply high pressure.
- The pipe connection could dislocate, causing the pipe tube to fly out, risking accidents.

■Before supplying compressed air after connecting pipes, check that there are no air leaks at any pipe connections.
- Use the product after checking for air leaks by applying leak detection liquid on the piping connections.

3. Piping

■Connect piping so that connections are not dislocated by equipment movement, vibration, tension, etc.
- Cut the push-in fitting tube at right angles with a dedicated tool.
- Confirm that the tube has been inserted properly, and make sure that there is no tension during use. The tube could be dislocated or damaged if there is any tension.

■Make sure that there is no torsion, tension or moment load applied to the fitting or the tube.

■Use the designated tube.
- Particularly in the case of super-flexible urethane tubes, attach insert sleeves for use.

■Securely insert the tube to the tube end, and make sure that the tube cannot be pulled off.

■Cut the tube with a dedicated cutter and always at a right angle.

4. Lead wire connection

⚠CAUTION

■Connect the lead wire appropriately.

The following lead wire should be used:

Electro connect code	Description	Conductor size	Conduct X-sect area	Outer diameter of insulator	Outer ø of covering
Blank	Grommet lead wire	AWG#24	0.22 or equiv.	1.42	-

5. DIN terminal box

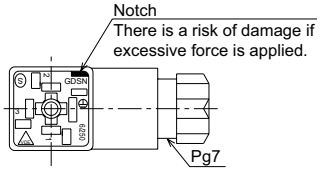
⚠WARNING

■As there is a risk of electric shock when assembling or disassembling the terminal box, perform the assembly and/or disassembly after turning OFF the power supply.

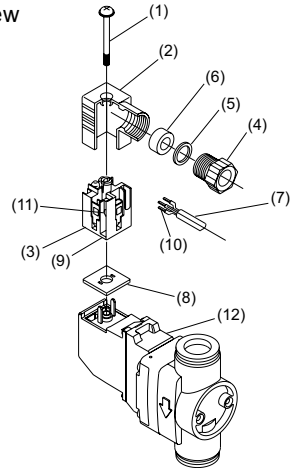
⚠CAUTION

■Disassembly
- Loosen screw (1) and pull cover (2) in the direction of screw (1) to remove the connector from coil assembly (12).
- Pull out screw (1) from cover (2).
- Notch (9) (next to the GDSN mark) can be found at the bottom of terminal block (3). Insert a compact flathead screwdriver in the gap between housing (2) and terminal block (3) and pry to remove terminal block (3) from cover (2) (Refer to Fig.1). Remove the terminal block without applying excessive force. There is a risk of damage.
- Remove cable gland (4) and take out washer (5) and rubber packing (6).

Fig. 1



Exploded view



■Wiring

● Wiring preparation

- The applicable dimensions for cable (7) are as the VCTF2(3) core (bore size: ø3.5 to 7) defined in JIS C3306.
- The length of the lead wire stripping of the cable is 10 mm.
- Both stranded wires and solid wires can be used for wiring.
- When using a stranded wire, avoid connecting a pre-soldered wire.
- When using a crimp sleeve (10) at the end of the twisted wire, select H0.5/6 (0.3 to 0.5 mm^2) or H0.75/6 (0.75 mm^2) made by Weidmüller Japan, or an equivalent product. Crimp sleeves are not included.

● Wiring

- Pass cable (7) through cable gland (4), washer (5), and rubber packing (6) in this order, and insert it into cover (2).
- Connect to terminals 1 and 2. There is no polarity.
- The recommended tightening torque is 0.2 to 0.25 N·m.

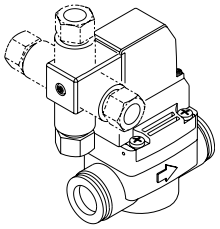
■Assembly

● Set the wired terminal block (3) on cover (2).(Push in until it clicks.)
* The terminal block can be set in any of the four different directions (Fig.2).

● Insert the rubber packing (6) and washer (5) in this order into the cable through-hole in cover (2), and securely tighten cable gland (4).
Remarks : The recommended tightening torque for the cable gland is 1.0 to 1.5 N·m.
Pull the cable to check that it does not become loose.

● Place gasket (8) between the bottom part of terminal block (3) and the plug of coil assembly (12), insert the connector, insert screw (1) from over cover (2) and tighten it.
Remarks : The recommended tightening torque for screws is 0.2 to 0.25 N·m.

Fig. 2



Use/maintenance

1. Common

⚠CAUTION

■Continuous energizing for long periods may accelerate degradation of the solenoid valve. Furthermore, use caution under the following working conditions, as with continuous energization:

● When the energized time exceeds non-energized time in intermittent operation
● When one energizing session exceeds 30 minutes in intermittent operation

Consider heat dissipation when installing the product. Contact CKD when energizing this device continuously.

■Instantaneous leakage

With the pilot operated 2-port valve, if the pressure is suddenly applied when the compressor starts while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.

■Disassembly

Do not disassemble this valve. Once disassembled, the valve may not retain its valve performance.

■The coil and AC rectification stack generate heat while the valve is energized and immediately after energization. Do not touch these parts with your hands or other body parts.

■Pressure differential

Under the following conditions, make sure to set the pressure so that the pressure differential while the valve is open does not drop below 0.01 MPa. If a pressure differential (between the primary side and secondary side) of at least 0.01 MPa cannot be secured while the valve is open, the diaphragm may vibrate, resulting in a short service life.

● When a needle valve is mounted on the secondary side
● When multiple solenoid valves connected in parallel piping (module and manifold connection) are opened simultaneously (The drop in source pressure causes the pressure differential between the primary side and the secondary side to diminish.)
● If sufficient pressure differential between the primary side and the secondary side cannot be ensured while the valve is open, or if the pressure differential is unknown, contact CKD for details.

■Note that the secondary-side pressure is retained when the primary-side pressure drops below the secondary-side pressure while the solenoid valve is open. (While the solenoid valve is closed, fluid flows from the secondary side to the primary side.)

■When installing the valve, make sure that no tension is applied to the coil lead wire.

■When carrying the product, hold the body.
(Do not dangle the product from the lead wire when carrying it.)

■When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.

■If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. For the fluid supply side, use piping of a piping size that matches the port size of the valve.

■Depending on the conditions of your usage, the operation of the solenoid valve may become unstable after being left unattended for an extended period of time.
Always perform a test run before using the product for actual operations.

Use/maintenance

■Avoid using the product for applications that involve continuous fitting rotation or oscillations. Fittings may become damaged.

2. Oil-prohibited specifications

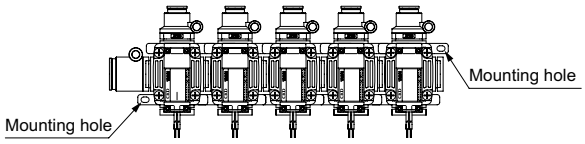
■The oil-prohibited specifications for this product indicate cleaning and assembly under the following conditions:

- Cleaning target: Major flow path components that come into contact with the fluid (excluding components that deteriorate in performance when cleaned)
- Cleaning solution: Industrial alcohol or fluorine cleaning agent
- Assembly system: Using assembly and testing systems for standard products.

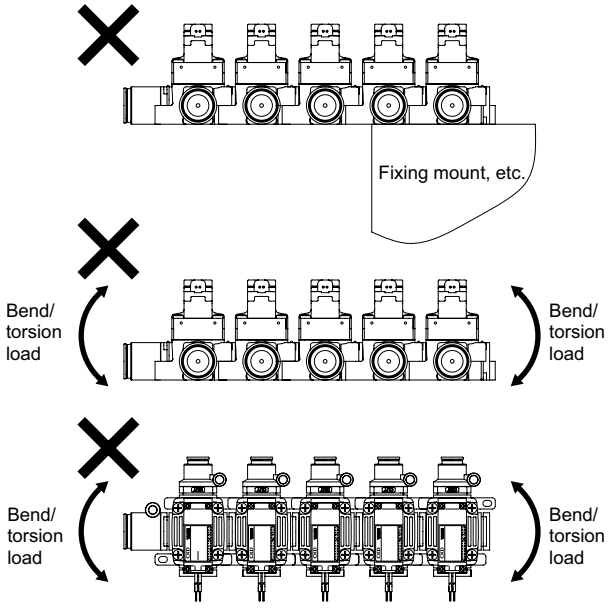
3. Manifold

■If you are considering an increase or decrease in the number of stations or changing the compatible tube size for this product, contact CKD for details.

■To install this product, use the mounting holes as shown in the figure below to install the product on a smooth, even surface.



■Do not install or carry this product by one side as shown in the figure below. Do not hold or carry this product in such a way that a torsional or bending force is applied to the manifold body. External leakage may occur when fluid pressure is increased, or the product may fail or break.



■Do not drop this product or use it as footing. The product may fail or break.

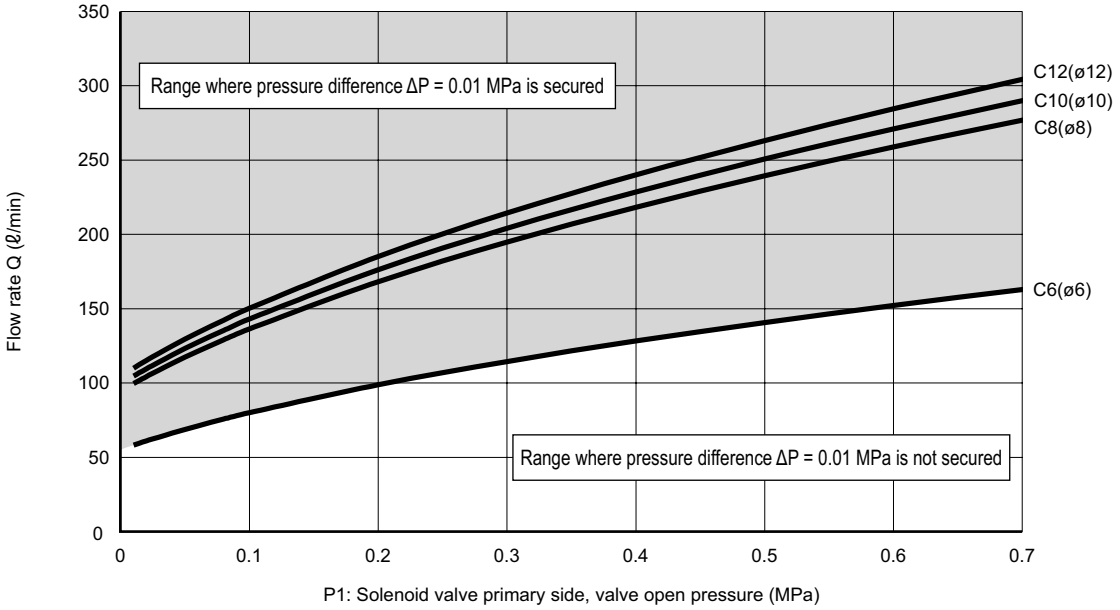
Use/maintenance

4. Internal exhaust specifications: Ensuring the min. working pressure differential

Target model No.: EXA / GEXA - [Port size] - 0 [Coil option] [Mounting plate option] - [Voltage code]

This pilot operated solenoid valve opens and closes based on differential pressure before and after the solenoid valve. Hence, a pressure difference (ΔP = P1 - P2) of at least 0.01 MPa must be ensured for accurate operation of the valve. If pressure differential ΔP cannot be secured, the diaphragm may vibrate upon use, resulting in a short service life.

Pressure difference ΔP is determined by the flow rate Q that flows through the solenoid valve. The larger the flow rate Q is, the greater the pressure difference ΔP will become. The guideline values for the “flow rate required” for ensuring a pressure difference ΔP of at least 0.01 MPa while the valve is open are as shown in the figure below.



(1) When selecting a product, check the above figure to make sure that the necessary pressure difference ΔP is secured with the required flow rate.

(2) Note that, particularly in the following cases, the required pressure differential ΔP and flow rate may not be secured:
- When flow rate is reduced before/after the solenoid valve by using a needle valve, nozzle, or long piping
- When air supply on the primary side of the solenoid valve is low (insufficient regulator capacity, a throttling section, long piping, etc.)
- When air consumption of a component sharing the air supply source (regulator, etc.) on the primary side of the solenoid valve increases constantly or temporarily.
- When the flow rate changes/decreases due to the fluctuation of the source pressure of the air supply on the primary side of the solenoid valve
- When multiple solenoid valves are opened simultaneously

(3) When operating a manifold with multiple valves opened simultaneously, be sure to select components so that the following flow rate will be ensured.
Operation flow rate/solenoid valve × No. of valves opened simultaneously = Required operation flow rate < supply flow rate.

(Example) If P1= 0.3 MPa when 1 solenoid valve is open, the flow rate that can be ensured when the pressure difference ΔP=0.01 MPa is approximately 110 ℓ/min (operation flow rate). When 3 manifolds are opened simultaneously, 110 ℓ/min×3 manifold stations = 330 ℓ/min (operation flow rate) < the supply flow rate.

(4) If the required operation flow rate cannot be secured, or if the flow rate cannot be checked, consider the use of the pilot air external exhaust (costume-made product) or contact CKD.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Compact pilot operated solenoid valve for water FWD Series

Design/selection

⚠ WARNING

■ Working fluid

- No liquid other than water can be used.

■ Working environment

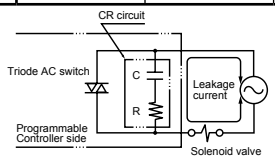
- Install in a place where the product is not exposed to rain, water, or direct sunlight. This valve cannot be used outdoors.

⚠ CAUTION

■ Safety design

- Leakage current from other fluid control components
  When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.

Voltage / Model No.	AC		DC
	100 V	200 V	24 V
FWD	3 mA or less	1.5 mA or less	1 mA or less



Mounting, installation and adjustment

⚠ CAUTION

■ Mounting

- When installing the valve, make sure that no tension is applied to the coil lead wire.
- When carrying the product, hold the body. (Do not dangle the product from the lead wire when carrying it.)

■ Piping

- Dirt or foreign matter in fluid could prevent the product from functioning correctly. Install an 80-mesh or finer air filter.
- When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.
- If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. For the fluid supply side, use piping of a piping size that matches the port size of the valve.

Use/maintenance

⚠ CAUTION

■ When using the product

- Instantaneous leakage
  With the pilot operated 2-port valve, if the pressure is suddenly applied when the pump starts while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.
- Operation
  Do not apply back pressure. This could lead to malfunction.
- Water hammer
  If the water hammer poses problems, consider using the CKD "RSV type" solenoid valve or a motor valve.
- Pressure differential
  Be sure to set the pressure so that the pressure differential between the primary side and the secondary side while the valve is open does not drop below 0.02 MPa.
  In the following cases, the pressure differential between the primary side and the secondary side diminishes:
  · When a needle valve is mounted on the secondary side
  · When multiple solenoid valves connected in parallel piping are opened simultaneously

■ Disassembly/assembly

- Tightening torque
  When disassembling or assembling, use the values below as tightening torques to tighten the screws.

Holder set screw	Body set screw
0.63 to 0.77 N·m	0.81 to 0.99 N·m (port size: 8A, 10A, 15A) 1.5 to 1.8 N·m (port size 20A, 25A)

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Compact direct acting 2, 3 port solenoid valve HN$^{B}_{G}$1/US$^{B}_{G}$2/US$^{B}_{G}$3

Design/selection

⚠WARNING

1 Working fluids

(1) When using this valve for dry air, the life can be shortened considerably due to wear. Use a valve intended for dry air.

(2) This valve cannot be used for maintaining vacuum. Consult with CKD when the vacuum needs to be maintained.

⚠CAUTION

1 Continuous energizing

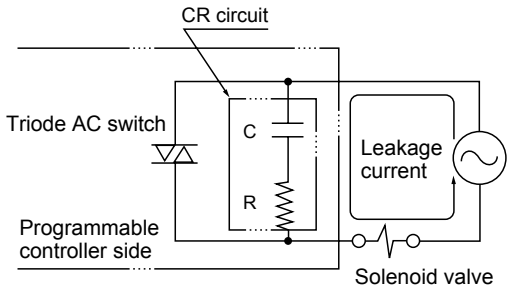
Consult with CKD when using the 3-port valve in a continuously energized state.

2 Fluid viscosity

The fluid viscosity must be 50 mm^2/s or less. Malfunctions could occur if the viscosity is higher than 50 mm^2/s.

3 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications. Failure to observe this could lead to malfunctions.



Voltage / Model No.	AC		AC diode		DC	
	100 V	200 V	100 V	200 V	12 V	24 V
USB,USG	-	-	0.2 mA or less	0.1 mA or less	2 mA or less	1 mA or less
HNB,HNG	-	-	-	-	1 mA or less	1 mA or less

Mounting, piping and wiring

⚠CAUTION

1 Piping

Always hold the socket with a wrench, etc., if the NO side is a socket.

Maintenance

⚠CAUTION

1 In the case of USB/USG

When disassembling or assembling, tighten the core assembly and socket with the following tightening torques.

Model No.	Core assembly tightening torque	Socket tightening torque
USB2	10 to 22 Nm	-
USG2	10 to 22 Nm	-
USB3	18 to 32 Nm	-
USG3	18 to 32 Nm	4 to 8 Nm

[Precautions for each model]

USB/USG (resin body)

⚠CAUTION

1 Metal comes into contact with the fluid. (Not a metal-free valve)

2 When coupling pipes to a solenoid valve, ensure that the valve does not become bent. Do not use metal fittings because they could damage the port. Use a PP or fluorine resin fitting.
Do not apply external force to the coil.
Refer to the recommended fitting tightening torque below.
Recommended tightening torque: 0.15 N·m or below

3 When connecting tubes to a solenoid valve, ensure that the tube is inserted straight into the barbed fitting. At this time, ensure that the valve does not become bent.
Do not apply external force to the coil.
The mounting force (holding force) differs according to the material and dimensions of the tube. Always make sure that there are no problems regarding leakage or attachment before use.
If necessary, take measures such as using a tube retainer.

FA$^{B}_{G}$/FG$^{B}_{G}$/FVB
FW$^{B}_{G}$/FHB/FLB

Dedicated fluid control direct acting 2, 3-port solenoid valve
Special purpose

■ For compressed air/dry air/medium vacuum/water/hot water/oil

Overview

This is a direct acting poppet solenoid valve. Six series for compressed air, dry air, medium vacuum, water, hot water and oil applications are available to suit the control fluid. Dedicated fluid design is suited for all types of fluids. Select the optimum series based on the fluid.

Features

Dedicated fluid design
Perfectly suits the fluid to be controlled.
Twice the durability (compared with our products)
Long life even with dry air or inactive gas.
Space-saving
Lightweight
Low watt design
Flame-retardant UL94V-0 compliant coil
Easy to disassemble and reassemble

CONTENTS

⚠ Always read the precautions in the Introduction and on page 140 before use.

Series variation

Direct acting 2, 3-port solenoid valves by target fluid
Special purpose

Working fluid	No. of ports	Model	Structure	Actuation category	
Compressed air	2-port 	FAB	Single unit	NC (open when energized)	
				NO (closed when energized)	
		GFAB	Manifold	Common supply	
				Individual supply	
	3-port 	FAG	Single unit	Universal	
				NC pressurization	
		GFAG	Manifold	Common supply/ common exhaust	
Dry air	2-port 	FGB	Single unit	NC (open when energized)	
		GFGB	Manifold	Common supply	
				Individual supply	
	3-port 	FGG	Single unit	Universal	
				NC pressurization	
		GFGG	Manifold	Common supply/ common exhaust	
Medium vacuum	2-port 	FVB	Single unit	NC (open when energized)	
		GFVB	Manifold	Individual supply	
Water	2-port 	FWB	Single unit	NC (open when energized)	
				NO (closed when energized)	
		GFWB	Manifold	Common water supply	
	3-port 	FWG	Single unit	Universal	
		GFWG	Manifold	Common water supply/individual drain	
Hot water	2-port 	FHB	Single unit	NC (open when energized)	
Oil	2-port 	FLB	Single unit	NC (open when energized)	
		GFLB	Manifold	Common lubrication	

	Port size					Page
	M5	Rc1/8	Rc1/4	Rc3/8	Rc1/2	
	●	●	●	●	●	52
		●	●	●		
		●		●		58
	●	●	●			
	●	●	●	●		64
		●	●	●		
	●	●	●			68
		●	●	●	●	74
		●		●		78
		●	●			
		●	●	●		84
		●	●	●		
		●	●			88
		●	●	●		94
		●	●	●		98
		●	●	●	●	104
		●	●	●		
		●	●	●		110
		●	●	●		116
		●	●	●		120
		●	●	●	●	126
		●	●	●	●	130
		●	●	●		134

*Note Port size of manifold is for pressurization port.

Direct acting 2-port solenoid valve for compressed air, single unit
Special purpose

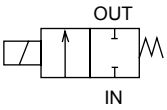
FAB Series

- NC (open when energized), NO (closed when energized)
- Port size: M5, Rc1/8 to Rc1/2

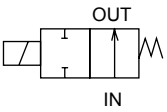
CE Refer to the Ending for details. RoHS CAD

JIS symbol

● NC (open when energized)



● NO (closed when energized)



Common specifications

Item	FAB
Working fluid	Compressed air
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.4 (≈200 psi, 14 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	2.1 (≈300 psi, 21 bar) (1.5 (≈220 psi, 15 bar) for FAB11/21)
Fluid temperature °C	AC: -10 (14°F) to 60 (140°F), DC: -10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	AC:-20 (-4°F) to 60 (140°F), DC:-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage $cm^3/min(ANR)$	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent, and the FAB11 compact terminal box is IP40 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

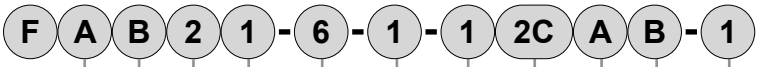
Item / Model No.	Port size	Orifice size (mm)	Flow characteristics C[$dm^3/(s\cdot bar)$]	Flow characteristics b	Max. working press diff MPa AC	Max. working press diff MPa DC	Max. working pressure MPa	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consumption (W) AC 50/60 Hz	Power consumption (W) DC	Weight (kg)
NC (open when energized)															
FAB11- M5 -Z	M5	1	0.12	0.64	0.7	0.7	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	3.4	2.6	5	4.6	2.3/1.6	3	0.07
FAB11- M5 -1	M5	1.5	0.28	0.52	0.3	0.3	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	3.4	2.6	5	4.6	2.3/1.6	3	0.07
FAB21- 6 -1	Rc1/8	1.5	0.28	0.52	1.0	1.0	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	5.3	3.7	10	9	2.7/2	4	0.12
FAB21- 6 -2	Rc1/8	2	0.55	0.59	0.6	0.6	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	5.3	3.7	10	9	2.7/2	4	0.12
FAB31- 6 -2	Rc1/8	2	0.55	0.56	1.4	1.4	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.21
FAB31- 8 -2	Rc1/8	2	0.55	0.56	1.4	1.4	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.21
FAB31- 6 -3	Rc1/4	3	1.2	0.56	1.0	0.6	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.21
FAB31- 8 -3	Rc1/4	3	1.2	0.56	1.0	0.6	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.21
FAB31- 6 -6	Rc1/4	5	3.1	0.50	0.3	0.15	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.21
FAB31- 8 -6	Rc1/4	5	3.1	0.50	0.3	0.15	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.21
FAB41- 8 -3	Rc1/4	3	1.2	0.56	1.4	1.4	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.37
FAB41- 10 -3	Rc1/4	3	1.2	0.56	1.4	1.4	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.37
FAB41- 8 -5	Rc3/8	4	2.1	0.54	1.0	0.9	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.37
FAB41- 10 -5	Rc3/8	4	2.1	0.54	1.0	0.9	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.37
FAB41- 8 -7	Rc3/8	7	5.7	0.48	0.25	0.15	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.37
FAB41- 10 -7	Rc3/8	7	5.7	0.48	0.25	0.15	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.37
FAB51- 10 -5	Rc3/8	4	2.1	0.54	1.2	1.2	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	20	16	55	45	11/9.5	11.5	0.60
FAB51- 10 -6	Rc3/8	5	3.1	0.50	0.7	0.8	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	20	16	55	45	11/9.5	11.5	0.60
FAB51- 15 -7	Rc3/8	7	5.7	0.48	0.3	0.3	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	20	16	55	45	11/9.5	11.5	0.60
FAB51- 15 -8	Rc1/2	10	5.5	0.41	0.15	0.15	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	20	16	55	45	11/9.5	11.5	0.60
NO (closed when energized)															
FAB32- 6 -2	Rc1/8	2	0.57	0.53	1.1	1.1	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	11.5	8	25	22	4.6/3.2	6	0.31
FAB32- 8 -2	Rc1/8	2	0.57	0.53	1.1	1.1	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	11.5	8	25	22	4.6/3.2	6	0.31
FAB32- 6 -3	Rc1/4	3	1.2	0.57	0.55	0.55	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	11.5	8	25	22	4.6/3.2	6	0.31
FAB32- 8 -3	Rc1/4	3	1.2	0.57	0.55	0.55	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	11.5	8	25	22	4.6/3.2	6	0.31
FAB32- 6 -6	Rc1/4	5	3.0	0.48	0.2	0.2	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	11.5	8	25	22	4.6/3.2	6	0.31
FAB32- 8 -6	Rc1/4	5	3.0	0.48	0.2	0.2	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	11.5	8	25	22	4.6/3.2	6	0.31
FAB42- 8 -3	Rc1/4	3	1.2	0.50	0.9	0.9	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	18	14	45	40	7.5/6.5	*3 8	0.54
FAB42- 10 -3	Rc1/4	3	1.2	0.50	0.9	0.9	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	18	14	45	40	7.5/6.5	*3 8	0.54
FAB42- 8 -5	Rc1/4	4	2.1	0.54	0.55	0.55	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	18	14	45	40	7.5/6.5	*3 8	0.54
FAB42- 10 -5	Rc1/4	4	2.1	0.54	0.55	0.55	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	18	14	45	40	7.5/6.5	*3 8	0.54
FAB42- 8 -7	Rc1/4	7	5.2	0.41	0.15	0.15	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	18	14	45	40	7.5/6.5	*3 8	0.54
FAB42- 10 -7	Rc1/4	7	5.2	0.41	0.15	0.15	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	18	14	45	40	7.5/6.5	*3 8	0.54
FAB52- 8 -5	Rc3/8	4	2.1	0.54	0.8	0.8	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	25	20	60	50	11/10	11.5	0.71
FAB52- 10 -5	Rc3/8	4	2.1	0.54	0.8	0.8	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	25	20	60	50	11/10	11.5	0.71
FAB52- 8 -6	Rc3/8	5	3.0	0.52	0.5	0.5	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	25	20	60	50	11/10	11.5	0.71
FAB52- 10 -6	Rc3/8	5	3.0	0.52	0.5	0.5	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	25	20	60	50	11/10	11.5	0.71
FAB52- 8 -7	Rc3/8	7	5.2	0.41	0.25	0.25	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	25	20	60	50	11/10	11.5	0.71
FAB52- 10 -7	Rc3/8	7	5.2	0.41	0.25	0.25	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	25	20	60	50	11/10	11.5	0.71

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown on the right.
*3 : 8.6 (W) for 12 VDC.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current

Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
FAB1	2 mA or less	1 mA or less	1 mA or less	2 mA or less
FAB2	3 mA or less	1.5 mA or less		
FAB3/4/5	6 mA or less	3 mA or less		

How to order



No. of ports (2-port valve)

Working fluid (Compressed air)

Ⓐ Series size

Ⓑ Actuation

Ⓒ Port size

Ⓓ Orifice size *1

Ⓔ Body/sealant combination *2

Ⓕ Coil option *3 *4 *5

Ⓖ Manual override *6

Ⓗ Other options

Ⓘ Voltage *7

Code	Description	Model No. FAB11	FAB21	FAB31	FAB41	FAB51	FAB32	FAB42	FAB52
Ⓐ Series size									
1	18 mm	●							
2	22 mm		●						
3	28 mm			●			●		
4	34 mm				●			●	
5	40 mm					●			●
Ⓑ Actuation									
1	NC (open when energized)	●	●	●	●	●			
2	NO (closed when energized)						●	●	●
Ⓒ Port size									
M5	M5	●							
6	Rc1/8		●	●			●		
8	Rc1/4			●	●		●	●	●
10	Rc3/8				●	●		●	●
15	Rc1/2					●			
Ⓓ Orifice size									
Z	ø1	●							
1	ø1.5	●	●						
2	ø2		●	●			●		
3	ø3			●	●		●	●	
5	ø4				●	●		●	●
6	ø5			●		●	●		●
7	ø7				●	●		●	●
8	ø10					●			
Ⓔ Body/sealant combination									
	Body / Seal / Actuation								
1	Aluminum / NBR / NC	●	●	●	●	●			
0	Copper alloy / NBR / NO						●	●	●
Ⓕ Coil option									
2C	Std. Grommet lead wire	●	●	●	●	●	●	●	●
2CS	Option Grommet lead wire with surge suppressor	●	●	●	●	●	●	●	●
2G	Option With DIN terminal box (Pg11)	●	●	●	●	●	●	●	●
2HS	Option DIN terminal box with lamp/ surge suppressor (Pg11)		●	●	●	●	●	●	●
2CG	Option Conduit (CTC19)			●	●	●	●	●	●
2CH	Option Conduit (G1/2)			●	●	●	●	●	●
3T	Option With T type terminal box (G1/2)			●	●	●	●	●	●
3RS	Option T type terminal box with lamp/ surge suppressor (G1/2)			●	●	●	●	●	●
Ⓖ Manual override									
Blank	Std. None	●	●	●	●	●	●	●	●
A	Option Manual locking	●	●	●	●	●			
N	Option Manual non-locking			●	●	●			
Ⓗ Other options									
Blank	Std. None	●	●	●	●	●	●	●	●
B	Option Mounting plate	●	●	●	●	●	●	●	●
Ⓘ Voltage									
1	100 VAC 50/60 Hz	●	●	●	●	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●	●	●	●	●
3	24 VDC	●	●	●	●	●	●	●	●
4	12 VDC	●	●	●	●	●	●	●	●
Specify the desired voltage if it is not listed above.									

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FAB21-6-1-12CAB-1

Model : FAB

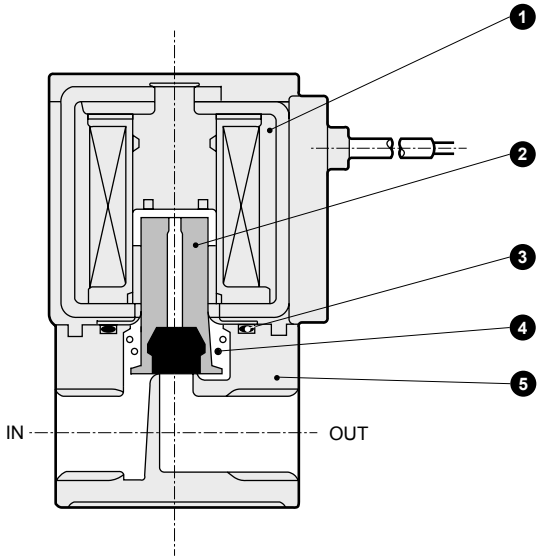
- Ⓐ Series size : 22 mm
- Ⓑ Actuation : NC (open when energized)
- Ⓒ Port size : Rc1/8
- Ⓓ Orifice size : ø1.5
- Ⓔ Body/sealant combination : Body - aluminum, sealant - NBR, actuation - NC (open when energized)
- Ⓕ Coil option : Grommet lead wire
- Ⓖ Manual override : Manual locking
- Ⓗ Other options : Mounting plate
- Ⓘ Voltage : 100 VAC50/60 Hz

⚠ Precautions for model No. selection

*1 : For FAB51 with orifice of ø4 mm (Item Ⓓ 5) and ø5 mm (Item Ⓓ 6), available port size is Rc3/8 (Item Ⓒ 10) only.
*2 : For Item Ⓔ 1, only NC is available. For Item Ⓔ 0, only NO is available.
*3 : For FAB11 Item Ⓕ 2G, the compact terminal box (G1/4) is used.
*4 : For FAB21 Item Ⓕ 2G, 2HS, the DIN terminal box (Pg9) is used.
*5 : The surge suppressor is built into the coil for Item Ⓕ 2CS and In the terminal box for 2HS and 3RS.
*6 : Manual override is available only for NC (open when energized).
*7 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

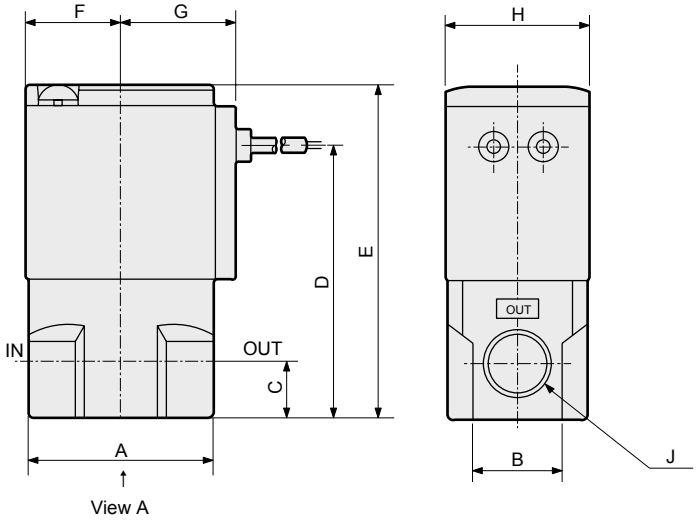
● FAB*1 Series

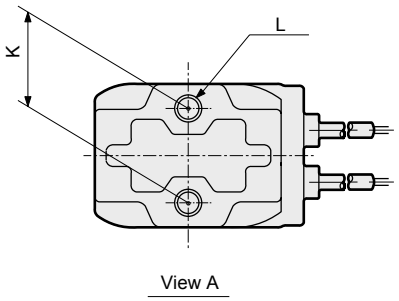


No.	Part name	Material	
1	Coil assembly	-	-
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber
3	O-ring	NBR	Nitrile rubber
4	Spring	SUS	Stainless steel
5	Body	ADC	Aluminum die-casting

Dimensions CAD

● Grommet lead wire
FAB*1-*-*-*2C





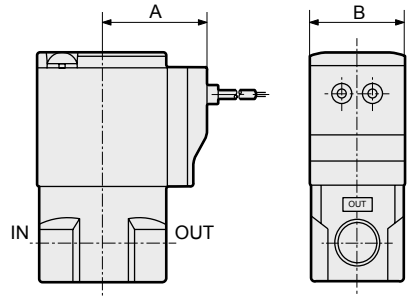
* Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	J	K	L
FAB11	25	14	5	34	43.5	13	17	18	M5	10	M4 depth 5.5
FAB21	32	16	8	43	54	15.5	19.5	22	Rc1/8	15	M4 depth 6
FAB31	36	18	11	53.5	65.5	18.5	22.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FAB41	40	25	12	62	76	22.5	26	34	Rc1/4, Rc3/8	18	M5 depth 7
FAB51	50	30	15	74.5	90.5	26	29.5	40	Rc3/8, Rc1/2	20	M5 depth 8

Optional dimensions

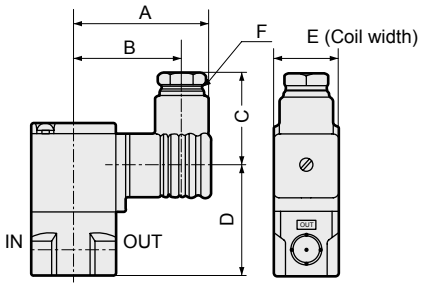
(Refer to the dimensions of grommet lead wire on page 54 for common dimensions.)

● Grommet lead wire with surge suppressor
FAB*1-*-*-* 2CS



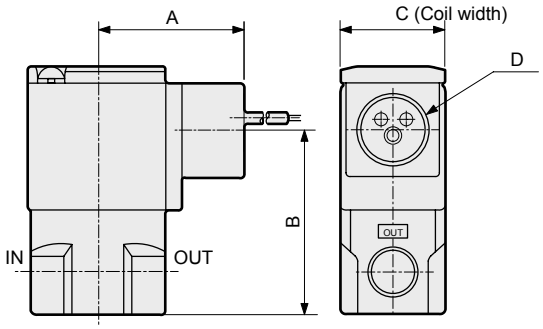
Model No.	A	B
FAB11	24.5	18
FAB21	26.5	22
FAB31	29.5	28
FAB41	34	34
FAB51	37.5	40

● DIN terminal box (with lamp/surge suppressor)
FAB*1-*-*-* 2G 2HS



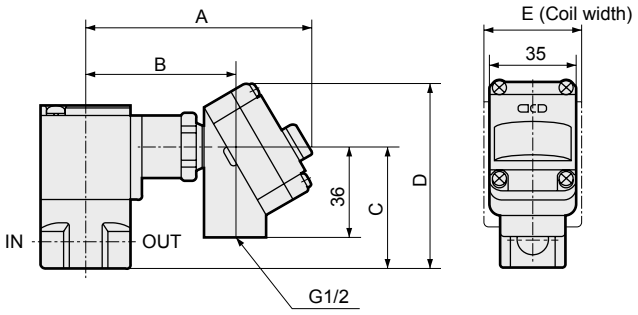
Model No.	A	B	C	D	E	F
FAB11	36	28.5	22	32	18	G1/4
FAB21	53	44	38	36.5	22	Pg 9
FAB31	58.5	47	39	47	28	Pg11
FAB41	62	50.5	39	55.5	34	Pg11
FAB51	65.5	54	39	70	40	Pg11

● Conduit (CTC19 / G1/2)
FAB*1-*-*-* 2CG 2CH



Model No.	A	B	C	D
FAB31	39	48.5	28	CTC19 G1/2
FAB41	43	57.5	34	CTC19 G1/2
FAB51	46.5	71.5	40	CTC19 G1/2

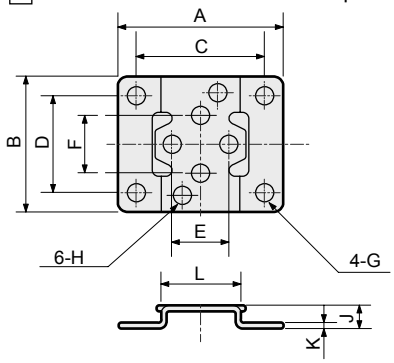
● T type terminal box (with lamp/surge suppressor) (G1/2)
FAB*1-*-*-* 3T 3RS



Model No.	A	B	C	D	E
FAB31	92	60.5	48.5	74.5	28
FAB41	96	64.5	57.5	83.5	34
FAB51	99.5	68	71.5	97.5	40

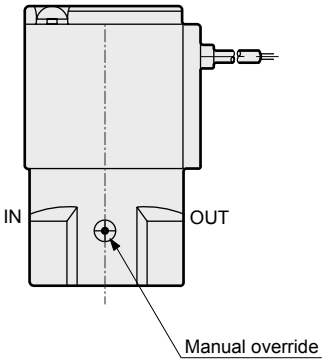
● Mounting plate
FAB*1-*-*-***B

Material : Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FAB11	40	30	30	21	10	10	ø5	ø4.5	6	1.2	19
FAB21	40	34	30	25	15	15	ø5	ø4.5	6	1.2	20
FAB31	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FAB41	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30
FAB51	62	50	50	38	20	20	ø6	ø5.5	7	1.6	36

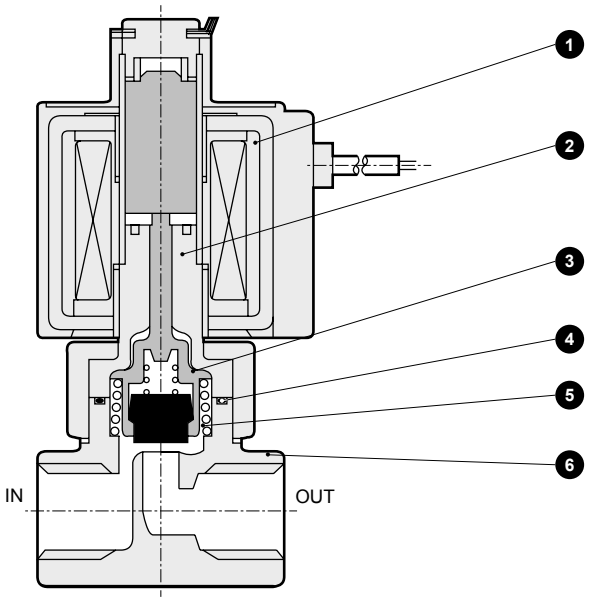
● Manual override locking/non-locking
FAB*1-*-*-** A N



Note : Non-locking is available only for sizes 3/4/5.

Internal structure and parts list

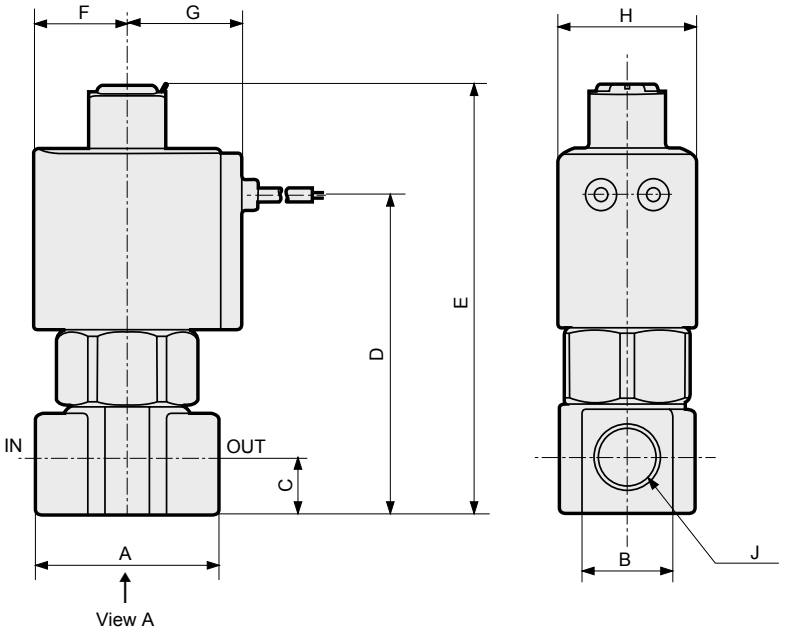
● FAB*2 Series

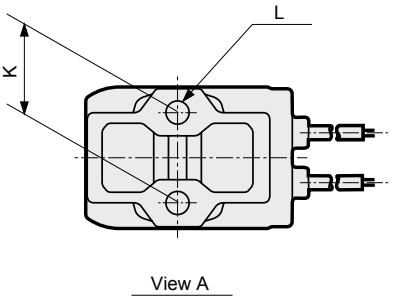


No.	Part name	Material	
1	Coil assembly	-	-
2	Core assembly	SUS, Cu	Stainless steel, copper
3	Valving element guide assembly	PPS, SUS, NBR	Polyphenylene sulfide, stainless steel, nitrile rubber
4	O-ring	NBR	Nitrile rubber
5	Spring	SUS	Stainless steel
6	Body	C3771	Copper alloy

Dimensions CAD

● Grommet lead wire
FAB*2-*-*-*2C





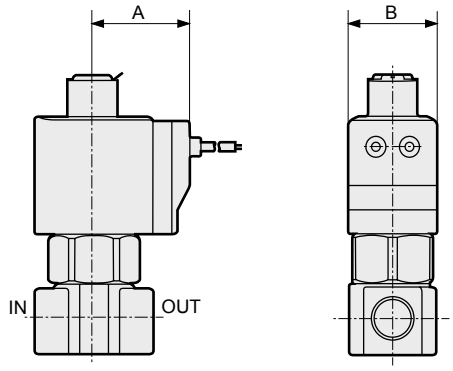
* Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	J	K	L
FAB32	36	18	11	62.5	84	18.5	22.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FAB42	40	21	12	71.5	96	22.5	26	34	Rc1/4, Rc3/8	18	M5 depth 8
FAB52	40	21	12	78	103.5	26	29.5	40	Rc1/4, Rc3/8	18	M5 depth 8

Optional dimensions

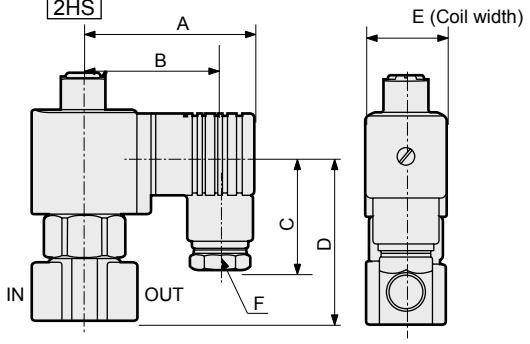
(Refer to the dimensions of grommet lead wire on page 56 for common dimensions.)

● Grommet lead wire with surge suppressor
FAB*2-*-*-* 2CS



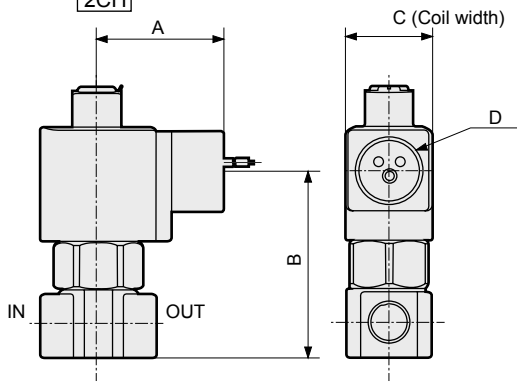
Model No.	A	B
FAB32	29.5	28
FAB42	34	34
FAB52	37.5	40

● DIN terminal box (with lamp/surge suppressor)
FAB*2-*-*-* 2G 2HS



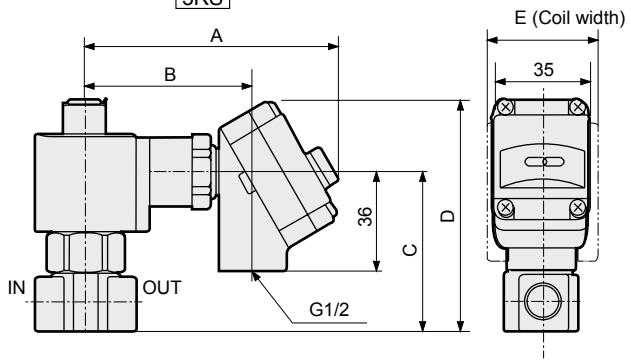
Model No.	A	B	C	D	E	F
FAB32	58.5	47	39	56.5	28	Pg11
FAB42	62	50.5	39	65	34	Pg11
FAB52	65.5	54	39	73.5	40	Pg11

● Conduit (CTC19 / G1/2)
FAB*2-*-*-* 2CG 2CH



Model No.	A	B	C	D
FAB32	39	58	28	CTC19 G1/2
FAB42	43	67	34	CTC19 G1/2
FAB52	46.5	75	40	CTC19 G1/2

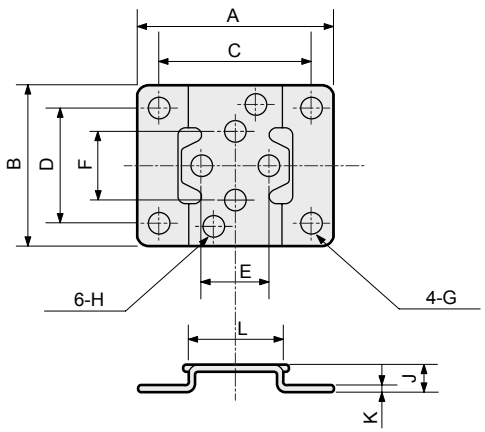
● T type terminal box (with lamp/surge suppressor)
(G1/2) FAB*2-*-*-* 3T 3RS



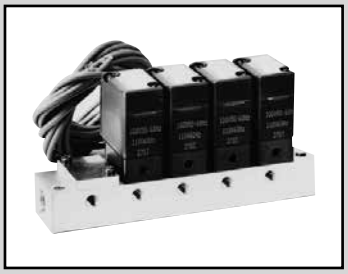
Model No.	A	B	C	D	E
FAB32	92	60.5	58	84	28
FAB42	96	64.5	67	93	34
FAB52	99.5	68	75	101	40

● Mounting plate
FAB*2-*-*-** B

Material : Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FAB32	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FAB42/52	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30



Direct acting 2-port solenoid valve for compressed air, manifold
Special purpose

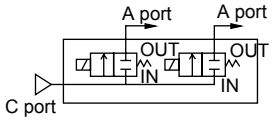
GFAB Series

- NC (open when energized)
- Port size: M5, Rc1/8, Rc1/4, Rc3/8

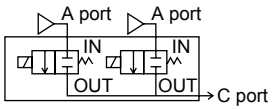
CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)/ common supply (port C pressurization)



- NC (open when energized)/ individual supply (port A pressurization)



Common specifications

Item	GFAB
Working fluid	Compressed air
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.4 (≈200 psi, 14 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	2.1 (≈300 psi, 21 bar) (1.5 (≈220 psi, 15 bar) for GFAB11/GFAB21)
Fluid temperature °C	AC: -10 (14°F) to 60 (140°F), DC: -10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature°C	AC:-20 (-4°F) to 40 (104°F), DC:-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent, and the GFAB11/GFAB15 compact terminal box is IP40 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size A port	Port size C port	Orifice size (mm)	Flow characteristics C[$dm^3/(s\cdot bar)$]	Flow characteristics b	Max. working press diff MPa AC	Max. working press diff MPa DC	Max. working pressure MPa	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consumption (W) AC 50/60 Hz	Power consumption (W) DC
GFAB 11 15 -Z	M5	Rc1/8	1	0.15	0.54	0.7	0.7	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	3.4	2.6	5.0	4.6	2.3/1.6	3
-1			1.5	0.31	0.49	0.3	0.3								
GFAB 21 25 -1	Rc1/8	Rc1/8	1.5	0.31	0.49	1.0	1.0			5.3	3.7	10	9	2.7/2	4
-2			2	0.53	0.38	0.6	0.6								
GFAB 31 35 -2	Rc1/4	Rc3/8	2	0.55	0.48	1.4	1.4	1.4		7.5	5.5	20	17	4/3.4	6.5
-3			3	1.2	0.39	1.0	0.6								
-6			5	2.1	0.27	0.3	0.15								
GFAB 41 45 -3	Rc1/4	Rc3/8	3	1.2	0.39	1.4	1.4			15	11	40	35	7.5/6.5	8
-5			4	2.1	0.34	1.0	0.9								
-7			7	3.5	0.21	0.25	0.15								
GFAB 51 55 -5	Rc1/4	Rc3/8	4	2.1	0.34	1.2	1.2			20	16	55	45	11/9.5	11.5
-6			5	3.0	0.22	0.7	0.8								
-7			7	4.4	0.18	0.3	0.3								

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*4 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz).
The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
GFAB1	2 mA or less	1 mA or less	1 mA or less	2 mA or less
GFAB2	3 mA or less	1.5 mA or less		
GFAB3/4/5	6 mA or less	3 mA or less		

Weight

Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (kg) (n: manifold station No.)	Formula for product weight
GFAB11 GFAB15	0.065	0.008	0.015+0.017×n	(Product weight (kg)) = 0.065 x (Actuator quantity) + 0.008 x (Masking quantity) + 0.015 + 0.017 x (Manifold station No.)
GFAB21 GFAB25	0.11	0.012	0.017+0.025×n	(Product weight (kg)) = 0.11 x (Actuator quantity) + 0.012 x (Masking quantity) + 0.017 + 0.025 x (Manifold station No.)
GFAB31 GFAB35	0.18	0.026	0.038+0.056×n	(Product weight (kg)) = 0.18 x (Actuator quantity) + 0.026 x (Masking quantity) + 0.038 + 0.056 x (Manifold station No.)
GFAB41 GFAB45	0.32	0.032	0.044+0.076×n	(Product weight (kg)) = 0.32 x (Actuator quantity) + 0.032 x (Masking quantity) + 0.044 + 0.076 x (Manifold station No.)
GFAB51 GFAB55	0.52	0.045	0.053+0.11×n	(Product weight (kg)) = 0.52 x (Actuator quantity) + 0.045 x (Masking quantity) + 0.053 + 0.11 x (Manifold station No.)

How to order

● Manifold

G F A B 3 1 - 2 - 7 - 1 2C N - 1

● Manifold with masking plate

G F A B 2 5 - 1 - X - 1 2G N - 2 - 5 2

No. of ports (2-port valve)

Working fluid (Compressed air)

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4 *5

Ⓖ Manual override

Ⓗ Voltage *6

Ⓘ No. of *7 solenoid valves

Ⓙ Masking plate quantity

Code	Description	Model No. GFAB11/15	GFAB21/25	GFAB31/35	GFAB41/45	GFAB51/55
Ⓐ Series size						
1	18 mm	●				
2	22 mm		●			
3	28 mm			●		
4	34 mm				●	
5	40 mm					●
Ⓑ Circuit configuration						
1	NC (open when energized)/common supply	●	●	●	●	●
5	NC (open when energized)/individual supply	●	●	●	●	●
Ⓒ Orifice size						
Z	ø1	●				
1	ø1.5	●	●			
2	ø2		●	●		
3	ø3			●	●	
5	ø4				●	●
6	ø5			●		●
7	ø7				●	●
Ⓓ Manifold station No.						
2 to 10	2 stations to 10 stations	●	●	●	●	●
0	Actuator only	●	●	●	●	●
X	With masking plate	●	●	●	●	●
Ⓔ Body/sealant combination	Body / Seal					
1	PPS / NBR	●	●	●	●	●
Ⓕ Coil option						
2C	Std. Grommet lead wire	●	●	●	●	●
2CS	Option Grommet lead wire With surge suppressor	●	●	●	●	●
2G	Option With DIN terminal box (Pg11)	●	●	●	●	●
2HS	Option DIN terminal box with lamp/ surge suppressor (Pg11)		●	●	●	●
2CG	Option Conduit (CTC19)			●	●	●
2CH	Option Conduit (G1/2)			●	●	●
3T	Option With T type terminal box (G1/2)				●	●
3RS	Option T type terminal box with lamp surge suppressor (G1/2)				●	●
Ⓖ Manual override						
Blank	Std. None	●	●	●	●	●
N	Option Manual non-locking	●	●	●	●	●
Ⓗ Voltage						
1	100 VAC 50/60 Hz	●	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●	●
3	24 VDC	●	●	●	●	●
4	12 VDC	●	●	●	●	●
Specify the desired voltage if it is not listed above.						
Ⓘ No. of solenoid valves						
Blank	No masking plate	●	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●	●
Ⓙ Masking plate quantity						
Blank	No masking plate	●	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●	●

Select from the combinations indicated with ● in the table above.

[Example of model No.]

GFAB31-2-7-12CN-1

Model : GFAB

Ⓐ Series size	: 28 mm
Ⓑ Circuit configuration	: NC (open when energized)/ common supply
Ⓒ Orifice size	: ø2
Ⓓ Manifold station No.	: 7 stations
Ⓔ Body/sealant combination	: Body - PPS, sealant - NBR
Ⓕ Coil option	: Grommet lead wire
Ⓖ Manual override	: Manual non-locking
Ⓗ Voltage	: 100 VAC 50/60 Hz
Ⓘ Ⓙ	: No masking plate

⚠ Precautions for model No. selection

*1 : Select a desired manifold station No. from 2 to 10.

*2 : For the type with masking plate, designate Item Ⓓ as "X", then designate the quantities of Ⓘ solenoid valves and Ⓙ masking plates.

*3 : For GFAB11/15 Item Ⓕ 2G, the compact terminal box (G1/4) is used.

*4 : For GFAB21/25 Item Ⓕ 2G/2HS, the DIN terminal box (Pg9) is used.

*5 : The surge suppressor is built into the coil for Item Ⓕ 2CS and In the terminal box for 2HS and 3RS.

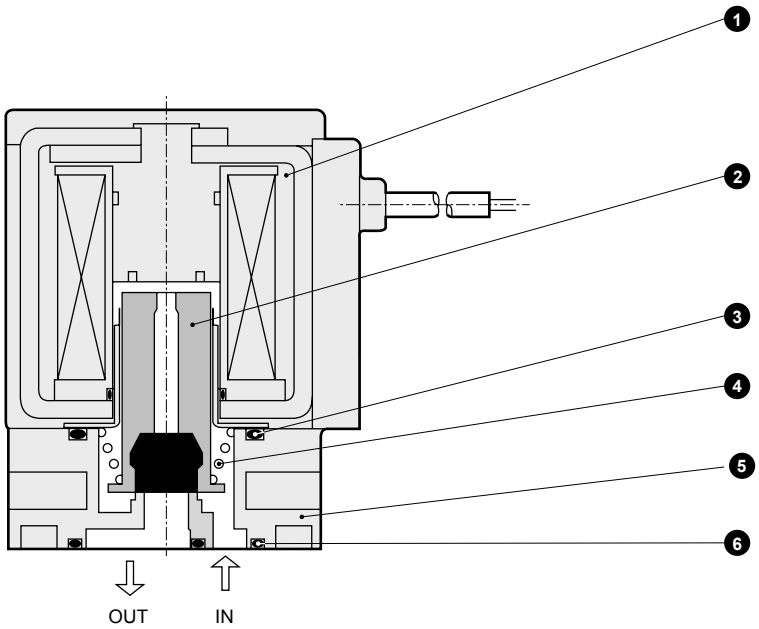
*6 : Other voltages may not be available. Contact CKD for details.

*7 : Solenoid valves are arranged from the right side with the sub-plate (individual) port A facing front.

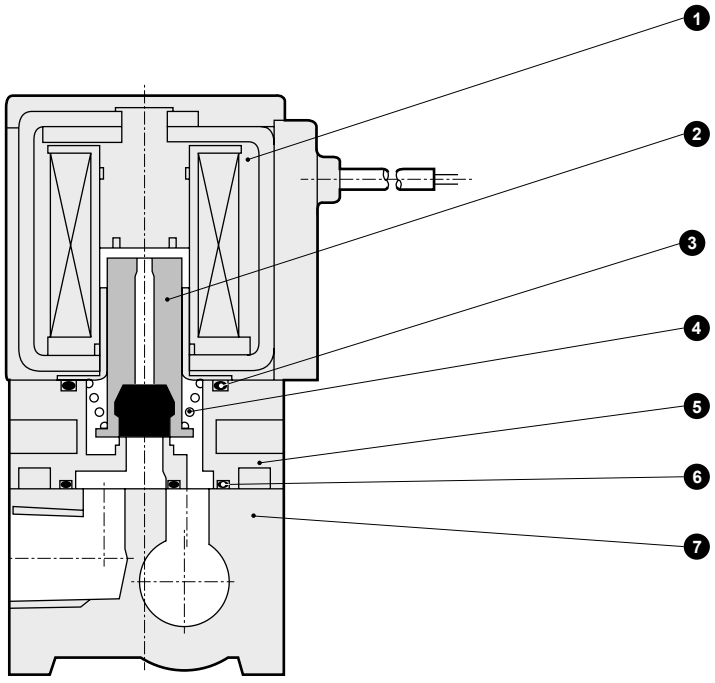
*8 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFAB actuator



● GFAB manifold

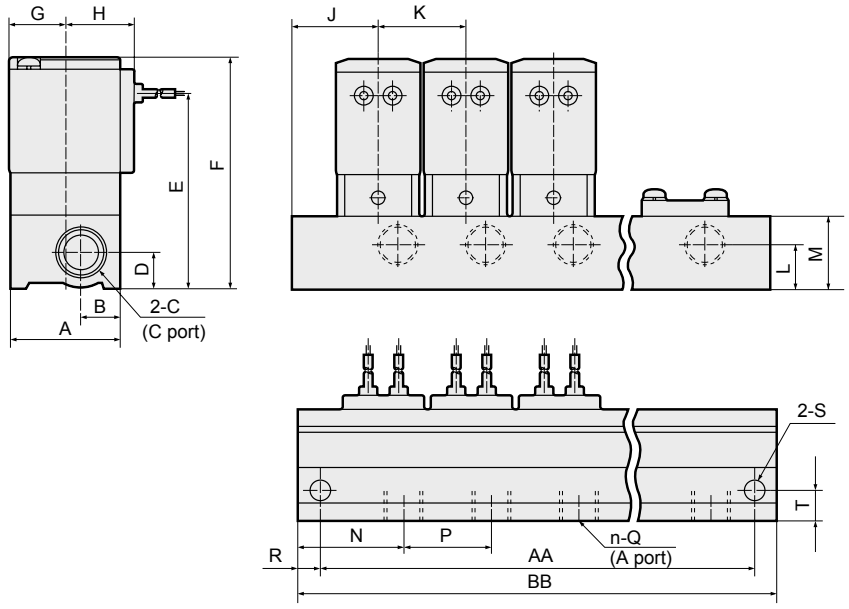


No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	5	Body	PPS	Polyphenylene sulfide
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber	6	Gasket	NBR	Nitrile rubber
3	O-ring	NBR	Nitrile rubber	7	Sub-plate	A6063	Aluminum
4	Spring	SUS	Stainless steel				

* 4 body mounting screws and 2 O-rings are attached to the actuator only.

Dimensions: Manifold

● Grommet lead wire
GFAB**-*-*-12C



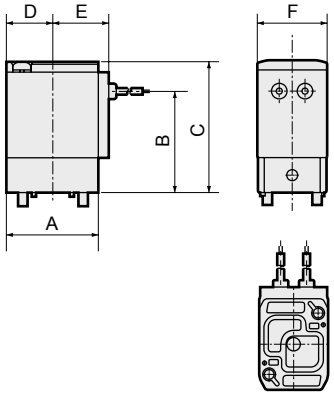
Lead wire length 300 mm

Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFAB1	AA	48	68	88	108	128	148	168	188	208
	BB	58	78	98	118	138	158	178	198	218
GFAB2	AA	58	84	110	136	162	188	214	240	266
	BB	68	94	120	146	172	198	224	250	276
GFAB3	AA	74	106	138	170	202	234	266	298	330
	BB	88	120	152	184	216	248	280	312	344
GFAB4	AA	86	124	162	200	238	276	314	352	390
	BB	100	138	176	214	252	290	328	366	404
GFAB5	AA	100	146	192	238	284	330	376	422	468
	BB	114	160	206	252	298	344	390	436	482

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
GFAB1	25	10	Rc1/8	8	44.5	54	13	17	19	20	11	16	21.5	20	M5	5	ø4.5	6.5
GFAB2	30	12	Rc1/8	8	49	60	15.5	19.5	21	26	8	16	25	26	Rc1/8	5	ø4.5	9
GFAB3	36	13	Rc3/8	12	64	76	18.5	22.5	28	32	15	24	34.5	32	Rc1/4	7	ø6.5	10
GFAB4	43	18	Rc3/8	12	71	85	22.5	26	31	38	15	24	31	38	Rc1/4	7	ø6.5	11.5
GFAB5	50	20	Rc3/8	12	79	95	26	29.5	34	46	12	24	34	46	Rc1/4	7	ø6.5	14

Dimensions: Actuator

● Grommet lead wire
GFAB**-*-0-12C



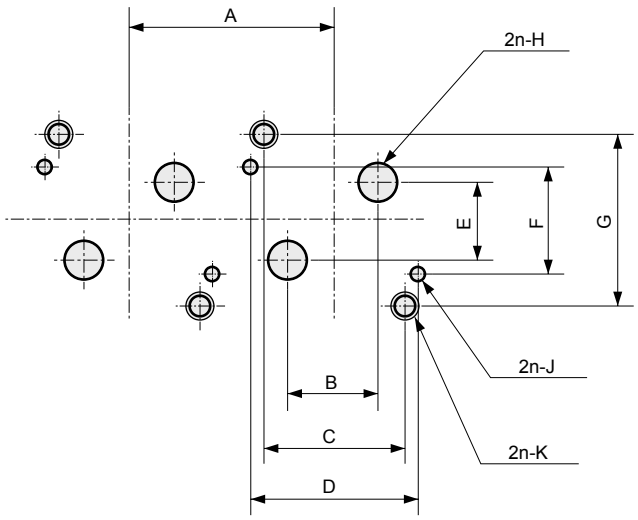
Model No.	A	B	C	D	E	F
GFAB1	25	28.5	38	13	17	18
GFAB2	30	33	44	15.5	19.5	22
GFAB3	36	40	52	18.5	22.5	28
GFAB4	43	47	61	22.5	26	34
GFAB5	50	55	71	26	29.5	40

* Lead wire length 300 mm

Actuator installation dimensions

● GFAB1*/2*/3*

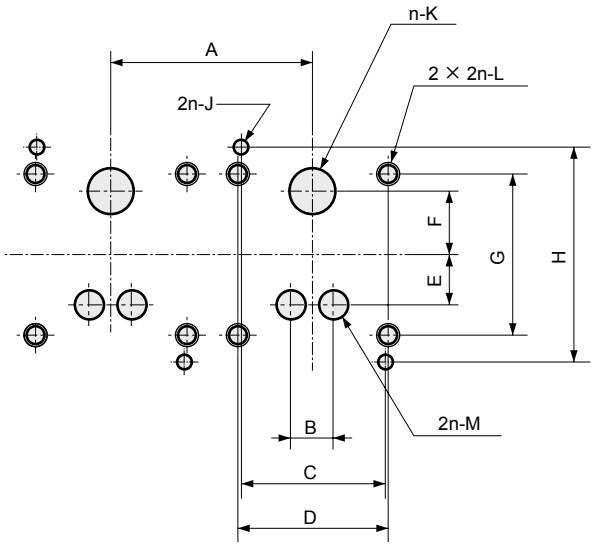
Machining drawing when using 2 actuators.



Model No.	A	B	C	D	E	F	G	H	J	K
GFAB1	20 or more	5±0.15	12.4±0.1	14.4±0.1	10±0.15	11.2±0.1	17±0.1	ø3	ø1.6 $^{+0.1}_{0}$ depth 2.5±0.5	M2.5 effective thread depth 5.5 or more
GFAB2	26 or more	8±0.15	15.5±0.1	18.4±0.1	10±0.15	12.4±0.1	19.4±0.1	ø3.5	ø1.6 $^{+0.1}_{0}$ depth 2.5±0.5	M3 effective thread depth 6 or more
GFAB3	32 or more	13±0.15	20±0.1	23.6±0.1	11.4±0.15	15±0.1	24.2±0.1	ø5.5	ø2.1 $^{+0.1}_{0}$ depth 2.5±0.5	M4 effective thread depth of 6 or more

● GFAB4*/5*

Machining drawing when using 2 actuators.

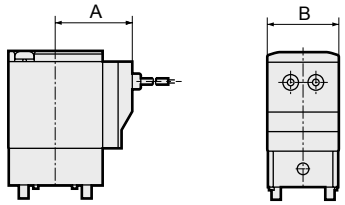


Model No.	A	B	C	D	E	F	G	H	J	K	L	M
GFAB4	38 or more	6±0.2	25±0.1	26±0.1	8.5±0.2	11±0.2	28±0.1	37±0.1	ø2.6 $^{+0.1}_{0}$ depth 2.5±0.5	ø8	M4 effective thread depth 9 or more	ø5
GFAB5	46 or more	8±0.2	30±0.1	30±0.1	11.5±0.2	14.5±0.2	33±0.1	43±0.1	ø2.6 $^{+0.1}_{0}$ depth 2.5±0.5	ø11	M5 effective thread depth 8 or more	ø7

Optional dimensions

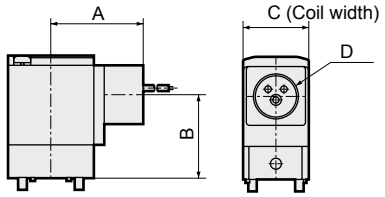
(Refer to the grommet lead wire actuator dimensions on page 61 for common dimensions.)

● Grommet lead wire with surge suppressor
GFAB**-*-*-1 2CS



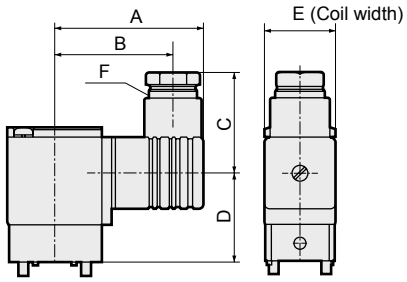
Model No.	A	B
GFAB1	24.5	18
GFAB2	26.5	22
GFAB3	29.5	28
GFAB4	34	34
GFAB5	37.5	40

● Conduit (CTC19 / G1/2)
GFAB**-*-*-1 2CG 2CH



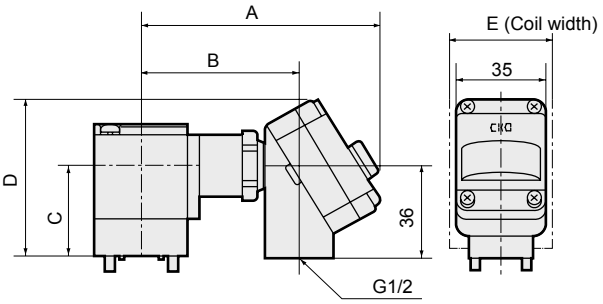
Model No.	A	B	C	D
GFAB3	39	35	28	CTC19 G1/2
GFAB4	43	42.5	34	CTC19 G1/2
GFAB5	46.5	52	40	CTC19 G1/2

● DIN terminal box (with lamp/surge suppressor)
GFAB**-*-*-1 2G 2HS



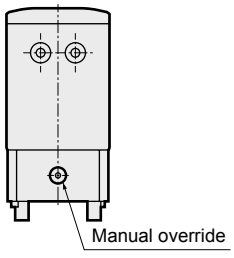
Model No.	A	B	C	D	E	F
GFAB1	36	28.5	22	26.5	18	G1/4
GFAB2	53	44	38	26.5	22	Pg9
GFAB3	58.5	47	39	33.5	28	Pg11
GFAB4	62	50.5	39	40.5	34	Pg11
GFAB5	65.5	54	39	50.5	40	Pg11

● T type terminal box (with lamp/surge suppressor) (G1/2)
GFAB**-*-*-1 3T 3RS



Model No.	A	B	C	D	E
GFAB4	96	64.5	42.5	68.5	34
GFAB5	99.5	68	52	78	40

● Manual override (non-locking)
GFAB**-*-*-** N



Position of manual override

● Common supply : Opposite side to port A

● Individual supply : Port A side

Direct acting 3-port solenoid valve for compressed air, single unit
Special purpose

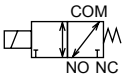
FAG Series

- Universal, NC pressurization
- Port size: M5, Rc1/8, Rc1/4, Rc3/8

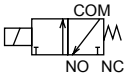
CE Refer to the Ending for details. RoHS CAD

JIS symbol

● Universal



● NC pressurization



Common specifications

Item	FAG
Working fluid	Compressed air
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.4 (≈200 psi, 14 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	2.1 (≈300 psi, 21 bar) (1.5 (≈220 psi, 15 bar) for FAG11/FAG21)
Fluid temperature °C	AC: -10 (14°F) to 60 (140°F), DC: -10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	AC:-20 (-4°F) to 60 (140°F), DC:-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent, and the FAG11 compact terminal box is IP40 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Flow characteristics C[dm^3/(s·bar)]	Flow characteristics b	Max. working pressure differential MPa	Max. working pressure MPa	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consumption (W) AC 50 Hz/60 Hz	Power consumption (W) DC	Weight (kg)
● Universal														
FAG11- M5 - Y	M5	0.8	0.08	0.61	0.7	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	3.4	2.6	5	4.6	2.3/1.6	3	0.09
FAG11- M5 - 0	M5	1.5	0.28	0.40	0.2	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	3.4	2.6	5	4.6	2.3/1.6	3	0.09
FAG21 - 6 - Z	Rc1/8	1	0.13	0.58	0.7	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	5.3	3.7	10	9	2.7/2	4	0.14
FAG21 - 6 - 1	Rc1/8	2	0.52	0.54	0.15	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	5.3	3.7	10	9	2.7/2	4	0.14
FAG31 - 6 8 - 0	Rc1/8 Rc1/4	1.5	0.32	0.58	0.7	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.23
FAG31 - 6 8 - 1	Rc1/8 Rc1/4	2	0.55	0.48	0.4	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.23
FAG31 - 6 8 - 4	Rc1/8 Rc1/4	3	1.2	0.57	0.2	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.23
FAG41 - 8 10 - 1	Rc1/4 Rc3/8	2	0.55	0.48	0.7	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.43
FAG41 - 8 10 - 4	Rc1/4 Rc3/8	3	1.2	0.57	0.3	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.43
FAG41 - 8 10 - 8	Rc1/4 Rc3/8	4	2.1	0.48	0.15	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6.5	8	0.43
FAG51 - 8 10 - 1	Rc1/4 Rc3/8	2	0.55	0.48	1.2(0.6)	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	20	16	55	45	11/9.5	11.5	0.63
FAG51 - 8 10 - 4	Rc1/4 Rc3/8	3	1.2	0.57	0.6(0.3)	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	20	16	55	45	11/9.5	11.5	0.63
FAG51 - 8 10 - 8	Rc1/4 Rc3/8	4	2.1	0.48	0.3(0.15)	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	20	16	55	45	11/9.5	11.5	0.63
● NC pressurization														
FAG33 - 6 8 - 0	Rc1/8 Rc1/4	1.5	0.32	0.58	1.0	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.23
FAG33 - 6 8 - 1	Rc1/8 Rc1/4	2	0.55	0.48	0.7	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.23
FAG33 - 6 8 - 4	Rc1/8 Rc1/4	3	1.2	0.57	0.3	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	7.5	5.5	20	17	4/3.4	6.5	0.23
FAG43 - 8 10 - 1	Rc1/4 Rc3/8	2	0.55	0.48	1.2	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6	8	0.43
FAG43 - 8 10 - 4	Rc1/4 Rc3/8	3	1.2	0.57	0.6	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6	8	0.43
FAG43 - 8 10 - 8	Rc1/4 Rc3/8	4	2.1	0.48	0.3	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	15	11	40	35	7.5/6	8	0.43

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : For FAG51, the max. working pressure differential when NO pressurized is shown in parentheses.
*3 : The leakage current must be less than or equal to the values shown on the right.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current

Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
FAG1	2 mA or less	1 mA or less	1 mA or less	2 mA or less
FAG2	3 mA or less	1.5 mA or less		
FAG3/4/5	6 mA or less	3 mA or less		

How to order

F A G 1 1 - M5 - Y - 1 2C A B - 1

- F A: Working fluid (Compressed air)
- G: No. of ports (3-port valve)
- 1: Ⓐ Series size
- 1: Ⓑ Actuation
- M5: Ⓒ Port size
- Y: Ⓓ Orifice size
- 1: Ⓔ Body/sealant combination
- 2C: Ⓕ Coil option *1 *2 *3
- A: Ⓖ Manual override
- B: Ⓗ Other options
- 1: Ⓘ Voltage *4

Code	Description	Model No. FAG11	FAG21	FAG31/33	FAG41/43	FAG51
Ⓐ Series size						
1	18 mm	●				
2	22 mm		●			
3	28 mm			●		
4	34 mm				●	
5	40 mm					●
Ⓑ Actuation						
1	Universal	●	●	●	●	●
3	NC pressurization			●	●	
Ⓒ Port size						
M5	M5	●				
6	Rc1/8		●	●		
8	Rc1/4			●	●	●
10	Rc3/8				●	●
Ⓓ Orifice size						
Y	ø0.8	●				
Z	ø1		●			
0	ø1.5	●		●		
1	ø2		●	●	●	●
4	ø3			●	●	●
8	ø4				●	●
Ⓔ Body/sealant combination						
	Body / **Seal**					
1	Aluminum / NBR	●	●	●	●	●
Ⓕ Coil option						
2C	Grommet lead wire	●	●	●	●	●
2CS	Grommet lead wire with surge suppressor	●	●	●	●	●
2G	With DIN terminal box (Pg11)	●	●	●	●	●
2HS	DIN terminal box with lamp/ surge suppressor (Pg11)		●	●	●	●
2CG	Conduit (CTC19)			●	●	●
2CH	Conduit (G1/2)			●	●	●
3T	With T type terminal box (G1/2)			●	●	●
3RS	T type terminal box with lamp/ surge suppressor (G1/2)			●	●	●
Ⓖ Manual override						
Blank	Std. None	●	●	●	●	●
A	Option Manual locking	●	●	●	●	●
N	Option Manual non-locking			●	●	●
Ⓗ Other options						
Blank	Std. None	●	●	●	●	●
B	Option Mounting plate	●	●	●	●	●
Ⓘ Voltage						
1	100 VAC 50/60 Hz	●	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●	●
3	24 VDC	●	●	●	●	●
4	12 VDC	●	●	●	●	●
Specify the desired voltage if it is not listed above.						

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FAG11-M5-Y-12CAB-1

Model : FAG

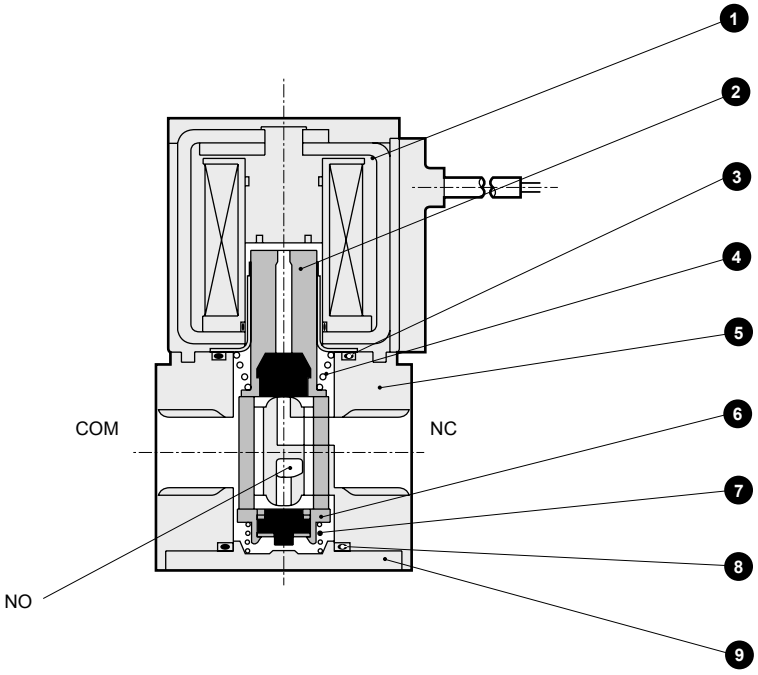
Ⓐ Series size	: 18 mm
Ⓑ Actuation	: Universal
Ⓒ Port size	: M5
Ⓓ Orifice size	: ø0.8
Ⓔ Body/sealant combination	: Body - aluminum, sealant - NBR
Ⓕ Coil option	: Grommet lead wire
Ⓖ Manual override	: Manual locking
Ⓗ Other options	: Mounting plate
Ⓘ Voltage	: 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : For FAG11 Item Ⓕ 2G, the compact terminal box (G1/4) is used.
*2 : For FAG21 Item Ⓕ 2G/2HS, the DIN terminal box (Pg9) is used.
*3 : The surge suppressor is built into the coil for Item Ⓕ 2CS and in the terminal box for 2HS and 3RS.
*4 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

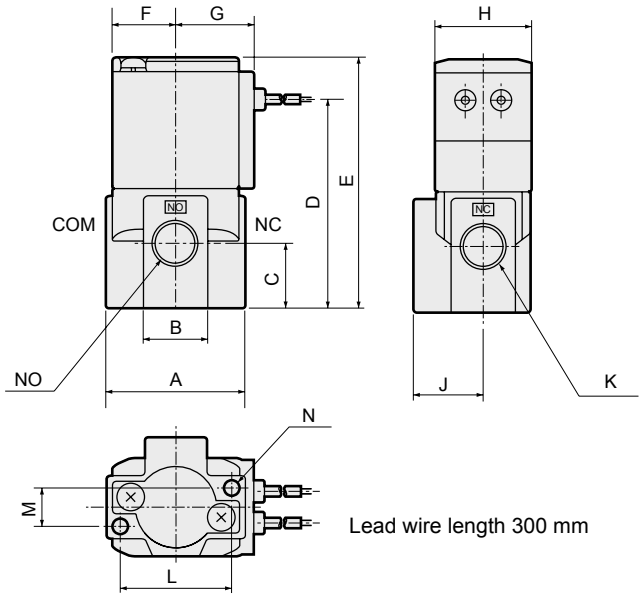
● FAG*1/*3 Series



No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	6	Valving element guide assembly	PPS, SUS, NBR	Polyphenylene sulfide, stainless steel, nitrile rubber
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber	7	Spring	SUS	Stainless steel
3	O-ring	NBR	Nitrile rubber	8	O-ring	NBR	Nitrile rubber
4	Spring	SUS	Stainless steel	9	Cover	ADC	Aluminum die-casting
5	Body	ADC	Aluminum die-casting				

Dimensions CAD

● Grommet lead wire
FAG**-*-*-12C



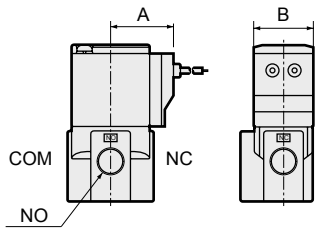
Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N
FAG1	28	14	13.5	42	51.5	13	17	18	12	M5×0.8	21	7	M4 depth 5.5
FAG2	32	16	16.5	51	62	15.5	19.5	22	16	Rc1/8	25	8	M4 depth 6
FAG3	40	18	18.5	60.5	72.5	18.5	22.5	28	20	Rc1/8 Rc1/4	32	11	M5 depth 8
FAG4	45	25	25	74.5	88.5	22.5	26	34	21	Rc1/4 Rc3/8	35	15	M5 depth 8
FAG5	50	25	25	81	97	26	29.5	40	21	Rc1/4 Rc3/8	35	15	M5 depth 8

Optional dimensions

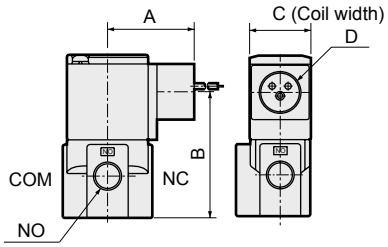
(Refer to the dimensions of grommet lead wire on page 66 for common dimensions.)

● Grommet lead wire with surge suppressor
FAG**-*-*-1 [2CS]



Model No.	A	B
FAG1	24.5	18
FAG2	26.5	22
FAG3	29.5	28
FAG4	34	34
FAG5	37.5	40

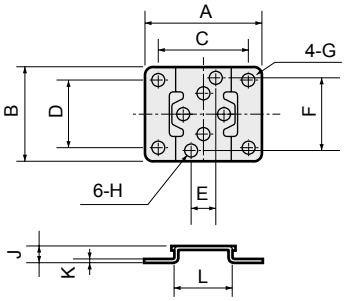
● Conduit (CTC19 / G1/2)
FAG**-*-*-1 [2CG / 2CH]



Model No.	A	B	C	D
FAG3	39	55.5	28	CTC19 G1/2
FAG4	43	70	34	CTC19 G1/2
FAG5	46.5	78	40	CTC19 G1/2

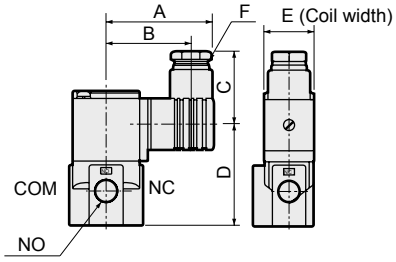
● Mounting plate
FAG**-*-*-1**[B]

Material : Steel
Zinc plated



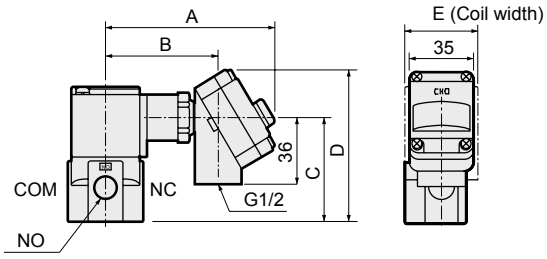
Model No.	A	B	C	D	E	F	G	H	J	K	L
FAG1	40	30	30	21	7	21	ø5	ø4.5	6	1.2	19
FAG2	40	34	30	25	8	25	ø5	ø4.5	6	1.2	20
FAG3	52	42	40	30	11	32	ø6	ø5.5	7	1.6	25
FAG4	56	48	44	36	15	35	ø6	ø5.5	7	1.6	30
FAG5	62	50	50	38	15	35	ø6	ø5.5	7	1.6	36

● DIN terminal box (with lamp/surge suppressor)
FAG**-*-*-1 [2G / 2HS]



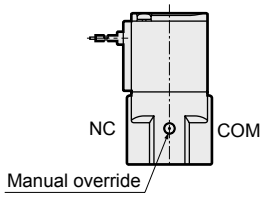
Model No.	A	B	C	D	E	F
FAG1	36	28.5	22	40	18	G1/4
FAG2	53	44	38	44.5	22	Pg9
FAG3	58.5	47	39	54	28	Pg11
FAG4	62	50.5	39	68	34	Pg11
FAG5	65.5	54	39	76.5	40	Pg11

● T type terminal box (with lamp/surge suppressor) (G1/2)
FAG**-*-*-1 [3T / 3RS]



Model No.	A	B	C	D	E
FAG3	92	60.5	55.5	81.5	28
FAG4	96	64.5	70	96	34
FAG5	99.5	68	78	104	40

● Manual override (locking/non-locking)
FAG**-*-*-1* [A / N]



Note: Non-locking is available only for sizes 3/4/5.

Direct acting 3-port solenoid valve for compressed air, manifold
Special purpose

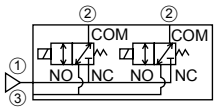
GFAG Series

- Universal
- Port size: M5, Rc1/8, Rc1/4

Refer to the Ending for details.

JIS symbol

- Common supply/common exhaust



Common specifications

Item	GFAG
Working fluid	Compressed air
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.2 (≈170 psi, 12 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	1.8 (≈260 psi, 18 bar) (1.5 (≈220 psi, 15 bar) for GFAG11/GFAG21/GFAG31)
Fluid temperature °C	AC: -10 (14°F) to 60 (140°F), DC: -10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	AC:-20 (-4°F) to 40 (104°F), DC:-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent, and the GFAG11 compact terminal box is IP40 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size 2-port (Ind)	Port size 1. 3-port (common)	Orifice size (mm)	Flow characteristics C[dm^3/(s·bar)]	Flow characteristics b	Max. working pressure differential MPa	Max. working pressure MPa	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consumption (W) AC 50/60 Hz	Power consumption (W) DC
GFAG11	-Y	M5	Rc1/8	0.8	0.08	0.55	0.7	1.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	3.4	2.6	5	4.6	2.3/1.6	3
	-0			1.5	0.25	0.29	0.2								
GFAG21	-Z	Rc1/8	Rc1/8	1	0.12	0.44	0.7			5.3	3.7	10	9	2.7/2	4
	-1			2	0.42	0.19	0.15								
GFAG31	-0	Rc1/4	Rc1/4	1.5	0.28	0.46	0.7			7.5	5.5	20	17	4/3.4	6.5
	-1			2	0.49	0.36	0.4								
	-4			3	0.90	0.20	0.2								
GFAG41	-1	Rc1/4	Rc1/4	2	0.50	0.31	0.7	1.2		15	11	40	35	7.5/6.5	8
	-4			3	1.1	0.20	0.3								
	-8			4	1.6	0.14	0.15								
GFAG51	-1	Rc1/4	Rc1/4	2	0.50	0.31	1.2(0.6)			20	16	55	45	11 /9.5	11.5
	-4			3	1.1	0.20	0.6(0.3)								
	-8			4	1.6	0.14	0.3(0.15)								

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : For GFAG51, the max. working pressure differential with NO pressurized is shown in ( ).
*3 : The leakage current must be less than or equal to the values shown below.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
GFAG1	2 mA or less	1 mA or less	1 mA or less	2 mA or less
GFAG2	3 mA or less	1.5 mA or less		
GFAG3/4/5	6 mA or less	3 mA or less		

Weight

Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (kg) (n: manifold station No.)	Formula for product weight
GFAG11	0.07	0.008	0.024+0.025×n	(Product weight (kg)) = 0.07 x (Actuator quantity) + 0.008 x (Masking quantity) + 0.024 + 0.025 x (Manifold station No.)
GFAG21	0.12	0.012	0.027+0.043×n	(Product weight (kg)) = 0.12 x (Actuator quantity) + 0.012 x (Masking quantity) + 0.027 + 0.043 x (Manifold station No.)
GFAG31	0.2	0.026	0.06+0.08×n	(Product weight (kg)) = 0.2 x (Actuator quantity) + 0.026 x (Masking quantity) + 0.06 + 0.080 x (Manifold station No.)
GFAG41	0.36	0.034	0.067+0.11×n	(Product weight (kg)) = 0.36 x (Actuator quantity) + 0.034 x (Masking quantity) + 0.067 + 0.11 x (Manifold station No.)
GFAG51	0.55	0.048	0.08+0.15×n	(Product weight (kg)) = 0.55 x (Actuator quantity) + 0.048 x (Masking quantity) + 0.08 + 0.15 x (Manifold station No.)

How to order

● Manifold

G F A G 2 1 - Z - 5 - 1 2C N - 1

● Manifold with masking plate

G F A G 3 1 - 1 - X - 1 2G N - 2 - 4 1

Working fluid (Compressed air)

No. of ports (3-port valve)

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4 *5

Ⓖ Manual operation

Ⓗ Voltage *6

Ⓘ No. of solenoid valves *7

Ⓙ Masking plate quantity

Code	Description	Model No. GFAG11	GFAG21	GFAG31	GFAG41	GFAG51
Ⓐ Series size						
1	18 mm	●				
2	22 mm		●			
3	28 mm			●		
4	34 mm				●	
5	40 mm					●
Ⓑ Circuit configuration						
1	Common supply/common exhaust	●	●	●	●	●
Ⓒ Orifice size						
Y	ø0.8	●				
Z	ø1		●			
0	ø1.5	●		●		
1	ø2		●	●	●	●
4	ø3			●	●	●
8	ø4				●	●
Ⓓ Manifold station No.						
2 to 10	2 stations to 10 stations	●	●	●	●	●
O	Actuator only	●	●	●	●	●
X	With masking plate	●	●	●	●	●
Ⓔ Body/sealant combination						
	Body / Seal					
1	PPS / NBR	●	●	●	●	●
Ⓕ Coil option						
2C	Std. Grommet lead wire	●	●	●	●	●
2CS	Option: Grommet lead wire with surge suppressor	●	●	●	●	●
2G	Option: With DIN terminal box (Pg11)	●	●	●	●	●
2HS	Option: DIN terminal box with lamp/ surge suppressor (Pg11)		●	●	●	●
2CG	Option: Conduit (CTC19)			●	●	●
2CH	Option: Conduit (G1/2)			●	●	●
3T	Option: With T type terminal box (G1/2)				●	●
3RS	Option: T type terminal box with lamp/ surge suppressor (G1/2)				●	●
Ⓖ Manual operation						
Blank	Std. None	●	●	●	●	●
N	Option: Manual non-locking	●	●	●	●	●
Ⓗ Voltage						
1	100 VAC 50/60 Hz	●	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●	●
3	24 VDC	●	●	●	●	●
4	12 VDC	●	●	●	●	●
Specify the desired voltage if it is not listed above.						
Ⓘ No. of solenoid valves						
Blank	No masking plate	●	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●	●
Ⓙ Masking plate quantity						
Blank	No masking plate	●	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●	●

Select from the combinations indicated with ● in the table above.

[Example of model No.]

GFAG21-Z-5-12CN-1

Model : GFAG

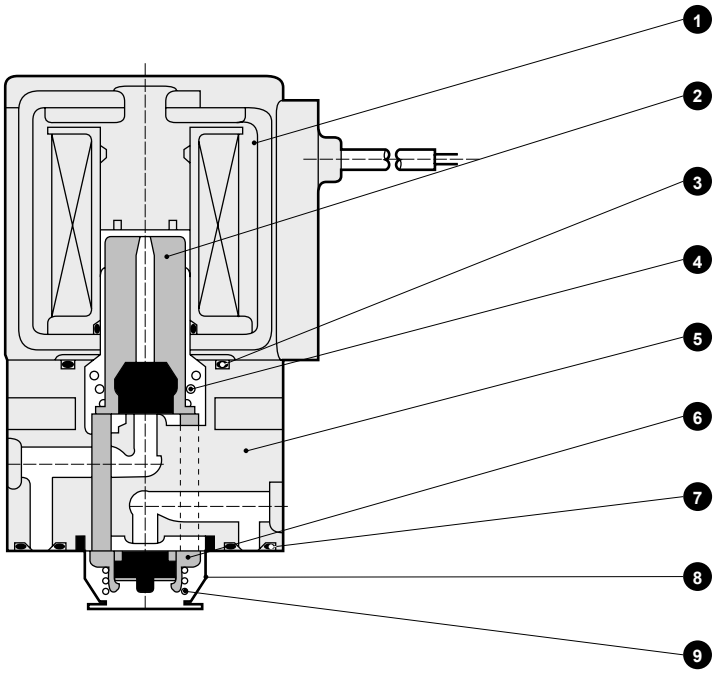
Ⓐ Series size : 22 mm
Ⓑ Circuit configuration : Common supply/common exhaust
Ⓒ Orifice size : ø1
Ⓓ Manifold station No. : 5 stations
Ⓔ Body/sealant combination : Body - PPS, sealant - NBR
Ⓕ Coil option : Grommet lead wire
Ⓖ Manual override : Manual non-locking
Ⓗ Voltage : 100 VAC50/60 Hz
Ⓘ Ⓙ : No masking plate

⚠ Precautions for model No. selection

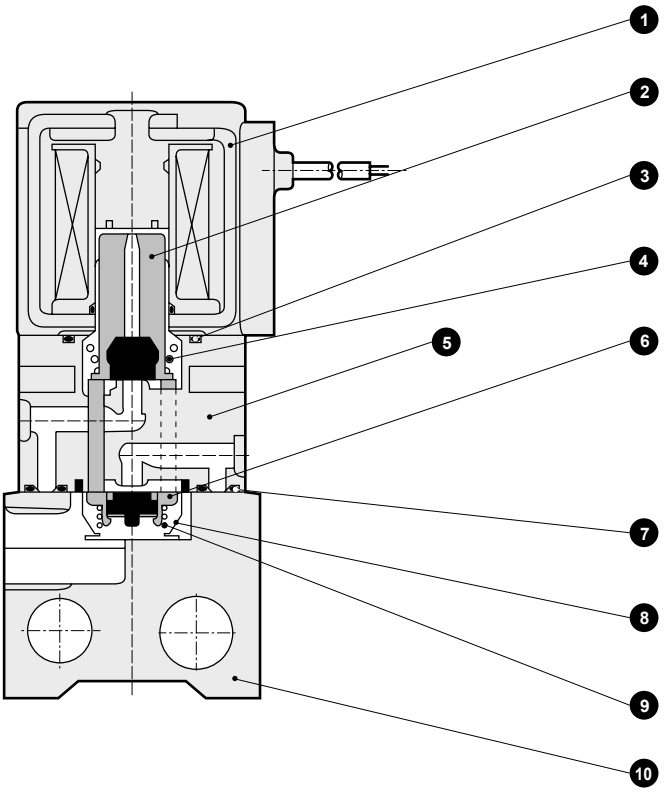
*1 : Select a desired manifold station No. from 2 to 10.
*2 : For the type with masking plate, designate Item Ⓓ as X, then designate the quantities of Ⓘ solenoid valves and Ⓙ masking plates.
*3 : For GFAG11 Item Ⓕ 2G, the compact terminal box (G1/4) is used.
*4 : For GFAG21 Ⓕ 2G/2HS, the DIN terminal box (Pg9) is used.
*5 : The surge suppressor is built into the coil for Item Ⓕ 2CS and in the terminal box for 2HS and 3RS.
*6 : Other voltages may not be available. Contact CKD for details.
*7 : Solenoid valves are arranged from the right side with the sub-plate (individual) port A facing front.
*8 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFAG actuator



● GFAG manifold

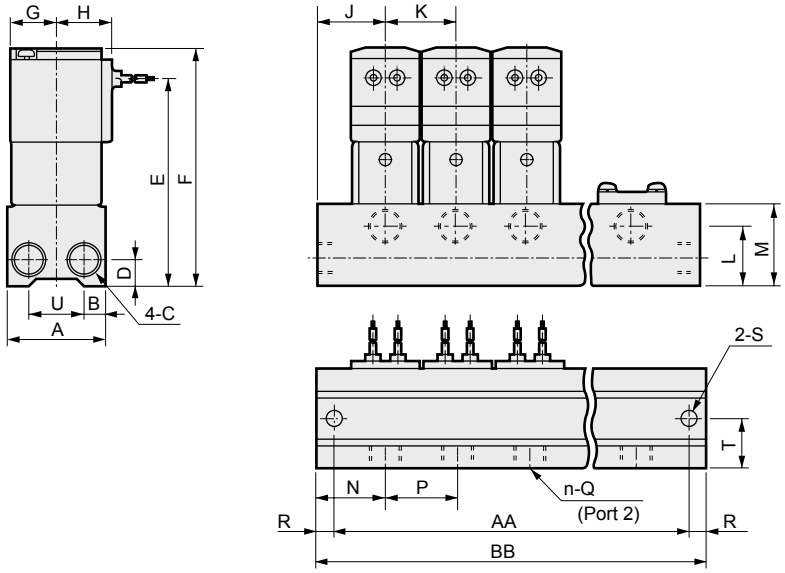


No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	6	Valving element guide assembly	PPS, SUS, NBR	Polyphenylene sulfide, stainless steel, nitrile rubber
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber	7	Gasket	NBR	Nitrile rubber
3	O-ring	NBR	Nitrile rubber	8	Holder	SUS	Stainless steel
4	Spring	SUS	Stainless steel	9	Spring	SUS	Stainless steel
5	Body	PPS	Polyphenylene sulfide	10	Sub-plate	A6063	Aluminum

* 4 body mounting screws and 2 O-rings are attached to the actuator only.

Dimensions: Manifold

● Grommet lead wire
GFAG*1-*-*-12C



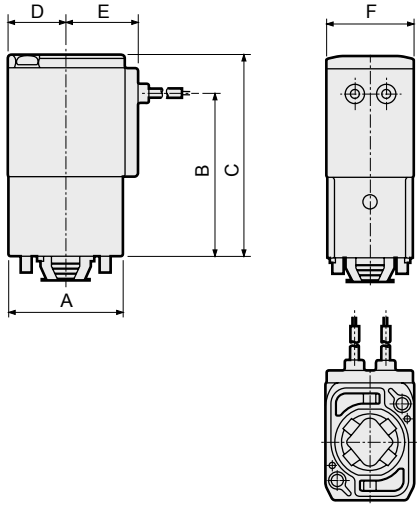
Lead wire length 300 mm

Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFAG1	AA	48	68	88	108	128	148	168	188	208
	BB	58	78	98	118	138	158	178	198	218
GFAG2	AA	58	84	110	136	162	188	214	240	266
	BB	68	94	120	146	172	198	224	250	276
GFAG3	AA	74	106	138	170	202	234	266	298	330
	BB	88	120	152	184	216	248	280	312	344
GFAG4	AA	86	124	162	200	238	276	314	352	390
	BB	100	138	176	214	252	290	328	366	404
GFAG5	AA	100	146	192	238	284	330	376	422	468
	BB	114	160	206	252	298	344	390	436	482

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U
GFAG1	30	6.5	Rc1/8	8	55.5	65	13	17	19	20	16	22	18.5	20	M5	5	ø4.5	15	17
GFAG2	30	6.5	Rc1/8	8	70	81	15.5	19.5	21	26	18	27	20	26	Rc1/8	5	ø4.5	15	17
GFAG3	40	9	Rc1/4	11	84	96	18.5	22.5	28	32	24	33	27.5	32	Rc1/4	7	ø6.5	20	22
GFAG4	43	9	Rc1/4	11	93.5	107.5	22.5	26	31	38	24	33	34.5	38	Rc1/4	7	ø6.5	21.5	25
GFAG5	50	10	Rc1/4	11	100	116	26	29.5	34	46	24	33	38.5	46	Rc1/4	7	ø6.5	25	30

Dimensions: Actuator

● Grommet lead wire
GFAG*1-*-0-12C



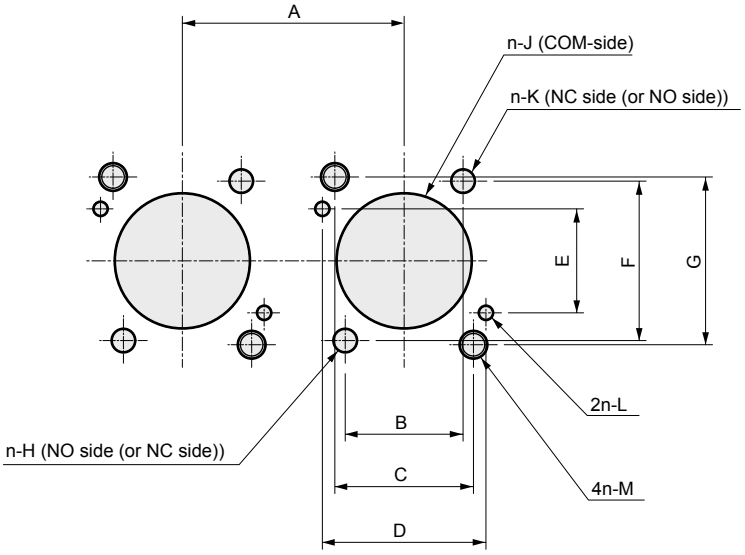
Model No.	A	B	C	D	E	F
GFAG1	25	33.5	43	13	17	18
GFAG2	30	43	54	15.5	19.5	22
GFAG3	36	51	63	18.5	22.5	28
GFAG4	43	60.5	74.5	22.5	26	34
GFAG5	50	67	83	26	29.5	40

* Lead wire length 300 mm

Actuator installation dimensions

● GFAG1*/2*/3*

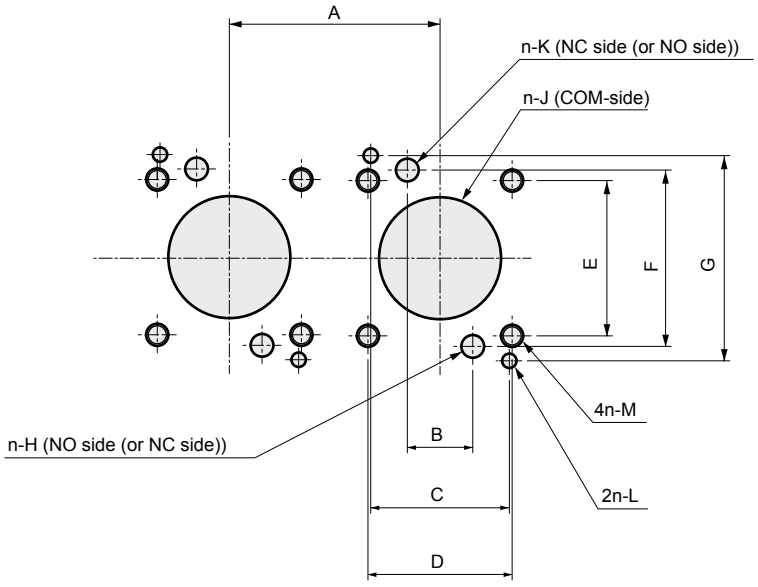
Machining drawing when using 2 actuators.



Model No.	A	B	C	D	E	F	G	H	J	K	L	M
GFAG1	20 or more	9±0.15	12.4±0.1	14.4±0.1	11.2±0.1	16.4±0.15	17±0.1	ø2 $^{+0.1}_{0}$	ø12 ±0.1 depth 7 $^{+0.2}_{0}$	ø2 $^{+0.1}_{0}$	ø1.6 $^{+0.1}_{0}$ depth 2.5±0.5	M2.5 effective depth 5
GFAG2	26 or more	12±0.15	15.5±0.1	18.4±0.1	12.4±0.1	20±0.15	19.4±0.1	ø2.5 $^{+0.1}_{0}$	ø14.5 ±0.1 depth 6.7 $^{+0.2}_{0}$	ø2.5 $^{+0.1}_{0}$	ø1.6 $^{+0.1}_{0}$ depth 2.5±0.5	M3 effective depth 6
GFAG3	32 or more	17±0.15	20±0.1	23.6±0.1	15±0.1	24±0.15	24.2±0.1	ø3.4 $^{+0.1}_{0}$	ø19.5 ±0.1 depth 7.6 $^{+0.2}_{0}$	ø3.4 $^{+0.1}_{0}$	ø2.1 $^{+0.1}_{0}$ depth 2.5±0.5	M4 effective depth 6

● GFAG4*/5*

Machining drawing when using 2 actuators.

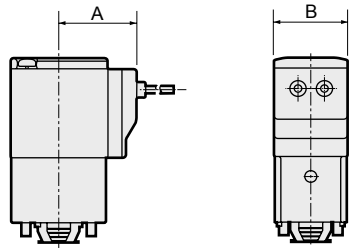


Model No.	A	B	C	D	E	F	G	H	J	K	L	M
GFAG4	38 or more	11.8±0.15	25±0.1	26±0.1	28±0.1	31.8±0.15	37±0.1	ø4.1 $^{+0.1}_{0}$	ø22 ±0.15 depth 11.2 $^{+0.2}_{0}$	ø4.1	ø2.6 depth 2.5±0.5 $^{+0.1}_{0}$	M4 effective depth 12
GFAG5	46 or more	11.8±0.15	30±0.1	30±0.1	33±0.1	31.8±0.15	43±0.1	ø4.1 $^{+0.1}_{0}$	ø22 ±0.15 depth 11.2 $^{+0.2}_{0}$	ø4.1	ø2.6 depth 2.5±0.5 $^{+0.1}_{0}$	M5 effective depth 8

Optional dimensions

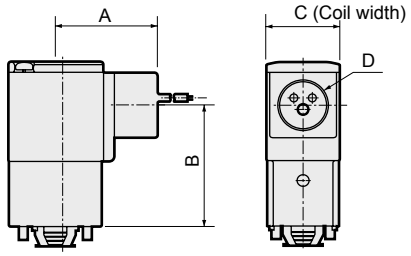
(Refer to the grommet lead wire actuator dimensions on page 71 for common dimensions.)

● Grommet lead wire with surge suppressor
GFAG*1-*-*-1 2CS



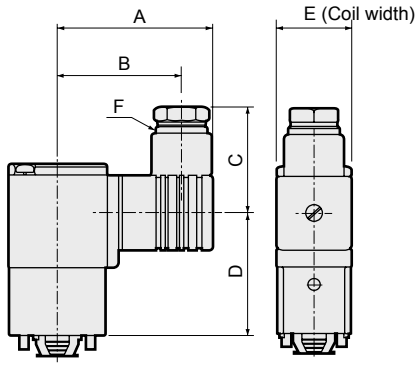
Model No.	A	B
GFAG1	24.5	18
GFAG2	26.5	22
GFAG3	29.5	28
GFAG4	34	34
GFAG5	37.5	40

● Conduit (CTC19 / G1/2)
GFAG*1-*-*-1 2CG 2CH



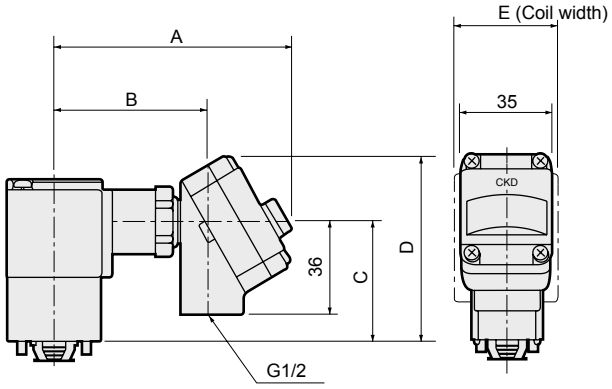
Model No.	A	B	C	D
GFAG3	39	46	28	CTC19 / G1/2
GFAG4	43	56	34	CTC19 / G1/2
GFAG5	46.5	64	40	CTC19 / G1/2

● DIN terminal box (with lamp/surge suppressor)
GFAG*1-*-*-1 2G 2HS



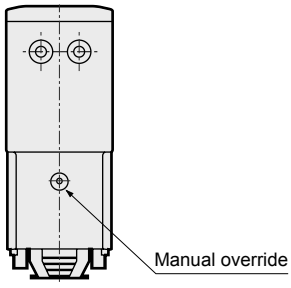
Model No.	A	B	C	D	E	F
GFAG1	36	28.5	22	31.5	18	G1/4
GFAG2	53	44	38	36.5	22	Pg9
GFAG3	58.5	47	39	44.5	28	Pg11
GFAG4	62	50.5	39	54	34	Pg11
GFAG5	65.5	54	39	62.5	40	Pg11

● T type terminal box (with lamp/surge suppressor) (G1/2)
GFAG*1-*-*-1 3T 3RS



Model No.	A	B	C	D	E
GFAG4	96	64.5	56	82	34
GFAG5	99.5	68	64	90	40

● Manual override (non-locking)
GFAG*1-*-*-** N



Position of manual override:
Opposite side to COM port

Direct acting 2-port solenoid valve for dry air, single unit
Special purpose

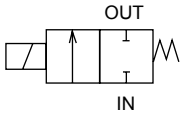
FGB Series

- NC (open when energized)
- Port size: Rc1/8 to Rc1/2

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)



Common specifications

Item	FGB
Working fluid	Dry air, inert gas, low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.4 (≈200 psi, 14 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	2.1 (≈300 psi, 21 bar) (1.5 (≈220 psi, 15 bar) for FGB11/21)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature°C	-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Flow characteristics C[dm^3/(s·bar)]	Flow characteristics b	Max. working pressure differential MPa AC	Max. working pressure differential MPa DC	Max. working pressure MPa	Rated voltage	Power consumption (W) AC	Power consumption (W) DC	Weight (kg)
NC (open when energized)												
FGB21-6	-1	Rc1/8	1.5	0.28	0.52	1.0	1.0	1.0 (≈150 psi, 10 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	4.6	4	0.13
	-2		2	0.55	0.59	0.6	0.6					
FGB31-$^{6}_{8}$	-2	Rc1/8 Rc1/4	2	0.55	0.56	1.4	1.4	1.4 (≈200 psi, 14 bar)		6.2	6.5	0.22
	-3		3	1.2	0.56	0.6	0.6					
	-6		5	3.1	0.50	0.15	0.15					
FGB41-$^{8}_{10}$	-3	Rc1/4 Rc3/8	3	1.2	0.56	1.2	1.2			8.7	8	0.39
	-5		4	2.1	0.54	0.5	0.5					
	-7		7	5.7	0.48	0.1	0.1					
FGB51-10	-5	Rc3/8	4	2.1	0.54	1.0	1.2			10.7	11.5	0.62
	-6		5	3.1	0.50	0.5	0.6					
FGB51-$^{10}_{15}$	-7	Rc3/8	7	5.7	0.48	0.2	0.25					
	-8	Rc1/2	10	5.5	0.41	0.08	0.1					

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*4 : When using at low vacuum, vacuum the OUT port side.

Leakage current	Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
	FGB**-	2 mA or less	1 mA or less	1 mA or less	2 mA or less

How to order

F G B 2 1 - 6 - 1 - 1 2CR A B - 1

- F G: Working fluid (Dry air)
- B: No. of ports (2-port valve)
- 2: Ⓐ Series size
- 1: Ⓑ Actuation
- 6: Ⓒ Port size
- 1: Ⓓ Orifice size *1
- 1: Ⓔ Body/sealant combination
- 2CR: Ⓕ Coil option *2 *3
- A: Ⓖ Manual override
- B: Ⓗ Other options
- 1: Ⓘ Voltage *4

Code	Description	Model No. FGB21	FGB31	FGB41	FGB51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Actuation					
1	NC (open when energized)	●	●	●	●
Ⓒ Port size					
6	Rc1/8	●	●		
8	Rc1/4		●	●	
10	Rc3/8			●	●
15	Rc1/2				●
Ⓓ Orifice size					
1	ø1.5	●			
2	ø2	●	●		
3	ø3		●	●	
5	ø4			●	●
6	ø5		●		●
7	ø7			●	●
8	ø10				●
Ⓔ Body/sealant combination					
	Body / **Seal**				
1	Aluminum / NBR	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Std. Grommet lead wire with full-wave rectifier	●	●	●	●
3TR	Option T type term box, full-wave rectifier (G1/2)		●	●	●
3RR	Option T type terminal box with lamp/ full-wave rectifier (G1/2)		●	●	●
For DC					
2C	Grommet lead wire	●	●	●	●
2CS	Grommet lead wire with surge suppressor	●	●	●	●
3T	With T type terminal box (G1/2)		●	●	●
3RS	T type terminal box with lamp surge suppressor (G1/2)		●	●	●
Ⓖ Manual override					
Blank	Std. None	●	●	●	●
A	Option Manual locking	●	●	●	●
N	Option Manual non-locking		●	●	●
Ⓗ Other options					
Blank	Std. None	●	●	●	●
B	Option Mounting plate	●	●	●	●
Ⓘ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FGB21-6-1-12CRAB-1

Model : FGB

- Ⓐ Series size : 22 mm
- Ⓑ Actuation : NC (open when energized)
- Ⓒ Port size : Rc1/8
- Ⓓ Orifice size : ø1.5
- Ⓔ Body/sealant combination : Body - aluminum, sealant - NBR
- Ⓕ Coil option : Grommet lead wire with full-wave rectifier
- Ⓖ Manual override : Manual locking
- Ⓗ Other options : Mounting plate
- Ⓘ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : For FGB51 with orifice of ø4 mm (Item Ⓓ 5) and ø5 mm (Item Ⓓ 6), available port size is Rc3/8 (Item Ⓒ 10) only.

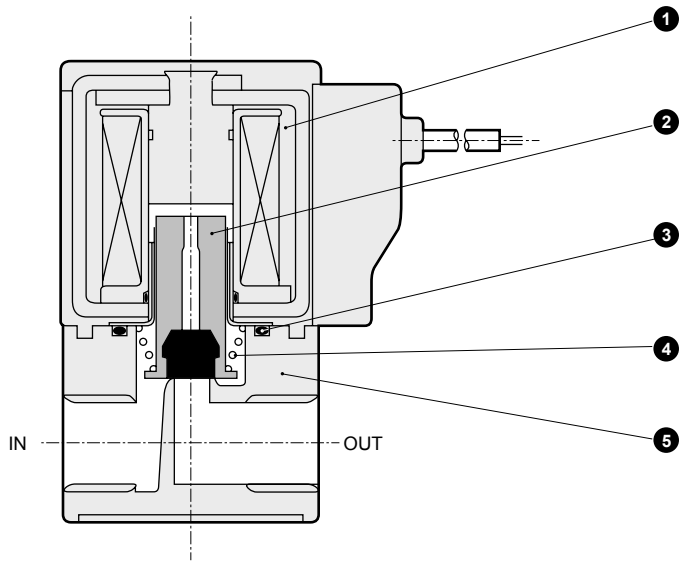
*2 : Full-wave rectifier and surge suppressor are built into the coil for Item Ⓕ 2CR, 2CS and in the terminal box for 3TR, 3RR, 3RS.

*3 : Surge suppressor is included as standard in the models with full-wave rectifier.

*4 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

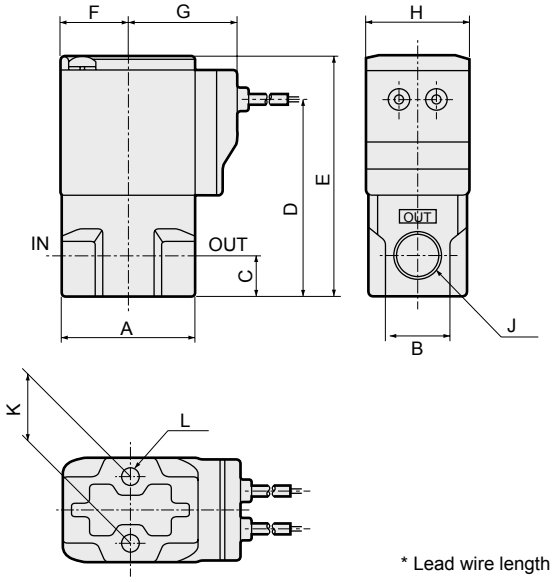
● FGB Series



No.	Part name	Material	
1	Coil assembly	-	-
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber
3	O-ring	NBR	Nitrile rubber
4	Spring	SUS	Stainless steel
5	Body	ADC	Aluminum die-casting

Dimensions CAD

● Grommet lead wire with full-wave rectifier
FGB*1-*-*-*2CR



* Lead wire length 300 mm

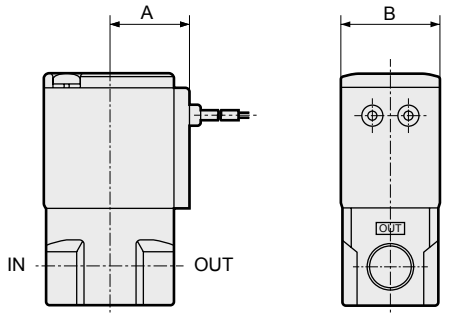
When using lead wire with DC voltage, use the grommet lead wire (2C) or grommet lead wire with surge suppressor (2CS).

Model No.	A	B	C	D	E	F	G	H	J	K	L
FGB21	32	16	8	43	54	15.5	26.5	22	Rc1/8	15	M4 depth 6
FGB31	36	18	11	53.5	65.5	18.5	29.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FGB41	40	25	12	62	76	22.5	34	34	Rc1/4, Rc3/8	18	M5 depth 7
FGB51	50	30	15	74.5	90.5	26	37.5	40	Rc3/8, Rc1/2	20	M5 depth 8

Optional dimensions

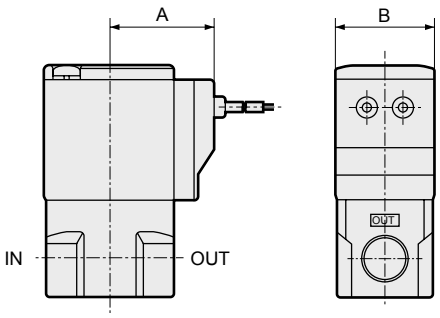
(Refer to the dimensions of grommet lead wire with full-wave rectifier on page 76 for common dimensions.)

● Grommet lead wire
FGB*1-*-*-*2C



Model No.	A	B
FGB21	19.5	22
FGB31	22.5	28
FGB41	26	34
FGB51	29.5	40

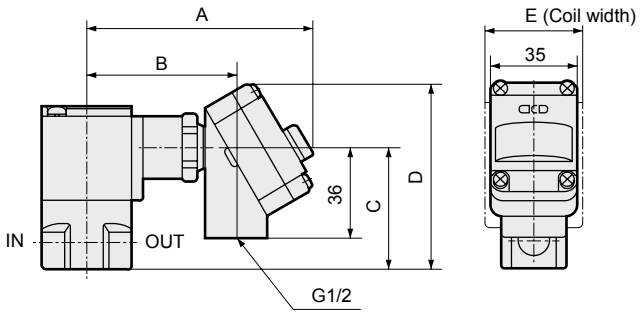
● Grommet lead wire with surge suppressor
FGB*1-*-*-*2CS



Model No.	A	B
FGB21	26.5	22
FGB31	29.5	28
FGB41	34	34
FGB51	37.5	40

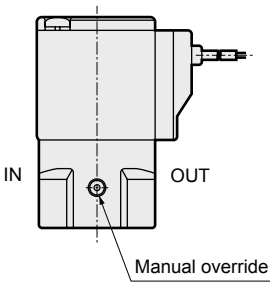
● T type terminal box (with lamp/surge suppressor) (G1/2)
FGB*1-*-*-* 3T 3RS

● T type terminal box with full-wave rectifier (with lamp) (G1/2)
FGB*1-*-*-* 3TR 3RR



Model No.	A	B	C	D	E
FGB31	92	60.5	48.5	74.5	28
FGB41	96	64.5	57.5	83.5	34
FGB51	99.5	68	71.5	97.5	40

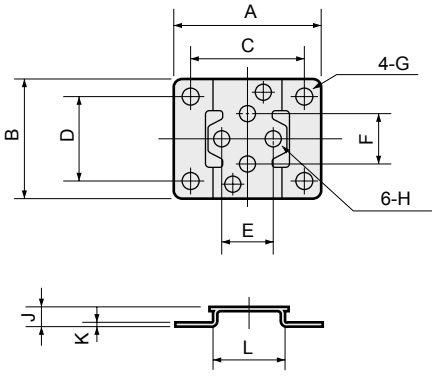
● Manual override locking/non-locking
FGB*1-*-*-** A N



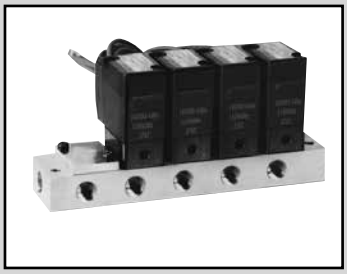
Note : Non-locking is available only for sizes 3, 4, 5.

● Mounting plate
FGB*1-*-*-***B

Material : Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FGB21	40	34	30	25	15	15	ø5	ø4.5	6	1.2	20
FGB31	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FGB41	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30
FGB51	62	50	50	38	20	20	ø6	ø5.5	7	1.6	36



Direct acting 2-port solenoid valve for dry air, manifold
Special purpose

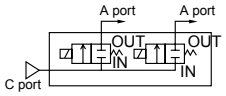
GFGB Series

- NC (open when energized)
- Port size: Rc1/8, Rc1/4, Rc3/8

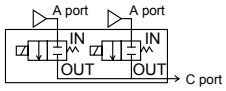
CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)/ common supply (port C pressurization)



- NC (open when energized)/ individual supply (port A pressurization)



Common specifications

Item	GFGB
Working fluid	Dry air, inert gas, low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.4 (≈200 psi, 14 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	2.1 (≈300 psi, 21 bar) (1.5 (≈220 psi, 15 bar) for GFGB2)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size A port (Individual)	Port size C port (Common)	Orifice size (mm)	Flow characteristics C[dm^3/(s·bar)]	Flow characteristics b	Max. working pressure differential MPa AC	Max. working pressure differential MPa DC	Max. working pressure MPa	Rated voltage	Power consumption (W) AC	Power consumption (W) DC
GFGB 21 25 - 1	Rc1/8	Rc1/8	1.5	0.31	0.49	1.0	1.0	1.0 (≈150 psi, 10 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	4.6	4
GFGB 21 25 - 2	Rc1/8	Rc1/8	2	0.53	0.38	0.6	0.6				
GFGB 31 35 - 2	Rc1/4	Rc3/8	2	0.55	0.48	1.4	1.4	1.4 (≈200 psi, 14 bar)		6.2	6.5
GFGB 31 35 - 3	Rc1/4	Rc3/8	3	1.2	0.39	0.6	0.6				
GFGB 31 35 - 6	Rc1/4	Rc3/8	5	2.1	0.27	0.15	0.15				
GFGB 41 45 - 3	Rc1/4	Rc3/8	3	1.2	0.39	1.2	1.2			8.7	8
GFGB 41 45 - 5	Rc1/4	Rc3/8	4	2.1	0.34	0.5	0.5				
GFGB 41 45 - 7	Rc1/4	Rc3/8	7	3.5	0.21	0.1	0.1				
GFGB 51 55 - 5	Rc1/4	Rc3/8	4	2.1	0.34	1.0	1.2			10.7	11.5
GFGB 51 55 - 6	Rc1/4	Rc3/8	5	3.0	0.22	0.5	0.6				
GFGB 51 55 - 7	Rc1/4	Rc3/8	7	4.4	0.18	0.2	0.25				

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*4 : When using at low vacuum, vacuum the OUT port side.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
GFGB	2 mA or less	1 mA or less	1 mA or less	2 mA or less

Weight

Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (kg) (n: manifold station No.)	Formula for product weight
GFGB21 GFGB25	0.11	0.012	0.017+0.025×n	(Product weight (kg)) = 0.11 x (Actuator quantity) + 0.012 x (Masking quantity) + 0.017 + 0.025 x (Manifold station No.)
GFGB31 GFGB35	0.18	0.026	0.038+0.056×n	(Product weight (kg)) = 0.18 x (Actuator quantity) + 0.026 x (Masking quantity) + 0.038 + 0.056 x (Manifold station No.)
GFGB41 GFGB45	0.32	0.032	0.044+0.076×n	(Product weight (kg)) = 0.32 x (Actuator quantity) + 0.032 x (Masking quantity) + 0.044 + 0.076 x (Manifold station No.)
GFGB51 GFGB55	0.52	0.045	0.053+0.11×n	(Product weight (kg)) = 0.52 x (Actuator quantity) + 0.045 x (Masking quantity) + 0.053 + 0.11 x (Manifold station No.)

How to order

● Manifold

GFGB31-2-7-12CN-3

● Manifold with masking plate

GFGB25-1-X-12CRN-2-52

No. of ports (2-port valve)

Working fluid (Dry air)

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4

Ⓖ Manual override

Ⓗ Voltage *5

Ⓘ No. of solenoid valves *6

Ⓙ Masking plate quantity

Code	Description	Model No. GFGB21/25	GFGB31/35	GFGB41/45	GFGB51/55
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Circuit configuration					
1	NC (open when energized)/common supply	●	●	●	●
5	NC (open when energized)/individual supply	●	●	●	●
Ⓒ Orifice size					
1	ø1.5	●			
2	ø2	●	●		
3	ø3		●	●	
5	ø4			●	●
6	ø5		●		●
7	ø7			●	●
Ⓓ Manifold station No.					
2 to 10	2 stations to 10 stations	●	●	●	●
0	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
Ⓔ Body/sealant combination					
	Body / **Seal**				
1	PPS / NBR	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Std. Grommet lead wire With full-wave rectifier	●	●	●	●
3TR	Option T type term box, full-wave rectifier (G1/2)			●	●
3RR	Option T type terminal box with lamp/ full-wave rectifier (G1/2)			●	●
For DC					
2C	Grommet lead wire	●	●	●	●
2CS	Grommet lead wire with surge suppressor	●	●	●	●
3T	With T type terminal box (G1/2)			●	●
3RS	T type terminal box with lamp surge suppressor (G1/2)			●	●
Ⓖ Manual override					
Blank	Std. None	●	●	●	●
N	Option Manual non-locking	●	●	●	●
Ⓗ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					
Ⓘ No. of solenoid valves					
Blank	No masking plate	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●
Ⓙ Masking plate quantity					
Blank	No masking plate	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●

Select from the combinations indicated with ● in the table above.

[Example of model No.]

GFGB31-2-7-12CN-3

Model : GFGB

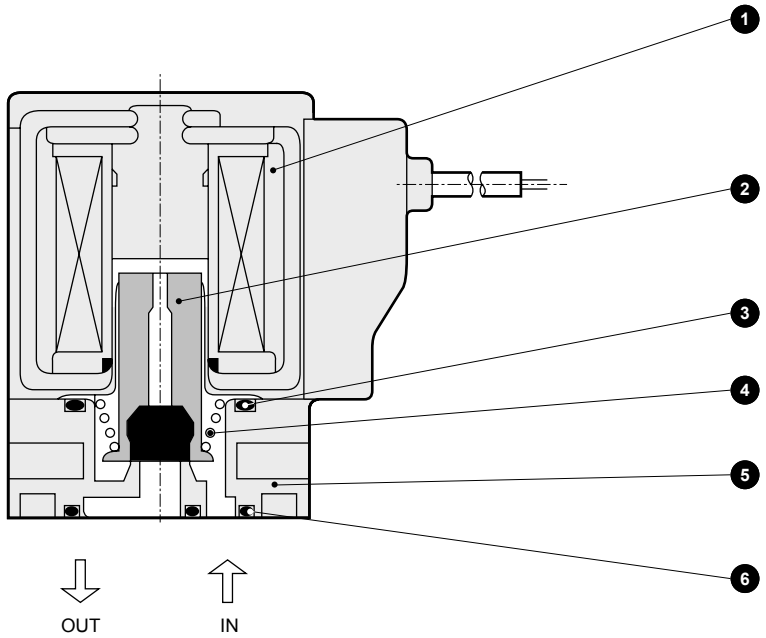
Ⓐ Series size : 28 mm
Ⓑ Circuit configuration : NC (open when energized)/ common supply
Ⓒ Orifice size : ø2
Ⓓ Manifold station No. : 7 stations
Ⓔ Body/sealant combination : Body - PPS, sealant - NBR
Ⓕ Coil option : Grommet lead wire
Ⓖ Manual override : Manual non-locking
Ⓗ Voltage : 24 VDC
Ⓘ Ⓙ : No masking plate

⚠ Precautions for model No. selection

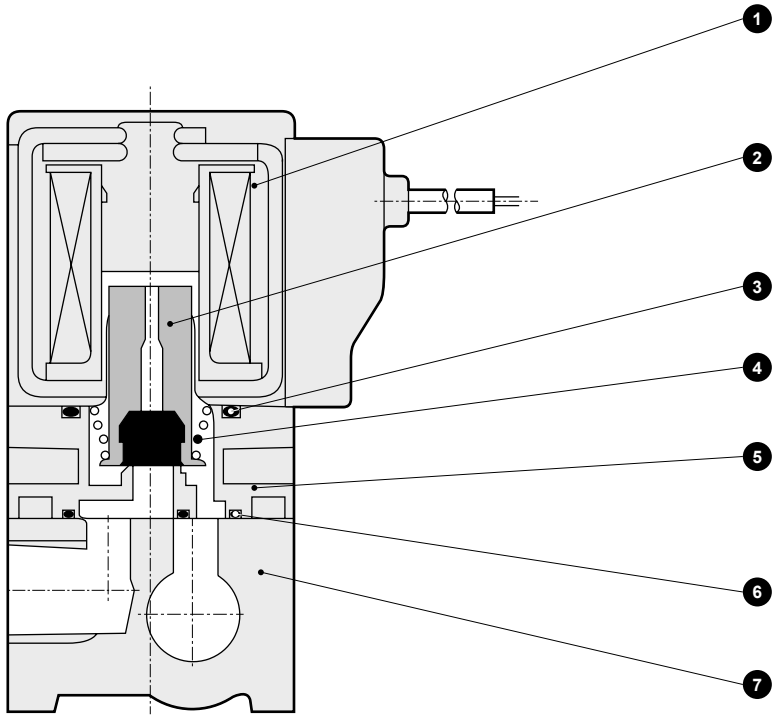
*1 : Select a desired manifold station No. from 2 to 10.
*2 : For the type with masking plate, designate Item Ⓓ as X, then designate the quantities of Ⓘ solenoid valves and Ⓙ masking plates.
*3 : Full-wave rectifier and surge suppressor are built into the coil for Item Ⓕ 2CR/2CS and in the terminal box for 3TR/3RR/3RS.
*4 : Surge suppressor is included as standard in the models with full-wave rectifier.
*5 : Other voltages may not be available. Contact CKD for details.
*6 : Solenoid valves are arranged from the right side with the sub-plate (individual) port A facing front.
*7 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFGB actuator



● GFGB manifold

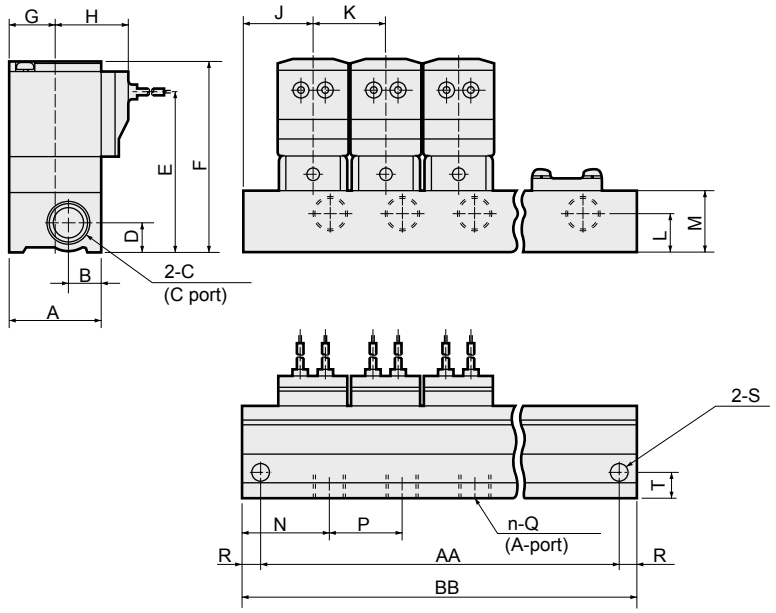


No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	5	Body	PPS	Polyphenylene sulfide
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber	6	Gasket	NBR	Nitrile rubber
3	O-ring	NBR	Nitrile rubber	7	Sub-plate	A6063	Aluminum
4	Spring	SUS	Stainless steel				

* 4 body mounting screws and 2 O-rings are attached to the actuator only.

Dimensions: Manifold

● Grommet lead wire with full-wave rectifier
GFGB**-*-*-12CR



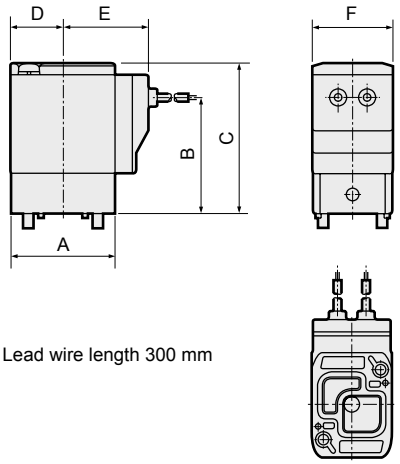
Lead wire length 300 mm

Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFGB2	AA	58	84	110	136	162	188	214	240	266
	BB	68	94	120	146	172	198	224	250	276
GFGB3	AA	74	106	138	170	202	234	266	298	330
	BB	88	120	152	184	216	248	280	312	344
GFGB4	AA	86	124	162	200	238	276	314	352	390
	BB	100	138	176	214	252	290	328	366	404
GFGB5	AA	100	146	192	238	284	330	376	422	468
	BB	114	160	206	252	298	344	390	436	482

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
GFGB2	30	12	Rc1/8	8	49	60	15.5	26.5	21	26	8	16	25	26	Rc1/8	5	ø4.5	9
GFGB3	36	13	Rc3/8	12	64	76	18.5	29.5	28	32	15	24	34.5	32	Rc1/4	7	ø6.5	10
GFGB4	43	18	Rc3/8	12	71	85	22.5	34	31	38	15	24	31	38	Rc1/4	7	ø6.5	11.5
GFGB5	50	20	Rc3/8	12	79	95	26	37.5	34	46	12	24	34	46	Rc1/4	7	ø6.5	14

Dimensions: Actuator

● Grommet lead wire with full-wave rectifier
GFGB**-*-0-12CR



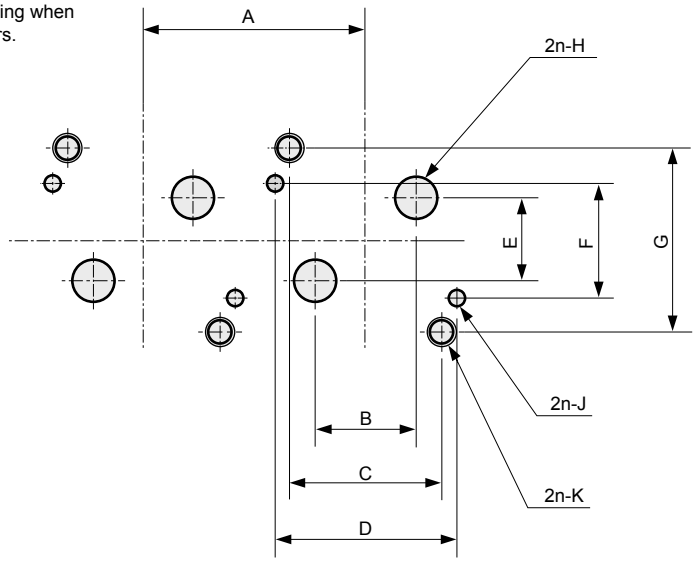
Lead wire length 300 mm

Model No.	A	B	C	D	E	F
GFGB2	30	33	44	15.5	26.5	22
GFGB3	36	40	52	18.5	29.5	28
GFGB4	43	47	61	22.5	34	34
GFGB5	50	55	71	26	37.5	40

Actuator installation dimensions

● GFGB2*/3*

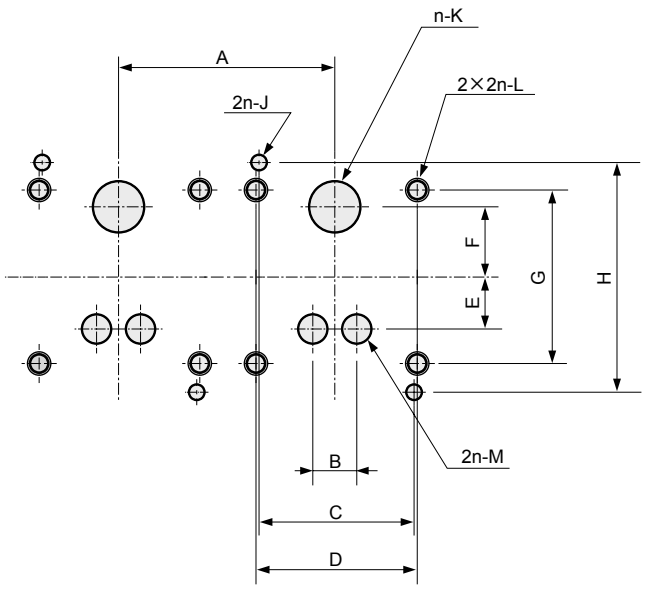
Machining drawing when using 2 actuators.



Model No.	A	B	C	D	E	F	G	H	J	K
GFGB2	26 or more	8±0.15	15.5±0.1	18.4±0.1	10±0.15	12.4±0.1	19.4±0.1	ø3.5	ø1.6$^{+0.1}_{0}$depth 2.5±0.5	M3 effective thread depth 6 or more
GFGB3	32 or more	13±0.15	20±0.1	23.6±0.1	11.4±0.15	15±0.1	24.2±0.1	ø5.5	ø2.1$^{+0.1}_{0}$depth 2.5±0.5	M4 effective thread depth 6 or more

● GFGB4*5*

Machining drawing when using 2 actuators.

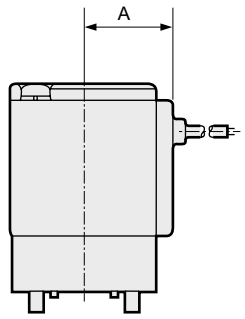


Model No.	A	B	C	D	E	F	G	H	J	K	L	M
GFGB4	38 or more	6±0.2	25±0.1	26±0.1	8.5±0.2	11±0.2	28±0.1	37±0.1	ø2.6$^{+0.1}_{0}$depth 2.5±0.5	ø8	M4 effective thread depth 9 or more	ø5
GFGB5	46 or more	8±0.2	30±0.1	30±0.1	11.5±0.2	14.5±0.2	33±0.1	43±0.1	ø2.6$^{+0.1}_{0}$depth 2.5±0.5	ø11	M5 effective thread depth 8 or more	ø7

Optional dimensions

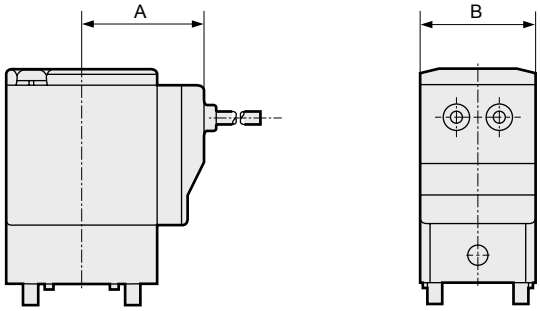
(Refer to the dimensions of grommet lead wire actuator with full-wave rectifier on page 81 for common dimensions.)

● Grommet lead wire
GFGB**-*-*-1 2C



Model No.	A	B
GFGB2	19.5	22
GFGB3	22.5	28
GFGB4	26	34
GFGB5	29.5	40

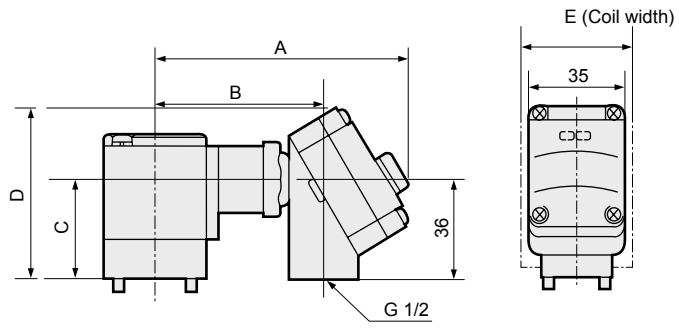
● Grommet lead wire with surge suppressor
GFGB**-*-*-1 2CS



Model No.	A	B
GFGB2	26.5	22
GFGB3	29.5	28
GFGB4	34	34
GFGB5	37.5	40

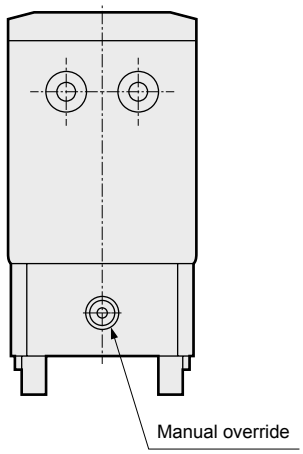
● T type terminal box (with lamp/surge suppressor) (G1/2)
GFGB**-*-*-1 3T 3RS

● T type terminal box with full-wave rectifier (with lamp) (G1/2)
GFGB**-*-*-1 3TR 3RR



Model No.	A	B	C	D	E
GFGB4	96	64.5	42.5	68.5	34
GFGB5	99.5	68	52	78	40

● Manual override (non-locking)
GFGB**-*-*-1*N



Position of manual override
· Common supply: Opposite side to port A
· Individual supply: Port A side

Direct acting 3-port solenoid valve for dry air, single unit
Special purpose

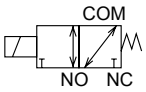
FGG Series

- Universal, NC pressurization
- Port size: Rc1/8, Rc1/4, Rc3/8

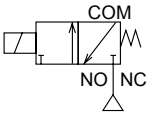
CE Refer to the Ending for details. RoHS CAD

JIS symbol

● Universal



● NC pressurization



Common specifications

Item	FGG
Working fluid	Dry air, inert gas, low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.4 (≈200 psi, 14 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	2.1 (≈300 psi, 21 bar) (1.5 (≈220 psi, 15 bar) for FGG2)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min (ANR)	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Flow characteristics C[dm^3/(s·bar)]	Flow characteristics b	Max. working pressure differential MPa	Max. working pressure MPa	Rated voltage	Power consumption (W) AC	Power consumption (W) DC	Weight (kg)
● Universal											
FGG21-6	-Z	Rc1/8	1	0.13	0.58	0.7	1.0 (≈150 psi, 10 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	4.6	4	0.15
	-1		2	0.52	0.54	0.15					
FGG31-6/8	-0	Rc1/8 Rc1/4	1.5	0.32	0.58	0.7	1.4 (≈200 psi, 14 bar)		6.2	6.5	0.25
	-1		2	0.55	0.48	0.4					
	-4		3	1.2	0.57	0.2					
FGG41-8/10	-1	Rc1/4 Rc3/8	2	0.55	0.48	0.7			8.7	8	0.45
	-4		3	1.2	0.57	0.3					
	-8		4	2.1	0.48	0.15					
FGG51-8/10	-1	Rc1/4 Rc3/8	2	0.55	0.48	1.2(0.6)			10.7	11.5	0.65
	-4		3	1.2	0.57	0.6(0.3)					
	-8		4	2.1	0.48	0.3(0.15)					
● NC pressurization											
FGG33-6/8	-0	Rc1/8 Rc1/4	1.5	0.32	0.58	1.0	1.4	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	6.2	6.5	0.25
	-1		2	0.55	0.48	0.7					
	-4		3	1.2	0.57	0.3					
FGG43-8/10	-1	Rc1/4 Rc3/8	2	0.55	0.48	1.2			8.7	8	0.45
	-4		3	1.2	0.57	0.6					
	-8		4	2.1	0.48	0.3					

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : For FGG51, the max. working pressure differential when NO pressurized is shown in ( ).
*3 : The leakage current must be less than or equal to the values shown below.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : When using NC pressurization at low vacuum, vacuum the NO port side.

Leakage current	Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
	FGG**	2 mA or less	1 mA or less	1 mA or less	2 mA or less

How to order

F G G 2 1 - 6 - Z - 1 2CR A B - 1

- No. of ports (3-port valve)
- Working fluid (Dry air)
- Ⓐ Series size
- Ⓑ Actuation
- Ⓒ Port size
- Ⓓ Orifice size
- Ⓔ Body/sealant combination
- Ⓕ Coil option *1 *2
- Ⓖ Manual override
- Ⓗ Other options
- Ⓘ Voltage *3

Code	Description	FGG21	FGG31/33	FGG41/43	FGG51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Actuation					
1	Universal	●	●	●	●
3	NC pressurization		●	●	
Ⓒ Port size					
6	Rc1/8	●	●		
8	Rc1/4		●	●	●
10	Rc3/8			●	●
Ⓓ Orifice size					
Z	ø1	●			
0	ø1.5		●		
1	ø2	●	●	●	●
4	ø3		●	●	●
8	ø4			●	●
Ⓔ Body/sealant combination					
	Body / Seal				
1	Aluminum / NBR	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Std. Grommet lead wire with full-wave rectifier	●	●	●	●
3TR	Option T type term box, full-wave rectifier (G1/2)		●	●	●
3RR	Option T type term box, lamp/full-wave rectifier (G1/2)		●	●	●
For DC					
2C	Option Grommet lead wire	●	●	●	●
2CS	Option Grommet lead wire with surge suppressor	●	●	●	●
3T	Option With T type terminal box (G1/2)		●	●	●
3RS	Option T type term box, lamp/anti-surge (G1/2)		●	●	●
Ⓖ Manual override					
Blank	Std. None	●	●	●	●
A	Option Manual locking	●	●	●	●
N	Option Manual non-locking		●	●	●
Ⓗ Other options					
Blank	Std. None	●	●	●	●
B	Option Mounting plate	●	●	●	●
Ⓘ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FGG21-6-Z-12CRAB-1

Model: FGG

- Ⓐ Series size : 22 mm
- Ⓑ Actuation : Universal
- Ⓒ Port size : Rc1/8
- Ⓓ Orifice size : ø1
- Ⓔ Body/sealant combination : Body - aluminum, sealant - NBR
- Ⓕ Coil option : Grommet lead wire with full-wave rectifier
- Ⓖ Manual override : Manual locking
- Ⓗ Other options : Mounting plate
- Ⓘ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

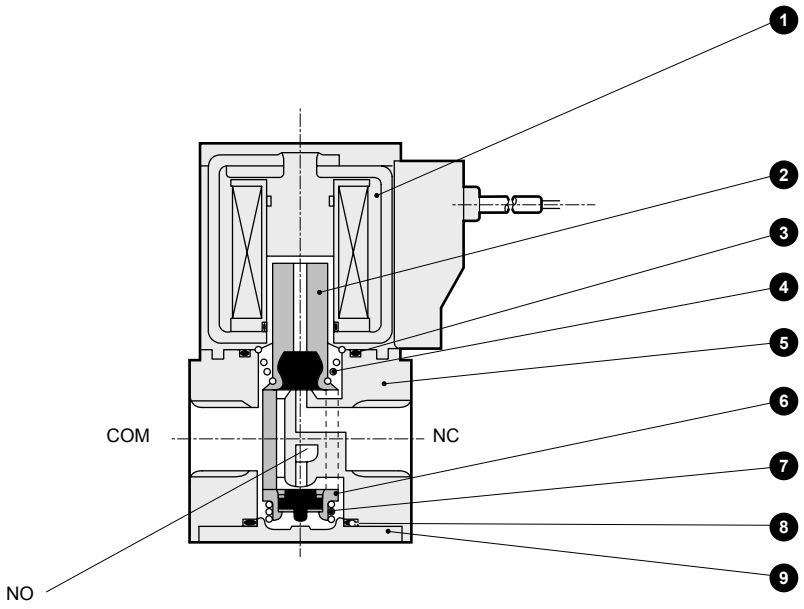
*1 : Full-wave rectifier and surge suppressor are built into the coil for Item Ⓕ 2CR, 2CS and in the terminal box for 3TR, 3RR, 3RS.

*2 : Surge suppressor is included as standard in the models with full-wave rectifier.

*3 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

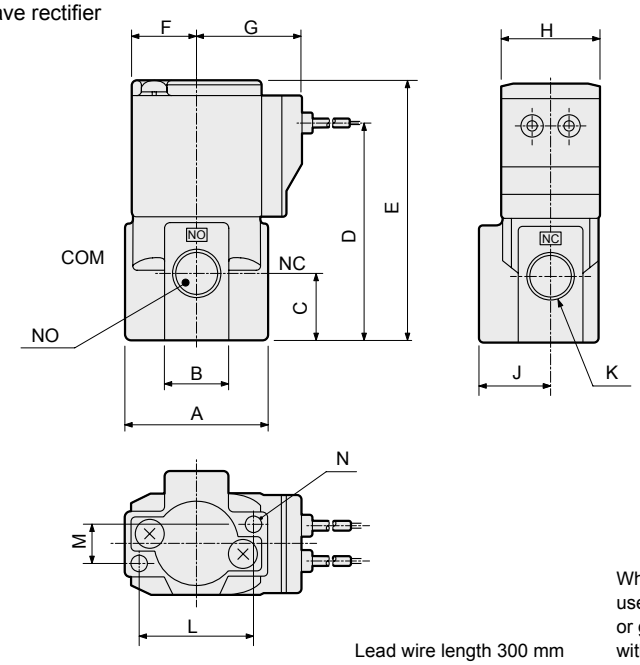
● FGG*1/*3 Series



No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	6	Valving element guide assembly	PPS, SUS, NBR	Polyphenylene sulfide, stainless steel, nitrile rubber
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber	7	Spring	SUS	Stainless steel
3	O-ring	NBR	Nitrile rubber	8	O-ring	NBR	Nitrile rubber
4	Spring	SUS	Stainless steel	9	Cover	ADC	Aluminum die-casting
5	Body	ADC	Aluminum die-casting				

Dimensions

● Grommet lead wire with full-wave rectifier
FGG**-*-*-12CR



Lead wire length 300 mm

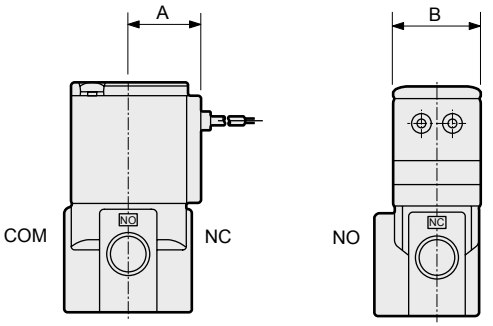
When using lead wire with DC voltage, use the grommet lead wire (2C) or grommet lead wire with surge suppressor (2CS).

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N
FGG2	32	16	16.5	51	62	15.5	26.5	22	16	Rc1/8	25	8	M4 depth 6
FGG3	40	18	18.5	60.5	72.5	18.5	29.5	28	20	Rc1/8 Rc1/4	32	11	M5 depth 8
FGG4	45	25	25	74.5	88.5	22.5	34	34	21	Rc1/4 Rc3/8	35	15	M5 depth 8
FGG5	50	25	25	81	97	26	37.5	40	21	Rc1/4 Rc3/8	35	15	M5 depth 8

Optional dimensions

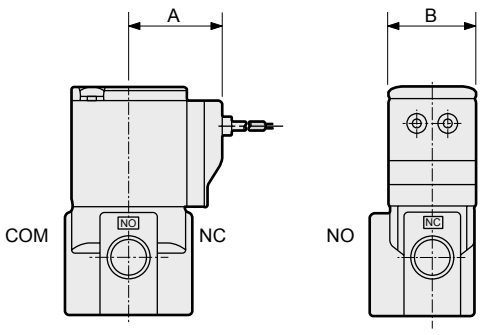
(Refer to the dimensions of grommet lead wire with full-wave rectifier on page 86 for common dimensions.)

● Grommet lead wire
FGG**-*-*-1 2C



Model No.	A	B
FGG2	19.5	22
FGG3	22.5	28
FGG4	26	34
FGG5	29.5	40

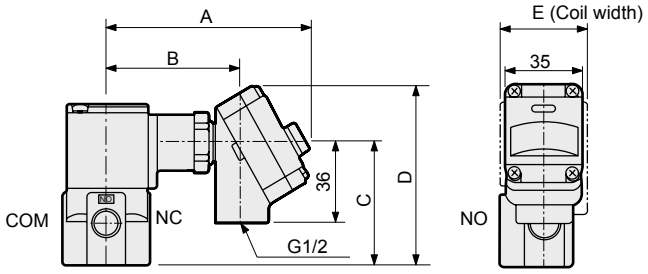
● Grommet lead wire with surge suppressor
FGG**-*-*-1 2CS



Model No.	A	B
FGG2	26.5	22
FGG3	29.5	28
FGG4	34	34
FGG5	37.5	40

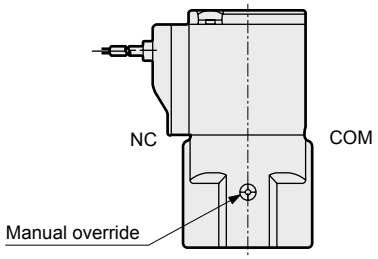
● T type terminal box (with lamp/surge suppressor) (G1/2)
FGG**-*-*-1 3T 3RS

● T type terminal box with full-wave rectifier (with lamp) (G1/2)
FGG**-*-*-1 3TR 3RR



Model No.	A	B	C	D	E
FGG3	92	60.5	55.5	81.5	28
FGG4	96	64.5	70	96	34
FGG5	99.5	68	78	104	40

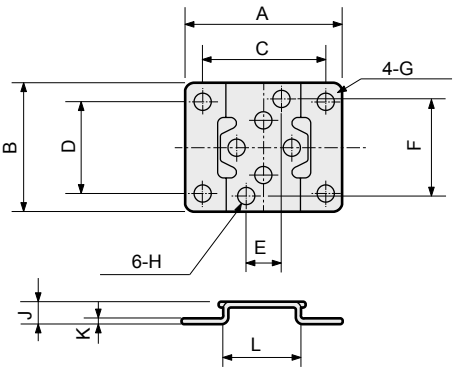
● Manual override (locking/non-locking)
FGG**-*-*-1* A N



Note : Non-locking is available only for sizes 3, 4, 5.

● Mounting plate
FGG**-*-*-1** B

Material : Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FGG2	40	34	30	25	8	25	ø5	ø4.5	6	1.2	20
FGG3	52	42	40	30	11	32	ø6	ø5.5	7	1.6	25
FGG4	56	48	44	36	15	35	ø6	ø5.5	7	1.6	30
FGG5	62	50	50	38	15	35	ø6	ø5.5	7	1.6	36

Direct acting 3-port solenoid valve for dry air, manifold
Special purpose

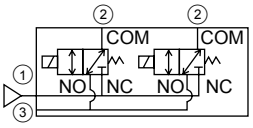
GFGG Series

- Universal
- Port size: Rc1/8, Rc1/4

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- Common supply/common exhaust



Common specifications

Item	GFGG
Working fluid	Dry air, inert gas, low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.2 (≈170 psi, 12 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	1.8 (≈260 psi, 18 bar) (1.5 (≈220 psi, 15 bar) for GFGG $\frac{2}{3}$)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage $cm^3/min(ANR)$	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size 2-port (Individual)	Port size 1, 3-port (Common)	Orifice size (mm)	Flow characteristics C[$dm^3/(s\cdot bar)$]	Flow characteristics b	Max. working pressure differential MPa	Max. working pressure MPa	Rated voltage	Power consumption (W) AC	Power consumption (W) DC
Universal										
GFGG21 -Z	Rc1/8	Rc1/8	1	0.12	0.44	0.7	1.0 (≈150 psi, 10 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	4.6	4
GFGG21 -1			2	0.42	0.19	0.15				
GFGG31 -0	Rc1/4	Rc1/4	1.5	0.28	0.46	0.7			6.2	6.5
GFGG31 -1			2	0.49	0.36	0.4				
GFGG31 -4			3	0.90	0.20	0.2				
GFGG41 -1	Rc1/4	Rc1/4	2	0.50	0.31	0.7	1.2 (≈170 psi, 12 bar)		8.7	8
GFGG41 -4			3	1.1	0.20	0.3				
GFGG41 -8			4	1.6	0.14	0.15				
GFGG51 -1	Rc1/4	Rc1/4	2	0.50	0.31	1.2(0.6)			10.7	11.5
GFGG51 -4			3	1.1	0.20	0.6(0.3)				
GFGG51 -8			4	1.6	0.14	0.3(0.15)				

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : For GFGG51, the max. working pressure differential when NO pressurized is shown in ( ).
*3 : The leakage current must be less than or equal to the values shown below.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
GFGG	2 mA or less	1 mA or less	1 mA or less	2 mA or less

Weight

Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (kg) (n: manifold station No.)	Formula for product weight
GFGG21	0.12	0.012	0.027+0.043×n	(Product weight (kg)) = 0.12 x (Actuator quantity) + 0.012 x (Masking quantity) + 0.027 + 0.043 x (Manifold station No.)
GFGG31	0.2	0.026	0.06+0.08×n	(Product weight (kg)) = 0.2 x (Actuator quantity) + 0.026 x (Masking quantity) + 0.06 + 0.080 x (Manifold station No.)
GFGG41	0.36	0.034	0.067+0.11×n	(Product weight (kg)) = 0.36 x (Actuator quantity) + 0.034 x (Masking quantity) + 0.067 + 0.11 x (Manifold station No.)
GFGG51	0.55	0.048	0.08+0.150×n	(Product weight (kg)) = 0.55 x (Actuator quantity) + 0.048 x (Masking quantity) + 0.08 + 0.15 x (Manifold station No.)

How to order

● Manifold

GFGG21-Z-5-12CN-3

● Manifold with masking plate

GFGG31-1-X-13TN-2-41

Working fluid (Dry air)

No. of ports (3-port valve)

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4

Ⓖ Manual override

Ⓗ Voltage *5

Ⓘ No. of solenoid valves *6

Ⓙ Masking plate quantity

Code	Description	GFGG21	GFGG31	GFGG41	GFGG51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Circuit configuration					
1	Common supply/common exhaust	●	●	●	●
Ⓒ Orifice size					
Z	ø1	●			
0	ø1.5		●		
1	ø2	●	●	●	●
4	ø3		●	●	●
8	ø4			●	●
Ⓓ Manifold station No.					
2 to 10	2 stations to 10 stations	●	●	●	●
0	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
Ⓔ Body/sealant combination					
	Body / Seal				
1	PPS / NBR	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Std. Grommet lead wire with full-wave rectifier	●	●	●	●
3TR	Option T type term box, full-wave rectifier (G1/2)			●	●
3RR	Option T type terminal with lamp/ full-wave rectifier (G1/2)			●	●
For DC					
2C	Option Grommet lead wire	●	●	●	●
2CS	Option Grommet lead wire with surge suppressor	●	●	●	●
3T	Option With T type terminal box (G1/2)			●	●
3RS	Option T type terminal with lamp/ surge suppressor (G1/2)			●	●
Ⓖ Manual override					
Blank	Std. None	●	●	●	●
N	Option Manual non-locking	●	●	●	●
Ⓗ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					
Ⓘ No. of solenoid valves					
Blank	No masking plate	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●
Ⓙ Masking plate quantity					
Blank	No masking plate	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●

Select from the combinations indicated with ● in the table above.

[Example of model No.]

GFGG21-Z-5-12CN-3

Model : GFGG

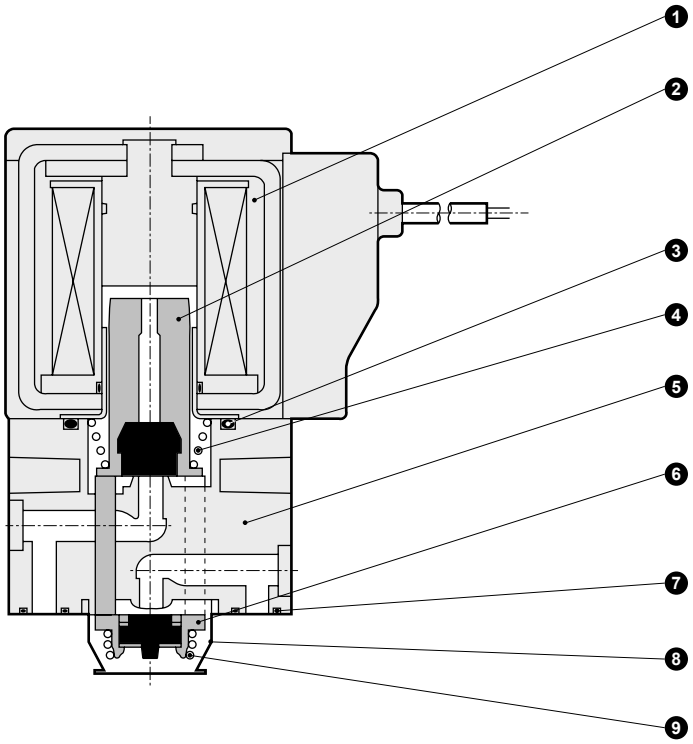
Ⓐ Series size : 22 mm
Ⓑ Circuit configuration : Common supply/common exhaust
Ⓒ Orifice size : ø1
Ⓓ Manifold station No. : 5 stations
Ⓔ Body/sealant combination : Body - PPS, sealant - NBR
Ⓕ Coil option : Grommet lead wire
Ⓖ Manual override : Manual non-locking
Ⓗ Voltage : 100 VAC 50/60 Hz
Ⓘ Ⓙ : No masking plate

⚠ Precautions for model No. selection

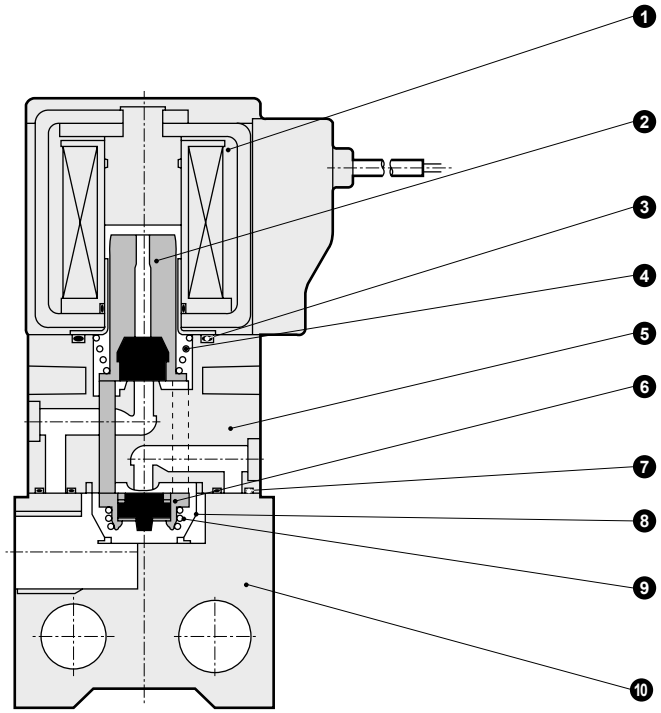
*1 : Select a desired manifold station No. from 2 to 10.
*2 : For the type with masking plate, designate Item Ⓓ as X, then designate the quantities Ⓘ of solenoid valves and Ⓙ masking plates.
*3 : Full-wave rectifier and surge suppressor are built into the coil for Item Ⓕ 2CR, 2CS and in the terminal box for 3TR, 3RR, 3RS.
*4 : Surge suppressor is included as standard in the models with full-wave rectifier.
*5 : Other voltages may not be available. Contact CKD for details.
*6 : Solenoid valves are arranged from the right side with the sub-plate (individual) port A facing front.
*7 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFGG actuator



● GFGG manifold

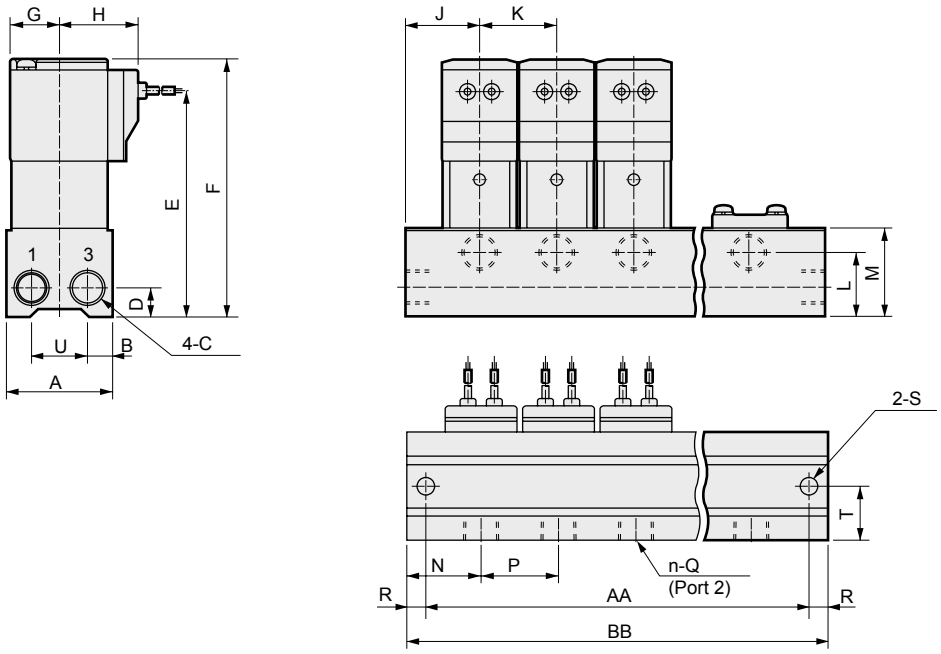


No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	6	Valving element guide assembly	PPS, SUS, NBR	Polyphenylene sulfide, stainless steel, nitrile rubber
2	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber	7	Gasket	NBR	Nitrile rubber
3	O-ring	NBR	Nitrile rubber	8	Holder	SUS	Stainless steel
4	Spring	SUS	Stainless steel	9	Spring	SUS	Stainless steel
5	Body	PPS	Polyphenylene sulfide	10	Sub-plate	A6063	Aluminum

* 4 body mounting screws and 2 O-rings are attached to the actuator only.

Dimensions: Manifold

● Grommet lead wire with full-wave rectifier
GFGG*1-*-*-12CR

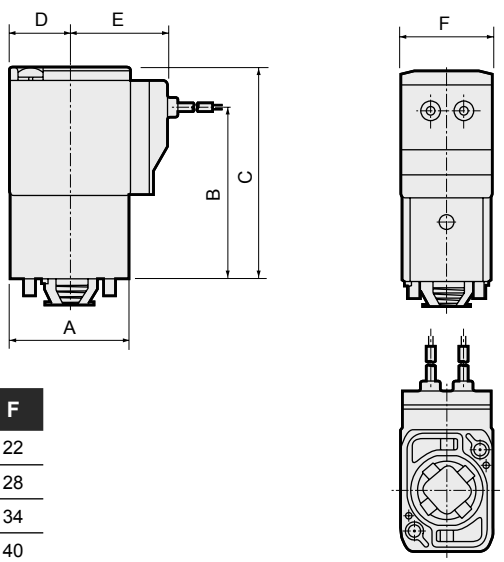


Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFGG2	AA	58	84	110	136	162	188	214	240	266
	BB	68	94	120	146	172	198	224	250	276
GFGG3	AA	74	106	138	170	202	234	266	298	330
	BB	88	120	152	184	216	248	280	312	344
GFGG4	AA	86	124	162	200	238	276	314	352	390
	BB	100	138	176	214	252	290	328	366	404
GFGG5	AA	100	146	192	238	284	330	376	422	468
	BB	114	160	206	252	298	344	390	436	482

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U
GFGG2	30	6.5	Rc1/8	8	70	81	15.5	26.5	21	26	18	27	20	26	Rc1/8	5	ø4.5	15	17
GFGG3	40	9	Rc1/4	11	84	96	18.5	29.5	28	32	24	33	27.5	32	Rc1/4	7	ø6.5	20	22
GFGG4	43	9	Rc1/4	11	93.5	107.5	22.5	34	31	38	24	33	34.5	38	Rc1/4	7	ø6.5	21.5	25
GFGG5	50	10	Rc1/4	11	100	116	26	37.5	34	46	24	33	38.5	46	Rc1/4	7	ø6.5	25	30

Dimensions: Actuator

● Grommet lead wire with full-wave rectifier
GFGG*1-*-0-12CR



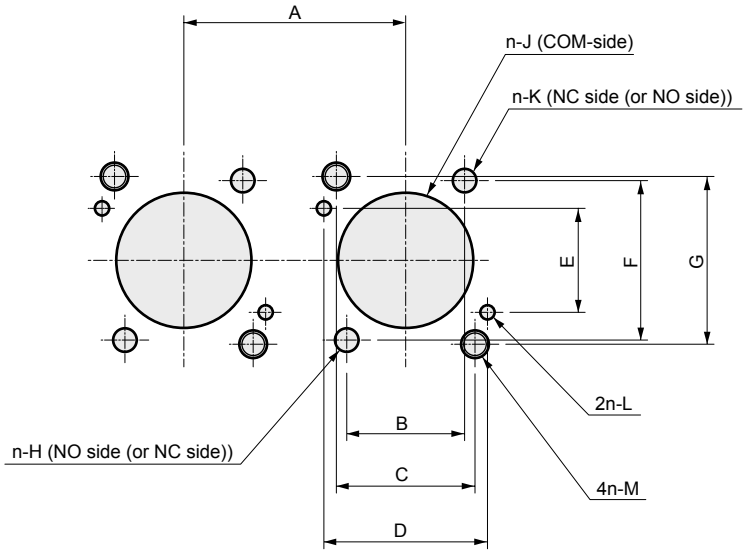
Model No.	A	B	C	D	E	F
GFGG2	30	43	54	15.5	26.5	22
GFGG3	36	51	63	18.5	29.5	28
GFGG4	43	60.5	74.5	22.5	34	34
GFGG5	50	67	83	26	37.5	40

Lead wire length 300 mm

Actuator installation dimensions

● GFGG2*/3*

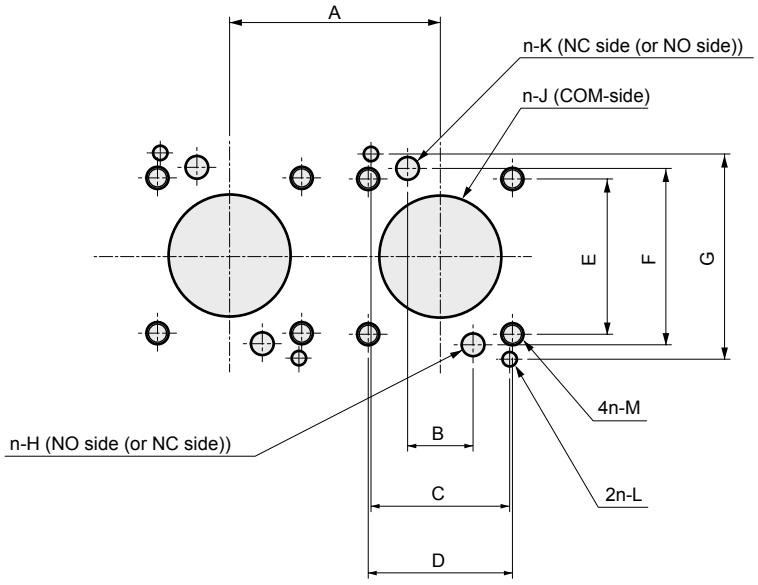
Machining drawing when using 2 actuators.



Model No.	A	B	C	D	E	F	G	H	J	K	L	M
GFGG2	26 or more	12±0.15	15.5±0.1	18.4±0.1	12.4±0.1	20±0.15	19.4±0.1	ø2.5 $^{+0.1}_{0}$	ø14.5 ±0.1 depth 6.7 $^{+0.2}_{0}$	ø2.5 $^{+0.1}_{0}$	ø1.6 $^{+0.1}_{0}$ depth 2.5±0.5	M3 effective depth 6
GFGG3	32 or more	17±0.15	20±0.1	23.6±0.1	15±0.1	24±0.15	24.2±0.1	ø3.4 $^{+0.1}_{0}$	ø19.5 ±0.1 depth 7.6 $^{+0.2}_{0}$	ø3.4 $^{+0.1}_{0}$	ø2.1 $^{+0.1}_{0}$ depth 2.5±0.5	M4 effective depth 6

● GFGG4*/5*

Machining drawing when using 2 actuators.

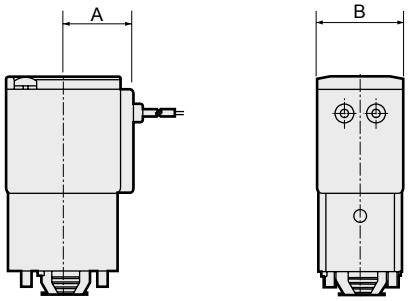


Model No.	A	B	C	D	E	F	G	H	J	K	L	M
GFGG4	38 or more	11.8±0.15	25±0.1	26±0.1	28±0.1	31.8±0.15	37±0.1	ø4.1 $^{+0.1}_{0}$	ø22 ±0.15 depth 11.2 $^{+0.2}_{0}$	ø4.1	ø2.6 $^{+0.1}_{0}$ depth 2.5±0.5	M4 effective depth 12
GFGG5	46 or more	11.8±0.15	30±0.1	30±0.1	33±0.1	31.8±0.15	43±0.1	ø4.1 $^{+0.1}_{0}$	ø22 ±0.15 depth 11.2 $^{+0.2}_{0}$	ø4.1	ø2.6 $^{+0.1}_{0}$ depth 2.5±0.5	M5 effective depth 8

Optional dimensions CAD

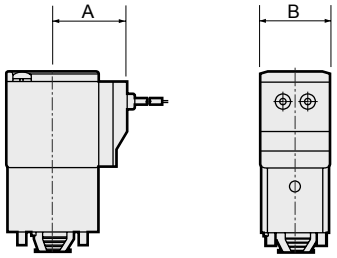
(Refer to the dimensions of grommet lead wire actuator with full-wave rectifier on page 91 for common dimensions.)

● Grommet lead wire
GFGG*1-*-*-1 2C



Model No.	A	B
GFGG2	19.5	22
GFGG3	22.5	28
GFGG4	26	34
GFGG5	29.5	40

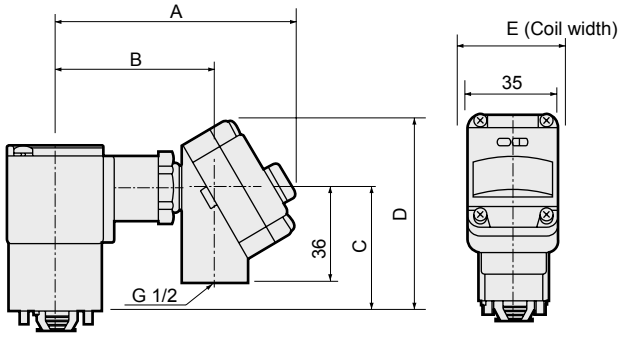
● Grommet lead wire with surge suppressor
GFGG*1-*-*-1 2CS



Model No.	A	B
GFGG2	26.5	22
GFGG3	29.5	28
GFGG4	34	34
GFGG5	37.5	40

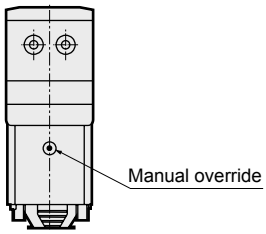
● T type terminal box (with lamp/surge suppressor) (G1/2)
GFGG*1-*-*-1 3T 3RS

● T type terminal box with full-wave rectifier (with lamp) (G1/2)
GFGG*1-*-*-1 3TR 3RR

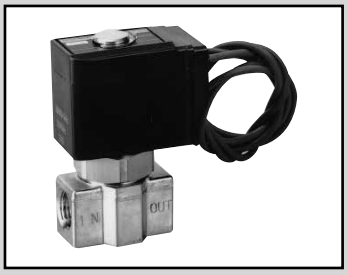


Model No.	A	B	C	D	E
GFGG4	96	64.5	56	82	34
GFGG5	99.5	68	64	90	40

● Manual override (non-locking)
GFGG*1-*-*-** N



Position of manual override
: Opposite side to COM port



Direct acting 2-port solenoid valve for medium vacuum, single unit
Special purpose

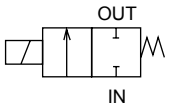
FVB Series

- NC (open when energized)
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)



Common specifications

Item	FVB
Working fluid	Air (medium vacuum)
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 orifice)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage $Pa \cdot m^3/sHe$	1.33×10^{-6} or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Flow characteristics C[$dm^3/(s \cdot bar)$]	Flow characteristics b	Working pressure Pa(abs)	Max. working pressure differential (*6)(MPa)	Rated voltage	Power consumption (W) AC	Power consumption (W) DC	Weight (kg)
NC (open when energized)										
FVB21- 6 - Z	Rc1/8	1	0.14	0.49	1.3×10^{-2} to 1×10^{6}	1	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	4.3	4	0.16
FVB21- 6 - 2	Rc1/8	2	0.55	0.56	1.3×10^{-2} to 0.3×10^{6}	0.3				
FVB31- 6/8 - 3	Rc1/8	3	1.2	0.57	1.3×10^{-2} to 0.4×10^{6}	0.4		6.5	6	0.29
FVB31- 6/8 - 5	Rc1/4	4	2.2	0.50	1.3×10^{-2} to 0.15×10^{6}	0.15				
FVB41- 8/10 - 5	Rc1/4	4	2.2	0.50	1.3×10^{-2} to 0.3×10^{6}	0.3		8.3	8 *3	0.50
FVB41- 8/10 - 6	Rc3/8	5	3.2	0.50	1.3×10^{-2} to 0.12×10^{6}	0.1				
FVB51- 8/10 - 5	Rc1/4 Rc3/8	4	2.2	0.50	1.3×10^{-2} to 0.5×10^{6}	0.5		11.8	11.5	0.69
FVB51- 8/10 - 6	Rc1/4 Rc3/8	5	3.2	0.50	1.3×10^{-2} to 0.3×10^{6}	0.3				
FVB51- 8/10 - 7	Rc1/4 Rc3/8	7	5.2	0.38	1.3×10^{-2} to 0.15×10^{6}	0.15				

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : 8.6 (W) for 12 VDC.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : When using in vacuum, vacuum the OUT port side.
*6 : The max. working pressure differential is the pressure difference between IN port (high-pressure side) and OUT port (low-pressure side).
*7 : The working pressure range vacuum does not guarantee the vacuum attainment time or that the vacuum will not change.
*8 : FKM is used for sealant material, so consider the generation of discharge gas during use.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
FVB	2 mA or less	1 mA or less	1 mA or less	2 mA or less

How to order

F V B 2 1 - 6 - 2 - B 2CR B - 1

- F V: Working fluid (Medium vacuum)
- B: No. of ports (2-port valve)
- 2: Ⓐ Series size
- 1: Ⓑ Actuation
- 6: Ⓒ Port size
- 2: Ⓓ Orifice size
- B: Ⓔ Body/sealant combination
- 2CR: Ⓕ Coil option *1 *2
- B: Ⓖ Other options
- 1: Ⓗ Rated voltage *3

Code	Description	Model No. FVB21	FVB31	FVB41	FVB51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Actuation					
1	NC (open when energized)	●	●	●	●
Ⓒ Port size					
6	Rc1/8	●	●		
8	Rc1/4		●	●	●
10	Rc3/8			●	●
Ⓓ Orifice size					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5			●	●
7	ø7				●
Ⓔ Body/sealant combination					
	Body / Seal				
B	Copper alloy / FKM	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Std. Grommet lead wire with full-wave rectifier	●	●	●	●
3TR	Option T type term box, full-wave rectifier (G1/2)		●	●	●
3RR	Option T type terminal box with lamp/ full-wave rectifier (G1/2)		●	●	●
For DC					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option Grommet lead wire with surge suppressor	●	●	●	●
3T	Option With T type terminal box (G1/2)		●	●	●
3RS	Option T type terminal box with lamp/ surge suppressor (G1/2)		●	●	●
Ⓖ Other options					
Blank	Std. None	●	●	●	●
B	Option Mounting plate	●	●	●	●
Ⓗ Rated voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FVB21-6-Z-B2CRB-1

Model : FVB

- Ⓐ Series size : 22 mm
- Ⓑ Actuation : NC (open when energized)
- Ⓒ Port size : Rc1/8
- Ⓓ Orifice size : ø1
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - FKM
- Ⓕ Coil option : Grommet lead wire with full-wave rectifier
- Ⓖ Other options : Mounting plate
- Ⓗ Rated voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

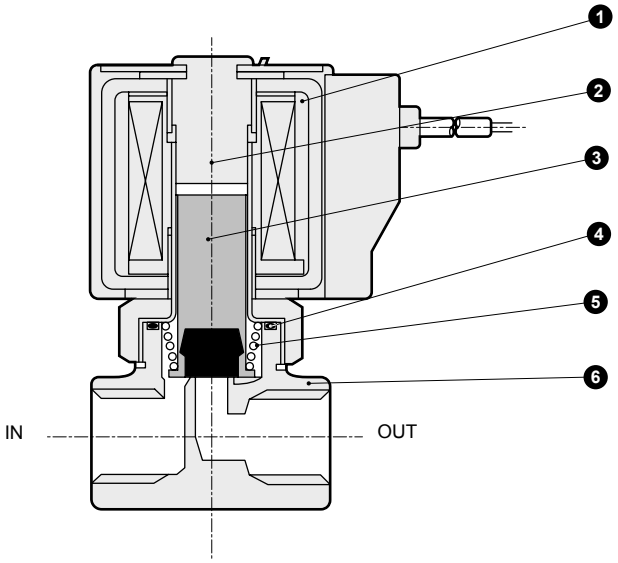
*1 : Full-wave rectifier and surge suppressor are built into the coil for Item Ⓕ 2CR, 2CS and in the terminal box for 3TR, 3RR, 3RS.

*2 : Surge suppressor is included as standard in the models with full-wave rectifier.

*3 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

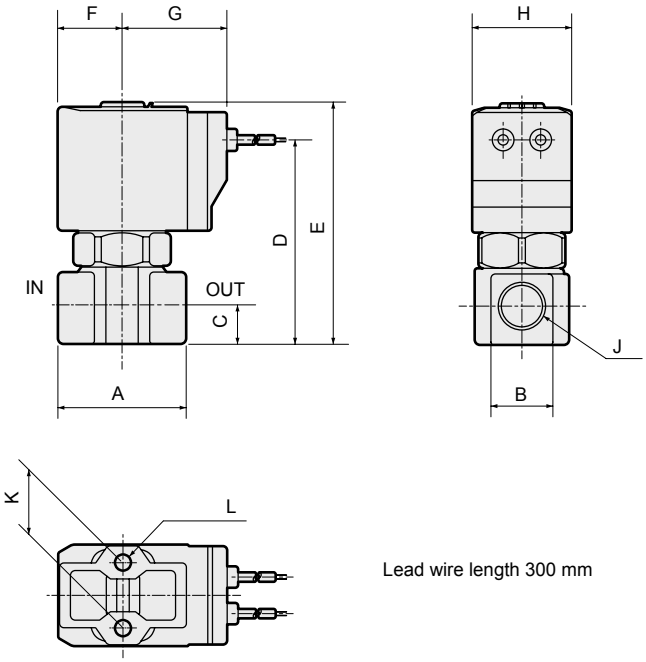
● FVB Series



No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	4	O-ring	FKM	Fluoro rubber
2	Core assembly	SUS	Stainless steel	5	Spring	SUS	Stainless steel
3	Plunger assembly	SUS, FKM	Stainless steel, fluoro rubber	6	Body	C3771	Copper alloy

Dimensions CAD

● Grommet lead wire with full-wave rectifier
FVB*1-*-*-*2CR



Lead wire length 300 mm

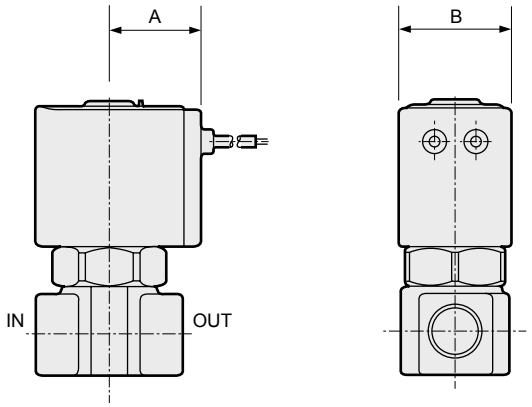
When using lead wire with DC voltage, use the grommet lead wire (2C) or grommet lead wire with surge suppressor (2CS).

Model No.	A	B	C	D	E	F	G	H	J	K	L
FVB21	32	14	8	45.5	56	15.5	26.5	22	Rc1/8	15	M4 depth 6
FVB31	36	18	11	57.5	68.5	18.5	29.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FVB41	40	21	12	67	81	22.5	34	34	Rc1/4, Rc3/8	18	M5 depth 8
FVB51	40	21	12	73.5	89	26	37.5	40	Rc1/4, Rc3/8	18	M5 depth 8

Optional dimensions

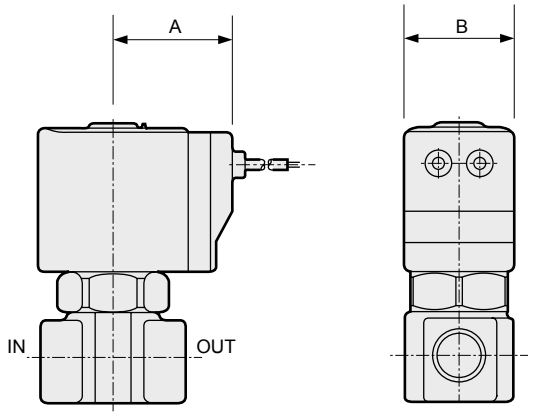
(Refer to the dimensions of grommet lead wire with full-wave rectifier on page 96 for common dimensions.)

● Grommet lead wire
FVB*1-*-*-* 2C



Model No.	A	B
FVB21	19.5	22
FVB31	22.5	28
FVB41	26	34
FVB51	29.5	40

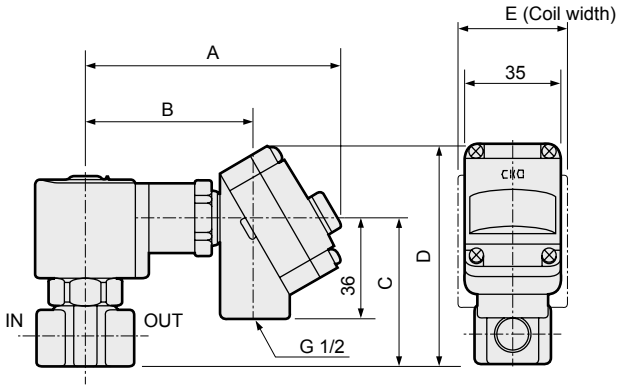
● Grommet lead wire with surge suppressor
FVB*1-*-*-* 2CS



Model No.	A	B
FVB21	26.5	22
FVB31	29.5	28
FVB41	34	34
FVB51	37.5	40

● T type terminal box (with lamp/surge suppressor) (G1/2)
FVB*1-*-*-* 3T
3RS

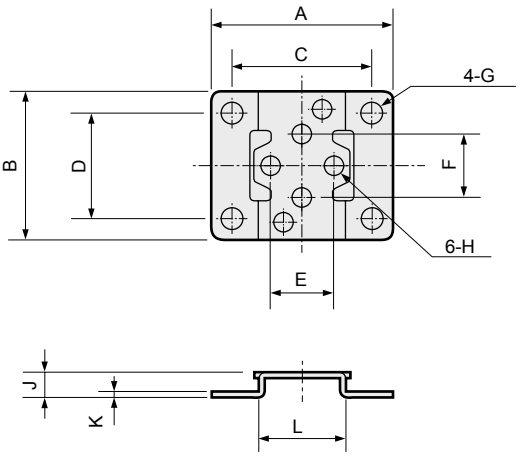
● T type terminal box with full-wave rectifier (with lamp) (G1/2)
FVB*1-*-*-* 3TR
3RR



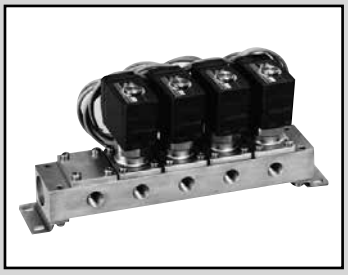
Model No.	A	B	C	D	E
FVB31	92	60.5	53	79	28
FVB41	96	64.5	62.5	88.5	34
FVB51	99.5	68	71	97	40

● Mounting plate
FVB*1-*-*-***B

Material : Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FVB21	40	34	30	25	15	15	ø5	ø4.5	6	1.2	20
FVB31	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FVB41	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30
FVB51											



Direct acting 2-port solenoid valve for medium vacuum, manifold
Special purpose

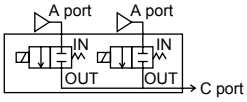
GFVB Series

- NC (open when energized)
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)/ individual supply



Common specifications

Item	GFVB
Working fluid	Air (medium vacuum)
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 orifice)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage Pa·m³/sHe	1.33 x 10^{-6} or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size: Individual port (port A)	Port size: Common port (port C)	Orifice size (mm)	Flow characteristics: C[dm³/(s·bar)]	Flow characteristics: b	Working pressure Pa(abs)	Max. working pressure differential (*6)(MPa)	Rated voltage	Power consumption (W): AC	Power consumption (W): DC
NC (open when energized)											
GFVB25	- Z	Rc1/8	Rc1/4	1	0.13	0.52	1.3×10^{-2} to 1×10^{6}	1	AC100 50/60 Hz AC200 50/60 Hz 24 VDC 12 VDC	4.3	4
	- 2			2	0.58	0.39	1.3×10^{-2} to 0.3×10^{6}	0.3			
GFVB35	- 3	Rc1/4	Rc3/8	3	1.1	0.35	1.3×10^{-2} to 0.4×10^{6}	0.4		6.5	6
	- 5			4	1.7	0.30	1.3×10^{-2} to 0.15×10^{6}	0.15			
GFVB45	- 5	Rc1/4	Rc3/8	4	2.1	0.36	1.3×10^{-2} to 0.3×10^{6}	0.3		8.3	8 *3
	- 6			5	2.7	0.34	1.3×10^{-2} to 0.12×10^{6}	0.1			
GFVB55	- 5	Rc1/4	Rc3/8	4	2.1	0.36	1.3×10^{-2} to 0.5×10^{6}	0.5		11.8	11.5
	- 6			5	2.7	0.34	1.3×10^{-2} to 0.3×10^{6}	0.3			
	- 7			7	3.8	0.19	1.3×10^{-2} to 0.15×10^{6}	0.15			

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : 8.6 (W) for 12 VDC.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : When using in vacuum, vacuum the OUT port side.
*6 : The max. working pressure differential is the pressure difference between IN port (high-pressure side) and OUT port (low-pressure side).
*7 : The working pressure vacuum does not guarantee the vacuum attainment time or that the vacuum will not change.
*8 : FKM is used for sealant material, so consider the generation of discharge gas during use.

Leakage current	Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
	GFVB	2 mA or less	1 mA or less	1 mA or less	2 mA or less

Weight

Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (g) (sub-plate, connection part and mounting plate): 2 stns.	3 stns.	4 stns.	5 stns.	6 stns.	7 stns.	8 stns.	9 stns.	10 stns.	Formula for product weight
GFVB25	0.14	0.03	0.40	0.51	0.77	0.77	1.03	1.16	1.30	1.60	1.55	(product weight (kg)) = 0.14 x (actuator quantity) + 0.03 x (masking quantity) + sub-plate weight
GFVB35	0.27	0.05	0.60	0.80	1.20	1.22	1.60	1.81	2.02	2.40	2.44	(product weight (kg)) = 0.27 x (actuator quantity) + 0.05 x (masking quantity) + sub-plate weight
GFVB45	0.45	0.06	0.73	1.00	1.47	1.50	2.00	2.23	2.50	3.00	3.00	(product weight (kg)) = 0.45 x (actuator quantity) + 0.06 x (masking quantity) + sub-plate weight
GFVB55	0.64	0.09	0.83	1.11	1.67	1.70	2.24	2.52	2.81	3.36	3.40	(product weight (kg)) = 0.64 x (actuator quantity) + 0.09 x (masking quantity) + sub-plate weight

How to order

● Manifold

GFVB35-2-7-B3RR-1

● Manifold with masking plate

GFVB25-Z-X-B2CR-2-52

No. of ports (2-port valve)

Working fluid (medium vacuum)

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4

Ⓖ Rated voltage *5

Ⓗ No. of solenoid valves *6

Ⓘ Masking plate quantity

Code	Description	Model No. GFVB25	GFVB35	GFVB45	GFVB55
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Circuit configuration					
5	NC (open when energized)/individual supply	●	●	●	●
Ⓒ Orifice size					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5			●	●
7	ø7				●
Ⓓ Manifold station No.					
2 to 10	2 stations to 10 stations	●	●	●	●
0	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
Ⓔ Body/sealant combination					
	Body / **Seal**				
B	Copper alloy / FKM	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Standard: Grommet lead wire With full-wave rectifier	●	●	●	●
3TR	Option: T type terminal box with full-wave rectifier		●	●	●
3RR	Option: T type terminal box with lamp full-wave rectifier (G1/2)		●	●	●
For DC					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option: Grommet lead wire with surge suppressor	●	●	●	●
3T	Option: With T type terminal box (G1/2)		●	●	●
3RS	Option: T type terminal box with lamp/ surge suppressor (G1/2)		●	●	●
Ⓖ Rated voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					
Ⓗ No. of solenoid valves					
Blank	No masking plate	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●
Ⓘ Masking plate quantity					
Blank	No masking plate	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●

Select from the combinations indicated with ● in the table above.

[Example of model No.]

GFVB25-Z-X-B2CR-2-52

Model: GFVB

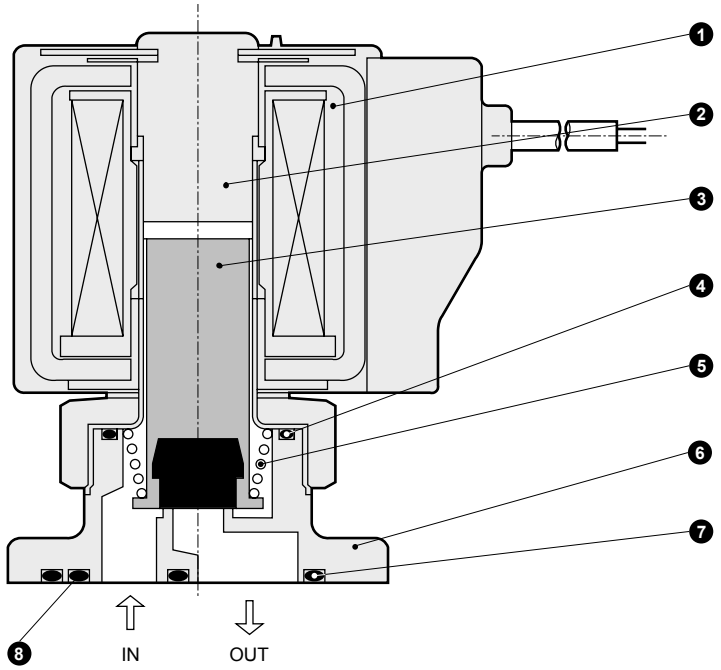
Ⓐ Series size : 22 mm
Ⓑ Circuit configuration : NC (open when energized)/individual supply
Ⓒ Orifice size : ø1
Ⓓ Manifold station No. : 7 stations (with masking plate)
Ⓔ Body/sealant combination : Body - copper alloy/sealant - FKM
Ⓕ Coil option : Grommet lead wire with full-wave rectifier
Ⓖ Rated voltage : 200 VAC 50/60 Hz
Ⓗ No. of solenoid valves : 5
Ⓘ Masking plate quantity : 2

⚠ Precautions for model No. selection

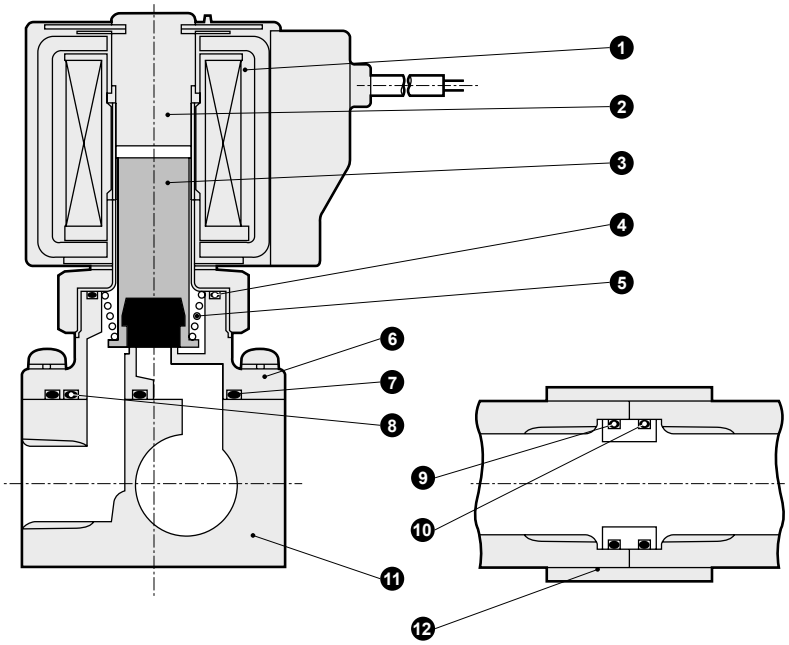
*1 : Select a desired manifold station No. from 2 to 10.
*2 : For the type with masking plate, designate Item Ⓓ as X, then designate the quantities of Ⓗ solenoid valves and Ⓘ masking plates.
*3 : Full-wave rectifier and surge suppressor are built into the coil for Item Ⓕ 2CR/2CS and in the terminal box for 3TR/3RR/3RS.
*4 : Surge suppressor is included as standard in the models with full-wave rectifier.
*5 : Other voltages may not be available. Contact CKD for details.
*6 : Solenoid valves are arranged from the right side with the sub-plate (individual) port A facing front.
*7 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFVB actuator



● GFVB manifold

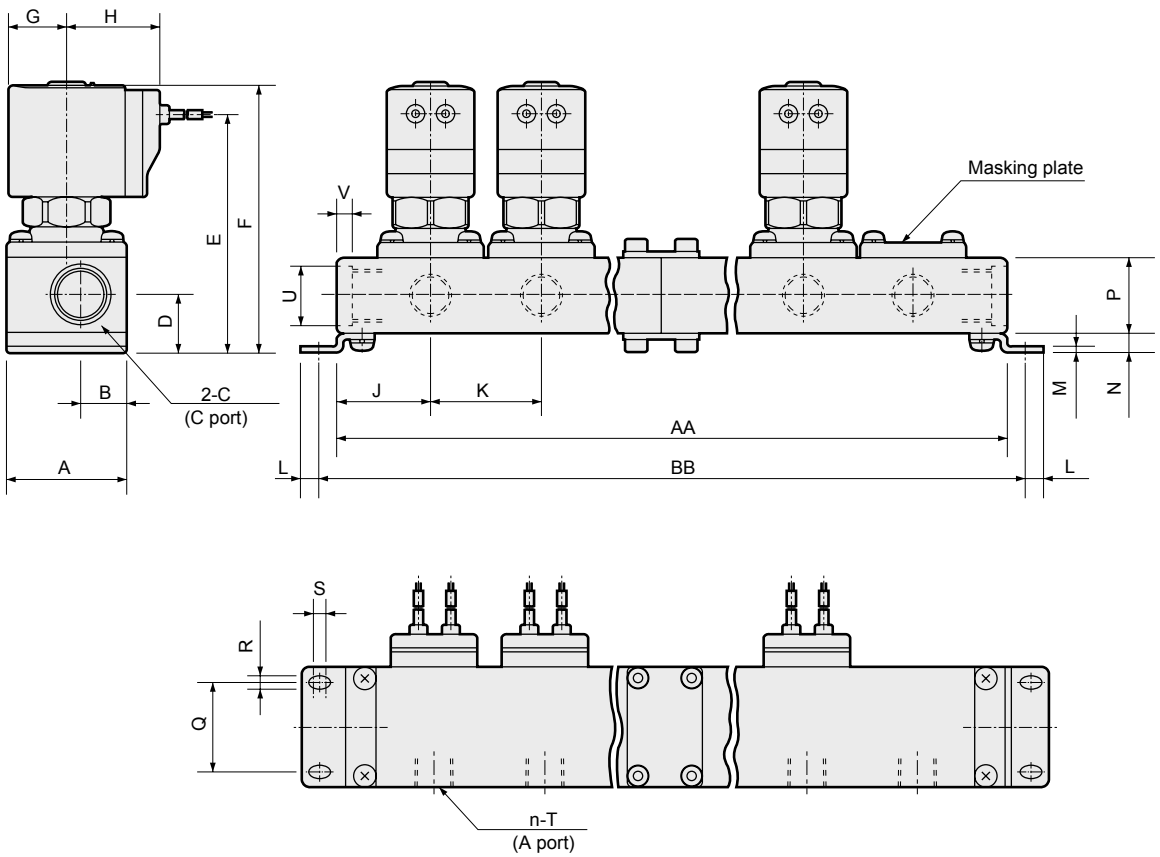


No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	7	O-ring	FKM	Fluoro rubber
2	Core assembly	SUS	Stainless steel	8	O-ring	FKM	Fluoro rubber
3	Plunger assembly	SUS, FKM	Stainless steel, fluoro rubber	9	Connector	C3604	Copper alloy
4	O-ring	FKM	Fluoro rubber	10	O-ring	FKM	Fluoro rubber
5	Spring	SUS	Stainless steel	11	Sub-plate	C3604	Copper alloy
6	Body	C3771	Copper alloy	12	Connecting plate	SPC	Steel

*4 body mounting screws and 2 O-rings are attached to the actuator only.

Dimensions: Manifold

● Grommet lead wire with full-wave rectifier
GFVB*5-*-*-B2CR



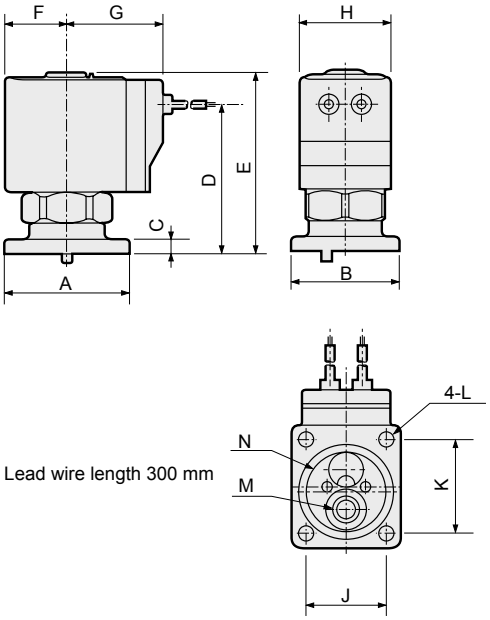
Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFVB2	AA	81	109	162	165	218	246	274	327	330
	BB	93	121	174	177	230	258	286	339	342
GFVB3	AA	97	133	194	205	266	302	338	399	410
	BB	109	145	206	217	278	314	350	411	422
GFVB4	AA	106	145	212	223	290	329	368	435	446
	BB	119	158	225	236	303	342	381	448	459
GFVB5	AA	118	163	236	253	326	371	416	489	506
	BB	131	176	249	266	339	384	429	502	519
Manifold configuration		2 stns. x 1	3 stns. x 1	2 stns. x 2	5 stns. x 1	3 stns. x 2	5 stns. + 2 stns.	5 stns. + 3 stns.	3 stns. x 3	5 stns. x 2

Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
GFVB2	32	13.5	Rc1/4	17.5	66.5	77	15.5	26.5	26	28	6	1.6	6.5	21	22	4.5	2.5	Rc1/8	ø17.3	4
GFVB3	38	14.5	Rc3/8	18.5	75.5	86.5	18.5	29.5	30	36	6	2	6.5	24	28	4.5	2.5	Rc1/4	ø19	4.6
GFVB4	42	16.5	Rc3/8	19.5	84	98	22.5	34	33	39	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	ø19	4.6
GFVB5	42	16.5	Rc3/8	19.5	90	105	26	37.5	36	45	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	ø19	4.6

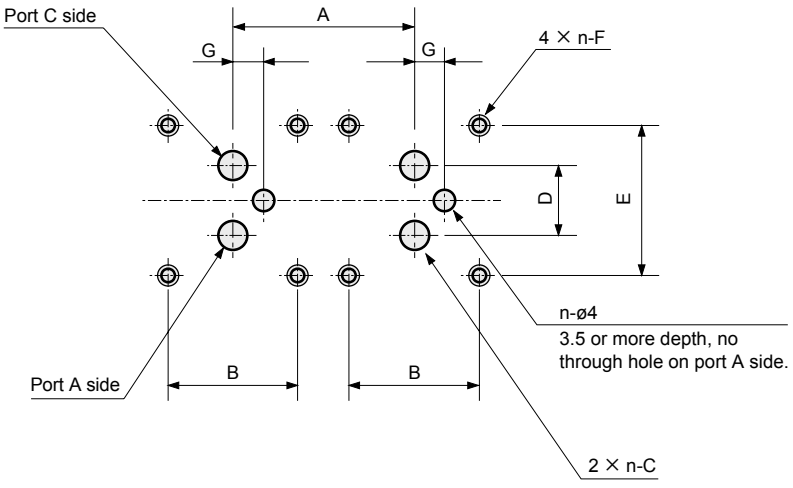
Dimensions: Actuator

● Grommet lead wire with full-wave rectifier
GFVB*5-*-0-B2CR



Model No.	A	B	C	D	E	F	G	H	J	K	L	Applicable O-ring	
												M	N
GFVB2	32	27	4	39	49.5	15.5	26.5	22	19	24	ø3.5	AS568-009	AS568-018
GFVB3	38	34	4.5	45	56	18.5	29.5	28	25	29	ø4.5	AS568-011	AS568-022
GFVB4	42	38	4.5	52.5	66.5	22.5	34	34	28	32	ø4.5	AS568-012	AS568-025
GFVB5	42	44	5.5	58.5	73.5	26	37.5	40	34	32	ø4.5	AS568-012	AS568-025

Actuator installation dimensions



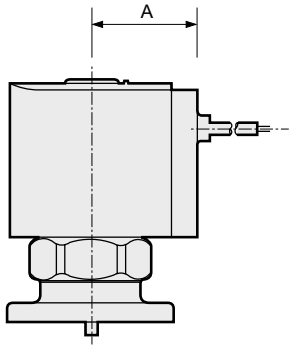
Machining drawing when using 2 actuators (n: number of stations)

Model No.	A	B	C	D	E	F	G
GFVB2	28 or more	19±0.1	ø3.5	10.6±0.1	24±0.1	M3 effective thread depth 6 or more	6±0.2
GFVB3	35 or more	25±0.1	ø5.5	13.8±0.1	29±0.1	M4 effective thread depth 6 or more	6±0.2
GFVB4	39 or more	28±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2
GFVB5	45 or more	34±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2

Optional dimensions

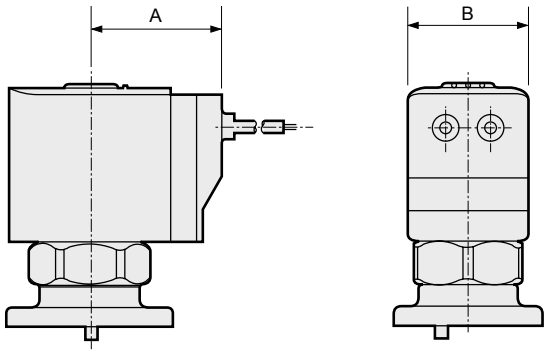
(Refer to the dimensions of grommet lead wire actuator with full-wave rectifier on page 102 for common dimensions.)

● Grommet lead wire
GFVB*5-*-*-B 2C



Model No.	A	B
GFVB2	19.5	22
GFVB3	22.5	28
GFVB4	26	34
GFVB5	29.5	40

● Grommet lead wire with surge suppressor
GFVB*5-*-*-B 2CS

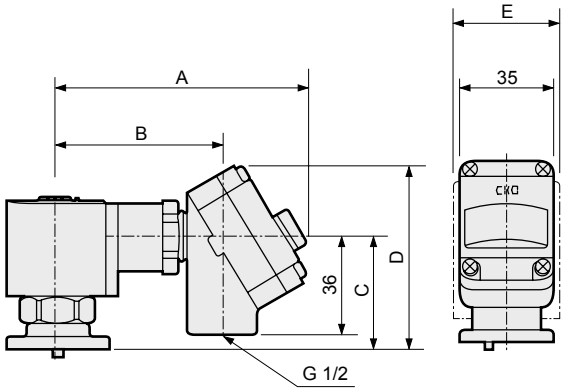


Model No.	A	B
GFVB2	26.5	22
GFVB3	29.5	28
GFVB4	34	34
GFVB5	37.5	40

● T type terminal box (with lamp/surge suppressor) (G1/2)
GFVB*5-*-*-B 3T
3RS

● T type terminal box with full-wave rectifier (with lamp) (G1/2)
GFVB*5-*-*-B 3TR
3RR

(Coil width)



Model No.	A	B	C	D	E
GFVB3	92	60.5	40.5	66.5	28
GFVB4	96	64.5	48	74	34
GFVB5	99.5	68	55.5	81.5	40

Direct acting 2-port solenoid valve for water, single unit
Special purpose

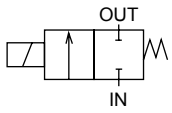
FWB Series

- NC (open when energized), NO (closed when energized)
- Port size: Rc1/8 to Rc1/2

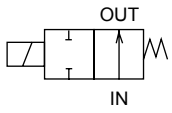
CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)



- NO (closed when energized)



Common specifications

Item	FWB
Working fluid	Water (excluding sewage, agricultural water and liquid manure)
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.5 (≈220 psi, 15 bar) (refer to the max. working pressure differential in the individual specifications)
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 and ø10 orifice)
Fluid temperature °C	AC: 1 (33.8°F) to 60 (140°F), DC: 1 (33.8°F) to 40 (104°F) (no freezing)
Ambient temperature °C	AC:-20 (-4°F) to 60 (140°F), DC:-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min	0 (water pressure)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Cv	Max. working pressure differential MPa AC	Max. working pressure differential MPa DC	Max. working pressure MPa	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consumption (W) AC 50/60 Hz	Power consumption (W) DC	Weight (kg)
NC (open when energized)														
FWB21 - 6 - Z	Rc1/8	1	0.036	1.5	0.9	1.5 (≈220 psi, 15 bar)	100 VAC 50/60 Hz; 200 VAC 50/60 Hz; 24 VDC 12 VDC	5	4	9	8	2.7/2	4	0.15
FWB21 - 6 - 2	Rc1/8	2	0.15	0.7	0.35									
FWB31 - 6/8 - 3	Rc1/8	3	0.31	0.8	0.5			9.5	7	23	20	4/3.2	6	0.3
FWB31 - 6/8 - 5	Rc1/4	4	0.5	0.5	0.2									
FWB31 - 6/8 - 6	Rc1/4	5	0.65	0.3	0.08									
FWB41 - 8/10 - 5	Rc1/4	4	0.54	0.8	0.5			16	13	40	35	7.5/6.3	8	0.49
FWB41 - 8/10 - 6	Rc3/8	5	0.8	0.5	0.25									
FWB41 - 8/10 - 7	Rc3/8	7	1.1	0.2	0.1	0.3 (≈44 psi)								
FWB41 - 10/15 - 8	Rc3/8 Rc1/2	10	1.88	0.1	0.05									
FWB51 - 8/10 - 5	Rc1/4	4	0.54	1.1	1.3	1.5 (≈220 psi)		23	19	60	50	11.5/10	11.5	0.68
FWB51 - 8/10 - 6	Rc3/8	5	0.8	0.7	0.6									
FWB51 - 8/10 - 7	Rc3/8	7	1.1	0.3	0.25	0.3 (≈44 psi)								
FWB51 - 10/15 - 8	Rc3/8 Rc1/2	10	1.88	0.12	0.1									0.8
NO (closed when energized)														
FWB32 - 6/8 - 3	Rc1/8	3	0.31	0.4	0.4	1.5 (≈220 psi, 15 bar)	100 VAC 50/60 Hz; 200 VAC 50/60 Hz; 24 VDC 12 VDC	11.5	8	25	22	4.6/3.2	6	0.31
FWB32 - 6/8 - 5	Rc1/4	4	0.5	0.2	0.2									
FWB32 - 6/8 - 6	Rc1/4	5	0.65	0.12	0.12									
FWB42 - 8/10 - 5	Rc1/4	4	0.54	0.4	0.4			18	14	45	40	7.5/6.5	8 *3	0.54
FWB42 - 8/10 - 6	Rc3/8	5	0.8	0.2	0.2									
FWB42 - 8/10 - 7	Rc3/8	7	1.1	0.12	0.12	0.3								
FWB52 - 8/10 - 5	Rc1/4	4	0.54	0.7	0.7	1.5 (≈220 psi)		25	20	60	50	11/10	11.5	0.71
FWB52 - 8/10 - 6	Rc3/8	5	0.8	0.45	0.45									
FWB52 - 8/10 - 7	Rc3/8	7	1.1	0.2	0.2	0.3								

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown on the right.
*3 : 8.5 (W) for 12 VDC.
*4 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
FWB2	3 mA or less	1.5 mA or less	1 mA or less	2 mA or less
FWB3/4/5	6 mA or less	3 mA or less		

How to order

F W B 2 1 - 6 - Z - O 2C B - 1

- F W: Working fluid (Water)
- B: No. of ports (2-port valve)
- 2: Ⓐ Series size
- 1: Ⓑ Actuation
- 6: Ⓒ Port size
- Z: Ⓓ Orifice size *1 *2
- O: Ⓔ Body/sealant combination *3
- 2C: Ⓕ Coil option *4 *5
- B: Ⓖ Other options
- 1: Ⓗ Rated voltage *6

Code	Description	FWB21	FWB31	FWB41	FWB51	FWB32	FWB42	FWB52
Ⓐ Series size								
2	22 mm	●						
3	28 mm		●			●		
4	34 mm			●			●	
5	40 mm				●			●
Ⓑ Actuation								
1	NC (open when energized)	●	●	●	●			
2	NO (closed when energized)					●	●	●
Ⓒ Port size								
6	Rc1/8	●	●			●		
8	Rc1/4		●	●	●	●	●	●
10	Rc3/8			●	●		●	●
15	Rc1/2			●	●			
Ⓓ Orifice size								
Z	ø1	●						
2	ø2	●						
3	ø3		●			●		
5	ø4		●	●	●	●	●	●
6	ø5		●	●	●	●	●	●
7	ø7			●	●		●	●
8	ø10			●	●			
Ⓔ Body/sealant combination								
	Body / **Seal**							
O	Copper alloy / NBR	●	●	●	●	●	●	●
D	Stainless steel / NBR	●	●	●	●	●	●	●
Ⓕ Coil option								
2C	Std. — Grommet lead wire	●	●	●	●	●	●	●
2CS	Option — Grommet lead wire with surge suppressor	●	●	●	●	●	●	●
2G	Option — With DIN terminal box (Pg11)	●	●	●	●	●	●	●
2HS	Option — DIN terminal box with lamp/ surge suppressor (Pg11)	●	●	●	●	●	●	●
2CG	Option — Conduit (CTC19)		●	●	●	●	●	●
2CH	Option — Conduit (G1/2)		●	●	●	●	●	●
3T	Option — With T type terminal box (G1/2)		●	●	●	●	●	●
3RS	Option — T type terminal box with lamp/ surge suppressor (G1/2)		●	●	●	●	●	●
Ⓖ Other options								
Blank	Std. — None	●	●	●	●	●	●	●
B	Option — Mounting plate	●	●	●	●	●	●	●
Ⓗ Rated voltage								
1	100 VAC 50/60 Hz	●	●	●	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●	●	●	●
3	24 VDC	●	●	●	●	●	●	●
4	12 VDC	●	●	●	●	●	●	●
Specify the desired voltage if it is not listed above.								

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FWB21-6-Z-02CB-1

Model: FWB

- Ⓐ Series size : 22 mm
- Ⓑ Actuation : NC (open when energized)
- Ⓒ Port size : Rc1/8
- Ⓓ Orifice size : ø1
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - NBR
- Ⓕ Coil option : Grommet lead wire
- Ⓖ Other options : Mounting plate
- Ⓗ Rated voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : For FWB41 and FWB51 with orifice of ø4 mm (Item Ⓓ 5), ø5 mm (Item Ⓓ 6) and ø7 mm (Item Ⓓ 7), available port size is Rc1/4 (Item Ⓒ 8) and Rc3/8 (Item Ⓒ 10) only.

*2 : For orifice of ø10 mm (Item Ⓓ 8), available port size is Rc3/8 (Item Ⓒ 10) and Rc1/2 (Item Ⓒ 15).

*3 : For orifice of ø10 mm (Item Ⓓ 8) with Item Ⓔ O (copper alloy body), the body is bronze casting.

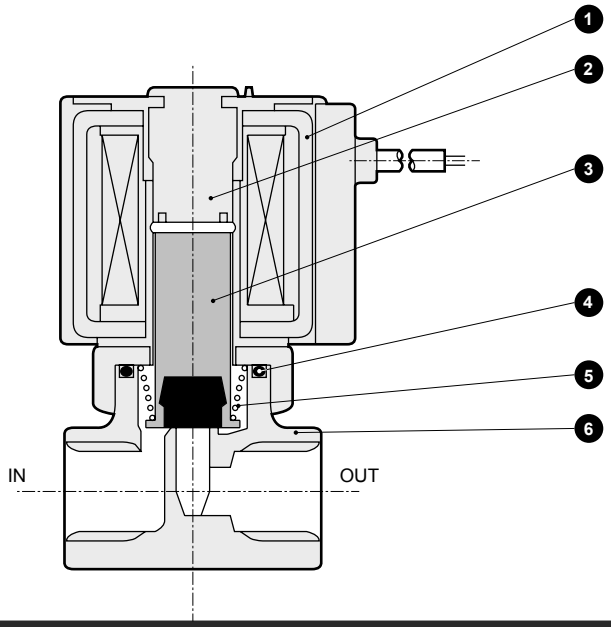
*4 : For FWB21 Item Ⓕ 2G/2HS, the DIN terminal box (Pg9) is used.

*5 : The surge suppressor is built into the coil for Item Ⓕ 2CS and in the terminal box for 2HS and 3RS.

*6 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

● FWB*1 Series

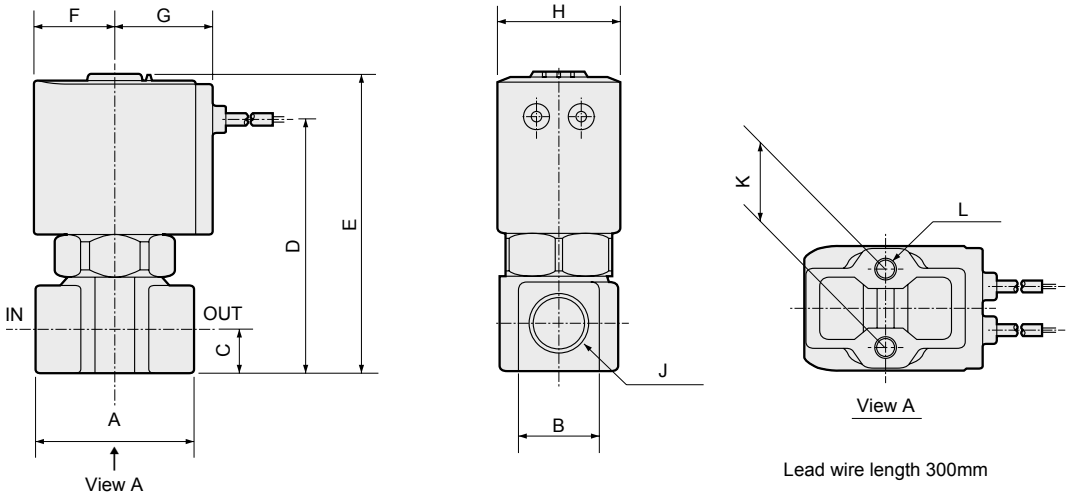


No.	Part name	Material	
1	Coil assembly	-	-
2	Core assembly	SUS, Cu (Ag for SUS body)	Stainless steel, copper (silver for stainless steel body)
3	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber
4	O-ring	NBR	Nitrile rubber
5	Spring	SUS	Stainless steel
6	Body	C3771 or CAC408 (SUS)	Copper alloy or bronze (stainless steel)

( ) shows options. Note: For FWB4 and FWB5 with orifice of ø10 and body seal code 0, the body is bronze casting.

Dimensions CAD

● Grommet lead wire
FWB*1-*-*-*2C



Lead wire length 300mm

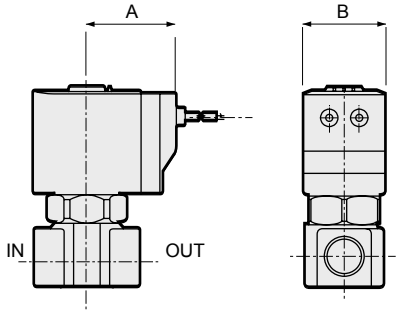
Model No.	A	B	C	D	E	F	G	H	J	K	L
FWB21	32	14	8	45.5	56	15.5	19.5	22	Rc1/8	15	M4 depth 6
FWB31	36	18	11	57.5	68.5	18.5	22.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FWB41	40	21	12	67	81	22.5	26	34	Rc1/4, Rc3/8	18	M5 depth 8
FWB41-10/15-8	50	29(26)	15	76	90				Rc3/8, Rc1/2		
FWB51	40	21	12	73.5	89	26	29.5	40	Rc1/4, Rc3/8	18	M5 depth 8
FWB51-10/15-8	50	29(26)	15	82.5	98				Rc3/8, Rc1/2		

Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

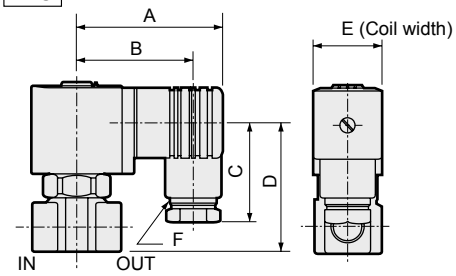
(Refer to the dimensions of grommet lead wire on page 106 for common dimensions.)

● Grommet lead wire with surge suppressor
FWB*1-*-*-* 2CS



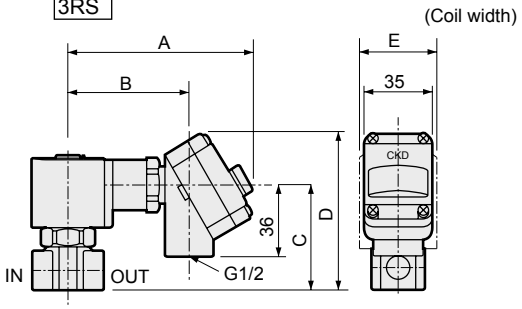
Model No.	A	B
FWB21	26.5	22
FWB31	29.5	28
FWB41	34	34
FWB51	37.5	40

● DIN terminal box (with lamp/surge suppressor)
FWB*1-*-*-* 2G
2HS



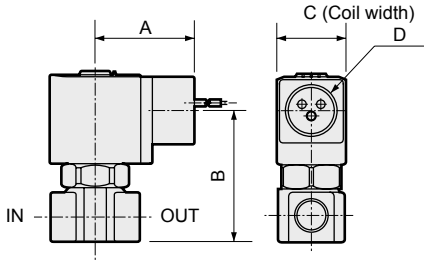
Model No.	A	B	C	D	E	F
FWB21	53	44	38	39	22	Pg9
FWB31	58.5	47	39	51	28	Pg11
FWB41	62	50.5	39	61	34	Pg11
FWB41-10/15-8				70		
FWB51	65.5	54	39	69.5	40	Pg11
FWB51-10/15-8				78.5		

● T type terminal box (with lamp/surge suppressor) (G1/2)
FWB*1-*-*-* 3T
3RS



Model No.	A	B	C	D	E
FWB31	92	60.5	53	79	28
FWB41	96	64.5	62.5	88.5	34
FWB41-10/15-8			71.5	97.5	
FWB51	99.5	68	71	97	40
FWB51-10/15-8			80	106	

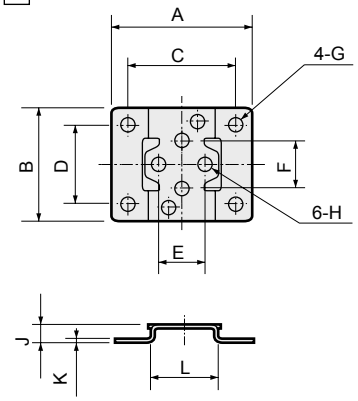
● Conduit (CTC19 / G1/2)
FWB*1-*-*-* 2CS
2CH



Model No.	A	B	C	D
FWB31	39	53	28	CTC19 G1/2
FWB41	43	62.5	34	CTC19 G1/2
FWB41-10/15-8		71.5		
FWB51	46.5	71	40	CTC19 G1/2
FWB51-10/15-8		80		

● Mounting plate
FWB*1-*-*-***B

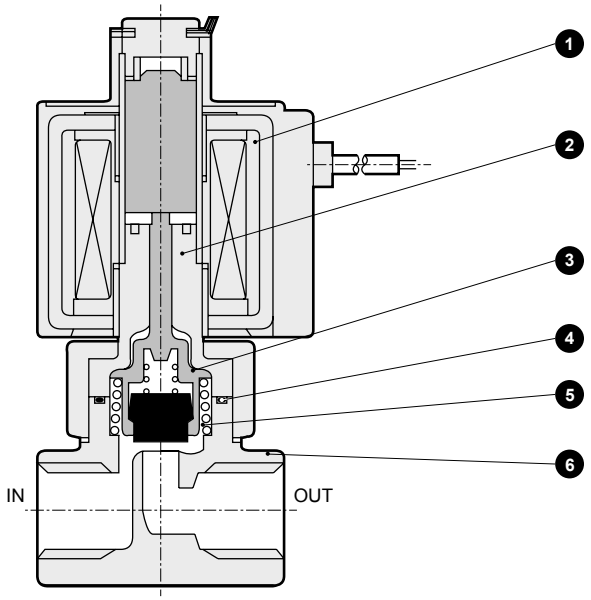
Material: Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FWB21	40	34	30	25	15	15	ø5	ø4.5	6	1.2	20
FWB31	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FWB41/51	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30

Internal structure and parts list

● FWB*2 Series

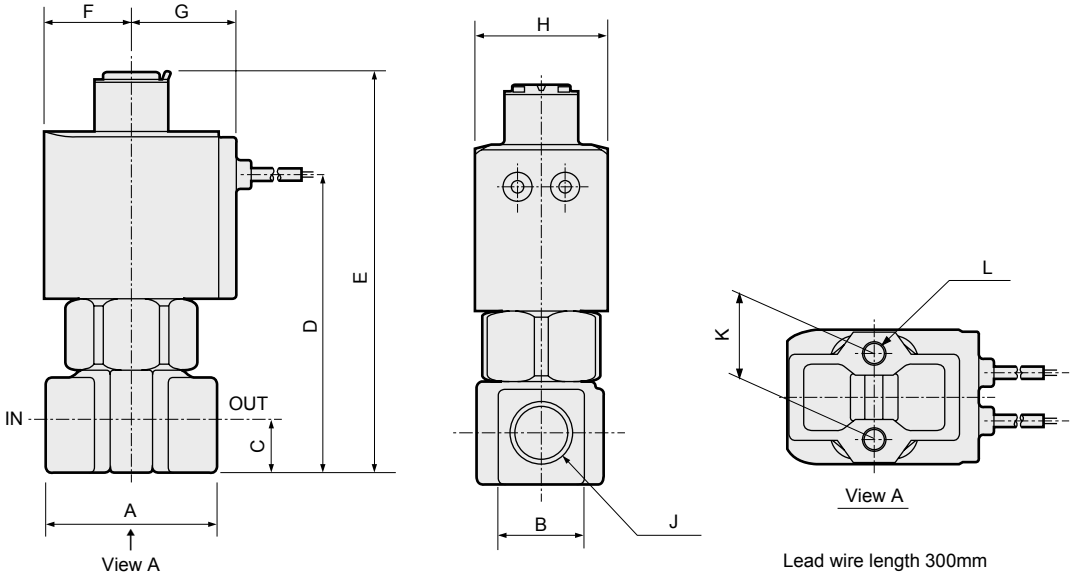


No.	Part name	Material	
1	Coil assembly	-	-
2	Core assembly	SUS, Cu (Ag for SUS body)	Stainless steel, copper (silver for stainless steel body)
3	Valving element guide assembly	PPS, SUS, NBR	Polyphenylene sulfide, stainless steel, nitrile rubber
4	O-ring	NBR	Nitrile rubber
5	Spring	SUS	Stainless steel
6	Body	C3771(SUS)	Copper alloy (stainless steel)

( ) shows options.

Dimensions CAD

● Grommet lead wire
FWB*2-*-*-*2C



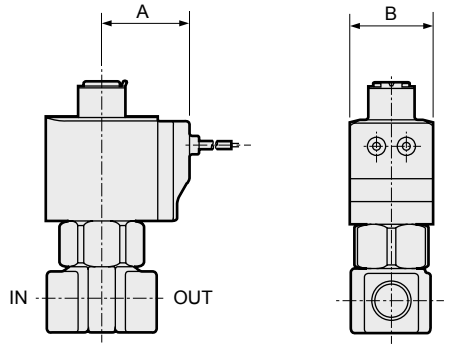
Lead wire length 300mm

Model No.	A	B	C	D	E	F	G	H	J	K	L
FWB32	36	18	11	62.5	84	18.5	22.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FWB42	40	21	12	71.5	96	22.5	26	34	Rc1/4, Rc3/8	18	M5 depth 8
FWB52	40	21	12	78	103.5	26	29.5	40	Rc1/4, Rc3/8	18	M5 depth 8

Optional dimensions

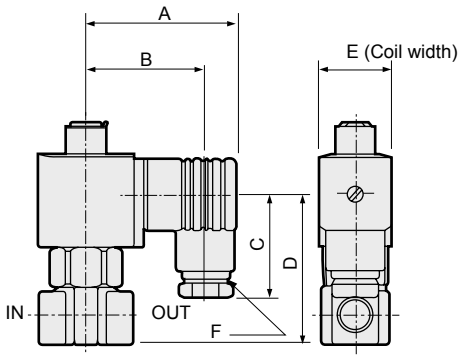
(Refer to the dimensions of grommet lead wire on page 108 for common dimensions.)

● Grommet lead wire with surge suppressor
FWB*2-*-*-* 2CS



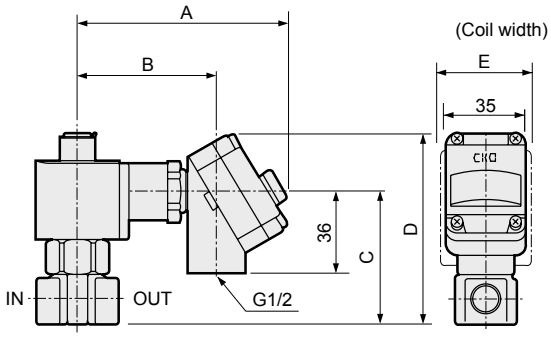
Model No.	A	B
FWB32	29.5	28
FWB42	34	34
FWB52	37.5	40

● DIN terminal box (with lamp/surge suppressor)
FWB*2-*-*-* 2G
2HS



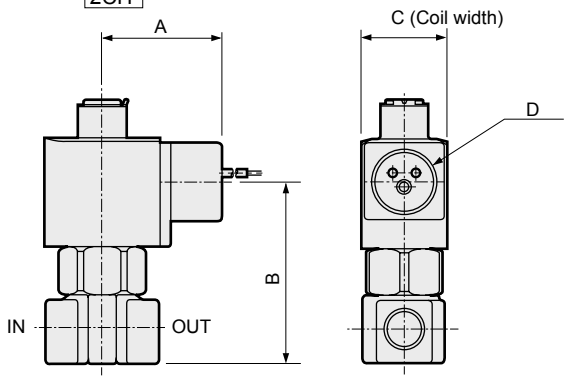
Model No.	A	B	C	D	E	F
FWB32	58.5	47	39	56.5	28	Pg11
FWB42	62	50.5	39	65	34	Pg11
FWB52	65.5	54	39	73.5	40	Pg11

● T type terminal box (with lamp/surge suppressor) (G1/2)
FWB*2-*-*-* 3T
3RS



Model No.	A	B	C	D	E
FWB32	92	60.5	58	84	28
FWB42	96	64.5	67	93	34
FWB52	99.5	68	75	101	40

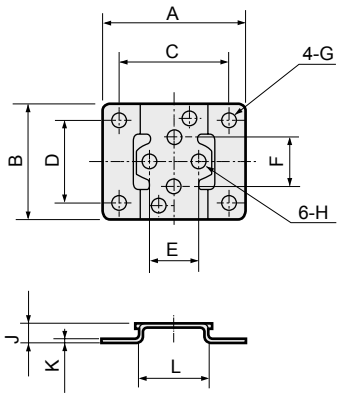
● Conduit (CTC19 / G1/2)
FWB*2-*-*-* 2CG
2CH



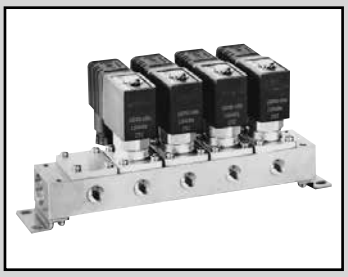
Model No.	A	B	C	D
FWB32	39	58	28	CTC19 G1/2
FWB42	43	67	34	CTC19 G1/2
FWB52	46.5	75	40	CTC19 G1/2

● Mounting plate
FWB*2-*-*-** B

Material: Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FWB32	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FWB42/52	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30



Direct acting 2-port solenoid valve for water, manifold
Special purpose

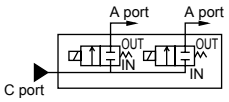
GFWB Series

- NC (open when energized)
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)/ common water supply (C port pressurization)



Common specifications

Item	GFWB
Working fluid	Water (excluding sewage, agricultural water and liquid manure)
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.5 (≈220 psi, 15 bar) (refer to the max. working pressure differential in the individual specifications.)
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 orifice)
Fluid temperature °C	AC: 1 (33.8°F) to 60 (140°F), DC: 1 (33.8°F) to 40 (104°F) (no freezing)
Ambient temperature °C	AC: -20 (-4°F) to 40 (104°F)/DC: -20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min	0 (water pressure)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size A port (Individual port)	Port size C port (Common port)	Orifice size (mm)	Cv	Max. working pressure differential MPa AC	Max. working pressure differential MPa DC	Max. working pressure MPa	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consumption (W) AC 50/60 Hz	Power consumption (W) DC
NC (open when energized)															
GFWB21	- Z	Rc1/8	Rc1/4	1	0036	1.5	0.9	1.5 (≈220 psi, 15 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	5	4	9	9	2.7/2	4
	- 2			2	0.12	0.7	0.35								
GFWB31	- 3	Rc1/4	Rc3/8	3	0.23	0.8	0.5			9.5	7	23	20	4/3.2	6
	- 5			4	0.36	0.5	0.2								
	- 6			5	0.45	0.3	0.08								
GFWB41	- 5	Rc1/4	Rc3/8	4	0.42	0.8	0.5			16	13	40	35	7.5/6.3	8
	- 6			5	0.55	0.5	0.25								
	- 7			7	0.73	0.2	0.1	0.3							
GFWB51	- 5	Rc1/4	Rc3/8	4	0.42	1.1	1.3	1.5 (≈220 psi)		23	19	60	50	11.5/10	11.5 *3
	- 6			5	0.55	0.7	0.6								
	- 7			7	0.73	0.3	0.25	0.3							

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : 8.6 (W) for 12 VDC.
*4 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
GFWB2	3 mA or less	1.5 mA or less	1 mA or less	2 mA or less
GFWB3/4/5	6 mA or less	3 mA or less		

Weight

Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (g) (sub-plate, connection part and mounting plate) 2 stns.	3 stns.	4 stns.	5 stns.	6 stns.	7 stns.	8 stns.	9 stns.	10 stns.	Formula for product weight
GFWB21	0.14	0.03	0.40	0.51	0.77	0.77	1.03	1.16	1.30	1.60	1.55	(Product weight (kg)) = 0.14 x (Actuator quantity) + 0.03 x (Masking quantity) + Sub-plate weight
GFWB31	0.27	0.05	0.60	0.80	1.20	1.22	1.60	1.81	2.02	2.40	2.44	(Product weight (kg)) = 0.27 x (Actuator quantity) + 0.05 x (Masking quantity) + Sub-plate weight
GFWB41	0.45	0.06	0.73	1.00	1.47	1.50	2.00	2.23	2.50	3.00	3.00	(Product weight (kg)) = 0.45 x (Actuator quantity) + 0.06 x (Masking quantity) + Sub-plate weight
GFWB51	0.64	0.09	0.83	1.11	1.67	1.70	2.24	2.52	2.81	3.36	3.40	(Product weight (kg)) = 0.64 x (Actuator quantity) + 0.09 x (Masking quantity) + Sub-plate weight

How to order

● Manifold

G F W B 2 1 - Z - 3 - 0 2C - 1

● Manifold with masking plate

G F W B 3 1 - 5 - X - D 2G - 2 - 5 2

Working fluid (Water)

No. of ports (2-port valve)

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4

Ⓖ Voltage *5

Ⓗ No. of solenoid valves *6

Ⓘ Masking plate quantity

Code	Description	Model No. GFWB21	GFWB31	GFWB41	GFWB51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Circuit configuration					
1	NC (open when energized)/common supply	●	●	●	●
Ⓒ Orifice size					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5		●	●	●
7	ø7			●	●
Ⓓ Manifold station No.					
2 to 10	2 stations to 10 stations	●	●	●	●
O	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
Ⓔ Body/sealant combination					
	Body / **Seal**				
O	Copper alloy / NBR	●	●	●	●
D	Stainless steel / NBR	●	●	●	●
Ⓕ Coil option					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option: Grommet lead wire with surge suppressor	●	●	●	●
2G	Option: With DIN terminal box (Pg11)	●	●	●	●
2HS	Option: DIN terminal box with lamp/ surge suppressor (Pg11)	●	●	●	●
2CG	Option: Conduit (CTC19)		●	●	●
2CH	Option: Conduit (G1/2)		●	●	●
3T	Option: With T type terminal box (G1/2)		●	●	●
3RS	Option: T type terminal box with lamp/ surge suppressor (G1/2)		●	●	●
Ⓖ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					
Ⓗ No. of solenoid valves					
Blank	No masking plate	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●
Ⓘ Masking plate quantity					
Blank	No masking plate	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●

Select from the combinations indicated with ● in the table above.

[Example of model No.]

GFWB21-Z-3-02C-1

Model: GFWB

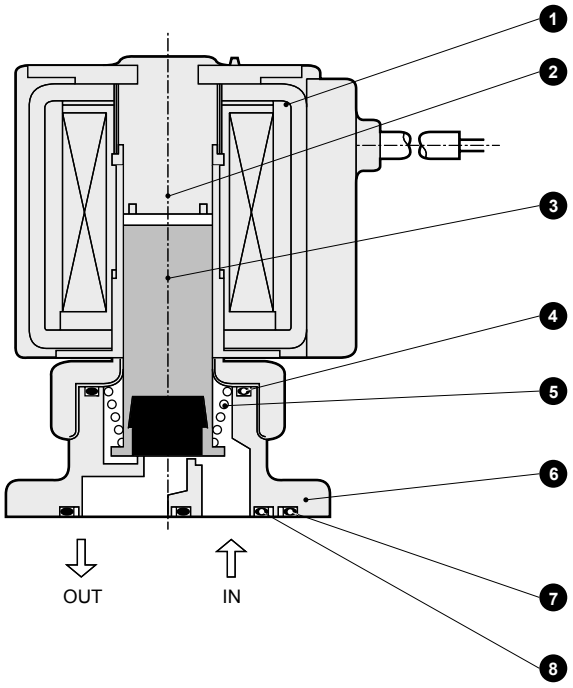
Ⓐ Series size	: 22 mm
Ⓑ Circuit configuration	: NC (open when energized)/ common supply
Ⓒ Orifice size	: ø1
Ⓓ Manifold station No.	: 3 stations
Ⓔ Body/sealant combination	: Body - copper alloy/sealant - NBR
Ⓕ Coil option	: Grommet lead wire
Ⓖ Voltage	: 100 VAC 50/60 Hz
Ⓗ Ⓘ	: No masking plate

⚠ Precautions for model No. selection

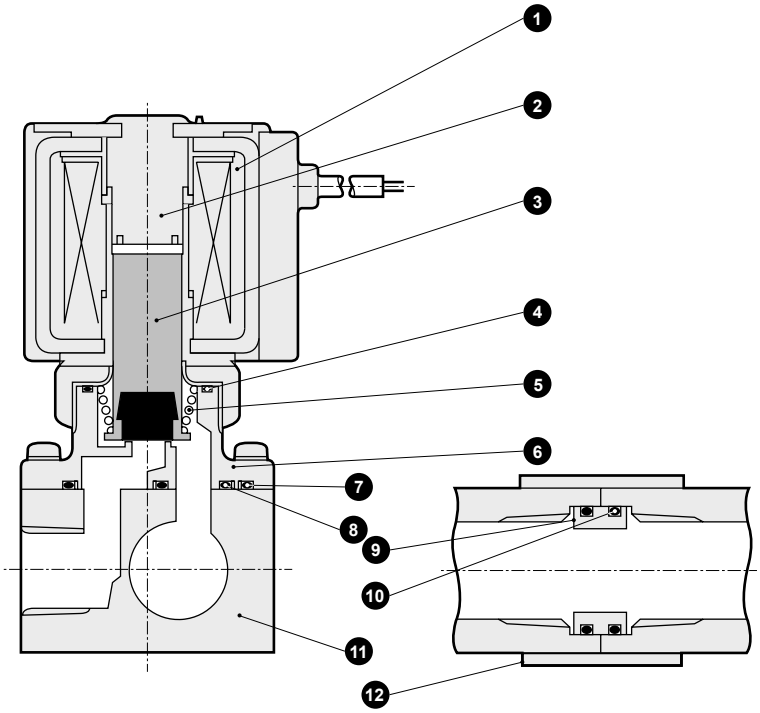
*1 : Select a desired manifold station No. from 2 to 10.
*2 : For the type with masking plate, designate Item Ⓓ as X, then designate the quantities of Ⓗ solenoid valves and Ⓘ masking plates.
*3 : For GFWB21 Ⓕ 2G/2HS, the DIN terminal box (Pg9) is used.
*4 : The surge suppressor is built into the coil for Item Ⓕ 2CS and in the terminal box for 2HS and 3RS.
*5 : Other voltages may not be available. Contact CKD for details.
*6 : Solenoid valves are arranged from the right side with the sub-plate (individual) port A facing front.
*7 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFWB actuator



● GFWB manifold



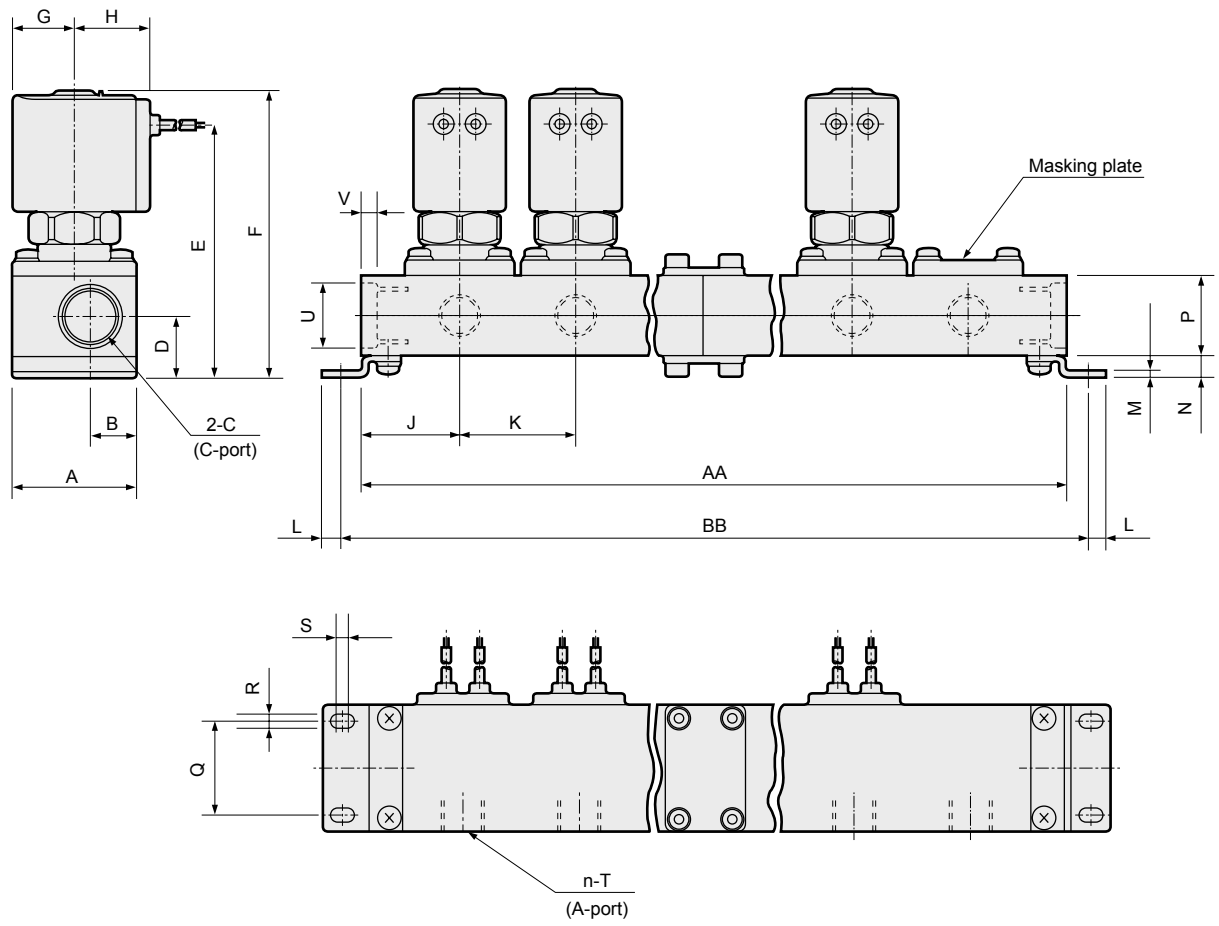
No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	7	O-ring	NBR	Nitrile rubber
2	Core assembly	SUS, Cu	Stainless steel, copper	8	O-ring	NBR	Nitrile rubber
		(Ag for SUS body)	(Silver for stainless steel body)	9	Connector	C3604	Copper alloy
3	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber			(SUS for SUS body)	(Stainless steel for stainless steel body)
4	O-ring	NBR	Nitrile rubber	10	O-ring	NBR	Nitrile rubber
5	Spring	SUS	Stainless steel	11	Sub-plate	C3604	Copper alloy
6	Body	C3771(SUS)	Copper alloy (stainless steel)			(SUS for SUS body)	(Stainless steel for stainless steel body)
				12	Connecting plate	SPC	Steel

*4 body mounting screws and 2 O-rings are attached to the actuator only.

( ) shows options.

Dimensions: Manifold

● Grommet lead wire
GFWB*1-*-*-*2C



* Lead wire length 300 mm

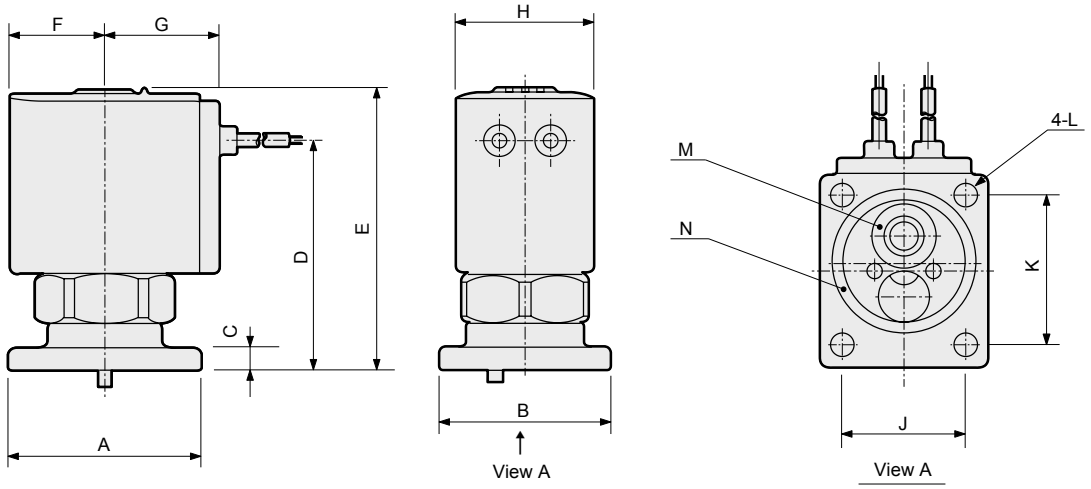
Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFWB2	AA	81	109	162	165	218	246	274	327	330
	BB	93	121	174	177	230	258	286	339	342
GFWB3	AA	97	133	194	205	266	302	338	399	410
	BB	109	145	206	217	278	314	350	411	422
GFWB4	AA	106	145	212	223	290	329	368	435	446
	BB	119	158	225	236	303	342	381	448	459
GFWB5	AA	118	163	236	253	326	371	416	489	506
	BB	131	176	249	266	339	384	429	502	519
Manifold configuration		2 stns. x 1	3 stns. x 1	2 stns. x 2	5 stns. x 1	3 stns. x 2	5 stns. + 2 stns.	5 stns. + 3 stns.	3 stns. x 3	5 stns. x 2

Note) Manifold configuration combines 2-station, 3-station and 5-station units.

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
GFWB2	32	13.5	Rc1/4	17.5	66.5	77	15.5	19.5	26	28	6	1.6	6.5	21	22	4.5	2.5	Rc1/8	ø17.3	4
GFWB3	38	14.5	Rc3/8	18.5	75.5	86.5	18.5	22.5	30	36	6	2	6.5	24	28	4.5	2.5	Rc1/4	ø19	4.6
GFWB4	42	16.5	Rc3/8	19.5	84	98	22.5	26	33	39	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	ø19	4.6
GFWB5	42	16.5	Rc3/8	19.5	90	105	26	29.5	36	45	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	ø19	4.6

Dimensions: Actuator

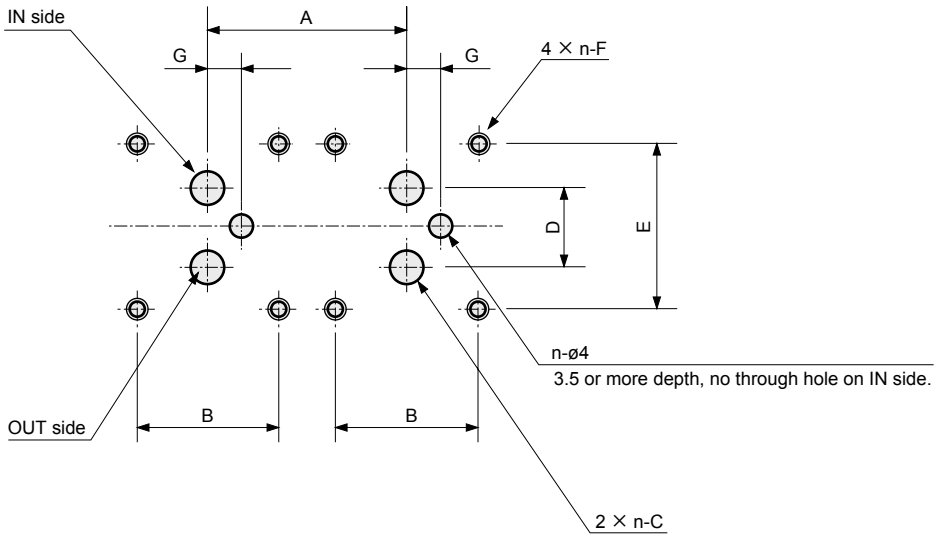
● Grommet lead wire
GFWB*1-*-O-*2C



Lead wire length 300mm

Model No.	A	B	C	D	E	F	G	H	J	K	L	Applicable O-ring	
												M	N
GFWB2	32	27	4	39	49.5	15.5	19.5	22	19	24	ø3.5	AS568-009	AS568-018
GFWB3	38	34	4.5	45	56	18.5	22.5	28	25	29	ø4.5	AS568-011	AS568-022
GFWB4	42	38	4.5	52.5	66.5	22.5	26	34	28	32	ø4.5	AS568-012	AS568-025
GFWB5	42	44	5.5	58.5	73.5	26	29.5	40	34	32	ø4.5	AS568-012	AS568-025

Actuator installation dimensions



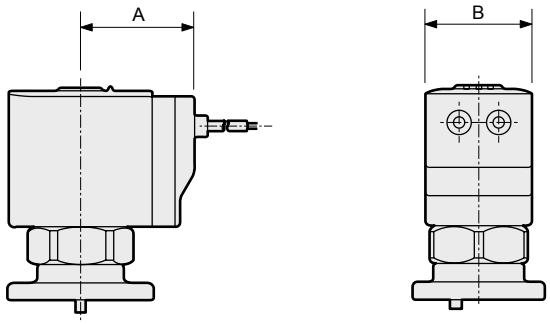
Machining drawing when using 2 actuators (n: number of stations)

Model No.	A	B	C	D	E	F	G
GFWB2	28 or more	19±0.1	ø3.5	10.6±0.1	24±0.1	M3 effective thread depth 6 or more	6±0.2
GFWB3	35 or more	25±0.1	ø5.5	13.8±0.1	29±0.1	M4 effective thread depth 6 or more	6±0.2
GFWB4	39 or more	28±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2
GFWB5	45 or more	34±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2

Optional dimensions

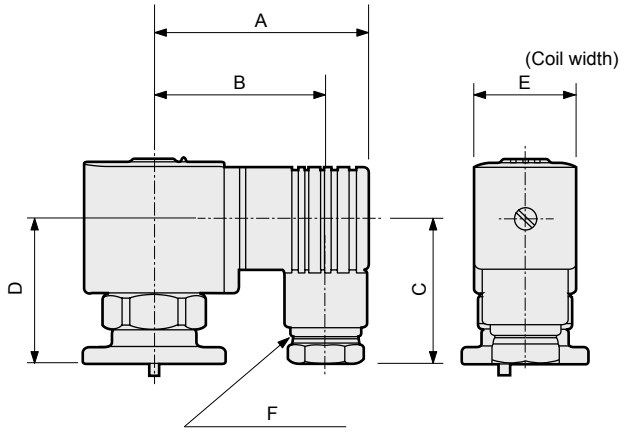
(Refer to the grommet lead wire actuator dimensions on page 114 for common dimensions.)

● Grommet lead with surge suppressor
GFWB*1-*-*-* 2CS



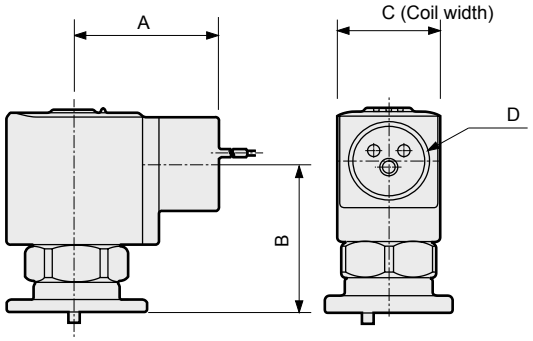
Model No.	A	B
GFWB2	26.5	22
GFWB3	29.5	28
GFWB4	34	34
GFWB5	37.5	40

● DIN terminal box (with lamp/surge suppressor)
GFWB*1-*-*-* 2G
2HS



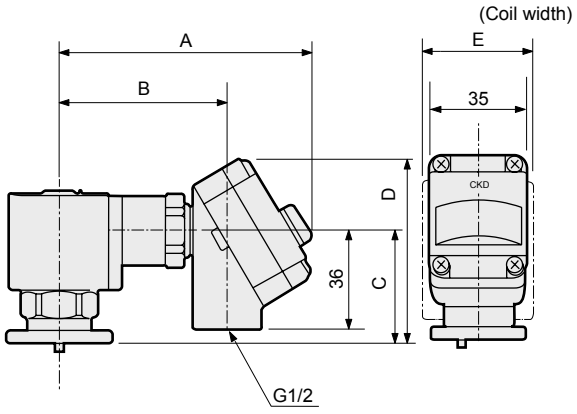
Model No.	A	B	C	D	E	F
GFWB2	53	44	38	32.5	22	Pg9
GFWB3	58.5	47	39	38.5	28	Pg11
GFWB4	62	50.5	39	46.5	34	Pg11
GFWB5	65.5	54	39	54	40	Pg11

● Conduit (CTC19 / G1/2)
GFWB*1-*-*-* 2CG
2CH

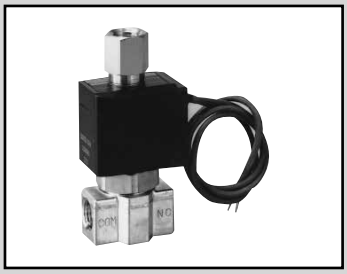


Model No.	A	B	C	D
GFWB3	39	40.5	28	CTC19 G1/2
GFWB4	43	48	34	CTC19 G1/2
GFWB5	46.5	55.5	40	CTC19 G1/2

● T type terminal box (with lamp/surge suppressor) (G1/2)
GFWB*1-*-*-* 3T
3RS



Model No.	A	B	C	D	E
GFWB3	92	60.5	40.5	66.5	28
GFWB4	96	64.5	48	74	34
GFWB5	99.5	68	55.5	81.5	40



Direct acting 3-port solenoid valve for water, single unit
Special purpose

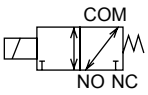
FWG Series

- Universal
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- Universal



Common specifications

Item	FWG
Working fluid	Water (excluding sewage, agricultural water and liquid manure)
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar) (refer to the max. working pressure differential in the individual specifications)
Max. working pressure MPa	1.0 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)
Fluid temperature °C	AC: 1 (33.8°F) to 60 (140°F), DC: 1 (33.8°F) to 40 (104°F) (no freezing)
Ambient temperature °C	AC:-20 (-4°F) to 60 (140°F), DC:-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min	0 (water pressure)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Cv	Max. working pressure differential MPa		Rated voltage	Apparent power (VA)				Power consumption (W)		Weight (kg)
							When holding		When starting		AC	DC	
				AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
Universal													
FWG21- 6 - Z	Rc1/8	1	0.036	0.7	0.7	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	6.5	5	10	9	3.6/2.5	4	0.17
FWG31- $^{6}_{8}$ - 0	Rc1/8 / Rc1/4	1.5	0.080	0.7	0.7		16	10.5	23	20	7/4.1	6	0.33
FWG41- $^{8}_{10}$ - 1	Rc1/4 / Rc3/8	2	0.14	1	1		22	16	40	35	8.5/6.5	8*4	0.52
FWG51- $^{8}_{10}$ - 4	Rc1/4 / Rc3/8	3	0.31	0.6 *2	0.6 *2		32	22	60	50	12.5/10.5	11.5	0.69

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : 0.4 for NO pressurization.
*3 : The leakage current must be less than or equal to the values shown below.
*4 : 8.6 (W) for 12 VDC.
*5 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz).
The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current	Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
	FWG2	3 mA or less	1.5 mA or less	1 mA or less	2 mA or less
	FWG3/4/5	6 mA or less	3 mA or less		

How to order

F W G 2 1 - 6 - Z - O 2C B - 1

- F W: Working fluid (Water)
- G: No. of ports (3-port valve)
- 2: Ⓐ Series size
- 1: Ⓑ Actuation
- 6: Ⓒ Port size
- Z: Ⓓ Orientation size
- O: Ⓔ Body/sealant combination
- 2C: Ⓕ Coil option *1 *2
- B: Ⓖ Other options
- 1: Ⓗ Voltage *3

Code	Description	Model No. FWG21	FWG31	FWG41	FWG51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Actuation					
1	Universal	●	●	●	●
Ⓒ Port size					
6	Rc1/8	●	●		
8	Rc1/4		●	●	●
10	Rc3/8			●	●
Ⓓ Orifice size					
Z	ø1	●			
O	ø1.5		●		
1	ø2			●	
4	ø3				●
Ⓔ Body/sealant combination					
	Body / Seal				
O	Copper alloy / NBR	●	●	●	●
D	Stainless steel / NBR	●	●	●	●
Ⓕ Coil option					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option: Grommet lead wire with surge suppressor	●	●	●	●
2G	Option: With DIN terminal box (Pg11)	●	●	●	●
2HS	Option: DIN terminal box with lamp/ surge suppressor (Pg11)	●	●	●	●
2CG	Option: Conduit (CTC19)		●	●	●
2CH	Option: Conduit (G1/2)		●	●	●
3T	Option: With T type terminal box (G1/2)		●	●	●
3RS	Option: T type terminal box with lamp/ surge suppressor (G1/2)		●	●	●
Ⓖ Other options					
Blank	None	●	●	●	●
B	Mounting plate	●	●	●	●
Ⓗ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FWG21-6-Z-02CB-1

Model: FWG

- Ⓐ Series size : 22 mm
- Ⓑ Actuation : Universal
- Ⓒ Port size : Rc1/8
- Ⓓ Orifice size : ø1
- Ⓔ Body/sealant combination : Body - copper alloy/sealant - NBR
- Ⓕ Coil option : Grommet lead wire
- Ⓖ Other options : Mounting plate
- Ⓗ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

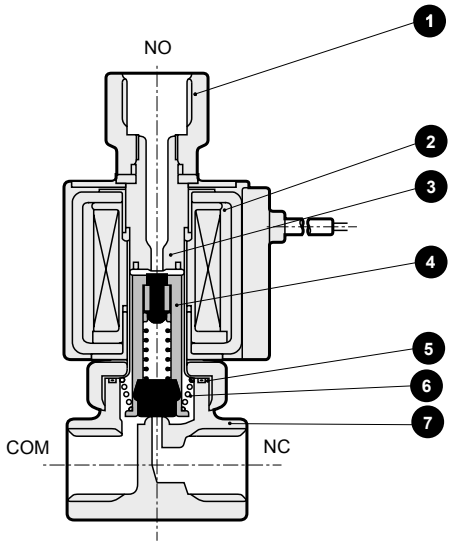
*1 : For FWG21 Item Ⓕ 2G/2HS, the DIN terminal box (Pg9) is used.

*2 : The surge suppressor is built into the coil for Item Ⓕ 2CS and in the terminal box for 2HS and 3RS.

*3 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

● FWG*1 Series

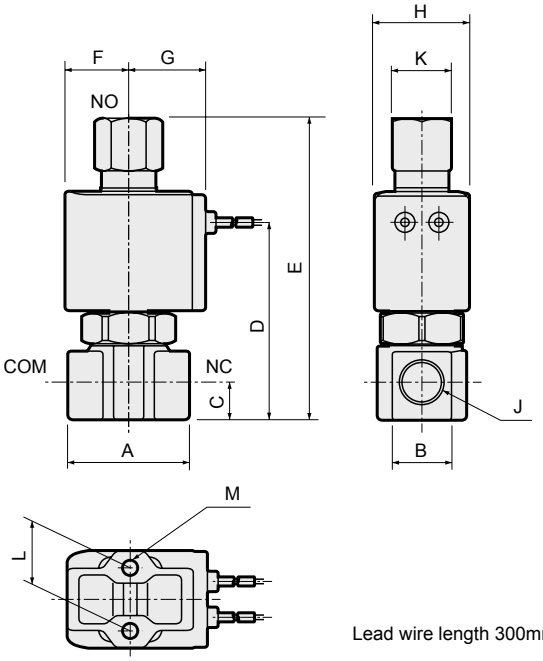


No.	Part name	Material	
1	Socket	C3604 (SUS for SUS body)	Copper alloy (stainless steel for stainless steel body)
2	Coil assembly	-	-
3	Core assembly	SUS, Cu (Ag for SUS body)	Stainless steel, copper (silver for stainless steel body)
4	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber
5	O-ring	NBR	Nitrile rubber
6	Spring	SUS	Stainless steel
7	Body	C3771(SUS)	Copper alloy (stainless steel)

( ) shows options.

Dimensions

● Grommet lead wire
FWG*1-*-*-*2C



Lead wire length 300mm

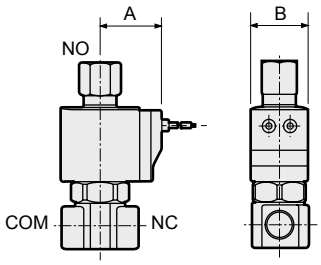
Model No.	A	B	C	D	E	(E)	F	G	H	J	K	L	M
FWG21	32	14	8	45.5	74	(75)	15.5	19.5	22	Rc1/8	14	15	M4 depth 6
FWG31	36	18	11	57.5	90	(Rc1/8:90) (Rc1/4:91.5)	18.5	22.5	28	Rc1/8, Rc1/4	17	18	M5 depth 6
FWG41	40	21	12	67	103	(105)	22.5	26	34	Rc1/4 Rc3/8	17 22	18	M5 depth 8
FWG51	40	21	12	73.5	111	(113)	26	29.5	40	Rc1/4 Rc3/8	17 22	18	M5 depth 8

* (E) shows dimensions of stainless steel body.

Optional dimensions

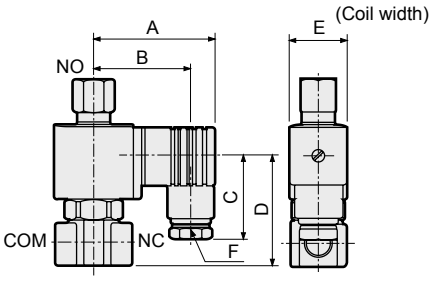
(Refer to the dimensions of grommet lead wire on page 118 for common dimensions.)

● Grommet lead wire with surge suppressor
FWG*1-*-*-* 2CS



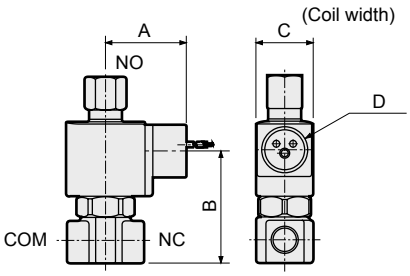
Model No.	A	B
FWG21	26.5	22
FWG31	29.5	28
FWG41	34	34
FWG51	37.5	40

● DIN terminal box (with lamp/surge suppressor)
FWG*1-*-*-* 2G
2HS



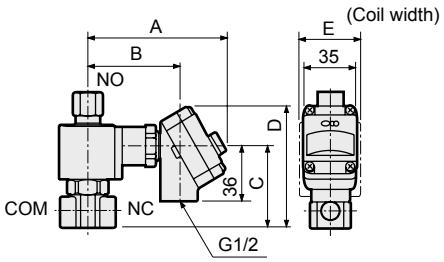
Model No.	A	B	C	D	E	F
FWG21	53	44	38	39	22	Pg9
FWG31	58.5	47	39	51	28	Pg11
FWG41	62	50.5	39	61	34	Pg11
FWG51	65.5	54	39	69.5	40	Pg11

● Conduit (CTC19 / G1/2)
FWG*1-*-*-* 2CG
2CH



Model No.	A	B	C	D
FWG31	39	53	28	CTC19 / G1/2
FWG41	43	62.5	34	CTC19 / G1/2
FWG51	46.5	71	40	CTC19 / G1/2

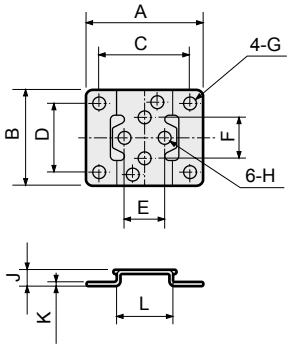
● T type terminal box (with lamp/surge suppressor) (G1/2)
FWG*1-*-*-* 3T
3RS



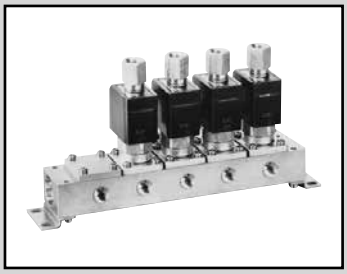
Model No.	A	B	C	D	E
FWG31	92	60.5	53	79	28
FWG41	96	64.5	62.5	88.5	34
FWG51	99.5	68	71	97	40

● Mounting plate
FWG*1-*-*-** B

Material: Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FWG21	40	34	30	25	15	15	ø5	ø4.5	6	1.2	20
FWG31	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FWG41/51	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30



Direct acting 3-port solenoid valve for water, manifold
Special purpose

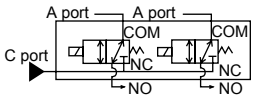
GFWG Series

- Universal
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- Common water supply/ individual drain



Common specifications

Item	GFWG
Working fluid	Water (excluding sewage, agricultural water and liquid manure)
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar) (refer to the max. working pressure differential in the individual specifications.)
Max. working pressure MPa	1.0 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)
Fluid temperature °C	AC: 1 (33.8°F) to 60 (140°F), DC: 1 (33.8°F) to 40 (104°F) (no freezing)
Ambient temperature °C	AC:-20 (-4°F) to 40 (104°F), DC:-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min	0 (water pressure)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size A/NO ports (Individual port)	Port size C port (Common port)	Orifice size (mm)	Cv	Max. working pressure differential MPa AC	Max. working pressure differential MPa DC	Rated voltage	Apparent power (VA) When holding 50 Hz	When holding 60 Hz	When starting 50 Hz	When starting 60 Hz	Power consumption (W) AC 50/60 Hz	Power consumption (W) DC
Universal													
GFWG21- Z	Rc1/8	Rc1/4	1	0.036	0.7	0.7	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	6.5	5	10	9	3.6/2.5	4
GFWG31- 0	Rc1/4	Rc3/8	1.5	0.080	0.7	0.7		16	10.5	23	20	7/4.1	6
GFWG41- 1	Rc1/4	Rc3/8	2	0.14	1.0	1.0		22	16	40	35	8.5/6.5	8.4
GFWG51- 4	Rc1/4	Rc3/8	3	0.27	0.6*2	0.6*2		32	22	60	50	12.5/10.5	11.5

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : 0.4 for NO pressurization.
*3 : The leakage current must be less than or equal to the values shown below.
*4 : 8.6 (W) for 12 VDC.
*5 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz).
The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

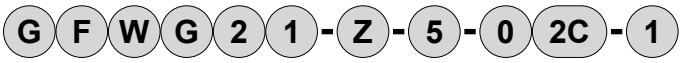
Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
GFWG2	3 mA or less	1.5 mA or less	1 mA or less	2 mA or less
GFWG3/4/5	6 mA or less	3 mA or less		

Weight

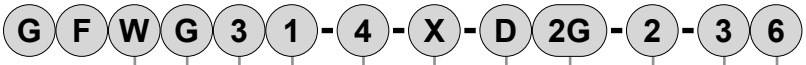
Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (g) (sub-plate, connection part and mounting plate) 2 stns.	3 stns.	4 stns.	5 stns.	6 stns.	7 stns.	8 stns.	9 stns.	10 stns.	Formula for product weight
GFWG21	0.16	0.03	0.40	0.51	0.77	0.77	1.03	1.16	1.30	1.60	1.55	(Product weight (g)) = 0.14 × (Actuator quantity) + 0.03 × (Masking quantity) + Sub-plate weight
GFWG31	0.3	0.05	0.60	0.80	1.20	1.22	1.60	1.81	2.02	2.40	2.44	(Product weight (g)) = 0.27 × (Actuator quantity) + 0.05 × (Masking quantity) + Sub-plate weight
GFWG41	0.48	0.06	0.73	1.00	1.47	1.50	2.00	2.23	2.50	3.00	3.00	(Product weight (g)) = 0.45 × (Actuator quantity) + 0.06 × (Masking quantity) + Sub-plate weight
GFWG51	0.65	0.09	0.83	1.11	1.67	1.70	2.24	2.52	2.81	3.36	3.40	(Product weight (g)) = 0.64 × (Actuator quantity) + 0.09 × (Masking quantity) + Sub-plate weight

How to order

● Manifold



● Manifold with masking plate



No. of ports (3-port valve)

Working fluid (Water)

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4

Ⓖ Voltage *5

Ⓗ No. of solenoid valves *6

Ⓘ Masking plate quantity

Code	Description	GFWG21	GFWG31	GFWG41	GFWG51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Circuit configuration					
1	Common water supply/individual drain	●	●	●	●
Ⓒ Orifice size					
Z	ø1	●			
O	ø1.5		●		
1	ø2			●	
4	ø3				●
Ⓓ Manifold station No.					
2 to 10	2 stations to 10 stations	●	●	●	●
O	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
Ⓔ Body/sealant combination					
	Body / **Seal**				
O	Copper alloy / NBR	●	●	●	●
D	Stainless steel / NBR	●	●	●	●
Ⓕ Coil option					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option: Grommet lead wire with surge suppressor	●	●	●	●
2G	Option: With DIN terminal box (Pg11)	●	●	●	●
2HS	Option: DIN terminal box with lamp/ surge suppressor (Pg11)	●	●	●	●
2CG	Option: Conduit (CTC19)		●	●	●
2CH	Option: Conduit (G1/2)		●	●	●
3T	Option: With T type terminal box (G1/2)		●	●	●
3RS	Option: T type terminal box with lamp/ surge suppressor (G1/2)		●	●	●
Ⓖ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					
Ⓗ No. of solenoid valves					
Blank	No masking plate	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●
Ⓘ Masking plate quantity					
Blank	No masking plate	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●

Select from the combinations indicated with ● in the table above.

[Example of model No.]

GFWG21-Z-5-02C-1

Model: GFWG

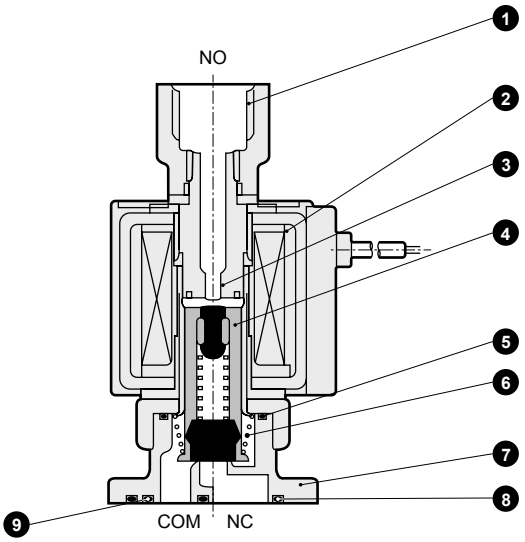
Ⓐ Series size	:	22 mm
Ⓑ Circuit configuration	:	Common water supply/individual drain
Ⓒ Orifice size	:	ø1
Ⓓ Manifold station No.	:	5 stations
Ⓔ Body/sealant combination	:	Body - copper alloy/sealant - NBR
Ⓕ Coil option	:	Grommet lead wire
Ⓖ Voltage	:	100 VAC 50/60 Hz
Ⓗ Ⓘ	:	No masking plate

⚠ Precautions for model No. selection

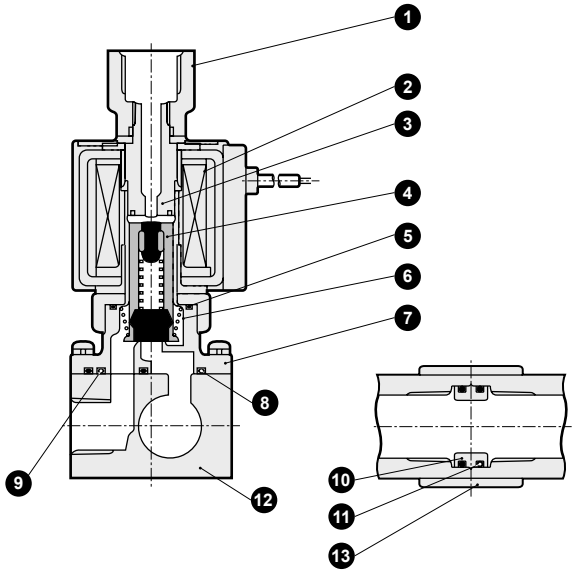
*1 : Select a desired manifold station No. from 2 to 10.
*2 : For the type with masking plate, designate Item Ⓓ as X, then designate the quantities of Ⓗ solenoid valves and Ⓘ masking plates.
*3 : For GFWG21 Ⓕ 2G/2HS, the DIN terminal box (Pg9) is used.
*4 : The surge suppressor is built into the coil for Item Ⓕ 2CS and in the terminal box for 2HS and 3RS.
*5 : Other voltages may not be available. Contact CKD for details.
*6 : Solenoid valves are arranged from the right side with the sub-plate (individual) port A facing front.
*7 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFWG actuator



● GFWG manifold



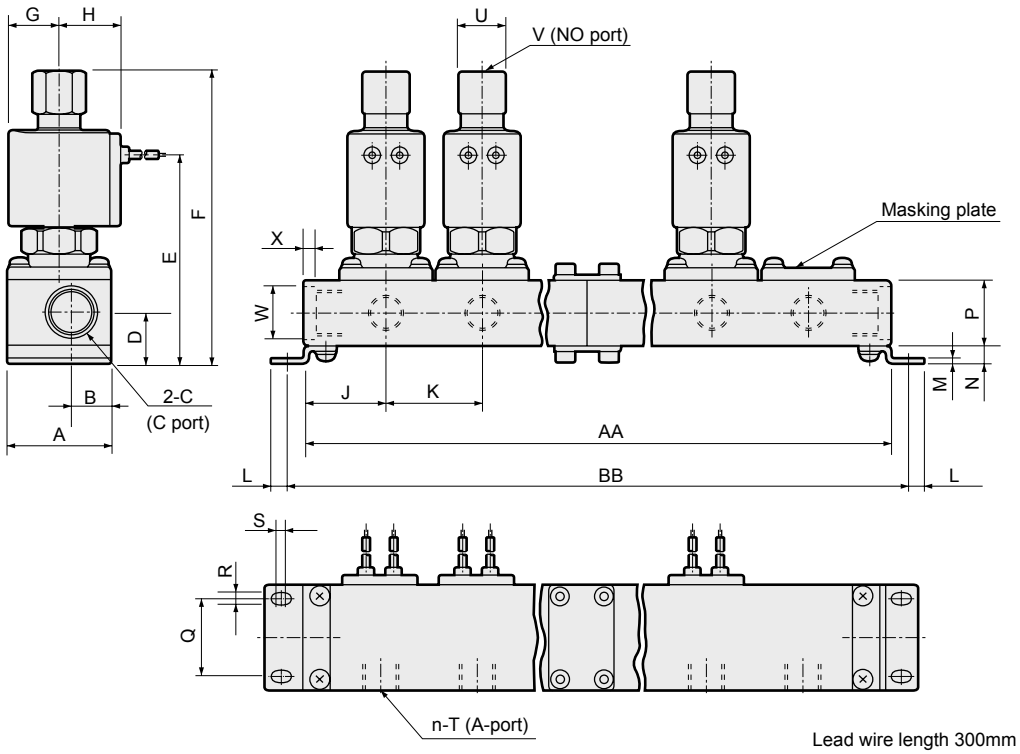
No.	Part name	Material		No.	Part name	Material	
1	Socket	C3604 (SUS for SUS body)	Copper alloy (stainless steel for stainless steel body)	8	O-ring	NBR	Nitrile rubber
				9	O-ring	NBR	Nitrile rubber
2	Coil assembly	-	-	10	Connector	C3604 (SUS for SUS body)	Copper alloy (stainless steel for stainless steel body)
3	Core assembly	SUS, Cu (Ag for SUS body)	Stainless steel, copper (silver for stainless steel body)				
				11	O-ring	NBR	Nitrile rubber
4	Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber	12	Sub-plate	C3604 (SUS for SUS body)	Copper alloy (stainless steel for stainless steel body)
5	O-ring	NBR	Nitrile rubber				
6	Spring	SUS	Stainless steel	13	Connecting plate	SPC	Steel
7	Body	C3771(SUS)	Copper alloy (stainless steel)				

*4 body mounting screws and 2 O-rings are attached to the actuator only.

( ) shows options.

Dimensions: Manifold

● Grommet lead wire
GFWG*1-*-*-*2C



Lead wire length 300mm

Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFWG2	AA	81	109	162	165	218	246	274	327	330
	BB	93	121	174	177	230	258	286	339	342
GFWG3	AA	97	133	194	205	266	302	338	399	410
	BB	109	145	206	217	278	314	350	411	422
GFWG4	AA	106	145	212	223	290	329	368	435	446
	BB	119	158	225	236	303	342	381	448	459
GFWG5	AA	118	163	236	253	326	371	416	489	506
	BB	131	176	249	266	339	384	429	502	519
Manifold configuration		2 stns. x 1	3 stns. x 1	2 stns. x 2	5 stns. x 1	3 stns. x 2	5 stns. + 2 stns.	5 stns. + 3 stns.	3 stns. x 3	5 stns. x 2

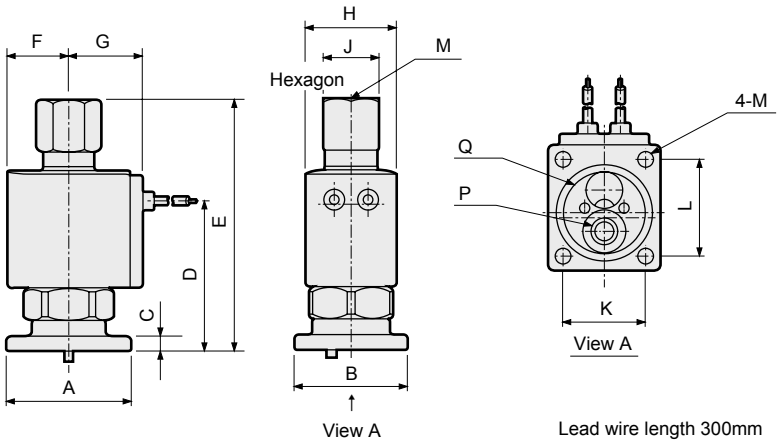
Note) Manifold configuration combines 2-station, 3-station and 5-station units.

Model No.	A	B	C	D	E	F	(F)	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X
GFWG2	32	13.5	Rc1/4	17.5	66.5	95	(96)	15.5	19.5	26	28	6	1.6	6.5	21	22	4.5	2.5	Rc1/8	14	Rc1/8	ø17.3	4
GFWG3	38	14.5	Rc3/8	18.5	75.5	108	(109)	18.5	22.5	30	36	6	2	6.5	24	28	4.5	2.5	Rc1/4	17	Rc1/4	ø19	4.6
GFWG4	42	16.5	Rc3/8	19.5	84	120	(121.5)	22.5	26	33	39	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	17	Rc1/4	ø19	4.6
GFWG5	42	16.5	Rc3/8	19.5	90	127	(128.5)	26	29.5	36	45	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	17	Rc1/4	ø19	4.6

*(F) shows dimensions of stainless steel body.

Dimensions: Actuator

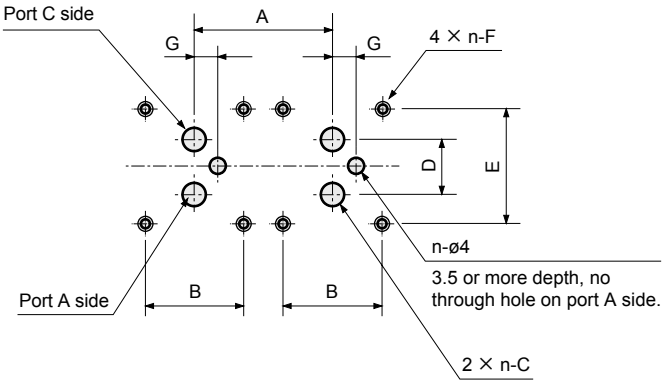
● Grommet lead wire
GFWG*1-*-O-*2C



Model No.	A	B	C	D	E	(E)	F	G	H	J	K	L	M	N	Applicable O-ring	
															P	Q
GFWG2	32	27	4	39	67.5	(68.5)	15.5	19.5	22	14	19	24	ø3.5	Rc1/8	AS568-009	AS568-018
GFWG3	38	34	4.5	45	77.5	(78.5)	18.5	22.5	28	17	25	29	ø4.5	Rc1/4	AS568-011	AS568-022
GFWG4	42	38	4.5	52.5	88.5	(90)	22.5	26	34	17	28	32	ø4.5	Rc1/4	AS568-012	AS568-025
GFWG5	42	44	5.5	58.5	95.5	(97)	26	29.5	40	17	34	32	ø4.5	Rc1/4	AS568-012	AS568-025

*(E) shows dimensions of stainless steel body.

Actuator installation dimensions



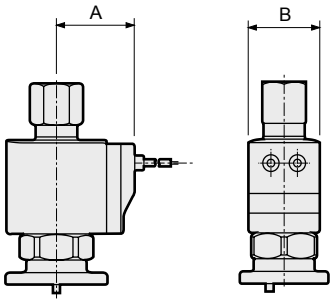
Machining drawing when using 2 actuators (n: number of stations)

Model No.	A	B	C	D	E	F	G
GFWG2	28 or more	19±0.1	ø3.5	10.6±0.1	24±0.1	M3 effective thread depth 6 or more	6±0.2
GFWG3	35 or more	25±0.1	ø5.5	13.8±0.1	29±0.1	M4 effective thread depth 6 or more	6±0.2
GFWG4	39 or more	28±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2
GFWG5	45 or more	34±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2

Optional dimensions

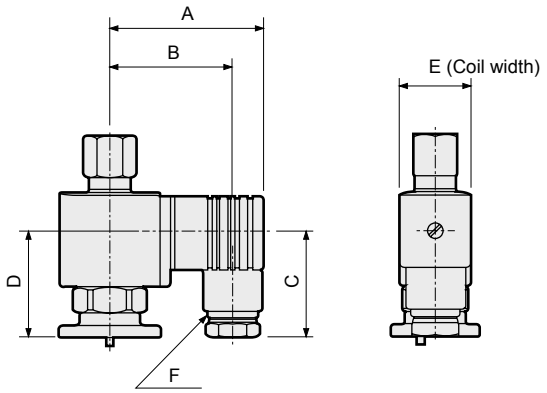
(Refer to the grommet lead wire actuator dimensions on page 124 for common dimensions.)

● Grommet lead with surge suppressor
GFWG*1-*-*-* 2CS



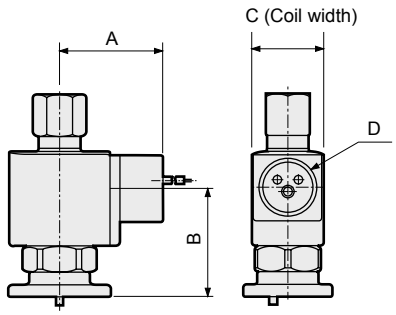
Model No.	A	B
GFWG2	26.5	22
GFWG3	29.5	28
GFWG4	34	34
GFWG5	37.5	40

● DIN terminal box (with lamp/surge suppressor)
GFWG*1-*-*-* 2G 2HS



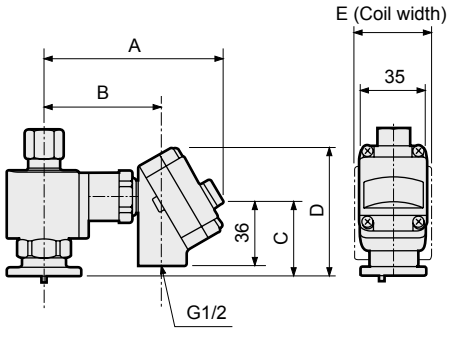
Model No.	A	B	C	D	E	F
GFWG2	53	44	38	32.5	22	Pg9
GFWG3	58.5	47	39	38.5	28	Pg11
GFWG4	62	50.5	39	46.5	34	Pg11
GFWG5	65.5	54	39	54	40	Pg11

● Conduit (CTC19 / G1/2)
GFWG*1-*-*-* 2CG 2CH

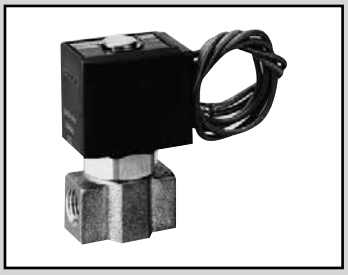


Model No.	A	B	C	D
GFWG3	39	40.5	28	CTC19 / G1/2
GFWG4	43	48	34	CTC19 / G1/2
GFWG5	46.5	55.5	40	CTC19 / G1/2

● T type terminal box (with lamp/surge suppressor) (G1/2)
GFWG*1-*-*-* 3T 3RS



Model No.	A	B	C	D	E
GFWG3	92	60.5	40.5	66.5	28
GFWG4	96	64.5	48	74	34
GFWG5	99.5	68	55.5	81.5	40



Direct acting 2-port solenoid valve for hot water, single unit
Special purpose

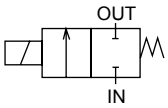
FHB Series

- NC (open when energized)
- Port size: Rc1/8 to Rc1/2

RoHS CAD

JIS symbol

● NC (open when energized)



Common specifications

Item	FHB
Working fluid	Hot water (90°C (194°F) or less)
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.5 (≈220 psi, 15 bar) (refer to the max. working pressure differential in the individual specifications.)
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 and ø10 orifice)
Fluid temperature °C	1 (33.8°F) to 90 (194°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)
Thermal class	Class 180 (H) or equivalent
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min	0 (water pressure)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Cv	Max. working pressure differential MPa AC	Max. working pressure MPa	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consumption (W) AC 50 Hz	Power consumption (W) AC 60 Hz	Weight (kg)
NC (open when energized)													
FHB 21- 6 - Z	Rc1/8	1	0.035	1.5	1.5 (≈220 psi, 15 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz	5.5	4	9	8	2.8	2	0.16
FHB 21- 6 - 2	Rc1/8	2	0.15	0.7									
FHB 31- 6/8 - 3	Rc1/8 · Rc1/4	3	0.31	0.7			10	7	23	20	4.2	3.2	0.31
FHB 31- 6/8 - 5	Rc1/8 · Rc1/4	4	0.54	0.4									
FHB 31- 6/8 - 6	Rc1/8 · Rc1/4	5	0.75	0.25									
FHB 41- 8/10 - 5	Rc1/4 · Rc3/8	4	0.54	0.8			16	13	40	35	7.5	6.3	0.51
FHB 41- 8/10 - 6	Rc1/4 · Rc3/8	5	0.80	0.5									
FHB 41- 8/10 - 7	Rc1/4 · Rc3/8	7	1.10	0.2	0.3 (≈44 psi, 3 bar)								
FHB 41- 10/15 - 8	Rc3/8 Rc1/2	10	1.88	0.1									0.60
FHB 51- 8/10 - 5	Rc1/4 · Rc3/8	4	0.54	1.1	1.5 (≈220 psi)		23	19	60	50	11.5	10	0.69
FHB 51- 8/10 - 6	Rc1/4 · Rc3/8	5	0.80	0.7									
FHB 51- 8/10 - 7	Rc1/4 · Rc3/8	7	1.10	0.3	0.3 (≈44 psi)								
FHB 51- 10/15 - 8	Rc3/8 Rc1/2	10	1.88	0.12									0.79

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz).
The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current	Voltage / Model No.	100 VAC	200 VAC
	FHB2	3 mA or less	1.5 mA or less
	FHB3/4/5	6 mA or less	3 mA or less

How to order

F H B 2 1 - 6 - Z - B 4A B - 1

- F H: Working fluid (Hot water)
- B: No. of ports (2-port valve)
- 2: Ⓐ Series size
- 1: Ⓑ Actuation
- 6: Ⓒ Port size
- Z: Ⓓ Orifice size *1 *2
- B: Ⓔ Body/sealant combination
- 4A: Ⓕ Coil option
- B: Ⓖ Other options
- 1: Ⓗ Voltage *3

Code	Description	Model No. FHB21	FHB31	FHB41	FHB51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Actuation					
1	NC (open when energized)	●	●	●	●
Ⓒ Port size					
6	Rc1/8	●	●		
8	Rc1/4		●	●	●
10	Rc3/8			●	●
15	Rc1/2			●	●
Ⓓ Orifice size					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5		●	●	●
7	ø7			●	●
8	ø10			●	●
Ⓔ Body/sealant combination					
	Body / **Seal**				
B	Bronze casting / FKM	●	●	●	●
Ⓕ Coil option					
4A	Std. Grommet lead wire	●	●	●	●
Ⓖ Other options					
Blank	Std. None	●	●	●	●
B	Option Mounting plate	●	●	●	●
Ⓗ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
Specify the desired voltage if it is not listed above. (AC only)					

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FHB21-6-Z-B4AB-1

Model: FHB

Ⓐ Series size	: 22 mm
Ⓑ Actuation	: NC (open when energized)
Ⓒ Port size	: Rc1/8
Ⓓ Orifice size	: ø1
Ⓔ Body/sealant combination	: Body - bronze casting/sealant - FKM
Ⓕ Coil option	: Grommet lead wire (thermal class H or equivalent)
Ⓖ Other options	: Mounting plate
Ⓗ Voltage	: 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

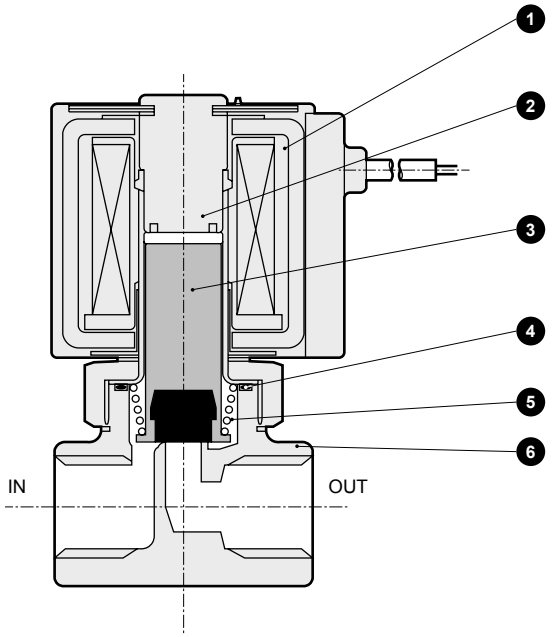
*1 : For FHB41 and FHB51 with orifice of ø4 mm (Item Ⓓ5), ø5 mm (Item Ⓓ6) and ø7 mm (Item Ⓓ7), available port sizes are Rc1/4 (Item Ⓒ8) and Rc3/8 (Item Ⓒ10) only.

*2 : For orifice of ø10 mm (Item Ⓓ8), available port sizes are Rc3/8 (Item Ⓒ10) and Rc1/2 (Item Ⓒ15).

*3 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

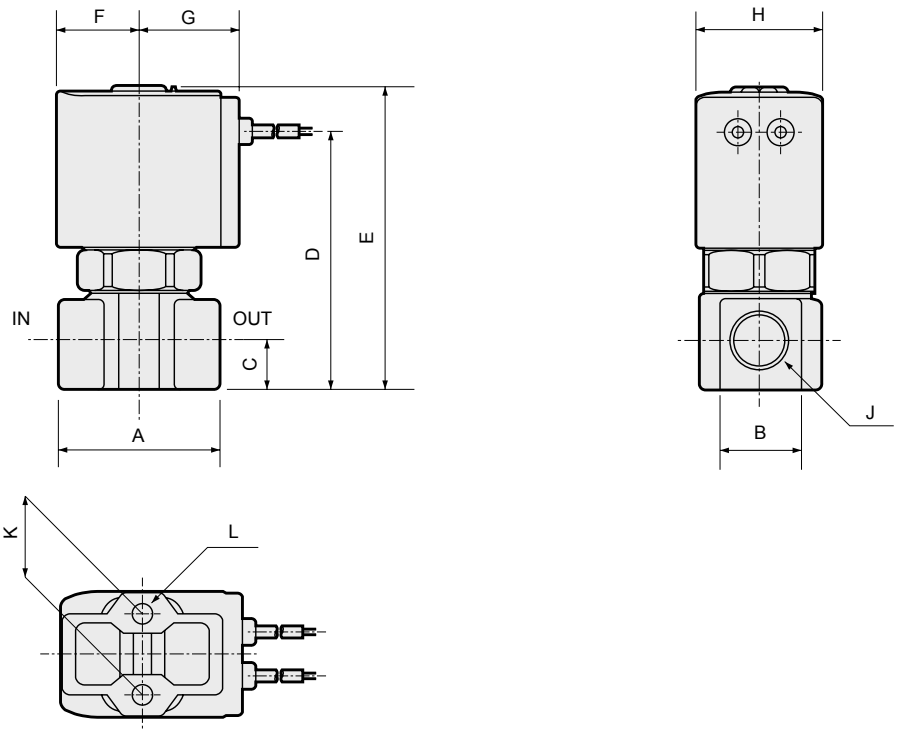
● FHB*1 Series



No.	Part name	Material	
1	Coil assembly	-	-
2	Core assembly	SUS, Cu	Stainless steel, copper
3	Plunger assembly	SUS, FKM	Stainless steel, fluoro rubber
4	O-ring	EPDM	Ethylene propylene rubber
5	Spring	SUS	Stainless steel
6	Body	CAC408	Bronze casting

Dimensions

● Grommet lead wire (thermal class H or equivalent)
FHB*1-*-*-B4A



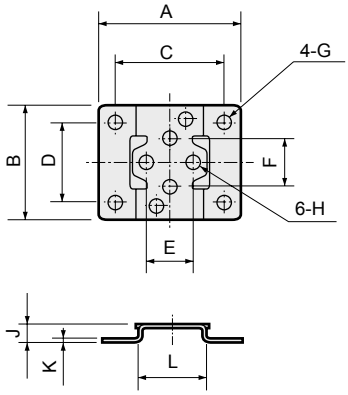
* Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	J	K	L
FHB21	32	14	8	45.5	56	15.5	19.5	22	Rc1/8	15	M4 depth 6
FHB31	36	18	11	57.5	68.5	18.5	22.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FHB41	40	23	12	67	81	22.5	26	34	Rc1/4, Rc3/8	18	M5 depth 8
FHB41-10/15-8 (orifice ø10)	50	29	15	76	90				Rc3/8, Rc1/2		
FHB51	40	23	12	73.5	89	26	29.5	40	Rc1/4, RC3/8	18	M5 depth 8
FHB51-10/15-8 (orifice ø10)	50	29	15	82.5	98				Rc3/8, Rc1/2		

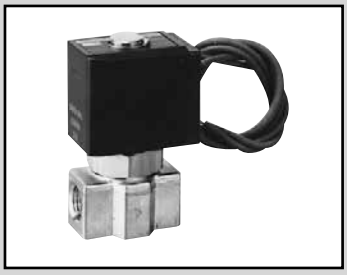
Optional dimensions

● Mounting plate
FHB*1-*-*-B* B

Material: Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FHB21	40	34	30	25	15	15	ø5	ø4.5	6	1.2	20
FHB31	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FHB41/51	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30



Direct acting 2-port solenoid valve for oil, single unit
Special purpose

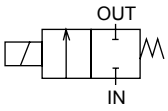
FLB Series

- NC (open when energized)
- Port size: Rc1/8 / Rc1/2

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)



Common specifications

Item	Standard specifications	Optional specifications
Working fluid	Oil (50 mm²/s or less)	
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.5 (≈220 psi, 15 bar)	
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 and ø10 orifice)	
Fluid temperature °C	AC:-10 (14°F) to 60 (140°F) DC:-10 (14°F) to 40 (104°F) (no freezing)	-10 (14°F) to 90 (194°F) (no freezing)
Ambient temperature °C	AC:-20 (-4°F) to 60 (140°F) DC:-20 (-4°F) to 40 (104°F)	-20 (-4°F) to 60 (140°F)
Thermal class	Class 130 (B)	Class 180 (H) or equivalent (AC only)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Direct acting poppet structure	
Valve seat leakage cm³/min	0 (oil)	
Mounting orientation	Unrestricted	
Degree of protection	IP65 or equivalent (*1)	

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Cv	Max. working pressure differential MPa AC	Max. working pressure differential MPa DC	Max. working pressure MPa	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consumption (W) AC 50 Hz/60 Hz	Power consumption (W) DC	Weight (kg)
NC (open when energized)														
FLB21-6-Z	Rc1/8	1	0.036	1.5	1.0	1.5 (≈220 psi, 15 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	6.5	5	9.5	8.5	3.6/2.4	4	0.16
FLB21-6-2		2	0.15	0.6	0.25									
FLB31-6-3	Rc1/8	3	0.31	0.8	0.5			15.5	10	24	20	6.5/4.0	6	0.30
FLB31-6-5	Rc1/4	4	0.50	0.4	0.15									
FLB31-6-6		5	0.65	0.25	0.05									
FLB41-8-5	Rc1/4	4	0.54	0.8	0.45			22	15	45	40	8.5/6.5	8	0.49
FLB41-10-6	Rc3/8	5	0.80	0.5	0.2									
FLB41-10-7		7	1.10	0.2	0.09	0.3 (≈44 psi)								
FLB41-15-8	Rc3/8 / Rc1/2	10	1.88	0.1	0.04								*3	0.60
FLB51-8-5	Rc1/4	4	0.54	1.1	1.3	1.5 (≈220 psi)		32	22	65	55	12.5/10.5	11.5	0.68
FLB51-10-6	Rc3/8	5	0.80	0.7	0.7									
FLB51-10-7		7	1.10	0.3	0.25	0.3 (≈44 psi)								
FLB51-15-8	Rc3/8 / Rc1/2	10	1.88	0.12	0.1									0.81

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : 8.6 (W) for 12 VDC.
*4 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz).
The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
FLB2	3 mA or less	1.5 mA or less	1 mA or less	2 mA or less
FLB3/4/5	6 mA or less	3 mA or less		

How to order

F L B 2 1 - 6 - Z - B 2C B - 1

- F L: Working fluid (Oil)
- B: Number of ports (2-port valve)
- 2: Ⓐ Series size
- 1: Ⓑ Actuation
- 6: Ⓒ Port size
- Z: Ⓓ Orifice size *1 *2
- B: Ⓔ Body/sealant combination
- 2C: Ⓕ Coil option *3 *4 *5
- B: Ⓖ Other options
- 1: Ⓗ Voltage *6

Code	Description	Model No. FLB21	FLB31	FLB41	FLB51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Actuation					
1	NC (open when energized)	●	●	●	●
Ⓒ Port size					
6	Rc1/8	●	●		
8	Rc1/4		●	●	●
10	Rc3/8			●	●
15	Rc1/2			●	●
Ⓓ Orifice size					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5		●	●	●
7	ø7			●	●
8	ø10			●	●
Ⓔ Body/sealant combination					
	Body: Seal				
B	Copper alloy: FKM	●	●	●	●
Ⓕ Coil option					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option Grommet lead wire with surge suppressor	●	●	●	●
2G	Option With DIN terminal box (Pg11)	●	●	●	●
2HS	Option DIN term box, lamp/anti-surge (Pg11)	●	●	●	●
2CG	Option Conduit (CTC19)		●	●	●
2CH	Option Conduit (G1/2)		●	●	●
3T	Option With T type terminal box (G1/2)		●	●	●
3RS	Option T type term box, lamp/anti-surge (G1/2)		●	●	●
4A	Option Grommet lead wire (class 180(H), equiv)	●	●	●	●
Ⓖ Other options					
Blank	Std. None	●	●	●	●
B	Option Mounting plate	●	●	●	●
Ⓗ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FLB21-6-Z-B2CB-1

Model: FLB

Ⓐ Series size	: 22 mm
Ⓑ Actuation	: NC (open when energized)
Ⓒ Port size	: Rc1 / 8
Ⓓ Orifice size	: ø1
Ⓔ Body/sealant combination	: Body - copper alloy, sealant - FKM
Ⓕ Coil option	: Grommet lead wire
Ⓖ Others	: With mounting plate
Ⓗ Voltage	: 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : For FLB41 and FLB51 with orifice of ø4 mm (Item Ⓓ5), ø5 mm (Item Ⓓ6) and ø7 mm (Item Ⓓ7), available port sizes are Rc1/4 (Item Ⓒ8) and Rc3/8 (Item Ⓒ10) only.

*2 : For orifice of ø10 mm (Item Ⓓ8), available port size is Rc3/8 (Item Ⓒ10) and Rc1/2 (Item Ⓒ15). The body is bronze casting.

*3 : For FLB21 Item Ⓕ2G/2HS, the DIN terminal box (Pg9) is used.

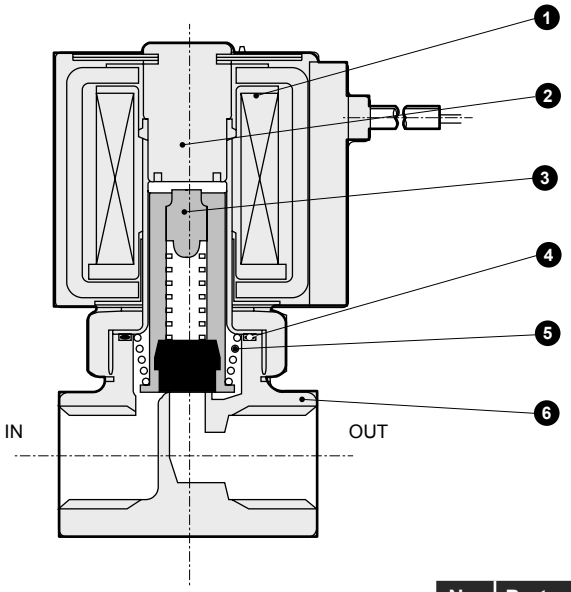
*4 : The surge suppressor is built into the coil for Item Ⓕ2CS and in the terminal box for 2HS and 3RS.

*5 : For high temperature specifications (fluid temperature 90°C), coil option 4A only is available. Grommet lead wire (class 180 (H) or equivalent) of Item Ⓕ4A is for AC only.

*6 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

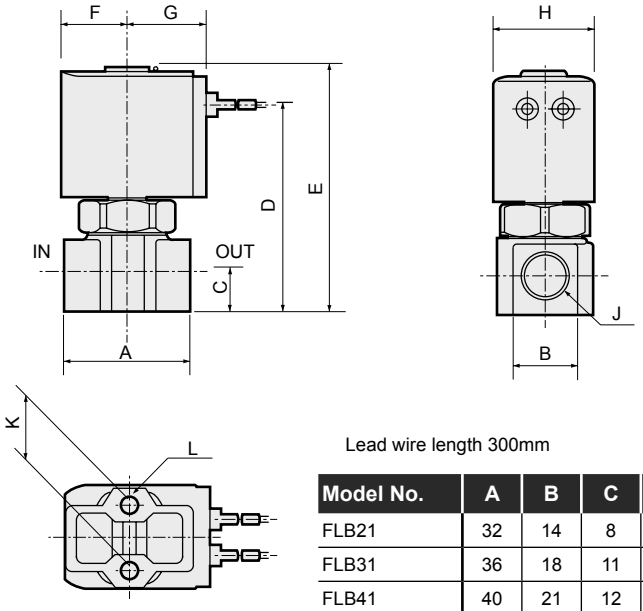
● FLB*1 Series



No.	Part name	Material	
1	Coil assembly	-	-
2	Core assembly	SUS, Cu	Stainless steel, copper
3	Plunger assembly	SUS, C3604, FKM	Stainless steel, copper alloy, fluoro rubber
4	O-ring	FKM	Fluoro rubber
5	Spring	SUS	Stainless steel
6	Body	C3771 or CAC407	Copper alloy or bronze

Dimensions CAD

● Grommet lead wire
FLB*1-*-*-B2C



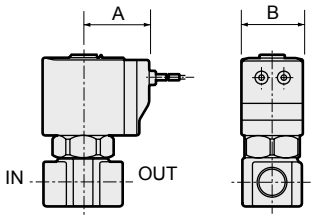
Lead wire length 300mm

Model No.	A	B	C	D	E	F	G	H	J	K	L
FLB21	32	14	8	45.5	56	15.5	19.5	22	Rc1/8	15	M4 depth 6
FLB31	36	18	11	57.5	68.5	18.5	22.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FLB41	40	21	12	67	81	22.5	26	34	Rc1/4, Rc3/8	18	M5 depth 8
FLB41-10/15-8 (Orifice ø10)	50	29	15	76	90				Rc3/8, Rc1/2		
FLB51	40	21	12	73.5	89	26	29.5	40	Rc1/4, Rc3/8	18	M5 depth 8
FLB51-10/15-8 (Orifice ø10)	50	29	15	82.5	98				Rc3/8, Rc1/2		

Optional dimensions

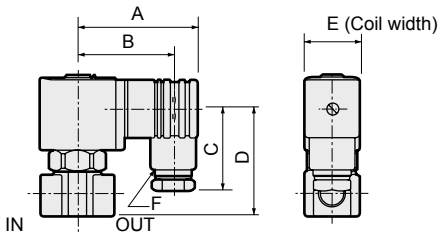
(Refer to the dimensions of grommet lead wire on page 132 for common dimensions.)

● Grommet lead wire with surge suppressor
FLB*1-*-*-B 2CS



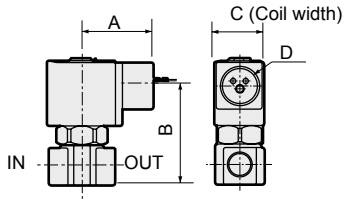
Model No.	A	B
FLB21	26.5	22
FLB31	29.5	28
FLB41	34	34
FLB51	37.5	40

● DIN terminal box (with lamp/surge suppressor)
FLB*1-*-*-B 2G
2HS



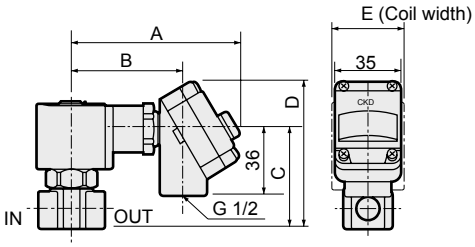
Model No.	A	B	C	D	E	F
FLB21	53	44	38	39	22	Pg 9
FLB31	58.5	47	39	51	28	Pg11
FLB41	62	50.5	39	61	34	Pg11
FLB41-10/15-8 (Orifice ø10)				70		
FLB51	65.5	54	39	69.5	40	Pg11
FLB51-10/15-8 (Orifice ø10)				78.5		

● Conduit (CTC19 / G1/2)
FLB*1-*-*-B 2CG
2CH



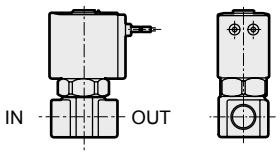
Model No.	A	B	C	D	E
FLB31	92	60.5	53	79	28
FLB41	96.5	64.5	62.5	88.5	34
FLB41-10/15-8 (Orifice ø10)			71.5	97.5	
FLB51	99.5	68	71	97	40
FLB51-10/15-8 (Orifice ø10)			80	106	

● T type terminal box (with lamp/surge suppressor) (G1/2)
FLB*1-*-*-B 3T
3RS



Model No.	A	B	C	D
FLB31	39	52.5	28	CTC19 G1/2
FLB41	43	62.5	34	CTC19 G1/2
FLB41-10/15-8 (Orifice ø10)		71.5		
FLB51	46.5	71	40	CTC19 G1/2
FLB51-10/15-8 (Orifice ø10)		80		

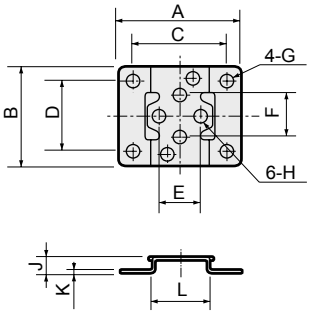
● Grommet lead wire (thermal class H or equivalent)
FLB*1-*-*-B 4A



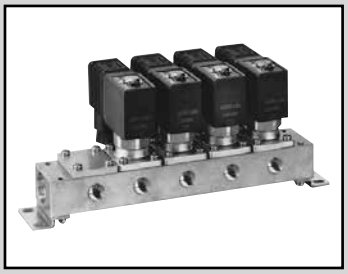
Dimensions are the same as those of grommet lead wire (2C).

● Mounting plate
FLB*1-*-*-B** B

Material: Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FLB21	40	34	30	25	15	15	ø5	ø4.5	6	1.2	20
FLB31	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FLB41/51	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30



Direct acting 2-port solenoid valve for oil, manifold
Special purpose

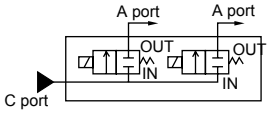
GFLB Series

- NC (open when energized)
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)/ common lubrication (C port pressurization)



Common specifications

Item	Standard specifications	Optional specifications
Working fluid	Oil [50 mm²/s] or less	
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.5 (≈220 psi, 15 bar)	
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 and ø10 orifice)	
Fluid temperature °C	AC:-10 (14°F) to 60 (140°F) DC:-10 (14°F) to 40 (104°F) (no freezing)	-10 (14°F) to 90 (194°F) (no freezing)
Ambient temperature °C	AC:-20 (-4°F) to 40 (104°F) DC:-20 (-4°F) to 40 (104°F)	-20 (-4°F) to 60 (140°F)
Thermal class	Class 130 (B)	Class 180 (H) or equivalent (AC only)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Direct acting poppet structure	
Valve seat leakage cm³/min	0 (oil)	
Mounting orientation	Unrestricted	
Degree of protection	IP65 or equivalent (*1)	

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size: A port (Individual port)	Port size: C port (Common port)	Orifice size (mm)	Cv	Max. working pressure differential MPa: AC	Max. working pressure differential MPa: DC	Max. working pressure MPa	Rated voltage	Apparent power (VA): When holding 50 Hz	Apparent power (VA): When holding 60 Hz	Apparent power (VA): When starting 50 Hz	Apparent power (VA): When starting 60 Hz	Power consumption (W): AC 50/60 Hz	Power consumption (W): DC
NC (open when energized)														
GFLB21 - Z	Rc1/8	Rc1/4	1	0.036	1.5	1.0	1.5 (≈220 psi, 15 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	6.5	5	9.5	8.5	3.6/2.4	4
GFLB21 - 2			2	0.12	0.6	0.25								
GFLB31 - 3	Rc1/4	Rc3/8	3	0.23	0.8	0.5			15.5	10	24	20	6.5/4.0	6
GFLB31 - 5			4	0.36	0.4	0.15								
GFLB31 - 6			5	0.45	0.25	0.05								
GFLB41 - 5	Rc1/4	Rc3/8	4	0.42	0.8	0.45			22	15	45	40	8.5/6.5	8 *3
GFLB41 - 6			5	0.55	0.5	0.2								
GFLB41 - 7			7	0.73	0.2	0.09	0.3							
GFLB51 - 5	Rc1/4	Rc3/8	4	0.42	1.1	1.3	1.5 (≈220 psi)		32	22	65	55	12.5/10.5	11.5
GFLB51 - 6			5	0.55	0.7	0.7								
GFLB51 - 7			7	0.73	0.3	0.25	0.3							

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : 8.6 (W) for 12 VDC.
*4 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz).
The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
GFLB2	3 mA or less	1.5 mA or less	1 mA or less	2 mA or less
GFLB3/4/5	6 mA or less	3 mA or less		

Weight

Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (g) (sub-plate, connection part and mounting plate): 2 stns.	3 stns.	4 stns.	5 stns.	6 stns.	7 stns.	8 stns.	9 stns.	10 stns.	Formula for product weight
GFLB21	0.14	0.03	0.40	0.51	0.77	0.77	1.03	1.16	1.30	1.60	1.55	(Product weight (kg)) = 0.14 x (Actuator quantity) + 0.03 x (Masking quantity) + Sub-plate weight
GFLB31	0.27	0.05	0.60	0.80	1.20	1.22	1.60	1.81	2.02	2.40	2.44	(Product weight (kg)) = 0.27 x (Actuator quantity) + 0.05 x (Masking quantity) + Sub-plate weight
GFLB41	0.45	0.06	0.73	1.00	1.47	1.50	2.00	2.23	2.50	3.00	3.00	(Product weight (kg)) = 0.45 x (Actuator quantity) + 0.06 x (Masking quantity) + Sub-plate weight
GFLB51	0.64	0.09	0.83	1.11	1.67	1.70	2.24	2.52	2.81	3.36	3.40	(Product weight (kg)) = 0.64 x (Actuator quantity) + 0.09 x (Masking quantity) + Sub-plate weight

How to order

● Manifold

G F L B 2 1 - Z - 3 - B 2C - 1

● Manifold with masking plate

G F L B 5 1 - 6 - X - B 2G - 2 - 5 2

No. of ports (2-port valve)

Working fluid (Oil)

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4 *5

Ⓖ Voltage *6

Ⓗ No. of solenoid valves *7

Ⓘ Masking plate quantity

Code	Description	Model No. GFLB21	GFLB31	GFLB41	GFLB51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Circuit configuration					
1	NC (open when energized)/common lubrication	●	●	●	●
Ⓒ Orifice size					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5		●	●	●
7	ø7			●	●
Ⓓ Manifold station No.					
2 to 10	2 stations to 10 stations	●	●	●	●
O	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
Ⓔ Body/sealant combination					
	Body / **Seal**				
B	Copper alloy / FKM	●	●	●	●
Ⓕ Coil option					
2C	Std. — Grommet lead wire	●	●	●	●
2CS	Option — Grommet lead wire with surge suppressor	●	●	●	●
2G	Option — With DIN terminal box (Pg11)	●	●	●	●
2HS	Option — DIN terminal box with lamp/surge suppressor (Pg11)	●	●	●	●
2CG	Option — Conduit (CTC19)		●	●	●
2CH	Option — Conduit (G1/2)		●	●	●
3T	Option — With T type terminal box (G1/2)		●	●	●
3RS	Option — T type terminal box with lamp/surge suppressor (G1/2)		●	●	●
4A	Option — Grommet lead wire (Class 180 (H) or equivalent)	●	●	●	●
Ⓖ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					
Ⓗ No. of solenoid valves					
Blank	No masking plate	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●
Ⓘ Masking plate quantity					
Blank	No masking plate	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●

Select from the combinations indicated with ● in the table above.

[Example of model No.]

GFLB21-Z-3-B2C-1

Model: GFLB

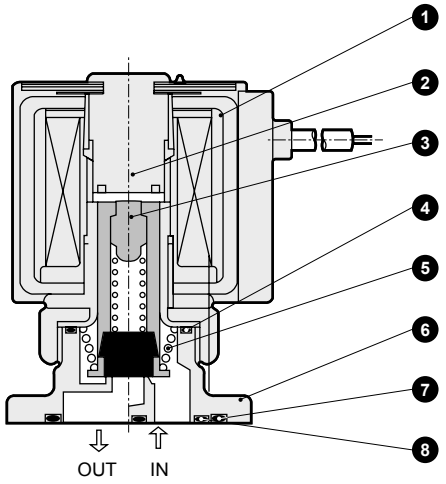
Ⓐ Series size : 22 mm
Ⓑ Circuit configuration : NC (open when energized)/common lubrication
Ⓒ Orifice size : ø1
Ⓓ Manifold station No. : 3 stations
Ⓔ Body/sealant combination : Body - copper alloy/sealant - FKM
Ⓕ Coil option : Grommet lead wire
Ⓖ Voltage : 100 VAC 50/60 Hz
Ⓗ Ⓘ : No masking plate

⚠ Precautions for model No. selection

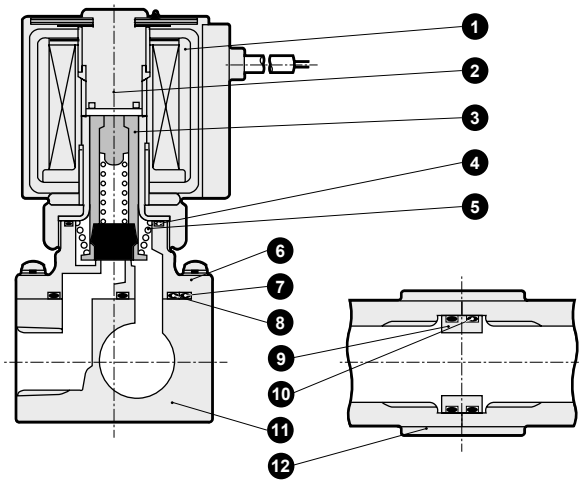
*1 : Select a desired manifold station No. from 2 to 10.
*2 : For the type with masking plate, designate Item Ⓓ as X, then designate the quantities of Ⓗ solenoid valves and Ⓘ masking plates.
*3 : Grommet lead wire (class 180 (H) or equivalent) of Item Ⓕ 4A is for AC only.
*4 : For GFLB21 Item Ⓕ 2G/2HS, the DIN terminal box (Pg9) is used.
*5 : The surge suppressor is built into the coil for Item Ⓕ 2CS and in the terminal box for 2HS and 3RS.
*6 : Other voltages may not be available. Contact CKD for details.
*7 : Solenoid valves are arranged from the right side with the sub-plate (individual) A port facing front.
*8 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFLB actuator



● GFLB manifold

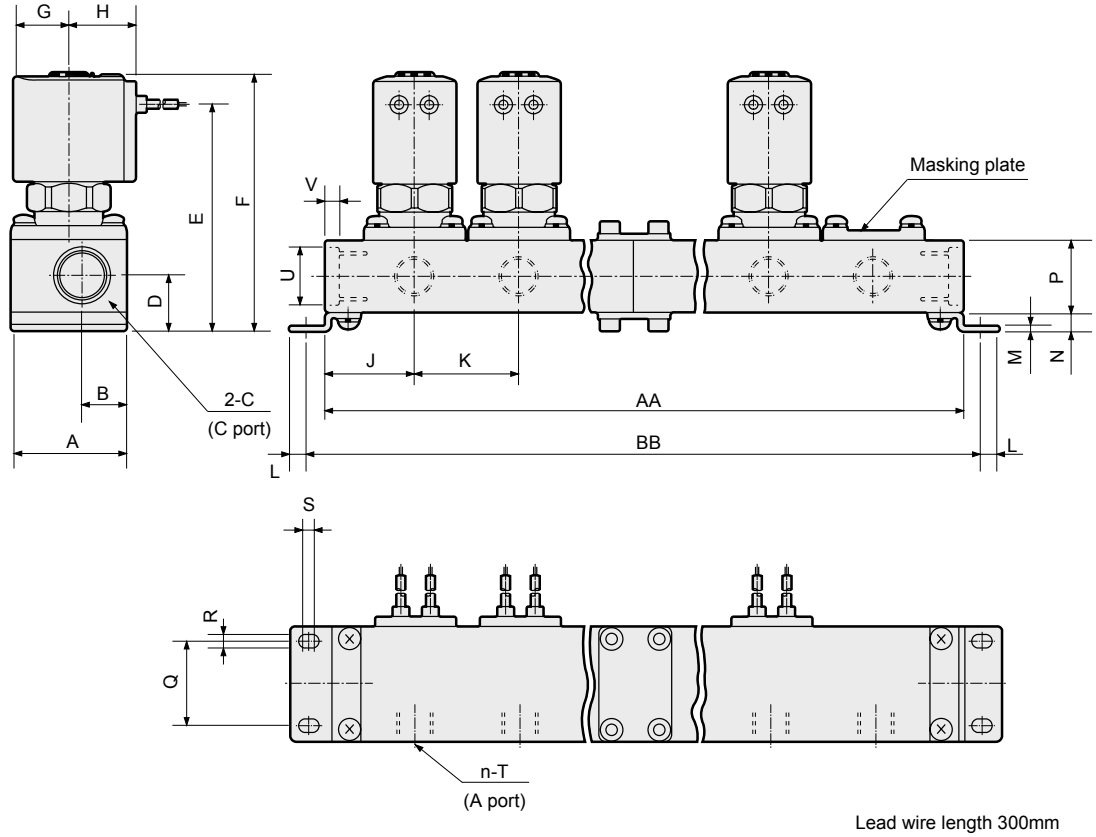


No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	7	O-ring	FKM	Fluoro rubber
2	Core assembly	SUS, Cu	Stainless steel, copper	8	O-ring	FKM	Fluoro rubber
3	Plunger assembly	SUS, C3604, FKM	Stainless steel, copper alloy, fluoro rubber	9	Connector	C3604	Copper alloy
4	O-ring	FKM	Fluoro rubber	10	O-ring	FKM	Fluoro rubber
5	Spring	SUS	Stainless steel	11	Sub-plate	C3604	Copper alloy
6	Body	C3771	Copper alloy	12	Connecting plate	SPC	Steel

*4 body mounting screws and 2 O-rings are attached to the actuator only.

Dimensions: Manifold CAD

● Grommet lead wire
GFLB*1-*-*-B2C



Lead wire length 300mm

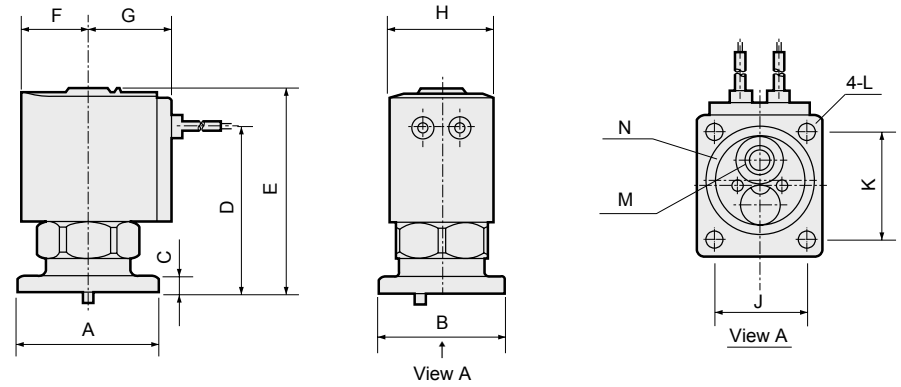
Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFLB2	AA	81	109	162	165	218	246	274	327	330
	BB	93	121	174	177	230	258	286	339	342
GFLB3	AA	97	133	194	205	266	302	338	399	410
	BB	109	145	206	217	278	314	350	411	422
GFLB4	AA	106	145	212	223	290	329	368	435	446
	BB	119	158	225	236	303	342	381	448	459
GFLB5	AA	118	163	236	253	326	371	416	489	506
	BB	131	176	249	266	339	384	429	502	519
Manifold configuration		2 stns. x 1	3 stns. x 1	2 stns. x 2	5 stns. x 1	3 stns. x 2	5 stns. + 2 stns.	5 stns. + 3 stns.	3 stns. x 3	5 stns. x 2

Note) Manifold configuration combines 2-station, 3-station and 5-station units.

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
GFLB2	32	13.5	Rc1/4	17.5	66.5	77	15.5	19.5	26	28	6	1.6	6.5	21	22	4.5	2.5	Rc1/8	ø17.3	4
GFLB3	38	14.5	Rc3/8	18.5	75.5	86.5	18.5	22.5	30	36	6	2	6.5	24	28	4.5	2.5	Rc1/4	ø19	4.6
GFLB4	42	16.5	Rc3/8	19.5	84	98	22.5	26	33	39	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	ø19	4.6
GFLB5	42	16.5	Rc3/8	19.5	90	105	26	29.5	36	45	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	ø19	4.6

Dimensions: Actuator

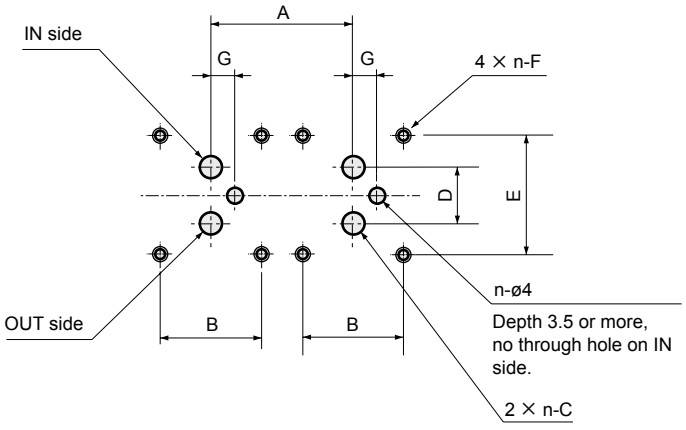
● Grommet lead wire
GFLB*1-*-O-B2C



Lead wire length 300mm

Model No.	A	B	C	D	E	F	G	H	J	K	L	Applicable O-ring	
												M	N
GFLB2	32	27	4	39	49.5	15.5	19.5	22	19	24	ø3.5	AS568-009	AS568-018
GFLB3	38	34	4.5	45	56	18.5	22.5	28	25	29	ø4.5	AS568-011	AS568-022
GFLB4	42	38	4.5	52.5	66.5	22.5	26	34	28	32	ø4.5	AS568-012	AS568-025
GFLB5	42	44	5.5	58.5	73.5	26	29.5	40	34	32	ø4.5	AS568-012	AS568-025

Actuator installation dimensions



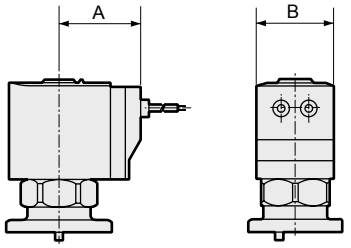
Machining drawing when using 2 actuators (n: number of stations)

Model No.	A	B	C	D	E	F	G
GFLB2	28 or more	19±0.1	ø3.5	10.6±0.1	24±0.1	M3 effective thread depth 6 or more	6±0.2
GFLB3	35 or more	25±0.1	ø5.5	13.8±0.1	29±0.1	M4 effective thread depth 6 or more	6±0.2
GFLB4	39 or more	28±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2
GFLB5	45 or more	34±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2

Optional dimensions

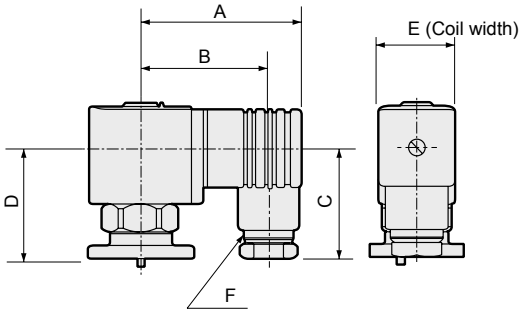
(Refer to the grommet lead wire actuator dimensions on page 138 for common dimensions.)

● Grommet lead wire with surge suppressor GFLB*1*-*-B 2CS



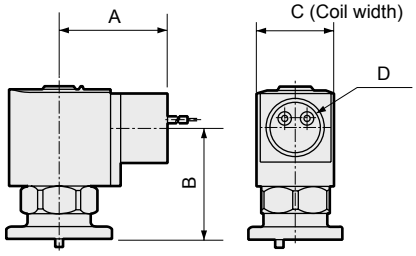
Model No.	A	B
GFLB2	26.5	22
GFLB3	29.5	28
GFLB4	34	34
GFLB5	37.5	40

● DIN terminal box (with lamp/surge suppressor) GFLB*1-*-*-B 2G 2HS



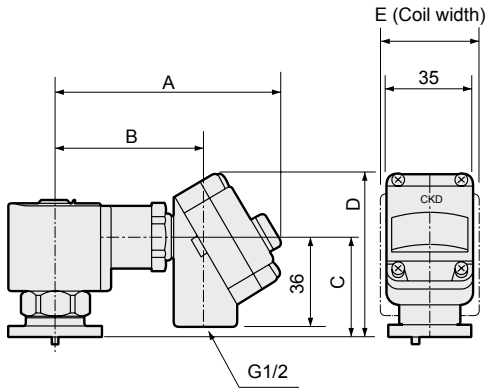
Model No.	A	B	C	D	E	F
GFLB2	53	44	38	32.5	22	Pg9
GFLB3	58.5	47	42	38.5	28	Pg11
GFLB4	62	50.5	42	46.5	34	Pg11
GFLB5	65.5	54	42	54	40	Pg11

● Conduit (CTC19 / G1/2) GFLB*1*-*-B 2CG 2CH



Model No.	A	B	C	D
GFLB3	39	40.5	28	CTC19 / G1/2
GFLB4	43	48	34	CTC19 / G1/2
GFLB5	46.5	55.5	40	CTC19 / G1/2

● T type terminal box (with lamp/surge suppressor) (G1/2) GFLB*1-*-*-B 3T 3RS



Model No.	A	B	C	D	E
GFLB3	92	60.5	40.5	66.5	28
GFLB4	96	64.5	48	74	34
GFLB5	99.5	68	55.5	81.5	40

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Dedicated direct acting 2, 3-port solenoid valves for each working fluid

Design/selection

⚠WARNING

1 Working fluids

(1) Since active gases cannot be used with the compressed air and dry air, contact CKD when these applications are required.

(2) Dedicated solenoid valve for each fluid. Select the solenoid valve based on the fluid. Consult with CKD when other kinds of fluids need to be used (for example, using air in a model for water) as specifications may differ.

2 Degree of protection

The degree of protection has passed IEC standard compliance tests, but performance greatly differs based on weather resistance and aging, so these values are not guaranteed.

Take measures to ensure that water, dust, etc., do not come in direct contact.

⚠CAUTION

1 Continuous energizing

Contact CKD when the 3-port valve for water (FWG) is to be continuously energized with the NO port pressurized.

2 Fluid viscosity

The fluid viscosity must be 50 mm^2/s or less.

Malfunctions could occur if the viscosity is higher than 50 mm^2/s.

Mounting, piping and wiring

⚠CAUTION

1 Piping

Always hold the socket with a wrench, etc., when tightening the piping to the NO port of the FWG Series.

2 Wiring

Refer to the connection methods on Intro Page 64 when wiring to a compact terminal box, DIN terminal box or T type terminal box.

Maintenance

⚠CAUTION

1 For compressed air/dry air/medium vacuum

(1) When disassembling or assembling the FAB/G or FGB/G Series, tighten the coil assembly mounting screws with the following tightening torques.

Model No.	Coil assembly mounting screw
FAB/G1	0.3 to 0.7 Nm
FAB/G2/FGB/G2	0.7 to 1.1 Nm
FAB/G3/FGB/G3	1.1 to 1.8 Nm
FAB/G4/FGB/G4	1.1 to 1.8 Nm
FAB/G5/FGB/G5	2.0 to 3.0 Nm

(2) When disassembling or assembling the FAB32/42/52 or FVB Series, tighten the core assembly and body with the following tightening torques.

Model No.	Core assembly mounting screw
FVB2	12 to 18 Nm
FAB32/FVB3	16 to 24 Nm
FAB42/FVB4	21 to 31 Nm
FAB52/FVB5	21 to 31 Nm

2 For water/hot water/oil

When disassembling or assembling the FWB/G, FHB or FLB Series and tightening the core assembly and body, and core assembly and socket, first temporarily tighten until the core assembly contacts the O-ring to prevent entanglement of the spring (outer spring). Then tighten with the following torques.

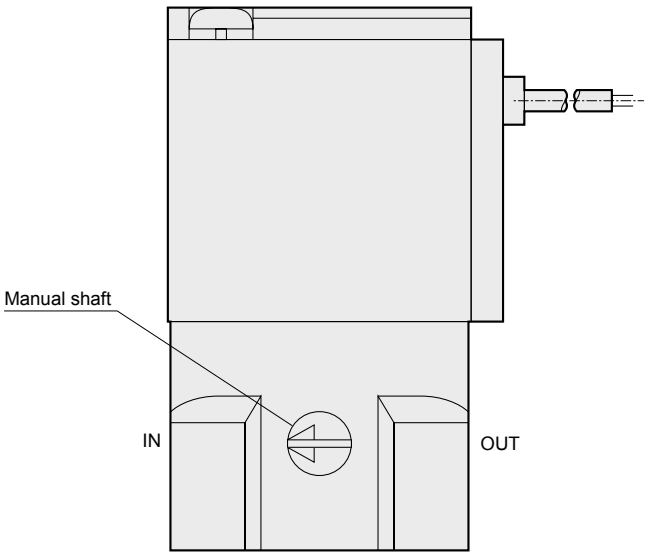
Model No.	Core assembly tightening torque	Socket tightening torque
FWB2/FHB2/FLB2	12 to 18 Nm	———
FWG2		3 to 5 Nm
FWB3/FHB3/FLB3	16 to 24 Nm	———
FWG3		6 to 10 Nm
FWB4/FHB4/FLB4	21 to 31 Nm	———
FWG4		10 to 14 Nm
FWB5/FHB5/FLB5	21 to 31 Nm	———
FWG5		10 to 14 Nm

⚠ Manual operation (optional) (FAB/FAG/FGB/FGG/GFAB/GFAG/GFGB/GFGG Series)

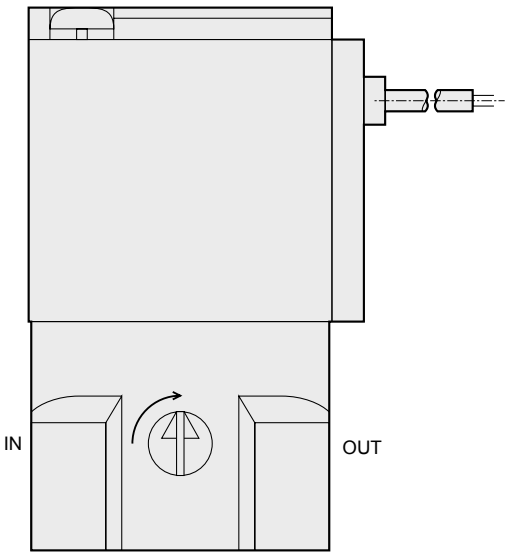
1 Manual locking (available for FAB/FAG/FGB/FGG Series)

Opening : Insert a flathead screwdriver into the slit on the manual adjustment shaft, and turn it approx. 90° to the right. The plunger assembly will rise and the valve will open. (For the 3-port valve, the NC side valve seat will open and the NO side valve seat will close.) The open state is held even when the screwdriver is removed.

Closing : Turn the manual adjustment shaft to the left from the open position to the close position. The plunger will lower and the valve will close. (For the 3-port valve, the NC side valve seat will close and the NO side valve seat will open.)



Valve closed
(Slit is in horizontal position)

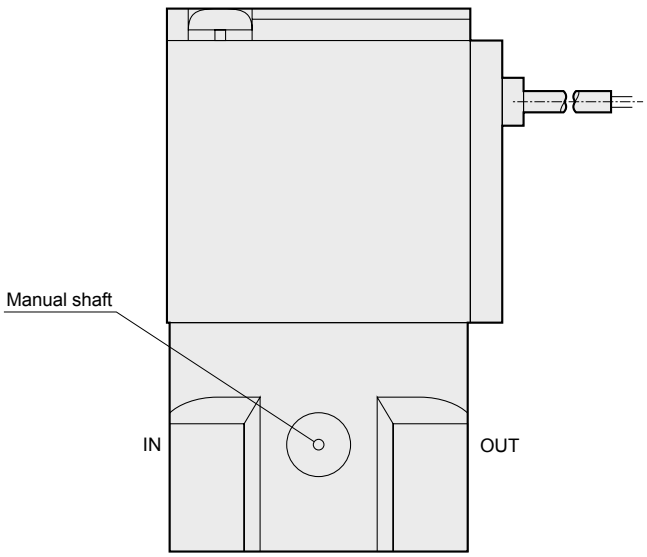


Valve opened
(Slit is in vertical position)

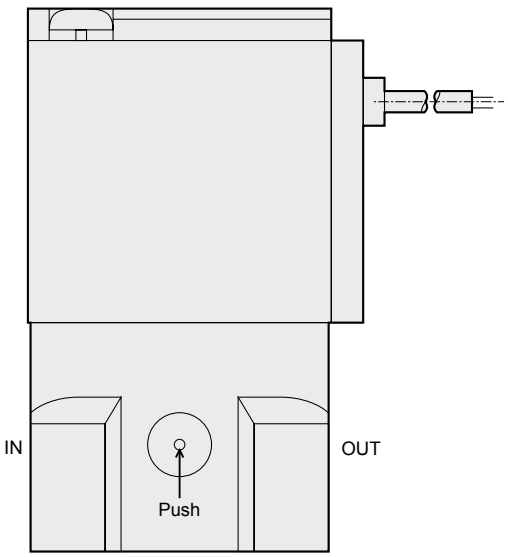
2 Manual non-locking

Opening : When the concave section at the center of the manual shaft is pressed in with the fine tip of a Phillips screwdriver, the plunger assembly will rise and the valve will open. (For the 3-port valve, the NC side valve seat will open and the NO side valve seat will close.)

Closing : When the screwdriver is removed from the manual shaft, the shaft will return to the front with inner spring force, the plunger assembly will lower and the valve will close. (For the 3-port valve, the NC side valve seat will close and the NO side valve seat will open.)



Valve closed state



Valve open state

MEMO

Multi-fluid control 2, 3-port solenoid valve
General purpose

AB/AG

Multi-fluid control direct acting 2, 3-port solenoid valve General purpose

■ **For air/vacuum/water/oil**

Overview

The general purpose valve series enables control of various types of fluids including water, air, oil and vacuums. In addition to the high reliability and high quality of the valve, a variety of options and variations are available.

Features

Control of multi-fluids

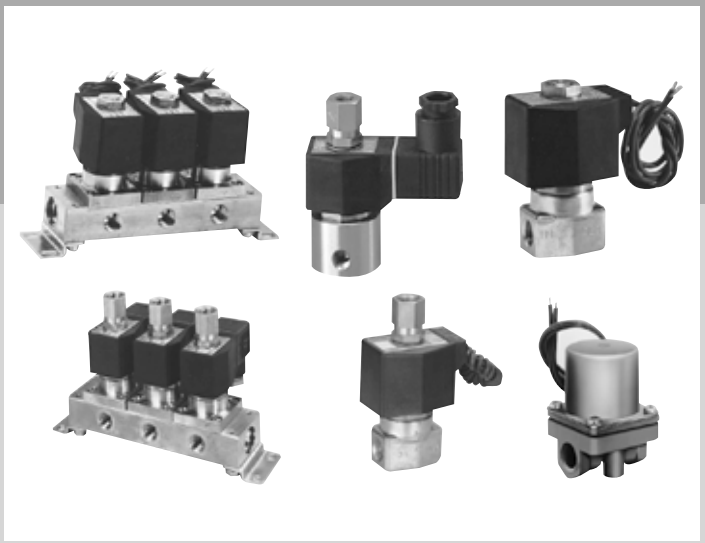
Supports various fluids by combining body and sealant materials as desired.

Abundant options

With options including open frame, coil with diode and terminal boxes.

A wide range of series and variations

Select from a wide range, from direct acting compact Rc1/8 (port size) to Rc1.



CONTENTS

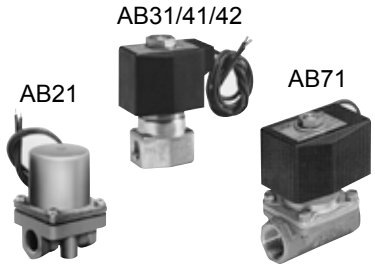
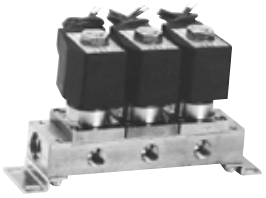
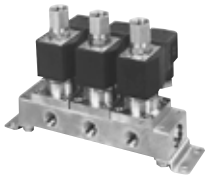
⚠ Always read the precautions in the Introduction and on page 242 before use.

Series variation

Multi-fluid control direct acting 2, 3-port solenoid valve

General purpose

* Refer to page 328 for dry air (-Z).

No. of ports	Model		Configuration	Actuation		Air	Low vacuum [1.33 x 10^2 Pa (abs)]	
2-port		AB21	Single unit	NC (open when energized)		●		
		AB31				●	●	
		AB41				●	●	
		AB42		NO (closed when energized)		●	●	
		AB71		NC (open when energized)		●		
		GAB312	Manifold	NC (open when energized)	Common supply	●	●	
		GAB352			Individual supply	●	●	
		GAB412			Common supply	●	●	
		GAB452			Individual supply	●	●	
		GAB422		NO (closed when energized)	Common supply	●	●	
3-port		AG31	Single unit	Universal		●	●	
		AG41				●	●	
		AG33		NC pressurization		●	●	
		AG43				●	●	
		AG34		NO pressurization		●	●	
		AG44				●	●	
	Manifold 	GAG31	Manifold	Universal	Common supply/individual exhaust	●	●	
		GAG35			Common supply separate flow	●	●	
		GAG41			Common supply/individual exhaust	●	●	
		GAG45			Common supply separate flow	●	●	
	Actuator 	GAG33		NC pressurization	Common supply/individual exhaust	●	●	
		GAG43				●	●	
		GAG34	Actuator	NO pressurization		●	●	
		GAG44				●	●	

Working fluid					Port size						Page
Water	Kerosene	Oil [50 mm²/s or less]	Hot water	Steam	Rc1/8	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	
●		●			●	●					150
●	●	●	●	●	●*4	●*4					154
●	●	●	●	●		●*4	●*4	●*4			154
●	●	●	●	●		●*4	●*4				154
●	●	●*1						●	●	●	168
●	●	●	●	●		●*2	●*2				172
●	●	●	●	●		●*2	●*2				172
●	●	●	●	●		●*2	●*2				172
●	●	●	●	●		●*2	●*2				172
●	●	●	●	●		●*2	●*2				182
●	●	●	●	●	●*4	●*4					190
●	●	●	●	●		●*4	●*4				190
●	●	●	●	●	●*4	●*4					208
●	●	●	●	●		●*4	●*4				208
●	●	●	●		●*4	●*4					226
●	●	●	●			●*4	●*4				226
●	●	●	●	●	●*2 *3	●*2 *3					198
●	●	●	●	●	●*2 *3	●*2 *3					198
●	●	●	●	●		●*2 *3	●*2 *3				198
●	●	●	●	●		●*2 *3	●*2 *3				198
●	●	●	●	●	●*2 *3	●*2 *3					216
●	●	●	●	●		●*2 *3	●*2 *3				216
●	●	●	●		●*2 *3	●*2 *3					234
●	●	●	●			●*2 *3	●*2 *3				234

Refer to page 148 for details on the coil system.

*1 : 20 mm²/s for AB71 Series.
*2 : Port A: Rc1/4, port C: Rc3/8
*3 : ● indicates NO port.
*4 : Refer to each How to order column for the thread.

Coil selection guide

● Coil housing types and selection guide

Various types are available according to the application.
Refer to the structure and features to select the optimum model.

For direct acting 2, 3-port solenoid valve (AB/GAB/AG/GAG)

Coil system

Open frame

				Appearance
Thermal class B mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP61 or equivalent ● Cannot be used outdoors	Grommet lead wire	● Lead wire length 300 mm	 Blank / 6C
Thermal class B mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP61 or equivalent ● Cannot be used outdoors	DIN terminal box	● Easy wiring and maintenance ● Enhanced electrical safety (by grounding the ground terminal) ● Indicator lamp available (Optional - 100 VAC, 200 VAC and 24 VDC)	 2E 2G 2H / 6E 6G 6H
Thermal class B mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached	 3A
Thermal class B mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP21 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC)	 3M 3N
Thermal class B mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC)	 3I 3J
Thermal class H taped	● AC dedicated (50/60 Hz common) ● High temperature fluids and high ambient temperatures usable ● Degree of protection: IP00 ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.	 4A
		HP terminal box	● Easy wiring ● Indicator lamp available (optional - 100 VAC, 200 VAC)	 4M 4N
Thermal class B mold with diode	● Diode in the coil converts AC to DC. ● Perfect for places where whirring noise should be prevented. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.	 5A
Thermal class B mold with diode	● Diode in the coil converts AC to DC. ● Perfect for places where whirring noise should be prevented. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP21 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100/200 VAC)	 5M 5N
Thermal class B mold with diode	● Diode in the coil converts AC to DC. ● Perfect for places where whirring noise should be prevented. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100/200 VAC)	 5I 5J
		Conduit	● Use a conduit (CTC19 or G1/2) when using direct conduit wiring for the open frame lead wire.	 G H

● Repair parts compatibility table by coil option

Coil option code	Supported voltage	Repair parts			
		Plunger assembly	Core assembly	Coil assembly	Actuator assembly *1
0 or blank	AC	○	○	○	-
6C *2, *3	DC	-	-	-	○
2E 2G 2H	AC	○	○	○	-
2E 2G 2H	DC	○	○	○	-
6E 6G 6H *2, *3	DC	-	-	-	○
3A	AC	○	○	○	-
	DC		○	○	-
3M 3N	AC	○	○	○	-
	DC		○	○	-
3I 3J	AC	○	○	○	-
	DC		○	○	-
4A	AC	○	○	○	-
4M 4N	AC	○	○	○	-
5A	AC	○	○	○	-
5M 5N	AC	○	○	○	-
5I 5J	AC	○	○	○	-

*1 : The actuator assembly includes the coil assembly, core assembly and plunger assembly.
*2 : As 6C, 6E, 6G and 6H are dedicated parts, they are provided as part of the actuator assembly.
*3 : AB41 only.

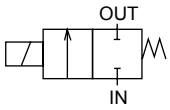
Direct acting 2-port solenoid valve
General purpose

AB21 Series

- NC (open when energized)
- Port size: Rc1/8, Rc1/4

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AB21
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0 to 1.5 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	1.5 (≈220 psi, 15 bar)
Proof pressure (water pressure) MPa	3 (≈440 psi, 30 bar)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 50 (122°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm³/min(ANR)	0.2 or less
Mounting orientation	Unrestricted

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consumption (W)		Weight (kg)
			Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC 50/60 Hz	DC	
			AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz			
AB21-01-1	Rc1/8	1.5	1.5	1.0	1.5	1.0	0.9	1.0	100 VAC 50/60 Hz *2	11	9	15.4	12.6	5.5/4.2	7	0.23 (Aluminum)
AB21-01-2		2.0	1.0	0.6	1.0	0.6	0.5	0.6								
AB21-01-3		3.0	0.7	0.2	0.4	0.2	0.25	0.2								
AB21-01-5		4.0	0.4	0.1	0.2	0.1	0.1	0.1								
AB21-02-1	Rc1/4	1.5	1.5	1.0	1.5	1.0	0.9	1.0	200 VAC 50/60 Hz *2							0.36 (Copper alloy)
AB21-02-2		2.0	1.0	0.6	1.0	0.6	0.5	0.6								
AB21-02-3		3.0	0.7	0.2	0.4	0.2	0.25	0.2								
AB21-02-5		4.0	0.4	0.1	0.2	0.1	0.1	0.1	24 VDC							

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics		
			C[dm³/(s·bar)]	b	Cv
NC (open when energized)					
AB21-01-1	Rc1/8	1.5	0.29	0.51	0.1
AB21-01-2		2.0	0.53	0.55	0.15
AB21-01-3		3.0	1.1	0.52	0.3
AB21-01-5		4.0	1.8	0.35	0.4
AB21-02-1	Rc1/4	1.5	0.29	0.51	0.1
AB21-02-2		2.0	0.53	0.55	0.15
AB21-02-3		3.0	1.1	0.52	0.3
AB21-02-5		4.0	1.8	0.35	0.4

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz).

How to order

AB21 - 01 - 1 - A 00B - AC100V

- AB21: Model No.
- 01: Ⓐ Port size
- 1: Ⓑ Orifice size
- A: Ⓒ Body/sealant combination *1 *2 *4
- 00B: Ⓓ Option
- AC100V: Ⓔ Rated voltage *3

Code	Description
Ⓐ Port size	
01	Rc1/8
02	Rc1/4

Ⓑ Orifice size	
1	ø1.5
2	ø2
3	ø3
5	ø4

Ⓒ Body/sealant combination

		Body	Seal	Remarks
Blank	Std.	Aluminum	Nitrile rubber	Air/kerosene/oil
2	Option		Fluoro rubber	Air/kerosene/oil
A		Copper alloy	Nitrile rubber	Air/water/kerosene/oil
B			Fluoro rubber	Air/water/kerosene/oil

Refer to Intro Page 39 for reference on material combinations.

Ⓓ Option		
Blank	None	
00B	With mounting plate	

Ⓔ Rated voltage		
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz	For other voltages, contact CKD.
AC200V	200 VAC 50/60 Hz, 220 VAC 60 Hz	
DC24V	24 VDC	

[Example of model No.]

AB21-01-1-A00B-AC100V

Model: AB21

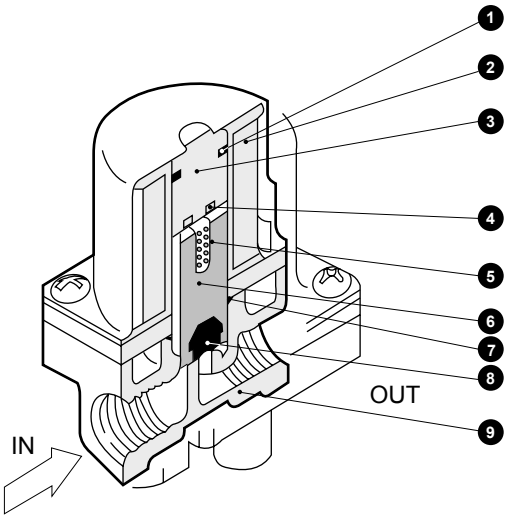
- Ⓐ Port size : Rc1/8
- Ⓑ Orifice size : ø1.5
- Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓓ Option : Mounting plate
- Ⓔ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

⚠ Precautions for model No. selection

*1 : For Ⓑ 1 (ø1.5 orifice), only Item Ⓒ A/B are available.
*2 : When the fluid is water, select the copper alloy (option code: A or B) body.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Leave Item Ⓒ blank for standard. However, to select 00B for Item Ⓓ, indicate 0 for Item Ⓒ.

Internal structure and parts list

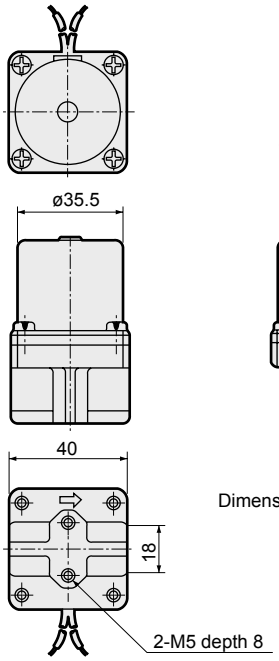
● AB21 Series



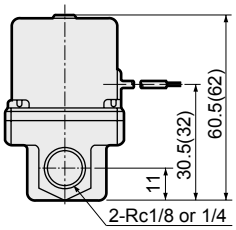
No.	Part name	Material
1	O-ring	Fluoro rubber
2	Coil	-
3	Core assembly	Stainless steel
4	Shading coil	Copper
5	Plunger spring	Stainless steel
6	Plunger	Stainless steel
7	O-ring	Nitrile or fluoro rubber
8	Seal	Nitrile or fluoro rubber
9	Body	Aluminum or copper alloy

Dimensions CAD

● AB21-01/02-1 to 5-*

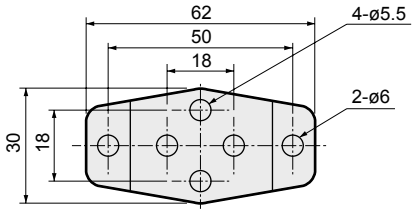


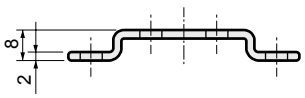
* Lead wire length
250 mm



Dimensions shown in ( ) are for copper alloy body.

● Mounting plate
AB21-01/02-1 to 5-*00B





Mounting plate
No,1
GE-100106

MEMO

Direct acting 2-port solenoid valve, single unit
General purpose

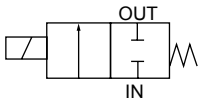
AB31/AB41 Series ● NC (open when energized)
AB42 Series ● NO (closed when energized)

● Port size: Rc1/8 to Rc1/2

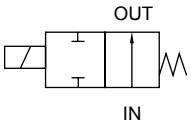
CE Refer to the Ending for details. RoHS CAD

JIS symbol

● AB31/41: NC (open when energized)



● AB42: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications	
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water	Steam
Working pressure differential MPa	0 to 5 (refer to max. working pressure differential in individual specifications.)		
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)		
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)	-10 (14°F) to 184 (363.2°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)	
Thermal class	Class 130 (B)	Class 180 (H)	
Atmosphere	Place free of corrosive gas and explosive gas		
Valve structure	Direct acting poppet structure		
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)		300 or less (air)
Mounting orientation	Unrestricted		
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/EPM rubber	Copper alloy/PTFE

*1: No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Max. working pressure differential (MPa)							Max. working pressure (MPa)	Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
			Air		Water/hot water/kerosene		Oil (50 mm^2/s)		Steam			Holding		Starting		AC	DC	
			AC	DC	AC	DC	AC	DC	AC			50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
NC (open when energized)																		
AB31- 01/02 -1	Rc1/8 Rc1/4	1.5	2.5	2.5	2.5	2.5	2.5	2.5	1.0	5 (≈730 psi, 50 bar) (Fluid: Steam For 1)	100 VAC 50/60 Hz *9 200 VAC 50/60 Hz *9 12 VDC 24 VDC 48 VDC 100 VDC	12	10	17	14	5.2/3.8	11 (8.1)*5	0.35
-2		2.0	1.5	1.5	1.5	1.5	1.5	1.5	1.0									
-3		3.0	1.0	0.5	0.7	0.5	0.5	0.5	0.7									
-4		3.5	0.6	0.4	0.5	0.4	0.4	0.4	0.5									
-5		4.0	0.4	0.25	0.3	0.25	0.25	0.25	0.3									
-6		5.0	0.2	0.15	0.15	0.15	0.15	0.15	0.15									
AB41- 02/03 -1	Rc1/4 Rc3/8	1.5	5.0	4.0	4.5	4.0	4.0	4.0	1.0			18	15	29	24	6.7/5.7	11 (10.4)*5 (7)*7	0.43 (Rc1/4) 0.45 (Rc3/8)
-2		2.0	3.0	2.5	2.7	2.5	2.5	2.5	1.0									
-3		3.0	1.5	0.9	1.3	0.9	0.9	0.9	1.0									
-4		3.5	1.2	0.6	0.9	0.6	0.6	0.6	0.9									
-5		4.0	1.0	0.5	0.7	0.5	0.5	0.5	0.7									
-6		5.0	0.6	0.25	0.4	0.25	0.25	0.25	0.4									
-7		7.0	0.25	0.1	0.2	0.1	0.15	0.1	0.2									
AB41- 03/04 -8	Rc3/8 Rc1/2	10.0	0.1	0.05 (0.03) *8	0.1	0.05 (0.03) *8	0.05	0.05 (0.03) *8										0.54
NO (closed when energized)																		
AB42- 02/03 -1	Rc1/4 Rc3/8	1.5	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2 (≈290 psi, 20 bar) (Fluid: Steam For 1)		22	18	35	29	8.7/6.7	15.5 (14)*5	0.50 (Rc1/4) 0.52 (Rc3/8)
-2		2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0									
-3		3.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7									
-4		3.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5									
-5		4.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4									
-6		5.0	0.25	0.25	0.25	0.25	0.25	0.25	0.25									
-7		7.0	0.15	0.15	0.15	0.15	0.15	0.15	0.15									

*1 : The model numbers above are for the basic port size (Rc) and orifice size. Refer to How to order for other combinations (e.g., for steam).
*2 : The port size model No. is 01 for Rc1/8 (6A), 02 for Rc1/4 (8A), 03 for Rc3/8 (10A) and 04 for Rc1/2 (15A).
*3 : Refer to DC column for the max. working pressure differential of coil with diode.
*4 : The voltage fluctuation range must be within ±10% of the rated voltage.
*5 : Power consumption of coil housings 2E/2G/2H.
*6 : When using at low vacuum, vacuum the OUT port side.
*7 : Power consumption of coil housings 6C/6E/6G/6H.
*8 : DC voltage of coil housings 2E/2G/2H, and max. working pressure differential of coil housings 6C/6E/6G/6H.
*9 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant	Fluoro rubber		Ethylene propylene rubber		PTFE	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1) °C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)	-10 to 60	-10 to 184
Ambient temperature °C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)				300 or less (air)	

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with light.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics		
			C[dm^3/(s·bar)]	b	Cv
NC (open when energized)					
AB31-$^{01}_{02}$-1	Rc1/8 Rc1/4	1.5	0.29	0.53	0.1
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.7 [1.5]	0.49 [0.47]	0.42 [0.40]
-5		4.0	2.1 [1.9]	0.48 [0.47]	0.54 [0.48]
-6		5.0	3.0 [2.6]	0.42 [0.38]	0.8 [0.62]
AB41-$^{02}_{03}$-1	Rc1/4 Rc3/8	1.5	0.29	0.53	0.1
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.7 [1.5]	0.49 [0.47]	0.42 [0.40]
-5		4.0	2.1 [1.9]	0.48 [0.47]	0.54 [0.48]
-6		5.0	3.0 [2.6]	0.42 [0.38]	0.8 [0.62]
-7		7.0	4.8 [4.6]	0.29 [0.37]	1.0 [0.82]
AB41-$^{03}_{04}$-8	Rc3/8 Rc1/2	10.0	9.3 [8.1]	0.36 [0.31]	1.88 [1.5]
NO (closed when energized)					
AB42-$^{02}_{03}$-1	Rc1/4 Rc3/8	1.5	0.29	0.53	0.1
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.7 [1.5]	0.49 [0.47]	0.42 [0.40]
-5		4.0	2.1 [1.9]	0.48 [0.47]	0.54 [0.48]
-6		5.0	3.0 [2.6]	0.42 [0.38]	0.8 [0.62]
-7		7.0	4.8 [4.6]	0.29 [0.37]	1.0 [0.82]

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2 : Dimensions shown in [ ] are for stainless steel body.

How to order

● NC (open when energized)

AB31 - 02 - 3 - 0 3A A B G S - AC100V

AB41

Model No.

Ⓓ Coil housing Ⓖ Other options Ⓘ Rated voltage

Ⓔ Manual override (locking) Ⓗ With surge suppressor

Ⓕ Mounting plate

Ⓐ Port size

Ⓑ Orifice size

Ⓒ Body/sealant combination

*1
*2
*3
*4
*5
*6
*7

Code	Description	Code	Description	Code	Description	Model No. AB31	AB41	AB41 Low pressure large flow
Ⓐ Port size								
01	Rc1/8	**1G**	G1/8	**1N**	1/8NPT	●		
02	Rc1/4	**2G**	G1/4	**2N**	1/4NPT	●	●	
03	Rc3/8	**3G**	G3/8	**3N**	3/8NPT		●	●
04	Rc1/2	**4G**	G1/2	**4N**	1/2NPT			●
Ⓑ Orifice size								
1	ø 1.5					●	●	
2	ø 2					●	●	
3	ø 3					●	●	
4	ø 3.5					●	●	
5	ø 4					●	●	
6	ø 5					●	●	
7	ø 7						●	
8	ø10							●

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks			
Blank	Std.	Copper alloy or bronze	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●	●
B	Option		Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *2)	●	●	●
C			PTFE		Steam (up to 184°C *2)	●	●	
V			Fluoro rubber	Vacuum inspection	Low vacuum	●	●	●
D		Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●	●
E			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *2)	●	●	●
F			PTFE		Steam (up to 184°C *2)	●	●	
W			Fluoro rubber	Vacuum inspection	Low vacuum	●	●	●
H		Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●	●
J			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *2)	●	●	●
K			PTFE		Steam (up to 184°C *2)	●	●	
P			Ethylene propylene rubber		Hot water (up to 90°C *2)	●	●	●
L		Stainless steel	Nitrile rubber		Air/water/low vacuum/kerosene (up to 60°C)	●	●	●
M			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *2)	●	●	●
N			PTFE		Steam (up to 184°C *2)	●	●	
R			Ethylene propylene rubber		Hot water (up to 90°C *2)	●	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ Coil housing

Description						
Blank	Std.	Grommet lead wire		●	●	●
2E	Option	With DIN terminal box	(G1/2)	●	●	●
2G		With DIN terminal box	(Pg11)	●	●	●
2H		DIN terminal box with small lamp	(Pg11)	●	●	●
3A		Open frame	Lead wire	●	●	●
3M			With HP terminal box (G1/2)	●	●	●
3N			HP terminal box with lamp (G1/2)	●	●	●
3I			HP terminal box (IP65 or equivalent) (G1/2)	●	●	●
3J			HP terminal box with lamp (IP65 or equivalent) (G1/2)	●	●	●
4A		Open frame (Thermal class 180 (H))	Lead wire	●	●	●
4M			With HP terminal box (G1/2)	●	●	●
4N			HP terminal box with lamp (G1/2)	●	●	●
5A		Open frame (diode integrated)	Lead wire	●	●	●
5M			With HP terminal box (G1/2)	●	●	●
5N			HP terminal box with lamp (G1/2)	●	●	●
5I			HP terminal box (IP65 or equivalent) (G1/2)	●	●	●
5J			HP terminal box with lamp (IP65 or equivalent) (G1/2)	●	●	●
6C		Grommet lead wire	7W		●	●
6E		With DIN terminal box	(G1/2) 7W		●	●
6G		With DIN terminal box	(Pg11) 7W		●	●
6H		DIN terminal box with small lamp	(Pg11) 7W		●	●

The combinations indicated with ● in the above table are available.

[Example of model No. 1]

AB41-02-3-000AS-AC100V

Model: AB41

Ⓐ Port size : Rc1/4
Ⓑ Orifice size : ø3
Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓓ Coil housing : Grommet lead wire
Ⓔ Manual override (locking) : With
Ⓕ/Ⓖ/Ⓗ : None
Ⓗ Surge suppressor : With surge suppressor
Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : Leave blank for standard. However, to select options in Ⓓ, Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 0 for Item Ⓒ.
*2 : When Item Ⓓ 4A/4M/4N is selected.
*3 : The body for low pressure large flow rate AB41-$^{03}_{04}$-8 is bronze (standard) or stainless steel (optional).
*4 : For option codes V and W, vacuum is inspected at "leakage rate: 1.33 x 10^{-6} Pa·m^3/s or less".
*5 : When using low pressure large flow rate AB41-$^{03}_{04}$-8 with Item Ⓒ V/W, DC voltage type and Item Ⓓ 5A/5M/5N/5I/5J are not available.
*6 : The ethylene propylene rubber seal combination (Item Ⓒ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*7 : When Item Ⓒ is C, F, K, P, N or R, the Item Ⓓ coil housings 6C, 6E, 6G and 6H cannot be selected.

Notes for Ⓓ

*8 : Leave blank for the standard coil housing. However, to select options in Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 00 for Item Ⓓ.
*9 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*10 : A DC coil for steam is available for AB41. Contact CKD for more information.
*11 : For 6C/6E/6G/6H, only AB41 is available.
*12 : The coil housings 6C, 6E and 6G are 12 VDC and 24 VDC dedicated. 6H is 24 VDC dedicated.

Code	Description		Model No. AB31	AB41	AB41 Low pressure large flow
Ⓔ Manual override (locking)					
Blank	None		●	●	●
A	With manual override		●	●	
Ⓕ Mounting plate					
Blank	None		●	●	●
B	With mounting plate		●	●	●
Ⓖ For cable gland and conduit combinations, refer to the compatible coil housings below.					
Blank	None		●	●	●
D	A-15a	Marine cable gland	●	●	●
E	A-15b	Marine cable gland	●	●	●
F	A-15c	Marine cable gland	●	●	●
G	CTC19	Conduit piping	●	●	●
H	G1/2	Conduit piping	●	●	●
Ⓗ For surge suppressor combinations, refer to the compatible coil housings below.					
Blank	Without surge suppressor		●	●	●
S	With surge suppressor		●	●	●
Ⓘ Rated voltage					
Refer to the table on the right for the voltage.			●	●	●

Ⓘ Rated voltage	
Blank	100 VAC, 200 VAC
2E	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2G	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2H	100 VAC, 200 VAC, 24 VDC
3A	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3M	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3N	100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J	100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A	100 VAC, 200 VAC
4M	100 VAC, 200 VAC
4N	100 VAC, 200 VAC
5A	100 VAC, 200 VAC
5M	100 VAC, 200 VAC
5N	100 VAC, 200 VAC
5I	100 VAC, 200 VAC
5J	100 VAC, 200 VAC
6C	12 VDC, 24 VDC
6E	12 VDC, 24 VDC
6G	12 VDC, 24 VDC
6H	24 VDC

● Compatible coil housing

		Blank	2E	2G	2H	3A	3M	3N	3I	3J	4A	4M	4N	5A	5M	5N	5I	5J	6C	6E	6G	6H
Ⓖ Cable gland/conduit																						
D	A-15a						●	●	●	●		●	●		●	●	●	●				
E	A-15b						●	●	●	●		●	●		●	●	●	●				
F	A-15c						●	●	●	●		●	●		●	●	●	●				
G	CTC19					●					●			●								
H	G1/2				●	●					●			●								●
Ⓗ For surge suppressor compatible coil housings, refer to page 156.																						
S	With surge suppressor	●	●	●	●	●	●	●	●	●	●								●	●	●	

⚠ Precautions for model No. selection

Notes for Ⓔ to Ⓗ

*13: Manual override (Item Ⓔ A) cannot be mounted on the low pressure large flow rate AB41-$^{03}_{04}$-8.

*14: When Item Ⓒ is C, F, K, N, V or W, the manual override (Item Ⓔ A) is not available.

*15: For Ⓖ, select an option from D, E, F, G and H.

*16: The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.

*17: As standard, the surge suppressor is built into the the coil with diode and the 24 VDC coil (Item Ⓓ 2H/6H), so the surge suppressor code S cannot be selected.

*18: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) and the coil option 6C/6E/6G/6H are selected.

Notes for Ⓘ

*20: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.

*21: For voltages other than above, contact CKD.

*22: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Blank 6C		● Grommet lead wire 300 mm
2E 2G 2H 6E 6G 6H		● DIN terminal box
3A 4A 5A		● Open frame lead wire 300 mm ● 4A (Thermal class 180 (H)) ● 5A (diode integrated)
3M 3N 4M 4N 5M 5N		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)
G H		● Conduit ● G(CTC19) ● H(G1/2)

Refer to page 148 for coil selection.

How to order

● NO (closed when energized)

AB42 - 02 - 4 - L 3A A B □ □ - AC100V

- AB42: Model No.
- 02: Ⓐ Port size
- 4: Ⓑ Orifice size
- L: Ⓒ Body/sealant combination *1 *2 *3 *4
- 3A: Ⓓ Coil housing
- A: Ⓔ Manual override (locking)
- B: Ⓕ Mounting plate
- □: Ⓖ Other options
- □: Ⓗ With surge suppressor
- AC100V: Ⓘ Rated voltage

Code	Description	Code	Description	Code	Description
Ⓐ Port size					
02	Rc1/4	**2G**	G1/4	**2N**	1/4NPT
03	Rc3/8	**3G**	G3/8	**3N**	3/8NPT

Ⓑ Orifice size	
1	ø1.5
2	ø2
3	ø3
4	ø3.5
5	ø4
6	ø5
7	ø7

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)
B			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *2)
C			PTFE		Steam (up to 184°C *2)
V			Fluoro rubber	Vacuum inspection	Low vacuum
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)
E			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *2)
F			PTFE		Steam (up to 184°C *2)
W			Fluoro rubber	Vacuum inspection	Low vacuum
H		Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)
J			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *2)
K			PTFE		Steam (up to 184°C *2)
P			Ethylene propylene rubber		Hot water (up to 90°C *2)
L		Stainless steel	Nitrile rubber		Air/water/low vacuum/kerosene (up to 60°C)
M			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *2)
N			PTFE		Steam (up to 184°C *2)
R			Ethylene propylene rubber		Hot water (up to 90°C *2)

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓘ

Refer to page 159 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]
AB42-02-1-AC100V
Model: AB42
- Ⓐ Port size : Rc1/4
- Ⓑ Orifice size : ø1.5
- Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓓ Coil housing : Grommet lead wire
- Ⓔ to Ⓗ : None
- Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]
AB42-03-6-000AS-AC100V
Model: AB42
- Ⓐ Port size : Rc3/8
- Ⓑ Orifice size : ø5
- Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓓ Coil housing : Grommet lead wire
- Ⓔ Manual override (locking) : Selected
- Ⓕ/Ⓖ : None
- Ⓗ Surge suppressor : With surge suppressor
- Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : Leave blank for standard. However, to select options in Ⓓ,Ⓔ,Ⓕ,Ⓖ or Ⓗ, indicate 0 for Item Ⓒ.
*2 : When Item Ⓓ 4A/4M/4N is selected.
*3 : For option codes V and W, vacuum is inspected at "leakage rate: 1.33 x 10^{-6} Pa·m^3/s or less".
*4 : The ethylene propylene rubber seal combination (Item Ⓒ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)

For Items Ⓓ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓗ are not required, they should be left blank.

Ⓓ Coil housing			Ⓔ	Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description			Manual override (Locking)	Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
Blank	Std.	Grommet lead wire	**A**	**B**						**S**	100 VAC, 200 VAC
2E		With DIN terminal box (G1/2)									100 VAC, 200 VAC
2G		With DIN terminal box (Pg11)									12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp (Pg11)							**H**		100 VAC, 200 VAC, 24 VDC
3A	Option	Open frame: Lead wire (IP65 or equivalent)	**A**	**B**				**G**	**H**	**S**	100 VAC, 200 VAC
3M		Open frame: With HP terminal box (G1/2)			**D**	**E**	**F**				12 VDC, 24 VDC, 48 VDC, 100 VDC
3N		Open frame: HP terminal box with lamp (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I		Open frame: HP terminal box (IP65 or equivalent) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		Open frame: HP term box, lamp (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H)): Lead wire	**A**	**B**				**G**	**H**	**S**	100 VAC, 200 VAC
4M		Open frame (Thermal class 180 (H)): With HP terminal box (G1/2)			**D**	**E**	**F**				
4N		Open frame (Thermal class 180 (H)): HP terminal box with lamp (G1/2)									
5A		Open frame (diode integrated): Lead wire (IP65 or equivalent)	**A**	**B**				**G**	**H**		100 VAC, 200 VAC
5M		Open frame (diode integrated): With HP terminal box (G1/2)			**D**	**E**	**F**				
5N		Open frame (diode integrated): HP terminal box with lamp (G1/2)									
5I		Open frame (diode integrated): HP terminal box (IP65 or equivalent) (G1/2)									
5J		Open frame (diode integrated): HP term box, lamp (IP65, equiv) (G1/2)									

⚠ Refer to the following cautions for Items Ⓓ to Ⓘ.

Blank		● Grommet lead wire 300 mm
2E 2G 2H		● DIN terminal box
3A 4A 5A		● Open frame lead wire 300 mm ● 4A (Thermal class 180 (H)) ● 5A (diode integrated)
3M 3N 4M 4N 5M 5N		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

G H		● Conduit ● G(CTC19) ● H(G1/2)

Refer to page 148 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓓ

*5 : Leave blank for the standard coil housing. However, to select options in Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 00 for Item Ⓓ.
*6 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.

Notes for Ⓔ to Ⓗ

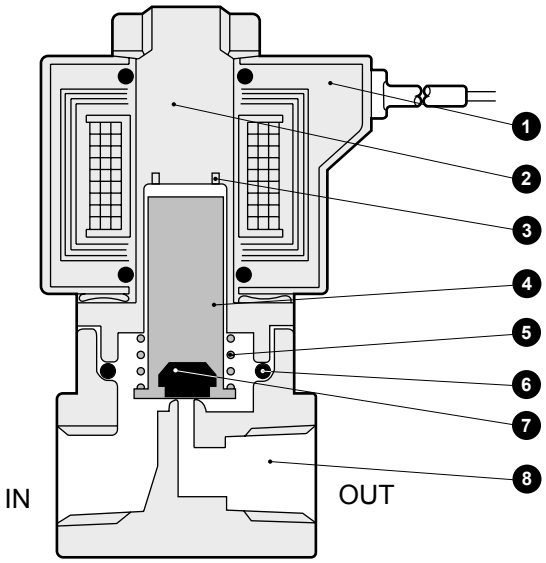
*7 : When Item Ⓒ is C, F, K, N, V or W, the manual override (Item Ⓔ A) is not available.
*8 : For Item Ⓖ, select an option from D, E, F, G and H.
*9 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*10: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓓ 2H), so the surge suppressor S cannot be selected.
*11: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

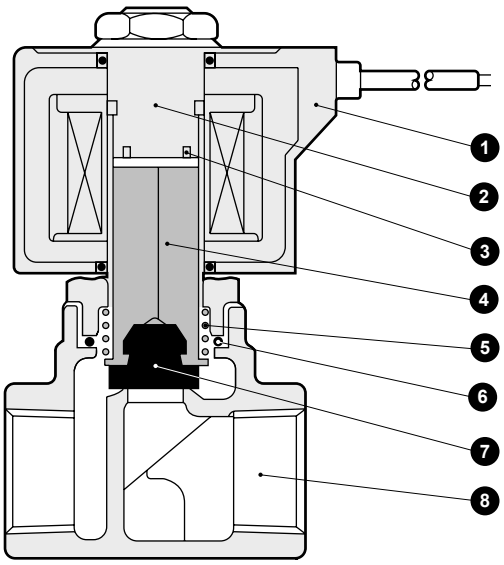
*13: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*14: For voltages other than above, contact CKD.
*15: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AB31 Series
● AB41-02/03-1 to 7



● AB41-03/04-8

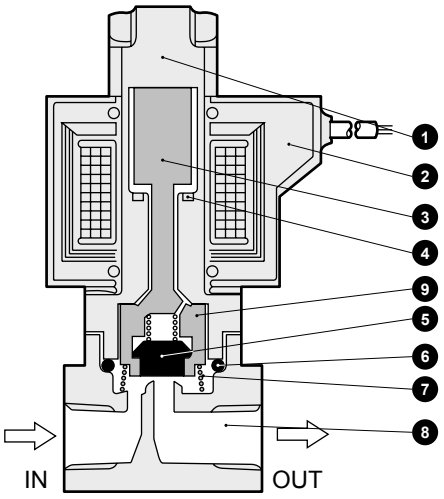


No.	Part name	Material		No.	Part name	Material	
1	Coil	-	-	5	Plunger spring	SUS304	Stainless steel
2	Core assembly	SUS405 or equivalent/316L/403 *1	Stainless steel	6	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)	NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin
3	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)	7	Seal	NBR (FKM/EPDM/PTFE)	
4	Plunger	SUS405 or equiv.	Stainless steel	8	Body	C3771 or CAC408*3 (SUS303)	Copper alloy or bronze *3 (stainless steel)

*1 : When the body/sealant combination code is other than blank and H, or the coil housing code is 6C, 6E, 6G or 6H, the material is SUS405 or equivalent/SUS316L/SUS430.
*2 : ( ) shows options. However, AB41-$^{03}_{04}$-8 PTFE is not available.
*3 : CAC408 for AB41-$^{03}_{04}$-8 (bronze)

Internal structure and parts list

● AB42



No.	Part name	Material		No.	Part name	Material	
1	Core assembly	SUS405 or equiv./316L/304	Stainless steel	7	Spring	SUS304	Stainless steel
2	Coil	-	-	8	Body	C3771(SUS303)	Copper alloy (stainless steel)
3	Plunger	SUS405 or equiv.	Stainless steel	9	NO Valve	POM (PPS/SUS303/PFA)	Body/sealant combination When Blank/O/D/H/L/V/W: Polyacetal resin When B/E/J/M/P/R: Polyphenylene sulfide resin When C/F/K/N: Stainless steel/perfluoroalkoxy resin
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)				
5	Seal	NBR (FKM/EPDM/PTFE)	NBR: nitrile rubber (EPDM: ethylene propylene rubber) (FKM: fluoro rubber) (PTFE: tetrafluoroethylene resin)				
6	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)	NBR: nitrile rubber (EPDM: ethylene propylene rubber) (FKM: fluoro rubber) (PTFE: tetrafluoroethylene resin)				

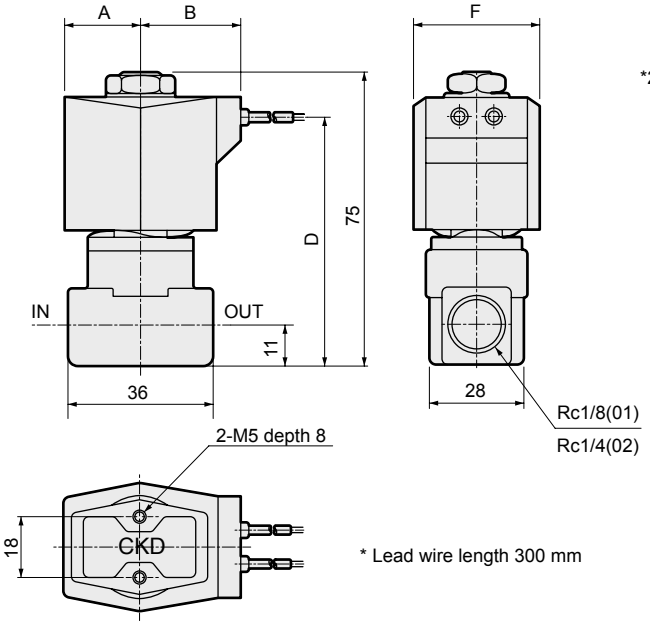
( ) shows options.

Dimensions: AB31 Series

● Grommet lead wire
AB31-01/02-1 to 6-* Blank

*1 : The AB31 Series is an NC 2-port solenoid valve. The body and sealant materials are combined according to the working fluid, and the orifice and pressure are selected according to the relation of the required flow rate and pressure. The coil specifications are determined according to the fluid temperature and ambient conditions, allowing the optimum valve to be selected.

*2 : The dimensions are the same for port sizes of G and NPT threads.



* Lead wire length 300 mm

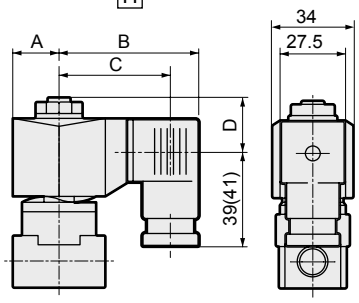
Model No.	A	B	D	F
AB31-01-1 to 6-AC -02-1 to 6-AC	20	27	63	34

Optional dimensions: AB31 Series

CAD

* Refer to the dimensions of grommet lead wire on page 162 for common dimensions.

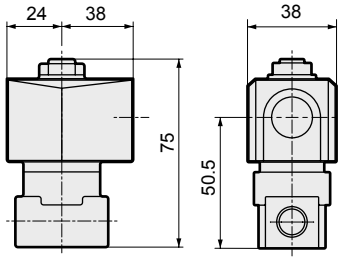
● With DIN terminal box
AB31-01/02-1 to 6-* 2 E G H



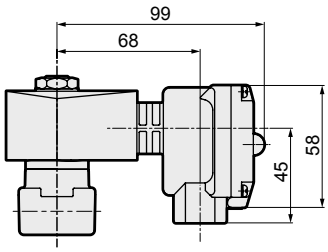
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C	D
AC (2E/2G/2H)	20	62	50.5(50)	20.5
DC (2E/2G/2H)	21	63.5	52(51.5)	20.5

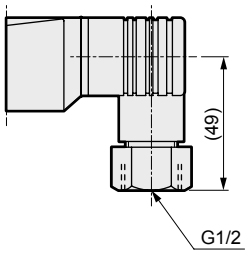
● Open frame lead wire
AB31-01/02-1 to 6-* 3A 4A 5A



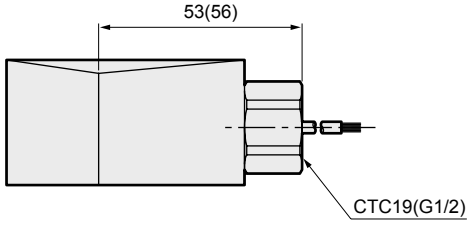
● Open frame + HP terminal box
AB31-01/02-1 to 6-* 3 5 M N I J / 4M 4N



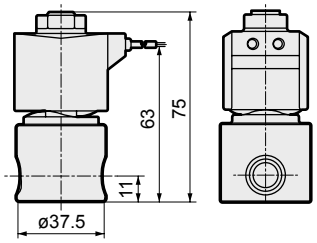
● DIN terminal box with small lamp + conduit (G1/2)
AB31-02/03-1 to 6-* 2H H



● Open frame + conduit
AB31-01/02-1 to 6-* 3A 4A 5A G H



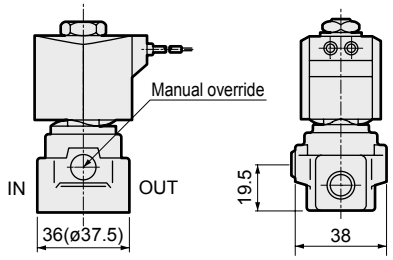
● Stainless steel body + grommet lead wire
AB31-01/02-1 to 6- D/E/F/R/W/L/M/N



Dimensions shown in ( ) are for G1/2.

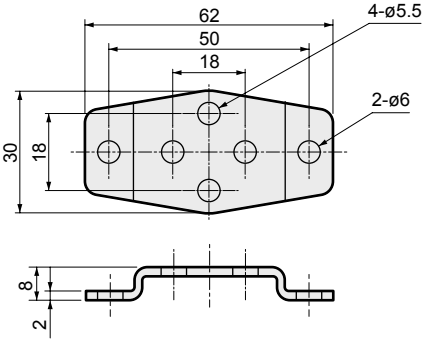
● Manual override (locking)
AB31-01/02-1 to 6-*** A

The figure shows copper alloy body.



Dimensions shown in ( ) are for stainless steel body.

● Mounting plate
AB31-01/02-1 to 6-*** B

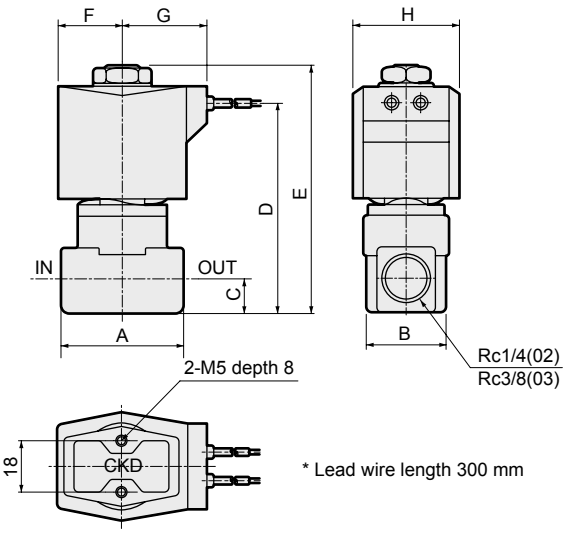


Mounting plate model	Compatibility
AB3-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● All of AB31 Series

* Material: Steel/Zinc plated

Dimensions: AB41 Series

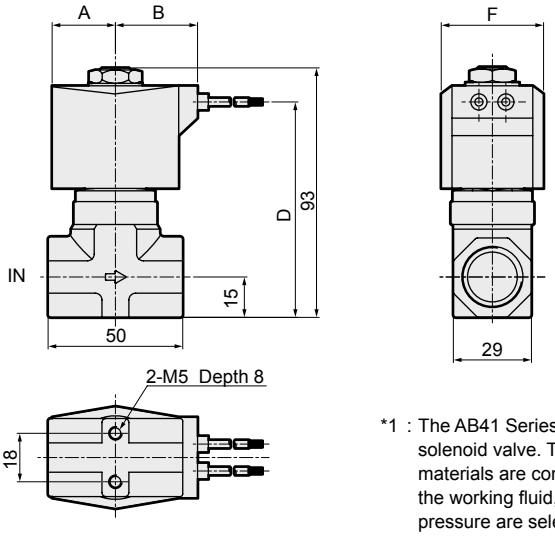
● Grommet lead wire
AB41-02/03-1 to 7-* Blank / 6C



* Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H
AB41-02-1 to 6-AC	36	28	11	68	80.5	23.5	30.5	38
AB41-02-7-AC -03-1 to 7-AC	40	28	12	71	83.5	23.5	30.5	38
AB41-02-1 to 6-6C-DC	36	28	11	68	80.5	24	30.5	39
AB41-02-7-6C-DC -03-1 to 7-6C-DC	40	28	12	71	83.5	24	30.5	39

● Grommet lead wire
AB41-03/04-8-* Blank / 6C



Model No.	A	B	D	F
AB41-03-8-AC -04-8-AC	23.5	30.5	80	38
AB41-03-8-6C-DC -04-8-6C-DC	24	30.5	80	39

*1 : The AB41 Series is an NC 2-port solenoid valve. The body and sealant materials are combined according to the working fluid, and the orifice and pressure are selected according to the relation of the required flow rate and pressure. The coil specifications are determined according to the fluid temperature and ambient conditions, allowing the optimum valve to be selected.

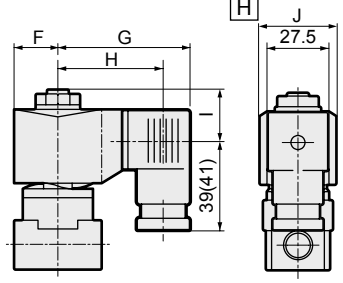
*2 : The dimensions are the same for port sizes of G and NPT threads.

Optional dimensions: AB41 Series

CAD

* Refer to the dimensions of grommet lead wire on page 164 for common dimensions.

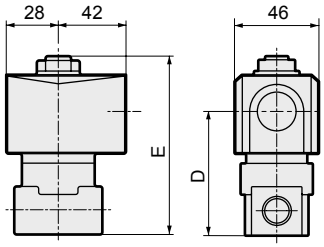
● With DIN terminal box
AB41-02/03/04-1 to 8-* 2 6 E G H



Dimensions shown in ( ) are for G1/2.

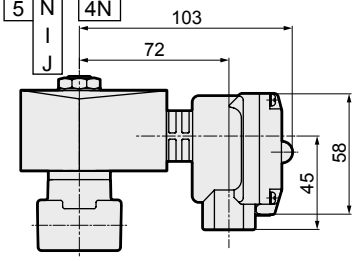
Voltage	F	G	H	I	J
AC (2E/2G/2H)	23.5	65.5	54(53.5)	22	38
DC (2E/2G/2H)	23.5	66	54.5(54)	22	38
DC (6E/6G/6H)	24	68	56.5(56)	22	39

● Open frame lead wire
AB41-02/03/04-1 to 8-* 3A 4A 5A

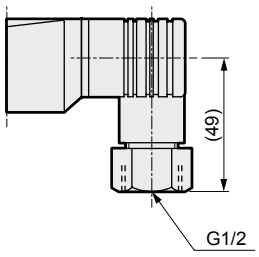


Model No.	D	E
AB41-02-1 to 6-*□A	52.0	80.5
AB41-02-7-*□A -03-1 to 7-*□A	55.0	83.5
AB41-03/04-8-*□A	64	93

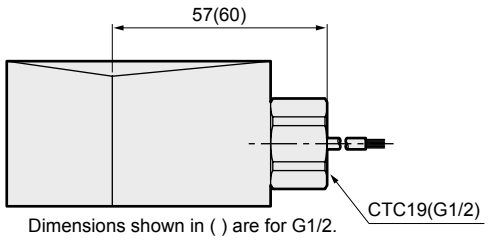
● Open frame + HP terminal box
AB41-02/03/04-1 to 8-* 3 5 M N I J · 4M 4N



● DIN terminal box with small lamp + conduit (G1/2)
AB41-02/03/04-1 to 8-* 2H H

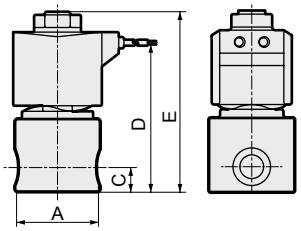


● Open frame + conduit
AB41-02/03/04-1 to 8-* 3A 4A 5A G H



Dimensions shown in ( ) are for G1/2.

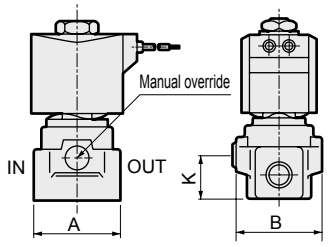
● Stainless steel body + grommet lead wire
AB41-02/03/04-1 to 8- D/F/R/W/L/M/N/E



Model No.	A	C	D	E
AB41-02-1 to 6-AC	ø37.5	11	68	80.5
AB41-02-7-AC -03-1 to 7-AC	ø45.0	12	71	83.5
AB41-03-8-AC -04-8-AC	50*1	15	80	93

*1: The max. dimension is ø54.

● Manual override (locking)
AB41-02/03-1 to 7-*** A
The figure shows copper alloy body.



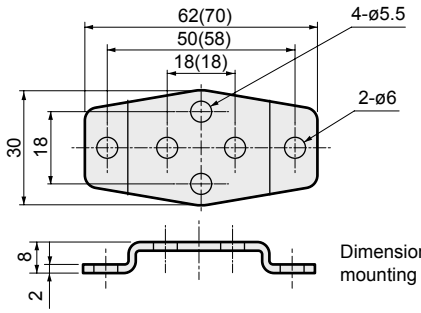
Note: The manual override is not supplied with AB41-03/04-8.

Model No.	A	B	K
AB41-02-1 to 6-***A	36(ø37.5)	38	19.5
AB41-02-7-***A -03-1 to 7-***A	40(ø45.0)	40	22.5

Dimensions shown in ( ) are for stainless steel body.

Optional dimensions: AB41 Series

● Mounting plate
AB41-02/03/04-1 to 8-*** B



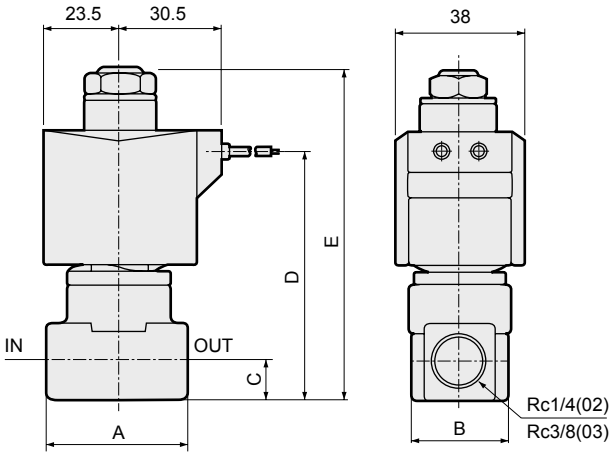
Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AB4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AB41-02/03-1 to 7 Series ● Stainless steel body AB41-02-1 to 6-D/E/F/L/M/N/R/W
AB4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● AB41-03/04-8 Series ● Stainless steel body AB41-02-7-D/E/F/L/M/N/R/W AB41-03-1 to 7-D/E/F/L/M/N/R/W

* Material: Steel/Zinc plated

Dimensions: AB42 Series

● Grommet lead wire
AB42-02/03-1 to 7



* Lead wire length 300 mm

[Reference] Normally-open direct acting 2-port valve is open when not energized and closed when energized. This structure is suitable for use in the open state for long periods.

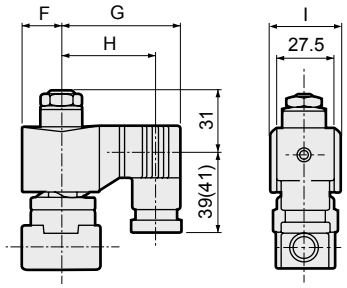
*1 : The dimensions are the same for port sizes of G and NPT threads.

Model No.	A	B	C	D	E
AB42-02-1 to 6	36	28	11	72	94
AB42-02-7	40	28	12	75	97
AB42-03-1 to 7	40	28	12	75	97

Optional dimensions: AB42 Series

* Refer to the dimensions of grommet lead wire above for common dimensions.

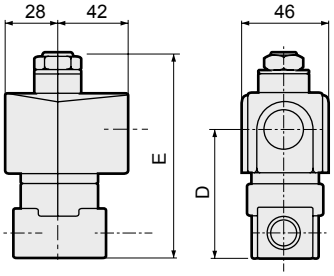
● With DIN terminal box
AB42-02/03-1 to 7-* 2E / 2G / 2H



Dimensions shown in ( ) are for G1/2.

Voltage	F	G	H	I
AC	23.5	65.5	54(53.5)	38
DC	28	72	60.5(60)	46

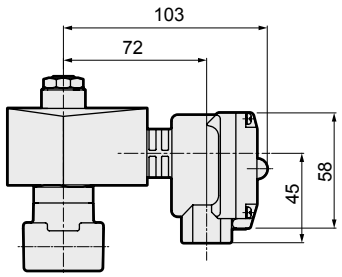
● Open frame lead wire
AB42-02/03-1 to 7-* 3A / 4A / 5A



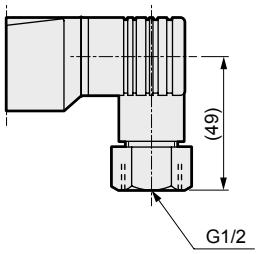
Model No.	D	E
AB42-02-1 to 6	56	94
AB42-02-7	59	97
AB42-03-1 to 7	59	97

Optional dimensions: AB42 Series

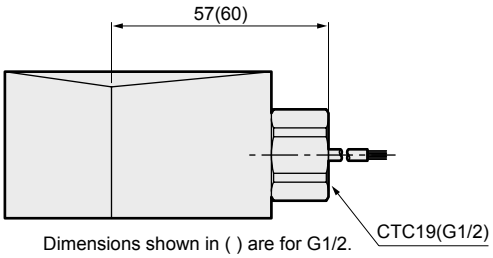
● Open frame + HP terminal box
AB42-02/03-1 to 7-* [3 5] [M N I J] · [4M 4N]



● DIN terminal box with small lamp + conduit (G1/2)
AB42-02/03-1 to 7-* [2H] [H]

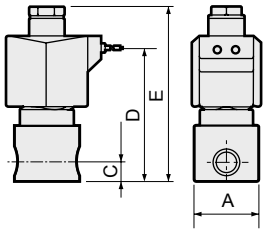


● Open frame + conduit
AB42-02/03-1 to 7-* [3A 4A 5A] [G H]



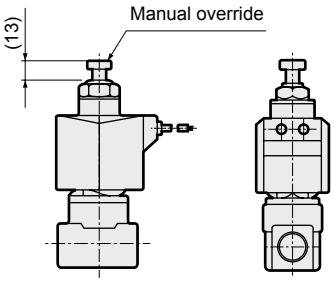
Dimensions shown in ( ) are for G1/2.

● Stainless steel body + grommet lead wire
AB42-02/03-1 to 7- [D/E/F/R/W/L/M/N]

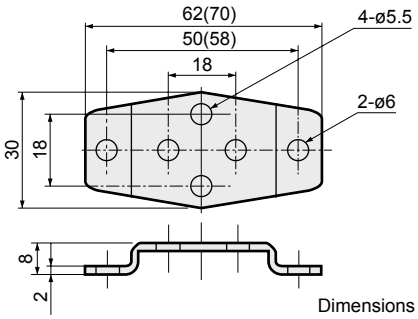


Model No.	A	C	D	E
AB42-02-1 to 6	ø37.5	11	72	94
AB42-02-7	ø45.0	12	75	97
AB42-03-1 to 7	ø45.0	12	75	97

● Manual override (locking)
AB42-02/03-1 to 7-*** [A]



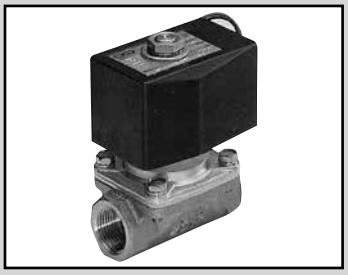
● Mounting plate
AB42-02/03-1 to 7-*** [B]



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AB4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AB42-02/03-1 to 7 Series ● Stainless steel body AB42-02-1 to 6-[D/E/F/L/M/N/R/W]
AB4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● Stainless steel body AB42-02-7-[D/E/F/L/M/N/R/W] AB42-03-1 to 7-[D/E/F/L/M/N/R/W]

* Material: Stee/Zinc plated



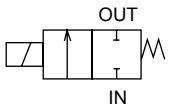
Large bore size direct acting 2-port solenoid valve
General purpose

AB71 Series

- NC (open when energized)
- Port size: Rc1/2, Rc3/4, Rc1

RoHS CAD

JIS symbol



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

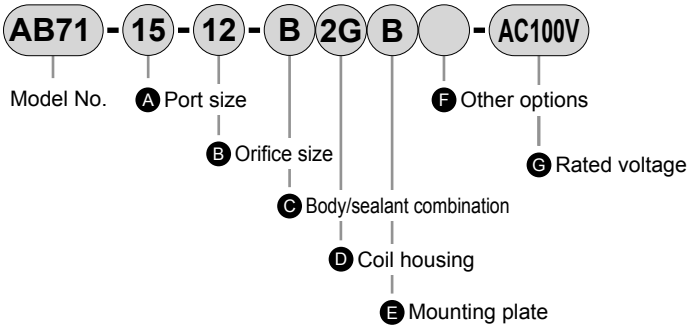
Item		AB71-15-12	AB71-20-15	AB71-25-18
Working fluid		Air/water/kerosene/oil (20 mm^2/s)		
Working pressure differential MPa	Air	AC:0 to 0.1, DC:0 to 0.08	AC:0 to 0.07, DC:0 to 0.04	AC:0 to 0.04, DC:0 to 0.03
	Fluids	AC:0 to 0.08, DC:0 to 0.08	AC:0 to 0.05, DC:0 to 0.04	AC:0 to 0.03, DC:0 to 0.03
Proof pressure (water pressure) MPa		1 (≈150 psi, 10 bar)		
Fluid viscosity mm^2/s		20 or less		
Fluid temperature °C		-5 (23°F) to 60 (140°F) (no freezing)		
Ambient temperature °C		-10 (14°F) to 60 (140°F)		
Valve seat leakage cm^3/min(ANR)		0.2 or less (air)		
Port size		Rc1/2	Rc3/4	Rc1
Orifice size mm		12	15	18
Mounting orientation		Limited to the range of vertical direction with the coil on top to horizontal direction.		
Weight kg		1.0	1.2	1.6
Electrical specifications				
Rated voltage		100 VAC50/60 Hz, 200 VAC50/60 Hz, 110 VAC60 Hz, 220 VAC60 Hz, 12 VDC, 24 VDC, 48 VDC, 100 VDC		
Apparent power VA	When holding (50/60 Hz)	32/26		
	When starting (50/60 Hz)	123/106		
Power consumption W		AC:13/11(50/60 Hz), DC:20		

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[$dm^3/(s \cdot bar)$]	b	Cv	S(mm^2)
AB71-15-12	Rc1/2	12	15	0.21	2.8	-
AB71-20-15	Rc3/4	15	-	-	4.3	106
AB71-25-18	Rc1	18	-	-	6.3	148

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order



Code	Description
A Port size	
15	Rc1/2
20	Rc3/4
25	Rc1

B Orifice size	
12	ø12 (AB71-15 [port size Rc1/2] only)
15	ø15 (AB71-20 [port size Rc3/4] only)
18	ø18 (AB71-25 [port size Rc1] only)

C Body/sealant combination

	Body	Body	Seal	Treatment
B	Bronze	Copper alloy	Fluoro rubber	-
J	Bronze	Copper alloy	Fluoro rubber	Oil-prohibited

[Example of model No.]

AB71-15-12-B2EB-AC100V

Model: AB71

- A Port size : Rc1/2
- B Orifice size : ø12
- C Body/sealant combination : Body - bronze, stuffing - copper alloy, seal - fluoro rubber
- D Coil housing : With DIN terminal box (G1/2)
- E Mounting plate : With
- F Other options : None
- G Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

D Coil housing			E	F Other options					G Rated voltage
Description			Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		Description
				A-15a	A-15b	A-15c	CTC19	G1/2	
2C	Std.	Grommet lead wire	**B**						100 VAC, 200 VAC
2E	Option	With DIN terminal box (G1/2)	**B**						100 VAC, 200 VAC
2G	Option	With DIN terminal box (Pg11)	**B**						100 VAC, 200 VAC
2H	Option	DIN terminal box with small lamp (Pg11)	**B**					**H**	100 VAC, 200 VAC
3A	Option	Open Frame: Lead wire (IP65 or equivalent)	**B**				**G**	**H**	100 VAC, 200 VAC
3M	Option	Open Frame: With HP terminal box (G1/2)	**B**	**D**	**E**	**F**			12 VDC, 24 VDC, 48 VDC, 100 VDC
3N	Option	Open Frame: HP terminal box with lamp (G1/2)	**B**	**D**	**E**	**F**			100 VAC, 200 VAC, 24 VDC, 100 VDC
5A	Option	Open Frame (diode integrated): Lead wire (IP65 or equivalent)	**B**				**G**	**H**	100 VAC, 200 VAC
5M	Option	Open Frame (diode integrated): With HP terminal box (G1/2)	**B**	**D**	**E**	**F**			100 VAC, 200 VAC
5N	Option	Open Frame (diode integrated): HP terminal box with lamp (G1/2)	**B**	**D**	**E**	**F**			100 VAC, 200 VAC

For Items Ⓓ to Ⓖ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ and Ⓕ are not required, they should be left blank.

⚠ Precautions for model No. selection

Notes for C

*1 : Refer to Intro Page 39 for reference on material combinations.

Notes for D

*2 : Refer to page 148 for coil selection.
*3 : Coils for 5A/5M/5N have a diode to convert AC to DC voltage.
*4 : When the fluid is air, 5A type is recommended.
*5 : For availability of coil of thermal class H, contact CKD.

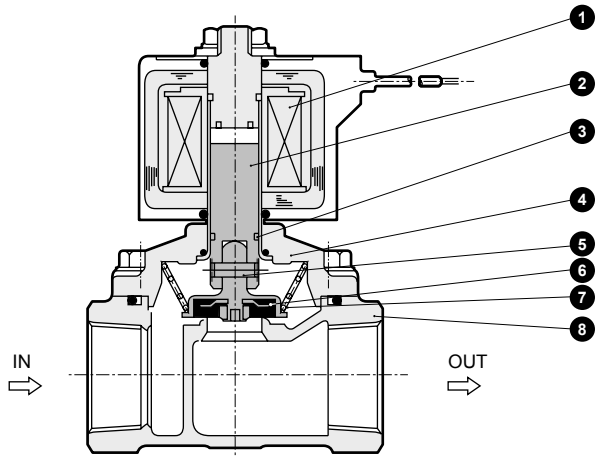
Notes for F

*6 : For Item Ⓕ, select an option from D, E, F, G and H.

Notes for G

*7 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, Ⓓ 5A/5K/5H coils can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*8 : For voltages other than above, contact CKD.
*9 : The lead wire is available in 300 mm length (standard) and 500 mm length. Contact CKD for more information.

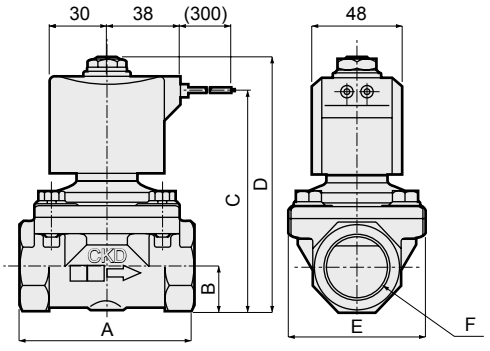
Internal structure and parts list



No.	Part name	Material	
1	Coil	-	-
2	Plunger	SUS405	Stainless steel
3	Wear ring	PTFE	Tetrafluoroethylene resin
4	Stuffing assembly (Core assembly)	C3771	Copper alloy
		SUS405, Cu	Stainless steel, copper
5	Spring pin	SUS420	Stainless steel
6	Main valve	SUS304, FKM	Stainless steel, fluoro rubber
7	Main valve spring	SUS304	Stainless steel
8	Body	CAC407	Bronze

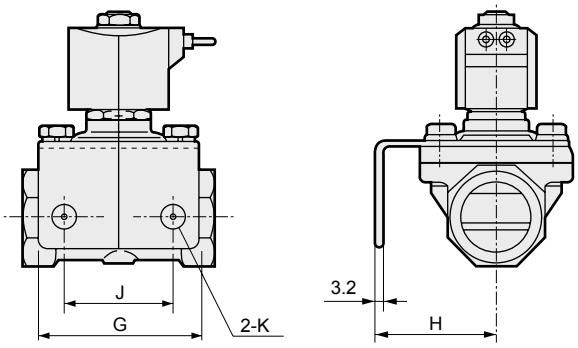
Dimensions CAD

● Grommet lead wire
AB71-*-*-*2C



● With mounting plate
AB71-*-*-** B

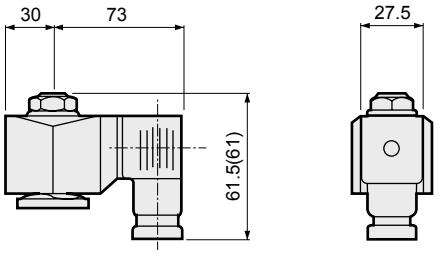
Material: Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K
AB71-15-12	71	14.5	95	110.5	50	Rc1/2	56	45	40	ø9
AB71-20-15	80	17.5	101	116	60	Rc3/4	63	50	45	ø9
AB71-25-18	90	22.5	111	126	71	Rc1	75	56	50	ø11

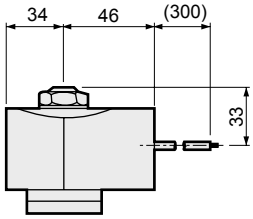
Optional dimensions

● With DIN terminal box
AB71-*-*-*2 [E G H]

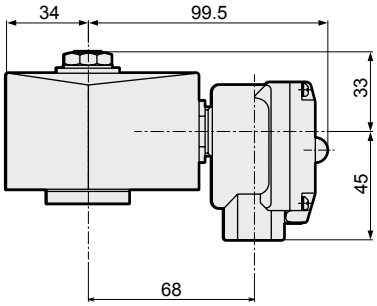


Dimensions shown in ( ) are for G1/2.

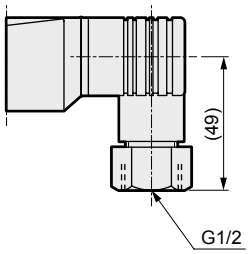
● Open frame lead wire
AB71-*-*-* [3A 5A]



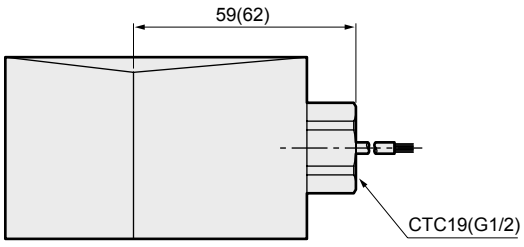
● Open frame + HP terminal box
AB71-*-*-* [3 5] [M N]



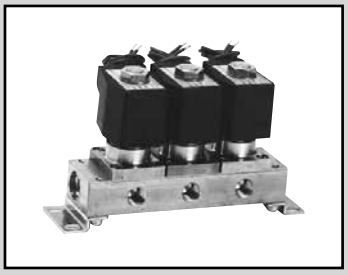
● DIN terminal box with small lamp + conduit (G1/2)
AB71-*-*-* [2H] [H]



● Open frame + conduit
AB71-*-*-* [3A 5A] [G H]



Dimensions shown in ( ) are for G1/2.



Direct acting 2-port solenoid valve, manifold/actuator
General purpose

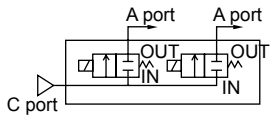
GAB312/GAB352/GAB412/GAB452 Series

- NC (open when energized)
- Common supply (port C pressurization), individual supply (port A pressurization)

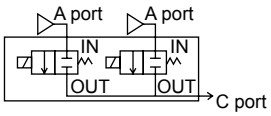
CE Refer to the Ending for details. RoHS CAD

JIS symbol

- GAB312/412
(Common supply/port C pressurization)



- GAB352/452
(Individual supply/port A pressurization)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications	
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water	Steam
Working pressure differential MPa	0 to 5 (refer to max. working pressure differential in individual specifications.)		
Max. working pressure MPa	5 (≈730 psi, 50 bar)		1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)		
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)	-10 (14°F) to 184 (363.2°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)	
Thermal class	Class 130 (B)	Class 180 (H)	
Atmosphere	Place free of corrosive gas and explosive gas		
Valve structure	Direct acting poppet structure		
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)		300 or less (air)
Mounting orientation	Unrestricted		
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/EPM rubber	Copper alloy/PTFE

*1: No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Model No.	Port size	Orifice size (mm)	Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consumption (W)	
			Air		Water(hot)/Kerosene		Oil (50 mm^2/s)		Steam		When holding		When starting		AC 50/60 Hz	DC
			AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz		
GAB312/352-1	-	1.5	2.5	2.5	2.5	2.5	2.5	2.5	1.0	100 VAC 50/60 Hz *8 200 VAC 50/60 Hz *8 12 VDC 24 VDC 48 VDC 100 VDC	12	10	17	14	5.2/3.8	11 (8.1)*5
-2		2.0	1.5	1.5	1.5	1.5	1.5	1.5	1.0							
-3		3.0	1.0	0.5	0.7	0.5	0.5	0.5	0.7							
-4		3.5	0.6	0.4	0.5	0.4	0.4	0.4	0.5							
-5		4.0	0.4	0.25	0.3	0.25	0.25	0.25	0.3							
-6		5.0	0.2	0.15	0.15	0.15	0.15	0.15	0.15							
GAB412/452-1	-	1.5	5.0	4.0	4.5	4.0	4.0	4.0	1.0		18	15	29	24	6.7/5.7	11 (10.4)*5 (7)*7
-2		2.0	3.0	2.5	2.7	2.5	2.5	2.5	1.0							
-3		3.0	1.5	0.9	1.3	0.9	0.9	0.9	1.0							
-4		3.5	1.2	0.6	0.9	0.6	0.6	0.6	0.9							
-5		4.0	1.0	0.5	0.7	0.5	0.5	0.5	0.7							
-6		5.0	0.6	0.25	0.4	0.25	0.25	0.25	0.4							
-7		7.0	0.25	0.1	0.2	0.1	0.15	0.1	0.2							

*1 : The model numbers above are for basic orifice sizes. Refer to How to order for other combinations (e.g., for steam).
*2 : For port size, refer to How to order (page 174) and dimensions (page 178).
*3 : Refer to DC column for the max. working pressure differential of coil with diode.
*4 : The voltage fluctuation range must be within ±10% of the rated voltage.
*5 : Power consumption of coil housings 2E/2G/2H.
*6 : When using at low vacuum, vacuum the OUT port side.
*7 : Power consumption of coil housings 6C/6E/6G/6H.
*8 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Weight

Model No.	Weight (kg)									
	Actuator only	2 stations	3 stations	4 stations	5 stations	6 stations	7 stations	8 stations	9 stations	10 stations
GAB312 GAB352	0.34	1.4	2.0	2.8	3.2	4.0	4.6	5.2	6.0	6.3
GAB412 GAB452	0.42	1.6	2.2	3.1	3.6	4.5	5.1	5.8	6.7	7.1

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant	Fluoro rubber		Ethylene propylene rubber		PTFE	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1) °C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)	-10 to 60	-10 to 184
Ambient temperature °C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)				300 or less (air)	

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with lamp.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics		
			C[dm^3/(s·bar)]	b	Cv
GAB312/352-1	-	1.5	0.29	0.53	0.10
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.5	0.47	0.40
-5		4.0	1.9	0.47	0.48
-6		5.0	2.6	0.38	0.62
GAB412/452-1	-	1.5	0.29	0.53	0.10
-2		2.0	0.53	0.5	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.5	0.47	0.40
-5		4.0	1.9	0.47	0.48
-6		5.0	2.6	0.38	0.62
-7		7.0	4.6	0.37	0.82

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

● Common supply (port C pressurization)

GAB312 ( ) - **1** - **5** - **B** **3A** **A** **G** **S** - **AC100V**

- ( ) : Thread
- **1** : Orifice size
- **5** : Manifold station No.
- **B** : Body/sealant combination
- **3A** : Coil housing
- **A** : Manual override (locking)
- **G** : Other options
- **S** : With surge suppressor
- **AC100V** : Rated voltage

● Individual supply (port A pressurization) **GAB352**

● Common supply (port C pressurization) **GAB412**

● Individual supply (port A pressurization) **GAB452**

Model No.

Code	Description	Model No. GAB312 / GAB352	Model No. GAB412 / GAB452
Ⓐ Thread			
Blank	Rc	●	●
G	G	●	●
N	NPT	●	●
Ⓑ Orifice size			
1	ø1.5	●	●
2	ø2	●	●
3	ø3	●	●
4	ø3.5	●	●
5	ø4	●	●
6	ø5	●	●
7	ø7		●
Ⓒ Manifold station No.			
2 to 10	2 stations to 10 stations	●	●
0	Actuator only	●	●

Ⓓ Body/sealant combination

		Body	Seal	Treatment	Remarks		
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
B	Option		Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)	●	●
C			PTFE		Steam (up to 184°C *4)	●	●
D		Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
E			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)	●	●
F			PTFE		Steam (up to 184°C *4)	●	●
H		Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
J			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)	●	●
K			PTFE		Steam (up to 184°C *4)	●	●
P			Ethylene propylene rubber		Hot water (up to 90°C *4)	●	●
L		Stainless steel	Nitrile rubber		Air/water/low vacuum/kerosene (up to 60°C)	●	●
M			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)	●	●
N			PTFE		Steam (up to 184°C *4)	●	●
R			Ethylene propylene rubber		Hot water (up to 90°C *4)	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓔ to Ⓘ

Refer to page 175 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]
GAB312G-1-3-AC200V

Model: GAB312 (common supply, port C pressurization)

- Ⓐ Thread : G
- Ⓑ Orifice size : ø1.5
- Ⓒ Manifold station No. : 3 stations
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil housing : Grommet lead wire
- Ⓕ to Ⓗ : None
- Ⓖ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

[Example of model No. 2]
GAB352-5-2-000AS-AC200V

Model: GAB352 (individual supply/port A pressurization)

- Ⓐ Thread : Rc
- Ⓑ Orifice size : ø4
- Ⓒ Manifold station No. : 2 stations
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil housing : Grommet lead wire
- Ⓕ Manual override (locking) : Selected
- Ⓖ Other options : None
- Ⓗ Surge suppressor : With surge suppressor
- Ⓘ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

*1 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Notes for Ⓒ to Ⓓ

*2 : For 11 or more manifold station No., contact CKD.
*3 : Leave blank for standard. However, to select options in Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 0 for Item Ⓓ.
*4 : When Item Ⓓ 4A/4M/4N is selected.
*5 : The ethylene propylene rubber seal combination (Item Ⓓ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*6 : When Item Ⓓ is C, F, K, P, N or R, the Item Ⓔ coil housings 6C, 6E, 6G and 6H cannot be selected.
*7 : For PTFE seal, O-ring material of sub-plate connection will be FKM.

For Items Ⓔ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓕ to Ⓗ are not required, they should be left blank.

Ⓔ Coil housing				Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description				Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
Blank	Std.	Grommet lead wire		**A**						**S**	100 VAC, 200 VAC
2E		With DIN terminal box	(G1/2)								100 VAC, 200 VAC
2G		With DIN terminal box	(Pg11)								12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp	(Pg11)						**H**		100 VAC, 200 VAC, 24 VDC
3A	Option	Open frame	Lead wire (IP65 or equivalent)	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
3M			With HP terminal box (G1/2)		**D**	**E**	**F**				12 VDC, 24 VDC, 48 VDC, 100 VDC
3N			HP terminal box with lamp (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP term box, lamp (IP65, equiv) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
4M			With HP terminal box (G1/2)		**D**	**E**	**F**				
4N			HP terminal box with lamp (G1/2)								
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)	**A**				**G**	**H**		100 VAC, 200 VAC
5M			With HP terminal box (G1/2)		**D**	**E**	**F**				
5N			HP terminal box with lamp (G1/2)								
5I			HP terminal box (IP65 or equivalent) (G1/2)								
5J			HP term box, lamp (IP65, equiv) (G1/2)								
6C		Grommet lead wire	7W	**A**						**S**	12 VDC, 24 VDC
6E		With DIN terminal box	(G1/2) 7W								
6G		With DIN terminal box	(Pg11) 7W								
6H		DIN terminal box with small lamp	(Pg11) 7W						**H**		24 VDC

⚠ Refer to the following cautions for Items Ⓔ to Ⓘ.

Blank, 6C

● Grommet lead wire 300 mm

2E, 2G, 2H, 6E, 6G, 6H

● DIN terminal box

3A, 4A, 5A

● Open frame lead wire 300 mm
● 4A (Thermal class 180 (H))
● 5A (diode integrated)

3M, 3N, 4M, 4N, 5M, 5N

● Open frame HP terminal box
● 4M, 4N (Thermal class 180 (H))
● 5M, 5N (diode integrated)

3I, 3J, 5I, 5J

● Open frame HP terminal box (IP65 or equivalent)
● 5I, 5J (diode integrated)

Refer to page 148 for coil selection.

G, H

● Conduit
● G(CTC19)
● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓔ

*8 : Leave blank for the standard coil housing. However, to select options in Ⓕ, Ⓖ or Ⓗ, indicate 00 for Item Ⓔ.
*9 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*10: A DC coil for steam is available for GAB4*2. Contact CKD for more information.
*11: The coil housings 6C, 6E and 6G are 12 VDC and 24 VDC dedicated. 6H is 24 VDC dedicated.
*12: For 6C/6E/6G/6H, only GAB4*2 is available.

Notes for Ⓕ to Ⓗ

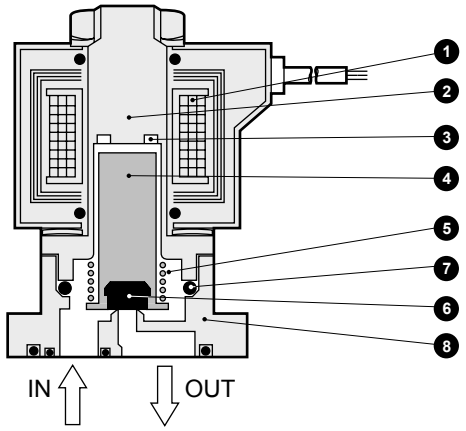
*13: When Item Ⓓ is C, F, K or N, the manual override (Item ⒻA) is not available.
*14: For Item Ⓖ, select an option from D, E, F, G and H.
*15: The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*16: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓔ2H/6H), so surge suppressor code S cannot be selected.
*17: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) and the coil option 6C/6E/6G/6H are selected.

Notes for Ⓘ

*18: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓔ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*19: For voltages other than above, contact CKD.
*20: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● GAB312/GAB352/GAB412/GAB452 actuator

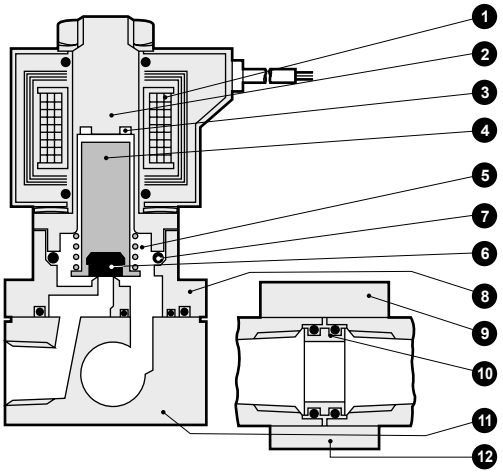


No.	Part name	Material	
1	Coil	-	-
2	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
3	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Seal	NBR (FKM/EPDM/PTFE)	NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin
7	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)	
8	Body	C3771(SCS13)	Copper alloy (stainless steel)

*1 : When the body/sealant combination code is other than blank and H, or the coil housing code is 6C, 6E, 6G or 6H, the material is SUS405 or equivalent/SUS316L/SUS430.
*2 : ( ) shows options.
*3 : 4 body mounting screws and 2 O-rings are attached to the actuator only.

Internal structure and parts list

● GAB312/GAB352/GAB412/GAB452 manifold



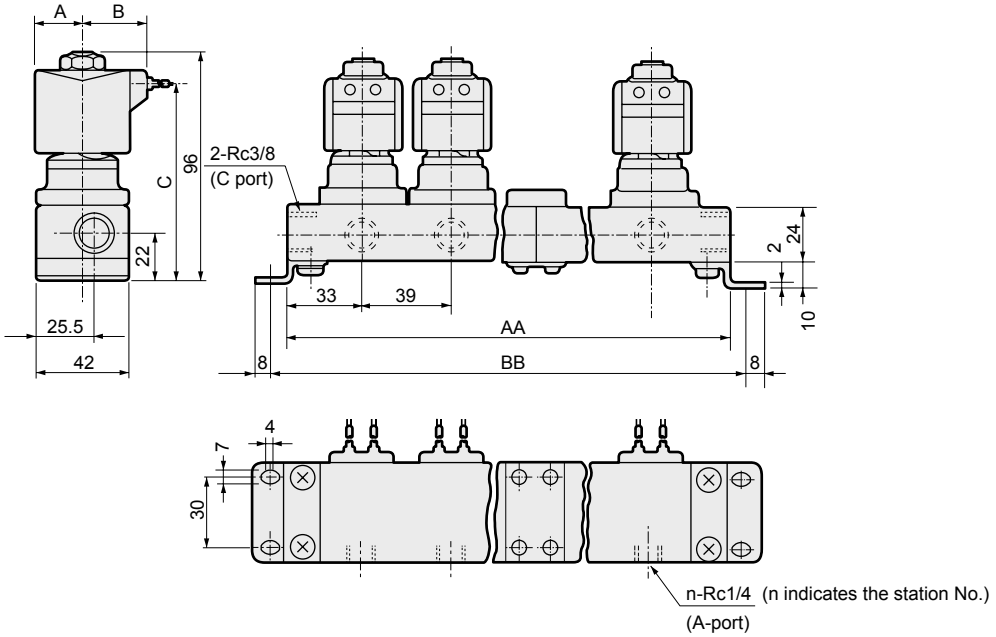
No.	Part name	Material	
1	Coil	-	-
2	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
3	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Seal	NBR (FKM/EPDM/PTFE)	(NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin)
7	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)	
8	Body	C3771(SCS13)	Copper alloy (stainless steel)
9	Holder	SPCC	Steel
10	Connector	C3604(SUS304)	Copper alloy (stainless steel)
11	Sub-plate	C3604(SUS303)	Copper alloy (stainless steel)
12	Connecting plate	SPCC	Steel

*1 : When the body/sealant combination code is other than blank and H, or the coil housing code is 6C, 6E, 6G or 6H, the material is SUS405 or equivalent/SUS316L/SUS430.

*2 : ( ) shows options.

Dimensions: GAB312/352 Series CAD

● Manifold (grommet lead wire)
GAB312/352-1 to 6- 2 to 10 -* Blank

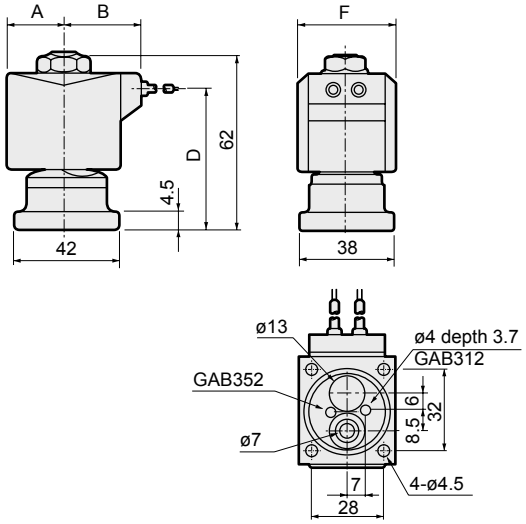


Station No.	AA	BB	Manifold configuration	Station No.	AA	BB	Manifold configuration
2	106	122	2 stations x 1	7	329	345	5 stations + 2 stations
3	145	161	3 stations x 1	8	368	384	5 stations + 3 stations
4	212	228	2 stations x 2	9	435	451	3 stations x 3
5	223	239	5 stations x 1	10	446	462	5 stations x 2
6	290	306	3 stations x 2	Contact CKD for 11 stations or more.			

Model No.	A	B	C
Blank	20	27	84

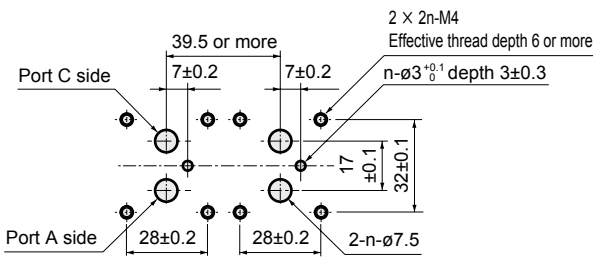
*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : The dimensions are the same for port sizes of G and NPT threads.

● Actuator (grommet lead wire)
GAB312/352-1 to 6- 0 -* Blank



Model No.	A	B	D	F
Blank	20	27	50	34

● Recommended dimensions for actuator mounting



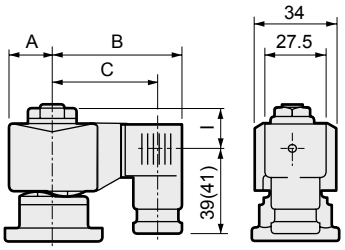
■ Machining drawing when using 2 actuators

Optional dimensions: GAB312/352 Series

CAD

* Refer to the dimensions of grommet lead wire on page 178 for common dimensions.

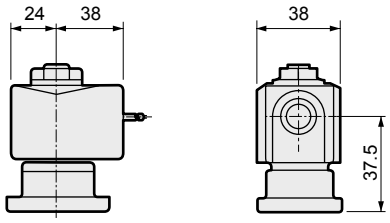
● With DIN terminal box
GAB312/352-1 to 6-0 to 10-* 2 E G H



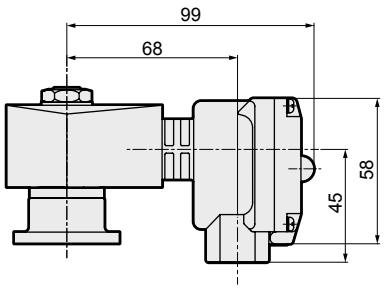
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C	I
AC (2E/2G/2H)	20	62	50.5(50)	20.5
DC (2E/2G/2H)	21	63.5	52(51.5)	20.5

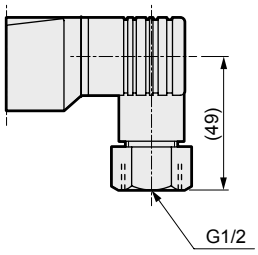
● Open frame lead wire
GAB312/352-1 to 6-0 to 10-* 3A 4A 5A



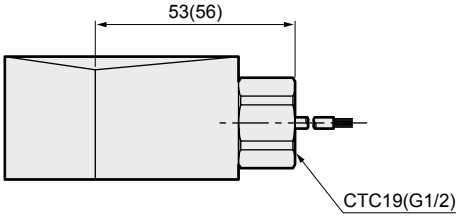
● Open frame + HP terminal box
GAB312/352-1 to 6-0 to 10-* 3 5 M N I J · 4M 4N



● DIN terminal box with small lamp + conduit (G1/2)
GAB312/352-1 to 6-0 to 10-* 2H H

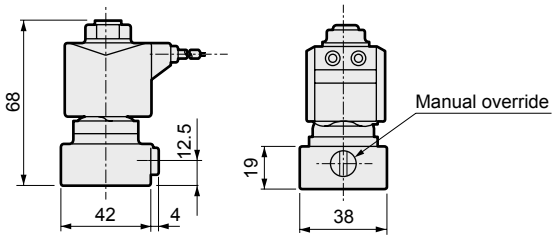


● Open frame + conduit
GAB312/352-1 to 6-0 to 10-* 3A 4A 5A G H



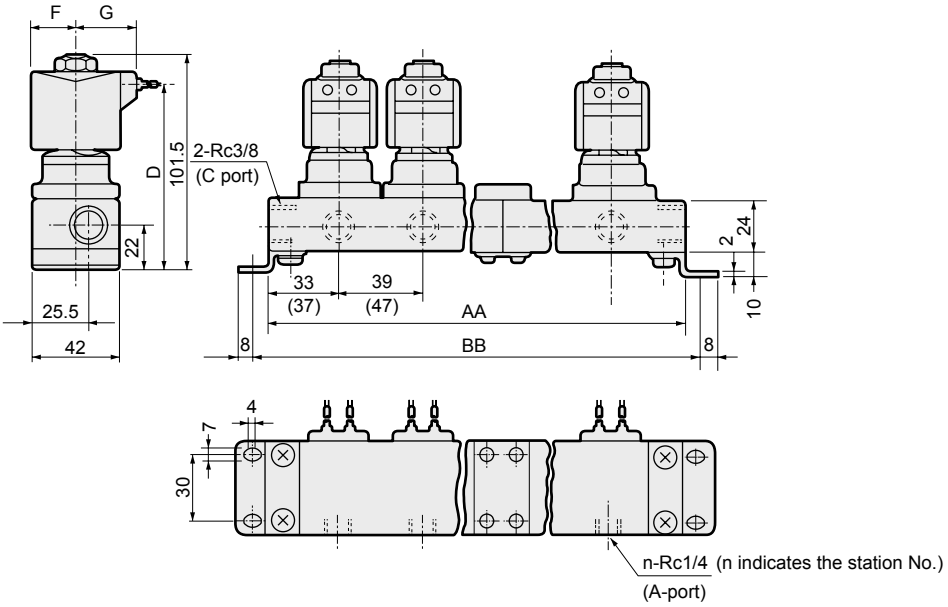
Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
GAB312/352-1 to 6-0 to 10-*** A



Dimensions: GAB412/452 Series

● Manifold (grommet lead wire)
GAB412/452-1 to 7- [2 to 10] -* [Blank] / [6C]

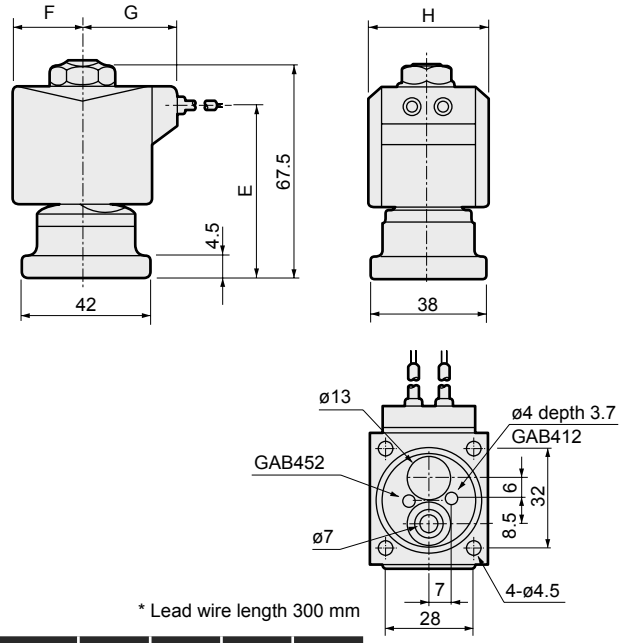


Station No.	AA	BB	Manifold configuration	Station No.	AA	BB	Manifold configuration
2	106(122)	122(138)	2 stations x 1	7	329(385)	345(401)	5 stations + 2 stations
3	145(169)	161(185)	3 stations x 1	8	368(432)	384(448)	5 stations + 3 stations
4	212(244)	228(260)	2 stations x 2	9	435(507)	451(523)	3 stations x 3
5	223(263)	239(279)	5 stations x 1	10	446(526)	462(542)	5 stations x 2
6	290(338)	306(354)	3 stations x 2	Contact CKD for 11 stations or more.			

Model No.	F	G	D
Blank	23.5	30.5	89
6C	24	30.5	89

*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : Dimensions shown in ( ) are for open frame.
*3 : The dimensions are the same for port sizes of G and NPT threads.

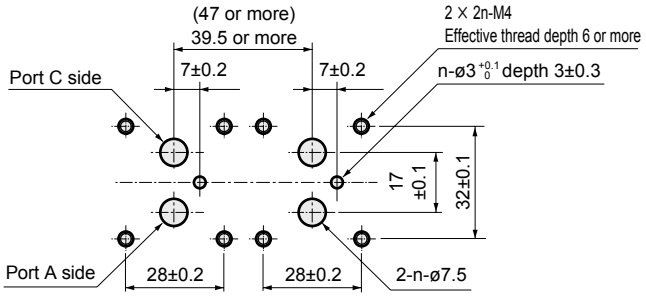
● Actuator (grommet lead wire)
GAB412/452-1 to 7-0 -* [Blank] / [6C]



* Lead wire length 300 mm

Model No.	F	G	E	H
Blank	23.5	30.5	55	38
6C	24	30.5	55	39

● Recommended dimensions for actuator mounting

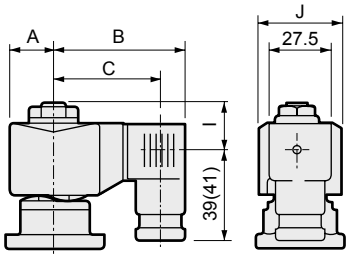


■ Machining drawing when using 2 actuators

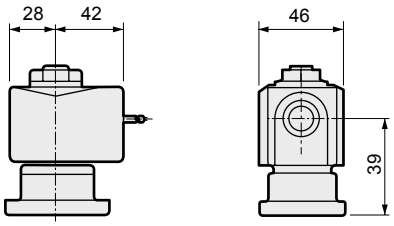
Optional dimensions: GAB412/452 Series

* Refer to the dimensions of grommet lead wire on page 180 for common dimensions.

● With DIN terminal box
GAB412/452-1 to 7-0 to 10-* 2 6 | E G H



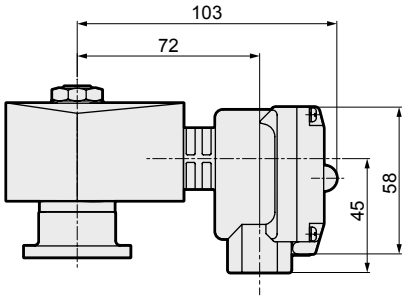
● Open frame lead wire
GAB412/452-1 to 7-0 to 10-* 3A 4A 5A



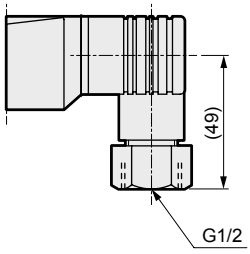
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C	I	J
AC (2E/2G/2H)	23.5	65.5	54(53.5)	22	38
DC (2E/2G/2H)	23.5	66	54.5(54)	22	38
DC (6E/6G/6H)	24	68	56.5(56)	22	39

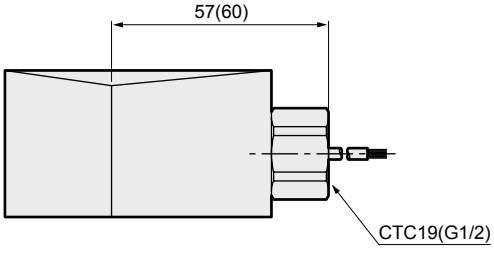
● Open frame + HP terminal box
GAB412/452-1 to 7-0 to 10-* 3 5 | M N I J / 4M 4N



● DIN terminal box with small lamp + conduit (G1/2)
GAB412/452-1 to 7-0 to 10-* 2H H

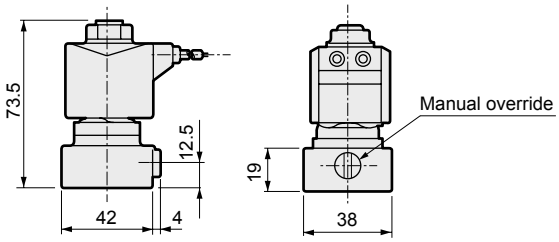


● Open frame + conduit
GAB412/452-1 to 7-0 to 10-* 3A 4A 5A | G H



Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
GAB412/452-1 to 7-0 to 10-*** A



Direct acting 2-port solenoid valve, manifold/actuator
General purpose

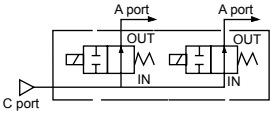
GAB422 Series

- NO (closed when energized)
- Common supply (port C pressurization)

Refer to the Ending for details.

Manifold circuit configuration

- GAB422
  (Common supply/port C pressurization)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications	
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water	Steam
Working pressure differential MPa	0 to 2 (refer to max. working pressure differential in individual specifications.)		
Max. working pressure MPa	2 (≈290 psi, 20 bar)		1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)		
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)	-10 (14°F) to 184 (363.2°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)	
Thermal class	Class 130 (B)	Class 180 (H)	
Atmosphere	Place free of corrosive gas and explosive gas		
Valve structure	Direct acting poppet structure		
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)		300 or less (air)
Mounting orientation	Unrestricted		
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/EPM rubber	Copper alloy/PTFE

*1 : No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consumption (W)	
			Air		Water(hot)/Kerosene		Oil (50 mm^2/s)		Steam		When holding		When starting		AC	DC
			AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz	
GAB422-1	-	1.5	2.0	2.0	2.0	2.0	2.0	2.0	1.0	100 VAC 50/60 Hz *7 200 VAC 50/60 Hz *7 12 VDC 24 VDC 48 VDC 100 VDC	22	18	35	29	8.7/6.7	15.5 (14)
GAB422-2		2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0							
GAB422-3		3.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7							
GAB422-4		3.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5							
GAB422-5		4.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4							
GAB422-6		5.0	0.25	0.25	0.25	0.25	0.25	0.25	0.25							
GAB422-7		7.0	0.15	0.15	0.15	0.15	0.15	0.15	0.15							

*1 : The model numbers above are for basic orifice sizes. Refer to How to order for other combinations.
*2 : For port size, refer to How to order (page 184) and dimensions (page 188).
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Values shown in ( ) are for the DC voltage type with DIN terminal box.
*5 : Refer to DC column for the max. working pressure differential of coil with diode.
*6 : When using at low vacuum, vacuum the OUT port side.
*7 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Weight

Model No.	Weight (kg)									
	Actuator only	2 stations	3 stations	4 stations	5 stations	6 stations	7 stations	8 stations	9 stations	10 stations
GAB422	0.47	1.7	2.4	3.3	3.8	4.8	5.5	6.2	7.2	7.6

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant		Fluoro rubber		Ethylene propylene rubber		PTFE	
Coil (thermal class)		Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1)	°C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)	-10 to 60	-10 to 184
Ambient temperature	°C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)
Valve seat leakage	cm^3/min(ANR)	0.2 or less (air)				300 or less (air)	

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with lamp.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics		
			C[dm^3/(s·bar)]	b	Cv
GAB422-1	-	1.5	0.29	0.53	0.10
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.5	0.47	0.40
-5		4.0	1.9	0.47	0.48
-6		5.0	2.6	0.38	0.62
-7		7.0	4.6	0.37	0.82

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

GAB422 ( ) - 2 - 5 - 0 3A A G S - AC100V

- GAB422: Model No.
- ( ): Ⓐ Thread
- 2: Ⓑ Orifice size
- 5: Ⓒ Manifold station No. *2
- 0: Ⓓ Body/sealant combination *3 *4 *5 *6
- 3A: Ⓔ Coil housing
- A: Ⓕ Manual override (locking)
- G: Ⓖ Other options
- S: Ⓗ With surge suppressor
- AC100V: Ⓘ Rated voltage

Code	Description
Ⓐ Thread	
Blank	Rc
G	G
N	NPT
Ⓑ Orifice size	
1	ø1.5
2	ø2
3	ø3
4	ø3.5
5	ø4
6	ø5
7	ø7
Ⓒ Manifold station No.	
2	2 stations
to	to
10	10 stations
0	Actuator only

Ⓓ Body/sealant combination

		Body	Seal	Treatment	Remarks
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)
B	Option		Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)
C			PTFE		Steam (up to 184°C *4)
D		Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)
E			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)
F			PTFE		Steam (up to 184°C *4)
H		Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)
J			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)
K			PTFE		Steam (up to 184°C *4)
P			Ethylene propylene rubber		Hot water (up to 90°C *4)
L		Stainless steel	Nitrile rubber		Air/water/low vacuum/kerosene (up to 60°C)
M			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)
N			PTFE		Steam (up to 184°C *4)
R			Ethylene propylene rubber		Hot water (up to 90°C *4)

Refer to Intro Page 39 for reference on material combinations.

Ⓔ to Ⓘ

Refer to page 185 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]

GAB422N-2-6-AC100V

Model : GAB422 (normally open/common supply)

- Ⓐ Thread : NPT
- Ⓑ Orifice size : ø2
- Ⓒ Manifold station No. : 6 stations
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil housing : Grommet lead wire
- Ⓕ to Ⓗ : None
- Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]

GAB422-3-0-000AS-AC100V

Model : GAB422 (normally open/common supply)

- Ⓐ Thread : Rc
- Ⓑ Orifice size : ø3
- Ⓒ Manifold station No. : Actuator only
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil housing : Grommet lead wire
- Ⓕ Manual override (locking) : Selected
- Ⓖ Other options : None
- Ⓗ Surge suppressor : With surge suppressor
- Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

⚠ Precautions for model No. selection

*1 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Notes for Ⓒ to Ⓓ

*2 : For 11 or more manifold station No., contact CKD.
*3 : Leave blank for standard. However, to select options in Ⓔ,Ⓕ,Ⓖ or Ⓗ, indicate 0 for Item Ⓓ.
*4 : When Item Ⓓ 4A/4M/4N is selected.
*5 : The ethylene propylene rubber seal combination (Item Ⓓ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*6 : For PTFE seal, O-ring material of sub-plate connection will be FKM.

For Items Ⓔ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓕ to Ⓗ are not required, they should be left blank.

Ⓔ Coil housing				Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description				Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC 19	G 1/2		
Blank	Std.	Grommet lead wire		**A**						**S**	100 VAC, 200 VAC
2E		With DIN terminal box (G1/2)									100 VAC, 200 VAC
2G		With DIN terminal box (Pg11)									12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp (Pg11)							**H**		100 VAC, 200 VAC, 24 VDC
3A	Option	Open frame	Lead wire (IP65 or equivalent)	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
3M			With HP terminal box(G1/2)								12 VDC, 24 VDC, 48 VDC, 100 VDC
3N			HP terminal box with lamp (G1/2)		**D**	**E**	**F**				100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP term box, lamp (IP65, equiv) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
4M			With HP terminal box(G1/2)		**D**	**E**	**F**				
4N			HP terminal box with lamp (G1/2)								
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)	**A**				**G**	**H**		100 VAC, 200 VAC
5M			With HP terminal box(G1/2)								
5N			HP terminal box with lamp (G1/2)		**D**	**E**	**F**				
5I			HP terminal box (IP65 or equivalent) (G1/2)								
5J			HP term box, lamp (IP65, equiv) (G1/2)								

⚠ Refer to the following cautions for Items Ⓔ to Ⓘ.

Blank

● Grommet lead wire 300 mm

2E 2G 2H

● DIN terminal box

3A 4A 5A

● Open frame lead wire 300 mm
● 4A (Thermal class 180 (H))
● 5A (diode integrated)

3M 3N 4M 4N 5M 5N

● Open frame HP terminal box
● 4M, 4N (Thermal class 180 (H))
● 5M, 5N (diode integrated)

3I 3J 5I 5J

● Open frame HP terminal box (IP65 or equivalent)
● 5I, 5J (diode integrated)

Refer to page 148 for coil selection.

G H

● Conduit
● G(CTC19)
● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓔ

*7 : Leave blank for the standard coil housing. However, to select options in Ⓕ, Ⓖ or Ⓗ, indicate 00 for Item E.
*8 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.

Notes for Ⓕ to Ⓗ

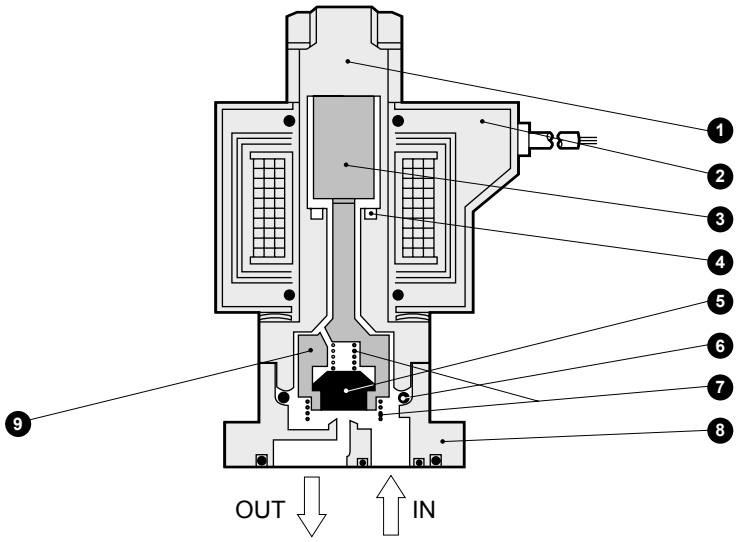
*9 : When Item Ⓓ is C, F, K or N, the manual override (Item ⒻA) is not available.
*10: For Item Ⓖ, select an option from D, E, F, G and H.
*11: The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*12: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓔ2H), so the surge suppressor S cannot be selected.
*13: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

*14: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓔ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*15: For voltages other than above, contact CKD.
*16: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● GAB422 actuator



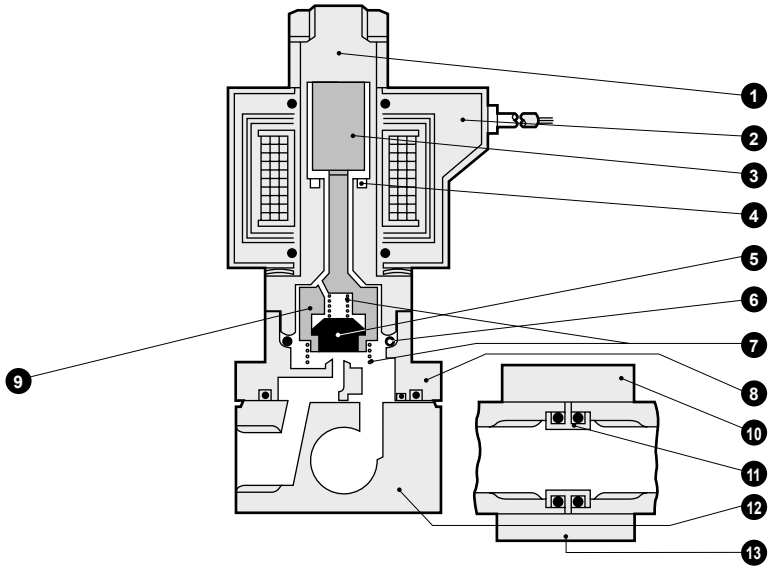
No.	Part name	Material		No.	Part name	Material	
1	Core assembly	SUS405 or equiv./316L/304	Stainless steel	8	Body	C3771(SCS13)	Copper alloy (stainless steel)
2	Coil	-	-	9	NO Valve	POM (PPS/SUS303/PFA)	Body/sealant combination When Blank/O/D/H/L/V/W: Polyacetal resin When B/E/J/M/P/R: Polyphenylene sulfide resin When C/F/K/N: Stainless steel/ perfluoroalkoxy resin
3	Plunger	SUS405 or equiv.	Stainless steel				
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)				
5	Seal	NBR (FKM/EPDM/PTFE)	(NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin)				
6	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)					
7	Spring	SUS304	Stainless steel				

* 4 body mounting screws and 2 O-rings are attached to the actuator only.

( ) shows options.

Internal structure and parts list

● GAB422 manifold

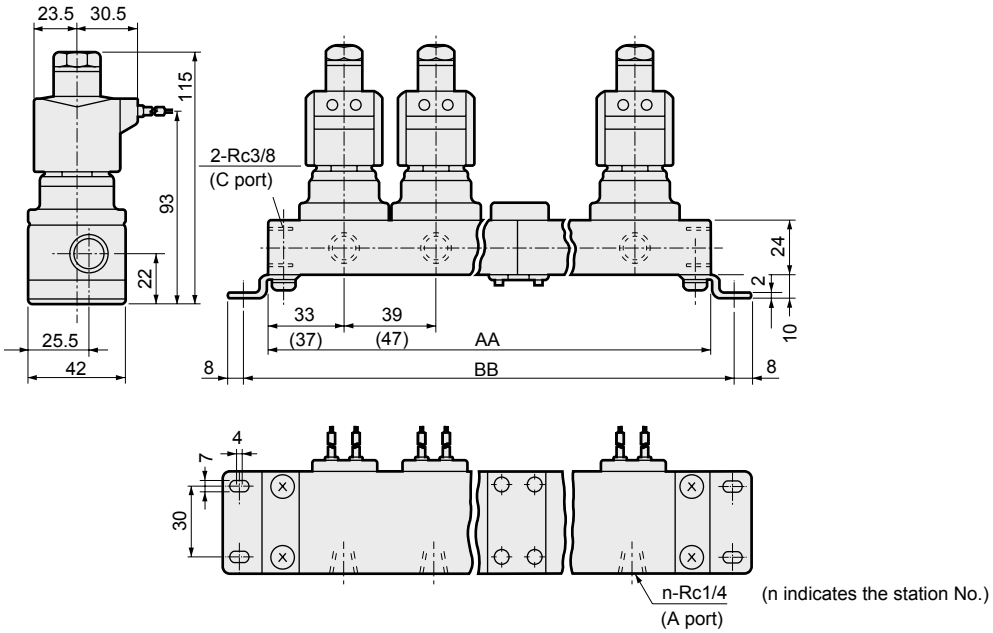


No.	Part name	Material		No.	Part name	Material	
1	Core assembly	SUS405 or equiv./316L/304	Stainless steel	9	NO Valve	POM (PPS/SUS303/PFA)	Body/sealant combination When Blank/O/D/H/L/V/W: Polyacetal resin When B/E/J/M/P/R: Polyphenylene sulfide Resin When C/F/K/N: Stainless steel/ perfluoroalkoxy resin
2	Coil	-	-				
3	Plunger	SUS405 or equiv.	Stainless steel				
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)				
5	Seal	NBR (FKM/EPDM/PTFE)	(NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin)	10	Holder	SPCC	Steel
6	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)		11	Connector	C3604(SUS304)	Copper alloy (stainless steel)
7	Spring	SUS304	Stainless steel	12	Sub-plate	C3604(SUS303)	Copper alloy (stainless steel)
8	Body	C3771(SCS13)	Copper alloy (stainless steel)	13	Connecting plate	SPCC	Steel

( ) shows options.

Dimensions: Manifold

● Grommet lead wire
GAB422-1 to 7-2 to 10

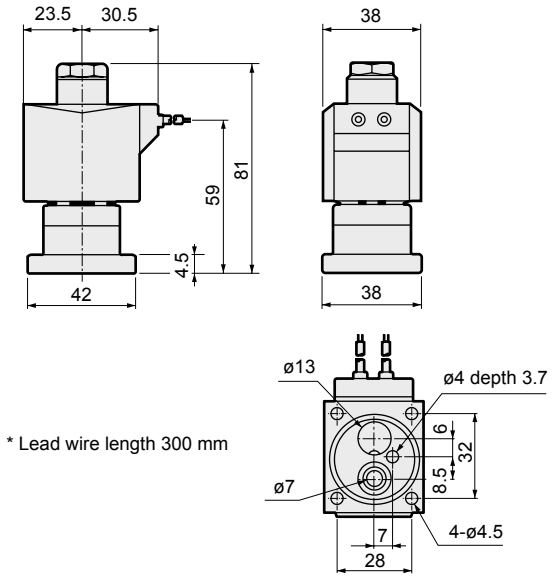


Station No.	AA	BB	Manifold configuration	Station No.	AA	BB	Manifold configuration
2	106(122)	122(138)	2 stations x 1	7	329(385)	345(401)	5 stations + 2 stations
3	145(169)	161(185)	3 stations x 1	8	368(432)	384(448)	5 stations + 3 stations
4	212(244)	228(260)	2 stations x 2	9	435(507)	451(523)	3 stations x 3
5	223(263)	239(279)	5 stations x 1	10	446(526)	462(542)	5 stations x 2
6	290(338)	306(354)	3 stations x 2	Contact CKD for 11 stations or more.			

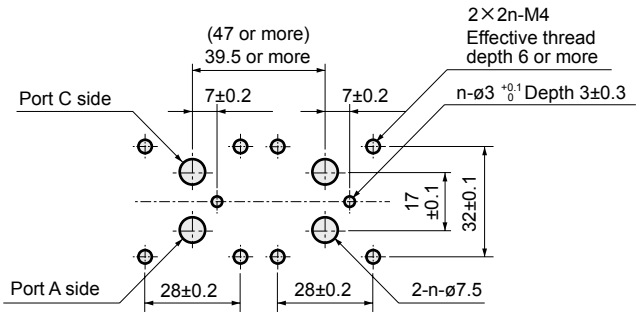
*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : Dimensions shown in ( ) are for open frame.
*3 : Dimensions for open frame will be applied to the DC voltage type of GAB422 Series with DIN terminal box.
*4 : The dimensions are the same for port sizes of G and NPT threads.

Dimensions: Actuator

● Grommet lead wire
GAB422-1 to 7-0



● Recommended dimensions for actuator mounting



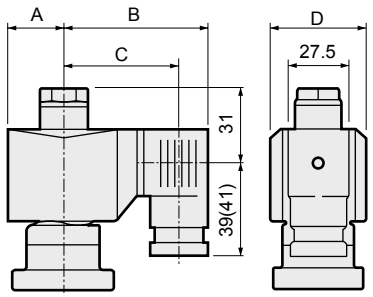
■ Machining drawing when using 2 actuators

Optional dimensions

CAD

* Refer to the dimensions of grommet lead wire on page 188 for common dimensions.

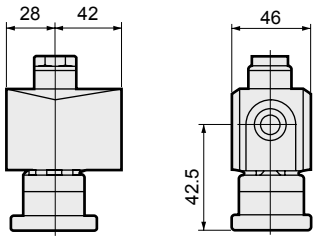
● With DIN terminal box
GAB422-1 to 7-0 to 10-* [2E] [2G] [2H]



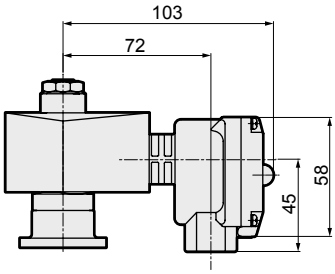
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C	D
AC	23.5	65.5	54(53.5)	38
DC	28	72	60.5(60)	46

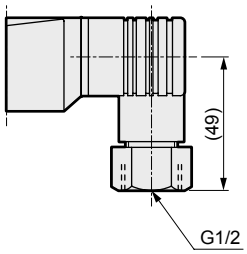
● Open frame lead wire
GAB422-1 to 7-0 to 10-* [3A] [4A] [5A]



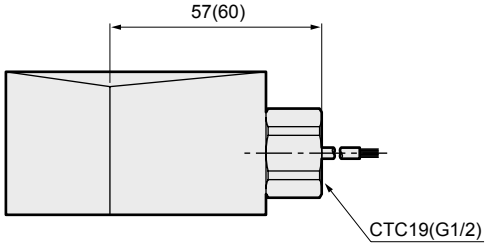
● Open frame + HP terminal box
GAB422-1 to 7-0 to 10-* [3 M / 4M] [5 N 4N] [I] [J]



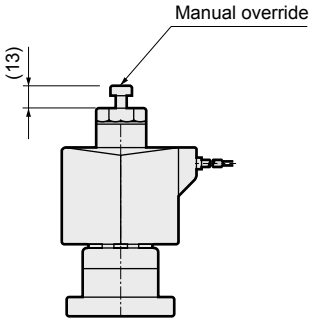
● DIN terminal box with small lamp + conduit (G1/2)
GAB422-1 to 7-0 to 10-* [2H] [H]



● Open frame + conduit
GAB422-1 to 7-0 to 10-* [3A 4A 5A] [G H]



● Manual override (locking)
GAB422-1 to 7-0 to 10-***[A]



Dimensions shown in ( ) are for G1/2.

Direct acting 3-port solenoid valve, single unit
General purpose

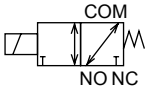
AG31/AG41 Series

- Universal
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- AG31/41: Universal



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications	
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water	Steam
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)		
Max. working pressure MPa	1 (≈150 psi, 10 bar)		
Proof pressure (water pressure) MPa	25 (≈3700 psi, 250 bar)		
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)	-10 (14°F) to 184 (363.2°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)	
Thermal class	Class 130 (B)	Class 180 (H)	
Atmosphere	Place free of corrosive gas and explosive gas		
Valve structure	Direct acting poppet structure		
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)		300 or less (air)
Mounting orientation	Unrestricted		
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/EPM rubber	Copper alloy/PTFE

*1 : No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)		Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consumption (W)		Weight (kg)
				Air		Water(hot)/Kerosene		Oil (50 mm^2/s)		Steam		When holding		When starting		AC	DC	
		TOP	BODY	AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
AG31-01-1	Rc1/8	1.5	1.5	0.7	0.7	0.7	0.7	0.6	0.6(0.5)	0.7	100 VAC 50/60 Hz *7 200 VAC 50/60 Hz *7 12 VDC 24 VDC 48 VDC 100 VDC	14	11	20	16	6/4.2	11 (8.1)	0.36
-01-2		2.0	2.0	0.4	0.4(0.35)	0.4	0.4	0.25	0.2(0.15)	0.4								
-02-1	Rc1/4	1.5	1.5	0.7	0.7	0.7	0.7	0.6	0.6(0.5)	0.7								
-02-2		2.0	2.0	0.4	0.4(0.35)	0.4	0.4	0.25	0.2(0.15)	0.4								
AG41-02-1	Rc1/4	2.0	2.0	1.0	0.7(0.45)	1.0	0.7	0.4	0.3(0.25)	1.0		22	17	35	27	8.3/6.2	11 (10.4)	0.45
-02-2		2.3	2.3	0.7	0.4(0.35)	0.7	0.4	0.25	0.15(0.1)	0.7								
-03-1	Rc3/8	2.0	2.0	1.0	0.7(0.45)	1.0	0.7	0.4	0.3(0.25)	1.0								0.48
-03-2		2.3	2.3	0.7	0.4(0.35)	0.7	0.4	0.25	0.15(0.1)	0.7								

*1 : The model numbers above are for the basic port size (Rc) and orifice size. Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Values shown in ( ) are for the DC voltage with DIN terminal box, indicating the max. working pressure differential when pressurized from the NO port.
*5 : When using in a continuously energized state, use fluoro rubber seal.
*6 : NO port pressurization is not possible for PTFE seal.
*7 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant		Fluoro rubber		Ethylene propylene rubber		PTFE	
Coil (thermal class)		Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1)	°C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)	-10 to 60	-10 to 184
Ambient temperature	°C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)
Valve seat leakage	cm^3/min(ANR)	0.2 or less (air)				300 or less (air)	

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with lamp.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics					
				C[dm^3/(s·bar)]		b		Cv	
		TOP	BODY	TOP	BODY	TOP	BODY	TOP	BODY
AG31-01-1	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-01-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-02-1	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-02-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
AG41-02-1	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-02-2		2.3	2.3	0.74	0.74	0.66	0.53	0.19	0.19
-03-1	Rc3/8	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-03-2		2.3	2.3	0.74	0.74	0.66	0.53	0.19	0.19

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AG31 - **02** - **2** - **B** **3A** **A** **B** **G** **S** - **AC100V**

AG41

Model No.

Ⓓ Coil housing, Ⓖ Other options, Ⓔ Manual override (locking), Ⓗ With surge suppressor, Ⓕ Mounting plate, Ⓘ Rated voltage

Ⓐ Port size

Ⓑ Orifice size

Ⓒ Body/sealant combination *1 *2 *3 *4 *5

Code	Description	Code	Description	Code	Description	Model No. AG31	Model No. AG41
Ⓐ Port size							
01	Rc1/8	**1G**	G1/8	**1N**	1/8NPT	●	
02	Rc1/4	**2G**	G1/4	**2N**	1/4NPT	●	●
03	Rc3/8	**3G**	G3/8	**3N**	3/8NPT		●

Ⓑ Orifice size	AG31		AG41			
	TOP	**BODY**	**TOP**	**BODY**		
1	ø1.5	ø1.5	ø2.0	ø2.0	●	●
2	ø2.0	ø2.0	ø2.3	ø2.3	●	●

Ⓒ Body/sealant combination		Body	Seal	Treatment	Remarks		
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
B	Option	Copper alloy	Fluoro rubber	-	Air/low vacuum/kerosene (up to 90°C *2)	●	●
C	Option	Copper alloy	PTFE	-	Steam (up to 184°C *2)	●	●
V	Option	Copper alloy	Fluoro rubber	Vacuum inspection	Low vacuum	●	●
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
E	Option	Stainless steel	Fluoro rubber	-	Air/low vacuum/kerosene (up to 90°C *2)	●	●
F	Option	Stainless steel	PTFE	-	Steam (up to 184°C *2)	●	●
W	Option	Stainless steel	Fluoro rubber	Vacuum inspection	Low vacuum	●	●
H	Option	Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
J	Option	Copper alloy	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene (up to 90°C *2)	●	●
K	Option	Copper alloy	PTFE	Oil-prohibited	Steam (up to 184°C *2)	●	●
P	Option	Copper alloy	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *2)	●	●
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene (up to 90°C *2)	●	●
N	Option	Stainless steel	PTFE	Oil-prohibited	Steam (up to 184°C *2)	●	●
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *2)	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓘ

Refer to page 193 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]

AG31-02-1-AC100V

Model : AG31
Ⓐ Port size : Rc1/4
Ⓑ Orifice size : TOP-ø1.5, BODY-ø1.5
Ⓒ Body/sealant combination
: Body - copper alloy, sealant - nitrile rubber
Ⓓ Coil housing : Grommet lead wire
Ⓔ to Ⓗ : None
Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]

AG41-03-2-000ABS-AC100V

Model : AG41
Ⓐ Port size : Rc3/8
Ⓑ Orifice size : TOP-ø2.3, BODY-ø2.3
Ⓒ Body/sealant : Body - copper alloy/sealant - nitrile rubber
Ⓓ Coil housing : Grommet lead wire
Ⓔ Manual override (locking) : Selected
Ⓕ Mounting plate : With mounting plate
Ⓖ Other options : None
Ⓗ Surge suppressor : With surge suppressor
Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : Leave blank for standard. However, to select options in Ⓓ, Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 0 for Item Ⓒ.
*2 : When Item Ⓒ 4A/4M/4N is selected.
*3 : The ethylene propylene rubber seal combination (Item Ⓒ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*4 : For option codes V and W, vacuum is inspected at "leakage rate: 1.33 x 10^{-6} Pa·m^3/s or less".
*5 : For PTFE seal, O-ring material of socket will be FKM.

For Items Ⓓ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓗ are not required, they should be left blank.

Ⓓ Coil housing			Ⓔ	Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description			Manual override (Locking)	Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC 19	G 1/2		
Blank	Std.	Grommet lead wire	**A**	**B**						**S**	100 VAC, 200 VAC
2E		With DIN terminal box (G1/2)									100 VAC, 200 VAC
2G		With DIN terminal box (Pg11)									12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp (Pg11)							**H**		100 VAC, 200 VAC, 24 VDC
3A	Option	Open Frame: Lead wire (IP65 or equivalent)	**A**	**B**				**G**	**H**	**S**	100 VAC, 200 VAC
3M		Open Frame: With HP terminal box (G1/2)			**D**	**E**	**F**				12 VDC, 24 VDC, 48 VDC, 100 VDC
3N		Open Frame: HP terminal box with lamp (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I		Open Frame: HP term box (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		Open Frame: HP term box, lamp (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open Frame (Thermal class 180 (H)): Lead wire	**A**	**B**				**G**	**H**	**S**	100 VAC, 200 VAC
4M		Open Frame (Thermal class 180 (H)): With HP terminal box (G1/2)			**D**	**E**	**F**				
4N		Open Frame (Thermal class 180 (H)): HP terminal box with lamp (G1/2)									
5A		Open Frame (diode integrated): Lead wire (IP65 or equivalent)	**A**	**B**				**G**	**H**		100 VAC, 200 VAC
5M		Open Frame (diode integrated): With HP terminal box (G1/2)			**D**	**E**	**F**				
5N		Open Frame (diode integrated): HP terminal box with lamp (G1/2)									
5I		Open Frame (diode integrated): HP term box (IP65, equiv) (G1/2)									
5J		Open Frame (diode integrated): HP term box, lamp (IP65, equiv) (G1/2)									

⚠ Refer to the following cautions for Items Ⓓ to Ⓘ.

Blank

● Grommet lead wire 300 mm

2E 2G 2H

● DIN terminal box

3A 4A 5A

● Open frame
Lead wire 300mm
● 4A (Thermal class 180 (H))
● 5A (diode integrated)

3M 3N 4M 4N 5M 5N

● Open frame HP terminal box
● 4M, 4N (Thermal class 180 (H))
● 5M, 5N (diode integrated)

3I 3J 5I 5J

● Open frame HP terminal box (IP65 or equivalent)
● 5I, 5J (diode integrated)

Refer to page 148 for coil selection.

G H

● Conduit
● G(CTC19)
● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓓ

*6 : Leave blank for the standard coil housing. However, to select options in Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 00 for Item Ⓓ.
*7 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*8 : A DC coil for steam is available for AG41. Contact CKD for more information.

Notes for Ⓔ to Ⓗ

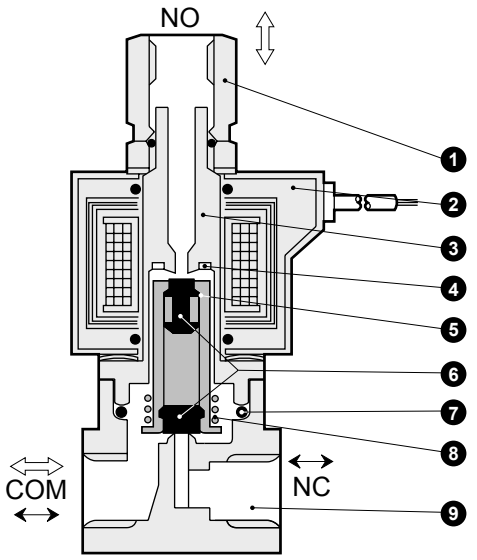
*9 : When Item Ⓒ is C, F, K, N, V or W, the manual override (Item ⒺA) is not available.
*10: For Item Ⓖ, select an option from D, E, F, G and H.
*11: The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*12: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓓ 2H), so the surge suppressor S cannot be selected.
*13: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

*14: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*15: For voltages other than above, contact CKD.
*16: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AG31/41 Series

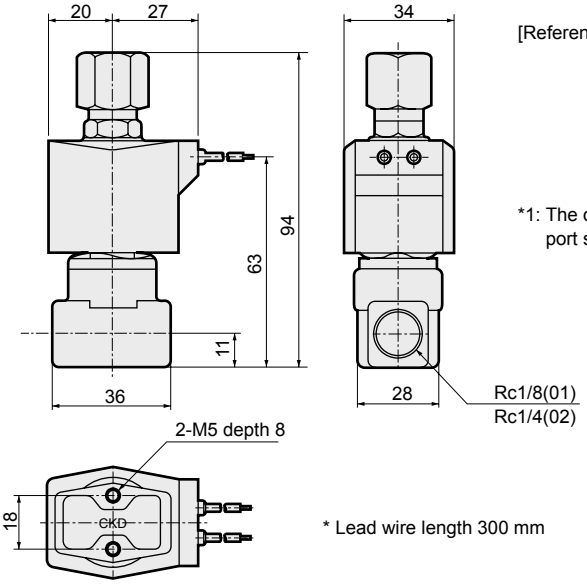


No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-
3	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Seal	NBR (FKM/EPDM/PTFE)	NBR : Nitrile rubber FKM : Fluoro rubber EPDM : ethylene propylene rubber PTFE : tetrafluoroethylene resin
7	O-ring	NBR (FKM/EPDM/PTFE) (AS568/019)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SUS303)	Copper alloy (stainless steel)

*1 : When the body/sealant combination code is other than blank and H, the material is SUS405 or equivalent/316L/430.
*2 : ( ) shows options.

Dimensions: AG31 Series CAD

● Grommet lead wire
AG31-01/02-1 to 2



[Reference] As the JIS symbol flow shows, pressure can be applied from any of the three piping ports. Generally, two orifices (TOP, BODY) have the same values and rated pressure.
When not energized : COM → NO or NO → COM
When energized : COM → NC or NC → COM

*1: The dimensions are the same for port sizes of G and NPT threads.

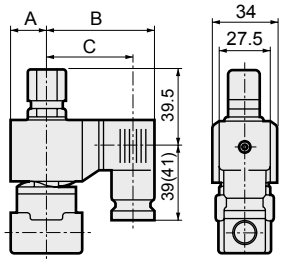
* Lead wire length 300 mm

Optional dimensions: AG31 Series

CAD

* Refer to the dimensions of grommet lead wire on page 194 for common dimensions.

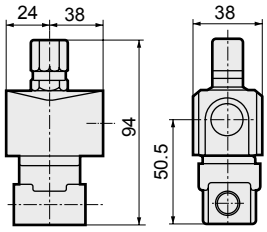
● With DIN terminal box
AG31-01/02-1 to 2-* [2E] [2G] [2H]



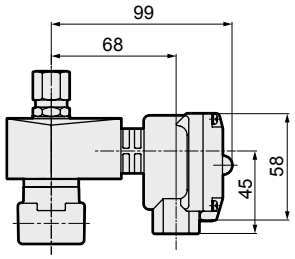
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C
AC	20	62	50.5(50)
DC	21	63.5	52(51.5)

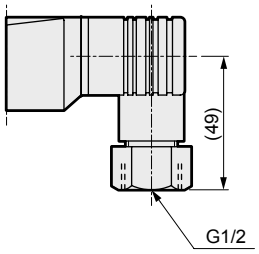
● Open frame
AG31-01/02-1 to 2-* [3A] [4A] [5A]



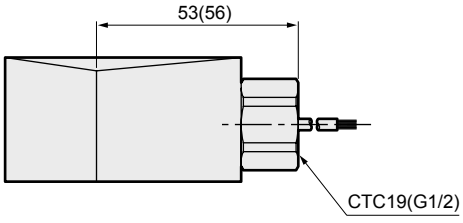
● Open frame + HP terminal box
AG31-01/02-1 to 2-* [3 5] [M N I J] / [4M 4N]



● DIN terminal box with small lamp + conduit (G1/2)
AG31-01/02-1 to 2-* [2H] [H]

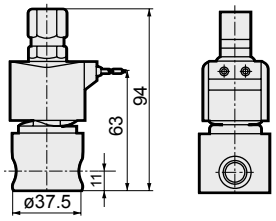


● Open frame + conduit
AG31-01/02-1 to 2-* [3A 4A 5A] [G H]



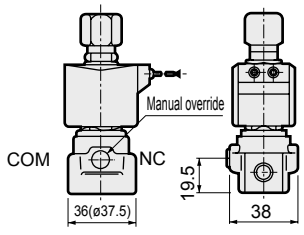
Dimensions shown in ( ) are for G1/2.

● Stainless steel body + grommet lead wire
AG31-01/02-1 to 2-[D/E/F/R/W/L/M/N]



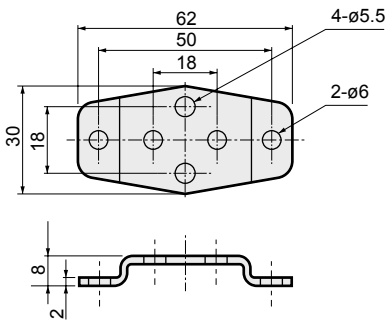
● Manual override (locking)
AG31-01/02-1 to 2-*** [A]

The figure shows copper alloy body.



Dimensions shown in ( ) are for stainless steel body.

● Mounting plate
AG31-01/02-1 to 2-*** [B]

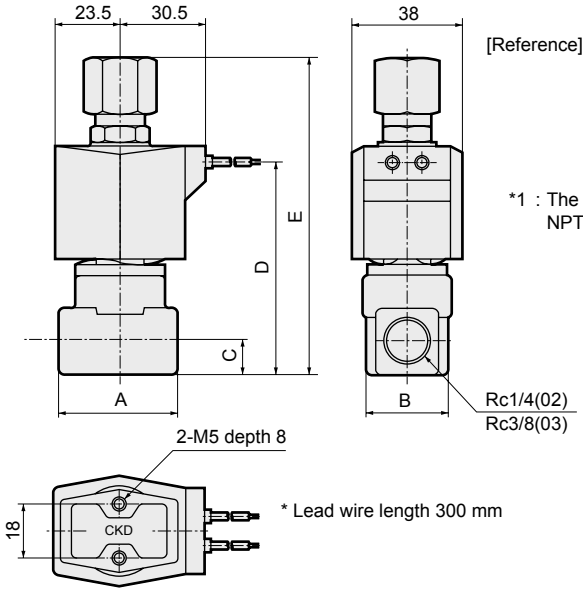


Mounting plate model	Compatibility
AG3-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● All of AG31 Series

* Material: Steel/Zinc plated

Dimensions: AG41 Series

● Grommet lead wire
AG41-02/03-1 to 2



[Reference] As the JIS symbol flow shows, pressure can be applied from any of the three piping ports. Generally, two orifices (TOP, BODY) have the same values and rated pressure.
When not energized : COM → NO or NO → COM
When energized : COM → NC or NC → COM

*1 : The dimensions are the same for port sizes of G and NPT threads.

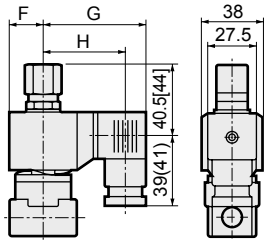
* Lead wire length 300 mm

Model No.	A	B	C	D	E
AG41-02-1 to 2	36	28	11	68	99.5
AG41-03-1 to 2	40	28	12	71	106

Optional dimensions: AG41 Series

* Refer to the dimensions of grommet lead wire above for common dimensions.

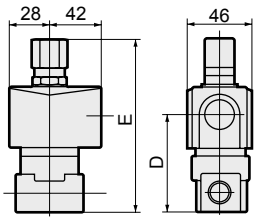
● With DIN terminal box
AG41-02/03-1 to 2-* 2E / 2G / 2H



Dimensions shown in [ ] are for Rc3/8. Dimensions shown in ( ) are for G1/2.

Voltage	F	G	H
AC	23.5	65.5	54(53.5)
DC	23.5	66	54.5(54)

● Open frame lead wire
AG41-02/03-1 to 2-* 3A / 4A / 5A

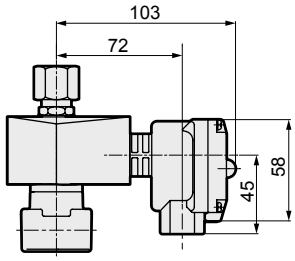


Model No.	D	E
AG41-02-1 to 2-**A	52	99.5
AG41-03-1 to 2-**A	55	106

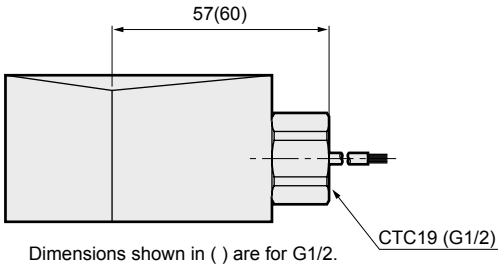
Optional dimensions: AG41 Series

* Refer to the dimensions of grommet lead wire on page 196 for common dimensions.

● Open frame + HP terminal box
AG41-02/03-1 to 2-* [3 / 5] [M / N / I / J] / [4M / 4N]



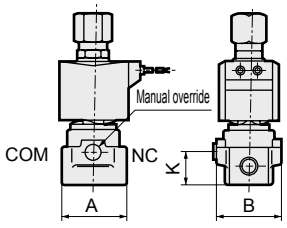
● Open frame + conduit
AG41-02/03-1 to 2-* [3A / 4A / 5A] [G / H]



Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
AG41-02/03-1 to 2***[A]

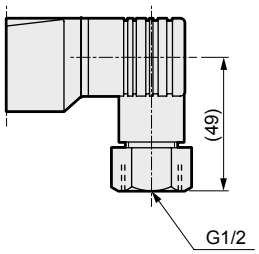
The figure shows copper alloy body.



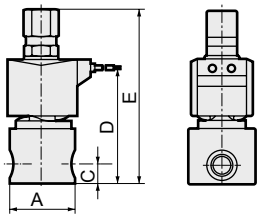
Model No.	A	B	K
AG41-02-1 to 2-***A	36(ø37.5)	38	19.5
AG41-03-1 to 2-***A	40(ø45.0)	40	22.5

Dimensions shown in ( ) are for stainless steel body.

● DIN terminal box with small lamp + conduit (G1/2)
AG41-02/03-1 to 2-* [2H] [H]

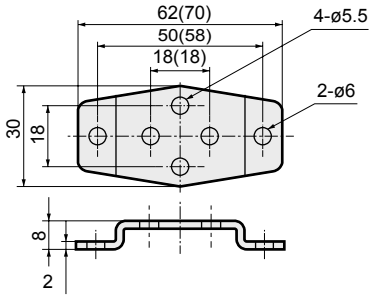


● Stainless steel body + grommet lead wire
AG41-02/03-1 to 7- [D/E/F/R/W/L/M/N]



Model No.	A	C	D	E
AG41-02-1 to 2-*	ø37.5	11	68	99.5
AG41-03-1 to 2-*	ø45	12	71	106

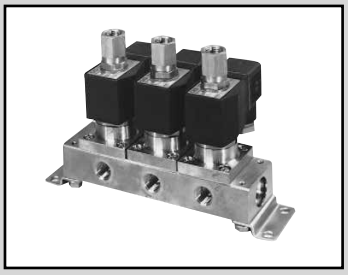
● Mounting plate
AG41-02/03-1 to 2***[B]



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AG4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AG41-02/03-1 to 2 Series ● Stainless steel body AG41-02-1 to 2-[D/E/F/L/M/N/R/W]
AG4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● Stainless steel body AG41-03-1 to 2-[D/E/F/L/M/N/R/W]

* Material: Steel/Zinc plated



Direct acting 3-port solenoid valve, manifold/actuator
General purpose

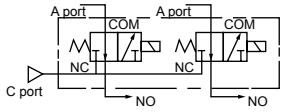
GAG31*/GAG35*, GAG41*/GAG45* Series

- Universal
- Common supply/individual exhaust, common supply/separate flow

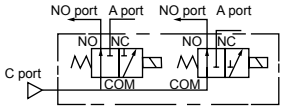
CE Refer to the Ending for details. RoHS CAD

Manifold circuit configuration

- GAG31*/41* (Common supply/individual exhaust)



- GAG35*/45* (Common supply/separate flow)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications	
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water	Steam
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)		
Max. working pressure MPa	1 (≈150 psi, 10 bar)		
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)		
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)	-10 (14°F) to 184 (363.2°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)	
Thermal class	Class 130 (B)	Class 180 (H)	
Atmosphere	Place free of corrosive gas and explosive gas		
Valve structure	Direct acting poppet structure		
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)		300 or less (air)
Mounting orientation	Unrestricted		
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/EPM rubber	Copper alloy/PTFE

*1 : No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	NO port size	Orifice size (mm)		Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consumption (W)	
				Air		Water(hot)/Kerosene		Oil (50 mm^2/s)		Steam		When holding		When starting		AC	DC
		TOP	BODY	AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz	
GAG311 -1 / 351 -2	Rc1/8	1.5	1.5	0.7	0.7	0.7	0.7	0.6	0.6 (0.5)	0.7	100 VAC 50/60 Hz *8 200 VAC 50/60 Hz *8 12 VDC 24 VDC 48 VDC 100 VDC	14	11	20	16	6/4.2	11 (8.1)
		2.0	2.0	0.4	0.4 (0.35)	0.4	0.4	0.25	0.2 (0.15)	0.4							
GAG312 -1 / 352 -2	Rc1/4	1.5	1.5	0.7	0.7	0.7	0.7	0.6	0.6 (0.5)	0.7							
		2.0	2.0	0.4	0.4 (0.35)	0.4	0.4	0.25	0.2 (0.15)	0.4							
GAG412 -1 / 452 -2	Rc1/4	2.0	2.0	1.0	0.7 (0.45)	1.0	0.7	0.4	0.3 (0.25)	1.0		22	17	35	27	8.3/6.2	11 (10.4)
		2.3	2.3	0.7	0.4 (0.25)	0.7	0.4	0.25	0.15 (0.1)	0.7							
GAG413 -1 / 453 -2	Rc3/8	2.0	2.0	1.0	0.7 (0.45)	1.0	0.7	0.4	0.3 (0.25)	1.0							
		2.3	2.3	0.7	0.4 (0.25)	0.7	0.4	0.25	0.15 (0.1)	0.7							

*1 : The model numbers above are for the basic NO port size (Rc) and orifice size. Refer to How to order for other combinations.
*2 : For A and C port sizes, refer to How to order (page 200) and dimensions (page 204).
*3 : Refer to DC column for the max. working pressure differential of coil with diode.
*4 : The voltage fluctuation range must be within ±10% of the rated voltage.
*5 : Values shown in ( ) are for the DC voltage type with DIN terminal box, indicating the max. working pressure when pressurized from the NO port.
*6 : When using in a continuously energized state, use a fluoro rubber seal.
*7 : NO port pressurization is not possible for PTFE seal.
*8 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Weight

Model No.	Weight (kg)									
	Actuator only	2 stations	3 stations	4 stations	5 stations	6 stations	7 stations	8 stations	9 stations	10 stations
GAG31* GAG35*	0.35	1.4	2.0	2.8	3.2	4.0	4.6	5.2	6.1	6.4
GAG412 GAG452	0.44	1.6	2.3	3.2	3.7	4.6	5.3	6.0	6.9	7.3
GAG413 GAG453	0.45	1.6	2.3	3.2	3.7	4.6	5.3	6.0	7.0	7.4

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant	Fluoro rubber		Ethylene propylene rubber		PTFE	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1) °C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)	-10 to 60	-10 to 184
Ambient temperature °C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)				300 or less (air)	

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with lamp.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics					
		TOP	BODY	C[dm^3/(s·bar)]		b		Cv	
				TOP	BODY	TOP	BODY	TOP	BODY
GAG311-1	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
GAG312-1	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
GAG412-1	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-2		2.3	2.3	0.74	0.74	0.66	0.53	0.19	0.19
GAG413-1	Rc3/8	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-2		2.3	2.3	0.74	0.74	0.66	0.53	0.19	0.19

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

● Common supply/individual exhaust (Port C pressurization)

GAG31 1 ○ - 1 - 7 - 0 3A A G S - AC100V

- ● Common supply/separate flow (Port C pressurization) **GAG35**
- ● Common supply/individual exhaust (Port C pressurization) **GAG41**
- ● Common supply/separate flow (Port C pressurization) **GAG45**

Model No.

Ⓐ NO port size

Ⓑ Thread

Ⓒ Orifice size

Ⓓ Manifold *2 station No.

Ⓔ Body/sealant combination *3 *4 *5 *6

Ⓕ Coil housing

Ⓖ Manual override (locking)

Ⓗ Other options

Ⓘ With surge suppressor

Ⓙ Rated voltage

Code	Description	Model No. GAG3**	Model No. GAG4**
Ⓐ NO port size			
1	1/8	●	
2	1/4	●	●
3	3/8		●
Ⓑ Thread			
Blank	Rc	●	●
G	G	●	●
N	NPT	●	●

Ⓒ Orifice size

	GAG3**		GAG4**			
	TOP	BODY	TOP	BODY		
1	ø1.5	ø1.5	ø2.0	ø2.0	●	●
2	ø2.0	ø2.0	ø2.3	ø2.3	●	●

Ⓓ Manifold station No.

2 to 10	2 stations to 10 stations	●	●
0	Actuator only	●	●

Ⓔ Body/sealant combination

		Body	Seal	Treatment	Remarks		
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vac/kerosene (≤60°C)	●	●
B	Option	Copper alloy	Fluoro rubber -	-	Air/low vac/kerosene (≤90°C *4)	●	●
C	Option	Copper alloy	PTFE	-	Steam (up to 184°C *4)	●	●
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vac/kerosene (≤60°C)	●	●
E	Option	Stainless steel	Fluoro rubber -	-	Air/low vac/kerosene (≤90°C *4)	●	●
F	Option	Stainless steel	PTFE	-	Steam (up to 184°C *4)	●	●
H	Option	Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vac/kerosene (≤60°C)	●	●
J	Option	Copper alloy	Fluoro rubber	Oil-prohibited	Air/low vac/kerosene (≤90°C *4)	●	●
K	Option	Copper alloy	PTFE	Oil-prohibited	Steam (up to 184°C *4)	●	●
P	Option	Copper alloy	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *4)	●	●
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vac/kerosene (≤60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/low vac/kerosene (≤90°C *4)	●	●
N	Option	Stainless steel	PTFE	Oil-prohibited	Steam (up to 184°C *4)	●	●
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *4)	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓕ to Ⓙ

Refer to page 201 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]
GAG311-1-4-AC200V

Model: GAG311 (common supply/individual exhaust, port C pressurization)

- Ⓐ NO port size : 1/8
- Ⓑ Thread : Rc
- Ⓒ Orifice size : TOP-ø1.5, BODY-ø1.5
- Ⓓ Manifold station No. : 4 stations
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓕ Coil housing : Grommet lead wire
- Ⓖ to Ⓘ : None
- Ⓙ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

[Example of model No. 2]
GAG352G-2-7-000AS-AC200V

Model: GAG352 (common supply/separate flow, port C pressurization)

- Ⓐ NO port size : 1/4
- Ⓑ Thread : G
- Ⓒ Orifice size : TOP-ø2.0, BODY-ø2.0
- Ⓓ Manifold station No. : 7 stations
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓕ Coil housing : Grommet lead wire
- Ⓖ Manual override (locking) : Selected
- Ⓗ Other options : None
- Ⓘ Surge suppressor : With surge suppressor
- Ⓙ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

*1 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Notes for Ⓓ to Ⓔ

*2 : For 11 or more manifold station No., contact CKD.

*3 : Leave blank for standard. However, to select options in Ⓕ, Ⓖ, Ⓗ or Ⓘ, indicate 0 for Item Ⓔ.

*4 : When Item E 4A/4M/4N is selected.

*5 : The ethylene propylene rubber seal combination (Item Ⓔ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)

*6 : For PTFE seal, O-ring material for socket and sub-plate connection will be FKM.

For Items Ⓕ to Ⓙ, the combinations indicated with codes are available.
Note that if options for Items Ⓖ to Ⓘ are not required, they should be left blank.

Ⓕ Coil housing				Ⓖ	Ⓗ Other options					Ⓘ	Ⓙ Rated voltage
Description				Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
Blank	Std.	Grommet lead wire		**A**						**S**	100 VAC, 200 VAC
2E	Option	With DIN terminal box	(G1/2)								100 VAC, 200 VAC
2G		With DIN terminal box	(Pg11)								12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp	(Pg11)						**H**		100 VAC, 200 VAC, 24 VDC
3A		Open frame	Lead wire (IP65 or equivalent)	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
3M			With HP terminal box (G1/2)		**D**	**E**	**F**				12 VDC, 24 VDC, 48 VDC, 100 VDC
3N			HP terminal box with lamp (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP term box, lamp (IP65, equiv) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
4M			With HP terminal box(G1/2)		**D**	**E**	**F**				
4N			HP terminal box with lamp(G1/2)								
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)	**A**				**G**	**H**		100 VAC, 200 VAC
5M			With HP terminal box(G1/2)		**D**	**E**	**F**				
5N			HP terminal box with lamp(G1/2)								
5I			HP terminal box (IP65 or equivalent) (G1/2)								
5J			HP term box, lamp (IP65, equiv) (G1/2)								

⚠ Refer to the following cautions for Items Ⓕ to Ⓙ.

Blank		● Grommet lead wire 300 mm
2E **2G** **2H**		● DIN terminal box
3A **4A** **5A**		● Open frame Lead wire 300 mm ● 4A (Thermal class 180 (H)) ● 5A (diode integrated)
3M **3N** **4M** **4N** **5M** **5N**		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
3I **3J** **5I** **5J**		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

Refer to page 148 for coil selection.

G **H**		● Conduit ● G(CTC19) ● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓕ

*7 : Leave blank for the standard coil housing. However, to select options in Ⓖ, Ⓗ or Ⓘ, indicate 00 for Item Ⓕ.
*8 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*9 : A DC coil for steam is available for GAG4**. Contact CKD for more information.

Notes for Ⓖ to Ⓘ

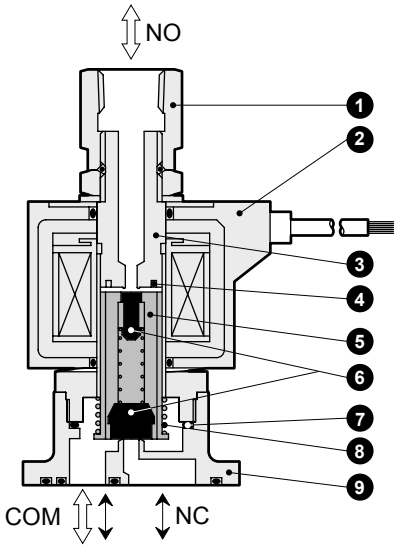
*10: When Item Ⓔ is C, F, K or N, the manual override (Item Ⓖ A) is not available.
*11: For Item Ⓗ, select an option from D, E, F, G and H.
*12: The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*13: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓕ 2H), so the surge suppressor S cannot be selected.
*14: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓙ

*15: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓕ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*16: For voltages other than above, contact CKD.
*17: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● GAG31*/GAG35*/GAG41*/GAG45* actuator

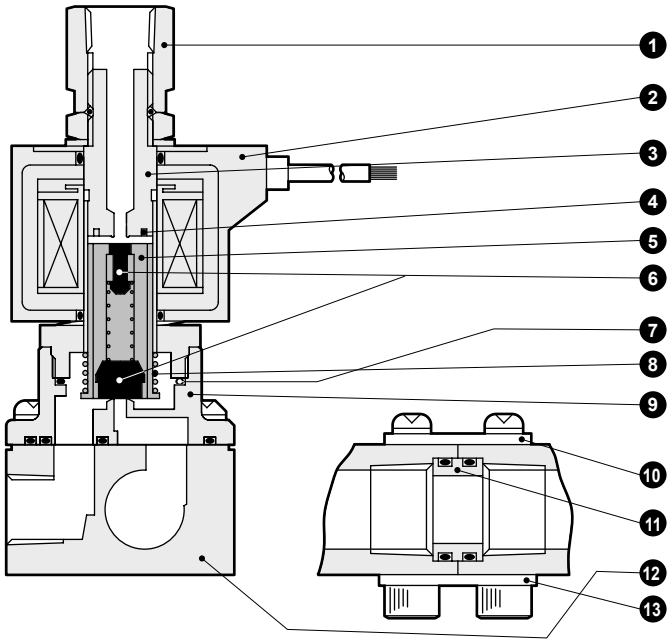


No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-
3	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Seal	NBR (FKM/EPDM/PTFE)	(NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin)
7	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SCS13)	Copper alloy (stainless steel)

*1 : When the body/sealant combination code is other than blank and H, the material is SUS405 or equivalent/316L/430.
*2 : ( ) shows options.
*3 : 4 body mounting screws and 2 O-rings are attached to the actuator only.

Internal structure and parts list

● GAG31*/GAG35*/GAG41*/GAG45* manifold



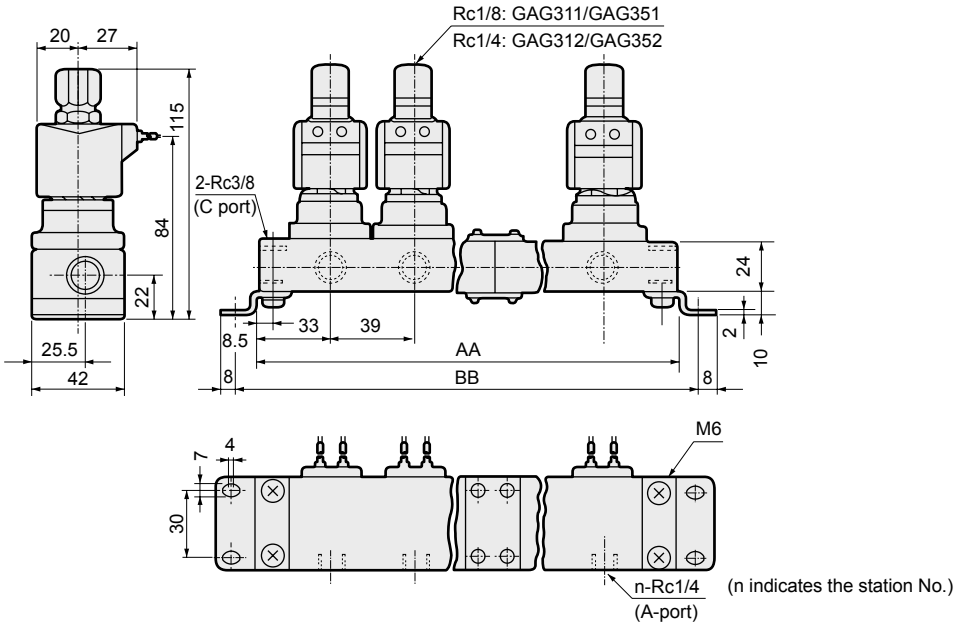
No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-
3	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Seal	NBR (FKM/EPDM/PTFE)	NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin
7	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SCS13)	Copper alloy (stainless steel)
10	Holder	SPCC	Steel
11	Connector	C3604(SUS304)	Copper alloy (stainless steel)
12	Sub-plate	C3604(SUS303)	Copper alloy (stainless steel)
13	Connecting plate	SPCC	Steel

*1 : When the body/sealant combination code is other than blank and H, the material is SUS405 or equivalent/316L/430.

*2 : ( ) shows options.

Dimensions: GAG31*/GAG35* Series

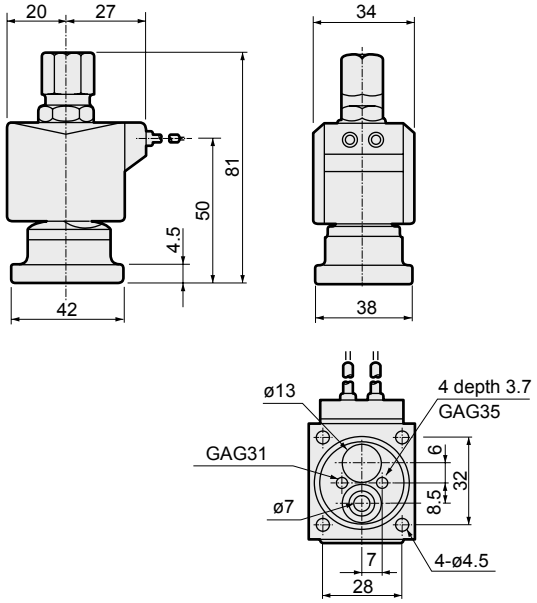
● Manifold (grommet lead wire)
GAG3**-1 to 2- 2 to 10



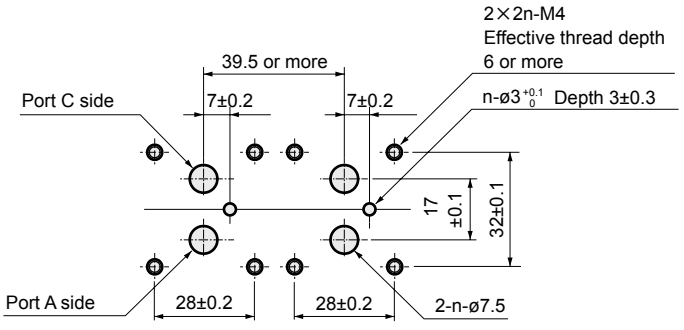
Station No.	AA	BB	Manifold configuration	Station No.	AA	BB	Manifold configuration
2	106	122	2 stations x 1	7	329	345	5 stations + 2 stations
3	145	161	3 stations x 1	8	368	384	5 stations + 3 stations
4	212	228	2 stations x 2	9	435	451	3 stations x 3
5	223	239	5 stations x 1	10	446	462	5 stations x 2
6	290	306	3 stations x 2	Contact CKD for 11 stations or more.			

*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : The dimensions are the same for port sizes of G and NPT threads.

● Actuator (grommet lead wire)
GAG3**-1 to 2- 0



● Recommended dimensions for actuator mounting

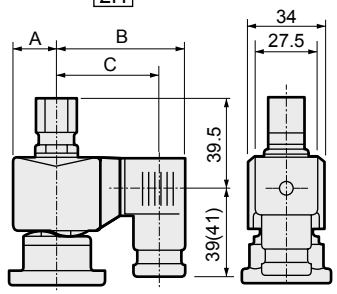


■ Machining drawing when using 2 actuators

Optional dimensions: GAG31*/GAG35*

* Refer to the dimensions of grommet lead wire on page 204 for common dimensions.

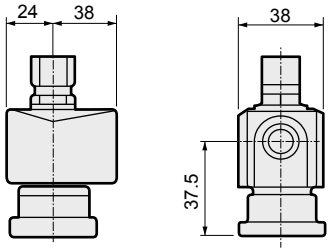
● With DIN terminal box
GAG3**-1 to 2-0 to 10-* [2E] [2G] [2H]



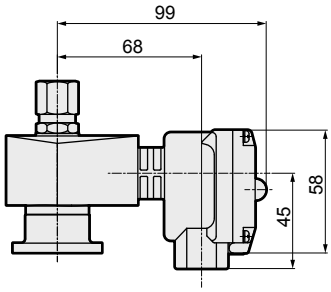
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C
AC	20	62	50.5(50)
DC	21	63.5	52(51.5)

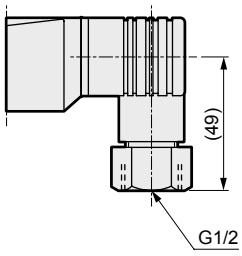
● Open frame lead wire
GAG3**-1 to 2-0 to 10-* [3A] [4A] [5A]



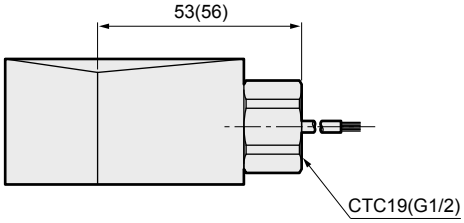
● Open frame + HP terminal box
GAG3**-1 to 2-0 to 10-* [3] [5] [M] [N] [I] [J] / [4M] [4N]



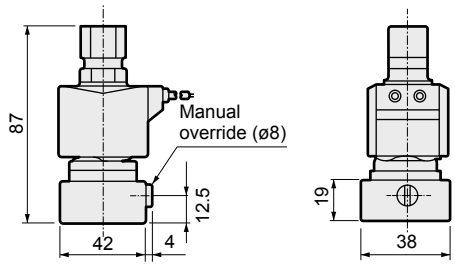
● DIN terminal box with small lamp + conduit (G1/2)
GAG3**-1 to 2-0 to 10-* [2H] [H]



● Open frame + conduit
GAG3**-1 to 2-0 to 10-* [3A] [4A] [5A] [G] [H]



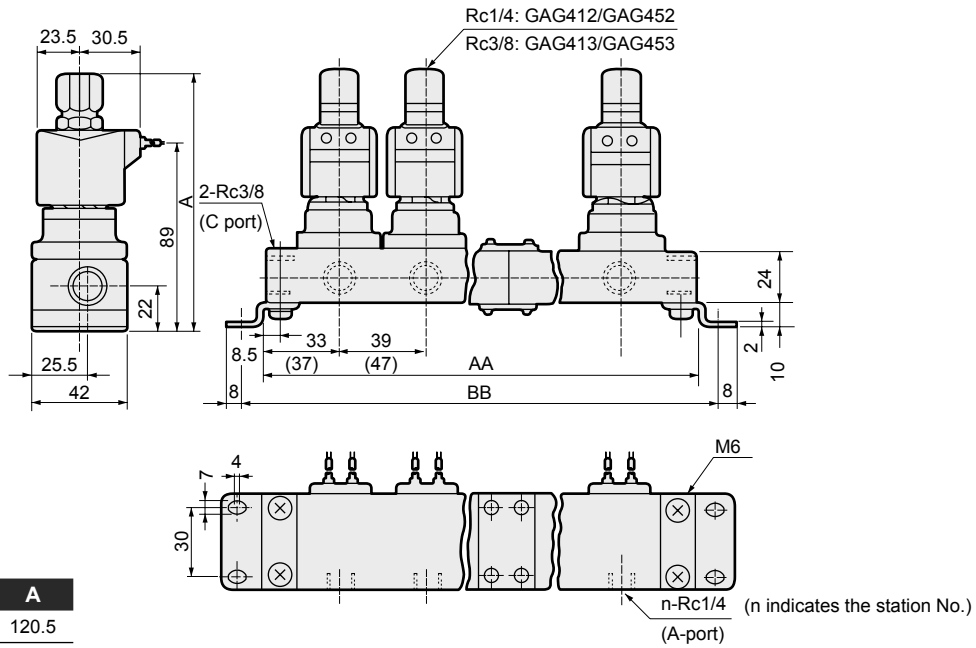
● Manual override (locking)
GAG3**-1 to 2-0 to 10-*** [A]



Dimensions shown in ( ) are for G1/2.

Dimensions: GAG41*/45* Series

● Manifold (grommet lead wire)
GAG4**-1 to 2- 2 to 10

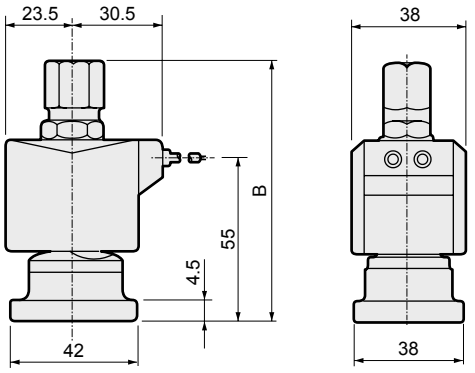


Model No.	A
GAG412/452-1 to 2	120.5
GAG413/453-1 to 2	124

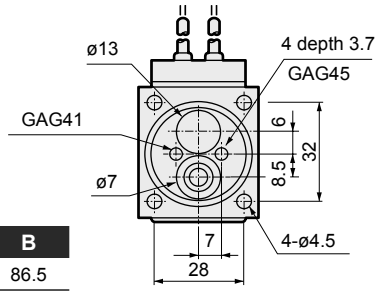
Station No.	AA	BB	Manifold configuration	Station No.	AA	BB	Manifold configuration
2	106(122)	122(138)	2 stations x 1	7	329(385)	345(401)	5 stations + 2 stations
3	145(169)	161(185)	3 stations x 1	8	368(432)	384(448)	5 stations + 3 stations
4	212(244)	228(260)	2 stations x 2	9	435(507)	451(523)	3 stations x 3
5	223(263)	239(279)	5 stations x 1	10	446(526)	462(542)	5 stations x 2
6	290(338)	306(354)	3 stations x 2	Contact CKD for 11 stations or more.			

*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : Dimensions shown in ( ) are for open frame.
*3 : The dimensions are the same for port sizes of G and NPT threads.

● Actuator (grommet lead wire)
GAG4**-1 to 2- 0

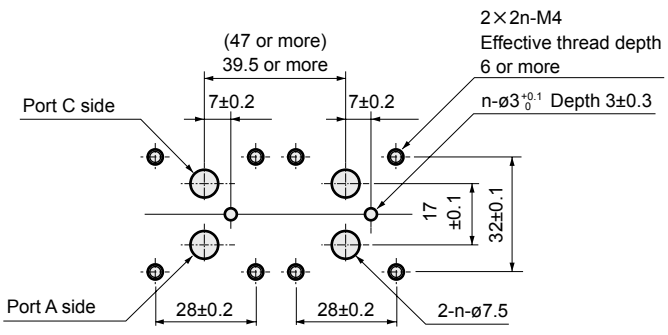


* Lead wire length 300 mm



Model No.	B
GAG412/452-1 to 2	86.5
GAG413/453-1 to 2	90

● Recommended dimensions for actuator mounting



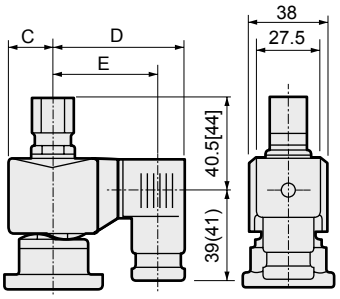
■ Machining drawing when using 2 actuators

Optional dimensions: GAG41*/45* Series

CAD

* Refer to the dimensions of grommet lead wire on page 206 for common dimensions.

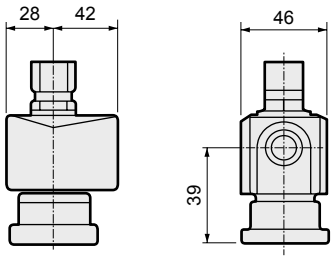
● With DIN terminal box
GAG4**-1 to 2-0 to 10-* [2E / 2G / 2H]



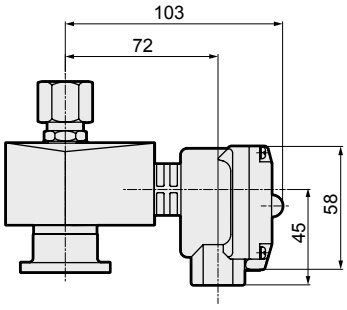
Dimensions shown in ( ) are for G1/2.
Dimensions shown in [ ] are for Rc3/8.

Voltage	C	D	E
AC	23.5	65.5	54(53.5)
DC	23.5	66	54.5(54)

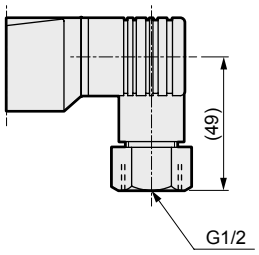
● Open frame lead wire
GAG4**-1 to 2-0 to 10-* [3A / 4A / 5A]



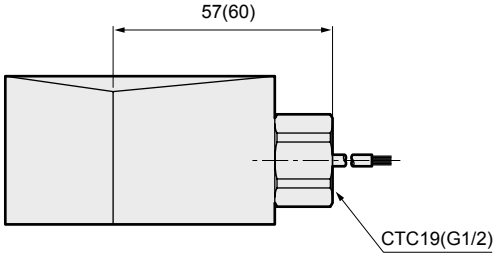
● Open frame + HP terminal box
GAG4**-1 to 2-0 to 10-* [3 / 5] [M / N / I / J] / [4M / 4N]



● DIN terminal box with small lamp + conduit (G1/2)
GAG4**-1 to 2-0 to 10-* [2H] [H]

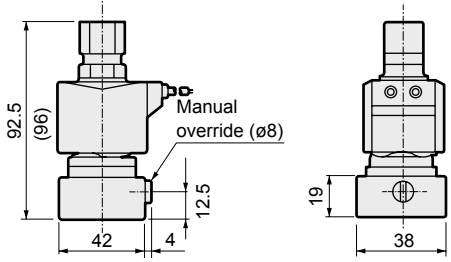


● Open frame + conduit
GAG4**-1 to 2-0 to 10-* [3A / 4A / 5A] [G / H]



Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
GAG4**-1 to 2-0 to 10-*** [A]



Direct acting 3-port solenoid valve, single unit
General purpose

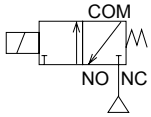
AG33/AG43 Series

- NC pressurization
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- AG33/43: NC pressurization



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications	
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water	Steam
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)		
Max. working pressure MPa	1 (≈150 psi, 10 bar)		
Proof pressure (water pressure) MPa	25 (≈3700 psi, 250 bar)		
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)	-10 (14°F) to 184 (363.2°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)	
Thermal class	Class 130 (B)	Class 180 (H)	
Atmosphere	Place free of corrosive gas and explosive gas		
Valve structure	Direct acting poppet structure		
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)		300 or less (air)
Mounting orientation	Unrestricted		
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/EPM rubber	Copper alloy/PTFE

*1: No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)		Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water(hot)/Kerosene		Oil (50 mm^2/s)		Steam		When holding		When starting		AC	DC	
		TOP	BODY	AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
AG33-01-1	Rc1/8	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	100 VAC 50/60 Hz *6 200 VAC 50/60 Hz *6 12 VDC 24 VDC 48 VDC 100 VDC	14	11	20	16	6/4.2	11 (8.1)	0.36
-01-2		2.0	2.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7								
-02-1	Rc1/4	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0								
-02-2		2.0	2.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7								
AG43-02-4	Rc1/4	3.0	3.0	0.7	0.7 (0.55)	0.7	0.7 (0.55)	0.7	0.7 (0.55)	0.7		22	17	35	27	8.3/6.2	11 (10.4)	0.45
-02-5		3.5	3.0	0.4	0.4 (0.25)	0.4	0.4 (0.25)	0.4	0.4 (0.25)	0.4								
-03-4	Rc3/8	3.0	3.0	0.7	0.7 (0.55)	0.7	0.7 (0.55)	0.7	0.7 (0.55)	0.7								0.48
-03-5		3.5	3.0	0.4	0.4 (0.25)	0.4	0.4 (0.25)	0.4	0.4 (0.25)	0.4								

*1 : The model numbers above show the basic port size (Rc) and orifice size. Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Values shown in ( ) are for the DC voltage type with DIN terminal box.
*5 : When using in vacuum, vacuum the NO port side.
*6 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant	Fluoro rubber		Ethylene propylene rubber		PTFE	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1) °C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)	-10 to 60	-10 to 184
Ambient temperature °C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)				300 or less (air)	

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with lamp.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics					
		TOP	BODY	C[dm^3/(s·bar)]		b		Cv	
				TOP	BODY	TOP	BODY	TOP	BODY
AG33-01-1	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-01-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-02-1	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-02-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
AG43-02-4	Rc1/4	3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31
-02-5		3.5	3.0	1.5	1.1	0.62	0.52	0.40	0.31
-03-4	Rc3/8	3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31
-03-5		3.5	3.0	1.5	1.1	0.62	0.52	0.40	0.31

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AG33 - **02** - **2** - **H** **2G** **A** **B** ** ** ** ** - **AC100V**

AG43

Model No.

Ⓓ Coil housing
Ⓖ Other options
Ⓔ Manual override (locking)
Ⓗ With surge suppressor
Ⓕ Mounting plate
Ⓘ Rated voltage

Ⓐ Port size
Ⓑ Orifice size
Ⓒ Body/sealant combination
*1
*2
*3
*4

Code	Description	Code	Description	Code	Description	Model No. AG33	Model No. AG43
Ⓐ Port size							
01	Rc1/8	**1G**	G1/8	**1N**	1/8NPT	●	
02	Rc1/4	**2G**	G1/4	**2N**	1/4NPT	●	●
03	Rc3/8	**3G**	G3/8	**3N**	3/8NPT		●

Ⓑ Orifice size

	AG33		AG43			
	TOP	BODY	TOP	BODY		
1	ø1.5	ø1.5	-	-	●	
2	ø2.0	ø2.0	-	-	●	
4	-	-	ø3.0	ø3.0		●
5	-	-	ø3.5	ø3.0		●

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks		
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
B	Option	Copper alloy	Fluoro rubber	-	Air/low vacuum/kerosene (up to 90°C *2)	●	●
C	Option	Copper alloy	PTFE	-	Steam (up to 184°C *2)	●	●
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
E	Option	Stainless steel	Fluoro rubber	-	Air/low vacuum/kerosene (up to 90°C *2)	●	●
F	Option	Stainless steel	PTFE	-	Steam (up to 184°C *2)	●	●
H	Option	Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
J	Option	Copper alloy	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene (up to 90°C *2)	●	●
K	Option	Copper alloy	PTFE	Oil-prohibited	Steam (up to 184°C *2)	●	●
P	Option	Copper alloy	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *2)	●	●
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene (up to 90°C *2)	●	●
N	Option	Stainless steel	PTFE	Oil-prohibited	Steam (up to 184°C *2)	●	●
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *2)	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓘ

Refer to page 211 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]
AG33-02-1-AC100V
Model: AG33
Ⓐ Port size : Rc1/4
Ⓑ Orifice size : TOP-ø1.5, BODY-ø1.5
Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓓ Coil housing : Grommet lead wire
Ⓔ to Ⓗ : None
Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]
AG43-03-4-000ABS-AC100V
Model: AG43
Ⓐ Port size : Rc 3/8
Ⓑ Orifice size : TOP-ø3.0, BODY-ø3.0
Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓓ Coil housing : Grommet lead wire
Ⓔ Manual override (locking) : Selected
Ⓕ Mounting plate : With mounting plate
Ⓖ Other options : None
Ⓗ Surge suppressor : With surge suppressor
Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : Leave blank for standard. However, to select options in Ⓓ, Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 0 for Item Ⓒ.
*2 : When Item Ⓒ 4A/4M/4N is selected.
*3 : The ethylene propylene rubber seal combination (Item Ⓒ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*4 : For PTFE seal, O-ring material of socket will be FKM.

For Items Ⓓ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓗ are not required, they should be left blank.

Ⓓ Coil housing				Ⓔ	Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description				Manual override (Locking)	Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
						A-15a	A-15b	A-15c	CTC19	G1/2		
Blank	Std.	Grommet lead wire		**A**	**B**						**S**	100 VAC, 200 VAC
2E		With DIN terminal box (G1/2)										100 VAC, 200 VAC
2G		With DIN terminal box (Pg11)										12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp(Pg11)								**H**		100 VAC, 200 VAC, 24 VDC
3A	Option	Open frame	Lead wire (IP65 or equivalent)	**A**	**B**				**G**	**H**	**S**	100 VAC, 200 VAC
3M			With HP terminal box(G1/2)			**D**	**E**	**F**				12 VDC, 24 VDC, 48 VDC, 100 VDC
3N			HP terminal box with lamp (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP term box (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP term box, lamp (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	**A**	**B**				**G**	**H**	**S**	100 VAC, 200 VAC
4M			With HP terminal box(G1/2)			**D**	**E**	**F**				
4N			HP terminal box with lamp (G1/2)									
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)	**A**	**B**				**G**	**H**		100 VAC, 200 VAC
5M			With HP terminal box(G1/2)			**D**	**E**	**F**				
5N			HP terminal box with lamp (G1/2)									
5I			HP term box (IP65, equiv) (G1/2)									
5J			HP term box, lamp (IP65, equiv) (G1/2)									

⚠ Refer to the following cautions for Items Ⓓ to Ⓘ.

Blank		● Grommet lead wire 300 mm
2E **2G** **2H**		● DIN terminal box
3A **4A** **5A**		● Open frame Lead wire 300 mm ● 4A (Thermal class 180 (H)) ● 5A (diode integrated)
3M **3N** **4M** **4N** **5M** **5N**		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
3I **3J** **5I** **5J**		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

Refer to page 148 for coil selection.

G **H**		● Conduit ● G(CTC19) ● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓓ

*5 : Leave blank for the standard coil housing. However, to select options in Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 00 for Item Ⓓ.
*6 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*7 : A DC coil for steam is available for AG43. Contact CKD for more information.

Notes for Ⓔ to Ⓗ

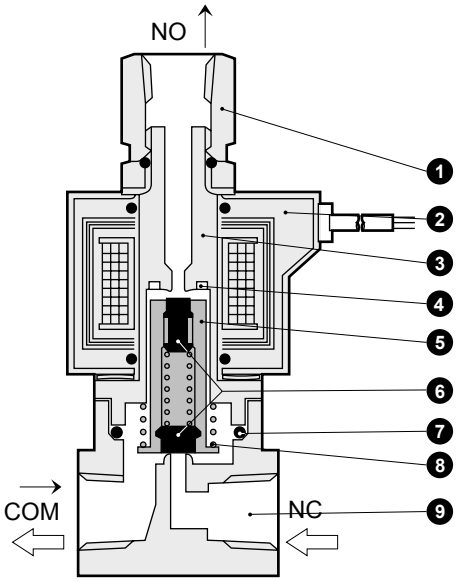
*8 : When Item Ⓒ is C, F, K or N, the manual override (Item ⒺA) is not available.
*9 : For Ⓖ, select an option from D, E, F, G and H.
*10: The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*11: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓓ 2H), so the surge suppressor S cannot be selected.
*12: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

*13: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*14: For voltages other than above, contact CKD.
*15: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AG33/43 Series



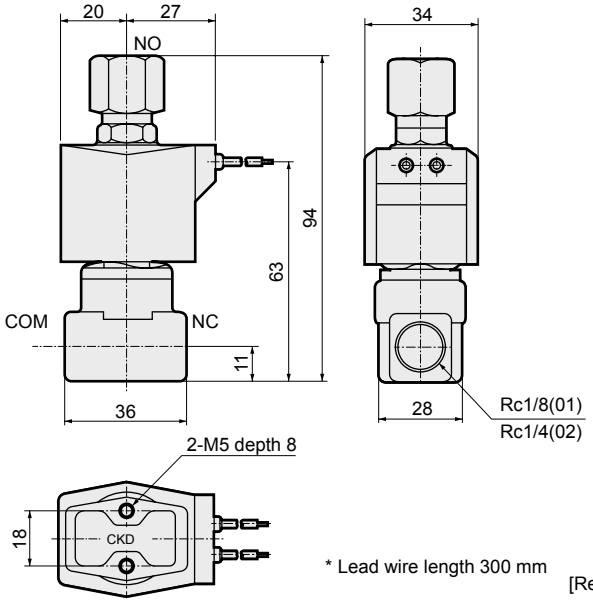
No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-
3	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Seal	NBR (FKM/EPDM/PTFE)	NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin
7	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SUS303)	Copper alloy (stainless steel)

*1 : When the body/sealant combination code is other than blank and H, the material is SUS405 or equivalent/316L/430.
*2 : ( ) shows options.

Dimensions: AG33 Series

CAD

● Grommet lead wire
AG33-01/02-1 to 2



* Lead wire length 300 mm

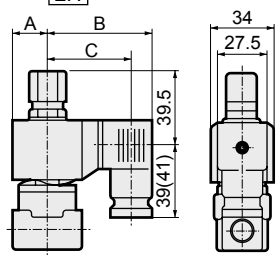
[Reference] As the JIS symbol flow shows, this is dedicated for NC port pressurization.
Pressurization from other ports is not possible.
When not energized : COM → NO
When energized : NC → COM

*1 : The dimensions are the same for port sizes of G and NPT threads.

Optional dimensions: AG33 Series

* Refer to the dimensions of grommet lead wire on page 212 for common dimensions.

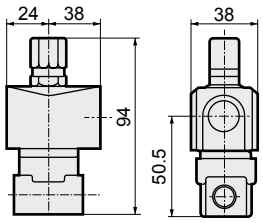
● With DIN terminal box
AG33-01/02-1 to 2-* [2E] [2G] [2H]



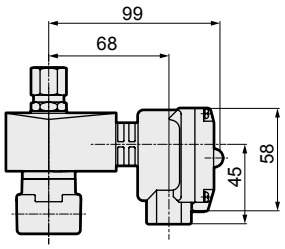
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C
AC	20	62	50.5(50)
DC	21	63.5	52(51.5)

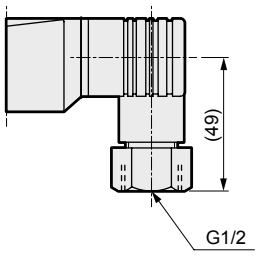
● Open frame lead wire
AG33-01/02-1 to 2-* [3A] [4A] [5A]



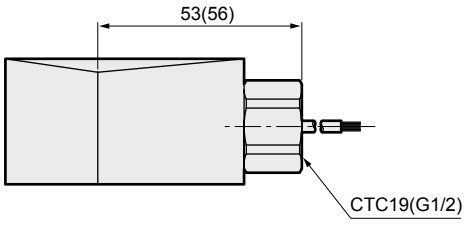
● Open frame + HP terminal box
AG33-01/02-1 to 2-* [3 5] [M N I J] / [4M 4N]



● DIN terminal box with small lamp + conduit (G1/2)
AG33-01/02-1 to 2-* [2H] [H]

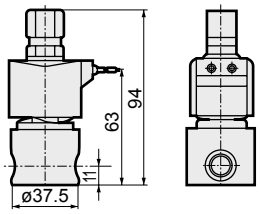


● Open frame + conduit
AG33-01/02-1 to 2-* [3A 4A 5A] [G H]

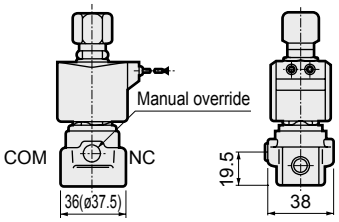


Dimensions shown in ( ) are for G1/2.

● Stainless steel body + grommet lead wire
AG33-01/02-1 to 2- [D/E/F/R/L/M/N]

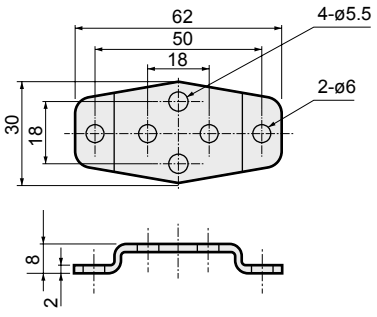


● Manual override (locking)
AG33-01/02-1 to 2-***[A]
The figure shows copper alloy body.



Dimensions shown in ( ) are for stainless steel body.

● Mounting plate
AG33-01/02-1 to 2-***[B]

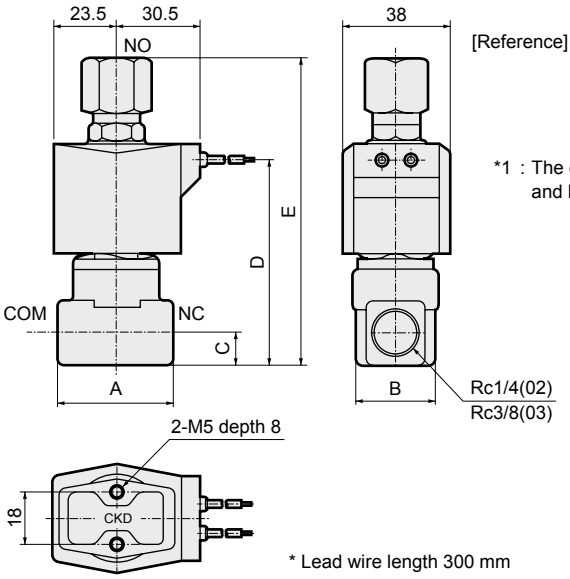


Mounting plate model	Compatibility
AG3-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● All of AG33 Series

* Material: Steel/Zinc plated

Dimensions: AG43 Series

● Grommet lead wire
AG43-02/03-4 to 5



[Reference] As the JIS symbol flow shows, this is dedicated for NC port pressurization. Pressurization from other ports is not possible.
When not energized: COM → NO
When energized: NC → COM

*1 : The dimensions are the same for port sizes of G and NPT threads.

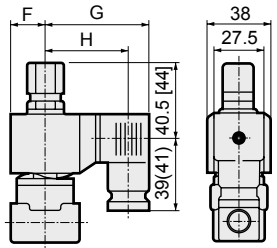
* Lead wire length 300 mm

Model No.	A	B	C	D	E
AG43-02-4 to 5	36	28	11	68	99.5
AG43-03-4 to 5	40	28	12	71	106

Optional dimensions: AG43 Series

* Refer to the dimensions of grommet lead wire above for common dimensions.

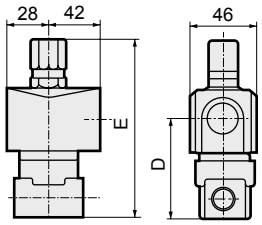
● With DIN terminal box
AG43-02/03-4 to 5-* 2E / 2G / 2H



Dimensions shown in [ ] are for Rc3/8.
Dimensions shown in ( ) are for G1/2.

Voltage	F	G	H
AC	23.5	65.5	54(53.5)
DC	23.5	66	54.5(54)

● Open frame lead wire
AG43-02/03-4 to 5-* 3A / 4A / 5A

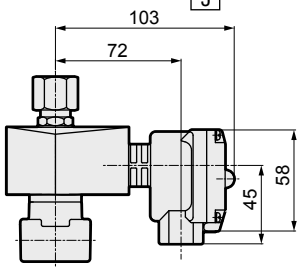


Model No.	D	E
AG43-02-4 to 5-**A	52.0	99.5
AG43-03-4 to 5-**A	55.0	106

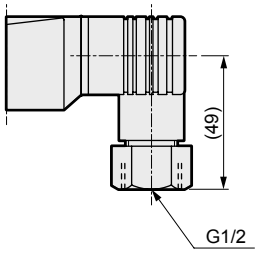
Optional dimensions: AG43 Series

* Refer to the dimensions of grommet lead wire on page 214 for common dimensions.

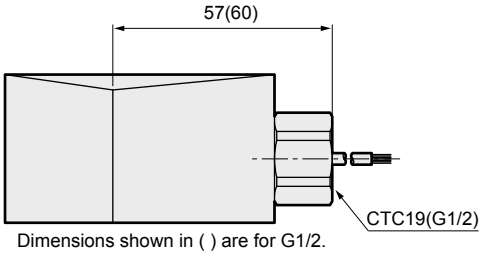
● Open frame + HP terminal box
AG43-02/03-4 to 5-* [3 / 5] [M / N / I / J] / [4M / 4N]



● DIN terminal box with small lamp + conduit (G1/2)
AG43-02/03-4 to 5-* [2H] [H]

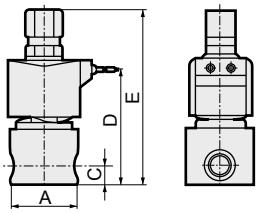


● Open frame + conduit
AG43-02/03-4 to 5-* [3A / 4A / 5A] [G / H]



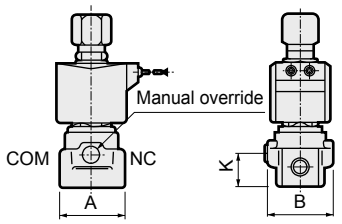
Dimensions shown in ( ) are for G1/2.

● Stainless steel body + grommet lead wire
AG43-02/03-4 to 5- [D/E/F/R/L/M/N]



Model No.	A	C	D	E
AG43-02-4 to 5-*	ø37.5	11	68	99.5
AG43-03-4 to 5-*	ø45	12	71	106

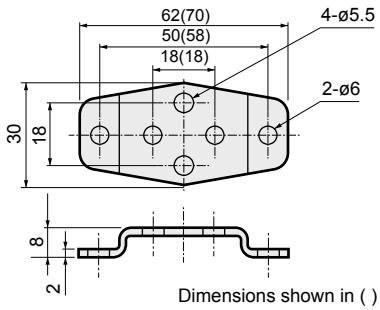
● Manual override (locking)
AG43-02/03-4 to 5***[A]
The figure shows copper alloy body.



Model No.	A	B	K
AG43-02-4 to 5-***A	36(ø37.5)	38	19.5
AG43-03-4 to 5-***A	40(ø45.0)	40	22.5

Dimensions shown in ( ) are for stainless steel body.

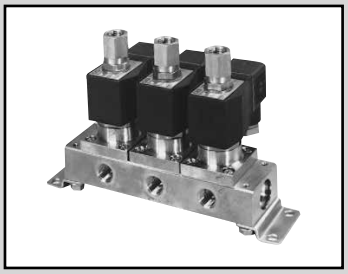
● Mounting plate
AG43-02/03-4 to 5-***[B]



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AG4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AG43-02/03-4 to 5 Series ● Stainless steel body AG43-02-4 to 5-[D/E/F/L/M/N/R]
AG4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● Stainless steel body AG43-03-4 to 5-[D/E/F/L/M/N/R]

* Material: Steel/Zinc plated



Direct acting 3-port solenoid valve, manifold/actuator
General purpose

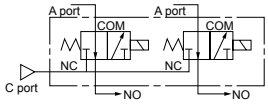
GAG33*/GAG43* Series

- NC pressurization
- Common supply/individual exhaust

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- GAG33*/GAG43* (Common supply/individual exhaust)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications	
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water	Steam
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)		
Max. working pressure MPa	1 (≈150 psi, 10 bar)		
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)		
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)	-10 (14°F) to 184 (363.2°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)	
Thermal class	Class 130 (B)	Class 180 (H)	
Atmosphere	Place free of corrosive gas and explosive gas		
Valve structure	Direct acting poppet structure		
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)		300 or less (air)
Mounting orientation	Unrestricted		
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/EPM rubber	Copper alloy/PTFE

*1 :No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	NO port size	Orifice size (mm)		Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consump (W)	
				Air		Water(hot)/Kerosene		Oil (50 mm^2/s)		Steam		When holding		When starting		AC	DC
		TOP	BODY	AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz	
GAG331-1	Rc1/8	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	100 VAC 50/60 Hz *7 200 VAC 50/60 Hz *7 12 VDC 24 VDC 48 VDC 100 VDC	14	11	20	16	6/4.2	11 (8.1)
-2		2.0	2.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7							
GAG332-1	Rc1/4	1.5	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0							
-2		2.0	2.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7							
GAG432-4	Rc1/4	3.0	3.0	0.7	0.7 (0.55)	0.7	0.7 (0.55)	0.7	0.7 (0.55)	0.7		22	17	35	27	8.3/6.2	11 (10.4)
-5		3.5	3.0	0.4	0.4 (0.25)	0.4	0.4 (0.25)	0.4	0.4 (0.25)	0.4							
GAG433-4	Rc3/8	3.0	3.0	0.7	0.7 (0.55)	0.7	0.7 (0.55)	0.7	0.7 (0.55)	0.7							
-5		3.5	3.0	0.4	0.4 (0.25)	0.4	0.4 (0.25)	0.4	0.4 (0.25)	0.4							

*1 : The model numbers above are for the basic NO port size (Rc) and orifice size. Refer to How to order for other combinations.
*2 : For A and C port sizes, refer to How to order (page 218) and dimensions (page 222).
*3 : Refer to DC column for the max. working pressure differential of coil with diode.
*4 : Values shown in ( ) are for the DC voltage with DIN terminal box.
*5 : The voltage fluctuation range must be ±10% of the rated voltage.
*6 : When using at low vacuum, vacuum the NO port side.
*7 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Weight

Model No.	Weight (kg)									
	Actuator only	2 stations	3 stations	4 stations	5 stations	6 stations	7 stations	8 stations	9 stations	10 stations
GAG33*	0.35	1.4	2.0	2.8	3.2	4.0	4.6	5.2	6.1	6.4
GAG432	0.44	1.6	2.3	3.2	3.7	4.6	5.3	6.0	6.9	7.3
GAG433	0.45	1.6	2.3	3.2	3.7	4.6	5.3	6.0	7.0	7.4

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant		Fluoro rubber		Ethylene propylene rubber		PTFE	
Coil (thermal class)		Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1)	°C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)	-10 to 60	-10 to 184
Ambient temperature	°C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)
Valve seat leakage	cm^3/min(ANR)	0.2 or less (air)				300 or less (air)	

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with lamp.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics					
		TOP	BODY	C[dm^3/(s·bar)]		b		Cv	
				TOP	BODY	TOP	BODY	TOP	BODY
GAG331-1	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
GAG332-1	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
GAG432-4	Rc1/4	3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31
-5		3.5	3.0	1.5	1.1	0.62	0.52	0.4	0.31
GAG433-4	Rc3/8	3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31
-5		3.5	3.0	1.5	1.1	0.62	0.52	0.4	0.31

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

● Common supply/individual exhaust (Port C pressurization)

GAG33 1 ( ) - 2 - 6 - B 4A A G S - AC100V

- GAG33 / GAG43: Model No.
- 1 / ( ): ● Common supply/individual exhaust (Port C pressurization)
- 2: Ⓐ NO port size
- 6: Ⓑ Thread
- B: Ⓒ Orifice size
- 4A: Ⓓ Manifold station No. *2
- A: Ⓔ Body/sealant combination
- G: Ⓕ Coil housing
- S: Ⓘ With surge suppressor
- AC100V: Ⓙ Rated voltage
- Ⓖ Manual override (locking)
- Ⓗ Other options

Code	Description	Model No. GAG33*	Model No. GAG43*
Ⓐ NO port size			
1	1/8	●	
2	1/4	●	●
3	3/8		●
Ⓑ Thread			
Blank	Rc	●	●
G	G	●	●
N	NPT	●	●

Ⓒ Orifice size

	GAG33*		GAG43*			
	TOP	**BODY**	**TOP**	**BODY**		
1	ø1.5	ø1.5	-	-	●	
2	ø2.0	ø2.0	-	-	●	
4	-	-	ø3.0	ø3.0		●
5	-	-	ø3.5	ø3.0		●

Ⓓ Manifold station No.

2 to 10	2 stations to 10 stations	●	●
0	Actuator only	●	●

Ⓔ Body/sealant combination *3*5*6

		Body	Seal	Treatment	Remarks		
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
B	Option		Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)	●	●
C			PTFE		Steam (up to 184°C *4)	●	●
D		Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
E			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)	●	●
F			PTFE		Steam (up to 184°C *4)	●	●
H		Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
J			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)	●	●
K			PTFE		Steam (up to 184°C *4)	●	●
P			Ethylene propylene rubber		Hot water (up to 90°C *4)	●	●
L		Stainless steel	Nitrile rubber		Air/water/low vacuum/kerosene (up to 60°C)	●	●
M			Fluoro rubber		Air/low vacuum/kerosene (up to 90°C *4)	●	●
N			PTFE		Steam (up to 184°C *4)	●	●
R			Ethylene propylene rubber		Hot water (up to 90°C *4)	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓕ to Ⓙ

Refer to page 219 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]
GAG331-1-4-AC200V

Model: GAG331 (common supply/individual exhaust, port C pressurization)

- Ⓐ NO port size : 1/8
- Ⓑ Thread : Rc
- Ⓒ Orifice size : TOP-ø1.5, BODY-ø1.5
- Ⓓ Manifold station No. : 4 stations
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓕ Coil housing : Grommet lead wire
- Ⓖ to Ⓘ : None
- Ⓙ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

[Example of model No. 2]
GAG332G-2-7-000AS-AC200V

Model: GAG332 (common supply/individual exhaust, port C pressurization)

- Ⓐ NO port size : 1/4
- Ⓑ Thread : G
- Ⓒ Orifice size : TOP-ø2.0, BODY-ø2.0
- Ⓓ Manifold station No. : 7 stations
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓕ Coil housing : Grommet lead wire
- Ⓖ Manual override (locking) : Selected
- Ⓗ Other options : None
- Ⓘ Surge suppressor : With surge suppressor
- Ⓙ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

*1 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Notes for Ⓓ to Ⓔ

*2 : For 11 or more manifold station No., contact CKD.
*3 : Leave blank for standard. However, to select options in Ⓕ, Ⓖ, Ⓗ or Ⓘ, indicate 0 for Item Ⓔ.
*4 : When Item Ⓔ 4A/4M/4N is selected.
*5 : The ethylene propylene rubber seal combination (Item Ⓔ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*6 : For PTFE seal, O-ring material for socket and sub-plate connection will be FKM.

For Items Ⓕ to Ⓙ, the combinations indicated with codes are available.
Note that if options for Items Ⓖ to Ⓘ are not required, they should be left blank.

Ⓕ Coil housing				Ⓖ	Ⓗ Other options					Ⓘ	Ⓙ Rated voltage
Description				Manual override (locking)	Cable gland (marine cable gland) A-15a	A-15b	A-15c	Conduit (conduit piping) CTC19	G1/2	With surge suppressor	Description
Blank	Std.	Grommet lead wire		**A**						**S**	100 VAC, 200 VAC
2E		With DIN terminal box	(G1/2)								100 VAC, 200 VAC
2G		With DIN terminal box	(Pg11)								12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp	(Pg11)						**H**		100 VAC, 200 VAC, 24 VDC
3A	Option	Open frame	Lead wire	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
3M			With HP terminal box (G1/2)		**D**	**E**	**F**				12 VDC, 24 VDC, 48 VDC, 100 VDC
3N			HP terminal box with lamp (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP term box, lamp (IP65, equiv) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
4M			With HP terminal box (G1/2)		**D**	**E**	**F**				
4N			HP terminal box with lamp (G1/2)								
5A		Open frame (diode integrated)	Lead wire	**A**				**G**	**H**		100 VAC, 200 VAC
5M			With HP terminal box (G1/2)		**D**	**E**	**F**				
5N			HP terminal box with lamp (G1/2)								
5I			HP terminal box (IP65 or equivalent) (G1/2)								
5J			HP term box, lamp (IP65, equiv) (G1/2)								

⚠ Refer to the following cautions for Items Ⓕ to Ⓙ.

Blank		● Grommet lead wire 300 mm
2E 2G 2H		● DIN terminal box
3A 4A 5A		● Open frame Lead wire 300 mm ● 4A (Thermal class 180 (H)) ● 5A (diode integrated)
3M 3N 4M 4N 5M 5N		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

Refer to page 148 for coil selection.

G H		● Conduit ● G(CTC19) ● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓕ

*7 : Leave blank for the standard coil housing. However, to select options in Ⓖ, Ⓗ or Ⓘ, indicate 00 for Item Ⓕ.
*8 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
9 : A DC coil for steam is available for GAG43. Contact CKD for more information.

Notes for Ⓖ to Ⓘ

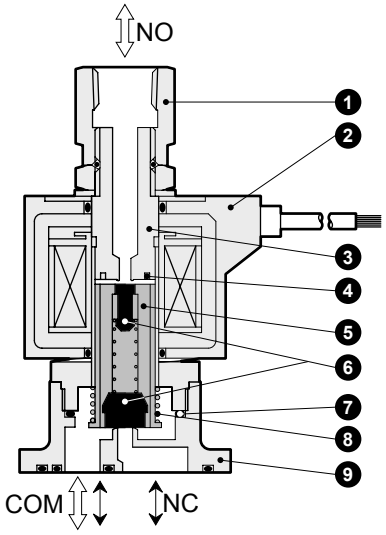
*10: When Item E is Ⓒ, Ⓕ, Ⓚ or Ⓝ, the manual override (Item Ⓖ A) is not available.
*11: For Item Ⓗ, select an option from D, E, F, G and H.
*12: The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*13: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓕ 2H), so the surge suppressor S cannot be selected.
*14: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓙ

*15: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓕ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*16: For voltages other than above, contact CKD.
*17: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● GAG33*/GAG43* Series actuator

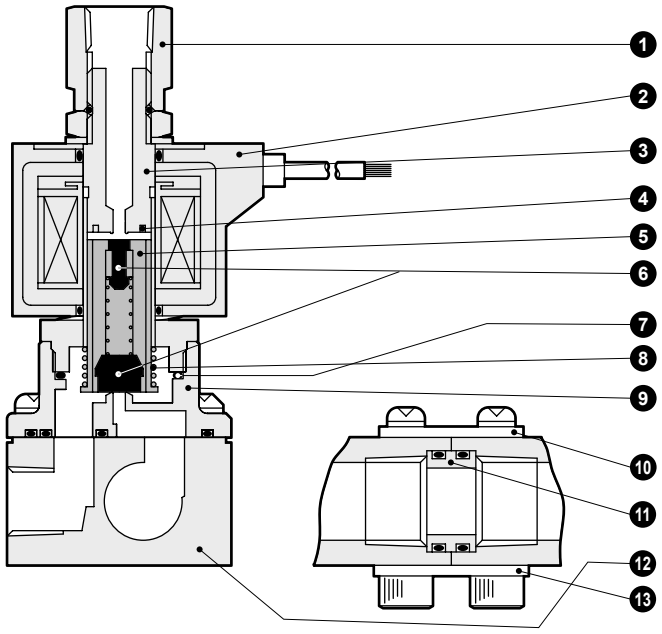


No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-
3	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Seal	NBR (FKM/EPDM/PTFE)	NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin
7	O-ring	NBR (FKM/EPDM/PTFE) (Size: AS568-019)	( )
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SCS13)	Copper alloy (stainless steel)

*1 : When the body/sealant combination code is other than blank and H, the material is SUS405 or equivalent/316L/430.
*2 : ( ) shows options.
*3 : 4 body mounting screws and 2 O-rings are attached to the actuator only.

Internal structure and parts list

● GAG33*/GAG43* manifold



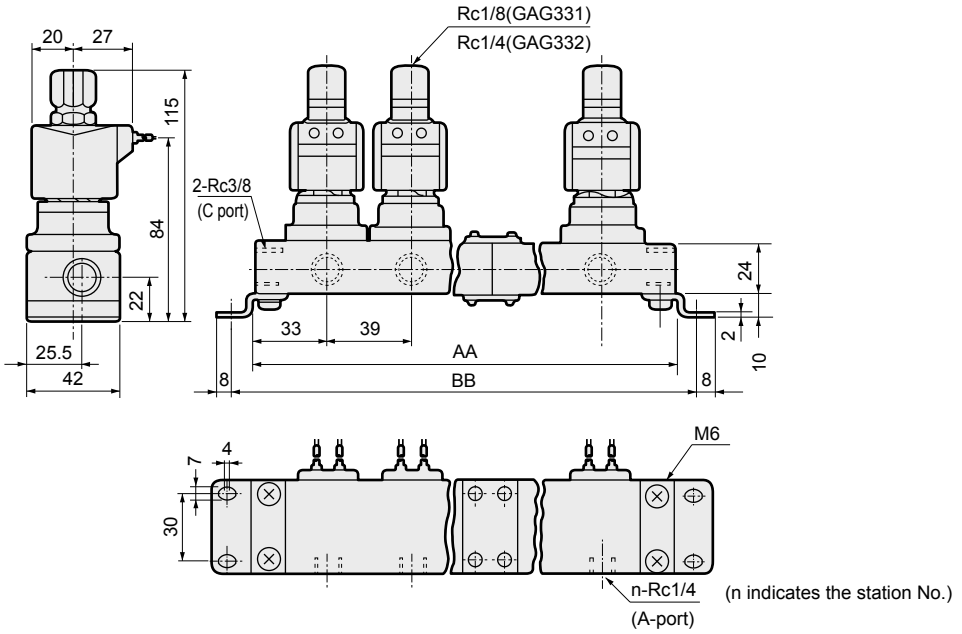
No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-
3	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Seal	NBR (FKM/EPDM/PTFE)	NBR: Nitrile rubber FKM: Fluoro rubber
7	O-ring	NBR (FKM/EPDM/PTFE) (AS568/019)	EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SCS13)	Copper alloy (stainless steel)
10	Holder	SPCC	Steel
11	Connector	C3604(SUS304)	Copper alloy (stainless steel)
12	Sub-plate	C3604(SUS303)	Copper alloy (stainless steel)
13	Connecting plate	SPCC	Steel

*1 : When the body/sealant combination code is other than blank and H, the material is SUS405 or equivalent/316L/430.

*2 : ( ) shows options.

Dimensions: GAG331/GAG332 Series

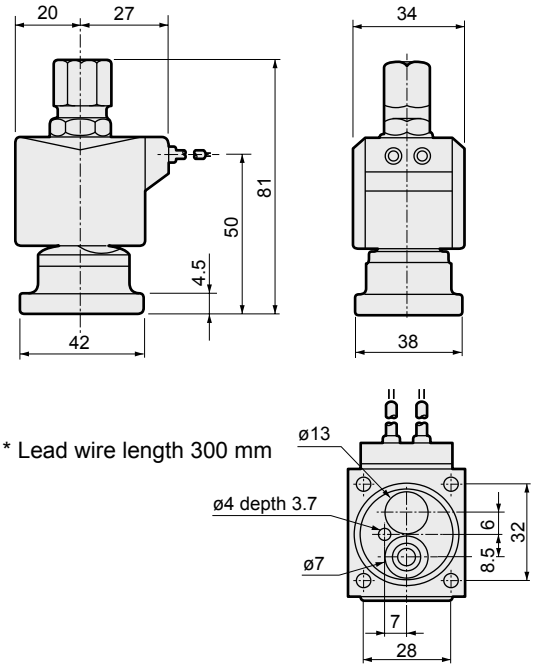
● Manifold (grommet lead wire)
GAG33*-1 to 2- 2 to 10



Station No.	AA	BB	Manifold configuration	Station No.	AA	BB	Manifold configuration
2	106	122	2 stations x 1	7	329	345	5 stations + 2 stations
3	145	161	3 stations x 1	8	368	384	5 stations + 3 stations
4	212	228	2 stations x 2	9	435	451	3 stations x 3
5	223	239	5 stations x 1	10	446	462	5 stations x 2
6	290	306	3 stations x 2	Contact CKD for 11 stations or more.			

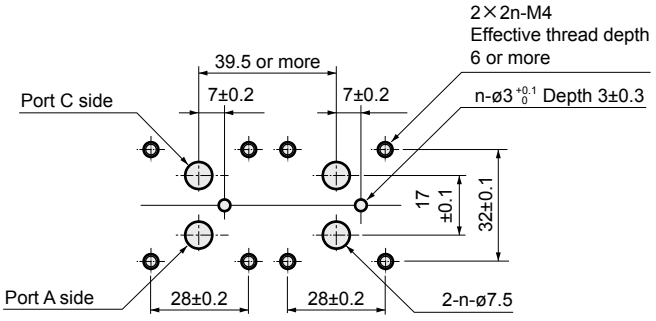
*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : The dimensions are the same for port sizes of G and NPT threads.

● Actuator (grommet lead wire)
GAG33*-1 to 2-0



* Lead wire length 300 mm

● Recommended dimensions for actuator mounting



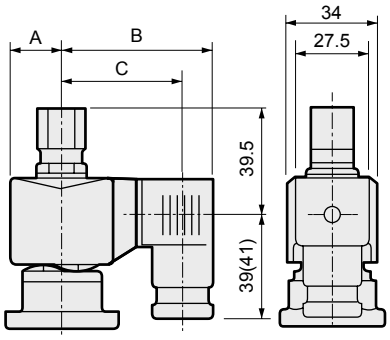
■ Machining drawing when using 2 actuators

Optional dimensions: GAG331/GAG332 Series

CAD

* Refer to the dimensions of grommet lead wire on page 222 for common dimensions.

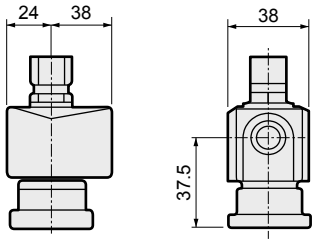
● With DIN terminal box
GAG33*-1 to 2-0 to 10-* [2E] [2G] [2H]



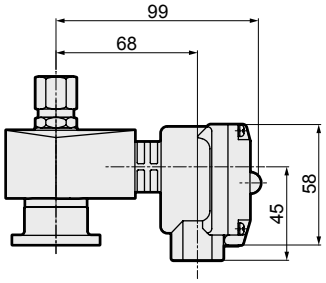
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C
AC	20	62	50.5(50)
DC	21	63.5	52(51.5)

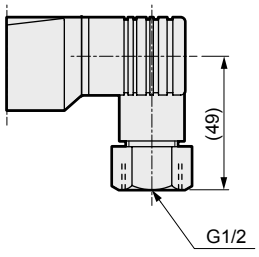
● Open frame lead wire
GAG33*-1 to 2-0 to 10-* [3A] [4A] [5A]



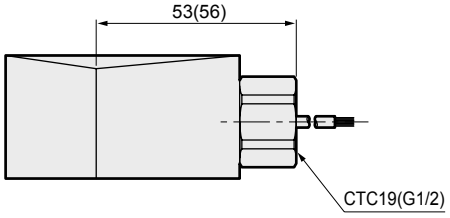
● Open frame + HP terminal box
GAG33*-1 to 2-0 to 10-* [3 / 5] [M / N / I / J] / [4M / 4N]



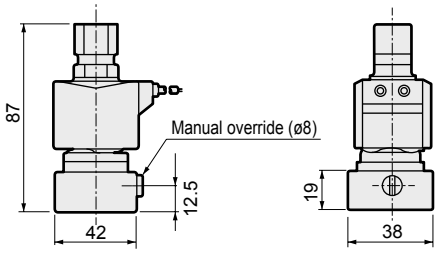
● DIN terminal box with small lamp + conduit (G1/2)
GAG33*-1 to 2-0 to 10-* [2H] [H]



● Open frame + conduit
GAG33*-1 to 2-0 to 10-* [3A / 4A / 5A] [G / H]



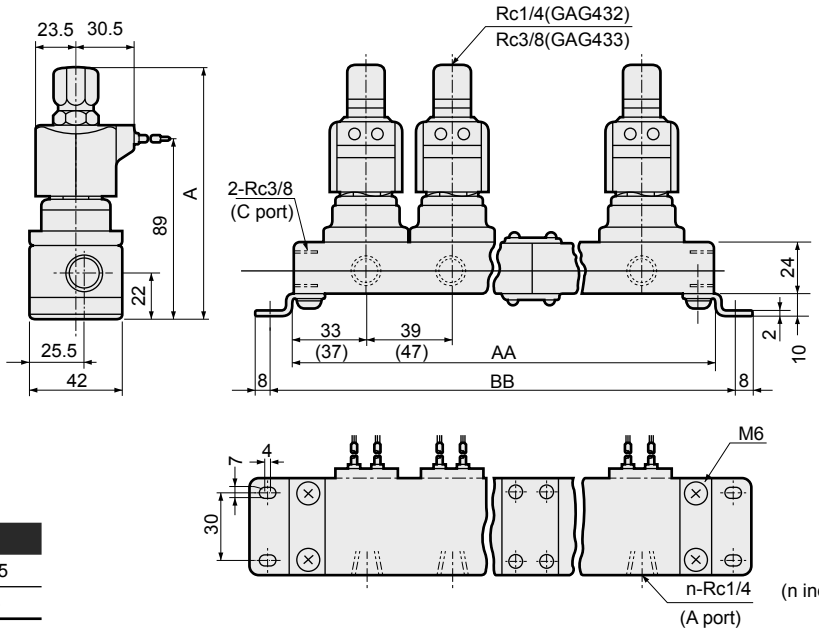
● Manual override (locking)
GAG33*-1 to 2-0 to 10-*** [A]



Dimensions shown in ( ) are for G1/2.

Dimensions: GAG432/GAG433 Series

● Manifold (grommet lead wire)
GAG43*-4 to 5-[2 to 10]



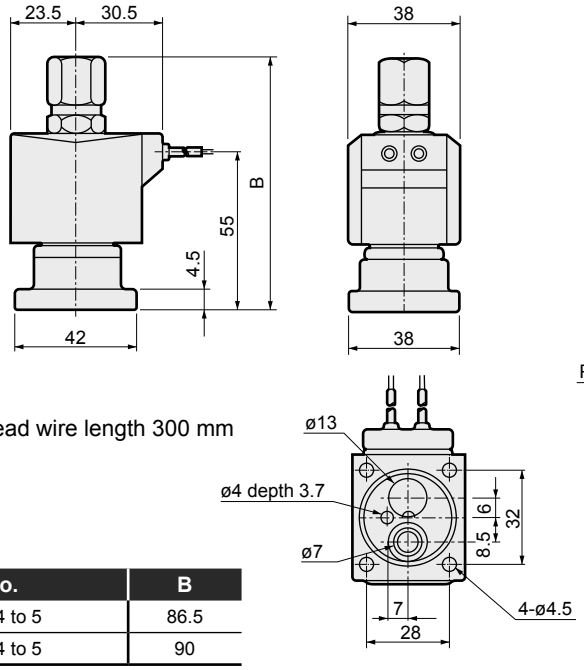
(n indicates the station No.)

Model No.	A
GAG432-4 to 5	120.5
GAG433-4 to 5	124

Station No.	AA	BB	Manifold configuration	Station No.	AA	BB	Manifold configuration
2	106(122)	122(138)	2 stations x 1	7	329(385)	345(401)	5 stations + 2 stations
3	145(169)	161(185)	3 stations x 1	8	368(432)	384(448)	5 stations + 3 stations
4	212(244)	228(260)	2 stations x 2	9	435(507)	451(523)	3 stations x 3
5	223(263)	239(279)	5 stations x 1	10	446(526)	462(542)	5 stations x 2
6	290(338)	306(354)	3 stations x 2	Contact CKD for 11 stations or more.			

*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : Dimensions shown in ( ) are for open frame.
*3 : The dimensions are the same for port sizes of G and NPT threads.

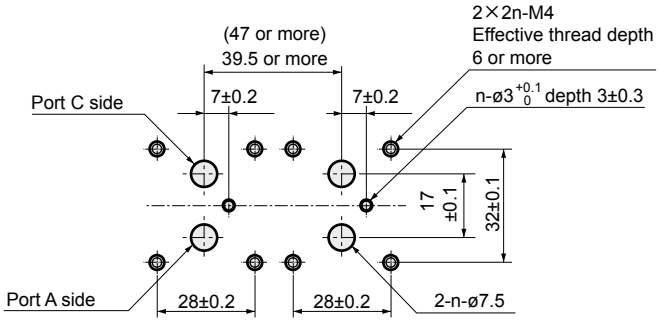
● Actuator (grommet lead wire)
GAG43*-4 to 5-[0]



* Lead wire length 300 mm

Model No.	B
GAG432-4 to 5	86.5
GAG433-4 to 5	90

● Recommended dimensions for actuator mounting

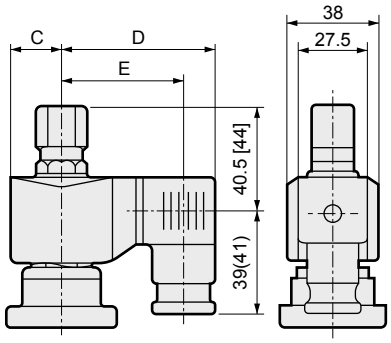


■ Machining drawing when using 2 actuators

Optional dimensions: GAG432/GAG433 Series

* Refer to the dimensions of grommet lead wire on page 224 for common dimensions.

● With DIN terminal box
GAG43*-4 to 5-0 to 10-* [2E / 2G / 2H]

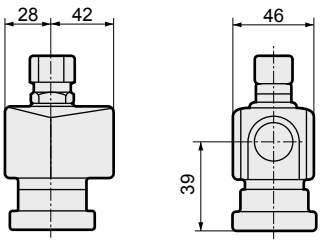


Dimensions shown in [ ] are for Rc3/8.

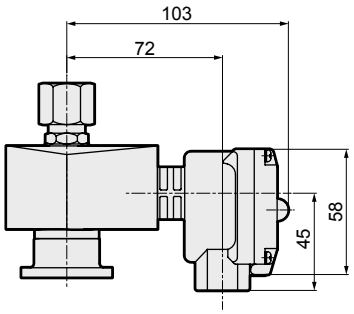
Dimensions shown in ( ) are for G1/2.

Voltage	C	D	E
AC	23.5	65.5	54(53.5)
DC	23.5	66	54.5(54)

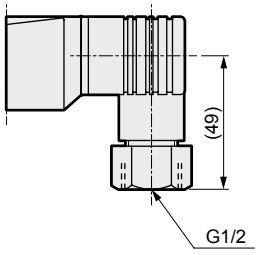
● Open frame lead wire
GAG43*-4 to 5-0 to 10-* [3A / 4A / 5A]



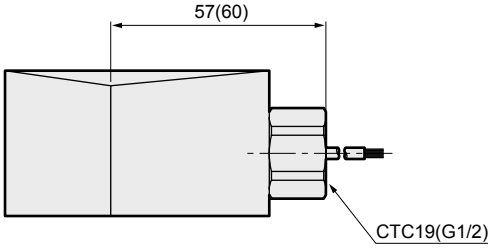
● Open frame + HP terminal box
GAG43*-4 to 5-0 to 10-* [3 / 5] [M / N / I / J] / [4M / 4N]



● DIN terminal box with small lamp + conduit (G1/2)
GAG43*-4 to 5-0 to 10-* [2H] [H]

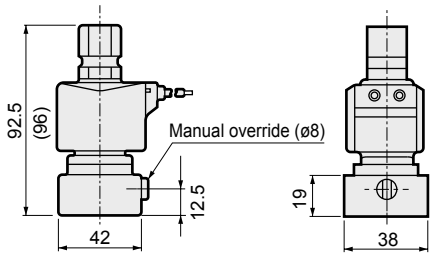


● Open frame + conduit
GAG43*-4 to 5-0 to 10-* [3A / 4A / 5A] [G / H]



Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
GAG43*-4 to 5-0 to 10-*** [A]



Dimensions shown in ( ) are for GAG433.

Direct acting 3-port solenoid valve, single unit
General purpose

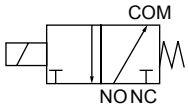
AG34/AG44 Series

- NO pressurization
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- AG34/44: NO pressurization



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water
Working pressure differential MPa	0 to 1.5 (refer to max. working pressure differential in individual specifications.)	
Max. working pressure MPa	1.5 (≈220 psi, 15 bar)	
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)	
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)
Thermal class	Class 130 (B)	Class 180 (H)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Direct acting poppet structure	
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)	
Mounting orientation	Unrestricted	
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/ethylene propylene rubber

*1 : No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)		Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water(hot)/Kerosene		Oil (50 mm^2/s)			When holding		When starting		AC	DC	
		TOP	BODY	AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
AG34-01-1	Rc1/8	1.5	1.5	1.0	1.0	1.0	1.0	1.0	0.7	100 VAC 50/60 Hz *6 200 VAC 50/60 Hz *6 12 VDC 24 VDC 48 VDC 100 VDC	14	11	20	16	6/4.2	11 (8.1)	0.36
-01-2		2.0	2.0	0.7	0.45	0.7	0.6 (0.45)	0.3	0.2								
-02-1	Rc1/4	1.5	1.5	1.0	1.0	1.0	1.0	1.0	0.7								
-02-2		2.0	2.0	0.7	0.45	0.7	0.6 (0.45)	0.3	0.2								
AG44-02-1	Rc1/4	2.0	2.0	1.2	0.75	1.5	1.0	1.0	0.45		22	17	35	27	8.3/6.2	11 (10.4)	0.45
-02-3		2.0	3.0	1.2	0.75	1.5	0.9	1.0	0.45								
-02-4		3.0	3.0	0.4	0.3 (0.25)	0.5	0.3	0.3	0.2 (0.15)								
-03-1	Rc3/8	2.0	2.0	1.2	0.75	1.5	1.0	1.0	0.45								0.48
-03-3		2.0	3.0	1.2	0.75	1.5	0.9	1.0	0.45								
-03-4		3.0	3.0	0.4	0.3 (0.25)	0.5	0.3	0.3	0.2 (0.15)								

*1 : The model numbers above are for the basic port size (Rc) and orifice size. Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Values shown in ( ) are for the DC voltage with DIN terminal box.
*5 : When using at low vacuum, vacuum the NC port side.
*6 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant	Fluoro rubber		Ethylene propylene rubber	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1) °C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)
Ambient temperature °C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)			

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with lamp.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics					
		TOP	BODY	C[dm^3/(s·bar)]		b		Cv	
				TOP	BODY	TOP	BODY	TOP	BODY
AG34-01-1	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-01-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-02-1	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-02-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
AG44-02-1	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-02-3		2.0	3.0	0.53	1.1	0.54	0.52	0.15	0.31
-02-4		3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31
-03-1	Rc3/8	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-03-3		2.0	3.0	0.53	1.1	0.54	0.52	0.15	0.31
-03-4		3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AG34 - **02** - **1** - **0** **3A** **A** **B** **G** **S** - **AC100V**

AG44

Model No.

Ⓓ Coil housing
Ⓔ Manual override (locking)
Ⓕ Mounting plate
Ⓖ Other options
Ⓗ With surge suppressor
Ⓘ Rated voltage
Ⓐ Port size
Ⓑ Orifice size
Ⓒ Body/sealant combination

Code	Description	Code	Description	Code	Description	Model No. AG34	Model No. AG44
Ⓐ Port size							
01	Rc1/8	**1G**	G1/8	**1N**	1/8NPT	●	
02	Rc1/4	**2G**	G1/4	**2N**	1/4NPT	●	●
03	Rc3/8	**3G**	G3/8	**3N**	3/8NPT		●

Ⓑ Orifice size

	AG34		AG44			
	TOP	**BODY**	**TOP**	**BODY**		
1	ø1.5	ø1.5	ø2.0	ø2.0	●	●
2	ø2.0	ø2.0	-	-	●	
3	-	-	ø2.0	ø3.0		●
4	-	-	ø3.0	ø3.0		●

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks		
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
B	Option	Copper alloy	Fluoro rubber	-	Air/low vacuum/kerosene (up to 90°C *2)	●	●
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
E	Option	Stainless steel	Fluoro rubber	-	Air/low vacuum/kerosene (up to 90°C *2)	●	●
H	Option	Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
J	Option	Copper alloy	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene (up to 90°C *2)	●	●
P	Option	Copper alloy	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *2)	●	●
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene (up to 90°C *2)	●	●
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *2)	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓘ

Refer to page 229 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]
AG34-1G-1-AC100V
Model: AG34
Ⓐ Port size : G1/8
Ⓑ Orifice size : TOP-ø1.5, BODY-ø1.5
Ⓒ Body/sealant combination
: Body - copper alloy, sealant - nitrile rubber
Ⓓ Coil housing : Grommet lead wire
Ⓔ to Ⓗ : None
Ⓘ Rated voltage :100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]
AG44-03-4-000ABS-AC100V
Model: AG44
Ⓐ Port size : Rc 3/8
Ⓑ Orifice size : TOP-ø3.0, BODY-ø3.0
Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓓ Coil housing : Grommet lead wire
Ⓔ Manual override (locking) : Selected
Ⓕ Mounting plate : With mounting plate
Ⓖ Other options : None
Ⓗ Surge suppressor : With surge suppressor
Ⓘ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : Leave blank for standard. However, to select options in Ⓓ,Ⓔ, Ⓕ,Ⓖ or Ⓗ, indicate 0 for Item Ⓒ.
*2 : When Item Ⓒ 4A/4M/4N is selected.
*3 : The ethylene propylene rubber seal combination (Item Ⓒ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*4 : Even if nitrile rubber seal is selected, the seal material on the NO side will be fluoro rubber.

For Items Ⓓ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓗ are not required, they should be left blank.

Ⓓ Coil housing				Ⓔ	Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description				Manual override (locking)	Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
						A-15a	A-15b	A-15c	CTC19	G1/2		
Blank	Std.	Grommet lead wire		**A**	**B**						**S**	100 VAC, 200 VAC
2E		With DIN terminal box	(G1/2)									100 VAC, 200 VAC
2G		With DIN terminal box	(Pg11)									12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp	(Pg11)							**H**		100 VAC, 200 VAC, 24 VDC
3A	Option	Open frame	Lead wire (IP65 or equivalent)	**A**	**B**				**G**	**H**	**S**	100 VAC, 200 VAC
3M			With HP terminal box (G1/2)			**D**	**E**	**F**				12 VDC, 24 VDC, 48 VDC, 100 VDC
3N			HP terminal box with lamp (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP term box, lamp (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	**A**	**B**				**G**	**H**	**S**	100 VAC, 200 VAC
4M			With HP terminal box (G1/2)			**D**	**E**	**F**				
4N			HP terminal box with lamp (G1/2)									
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)	**A**	**B**				**G**	**H**		100 VAC, 200 VAC
5M			With HP terminal box (G1/2)			**D**	**E**	**F**				
5N			HP terminal box with lamp (G1/2)									
5I			HP terminal box (IP65 or equivalent) (G1/2)									
5J			HP term box, lamp (IP65, equiv) (G1/2)									

⚠ Refer to the following cautions for Items Ⓓ to Ⓘ.

Blank

● Grommet lead wire 300 mm

2E 2G 2H

● DIN terminal box

3A 4A 5A

● Open frame
Lead wire 300 mm
● 4A (Thermal class 180 (H))
● 5A (diode integrated)

3M 3N 4M 4N 5M 5N

● Open frame HP terminal box
● 4M, 4N (Thermal class 180 (H))
● 5M, 5N (diode integrated)

3I 3J 5I 5J

● Open frame HP terminal box (IP65 or equivalent)
● 5I, 5J (diode integrated)

G H

● Conduit
● G(CTC19)
● H(G1/2)

Refer to page 148 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓓ

*5 : Leave blank for the standard coil housing. However, to select options in Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 00 for Item Ⓓ.
*6 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*7 : A DC coil for steam is available for AG44. Contact CKD for more information.

Notes for Ⓔ to Ⓗ

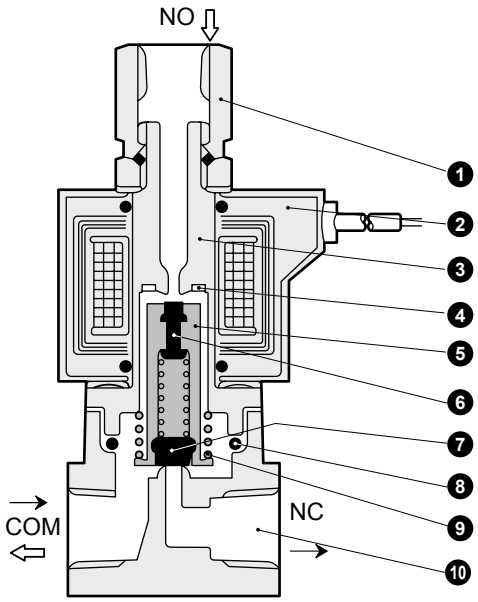
*8 : For Item Ⓖ, select an option from D, E, F, G and H.
*9 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*10: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓓ 2H), so the surge suppressor S cannot be selected.
*11: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

*12: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*13: For voltages other than above, contact CKD.
*14: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AG34/AG44 Series

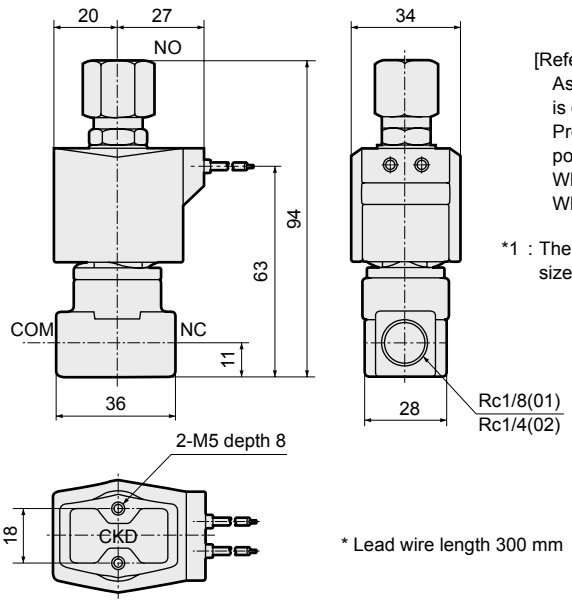


No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-
3	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	NO valve sealant	FKM (FKM/EPDM)	NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber
7	NC valve sealant	NBR (FKM/EPDM)	
8	O-ring	NBR (FKM/EPDM) (Size: AS568-019)	
9	Plunger spring	SUS304	Stainless steel
10	Body	C3771(SUS303)	Copper alloy (stainless steel)

*1 : When the body/sealant combination code is other than blank and H, the material is SUS405 or equivalent/316L/430.
*2 : ( ) shows options.

Dimensions: AG34 Series

● Grommet lead wire
AG34-01/02-1 to 2



[Reference]
As the JIS symbol flow shows, this type is dedicated for NO port pressurization. Pressurization from other ports is not possible.
When not energized: NO → COM
When energized : COM → NC

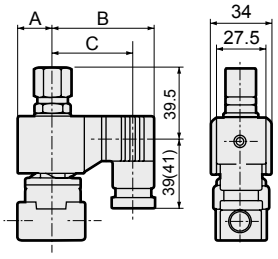
*1 : The dimensions are the same for port sizes of G and NPT threads.

* Lead wire length 300 mm

Optional dimensions: AG34 Series

* Refer to the dimensions of grommet lead wire on page 230 for common dimensions.

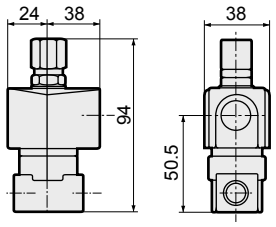
● With DIN terminal box
AG34-01/02-1 to 2-* [2E / 2G / 2H]



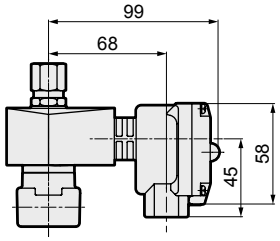
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C
AC	20	62	50.5(50)
DC	21	63.5	52(51.5)

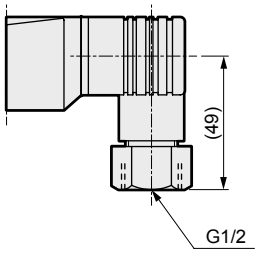
● Open frame lead wire
AG34-01/02-1 to 2-* [3A / 4A / 5A]



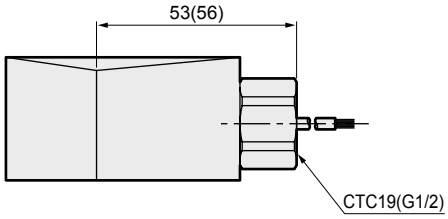
● Open frame + HP terminal box
AG34-01/02-1 to 2-* [3 / 5] [M / N / I / J] / [4M / 4N]



● DIN terminal box with small lamp + conduit (G1/2)
AG34-01/02-1 to 2-* [2H] [H]

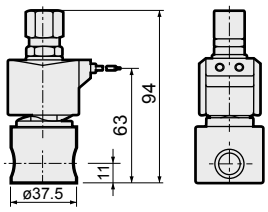


● Open frame + conduit
AG34-01/02-1 to 2-* [3A / 4A / 5A] [G / H]



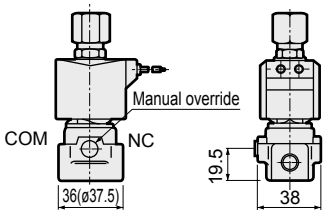
Dimensions shown in ( ) are for G1/2.

● Stainless steel body + grommet lead wire
AG34-01/02-1 to 2- [D/E/R/L/M]



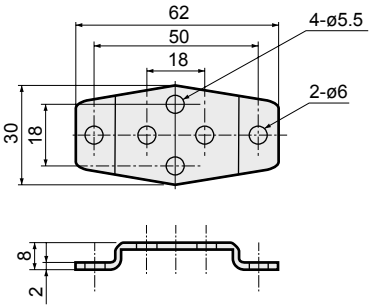
● Manual override (locking)
AG34-01/02-1 to 2-*** [A]

The figure shows copper alloy body.



Dimensions shown in ( ) are for stainless steel body.

● Mounting plate
AG34-01/02-1 to 2-*** [B]

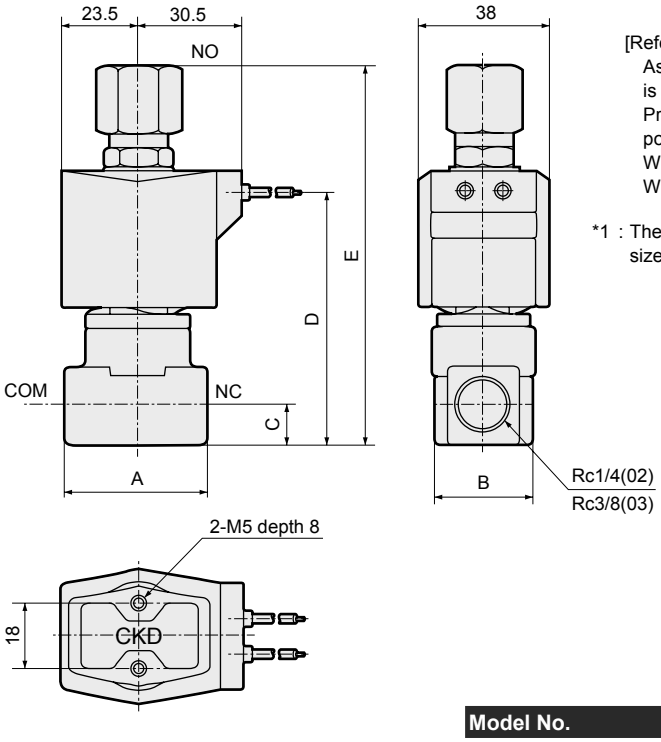


Mounting plate model	Compatibility
AG3-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● All of AG34 Series

* Material: Steel/Zinc plated

Dimensions: AG44 Series

● Grommet lead wire
AG44-02/03-1/3/4



[Reference]
As the JIS symbol flow shows, this type is dedicated for NO port pressurization. Pressurization from other ports is not possible.
When not energized: NO → COM
When energized : COM → NC

*1 : The dimensions are the same for port sizes of G and NPT threads.

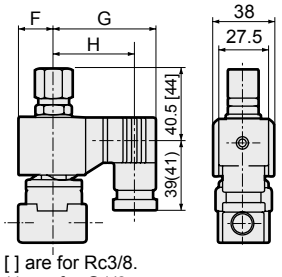
* Lead wire length 300 mm

Model No.	A	B	C	D	E
AG44-02-1 to 4	36	28	11	68	99.5
AG44-03-1 to 4	40	28	12	71	106

Optional dimensions: AG44 Series

* Refer to the dimensions of grommet lead wire above for common dimensions.

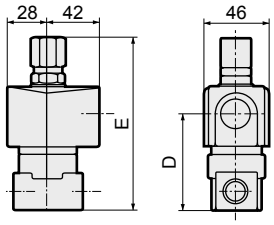
● With DIN terminal box
AG44-02/03-1/3/4-* 2E / 2G / 2H



Dimensions shown in [ ] are for Rc3/8.
Dimensions shown in ( ) are for G1/2.

Voltage	F	G	H
AC	23.5	65.5	54(53.5)
DC	23.5	66	54.5(54)

● Open frame lead wire
AG44-02/03-1/3/4-* 3A / 4A / 5A

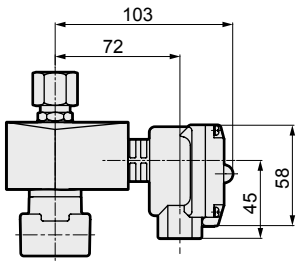


Model No.	D	E
AG44-02-1 to 4-*□A	52.0	99.5
AG44-03-1 to 4-*□A	55.0	106

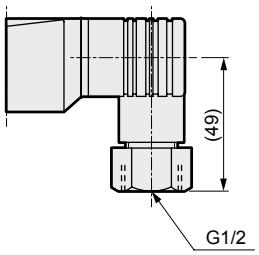
Optional dimensions: AG44 Series

* Refer to the dimensions of grommet lead wire on page 232 for common dimensions.

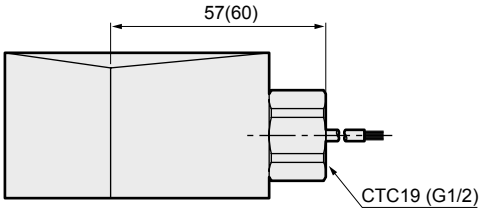
● Open frame + HP terminal box
AG44-02/03-1/3/4-* [3 / 5] [M / N / I / J] / [4M / 4N]



● DIN terminal box with small lamp + conduit (G1/2)
AG44-02/03-1/3/4-* [2H] [H]

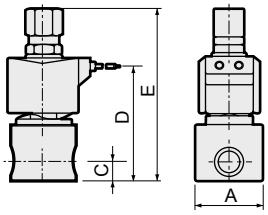


● Open frame + conduit
AG44-02/03-1/3/4-* [3A / 4A / 5A] [G / H]



Dimensions shown in ( ) are for G1/2.

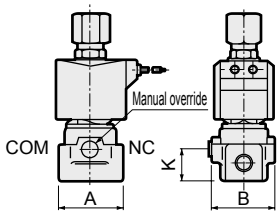
● Stainless steel body + grommet lead wire
AG44-02/03-1 to 4- [D/E/L/M/R]



Model No.	A	C	D	E
AG44-02-1 to 4-*	ø37.5	11	68	99.5
AG44-03-1 to 4-*	ø45	12	71	106

● Manual override (locking)
AG44-02/03-1 to 4-*** [A]

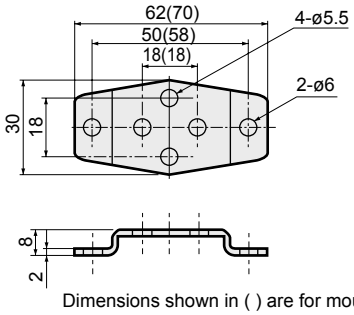
The figure shows copper alloy body.



Model No.	A	B	K
AG44-02-1 to 4-***A	36(ø37.5)	38	19.5
AG44-03-1 to 4-***A	40(ø45.0)	40	22.5

Dimensions shown in ( ) are for stainless steel body.

● Mounting plate
AG44-02/03-1 to 4-*** [B]



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AG4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AG44-02/03-1 to 4 Series ● Stainless steel body AG44-02-1 to 4- [D/E/L/M/R]
AG4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● Stainless steel body AG44-03-1 to 4- [D/E/L/M/R]

* Material: Steel/Zinc plated

Direct acting 3-port solenoid valve, actuator
General purpose

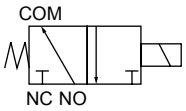
GAG34*/GAG44* Series

● NO pressurization

CE Refer to the Ending for details. RoHS CAD

JIS symbol

● GAG34*/44*: NO pressurization



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	Hot water
Working pressure differential MPa	0 to 1.5 (refer to max. working pressure differential in individual specifications.)	
Max. working pressure MPa	1.5 (≈220 psi, 15 bar)	
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)	
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)
Thermal class	Class 130 (B)	Class 180 (H)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Direct acting poppet structure	
Valve seat leakage cm^3/min(ANR)	0.2 or less (air)	
Mounting orientation	Unrestricted	
Body/seal material	Copper alloy/nitrile rubber	Copper alloy/ethylene propylene rubber

*1 : No freezing.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	NO port size	Orifice size (mm)		Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water(hot)/Kerosene		Oil (50 mm^2/s)			When holding		When starting		AC	DC	
		TOP	BODY	AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
GAG341-1	Rc1/8	1.5	1.5	1.0	1.0	1.0	1.0	1.0	0.7	100 VAC 50/60 Hz *6 200 VAC 50/60 Hz *6 12 VDC 24 VDC 48 VDC 100 VDC	14	11	20	16	6/4.2	11 (8.1)	0.35
-2		2.0	2.0	0.7	0.45	0.7	0.6 (0.45)	0.3	0.2								
GAG342-1	Rc1/4	1.5	1.5	1.0	1.0	1.0	1.0	1.0	0.7								
-2		2.0	2.0	0.7	0.45	0.7	0.6 (0.45)	0.3	0.2								
GAG442-1	Rc1/4	2.0	2.0	1.2	0.75	1.5	1.0	1.0	0.45		22	17	35	27	8.3/6.2	11 (10.4)	0.44
-3		2.0	3.0	1.2	0.75	1.5	0.9	1.0	0.45								
-4		3.0	3.0	0.4	0.3 (0.25)	0.5	0.3	0.3	0.2 (0.15)								
GAG443-1	Rc3/8	2.0	2.0	1.2	0.75	1.5	1.0	1.0	0.45								0.45
-3		2.0	3.0	1.2	0.75	1.5	0.9	1.0	0.45								
-4		3.0	3.0	0.4	0.3 (0.25)	0.5	0.3	0.3	0.2 (0.15)								

*1 : The model numbers above are for the basic NO port size (Rc) and orifice size. Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Values shown in ( ) are for the DC voltage type with DIN terminal box.
*5 : When using at low vacuum, vacuum the NC port side.
*6 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications (fluid temperature, ambient temperature, valve seat leakage)

Sealant		Fluoro rubber		Ethylene propylene rubber	
Coil (thermal class)		Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1)	°C	-10 to 60	-10 to 90	0 to 60 (*3)	0 to 90 (*3)
Ambient temperature	°C	-20 to 60	-20 to 100 (*2)	-20 to 60	-20 to 100 (*2)
Valve seat leakage	cm^3/min(ANR)	0.2 or less (air)			

*1 : No freezing.
*2 : -20 to 80°C when coil housing is HP terminal box with lamp.
*3 : The lowest temperature is 0°C since the fluid is water.

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics					
		TOP	BODY	C[dm^3/(s·bar)]		b		Cv	
				TOP	BODY	TOP	BODY	TOP	BODY
GAG341-1	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
GAG342-1	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53	0.09	0.09
-2		2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
GAG442-1	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-3		2.0	3.0	0.53	1.1	0.54	0.52	0.15	0.31
-4		3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31
GAG443-1	Rc3/8	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-3		2.0	3.0	0.53	1.1	0.54	0.52	0.15	0.31
-4		3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

GAG34 / GAG44 **1** ( ) - **1** - **0** - **B** **2H** **A** **H** **S** - **AC100V**

- GAG34 / GAG44: Model No.
- 1: Ⓐ NO port size
- ( ): Ⓑ Thread
- 1: Ⓒ Orifice size
- 0: Actuator only (Fixed symbol)
- B: Ⓓ Body/sealant combination
- 2H: Ⓔ Coil housing
- A: Ⓕ Manual override (locking)
- H: Ⓖ Other options
- S: Ⓗ With surge suppressor
- AC100V: Ⓘ Rated voltage

Code	Description	Model No. GAG34*	Model No. GAG44*
Ⓐ NO port size			
1	1/8	●	
2	1/4	●	●
3	3/8		●
Ⓑ Thread			
Blank	Rc	●	●
G	G	●	●
N	NPT	●	●

Ⓒ Orifice size

	GAG34* TOP	GAG34* BODY	GAG44* TOP	GAG44* BODY	GAG34*	GAG44*
1	ø1.5	ø1.5	ø2.0	ø2.0	●	●
2	ø2.0	ø2.0	-	-	●	
3	-	-	ø2.0	ø3.0		●
4	-	-	ø3.0	ø3.0		●

Ⓓ Body/sealant combination *1*3*4

		Body	Seal	Treatment	Remarks	GAG34*	GAG44*
Blank	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
B	Option	Copper alloy	Fluoro rubber	-	Air/low vacuum/kerosene (up to 90°C *2)	●	●
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene (up to 60°C)	●	●
E	Option	Stainless steel	Fluoro rubber	-	Air/low vacuum/kerosene (up to 90°C *2)	●	●
H	Option	Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
J	Option	Copper alloy	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene (up to 90°C *2)	●	●
P	Option	Copper alloy	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *2)	●	●
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene (up to 60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene (up to 90°C *2)	●	●
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *2)	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓔ to Ⓘ

Refer to page 237 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]
GAG341-1-0-AC200V
Model: GAG341
- Ⓐ NO port size : 1/8
- Ⓑ Thread : Rc
- Ⓒ Orifice size : TOP-ø1.5, BODY-ø1.5
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil housing : Grommet lead wire
- Ⓕ to Ⓗ : None
- Ⓘ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

[Example of model No. 2]
GAG342G-2-0-000AS-AC200V
Model: GAG342
- Ⓐ NO port size : 1/4
- Ⓑ Thread : G
- Ⓒ Orifice size : TOP-ø2.0, BODY-ø2.0
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil housing : Grommet lead wire
- Ⓕ Manual override (locking) : Selected
- Ⓖ Other options : None
- Ⓗ Surge suppressor : With surge suppressor
- Ⓘ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓓ

*1 : Leave blank for standard. However, to select options in Ⓔ, Ⓕ, Ⓖ or Ⓗ, indicate 0 for Item Ⓒ.
*2 : When Item Ⓓ 4A/4M/4N is selected.
*3 : The ethylene propylene rubber seal combination (Item Ⓓ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*4 : Even if nitrile rubber seal is selected, the seal material on the NO side will be fluoro rubber.

For Items Ⓔ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓕ to Ⓗ are not required, they should be left blank.

Ⓔ Coil housing				Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description				Manual override (locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
Blank	Std.	Grommet lead wire		**A**						**S**	100 VAC, 200 VAC
2E		With DIN terminal box	(G1/2)								100 VAC, 200 VAC
2G		With DIN terminal box	(Pg11)								12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp	(Pg11)						**H**		100 VAC, 200 VAC, 24 VDC
3A	Option	Open frame	Lead wire (IP65 or equivalent)	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
3M			With HP terminal box (G1/2)		**D**	**E**	**F**				12 VDC, 24 VDC, 48 VDC, 100 VDC
3N			HP terminal box with lamp (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP term box, lamp (IP65, equiv) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	**A**				**G**	**H**	**S**	100 VAC, 200 VAC
4M			With HP terminal box (G1/2)		**D**	**E**	**F**				
4N			HP terminal box with lamp (G1/2)								
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)	**A**				**G**	**H**		100 VAC, 200 VAC
5M			With HP terminal box (G1/2)		**D**	**E**	**F**				
5N			HP terminal box with lamp (G1/2)								
5I			HP terminal box (IP65 or equivalent) (G1/2)								
5J			HP term box, lamp (IP65, equiv) (G1/2)								

⚠ Refer to the following cautions for Items Ⓔ to Ⓘ.

Blank

● Grommet lead wire 300 mm

2E 2G 2H

● DIN terminal box

3A 4A 5A

● Open frame
Lead wire 300 mm
● 4A (Thermal class 180 (H))
● 5A (diode integrated)

3M 3N 4M 4N 5M 5N

● Open frame HP terminal box
● 4M, 4N (Thermal class 180 (H))
● 5M, 5N (diode integrated)

3I 3J 5I 5J

● Open frame HP terminal box (IP65 or equivalent)
● 5I, 5J (diode integrated)

Refer to page 148 for coil selection.

G H

● Conduit
● G(CTC19)
● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓔ

*5 : Leave blank for the standard coil housing. However, to select options in Ⓕ, Ⓖ or Ⓗ, indicate 00 for Item Ⓔ.
*6 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*7 : A DC coil for steam is available for GAG44. Contact CKD for more information.

Notes for Ⓕ to Ⓗ

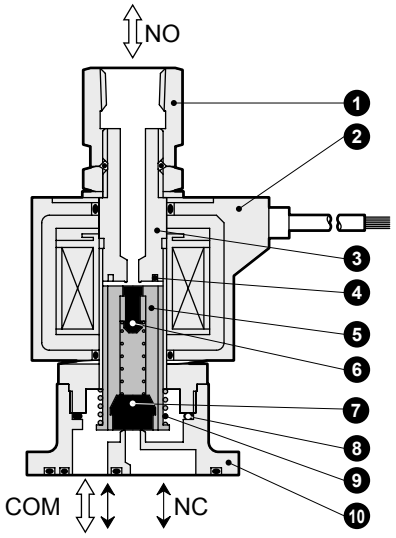
*8 : For Item Ⓖ, select an option from D, E, F, G and H.
*9 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*10: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓔ 2H), so the surge suppressor S cannot be selected.
*11: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

*12: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓔ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*13: For voltages other than above, contact CKD.
*14: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● GAG34*/GAG44* actuator

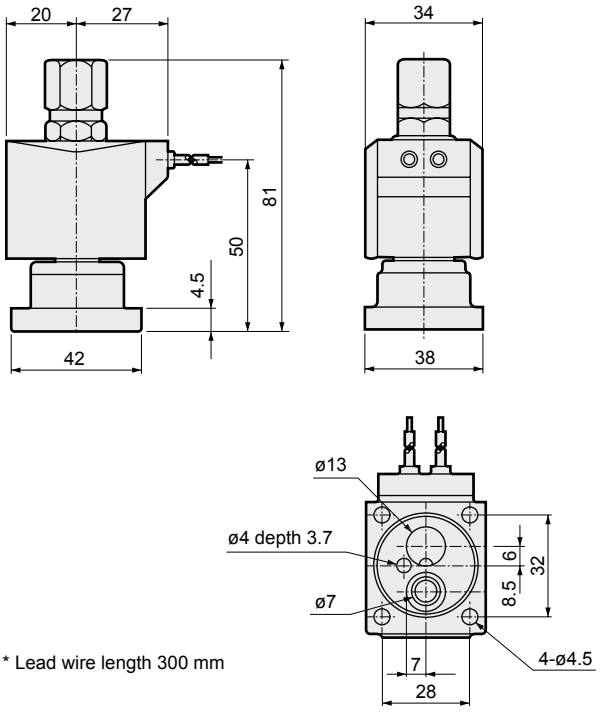


No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-
3	Core assembly	SUS405 or equiv./316L/403 *1	Stainless steel
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	NO valve sealant	FKM (FKM/EPDM)	NBR: Nitrile rubber FKM: Fluoro rubber EPDM: Ethylene propylene rubber
7	NC valve sealant	NBR (FKM/EPDM)	
8	O-ring	NBR (FKM/EPDM) (Size: AS568-019)	
9	Plunger spring	SUS304	Stainless steel
10	Body	C3771(SUS303)	Copper alloy (stainless steel)

*1 : When the body/sealant combination code is other than blank and H, the material is SUS405 or equivalent/316L/430.
*2 : ( ) shows options.
*3 : 4 body mounting screws and 2 O-rings are attached.

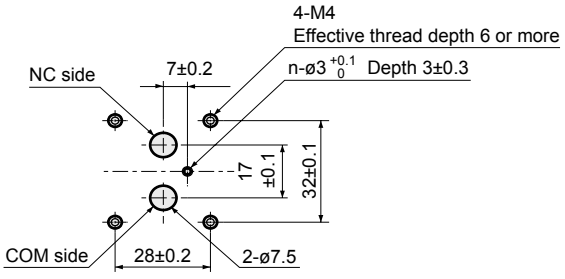
Dimensions: GAG341/GAG342 Series

● Actuator (grommet lead wire)
GAG34*-1 to 2-0



* Lead wire length 300 mm

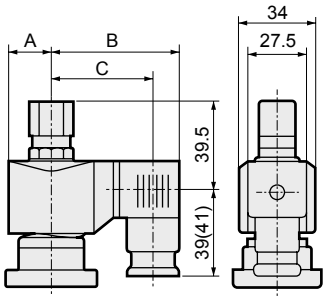
● Recommended dimensions for actuator mounting



Optional dimensions: GAG341/GAG342 Series

* Refer to the dimensions of grommet lead wire on page 238 for common dimensions.

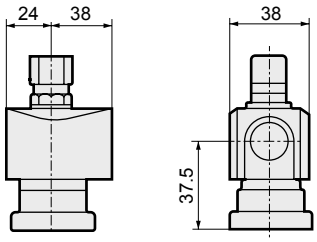
● With DIN terminal box
GAG34*-1 to 2-0-* [2E] [2G] [2H]



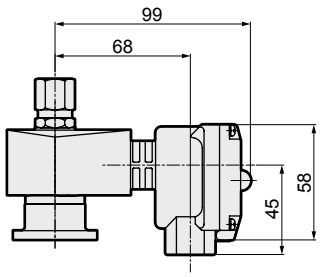
Dimensions shown in ( ) are for G1/2.

Voltage	A	B	C
AC	20	62	50.5(50)
DC	21	63.5	52(51.5)

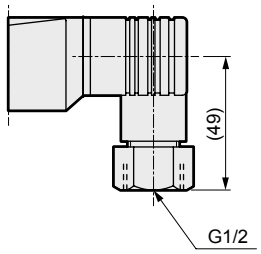
● Open frame lead wire
GAG34*-1 to 2-0-* [3A] [4A] [5A]



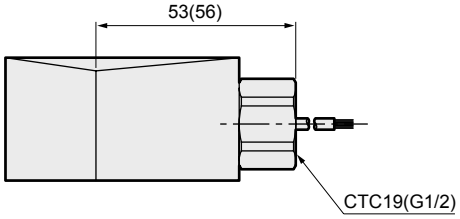
● Open frame + HP terminal box
GAG34*-1 to 2-0-* [3] [4] [5] [M] [N]



● DIN terminal box with small lamp + conduit (G1/2)
GAG34*-1 to 2-0-* [2H] [H]

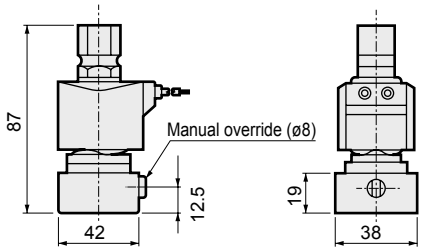


● Open frame + conduit
GAG34*-1 to 2-0-* [3A] [4A] [5A] [G] [H]



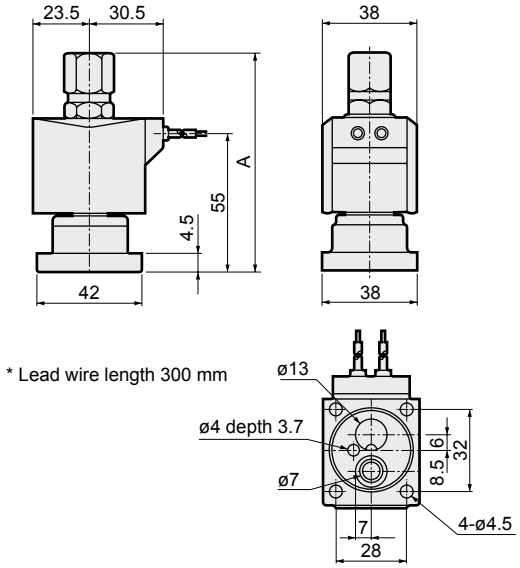
Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
GAG34*-1 to 2-0-*** [A]



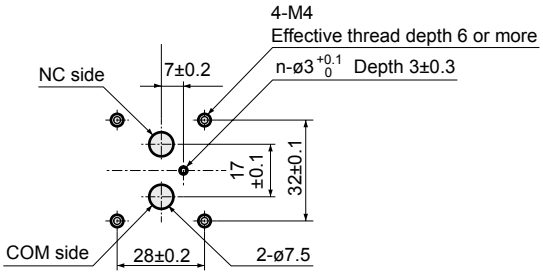
Dimensions: GAG442/GAG443 Series

● Actuator (grommet lead wire)
GAG44*-1/3/4-0



Model No.	A
GAG442-1/3/4	86.5
GAG443-1/3/4	90

● Recommended dimensions for actuator mounting

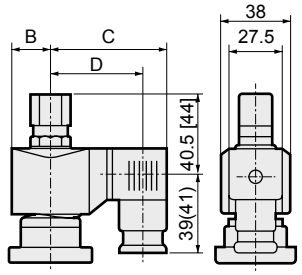


Optional dimensions: GAG442/GAG443 Series

CAD

* Refer to the dimensions of grommet lead wire on page 240 for common dimensions.

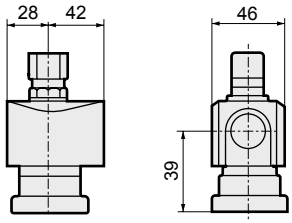
● With DIN terminal box
GAG44*-1/3/4-0-* [2E] [2G] [2H]



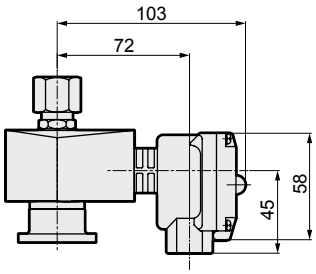
Dimensions shown in ( ) are for G1/2.
Dimensions shown in [ ] are for Rc3/8.

Voltage	B	C	D
AC	23.5	65.5	54(53.5)
DC	23.5	66	54.5(54)

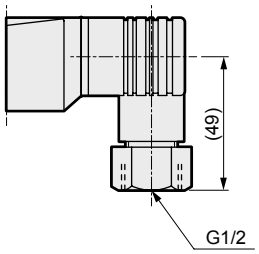
● Open frame lead wire
GAG44*-1/3/4-0-* [3A] [4A] [5A]



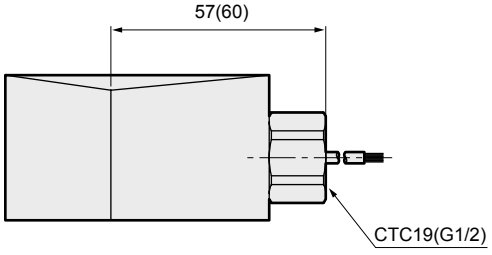
● Open frame + HP terminal box
GAG44*-1/3/4-0-* [3] [4] [5] [M] [N]



● DIN terminal box with small lamp + conduit (G1/2)
GAG44*-1/3/4-0-* [2H] [H]

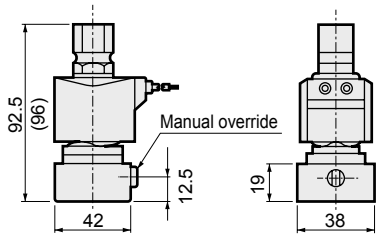


● Open frame + conduit
GAG44*-1/3/4-0-* [3A] [4A] [5A] [G] [H]



Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
GAG44*-1/3/4-0-***[A]



Dimensions shown in ( ) are for GAG443.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Direct acting 2, 3-port solenoid valve (AB/GAB/AG/GAG)

Design/selection

WARNING

1 Working fluids

(1) Contact CKD before using this valve for active gas (combustion gas, acetylene gas, etc.).

(2) Since valves for LPG (propane gas, butane gas) are available as custom-made products, contact CKD.

(3) When using this valve for dry air or inert gas, the life can be shortened considerably due to wear. Use a valve intended for dry air.

(4) This valve cannot be used for maintaining vacuum. Consult with CKD when the vacuum needs to be maintained.

CAUTION

1 Continuous energizing

Use the NO pressurization when using the 3-port valve in a continuously energized state with the NO port pressurized. When continuously energizing the universal or NC pressurization, use a fluoro rubber seal.

2 Suction sound

With the AC voltage specifications, a loud suction sound may be heard momentarily after energizing. To avoid a suction sound, select a coil with a diode or the DC voltage model. The suction sound volume will be reduced.

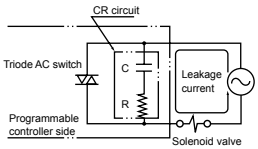
3 Fluid viscosity

The fluid viscosity must be 50 mm^2/s or less. Malfunctions could occur if the viscosity is higher than 50 mm^2/s.

4 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.

Failure to observe this could lead to malfunctions.



Voltage / Model No.	AC		AC diode		DC			
	100 V	200 V	100 V	200 V	12 V	24 V	48 V	100 V
AB,AG	6 mA or less	3 mA or less	2 mA or less	1 mA or less	2 mA or less	1 mA or less	0.5 mA or less	0.2 mA or less

Mounting, piping and wiring

CAUTION

1 Piping

(1) Always hold the socket with a wrench, etc., if the NO side is a socket.

(2) For steam fluids, steam generated from a boiler will contain a large amount of drainage. Always install a drain trap.

(3) When passing steam, the make-up water in the boiler will contain substances such as “calcium salt” and “magnesium salt”. As these substances will react with oxygen and carbon dioxide, and cause scales and sludge to form, always install a “water softener” and a filter for steam.

2 Wiring

(1) Refer to Intro Page 64 for information on how to wire a terminal box.

When using the product

CAUTION

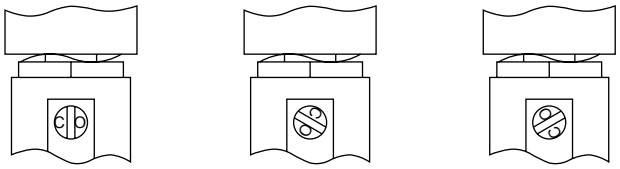
1 Manual operation

When using a product with a manual override, follow the operations below:

[For NC (open when energized)]

Opening : Insert a flathead screwdriver into the slit on the manual adjustment shaft, and turn it approx. 120° to the right or left. The plunger will rise and the valve will open. (For the 3-port valve, the NC side valve seat will open and the NO side valve seat will close.)
The open state is held even when the screwdriver is removed. Always return the valve to the original position after use.

Closing : From the open position, turn the manual adjustment shaft so that the slit is returned to the perpendicular position, which will lower the plunger and close the valve. (For the 3-port valve, the NC side valve seat will close and the NO side valve seat will open.) (Refer to the figure below)

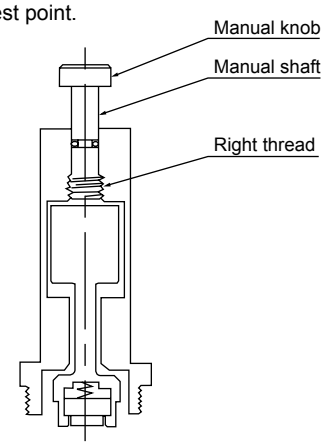


Valve closed state | Valve open state | Valve open state

[For NO (closed when energized)]

(1) When closing the valve with manual operation
The manual shaft is threaded, so hold the manual dial and rotate the shaft clockwise.
When the manual dial has been rotated downward 5 to 6 mm and no longer rotates, the solenoid valve will switch to closing operation.

(2) Reset (when not using a manual override)
Always rotate the manual dial counterclockwise and return it to the highest point.



Maintenance

CAUTION

1 When disassembling or assembling, tighten the core assembly and socket with the following tightening torques.

Model No.	Core assembly tightening torque	Socket tightening torque	Nut tightening torque
AB	30 to 45 Nm	-	8 to 16 Nm
AG	30 to 45 Nm	8 to 16 Nm	8 to 16 Nm

Working environment

⚠ CAUTION

IP65 (IEC60529 [IEC529:1989-11]) standards are applied to the test. Avoid use in conditions where water or coolant directly contacts the valve.

Degree of protection of IP65 and explanation of test method

● Degree of protection

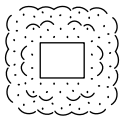
Note: IP65 is based on the following testing method.

■ IEC (International Electrotechnical Commission) standards (IEC60529 [IEC529:1989-11])

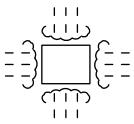
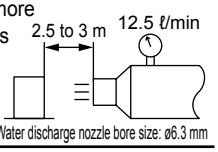
IP-□□

Degree of protection (International Protection)

1st characteristic No. (degree of protection for foreign solid matter)

Grade	Degree of protection	
6	Dust proof 	No inflow of dust.

2nd characteristic No. (degree of protection for water entry)

Grade	Degree of protection		Overview of test method (fresh water is used)
5	Protection against water jets 	No harmful effects occur even when water is sprayed with nozzles from all directions.	The sample (exterior) is exposed to water jetting of 1 m^2 per minute for a total of 3 minutes or more from all directions with the testing equipment in the figure below.  Water discharge nozzle bore size: ø6.3 mm

AP/APK/AD/ADK

Multi-fluid control pilot operated 2-port solenoid valve
General purpose

■ **For air/vacuum/water/oil**

Overview

The general purpose series enables control of various types of fluids including water, air, oil and vacuums. In addition to the high reliability and high quality of the valve, a variety of options and variations are available.

Features

Control of multi-fluid
Supports various fluids by combining body and sealant materials as desired.
Abundant options
With options including open frame, coil with diode and terminal boxes.
A wide range of series and variations
A wide selection is available from the Rc1/4 to large 50 flanges with series such as pilot operated diaphragm and piston valves, and pilot kick diaphragm and piston valves.

CONTENTS

⚠ Always read the precautions in the Introduction and on page 324 before use.

Series variation

Multi-fluid control pilot operated 2-port solenoid valve
General purpose

* Refer to page 328 for the dry air (-Z).

No. of ports	Model		Structure	Actuation	Working fluid							
					Air	Low vacuum [1.33 x 10^3 Pa (abs)]	Water	Kerosene	Oil [50 mm^2/s or less]	Hot water	Steam	
2-port		AP11	Pilot operated (Piston drive)	NC (open when energized)	●		●	●	●		●	
		AP12		NO (closed when energized)	●		●	●	●		●	
		AP21		NC (open when energized)	●		●	●	●		●	
		AP22		NO (closed when energized)	●		●	●	●		●	
		AD11	Pilot operated (Diaphragm drive)	NC (open when energized)	●		●	●	●			
		AD12		NO (closed when energized)	●		●	●	●			
		AD21		NC (open when energized)	●		●	●	●			
		AD22		NO (closed when energized)	●		●	●	●			
		APK11	Pilot kick (Piston kick structure)	NC (open when energized)	●	●	●	●	●*1		●	
		APK21		NC (open when energized)	●	●	●	●	●*1		●	
		ADK11	Pilot kick (Diaphragm drive)	NC (open when energized)	●	●	●	●	●	●		
		ADK12		NO (closed when energized)	●	●	●	●	●	●		
		ADK21		NC (open when energized)	●	●	●	●	●			

*1: 20 mm^2/s or less for APK11/21 Series.

	Port size											Page
	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	32 flange	Rc1 1/2	40 flange	Rc2	50 flange	
	●*2	●*2	●*2	●*2	●*2							252
	●*2	●*2	●*2	●*2	●*2							252
						●	●	●	●	●	●	262
						●	●	●	●	●	●	262
	●*2	●*2	●*2	●*2	●*2							272
			●*2	●*2	●*2							272
						●	●	●	●	●	●	282
						●	●	●	●	●	●	282
	●*2	●*2	●*2	●*2	●*2							292
						●	●	●	●	●	●	300
	●*2	●*2	●*2	●*2	●*2							306
			●*2	●*2	●*2							306
						●	●	●	●	●	●	318

*2: Refer to each How to order column for the thread.

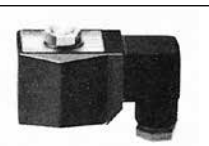
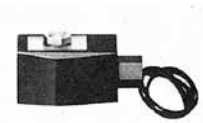
Refer to page 248 for details on the coil system.

Coil selection guide

● Coil housing types and selection guide

Various types are available according to the application.
Refer to the structure and features to select the optimum model.

For AP/AD*

Coil system				Appearance
Open frame	Thermal class 130 (B) Mold	● AC dedicated (50/60 Hz common) ● Degree of protection: IP61 or equivalent ● Cannot be used outdoors	Grommet lead wire	● Lead wire length 300 mm		2C 6C
	Thermal class 130 (B) Mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP61 or equivalent ● Cannot be used outdoors	DIN terminal box	● Easy wiring and maintenance ● Enhanced electrical safety (by grounding the ground terminal) ● Indicator lamp available (Optional - 100 VAC, 200 VAC and 24 VDC)		2E 2G 2H 6E 6G 6H
	Thermal class 130 (B) Mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.		3A
	Thermal class 130 (B) Mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP21 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC)		3M 3N
	Thermal class 130 (B) Mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC)		3I 3J
	Thermal class 180 (H) Taped	● AC dedicated (50/60 Hz common) ● High temperature fluids and high ambient temperatures usable ● Cannot be used outdoors ● Degree of protection: IP00	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.		4A
			HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC)		4M 4N
	Thermal class 130 (B) mold with diode	● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.		5A
	Thermal class 130 (B) mold with diode	● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP21 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC)		5M 5N
	Thermal class 130 (B) mold with diode	● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC)		5I 5J
			Conduit	● Use a conduit (CTC19 or G1/2) when using direct conduit wiring for the open frame lead wire.		G H

Coil selection guide

● Coil housing types and selection guide

Various types are available according to the application.
Refer to the structure and features to select the optimum model.

For APK11/ADK1*

					Appearance
Coil system	Thermal class 130 (B) Mold	● AC dedicated (50/60 Hz common) ● Degree of protection: IP61 or equivalent ● Cannot be used outdoors	Grommet lead wire	● Lead wire length 300 mm	2C
	Thermal class 130 (B) Mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP61 or equivalent ● Cannot be used outdoors	DIN terminal box	● Easy wiring and maintenance ● Enhanced electrical safety (by grounding the ground terminal) ● Indicator lamp available (Optional - 100 VAC, 200 VAC and 24 VDC)	2E 2G 2H
	Thermal class 130 (B) Mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.	3A
	Thermal class 130 (B) Mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP21 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (optional 100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC)	3M 3N
	Thermal class 130 (B) Mold	● For DC and AC (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (optional 100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC)	3I 3J
Open frame	Thermal class 180 (H) Taped	● AC dedicated (50/60 Hz common) ● High temperature fluids and high ambient temperatures usable ● Cannot be used outdoors ● Degree of protection: IP00	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.	4A
			HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC)	4M 4N
	Thermal class 130 (B) mold with diode	● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.	5A
	Thermal class 130 (B) mold with diode	● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP21 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC)	5M 5N
	Thermal class 130 (B) mold with diode	● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC)	5I 5J
			Conduit	● Use a conduit (CTC19 or G1/2) when using direct conduit wiring for the open frame lead wire.	G H

For APK21/ADK21

Open frame

			Appearance
Thermal class 130 (B) Mold	● For DC and AC ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● With CTC19 thread for direct conduit piping	3A 
Thermal class 130 (B) Mold	● For DC and AC ● Degree of protection: IP21 or equivalent ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (options 100 VAC, 200 VAC, 24 VDC, 100 VDC)	3M 3N 
Thermal class 180 (H) Taped	● AC dedicated ● High temperature fluids and high ambient temperatures usable ● Degree of protection: IP00 ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● With CTC19 thread for direct conduit piping	4A 
		HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC)	4M 4N 
Thermal class 130 (B) mold with diode	● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors	Lead wire	● Lead wire length 300 mm ● With CTC19 thread for direct conduit piping	5A 
Thermal class 130 (B) mold with diode	● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP21 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors	HP terminal box	● Easy wiring ● Indicator lamp available (Optional - 100 VAC, 200 VAC)	5M 5N 
		Conduit	● Use a conduit (G1/2) when using direct conduit wiring for the open frame lead wire.	H 

● Repair parts compatibility table by coil option

Coil option code	Supported voltage	Repair parts			
		Plunger assembly	Core assembly	Coil assembly	Actuator assembly *1
2C	AC	○	○	○	-
6C *2	DC	-	-	-	○
2E 2G 2H	AC	○	○	○	-
2E 2G 2H	DC	○	○	○	-
6E 6G 6H *2	DC	-	-	-	○
3A	AC	○	○	○	-
	DC		○	○	-
3M 3N	AC	○	○	○	-
	DC		○	○	-
3I 3J	AC	○	○	○	-
	DC		○	○	-
4A	AC	○	○	○	-
4M 4N	AC	○	○	○	-
5A	AC	○	○	○	-
5M 5N	AC	○	○	○	-
5I 5J	AC	○	○	○	-

*1 : The actuator assembly includes the coil assembly, core assembly and plunger assembly.
*2 : As 6C, 6E, 6G and 6H are dedicated parts, they are provided as part of the actuator assembly.

Pilot operated 2-port solenoid valve
General purpose

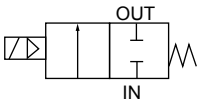
AP11/AP12 Series

- NC (open when energized), NO (closed when energized)
- Port size: Rc1/4 to Rc1
- Piston drive

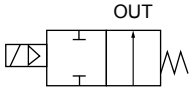
CE Refer to the Ending for details. RoHS CAD

JIS symbol

- AP11: NC (open when energized)



- AP12: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications
Working fluid	Air/water/kerosene/oil (50 mm^2/s or less)	Steam
Working pressure differential MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications.)	
Max. working pressure MPa	2 (≈290 psi, 20 bar)	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)	
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 180 (356°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)	-20 (-4°F) to 100 (212°F)
Thermal class	Class 130 (B)	Class 180 (H)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Pilot operated poppet, piston drive	
Valve seat leakage (*2) cm^3/min(ANR)	0.2 or less (air)	300 or less (air)
Mounting orientation	Free (within working pressure differential range)	
Body/seal material	Bronze/nitrile rubber	Bronze/PTFE

*1 : No freezing.
*2 : Pneumatic pressure used for measurement is 0.05 to 1.2 MPa for AP11 (NC), 0.05 to 0.9 MPa for AP12-8A/10A (NO [closed when energized]), and 0.05 to 0.5 MPa for AP12-15A/20A/25A (NO).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (50 mm^2/s)		Steam		When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
NC (open when energized)																		
AP11-8A	Rc1/4	10	0.05	1.2	0.9	1.0	0.9	0.9	0.9	1.0	100 VAC 50/60 Hz *6 200 VAC 50/60 Hz *6 12 VDC 24 VDC 48 VDC 100 VDC	12	10	17	14	5.2/3.8	11 (8.1)*4 (7)*5	0.9
AP11-10A	Rc3/8	10		1.2	0.9	1.0	0.9	0.9	0.9	1.0								0.9
AP11-15A	Rc1/2	15		1.2	0.6	1.0	0.6	0.6	0.6	1.0		18	15	29	24	6.7/5.7	11	1.4
AP11-20A	Rc3/4	20		1.2	0.6	1.0	0.6	0.6	0.6	1.0							(10.4)*4	1.8
AP11-25A	Rc1	25		1.2	0.6	1.0	0.6	0.6	0.6	1.0							(7)*5	2.5
NO (closed when energized)																		
AP12-8A	Rc1/4	10	0.05	0.9	0.9	0.9	0.9	0.9	0.9	0.9		22	18	35	29	8.7/6.7	15.5 (14)*4	1.0
AP12-10A	Rc3/8	10		0.9	0.9	0.9	0.9	0.9	0.9	0.9								1.0
AP12-15A	Rc1/2	15		0.5	0.5	0.5	0.5	0.5	0.5	0.5								1.4
AP12-20A	Rc3/4	20		0.5	0.5	0.5	0.5	0.5	0.5	0.5								1.8
AP12-25A	Rc1	25		0.5	0.5	0.5	0.5	0.5	0.5	0.5								2.5

*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of AP11 type coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Power consumption of coil housings 2E/2G/2H.
*5 : Power consumption of coil housings 6C/6E/6G/6H.
*6 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications

Sealant	Fluoro rubber		PTFE	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1) °C	-10 to 60	-10 to 90	-10 to 60	-10 to 180
Ambient temperature °C	-20 to 60	-20 to 100 (*3)	-20 to 60	-20 to 100 (*3)
Valve seat leakage (*2) cm^3/min(ANR)	0.2 or less (air)		300 or less (air)	

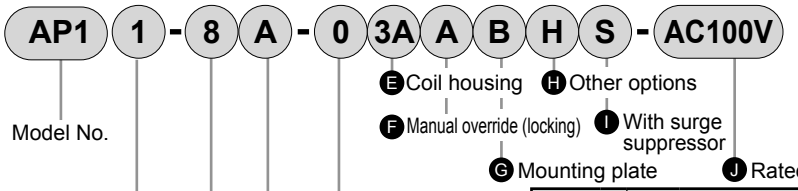
*1 : No freezing.
*2 : Pneumatic pressure used for measurement is 0.05 to 1.2 MPa for AP11 (NC), 0.05 to 0.9 MPa for AP12-8A/10A (NO), and 0.05 to 0.5 MPa for AP12-15A/20A/25A (NO).
*3 : -20 to 80°C when coil housing is HP terminal box with lamp.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[dm^3/(s·bar)]	b	Cv	S(mm^2)
NC (open when energized)						
AP11- 8A	Rc1/4	10	8.1	0.17	1.4	-
AP11-10A	Rc3/8	10	10	0.19	1.8	-
AP11-15A	Rc1/2	15	21	0.22	4.5	-
AP11-20A	Rc3/4	20	-	-	9.3	162
AP11-25A	Rc1	25	-	-	12.0	231
NO (closed when energized)						
AP12- 8A	Rc1/4	10	8.1	0.17	1.4	-
AP12-10A	Rc3/8	10	10	0.19	1.8	-
AP12-15A	Rc1/2	15	21	0.22	4.5	-
AP12-20A	Rc3/4	20	-	-	9.3	162
AP12-25A	Rc1	25	-	-	12.0	231

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order



Code	Description
Ⓐ Actuation	
1	NC (open when energized)
2	NO (closed when energized)
Ⓑ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
Ⓒ Thread	
A	Rc
G	G
N	NPT

Ⓓ Body/sealant combination

		Body	Seal	O-ring	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
B	Option	Bronze	Fluoro rubber	Fluoro rubber	-	Air/kerosene/oil (When 4A/4M/4N is selected)
C	Option	Bronze	PTFE	Fluoro rubber (*1)	-	Steam (When 4A/4M/4N is selected)
D	Option	Stainless steel	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	Fluoro rubber	-	Air/kerosene/oil (When 4A/4M/4N is selected)
F	Option	Stainless steel	PTFE	PTFE (*1)	-	Steam (When 4A/4M/4N is selected)
H	Option	Bronze	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
J	Option	Bronze	Fluoro rubber	Fluoro rubber	Oil-prohibited	Air/kerosene/oil (When 4A/4M/4N is selected)
K	Option	Bronze	PTFE	Fluoro rubber (*1)	Oil-prohibited	Steam (When 4A/4M/4N is selected)
L	Option	Stainless steel	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Fluoro rubber	Oil-prohibited	Air/kerosene/oil (When 4A/4M/4N is selected)
N	Option	Stainless steel	PTFE	PTFE (*1)	Oil-prohibited	Steam (When 4A/4M/4N is selected)

Refer to Intro Page 39 for reference on material combinations.

Ⓔ to Ⓙ

Refer to page 255 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]

AP11-15A-03A-AC100V

Model : AP11

- Ⓐ Actuation : NC (open when energized)
- Ⓑ Port size : 1/2
- Ⓒ Thread : Rc
- Ⓓ Body/sealant combination : Body - bronze, sealant - nitrile rubber, O-ring - nitrile rubber
- Ⓔ Coil housing : Open frame lead wire
- Ⓕ to Ⓘ : None
- Ⓙ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]

AP12-25N-E3MAD-AC200V

Model : AP12

- Ⓐ Actuation : NO (closed when energized)
- Ⓑ Port size : 1
- Ⓒ Thread : NPT
- Ⓓ Body/sealant combination : Body - stainless steel, sealant - fluoro rubber, O-ring - fluoro rubber
- Ⓔ Coil housing : Open frame + HP terminal box (G1/2)
- Ⓕ Manual override (locking) : Selected
- Ⓖ Mounting plate : None
- Ⓗ Other options : Cable gland A-15a
- Ⓘ Surge suppressor : None
- Ⓙ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓓ

*1 : When using the PTFE valve seal with thermal class 180(H) coil, the O-ring material is fluoro rubber for steam.

*2 : For Item Ⓑ (port size) 8 (1/4) and 10 (3/8), the standard body material is copper alloy.

*3 : When Item Ⓓ is C, F, K or N, Item Ⓔ Coil housings 6C, 6E, 6G and 6H cannot be selected.

For Items Ⓔ to Ⓙ, the combinations indicated with codes are available.
Note that if options for Items Ⓕ to Ⓘ are not required, they should be left blank.

Ⓔ Coil housing			Ⓕ	Ⓖ	Ⓗ Other options					Ⓘ	Ⓙ Rated voltage
Description			Manual override (Locking)	Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Std.	Open frame lead wire (IP65 equivalent)	A *8	B *7				G	H	S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2C		Grommet lead wire	A *8	B *9						S	100 VAC, 200 VAC
2E		With DIN terminal box (G1/2)									100 VAC, 200 VAC
2G		With DIN terminal box (Pg11)									12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp(Pg11)							H		100 VAC, 200 VAC, 24 VDC
3M		Open frame With HP terminal box(G1/2)	A *8	B *9	D	E	F			S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3N		Open frame HP terminal box with lamp(G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I		Open frame HP term box (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		Open frame HP term box, lamp (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H)) Lead wire	A *8	B *9				G	H	S	100 VAC, 200 VAC
4M		Open frame (Thermal class 180 (H)) With HP terminal box(G1/2)			D	E	F				
4N		Open frame (Thermal class 180 (H)) HP terminal box with lamp(G1/2)									
5A		Open frame (diode integrated) Lead wire (IP65 or equivalent)	A *8	B *9				G	H		100 VAC, 200 VAC
5M		Open frame (diode integrated) With HP terminal box(G1/2)			D	E	F				
5N		Open frame (diode integrated) HP terminal box with lamp(G1/2)									
5I		Open frame (diode integrated) HP term box (IP65, equiv) (G1/2)									
5J		Open frame (diode integrated) HP term box, lamp (IP65, equiv) (G1/2)									
6C		Grommet lead wire 7W	A *8	B *9						S	12 VDC, 24 VDC
6E		With DIN terminal box(G1/2)7W									
6G		With DIN terminal box(Pg11)7W									
6H		DIN terminal box with small lamp(Pg11)7W							H		24 VDC

⚠ Refer to the following cautions for Ⓔ to Ⓙ.

2C 6C

● Grommet lead wire 300 mm

2E 2G 2H 6E 6G 6H

● DIN terminal box

3A 4A 5A

● Open frame
Lead wire 300mm
● 4A (Thermal class 180 (H))
● 5A (diode integrated)

3M 3N 4M 4N 5M 5N

● Open frame HP terminal box
● 4M, 4N (Thermal class 180 (H))
● 5M, 5N (diode integrated)

3I 3J 5I 5J

● Open frame HP terminal box
(IP65 or equivalent)
● 5I, 5J (diode integrated)

Refer to page 248 for coil selection.

G H

● Conduit
● G(CTC19)
● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓔ

*4 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*5 : DC coil for steam is available for AP11. Contact CKD for more information.
* For 6C/6E/6G/6H, only AP11 is available.
*6 : The coil housings 6C, 6E and 6G are 12 VDC and 24 VDC dedicated. 6H is 24 VDC dedicated.

Notes for Items Ⓕ to Ⓘ

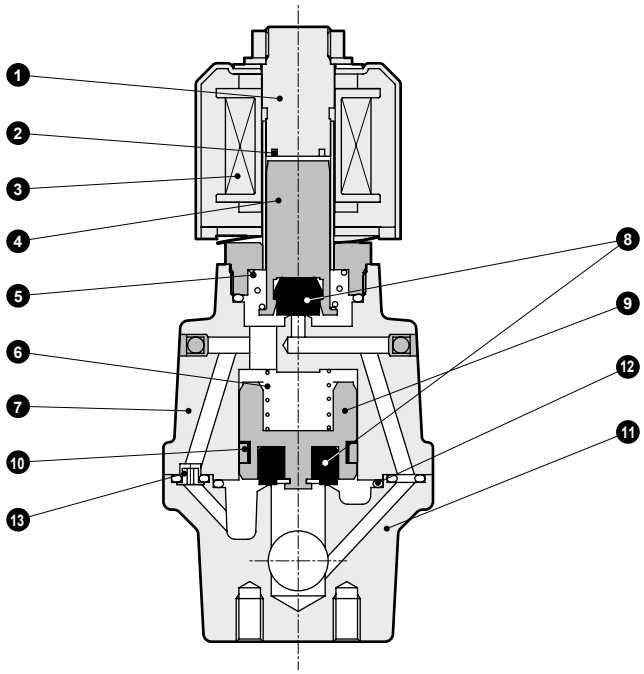
*7 : The mounting plate (Item Ⓖ B) can be mounted only on Item Ⓑ (port size) 8 (1/4) or 10 (3/8).
*8 : When Item Ⓓ is C, F, K or N, the manual override (Item Ⓕ A) is not available.
*9 : For Item Ⓗ, select an option from D, E, F, G and H.
*10 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*11 : As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓔ 2H, 6H), so surge suppressor code S cannot be selected.
*12 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) and the coil option 6C/6E/6G/6H are selected.

Notes for Ⓙ

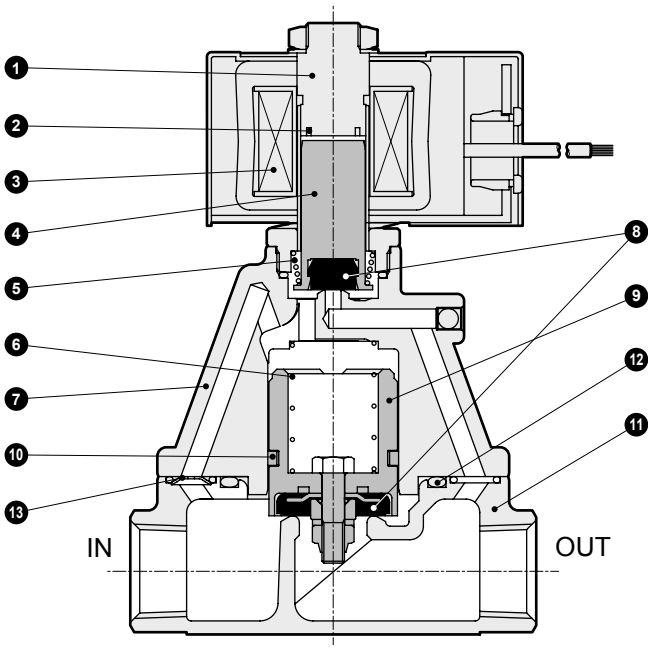
*13 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓔ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*14 : For voltages other than above, contact CKD.
*15 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AP11-8A/10A



● AP11-15A/20A/25A



(The figure shows the closing operation)

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403 *1	Stainless steel
2	Shading coil *2	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)*3	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (stainless steel)
10	Piston ring	SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
11	Body	CAC408(SCS13)*3	Bronze casting (stainless steel casting)
12	O-ring	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304(SUS303)*3	Stainless steel

( ) shows options.

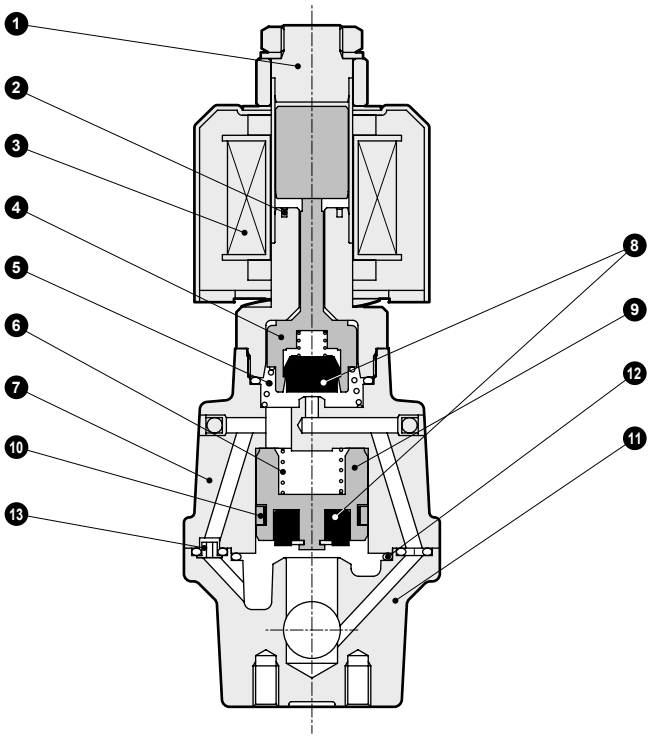
*1 : When the body/sealant combination code is other than O and H, or the coil housing code is 6C, 6E, 6G or 6H, the material is SUS405 or equivalent/SUS316L/SUS430.

*2 : No shading coil is used for DC coil or coil with diode.

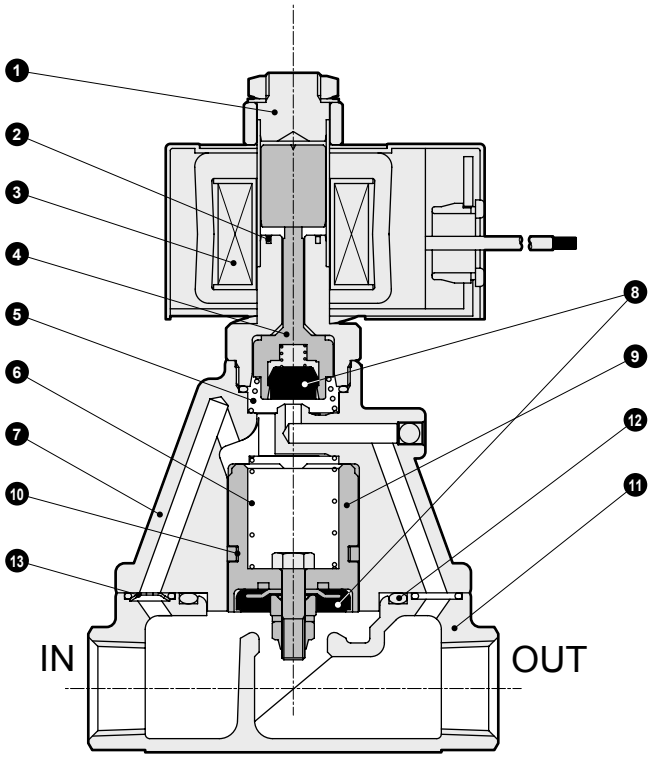
*3 : For port size 8 (1/4) and 10 (3/8), the body material is C3771 (copper alloy) as standard, and the orifice plate material is SUS303 (stainless steel) for both the standard and options.

Internal structure and parts list

● AP12-8A/10A



● AP12-15A/20A/25A



(The figure shows the opening operation)

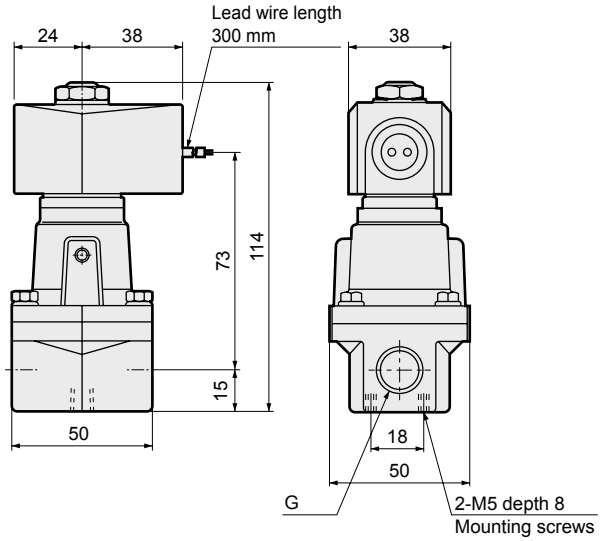
No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./SUS316L/SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO Valve	POM(PPS/SUS303/PFA)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M: Polyphenylene sulfide resin When C/F/K/N: Stainless steel/perfluoroalkoxy resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13) *1	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (stainless steel)
10	Piston ring	SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
11	Body	CAC408(SCS13) *1	Bronze casting (stainless steel casting)
12	O-ring	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304(SUS303) *1	Stainless steel

( ) shows options.

*1 : For port size 8 (1/4) and 10 (3/8), the standard body material is C3771 (copper alloy) and the standard orifice plate material is SUS303 (stainless steel) for both standard and options.

Dimensions: AP11 Series

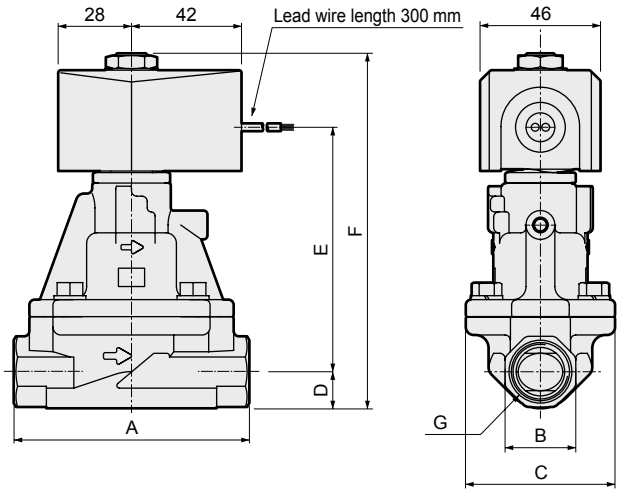
● Open frame lead wire
AP11-8A/10A-* 3A / 4A / 5A



*1: The dimensions are the same for port sizes of G and NPT threads.

Model No.	G
AP11-8A-*□A	Rc1/4
AP11-10A-*□A	Rc3/8

● Open frame lead wire
AP11-15A/20A/25A-* 3A / 4A / 5A



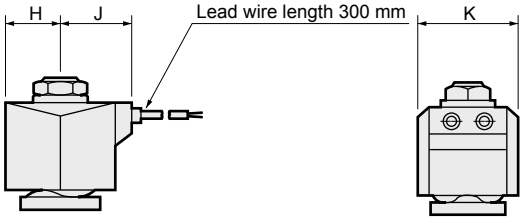
Model No.	A	B	C	D	E	F	G
AP11-15A-*□A	90	27	57	14	92.5	135.5	Rc1/2
AP11-20A-*□A	100	32	65	17	100.5	146.5	Rc3/4
AP11-25A-*□A	110	41	76	20.5	116	165.5	Rc1

*1: The dimensions are the same for port sizes of G and NPT threads.

Optional dimensions: AP11 Series

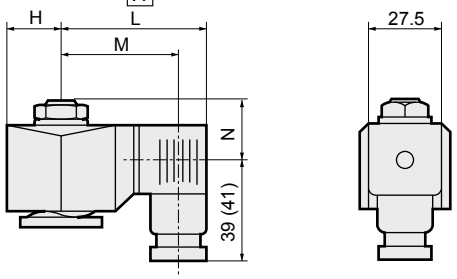
* Refer to the open frame lead wire dimensions above for common dimensions.

● Grommet lead wire
AP11-8A to 25A-* 2C / 6C



Model No.	H	J	K
AP11-8A to 10A-*2C	20	27	34
AP11-15A to 25A-*2C	23.5	30.5	38
AP11-8A to 25A-*6C	24	30.5	39

● With DIN terminal box
AP11-8A to 25A-* 2E / 6G / 6H



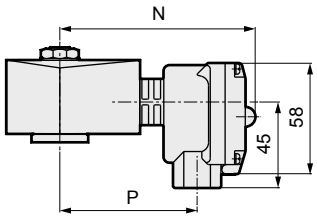
Dimensions shown in ( ) are for G1/2.

Model No.	H	L	M	N	Model No.	H	L	M	N
AP11-8A to 10A-*2□-AC	20	62	50.5 (50)	20.5	AP11-15A to 25A-*2□-AC	23.5	65.5	54 (53.5)	22
AP11-8A to 10A-*2□-DC	21	63.5	52 (51.5)	20.5	AP11-15A to 25A-*2□-DC	23.5	66	54.5 (54)	22
AP11-8A to 25A-*6□-DC	24	68	56.5 (56)	22					

Optional dimensions: AP11 Series

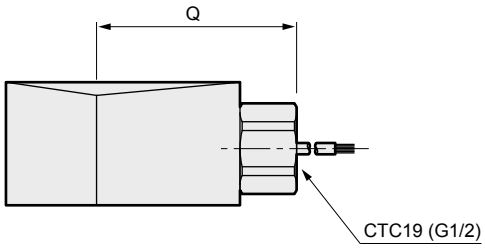
* Refer to the open frame lead wire dimensions on page 258 for common dimensions.

● Open frame + HP terminal box
AP11-8A to 25A-* [3 / 5] [M / N / I / J] / [4M / 4N]



Model No.	N	P
AP11-8A to 10A-*□□	99	68
AP11-15A to 25A-*□□	103	72

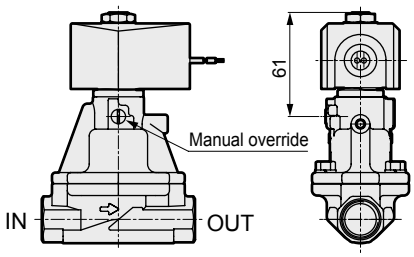
● Open frame + conduit
AP11-8A to 25A-* [3A / 4A / 5A] [G / H]



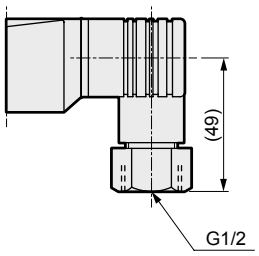
Dimensions shown in ( ) are for G1/2.

Model No.	Q
AP11-8A to 10A	53(56)
AP11-15A to 25A	57(60)

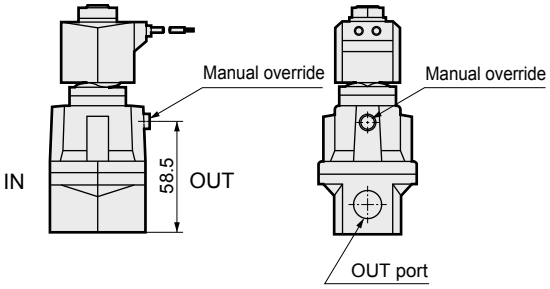
● Manual override (locking)
AP11-15A/20A/25A-*** [A]



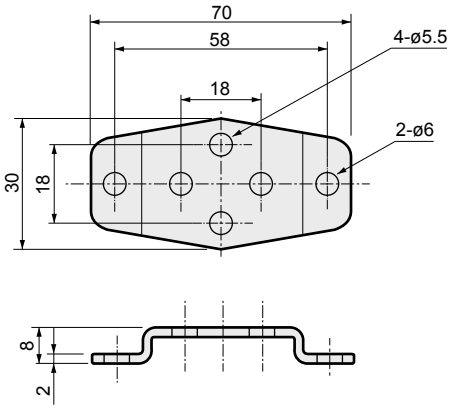
● DIN terminal box with small lamp + conduit (G1/2)
AP11-8A to 25A-* [2H] [H]



● Manual override (locking)
AP11-8A/10A-*** [A]



● Mounting plate
AP11-8A/10A-*** [B]

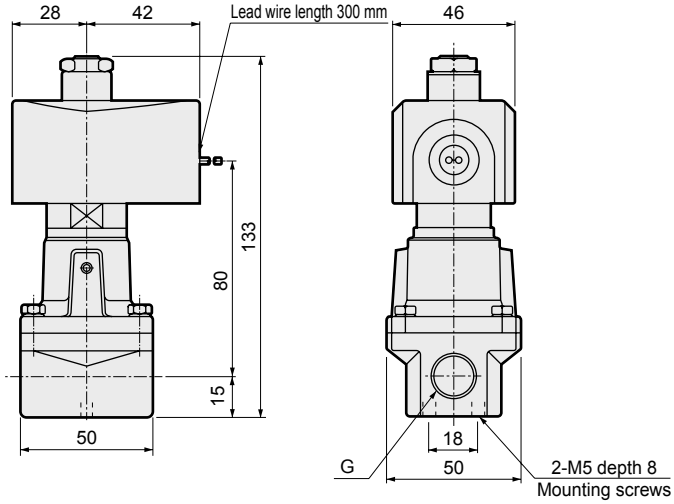


Mounting plate model	Compatibility
AP11-8A-MOUNT-PLATE-KIT	● AP11-8A Series
AP11-10A-MOUNT-PLATE-KIT	● AP11-10A Series

* Material: Steel/Zinc plated
* Mounting plate is not available for port size 15 (1/2) to 25 (1).

Dimensions: AP12 Series

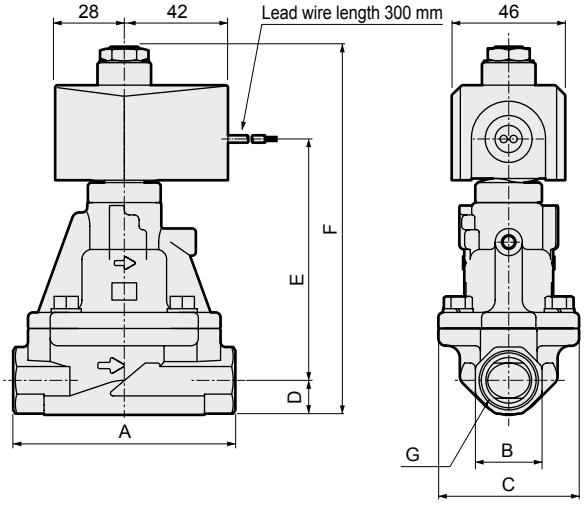
● Open frame lead wire
AP12-8A/10A-* 3A / 4A / 5A



*1: The dimensions are the same for port sizes of G and NPT threads.

Model No.	G
AP12-8A-*□A	Rc1/4
AP12-10A-*□A	Rc3/8

● Open frame lead wire
AP12-15A/20A/25A-* 3A / 4A / 5A



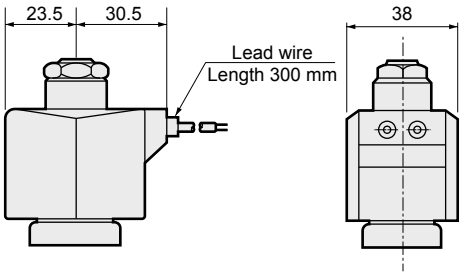
Model No.	A	B	C	D	E	F	G
AP12-15A-*□A	90	27	57	14	96.5	148.5	Rc1/2
AP12-20A-*□A	100	32	65	17	104.5	159.5	Rc3/4
AP12-25A-*□A	110	41	76	20.5	120	178.5	Rc1

*1: The dimensions are the same for port sizes of G and NPT threads.

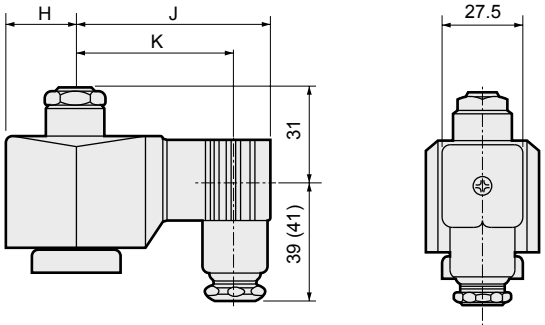
Optional dimensions: AP12 Series

* Refer to the open frame lead wire dimensions above for common dimensions.

● Grommet lead wire
AP12-8A to 25A-* 2C



● With DIN terminal box
AP12-8A to 25A-* 2E / 2G / 2H



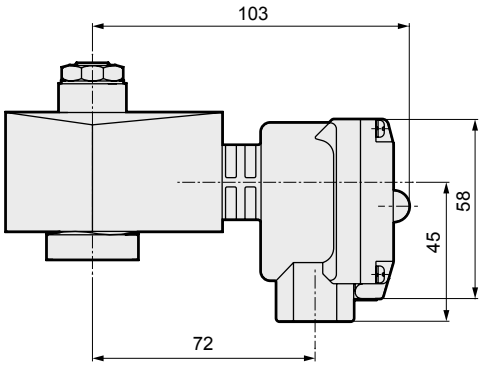
Dimensions shown in ( ) are for G1/2.

Voltage	H	J	K
AC	23.5	65.5	54 (53.5)
DC	28	72	60.5 (60)

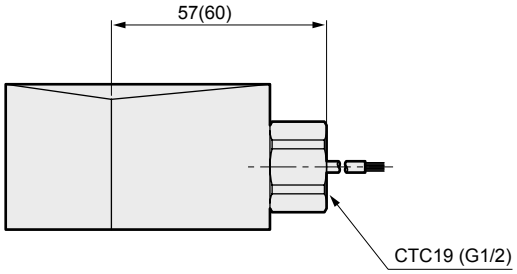
Optional dimensions: AP12 Series

* Refer to the open frame lead wire dimensions on page 260 for common dimensions.

● Open frame + HP terminal box
AP12-8A to 25A-* [3 / 5] [M / N / I / J] / [4M / 4N]

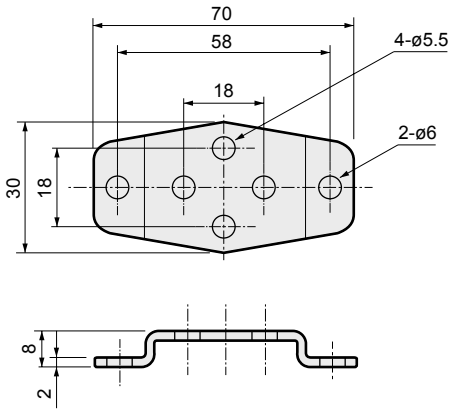


● Open frame + conduit
AP12-8A to 25A-* [3A / 4A / 5A] [G / H]

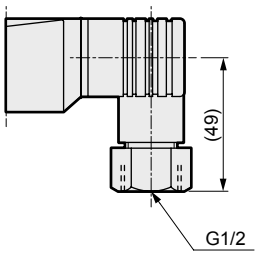


Dimensions shown in ( ) are for G1/2.

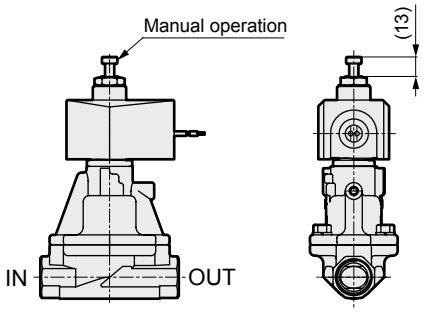
● Mounting plate
AP12-8A/10A-*** [B]



● DIN terminal box with small lamp + conduit (G1/2)
AP12-8A to 25A-* [2H] [H]



● Manual override (locking)
AP12-15A/20A/25A-*** [A]



Mounting plate model	Compatibility
AP12-8A-MOUNT-PLATE-KIT	● AP12-8A Series
AP12-10A-MOUNT-PLATE-KIT	● AP12-10A Series

* Material: Steel/Zinc plated
* Mounting plate is not available for port size 15 (1/2) to 25 (1).

Pilot operated 2-port solenoid valve
General purpose

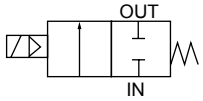
AP21/AP22 Series

- NC (open when energized), NO (closed when energized)
- Port size: Rc1¼ to Rc2, 32 to 50 flange
- Piston drive

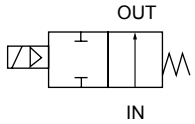
CE Refer to the Ending for details. RoHS CAD

JIS symbol

- AP21: NC (open when energized)



- AP22: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)	Steam
Working pressure differential MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications.)	
Max. working pressure MPa	1.6 (≈230 psi, 16 bar)	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (*1)	5 (41°F) to 180 (356°F)
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Thermal class	Class 130 (B)	Class 180 (H)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Pilot operated poppet, piston drive	
Valve seat leakage (*2) cm³/min(ANR)	1 or less (air)	400 or less (air)
Mounting orientation	Free (within working pressure differential range)	
Body/seal material	Bronze/nitrile rubber	Bronze/PTFE

*1 : No freezing.
*2 : Pneumatic pressure used for measurement is 0.05 to 1.2 MPa for AP21 (NC [open when energized]), and 0.05 to 0.5 MPa for AP22 (NO [closed when energized]).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (50 mm²/s)		Steam		When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
NC (open when energized)																		
AP21-32A	Rc1¼	35	0.05	1.2	0.6	1.0	0.6	0.6	0.6	1.0	100 VAC 50/60 Hz *6 200 VAC 50/60 Hz *6 12 VDC 24 VDC 48 VDC 100 VDC	18	15	29	24	6.7/5.7	11 (10.4) *4 (7) *5	3.5
AP21-32F	32 flange																	7
AP21-40A	Rc1½	43																4.5
AP21-40F	40 flange																	8
AP21-50A	Rc2	53																6
AP21-50F	50 flange																	10
NO (closed when energized)																		
AP22-32A	Rc1¼	35	0.05	0.5	0.5	0.5	0.5	0.5	0.5	0.5	100 VAC 50/60 Hz *6 200 VAC 50/60 Hz *6 12 VDC 24 VDC 48 VDC 100 VDC	22	18	35	29	8.7/6.7	15.5 (14) *4	3.5
AP22-32F	32 flange																	7
AP22-40A	Rc1½	43																4.5
AP22-40F	40 flange																	8
AP22-50A	Rc2	53																6
AP22-50F	50 flange																	10

*1 : The model numbers above show the basic port size. Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Power consumption of coil housings 2E/2G/2H.
*5 : Power consumption of coil housings 6C/6E/6G/6H.
*6 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications

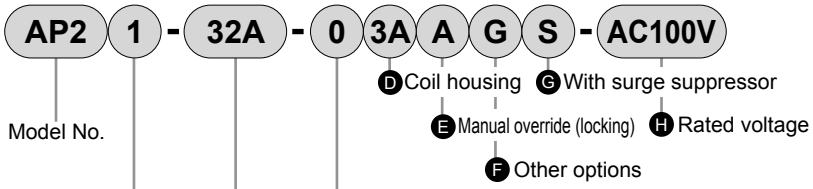
Sealant	Fluoro rubber		PTFE	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature °C	-10 to 60 (*1)	-10 to 90 (*1)	-10 to 60 (*1)	5 to 180
Ambient temperature °C	-10 to 60			
Valve seat leakage (*2) cm^3/min(ANR)	1 or less (air)		400 or less (air)	

*1 : No freezing.
*2 : Pneumatic pressure used for measurement is 0.05 to 1.2 MPa for AP21 (NC [open when energized]), and 0.05 to 0.5 MPa for AP22 (NO [closed when energized]).

Flow characteristics

Model No.	Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm^2)
NC (open when energized)				
AP21-32A	Rc1 1/4	35	25	460
AP21-32F	32 flange			
AP21-40A	Rc1 1/2	43	34	625
AP21-40F	40 flange			
AP21-50A	Rc2	53	53	975
AP21-50F	50 flange			
NO (closed when energized)				
AP22-32A	Rc1 1/4	35	25	460
AP22-32F	32 flange			
AP22-40A	Rc1 1/2	43	34	625
AP22-40F	40 flange			
AP22-50A	Rc2	53	53	975
AP22-50F	50 flange			

How to order



Ⓐ Actuation

Ⓑ Port size
*1
*2

Ⓒ Body/sealant combination
*3
*4

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
2	NO (closed when energized)
Ⓑ Port size	
32A	Rc1¼
32F	32 flange
40A	Rc1½
40F	40 flange
50A	Rc2
50F	50 flange

Ⓒ Body/sealant combination

		Body	Seal	O-ring	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
B	Option	Bronze	Fluoro rubber	Fluoro rubber	-	Air/kerosene/oil (When 4A/4M/4N is selected)
C	Option	Bronze	PTFE	Fluoro rubber (*3)	-	Steam (When 4A/4M/4N is selected)
D	Option	Stainless steel	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	Fluoro rubber	-	Air/kerosene/oil (When 4A/4M/4N is selected)
F	Option	Stainless steel	PTFE	PTFE (*3)	-	Steam (When 4A/4M/4N is selected)
H	Option	Bronze	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
J	Option	Bronze	Fluoro rubber	Fluoro rubber	Oil-prohibited	Air/kerosene/oil (When 4A/4M/4N is selected)
K	Option	Bronze	PTFE	Fluoro rubber (*3)	Oil-prohibited	Steam (When 4A/4M/4N is selected)
L	Option	Stainless steel	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Fluoro rubber	Oil-prohibited	Air/kerosene/oil (When 4A/4M/4N is selected)
N	Option	Stainless steel	PTFE	PTFE (*3)	Oil-prohibited	Steam (When 4A/4M/4N is selected)

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓗ

Refer to page 265 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]
AP21-32A-02C-AC100V

Model : AP21
Ⓐ Actuation : NC (open when energized)
Ⓑ Port size : Rc1¼
Ⓒ Body/sealant combination
: Body - bronze, sealant - nitrile rubber, O-ring - nitrile rubber
Ⓓ Coil housing : Grommet lead wire
Ⓔ to Ⓖ : None
Ⓗ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]
AP22-40F-H3AAS-AC200V

Model : AP22
Ⓐ Actuation : NO (closed when energized)
Ⓑ Port size : 40 flange
Ⓒ Body/sealant combination
: Body - bronze, sealant - nitrile rubber O-ring - nitrile rubber (oil-prohibited)
Ⓓ Coil housing : Open frame lead wire
Ⓔ Manual override (locking) : Selected
Ⓕ Other options : None
Ⓖ Surge suppressor : With surge suppressor
Ⓗ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

*1 : The companion flange is JIS B2210 10K. (Flange is not enclosed with the product and must be purchased separately.)
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.

Notes for Ⓒ

*3 : When using the PTFE valve seal with thermal class 180(H) coil, the O-ring material is fluoro rubber for steam.
*4 : When Item Ⓒ is C, F, K or N, Item Ⓓ Coil housings 6C, 6E, 6G and 6H cannot be selected.

For Items Ⓓ to Ⓗ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓖ are not required, they should be left blank.

Ⓓ Coil housing			Ⓔ	Ⓕ Other options					Ⓖ	Ⓗ Rated voltage
Description			Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
				A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Std.	Open frame lead wire (IP65 equivalent)	A *9				G	H	S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2C	Option	Grommet lead wire	A *9						S	100 VAC, 200 VAC
2E		With DIN terminal box (G1/2)								100 VAC, 200 VAC 12 VDC, 24 VDC, 48 VDC, 100 VDC
2G		With DIN terminal box (Pg11)								
2H		DIN terminal box with small lamp (Pg11)						H		100 VAC, 200 VAC, 24 VDC
3M		Open frame: With HP terminal box (G1/2)	A *9	D	E	F			S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3N		Open frame: HP terminal box with lamp (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I		Open frame: HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		Open frame: HP term box, lamp (IP65, equiv) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H)): Lead wire	A *9				G	H	S	100 VAC, 200 VAC
4M		Open frame (Thermal class 180 (H)): With HP terminal box (G1/2)		D	E	F				
4N		Open frame (Thermal class 180 (H)): HP terminal box with lamp (G1/2)								
5A		Open frame (diode integrated): Lead wire (IP65 or equivalent)	A *9				G	H		100 VAC, 200 VAC
5M		Open frame (diode integrated): With HP terminal box (G1/2)		D	E	F				
5N		Open frame (diode integrated): HP terminal box with lamp (G1/2)								
5I		Open frame (diode integrated): HP terminal box (IP65 or equivalent) (G1/2)								
5J		Open frame (diode integrated): HP term box, lamp (IP65, equiv) (G1/2)								
6C		Grommet lead wire 7W	A *9						S	12 VDC, 24 VDC
6E		With DIN terminal box (G1/2) 7W								
6G		With DIN terminal box (Pg11) 7W								
6H		DIN terminal box with small lamp (Pg11) 7W						H		24 VDC

⚠ Refer to the following cautions for Ⓓ to Ⓗ.

2C 6C		● Grommet lead wire 300 mm
2E 2G 2H 6E 6G 6H		● DIN terminal box
3A 4A 5A		● Open frame Lead wire 300 mm ● 4A (Thermal class 180 (H)) ● 5A (diode integrated)
3M 3N 4M 4N 5M 5N		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

Refer to page 248 for coil selection.

G H		● Conduit ● G(CTC19) ● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓓ

*5 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*6 : A DC coil for steam is available for AP21. Contact CKD for more information.
*7 : For 6C/6E/6G/6H, only AP21 is available.
*8 : The coil housings 6C, 6E and 6G are 12 VDC and 24 VDC dedicated. 6H is 24 VDC dedicated.

Notes for Ⓔ to Ⓖ

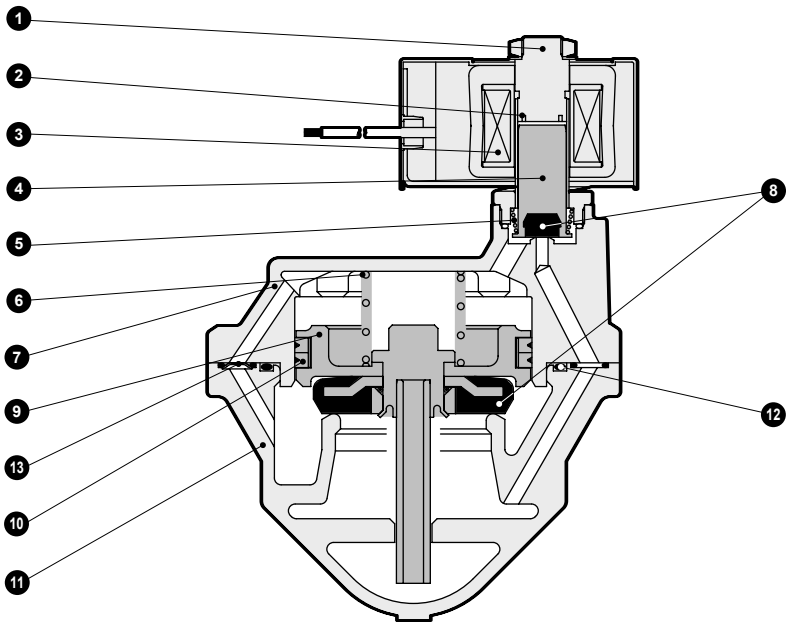
*9 : When Item Ⓒ is C, F, K or N, the manual override (Item Ⓔ A) is not available.
*10: For Item Ⓕ, select an option from D, E, F, G and H.
*11: The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*12: As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓓ 2H, 6H), so surge suppressor code S cannot be selected.
*13: Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) and the coil option 6C/6E/6G/6H are selected.

Notes for Ⓗ

*14: 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*15: For voltages other than above, contact CKD.
*16: The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AP21 Series

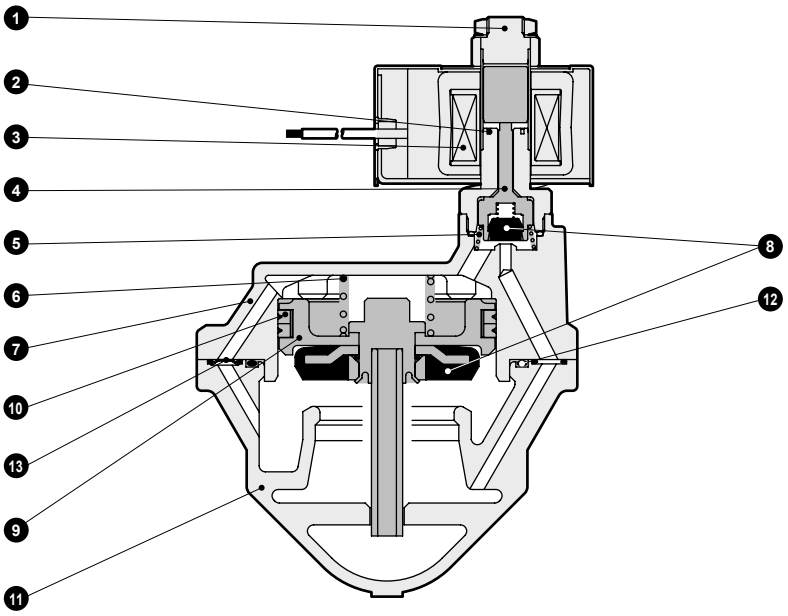


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403 *1	Stainless steel
2	Shading coil *2	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (stainless steel)
10	Seal ring set	SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	O-ring	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)
13	Orifice plate	SUS304	Stainless steel

( ) shows options.
*1 : When the body/sealant combination code is other than O and H, or the coil housing code is 6C, 6E, 6G or 6H, the material is SUS405 or equivalent/SUS316L/SUS430.
*2 : No shading coil is used for DC coil or coil with diode.

Internal structure and parts list

● AP22 Series

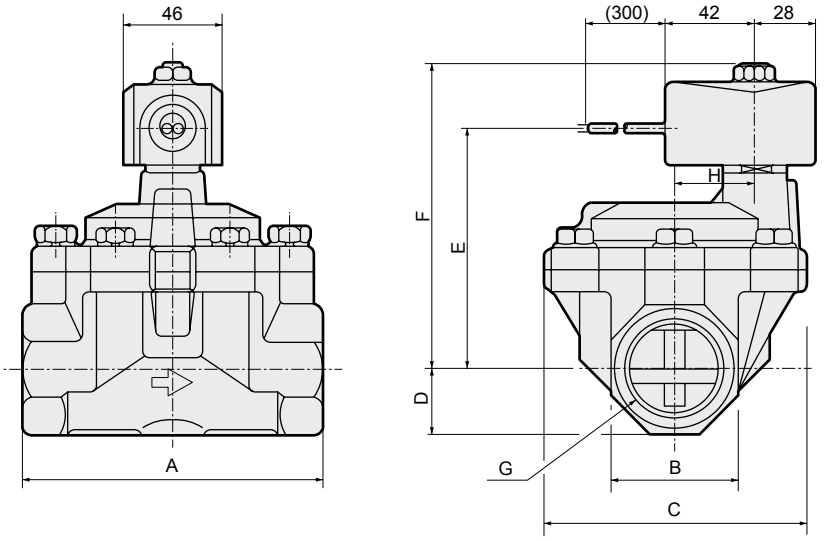


No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./SUS316L/SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO valve	POM(PPS/SUS303/PFA)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M: Polyphenylene sulfide resin When C/F/K/N: Stainless steel/perfluoroalkoxy resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	NBR (FKM or PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (stainless steel)
10	Seal ring set	SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	O-ring	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)
13	Orifice plate	SUS304	Stainless steel

( ) shows options.

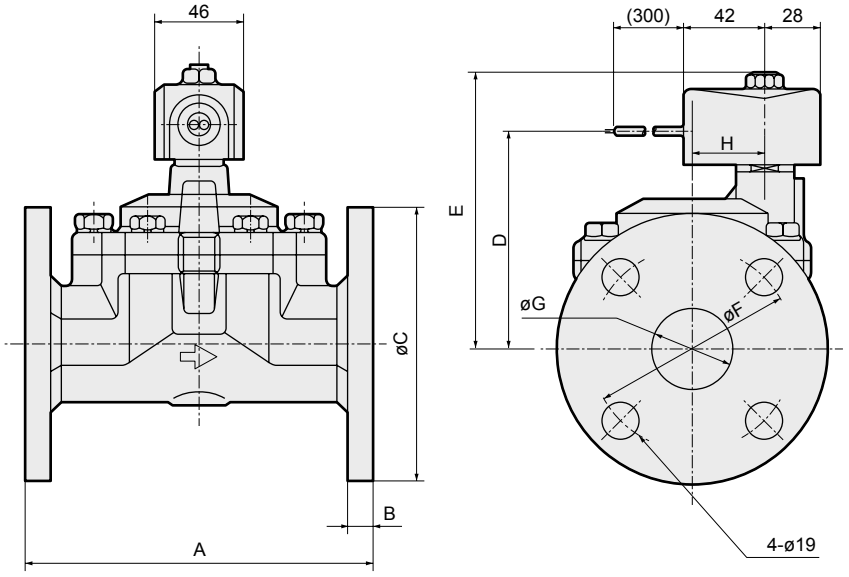
Dimensions: AP21 Series CAD

● Open frame lead wire (Rc screw-in)
AP21-32A/40A/50A-* 3A / 4A / 5A



Model No.	A	B	C	D	E	F	G	H
AP21-32A-*□A	125	54	112	27	106.5	135.5	Rc1¼	32
AP21-40A-*□A	140	60	122	30	112.5	141.5	Rc1½	38
AP21-50A-*□A	160	74	132	37	120.5	149.5	Rc2	45

● Open frame lead wire (flange)
AP21-32F/40F/50F-* 3A / 4A / 5A



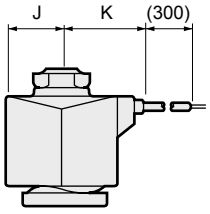
Model No.	A	B	C	D	E	F	G	H
AP21-32F-*□A	170	12	135	106.5	135.5	100	36(35)	32
AP21-40F-*□A	180	14	140	112.5	141.5	105	42	38
AP21-50F-*□A	180	14	155	120.5	149.5	120	53(52)	45

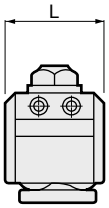
Dimensions shown in ( ) are for stainless steel body.

Optional dimensions: AP21 Series

* Refer to the open frame lead wire dimensions on page 268 for common dimensions.

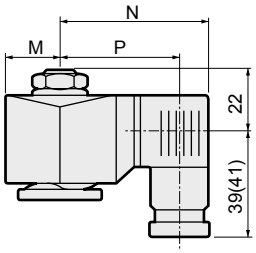
● Grommet lead wire
AP21-32[A][F] to 50[A][F] -* 2C / 6C

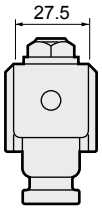




Model No.	J	K	L
AP21-32[A][F] to 50[A][F] -*2C	23.5	34.5	38
AP21-32[A][F] to 50[A][F] -*6C	24	30.5	39

● With DIN terminal box
AP21-32[A][F] to 50[A][F] -* 2 E / 6 G / H

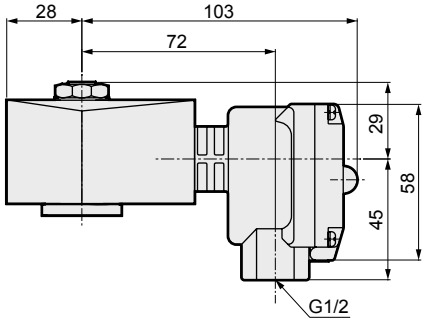




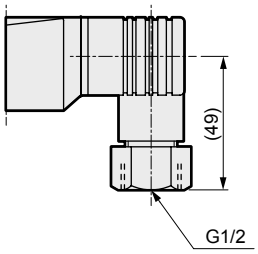
Dimensions shown in ( ) are for G1/2.

Voltage	M	N	P
AC (2E/2G/2H)	23.5	65.5	54(53.5)
DC (2E/2G/2H)	23.5	66	54.5(54)
DC (6E/6G/6H)	24	68	56.5(56)

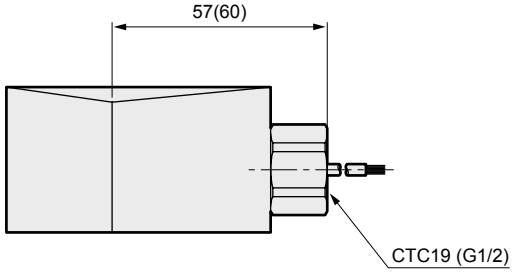
● Open frame + HP terminal box
AP21-32[A][F] to 50[A][F] -* 3 / 5 M / N / I / J / 4M / 4N



● DIN terminal box with small lamp + conduit (G1/2)
AP21-32[A][F] to 50[A][F]-* 2H H

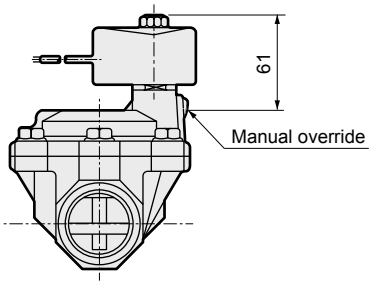


● Open frame + conduit
AP21-32[A][F] to 50[A][F] -* 3A / 4A / 5A G / H

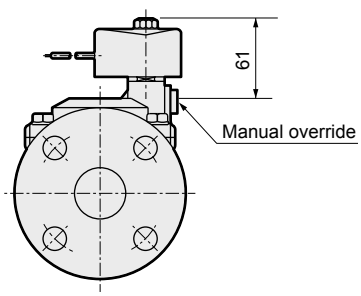


Dimensions shown in ( ) are for G1/2.

● Manual override (locking, Rc screw-in)
AP21-32A/40A/50A-*** A

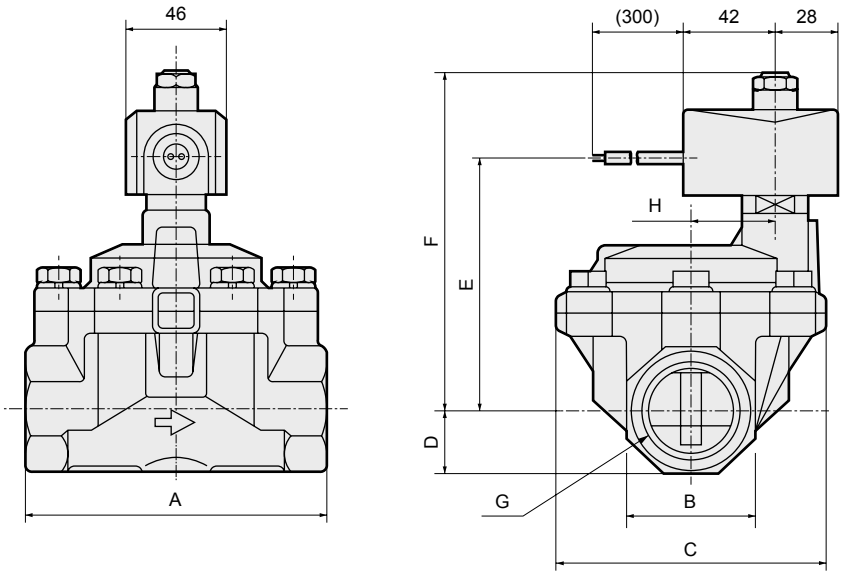


● Manual override (locking, flange)
AP21-32F/40F/50F-*** A



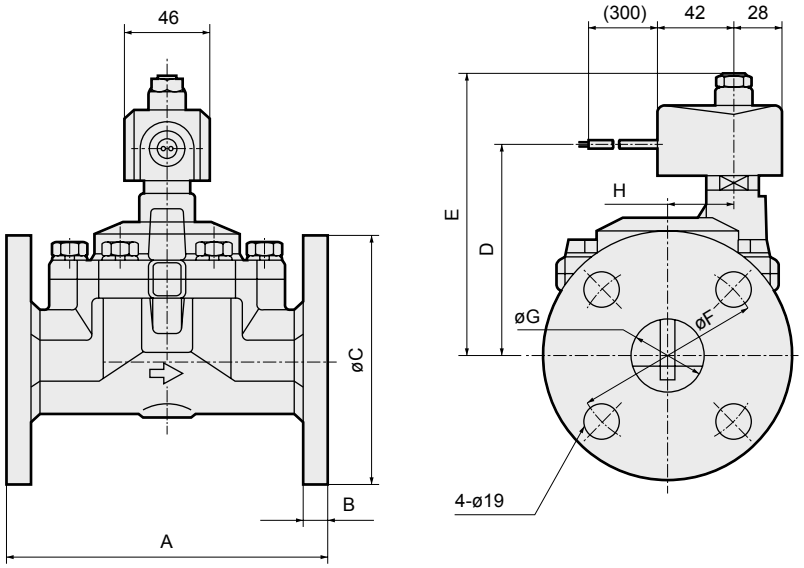
Dimensions: AP22 Series

● Open frame lead wire (Rc screw-in)
AP22-32A/40A/50A-* 3A / 4A / 5A



Model No.	A	B	C	D	E	F	G	H
AP22-32A-*□A	125	54	112	27	110.5	149	Rc1¼	32
AP22-40A-*□A	140	60	122	30	116.5	155	Rc1½	38
AP22-50A-*□A	160	74	132	37	124.5	163	Rc2	45

● Open frame lead wire (flange)
AP22-32F/40F/50F-* 3A / 4A / 5A



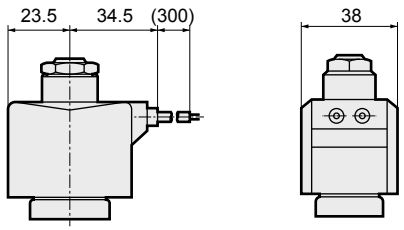
Model No.	A	B	C	D	E	F	G	H
AP22-32F-*□A	170	12	135	110.5	149	100	36(35)	32
AP22-40F-*□A	180	14	140	116.5	155	105	42	38
AP22-50F-*□A	180	14	155	124.5	163	120	53(52)	45

Dimensions shown in ( ) are for stainless steel body.

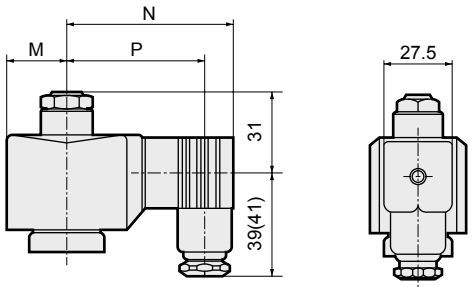
Optional dimensions: AP22 Series

* Refer to the open frame lead wire dimensions on page 270 for common dimensions.

● Grommet lead wire
AP22-32[A/F] to 50[A/F] -* 2C



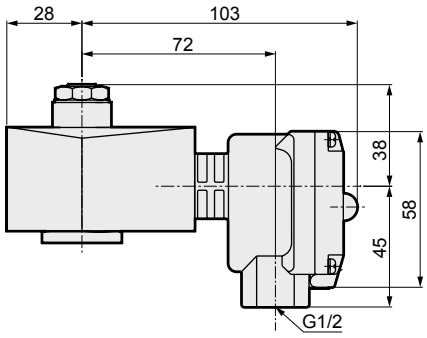
● With DIN terminal box
AP22-32[A/F] to 50[A/F] -* 2E / 2G / 2H



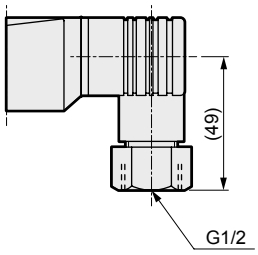
Dimensions shown in ( ) are for G1/2.

Voltage	M	N	P
AC	23.5	65.5	54(53.5)
DC	28	72	60.5(60)

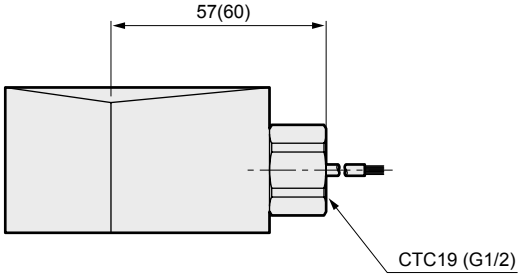
● Open frame + HP terminal box
AP22-32[A/F] to 50[A/F] -* 3 / 5 | M / N / I / J | / 4M / 4N



● DIN terminal box with small lamp + conduit (G1/2)
AP22-32[A/F] to 50[A/F] -* 2H H

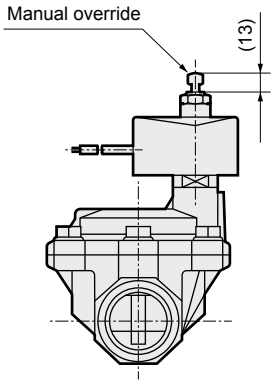


● Open frame + conduit
AP22-32[A/F] to 50[A/F] -* 3A / 4A / 5A | G / H

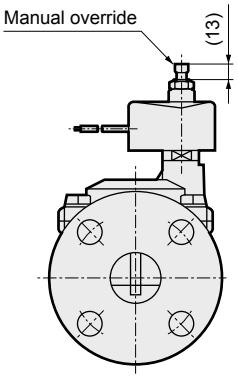


Dimensions shown in ( ) are for G1/2.

● Manual override (locking, Rc screw-in)
AP22-32A/40A/50A-***A



● Manual override (locking, flange)
AP22-32F/40F/50F-***A



Pilot operated 2-port solenoid valve
General purpose

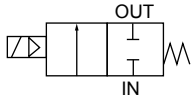
AD11/AD12 Series

- NC (open when energized), NO (closed when energized)
- Port size: Rc1/4 to Rc1
- Diaphragm drive

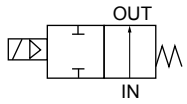
CE Refer to the Ending for details. RoHS CAD

JIS symbol

- AD11: NC (open when energized)



- AD12: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	Air/water/kerosene/oil (50 mm^2/s or less)
Working pressure differential MPa	0.02 to 1.0 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	8 (≈1200 psi, 80 bar)
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)
Ambient temperature °C	-20 (-4°F) to 60 (140°F)
Thermal class	Thermal class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Pilot operated poppet, diaphragm drive
Valve seat leakage (*2) cm^3/min(ANR)	0.2 or less (air)
Mounting orientation	Free (within working pressure differential range)
Body/seal material	Bronze/nitrile rubber

*1 : No freezing.
*2 : Pneumatic pressure used for measurement is 0.02 to 1.0 MPa for AD11 (NC [open when energized]), and 0.02 to 0.5 MPa for AD12 (NO [closed when energized]).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa) Air AC	Air DC	Water/kerosene AC	Water/kerosene DC	Oil (50 mm^2/s) AC	Oil (50 mm^2/s) DC	Rated voltage	Apparent power (VA) When holding 50 Hz	When holding 60 Hz	When starting 50 Hz	When starting 60 Hz	Power consumption (W) AC 50/60 Hz	Power consumption (W) DC	Weight (kg)
NC (open when energized)																	
AD11-8A	Rc1/4	10	0.02 *5	1.0	0.7	1.0	0.7	0.7	0.7	100 VAC 50/60 Hz *7	18	15	29	24	6.7/5.7	12 (7)*6	0.4
AD11-10A	Rc3/8	10		1.0	0.7	1.0	0.7	0.7	0.7								0.4
AD11-15A	Rc1/2	15	0.02	1.0	0.6	0.7	0.6	0.6	0.6	200 VAC 50/60 Hz *7	18	15	29	24	6.7/5.7	11 (10.4)*4 (7)*6	1.2
AD11-20A	Rc3/4	20		1.0	0.6	0.7	0.6	0.6	0.6								1.2
AD11-25A	Rc1	25		1.0	0.6	0.7	0.6	0.6	0.6	12 VDC 24 VDC 48 VDC 100 VDC							1.9
NO (closed when energized)																	
AD12-15A	Rc1/2	15	0.02	0.5	0.5	0.5	0.5	0.5	0.5		22	18	35	29	8.7/6.7	15.5 (14)*4	1.2
AD12-20A	Rc3/4	20															1.5
AD12-25A	Rc1	25															1.9

*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of AD11 type coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Power consumption of coil housings 2E/2G/2H.
*5 : For fluoro rubber seal, the min. working pressure differential of port size 8 (1/4) and 10 (3/8) is 0.05 MPa.
*6 : Power consumption of coil housings 6C/6E/6G/6H.
*7 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications

Sealant	Fluoro rubber	
Coil (thermal class)	Class 130 (B)	Class 180 (H)
Fluid temperature (*1) °C	-10 to 60	-10 to 90
Ambient temperature °C	-20 to 60	-20 to 100 (*3)
Valve seat leakage (*2) cm^3/min(ANR)	0.2 or less (air)	

*1 : No freezing.
*2 : Pneumatic pressure used for measurement is 0.02 to 1.0 MPa for AD11 (NC [open when energized]), and 0.02 to 0.5 MPa for AD12 (NO [closed when energized]).
*3 : -20 to 80°C when coil housing is HP terminal box with lamp.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[dm^3/(s·bar)]	b	Cv	S(mm^2)
NC (open when energized)						
AD11-8A	Rc1/4	10	8.1	0.17	1.5	-
AD11-10A	Rc3/8	10	10	0.19	1.8	-
AD11-15A	Rc1/2	15	21	0.22	4.5	-
AD11-20A	Rc3/4	20	-	-	9.3	162
AD11-25A	Rc1	25	-	-	12.0	231
NO (closed when energized)						
AD12-15A	Rc1/2	15	21	0.22	4.5	-
AD12-20A	Rc3/4	20	-	-	9.3	162
AD12-25A	Rc1	25	-	-	12.0	231

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AD1 1 - 15 A - 0 3A A B G S - AC100V

- AD1: Model No.
- 1: Ⓐ Actuation
- 15: Ⓑ Port size
- A: Ⓒ Thread
- 0: Ⓓ Body/sealant combination *1 *2 *3
- 3A: Ⓔ Coil housing
- A: Ⓕ Manual override (locking)
- B: Ⓖ Mounting plate
- G: Ⓗ Other options
- S: Ⓘ With surge suppressor
- AC100V: Ⓙ Rated voltage

Code	Description	Model No. AD11	Model No. AD12
Ⓐ Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●
Ⓑ Port size			
8	1/4	●	
10	3/8	●	
15	1/2	●	●
20	3/4	●	●
25	1	●	●
Ⓒ Thread			
A	Rc	●	●
G	G	●	●
N	NPT	●	●

Ⓓ Body/sealant combination

		Body	Seal	Treatment	Remarks		
0	Std.	Bronze	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
B	Option	Bronze	Fluoro rubber	-	Air/kerosene/oil (up to 90°C*1)	●	●
D	Option	Stainless steel	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
E	Option	Stainless steel	Fluoro rubber	-	Air/kerosene/oil (up to 90°C*1)	●	●
H	Option	Bronze	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)	●	●
J	Option	Bronze	Fluoro rubber	Oil-prohibited	Air/kerosene/oil (up to 90°C*1)	●	●
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/kerosene/oil (up to 90°C*1)	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓔ to Ⓙ

Refer to page 275 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]

AD11-20A-03A-AC100V

Model : AD11

- Ⓐ Actuation : NC (open when energized)
- Ⓑ Port size : Rc3/4
- Ⓒ Thread : Rc
- Ⓓ Body/sealant combination : Body - bronze, sealant - nitrile rubber
- Ⓔ Coil housing : Open frame lead wire
- Ⓕ ~ Ⓘ : None
- Ⓙ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]

AD12-15G-D2CAS-AC200V

Model : AD12

- Ⓐ Actuation : NO (closed when energized)
- Ⓑ Port size : Rc1/2
- Ⓒ Thread : G
- Ⓓ Body/sealant combination : Body - stainless steel, sealant - nitrile rubber
- Ⓔ Coil housing : Grommet lead wire
- Ⓕ Manual override (locking) : Selected
- Ⓖ Ⓗ : None
- Ⓘ Surge suppressor : With surge suppressor
- Ⓙ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓓ

*1 : When Item Ⓓ 4A/4M/4N is selected.
*2 : For Item Ⓑ (port size) 8 (1/4) and 10 (3/8), stainless body is not available.
*3 : For Item Ⓑ (port size) 8 (1/4) and 10 (3/8), the standard body material is copper alloy.

For Items Ⓔ to Ⓙ, the combinations indicated with codes are available.
Note that if options for Items Ⓕ to Ⓘ are not required, they should be left blank.

Ⓔ Coil housing			Ⓕ	Ⓖ	Ⓗ Other options					Ⓘ	Ⓙ Rated voltage
Description			Manual override (Locking)	Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Std.	Open frame lead wire (IP65 equivalent)	A	B *9				G	H	S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2C	Option	Grommet lead wire	A	B *9						S	100 VAC, 200 VAC
2E		With DIN terminal box (G1/2)									100 VAC, 200 VAC
2G		With DIN terminal box (Pg11)									12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp(Pg11)							H		100 VAC, 200 VAC, 24 VDC
3M		Open frame: With HP terminal box(G1/2)	A	B *9	D	E	F			S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3N		Open frame: HP terminal box with lamp(G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I		Open frame: HP term box (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		Open frame: HP term box, lamp (IP65, equiv) (G1/2)									100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H)): Lead wire	A	B *9				G	H	S	100 VAC, 200 VAC
4M		Open frame (Thermal class 180 (H)): With HP terminal box (G1/2)			D	E	F				
4N		Open frame (Thermal class 180 (H)): HP terminal box with lamp(G1/2)									
5A		Open frame (diode integrated): Lead wire (IP65 or equivalent)	A	B *9				G	H		100 VAC, 200 VAC
5M		Open frame (diode integrated): With HP terminal box(G1/2)			D	E	F				
5N		Open frame (diode integrated): HP terminal box with lamp(G1/2)									
5I		Open frame (diode integrated): HP term box (IP65, equiv) (G1/2)									
5J		Open frame (diode integrated): HP term box, lamp (IP65, equiv) (G1/2)									
6C		Grommet lead wire 7W	A	B *9						S	12 VDC, 24 VDC
6E		With DIN terminal box(G1/2)7W									
6G		With DIN terminal box(Pg11)7W									
6H		DIN terminal box with small lamp(Pg11)7W							H		24 VDC

⚠ Refer to the following cautions for Ⓔ to Ⓙ.

2C 6C

● Grommet lead wire 300 mm

2E 2G 2H 6E 6G 6H

● DIN terminal box

3A 4A 5A

● Open frame
Lead wire 300 mm
● 4A (Thermal class 180 (H))
● 5A (diode integrated)

3M 3N 4M 4N 5M 5N

● Open frame HP terminal box
● 4M, 4N (Thermal class 180 (H))
● 5M, 5N (diode integrated)

3I 3J 5I 5J

● Open frame HP terminal box
(IP65 or equivalent)
● 5I, 5J (diode integrated)

Refer to page 248 for coil selection.

G H

● Conduit
● G(CTC19)
● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓔ

*4 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*5 : For Item Ⓑ (port size) 8(1/4)/10(3/8), DC power supply with DIN terminal box is not available.
*6 : For 6C/6E/6G/6H, only AD11 can be selected.
*7 : The coil housings 6C, 6E and 6G are 12 VDC and 24 VDC dedicated. 6H is 24 VDC dedicated.

Notes for Items Ⓕ to Ⓘ

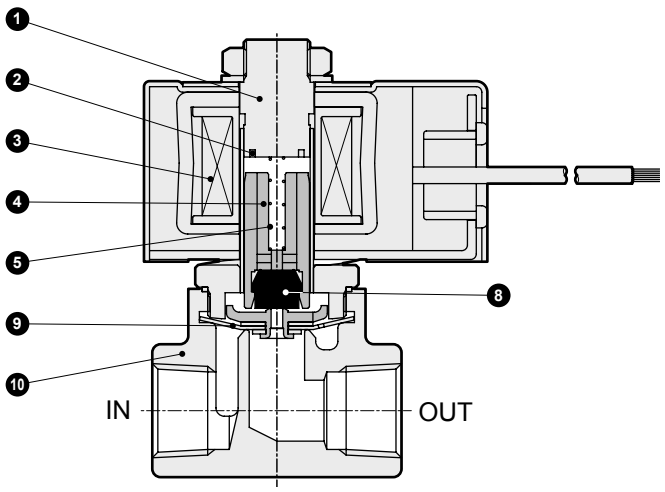
*8 : Manual override (Item Ⓕ A) cannot be mounted to port size 8(1/4) and 10(3/8).
*9 : The mounting plate (Item Ⓖ B) can be mounted only on Item (port size) 8 (1/4) or 10 (3/8).
*10 : For Item Ⓗ, select an option from D, E, F, G and H.
*11 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*12 : As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓔ 2H, 6H), so surge suppressor code S cannot be selected.
*13 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) and the coil option 6C/6E/6G/6H are selected.

Notes for Ⓙ

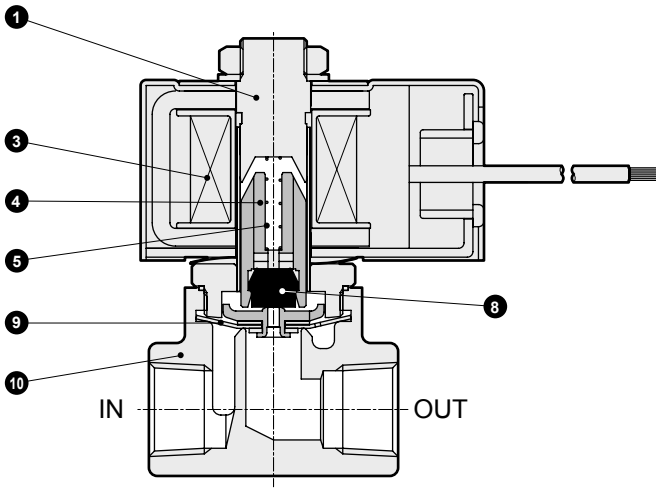
*14 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓔ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*15 : For voltages other than above, contact CKD.
*16 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths.
Contact CKD for more information.

Internal structure and parts list

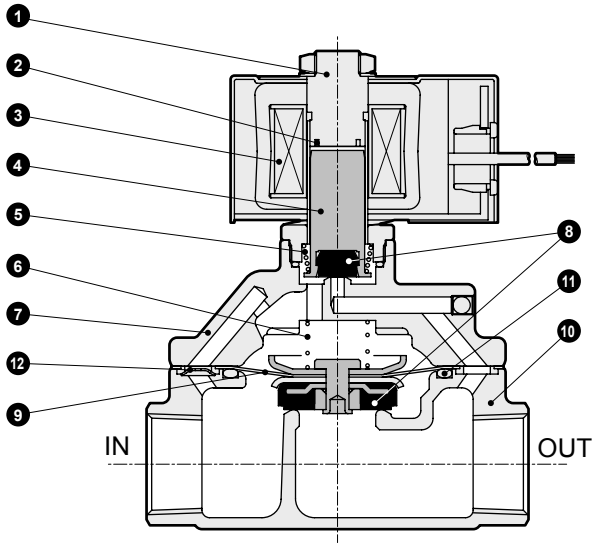
● AD11-8A/10A (AC)



● AD11-8A/10A (DC/diode integrated)



● AD11-15A/20A/25A



No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403 *1	Stainless steel
2	Shading coil *2	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Stuffing *3	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)*4	Bronze casting (stainless steel casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate *3	SUS304	Stainless steel

( ) shows options.

*1 : When the body/sealant combination code is other than O and H, or the coil housing code is 6C, 6E, 6G or 6H, the material is SUS405 or equivalent/SUS316L/SUS430.

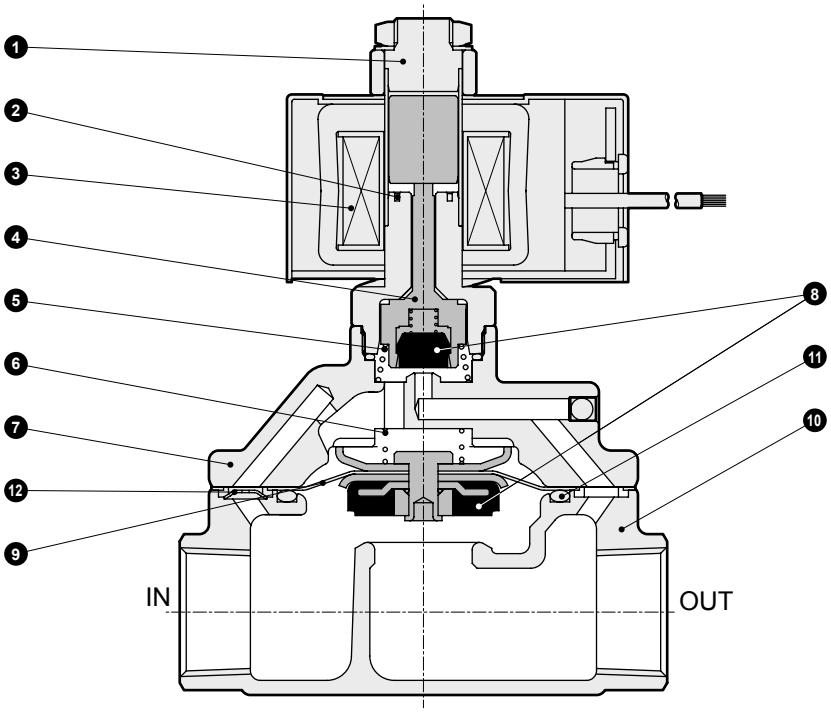
*2 : No shading coil is used for DC coil or coil with diode.

*3 : For port size 8 (1/4) and 10 (3/8), stuffing and orifice plate are not used.

*4 : For port size 8 (1/4) and 10 (3/8), the standard body material is C3771 (copper alloy).

Internal structure and parts list

● AD12-15A/20A/25A

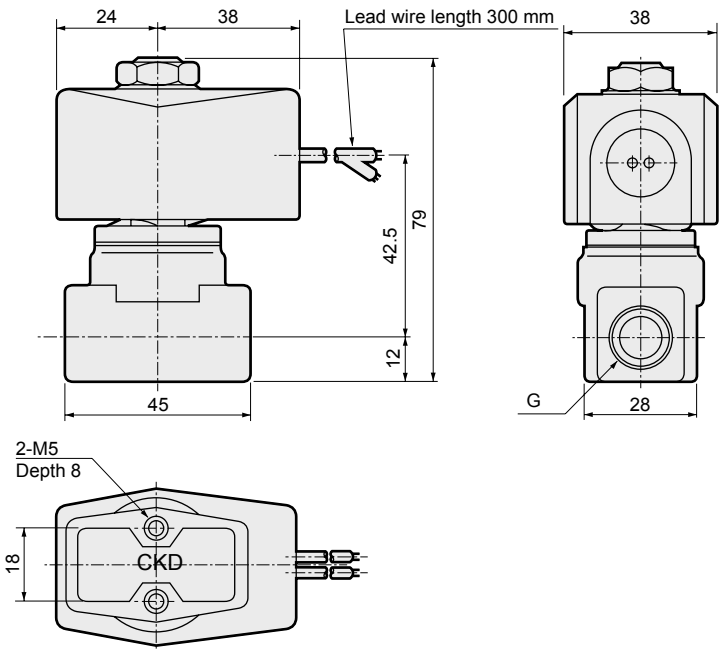


No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./SUS316L/SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO valve	POM(PPS)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M: Polyphenylene sulfide resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel

( ) shows options.

Dimensions: AD11 Series CAD

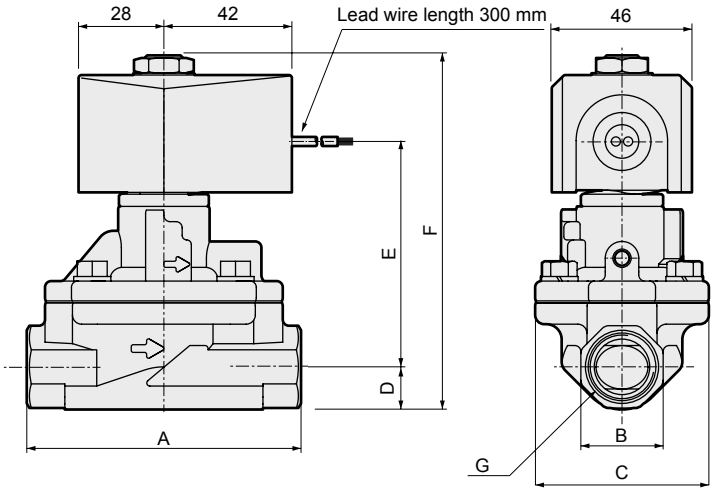
● Open frame lead wire
AD11-8A/10A-* 3A 4A 5A



Model No.	G
AD11-8A-*□A	Rc1/4
AD11-10A-*□A	Rc3/8

*1: The dimensions are the same for port sizes of G and NPT threads.

● Open frame lead wire
AD11-15A/20A/25A-* 3A 4A 5A



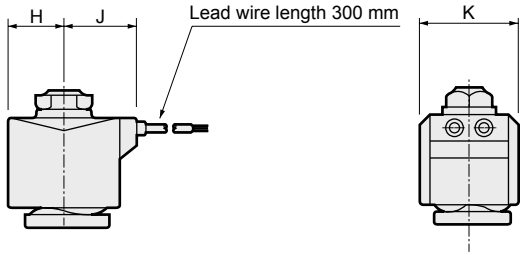
Model No.	A	B	C	D	E	F	G
AD11-15A-*□A	90	27	57	14	73.5	116.5	Rc1/2
AD11-20A-*□A	100	32	65	17	79.5	125.5	Rc3/4
AD11-25A-*□A	110	41	76	20.5	85	134.5	Rc1

*1 : The dimensions are the same for port sizes of G and NPT threads.

Optional dimensions: AD11 Series

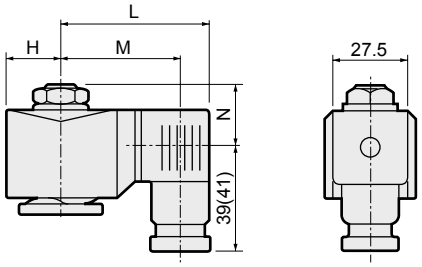
* Refer to the open frame lead wire dimensions on page 278 for common dimensions.

● Grommet lead wire
AD11-8A to 25A-* 2C / 6C



Model No.	H	J	K
AD11-8A to 10A-*2C	20	27	34
AD11-15A to 25A-*2C	23.5	30.5	38
AD11-8A to 25A-*6C	24	30.5	39

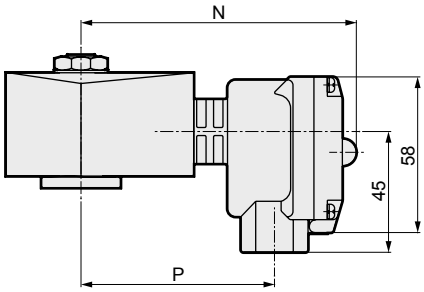
● With DIN terminal box
AD11-8A to 25A-* 2/6 E/G/H



Dimensions shown in ( ) are for G1/2.

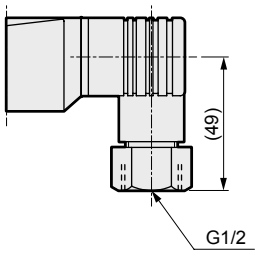
Model No.	H	L	M	N
AD11-8A/10A-*2□-AC	20	62	50.5(50)	20.5
AD11-15A to 25A-*2□-AC	23.5	65.5	54(53.5)	22
AD11-15A to 25A-*2□-DC	23.5	66	54.5(54)	22
AD11-8A to 25A-6□-DC	24	68	56.5(56)	22

● Open frame + HP terminal box
AD11-8A to 25A-* 3/5 M/N/I/J / 4M/4N

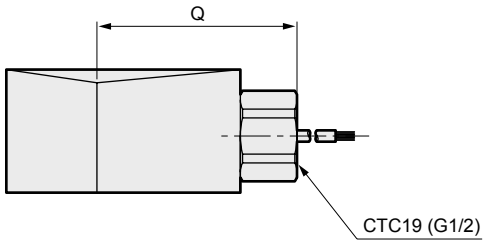


Model No.	N	P
AD11-8A to 10A-*□□	99	68
AD11-15A to 25A-*□□	103	72

● DIN terminal box with small lamp + conduit (G1/2)
AD11-8A to 25A-* 2H H



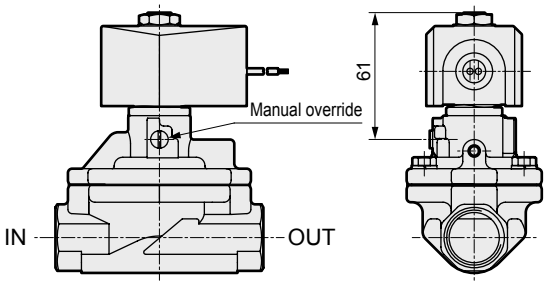
● Open frame + conduit
AD11-8A to 25A-* 3A/4A/5A G/H



Dimensions shown in ( ) are for G1/2.

Model No.	Q
AD11-8A to 10A	53(56)
AD11-15A to 25A	57(60)

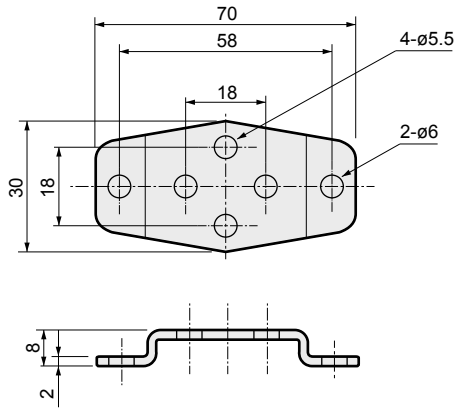
● Manual override (locking)
AD11-15A/20A/25A-*** A



Optional dimensions: AD11 Series

* Refer to the open frame lead wire dimensions on page 278 for common dimensions.

● Mounting plate
AD11-8A/10A-***B

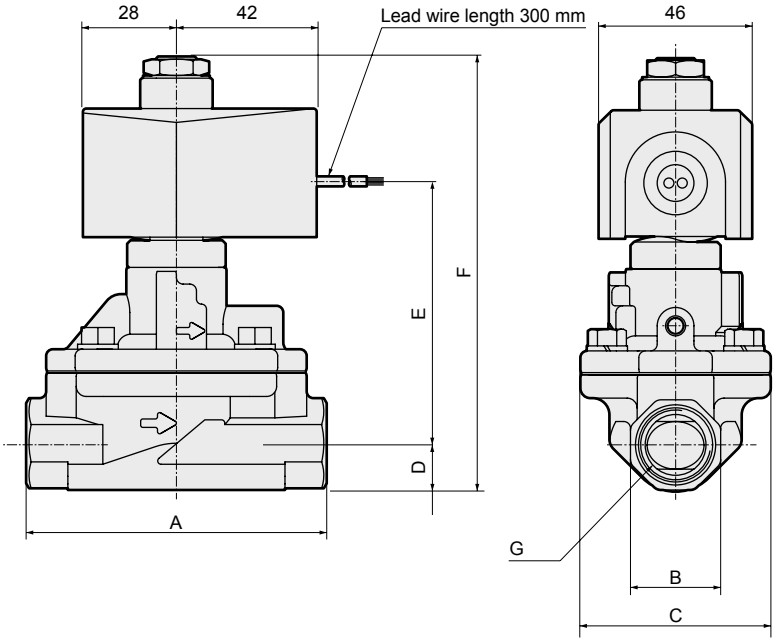


Mounting plate model	Compatibility
AD11-8A-MOUNT-PLATE-KIT	● AD11-8A Series
AD11-10A-MOUNT-PLATE-KIT	● AD11-10A Series

* Material: Steel/Zinc plated
* Mounting plate is not available for port sizes 15 (1/2) to 25 (1).

Dimensions: AD12 Series

● Open frame lead wire
AD12-15A/20A/25A-* 3A / 4A / 5A



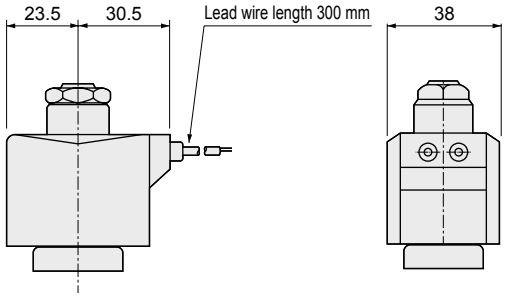
Model No.	A	B	C	D	E	F	G
AD12-15A-*□A	90	27	57	14	77.5	129.5	Rc1/2
AD12-20A-*□A	100	32	65	17	83.5	138.5	Rc3/4
AD12-25A-*□A	110	41	76	20.5	89	147.5	Rc1

*1 : The dimensions are the same for port sizes of G and NPT threads.

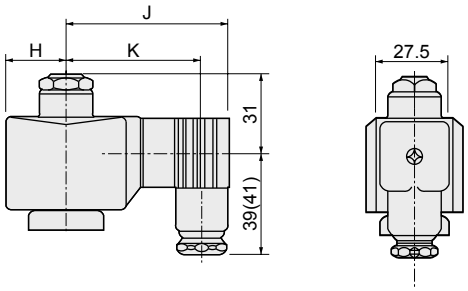
Optional dimensions: AD12 Series

* Refer to the open frame lead wire dimensions on page 280 for common dimensions.

● Grommet lead wire
AD12-15A/20A/25A-* [2C]



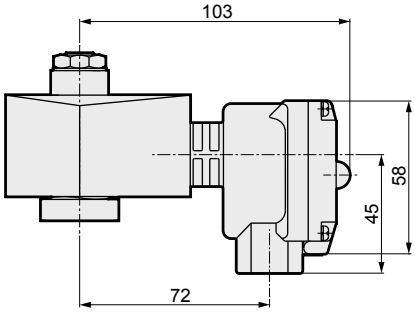
● With DIN terminal box
AD12-15A/20A/25A-* [2E] [2G] [2H]



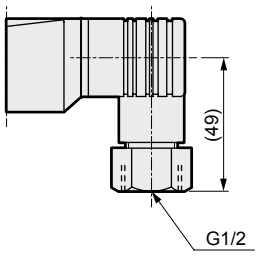
Dimensions shown in ( ) are for G1/2.

Voltage	H	J	K
AC	23.5	65.5	54(53.5)
DC	28	72	60.5(60)

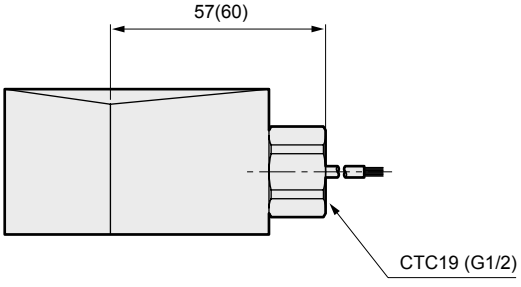
● Open frame + HP terminal box
AD12-15A/20A/25A-* [3 5] [M N I J] / [4M 4N]



● DIN terminal box with small lamp + conduit (G1/2)
AD12-15A/20A/25A-* [2H] [H]

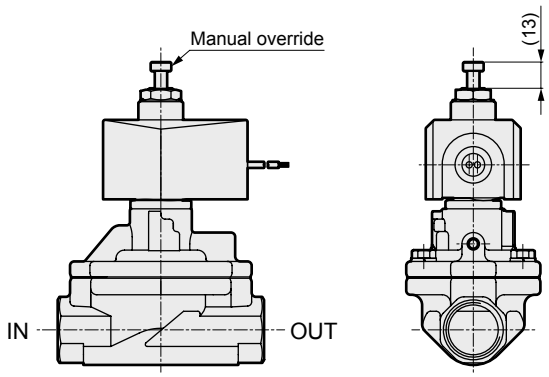


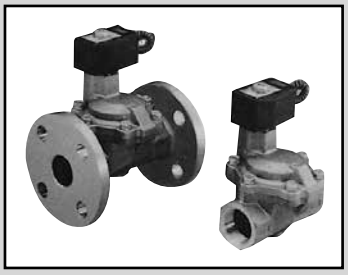
● Open frame + conduit
AD12-15A to 25A-* [3A 4A 5A] [G H]



Dimensions shown in ( ) are for G1/2.

● Manual override (locking)
AD12-15A/20A/25A-*** [A]





Pilot operated 2-port solenoid valve
General purpose

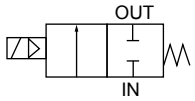
AD21/AD22 Series

- NC (open when energized), NO (closed when energized)
- Port size: Rc1¼ to Rc2, 32 to 50 flange
- Diaphragm drive

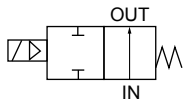
CE Refer to the Ending for details. RoHS CAD

JIS symbol

- AD21: NC (open when energized)



- AD22: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0.02 to 0.7 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 60 (140°F)
Thermal class	Thermal class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Pilot operated poppet, diaphragm drive
Valve seat leakage (*1) cm³/min(ANR)	1 or less (air)
Mounting orientation	Free (within working pressure differential range)
Body/seal material	Bronze/nitrile rubber

*1 : Pneumatic pressure used for measurement is 0.02 to 0.7 MPa for AD21 (NC [open when energized]), and 0.02 to 0.5 MPa for AD22 (NO [closed when energized]).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
NC (open when energized)																	
AD21-32A	Rc1¼	35	0.02 (≈2.9 psi, 0.2 bar)	0.7	0.6	0.7	0.6	0.6	0.6	100 VAC 50/60 Hz *6 200 VAC 50/60 Hz *6 12 VDC 24 VDC 48 VDC 100 VDC	18	15	29	24	6.7/5.7	11 (10.4) *4 (7) *5	3.5
AD21-32F	32 flange																7
AD21-40A	Rc1½	43															4.5
AD21-40F	40 flange																8
AD21-50A	Rc2	53															6
AD21-50F	50 flange																10
NO (closed when energized)																	
AD22-32A	Rc1¼	35	0.02 (≈2.9 psi, 0.2 bar)	0.5	0.5	0.5	0.5	0.5	0.5	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz 12 VDC 24 VDC 48 VDC 100 VDC	22	18	35	29	8.7/6.7	15.5 (14) *4	3.5
AD22-32F	32 flange																7
AD22-40A	Rc1½	43															4.5
AD22-40F	40 flange																8
AD22-50A	Rc2	53															6
AD22-50F	50 flange																10

*1 : The model numbers above show the basic port size. Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : Power consumption of coil housings 2E/2G/2H.
*5 : Power consumption of coil housings 6C/6E/6G/6H.
*6 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications

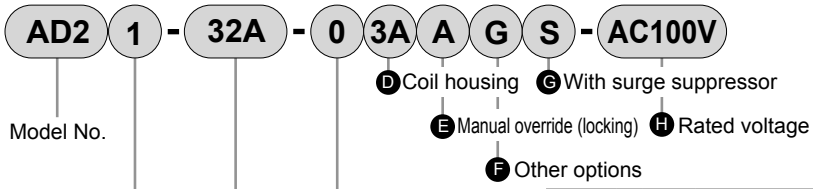
Sealant		Fluoro rubber	
Coil (thermal class)		Class 130 (B)	Class 180 (H)
Fluid temperature	°C	5 to 60	5 to 90
Ambient temperature	°C	-10 to 60	-10 to 100 (*2)
Valve seat leakage (*1)	cm^3/min(ANR)	1 or less (air)	

*1 : Pneumatic pressure used for measurement is 0.02 to 0.7 MPa for AD21 (NC [open when energized]), and 0.02 to 0.5 MPa for AD22 (NO [closed when energized]).
*2 : -10 to 80°C when coil housing is HP terminal box with lamp.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm^2)
NC (open when energized)				
AD21-32A	Rc1 1/4	35	25	460
AD21-32F	32 flange			
AD21-40A	Rc1 1/2	43	34	625
AD21-40F	40 flange			
AD21-50A	Rc2	53	53	975
AD21-50F	50 flange			
NO (closed when energized)				
AD22-32A	Rc1 1/4	35	25	460
AD22-32F	32 flange			
AD22-40A	Rc1 1/2	43	34	625
AD22-40F	40 flange			
AD22-50A	Rc2	53	53	975
AD22-50F	50 flange			

How to order



Code	Description
Ⓐ Actuation	
1	NC (open when energized)
2	NO (closed when energized)

Ⓑ Port size	
32A	Rc1 1/4
32F	32 flange
40A	Rc1 1/2
40F	40 flange
50A	Rc2
50F	50 flange

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
B	Option	Bronze	Fluoro rubber	-	Air/kerosene/oil (up to 90°C*3)
D	Option	Stainless steel	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	-	Air/kerosene/oil (up to 90°C*3)
H	Option	Bronze	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
J	Option	Bronze	Fluoro rubber	Oil-prohibited	Air/kerosene/oil (up to 90°C*3)
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/kerosene/oil (up to 90°C*3)

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓗ

Refer to page 285 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]

AD21-32A-B4A-AC100V

Model : AD21
Ⓐ Actuation : NC (open when energized)
Ⓑ Port size : Rc1 1/4
Ⓒ Body/sealant combination : Body - bronze, sealant - fluoro rubber
Ⓓ Coil housing : Open frame lead wire (thermal class 180(H) coil)
Ⓔ to Ⓖ : None
Ⓗ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]

AD22-40F-02HHS-AC200V

Model : AD22
Ⓐ Actuation : NO (closed when energized)
Ⓑ Port size : 40 flange
Ⓒ Body/sealant combination : Body - bronze, sealant - nitrile rubber
Ⓓ Coil housing : DIN terminal box with small light (Pg11)
Ⓔ Manual override (locking): None
Ⓕ Other options : Conduit G1/2
Ⓖ Surge suppressor : With surge suppressor
Ⓗ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

*1 : The companion flange is JIS B2210 10K. (Flange is not enclosed with the product and must be purchased separately.)
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.

Notes for Ⓒ

*3: When Item Ⓒ 4A/4M/4N is selected.

For Items Ⓓ to Ⓗ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓖ are not required, they should be left blank.

Ⓓ Coil housing			Ⓔ	Ⓕ Other options					Ⓖ	Ⓗ Rated voltage
Description			Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
				A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Std.	Open frame lead wire (IP65 equivalent)	A				G	H	S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2C		Grommet lead wire	A						S	100 VAC, 200 VAC
2E		With DIN terminal box (G1/2)								100 VAC, 200 VAC
2G		With DIN terminal box (Pg11)								12 VDC, 24 VDC, 48 VDC, 100 VDC
2H		DIN terminal box with small lamp (Pg11)						H		100 VAC, 200 VAC, 24 VDC
3M		Open frame: With HP terminal box (G1/2)	A	D	E	F			S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3N		Open frame: HP terminal box with lamp (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I		Open frame: HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		Open frame: HP term box, lamp (IP65, equiv) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A	Option	Open frame (Thermal class 180 (H)): Lead wire	A				G	H	S	100 VAC, 200 VAC
4M		Open frame (Thermal class 180 (H)): With HP terminal box (G1/2)		D	E	F				
4N		Open frame (Thermal class 180 (H)): HP terminal box with lamp (G1/2)								
5A		Open frame (diode integrated): Lead wire (IP65 or equivalent)	A				G	H		100 VAC, 200 VAC
5M		Open frame (diode integrated): With HP terminal box (G1/2)		D	E	F				
5N		Open frame (diode integrated): HP terminal box with lamp (G1/2)								
5I		Open frame (diode integrated): HP terminal box (IP65 or equivalent) (G1/2)								
5J		Open frame (diode integrated): HP term box, lamp (IP65, equiv) (G1/2)								
6C		Grommet lead wire 7W	A						S	12 VDC, 24 VDC
6E		With DIN terminal box (G1/2)7W								
6G		With DIN terminal box (Pg11)7W								
6H		DIN terminal box with small lamp (Pg11)7W						H		24 VDC

⚠ Refer to the following cautions for Ⓓ to Ⓗ.

2C 6C

● Grommet lead wire 300 mm

2E 2G 2H 6E 6G 6H

● DIN terminal box

3A 4A 5A

● Open frame
Lead wire 300 mm
● 4A (Thermal class 180 (H))
● 5A (diode integrated)

3M 3N 4M 4N 5M 5N

● Open frame HP terminal box
● 4M, 4N (Thermal class 180 (H))
● 5M, 5N (diode integrated)

3I 3J 5I 5J

● Open frame HP terminal box
(IP65 or equivalent)
● 5I, 5J (diode integrated)

Refer to page 248 for coil selection.

G H

● Conduit
● G(CTC19)
● H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓓ

*4 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.
*5 : For 6C/6E/6G/6H, only AD21 can be selected.
*6 : The coil housings 6C, 6E and 6G are 12 VDC and 24 VDC dedicated. 6H is 24 VDC dedicated.

Notes for Ⓔ to Ⓖ

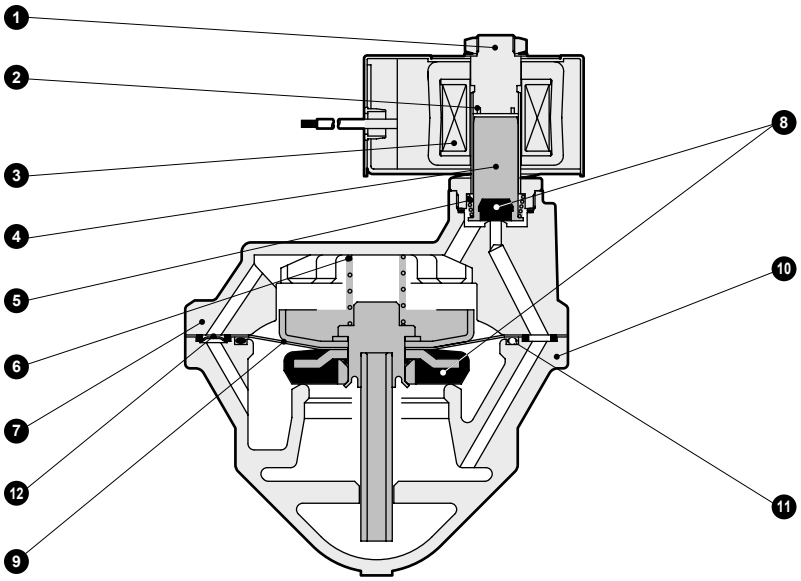
*7 : For Item Ⓕ, select an option from D, E, F, G and H.
*8 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*9 : As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓓ 2H, 6H), so surge suppressor code S cannot be selected.
*10 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) and the coil option 6C/6E/6G/6H are selected.

Notes for Ⓗ

*11 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*12 : For voltages other than above, contact CKD.
*13 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AD21 Series



(The figure shows the closing operation)

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403 *1	Stainless steel
2	Shading coil *2	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel

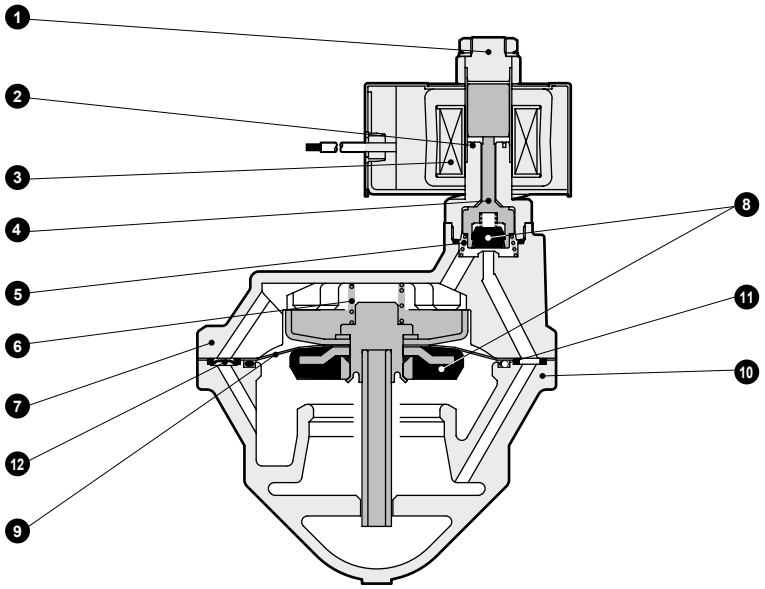
( ) shows options.

*1 : When the body/sealant combination code is other than O and H, or the coil housing code is 6C, 6E, 6G or 6H, the material is SUS405 or equivalent/SUS316L/SUS430.

*2 : No shading coil is used for DC coil or coil with diode.

Internal structure and parts list

● AD22 Series



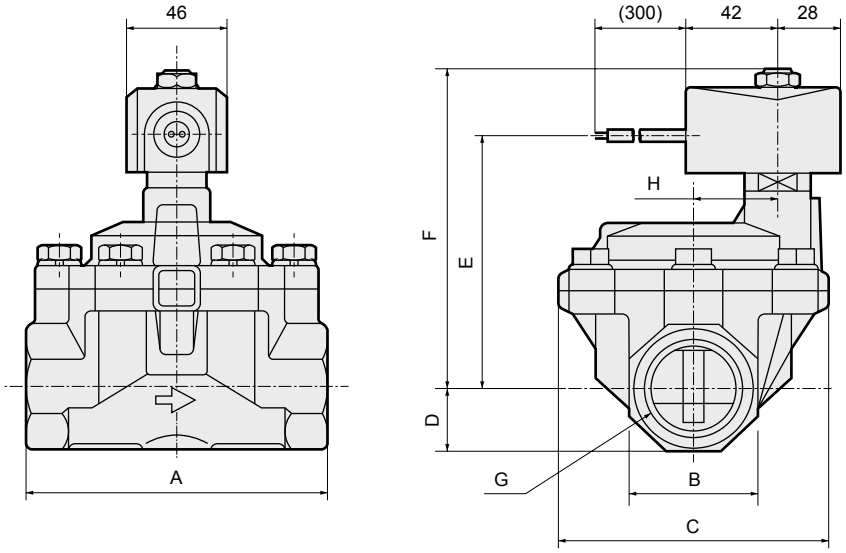
(The figure shows the opening operation)

No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./SUS316L/SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO valve	POM(PPS)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M: Polyphenylene sulfide resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel

( ) shows options.

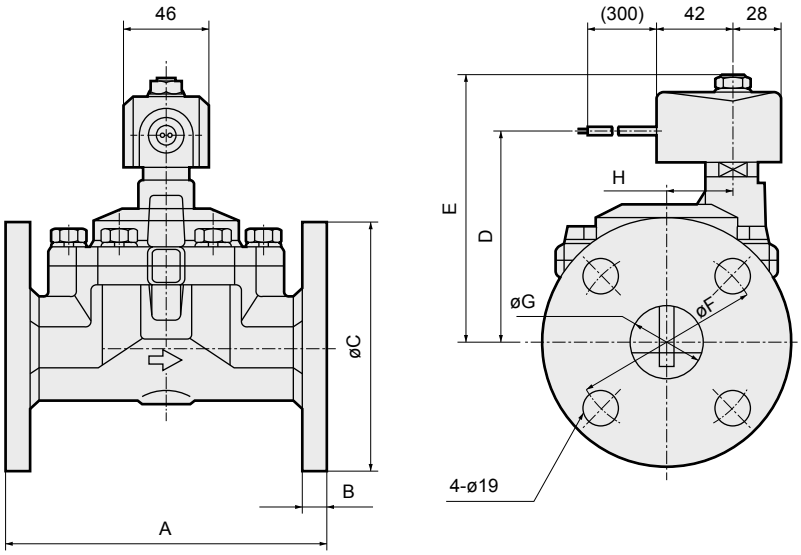
Dimensions: AD21 Series CAD

● Open frame lead wire (Rc screw-in)
AD21-32A/40A/50A-* 3A / 4A / 5A



Model No.	A	B	C	D	E	F	G	H
AD21-32A-*□A	125	54	112	27	107	136	Rc1 1/4	32
AD21-40A-*□A	140	60	122	30	113	142	Rc1 1/2	38
AD21-50A-*□A	160	74	132	37	121	150	Rc2	45

● Open frame lead wire (flange)
AD21-32F/40F/50F-* 3A / 4A / 5A



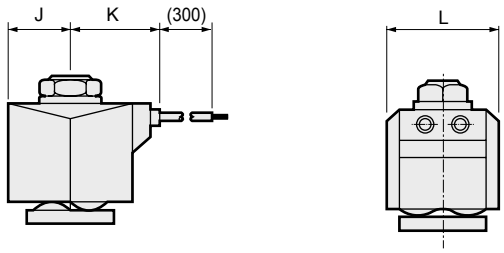
Model No.	A	B	C	D	E	F	G	H
AD21-32F-*□A	170	12	135	107	136	100	36(35)	32
AD21-40F-*□A	180	14	140	113	142	105	42	38
AD21-50F-*□A	180	14	155	121	150	120	53(52)	45

Dimensions shown in ( ) are for stainless steel body.

Optional dimensions: AD21 Series

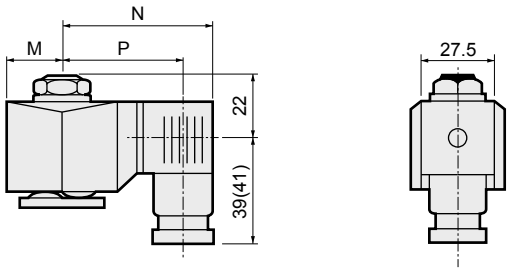
* Refer to the open frame lead wire dimensions on page 288 for common dimensions.

● Grommet lead wire
AD21-32$^{A}_{F}$ to 50$^{A}_{F}$ -* 2C / 6C



Model No.	J	K	L
AD21-32$^{A}_{F}$ to 50$^{A}_{F}$ -*2C	23.5	34.5	38
AD21-32$^{A}_{F}$ to 50$^{A}_{F}$ -*6C	24	30.5	39

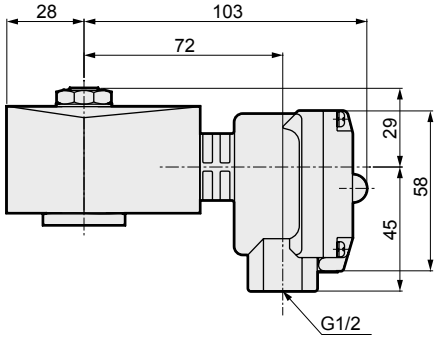
● With DIN terminal box
AD21-32$^{A}_{F}$ to 50$^{A}_{F}$ -* 2/6 E/G/H



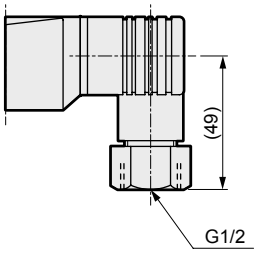
Dimensions shown in ( ) are for G1/2.

Voltage	M	N	P
AC (2E/2G/2H)	23.5	65.5	54(53.5)
DC (2E/2G/2H)	23.5	66	54.5(54)
DC (6E/6G/6H)	24	68	56.5(56)

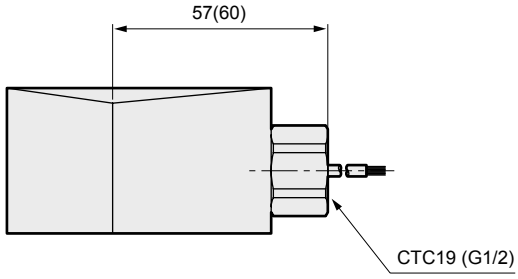
● Open frame + HP terminal box
AD21-32$^{A}_{F}$ to 50$^{A}_{F}$ -* 3/5 M/N/I/J / 4M/4N



● DIN terminal box with small lamp + conduit (G1/2)
AD21-32$^{A}_{F}$ to 50$^{A}_{F}$ -* 2H H

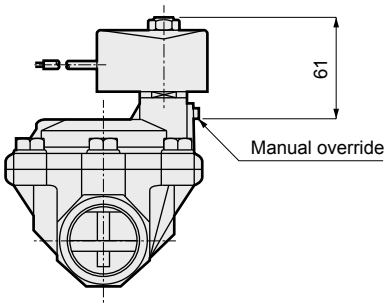


● Open frame + conduit
AD21-32$^{A}_{F}$ to 50$^{A}_{F}$ -* 3A/4A/5A G/H

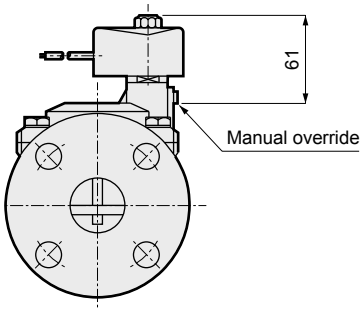


Dimensions shown in ( ) are for G1/2.

● Manual override (locking, Rc screw-in)
AD21-32A/40A/50A-*** A

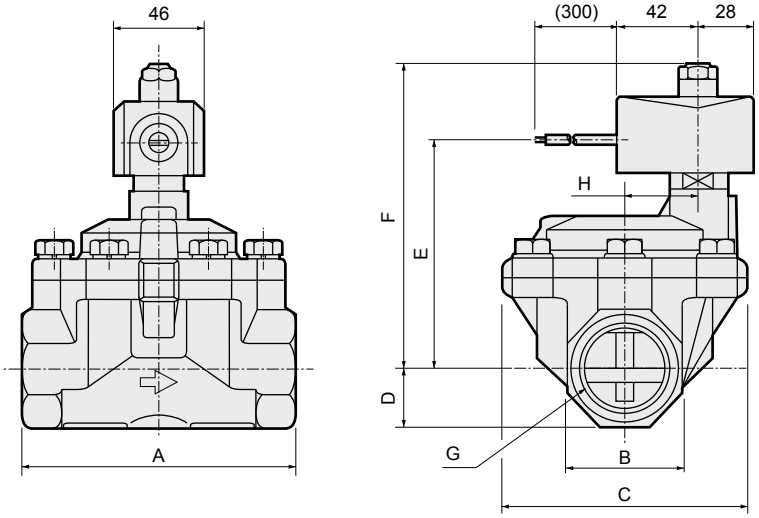


● Manual override (locking, flange)
AD21-32F/40F/50F-*** A



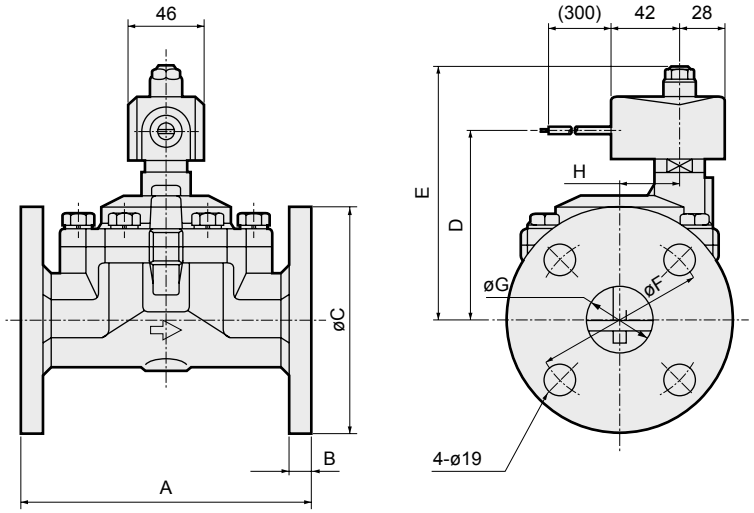
Dimensions: AD22 Series

● Open frame lead wire (Rc screw-in)
AD22-32A/40A/50A-* 3A / 4A / 5A



Model No.	A	B	C	D	E	F	G	H
AD22-32A-*□A	125	54	112	27	111	149.5	Rc1¼	32
AD22-40A-*□A	140	60	122	30	117	155.5	Rc1½	38
AD22-50A-*□A	160	74	132	37	125	163.5	Rc2	45

● Open frame lead wire (flange)
AD22-32F/40F/50F-* 3A / 4A / 5A



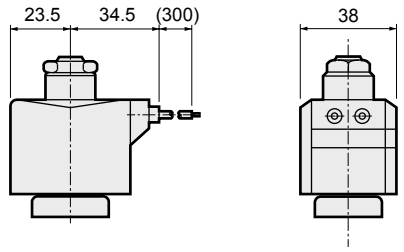
Model No.	A	B	C	D	E	F	G	H
AD22-32F-*□A	170	12	135	111	149.5	100	36(35)	32
AD22-40F-*□A	180	14	140	117	155.5	105	42	38
AD22-50F-*□A	180	14	155	125	163.5	120	53(52)	45

Dimensions shown in ( ) are for stainless steel body.

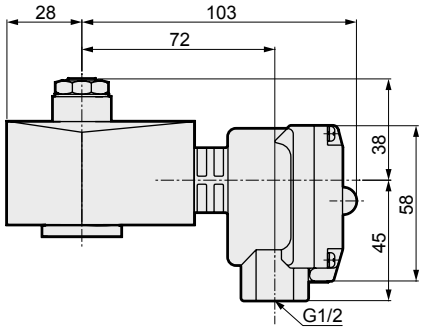
Optional dimensions: AD22 Series

* Refer to the open frame lead wire dimensions on page 290 for common dimensions.

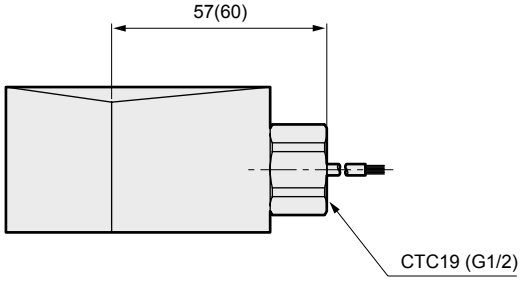
● Grommet lead wire
AD22-32[A/F] to 50[A/F] -* 2C



● Open frame + HP terminal box
AD22-32[A/F] to 50[A/F] -* 3 / 5 | M / N / I / J | / 4M / 4N

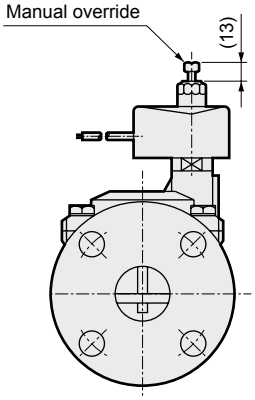


● Open frame + conduit
AD22-32[A/F] to 50[A/F] -* 3A / 4A / 5A | G / H

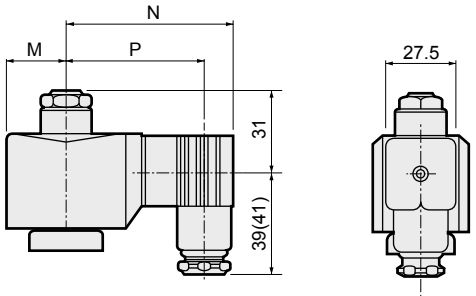


Dimensions shown in ( ) are for G1/2.

● Manual override (locking, flange)
AD22-32F/40F/50F-*** A



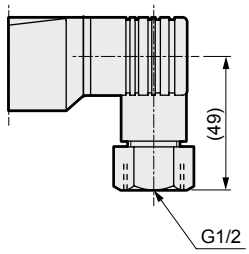
● With DIN terminal box
AD22-32[A/F] to 50[A/F] -* 2E / 2G / 2H



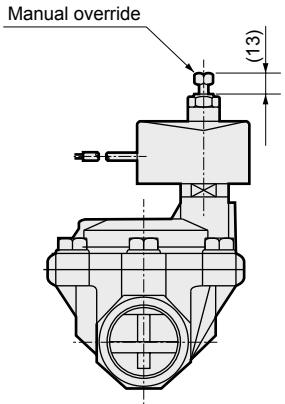
Dimensions shown in ( ) are for G1/2.

Voltage	M	N	P
AC	23.5	65.5	54(53.5)
DC	28	72	60.5(60)

● DIN terminal box with small lamp + conduit (G1/2)
AD22-32[A/F] to 50[A/F] -* 2H H



● Manual override (locking, Rc screw-in)
AD22-32A/40A/50A-*** A



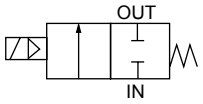
Pilot kick 2-port solenoid valve
General purpose

APK11 Series

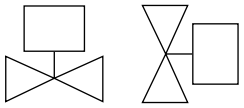
- NC (open when energized)
- Port size: Rc1/4 to Rc1
- Piston drive

CE Refer to the Ending for details. RoHS CAD

JIS symbol



Mounting orientation



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications
Working fluid	Air/low vacuum (1.33 x 10^3 Pa (abs))/water/kerosene/oil (20mm^2/s or less)	Steam
Working pressure differential MPa	0 to 1.0 (refer to max. working pressure differential in individual specifications.)	
Max. working pressure MPa	2 (≈290 psi, 20 bar)	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	4 (≈580 psi, 40 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (*1)	5 (41°F) to 180 (356°F)
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Thermal class	Class 130 (B)	Class 180 (H)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Pilot kick poppet, piston drive	
Valve seat leakage (*2) cm^3/min(ANR)	0.2 or less (air)	400 or less (air)
Mounting orientation	Limited to the range of vertical orientation with the coil on top to horizontal orientation (*3).	
Body/seal material	Bronze/nitrile rubber	Bronze/PTFE

*1 : No freezing.
*2 : Value at pneumatic pressure of 0.05 to 1.0 MPa. When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.
*3 : Limited to vertical orientation when used at a pressure less than 0.05 MPa.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (20 mm^2/s)		Steam		When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
APK11-8A	Rc1/4	12	0	1.0	0.7	1.0	0.7	0.7	0.6	1.0	100 VAC 50/60 Hz *5 200 VAC 50/60 Hz *5 12 VDC 24 VDC 48 VDC 100 VDC	24	19	61	54	10/8	11	0.7
APK11-10A	Rc3/8	12																0.7
APK11-15A	Rc1/2	16			0.6		0.6		0.5			32	26	123	106	13/11	20	1.0
APK11-20A	Rc3/4	23																1.3
APK11-25A	Rc1	28																1.7

*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : The voltage fluctuation range must be within ±10% of the rated voltage.
*3 : Refer to DC column for the max. working pressure differential of coil with diode.
*4 : When using at low vacuum, vacuum the OUT port side.
*5 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications

Sealant		Fluoro rubber		PTFE	
Coil (thermal class)		Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature	°C	5 to 60	5 to 90	-10 to 60 (*1)	5 to 180
Ambient temperature	°C	-10 to 60			
Valve seat leakage (*2)	cm^3/min (ANR)	0.2 or less (air)		400 or less (air)	

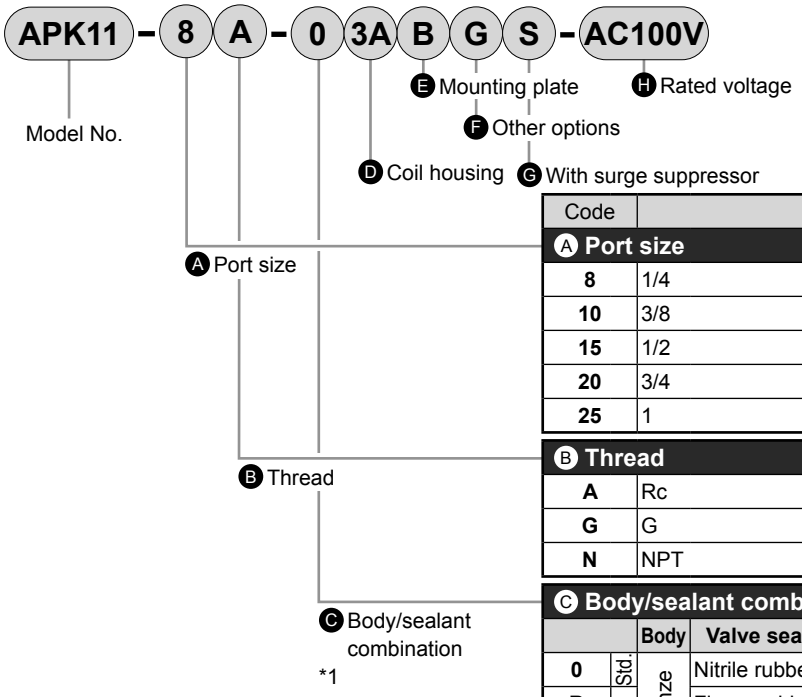
*1 : No freezing.
*2 : Value at pneumatic pressure of 0.05 to 1.0 MPa. When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[dm^3/(s·bar)]	b	Cv	S(mm^2)
APK11-8A	Rc1/4	12	9.4	0.41	2.2	-
APK11-10A	Rc3/8	12	15	0.37	2.7	-
APK11-15A	Rc1/2	16	20	0.31	4.5	-
APK11-20A	Rc3/4	23	-	-	8.6	162
APK11-25A	Rc1	28	-	-	12	231

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order



Code	Description
A Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1

B Thread	
A	Rc
G	G
N	NPT

C Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
B	Option	Bronze	Fluoro rubber	Fluoro rubber	-	Air/low vacuum/kerosene/oil (When 4A/4M/4N is selected, up to 90°C)
C	Option	Bronze	PTFE	Fluoro rubber (*1)	-	Steam (When 4A/4M/4N is selected)
D	Option	Stainless steel	Nitrile rubber	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	Fluoro rubber	-	Air/low vacuum/kerosene/oil (When 4A/4M/4N is selected, up to 90°C)
F	Option	Stainless steel	PTFE	PTFE (*1)	-	Steam (When 4A/4M/4N is selected)
H	Option	Bronze	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
J	Option	Bronze	Fluoro rubber	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene/oil (When 4A/4M/4N is selected, up to 90°C)
K	Option	Bronze	PTFE	Fluoro rubber (*1)	Oil-prohibited	Steam (When 4A/4M/4N is selected)
L	Option	Stainless steel	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene/oil (When 4A/4M/4N is selected, up to 90°C)
N	Option	Stainless steel	PTFE	PTFE (*1)	Oil-prohibited	Steam (When 4A/4M/4N is selected)

Refer to Intro Page 39 for reference on material combinations.

D to H

Refer to page 295 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]
APK11-20A-02C-AC100V
Model : APK11
A Port size : 3/4
B Thread : Rc
C Body/sealant combination
: Body - bronze, valve seal - nitrile rubber
O-ring - nitrile rubber
D Coil housing : Grommet lead wire
F to I : None
J Rated voltage : 100 VAC 50/60 Hz,
110 VAC 60 Hz

[Example of model No. 2]
APK11-10G-C4ABS-AC200V
Model : APK11
A Port size : 3/8
B Thread : G
C Body/sealant combination
: Body - bronze, valve seal - PTFE,
O-ring - fluoro rubber
D Coil housing : Open frame lead wire (thermal class 180(H) coil)
E Mounting plate : With mounting plate
F Other options : None
G Surge suppressor : With surge suppressor
H Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for C

*1 : When using the PTFE valve seal with thermal class 180(H) coil, the O-ring material is fluoro rubber for steam.

For Items Ⓓ to Ⓗ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓖ are not required, they should be left blank.

Ⓓ Coil housing				Ⓔ	Ⓕ Other options					Ⓖ	Ⓗ Rated voltage
Description				Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
2C	Std.	Grommet lead wire		B *3						S	100 VAC, 200 VAC
2E	Option	With DIN terminal box	(G1/2)								
2G		With DIN terminal box	(Pg11)								
2H		DIN terminal box with small lamp	(Pg11)						H		
3A		Open frame	Lead wire (IP65 or equivalent)	B *3				G	H	S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3M			With HP terminal box (G1/2)		D	E	F				
3N			HP terminal box with lamp (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP term box, lamp (IP65, equiv) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	B *3				G	H	S	100 VAC, 200 VAC
4M			With HP terminal box (G1/2)		D	E	F				
4N			HP terminal box with lamp (G1/2)								
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)	B *3				G	H		100 VAC, 200 VAC
5M			With HP terminal box (G1/2)		D	E	F				
5N			HP terminal box with lamp (G1/2)								
5I			HP terminal box (IP65 or equivalent) (G1/2)								
5J			HP term box, lamp (IP65, equiv) (G1/2)								

Refer to the following cautions for Ⓓ to Ⓗ.

2C		● Grommet lead wire 300 mm
2E 2G 2H		● DIN terminal box
3A 4A 5A		● Open frame Lead wire 300mm ● 4A (Thermal class 180 (H)) ● 5A (diode integrated)
3M 3N 4M 4N 5M 5N		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

G H		● Conduit ● G(CTC19) ● H(G1/2)

Refer to page 249 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓓ

*2 : Coils for 5A/5M/5N have a diode to convert AC to DC voltage.

Notes for Ⓔ to Ⓖ

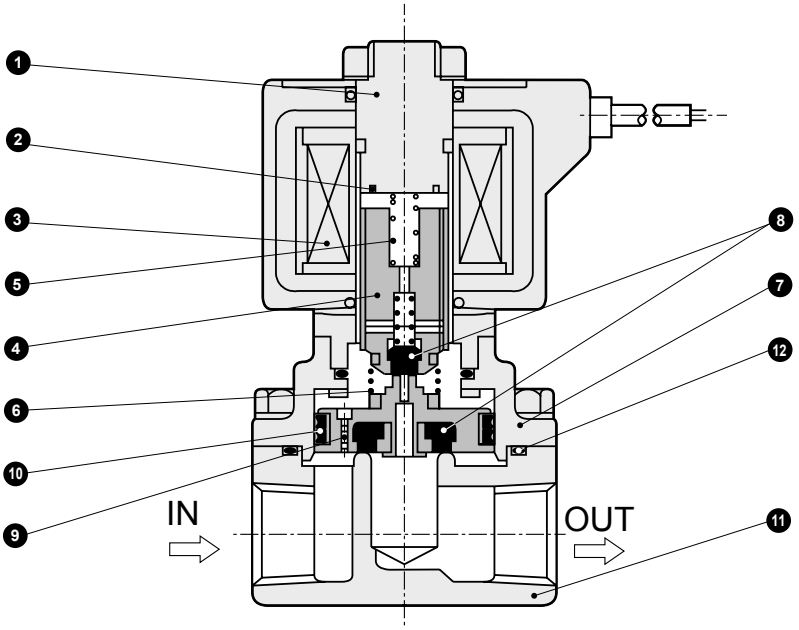
*3 : The mounting plate (Item Ⓔ B) can be mounted only on Item Ⓐ (port size) 8 (1/4) or 10 (3/8).
*4 : For Item Ⓕ, select an option from D, E, F, G and H.
*5 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*6 : Surge suppressor is incorporated as standard in the coil with diode.
*7 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.

Notes for Ⓗ

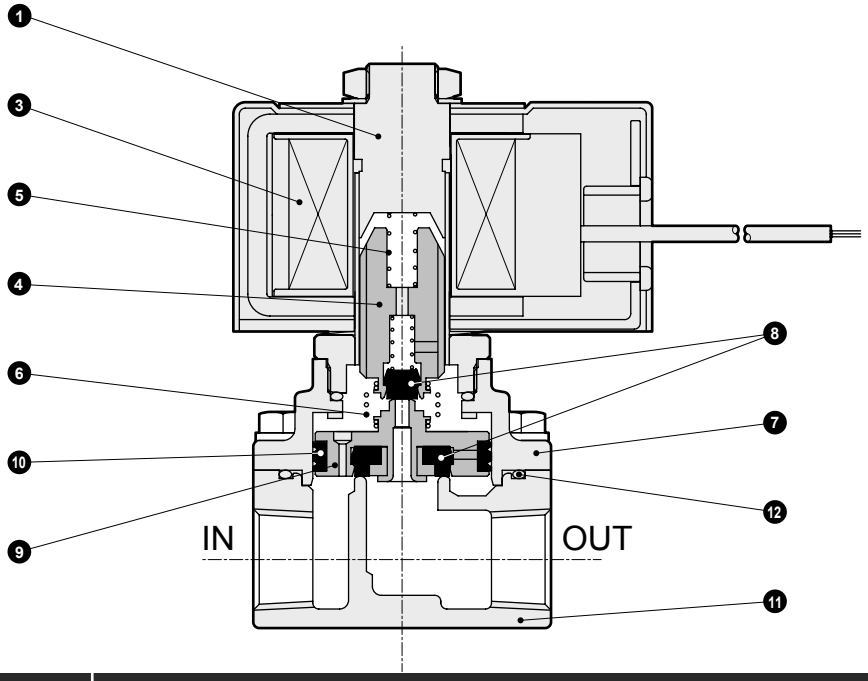
*8 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*9 : For voltages other than above, contact CKD.
*10 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● APK11-8A/10A (AC)



● APK11-8A/10A (DC/diode integrated)

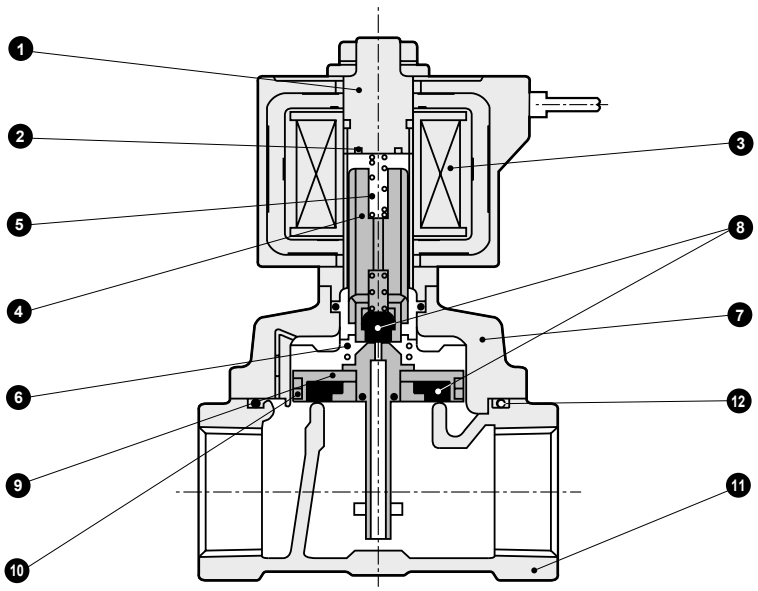


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403 *1	Stainless steel
2	Shading coil *2	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger assembly	SUS405 or equiv./SUS304/NBR (SUS405 or equiv./SUS304/FKM, PFA or PTFE)	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Kick spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)
9	Main valve assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM or PTFE)	Stainless steel
10	Seal ring set	SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	O-ring	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)

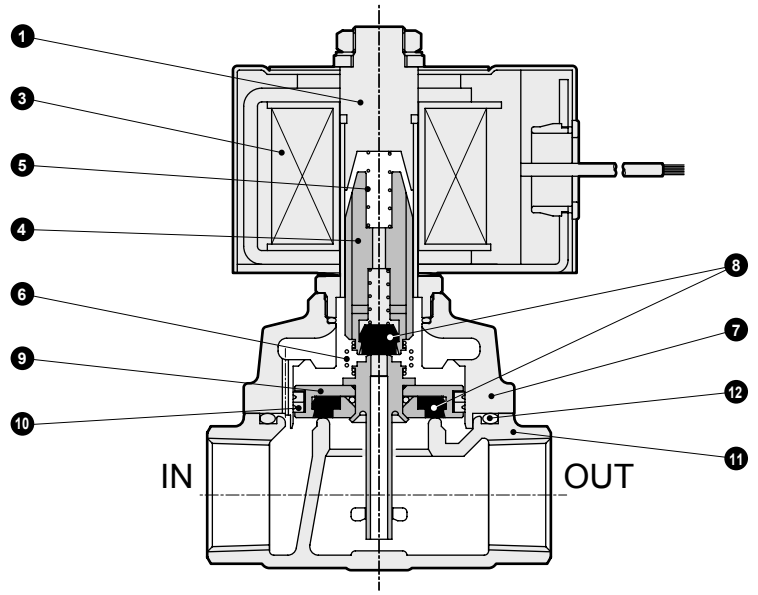
( ) shows options.
*1 : When the body/sealant combination is other than O and H: SUS405 or equivalent/SUS316L/SUS430.
*2 : No shading coil is used for DC coil or coil with diode.

Internal structure and parts list

● APK11-15A/20A/25A (AC)



● APK11-15A/20A/25A (DC/diode integrated)

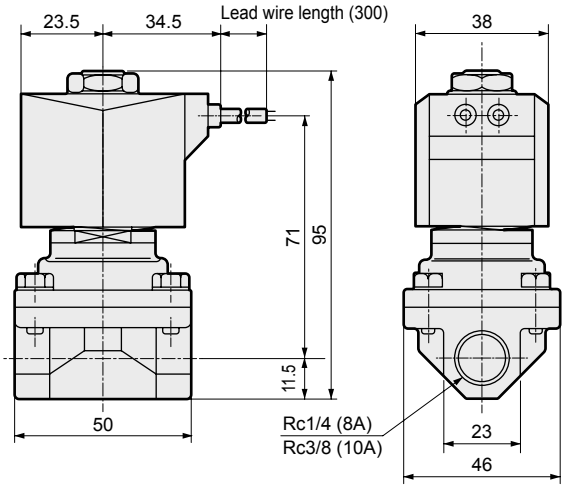


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403 *1	Stainless steel
2	Shading coil *2	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger assembly	SUS405 or equiv./SUS304/NBR (SUS405 or equiv./SUS304/FKM, PFA or PTFE)	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Kick spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)
9	Main valve assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM or PTFE)	Stainless steel
10	Seal ring set	SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	O-ring	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)

( ) shows options.
*1 : When the body/sealant combination is other than O and H: SUS405 or equivalent/SUS316L/SUS430.
*2 : No shading coil is used for DC coil or coil with diode.

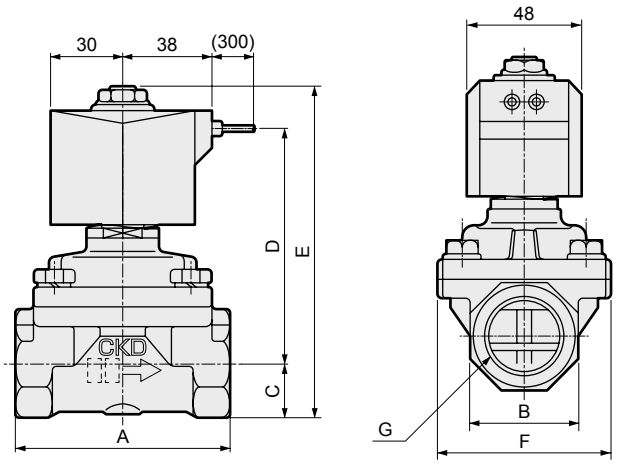
Dimensions

● Grommet lead wire
APK11-8A/10A-*2C



*1: The dimensions are the same for port sizes of G and NPT threads.

● Grommet lead wire
APK11-15A/20A/25A-*2C



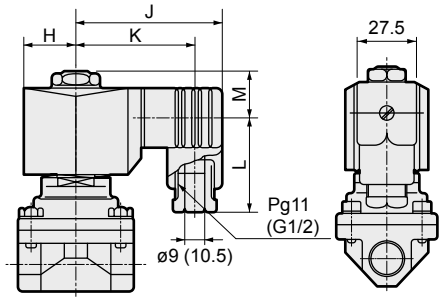
*1: The dimensions are the same for port sizes of G and NPT threads.
*2: Dimensions shown in ( ) are for stainless steel body.

Model No.	A	B	C	D	E	F	G
APK11-15A-*2C	71	27 (29)	14.5	89	119.5	50	Rc1/2
APK11-20A-*2C	80	32 (35)	17.5	93	126.5	60	Rc3/4
APK11-25A-*2C	90	41 (45)	21.5 (22.5)	99	136.5 (137.5)	71	Rc1

Optional dimensions

* Refer to the dimensions of grommet lead wire above for common dimensions.

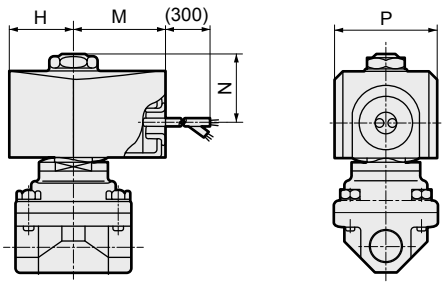
● With DIN terminal box
APK11-8A to 25A-* 2E / 2G / 2H



Dimensions shown in ( ) are for G1/2.

Model No.	H	J	K	L	M
APK11-8A/10A	23.5	65.5	54 (53.5)	39 (41)	22
APK11-15A/20A/25A	30	73	61.5 (61)	39 (41)	24

● Open frame lead wire
APK11-8A to 25A-* 3A / 4A / 5A



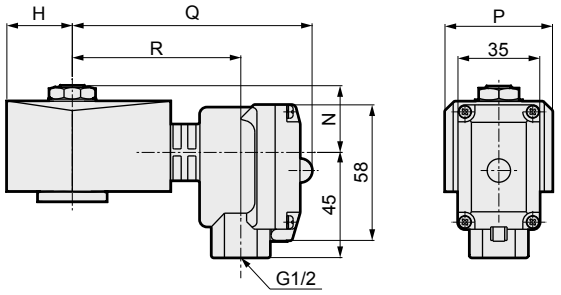
Model No.	H	M	N	P
APK11-8A/10A	28	42	29	46
APK11-15A/20A/25A	34	46	33	56

Optional dimensions

CAD

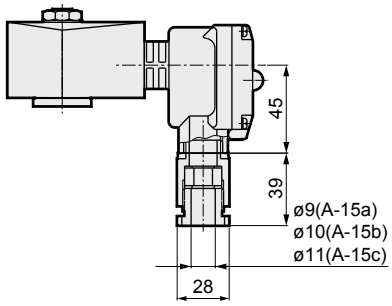
* Refer to the dimensions of grommet lead wire on page 298 for common dimensions.

● Open frame + HP terminal box
APK11-8A to 25A-* [3/4/5] [M/N]

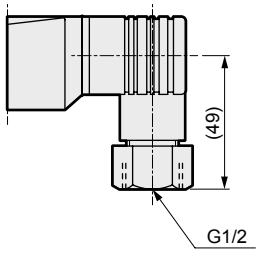


Model No.	H	N	P	Q	R
APK11-8A/10A	28	29	46	103	72
APK11-15A/20A/25A	34	33	56	98	68

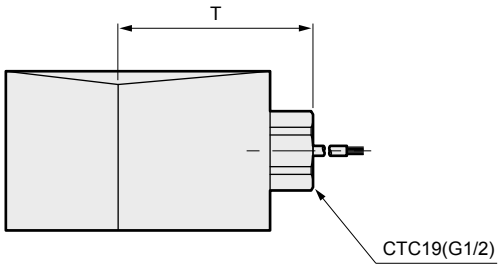
● Open frame + cable gland
APK11-8A to 25A-* [3/4/5] [M/N] [D/E/F]



● DIN terminal box with small lamp + conduit (G1/2)
APK11-8A to 25A-* [2H] [H]



● Open frame + conduit
APK11-8A to 25A-* [3A/4A/5A] [G/H]

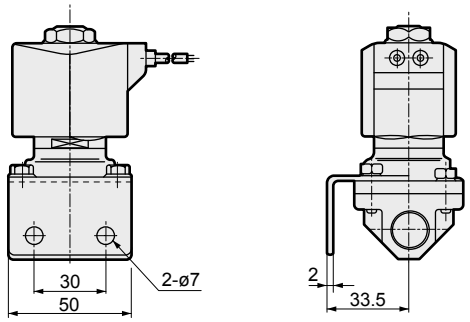


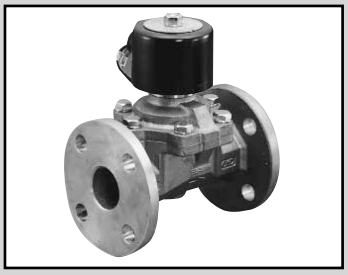
Dimensions shown in ( ) are for G1/2.

Model No.	T
APK11-8A/10A	57(60)
APK11-15A to 25A	59(62)

● Mounting plate
APK11-8A/10A-*** [B]

Material: Steel
Zinc plated





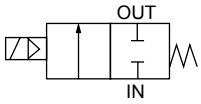
Pilot kick 2-port solenoid valve
General purpose

APK21 Series

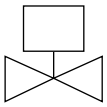
- NC (open when energized)
- Port size: Rc1¼ to Rc2, 32 to 50 flange
- Piston drive

RoHS CAD

JIS symbol



Mounting orientation



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications
Working fluid	Air/low vacuum (1.33 x 10^3 Pa (abs))/water/kerosene/oil (20mm^2/s or less)	Steam
Working pressure differential MPa	0 to 0.7 (refer to max. working pressure differential in individual specifications.)	
Max. working pressure MPa	1 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (*1)	5 (41°F) to 180 (356°F)
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Thermal class	Class 130 (B)	Class 180 (H)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Pilot kick poppet, piston drive	
Valve seat leakage (*2) cm^3/min(ANR)	1 or less (air)	800 or less (air)
Mounting orientation	Limited to vertical orientation with the coil on top	
Body/seal material	Bronze/nitrile rubber	Bronze/PTFE

*1 : No freezing.
*2 : Value at pneumatic pressure of 0.05 to 0.7 MPa. When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)							Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (20 mm^2/s)		Steam		When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
APK21-32A	Rc1¼	35	0	0.7	0.6	0.7	0.6	0.5	0.5	0.7	100 VAC 50/60 Hz	64	69	274	289	44/48	20	4.5
APK21-32F	32 flange										200 VAC 50/60 Hz							8
APK21-40A	Rc1½	43									12 VDC							5.5
APK21-40F	40 flange										24 VDC							9
APK21-50A	Rc2	53									48 VDC							7
APK21-50F	50 flange										100 VDC							11.5

*1 : The model numbers above are for the basic port size. Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : When using at low vacuum, vacuum the OUT port side.

Optional specifications

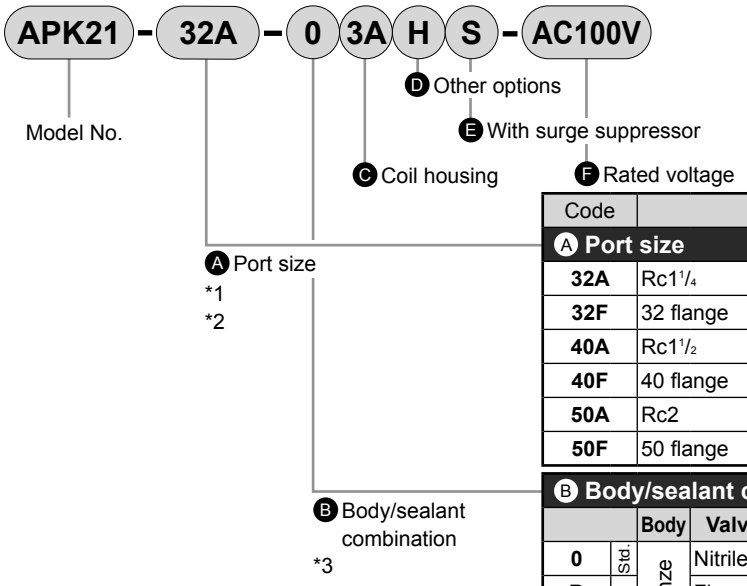
Sealant	Fluoro rubber		PTFE	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature °C	5 to 60	5 to 90	-10 to 60 (*1)	5 to 180
Ambient temperature °C	-10 to 60			
Valve seat leakage (*2) cm^3/min (ANR)	1 or less (air)		800 or less (air)	

*1 : No freezing.
*2 : Value at pneumatic pressure of 0.05 to 0.7 MPa. When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm^2)
APK21-32A	Rc1 1/4	35	25	460
APK21-32F	32 flange			
APK21-40A	Rc1 1/2	43	34	625
APK21-40F	40 flange			
APK21-50A	Rc2	53	53	975
APK21-50F	50 flange			

How to order



Code	Description
Ⓐ Port size	
32A	Rc1¼
32F	32 flange
40A	Rc1½
40F	40 flange
50A	Rc2
50F	50 flange

Ⓑ Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
B	Option	Bronze	Fluoro rubber	Fluoro rubber	-	Air/vac/kerosene/oil (for 4A,4M,4N: ≤ 90°C)
C	Option	Bronze	PTFE	Fluoro rubber (*3)	-	Steam (When 4A/4M/4N is selected)
D	Option	Stainless steel	Nitrile rubber	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	Fluoro rubber	-	Air/vac/kerosene/oil (for 4A,4M,4N: ≤ 90°C)
F	Option	Stainless steel	PTFE	PTFE (*3)	-	Steam (When 4A/4M/4N is selected)
H	Option	Bronze	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
J	Option	Bronze	Fluoro rubber	Fluoro rubber	Oil-prohibited	Air/vac/kerosene/oil (for 4A,4M,4N: ≤ 90°C)
K	Option	Bronze	PTFE	Fluoro rubber (*3)	Oil-prohibited	Steam (When 4A/4M/4N is selected)
L	Option	Stainless steel	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Fluoro rubber	Oil-prohibited	Air/vac/kerosene/oil (for 4A,4M,4N: ≤ 90°C)
N	Option	Stainless steel	PTFE	PTFE (*3)	Oil-prohibited	Steam (When 4A/4M/4N is selected)

Refer to Intro Page 39 for reference on material combinations.

Ⓒ to Ⓕ

Refer to page 303 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]

APK21-32F-03A-DC24V

Model : APK21
Ⓐ Port size : 32 flange
Ⓑ Body/sealant combination
: Body - bronze, valve seal - nitrile rubber
O-ring - nitrile rubber
Ⓒ Coil housing : Open frame lead wire
Ⓓ Ⓔ : None
Ⓕ Rated voltage : 24 VDC

[Example of model No. 2]

APK21-50F-B4MD-AC100V

Model : APK21
Ⓐ Port size : 50 flange
Ⓑ Body/sealant combination
: Body - bronze, valve seal - fluoro rubber
O-ring - fluoro rubber
Ⓒ Coil housing : Open frame
(Thermal class 180 (H) coil)
HP terminal box (G1/2)
Ⓓ Other options : Cable gland A-15a
Ⓔ Surge suppressor : None
Ⓕ Rated voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The companion flange is JIS B2210 10K. (Flange is not enclosed with the product and must be purchased separately.)
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.

Notes for Ⓑ

*3 : When using the PTFE valve seal with thermal class 180(H) coil, the O-ring material is fluoro rubber for steam.

For Items Ⓒ to Ⓕ, the combinations indicated with codes are available.
Note that if options for Items Ⓓ and Ⓔ are not required, they should be left blank.

Ⓒ Coil housing				Ⓓ Other options				Ⓔ	Ⓕ Rated voltage
Description				Cable gland (marine cable gland)			Conduit (conduit piping)	With surge suppressor	Description
				A-15a	A-15b	A-15c	G1/2		
3A	Std.	Open frame	Lead wire (IP65 or equivalent)				H	S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3M	Option		With HP terminal box (G1/2)	D	E	F			
3N			HP terminal box with lamp (G1/2)						100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire				H	S	100 VAC, 200 VAC
4M			With HP terminal box (G1/2)	D	E	F			
4N			HP terminal box with lamp (G1/2)						
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)				H		100 VAC, 200 VAC
5M			With HP terminal box (G1/2)	D	E	F			
5N			HP terminal box with lamp (G1/2)						

⚠ Refer to the following cautions for Ⓒ to Ⓕ.

3A 4A 5A

- Open frame lead wire 300 mm
- With CTC19 thread for direct conduit piping

H

- Conduit (G1/2)

3M 3N 4M 4N 5M 5N

- Open frame HP terminal box
- 4M, 4N (Thermal class 180 (H))
- 5M, 5N (diode integrated)

Refer to page 250 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓒ

*4 : Coils for 5A/5M/5N have a diode to convert AC to DC voltage.

Notes for Ⓓ/Ⓔ

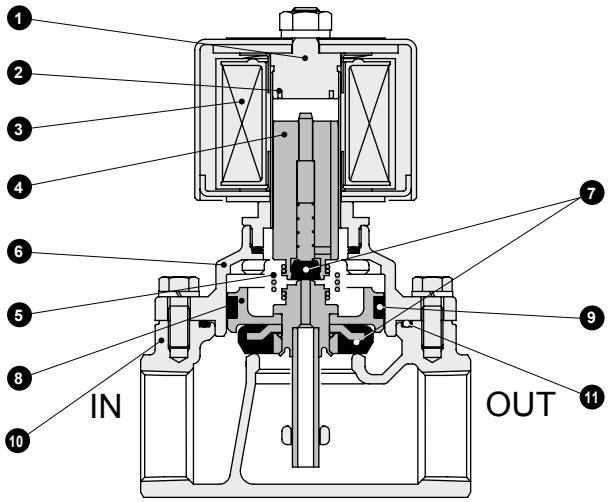
*5 : For Item Ⓓ, select an option from D, E, F and H.
*6 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*7 : Surge suppressor is incorporated as standard in the coil with diode.
*8 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.

Notes for Ⓕ

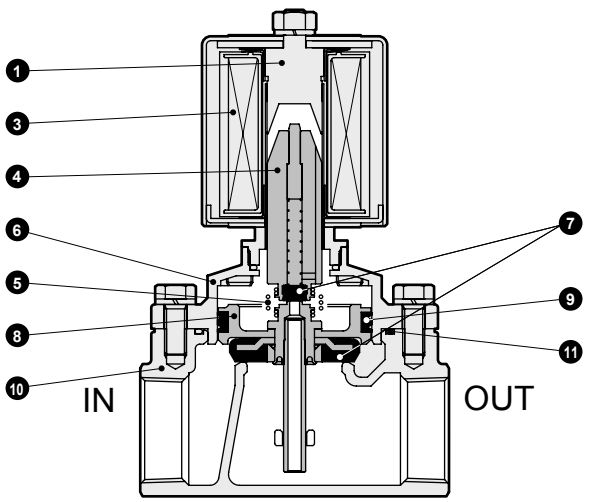
*9 : For voltages other than above, contact CKD.
*10 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● APK21-32A/40A/50A (AC)



● APK21-32A/40A/50A (DC/diode integrated)

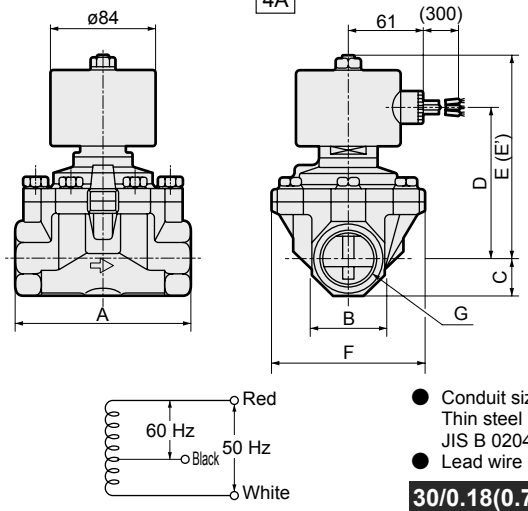


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil *1	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger assembly	SUS405 or equiv./SUS304/C3604/NBR (SUS405 or equiv./SUS304/FKM, PFA or PTFE)	Stainless steel
5	Kick spring	SUS304	Stainless steel
6	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
7	Seal	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)
8	Main valve assembly	SUS303/SUS304/C3604/NBR (SUS303/SUS304/FKM or PTFE)	Stainless steel/copper alloy (stainless steel)
9	Seal ring set	SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
10	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
11	O-ring	NBR(FKM, PTFE)	Nitrile rubber (fluoro rubber or tetrafluoroethylene resin)

( ) shows options.
*1 : No shading coil is used for DC coil or coil with diode.

Dimensions CAD

● Open frame lead wire (Rc screw-in)
APK21-32A/40A/50A-* 3A 4A



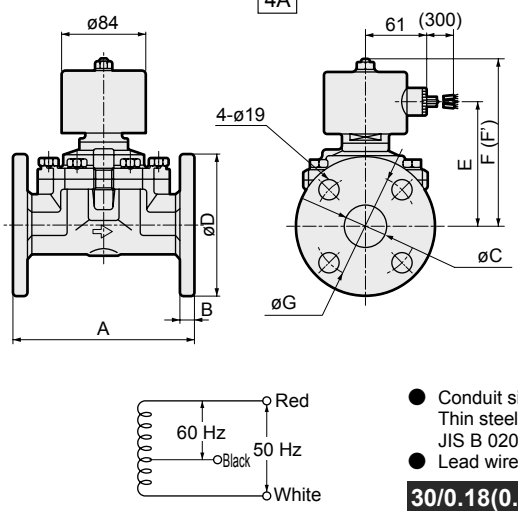
● Conduit size
Thin steel conduit thread
JIS B 0204 CTC19
● Lead wire

30/0.18(0.75 mm²)	
Length	300 mm

The dimension (E') applies only to the APK21-32A/40A/50A-*3A DC specifications.

Model No.	A	B	C	D	E	E'	F	G
APK21-32A-*□A	125	54	27	116.5	158.5	183.5	112	Rc1¼
APK21-40A-*□A	140	60	30	123.5	165.5	190.5	122	Rc1½
APK21-50A-*□A	160	74	37	132.5	174.5	199.5	132	Rc2

● Open frame lead wire (flange)
APK21-32F/40F/50F-* 3A 4A



● Conduit size
Thin steel conduit thread
JIS B 0204 CTC19
● Lead wire

30/0.18(0.75 mm²)	
Length	300 mm

The dimension (F') applies only to the APK21-32F/40F/50F-*3A DC specifications.

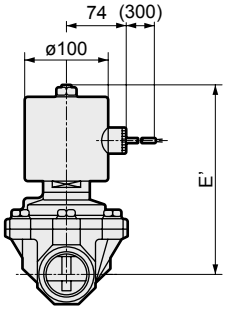
Model No.	A	B	C	D	E	F	F'	G
APK21-32F-*□A	170	12	36(35)	135	116.5	158.5	183.5	100
APK21-40F-*□A	180	14	42	140	123.5	165.5	190.5	105
APK21-50F-*□A	180	14	53(52)	155	132.5	174.5	199.5	120

Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

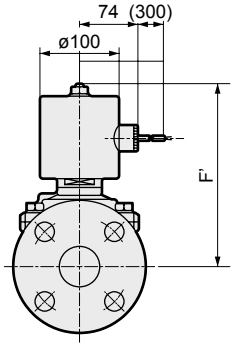
* Refer to the open frame lead wire dimensions on page 304 for common dimensions.

● Open frame diode integrated lead wire (Rc screw-in)
APK21-32A/40A/50A-* 5A



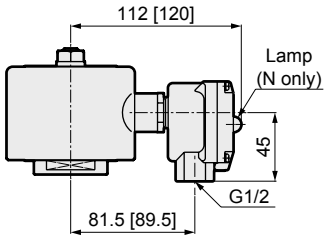
Model No.	E'
APK21-32A-*5A	183.5
APK21-40A-*5A	190.5
APK21-50A-*5A	199.5

● Open frame diode integrated lead wire (flange)
APK21-32F/40F/50F-* 5A



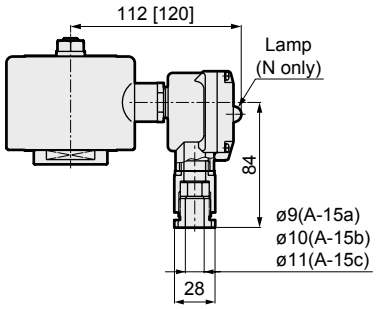
Model No.	F'
APK21-32F-*5A	183.5
APK21-40F-*5A	190.5
APK21-50F-*5A	199.5

● Open frame + HP terminal box
APK21-32A/F to 50A/F -* 3/4/5 M/N



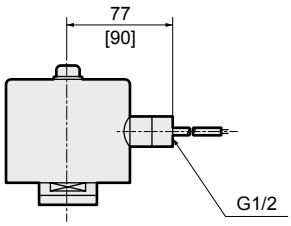
[ ] shows APK21-32A/F to 50A/F -*5 M/N type.

● Open frame + cable gland
APK21-32A/F to 50A/F -* 3/4/5 M/N D/E/F



[ ] shows APK21-32A/F to 50A/F -*5 M/N type.

● Open frame + conduit
APK21-32A/F to 50A/F -* 3A/4A/5A H



[ ] shows APK21-32A/F to 50A/F -*5 M/N type.

Pilot kick 2-port solenoid valve
General purpose

ADK11/ADK12 Series

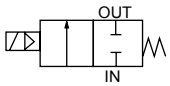
- NC (open when energized), NO (closed when energized)
- Port size: Rc1/4 to Rc1
- Diaphragm drive

CE Excluding ADK12
Refer to the Ending for details.

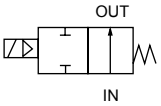
RoHS CAD

JIS symbol

- ADK11: NC (open when energized)



- ADK12: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications	Optional specifications
Working fluid	Air/low vacuum (1.33 x 10^3 Pa (abs))/water/kerosene/oil (50mm^2/s or less)	Hot water
Working pressure differential MPa	0 to 1.0 (refer to max. working pressure differential in individual specifications.)	
Max. working pressure MPa	2 (≈290 psi, 20 bar)	
Proof pressure (water pressure) MPa	4 (≈580 psi, 40 bar)	
Fluid temperature (*1) °C	-10 (14°F) to 60 (140°F)	-10 (14°F) to 90 (194°F)
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Thermal class	Class 130 (B)	Class 180 (H)
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Pilot kick poppet, diaphragm drive	
Valve seat leakage (*2) cm^3/min(ANR)	1 or less (air)	
Mounting orientation	Unrestricted	
Body/seal material	Bronze/nitrile rubber	Bronze/ethylene propylene rubber

*1 : No freezing.
*2 : Pneumatic pressure used for measurement is 0.02 to 1.0 MPa for ADK11 (NC [open when energized]), and 0.02 to 0.6 MPa for ADK12 (NO [closed when energized]).
When used at a pressure less than 0.02 MPa, the operation or sealant may be unstable. Contact CKD in this case.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa) Air AC	Air DC	Water/kerosene AC	Water/kerosene DC	Oil (50 mm^2/s) AC	Oil (50 mm^2/s) DC	Rated voltage	Apparent power (VA) When holding 50 Hz	When holding 60 Hz	When starting 50 Hz	When starting 60 Hz	Power consump (W) AC 50/60 Hz	Power consump (W) DC	Weight (kg)
NC (open when energized)																	
ADK11-8A	Rc1/4	12	0	1	0.7	1	0.7	0.7	0.6	100 VAC 50/60 Hz *8	24	19	61	54	10/8	11*2 (10.4)	0.65
ADK11-10A	Rc3/8	12															0.65
ADK11-15A	Rc1/2	16			0.6		0.6	0.6	0.5	200 VAC 50/60 Hz *8	25	21	84	75	10/8.5	14*3 [15.5]	0.9
ADK11-20A	Rc3/4	23															1.0
ADK11-25A	Rc1	28								12 VDC							1.4
NO (closed when energized)										24 VDC							
ADK12-15A	Rc1/2	16	0	0.6	0.6	0.6	0.6	0.5	0.5	48 VDC	30	25	180	150	13/11	14	1.0
ADK12-20A	Rc3/4	23								100 VDC							1.2
ADK12-25A	Rc1	28															1.6

*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : Values shown in ( ) are power consumption of the type with DIN terminal box.
*3 : Values shown in [ ] are power consumption of the type with coil with diode.
*4 : Refer to DC column for the max. working pressure differential of coil with diode.
*5 : The voltage fluctuation range must be within ±10% of the rated voltage.
*6 : For 0.02 MPa or less pressure, as operation may become unstable depending on the usage method, the AB71 Series is recommended.
*7 : When using at low vacuum, vacuum the OUT port side.
*8 : The 100 VAC (50/60 Hz) can be used with 110 VAC (60 Hz). The 200 VAC (50/60 Hz) can be used with 220 VAC (60 Hz). However, this does not apply to coil housings 5A/5M/5N/5I/5J.

Optional specifications

Sealant	Fluoro rubber		Ethylene propylene rubber	
Coil (thermal class)	Class 130 (B)	Class 180 (H)	Class 130 (B)	Class 180 (H)
Fluid temperature °C	5 to 60	5 to 90	-10 to 60 (*1)	-10 to 90 (*1)
Ambient temperature °C	-10 to 60			
Valve seat leakage (*2) cm^3/min (ANR)	1 or less (air)			

*1 : No freezing.
*2 : Pneumatic pressure used for measurement is 0.02 to 1.0 MPa for ADK11 (NC [open when energized]), and 0.02 to 0.6 MPa for ADK12 (NO [closed when energized]).
When used at a pressure less than 0.02 MPa, the sealant may be unstable. Contact CKD in this case.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[dm^3/(s·bar)]	b	Cv	S(mm^2)
NC (open when energized)						
ADK11-8A	Rc1/4	12	9.2	0.36	2.0	-
ADK11-10A	Rc3/8	12	11	0.46	2.4	-
ADK11-15A	Rc1/2	16	20	0.31	4.5	-
ADK11-20A	Rc3/4	23	-	-	8.6	162
ADK11-25A	Rc1	28	-	-	12.0	231
NO (closed when energized)						
ADK12-15A	Rc1/2	16	20	0.31	4.5	-
ADK12-20A	Rc3/4	23	-	-	8.6	162
ADK12-25A	Rc1	28	-	-	12.0	231

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

● NC (open when energized)

ADK11 – 25 A - 0 3A B G S – AC100V

- ADK11: Model No.
- 25: Ⓐ Port size
- A: Ⓑ Thread
- 0: Ⓒ Body/sealant combination *1 *2 *3 *4
- 3A: Ⓓ Coil housing
- B: Ⓔ Mounting plate
- G: Ⓕ Other options
- S: Ⓖ With surge suppressor
- AC100V: Ⓗ Rated voltage

Code	Description
Ⓐ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
Ⓑ Thread	
A	Rc
G	G
N	NPT

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
B	Option	Bronze	Fluoro rubber	-	Air/low vacuum/kerosene/oil (up to 90°C *1)
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	-	Air/low vacuum/kerosene/oil (up to 90°C *1)
H	Option	Bronze	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
J	Option	Bronze	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene/oil (up to 90°C *1)
P	Option	Bronze	Ethylene propylene rubber	Oil-prohibited	Water (up to 90°C *1)
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene/oil (up to 90°C *1)
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	Water (up to 90°C *1)

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓗ

Refer to page 309 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]

ADK11-15A-02C-AC100V

Model : ADK11
- Ⓐ Port size : 1/2
- Ⓑ Thread : Rc
- Ⓒ Body/sealant combination : Body - bronze, sealant - nitrile rubber
- Ⓓ Coil housing : Grommet lead wire
- Ⓔ to Ⓖ : None
- Ⓗ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

[Example of model No. 2]

ADK11-20N-B4ABS-AC200V

Model : ADK11
- Ⓐ Port size : 3/4
- Ⓑ Thread : NPT
- Ⓒ Body/sealant combination : Body - bronze, sealant - fluoro rubber
- Ⓓ Coil housing : Open frame lead wire (thermal class 180(H) coil)
- Ⓔ Mounting plate : With mounting plate
- Ⓕ Other options : None
- Ⓖ Surge suppressor : With surge suppressor
- Ⓗ Rated voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : When Item Ⓒ 4A/4M/4N is selected.
*2 : For Item Ⓒ P/R, Item Ⓐ (port size) 15 (1/2)/20 (3/4)/25 (1) only are available.
*3 : The max. working pressure differential of the ethylene propylene rubber seal combination (Item Ⓒ P/R) is 0.6 MPa.
*4 : The ethylene propylene rubber seal combination (Item Ⓒ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)

For Items Ⓓ to Ⓗ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓖ are not required, they should be left blank.

Ⓓ Coil housing				Ⓔ	Ⓕ Other options					Ⓖ	Ⓗ Rated voltage
Description				Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
2C	Std.	Grommet lead wire		B						S	100 VAC, 200 VAC
2E	Option	With DIN terminal box	(G1/2)	B						S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2G	Option	With DIN terminal box	(Pg11)	B						S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
2H	Option	DIN terminal box with small lamp	(Pg11)	B					H	S	100 VAC, 200 VAC, 24 VDC
3A	Option	Open frame: Lead wire (IP65 or equivalent)		B				G	H	S	100 VAC, 200 VAC
3M	Option	Open frame: With HP terminal box	(G1/2)	B	D	E	F			S	12 VDC, 24 VDC, 48 VDC, 100 VDC
3N	Option	Open frame: HP terminal box with lamp	(G1/2)	B	D	E	F			S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I	Option	Open frame: HP terminal box (IP65 or equivalent)	(G1/2)	B	D	E	F			S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J	Option	Open frame: HP terminal box with lamp (IP65 or equivalent)	(G1/2)	B	D	E	F			S	100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A	Option	Open frame (Thermal class 180 (H)): Lead wire		B				G	H	S	100 VAC, 200 VAC
4M	Option	Open frame (Thermal class 180 (H)): With HP terminal box	(G1/2)	B	D	E	F				
4N	Option	Open frame (Thermal class 180 (H)): HP terminal box with lamp	(G1/2)	B	D	E	F				
5A	Option	Open frame (diode integrated): Lead wire (IP65 or equivalent)		B				G	H		100 VAC, 200 VAC
5M	Option	Open frame (diode integrated): With HP terminal box	(G1/2)	B	D	E	F				
5N	Option	Open frame (diode integrated): HP terminal box with lamp	(G1/2)	B	D	E	F				
5I	Option	Open frame (diode integrated): HP terminal box (IP65 or equivalent)	(G1/2)	B	D	E	F				
5J	Option	Open frame (diode integrated): HP terminal box with light (IP65 or equivalent)	(G1/2)	B	D	E	F				

⚠ Refer to the following cautions for Ⓓ to Ⓗ.

2C

- Grommet lead wire 300 mm

2E 2G 2H

- DIN terminal box

3A 4A 5A

- Open frame lead wire 300 mm
- 4A (Thermal class 180 (H))
- 5A (diode integrated)

3M 3N 4M 4N 5M 5N

- Open frame HP terminal box
- 4M, 4N (Thermal class 180 (H))
- 5M, 5N (diode integrated)

3I 3J 5I 5J

- Open frame HP terminal box (IP65 or equivalent)
- 5I, 5J (diode integrated)

Refer to page 249 for coil selection.

G H

- Conduit
- G(CTC19)
- H(G1/2)

⚠ Precautions for model No. selection

Notes for Ⓓ

*5 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.

Notes for Ⓔ to Ⓖ

*6 : For Item Ⓕ, select an option from D, E, F, G and H.
*7 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*8 : As standard, the surge suppressor is built into the coil with diode and the 24 VDC coil (Item Ⓓ 2H), so the surge suppressor S cannot be selected.
*9 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.

Notes for Ⓗ

*10 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*11 : For voltages other than above, contact CKD.
*12 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

How to order

● NO (closed when energized)

ADK12 – 15 A – 0 3A B G S – AC100V

- ADK12 – Model No.
- 15 A – Ⓐ Port size
- 0 – Ⓑ Thread
- 3A – Ⓓ Coil housing
- B – Ⓒ Body/sealant combination *1
- G – Ⓔ Mounting plate
- S – Ⓕ Other options
- AC100V – Ⓗ Rated voltage

Code	Description
Ⓐ Port size	
15	1/2
20	3/4
25	1
Ⓑ Thread	
A	Rc
G	G
N	NPT

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
B	Option	Bronze	Fluoro rubber	-	Air/low vacuum/kerosene/oil (up to 90°C *1)
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	-	Air/low vacuum/kerosene/oil (up to 90°C *1)
H	Option	Bronze	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
J	Option	Bronze	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene/oil (up to 90°C *1)
P	Option	Bronze	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *1)
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene/oil (up to 90°C *1)
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	Hot water (up to 90°C *1)

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓗ

Refer to page 311 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]

ADK12-20A-03A-DC24V

Model : ADK12
Ⓐ Port size : 3/4
Ⓑ Thread : Rc
Ⓒ Body/sealant combination : Body - bronze, sealant - nitrile rubber
Ⓓ Coil housing : Open frame lead wire
Ⓔ to Ⓖ : None
Ⓗ Rated voltage : 24 VDC

[Example of model No. 2]

ADK12-15G-B3NBD-AC100V

Model : ADK12
Ⓐ Port size : 1/2
Ⓑ Thread : G
Ⓒ Body/sealant combination
: Body - bronze, sealant - fluoro rubber
Ⓓ Coil housing : Open frame HP terminal box with light (G1/2)
Ⓔ Mounting plate : Selected
Ⓕ Other options : Cable gland A-15a
Ⓖ Surge suppressor : None
Ⓗ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : When Item Ⓒ 4A/4M/4N is selected.

For Items Ⓓ to Ⓗ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓖ are not required, they should be left blank.

Ⓓ Coil housing				Ⓔ	Ⓕ Other options					Ⓖ	Ⓗ Rated voltage
Description				Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Std.	Open frame	Lead wire (IP65 or equivalent)	B				G	H	S	100 VAC, 200 VAC 12 VDC, 24 VDC, 48 VDC, 100 VDC
3M	Option		With HP terminal box (G1/2)		D	E	F				
3N			HP terminal box with lamp (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
3I			HP terminal box (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 48 VDC, 100 VDC
3J			HP terminal box with lamp (IP65 or equivalent) (G1/2)								100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire	B				G	H	S	100 VAC, 200 VAC
4M			With HP terminal box (G1/2)		D	E	F				
4N			HP terminal box with lamp (G1/2)								
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)	B				G	H		100 VAC, 200 VAC
5M			With HP terminal box (G1/2)		D	E	F				
5N			HP terminal box with lamp (G1/2)								
5I			HP terminal box (IP65 or equivalent) (G1/2)								
5J			HP terminal box with lamp (IP65 or equivalent) (G1/2)								

⚠ Refer to the following cautions for Ⓓ to Ⓗ.

3A 4A 5A		● Open frame lead wire 300 mm ● 4A (Thermal class 180 (H)) ● 5A (diode integrated)
3M 3N 4M 4N 5M 5N		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

G H		● Conduit ● G(CTC19) ● H(G1/2)

Refer to page 249 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓓ

*2 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.

Notes for Ⓔ to Ⓖ

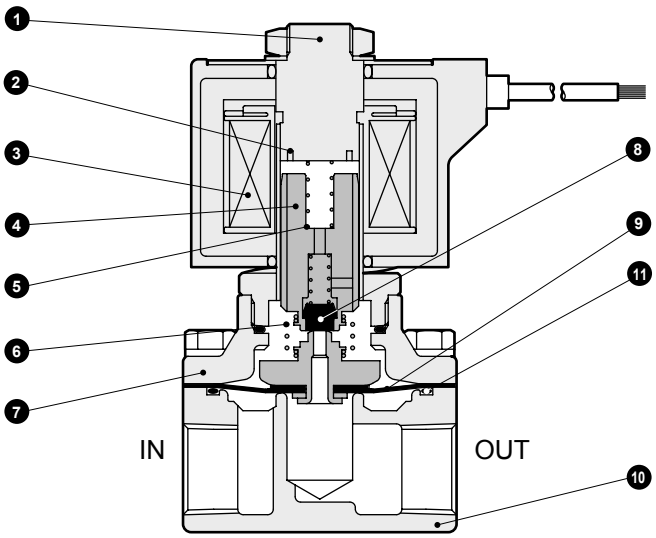
*3 : For Item Ⓕ, select an option from D, E, F, G and H.
*4 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*5 : Surge suppressor is incorporated as standard in the coil with diode.
*6 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.

Notes for Ⓗ

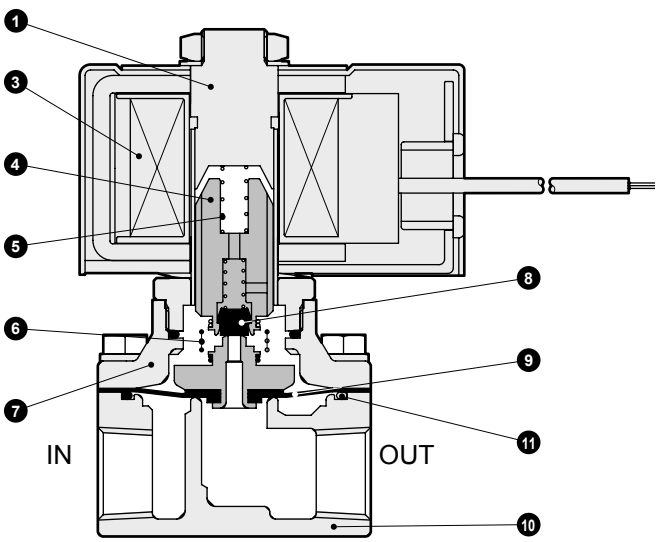
*7 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. However, coils for Item Ⓓ 5A/5M/5N/5I/5J can be used with 100 VAC 50/60 Hz and 200 VAC 50/60 Hz only.
*8 : For voltages other than above, contact CKD.
*9 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

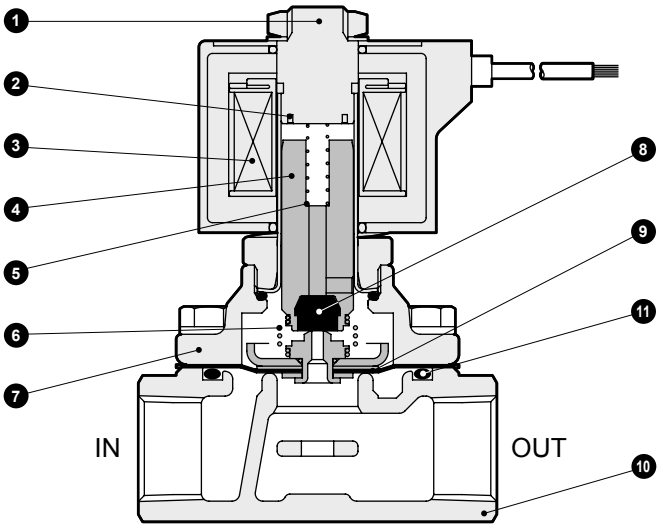
● ADK11-8A/10A (AC)



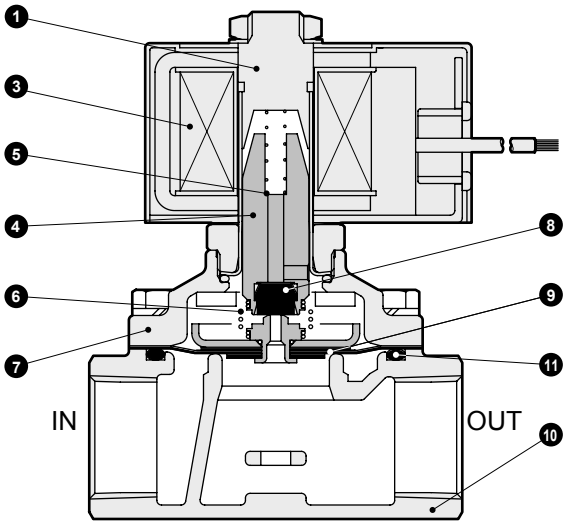
● ADK11-8A/10A (DC/diode integrated)



● ADK11-15A/20A/25A (AC)



● ADK11-15A/20A/25A (DC/diode integrated)

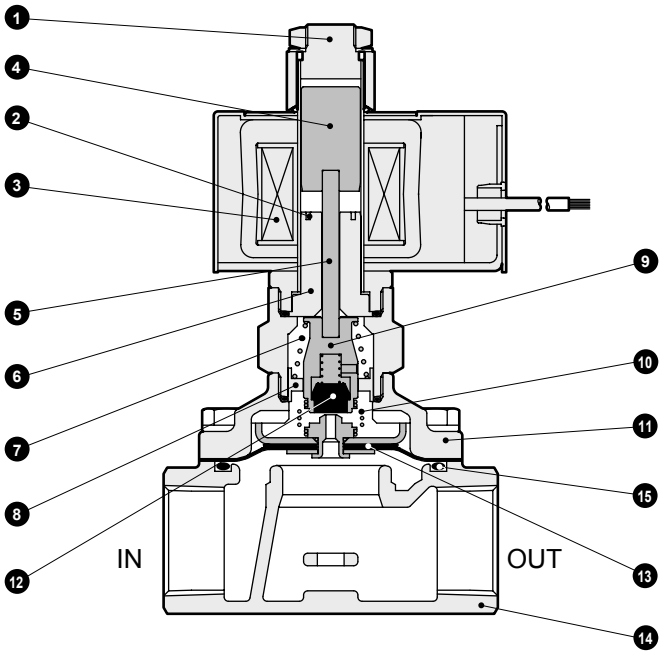


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil *1	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger assembly	SUS405 or equiv./SUS304/NBR (SUS405 or equiv./SUS304/FKM or EPDM) *2, 3	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Kick spring	SUS304	Stainless steel
7	Body	C3771(SCS13)	Copper alloy (stainless steel casting)
8	Seal	NBR(FKM, EPDM)	Nitrile rubber (fluoro rubber or ethylene propylene rubber)
9	Diaphragm assembly	SUS304/NBR (SUS304/FKM or EPDM)*3	Stainless steel/nitrile rubber (stainless steel/fluoro rubber or ethylene propylene rubber)
10	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
11	O-ring	NBR(FKM, EPDM)	Nitrile rubber (fluoro rubber or ethylene propylene rubber)

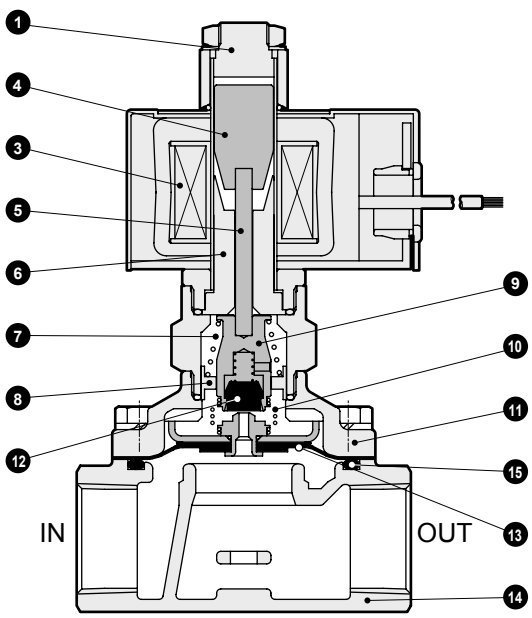
( ) shows options.
*1 : No shading coil is used for DC coil or coil with diode.
*2 : SUS304 is not used for port size 15 (1/2) to 25 (1).
*3 : EPDM is not available for port size 8 (1/4) and 10 (3/8).

Internal structure and parts list

● ADK12-15A/20A/25A (AC)



● ADK12-15A/20A/25A (DC/diode integrated)

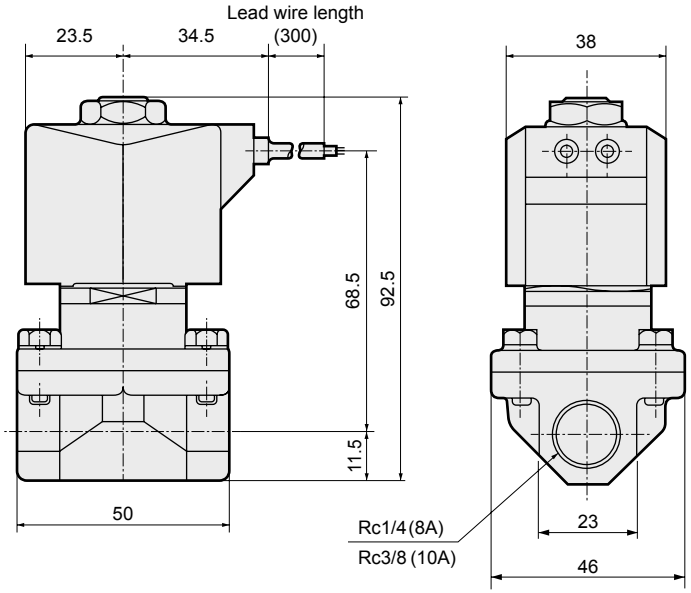


No.	Part name	Material	
1	Core assembly	SUS403/SUS316L/SUS304 *1	Stainless steel
2	Shading coil *2	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Push rod	SUS304	Stainless steel
6	Fixed core	SUS405 or equiv.	Stainless steel
7	Spring	SUS304	Stainless steel
8	Spring holder	POM(SUS303)	Acetal resin (stainless steel)
9	NO valve assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM, EPDM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber or ethylene propylene rubber)
10	Kick spring	SUS304	Stainless steel
11	Body	C3771(SCS13)	Copper alloy (stainless steel casting)
12	Seal	NBR(FKM, EPDM)	Nitrile rubber (fluoro rubber or ethylene propylene rubber)
13	Diaphragm assembly	SUS304/NBR (SUS304/FKM or EPDM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber or ethylene propylene rubber)
14	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
15	O-ring	NBR(FKM, EPDM)	Nitrile rubber (fluoro rubber or ethylene propylene rubber)

( ) shows options.
*1 : When the body/sealant combination is other than 0 and H: SUS430/SUS316L/SUS304.
*2 : No shading coil is used for DC coil or coil with diode.

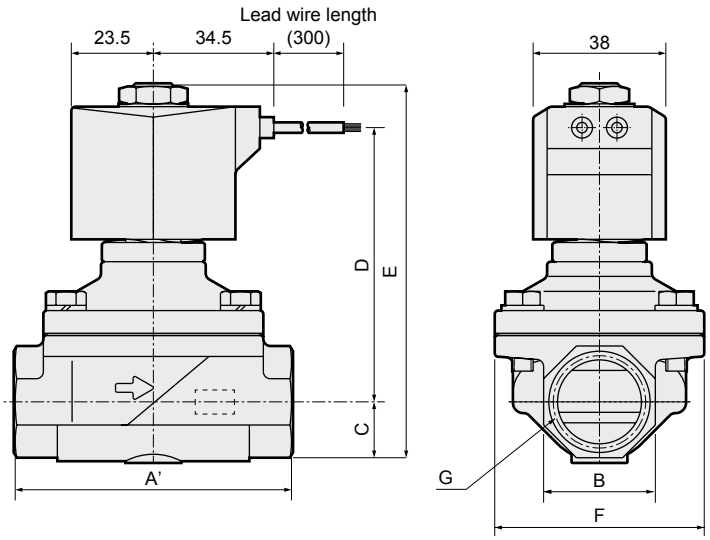
Dimensions: ADK11 Series

● Grommet lead wire
ADK11-8A/10A-*2C



*1: The dimensions are the same for port sizes of G and NPT threads.

● Grommet lead wire
ADK11-15A/20A/25A-*2C



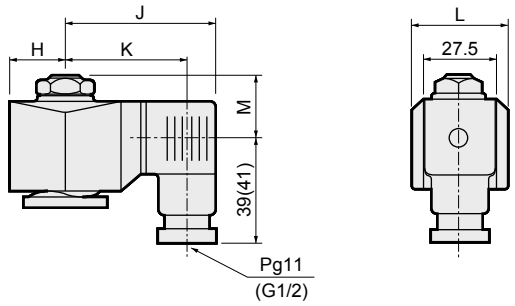
*1 : The dimensions are the same for port sizes of G and NPT threads.
*2 : Dimensions shown in ( ) are for SUS body.

Model No.	A	B	C	D	E	F	G
ADK11-15A-02C	71	27(29)	14.5	75.5	102	50	Rc1/2
ADK11-20A-02C	80	32(35)	17.5	79	108.5	60	Rc3/4
ADK11-25A-02C	90	41(45)	21.5(22.5)	84.5	118(119)	71	Rc1

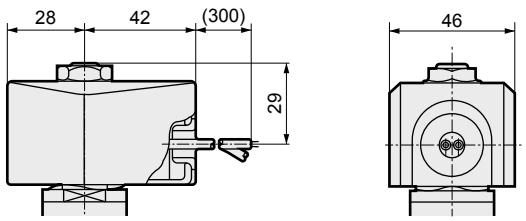
Optional dimensions: ADK11 Series

* Refer to the dimensions of grommet lead wire on page 314 for common dimensions.

● With DIN terminal box
ADK11-8A to 25A-* [2E / 2G / 2H]



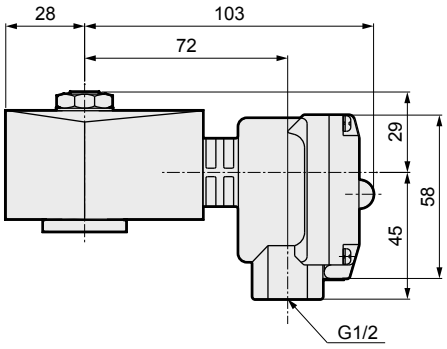
● Open frame lead wire
ADK11-8A to 25A-* [3A / 4A / 5A]



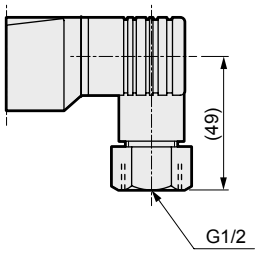
Dimensions shown in ( ) are for G1/2.

Model No.	H	J	K	L	M
ADK11-8A to 25A-*2□-AC	23.5	65.5	54(53.5)	38	22
ADK11-8A/10A-*2□-DC	23.5	66	54.5(54)	38	22
ADK11-15A to 25A-*2□-DC	28	72	60.5(60)	46	22

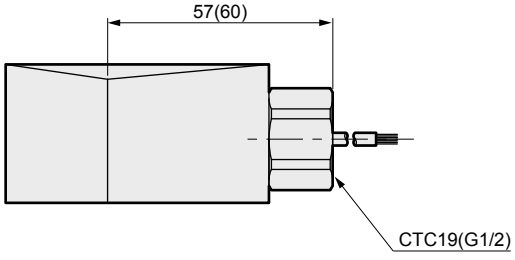
● Open frame + HP terminal box
ADK11-8A to 25A-* [3 / 5] [M / N / I / J] / [4M / 4N]



● DIN terminal box with small lamp + conduit (G1/2)
ADK11-8A to 25A-* [2H] [H]



● Open frame + conduit
ADK11-8A to 25A-* [3A / 4A / 5A] [G / H]

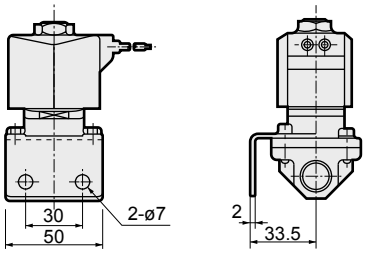


Dimensions shown in ( ) are for G1/2.

Optional dimensions: ADK11 Series

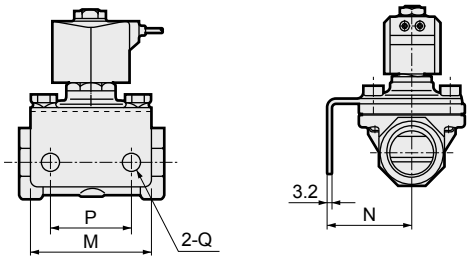
● Mounting plate
ADK11-8A/10A-***B

Material: Steel
Zinc plated



● Mounting plate
ADK11-15A/20A/25A-***B

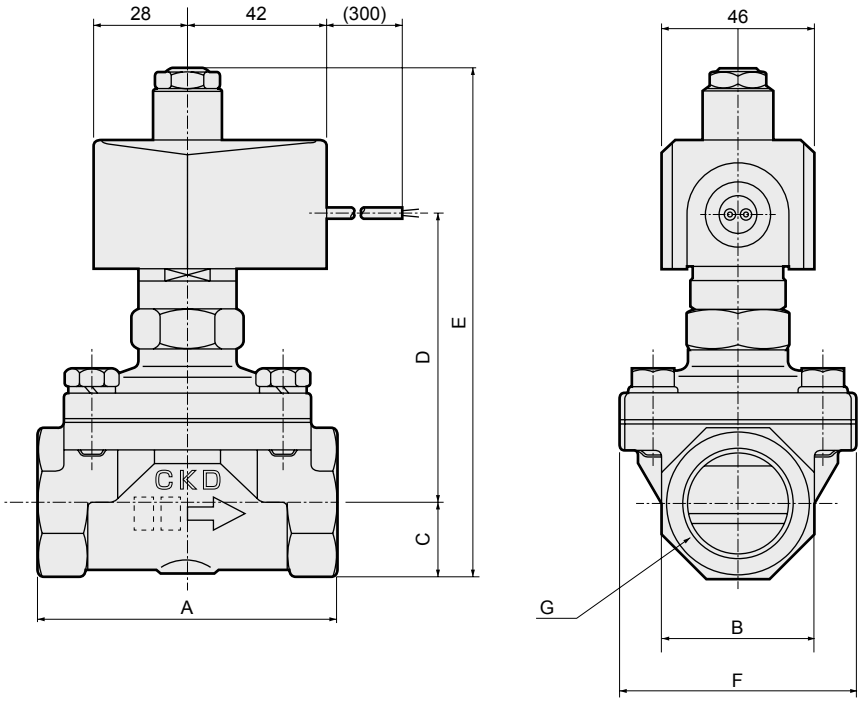
Material: Steel
Zinc plated



Model No.	M	N	P	Q
ADK11-15A-***B	56	45	40	ø9
ADK11-20A-***B	63	50	45	ø9
ADK11-25A-***B	75	56	50	ø11

Dimensions: ADK12 Series

● Open frame lead wire
ADK12-15A/20A/25A-*3A



*1 : The dimensions are the same for port sizes of G and NPT threads.

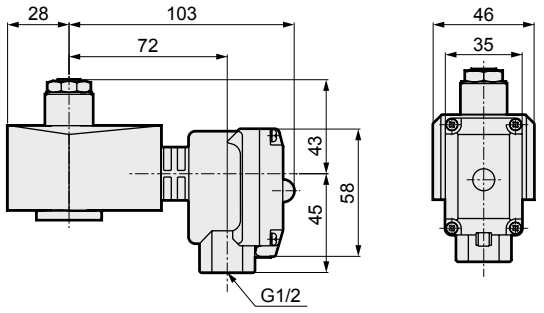
Model No.	A	B	C	D	E	F	G
ADK12-15A-03A	71	27(29)	14.5	77	134.5	50	Rc1/2
ADK12-20A-03A	80	32(35)	17.5	80.5	141	60	Rc3/4
ADK12-25A-03A	90	41(45)	21.5(22.5)	86	150.5(151.5)	71	Rc1

Optional dimensions: ADK12 Series

* Refer to the open frame lead wire dimensions on page 316 for common dimensions.

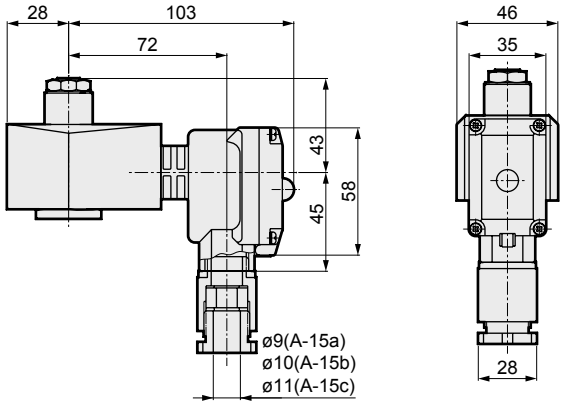
● Open frame + HP terminal box

ADK12-15A/20A/25A-* [3 5] [M N I J] / [4M 4N]



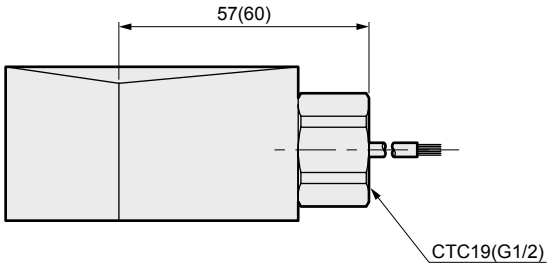
● Open frame + cable gland

ADK12-15A/20A/25A-* [3 4 5] [M N] [D E F]



● Open frame + conduit

ADK12-15A/20A/25A-* [3A 4A 5A] [G H]

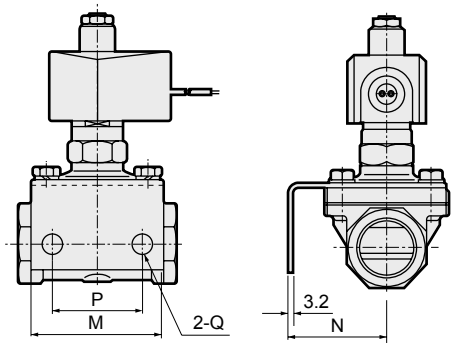


Dimensions shown in ( ) are for G1/2.

● Mounting plate

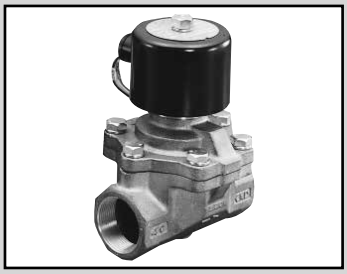
ADK12-15A/20A/25A-*** [B]

Material: Steel
Zinc plated



Model No.	M	N	P	Q
ADK12-15A-***B	56	45	40	ø9
ADK12-20A-***B	63	50	45	ø9
ADK12-25A-***B	75	56	50	ø11

Mounting plate model	Compatibility
ADK11-8A-MOUNT-PLATE-KIT	● ADK11-8A Series
ADK11-10A-MOUNT-PLATE-KIT	● ADK11-10A Series
ADK11-15A-MOUNT-PLATE-KIT	● ADK11-15A Series
ADK11-20A-MOUNT-PLATE-KIT	● ADK11-20A Series
ADK11-25A-MOUNT-PLATE-KIT	● ADK11-25A Series
ADK12-15A-MOUNT-PLATE-KIT	● ADK12-15A Series
ADK12-20A-MOUNT-PLATE-KIT	● ADK12-20A Series
ADK12-25A-MOUNT-PLATE-KIT	● ADK12-25A Series



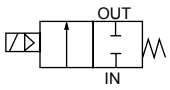
Pilot kick 2-port solenoid valve
General purpose

ADK21 Series

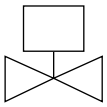
- NC (open when energized)
- Port size: Rc1¹/₄ to Rc2, 32 to 50 flange
- Diaphragm drive

RoHS CAD

JIS symbol



Mounting orientation



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	Air/low vacuum (1.33 x 10^3 Pa (abs))/water/kerosene/oil (50mm^2/s or less)
Working pressure differential MPa	0 to 0.7 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 60 (140°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Pilot kick poppet, diaphragm drive
Valve seat leakage (*1) cm^3/min(ANR)	1 or less (air)
Mounting orientation	Limited to vertical orientation with the coil on top
Body/seal material	Bronze/nitrile rubber

*1 : Value at pneumatic pressure of 0.02 to 0.7 MPa. When used at a pressure less than 0.02 MPa, the sealant may be unstable. Contact CKD in this case.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (50 mm^2/s)			When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
ADK21-32A	Rc1¹/₄	35	0	0.7	0.6	0.7	0.6	0.5	0.5	100 VAC 50/60 Hz	64	69	274	289	44/48	20	4.5
ADK21-32F	32 flange									200 VAC 50/60 Hz							8
ADK21-40A	Rc1¹/₂	43								12 VDC							5.5
ADK21-40F	40 flange									24 VDC							9
ADK21-50A	Rc2	53								48 VDC							7
ADK21-50F	50 flange									100 VDC							11.5

*1 : The model numbers above are for the basic port size. Refer to How to order for other combinations.
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : When using at low vacuum, vacuum the OUT port side.

Optional specifications

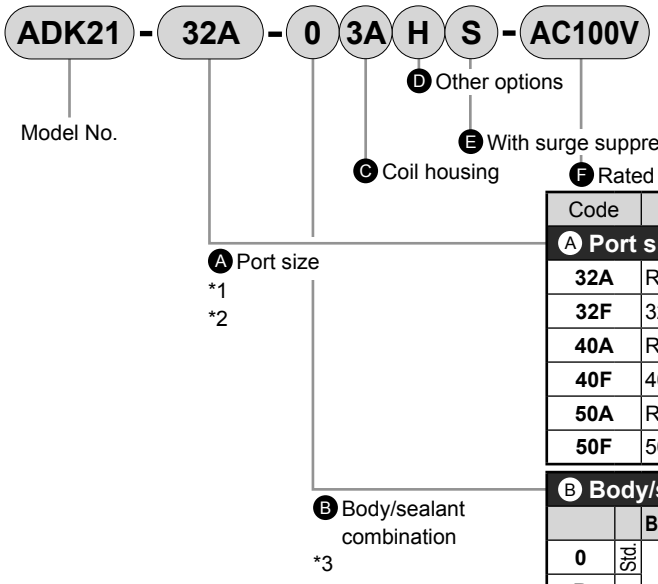
Sealant		Fluoro rubber	
Coil (thermal class)		Class 130 (B)	Class 180 (H)
Fluid temperature	°C	5 to 60	5 to 90
Ambient temperature	°C	-10 to 60	
Valve seat leakage (*1)	cm^3/min (ANR)	1 or less (air)	

*1 : Value at pneumatic pressure of 0.02 to 0.7 MPa. When used at a pressure less than 0.02 MPa, the sealant may be unstable. Contact CKD in this case.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm^2)
ADK21-32A	Rc1 1/4	35	25	460
ADK21-32F	32 flange			
ADK21-40A	Rc1 1/2	43	34	625
ADK21-40F	40 flange			
ADK21-50A	Rc2	53	53	975
APK21-50F	50 flange			

How to order



Code	Description
Ⓐ Port size	
32A	Rc1¼
32F	32 flange
40A	Rc1½
40F	40 flange
50A	Rc2
50F	50 flange

Ⓑ Body/sealant combination

		Body	Seal	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
B	Option	Bronze	Fluoro rubber	-	Air/low vacuum/kerosene/oil (up to 90°C *3)
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	-	Air/low vacuum/kerosene/oil (up to 90°C *3)
H	Option	Bronze	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
J	Option	Bronze	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene/oil (up to 90°C *3)
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	Air/low vacuum/kerosene/oil (up to 90°C *3)

Refer to Intro Page 39 for reference on material combinations.

Ⓒ to Ⓕ

Refer to page 321 for details on the coil housing, other options and voltage, etc.

[Example of model No. 1]

ADK21-50F-03A-DC24V

Model : ADK21
Ⓐ Port size : 50 flange
Ⓑ Body/sealant combination
: Body - bronze, sealant - nitrile rubber
Ⓒ Coil housing : Open frame lead wire
Ⓓ Ⓔ : None
Ⓕ Rated voltage : 24 VDC

[Example of model No. 2]

ADK21-40F-B4MD-AC200V

Model : ADK21
Ⓐ Port size : 40 flange
Ⓑ Body/sealant combination
: Body - bronze, sealant - fluoro rubber
Ⓒ Coil housing : Open frame
(Thermal class 180 (H) coil) with HP terminal box
(G1/2)
Ⓓ Other options : Cable gland A-15a
Ⓔ Surge suppressor : None
Ⓕ Rated voltage : 200 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The companion flange is JIS B2210 10K. (Flange is not enclosed with the product and must be purchased separately.)
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.

Notes for Ⓑ

*3 : When Item Ⓑ 4A/4M/4N is selected.

For Items Ⓒ to Ⓕ, the combinations indicated with codes are available.
Note that if options for Items Ⓓ to Ⓔ are not required, they should be left blank.

Ⓒ Coil housing				Ⓓ Other options				Ⓔ	Ⓕ Rated voltage
Description				Cable gland (marine cable gland)			Conduit (conduit piping)	With surge suppressor	Description
				A-15a	A-15b	A-15c	G1/2		
3A	Std.	Open frame	Lead wire (IP65 or equivalent)				H	S	100 VAC, 200 VAC 12 VDC, 24 VDC, 48 VDC, 100 VDC
3M	Option		With HP terminal box (G1/2)	D	E	F			
3N			HP terminal box with lamp (G1/2)						100 VAC, 200 VAC, 12 VDC, 24 VDC, 100 VDC
4A		Open frame (Thermal class 180 (H))	Lead wire				H	S	100 VAC, 200 VAC
4M			With HP terminal box (G1/2)	D	E	F			
4N			HP terminal box with lamp (G1/2)						
5A		Open frame (diode integrated)	Lead wire (IP65 or equivalent)				H		100 VAC, 200 VAC
5M			With HP terminal box (G1/2)	D	E	F			
5N			HP terminal box with lamp (G1/2)						

⚠ Refer to the following cautions for Ⓒ to Ⓕ.

3A 4A 5A		● Open frame lead wire 300 mm ● With CTC19 thread for direct conduit piping
3M 3N 4M 4N 5M 5N		● Open frame HP terminal box ● 4M, 4N (Thermal class 180 (H)) ● 5M, 5N (diode integrated)
H		● Conduit (G1/2)

Refer to page 250 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓒ

*4 : Coils for 5A/5M/5N have a diode to convert AC to DC voltage.

Notes for Ⓓ / Ⓔ

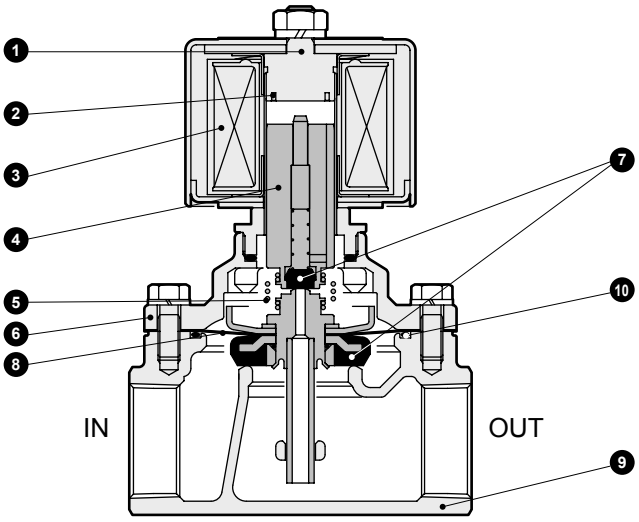
*5 : For Item Ⓓ, select an option from D, E, F and H.
*6 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*7 : Surge suppressor is incorporated as standard in the coil with diode.
*8 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.

Notes for Ⓕ

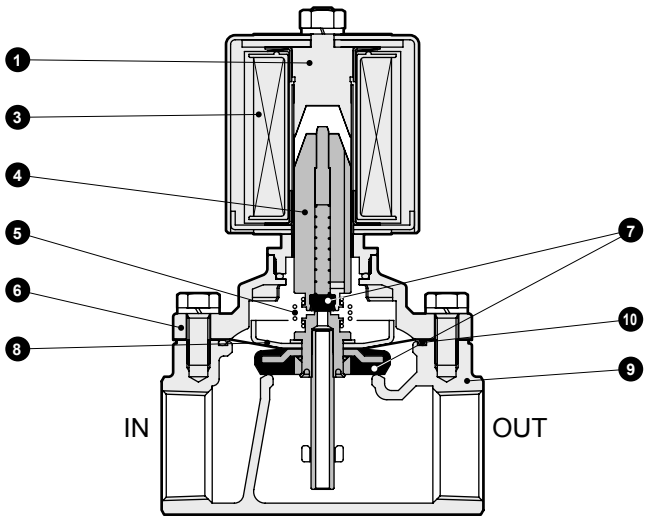
*9 : For voltages other than above, contact CKD.
*10 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● ADK21-32A/40A/50A (AC)



● ADK21-32A/40A/50A (DC/diode integrated)

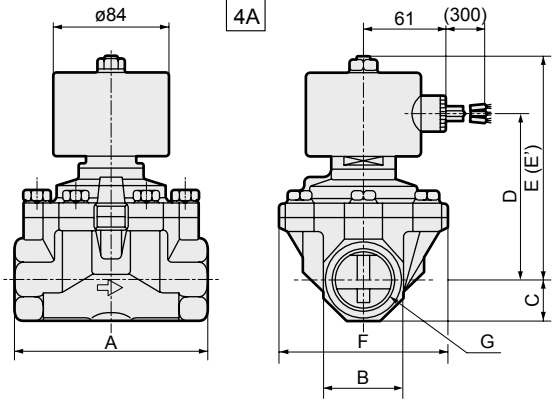


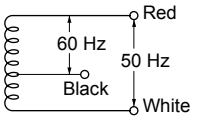
No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil *1	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger assembly	SUS405 or equiv./SUS304/C3604/NBR (SUS405 or equiv./SUS304/FKM)	Stainless steel
5	Kick spring	SUS304	Stainless steel
6	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
7	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
8	Diaphragm assembly	SUS303/SUS304/C3604/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
9	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
10	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)

( ) shows options.
*1 : No shading coil is used for DC coil or coil with diode.

Dimensions CAD

● Open frame lead wire (Rc screw-in)
ADK21-32A/40A/50A-* 3A 4A





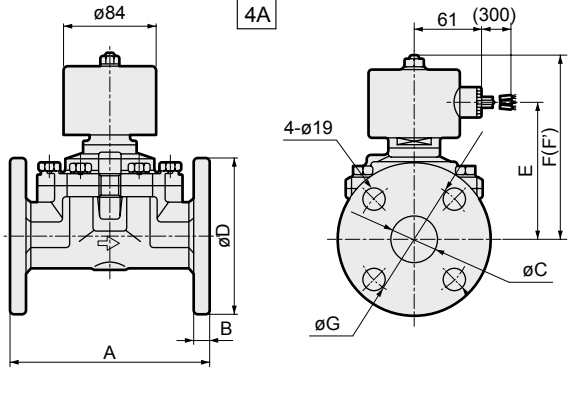
● Conduit size
Thin steel conduit thread
JIS B 0204 CTC19
● Lead wire

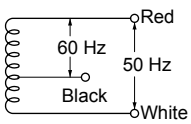
30/0.18(0.75 mm²)	
Length	300 mm

The dimension (E') applies only to the ADK21-32A/40A/50A-*3A DC specifications.

Model No.	A	B	C	D	E	E'	F	G
ADK21-32A-*□A	125	54	27	116.5	158.5	183.5	112	Rc1¼
ADK21-40A-*□A	140	60	30	123.5	165.5	190.5	122	Rc1½
ADK21-50A-*□A	160	74	37	132.5	174.5	199.5	132	Rc2

● Open frame lead wire (flange)
ADK21-32F/40F/50F-* 3A 4A





● Conduit size
Thin steel conduit thread
JIS B 0204 CTC19
● Lead wire

30/0.18(0.75 mm²)	
Length	300 mm

The dimension (F') applies only to the ADK21-32F/40F/50F-*3A DC specifications.

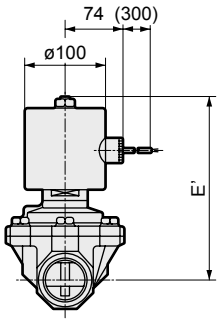
Model No.	A	B	C	D	E	F	F'	G
ADK21-32F-*□A	170	12	36(35)	135	116.5	158.5	183.5	100
ADK21-40F-*□A	180	14	42	140	123.5	165.5	190.5	105
ADK21-50F-*□A	180	14	53(52)	155	132.5	174.5	199.5	120

Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

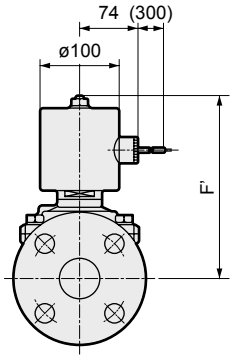
* Refer to the open frame lead wire dimensions on page 322 for common dimensions.

● Open frame diode integrated lead wire (Rc screw-in)
ADK21-32A/40A/50A-* [5A]



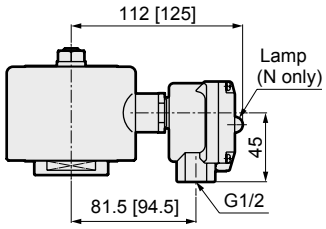
Model No.	E'
ADK21-32A-*5A	183.5
ADK21-40A-*5A	190.5
ADK21-50A-*5A	199.5

● Open frame diode integrated lead wire (flange)
ADK21-32F/40F/50F-* [5A]



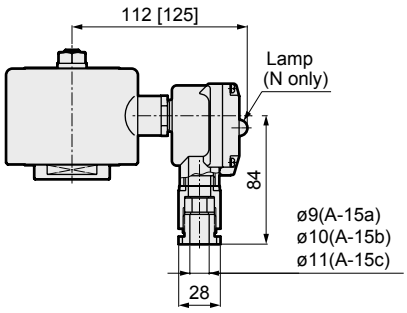
Model No.	F'
ADK21-32F-*5A	183.5
ADK21-40F-*5A	190.5
ADK21-50F-*5A	199.5

● Open frame + HP terminal box
ADK21-32A/F to 50A/F -* [3/4/5] [M/N]



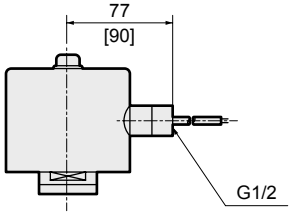
[ ] shows ADK21-32A/F to 50A/F -*5 [M/N] type.

● Open frame + cable gland
ADK21-32A/F to 50A/F -* [3/4/5] [M/N] [D/E/F]



[ ] shows ADK21-32A/F to 50A/F -*5 [M/N] type.

● Open frame + conduit
ADK21-32A/F to 50A/F -* [3A/4A/5A] H



[ ] shows ADK21-32A/F to 50A/F -*5 [M/N] type.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Pilot operated 2-port solenoid valve (AP/AD) and pilot kick 2-port solenoid valve (APK/ADK)

Design/selection

⚠WARNING

1 Working fluids

(1) When using this valve for dry air or inert gas, the life can be shortened considerably due to wear. Use a valve intended for dry air.

(2) This valve cannot be used for maintaining vacuum.

(3) This valve cannot be used with combustion gas.

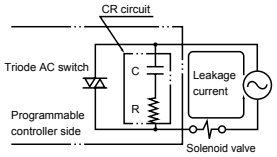
⚠CAUTION

1 Fluid viscosity

The fluid viscosity must be 50 mm^2/s or less. Malfunctions could occur if the viscosity is higher than 50 mm^2/s. (For APK Series, 20 mm^2/s or less)

2 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.



Voltage / Model No.	AC		AC diode		DC	
	100 V	200 V	100 V	200 V	12 V	24 V
AP,AD	6 mA or less	3 mA or less	2 mA or less	1 mA or less	2 mA or less	1 mA or less
APK,ADK	6 mA or less	3 mA or less	2 mA or less	1 mA or less	2 mA or less	1 mA or less

Mounting, piping and wiring

⚠CAUTION

1 Mounting

(1) As a general rule, the mounting orientation is vertical, with the coil on top.

2 Piping

(1) If the pipe vibrates when the solenoid valve is opened and closed, securely fix the piping.

(2) For steam fluids, steam generated from a boiler will contain a large amount of drainage. Always install a drain trap.

(3) When passing steam, the make-up water in the boiler will contain substances such as “calcium salt” and “magnesium salt”. As these substances will react with oxygen and carbon dioxide, and cause scales and sludge to form, always install a “water softener” and a filter for steam.

(4) When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.

(5) If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. For the fluid inlet, use piping of a piping size that matches the port size of the valve. Do not use a needle valve.

3 Wiring

(1) Refer to Intro Page 64 for information on how to wire a terminal box.

When using the product

⚠CAUTION

1 Sudden leakage

With the pilot operated or pilot kick 2-port valve, if the pressure is suddenly applied when the pump starts while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.

2 Operation

Do not apply back pressure. This could lead to malfunction.

3 Water hammer

If the water hammer poses problems, consider using the CKD “RSV type” solenoid valve or a motor valve.

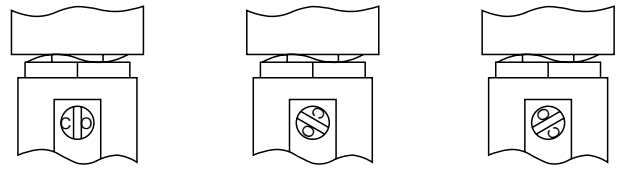
4 Manual operation

When using a product with a manual override, follow the operations below:

[For NC (open when energized)]

Opening: Insert a flathead screwdriver into the slit on the manual adjustment shaft, and turn it approx. 120° to the right or left. The plunger will rise and the valve will open.
The open state is held even when the screwdriver is removed.
Always return the valve to the original position after use.

Closing: From the open position, turn the manual adjustment shaft so that the slit is returned to the perpendicular position, which will lower the plunger and close the valve. (Refer to the figure below)

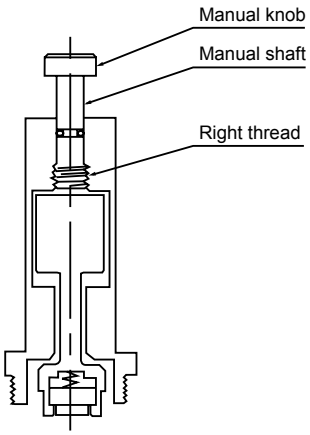


Valve closed state　Valve open state　Valve open state

[For NO (closed when energized)]

(1) When closing the valve with manual operation
The manual shaft is threaded, so hold the manual dial and rotate the shaft clockwise.
When the manual dial has been rotated downward 5 to 6 mm and no longer rotates, the solenoid valve will switch to closing operation.

(2) Reset (when not using a manual override)
Always rotate the manual dial counterclockwise and return it to the highest point.



Maintenance

⚠CAUTION

1 Thermal insulation cover

When piping for steam or hot water, etc., use an insulating cover structure that can be disassembled for maintenance purposes.

Avoid placing an insulating cover on the entire solenoid valve or on the coil section. The coil could burn.

2 Tightening torque

When disassembling or assembling, tighten the body bolt, core assembly and nut with the following tightening torques.

		Body bolt tightening torque	Core assembly tightening torque	Nut tightening torque
AP 11 12 AD 11 12 APK11 ADK 11 12	8A 10A	3 to 4 Nm	30 to 45 Nm (For APK11-15A to 25A and AD11-8A and 10A, 45 to 60 Nm)	8 to 16 Nm
	15A 20A	5 to 7 Nm		
	25A	9 to 12 Nm		
AP 21 22 AD 21 22	32 A F	9 to 12 Nm		
	40 A F 50 A F	15 to 22 Nm		
APK21 ADK21	32 A F	9 to 12 Nm	80 to 120 Nm	
	40 A F 50 A F	15 to 22 Nm		

Working environment

⚠CAUTION

IP65 (IEC60529 [IEC529:1989-11]) standards are applied to the test. Avoid use in conditions where water or coolant directly contacts the valve.

Degree of protection of IP65 and explanation of test method

● Degree of protection

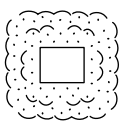
Note: IP65 is based on the following testing method.

■ IEC (International Electrotechnical Commission) standards (IEC60529 [IEC529:1989-11])

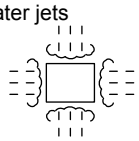
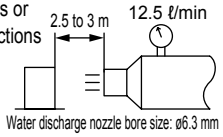
IP-□□

Degree of protection (International Protection)

1st characteristic No. (degree of protection for foreign solid matter)

Grade	Degree of protection	
6	Dust proof 	No inflow of dust.

2nd characteristic No. (degree of protection for water entry)

Grade	Degree of protection		Overview of test method (fresh water is used)
5	Protection against water jets 	No harmful effects occur even when water is sprayed with nozzles from all directions.	The sample (exterior) is exposed to water jetting of 1 m^2 per minute for a total of 3 minutes or more from all directions with the testing equipment in the figure below. 

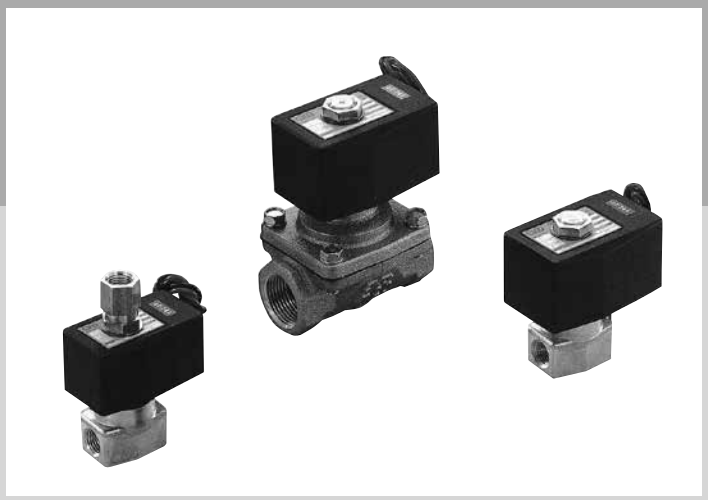
AB/AG/ADK-Z

2, 3-port solenoid valve for dry air General purpose

■ For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum

Overview

This product is a long service life solenoid valve for dry air control, created based on the reliable CKD general purpose valve. Ideal for dry air with an atmospheric dew point of -60°C, inert gases such as N_2, Ar and He, and fluids under low vacuum. A wide lineup including direct acting and pilot kick can meet the requirements of various applications.



CONTENTS

⚠ Always read the precautions in the Introduction and on page 366 before use.

Series variation

2, 3-port solenoid valve for dry air General purpose

No. of ports	Model		Structure	Remarks	
2-port		AB31-Z	Direct acting/single unit		
		AB41-Z			
		GAB312-Z	Direct acting/ manifold		
		GAB352-Z			
		GAB412-Z			
		GAB452-Z			
		ADK11-Z	Pilot kick (Diaphragm drive)		
3-port		AG31-Z	Direct acting/single unit		
		AG41-Z			
		AG33-Z			
		AG43-Z			
		AG34-Z			
		AG44-Z			
	 Actuator 	GAG31*-Z	Direct acting/ manifold		
		GAG35*-Z			
		GAG41*-Z			
		GAG45*-Z			
		GAG33*-Z			
		GAG43*-Z			
		GAG34*-Z			
		GAG44*-Z			

	Actuation		Fluid	Port size						Page
				Rc1/8	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	
	NC (open when energized)		Dry air inert gas low vacuum	●	●					332
					●	●				332
										338
										338
										338
										338
					●	●	●	●	●	360
	Universal			●	●					342
					●	●				342
	NC pressurization			●	●					342
					●	●				342
	NO pressurization			●	●					342
					●	●				342
	Universal	Common supply/ individual exhaust		●*1*2	●*1*2					348
		Common supply separate flow		●*1*2	●*1*2					348
		Common supply/ individual exhaust			●*1*2	●*1*2				348
		Common supply separate flow			●*1*2	●*1*2				348
	NC pressurization	Common supply/ individual exhaust		●*1*2	●*1*2					352
					●*1*2	●*1*2				352
	NO pressurization			●*1*2	●*1*2					356
					●*1*2	●*1*2				356

*1 : A port: Rc1/4, C port: Rc3/8
*2 : ● indicates NO port.

Coil selection guide

● Coil housing types and selection guide (excluding explosion-proof)

Various types are available according to the application.
Refer to the structure and features to select the optimum model.

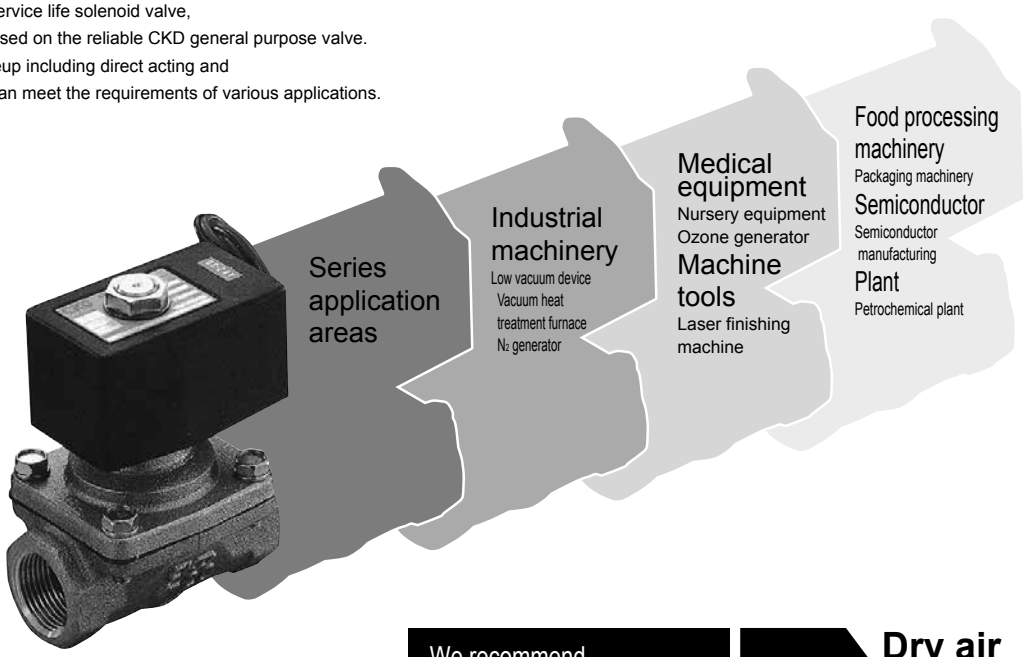
Coil system > Open frame

Thermal class 130 (B) mold		Lead wire / HP terminal box / Conduit		
● For DC ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors		Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached	3A
● For DC ● Degree of protection: IP21 or equivalent ● Cannot be used outdoors		HP terminal box	● Easy wiring ● Indicator lamp available	3M 3N
● For DC ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors		HP terminal box	● Easy wiring ● Indicator lamp available	3I 3J
Thermal class 130 (B) mold with diode				
● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Cannot be used outdoors		Lead wire	● Lead wire length 300 mm ● Conduit (CTC19) for direct piping can be attached.	5A
● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP21 or equivalent ● Cannot be used outdoors		HP terminal box	● Easy wiring ● Indicator lamp available	5M 5N
● Diode in the coil converts AC to DC. ● AC dedicated (50/60 Hz common) ● Degree of protection: IP65 or equivalent ● Perfect for places where whirring noise should be prevented. ● Cannot be used outdoors		HP terminal box	● Easy wiring ● Indicator lamp available	5I 5J
		Conduit	● Use a conduit (CTC19 or G1/2) when using direct conduit wiring for the open frame lead wire.	G H

Achieves long service life even with ultra dry air.

Ideal for managing dry air with the atmospheric dew point of -60°C as well as inert gas and low vacuum.
Solenoid valve for dry air, capable of sustaining high performance for a long period of time.

The CKD solenoid valve for dry air
is a long service life solenoid valve,
created based on the reliable CKD general purpose valve.
A wide lineup including direct acting and
pilot kick can meet the requirements of various applications.

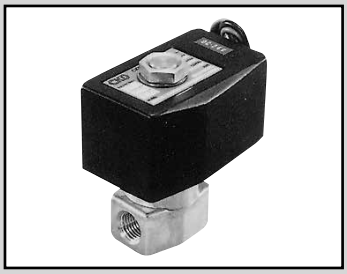


We recommend
the solenoid valve for dry air
for the following fluids.

- **Dry air**
- **Inert gas** N_2Ar He gas
- **Low vacuum** 0.133 kPa {1 Torr} or more

Oil-prohibited product

This valve is suited to fluids susceptible to oil and dust, such as dry air, nitrogen gases, helium and low vacuum 0.133 kPa {1 Torr}. (AB31/AB41 / AB41E4)



Direct acting 2-port solenoid valve for dry air
General purpose

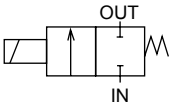
AB31/AB41-Z Series

- NC (open when energized)
- Port size: Rc1/8 to Rc1/2

RoHS CAD

JIS symbol

- NC (open when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 to 4 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	5 (≈730 psi, 50 bar)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to 45 (113°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 45 (113°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted

Individual specifications

1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Max. working pressure differential (MPa)	Rated voltage	Power consumption (W) AC	Power consumption (W) DC	Weight (kg)
AB31- 01 02	-1-******Z	Rc1/8 Rc1/4	1.5	2.5 (≈360 psi)	100 VAC 50/60 Hz 200 VAC 50/60 Hz	17	14	0.45
	-2-******Z		2.0	1.5 (≈220 psi)				
	-3-******Z		3.0	0.5 (≈73 psi)				
	-4-******Z		3.5	0.35 (≈51 psi)				
	-5-******Z		4.0	0.2 (≈29 psi)				
	-6-******Z		5.0	0.12 (≈17 psi)				
AB41- 02 03	-1-******Z	Rc1/4 Rc3/8	1.5	4.0 (≈580 psi)	12 VDC 24 VDC 48 VDC 100 VDC			0.57 (Rc1/4) 0.59 (Rc3/8)
	-2-******Z		2.0	2.5 (≈360 psi)				
	-3-******Z		3.0	0.9 (≈130 psi)				
	-4-******Z		3.5	0.6 (≈87 psi)				
	-5-******Z		4.0	0.4 (≈58 psi)				
	-6-******Z		5.0	0.2 (≈29 psi)				
	-7-******Z		7.0	0.1 (≈15 psi)				
AB41- 03 04	-8-******Z	Rc3/8 / Rc1/2	10.0	0.03 (≈4.4 psi)				0.68

*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : The port size model No. is 01 for Rc1/8 (6A), 02 for Rc1/4 (8A), 03 for Rc3/8 (10A) and 04 for Rc1/2 (15A).
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : The leakage current must be less than the values shown below.
*5 : When using at low vacuum, vacuum the OUT port side.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
AB31-*-*-******Z	10 mA or less	5 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less
AB41-*-*-******Z	10 mA or less	5 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics	
			C[dm³/(s·bar)]	b
NC (open when energized)				
AB31-$^{01}_{02}$-1-******Z	Rc1/8 Rc1/4	1.5	0.29	0.53
-2-******Z		2.0	0.53	0.52
-3-******Z		3.0	1.1	0.52
-4-******Z		3.5	1.7 [1.5]	0.49 [0.47]
-5-******Z		4.0	2.1 [1.9]	0.48 [0.47]
-6-******Z		5.0	3.0 [2.6]	0.42 [0.38]
AB41-$^{02}_{03}$-1-******Z	Rc1/4 Rc3/8	1.5	0.29	0.53
-2-******Z		2.0	0.53	0.52
-3-******Z		3.0	1.1	0.52
-4-******Z		3.5	1.7 [1.5]	0.49 [0.47]
-5-******Z		4.0	2.1 [1.9]	0.48 [0.47]
-6-******Z		5.0	3.0 [2.6]	0.42 [0.38]
-7-******Z		7.0	4.8 [4.6]	0.29 [0.37]
AB41-$^{03}_{04}$-8-******Z	Rc3/8 Rc1/2	10.0	9.3 [8.1]	0.36 [0.31]

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2 : Dimensions shown in [ ] are for stainless steel body.

How to order

AB31 - **02** - **3** - **H** **3A** **A** **B** **G** **S** **Z** - **DC24V**

AB41

Model No.

Ⓓ Coil housing Ⓖ Other options

Ⓔ Manual override (locking)

Ⓕ Mounting plate

Ⓗ With surge suppressor

Ⓘ Voltage

Ⓐ Port size

Ⓑ Orifice size

Ⓒ Body/sealant combination

*1

*2

Code	Description	Code	Description	Code	Description	Model No. AB31	AB41	AB41 Low pressure Large flow
Ⓐ Port size								
01	Rc1/8	**1G**	G1/8	**1N**	1/8NPT	●		
02	Rc1/4	**2G**	G1/4	**2N**	1/4NPT	●	●	
03	Rc3/8	**3G**	G3/8	**3N**	3/8NPT		●	●
04	Rc1/2	**4G**	G1/2	**4N**	1/2NPT			●

Ⓑ Orifice size				
1	ø1.5	●	●	
2	ø2	●	●	
3	ø3	●	●	
4	ø3.5	●	●	
5	ø4	●	●	
6	ø5	●	●	
7	ø7		●	
8	ø10			●

Ⓒ Body/sealant combination	**Body**	**Seal**	**Treatment**	**Remarks**			
H	Copper alloy	Nitrile rubber	Oil-prohibited	—	●	●	●
J		Fluoro rubber		—	●	●	●
P		Ethylene propylene rubber		—	●	●	●
L	Stainless steel	Nitrile rubber		—	●	●	●
M		Fluoro rubber		—	●	●	●
R		Ethylene propylene rubber		—	●	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓘ

Refer to page 335 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No.]

AB31-02-3-H3ABSZ-DC24V

Model : AB31

Ⓐ Port size : Rc 1/4
Ⓑ Orifice size : ø3
Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓓ Coil housing : Open frame lead wire for DC voltage
Ⓔ Manual override (locking) : None
Ⓕ Mounting plate : With mounting plate
Ⓖ Other options : None
Ⓗ Surge suppressor : With surge suppressor
Ⓘ Voltage : 24 VDC

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : The body for the low pressure large flow rate AB41-03/04-8 is bronze (standard) or stainless steel (option).

*2 : Do not use fluid containing oil with ethylene propylene rubber, since it is not oil-resistant.

For Items Ⓓ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓗ are not required, they should be left blank.

Ⓓ Coil housing			Ⓔ	Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description			Manual override (Locking)	Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Open frame	Lead wire (IP65 or equivalent)	A	B				G	H	S	12 VDC, 24 VDC, 48 VDC, 100 VDC
3M		With HP terminal box (G1/2)			D	E	F				
3N		HP terminal box with lamp (G1/2)									12 VDC, 24 VDC, 100 VDC
3I		HP terminal box (IP65 or equivalent) (G1/2)									12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		HP term box, lamp (IP65, equiv) (G1/2)									12 VDC, 24 VDC, 100 VDC
5A	Open frame (diode integrated)	Lead wire (IP65 or equivalent)	A	B				G	H		100 VAC, 200 VAC
5M		With HP terminal box (G1/2)			D	E	F				
5N		HP terminal box with lamp (G1/2)									
5I		HP terminal box (IP65 or equivalent) (G1/2)									
5J		HP term box, lamp (IP65, equiv) (G1/2)									

⚠ Refer to the following cautions for Items Ⓓ to Ⓘ.

3A 5A

- Open frame
  Lead wire 300mm
- 5A (diode integrated)

3M 3N 5M 5N

- Open frame HP terminal box
- 5M, 5N (diode integrated)

3I 3J 5I 5J

- Open frame HP terminal box (IP65 or equivalent)
- 5I, 5J (diode integrated)

G H

- Conduit
- G(CTC19)
- H(G1/2)

Refer to page 330 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓓ

*3 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage. Voltage of less than 100 VAC is not available.

Notes for Ⓔ to Ⓗ

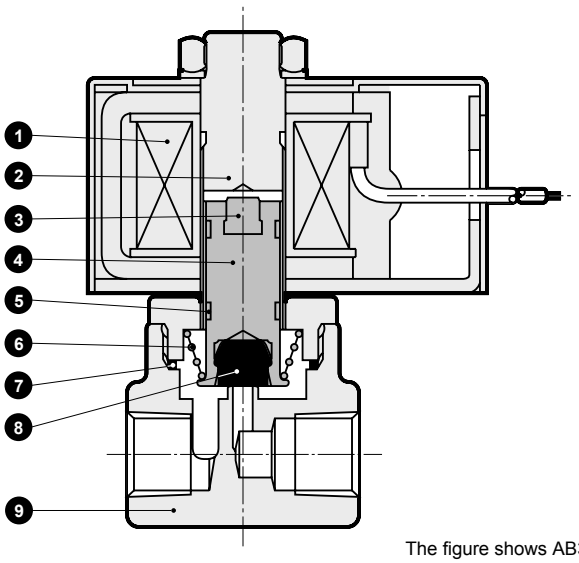
*4 : Manual override (Item Ⓔ A) cannot be mounted on the low pressure large flow rate AB41-03/04-8.
*5 : For Ⓖ, select an option from D, E, F, G and H.
*6 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*7 : Surge suppressor is incorporated as standard in the coil with diode.
*8 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

*9 : 100 VAC coil is compatible with 100 VAC 50/60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz.
*10 : For voltages other than above, contact CKD.
*11 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AB31/41-Z Series



The figure shows AB31.

No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	6	Plunger spring	SUS304	Stainless steel
2	Core assembly	SUS405 or equiv.316/403 *1	Stainless steel	7	O-ring	NBR (FKM/EPDM)	NBR: Nitrile rubber (FKM: Fluoro rubber) (EPDM: Ethylene propylene rubber)
3	Plunger cushion	PFA	Tetrafluoroethylene resin	8	Valve seal	NBR (FKM/EPDM)	
4	Plunger	SUS405 or equiv.	Stainless steel	9	Body	C3771/CAC408 (SUS303)	Bronze (stainless steel)
5	Wear ring	POM	Acetal resin				

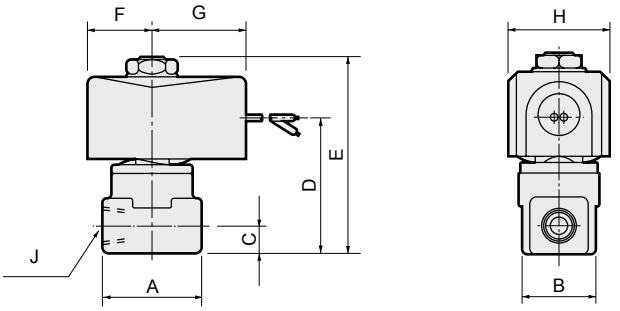
*1 : When the body/sealant combination code is other than H, the material is SUS405 or equivalent/316L/430. ( ) shows options.

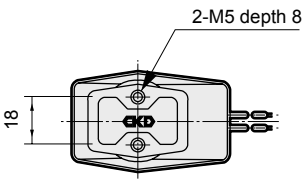
Dimensions CAD

● Open frame lead wire

AB31/41-*-1 to 7-[H/J/P] [3A/5A] ****Z

AB41-03/04-8-[H/J/P] [3A/5A] ****Z





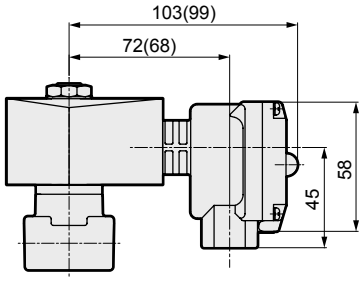
Model No.	A	B	C	D	E	F	G	H	J
AB31-$^{01}_{02}$-1 to 6-******Z	36	28	11	50.5	75	24	38	38	Rc1/8 Rc1/4
AB41-02-1 to 6-******Z	36	28	11	52	80.5	28	42	46	Rc1/4
AB41-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$-******Z	40	28	12	55	83.5	28	42	46	Rc1/4 Rc3/8
AB41-$^{03}_{04}$-8-******Z	50	29	15	64	92.6	28	42	46	Rc3/8 Rc1/2

Optional dimensions

CAD

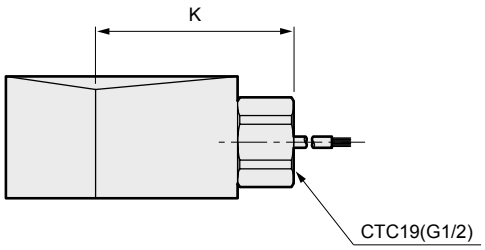
* Refer to the open frame lead wire dimensions on page 336 for common dimensions.

● Open frame + HP terminal box
AB31/41-*-*-* [3 5] [M N I J] ****Z



Dimensions shown in ( ) are for AB31 Series.

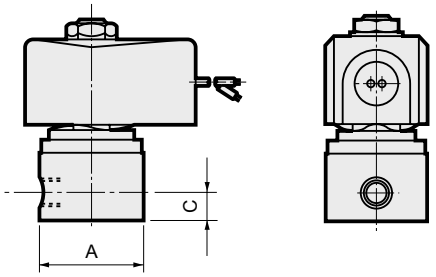
● Open frame + conduit
AB31/41-*-1 to 7-* [3A 5A] [G H]



Dimensions shown in ( ) are for G1/2.

Model No.	K
AB31-*	53(56)
AB41-*	57(60)

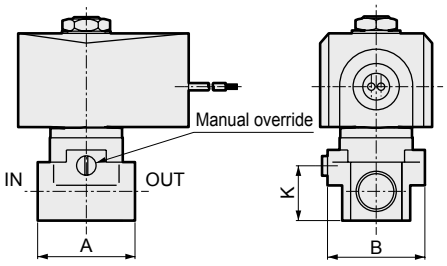
● Stainless steel body
AB31/41-*-* [L M R] *****Z



Model No.	A	C
AB31-$^{01}_{02}$-1 to 6-******Z	ø37.5	11
AB41-02-1 to 6-******Z	ø37.5	11
AB41-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$-******Z	ø45	12
AB41-$^{03}_{04}$-8-******Z	50 *1	15

*1 (The max. dimension is ø54)

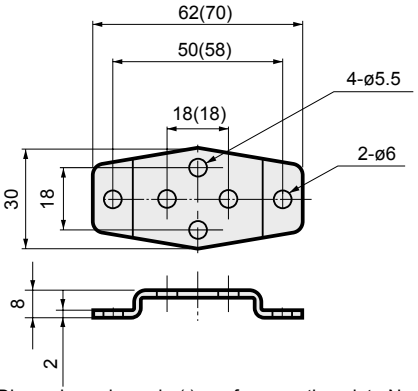
● Manual override (locking)
AB31/41-*-*-** [A] ***Z
(The figure shows copper alloy body.)



Model No.	A	B	K
AB31-$^{01}_{02}$-1 to 6-**A***Z	36	38(ø37.5)	19.5
AB41-02-1 to 6-**A***Z	36	38(ø37.5)	19.5
AB41-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$-**A***Z	40	40(ø45)	22.5

Dimensions shown in ( ) are for stainless steel body.

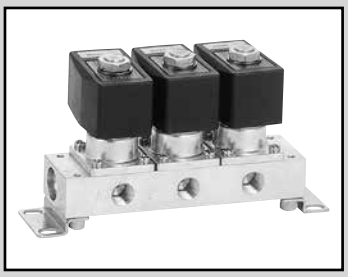
● Mounting plate
AB31/41-*-*-*** [B] **Z



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AB3-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● All of AB31 Series
AB4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AB41-02/03-1 to 7 Series - [H/J/P] ● Stainless steel body AB41-02-1 to 6- [L/M/R]
AB4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● AB41-03/04-8 Series ● Stainless steel body AB41-02-7- [L/M/R] AB41-03-1 to 7- [L/M/R]

* Material: Steel/Zinc plated



Direct acting 2 port solenoid valve for dry air, manifold/actuator
General purpose

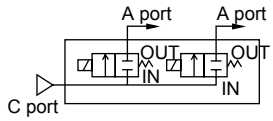
GAB312/GAB352/GAB412/GAB452-Z Series

- NC (open when energized)
- Common supply (port C pressurization), individual supply (port A pressurization)

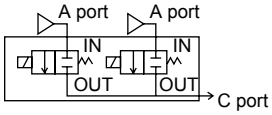
RoHS CAD

JIS symbol

- GAB312/412-Z
  (Common supply/
  port C pressurization)



- GAB352/452-Z
  (Individual supply/port A
  pressurization)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 to 4 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	5 (≈730 psi, 50 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)
Fluid temperature °C	-10 (14°F) to 45 (113°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 45 (113°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Max. working pressure differential (MPa)	Rated voltage	Power consumption (W) AC50/60 Hz	Power consumption (W) DC
GAB312/352-1-Z		1.5	2.5 (≈360 psi, 25 bar)			
-2-Z		2.0	1.5 (≈220 psi, 15 bar)			
-3-Z		3.0	0.5 (≈73 psi, 5 bar)	100 VAC 50/60 Hz		
-4-Z	—	3.5	0.35 (≈51 psi, 3.5 bar)			
-5-Z		4.0	0.2 (≈29 psi, 2 bar)			
-6-Z		5.0	0.12 (≈17 psi, 1.2 bar)	200 VAC 50/60 Hz		
GAB412/452-1-Z		1.5	4.0 (≈580 psi, 40 bar)		17	14
-2-Z		2.0	2.5 (≈360 psi, 25 bar)			
-3-Z		3.0	0.9 (≈130 psi, 9 bar)	12 VDC 24 VDC 48 VDC 100 VDC		
-4-Z	—	3.5	0.6 (≈87 psi, 6 bar)			
-5-Z		4.0	0.4 (≈58 psi, 4 bar)			
-6-Z		5.0	0.2 (≈29 psi, 2 bar)			
-7-Z		7.0	0.1 (≈15 psi, 1 bar)			

*1 : The model numbers above are for basic orifice sizes. Refer to How to order for other combinations.
*2 : For port size, refer to How to order (page 340) and dimensions (pages 178 to 181).
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : The leakage current must be less than the values shown below.
*5 : When using at low vacuum, vacuum the OUT port side.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
GAB312/352*-*-******Z	10 mA or less	5 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less
GAB412/452*-*-******Z	10 mA or less	5 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Weight

Model No.	Weight (kg) Actuator only	2 stations	3 stations	4 stations	5 stations	6 stations	7 stations	8 stations	9 stations	10 stations
GAB312 GAB352 -*-*-H3AZ	0.44	1.6	2.3	3.2	3.7	4.6	5.3	6.0	6.9	7.3
GAB412 GAB452 -*-*-H3AZ	0.56	1.9	2.8	3.8	4.6	5.7	6.5	7.4	8.5	9.1

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics	
			C[dm³/(s·bar)]	b
GAB312/352 -1-Z	-	1.5	0.29	0.53
-2-Z		2.0	0.53	0.52
-3-Z		3.0	1.1	0.52
-4-Z		3.5	1.5	0.47
-5-Z		4.0	1.9	0.47
-6-Z		5.0	2.6	0.38
GAB412/452 -1-Z	-	1.5	0.29	0.53
-2-Z		2.0	0.53	0.52
-3-Z		3.0	1.1	0.52
-4-Z		3.5	1.5	0.47
-5-Z		4.0	1.9	0.47
-6-Z		5.0	2.6	0.38
-7-Z		7.0	4.6	0.37

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Internal structure and parts list

Same as AB31/41-Z Series. Refer to page 336.

Dimensions

The same as the open frame of GAB Series. Refer to pages 178 to 181.

How to order

● Common supply (port C pressurization)

GAB312 ○ - **1** - **5** - **H** **5A** **A** **G** **S** **Z** - **AC100V**

● Individual supply (port A pressurization)

GAB352

● Common supply (port C pressurization)

GAB412

● Individual supply (port A pressurization)

GAB452

Model No.

Ⓐ Thread

Ⓑ Orifice size

Ⓒ Manifold station No. *2

Ⓓ Body/sealant combination *3

Ⓔ Coil housing

Ⓕ Manual override (locking)

Ⓖ Other options

Ⓗ With surge suppressor

Ⓘ Rated voltage

Code	Description	Model No. GAB312 GAB352	Model No. GAB412 GAB452
Ⓐ Thread			
Blank	Rc	●	●
G	G	●	●
N	NPT	●	●
Ⓑ Orifice size			
1	ø1.5	●	●
2	ø2	●	●
3	ø3	●	●
4	ø3.5	●	●
5	ø4	●	●
6	ø5	●	●
7	ø7		●
Ⓒ Manifold station No.			
2 to 10	2 stations to 10 stations	●	●
0	Actuator only	●	●

Ⓓ Body/sealant combination

	Body	Seal	Treatment	Remarks		
H	Copper alloy	Nitrile rubber	Oil-prohibited	—	●	●
J		Fluoro rubber		—	●	●
P		Ethylene propylene rubber		—	●	●
L	Stainless steel	Nitrile rubber		—	●	●
M		Fluoro rubber		—	●	●
R		Ethylene propylene rubber		—	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓔ to Ⓘ

Refer to page 341 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]

GAB312-1-3-H5AZ-AC200V

Model : GAB312 (common supply, port C pressurization)

Ⓐ Thread : Rc
Ⓑ Orifice size : ø1.5
Ⓒ Manifold station No. : 3 stations
Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓔ Coil housing : Open frame(diode integrated) lead wire for AC voltage
Ⓕ to Ⓗ : None
Ⓘ Rated voltage : 200 VAC 50/60 Hz

[Example of model No. 2]

GAB352G-5-2-H3AASZ-DC24V

Model : GAB352 (individual supply/port A pressurization)

Ⓐ Thread : G
Ⓑ Orifice size : ø4
Ⓒ Manifold station No. : 2 stations
Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓔ Coil housing : Open frame lead wire for DC voltage
Ⓕ Manual override (locking) : With
Ⓖ Other options : None
Ⓗ Surge suppressor : With surge suppressor
Ⓘ Rated voltage : 24 VDC

⚠ Precautions for model No. selection

*1 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Notes for Ⓒ to Ⓓ

*2 : For 11 or more manifold station No., contact CKD.

*3 : Do not use fluid containing oil with ethylene propylene rubber, since it is not oil-resistant.

For Items Ⓔ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓕ to Ⓗ are not required, they should be left blank.

Ⓔ Coil housing			Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description			Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
				A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Open frame	Lead wire (IP65 or equivalent)	A				G	H	S	12 VDC, 24 VDC, 48 VDC, 100 VDC
3M		With HP terminal box (G1/2)		D	E	F				
3N		HP terminal box with lamp (G1/2)								12 VDC, 24 VDC, 100 VDC
3I		HP term box (IP65, equiv) (G1/2)								12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		HP term box, lamp (IP65, equiv) (G1/2)								12 VDC, 24 VDC, 100 VDC
5A	Open frame (diode integrated)	Lead wire (IP65 or equivalent)	A				G	H		100 VAC, 200 VAC
5M		With HP terminal box (G1/2)		D	E	F				
5N		HP terminal box with lamp (G1/2)								
5I		HP term box (IP65, equiv) (G1/2)								
5J		HP term box, lamp (IP65, equiv) (G1/2)								

⚠ Refer to the following cautions for Items Ⓔ to Ⓘ.

3A 5A

- Open frame lead wire 300 mm
- 5A (diode integrated)

3M 3N 5M 5N

- Open frame HP terminal box
- 5M, 5N (diode integrated)

3I 3J 5I 5J

- Open frame HP terminal box (IP65 or equivalent)
- 5I, 5J (diode integrated)

G H

- Conduit
- G(CTC19)
- H(G1/2)

Refer to page 330 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓔ

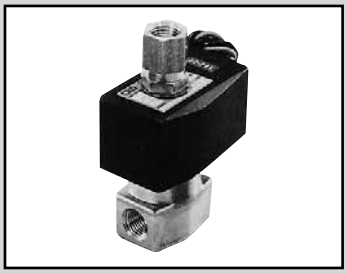
*4 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.

Notes for Ⓖ to Ⓗ

*5 : For Item Ⓖ, select an option from D, E, F, G and H.
*6 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*7 : Surge suppressor is incorporated as standard in the coil with diode.
*8 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

*9 : 100 VAC coil is compatible with 100 VAC 50/60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz.
*10 : For voltages other than above, contact CKD.
*11 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.



Direct acting 3-port solenoid valve for dry air
General purpose

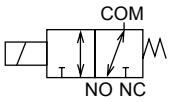
AG3*/AG4*-Z Series

- Universal, NC pressurization, NO pressurization
- Port size : Rc1/8, Rc1/4, Rc3/8

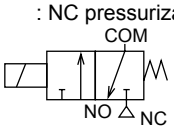
RoHS CAD

JIS symbol

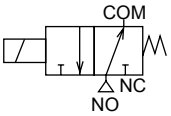
- AG31/41-Z
  : Universal



- AG33/43-Z
  : NC pressurization



- AG34/44-Z
  : NO pressurization



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to 45 (113°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 45 (113°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted

Individual specifications

1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm) TOP	Orifice size (mm) BODY	Max. working pressure differential (MPa)	Max. working pressure MPa	Rated voltage	Power consump (W) AC	Power consump (W) DC	Weight (kg)
Universal									
AG31-01 -1-******Z	Rc1/8	1.5	1.5	0.7 (≈100 psi)	1				0.45
AG31-02 -1-******Z	Rc1/8	1.5	1.5	0.7 (≈100 psi)	1				0.45
-2-******Z	Rc1/4	2.0	2.0	0.4 (≈58 psi)	1				0.45
AG41-02 -1-******Z	Rc1/4	2.0	2.0	0.65 (≈94 psi)	1				0.57 (Rc1/4)
AG41-03 -1-******Z	Rc1/4	2.0	2.0	0.65 (≈94 psi)	1				0.57 (Rc1/4)
-2-******Z	Rc3/8	2.3	2.3	0.4 (≈58 psi)	1	100 VAC 50/60 Hz 200 VAC 50/60 Hz	17	14	0.59 (Rc3/8)
NC pressurization									
AG33-01 -1-******Z	Rc1/8	1.5	1.5	1.0 (≈150 psi)	1				0.45
AG33-02 -1-******Z	Rc1/8	1.5	1.5	1.0 (≈150 psi)	1				0.45
-2-******Z	Rc1/4	2.0	2.0	0.7 (≈100 psi)	1				0.45
AG43-02 -4-******Z	Rc1/4	3.0	3.0	0.7 (≈100 psi)	1				0.57 (Rc1/4)
AG43-03 -4-******Z	Rc1/4	3.0	3.0	0.7 (≈100 psi)	1				0.57 (Rc1/4)
-5-******Z	Rc3/8	3.5	3.0	0.4 (≈58 psi)	1				0.59 (Rc3/8)
NO pressurization									
AG34-01 -1-******Z	Rc1/8	1.5	1.5	1.0 (≈150 psi)	1.5				0.45
AG34-02 -1-******Z	Rc1/8	1.5	1.5	1.0 (≈150 psi)	1.5				0.45
-2-******Z	Rc1/4	2.0	2.0	0.45 (≈65 psi)	1.5				0.45
AG44-02 -1-******Z	Rc1/4	2.0	2.0	0.75 (≈110 psi)	1.5				0.57 (Rc1/4)
AG44-03 -1-******Z	Rc1/4	2.0	2.0	0.75 (≈110 psi)	1.5				0.57 (Rc1/4)
-3-******Z	Rc1/4 Rc3/8	2.0	3.0	0.7 (≈100 psi)	1.5				0.59 (Rc3/8)
-4-******Z	Rc3/8	3.0	3.0	0.25 (≈36 psi)	1.5	12 VDC 24 VDC 48 VDC 100 VDC	17	14	0.59 (Rc3/8)

*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : The port size model No. is 01 for Rc1/8 (6A), 02 for Rc1/4 (8A) and 03 for Rc3/8 (10A).
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : The leakage current must be less than the values shown below.
*5 : When using at low vacuum, vacuum the NO port side of NC pressurization or the NC port side of NO pressurization.

Leakage current

Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
AG31/33/34-*-******Z	6 mA or less	3 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less
AG41/43/44-*-******Z	8 mA or less	4 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics			
		TOP	BODY	C[dm³/(s·bar)]		b	
				TOP	BODY	TOP	BODY
Universal							
AG31-$^{01}_{02}$-1-******Z	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53
-2-******Z	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52
AG41-$^{02}_{03}$-1-******Z	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52
-2-******Z	Rc3/8	2.3	2.3	0.74	0.74	0.66	0.53
NC pressurization							
AG33-$^{01}_{02}$-1-******Z	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53
-2-******Z	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52
AG43-$^{02}_{03}$-4-******Z	Rc1/4	3.0	3.0	1.1	1.1	0.72	0.52
-5-******Z	Rc3/8	3.5	3.0	1.5	1.1	0.62	0.52
NO pressurization							
AG34-$^{01}_{02}$-1-******Z	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53
-2-******Z	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52
AG44-$^{02}_{03}$-1-******Z	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52
-3-******Z	Rc1/4 Rc3/8	2.0	3.0	0.53	1.1	0.54	0.52
-4-******Z	Rc3/8	3.0	3.0	1.1	1.1	0.72	0.52

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

● Universal

AG31 - **02** - **2** - **H** **3A** **A** **B** **G** **S** **Z** - **DC24V**

AG41

● NC pressurization

AG33

AG43

● NO pressurization

AG34

AG44

Model No.

Ⓐ Port size

Ⓑ Orifice size

Ⓒ Body/sealant combination *1 *2

Ⓓ Coil housing Ⓖ Other options

Ⓔ Manual override (locking)

Ⓕ Mounting plate

Ⓗ With surge suppressor

Ⓘ Voltage

Code	Description	Code	Description	Code	Description	Model No. AG31	AG41	AG33	AG43	AG34	AG44
Ⓐ Port size											
01	Rc1/8	1G	G1/8	1N	1/8NPT	●		●		●	
02	Rc1/4	2G	G1/4	2N	1/4NPT	●	●	●	●	●	●
03	Rc3/8	3G	G3/8	3N	3/8NPT		●		●		●

Ⓑ Orifice size

	AG31		AG41		AG33		AG43		AG34		AG44							
	TOP	BODY	TOP	BODY	TOP	BODY	TOP	BODY	TOP	BODY	TOP	BODY						
1	ø1.5	ø1.5	ø2.0	ø2.0	ø1.5	ø1.5	-	-	ø1.5	ø1.5	ø2.0	ø2.0	●	●	●		●	●
2	ø2.0	ø2.0	ø2.3	ø2.3	ø2.0	ø2.0	-	-	ø2.0	ø2.0	-	-	●	●	●		●	
3	-	-	-	-	-	-	-	-	-	-	ø2.0	ø3.0						●
4	-	-	-	-	-	-	ø3.0	ø3.0	-	-	ø3.0	ø3.0				●		●
5	-	-	-	-	-	-	ø3.5	ø3.0	-	-	-	-				●		

Ⓒ Body/sealant combination

	Body	Seal	Treatment	Remarks						
H	Copper alloy	Nitrile rubber	Oil-prohibited	—	●	●	●	●	●	●
J		Fluoro rubber		—	●	●	●	●	●	●
P		Ethylene propylene rubber		—	●	●	●	●	●	●
L	Stainless steel	Nitrile rubber		—	●	●	●	●	●	●
M		Fluoro rubber		—	●	●	●	●	●	●
R		Ethylene propylene rubber		—	●	●	●	●	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ to Ⓘ

Refer to page 345 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No.]
AG31-02-1-H3AASZ-DC24V

Model : AG31

Ⓐ Port size : Rc1/4
Ⓑ Orifice size : TOP-ø1.5/BODY-ø1.5
Ⓒ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓓ Coil housing : Open frame lead wire for DC voltage
Ⓔ Manual override (locking) : Selected
Ⓕ Ⓖ : None
Ⓗ Surge suppressor : With surge suppressor
Ⓘ Voltage : 24 VDC

⚠ Precautions for model No. selection

Notes for Ⓒ

*1 : NO valve seal of AG34 and AG44 is fluoro rubber.
*2 : Do not use fluid containing oil with ethylene propylene rubber, since it is not oil-resistant.

For Items Ⓓ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓗ are not required, they should be left blank.

Ⓓ Coil housing			Ⓔ	Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description			Manual override (Locking)	Mounting plate	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
					A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Open frame	Lead wire (IP65 or equivalent)	A	B	D	E	F	G	H	S	12 VDC, 24 VDC, 48 VDC, 100 VDC
3M		HP terminal box (G1/2)									
3N		HP terminal box with lamp (G1/2)									12 VDC, 24 VDC, 100 VDC
3I		HP terminal box (IP65 or equivalent) (G1/2)									12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		HP term.box w/ lamp (IP65 equiv.) (G1/2)									12 VDC, 24 VDC, 100 VDC
5A	Open frame (diode integrated)	Lead wire (IP65 or equivalent)	A	B	D	E	F	G	H		100 VAC, 200 VAC
5M		HP terminal box (G1/2)									
5N		HP terminal box with lamp (G1/2)									
5I		HP terminal box (IP65 or equivalent) (G1/2)									
5J		HP term.box w/ lamp (IP65 equiv.) (G1/2)									

⚠ Refer to the following cautions for Ⓓ to Ⓘ.

3A 5A		● Open frame Lead wire 300 mm ● 5A (diode integrated)
3M 3N 5M 5N		● Open frame HP terminal box ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

G H		● Conduit ● G(CTC19) ● H(G1/2)

Refer to page 330
for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓓ

*3 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage
Voltage of less than 100 VAC is not available.

Notes for Ⓖ to Ⓗ

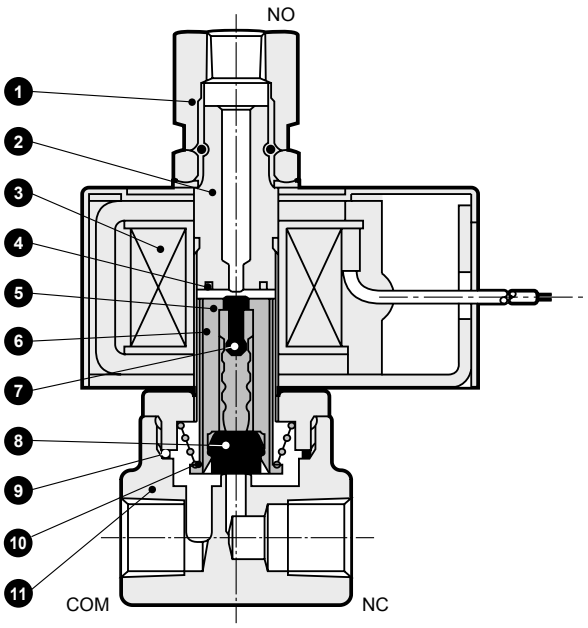
*4 : For Ⓖ, select an option from D, E, F, G and H.
*5 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*6 : Surge suppressor is incorporated as standard in the coil with diode.
*7 : Tropicalization (rust-proof coating) is available as a measure against rust.Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓘ

*8 : 100 VAC coil is compatible with 100 VAC 50/60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz.
*9 : For voltages other than above, contact CKD.
*10 : The lead wire is available in the standard 300 mm length, and 500 mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● AG3*/4*-Z Series



No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Core assembly	SUS405 or equiv.316/403 *1	Stainless steel
3	Coil assembly	-	-
4	Shading coil	Cu (Ag for SUS body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Plunger tube	PET	Polyethylene terephthalate
7	NO valve sealant	NBR (FKM/EPDM) *3	NBR: Nitrile rubber (FKM: Fluoro rubber) (EPDM: Ethylene propylene rubber)
8	NC valve sealant	NBR (FKM/EPDM)	
9	O-ring	NBR (FKM/EPDM)	
10	Plunger spring	SUS304	Stainless steel
11	Body	C3771(SUS303)	Copper alloy (stainless steel)

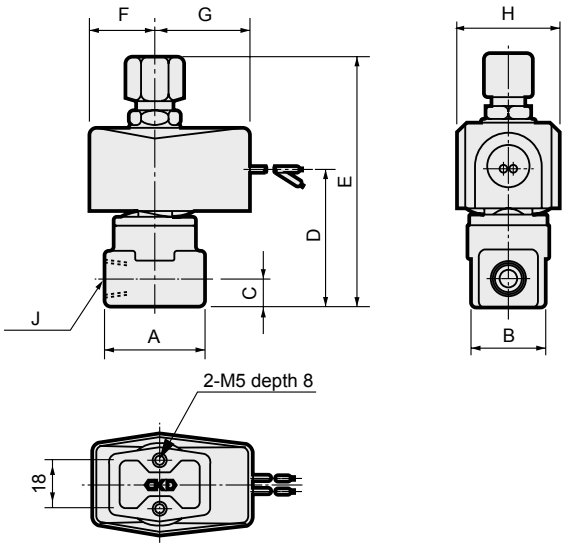
*1 : When the body/sealant combination code is other than H, the material is SUS405 or equivalent/316L/430.
*2 : ( ) shows options.
*3 : For AG34 and AG44 with body/sealant combination code H/L, NO valve seal is FKM.

The figure shows AG31/33/34.

Dimensions CAD

● Open frame lead wire

AG3*/4*-*-*- [H / J / P] [3A / 5A] ****Z

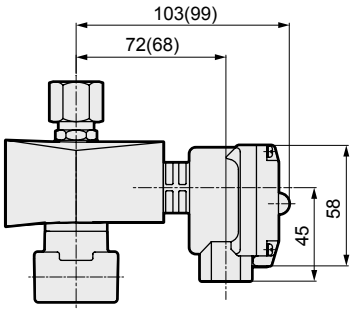


Model No.	A	B	C	D	E	F	G	H	J
AG3*-$^{01}_{02}$-1 to 2-******Z	36	28	11	50.5	94	24	38	38	Rc1/8 Rc1/4
AG4*-02-1 to 5-******Z	36	28	11	52	99.5	28	42	46	Rc1/4
AG4*-03-1 to 5-******Z	40	28	12	55	106	28	42	46	Rc3/8

Optional dimensions

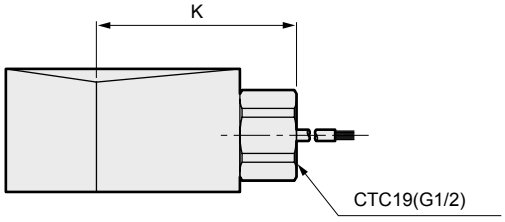
* Refer to the open frame lead wire dimensions on page 346 for common dimensions.

● Open frame + HP terminal box
AG3*/4*-*-*-* [5 3] [J I N M] ****Z



Dimensions shown in ( ) are for AG3 Series.

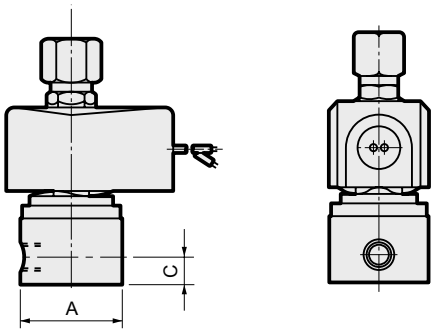
● Open frame + conduit
AG3*/4*-*-*-* [3A 5A] [G H]



Dimensions shown in ( ) are for G1/2.

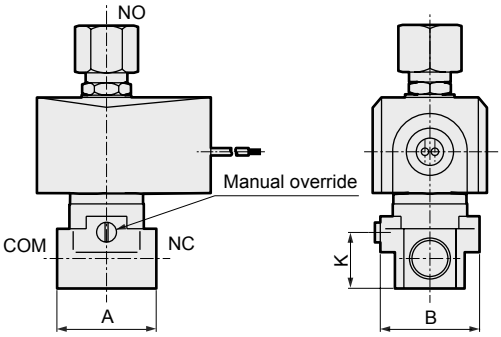
Model No.	K
AG3*	53(56)
AG4*	57(60)

● Stainless steel body
AG3*/4*-*-*- [L M R] *****Z



Model No.	A	C
AG3*- 01 02 -1 to 2-******Z	ø37.5	11
AG4*-02-1 to 5-******Z	ø37.5	11
AG4*-03-1 to 5-******Z	ø45	12

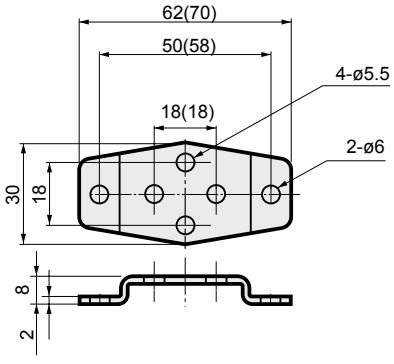
● Manual override (locking)
AG3*/4*-*-*-** [A] ***Z
(The figure shows copper alloy body.)



Model No.	A	B	K
AG3*- 01 02 -1 to 2-**A***Z	36	38(ø37.5)	19.5
AG4*-02-1 to 5-**A***Z	36	38(ø37.5)	19.5
AG4*-03-1 to 5-**A***Z	40	40(ø45)	22.5

Dimensions shown in ( ) are for stainless steel body.

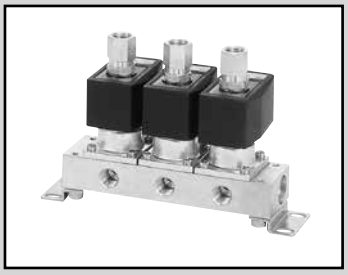
● Mounting plate
AG3*/4*-*-*-*** [B] **Z



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AG3-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● All of AG3* Series
AG4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● Copper alloy body AG4*-02/03-1 to 5- [H/J/P] ● Stainless steel body AG4*-02-1 to 5- [L/M/R]
AG4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● Stainless steel body AG4*-03-1 to 5- [L/M/R]

* Material: Steel/Zinc plated



Direct acting 3-port solenoid valve for dry air, manifold/actuator
General purpose

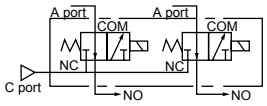
GAG31*/GAG35*/GAG41*/GAG45* -Z Series

- Universal
- Common supply/individual exhaust, common supply/separate flow

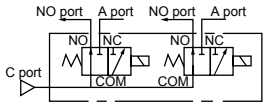
RoHS CAD

Manifold circuit configuration

● GAG31*/41*-Z
(Common supply/individual exhaust)



● GAG352/452-Z
(Common supply/separate flow)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)
Fluid temperature °C	-10 (14°F) to 45 (113°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 45 (113°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted

Individual specifications

Item / Model No.	NO port Port size	Orifice size (mm) TOP	Orifice size (mm) BODY	Max. working pressure differential (MPa)	Rated voltage	Power consumption (W) AC50/60 Hz	Power consumption (W) DC
GAG311-1-Z	Rc1/8	1.5	1.5	0.7 (≈100 psi, 7 bar)	100 VAC 50/60 Hz	17	14
351-2-Z	Rc1/8	2.0	2.0	0.4 (≈58 psi, 4 bar)	100 VAC 50/60 Hz	17	14
GAG312-1-Z	Rc1/4	1.5	1.5	0.7 (≈100 psi, 7 bar)	200 VAC 50/60 Hz	17	14
352-2-Z	Rc1/4	2.0	2.0	0.4 (≈58 psi, 4 bar)	200 VAC 50/60 Hz	17	14
GAG412-1-Z	Rc1/4	2.0	2.0	0.65 (≈94 psi, 6.5 bar)	12 VDC 24 VDC 48 VDC 100 VDC	17	14
452-2-Z	Rc1/4	2.3	2.3	0.4 (≈58 psi, 4 bar)	12 VDC 24 VDC 48 VDC 100 VDC	17	14
GAG413-1-Z	Rc3/8	2.0	2.0	0.65 (≈94 psi, 6.5 bar)	12 VDC 24 VDC 48 VDC 100 VDC	17	14
453-2-Z	Rc3/8	2.3	2.3	0.4 (≈58 psi, 4 bar)	12 VDC 24 VDC 48 VDC 100 VDC	17	14

*1 : The model numbers above are for the basic NO port size and orifice size. Refer to How to order for other combinations.
*2 : For A and C port sizes, refer to How to order (page 350) and dimensions (pages 204 to 207).
*3 : The voltage fluctuation range must be within ±10% of the rated voltage.
*4 : When using in a continuously energized state, use fluoro rubber seal.
*5 : The leakage current must be less than the values shown below.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
GAG34*-******Z	6 mA or less	3 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less
GAG45*-******Z	8 mA or less	4 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Weight

Model No.	Weight (kg) Actuator only	2 stations	3 stations	4 stations	5 stations	6 stations	7 stations	8 stations	9 stations	10 stations
GAG35*-*-*-H3AZ	0.45	1.6	2.3	3.2	3.7	4.6	5.3	6.0	7.0	7.4
GAG452-*-*-H3AZ	0.51	1.8	2.7	3.6	4.3	5.4	6.1	7.0	8.1	8.6
GAG453-*-*-H3AZ	0.52	1.8	2.7	3.6	4.4	5.4	6.2	7.1	8.2	8.7

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics			
		TOP	BODY	C[dm³/(s·bar)]		b	
				TOP	BODY	TOP	BODY
GAG311 -1-Z	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53
351 -2-Z		2.0	2.0	0.53	0.53	0.54	0.52
GAG312 -1-Z	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53
352 -2-Z		2.0	2.0	0.53	0.53	0.54	0.52
GAG412 -1-Z	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52
452 -2-Z		2.3	2.3	0.74	0.74	0.66	0.53
GAG413 -1-Z	Rc3/8	2.0	2.0	0.53	0.53	0.54	0.52
453 -2-Z		2.3	2.3	0.74	0.74	0.66	0.53

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Internal structure and parts list

The same as AG3*/4*-Z Series. Refer to page 346.

Dimensions

The same as the open frame of GAG31/35/41/45 Series. Refer to pages 204 to 207.

How to order

● Common supply/individual exhaust (port C pressurization)

GAG31 1 ○ - 1 - 7 - H 5A A G S Z - AC100V

● Common supply/separate flow (port C pressurization)

GAG35 1

● Common supply/individual exhaust (port C pressurization)

GAG41 2

● Common supply/separate flow (port C pressurization)

GAG45 2

Model No.

Ⓕ Coil housing
Ⓘ With surge suppressor
Ⓖ Manual override (locking)
Ⓙ Rated voltage
Ⓗ Other options

Ⓐ NO port size
Ⓑ Thread
Ⓒ Orifice size
Ⓓ Manifold station No. *2
Ⓔ Body/sealant combination *3

Code	Description	Model No. GAG3**	Model No. GAG4**
Ⓐ NO port size			
1	1/8	●	
2	1/4	●	●
3	3/8		●
Ⓑ Thread			
Blank	Rc	●	●
G	G	●	●
N	NPT	●	●

Ⓒ Orifice size

	GAG3**		GAG4**			
	TOP	**BODY**	**TOP**	**BODY**		
1	ø1.5	ø1.5	ø2.0	ø2.0	●	●
2	ø2.0	ø2.0	ø2.3	ø2.3	●	●

Ⓓ Manifold station No.

2 to 10	2 stations to 10 stations	●	●
0	Actuator only	●	●

Ⓔ Body/sealant combination

	Body	Seal	Treatment	Remarks		
H	Copper alloy	Nitrile rubber	Oil-prohibited	—	●	●
J		Fluoro rubber		—	●	●
P		Ethylene propylene rubber		—	●	●
L	Stainless steel	Nitrile rubber		—	●	●
M		Fluoro rubber		—	●	●
R		Ethylene propylene rubber		—	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓕ to Ⓙ

Refer to page 351 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]

GAG311-1-4-H5AZ-AC200V

Model : GAG311 (common supply/individual exhaust, port C pressurization)

- Ⓐ NO port size : 1/8
- Ⓑ Thread : Rc
- Ⓒ Orifice size : TOP-ø1.5, BODY-ø1.5
- Ⓓ Manifold station No. : 4 stations
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓕ Coil housing : Open frame (diode integrated) lead wire for AC voltage
- Ⓖ to Ⓘ : None
- Ⓙ Rated voltage : 200 VAC 50/60 Hz

[Example of model No. 2]

GAG352N-2-7-H3AASZ-DC24V

Model : GAG352 (common supply/separate flow, port C pressurization)

- Ⓐ NO port size : 1/4
- Ⓑ Thread : NPT
- Ⓒ Orifice size : TOP-ø2.0, BODY-ø2.0
- Ⓓ Manifold station No. : 7 stations
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓕ Coil housing : Open frame lead wire for DC voltage
- Ⓖ Manual override (locking) : Selected
- Ⓗ Other options : None
- Ⓘ Surge suppressor : With surge suppressor
- Ⓙ Rated voltage : 24 VDC

⚠ Precautions for model No. selection

*1 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Notes for Ⓓ to Ⓔ

*2 : For 11 or more manifold station No., contact CKD.

*3 : Do not use fluid containing oil with ethylene propylene rubber, since it is not oil-resistant.

For Items Ⓕ to Ⓙ, the combinations indicated with codes are available.
Note that if options for Items Ⓖ to Ⓘ are not required, they should be left blank.

Ⓕ Coil housing			Ⓖ	Ⓗ Other options					Ⓘ	Ⓙ Rated voltage
Description			Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
				A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Open frame	Lead wire (IP65 or equivalent)	A				G	H	S	12 VDC, 24 VDC, 48 VDC, 100 VDC
3M		HP terminal box (G1/2)		D	E	F				
3N		HP terminal box with lamp (G1/2)								12 VDC, 24 VDC, 100 VDC
3I		HP term box (IP65, equiv) (G1/2)								12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		HP term.box w/ lamp (IP65 equiv.) (G1/2)								12 VDC, 24 VDC, 100 VDC
5A	Open frame (diode integrated)	Lead wire (IP65 or equivalent)	A				G	H		100 VAC, 200 VAC
5M		HP terminal box (G1/2)		D	E	F				
5N		HP terminal box with lamp (G1/2)								
5I		HP term box (IP65, equiv) (G1/2)								
5J		HP term.box w/ lamp (IP65 equiv.) (G1/2)								

⚠ Refer to the following cautions for Ⓕ to Ⓙ.

3A 5A

● Open frame
Lead wire 300 mm
● 5A (diode integrated)

3M 3N 5M 5N

● Open frame HP terminal box
● 5M, 5N (diode integrated)

3I 3J 5I 5J

● Open frame HP terminal box
(IP65 or equivalent)
● 5I, 5J (diode integrated)

G H

● Conduit
● G(CTC19)
● H(G1/2)

Refer to page 330
for coil selection.

⚠ Precautions for model No. selection

Ⓕ Notes for

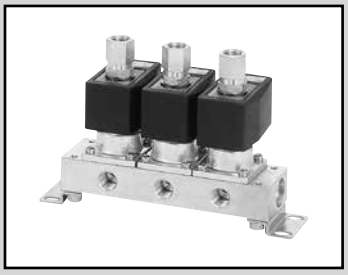
*4 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.

Notes for Ⓗ to Ⓘ

*5 : For Item Ⓗ, select an option from D, E, F, G and H.
*6 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*7 : Surge suppressor is incorporated as standard in the coil with diode.
*8 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Ⓙ

*9 : 100 VAC coil is compatible with 100 VAC 50/60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz.
*10 : For voltages other than above, contact CKD.
*11 : The lead wire is available in the standard 300 mm length, and 500mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.



Direct acting 3-port solenoid valve for dry air, manifold/actuator
General purpose

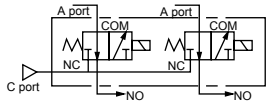
GAG33*/GAG43*-Z Series

- NC pressurization
- Common supply/individual exhaust

RoHS CAD

JIS symbol

- GAG33*/GAG43*-Z
  (Common supply/individual exhaust)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)
Fluid temperature °C	-10 (14°F) to 45 (113°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 45 (113°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted

Individual specifications

Item / Model No.	NO port size	Orifice size (mm) TOP	Orifice size (mm) BODY	Max. working pressure differential (MPa)	Rated voltage	Power consumption (W) AC50/60 Hz	Power consumption (W) DC
GAG331-1-Z	Rc1/8	1.5	1.5	1.0 (≈150 psi, 10 bar)	100 VAC 50/60 Hz	17	14
-2-Z		2.0	2.0	0.7 (≈100 psi, 7 bar)			
GAG332-1-Z	Rc1/4	1.5	1.5	1.0 (≈150 psi, 10 bar)	200 VAC 50/60 Hz		
-2-Z		2.0	2.0	0.7 (≈100 psi, 7 bar)			
GAG432-4-Z	Rc1/4	3.0	3.0	0.7 (≈100 psi, 7 bar)			
-5-Z		3.5	3.0	0.4 (≈58 psi, 4 bar)	12 VDC 24 VDC 48 VDC 100 VDC		
GAG433-4-Z	Rc3/8	3.0	3.0	0.7 (≈100 psi, 7 bar)			
-5-Z		3.5	3.0	0.4 (≈58 psi, 4 bar)			

*1 : The model numbers above are for the basic NO port size (Rc) and orifice size. Refer to How to order for other combinations.
*2 : For A and C port sizes, refer to How to order (page 354) and dimensions (pages 222 to 225).
*3 : The voltage fluctuation range must be ±10% of the rated voltage.
*4 : The leakage current must be less than the values shown below.
*5 : When using at low vacuum, vacuum the NO port side.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
GAG33*-******Z	6 mA or less	3 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less
GAG43*-******Z	8 mA or less	4 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Weight

Model No.	Weight (kg) Actuator only	2 stations	3 stations	4 stations	5 stations	6 stations	7 stations	8 stations	9 stations	10 stations
GAG33*-*-*-H3AZ	0.45	1.6	2.3	3.2	3.7	4.6	5.3	6.0	7.0	7.4
GAG432-*-*-H3AZ	0.51	1.8	2.7	3.6	4.3	5.4	6.1	7.0	8.1	8.6
GAG433-*-*-H3AZ	0.52	1.8	2.7	3.6	4.4	5.4	6.2	7.1	8.2	8.7

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics			
		TOP	BODY	C[dm³/(s·bar)]		b	
				TOP	BODY	TOP	BODY
GAG331-1-Z	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53
-2-Z		2.0	2.0	0.53	0.53	0.54	0.52
GAG332-1-Z	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53
-2-Z		2.0	2.0	0.53	0.53	0.54	0.52
GAG432-4-Z	Rc1/4	3.0	3.0	1.1	1.1	0.72	0.52
-5-Z		3.5	3.0	1.5	1.1	0.62	0.52
GAG433-4-Z	Rc3/8	3.0	3.0	1.1	1.1	0.72	0.52
-5-Z		3.5	3.0	1.5	1.1	0.62	0.52

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Internal structure and parts list

The same as AG3*/4*-Z Series. Refer to page 346.

Dimensions

The same as the open frame of GAG33/43 Series. Refer to pages 222 to 225.

How to order

● Common supply/individual exhaust (port C pressurization)

GAG33 / GAG43 **1** ( ) **-2-6-H5AAGS Z -AC100V**

- GAG33 / GAG43 → Model No.
- 1 → Ⓐ NO port size
- ( ) → Ⓑ Thread
- 2 → Ⓒ Orifice size
- 6 → Ⓓ Manifold station No. *2
- H → Ⓔ Body/sealant combination *3
- 5A → Ⓕ Coil housing
- A → Ⓖ Manual override (locking)
- G → Ⓗ Other options
- S → Ⓘ With surge suppressor
- Z → Ⓙ Rated voltage
- AC100V → Ⓙ Rated voltage

Code	Description	Model No. GAG33*	Model No. GAG43*
Ⓐ NO port size			
1	1/8	●	
2	1/4	●	●
3	3/8		●
Ⓑ Thread			
Blank	Rc	●	●
G	G	●	●
N	NPT	●	●

Ⓒ Orifice size

	GAG33* TOP	GAG33* BODY	GAG43* TOP	GAG43* BODY	GAG33*	GAG43*
1	ø1.5	ø1.5	-	-	●	
2	ø2.0	ø2.0	-	-	●	
4	-	-	ø3.0	ø3.0		●
5	-	-	ø3.5	ø3.0		●

Ⓓ Manifold station No.			
2 to 10	2 stations to 10 stations	●	●
0	Actuator only	●	●

Ⓔ Body/sealant combination

	Body	Seal	Treatment	Remarks	GAG33*	GAG43*
H	Copper alloy	Nitrile rubber	Oil-prohibited	—	●	●
J		Fluoro rubber		—	●	●
P		Ethylene propylene rubber		—	●	●
L	Stainless steel	Nitrile rubber		—	●	●
M		Fluoro rubber		—	●	●
R		Ethylene propylene rubber		—	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓕ to Ⓙ

Refer to page 355 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]

GAG331-1-4-H5AZ-AC200V

Model : GAG331 (common supply/individual exhaust, port C pressurization)

- Ⓐ NO port size : 1/8
- Ⓑ Thread : Rc
- Ⓒ Orifice size : TOP-ø1.5, BODY-ø1.5
- Ⓓ Manifold station No. : 4 stations
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓕ Coil housing : Open frame (diode integrated) lead wire for AC voltage
- Ⓖ to Ⓘ : None
- Ⓙ Rated voltage : 200 VAC 50/60 Hz

[Example of model No. 2]

GAG332G-2-7-H3AASZ-DC24V

Model : GAG332 (common supply/individual exhaust, port C pressurization)

- Ⓐ NO port size : 1/4
- Ⓑ Thread : G
- Ⓒ Orifice size : TOP-ø2.0, BODY-ø2.0
- Ⓓ Manifold station No. : 7 stations
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓕ Coil housing : Open frame lead wire for DC voltage
- Ⓖ Manual override (locking) : Selected
- Ⓗ Other options : None
- Ⓘ Surge suppressor : With surge suppressor
- Ⓙ Rated voltage : 24 VDC

⚠ Precautions for model No. selection

*1 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Notes for Ⓓ to Ⓔ

*2 : For 11 or more manifold station No., contact CKD.

*3 : Do not use fluid containing oil with ethylene propylene rubber, since it is not oil-resistant.

For Items Ⓕ to Ⓙ, the combinations indicated with codes are available.
Note that if options for Items Ⓖ to Ⓘ are not required, they should be left blank.

Ⓕ Coil housing			Ⓖ	Ⓗ Other options					Ⓘ	Ⓙ Rated voltage
Description			Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
				A-15a	A-15b	A-15c	CTC-19	G1/2		
3A	Open frame	Lead wire (IP65 or equivalent)	A				G	H	S	12 VDC, 24 VDC, 48 VDC, 100 VDC
3M		With HP terminal box (G1/2)		D	E	F				
3N		HP terminal box with lamp (G1/2)								12 VDC, 24 VDC, 100 VDC
3I		HP terminal box (IP65 or equivalent) (G1/2)								12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		HP term box, lamp (IP65, equiv) (G1/2)								12 VDC, 24 VDC, 100 VDC
5A	Open frame (diode integrated)	Lead wire (IP65 or equivalent)	A				G	H		100 VAC, 200 VAC
5M		With HP terminal box (G1/2)		D	E	F				
5N		HP terminal box with lamp (G1/2)								
5I		HP terminal box (IP65 or equivalent) (G1/2)								
5J		HP term box, lamp (IP65, equiv) (G1/2)								

⚠ Refer to the following cautions for Items Ⓕ to Ⓙ.

3A 5A		● Open frame Lead wire 300 mm ● 5A (diode integrated)
3M 3N 5M 5N		● Open frame HP terminal box ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

G H		● Conduit ● G(CTC19) ● H(G1/2)

Refer to page 330 for coil selection.

⚠ Precautions for model No. selection

Notes for Item Ⓕ

*4 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.

Notes for Items Ⓗ to Ⓘ

*5 : For Item Ⓗ, select an option from D, E, F, G and H.
*6 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*7 : Surge suppressor is incorporated as standard in the coil with diode.
*8 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Item Ⓙ

*9 : 100 VAC coil is compatible with 100 VAC 50/60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz.
*10 : For voltages other than above, contact CKD.
*11 : The lead wire is available in the standard 300 mm length, and 500mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Direct acting 3-port solenoid valve for dry air, actuator
General purpose

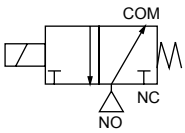
GAG34*/GAG44*-Z Series

● NO pressurization

RoHS CAD

JIS symbol

● GAG34*/44*-Z
: NO pressurization



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1.5 (≈220 psi, 15 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)
Fluid temperature °C	-10 (14°F) to 45 (113°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 45 (113°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted

Individual specifications

Item / Model No.	Port size	Orifice size (mm) TOP	Orifice size (mm) BODY	Max. working pressure differential (MPa)	Rated voltage	Power consumption (W) AC50/60 Hz	Power consumption (W) DC	Weight (kg)
GAG341-1-Z	Rc1/8	1.5	1.5	1.0 (≈150 psi, 10 bar)	100 VAC 50/60 Hz	17	14	0.45
-2-Z		2.0	2.0	0.45 (≈65 psi, 4.5 bar)				
GAG342-1-Z	Rc1/4	1.5	1.5	1.0 (≈150 psi, 10 bar)				
-2-Z		2.0	2.0	0.45 (≈65 psi, 4.5 bar)				
GAG442-1-Z	Rc1/4	2.0	2.0	0.75 (≈110 psi, 7.5 bar)	200 VAC 50/60 Hz			0.51
-3-Z		2.0	3.0	0.7 (≈100 psi, 7 bar)				
-4-Z		3.0	3.0	0.25 (≈36 psi, 2.5 bar)				
GAG443-1-Z	Rc3/8	2.0	2.0	0.75 (≈110 psi, 7.5 bar)	12 VDC 24 VDC 48 VDC 100 VDC			0.52
-3-Z		2.0	3.0	0.7 (≈100 psi, 7 bar)				
-4-Z		3.0	3.0	0.25 (≈36 psi, 2.5 bar)				

*1 : The model numbers above are for the basic NO port size (Rc) and orifice size. Refer to How to order for other combinations.
*2 : The voltage fluctuation range must be within ±10% of the rated voltage.
*3 : The leakage current must be less than or equal to the values shown below.
*4 : When using at low vacuum, vacuum the NC port side.

Leakage current

Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
GAG34*-******Z	6 mA or less	3 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less
GAG44*-******Z	8 mA or less	4 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics			
		TOP	BODY	C[dm³/(s·bar)]		b	
				TOP	BODY	TOP	BODY
GAG341 -1-Z	Rc1/8	1.5	1.5	0.29	0.29	0.64	0.53
-2-Z		2.0	2.0	0.53	0.53	0.54	0.52
GAG342 -1-Z	Rc1/4	1.5	1.5	0.29	0.29	0.64	0.53
-2-Z		2.0	2.0	0.53	0.53	0.54	0.52
GAG442 -1-Z	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52
-3-Z		2.0	3.0	0.53	1.1	0.54	0.52
-4-Z		3.0	3.0	1.1	1.1	0.72	0.52
GAG443 -1-Z	Rc3/8	2.0	2.0	0.53	0.53	0.54	0.52
-3-Z		2.0	3.0	0.53	1.1	0.54	0.52
-4-Z		3.0	3.0	1.1	1.1	0.72	0.52

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

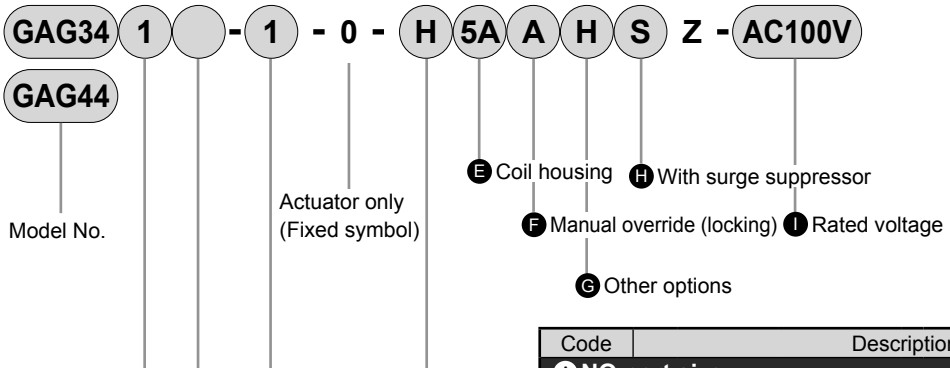
Internal structure and parts list

The same as AG3*/4*-Z Series. Refer to page 346.

Dimensions

The same as the open frame of GAG34/44 Series. Refer to pages 238 to 241.

How to order



Code	Description	Model No. GAG34*	Model No. GAG44*
A NO port size			
1	1/8	●	
2	1/4	●	●
3	3/8		●
B Thread			
Blank	Rc	●	●
G	G	●	●
N	NPT	●	●

C Orifice size

	GAG34*		GAG44*			
	TOP	**BODY**	**TOP**	**BODY**		
1	ø1.5	ø1.5	ø2.0	ø2.0	●	●
2	ø2.0	ø2.0	-	-	●	
3	-	-	ø2.0	ø3.0		●
4	-	-	ø3.0	ø3.0		●

D Body/sealant combination

	Body	Seal	Treatment	Remarks		
H	Copper alloy	Nitrile rubber	Oil-prohibited	—	●	●
J		Fluoro rubber		—	●	●
P		Ethylene propylene rubber		—	●	●
L	Stainless steel	Nitrile rubber		—	●	●
M		Fluoro rubber		—	●	●
R		Ethylene propylene rubber		—	●	●

Refer to Intro Page 39 for reference on material combinations.

E to I

Refer to page 359 for details on the coil housing, other options and voltage, etc.

The combinations indicated with ● in the above table are available.

[Example of model No. 1]
GAG341-1-0-H5AZ-AC200V
Model : GAG341
A NO port size : 1/8
B Thread : Rc
C Orifice size : TOP-ø1.5, BODY-ø1.5
D Body/sealant combination
: Body - copper alloy, sealant - nitrile rubber
E Coil housing : Open frame
(diode integrated) lead wire for AC voltage
F to H : None
I Rated voltage : 200 VAC 50/60 Hz

[Example of model No. 2]
GAG342N-2-0-H3AASZ-DC24V
Model : GAG342
A NO port size : 1/4
B Thread : NPT
C Orifice size : TOP-ø2.0, BODY-ø2.0
D Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
E Coil housing : Open frame lead wire for DC voltage
F Manual override (locking) : Selected
G Other options : None
H Surge suppressor : With surge suppressor
I Rated voltage : 24 VDC

⚠ Precautions for model No. selection

Notes for D

*1 : NO valve seal is fluoro rubber.
*2 : Do not use fluid containing oil with ethylene propylene rubber, since it is not oil-resistant.

For Items Ⓔ to Ⓘ, the combinations indicated with codes are available.
Note that if options for Items Ⓕ to Ⓗ are not required, they should be left blank.

Ⓔ Coil housing			Ⓕ	Ⓖ Other options					Ⓗ	Ⓘ Rated voltage
Description			Manual override (Locking)	Cable gland (marine cable gland)			Conduit (conduit piping)		With surge suppressor	Description
				A-15a	A-15b	A-15c	CTC19	G1/2		
3A	Open frame	Lead wire (IP65 or equivalent)	A	D	E	F	G	H	S	12 VDC, 24 VDC, 48 VDC, 100 VDC
3M		With HP terminal box (G1/2)								
3N		HP terminal box with lamp (G1/2)								12 VDC, 24 VDC, 100 VDC
3I		HP terminal box (IP65 or equivalent) (G1/2)								12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		HP term box, lamp (IP65, equiv) (G1/2)								12 VDC, 24 VDC, 100 VDC
5A	Open frame (diode integrated)	Lead wire (IP65 or equivalent)	A	D	E	F	G	H		100 VAC, 200 VAC
5M		With HP terminal box (G1/2)								
5N		HP terminal box with lamp (G1/2)								
5I		HP terminal box (IP65 or equivalent) (G1/2)								
5J		HP term box, lamp (IP65, equiv) (G1/2)								

⚠ Refer to the following cautions for Items Ⓔ to Ⓘ.

3A 5A		● Open frame Lead wire 300 mm ● 5A (diode integrated)
3M 3N 5M 5N		● Open frame HP terminal box ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

G H		● Conduit ● G(CTC19) ● H(G1/2)

Refer to page 330 for coil selection.

⚠ Precautions for model No. selection

Notes for Item Ⓔ

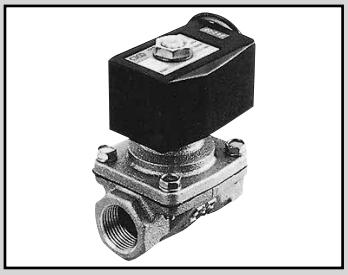
*3 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage.

Notes for Items Ⓖ to Ⓗ

*4 : For Item Ⓖ, select an option from D, E, F, G and H.
*5 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*6 : Surge suppressor is incorporated as standard in the coil with diode.
*7 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.

Notes for Item Ⓘ

*8 : 100 VAC coil is compatible with 100 VAC 50/60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz.
*9 : For voltages other than above, contact CKD.
*10 : The lead wire is available in the standard 300 mm length, and 500mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.



Pilot kick 2-port solenoid valve for dry air
General purpose

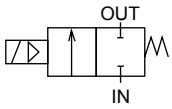
ADK11-Z Series

- NC (open when energized)
- Port size: Rc1/4 to Rc1
- Diaphragm drive

RoHS CAD

JIS symbol

- NC (open when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^3 Pa (abs)]
Working pressure differential MPa	0 to 0.7 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	4 (≈580 psi, 40 bar)
Fluid temperature °C	Nitrile rubber: -10 (14°F) to 40 (104°F) (no freezing), Fluoro rubber: 5 (41°F) to 40 (104°F)
Ambient temperature °C	-10 (14°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Pilot kick poppet/diaphragm drive
Valve seat leakage cm^3/min(ANR)	1 or less (8A/10A: at 0.02 to 0.7 MPa, 15A to 25A: at 0.02 to 0.6 MPa)*
Mounting orientation	Unrestricted

* When used at a pressure less than 0.02 MPa, the sealant may be unstable. Contact CKD in this case.

Individual specifications

1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)	Rated voltage	Power consump (W) AC	Power consump (W) DC	Weight (kg)
ADK11-8A-*****Z	Rc1/4	12	0	0.7 (≈100 psi)	100 VAC 50/60 Hz 200 VAC 50/60 Hz 12 VDC 24 VDC 48 VDC 100 VDC	15.5	14	0.8
-10A-*****Z	Rc3/8	12		0.7 (≈100 psi)				0.8
-15A-*****Z	Rc1/2	16		0.6 (≈87 psi)				1.0
-20A-*****Z	Rc3/4	23		0.6 (≈87 psi)				1.1
-25A-*****Z	Rc1	28		0.6 (≈87 psi)				1.5

*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : The voltage fluctuation range must be within ±10% of the rated voltage.
*3 : The leakage current must be less than or equal to the values shown below.

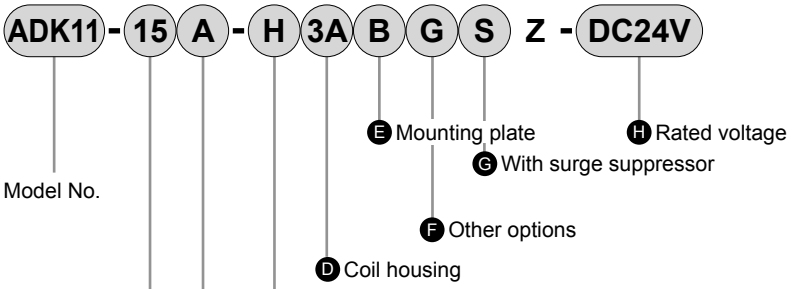
Leakage current: Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
ADK11-8A to 25A-*****Z	10 mA or less	5 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics		
			C[dm³/(s·bar)]	b	S(mm²)
ADK11-8A-*****Z	Rc1/4	12	9.2	0.36	-
ADK11-10A-*****Z	Rc3/8	12	11	0.46	-
ADK11-15A-*****Z	Rc1/2	16	20	0.31	-
ADK11-20A-*****Z	Rc3/4	23	-	-	162
ADK11-25A-*****Z	Rc1	28	-	-	231

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order



Code	Description
A Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1

B Thread	
A	Rc
G	G
N	NPT

C Body/sealant combination

	Body	Seal	Treatment	Remarks
H	Bronze	Nitrile rubber	Oil-prohibited	—
J		Fluoro rubber		—
L	Stainless steel	Nitrile rubber		—
M		Fluoro rubber		—

Refer to Intro Page 39 for reference on material combinations.

D to H

Refer to page 363 for details on the coil housing, other options and voltage, etc.

[Example of model No.]
ADK11-15A-H3ABSZ-DC24V
Model : ADK11

A Port size	: 1/2
B Thread	: Rc
C Body/sealant combination	: Body - bronze, sealant - nitrile rubber
D Coil housing	: Open frame lead wire for DC voltage
E Mounting plate	: With mounting plate
F Other options	: None
G Surge suppressor	: With surge suppressor
H Rated voltage	: 24 VDC

For Items Ⓓ to Ⓗ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓖ are not required, they should be left blank.

Ⓓ Coil housing			Ⓔ	Ⓕ Other options					Ⓖ	Ⓗ Rated voltage
Description			Mounting plate	Cable gland (marine cable gland) A-15a	Cable gland (marine cable gland) A-15b	Cable gland (marine cable gland) A-15c	Conduit (conduit piping) CTC-19	Conduit (conduit piping) G 1 / 2	With surge suppressor	Description
3A	Open frame	Lead wire (IP65 or equivalent)	B				G	H	S	12 VDC, 24 VDC, 48 VDC, 100 VDC
3M		With HP terminal box (G1/2)		D	E	F				
3N		HP terminal box with lamp (G1/2)								12 VDC, 24 VDC, 100 VDC
3I		HP terminal box (IP65 or equivalent) (G1/2)								12 VDC, 24 VDC, 48 VDC, 100 VDC
3J		HP terminal box with lamp (IP65 or equivalent) (G1/2)								12 VDC, 24 VDC, 100 VDC
5A	Open frame (diode integrated)	Lead wire (IP65 or equivalent)	B				G	H		100 VAC, 200 VAC
5M		With HP terminal box (G1/2)		D	E	F				
5N		HP terminal box with lamp (G1/2)								
5I		HP terminal box (IP65 or equivalent) (G1/2)								
5J		HP terminal box with lamp (IP65 or equivalent) (G1/2)								

⚠ Refer to the following cautions for Ⓓ to Ⓗ.

3A 5A		● Open frame Lead wire 300 mm ● 5A (diode integrated)
3M 3N 5M 5N		● Open frame HP terminal box ● 5M, 5N (diode integrated)
3I 3J 5I 5J		● Open frame HP terminal box (IP65 or equivalent) ● 5I, 5J (diode integrated)

G H		● Conduit ● G(CTC19) ● H(G1/2)

Refer to page 330 for coil selection.

⚠ Precautions for model No. selection

Notes for Ⓓ

*1 : Coils for 5A/5M/5N/5I/5J have a diode to convert AC to DC voltage. Voltage of less than 100 VAC is not available.

Notes for Items Ⓔ to Ⓖ

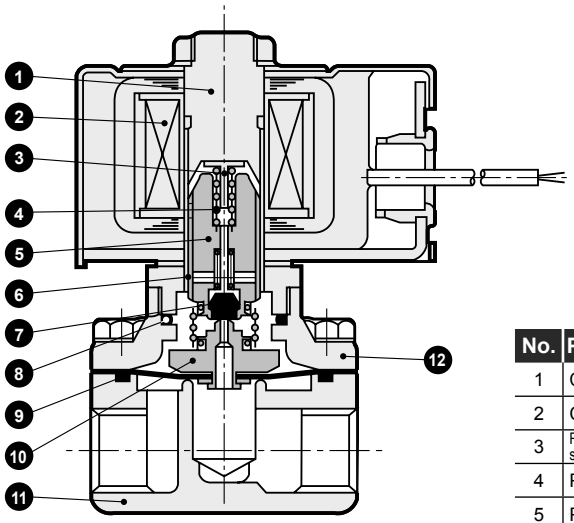
*2 : For Ⓕ, select an option from D, E, F, G and H.
*3 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*4 : Surge suppressor is incorporated as standard in the coil with diode.
*5 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.

Notes for Ⓗ

*6 : 100 VAC coil is compatible with 100 VAC 50/60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz.
*7 : For voltages other than above, contact CKD.
*8 : The lead wire is available in the standard 300 mm length, and 500mm, 1000 mm, 2000 mm and 3000 mm lengths. Contact CKD for more information.

Internal structure and parts list

● ADK11-Z Series



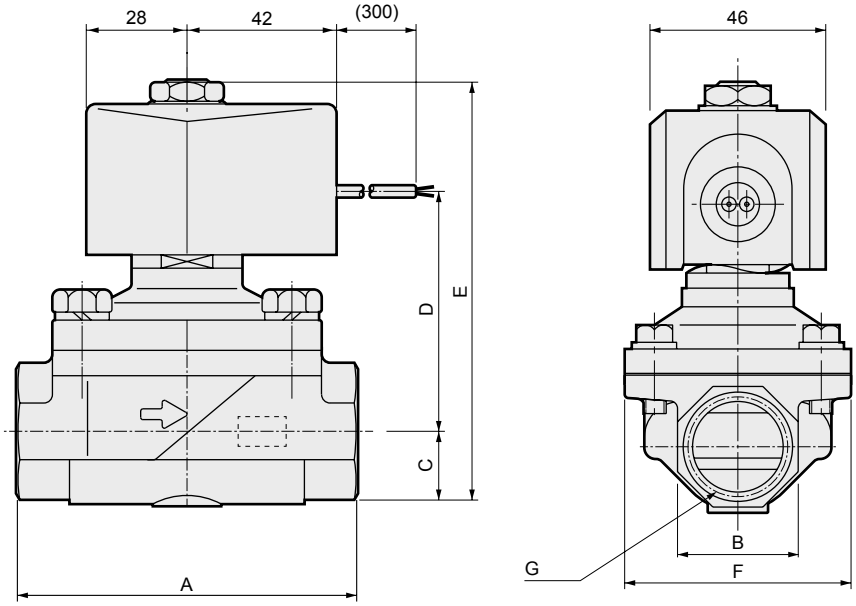
The figure shows ADK11-8A/10A.

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./316/403	Stainless steel
2	Coil assembly	-	-
3	Residual magnetism suppressor	PPS	Polyphenylene sulfide
4	Plunger spring	SUS304	Stainless steel
5	Plunger	SUS405 or equiv.	Stainless steel
6	Wear ring	POM	Acetal resin
7	Valve seal	NBR(FKM)	NBR: Nitrile rubber (FKM: Fluoro rubber)
8	O-ring	NBR(FKM)	
9	O-ring	NBR(FKM)	
10	Diaphragm assembly	SUS304, NBR(FKM)	Stainless steel, nitrile rubber (Fluoro rubber)
11	Body	CAC408(SCS13)	Bronze (stainless steel)
12	Body	C3771(SCS13)	Copper alloy (stainless steel)

( ) shows options.

Dimensions CAD

● Open frame lead wire
ADK11-*-* 3A/5A ***Z



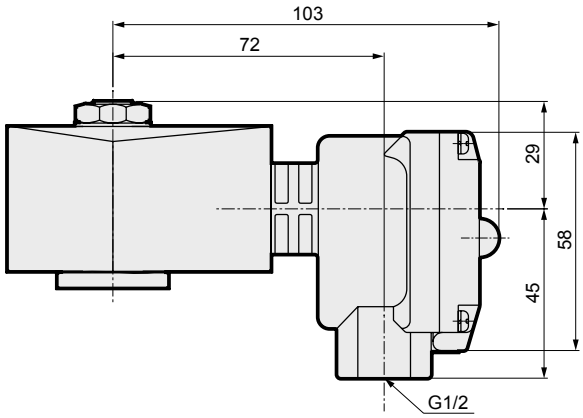
Model No.	A	B	C	D	E	F	G
ADK11-8A-*****Z	50	23	11.5	52	92.5	46	Rc1/4
ADK11-10A-*****Z	50	23	11.5	52	92.5	46	Rc3/8
ADK11-15A-*****Z	71	27(29)	14.5	57	100.5	50	Rc1/2
ADK11-20A-*****Z	80	32(35)	17.5	60.5	107	60	Rc3/4
ADK11-25A-*****Z	90	41(45)	21.5(22.5)	66	116.5(117.5)	71	Rc1

*1: Dimensions shown in ( ) are for stainless steel body.

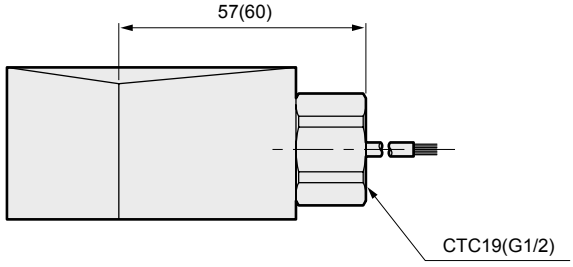
Optional dimensions

* Refer to the open frame lead wire dimensions on page 364 for common dimensions.

● Open frame + HP terminal box
ADK11-*-* 3 M 5 N ***Z



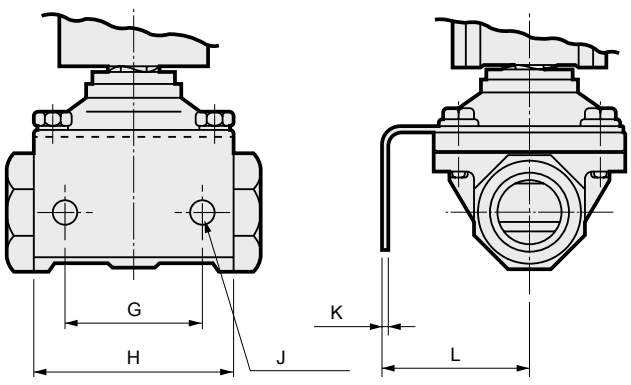
● Open frame + conduit
ADK11-*-* 3A G 5A H



Dimensions shown in ( ) are for G1/2.

● Mounting plate
ADK11-*-** B **Z

Material : Steel
Zinc plated



Model No.	G	H	J	K	L
ADK11-8A-**B**Z	30	50	ø7	2	33.5
ADK11-10A-**B**Z	30	50	ø7	2	33.5
ADK11-15A-**B**Z	40	56	ø9	3.2	45
ADK11-20A-**B**Z	45	63	ø9	3.2	50
ADK11-25A-**B**Z	50	75	ø11	3.2	56

Mounting plate model	Compatibility
ADK11-8A-MOUNT-PLATE-KIT	● ADK11-8A Z Series
ADK11-10A-MOUNT-PLATE-KIT	● ADK11-10A Z Series
ADK11-15A-MOUNT-PLATE-KIT	● ADK11-15A Z Series
ADK11-20A-MOUNT-PLATE-KIT	● ADK11-20A Z Series
ADK11-25A-MOUNT-PLATE-KIT	● ADK11-25A Z Series

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

Direct acting 2, 3-port solenoid valve for dry air (AB-Z/GAB-Z/AG-Z/GAG-Z)

Design/selection

⚠WARNING

1 Working fluids

(1) The quality of the dry air used for the general purpose valve for dry air (Z Series) should have an atmospheric dew point of -60°C and over and an oil removing rate of 0.01 mg/m^3 or less.

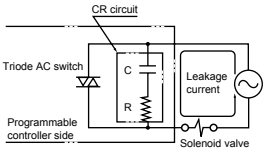
(2) This valve cannot be used for maintaining vacuum. Consult with CKD when the vacuum needs to be maintained.

⚠CAUTION

1 Continuous energizing

Use the NO pressurization when using the 3-port valve in a continuously energized state with the NO port pressurized. When continuously energizing the universal or NC pressurization, use a fluoro rubber seal.

2 Leakage current from other fluid control components



When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the specifications. Failure to observe this could lead to malfunctions.

Mounting, piping and wiring

⚠CAUTION

1 Piping

(1) Always hold the socket with a wrench, etc., if the NO side is a socket.

2 Wiring

Refer to Intro Page 64 for information on how to wire a terminal box.

When using the product

⚠CAUTION

1 Manual operation

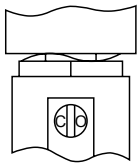
When using a product with a manual override, follow the operations below:

[For NC (open when energized)]

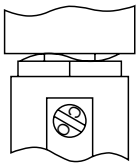
Opening : Insert a flathead screwdriver into the slit on the manual adjustment shaft, and turn it approx. 120° to the right or left. The plunger will rise and the valve will open. (For the 3-port valve, the NC side valve seat will open and the NO side valve seat will close.) The open state is held even when the screwdriver is removed.

Always return the valve to the original position after use.

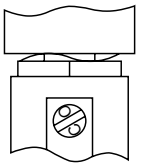
Closing : From the open position, turn the manual adjustment shaft so that the slit is returned to the perpendicular position, which will lower the plunger and close the valve. (For the 3-port valve, the NC side valve seat will close and the NO side valve seat will open.) (Refer to the figure below)



Valve closed state



Valve open state



Valve open state

Maintenance

⚠CAUTION

1 When disassembling or assembling, tighten the core assembly and socket with the following tightening torques.

Model No.	Core assembly tightening torque	Socket tightening torque	Nut tightening torque
AB	25 to 45 Nm	-	8 to 16 Nm
AG	25 to 45 Nm	8 to 16 Nm	8 to 16 Nm

Precautions for each model series and for individual products

Pilot kick 2, 3-port solenoid valve for dry air (ADK-Z)

Design/selection

⚠ WARNING

1 Working fluids

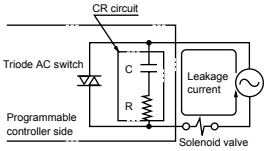
(1) The quality of the dry air used for the general purpose valve for dry air (Z Series) should have an atmospheric dew point of -60°C and over and oil removing rate of 0.1 $PPM^{w}/_{w}$ or less.

(2) This valve cannot be used for maintaining vacuum.

⚠ CAUTION

1 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the specifications.



Mounting, piping and wiring

⚠ CAUTION

1 Mounting

(1) As a general rule, the mounting orientation is vertical, with the coil on top.

2 Piping

(1) If the pipe vibrates when the solenoid valve is opened and closed, securely fix the piping.

(2) When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.

(3) If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. For the fluid inlet, use piping of a piping size that matches the port size of the valve. Do not use a needle valve.

3 Wiring

Refer to Intro Page 64 for information on how to wire a terminal box.

When using the product

⚠ CAUTION

1 Instantaneous leakage

With the pilot kick 2-port valve, if the pressure is suddenly applied while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.

MEMO

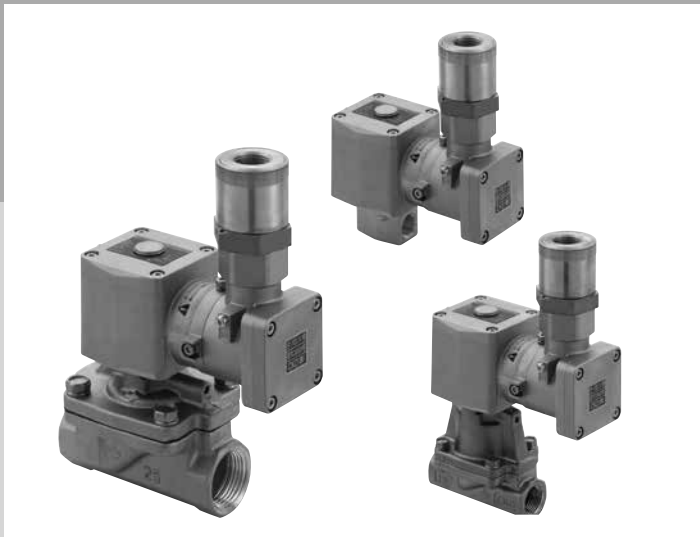
MEMO

AB*EX/AG*EX/AP*EX
AD*EX/ADK*EX

Explosion-proof solenoid valve (2, 3-port) Compliant with international explosion-proof guidelines

General purpose

■ **For air/water/oil (kerosene/light oil)/steam**



Overview

A solenoid valve that can be installed in hazardous areas where flammable gas or vapor produces an explosive atmosphere.
In addition to the conventional explosion-proof standard (Design Standard), international explosion-proof guidelines (according to Ministry of Health, Labour and Welfare) that align with the international standards (IEC) have been recognized as a new explosion-proof standard (Technical Standard).
Along with our popular conventional explosion-proof solenoid valve series, compliant with the Design Standard, CKD has commercialized products that comply with the international explosion-proof guidelines, for which CKD has acquired certification.

CONTENTS

⚠ Always read the precautions in the Introduction and on page 418 before use.

Series variation

Explosion-proof multi-fluid direct acting/ pilot operated 2, 3-port solenoid valve (Explosion-proof general purpose valve)

Explosion proof structure	No. of Ports	Model		Structure	Actuation category	Working fluid						
						Air	Low vacuum	Water	Kerosene	Oil (50 mm²/s or less)	Steam	
Ex d IIB T4	2-port		AB41EX4	Direct acting	NC (open when energized)	●	●	●	●	●		
	3-port		AG41EX4	Direct acting	Universal	●	●	●	●	●		
			AG43EX4		NC pressurization	●	●	●	●	●		
			AG44EX4		NO pressurization	●	●	●	●	●		
	2-port		AP11EX4	Pilot operated piston drive	NC (open when energized)	●		●	●	●		
			AP21EX4		NC (open when energized)	●		●	●	●		
			AD11EX4	Pilot operated diaphragm drive	NC (open when energized)	●		●	●	●		
			AD21EX4		NC (open when energized)	●		●	●	●		
			ADK11EX4	Pilot kick diaphragm drive	NC (open when energized)	●	●	●	●	●		
Ex d IIB T2	2-port		AB41EX2	Direct acting	NC (open when energized)	●		●	●	●	●	
			AP11EX2	Pilot operated piston drive	NC (open when energized)	●		●	●	●	●	
			AP21EX2		NC (open when energized)	●		●	●	●	●	

● Explosion-proof performance

Explo-proof structure	Japan certification(TIIS) *1	Korea certification(KOSHA) *1	Test model	Voltage	No. of Ports	Coil insulation class	Ambient temperature	Fluid temperature	Applicable solenoid valve
Ex d IIB T4	No. TC20594	16-AV4BO-0150X	EH21-G	AC	2	180(H)	-10 to +50°C	-10 to +60°C	● Direct acting (AB41EX4 Series) ● Pilot operated Piston drive (AP11EX4/AP21EX4 Series) Diaphragm drive (AD11EX4/AD21EX4 Series)
	No. TC20618	16-AV4BO-0147X	EB21-G	DC Diode integrated AC		130(B)			
	No. TC20593	16-AV4BO-0153X	EH31-G	AC	3	180(H)			● Direct acting (AG41EX4 Series) ● Direct acting (AG43EX4 Series) ● Direct acting (AG44EX4 Series)
	No. TC20617	16-AV4BO-0149X	EB31-G	DC Diode integrated AC		130(B)			
	No. TC20592	16-AV4BO-0152X	EH23-G	AC	2	180(H)			● Pilot kick diaphragm drive (ADK11EX4 Series)
	No. TC20616	16-AV4BO-0148X	EB23-G	DC Diode integrated AC		130(B)			
Ex d IIB T2	No. TC20614	16-AV4BO-0151X	EH21-G	AC	2	180(H)	-10 to +40°C	+5 to +170°C	● Direct acting (AB41EX2 Series) ● Pilot operated piston drive (AP11EX2/AP21EX2 Series)

*1 With regard to certification, the model codes of organizations for explosive-proof certification indicate certification in either Japan or Korea.

	Port size											Page
	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	32 Flange	Rc1 1/2	40 Flange	Rc2	50 Flange	
	●	●										374
	●	●										378
	●	●										
	●	●										
			●	●	●							382
						●	●	●	●	●	●	386
			●	●	●							392
						●	●	●	●	●	●	396
			●	●	●							402
	●	●										406
			●	●	●							410
						●	●	●	●	●	●	414

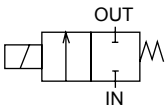
Explosion-proof direct acting 2-port solenoid valve General purpose

AB41EX4 Series

- Pressure and explosion proof construction Ex d IIB T4 (group IIB/temperature class T4)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1/4, Rc3/8

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AB41EX4
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)
Working pressure differential MPa	0 to 5 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	5 (≈730 psi, 50 bar)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	AC: Class 180 (H) AC diode integrated, DC: Class 130 (B)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T4)
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less (PTFE sealant: 300 or less) (air)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consumption (W)		Weight (kg)
			Air		Water (hot)/Kerosene		Oil (50 mm^2/s)			When holding		When starting		AC	DC	
			AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz/60 Hz		
NC (open when energized)																
AB41EX4-$\frac{02}{03}$-1	Rc1/4 Rc3/8	1.5	5.0	4.0	4.5	4.0	4.0	4.0	100 VAC 50/60 Hz 200 VAC 50/60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *5	18	15	29	24	8/7	11.6	1.2
-2		2.0	3.0	2.5	2.7	2.5	2.5	2.5								
-3		3.0	1.5	0.9	1.3	0.9	0.9	0.9								
-4		3.5	1.2	0.6	0.9	0.6	0.6	0.6								
-5		4.0	1.0	0.5	0.7	0.5	0.5	0.5								
-6		5.0	0.6	0.25	0.4	0.25	0.25	0.25								
-7		7.0	0.25	0.1	0.2	0.1	0.15	0.1								

*1 : The port size model No. is 02 for Rc1/4 (8A) and 03 for Rc3/8 (10A).
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within -10 to +10% of the rated voltage.
*4 : When using at low vacuum, vacuum the OUT port side.
*5 : ( ) shows options.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics		
			C[dm^3/(s·bar)]	b	Cv
NC (open when energized)					
AB41EX4-$\frac{02}{03}$-1	Rc1/4 Rc3/8	1.5	0.29	0.53	0.1
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.7 [1.5]	0.49 [0.47]	0.42 [0.40]
-5		4.0	2.1 [1.9]	0.48 [0.47]	0.54 [0.48]
-6		5.0	3.0 [2.6]	0.42 [0.38]	0.80 [0.62]
-7		7.0	4.8 [4.6]	0.29 [0.37]	1.0 [0.82]

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2: Dimensions shown in [ ] are for stainless steel body.

How to order

AB4①EX4 - 02 - 3 - 0 4 G 10 A KR - AC100V

Model No. ① | Ⓐ Actuation | Ⓑ Port size *1 | Ⓒ Orifice size | Ⓓ Body/sealant combination *2 | Ⓔ Coil *3 | Ⓕ Applicable cable O.D. | Ⓖ Other options *4 | Ⓗ Organizations for explosive-proof certification | Ⓘ Voltage *5

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
Ⓑ Port size	
02	Rc1/4
03	Rc3/8
Ⓒ Orifice size	
1	ø1.5
2	ø2
3	ø3
4	ø3.5
5	ø4
6	ø5
7	ø7

Ⓓ Body/sealant combination

		Body	Seal	Treatment	Remarks
0	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
B	Option	Copper alloy	Fluoro rubber	-	-
C	Option	Copper alloy	PTFE	-	-
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
E	Option	Stainless steel	Fluoro rubber	-	-
F	Option	Stainless steel	PTFE	-	-
H	Option	Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
J	Option	Copper alloy	Fluoro rubber	Oil-prohibited	-
K	Option	Copper alloy	PTFE	Oil-prohibited	-
P	Option	Copper alloy	Ethylene propylene rubber	Oil-prohibited	-
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	-
N	Option	Stainless steel	PTFE	Oil-prohibited	-
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	-

Ⓔ Coil	
3	Thermal class 130 (B) explosion-proof coil (for DC)
4	Thermal class 180 (H) explosion-proof coil (for AC)
5	Thermal class 130 (B) diode integrated explosion-proof coil (for AC)

Ⓕ Applicable cable O.D.	
9	ø7.5 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5

Ⓖ Other options		
Blank	Std.	No option
A	Option	Manual override (locking)
B	Option	With mounting plate
AB	Option	With manual override/mounting plate

Ⓗ Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *6
KR	Korea certification (KOSHA) *7

Ⓘ Voltage		
AC100V	Std.	100 VAC 50/60 Hz
AC200V	Std.	200 VAC 50/60 Hz
DC12V	Option	12 VDC
DC24V	Option	24 VDC
DC48V	Option	48 VDC
DC100V	Option	100 VDC

[Example of model No.]

AB41EX4-02-3-04G10AKR-AC100V

Model : AB41EX4

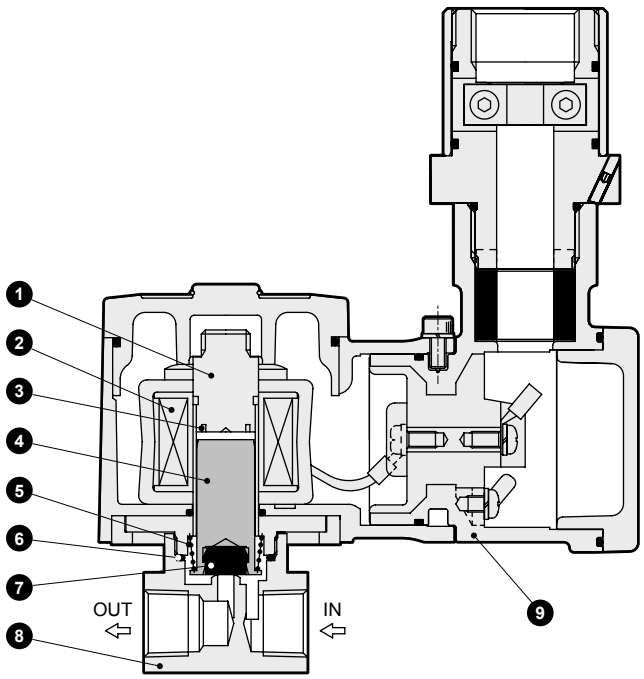
Ⓐ Actuation : NC (open when energized)
Ⓑ Port size : Rc1/4
Ⓒ Orifice size : ø3
Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
Ⓔ Coil : Thermal class 180 (H) explosion-proof coil (for AC)
Ⓕ Applicable cable O.D. : ø9.5 to ø10.5
Ⓖ Other options : Manual override (locking)
Ⓗ Organizations for explosive-proof certification : Korea certification (KOSHA)
Ⓘ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*2 : The ethylene propylene rubber seal combination (Item Ⓓ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*3 : For the thermal class B diode integrated coil, the AC power supply voltage is converted into DC coil voltage by the diode.
*4 : When Item Ⓓ is C, F, K or N, the manual override (Item Ⓖ A, AB) is not available.
*5 : Other voltages as below are also available. Contact CKD for details. 12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC (with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*6 : Japan certification (TIIS) is included.
*7 : Korea certification (KOSHA) is included.

Internal structure and parts list

● AB41EX4 Series

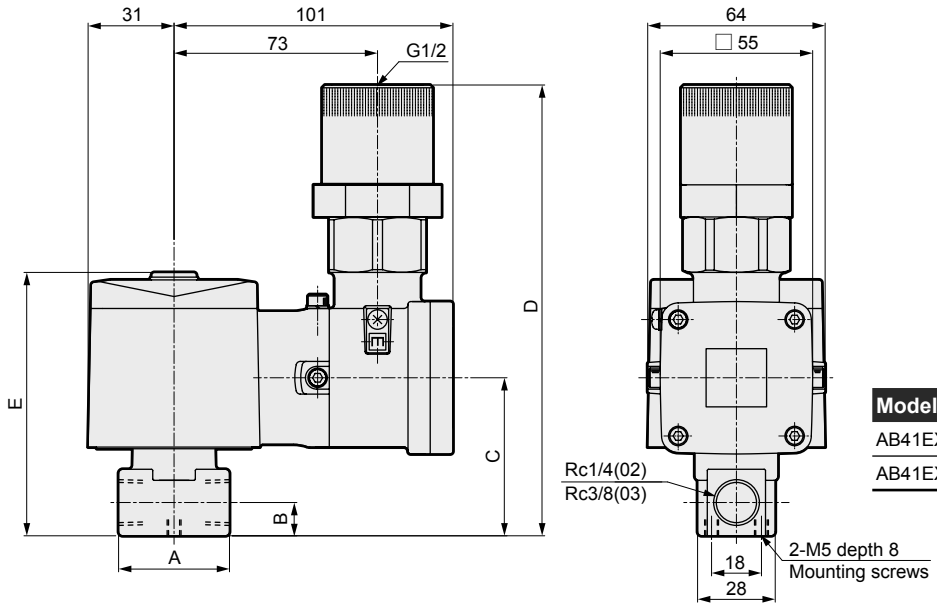


No.	Part name	Material		No.	Part name	Material	
1	Core assembly	SUS405 or equiv./316L/403	Stainless steel	6	O-ring	NBR (FKM/PTFE/EPDM)	NBR: Nitrile rubber
2	Coil assembly	-	-				FKM: Fluoro rubber
3	Shading coil	Cu (Ag for stainless steel body)	Copper (silver - S.S. body)	7	Valve seal	NBR (FKM/PTFE/EPDM)	EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin
4	Plunger	SUS405 or equiv.	Stainless steel	8	Body	C3771(SUS303)	Copper alloy (stainless steel)
5	Plunger spring	SUS304	Stainless steel	9	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions

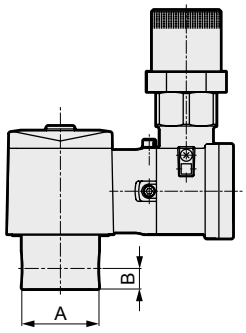
● Standard
AB41EX4



Model No.	A	B	C	D	E
AB41EX4-02-1 to 6	36	11	54	160	92
AB41EX4-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$	40	12	57	163	95

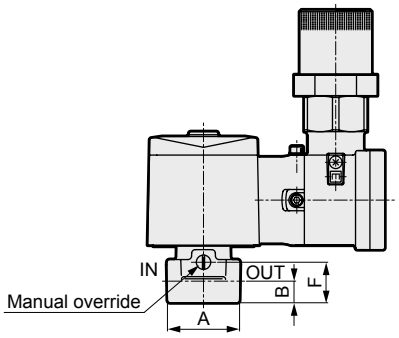
Optional dimensions

● Stainless steel body
AB41EX4-*-* D,E,F,R,L,M,N



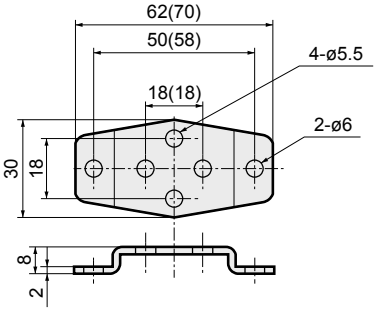
Model No.	A	B
AB41EX4-02-1 to 6	ø37.5	11
AB41EX4-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$	ø45	12

● Manual override (locking)
AB41EX4-*-*-*** A



Model No.	A	B	F
AB41EX4-02-1 to 6	36	11	19.5
AB41EX4-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$	40	12	22.5

● Mounting plate
AB41EX4-*-*-*** B AB



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility	
AB4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AB41EX4-02/03-1 to 7 ● AB41EX4-02-1 to 6	Copper alloy body Stainless steel body
AB4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● AB41EX4-02-7 ● AB41EX4-03-1 to 7	Stainless steel body Stainless steel body

* Material: Steel/Zinc plated

Explosion-proof direct acting 3-port solenoid valve General purpose

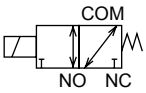
AG41EX4/AG43EX4/AG44EX4 Series

- Pressure and explosion proof construction Ex d IIB T4 (group IIB/temperature class T4)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- Universal, NC pressurization, NO pressurization
- Port size: Rc1/4, Rc3/8

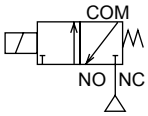
RoHS

JIS symbol

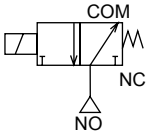
- AG41EX4: Universal



- AG43EX4:NO pressurization



- AG44EX4:NO pressurization



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AG41EX4/AG43EX4/AG44EX4
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)
Working pressure differential MPa	0 to 1.5 (refer to max. working pressure differential in individual specifications)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	AC: Class 180 (H) AC diode integrated, DC: Class 130 (B)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T4)
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less (PTFE sealant: 300 or less) (air)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)		Max. working pressure differential (MPa)						Max. working pressure	Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water (hot)/Kerosene		Oil (50 mm^2/s)				When holding		When starting		AC 50 Hz/60 Hz	DC	
		TOP	BODY	AC	DC	AC	DC	AC	DC	MPa		50 Hz	60 Hz	50 Hz	60 Hz			
Universal																		
AG41EX4-$\frac{02}{03}$-1	Rc1/4	2.0	2.0	1.0	0.7	1.0	0.7	0.4	0.3	1	100 VAC 50/60 Hz	22	17	35	27	10/8	11.6	1.3
-2	Rc3/8	2.3	2.3	0.7	0.4	0.7	0.4	0.25	0.15									
NC pressurization											200 VAC 50/60 Hz							
AG43EX4-$\frac{02}{03}$-4	Rc1/4	3.0	3.0	0.7	0.7	0.7	0.7	0.7	0.7	1		22	17	35	27	10/8	11.6	1.3
-5	Rc3/8	3.5	3.0	0.4	0.4	0.4	0.4	0.4	0.4									
NO pressurization											(12 VDC) (24 VDC) (48 VDC) (100 VDC) *6							
AG44EX4-$\frac{02}{03}$-1	Rc1/4	2.0	2.0	1.2	0.75	1.5	1.0	1.0	0.45	1.5		22	17	35	27	10/8	11.6	1.3
-3	Rc3/8	2.0	3.0	1.2	0.75	1.5	0.9	1.0	0.45									
-4		3.0	3.0	0.4	0.3	0.5	0.3	0.3	0.2									

*1 : The port size model No. is 02 for Rc1/4 (8A) and 03 for Rc3/8 (10A).
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within -10 to +10% of the rated voltage.
*4 : NO port pressurization is not possible for the PTFE seal of AG41EX4.
*5 : When using at low vacuum, vacuum the port side specified as below.
Universal: COM/NC/NO port, NC pressurization: NO port, NO pressurization: NC port
*6 : ( ) shows options.

Flow characteristics

Model No.	Port size	Orifice size (mm)		Flow characteristics					
				C[dm^3/(s·bar)]		b		Cv	
		TOP	BODY	TOP	BODY	TOP	BODY	TOP	BODY
Universal									
AG41EX4-$\frac{02}{03}$-1	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-2	Rc3/8	2.3	2.3	0.74	0.74	0.66	0.53	0.19	0.19
NC pressurization									
AG43EX4-$\frac{02}{03}$-4	Rc1/4	3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31
-5	Rc3/8	3.5	3.0	1.5	1.1	0.62	0.52	0.40	0.31
NO pressurization									
AG44EX4-$\frac{02}{03}$-1	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
-3	Rc3/8	2.0	3.0	0.53	1.1	0.54	0.52	0.15	0.31
-4		3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31

*: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AG4①EX4 - 02 - 2 - 0 4 G 10 A KR - AC200V

- AG4①EX4 — Model No.
- 02 — Ⓑ Port size *2
- 2 — Ⓒ Orifice size
- 0 4 — Ⓓ Body/sealant combination *3 *7
- G — Ⓖ Other options *5
- 10 — Ⓕ Applicable cable O.D.
- A — Ⓐ Actuation
- KR — Ⓗ Organizations for explosive-proof certification
- AC200V — Ⓘ Voltage *6

Code	Description	Model No. AG41EX4	AG43EX4	AG44EX4
Ⓐ Actuation				
1	Universal	●		
3	NC pressurization		●	
4	NO pressurization			●
Ⓑ Port size				
02	Rc1/4	●	●	●
03	Rc3/8	●	●	●
Ⓒ Orifice size				
1	TOP ø2.0 / BODY ø2.0	●		●
2	TOP ø2.3 / BODY ø2.3	●		
3	TOP ø2.0 / BODY ø3.0			●
4	TOP ø3.0 / BODY ø3.0		●	●
5	TOP ø3.5 / BODY ø3.0		●	
Ⓓ Body/sealant combination				
0 (Std.)	Body: Copper alloy; Seal: Nitrile rubber; Treatment: -; Remarks: Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●	●
B (Option)	Body: Copper alloy; Seal: Fluoro rubber; Treatment: -; Remarks: -	●	●	●
C (Option)	Body: Copper alloy; Seal: PTFE; Treatment: -; Remarks: -	●	●	
D (Option)	Body: Stainless steel; Seal: Nitrile rubber; Treatment: -; Remarks: Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●	●
E (Option)	Body: Stainless steel; Seal: Fluoro rubber; Treatment: -; Remarks: -	●	●	●
F (Option)	Body: Stainless steel; Seal: PTFE; Treatment: -; Remarks: -	●	●	
H (Option)	Body: Copper alloy; Seal: Nitrile rubber; Treatment: Oil-prohibited; Remarks: Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●	●
J (Option)	Body: Copper alloy; Seal: Fluoro rubber; Treatment: Oil-prohibited; Remarks: -	●	●	●
K (Option)	Body: Copper alloy; Seal: PTFE; Treatment: Oil-prohibited; Remarks: -	●	●	
P (Option)	Body: Copper alloy; Seal: Ethylene propylene rubber; Treatment: Oil-prohibited; Remarks: -	●	●	●
L (Option)	Body: Stainless steel; Seal: Nitrile rubber; Treatment: Oil-prohibited; Remarks: Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●	●
M (Option)	Body: Stainless steel; Seal: Fluoro rubber; Treatment: Oil-prohibited; Remarks: -	●	●	●
N (Option)	Body: Stainless steel; Seal: PTFE; Treatment: Oil-prohibited; Remarks: -	●	●	
R (Option)	Body: Stainless steel; Seal: Ethylene propylene rubber; Treatment: Oil-prohibited; Remarks: -	●	●	●
Ⓔ Coil				
3	Thermal class 130 (B) explosion-proof coil (for DC)	●	●	●
4	Thermal class 180 (H) explosion-proof coil (for AC)	●	●	●
5	Thermal class 130 (B) diode integrated explosion-proof coil (for AC)	●	●	●
Ⓕ Applicable cable O.D.				
9	ø7.5 to ø9.5	●	●	●
10	ø9.5 to ø10.5	●	●	●
11	ø10.5 to ø11.5	●	●	●
13	ø11.5 to ø13.5	●	●	●
Ⓖ Other options				
Blank (Std.)	No option	●	●	●
A (Option)	Manual override (locking)	●	●	●
B (Option)	With mounting plate	●	●	●
AB (Option)	Manual override/mounting plate	●	●	●
Ⓗ Organizations for explosive-proof certification				
Blank	Japan certification (TIIS) *8	●	●	●
KR	Korea certification (KOSHA) *9	●	●	●
Ⓘ Voltage				
AC100V (Std.)	100 VAC 50/60 Hz	●	●	●
AC200V (Std.)	200 VAC 50/60 Hz	●	●	●
DC12V (Option)	12 VDC	●	●	●
DC24V (Option)	24 VDC	●	●	●
DC48V (Option)	48 VDC	●	●	●
DC100V (Option)	100 VDC	●	●	●

[Example of model No.]

AG41EX4-02-2-04G10AKR-AC200V

Model : AG41EX4

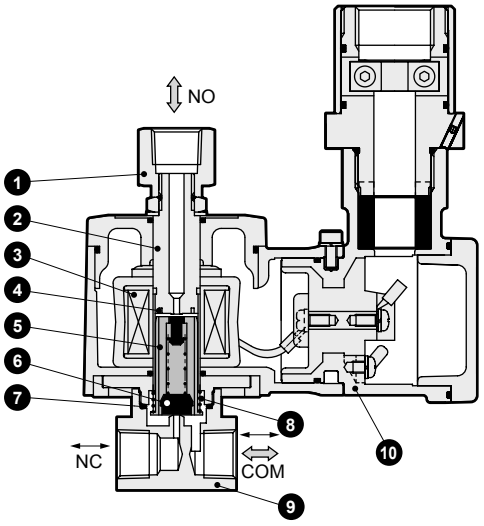
- Ⓐ Actuation : Universal
- Ⓑ Port size : Rc1/4
- Ⓒ Orifice size : TOPø2.3/BODYø2.3
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil : Thermal class 180 (H) explosion-proof coil (for AC)
- Ⓕ Applicable cable O.D. : ø9.5 to ø10.5
- Ⓖ Other options : Manual override (locking)
- Ⓗ Organizations for explosive-proof certification : Korea certification (KOSHA)
- Ⓘ Voltage : 200 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : As G and NPT threads can be used for piping port threads, contact CKD for details.
*3 : The ethylene propylene rubber seal combination (Item Ⓓ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*4 : For the thermal class B diode integrated coil, the AC power supply voltage is converted into DC coil voltage by the diode.
*5 : When Item Ⓓ is C, F, K or N, the manual override (Item Ⓖ A, AB) is not available.
*6 : Other voltages as below are also available. Contact CKD for details. 12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC (with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*7 : Even if nitrile rubber sealant is selected for AG44EX4, the seal material on the NO side will be fluoro rubber.
*8 : Japan certification (TIIS) is included.
*9 : Korea certification (KOSHA) is included.

Internal structure and parts list

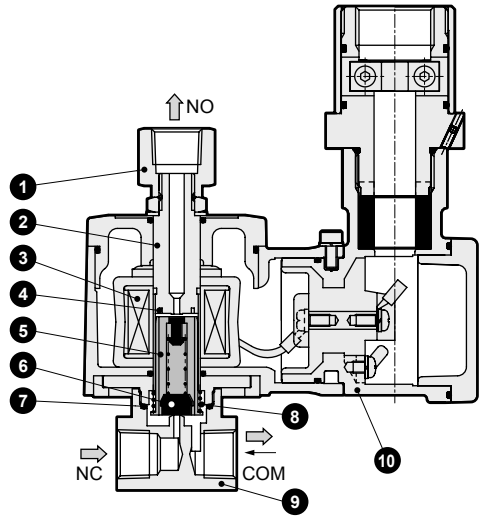
● AG41EX4 Series



No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Core assembly	SUS405 or equiv./316L/403	Stainless steel
3	Coil	-	-
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Valve seal	NBR (FKM/PTFE/EPDM)	NBR : Nitrile rubber FKM : Fluoro rubber EPDM: Ethylene propylene rubber PTFE : Tetrafluoroethylene resin
7	O-ring	NBR (FKM/PTFE/EPDM)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SUS303)	Copper alloy (stainless steel)
10	Coil case	ADC12	Aluminum die-casting

( ) shows options.

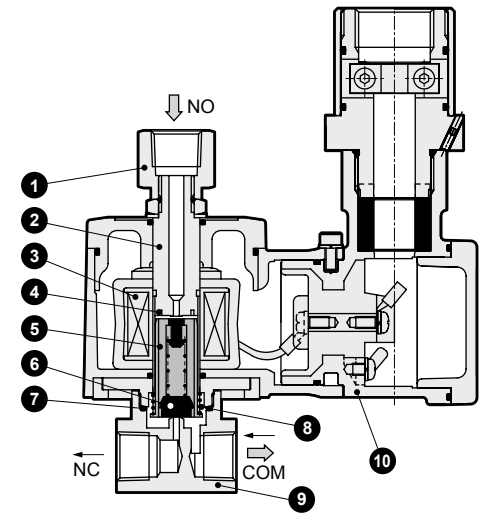
● AG43EX4 Series



No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Core assembly	SUS405 or equiv./316L/403	Stainless steel
3	Coil	-	-
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Valve seal	NBR (FKM/PTFE/EPDM)	NBR : Nitrile rubber FKM : Fluoro rubber EPDM : Ethylene propylene rubber PTFE : Tetrafluoroethylene resin
7	O-ring	NBR (FKM/PTFE/EPDM)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SUS303)	Copper alloy (stainless steel)
10	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AG44EX4 Series

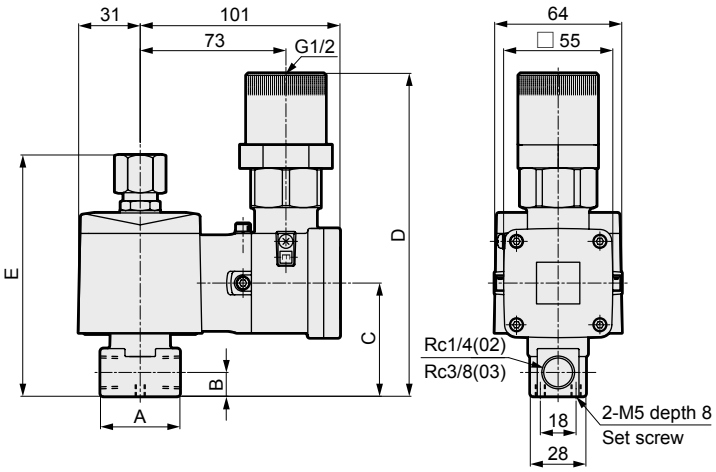


No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Core assembly	SUS405 or equiv./316L/403	Stainless steel
3	Coil	-	-
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Valve seal	NBR (FKM/EPDM)	NBR : Nitrile rubber FKM : Fluoro rubber EPDM : Ethylene propylene rubber
7	O-ring	NBR (FKM/EPDM)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SUS303)	Copper alloy (stainless steel)
10	Coil case	ADC12	Aluminum die-casting

( ) shows options.

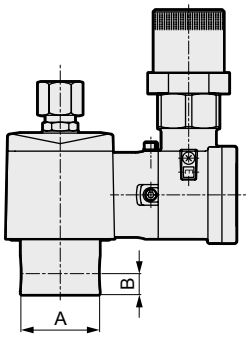
Dimensions and optional dimensions

● Standard
AG4*EX4



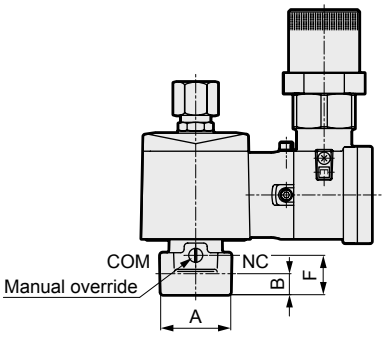
Model No.	A	B	C	D	E
AG41EX4-02-1/2	36	11	54	160	116
AG41EX4-03-1/2	40	12	57	163	122
AG43EX4-02-4/5	36	11	54	160	116
AG43EX4-03-4/5	40	12	57	163	122
AG44EX4-02-1/3/4	36	11	54	160	116
AG44EX4-03-1/3/4	40	12	57	163	122

● Stainless steel body
AG4*E4-*-*- D,E,F,R L,M,N



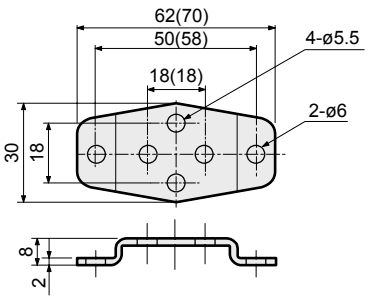
Model No.	A	B
AG41EX4-02-1/2	ø37.5	11
AG41EX4-03-1/2	ø45	12
AG43EX4-02-4/5	ø37.5	11
AG43EX4-03-4/5	ø45	12
AG44EX4-02-1/3/4	ø37.5	11
AG44EX4-03-1/3/4	ø45	12

● Manual override (locking)
AG4*EX4-*-*-*** A



Model No.	A	B	F
AG41EX4-02-1/2	36	11	19.5
AG41EX4-03-1/2	40	12	22.5
AG43EX4-02-4/5	36	11	19.5
AG43EX4-03-4/5	40	12	22.5
AG44EX4-02-1/3/4	36	11	19.5
AG44EX4-03-1/3/4	40	12	22.5

● Mounting plate
AG4*EX4-*-*-***B



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility	
AG4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AG41EX4-02/03-1/2	Copper alloy body
	● AG41EX4-02-1/2	Stainless steel body
	● AG43EX4-02/03-4/5	Copper alloy body
	● AG43EX4-02-4/5	Stainless steel body
	● AG44EX4-02/03-1/3/4	Copper alloy body
	● AG44EX4-02-1/3/4	Stainless steel body
AG4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● AG41EX4-03-1/2	Stainless steel body
	● AG43EX4-03-4/5	Stainless steel body
	● AG44EX4-03-1/3/4	Stainless steel body

* Material: Steel/Zinc plated

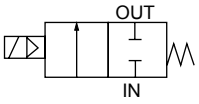
Explosion-proof pilot operated 2-port solenoid valve General purpose

AP11EX4 Series

- Pressure and explosion proof construction Ex d IIB T4 (group IIB/temperature class T4)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1/2 to Rc1 ● Piston drive

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AP11EX4
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	AC: Class 180 (H) AC diode integrated, DC: Class 130 (B)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T4)
Valve structure	Pilot operated poppet, piston drive
Valve seat leakage (*) cm³/min(ANR)	0.2 or less (PTFE sealant: 300 or less) (air)
Mounting orientation	Free (within working pressure differential range)
Degree of protection	IP65 or equivalent

*: Value at pneumatic pressure of 0.05 to 1.2 MPa.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working press diff (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz/60 Hz		
NC (open when energized)																	
AP11EX4 -15A	Rc1/2	15	0.05	1.2	0.6	1.0	0.6	0.6	0.6	100 VAC 50/60 Hz 200 VAC 50/60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	18	15	29	24	8/7	11.6	2.1
-20A	Rc3/4	20															2.5
-25A	Rc1	25															3.2

*1 : Refer to DC column for the max. working pressure differential of coil with diode.
*2 : The voltage fluctuation range must be within -10 to +10% of the rated voltage.
*3 : ( ) shows options.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[dm³/(s·bar)]	b	Cv	S(mm²)
NC (open when energized)						
AP11EX4 -15A	Rc1/2	15	21	0.22	4.5	-
-20A	Rc3/4	20	-	-	9.3	162
-25A	Rc1	25	-	-	12.0	231

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AP1①EX4 - 25A - 0 4 G 10 A KR - AC200V

- Model No.
- ① Actuation
- Ⓑ Port size *1
- Ⓒ Body/sealant combination
- Ⓓ Coil *2
- Ⓔ Applicable cable O.D.
- Ⓕ Other options *3
- Ⓖ Organizations for explosive-proof certification
- Ⓗ Voltage *4

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
Ⓑ Port size	
15A	Rc1/2
20A	Rc3/4
25A	Rc1

Ⓒ Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
B	Option		Fluoro rubber	Fluoro rubber		-
C			PTFE	Fluoro rubber		-
D		Stainless steel	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
E			Fluoro rubber	Fluoro rubber		-
F			PTFE	PTFE		-
H		Bronze	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
J			Fluoro rubber	Fluoro rubber		-
K			PTFE	Fluoro rubber		-
L		Stainless steel	Nitrile rubber	Nitrile rubber		Air/water/kerosene/oil (up to 60°C)
M			Fluoro rubber	Fluoro rubber		-
N			PTFE	PTFE		-

Ⓓ Coil	
3	Thermal class 130 (B) explosion-proof coil (for DC)
4	Thermal class 180 (H) explosion-proof coil (for AC)
5	Thermal class 130 (B) diode integrated explosion-proof coil (for AC)
Ⓔ Applicable cable O.D.	
9	ø7.5 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5
Ⓕ Other options	
Blank	Std. No option
A	Manual override (locking)
Ⓖ Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *5
KR	Korea certification (KOSHA) *6

Ⓗ Voltage

AC100V	Std.	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz
DC12V	Option	12 VDC
DC24V		24 VDC
DC48V		48 VDC
DC100V		100 VDC

[Example of model No.]

AP11EX4-25A-04G10AKR-AC100V

Model : AP11EX4

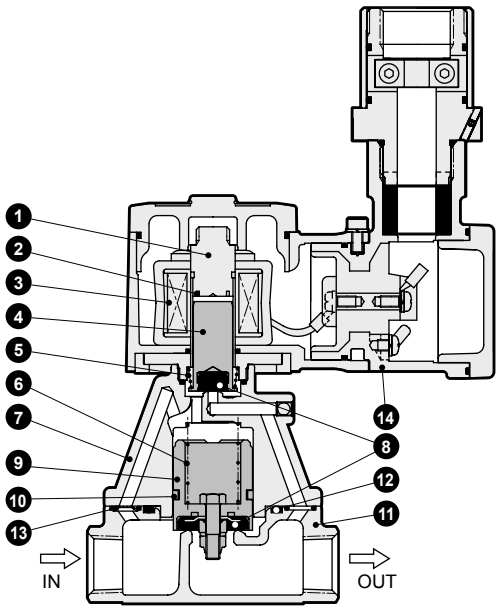
- Ⓐ Actuation : NC (open when energized)
- Ⓑ Port size : Rc1
- Ⓒ Body/sealant combination
  : Body - bronze, valve seal - nitrile rubber
  : O-ring - nitrile rubber
- Ⓓ Coil : Thermal class 180 (H) explosion-proof coil (for AC)
- Ⓔ Applicable cable O.D. : ø9.5 to ø10.5
- Ⓕ Other options : Manual override (locking)
- Ⓖ Organizations for explosive-proof certification
  : Korea certification (KOSHA)
- Ⓗ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*2 : For the thermal class B diode integrated coil, the AC power supply voltage is converted into DC coil voltage by the diode.
*3 : When Item Ⓒ is C, F, K or N, the manual override (Ⓕ A) is not available.
*4 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
(with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*5 : Japan certification (TIIS) is included.
*6 : Korea certification (KOSHA) is included.

Internal structure and parts list

● AP11EX4 Series

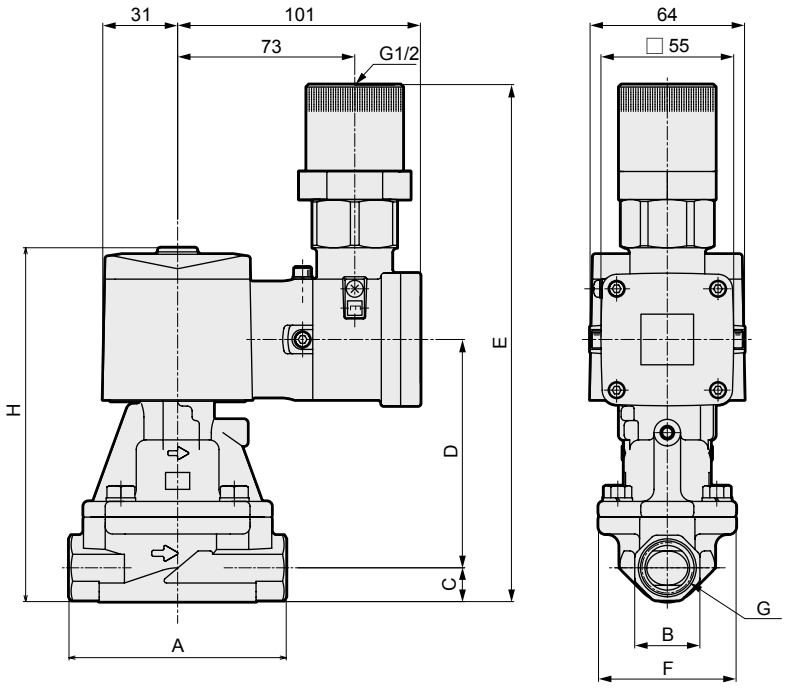


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./ SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13) *	Bronze casting (S.S. casting)
8	Valve seal	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (stainless steel)
10	Piston ring	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13) *	Bronze casting (S.S. casting)
12	O-ring	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304(SUS303)	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.
* For port size 8 (1/4) or 10 (3/8), the body material is copper alloy (C3771) as standard, and the orifice plate material is SUS303 (stainless steel) for both the standard and options.

Dimensions

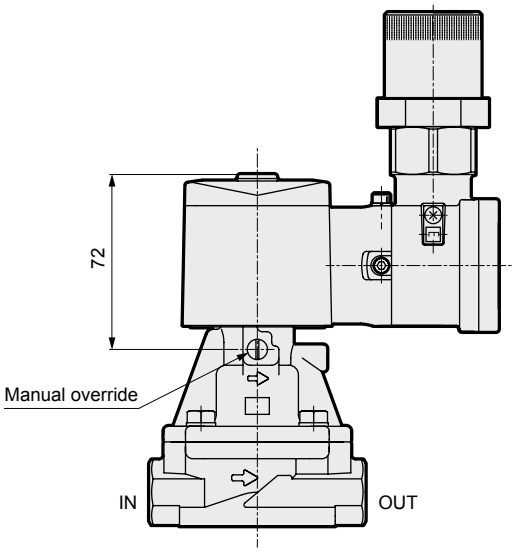
● Standard
AP11EX4



Model No.	A	B	C	D	E	F	G	H
AP11EX4-15A	90	27	14	94.5	214.5	57	Rc1/2	146.5
AP11EX4-20A	100	32	17	103.5	226.5	65	Rc3/4	158.5
AP11EX4-25A	110	41	20.5	118	244.5	76	Rc1	176.5

Optional dimensions

● Manual override (locking)
AP11EX4-*-*** A



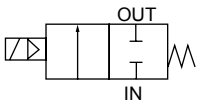
Explosion-proof pilot operated 2-port solenoid valve General purpose

AP21EX4 Series

- Pressure and explosion proof construction Ex d IIB T4 (group IIB/temperature class T4)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1¼ to Rc2, 32 to 50 flange ● Piston drive

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AP21EX4
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	1.6 (≈230 psi, 16 bar)
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	AC: Class 180 (H) AC diode integrated, DC: Class 130 (B)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T4)
Valve structure	Pilot operated poppet, piston drive
Valve seat leakage (*) cm³/min	1 or less (PTFE sealant: 400 or less) (air)
Mounting orientation	Free (within working pressure differential range)
Degree of protection	IP65 or equivalent

*: Value at pneumatic pressure of 0.05 to 1.2 MPa.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

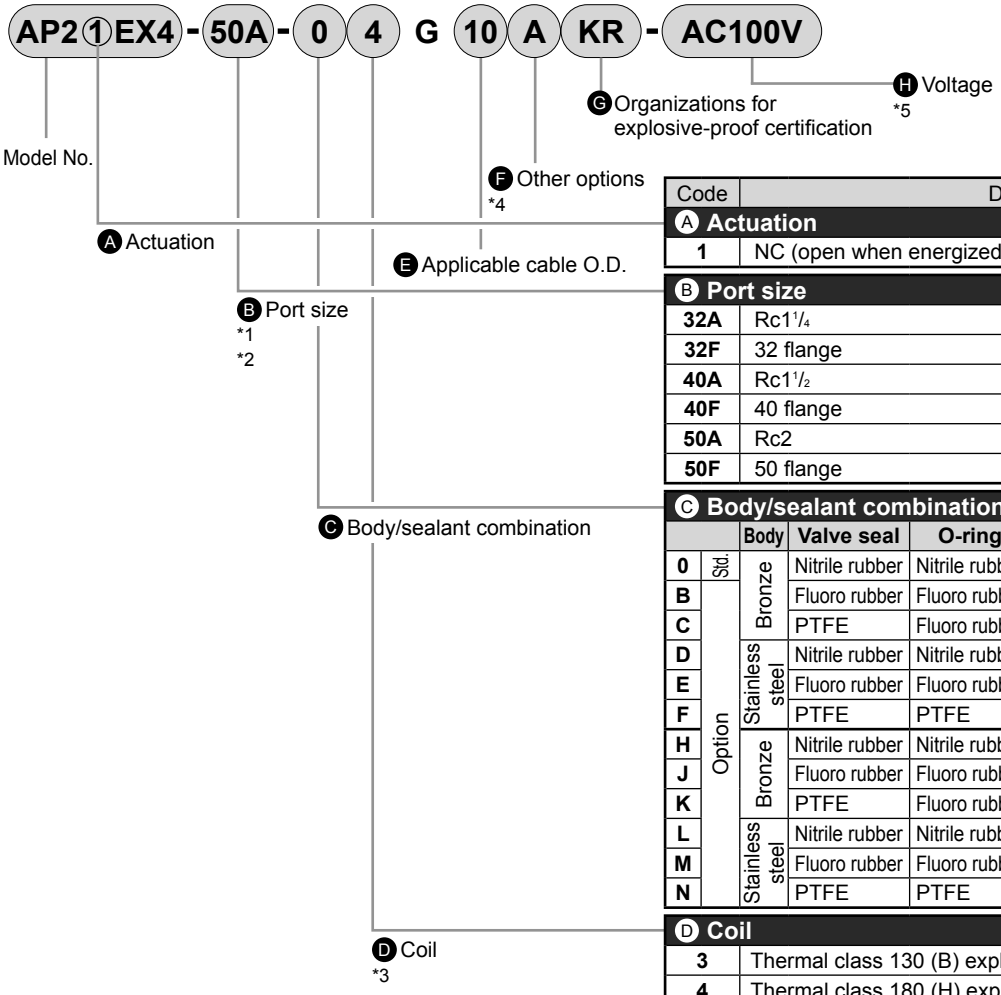
Item / Model No.	Port size	Orifice Diameter (mm)	Min. working Pressure difference (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz/60 Hz		
NC (open when energized)																	
AP21EX4-32A	Rc1¼	35	0.05	1.2	0.6	1.0	0.6	0.6	0.6	100 VAC 50/60 Hz 200 VAC 50/60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	18	15	29	24	8/7	11.6	4.2
-32F	32 flange																7.7
-40A	Rc1½	43															5.2
-40F	40 flange																8.7
-50A	Rc2	53															6.7
-50F	50 flange																10.7

*1 : Refer to DC column for the max. working pressure differential of coil with diode.
*2 : The voltage fluctuation range must be within -10 to +10% of the rated voltage.
*3 : ( ) shows options.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm²)
NC (open when energized)				
AP21EX4-32A	Rc1¼	35	25	460
-32F	32 flange			
-40A	Rc1½	43	34	625
-40F	40 flange			
-50A	Rc2	53	53	975
-50F	50 flange			

How to order



Code	Description
A Actuation	
1	NC (open when energized)
B Port size	
32A	Rc1 1/4
32F	32 flange
40A	Rc1 1/2
40F	40 flange
50A	Rc2
50F	50 flange

C Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
B	Option		Fluoro rubber	Fluoro rubber		-
C			PTFE	Fluoro rubber		-
D		Stainless steel	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
E			Fluoro rubber	Fluoro rubber		-
F			PTFE	PTFE		-
H		Bronze	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
J			Fluoro rubber	Fluoro rubber		-
K			PTFE	Fluoro rubber		-
L		Stainless steel	Nitrile rubber	Nitrile rubber		Air/water/kerosene/oil (up to 60°C)
M			Fluoro rubber	Fluoro rubber		-
N			PTFE	PTFE		-

D Coil	
3	Thermal class 130 (B) explosion-proof coil (for DC)
4	Thermal class 180 (H) explosion-proof coil (for AC)
5	Thermal class 130 (B) diode integrated explosion-proof coil (for AC)
E Applicable cable O.D.	
9	ø7.5 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5

F Other options		
Blank	Std.	No option
A		Manual override (locking)

G Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *6
KR	Korea certification (KOSHA) *7

H Voltage		
AC100V	Std.	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz
DC12V	Option	12 VDC
DC24V		24 VDC
DC48V		48 VDC
DC100V		100 VDC

[Example of model No.]

AP21EX4-50F-04G10AKR-AC100V

Model : AP21EX4

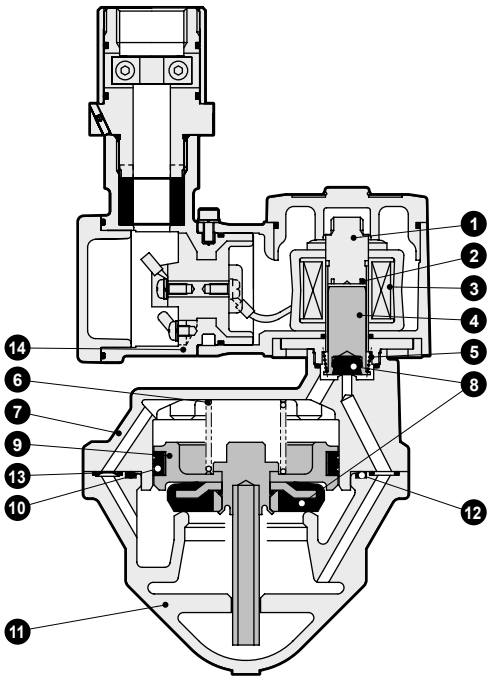
- A Actuation : NC (open when energized)
- B Port size : 50 flange
- C Body/sealant combination : Body - bronze, sealant - nitrile rubber, O-ring - nitrile rubber
- D Type of coil : Thermal class 180 (H) explosion-proof coil (for AC)
- E Applicable cable O.D. : ø9.5 to ø10.5
- F Other options : Manual override (locking)
- G Organizations for explosive-proof certification : Korea certification (KOSHA)
- H Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The companion flange is JIS B2210 10K. (Flange is not enclosed with the product and must be purchased separately.)
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*3 : For the thermal class B diode integrated coil, the AC power supply voltage is converted into DC coil voltage by the diode.
*4 : When Item C is C, F, K or N, the manual override (Item F A) is not available.
*5 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
(with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*6 : Japan certification (TIIS) is included.
*7 : Korea certification (KOSHA) is included.

Internal structure and parts list

● AP21EX4 Series

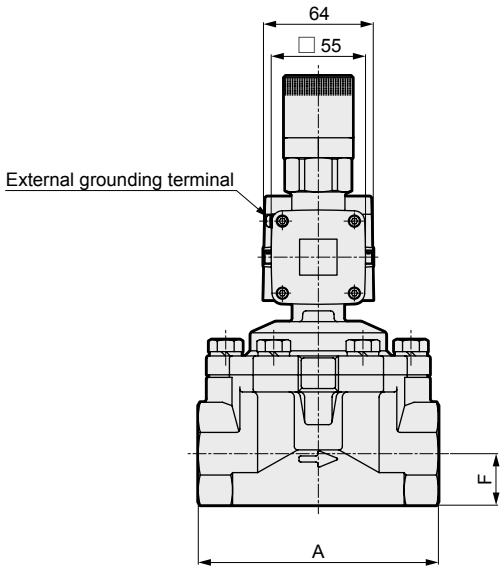


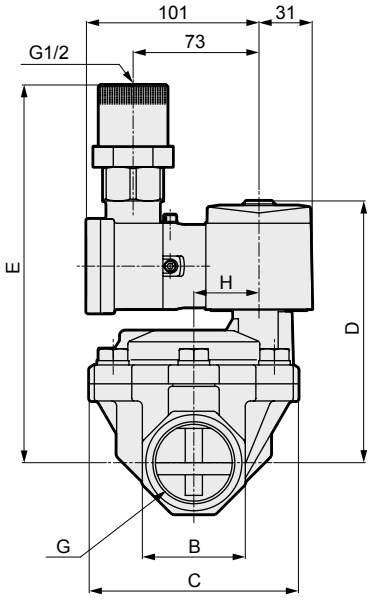
No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/ SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/ Copper alloy (stainless steel)
10	Seal ring set	SUS304/PTFE	Stainless steel/ Tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions

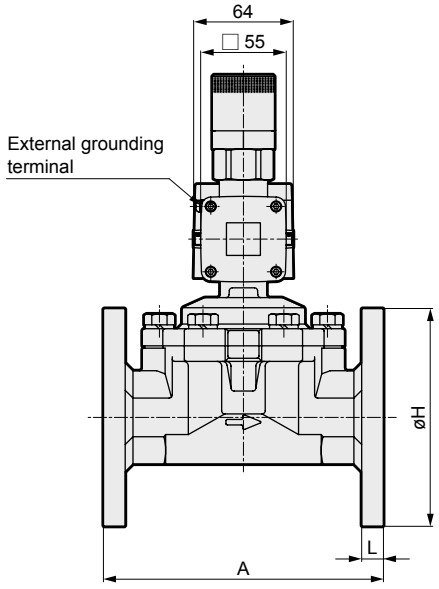
● Standard (Rc screw-in)
AP21EX4-32A/40A/50A

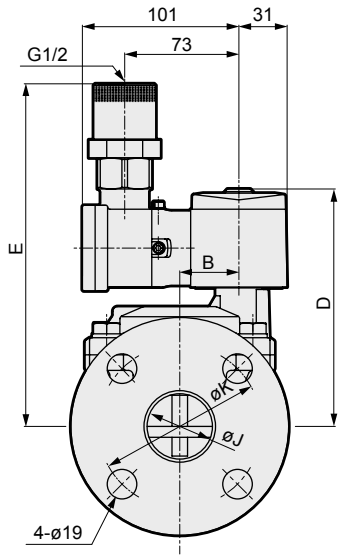




Model No.	A	B	C	D	E	F	G	H
AP21EX4-32A	125	54	112	147	215	27	Rc1 1/4	32
AP21EX4-40A	140	60	122	153	221	30	Rc1 1/2	38
AP21EX4-50A	160	74	132	161	229	37	Rc2	45

● Standard (flange)
AP21EX4-32F/40F/50F



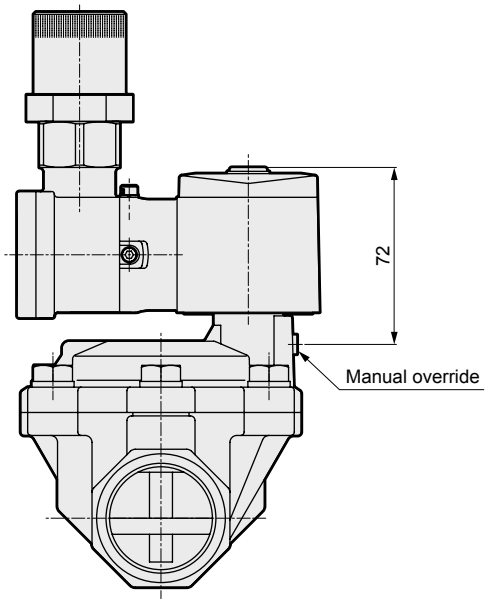


Model No.	A	B	D	E	H	J	K	L
AP21EX4-32F	170	32	147	215	135	36 (35)	100	12
AP21EX4-40F	180	38	153	221	140	42	105	14
AP21EX4-50F	180	45	161	229	155	53 (52)	120	14

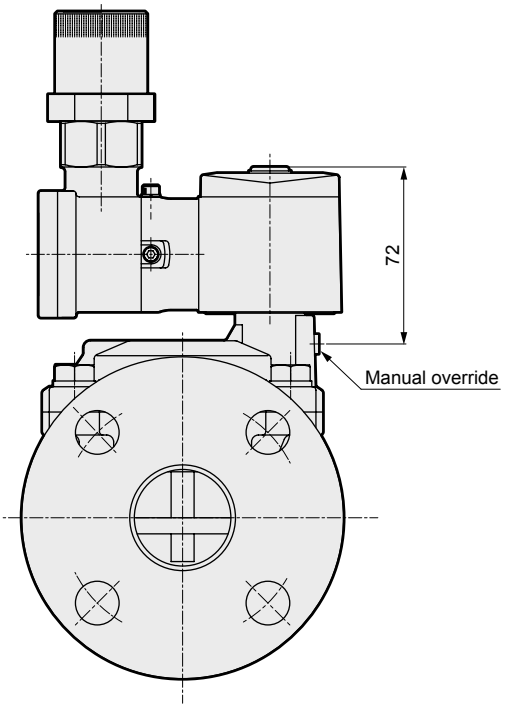
Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

● Manual override (locking) (Rc screw-in)
AP21EX4-32A/40A/50A-*** A



● Manual override (locking) (flange)
AP21EX4-32F/40F/50F-*** A



MEMO

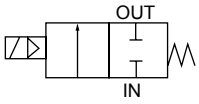
Explosion-proof pilot operated 2-port solenoid valve General purpose

AD11EX4 Series

- Pressure and explosion proof construction Ex d IIB T4 (group IIB/temperature class T4)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1/2 to Rc1 ● Diaphragm drive

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AD11EX4
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0.02 to 1 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	8 (≈1200 psi, 80 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	AC: Class 180 (H) AC diode integrated, DC: Class 130 (B)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T4)
Valve structure	Pilot operated poppet, diaphragm drive
Valve seat leakage (*) cm³/min(ANR)	0.2 or less (air)
Mounting orientation	Free (within working pressure differential range)
Degree of protection	IP65 or equivalent

*: Value at pneumatic pressure of 0.02 to 1 MPa.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC	DC	
				AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz/60 Hz		
NC (open when energized)																	
AD11EX4 -15A	Rc1/2	15	0.02 (≈2.9 psi, 0.2 bar)	1	0.6	0.7	0.6	0.6	0.6	100 VAC 50/60 Hz 200 VAC 50/60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	18	15	29	24	8/7	11.6	1.7
-20A	Rc3/4	20															1.9
-25A	Rc1	25															2.3

*1 : Refer to DC column for the max. working pressure differential of coil with diode.
*2 : The voltage fluctuation range must be within -10 to +10% of the rated voltage.
*3 : ( ) shows options.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[dm³/(s·bar)]	b	Cv	S(mm²)
NC (open when energized)						
AD11EX4 -15A	Rc1/2	15	21	0.22	4.5	-
-20A	Rc3/4	20	-	-	9.3	162
-25A	Rc1	25	-	-	12.0	231

*: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AD1 ① EX4 - 20A - 0 4 G 10 A KR - AC100V

- Model No.
- ① Actuation
- Ⓐ Port size *1
- Ⓑ Body/sealant combination
- Ⓒ Coil *2
- Ⓓ Applicable cable O.D.
- Ⓔ Other options
- Ⓕ Organizations for explosive-proof certification
- Ⓖ Voltage *5

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
Ⓑ Port size	
15A	Rc1/2
20A	Rc3/4
25A	Rc1

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks
0	Std.	Bronze	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
B	Option		Fluoro rubber		-
D		Stainless steel	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
E			Fluoro rubber		-
H		Bronze	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
J			Fluoro rubber		-
L		Stainless steel	Nitrile rubber		Air/water/kerosene/oil (up to 60°C)
M			Fluoro rubber		-

Ⓓ Coil	
3	Thermal class 130 (B) explosion-proof coil (for DC)
4	Thermal class 180 (H) explosion-proof coil (for AC)
5	Thermal class 130 (B) diode integrated explosion-proof coil (for AC)
Ⓔ Applicable cable O.D.	
9	ø7.5 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5

Ⓕ Other options		
Blank	Std.	No option
A		Manual override (locking)
Ⓖ Organizations for explosive-proof certification		
Blank		Japan certification (TIIS) *4
KR		Korea certification (KOSHA) *5

Ⓗ Voltage		
AC100V	Std.	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz
DC12V	Option	12 VDC
DC24V		24 VDC
DC48V		48 VDC
DC100V		100 VDC

[Example of model No.]

AP11EX4-20A-04G10AKR-AC100V

Model : AP11EX4

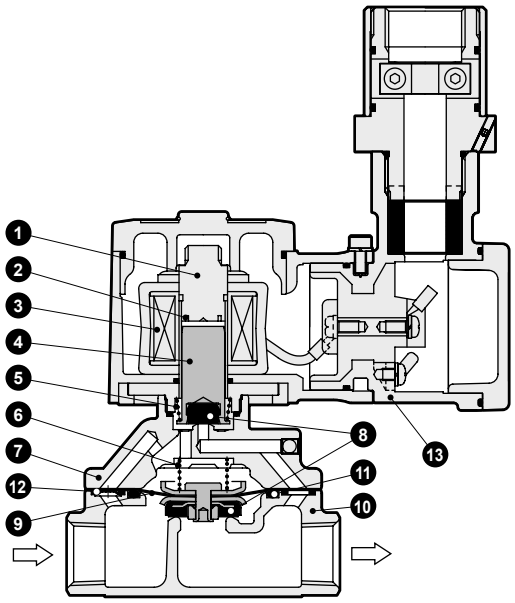
- Ⓐ Actuation : NC (open when energized)
- Ⓑ Port size : Rc 3/4
- Ⓒ Body/sealant combination : Body - bronze, sealant - nitrile rubber
- Ⓓ Type of coil : Thermal class 180 (H) explosion-proof coil (for AC)
- Ⓔ Applicable cable O.D. : ø9.5 to ø10.5
- Ⓕ Other options : Manual override (locking)
- Ⓖ Organizations for explosive-proof certification : Korea certification (KOSHA)
- Ⓗ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*2 : For the thermal class B diode integrated coil, the AC power supply voltage is converted into DC coil voltage by the diode.
*3 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
(with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*4 : Japan certification (TIIS) is included.
*5 : Korea certification (KOSHA) is included.

Internal structure and parts list

● AD11EX4 Series

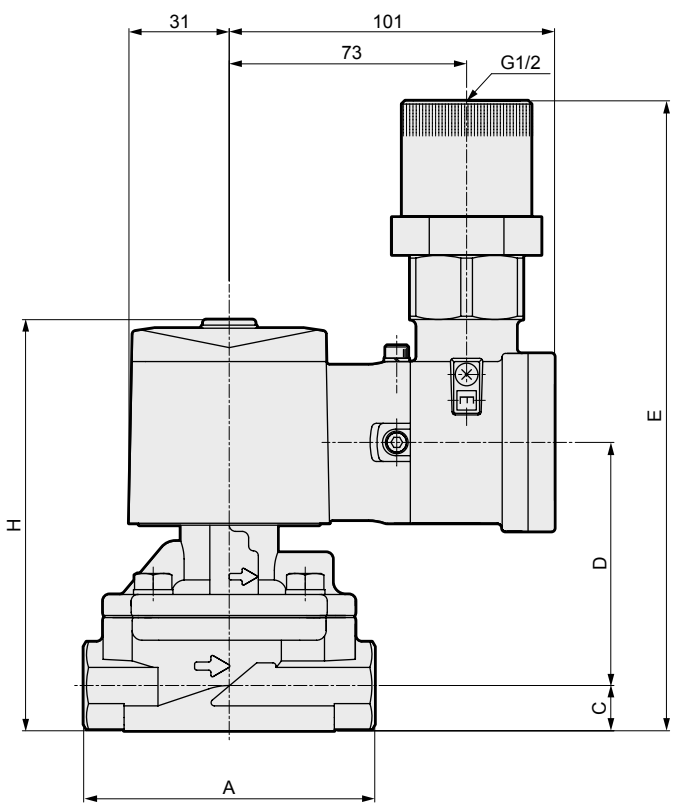


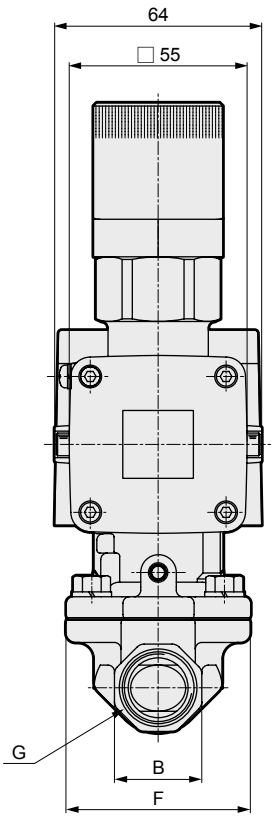
No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel
13	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions and optional dimensions

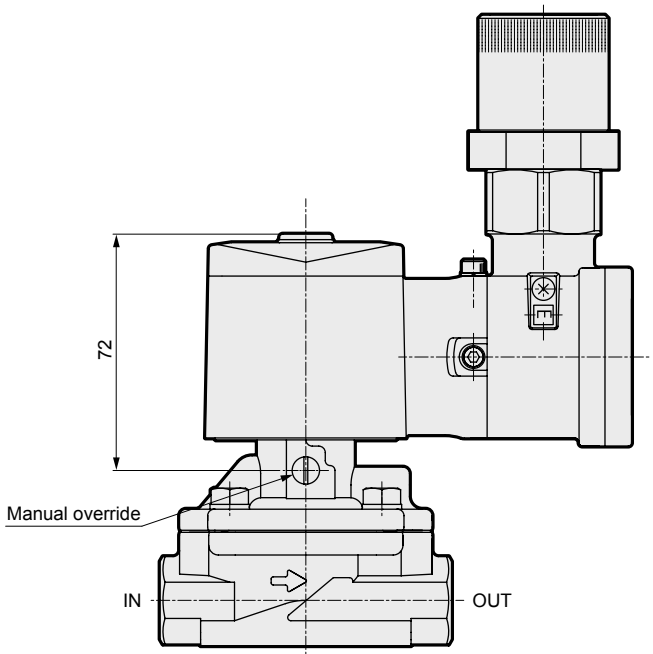
● Standard
AD11EX4-15A/20A/25A





Model No.	A	B	C	D	E	F	G	H
AD11EX4-15A	90	27	14	75.5	195.5	57	Rc1/2	127.5
AD11EX4-20A	100	32	17	81.5	204.5	65	Rc3/4	136.5
AD11EX4-25A	110	41	20.5	87	213.5	76	Rc1	145.5

● Manual override (locking)
AD11EX4-15A/20A/25A-*** A



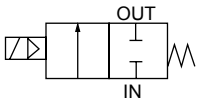
Explosion-proof pilot operated 2-port solenoid valve General purpose

AD21EX4 Series

- Pressure and explosion proof construction Ex d IIB T4 (group IIB/temperature class T4)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1¼ to Rc2, 32 to 50 flange
- Diaphragm drive

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AD21EX4
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0.02 to 0.7 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1 (≈150 psi, 10 bar)
Proof pressure (water) MPa	3.2 (≈460 psi, 32 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	AC: Class 180 (H) AC diode integrated, DC: Class 130 (B)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T4)
Valve structure	Pilot operated poppet, diaphragm drive
Valve seat leakage (*) cm³/min(ANR)	1 or less (air)
Mounting orientation	Free (within working pressure differential range)
Degree of protection	IP65 or equivalent

*: Value at pneumatic pressure of 0.02 to 0.7 MPa.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

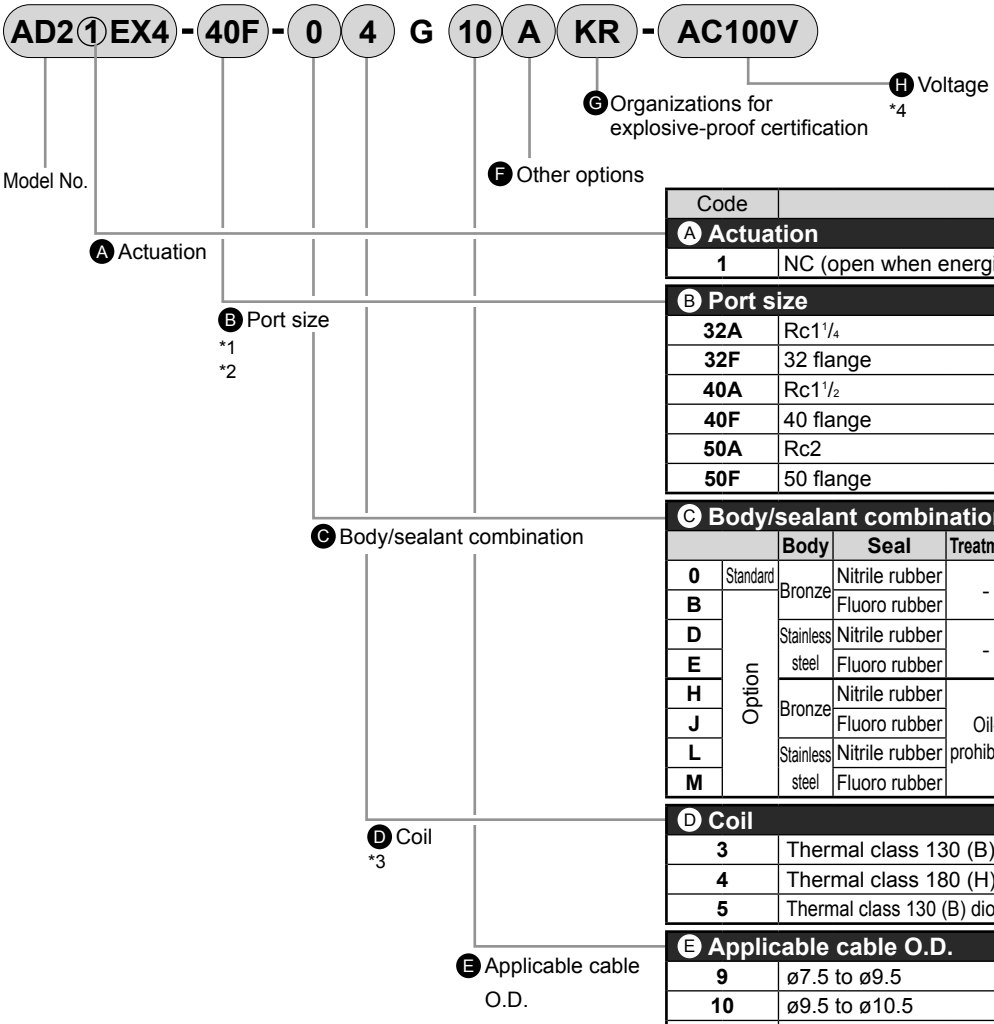
Item / Model No.		Port size	Orifice size (mm)	Min. working pressure difference (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
					Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC 50 Hz/60 Hz	DC	
					AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz			
NC (open when energized)																		
AD21EX4	-32A	Rc1¼	35	0.02	0.7	0.6	0.7	0.6	0.6	0.6	100 VAC 50/60 Hz 200 VAC 50/60Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	18	15	29	24	8/7	11.6	4.0
	-32F	32 flange																7.5
	-40A	Rc1½	43															5.0
	-40F	40 flange																8.5
	-50A	Rc2	53															6.5
	-50F	50 flange																10.5

*1 : Refer to DC column for the max. working pressure differential of coil with diode.
*2 : The voltage fluctuation range must be within -10 to +10% of the rated voltage.
*3 : ( ) shows options.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm²)
NC (open when energized)					
AD21EX4	-32A	Rc1¼	35	25	460
	-32F	32 flange			
	-40A	Rc1½	43	34	625
	-40F	40 flange			
	-50A	Rc2	53	53	975
	-50F	50 flange			

How to order



Code	Description
A Actuation	
1	NC (open when energized)
B Port size	
32A	Rc1 1/4
32F	32 flange
40A	Rc1 1/2
40F	40 flange
50A	Rc2
50F	50 flange

C Body/sealant combination

		Body	Seal	Treatment	Remarks
0	Standard	Bronze	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
B	Option		Fluoro rubber		-
D		Stainless steel	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)
E			Fluoro rubber		-
H		Bronze	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)
J			Fluoro rubber		-
L		Stainless steel	Nitrile rubber		Air/water/kerosene/oil (up to 60°C)
M			Fluoro rubber		-

D Coil	
3	Thermal class 130 (B) explosion-proof coil (for DC)
4	Thermal class 180 (H) explosion-proof coil (for AC)
5	Thermal class 130 (B) diode integrated explosion-proof coil (for AC)

E Applicable cable O.D.	
9	ø7.5 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5

F Other options		
Blank	Standard	No option
A		Manual override (locking)

G Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *5
KR	Korea certification (KOSHA) *6

H Voltage		
AC100V	Std.	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz
DC12V	Option	12 VDC
DC24V		24 VDC
DC48V		48 VDC
DC100V		100 VDC

[Example of model No.]

AD21EX4-40F-04G10AKR-AC100V

Model : AD21EX4

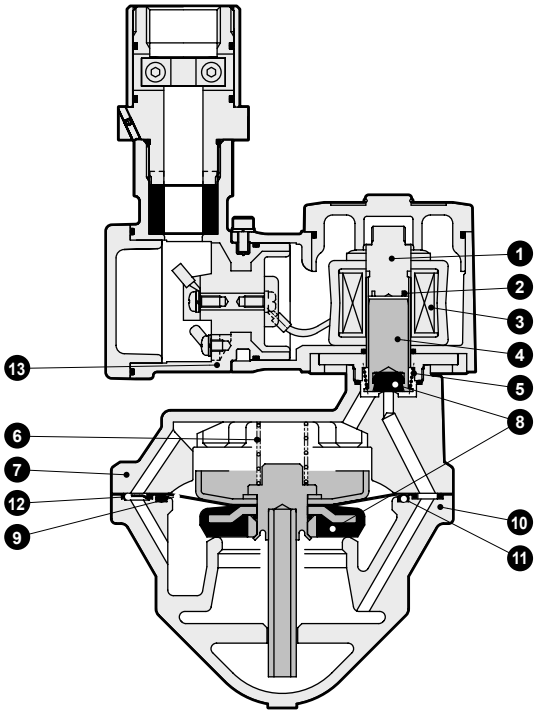
- A Actuation : NC (open when energized)
- B Port size : 40 flange
- C Body/sealant combination : Body - bronze, sealant - nitrile rubber O-ring - nitrile rubber
- D Type of coil : Thermal class 180 (H) explosion-proof coil (for AC)
- E Applicable cable O.D. : ø9.5 to ø10.5
- F Other options : Manual override (locking)
- G Organizations for explosive-proof certification : Korea certification (KOSHA)
- H Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The companion flange is JIS B2210 10K. (Flange is not enclosed with the product and must be purchased separately.)
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*3 : For the thermal class B diode integrated coil, the AC power supply voltage is converted into DC coil voltage by the diode.
*4 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
(with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*5 : Japan certification (TIIS) is included.
*6 : Korea certification (KOSHA) is included.

Internal structure and parts list

● AD21EX4 Series

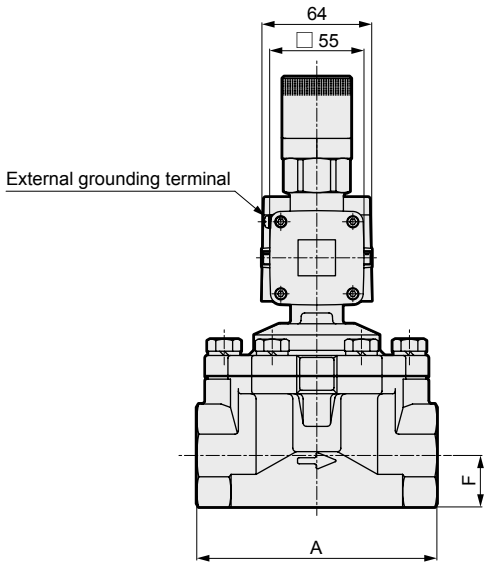


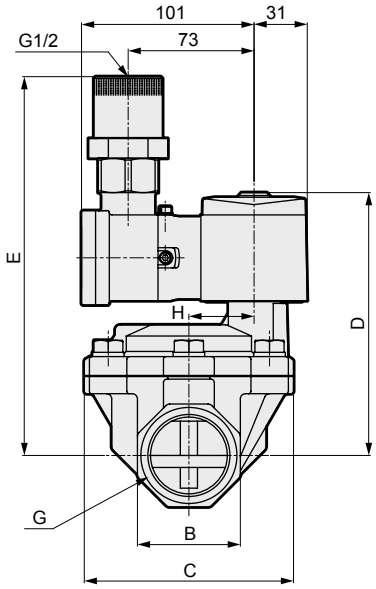
No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel
13	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions

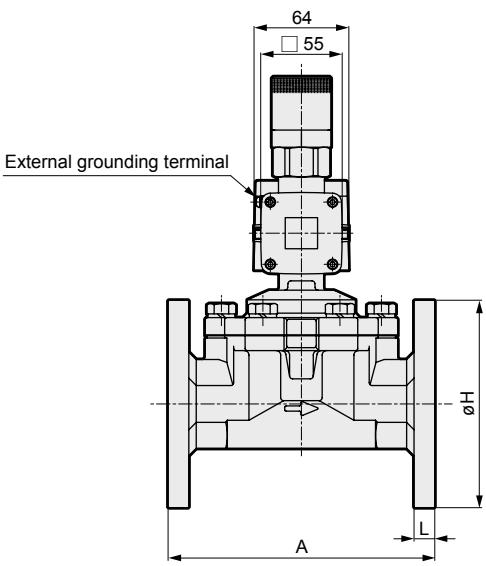
● Standard (Rc screw-in)
AD21EX4-32A/40A/50A

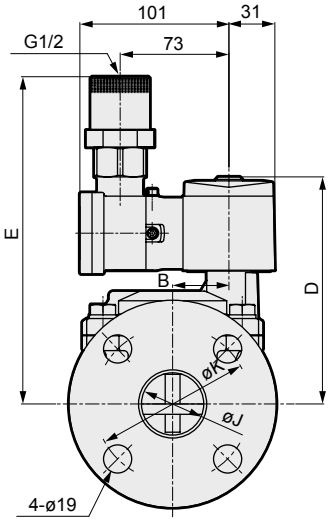




Model No.	A	B	C	D	E	F	G	H
AD21EX4-32A	125	54	112	147.5	215.5	27	Rc1 1/4	32
AD21EX4-40A	140	60	122	153.5	221.5	30	Rc1 1/2	38
AD21EX4-50A	160	74	132	161.5	229.5	37	Rc2	45

● Standard (flange)
AD21EX4-32F/40F/50F



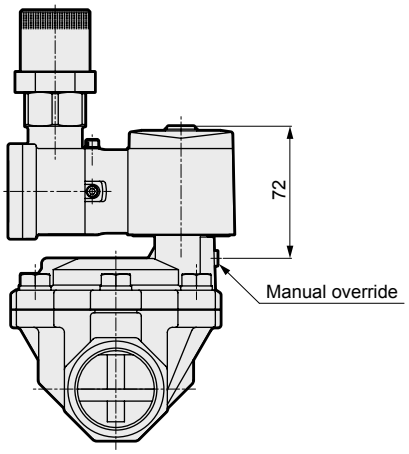


Model No.	A	B	D	E	H	J	K	L
AD21EX4-32F	170	32	147.5	215.5	135	36 (35)	100	12
AD21EX4-40F	180	38	153.5	221.5	140	42	105	14
AD21EX4-50F	180	45	161.5	229.5	155	53 (52)	120	14

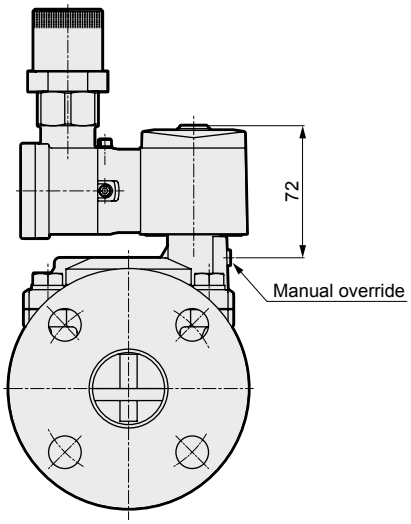
Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

● Manual override (locking) (Rc screw-in)
AD21EX4-32A/40A/50A-*** A



● Manual override (locking) (flange)
AD21EX4-32F/40F/50F-*** A



MEMO

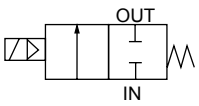
Explosion-proof pilot kick 2-port solenoid valve General purpose

ADK11EX4 Series

- Pressure and explosion proof construction Ex d IIB T4 (group IIB/temperature class T4)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1/2, Rc3/4, Rc1 ● Diaphragm drive

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		ADK11EX4
Working fluid		Air/low vacuum (1.33 x 10^3 Pa)/water/kerosene/oil (50 mm^2/s or less)
Working pressure differential	MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)
Max. working pressure	MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure)	MPa	4 (≈580 psi, 40 bar)
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing) *2
Ambient temperature	°C	-10 (14°F) to 50 (122°F)
Thermal class		AC: Class 180 (H) AC diode integrated, DC: Class 130 (B)
Atmosphere		Outdoors/explosive gas (group IIB/temperature class T4)
Valve structure		Pilot kick poppet, diaphragm drive
Valve seat leakage (*1)	cm^3/min(ANR)	1 or less (air)
Mounting orientation		Unrestricted
Degree of protection		IP65 or equivalent

*1 : Value at pneumatic pressure of 0.02 to 1 MPa.
When used at a pressure less than 0.02 MPa, the sealant may be unstable. Contact CKD in this case.
*2 : When the sealant material is fluoro rubber, the fluid temperature is 5 to 60°C.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
					Air		Water/kerosene		Oil (50 mm^2/s)			When holding		When starting		AC	DC	
					AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
NC (open when energized)																		
ADK11EX4	-15A	Rc1/2	16	0	1	0.6	1	0.6	0.6	0.5	100 VAC 50/60 Hz 200 VAC 50/60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *4	20	16	80	64	10/8.5	15	1.4
	-20A	Rc3/4	23															1.5
	-25A	Rc1	28															1.9

*1 : Refer to DC column for the max. working pressure differential of coil with diode.
*2 : The voltage fluctuation range must be within -10 to +10% of the rated voltage.
*3 : When using at low vacuum, vacuum the OUT port side.
*4 : ( ) shows options.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Flow characteristics			
				C[dm^3/(s·bar)]	b	Cv	S(mm^2)
NC (open when energized)							
ADK11EX4	-15A	Rc1/2	16	20	0.31	4.5	-
	-20A	Rc3/4	23	-	-	8.6	162
	-25A	Rc1	28	-	-	12.0	231

*: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

ADK1①EX4 - 20A - 0 4 G 10 KR - AC100V

- Model No.
- ① Actuation
- Ⓑ Port size *1
- Ⓒ Body/sealant combination *2 *3
- Ⓓ Coil *4
- Ⓔ Applicable cable O.D.
- Ⓕ Organizations for explosive-proof certification
- Ⓖ Voltage *5

Code	Description
① Actuation	
1	NC (open when energized)
Ⓑ Port size	
15A	Rc1/2
20A	Rc3/4
25A	Rc1

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Treatment
0	Standard	Bronze	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
B	Option		Fluoro rubber		-
D		Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)
E			Fluoro rubber		-
H		Bronze	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)
J			Fluoro rubber		-
P			EPM rubber		-
L		Stainless steel	Nitrile rubber		Air/water/low vacuum/kerosene/oil (up to 60°C)
M			Fluoro rubber		-
R			EPM rubber		-

Ⓓ Coil	
3	Thermal class 130 (B) explosion-proof coil (for DC)
4	Thermal class 180 (H) explosion-proof coil (for AC)
5	Thermal class 130 (B) diode integrated explosion-proof coil (for AC)

Ⓔ Applicable cable O.D.	
9	ø7.5 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5

Ⓕ Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *6
KR	Korea certification (KOSHA) *7

Ⓖ Voltage		
AC100V	Std.	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz
DC12V	Option	12 VDC
DC24V		24 VDC
DC48V		48 VDC
DC100V		100 VDC

[Example of model No.]

ADK11EX4-20A-04G10KR-AC100V

Model : ADK11EX4

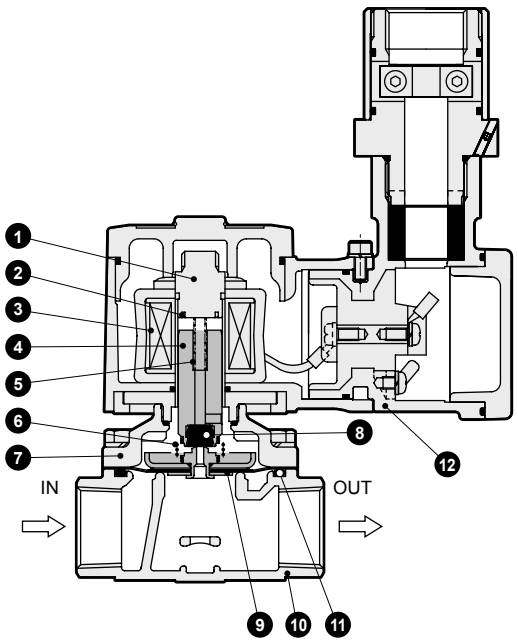
- ① Actuation : NC (open when energized)
- Ⓑ Port size : Rc3/4
- Ⓒ Body/sealant combination : Body - bronze/sealant - nitrile rubber
- Ⓓ Coil : Thermal class 180 (H) explosion-proof coil (for AC)
- Ⓔ Applicable cable O.D. : ø9.5 to ø10.5
- Ⓕ Organizations for explosive-proof certification : Korea certification (KOSHA)
- Ⓖ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*2 : The max. working pressure differential of the ethylene propylene rubber seal combination (Item Ⓒ P/R) is 0.6 MPa.
*3 : The ethylene propylene rubber seal combination (Item Ⓒ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*4 : For the thermal class B diode integrated coil, the AC power supply voltage is converted into DC coil voltage by the diode.
*5 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
(with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*6 : Japan certification (TIIS) is included.
*7 : Korea certification (KOSHA) is included.

Internal structure and parts list

● ADK11EX4 Series

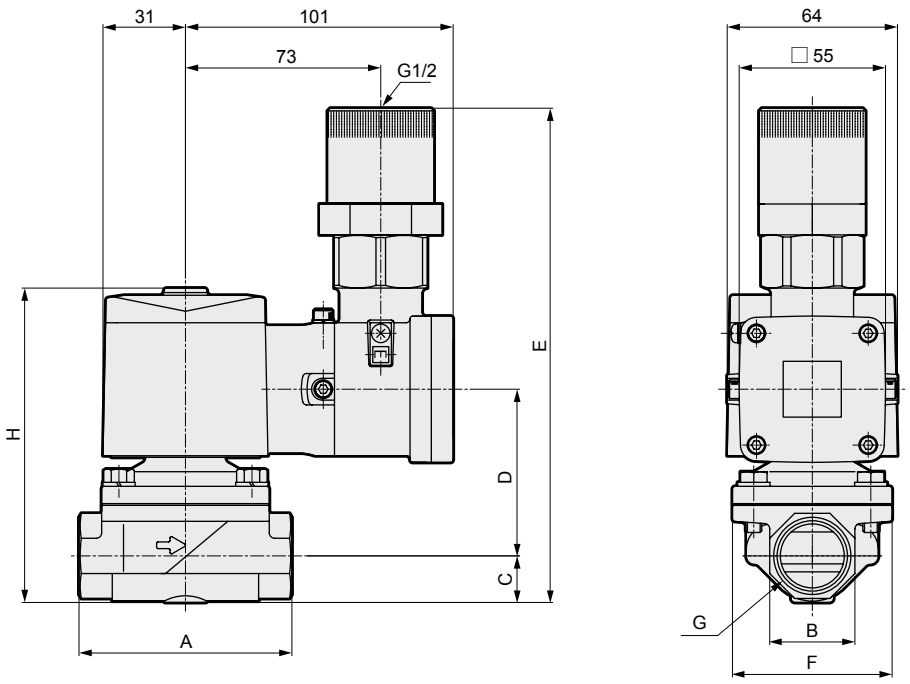


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./ SUS316L/SUS403	Stainless steel
2	Shading coil *	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger assembly	SUS405 or equiv./NBR (SUS405 or equiv./FKM or EPDM)	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Kick spring	SUS304	Stainless steel
7	Body	C3771(SCS13)	Copper alloy (stainless steel casting)
8	Seal	NBR (FKM, EPDM)	Nitrile rubber (fluoro rubber, ethylene propylene rubber)
9	Diaphragm assembly	SUS304/NBR (SUS304/FKM or EPDM)	Stainless steel/nitrile rubber (Stainless steel/fluoro rubber or ethylene propylene rubber)
10	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
11	O-ring	NBR (FKM, EPDM)	Nitrile rubber (fluoro rubber, ethylene propylene rubber)
12	Coil case	ADC12	Aluminum die-casting

( ) shows options.
* No shading coil is used for DC coil or coil with diode.

Dimensions

● Standard
ADK11EX4-15A/20A/25A



Model No.	A	B	C	D	E	F	G	H
ADK11EX4-15A	71	27(29)	14.5	59	179.5	50	Rc1/2	111.5
ADK11EX4-20A	80	32(35)	17.5	62.5	186	60	Rc3/4	118
ADK11EX4-25A	90	41(45)	21.5(22.5)	68	195.5(196.5)	71	Rc1	127.5(128.5)

Dimensions shown in ( ) are for stainless steel body.

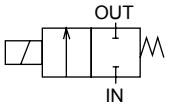
Explosion-proof direct acting 2-port solenoid valve General purpose

AB41EX2 Series

- Pressure and explosion proof construction Ex d IIB T2 (group IIB/temperature class T2)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1/4, Rc3/8

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AB41EX2
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)/steam
Working pressure differential MPa	0 to 4 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	5 (≈730 psi, 50 bar) (0.7 (≈100 psi, 7 bar) when fluid is steam)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to +170 (338°F)
Ambient temperature °C	-10 (14°F) to +40 (104°F)
Thermal class	Class 180 (H)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T2)
Valve structure	Direct acting poppet structure
Valve seat leakage cm³/min(ANR)	300 or less (air)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Max. working pressure differential (MPa) Air AC	Water(hot)/Kerosene AC	Oil (50 mm²/s) AC	Steam AC	Rated voltage	Apparent power (VA) When holding 50 Hz	When holding 60 Hz	When starting 50 Hz	When starting 60 Hz	Power consump (W) AC 50 Hz	AC 60 Hz	Weight (kg)
AB41EX2-02 -1	Rc1/4	1.5	4	2.5	2	0.7	100 VAC 50/60 Hz 200 VAC 50/60 Hz	11	9.5	30	26	5.5	5	1.2
-2		2.0	2	1.5	1.2	0.7								
-3		3.0	0.9	0.7	0.4	0.7								
-4		3.5	0.7	0.6	0.3	0.6								
-5		4.0	0.5	0.4	0.2	0.4								
-6		5.0	0.3	0.3	0.15	0.3								
-7		7.0	0.15	0.15	0.10	0.15								
AB41EX2-03 -1	Rc3/8	1.5	4	2.5	2	0.7								
-2		2.0	2	1.5	1.2	0.7								
-3		3.0	0.9	0.7	0.4	0.7								
-4		3.5	0.7	0.6	0.3	0.6								
-5		4.0	0.5	0.4	0.2	0.4								
-6		5.0	0.3	0.3	0.15	0.3								
-7		7.0	0.15	0.15	0.10	0.15								

*: The voltage fluctuation range must be within -10 to +10% of the rated voltage.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics C[dm³/(s·bar)]	b	Cv
AB41EX2- 02/03 -1	Rc1/4 Rc3/8	1.5	0.29	0.53	0.1
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.7 [1.5]	0.49 [0.47]	0.42 [0.40]
-5		4.0	2.1 [1.9]	0.48 [0.47]	0.54 [0.48]
-6		5.0	3.0 [2.6]	0.42 [0.38]	0.8 [0.62]
-7		7.0	4.8 [4.6]	0.29 [0.37]	1.0 [0.82]

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2 : Dimensions shown in [ ] are for stainless steel body.

How to order

AB41EX2 - 02 - 4 - C 4 G 10 B KR - AC100V

- AB41EX2: Model No.
- 02: Ⓐ Port size *1
- 4: Ⓑ Orifice size
- C: Ⓒ Body/sealant combination
- 4: Ⓓ Coil
- 10: Ⓔ Applicable cable O.D.
- B: Ⓕ Other options
- KR: Ⓖ Organizations for explosive-proof certification
- AC100V: Ⓗ Voltage *2

Code	Description
Ⓐ Port size	
02	Rc1/4
03	Rc3/8
Ⓑ Orifice size	
1	ø1.5
2	ø2
3	ø3
4	ø3.5
5	ø4
6	ø5
7	ø7

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks
C	Std.	Copper alloy	PTFE	-	Air/water/kerosene/oil/steam (up to 170°C)
F	Option	Stainless steel	PTFE	-	
K	Option	Copper alloy	PTFE	Oil-prohibited	
N	Option	Stainless steel	PTFE	Oil-prohibited	

Ⓓ Coil	
4	Thermal class 180 (H) explosion-proof coil (for AC)
Ⓔ Applicable cable O.D.	
9	ø7.5 to ø9.5 *For Item Ⓖ KR,ø8.0 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5
Ⓕ Other options	
Blank	No option
B	With mounting plate
Ⓖ Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *3
KR	Korea certification (KOSHA) *4
Ⓗ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

[Example of model No.]

AB41EX2-02-4-C4G10BKR-AC100V

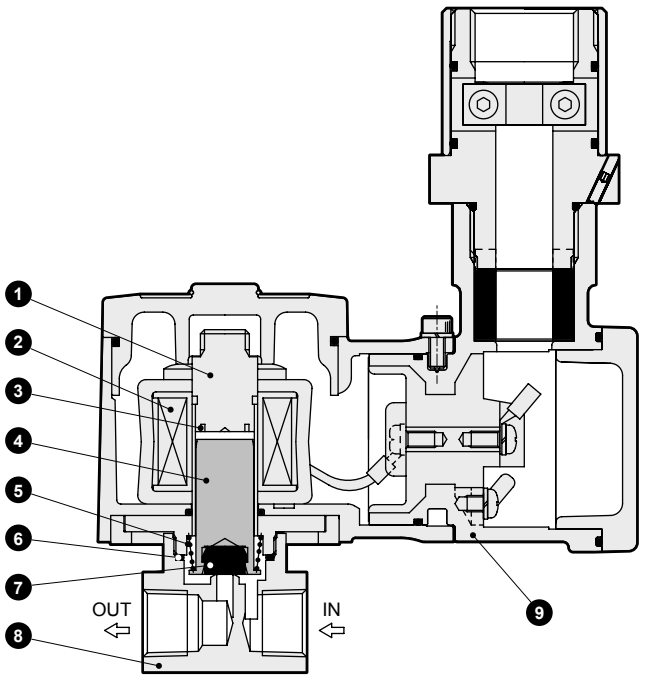
Model : AB41EX2

- Ⓐ Port size : Rc1/4
- Ⓑ Orifice size : ø3.5
- Ⓒ Body/sealant combination : Body - copper alloy/sealant - PTFE
- Ⓓ Coil : Thermal class 180 (H) explosion-proof coil (for AC)
- Ⓔ Applicable cable O.D. : ø9.5 to ø10.5
- Ⓕ Other options : With mounting plate
- Ⓖ Organizations for explosive-proof certification : Korea certification (KOSHA)
- Ⓗ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*2 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
*3 : Japan certification (TIIS) is included.
*4 : Korea certification (KOSHA) is included.

Internal structure and parts list

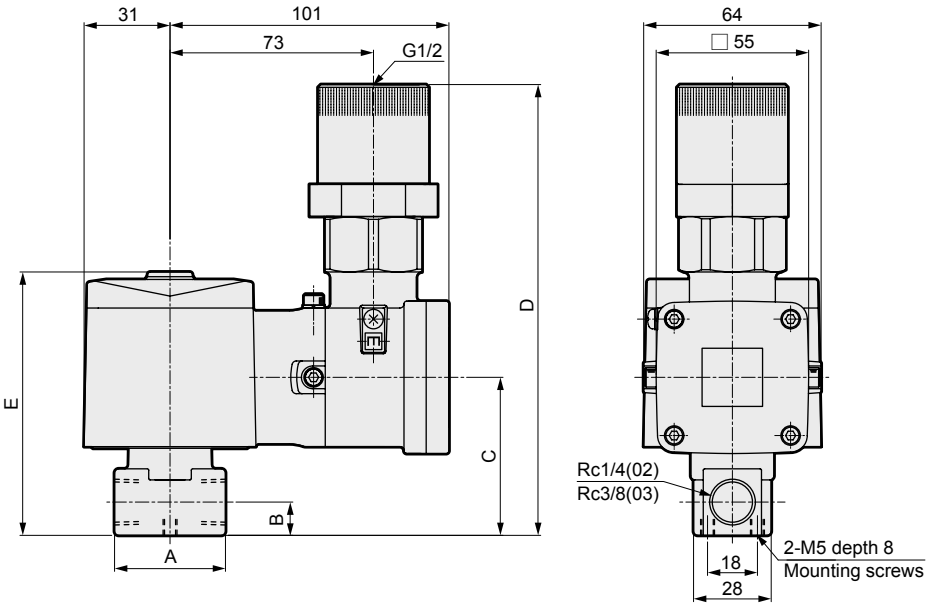


No.	Part name	Material	
1	Core assembly	SUS405 or equiv., 316L/403	Stainless steel
2	Coil	-	-
3	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	O-ring	PTFE	Tetrafluoroethylene resin
7	Valve seal	PTFE	Tetrafluoroethylene resin
8	Body	C3771(SUS303)	Copper alloy (stainless steel)
9	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions

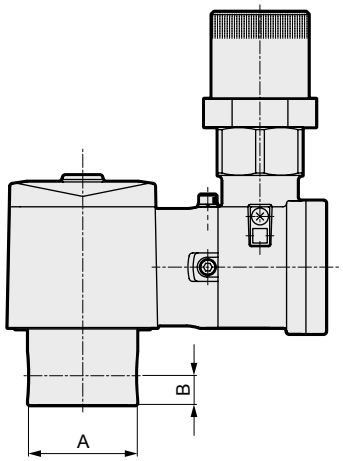
● Standard
AB41EX2-02/03-1 to 7



Model No.	A	B	C	D	E
AB41EX2-02-1 to 6	36	11	54	160	92
AB41EX2-02-7 AB41EX2-03-1 to 7	40	12	57	163	95

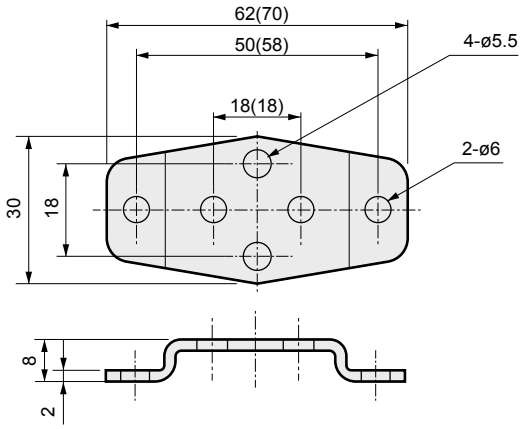
Optional dimensions

● Stainless steel body
AB41EX2-02/03-1 to 7-F,N



Model No.	A	B
AB41EX2-02-1 to 6 □	ø37.5	11
AB41EX2-02-7 □ AB41EX2-03-1 to 7 □	ø45	12

● Mounting plate
AB41EX2-02/03-1 to 7-*** B, AB



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatible model	
AB4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AB41EX2-02/03-1 to 7 ● AB41EX2-02-1 to 6	Copper alloy body Stainless steel body
AB4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● AB41EX2-02-7 ● AB41EX2-03-1 to 7	Stainless steel body Stainless steel body

*Material: Steel/Zinc plated

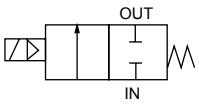
Explosion-proof pilot operated 2-port solenoid valve General purpose

AP11EX2 Series

- Pressure and explosion proof construction Ex d IIB T2 (group IIB/temperature class T2)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1/2 to Rc1 ● Piston drive

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AP11EX2
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)/steam
Working pressure differential MPa	0.05 to 0.6 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	2 (≈290 psi, 20 bar) (0.7 (≈100 psi, 7 bar) when fluid is steam)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)
Fluid temperature °C	+5 (41°F) to +170 (338°F)
Ambient temperature °C	-10 (14°F) to +40 (104°F)
Thermal class	Class 180 (H)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T2)
Valve structure	Pilot operated poppet, piston drive
Valve seat leakage (*) cm³/min(ANR)	300 or less (air)
Mounting orientation	Free (within working pressure differential range)
Degree of protection	IP65 or equivalent

*: Value at pneumatic pressure of 0.05 to 0.7 MPa.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)				Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air	Water/kerosene	Oil (50 mm²/s)	Steam		When holding		When starting		AC		
				AC	AC	AC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	
NC (open when energized)															
AP11EX2-15A	Rc1/2	15	0.05 (≈7.3 psi, 0.5 bar)	0.7	0.6	0.3	0.6	100 VAC 50/60 Hz 200 VAC 50/60 Hz	11	9.5	30	26	5.5	5	2.1
-20A	Rc3/4	20													2.5
-25A	Rc1	25													3.2

*: The voltage fluctuation range must be within -10 to +10% of the rated voltage.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[dm³/(s·bar)]	b	Cv	S(mm²)
NC (open when energized)						
AP11EX2-15A	Rc1/2	15	21	0.22	4.5	-
-20A	Rc3/4	20	-	-	9.3	162
-25A	Rc1	25	-	-	12.0	231

*: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AP1①EX2 - 15A - C 4 G 10 KR - AC100V

- Model No.
- Ⓐ Actuation
- Ⓑ Port size *1
- Ⓒ Body/sealant combination
- Ⓓ Coil
- Ⓔ Applicable cable O.D.
- Ⓕ Organizations for explosive-proof certification
- Ⓖ Voltage *2

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
Ⓑ Port size	
15A	Rc1/2
20A	Rc3/4
25A	Rc1

Ⓒ Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks
C	Standard	Bronze	PTFE	Fluoro rubber	-	Air/water/kerosene/oil/ steam (up to 170°C)
F	Option	Stainless steel	PTFE	Fluoro rubber		
K	Option	Bronze	PTFE	Fluoro rubber	Oil-prohibited	
N	Option	Stainless steel	PTFE	Fluoro rubber		

Ⓓ Coil	
4	Thermal class 180 (H) explosion-proof coil (for AC)
Ⓔ Applicable cable O.D.	
9	ø7.5 to ø9.5 *For Item Ⓕ KR,ø8.0 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5
Ⓕ Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *3
KR	Korea certification (KOSHA) *4
Ⓖ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

[Example of model No.]

AP11EX2-15A-C4G10KR-AC100V

Model: AP11EX2

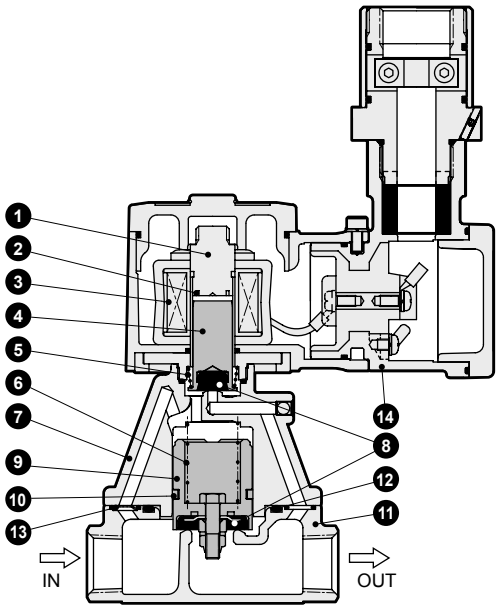
Ⓐ Actuation	: NC (open when energized)
Ⓑ Port size	: Rc1/2
Ⓒ Body/sealant combination	: Body - bronze, valve seal - PTFE, O-ring - fluoro rubber
Ⓓ Coil	: Thermal class 180 (H) explosion-proof coil (for AC)
Ⓔ Applicable cable O.D.	: ø9.5 to ø10.5
Ⓕ Organizations for explosive-proof certification	: Korea certification (KOSHA)
Ⓖ Voltage	: 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*2 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
*3 : Japan certification (TIIS) is included.
*4 : Korea certification (KOSHA) is included.

Internal structure and parts list

● AP11EX2 Series

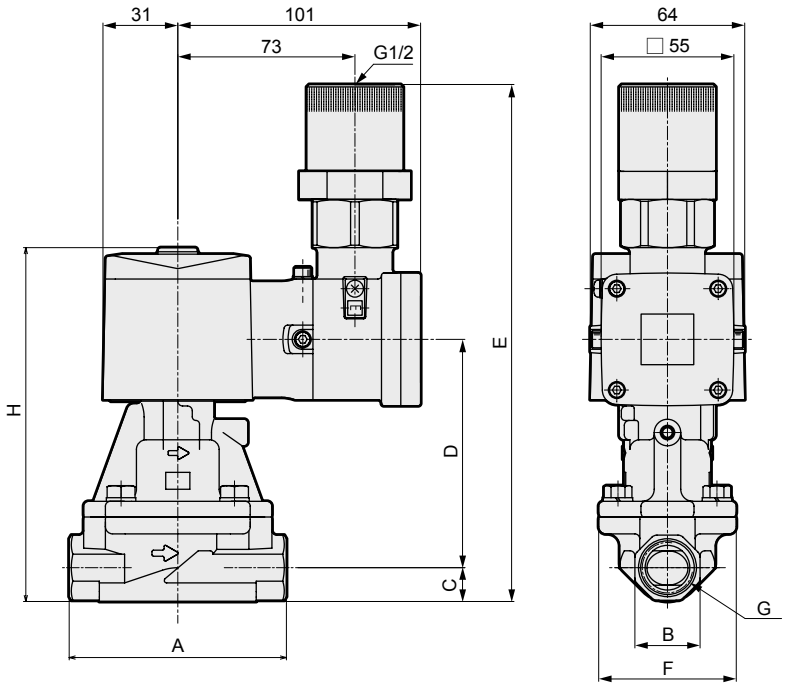


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	——	——
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	PTFE	Tetrafluoroethylene resin
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (Stainless steel)
10	Piston ring	SUS304/PTFE	Stainless steel/ Tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	FKM	Fluoro rubber
13	Orifice plate	SUS304(SUS303)	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions

● Standard
AP11EX2-15A/20A/25A



Model No.	A	B	C	D	E	F	G	H
AP11EX2-15A	90	27	14	94.5	214.5	57	Rc1/2	146.5
AP11EX2-20A	100	32	17	103.5	226.5	65	Rc3/4	158.5
AP11EX2-25A	110	41	20.5	118	244.5	76	Rc1	176.5

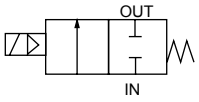
Explosion-proof pilot operated 2-port solenoid valve General purpose

AP21EX2 Series

- Pressure and explosion proof construction Ex d IIB T2 (group IIB/temperature class T2)
- Organizations for explosive-proof certification: Japan certification (TIIS), Korea certification (KOSHA)
- NC (open when energized)
- Port size: Rc1¼ to Rc2, 32 to 50 flange ● Piston drive

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AP21EX2
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)/steam
Working pressure differential MPa	0.05 to 0.6 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1.6 (≈230 psi, 16 bar) (0.7 (≈101 psi, 7 bar) when fluid is steam)
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)
Fluid temperature °C	+5 (41°F) to +170 (338°F)
Ambient temperature °C	-10 (14°F) to +40 (104°F)
Thermal class	Class 180 (H)
Atmosphere	Outdoors/explosive gas (group IIB/temperature class T2)
Valve structure	Pilot operated poppet, piston drive
Valve seat leakage (*) cm³/min(ANR)	400 or less (air)
Mounting orientation	Free (within working pressure differential range)
Degree of protection	IP65 or equivalent

*: Value at pneumatic pressure of 0.05 to 0.7 MPa.

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)				Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
				Air	Water/kerosene	Oil (50 mm²/s)	Steam		When holding		When starting		AC		
				AC	AC	AC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	
NC (open when energized)															
AP21EX2 -32A	Rc1¼	35	0.05 (≈7.3 psi, 0.5 bar)	0.7 (≈100 psi, 7 bar)	0.6 (≈87 psi, 6 bar)	0.3 (≈44 psi, 3 bar)	0.6 (≈87 psi, 6 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz	11	9.5	30	26	5.5	5	4.2
-32F	32 flange														7.7
-40A	Rc1½	43													5.2
-40F	40 flange														8.7
-50A	Rc2	53													6.7
-50F	50 flange														10.7

*1 : The model numbers above are for the standard products. Refer to How to order for other combinations.
*2 : The voltage fluctuation range must be within -10 to +10% of the rated voltage.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm²)
NC (open when energized)				
AP21EX2-32A	Rc1¼	35	25	460
-32F	32 flange			
-40A	Rc1½	43	34	625
-40F	40 flange			
-50A	Rc2	53	53	975
-50F	50 flange			

How to order

AP2①EX2 - 32F - C 4 G 10 KR - AC100V

- Model No.
- Ⓐ Actuation
- Ⓑ Port size *1 *2
- Ⓒ Body/sealant combination
- Ⓓ Coil
- Ⓔ Applicable cable O.D.
- Ⓕ Organizations for explosive-proof certification
- Ⓖ Voltage *3

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
Ⓑ Port size	
32A	Rc1¼
32F	32 flange
40A	Rc1½
40F	40 flange
50A	Rc2
50F	50 flange

Ⓒ Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks
C	Standard	Bronze	PTFE	Fluoro rubber	-	Air/water/kerosene/oil/ steam (up to 170°C)
F	Option	Stainless steel	PTFE	Fluoro rubber		
K	Option	Bronze	PTFE	Fluoro rubber	Oil-prohibited	
N	Option	Stainless steel	PTFE	Fluoro rubber		

Ⓓ Coil	
4	Thermal class 180 (H) explosion-proof coil (for AC)
Ⓔ Applicable cable O.D.	
9	ø7.5 to ø9.5 *For Item Ⓕ KR,ø8.0 to ø9.5
10	ø9.5 to ø10.5
11	ø10.5 to ø11.5
13	ø11.5 to ø13.5
Ⓕ Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *4
KR	Korea certification (KOSHA) *5
Ⓖ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

[Example of model No.]

AP21EX2-32F-C4G10KR-AC100V

Model: AP21EX2

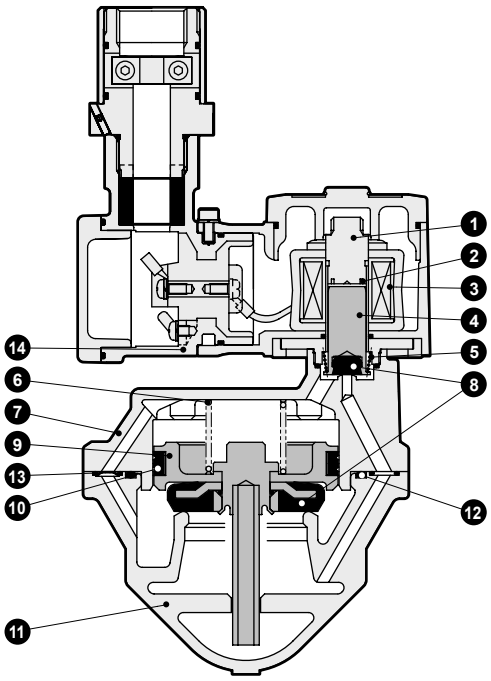
Ⓐ Actuation	: NC (open when energized)
Ⓑ Port size	: 32 flange
Ⓒ Body/sealant combination	: Body - bronze, valve seal - PTFE, O-ring - fluoro rubber
Ⓓ Coil	: Thermal class 180 (H) explosion-proof coil (for AC)
Ⓔ Applicable cable O.D.	: ø9.5 to ø10.5
Ⓕ Organizations for explosive-proof certification	: Korea certification (KOSHA)
Ⓖ Voltage	: 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The companion flange is JIS B2210 10K.
(Flange is not enclosed with the product and must be purchased separately.)
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*3 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
*4 : Japan certification (TIIS) is included.
*5 : Korea certification (KOSHA) is included.

Internal structure and parts list

● AP21EX2 Series

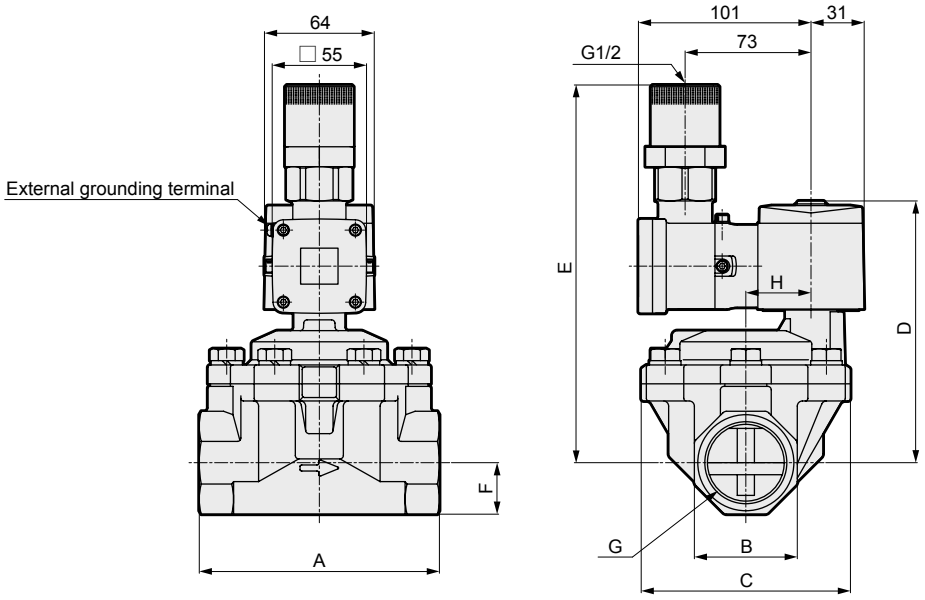


No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	——	——
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	PTFE	Tetrafluoroethylene resin
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/ Copper alloy (stainless steel)
10	Seal ring set	SUS304/PTFE	Stainless steel/ Tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	FKM	Fluoro rubber
13	Orifice plate	SUS304	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

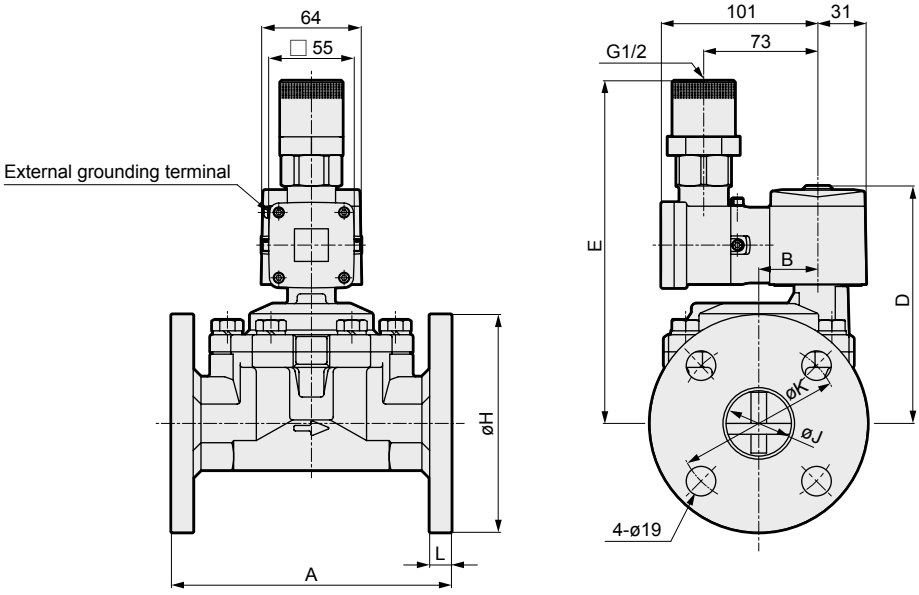
Dimensions

● Standard (Rc screw-in)
AP21EX2-32A/40A/50A



Model No.	A	B	C	D	E	F	G	H
AP21EX2-32A	125	54	112	147	215	27	Rc1¼	32
AP21EX2-40A	140	60	122	153	221	30	Rc1½	38
AP21EX2-50A	160	74	132	161	229	37	Rc2	45

● Standard (flange)
AP21EX2-32F/40F/50F



Model No.	A	B	D	E	H	J	K	L
AP21EX2-32F	170	32	147	215	135	36 (35)	100	12
AP21EX2-40F	180	38	153	221	140	42	105	14
AP21EX2-50F	180	45	161	229	155	53 (52)	120	14

Dimensions shown in ( ) are for stainless steel body.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

Compliant with international standard guidelines Explosion-proof solenoid valve (2, 3-port)

Design/selection

⚠ WARNING

■ Usable in Class 1 and 2 danger zones where there is combustible gas or steam. Cannot be used in special danger zone.

■ Select models and perform installation in accordance with JIS.C.60079 “Factory Explosion-Proof Guidelines for Users JNIOSH-TR-NO.44 (2012)”.

⚠ CAUTION

■ Explosive gas and explosion-proof enclosure

The degree of explosive gas danger is classified according to the group and temperature grade. Gases with equivalent risk are grouped into one group, and explosion-proof structure standards are set for each group. Codes to indicate the type, group and temperature grade must be indicated in this order on the electrical components of explosion-proof structures. These codes indicate which group and temperature grade the electrical components have been manufactured for, and which gases can be used. For the example of explosion-proof solenoid valve of Exd II BT4:

Ex d IIB T4

- T4 — Temperature class T4
- IIB — Group II B
- d — Pressure and explosion proof structure

Table 2 indicates the classification of gases with a danger category of Group II B and Grade T4 temperature that are compatible with the product. Less dangerous gases are also listed that are guaranteed to be explosion-proof.

Temperature grade refers to the degree of ignition risk, and is classified into six grades according to the ignition point. It defines the maximum surface temperature of the device corresponding to each grade (Table 1).

Higher numbers indicate a higher risk that the gas will ignite at low igniting temperatures. Group refers to the risk of fire leaping to the exterior from small gaps. The level is classified into three grades according to the gap, and the codes shown in Table 1 are used. It can be said that this group expresses the classification by size of the explosive energy. Lower maximum safety clearance indicates more dangerous gases with higher explosive energy that can cause flames to pass through small gaps and leap to the exterior.

Table 1

Description	Code	Provision
Temperature class	T1	Max. surface temperature: 450°C
	T2	300°C
	T3	200°C
	T4	135°C
	T5	100°C
	T6	85°C
Group	II A	Max. safety clearance: 0.9 mm or more
	II B	Over 0.5 to less than 0.9
	II C	0.5 mm or less

Table 2

Temp class / Group	T1	T2	T3	T4	T5
II A	Acetone, Ammonia, Carbon monoxide, Ethane, Acetic acid, Ethyl acetate, Toluene, Propane, Benzene, Methanol, Methane	Ethanol, Isoamyl acetate, Butane, Acetic anhydride	Gasoline, Hexane	Acetaldehyde	
II B		Ethylene, Ethylene oxide		Ethyl ether	
II C	Hydrogen	Acetylene			Carbon disulfide

■ Dangerous zone

Situations where explosive gases and air mix at a high enough level to cause an explosion or fire are called “danger zones”. These zones are classified into Zones 0, 1 and 2 according to the time and frequency at which the dangerous atmosphere is reached. The explosion-proof structure that can be used is determined according to these classes.

● Zone 0 (explosion-proof general purpose valve EX Series cannot be used)

Zones where a dangerous atmosphere is or could be continuously generated, and where the concentration of explosive gas is maintained continuously or for a long time above the lower limit for explosions.

Example a: The open space above a flammable fluid inside a container or tank.
b: Inside a combustible gas container or tank.
c: Near flammable fluid in an open container.

● Zone 1

(1) Zones where explosive gas could accumulate to a dangerous concentration during operations such as the opening/closing of the lid for removing the product or operation of the safety valve, etc.

(2) Zones where explosive gases are likely to accumulate to dangerous concentrations during repair or maintenance or due to leakage, etc.

● Zone 2

(1) Zones where combustible gases or flammable fluids are regularly handled, but where the gases and fluids are sealed in a vessel or equipment, and where the gases and fluids could leak to dangerous concentrations only if the vessel or equipment breaks by accident or due to misoperation.

■ Explosion-proof test model

Explosion-proof certification has been obtained with the electromagnet.

The test model and product model No. of the electromagnet are as listed in the explosion-proof performance on page 372.

Design/selection

⚠ WARNING

1 Working fluids

(1) When using this valve for dry air or inert gas, the life can be shortened considerably due to wear.

(2) This valve cannot be used for maintaining vacuum. Consult with CKD when the vacuum needs to be maintained.

⚠ CAUTION

1 Continuous energizing

Use the NO pressurization when using the 3-port valve in a continuously energized state with the NO port pressurized. When continuously energizing the universal or NC pressurization, use a fluoro rubber seal.

2 Suction sound

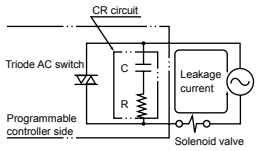
With the AC voltage specifications, a loud suction sound may be heard momentarily after energizing. To avoid a suction sound, select a coil with a diode or the DC voltage model. The suction sound volume will be reduced.

3 Fluid viscosity

The fluid viscosity must be 50 mm^2/s or less. Malfunctions could occur if the viscosity is higher than 50 mm^2/s.

4 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications. Failure to observe this could lead to malfunctions.



Voltage / Model No.	AC		AC diode		DC			
	100 V	200 V	100 V	200 V	12 V	24 V	48V	100 V
AB,AG,AP,AD ADK	6 mA or less	3 mA or less	2 mA or less	1 mA or less	2 mA or less	1 mA or less	0.5 mA or less	0.2 mA or less

Mounting, piping and wiring

⚠ CAUTION

1 Piping

(1) Always hold the socket with a wrench, etc., when piping the NO side of the 3-port valve.

(2) If the pipe vibrates when the solenoid valve is opened and closed, securely fix the piping.

(3) For steam fluids, steam generated from a boiler will contain a large amount of drainage. Always install a drain trap.

(4) When passing steam, the make-up water in the boiler will contain substances such as “calcium salt” and “magnesium salt”. As these substances will react with oxygen and carbon dioxide, and cause scales and sludge to form, always install a “water softener” and a filter for steam.

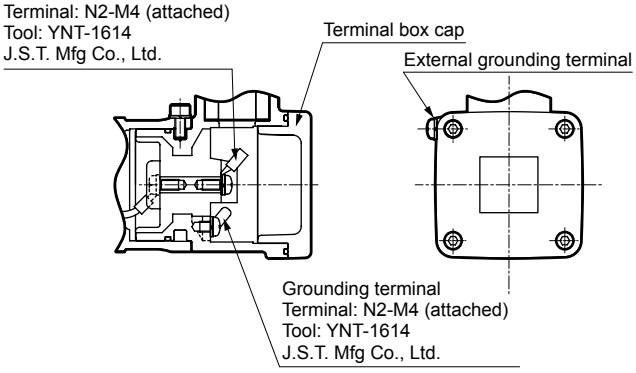
(5) When AP/AD/ADK and the regulator are directly coupled, the parts could mutually vibrate, causing resonance and chattering.

(6) If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. For the fluid inlet, use piping of a piping size that matches the port size of the valve. Do not use a needle valve.

2 Wiring

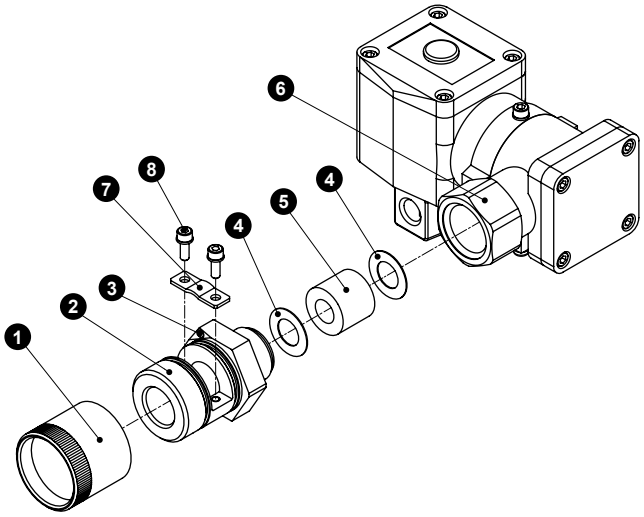
■ Wiring

- As a guide, use a wire with a nominal cross section of 1.04 to 2.63 mm^2 and the following allowable temperature.
  AB*EX4, AG4*EX4, AP**EX4, AD**EX4, ADK1*EX4 ..... Allowable temperatures 80°C or higher
  AB*EX2, AP**EX2 ..... Allowable temperatures 100°C or higher
  Make sure that excessive force is not applied to the lead wire.
- Install wiring in accordance with JIS explosion-proof guidelines.
- Remove the terminal box cap and install the wiring. Use the tools specified in the following diagram for crimping the crimp terminals upon wiring. After finishing wiring, securely tighten the terminal box cap.



■ Tightening the gland

1. Pass the cable through ❶ connector cap, ❷ gland, ❹ spacer, ❺ packing and ❹ spacer, and connect to ❻ terminal box.
2. Insert ❹ spacer, ❺ packing and ❹ spacer to ❻ terminal box, and screw ❷ gland into ❻ terminal box with 40 to 44 N·m of torque until the gap is eliminated.
3. Be sure to tighten ❸ low head hexagon socket set screws to prevent ❷ glands from loosening.
4. Tighten ❼ holder using ❽ low head hexagon socket bolt × 2 and spring washers × 2 with 1.9 to 2.0 N·m of torque to hold the cable.
5. Tighten ❶ connector cap until it comes in contact with ❷ gland.



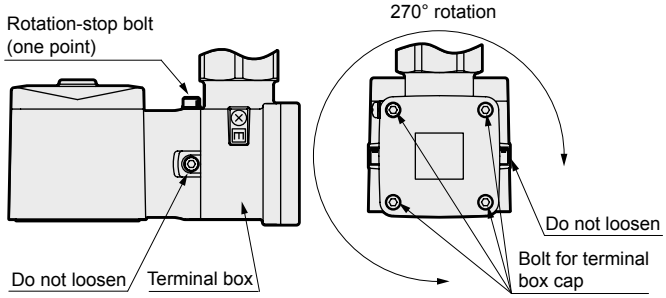
Make sure that the spacer does not catch on the terminal box thread part. The gland may be insufficiently tightened and disassembly may become impossible.

■ Be sure to replace used packings rather than reusing them.

■ Packing sizes are the four types shown below.

(1) ø7.5 to 9.5 *1, ø9.5 to 10.5, ø10.5 to 11.5, ø11.5 to 13.5
Be sure to use the cable diameter within the packing display value range. When the packing size and cable diameter do not match, the explosion-proof performance may be compromised.
*1 ø8.0 to ø9.5 for Korea-certified products AB41EX2, AP11EX2, and AP21EX2.

(2) Terminal box rotates 270°. The orientation can be changed by loosening the rotation-stop bolt. After wiring and setting the wiring direction, tighten the rotation-stop bolt with a torque of 0.6 to 0.8 N·m to fix the terminal box. If the rotation-stop bolt is loose, the terminal box could fall off during use. Furthermore, rotation of the terminal box may result in damage to the rotating unit or disconnection of an internal wire. When laying the electric wires, do not loosen any bolts other than the four terminal box cap bolts and rotation-stop bolt. The explosion-proof performance cannot be guaranteed.



(3) Include a fuse (1A) in the electrical circuit.

When using the product

⚠CAUTION

1 Instantaneous leakage

With the pilot operated or pilot kick 2-port valve, if the pressure is suddenly applied when the pump starts while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.

2 Operation

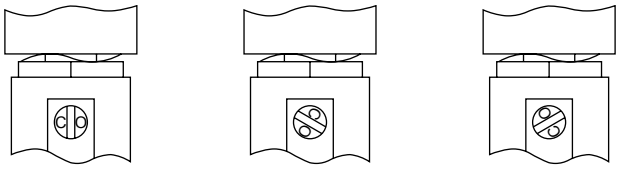
Do not apply back pressure. This could lead to malfunction.

3 Manual operation

When using a product with a manual override, follow the operations below:

Opening : Insert a flathead screwdriver into the slit on the manual adjustment shaft, and turn it approx. 120° to the right or left. The plunger will rise and the valve will open. (For the 3-port valve, the NC side valve seat will open and the NO side valve seat will close.)
The open state is held even when the screwdriver is removed.
Always return the valve to the original position after use.

Closing : From the open position, turn the manual adjustment shaft so that the slit is returned to the perpendicular position, which will lower the plunger and close the valve. (For the 3-port valve, the NC side valve seat will close and the NO side valve seat will open.) (Refer to the figure below)



Valve closed state | Valve open state | Valve open state

Maintenance

⚠CAUTION

1 Maintenance of coil case

Do not disassemble an explosion-proof solenoid valve used in an explosive hazard area, even when repair is necessary. Since the coil case section has a pressure and explosion-proof structure, if it must be disassembled for inspection, contact CKD.

To guarantee the performance of the explosion-proof valve, CKD requests that customers return the valves temporarily for repair at the CKD manufacturing plant.

AB*E4/E2 /AG*E4/AP*E4/E2 AD*E4/ADK*E4

Explosion proof multi-fluid control 2, 3-port solenoid valve General purpose

■ **For air/water/oil (kerosene/light oil)/steam**

Overview

A solenoid valve that can be installed in hazardous areas where flammable gas or vapor produces an explosive atmosphere.
This product is compliant with the conventional explosion-proof standard (Design Standard).

Features

Explosion-proof performance d2G4, d2G2
- Pressure and explosion proof structure
  - Flame-proof grade 2
  - Ignitability G4, G2
- Japan Conformity Certificate No...
  - No. T64349
  - No. T64361
  - No. T64346
  - No. T64362
  - No. T64352
  - No. T64355
  - No. T64358
  - No. T64351
  - No. T64354

China Conformity Certification Certificate No. (CCC)
- 2020322307003155

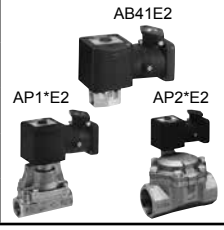
China explosion-proof standard NEPSI acquired
- GYB20. 2593X

CONTENTS

⚠ Always read the precautions in the Introduction and on page 480 before use.

Series variation

Explosion-proof multi-fluid direct acting/pilot operated 2, 3-port solenoid valve
Explosion-proof general purpose

Explosion proof structure	Model		Structure	Actuation	Working fluid						
					Air	Low vacuum	Water	Kerosene	Oil (50 mm²/s or less)	Steam	
d2G4		AB41E4	Direct acting	NC (open when energized)	●	●	●	●	●		
		AB42E4		NO (closed when energized)	●	●	●	●	●		
		AB41E4-Z	For direct acting dry air	NC (open when energized)	● (Dry air)	●					
		AG41E4	Direct acting	3-port universal	●	●	●	●	●		
		AG43E4		3-port NC press	●	●	●	●	●		
		AG44E4		3-port NO press	●	●	●	●	●		
		AG41E4-Z	For direct acting dry air	3-port universal	● (Dry air)	●					
		AG43E4-Z		3-port NC press	● (Dry air)	●					
		AG44E4-Z		3-port NO press	● (Dry air)	●					
		AP11E4	Pilot operated piston drive	NC (open when energized)	●		●	●	●		
		AP12E4		NO (closed when energized)	●		●	●	●		
		AP21E4		NC (open when energized)	●		●	●	●		
		AP22E4		NO (closed when energized)	●		●	●	●		
		AD11E4	Pilot operated diaphragm drive	NC (open when energized)	●		●	●	●		
		AD12E4		NO (closed when energized)	●		●	●	●		
		AD21E4		NC (open when energized)	●		●	●	●		
		AD22E4		NO (closed when energized)	●		●	●	●		
		ADK11E4	Pilot kick diaphragm drive	NC (open when energized)	●	●	●	●	●		
		ADK12E4		NO (closed when energized)	●	●	●	●	●		
d2G2		AB41E2	Direct acting	NC (open when energized)	●		●	●	●	●	
		AP11E2	Pilot operated piston drive	NC (open when energized)	●		●	●	●	●	
		AP12E2		NO (closed when energized)	●		●	●	●	●	
		AP21E2		NC (open when energized)	●		●	●	●	●	
		AP22E2		NO (closed when energized)	●		●	●	●	●	

● Explosion-proof performance

Explosion proof structure	Electromagnet model No.	Certification No.	Port	Coil	Ambient temperature	Fluid temperature	Applicable solenoid valve
d2G4	EB21-G	No. T64349	2	B	-10 to 50°C	-10 to 60°C	● Direct acting (AB41E4 Series) ● Pilot operated Piston drive (AP11E4/AP21E4 Series) Diaphragm drive (AD11E4/AD21E4 Series)
	EB25-G	No. T64361	2				● Direct acting (AB41E4-Z Series)
	EB31-G	No. T64346	3				● Direct acting (AG41E4 Series) ● Direct acting (AG43E4 Series) ● Direct acting (AG44E4 Series)
	EB35-G	No. T64362	3				● Direct acting (AG41E4-Z Series) ● Direct acting (AG43E4-Z Series) ● Direct acting (AG44E4-Z Series)
	EB22-G	No. T64352	2				● Direct acting (AB42E4 Series) ● Pilot operated Piston drive (AP12E4/AP22E4 Series) Diaphragm drive (AD12E4/AD22E4 Series)
	EB23-G	No. T64355					● Pilot operated diaphragm drive (ADK11E4 Series)
	EB24-G	No. T64358					● Pilot operated diaphragm drive (ADK12E4 Series)
d2G2	EH21-G	No. T64351	2	H	-10 to 40°C	5 to 181°C	● Direct acting (AB41E2 Series) ● Pilot operated (AP11E2/AP21E2 Series)
	EH22-G	No. T64354					● Pilot operated (AP12E2/AP22E2 Series)

	Port size											Page
	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	32 Flange	Rc1 1/2	40 Flange	Rc2	50 Flange	
	●	●										424
	●	●										424
	●	●										430
	●	●										434
	●	●										434
	●	●										434
	●	●										438
	●	●										438
	●	●										438
			●	●	●							442
			●	●	●							442
						●	●	●	●	●	●	446
						●	●	●	●	●	●	446
			●	●	●							452
			●	●	●							452
						●	●	●	●	●	●	456
						●	●	●	●	●	●	456
			●	●	●							462
			●	●	●							462
	●	●										466
			●	●	●							470
			●	●	●							470
						●	●	●	●	●	●	474
						●	●	●	●	●	●	474

Explosion-proof direct acting 2-port solenoid valve General purpose

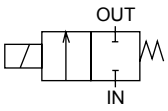
AB41E4/AB42E4 Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- Japan Conformity Certificate No. AB41E4: No. T64349, AB42E4: No. T64352
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- NC (open when energized), NO (closed when energized)
- Port size: Rc1/4, Rc3/8

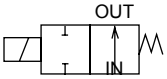
RoHS CAD

JIS symbol

- AB41E4: NC (open when energized)



- AB42E4: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AB41E4	AB42E4
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)	
Working pressure differential MPa	0 to 5 (Refer to max. working press diff, indiv specs)	0 to 2 (Refer to max. working press diff, indiv specs)
Max. working pressure MPa	5 (≈730 psi, 50 bar)	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 50 (122°F)	
Thermal class	Class 130 (B)	
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)	
Valve structure	Direct acting poppet structure	
Valve seat leakage cm^3/min(ANR)	0.2 or less (PTFE sealant: 300 or less) (air)	
Mounting orientation	Unrestricted	
Degree of protection	IP65 or equivalent	

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Max. working pressure differential (MPa) Air AC	Air DC	Water(hot)/Kerosene AC	Water(hot)/Kerosene DC	Oil (50 mm^2/s) AC	Oil (50 mm^2/s) DC	Rated voltage	Apparent power (VA) When holding 50 Hz	When holding 60 Hz	When starting 50 Hz	When starting 60 Hz	Power consumption (W) AC 50 Hz/60 Hz	Power consumption (W) DC	Weight (kg)
NC (open when energized)																	
AB41E4- 02/03	-1	Rc1/4 Rc3/8	1.5	5.0	4.0	4.5	4.0	4.0	4.0	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *5	18	15	29	24	8/7	11.6	1.0
	-2		2.0	3.0	2.5	2.7	2.5	2.5	2.5								
	-3		3.0	1.5	0.9	1.3	0.9	0.9	0.9								
	-4		3.5	1.2	0.6	0.9	0.6	0.6	0.6								
	-5		4.0	1.0	0.5	0.7	0.5	0.5	0.5								
	-6		5.0	0.6	0.25	0.4	0.25	0.25	0.25								
02/03	-7		7.0	0.25	0.1	0.2	0.1	0.15	0.1								
NO (closed when energized)																	
AB42E4-	-1	Rc1/4 Rc3/8	1.5	2.0	2.0	2.0	2.0	2.0	2.0	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *5	22	18	35	29	8.7/6.7	15.5	1.0
	-2		2.0	1.0	1.0	1.0	1.0	1.0	1.0								
	-3		3.0	0.7	0.7	0.7	0.7	0.7	0.7								
	-4		3.5	0.5	0.5	0.5	0.5	0.5	0.5								
	-5		4.0	0.4	0.4	0.4	0.4	0.4	0.4								
	-6		5.0	0.25	0.25	0.25	0.25	0.25	0.25								
	-7		7.0	0.15	0.15	0.15	0.15	0.15	0.15								

*1 : The port size model No. is 02 for Rc1/4 (8A) and 03 for Rc3/8 (10A).
*2 : Refer to DC column for the max. working pressure differential of AB41E4 type coil with diode.
*3 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*4 : When using at low vacuum, vacuum the OUT port side.
*5 : ( ) shows options.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics		
			C[dm³/(s·bar)]	b	Cv
NC (open when energized)					
AB41E4-02 -1	Rc1/4 Rc3/8	1.5	0.29	0.53	0.1
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.7 [1.5]	0.49 [0.47]	0.42 [0.40]
-5		4.0	2.1 [1.9]	0.48 [0.47]	0.54 [0.48]
-6		5.0	3.0 [2.6]	0.42 [0.38]	0.80 [0.62]
-7		7.0	4.8 [4.6]	0.29 [0.37]	1.0 [0.82]
NO (closed when energized)					
AB42E4-02 -1	Rc1/4 Rc3/8	1.5	0.29	0.53	0.1
-2		2.0	0.53	0.52	0.15
-3		3.0	1.1	0.52	0.31
-4		3.5	1.7 [1.5]	0.49 [0.47]	0.42 [0.40]
-5		4.0	2.1 [1.9]	0.48 [0.47]	0.54 [0.48]
-6		5.0	3.0 [2.6]	0.42 [0.38]	0.80 [0.62]
-7		7.0	4.8 [4.6]	0.29 [0.37]	1.0 [0.82]

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2 : Dimensions shown in [ ] are for stainless steel body.

How to order

AB4①E4 - 02 - 3 - 0 3 T A CN - AC100V

Model No. | Ⓐ Actuation | Ⓑ Port size | Ⓒ Orifice size | Ⓓ Body/sealant combination *2 | Ⓔ Coil *3 | Ⓕ External wire pull method *4 | Ⓖ Other options *5 | Ⓗ Organizations for explosive-proof certification | Ⓘ Voltage *7, *8

Code	Description	Model No. AB41E4	Model No. AB42E4
Ⓐ Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●

Code	Description	Code	Description	Code	Description		
Ⓑ Port size							
02	Rc1/4	2G	G1/4	2N	1/4NPT	●	●
03	Rc3/8	3G	G3/8	3N	3/8NPT	●	●

Ⓒ Orifice size			
1	ø1.5	●	●
2	ø2	●	●
3	ø3	●	●
4	ø3.5	●	●
5	ø4	●	●
6	ø5	●	●
7	ø7	●	●

Ⓓ Body/sealant combination

		Body	Seal	Treatment	Remarks		
0	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●
B	Option		Fluoro rubber		-	●	●
C			PTFE		-	●	●
D		Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●
E			Fluoro rubber		-	●	●
F			PTFE		-	●	●
H		Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●
J			Fluoro rubber		-	●	●
K			PTFE		-	●	●
P			Ethylene propylene rubber		-	●	●
L		Stainless steel	Nitrile rubber		Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●
M			Fluoro rubber		-	●	●
N			PTFE		-	●	●
R			Ethylene propylene rubber		-	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓔ Coil			
3	Thermal class 130 (B) explosion-proof coil	●	●
5	Thermal class 130 (B) diode integrated explosion-proof coil	●	●

Ⓕ External wire pull method				
T	Std.	Conduit screw connection (G1/2) *9	●	●
L	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●
M		Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●

Ⓖ Other options				
Blank	Std.	No option	●	●
A	Option	Manual override (locking)	●	
B		With mounting plate	●	●
AB		Manual override/mounting plate	●	

Ⓗ Organizations for explosive-proof certification			
Blank	Japan certification (TIIS) *10	●	●
CN	China certification (NEPSI) *11	●	●

Ⓘ Voltage				
AC100V	Std.	100 VAC 50/60 Hz	●	●
AC200V		200 VAC 50/60 Hz	●	●
DC12V	Option	12 VDC	●	●
DC24V		24 VDC	●	●
DC48V		48 VDC	●	●
DC100V		100 VDC	●	●

[Example of model No.]

AB41E4-02-3-03TACN-AC100V

Model: AB41E4

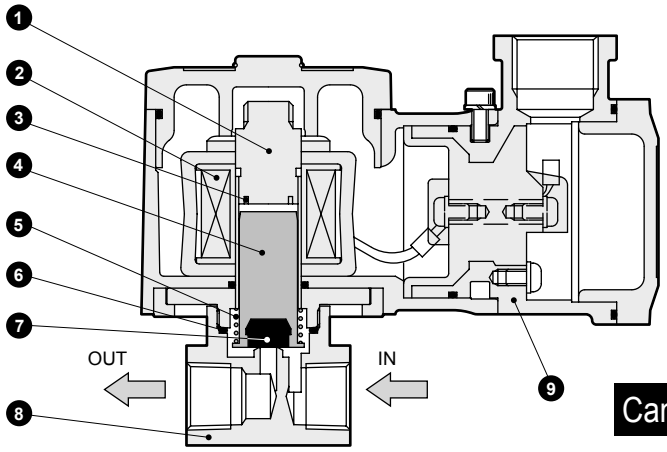
Ⓐ Actuation	: NC (open when energized)
Ⓑ Port size	: Rc1/4
Ⓒ Orifice size	: ø3
Ⓓ Body/sealant combination	: Body - copper alloy, sealant - nitrile rubber
Ⓔ Coil	: Thermal class 130 (B) explosion-proof coil
Ⓕ External wire pull method	: Conduit screw connection (1/2NPT)
Ⓖ Other options	: Manual override (locking)
Ⓗ Organizations for explosive-proof certification	: China Certification (NEPSI)
Ⓘ Voltage	: 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : The ethylene propylene rubber seal combination (Item Ⓓ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*3 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*4 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*5 : When Item Ⓓ is C, F, K or N, the manual override (Item Ⓖ A or AB) is not available. When Item Ⓐ is 2, the manual override (Item Ⓖ A or AB) is not available.
*6 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) is selected.
*7 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz.
The thermal class 130 (B) diode integrated explosion-proof coil (Item Ⓔ 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*8 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC (with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*9 : China certification will be 1/2 NPT.
*10 : Japan certification (TIIS) is included.
*11 : China certification (NEPSI) is included.

Internal structure and parts list

● AB41E4 Series

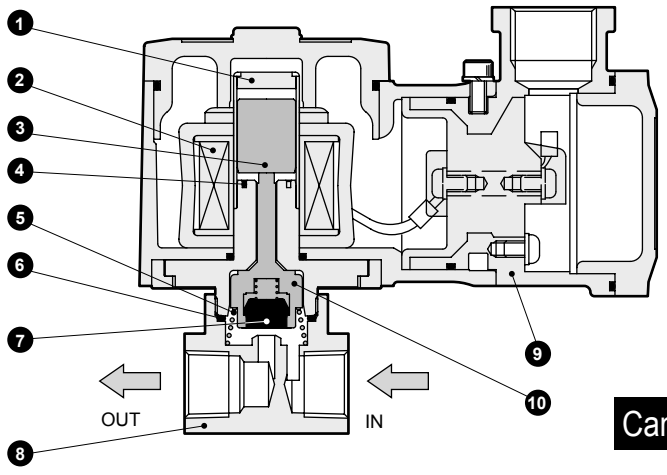


Cannot be disassembled

No.	Part name	Material		No.	Part name	Material	
1	Core assembly	SUS405 or equiv./316L/403	Stainless steel	6	O-ring	NBR (FKM/PTFE/EPDM)	NBR: Nitrile rubber FKM: Fluoro rubber
2	Coil assembly	-	-				
3	Shading coil	Cu (Ag for stainless steel body)	Copper (silver - S.S. body)	7	Valve seal	NBR (FKM/PTFE/EPDM)	EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin
4	Plunger	SUS405 or equiv.	Stainless steel	8	Body	C3771(SUS303)	Copper alloy (stainless steel)
5	Plunger spring	SUS304	Stainless steel	9	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AB42E4 Series



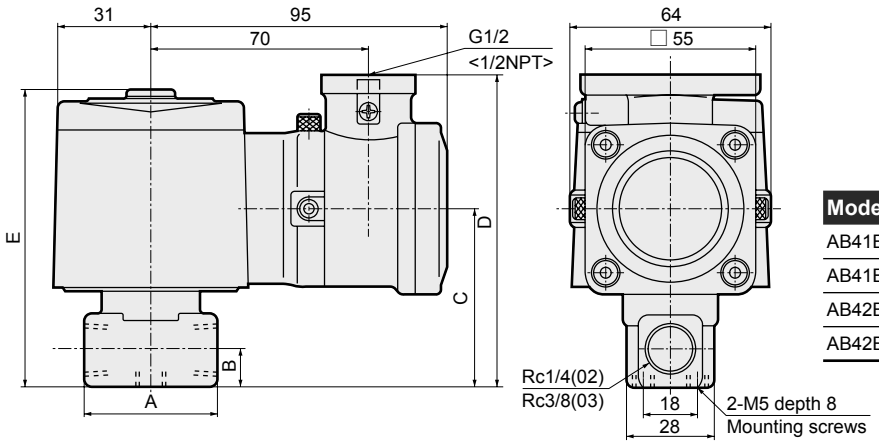
Cannot be disassembled

No.	Part name	Material		No.	Part name	Material	
1	Core assembly	SUS405 or equiv./316L/304	Stainless steel	8	Body	C3771(SUS303)	Copper alloy (stainless steel)
2	Coil	-	-	9	Coil case	ADC12	Aluminum die-casting
3	Plunger	SUS405 or equiv.	Stainless steel	10	NO Valve	POM(PPS/SUS303/PFA)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M/P/R: Polyphenylene sulfide resin When C/F/K/N: Stainless steel/perfluoroalkoxy resin
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)				
5	Spring	SUS304	Stainless steel				
6	O-ring	NBR (FKM/PTFE/EPDM)	NBR: Nitrile rubber FKM: Fluoro rubber				
7	Valve seal	NBR (FKM/PTFE/EPDM)	EPDM: Ethylene propylene rubber PTFE: Tetrafluoroethylene resin				

( ) shows options.

Dimensions

● Conduit screw (G1/2) connection
AB41E4 -*-*-**T
AB42E4

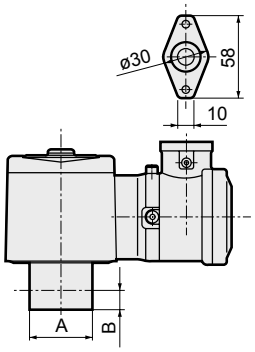


Model No.	A	B	C	D	E
AB41E4-02-1 to 6	36	11	54	97	92
AB41E4-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$	40	12	57	100	95
AB42E4-02-1 to 6	36	11	58	101	96
AB42E4-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$	40	12	61	104	99

Dimensions in < > are for China certification

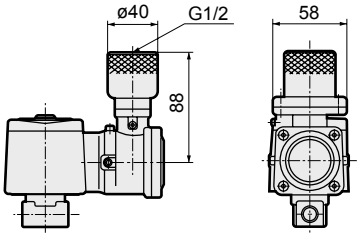
Optional dimensions

● Stainless steel body
AB41E4 -*-* D,E,F,R L,M,N
AB42E4

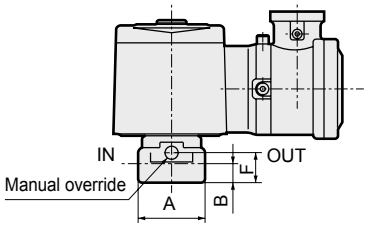


Model No.	A	B
AB41E4-02-1 to 6	ø37.5	11
AB41E4-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$	ø45	12
AB42E4-02-1 to 6	ø37.5	11
AB42E4-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$	ø45	12

● Pressure proof packing (G1/2) connection
AB41E4 -*-*-** L,M
AB42E4

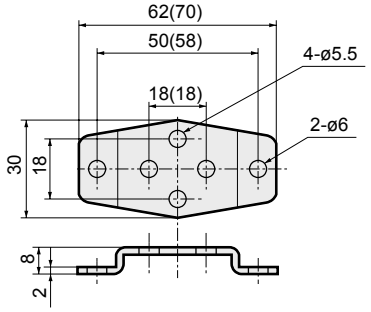


● Manual override (locking)
AB41E4-*-*-*** A



Model No.	A	B	F
AB41E4-02-1 to 6	36	11	19.5
AB41E4-$^{02\text{-}7}_{03\text{-}1\text{ to }7}$	40	12	22.5

● Mounting plate
AB41E4 -*-*-*** B AB
AB42E4



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility	
AB4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	●AB41E4-02/03-1 to 7	Copper alloy body
	●AB41E4-02-1 to 6	Stainless steel body
	●AB42E4-02/03-1 to 7	Copper alloy body
	●AB42E4-02-1 to 6	Stainless steel body
AB4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	●AB41E4-02-7	Stainless steel body
	●AB41E4-03-1 to 7	Stainless steel body
	●AB42E4-02-7	Stainless steel body
	●AB42E4-03-1 to 7	Stainless steel body

* Material: Steel/Zinc plated

MEMO

Explosion-proof direct acting 2-port solenoid valve for dry air
General purpose

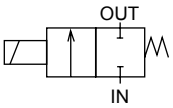
AB41E4-Z Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- Japan Conformity Certificate No.: No. T64361
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- NC (open when energized)
- Port size: Rc1/4, Rc3/8

RoHS CAD

JIS symbol

● NC (open when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 to 4 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	5 (≈730 psi, 50 bar)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to 45 (113°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 45 (113°F)
Thermal class	Class 130 (B)
Atmosphere	Outdoor/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

Individual specifications

1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Max. working pressure differential (MPa)	Rated voltage	Power consumption (W)	Weight (kg)
AB41E4- 02/03	-1-****Z	Rc1/4 Rc3/8	1.5	4.0 (≈580 psi)	100 VAC 50/60 Hz 200 VAC 50/60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *4	17	1.0
	-2-****Z		2.0	2.5 (≈360 psi)			
	-3-****Z		3.0	0.9 (≈130 psi)			
	-4-****Z		3.5	0.6 (≈87 psi)			
	-5-****Z		4.0	0.4 (≈58 psi)			
	-6-****Z		5.0	0.2 (≈29 psi)			
	-7-****Z		7.0	0.1 (≈15 psi)			

*1 : The port size code is 02 for Rc1/4 (8A) and 03 for Rc3/8 (10A).
*2 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*3 : The leakage current must be less than or equal to the values shown below.
*4 : ( ) shows options.
*5 : When using at low vacuum, vacuum the OUT port side.

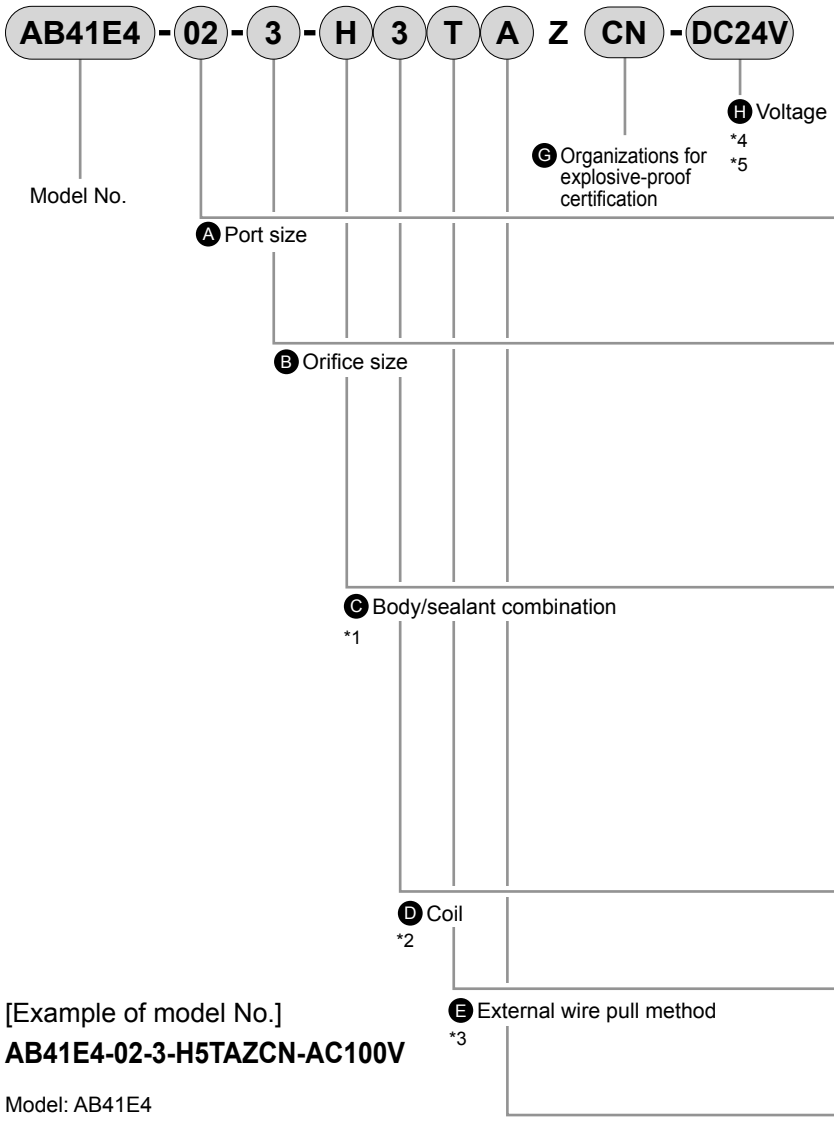
Leakage current: Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
AB41E4-*-*-****Z	10 mA or less	5 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Flow characteristics

Model No.		Port size	Orifice size (mm)	Flow characteristics	
				C[dm^3/(s·bar)]	b
AB41E4- 02/03	-1-****Z	Rc1/4 Rc3/8	1.5	0.29	0.53
	-2-****Z		2.0	0.53	0.52
	-3-****Z		3.0	1.1	0.52
	-4-****Z		3.5	1.7 [1.5]	0.49 [0.47]
	-5-****Z		4.0	2.1 [1.9]	0.48 [0.47]
	-6-****Z		5.0	3.0 [2.6]	0.42 [0.38]
	-7-****Z		7.0	4.8 [4.6]	0.29 [0.37]

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2 : Dimensions shown in [ ] are for stainless steel body.

How to order



Code	Description	Code	Description	Code	Description
A Port size					
02	Rc1/4	**2G**	G 1/4	**2N**	1/4NPT
03	Rc3/8	**3G**	G 3/8	**3N**	3/8NPT

Code	Description
B Orifice size	
1	ø1.5
2	ø2
3	ø3
4	ø3.5
5	ø4
6	ø5
7	ø7

C Body/sealant combination

	Body	Seal	Treatment	Remarks
H	Copper alloy	Nitrile rubber	Oil-prohibited	—
J		Fluoro rubber		—
P		Ethylene propylene rubber		—
L	Stainless steel	Nitrile rubber		—
M		Fluoro rubber		—
R		Ethylene propylene rubber		—

Refer to Intro Page 39 for reference on material combinations.

D Coil	
3	Thermal class 130 (B) explosion-proof coil
5	Thermal class 130 (B) diode integrated explosion-proof coil

E External wire pull method	
T	Conduit screw connection (G1/2) *7
L	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4
M	Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4

F Other options	
Blank	No option
A	Manual override (locking)
B	With mounting plate
AB	Manual override/mounting plate

G Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *8
CN	China certification (NEPSI) *9

H Voltage		
AC100V	Standard	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz
DC12V	Option	12 VDC
DC24V		24 VDC
DC48V		48 VDC
DC100V		100 VDC

[Example of model No.]

AB41E4-02-3-H5TAZCN-AC100V

Model: AB41E4

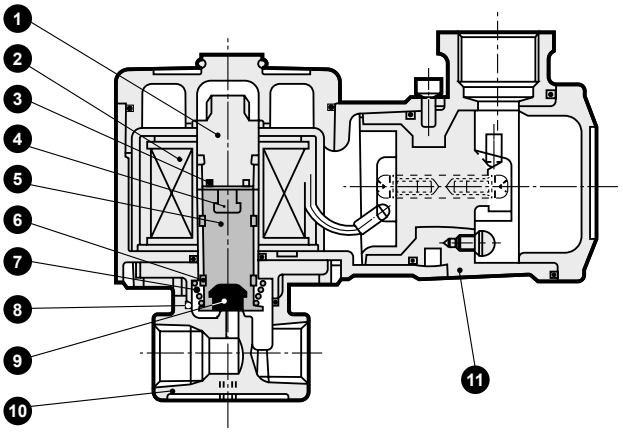
- A Port size : Rc1/4
- B Orifice size : ø3
- C Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- D Coil : Thermal class 130 (B) diode integrated explosion-proof coil
- E External wire pull method : Conduit screw connection (1/2NPT)
- F Other options : Manual override (locking)
- G Organizations for explosive-proof certification : China Certification (NEPSI)
- H Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : Do not use fluid containing oil with ethylene propylene rubber, since it is not oil-resistant.
*2 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*3 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*4 : Thermal class 130 (B) explosion-proof coil (3) can be used with 12 VDC, 24 VDC, 48 VDC and 100 VDC only.
The thermal class 130 (B) diode integrated explosion-proof coil (5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*5 : Other voltages as below are also available. Contact CKD for details.
AC (diode integrated) 110, 220 V
*6 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.
*7 : China certification will be 1/2 NPT.
*8 : Japan certification (TIIS) is included.
*9 : China certification (NEPSI) is included.

Internal structure and parts list

● AB41E4-Z Series



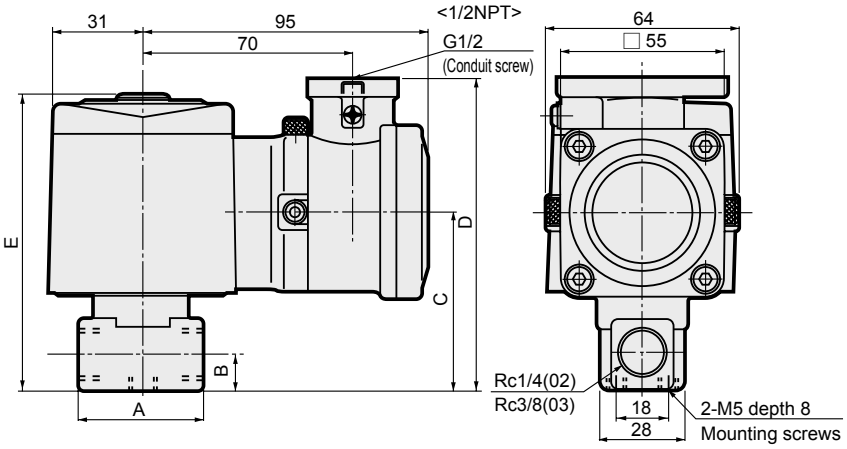
Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./316/403	Stainless steel
2	Coil assembly	-	-
3	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
4	Plunger cushion	PFA	Tetrafluoroethylene resin
5	Plunger	SUS405 or equiv.	Stainless steel
6	Wear ring	POM	Acetal resin
7	Plunger spring	SUS304	Stainless steel
8	O-ring	NBR (FKM/EPDM)	NBR: Nitrile rubber (FKM: Fluoro rubber) (EPDM: Ethylene propylene rubber)
9	Valve seal	NBR (FKM/EPDM)	
10	Body	C3771(SUS303)	Copper alloy (stainless steel)
11	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions CAD

● Conduit screw (G1/2) connection
AB41E4-*-*- H J P *T*Z



Dimensions in < > are for China certification

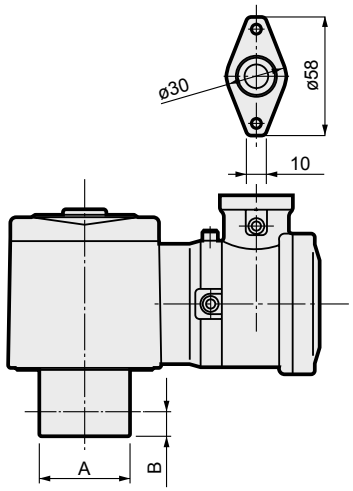
Model No.	A	B	C	D	E
AB41E4-02-1 to 6- ****Z	36	11	54	97	92
AB41E4 -02-7 -03-1 to 7 ****Z	40	12	57	100	95

Optional dimensions

CAD

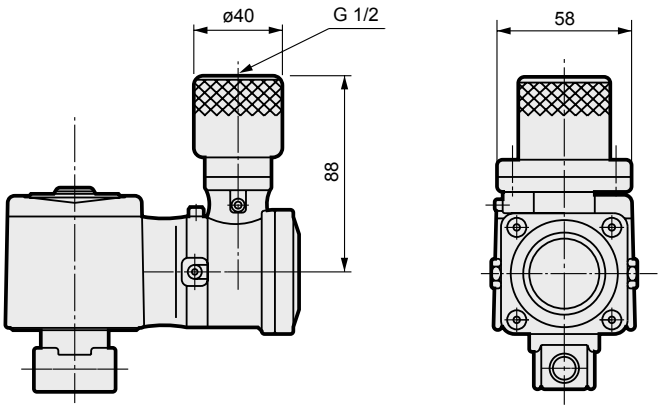
* Refer to the dimensions of conduit screw connection (G1/2) on page 432 for common dimensions.

● Stainless steel body
AB41E4-*-*- [L/M/R] -***Z

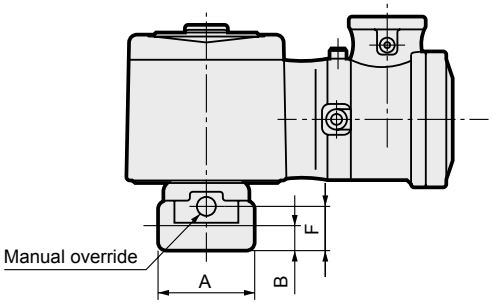


Model No.	A	B
AB41E4-02-1 to 6- ****Z	ø37.5	11
AB41E4 -02-7 -03-1 to 7 ****Z	ø45	12

● Pressure proof packing (G1/2) connection
AB41E4-*-*-** [L/M] *Z

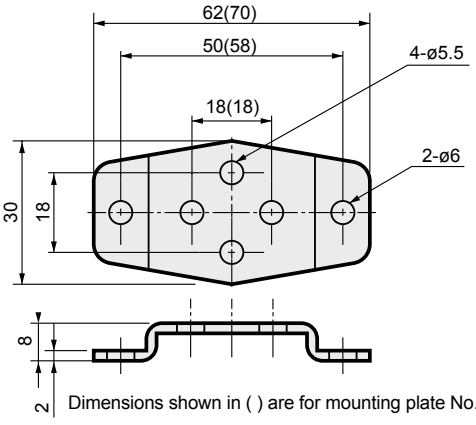


● Manual override (locking)
AB41E4-*-*-*** [A] Z



Model No.	A	B	F
AB41E4-02-1 to 7-***AZ	36	11	19.5
AB41E4-03-1 to 7-***AZ	40	12	22.5

● Mounting plate
AB41E4-*-*-*** [B] Z



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AB4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● Copper alloy body AB41E4-02/03-1 to 7- [H/J/P] ● Stainless steel body AB41E4-02-1 to 6- [H/P/J]
AB4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● Stainless steel body AB41E4-02-7- [L/M/R] AB41E4-03-1 to 7- [L/M/R]

* Material: Steel/Zinc plated

Explosion-proof direct acting 3-port solenoid valve
General purpose

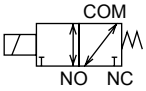
AG41E4/AG43E4/AG44E4 Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- Japan Conformity Certificate No.: No. T64346
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- Universal, NC pressurization, NO pressurization
- Port size: Rc1/4, Rc3/8

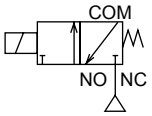
RoHS CAD

JIS symbol

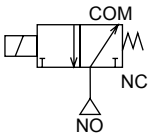
- AG41E4: Universal



- AG43E4: NC pressurization



- AG44E4: NO pressurization



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AG41E4/AG43E4/AG44E4
Working fluid	Air/low vacuum [1.33 x 10^2 Pa (abs)]/water/kerosene/oil (50 mm^2/s or less)
Working pressure differential MPa	0 to 1.5 (refer to max. working pressure differential in individual specifications)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	Class 130 (B)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less (PTFE sealant: 300 or less) (air)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)		Max. working pressure differential (MPa)						Max. working pressure	Rated voltage	Apparent power (VA)				Power consump (W)		Weight(kg)
					Air		Water(hot)/Kerosene		Oil (50 mm^2/s)				When holding		When starting		AC 50 Hz/ 60 Hz	DC	
			TOP	BODY	AC	DC	AC	DC	AC	DC	MPa		50 Hz	60 Hz	50 Hz	60 Hz			
Universal																			
AG41E4- 02/03	-1	Rc1/4	2.0	2.0	1.0	0.7	1.0	0.7	0.4	0.3	1	100 VAC 50/60 Hz 110 VAC 60 Hz	22	17	35	27	10/8	11.6	1.1
	-2	Rc3/8	2.3	2.3	0.7	0.4	0.7	0.4	0.25	0.15									
NC pressurization																			
AG43E4- 02/03	-4	Rc1/4	3.0	3.0	0.7	0.7	0.7	0.7	0.7	0.7	1	200 VAC 50/60 Hz 220 VAC 60 Hz	22	17	35	27	10/8	11.6	1.1
	-5	Rc3/8	3.5	3.0	0.4	0.4	0.4	0.4	0.4	0.4									
NO pressurization																			
AG44E4- 02/03	-1	Rc1/4	2.0	2.0	1.2	0.75	1.5	1.0	1.0	0.45	1.5	(12 VDC) (24 VDC) (48 VDC) (100 VDC) *6	22	17	35	27	10/8	11.6	1.1
	-3	Rc3/8	2.0	3.0	1.2	0.75	1.5	0.9	1.0	0.45									
	-4		3.0	3.0	0.4	0.3	0.5	0.3	0.3	0.2									

*1 : The port size model No. is 02 for Rc1/4 (8A) and 03 for Rc3/8 (10A).
*2 : Refer to DC column for the max. working pressure differential of coil with diode.
*3 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*4 : NO port pressurization is not possible for PTFE seal of AG41E4.
*5 : When using at low vacuum, vacuum the port side specified as below.
Universal: COM/NC/NO port, NC pressurization: NO port, NO pressurization: NC port
*6 : ( ) shows options.

Flow characteristics

Model No.		Port size	Orifice size (mm)		Flow characteristics					
					C[dm^3/(s·bar)]		b		Cv	
			TOP	BODY	TOP	BODY	TOP	BODY	TOP	BODY
Universal										
AG41E4- 02/03	-1	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
	-2	Rc3/8	2.3	2.3	0.74	0.74	0.66	0.53	0.19	0.19
NC pressurization										
AG43E4- 02/03	-4	Rc1/4	3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31
	-5	Rc3/8	3.5	3.0	1.5	1.1	0.62	0.52	0.40	0.31
NO pressurization										
AG44E4- 02/03	-1	Rc1/4	2.0	2.0	0.53	0.53	0.54	0.52	0.15	0.15
	-3	Rc3/8	2.0	3.0	0.53	1.1	0.54	0.52	0.15	0.31
	-4		3.0	3.0	1.1	1.1	0.72	0.52	0.31	0.31

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AG4①E4 - 02 - 2 - 0 3 T A CN - AC200V

- Model No.
- ① Actuation
- Port size
- Orifice size
- Body/sealant combination *2 *9
- Coil *3
- External wire pull method *4
- Other options *5
- Organizations for explosive-proof certification
- Voltage *7, *8

Code	Description	Model No. AG41E4	AG43E4	AG44E4
A Actuation				
1	Universal	●		
3	NC pressurization		●	
4	NO pressurization			●

Code	Description	Code	Description	Code	Description			
B Port size								
02	Rc1/4	2G	G1/4	2N	1/4NPT	●	●	●
03	Rc3/8	3G	G3/8	3N	3/8NPT	●	●	●

	TOP	BODY			
C Orifice size					
1	ø2.0	ø2.0	●		●
2	ø2.3	ø2.3	●		
3	ø2.0	ø3.0			●
4	ø3.0	ø3.0		●	●
5	ø3.5	ø3.0		●	

		Body	Seal	Treatment	Remarks			
D Body/sealant combination								
0	Std.	Copper alloy	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●	●
B	Option	Copper alloy	Fluoro rubber	-	-	●	●	●
C	Option	Copper alloy	PTFE	-	-	●	●	
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●	●
E	Option	Stainless steel	Fluoro rubber	-	-	●	●	●
F	Option	Stainless steel	PTFE	-	-	●	●	
H	Option	Copper alloy	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●	●
J	Option	Copper alloy	Fluoro rubber	Oil-prohibited	-	●	●	●
K	Option	Copper alloy	PTFE	Oil-prohibited	-	●	●	
P	Option	Copper alloy	Ethylene propylene rubber	Oil-prohibited	-	●	●	●
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●	●
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	-	●	●	●
N	Option	Stainless steel	PTFE	Oil-prohibited	-	●	●	
R	Option	Stainless steel	Ethylene propylene rubber	Oil-prohibited	-	●	●	●

Refer to Intro Page 39 for reference on material combinations.

E Coil					
3		Thermal class 130 (B) explosion-proof coil	●	●	●
5		Thermal class 130 (B) diode integrated explosion-proof coil	●	●	●
F External wire pull method					
T	Std.	Conduit screw connection (G1/2) *10	●	●	●
L	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●	●
M	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●	●
G Other options					
Blank	Std.	No option	●	●	●
A	Option	Manual override (locking)	●	●	●
B	Option	With mounting plate	●	●	●
AB	Option	Manual override/mounting plate	●	●	●
H Organizations for explosive-proof certification					
Blank		Japan certification (TIIS) *11	●	●	●
CN		China certification (NEPSI) *12	●	●	●
I Voltage					
AC100V	Std.	100 VAC 50/60 Hz	●	●	●
AC200V	Std.	200 VAC 50/60 Hz	●	●	●
DC12V	Option	12 VDC	●	●	●
DC24V	Option	24 VDC	●	●	●
DC48V	Option	48 VDC	●	●	●
DC100V	Option	100 VDC	●	●	●

[Example of model No.]

AG41E4-02-2-03TACN-AC200V

Model: AG41E4

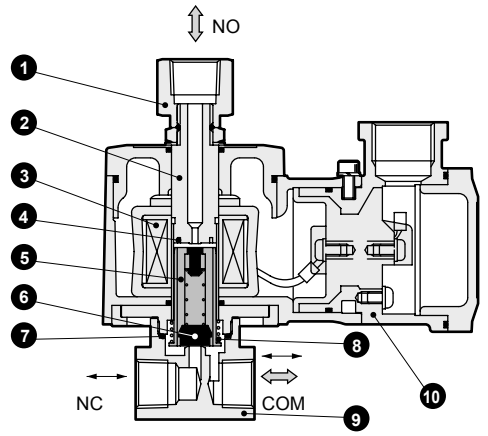
- Ⓐ Actuation : Universal
- Ⓑ Port size : Rc1/4
- Ⓒ Orifice size : TOPø2.3/BODYø2.3
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil : Thermal class 130 (B) explosion-proof coil
- Ⓕ External wire pull method : Conduit screw connection (1/2NPT)
- Ⓖ Other options : Manual override (locking)
- Ⓗ Organizations for explosive-proof certification : China Certification (NEPSI)
- Ⓘ Voltage : 200 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : The ethylene propylene rubber seal combination (Item Ⓓ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*3 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*4 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*5 : When Item Ⓓ is C, F, K or N, the manual override (Item Ⓖ A, AB) is not available.
*6 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) is selected.
*7 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. The thermal class 130 (B) diode integrated explosion-proof coil (Item Ⓔ 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*8 : Other voltages as below are also available. Contact CKD for details. 12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC (with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*9 : Even if nitrile rubber sealant is selected for AG44E4, the seal material on the NO side will be fluoro rubber.
*10 : China certification will be 1/2 NPT.
*11 : Japan certification (TIIS) is included.
*12 : China certification (NEPSI) is included.

Internal structure and parts list

● AG41E4 Series

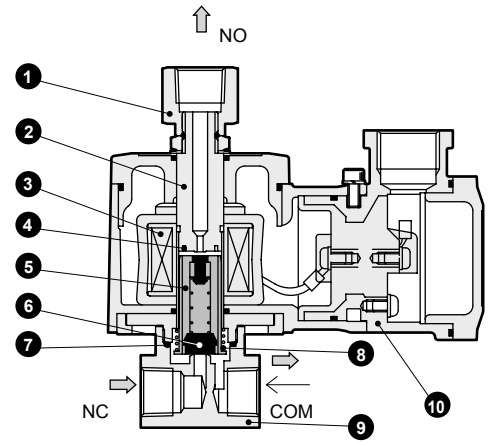


Cannot be disassembled

No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Core assembly	SUS405 or equiv./316L/403	Stainless steel
3	Coil	-	-
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Valve seal	NBR (FKM/PTFE/EPDM)	NBR : Nitrile rubber FKM : Fluoro rubber EPDM : Ethylene propylene rubber PTFE : Tetrafluoroethylene resin
7	O-ring	NBR (FKM/PTFE/EPDM)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SUS303)	Copper alloy (stainless steel)
10	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AG43E4 Series

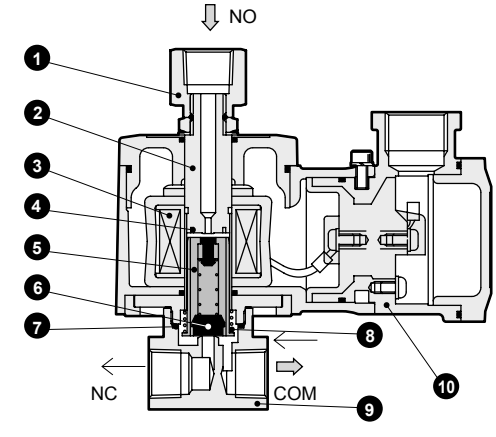


Cannot be disassembled

No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Core assembly	SUS405 or equiv./316L/403	Stainless steel
3	Coil	-	-
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Valve seal	NBR (FKM/PTFE/EPDM)	NBR : Nitrile rubber FKM : Fluoro rubber EPDM : Ethylene propylene rubber PTFE : Tetrafluoroethylene resin
7	O-ring	NBR (FKM/PTFE/EPDM)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SUS303)	Copper alloy (stainless steel)
10	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AG44E4 Series



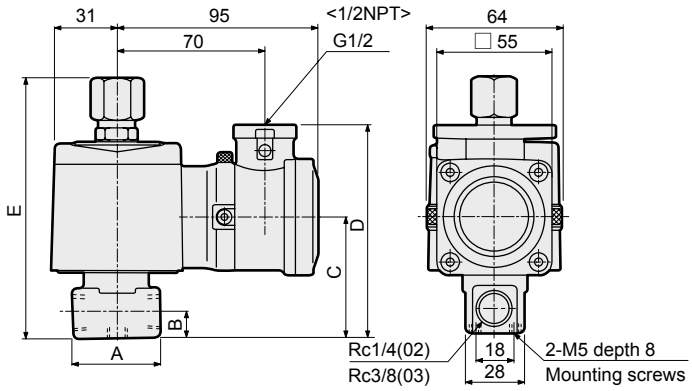
Cannot be disassembled

No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Core assembly	SUS405 or equiv./316L/403	Stainless steel
3	Coil	-	-
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Valve seal	NBR (FKM/EPDM)	NBR : Nitrile rubber FKM : Fluoro rubber EPDM : Ethylene propylene rubber
7	O-ring	NBR (FKM/EPDM)	
8	Plunger spring	SUS304	Stainless steel
9	Body	C3771(SUS303)	Copper alloy (stainless steel)
10	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions and optional dimensions

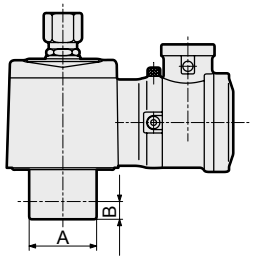
● Conduit screw (G1/2) connection
AG4*E4-*-*-** T



Dimensions in < > are for China certification

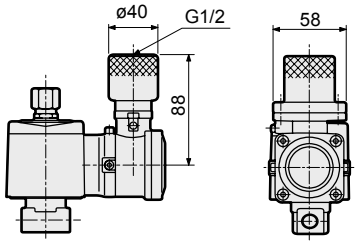
Model No.	A	B	C	D	E
AG41E4-02-1/2	36	11	54	97	116
AG41E4-03-1/2	40	12	57	100	122
AG43E4-02-4/5	36	11	54	97	116
AG43E4-03-4/5	40	12	57	100	122
AG44E4-02-1/3/4	36	11	54	97	116
AG44E4-03-1/3/4	40	12	57	100	122

● Stainless steel body
AG4*E4-*-*- D,E,F,R L,M,N

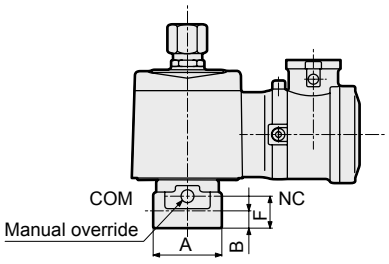


Model No.	A	B
AG41E4-02-1/2	ø37.5	11
AG41E4-03-1/2	ø45	12
AG43E4-02-4/5	ø37.5	11
AG43E4-03-4/5	ø45	12
AG44E4-02-1/3/4	ø37.5	11
AG44E4-03-1/3/4	ø45	12

● Pressure proof packing (G1/2) connection
AG4*E4-*-*-** L,M

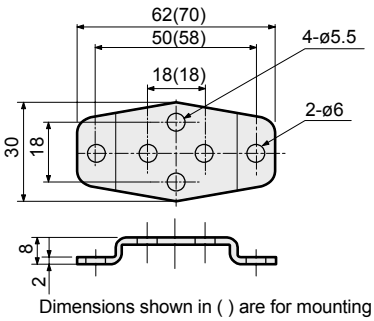


● Manual override (locking)
AG4*E4-*-*-*** A



Model No.	A	B	F
AG41E4-02-1/2	36	11	19.5
AG41E4-03-1/2	40	12	22.5
AG43E4-02-4/5	36	11	19.5
AG43E4-03-4/5	40	12	22.5
AG44E4-02-1/3/4	36	11	19.5
AG44E4-03-1/3/4	40	12	22.5

● Mounting plate
AG4*E4-*-*-*** B



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility	
AG4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AG41E4-02/03-1/2	Copper alloy body
	● AG41E4-02-1/2	Stainless steel body
	● AG43E4-02/03-4/5	Copper alloy body
	● AG43E4-02-4/5	Stainless steel body
	● AG44E4-02/03-1/3/4	Copper alloy body
	● AG44E4-02-1/3/4	Stainless steel body
AG4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● AG41E4-03-1/2	Stainless steel body
	● AG43E4-03-4/5	Stainless steel body
	● AG44E4-03-1/3/4	Stainless steel body

* Material: Steel/Zinc plated

Explosion-proof direct acting 3-port solenoid valve for dry air
General purpose

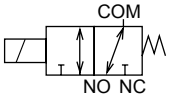
AG4*E4 -Z Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- Japan Conformity Certificate No.: No. T64362
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- Universal, NC pressurization, NO pressurization
- Port size: Rc1/4, Rc3/8

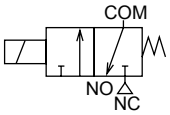
RoHS CAD

JIS symbol

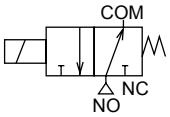
- AG41E4-Z: Universal



- AG43E4-Z: NC pressurization



- AG44E4-Z: NO pressurization



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	For dry air (atmospheric dew point -60°C and over)/inert gas/low vacuum [1.33 x 10^2 Pa (abs)]
Working pressure differential MPa	0 to 0.75 (refer to max. working pressure differential in individual specifications.)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to 45 (113°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 45 (113°F)
Thermal class	Class 130 (B)
Atmosphere	Outdoor/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure	Direct acting poppet structure
Valve seat leakage cm^3/min(ANR)	0.2 or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm) TOP	Orifice size (mm) BODY	Max. working pressure differential (MPa)	Max. working pressure MPa	Rated voltage	Power consumption (W)	Weight (kg)
Universal	Rc1/4 Rc3/8				1 (≈150 psi, 10 bar)	100 VAC 50/60 Hz 200 VAC 50/60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *4	17	1.0
AG41E4- 02 03 -1-****Z		2.0	2.0	0.65				
-2-****Z		2.3	2.3	0.4				
NC pressurization								
AG43E4- 02 03 -4-****Z		3.0	3.0	0.7				
-5-****Z		3.5	3.0	0.4				
NO pressurization					1.5 (≈220 psi, 15 bar)			
AG44E4- 02 03 -1-****Z		2.0	2.0	0.75				
-3-****Z		2.0	3.0	0.7				
-4-****Z		3.0	3.0	0.25				

*1 : The port size code is 02 for Rc1/4 (8A) and 03 for Rc3/8 (10A).
*2 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*3 : The leakage current must be less than or equal to the values shown below.
*4 : ( ) shows options.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	12 VDC	24 VDC	48 VDC	100 VDC
AG4*E4-*-*-****Z	8 mA or less	4 mA or less	40 mA or less	20 mA or less	10 mA or less	5 mA or less

Flow characteristics

Model No.	Port size	Orifice size (mm) TOP	Orifice size (mm) BODY	Flow characteristics C[dm^3/(s·bar)] TOP	C[dm^3/(s·bar)] BODY	b TOP	b BODY
Universal	Rc1/4 Rc3/8						
AG41E4- 02 03 -1-****Z		2.0	2.0	0.53	0.53	0.54	0.52
-2-****Z		2.3	2.3	0.74	0.74	0.66	0.53
NC pressurization							
AG43E4- 02 03 -4-****Z		3.0	3.0	1.1	1.1	0.72	0.52
-5-****Z		3.5	3.0	1.5	1.1	0.62	0.52
NO pressurization							
AG44E4- 02 03 -1-****Z		2.0	2.0	0.53	0.53	0.54	0.52
-3-****Z		2.0	3.0	0.53	1.1	0.54	0.52
-4-****Z		3.0	3.0	1.1	1.1	0.72	0.52

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AG4 ① E4 - 02 - 2 - H 5 T A Z CN - AC100V

- Model No.
- ① Actuation
- Ⓑ Port size
- Ⓒ Orifice size
- Ⓓ Body/sealant combination *1 *2
- Ⓔ Coil *3
- Ⓕ External wire pull method *4
- Ⓖ Other options *7
- Ⓗ Organizations for explosive-proof certification
- Ⓘ Voltage *6

Code	Description	Model No. AG41E4	AG43E4	AG44E4
① Actuation				
1	Universal	●		
3	NC pressurization		●	
4	NO pressurization			●

Code	Description	Code	Description	Code	Description			
Ⓑ Port size								
02	Rc1/4	**2G**	G1/4	**2N**	1/4NPT	●	●	●
03	Rc3/8	**3G**	G3/8	**3N**	3/8NPT	●	●	●

	TOP	BODY				
Ⓒ Orifice size						
1	ø2.0	ø2.0		●		●
2	ø2.3	ø2.3		●		
3	ø2.0	ø3.0				●
4	ø3.0	ø3.0			●	●
5	ø3.5	ø3.0			●	

	Body	Seal	Treatment	Remarks			
Ⓓ Body/sealant combination							
H	Copper alloy	Nitrile rubber	Oil-prohibited	—	●	●	●
J		Fluoro rubber		—	●	●	●
P		Ethylene propylene rubber		—	●	●	●
L	Stainless steel	Nitrile rubber		—	●	●	●
M		Fluoro rubber		—	●	●	●
R		Ethylene propylene rubber		—	●	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓔ Coil				
3	Thermal class 130 (B) explosion-proof coil	●	●	●
5	Thermal class 130 (B) diode integrated explosion-proof coil	●	●	●
Ⓕ External wire pull method				
T	Conduit screw connection (G1/2) *8	●	●	●
L	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●	●
M	Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●	●
Ⓖ Other options				
Blank	No option	●	●	●
A	Manual override (locking)	●	●	●
B	With mounting plate	●	●	●
AB	Manual override/mounting plate	●	●	●
Ⓗ Organizations for explosive-proof certification				
Blank	Japan certification (TIIS) *9	●	●	●
CN	China certification (NEPSI) *10	●	●	●
Ⓘ Voltage				
AC100V	Standard: 100 VAC 50/60 Hz	●	●	●
AC200V	Standard: 200 VAC 50/60 Hz	●	●	●
DC12V	Option: 12 VDC	●	●	●
DC24V	Option: 24 VDC	●	●	●
DC48V	Option: 48 VDC	●	●	●
DC100V	Option: 100 VDC	●	●	●

The combinations indicated with ● in the above table are available.

[Example of model No.]

AG41E4-02-2-H5TAZCN-AC100V

Model: AG41E4

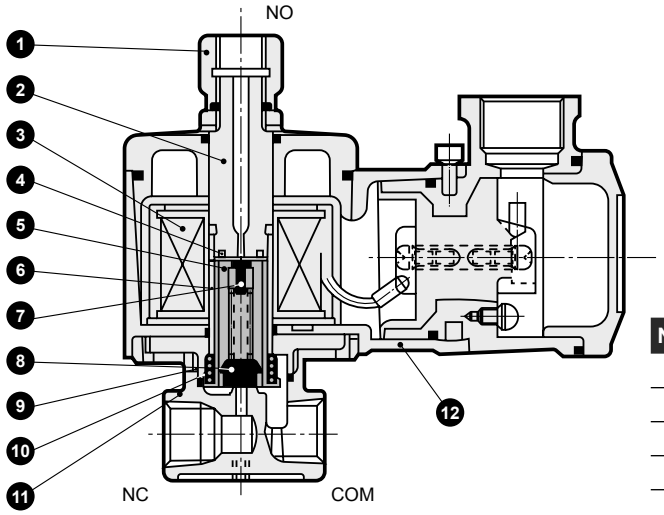
- ① Actuation : Universal
- Ⓑ Port size : Rc1/4
- Ⓒ Orifice size : TOPø2.3/BODYø2.3
- Ⓓ Body/sealant combination : Body - copper alloy, sealant - nitrile rubber
- Ⓔ Coil : Thermal class 130 (B) diode integrated explosion-proof coil
- Ⓕ External wire pull method : Conduit screw connection (1/2NPT)
- Ⓖ Other options : Manual override (locking)
- Ⓗ Organizations for explosive-proof certification : China Certification (NEPSI)
- Ⓘ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : Do not use fluid containing oil with ethylene propylene rubber, since it is not oil-resistant.
*2 : NO valve seal of AG44 is fluoro rubber.
*3 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*4 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*5 : Thermal class 130 (B) explosion-proof coil (Ⓔ 3) can be used with 12 VDC, 24 VDC, 48 VDC and 100 VDC only.
The thermal class 130 (B) diode integrated explosion-proof coil (Ⓔ 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*6 : Other voltages as below are also available. Contact CKD for details.
AC (diode integrated) 110, 220 V
*7 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.
*8 : China certification will be 1/2 NPT.
*9 : Japan certification (TIIS) is included.
*10 : China certification (NEPSI) is included.

Internal structure and parts list

● AG4*E4-Z Series



The figure shows AG41/43/44E4.

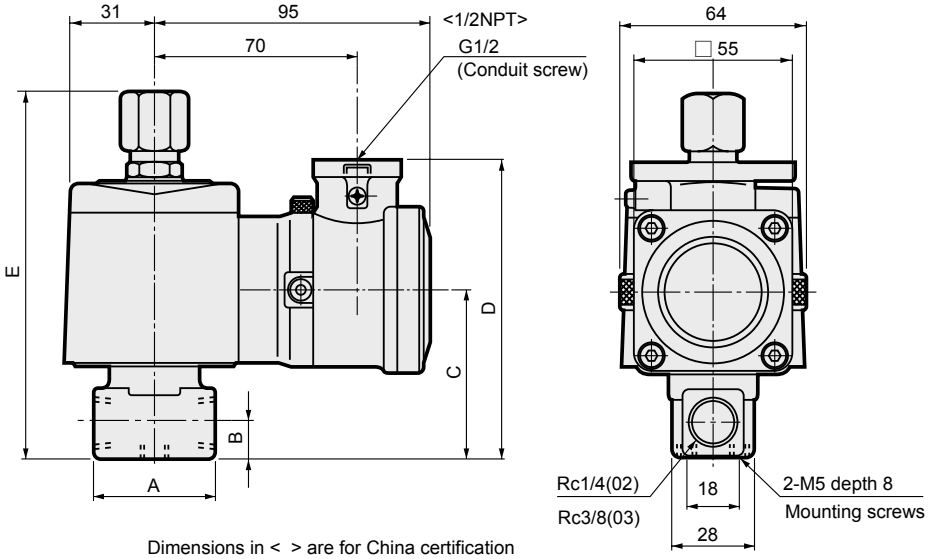
Cannot be disassembled

No.	Part name	Material	
1	Socket	C3604(SUS303)	Copper alloy (stainless steel)
2	Core assembly	SUS405 or equiv./316/403	Stainless steel
3	Coil assembly	-	-
4	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
5	Plunger	SUS405 or equiv.	Stainless steel
6	Plunger tube	PET	Polyethylene terephthalate
7	NO valve sealant	NBR (FKM/EPDM) *2	NBR: Nitrile rubber (FKM: Fluoro rubber) (EPDM: Ethylene propylene rubber)
8	NC valve sealant	NBR (FKM/EPDM)	
9	O-ring	NBR (FKM/EPDM)	
10	Plunger spring	SUS304	Stainless steel
11	Body	C3771(SUS303)	Copper alloy (stainless steel)
12	Coil case	ADC12	Aluminum die-casting

*1 : ( ) shows options.
*2 : For AG44 with body/sealant combination code H/L, NO valve seal is FKM.

Dimensions CAD

● Conduit screw (G1/2) connection
AG4*E4-*-*- H J P *T*Z



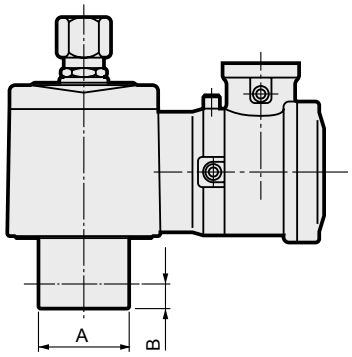
Dimensions in < > are for China certification

Model No.	A	B	C	D	E
AG4*E4-02-1 to 5-****Z	36	11	54	97	116
AG4*E4-03-1 to 5-****Z	40	12	57	100	122

Optional dimensions

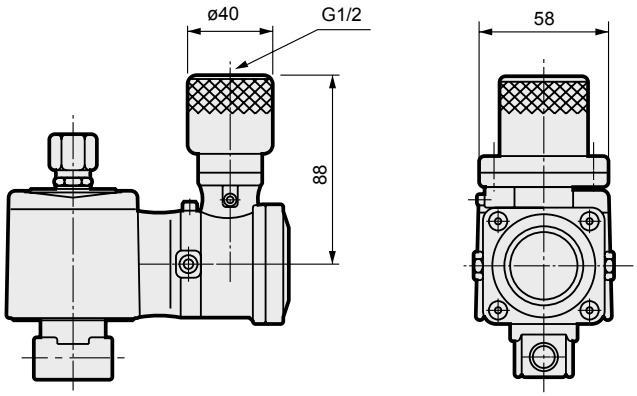
* Refer to the dimensions of conduit screw connection (G1/2) on page 440 for common dimensions.

● Stainless steel body
AG4*E4-*-*- [L/M/R] ***Z

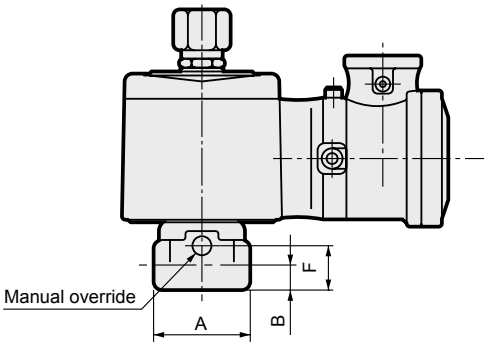


Model No.	A	B
AG4*E4-02-1 to 5-****Z	ø37.5	11
AG4*E4-03-1 to 5-****Z	ø45	12

● Pressure proof packing (G1/2) connection
AG4*E4-*-*-** [L/M] *Z

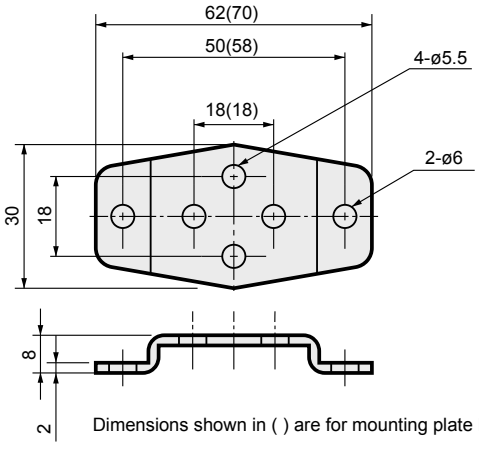


● Manual override (locking)
AG4*E4-*-*-*** [A] Z



Model No.	A	B	F
AG4*E4-02-1 to 5-***AZ	36	11	19.5
AG4*E4-03-1 to 5-***AZ	40	12	22.5

● Mounting plate
AG4*E4-*-*-*** [B] Z



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility
AG4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● Copper alloy body AG4*E4-02/03-1 to 5- [H/J/P] ● Stainless steel body AG4*E4-02-1 to 5- [L/M/R]
AG4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● Stainless steel body AG4*E4-03-1 to 5- [L/M/R]

* Material: Steel/Zinc plated

Explosion-proof pilot operated 2-port solenoid valve
General purpose

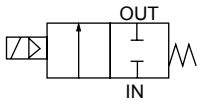
AP11E4/AP12E4 Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- Japan Conformity Certificate No. AP11E4: No. T64349, AP12E4: No. T64352
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- NC (open when energized), NO (closed when energized)
- Port size: Rc1/2 to Rc1 ● Piston drive

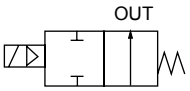
RoHS CAD

JIS symbol

● AP11E4: NC (open when energized)



● AP12E4: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AP11E4/AP12E4
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	Class 130 (B)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure	Pilot operated poppet, piston drive
Valve seat leakage (*1) cm³/min(ANR)	0.2 or less (PTFE sealant: 300 or less) (air)
Mounting orientation	Free (within working pressure range)
Degree of protection	IP65 or equivalent

*1: Pneumatic pressure used for measurement is: 0.05 to 1.2 MPa for AP11E4 (NC [open when energized]), and 0.05 to 0.5 MPa for AP12E4 (NO [closed when energized]).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
					Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC	DC	
					AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz/60 Hz		
NC (open when energized)																		
AP11E4	-15A	Rc1/2	15	0.05	1.2	0.6	1.0	0.6	0.6	0.6	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC)*3	18	15	29	24	8/7	11.6	1.9
	-20A	Rc3/4	20															2.3
	-25A	Rc1	25															3.0
NO (closed when energized)																		
AP12E4	-15A	Rc1/2	15	0.05	0.5	0.5	0.5	0.5	0.5	0.5	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC)*3	22	18	35	29	8.7/6.7	15.5	1.9
	-20A	Rc3/4	20															2.3
	-25A	Rc1	25															3.0

*1 : Refer to DC column for the max. working pressure differential of AP11E4 type coil with diode.
*2 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*3 : ( ) shows options.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Flow characteristics			
				C[dm³/(s·bar)]	b	Cv	S(mm²)
NC (open when energized)							
AP11E4	-15A	Rc1/2	15	21	0.22	4.5	-
	-20A	Rc3/4	20	-	-	9.3	162
	-25A	Rc1	25	-	-	12.0	231
NO (closed when energized)							
AP12E4	-15A	Rc1/2	15	21	0.22	4.5	-
	-20A	Rc3/4	20	-	-	9.3	162
	-25A	Rc1	25	-	-	12.0	231

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AP1 ① E4 - 25A - 0 3 T A CN - AC200V

- Model No.
- ① Actuation
- Port size *2
- Body/sealant combination
- Coil *3
- External wire pull method *4
- Other options *5
- Organizations for explosive-proof certification
- Voltage *7, *8

Code	Description	Model No. AP11E4	Model No. AP12E4
A Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●
B Port size			
15A	Rc1/2	●	●
20A	Rc3/4	●	●
25A	Rc1	●	●

C Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks		
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
B	Option	Bronze	Fluoro rubber	Fluoro rubber	-	-	●	●
C	Option	Bronze	PTFE	Fluoro rubber	-	-	●	●
D	Option	Stainless steel	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
E	Option	Stainless steel	Fluoro rubber	Fluoro rubber	-	-	●	●
F	Option	Stainless steel	PTFE	PTFE	-	-	●	●
H	Option	Bronze	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)	●	●
J	Option	Bronze	Fluoro rubber	Fluoro rubber	Oil-prohibited	-	●	●
K	Option	Bronze	PTFE	Fluoro rubber	Oil-prohibited	-	●	●
L	Option	Stainless steel	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Fluoro rubber	Oil-prohibited	-	●	●
N	Option	Stainless steel	PTFE	PTFE	Oil-prohibited	-	●	●

Refer to Intro Page 39 for reference on material combinations.

D Coil				
3		Thermal class 130 (B) explosion-proof coil	●	●
5		Thermal class 130 (B) diode integrated explosion-proof coil	●	●
E External wire pull method				
T	Std.	Conduit screw connection (G1/2) *9	●	●
L	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●
M	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●
F Other options				
Blank	Std.	No option	●	●
A		Manual override (locking)	●	
G Organizations for explosive-proof certification				
Blank		Japan certification (TIIS) *10	●	●
CN		China certification (NEPSI) *11	●	●
H Voltage				
AC100V	Std.	100 VAC 50/60 Hz	●	●
AC200V	Std.	200 VAC 50/60 Hz	●	●
DC12V	Option	12 VDC	●	●
DC24V	Option	24 VDC	●	●
DC48V	Option	48 VDC	●	●
DC100V	Option	100 VDC	●	●

[Example of model No.]

AP11E4-25A-03TACN-AC100V

Model: AP11E4

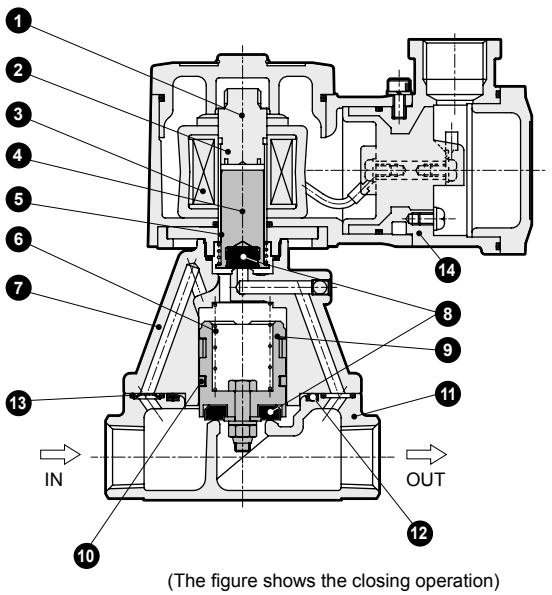
- A Actuation : NC (open when energized)
- B Port size : Rc1
- C Body/sealant combination : Body - bronze, valve seal - nitrile rubber : O-ring - nitrile rubber
- D Coil : Thermal class 130 (B) explosion-proof coil
- E External wire pull method : Conduit screw connection (1/2NPT)
- F Other options : With manual override (locking)
- G Organizations for explosive-proof certification : China Certification (NEPSI)
- H Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*3 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*4 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*5 : When Item C is C, F, K or N, the manual override (F A) is not available. When Item A is 2, the manual override (F A) is not available.
*6 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) is selected.
*7 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. The thermal class 130 (B) diode integrated explosion-proof coil (D 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*8 : Other voltages as below are also available. Contact CKD for details. 12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC (with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*9 : China certification will be 1/2 NPT.
*10 : Japan certification (TIIS) is included.
*11 : China certification (NEPSI) is included.

Internal structure and parts list

● AP11E4 Series



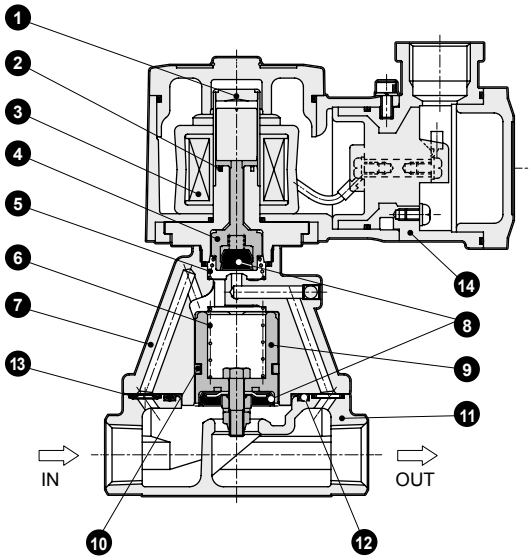
(The figure shows the closing operation)

Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)*1	Bronze casting (S.S. casting)
8	Valve seal	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (Stainless steel)
10	Piston ring	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13)*1	Bronze casting (S.S. casting)
12	O-ring	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304(SUS303)	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.
*1 For port size 8 (1/4) or 10 (3/8), the body material is copper alloy (C3771) as standard, and the orifice plate material is SUS303 (stainless steel) for both the standard and options.

● AP12E4 Series



(The figure shows the opening operation)

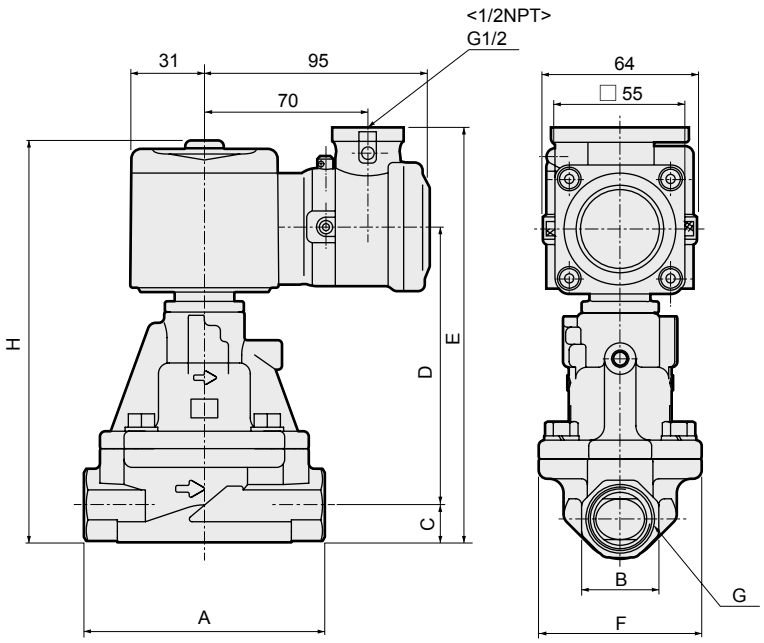
Cannot be disassembled

No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./ SUS316L/SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO valve	POM (PPS/SUS303/PFA)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M: Polyphenylene sulfide resin When C/F/K/N: Stainless steel/ perfluoroalkoxy resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)*1	Bronze casting (S.S. casting)
8	Valve seal	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (Stainless steel)
10	Piston ring	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13)*1	Bronze casting (S.S. casting)
12	O-ring	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304(SUS303)	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.
*1 For port size 8 (1/4) or 10 (3/8), the body material is copper alloy (C3771) as standard, and the orifice plate material is SUS303 (stainless steel) for both the standard and options.

Dimensions

● Conduit screw (G1/2) connection
AP11E4-*-**T
AP12E4

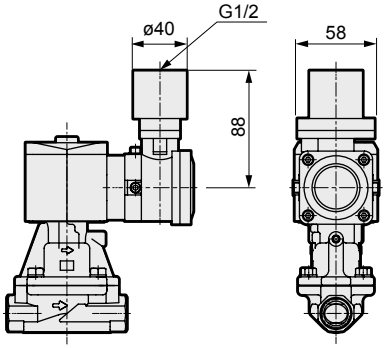


Dimensions in < > are for China certification

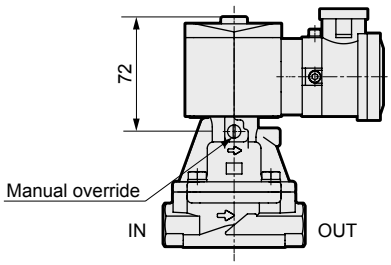
Model No.	A	B	C	D	E	F	G	H
AP11E4-15A-**T	90	27	14	94.5	151.5	57	Rc1/2	146.5
AP11E4-20A-**T	100	32	17	103.5	163.5	65	Rc3/4	158.5
AP11E4-25A-**T	110	41	20.5	118	181.5	76	Rc1	176.5
AP12E4-15A-**T	90	27	14	98.5	155.5	57	Rc1/2	150.5
AP12E4-20A-**T	100	32	17	107.5	167.5	65	Rc3/4	162.5
AP12E4-25A-**T	110	41	20.5	122	185.5	76	Rc1	180.5

Optional dimensions

● Pressure proof packing (G1/2) connection
AP11E4-*-** L,M
AP12E4



● Manual override (locking)
AP11E4-*-*** A



Explosion-proof pilot operated 2-port solenoid valve
General purpose

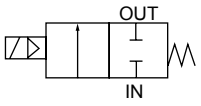
AP21E4/AP22E4 Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- NC (open when energized), NO (closed when energized)
- Japan Conformity Certificate No. AP21E4: No. T64349, AP22E4: No. T64352
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- Port size: Rc1$^{1}/_{4}$ to Rc2, 32 to 50 flange ● Piston drive

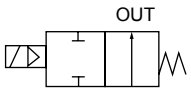
RoHS CAD

JIS symbol

● AP21E4: NC (open when energized)



● AP22E4: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AP21E4/AP22E4
Working fluid	Air/water/kerosene/oil (50 mm^2/s or less)
Working pressure differential MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	1.6 (≈230 psi, 16 bar)
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	Class 130 (B)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure	Pilot operated poppet, piston drive
Valve seat leakage (*1) cm^3/min	1 or less (PTFE sealant: 400 or less) (air)
Mounting orientation	Free (within working pressure range)
Degree of protection	IP65 or equivalent

*1: Pneumatic pressure used for measurement is: 0.05 to 1.2 MPa for AP21E4 (NC [open when energized]), and 0.05 to 0.5 MPa for AP22E4 (NO [closed when energized]).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
					Air		Water/kerosene		Oil (50 mm^2/s)			When holding		When starting		AC	DC	
					AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz/60 Hz		
NC (open when energized)																		
AP21E4	-32A	Rc1$^{1}/_{4}$	35	0.05	1.2	0.6	1.0	0.6	0.6	0.6	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	18	15	29	24	8/7	11.6	4.0
	-32F	32 flange																7.5
	-40A	Rc1$^{1}/_{2}$	43															5.0
	-40F	40 flange																8.5
	-50A	Rc2	53															6.5
	-50F	50 flange																10.5
NO (closed when energized)																		
AP22E4	-32A	Rc1$^{1}/_{4}$	35	0.05	0.5	0.5	0.5	0.5	0.5	0.5	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	22	18	35	29	8.7/6.7	15.5	4.0
	-32F	32 flange																7.5
	-40A	Rc1$^{1}/_{2}$	43															5.0
	-40F	40 flange																8.5
	-50A	Rc2	53															6.5
	-50F	50 flange																10.5

*1 : Refer to DC column for the max. working pressure differential of AP21E4 type coil with diode.
*2 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*3 : ( ) shows options.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm^2)
NC (open when energized)					
AP21E4	-32A	Rc1 1/4	35	25	460
	-32F	32 flange			
	-40A	Rc1 1/2	43	34	625
	-40F	40 flange			
	-50A	Rc2	53	53	975
	-50F	50 flange			
NO (closed when energized)					
AP22E4	-32A	Rc1 1/4	35	25	460
	-32F	32 flange			
	-40A	Rc1 1/2	43	34	625
	-40F	40 flange			
	-50A	Rc2	53	53	975
	-50F	50 flange			

How to order

AP2 ① E4 - 50F - 0 3 T A CN - AC100V

- Model No.
- ① Actuation
- B Port size *2 *3
- C Body/sealant combination
- D Coil *4
- E External wire pull method *5
- F Other options *6
- G Organizations for explosive-proof certification
- H Voltage *8, *9

Code	Description	Model No. AP21E4	Model No. AP22E4
A Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●
B Port size			
32A	Rc1 1/4	●	●
32F	32 flange	●	●
40A	Rc1 1/2	●	●
40F	40 flange	●	●
50A	Rc2	●	●
50F	50 flange	●	●

C Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks		
0	Std.	Bronze	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
B	Option	Bronze	Fluoro rubber	Fluoro rubber	-	-	●	●
C	Option	Bronze	PTFE	Fluoro rubber	-	-	●	●
D	Option	Stainless steel	Nitrile rubber	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
E	Option	Stainless steel	Fluoro rubber	Fluoro rubber	-	-	●	●
F	Option	Stainless steel	PTFE	PTFE	-	-	●	●
H	Option	Bronze	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)	●	●
J	Option	Bronze	Fluoro rubber	Fluoro rubber	Oil-prohibited	-	●	●
K	Option	Bronze	PTFE	Fluoro rubber	Oil-prohibited	-	●	●
L	Option	Stainless steel	Nitrile rubber	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Fluoro rubber	Oil-prohibited	-	●	●
N	Option	Stainless steel	PTFE	PTFE	Oil-prohibited	-	●	●

Refer to Intro Page 39 for reference on material combinations.

D Coil				
3		Thermal class 130 (B) explosion-proof coil	●	●
5		Thermal class 130 (B) diode integrated explosion-proof coil	●	●
E External wire pull method				
T	Std.	Conduit screw connection (G1/2) *10	●	●
L	Option	Pressure proof packing (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●
M	Option	Pressure proof packing (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●
F Other options				
Blank	Std.	No option	●	●
A		Manual override (locking)	●	
G Organizations for explosive-proof certification				
Blank		Japan certification (TIIS) *11	●	●
CN		China certification (NEPSI) *12	●	●
H Voltage				
AC100V	Std.	100 VAC 50/60 Hz	●	●
AC200V	Std.	200 VAC 50/60 Hz	●	●
DC12V	Option	12 VDC	●	●
DC24V	Option	24 VDC	●	●
DC48V	Option	48 VDC	●	●
DC100V	Option	100 VDC	●	●

[Example of model No.]

AP21E4-50F-03TACN-AC100V

Model: AP21E4

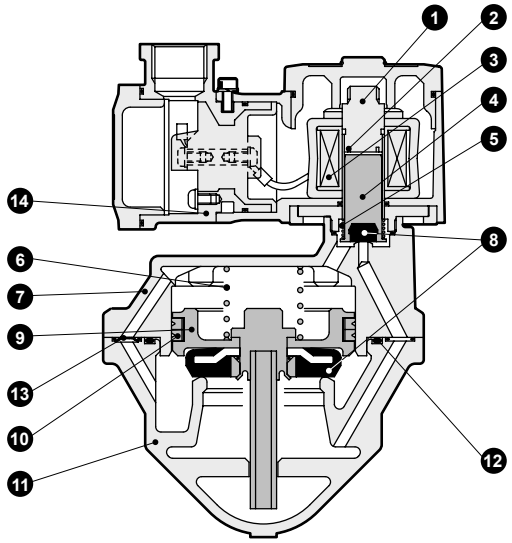
- A Actuation : NC (open when energized)
- B Port size : 50 flange
- C Body/sealant combination : Body - bronze/ sealant - nitrile rubber O-ring - nitrile rubber
- D Coil : Thermal class 130 (B) explosion-proof coil
- E External wire pull method : Conduit screw connection (1/2NPT)
- F Other options : Manual override (locking)
- G Organizations for explosive-proof certification : China Certification (NEPSI)
- H Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : The companion flange is JIS B2210 10K. (Flange is not enclosed with the product and must be purchased separately.)
*3 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*4 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*5 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*6 : When Item C is C, F, K or N, the manual override (Item F A) is not available. When Item A is 2, the manual override (Item F A) is not available.
*7 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) is selected.
*8 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. The thermal class 130 (B) diode integrated explosion-proof coil (D 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*9 : Other voltages as below are also available. Contact CKD for details. 12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC (with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*10 : China certification will be 1/2 NPT.
*11 : Japan certification (TIIS) is included.
*12 : China certification (NEPSI) is included.

Internal structure and parts list

● AP21E4 Series



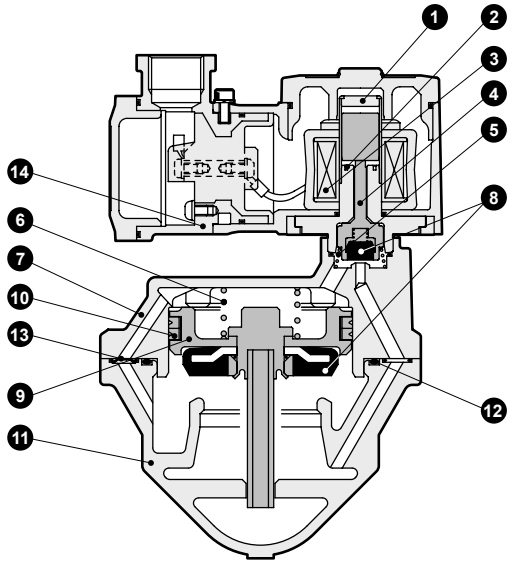
(The figure shows the closing operation)

Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./ SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/ copper alloy (stainless steel)
10	Seal ring set	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AP22E4 Series



(The figure shows the opening operation)

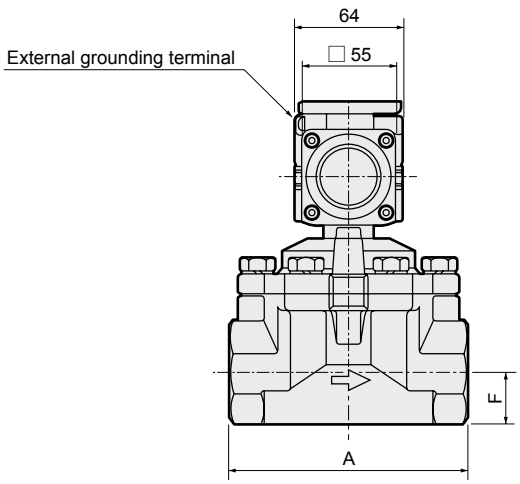
Cannot be disassembled

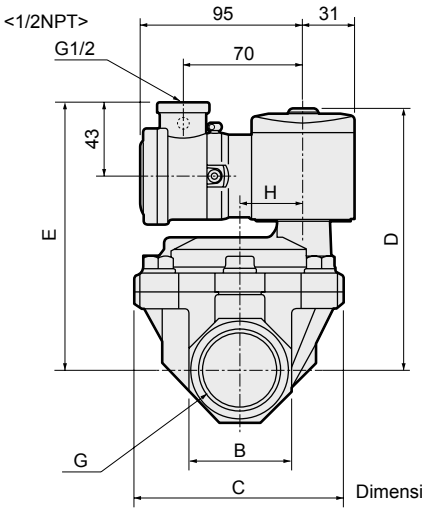
No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./SUS316L/ SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO valve	POM (PPS/SUS303/PFA)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M: Polyphenylene sulfide resin When C/F/K/N: Stainless steel/ perfluoroalkoxy resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/ copper alloy (stainless steel)
10	Seal ring set	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	NBR (FKM, PTFE)	Nitrile rubber (fluoro rubber, tetrafluoroethylene resin)
13	Orifice plate	SUS304	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions CAD

● Conduit screw (G1/2) connection (Rc screw-in)
AP21E4-32A/40A/50A-**T
AP22E4

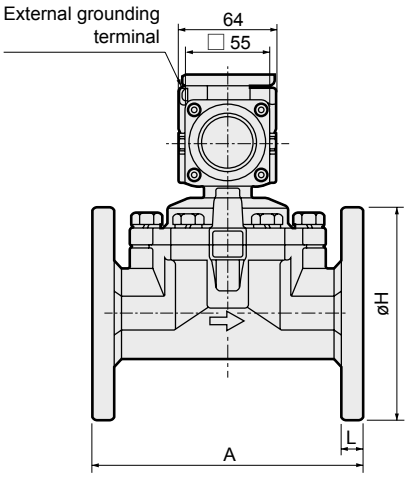


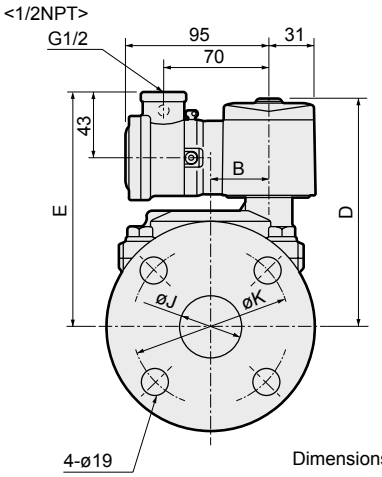


Dimensions in < > are for China certification

Model No.	A	B	C	D	E	F	G	H
AP21E4-32A-**T	125	54	112	147	152	27	Rc1 1/4	32
AP21E4-40A-**T	140	60	122	153	158	30	Rc1 1/2	38
AP21E4-50A-**T	160	74	132	161	166	37	Rc2	45
AP22E4-32A-**T	125	54	112	151	156	27	Rc1 1/4	32
AP22E4-40A-**T	140	60	122	157	162	30	Rc1 1/2	38
AP22E4-50A-**T	160	74	132	165	170	37	Rc2	45

● Conduit screw (G1/2) connection (flange)
AP21E4-32F/40F/50F-**T
AP22E4





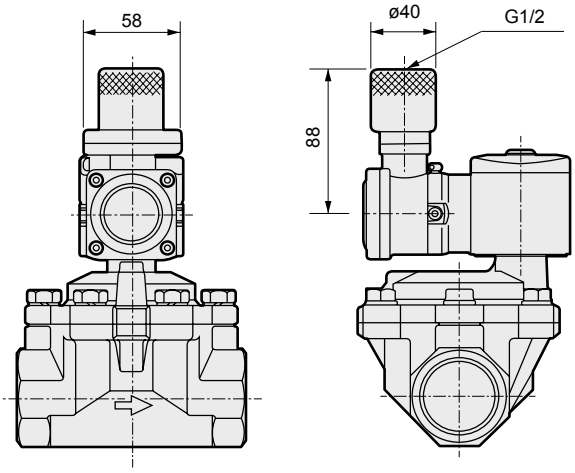
Dimensions in < > are for China certification

Model No.	A	B	D	E	H	J	K	L
AP21E4-32F-**T	170	32	147	152	135	36(35)	100	12
AP21E4-40F-**T	180	38	153	158	140	42	105	14
AP21E4-50F-**T	180	45	161	166	155	53(52)	120	14
AP22E4-32F-**T	170	32	151	156	135	36(35)	100	12
AP22E4-40F-**T	180	38	157	162	140	42	105	14
AP22E4-50F-**T	180	45	165	170	155	53(52)	120	14

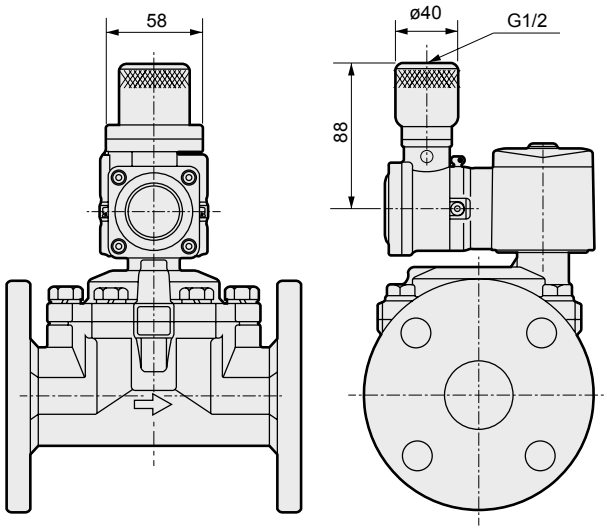
Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

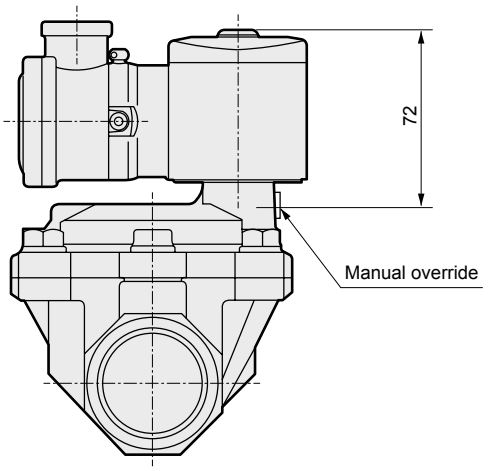
● Pressure proof packing (G1/2) connection (Rc screw-in)
AP21E4-32A/40A/50A-** L,M
AP22E4



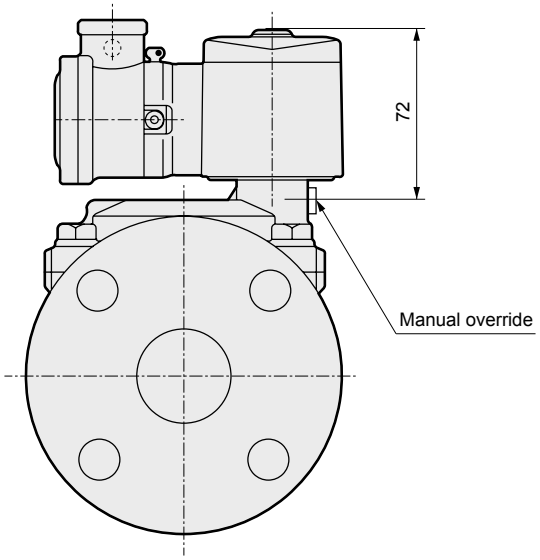
● Pressure proof packing (G1/2) connection (flange)
AP21E4-32F/40F/50F-** L,M
AP22E4

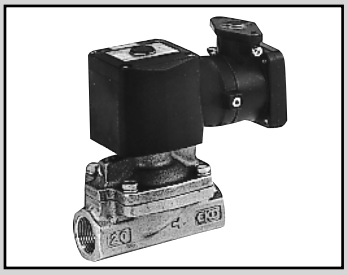


● Manual override (locking) (Rc screw-in)
AP21E4-32A/40A/50A-*** A



● Manual override (locking) (flange)
AP21E4-32F/40F/50F-*** A





Explosion-proof pilot operated 2-port solenoid valve
General purpose

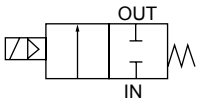
AD11E4/AD12E4 Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- NC (open when energized), NO (closed when energized)
- Japan Conformity Certificate No. AD11E4: No. T64349, AD12E4: No. T64352
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- Port size: Rc1/2 to Rc1 ● Diaphragm drive

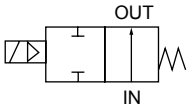
RoHS CAD

JIS symbol

● AD11E4: NC (open when energized)



● AD12E4: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AD11E4/AD12E4
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0.02 to 1 (refer to max. working pressure differential in individual specifications)
Max. working pressure MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	8 (≈1200 psi, 80 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	Class 130 (B)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure	Pilot operated poppet, diaphragm drive
Valve seat leakage (*1) cm³/min(ANR)	0.2 or less (air)
Mounting orientation	Free (within working pressure range)
Degree of protection	IP65 or equivalent

*1: Pneumatic pressure used for measurement is 0.02 to 1 MPa for AD11E4 (NC [open when energized]), and 0.02 to 0.5 MPa for AD12E4 (NO [closed when energized]).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
					Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC	DC	
					AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz/60 Hz		
NC (open when energized)																		
AD11E4	-15A	Rc1/2	15	0.02	1	0.6	0.7	0.6	0.6	0.6	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	18	15	29	24	8/7	11.6	1.7
	-20A	Rc3/4	20															1.9
	-25A	Rc1	25															2.3
NO (closed when energized)																		
AD12E4	-15A	Rc1/2	15	0.02	0.5	0.5	0.5	0.5	0.5	0.5	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC)*3	22	18	35	29	8.7/6.7	15.5	1.7
	-20A	Rc3/4	20															1.9
	-25A	Rc1	25															2.3

*1 : Refer to DC column for the max. working pressure differential of AD11E4 type coil with diode.
*2 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*3 : ( ) shows options.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Flow characteristics			
				C[dm³/(s·bar)]	b	Cv	S(mm²)
NC (open when energized)							
AD11E4	-15A	Rc1/2	15	21	0.22	4.5	-
	-20A	Rc3/4	20	-	-	9.3	162
	-25A	Rc1	25	-	-	12.0	231
NO (closed when energized)							
AD12E4	-15A	Rc1/2	15	21	0.22	4.5	-
	-20A	Rc3/4	20	-	-	9.3	162
	-25A	Rc1	25	-	-	12.0	231

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

AD1 ① E4 - 20A - 0 3 T A CN - AC100V

- Model No.
- ① Model No.
- Ⓐ Actuation
- Ⓑ Port size *2
- Ⓒ Body/sealant combination
- Ⓓ Coil *3
- Ⓔ External wire pull method *4
- Ⓕ Other options
- Ⓖ Organizations for explosive-proof certification
- Ⓗ Voltage *7 *8

Code	Description	Model No. AD11E4	Model No. AD12E4
Ⓐ Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●
Ⓑ Port size			
15A	Rc1/2	●	●
20A	Rc3/4	●	●
25A	Rc1	●	●

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks		
0	Std.	Bronze	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
B	Option		Fluoro rubber		-	●	●
D		Stainless steel	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
E			Fluoro rubber		-	●	●
H		Bronze	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)	●	●
J			Fluoro rubber		-	●	●
L		Stainless steel	Nitrile rubber		Air/water/kerosene/oil (up to 60°C)	●	●
M			Fluoro rubber		-	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ Coil				
3		Thermal class 130 (B) explosion-proof coil	●	●
5		Thermal class 130 (B) diode integrated explosion-proof coil	●	●
Ⓔ External wire pull method				
T	Std.	Conduit screw connection (G1/2) *9	●	●
L	Option	Pressure proof packing (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●
M		Pressure proof packing (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●
Ⓕ Other options				
Blank	Std.	No option	●	●
A		Manual override (locking)	●	
Ⓖ Organizations for explosive-proof certification				
Blank		Japan certification (TIIS) *10	●	●
CN		China certification (NEPSI) *11	●	●
Ⓗ Voltage				
AC100V	Std.	100 VAC 50/60 Hz	●	●
AC200V		200 VAC 50/60 Hz	●	●
DC12V	Option	12 VDC	●	●
DC24V		24 VDC	●	●
DC48V		48 VDC	●	●
DC100V		100 VDC	●	●

[Example of model No.]

AD11E4-20A-03TACN-AC100V

Model: AD11E4

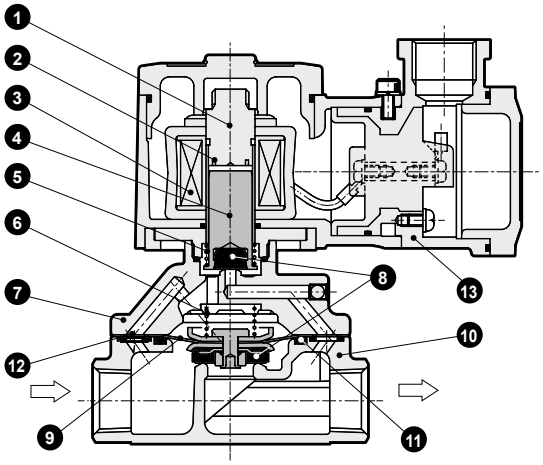
- Ⓐ Actuation : NC (open when energized)
- Ⓑ Port size : Rc 3/4
- Ⓒ Body/sealant combination : Body - bronze/sealant - nitrile rubber
- Ⓓ Coil : Thermal class 130 (B) explosion-proof coil
- Ⓔ External wire pull method : Conduit screw connection (1/2NPT)
- Ⓕ Other options : Manual override (locking)
- Ⓖ Organizations for explosive-proof certification : China Certification (NEPSI)
- Ⓗ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*3 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*4 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*5 : When Item Ⓐ is 2, the manual override (Item Ⓕ A) is not available.
*6 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information. Note that tropicalization is not available when the manual override option (A) is selected.
*7 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. The thermal class 130 (B) diode integrated explosion-proof coil (Ⓓ 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*8 : Other voltages as below are also available. Contact CKD for details. 12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC (with diode) 110, 220 VAC 6, 110, 200, 220 VDC
*9 : China certification will be 1/2 NPT.
*10 : Japan certification (TIIS) is included.
*11 : China certification (NEPSI) is included.

Internal structure and parts list

● AD11E4 Series



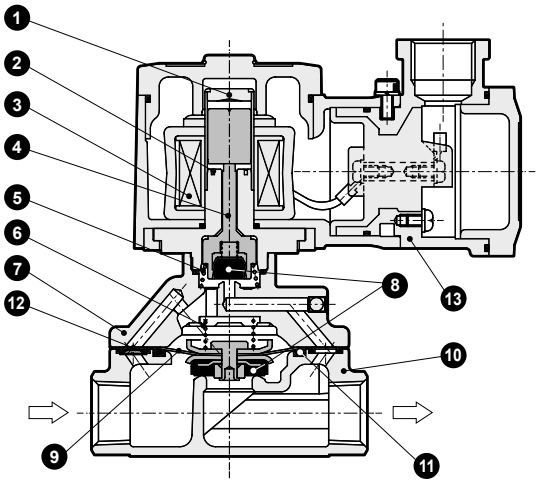
(The figure shows the closing operation)

Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./ SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel
13	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AD12E4 Series



(The figure shows the opening operation)

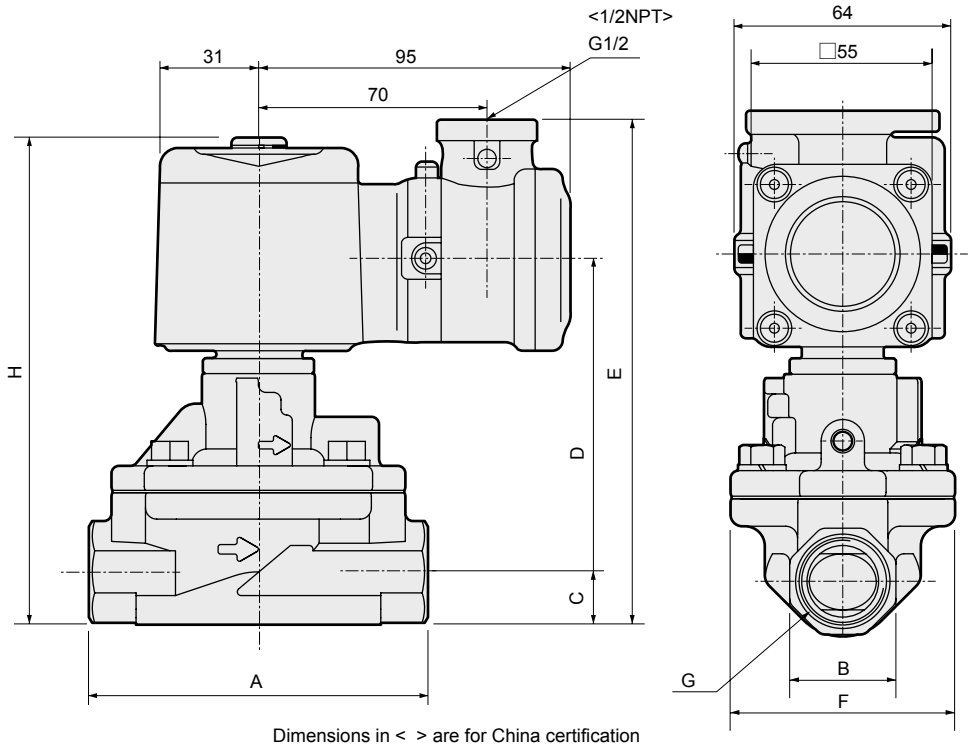
Cannot be disassembled

No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./ SUS316L/SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO valve	POM(PPS)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M: Polyphenylene sulfide resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel
13	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions and optional dimensions

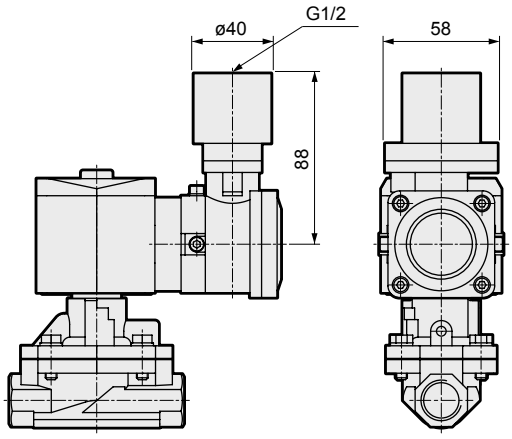
● Conduit screw (G1/2) connection
AD11E4-15A/20A/25A-** T
AD12E4



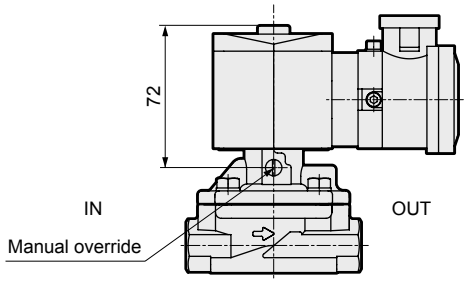
Dimensions in < > are for China certification

Model No.	A	B	C	D	E	F	G	H
AD11E4-15A-**T	90	27	14	75.5	132.5	57	Rc1/2	127.5
AD11E4-20A-**T	100	32	17	81.5	141.5	65	Rc3/4	136.5
AD11E4-25A-**T	110	41	20.5	87	150.5	76	Rc1	145.5
AD12E4-15A-**T	90	27	14	80.5	137.5	57	Rc1/2	132.5
AD12E4-20A-**T	100	32	17	86.5	146.5	65	Rc3/4	141.5
AD12E4-25A-**T	110	41	20.5	92	155.5	76	Rc1	150.5

● Pressure proof packing (G1/2) connection
AD11E4-15A/20A/25A-** L,M
AD12E4



● Manual override (locking)
AD11E4-15A/20A/25A-*** A



Explosion-proof pilot operated 2-port solenoid valve
General purpose

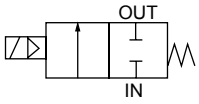
AD21E4/AD22E4 Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- NC (open when energized), NO (closed when energized)
- Japan Conformity Certificate No. AD21E4: No. T64349, AD22E4: No. T64352
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- Port size: Rc1¼ to Rc2, 32 to 50 flange ● Diaphragm drive

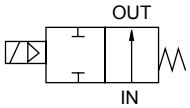
RoHS CAD

JIS symbol

● AD21E4: NC (open when energized)



● AD22E4: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AD21E4/AD22E4
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)
Working pressure differential MPa	0.02 to 0.7 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	Class 130 (B)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure	Pilot operated poppet, diaphragm drive
Valve seat leakage (*1) cm³/min(ANR)	1 or less (air)
Mounting orientation	Free (within working pressure range)
Degree of protection	IP65 or equivalent

*1: Pneumatic pressure used for measurement is 0.02 to 0.7 MPa for AD21E4 (NC [open when energized]), and 0.02 to 0.5 MPa for AD22E4 (NO [closed when energized]).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
					Air		Water/kerosene		Oil (50 mm²/s)			When holding		When starting		AC	DC	
					AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz/60 Hz		
NC (open when energized)																		
AD21E4	-32A	Rc1¼	35	0.02	0.7	0.6	0.7	0.6	0.6	0.6	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	18	15	29	24	8/7	11.6	4.0
	-32F	32 flange																7.5
	-40A	Rc1½	43															5.0
	-40F	40 flange																8.5
	-50A	Rc2	53															6.5
	-50F	50 flange																10.5
NO (closed when energized)																		
AD22E4	-32A	Rc1¼	35	0.02	0.5	0.5	0.5	0.5	0.5	0.5	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *3	22	18	35	29	8.7/6.7	15.5	4.0
	-32F	32 flange																7.5
	-40A	Rc1½	43															5.0
	-40F	40 flange																8.5
	-50A	Rc2	53															6.5
	-50F	50 flange																10.5

*1 : Refer to DC column for the max. working pressure differential of AD21E4 type coil with diode.
*2 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*3 : ( ) shows options.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm^2)
NC (open when energized)					
AD21E4	-32A	Rc1 1/4	35	25	460
	-32F	32 flange			
	-40A	Rc1 1/2	43	34	625
	-40F	40 flange			
	-50A	Rc2	53	53	975
	-50F	50 flange			
NO (closed when energized)					
AD22E4	-32A	Rc1 1/4	35	25	460
	-32F	32 flange			
	-40A	Rc1 1/2	43	34	625
	-40F	40 flange			
	-50A	Rc2	53	53	975
	-50F	50 flange			

How to order

AD2 ① E4 - 40F - 0 3 T A CN - AC100V

Model No. | Ⓐ Actuation | Ⓑ Port size *2 *3 | Ⓒ Body/sealant combination | Ⓓ Coil *4 | Ⓔ External wire pull method *5 | Ⓕ Other options | Ⓖ Organizations for explosive-proof certification | Ⓗ Voltage *8 *9

Code	Description	Model No. AD21E4	Model No. AD22E4
Ⓐ Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●
Ⓑ Port size			
32A	Rc1¼	●	●
32F	32 flange	●	●
40A	Rc1½	●	●
40F	40 flange	●	●
50A	Rc2	●	●
50F	50 flange	●	●

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks		
0	Standard	Bronze	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
B	Option		Fluoro rubber		-	●	●
D		Stainless steel	Nitrile rubber	-	Air/water/kerosene/oil (up to 60°C)	●	●
E			Fluoro rubber		-	●	●
H		Bronze	Nitrile rubber	Oil-prohibited	Air/water/kerosene/oil (up to 60°C)	●	●
J			Fluoro rubber		-	●	●
L		Stainless steel	Nitrile rubber		Air/water/kerosene/oil (up to 60°C)	●	●
M			Fluoro rubber		-	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ Coil			
3		Thermal class 130 (B) explosion-proof coil	●	●
5		Thermal class 130 (B) diode integrated explosion-proof coil	●	●
Ⓔ External wire pull method			
T	Standard	Conduit screw connection (G1/2) *10	●	●
L	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●
M		Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●
Ⓕ Other options			
Blank	Standard	No option	●	●
A		Manual override (locking)	●	
Ⓖ Organizations for explosive-proof certification			
Blank		Japan certification (TIIS) *11	●	●
CN		China certification (NEPSI) *12	●	●
Ⓗ Voltage			
AC100V	Std.	100 VAC 50/60 Hz	●	●
AC200V		200 VAC 50/60 Hz	●	●
DC12V	Option	12 VDC	●	●
DC24V		24 VDC	●	●
DC48V		48 VDC	●	●
DC100V		100 VDC	●	●

[Example of model No.]

AD21E4-40F-03TACN-AC100V

Model: AD21E4

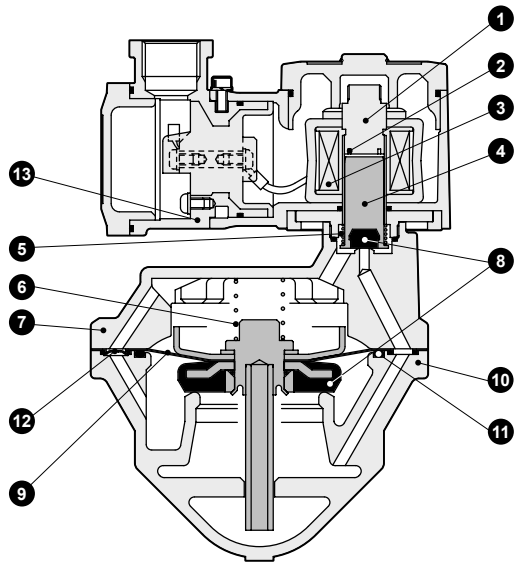
- Ⓐ Actuation : NC (open when energized)
- Ⓑ Port size : 40 flange
- Ⓒ Body/sealant combination : Body - bronze/sealant - nitrile rubber
- Ⓓ Coil : Thermal class 130 (B) explosion-proof coil
- Ⓔ External wire pull method : Conduit screw connection (1/2NPT)
- Ⓕ Other options : Manual override (locking)
- Ⓖ Organizations for explosive-proof certification : China Certification (NEPSI)
- Ⓗ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : The companion flange is JIS B2210 10K. (Flange is not enclosed with the product and must be purchased separately.)
*3 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*4 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*5 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*6 : When Item Ⓐ is 2, the manual override (Item Ⓕ A) is not available.
*7 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
Note that tropicalization is not available when the manual override option (A) is selected.
*8 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz.
The thermal class 130 (B) diode integrated explosion-proof coil (Ⓓ 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*9 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
(with diode) 110, 220 VAC
6, 110, 200, 220 VDC
*10 : China certification will be 1/2 NPT.
*11 : Japan certification (TIIS) is included.
*12 : China certification (NEPSI) is included.

Internal structure and parts list

● AD21E4 Series



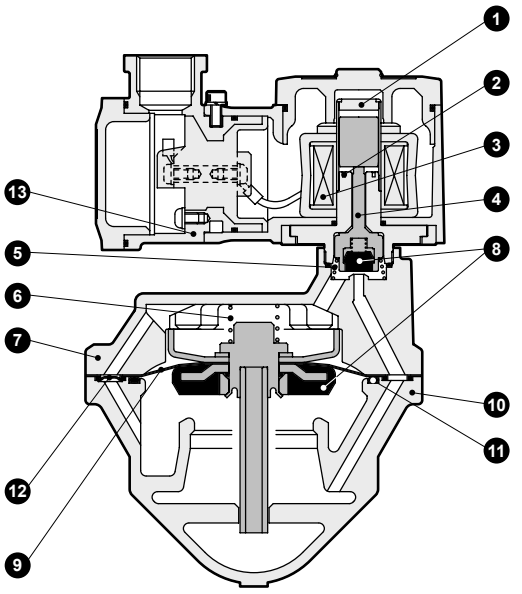
(The figure shows the closing operation)

Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/ SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel
13	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AD22E4 Series



(The figure shows the opening operation)

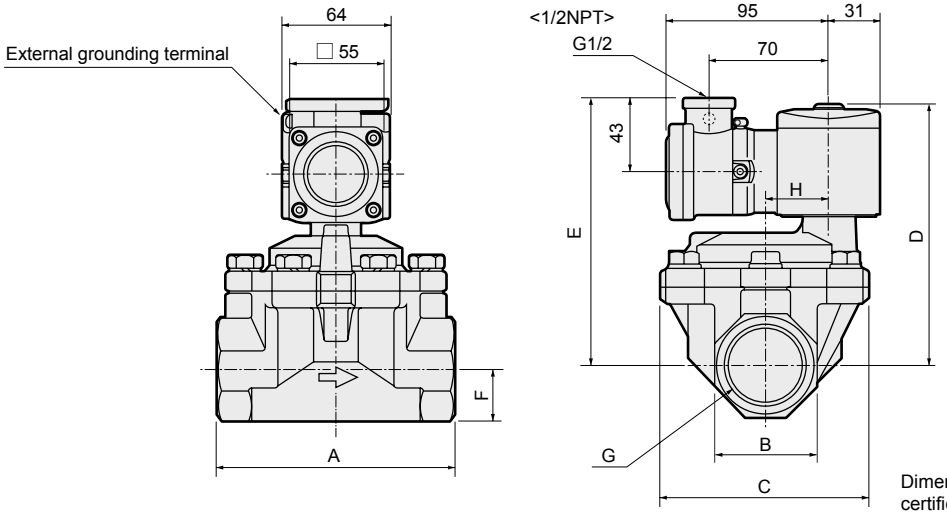
Cannot be disassembled

No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./ SUS316L/SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	NO valve	POM(PPS)	Body/sealant combination When O/D/H/L: Polyacetal resin When B/E/J/M: Polyphenylene sulfide resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Seal	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Diaphragm assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber)
10	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
11	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Orifice plate	SUS304	Stainless steel
13	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions CAD

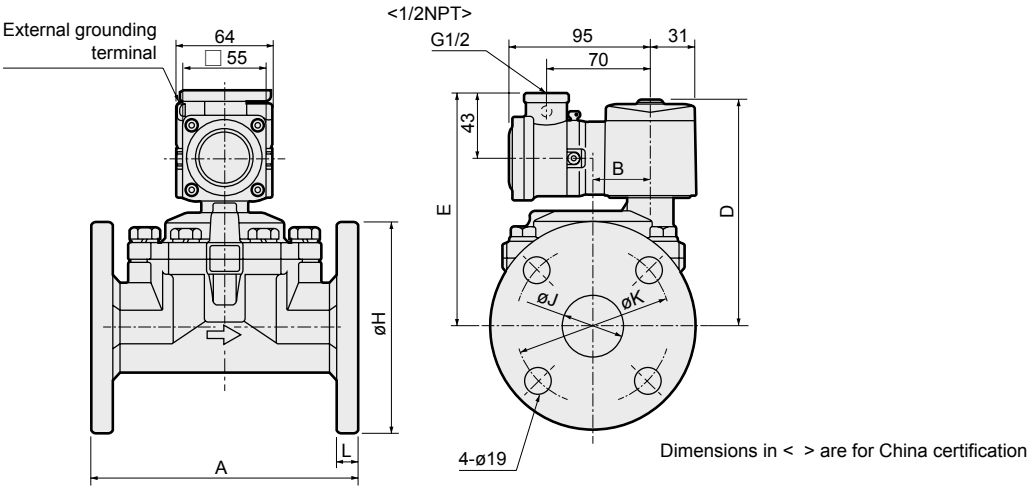
● Conduit screw (G1/2) connection (Rc screw-in)
AD21E4
AD22E4 -32A/40A/50A-**T



Dimensions in < > are for China certification

Model No.	A	B	C	D	E	F	G	H
AD21E4-32A-**T	125	54	112	147.5	152.5	27	Rc1¼	32
AD21E4-40A-**T	140	60	122	153.5	158.5	30	Rc1½	38
AD21E4-50A-**T	160	74	132	161.5	166.5	37	Rc2	45
AD22E4-32A-**T	125	54	112	151.5	156.5	27	Rc1¼	32
AD22E4-40A-**T	140	60	122	157.5	162.5	30	Rc1½	38
AD22E4-50A-**T	160	74	132	165.5	170.5	37	Rc2	45

● Conduit screw (G1/2) connection (flange)
AD21E4
AD22E4 -32F/40F/50F-**T



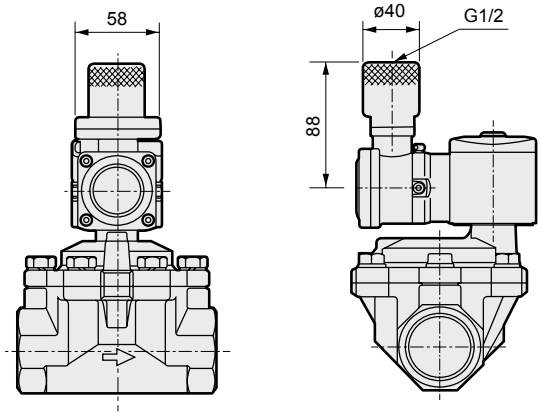
Dimensions in < > are for China certification

Model No.	A	B	D	E	H	J	K	L
AD21E4-32F-**T	170	32	147.5	152.5	135	36(35)	100	12
AD21E4-40F-**T	180	38	153.5	158.5	140	42	105	14
AD21E4-50F-**T	180	45	161.5	166.5	155	53(52)	120	14
AD22E4-32F-**T	170	32	151.5	156.5	135	36(35)	100	12
AD22E4-40F-**T	180	38	157.5	162.5	140	42	105	14
AD22E4-50F-**T	180	45	165.5	170.5	155	53(52)	120	14

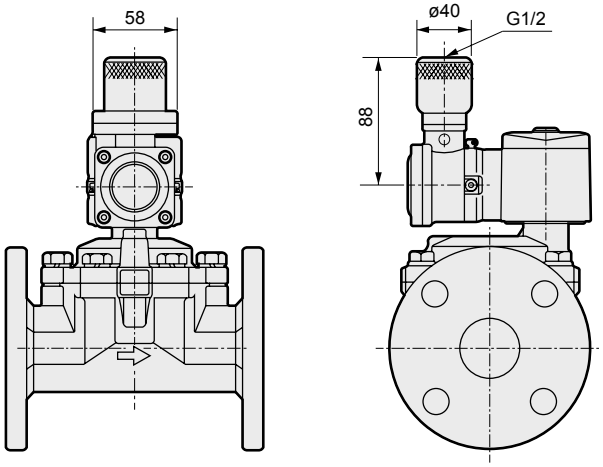
Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

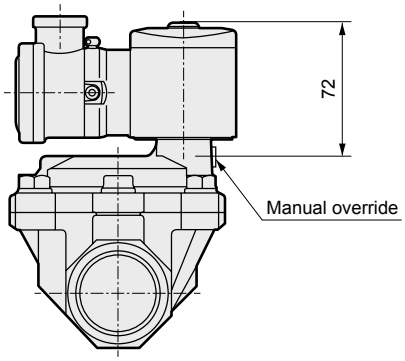
● Pressure proof packing (G1/2) connection (Rc screw-in)
AD21E4
AD22E4 -32A/40A/50A-** L,M



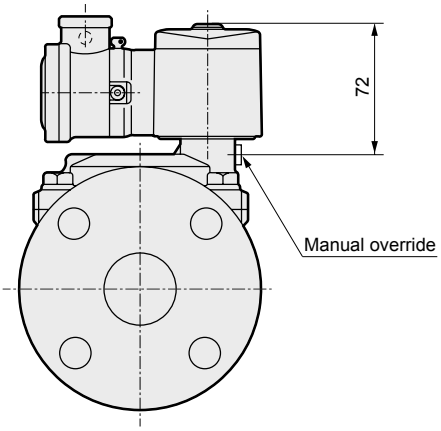
● Pressure proof packing (G1/2) connection (flange)
AD21E4
AD22E4 -32F/40F/50F-** L,M



● Manual override (locking) (Rc screw-in)
AD21E4-32A/40A/50A-*** A



● Manual override (locking) (flange)
AD21E4-32F/40F/50F-*** A



Explosion-proof pilot kick 2-port solenoid valve
General purpose

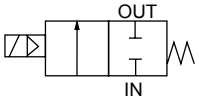
ADK11E4/ADK12E4 Series

- Pressure and explosion proof construction d2G4 (flame-proof grade 2/ignitability G4)
- NC (open when energized), NO (closed when energized)
- Japan Conformity Certificate No. ADK11E4: No. T64355, ADK12E4: No. T64358
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- Port size: Rc1/2, Rc3/4, Rc1 ● Diaphragm drive

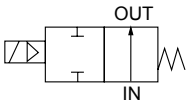
RoHS CAD

JIS symbol

● ADK11E4: NC (open when energized)



● ADK12E4: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	ADK11E4/ADK12E4
Working fluid	Air/low vacuum (1.33 x 10^3 Pa)/water/kerosene/oil (50 mm^2/s or less)
Working pressure differential MPa	0 to 1 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	4 (≈580 psi, 40 bar)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Thermal class	Class 130 (B)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure	Pilot kick poppet, diaphragm drive
Valve seat leakage (*1) cm^3/min(ANR)	1 or less (air)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

*1: Pneumatic pressure used for measurement is 0.02 to 1 MPa for ADK11E4 (NC [open when energized]), and 0.02 to 0.6 MPa for ADK12E4 (NO [closed when energized]).
When used at a pressure less than 0.02 MPa, the sealant may be unstable. Contact CKD in this case.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)						Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
					Air		Water/kerosene		Oil (50 mm^2/s)			When holding		When starting		AC	DC	
					AC	DC	AC	DC	AC	DC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz		
NC (open when energized)																		
ADK11E4	-15A	Rc1/2	16	0	1	0.6	1	0.6	0.6	0.5	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *4	20	16	80	64	10/8.5	15	1.4
	-20A	Rc3/4	23															1.5
	-25A	Rc1	28															1.9
NO (closed when energized)																		
ADK12E4	-15A	Rc1/2	16	0	0.6	0.6	0.6	0.6	0.5	0.5	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz (12 VDC) (24 VDC) (48 VDC) (100 VDC) *4	25	21	100	84	12/10	15	1.5
	-20A	Rc3/4	23															1.7
	-25A	Rc1	28															2.1

*1 : Refer to DC column for the max. working pressure differential of coil with diode.
*2 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.
*3 : When using at low vacuum, vacuum the OUT port side.
*4 : ( ) shows options.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Flow characteristics			
				C[dm^3/(s·bar)]	b	Cv	S(mm^2)
NC (open when energized)							
ADK11E4	-15A	Rc1/2	16	20	0.31	4.5	-
	-20A	Rc3/4	23	-	-	8.6	162
	-25A	Rc1	28	-	-	12.0	231
NO (closed when energized)							
ADK12E4	-15A	Rc1/2	16	20	0.31	4.5	-
	-20A	Rc3/4	23	-	-	8.6	162
	-25A	Rc1	28	-	-	12.0	231

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order

ADK1②E4 - 20A - 0 3 T CN - AC100V

- Model No.
- Ⓐ Actuation
- Ⓑ Port size *2
- Ⓒ Body/sealant combination *3 *4
- Ⓓ Coil *5
- Ⓔ External wire pull method *6
- Ⓕ Organizations for explosive-proof certification
- Ⓖ Voltage *8 *9

Code	Description	Model No. ADK11E4	Model No. ADK12E4
Ⓐ Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●
Ⓑ Port size			
15A	Rc1/2	●	●
20A	Rc3/4	●	●
25A	Rc1	●	●

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks		
0	Standard	Bronze	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●
B	Option	Bronze	Fluoro rubber	-	-	●	●
D	Option	Stainless steel	Nitrile rubber	-	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●
E	Option	Stainless steel	Fluoro rubber	-	-	●	●
H	Option	Bronze	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●
J	Option	Bronze	Fluoro rubber	Oil-prohibited	-	●	●
P	Option	Bronze	EPM rubber	Oil-prohibited	-	●	●
L	Option	Stainless steel	Nitrile rubber	Oil-prohibited	Air/water/low vacuum/kerosene/oil (up to 60°C)	●	●
M	Option	Stainless steel	Fluoro rubber	Oil-prohibited	-	●	●
R	Option	Stainless steel	EPM rubber	Oil-prohibited	-	●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ Coil			
3	Thermal class 130 (B) explosion-proof coil	●	●
5	Thermal class 130 (B) diode integrated explosion-proof coil	●	●

Ⓔ External wire pull method				
T	Standard	Conduit screw connection (G1/2) *10	●	●
L	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●
M	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●

Ⓕ Organizations for explosive-proof certification			
Blank	Japan certification (TIIS) *11	●	●
CN	China certification (NEPSI) *12	●	●

Ⓖ Voltage				
AC100V	Std.	100 VAC 50/60 Hz	●	●
AC200V	Std.	200 VAC 50/60 Hz	●	●
DC12V	Option	12 VDC	●	●
DC24V	Option	24 VDC	●	●
DC48V	Option	48 VDC	●	●
DC100V	Option	100 VDC	●	●

[Example of model No.]

ADK12E4-20A-03TCN-AC100V

Model: ADK12E4

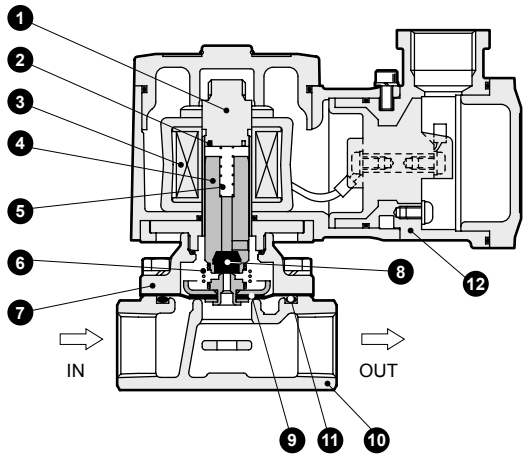
- Ⓐ Actuation : NO (closed when energized)
- Ⓑ Port size : Rc3/4
- Ⓒ Body/sealant combination : Body - bronze/sealant - nitrile rubber
- Ⓓ Coil : Thermal class 130 (B) explosion-proof coil
- Ⓔ External wire pull method : Conduit screw connection (1/2NPT)
- Ⓕ Organizations for explosive-proof certification : China Certification (NEPSI)
- Ⓖ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*3 : The max. working pressure differential of the ethylene propylene rubber seal combination (Item Ⓒ P/R) is 0.6 MPa.
*4 : The ethylene propylene rubber seal combination (Item Ⓒ P/R) cannot be used with air. (Compressed air contains oil, and ethylene propylene rubber is not oil-resistant.)
*5 : For the thermal class 130 (B) diode integrated coil, the AC power supply voltage is converted into a DC coil voltage by the diode.
*6 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information. Note that the conduit connection (G3/4) is not available.
*7 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
*8 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz. The thermal class 130 (B) diode integrated explosion-proof coil (Ⓓ 5) can be used with 100 VAC 50/60 Hz or 200 VAC 50/60 Hz.
*9 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC (with diode) 110, 220 V
6, 110, 200, 220 VDC
*10 : China certification will be 1/2 NPT.
*11 : Japan certification (TIIS) is included.
*12 : China certification (NEPSI) is included.

Internal structure and parts list

● ADK11E4 Series

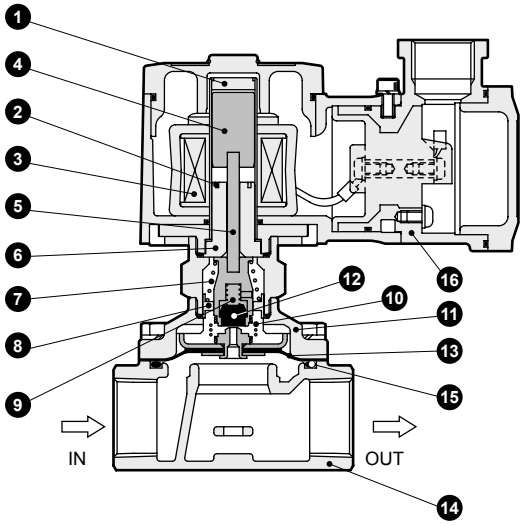


Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./ SUS316L/SUS403	Stainless steel
2	Shading coil *1	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger assembly	SUS405 or equiv./NBR (SUS405 or equiv./FKM or EPDM)	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Kick spring	SUS304	Stainless steel
7	Body	C3771(SCS13)	Copper alloy (stainless steel casting)
8	Seal	NBR (FKM, EPDM)	Nitrile rubber (fluoro rubber, ethylene propylene rubber)
9	Diaphragm assembly	SUS304/NBR (SUS304/FKM or EPDM)	Stainless steel/nitrile rubber (Stainless steel/fluoro rubber or ethylene propylene rubber)
10	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
11	O-ring	NBR (FKM, EPDM)	Nitrile rubber (fluoro rubber, ethylene propylene rubber)
12	Coil case	ADC12	Aluminum die-casting

( ) shows options.
*1 No shading coil is used for DC coil or coil with diode.

● ADK12E4 Series



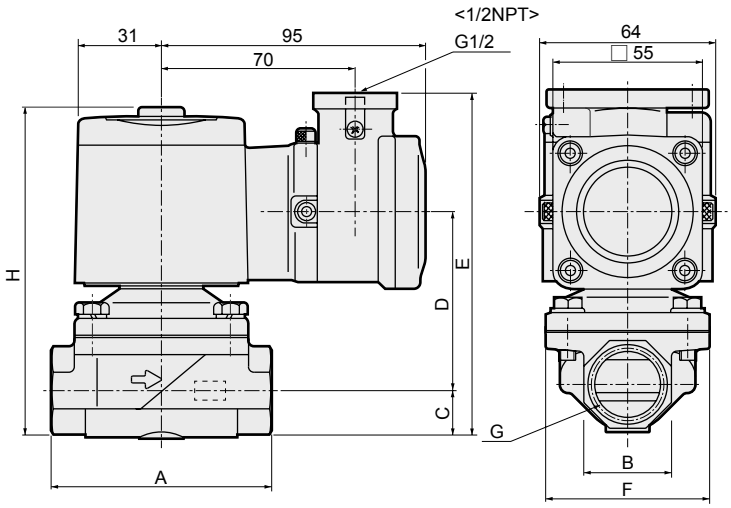
Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS403/SUS316L/ SUS304	Stainless steel
2	Shading coil *1	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil		
4	Plunger	SUS405 or equiv.	Stainless steel
5	Push rod	SUS304	Stainless steel
6	Fixed core	SUS405 or equiv.	Stainless steel
7	Spring	SUS304	Stainless steel
8	Spring holder	POM(SUS303)	Acetal resin (stainless steel)
9	NO valve assembly	SUS303/SUS304/NBR (SUS303/SUS304/FKM or EPDM)	Stainless steel/nitrile rubber (stainless steel/fluoro rubber or ethylene propylene rubber)
10	Kick spring	SUS304	Stainless steel
11	Body	C3771(SCS13)	Copper alloy (stainless steel casting)
12	Seal	NBR (FKM, EPDM)	Nitrile rubber (fluoro rubber, ethylene propylene rubber)
13	Diaphragm assembly	SUS304/NBR (SUS304/FKM or EPDM)	Stainless steel/nitrile rubber (Stainless steel/fluoro rubber or ethylene propylene rubber)
14	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
15	O-ring	NBR (FKM, EPDM)	Nitrile rubber (fluoro rubber, ethylene propylene rubber)
16	Coil case	ADC12	Aluminum die-casting

( ) shows options.
*1 No shading coil is used for DC coil or coil with diode.

Dimensions CAD

● Conduit screw (G1/2) connection
ADK11E4-15A/20A/25A-**T

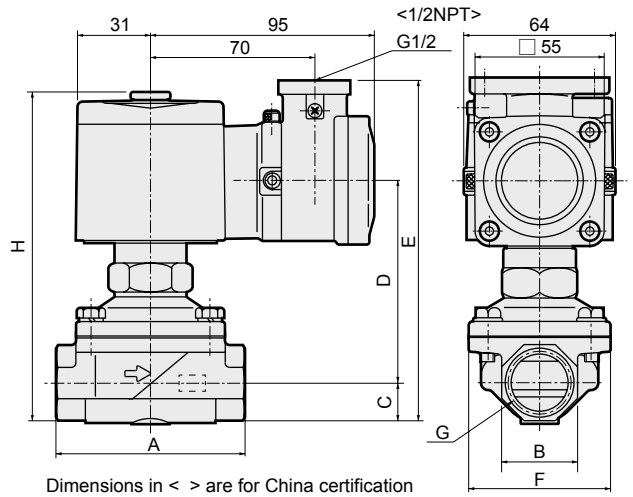


Dimensions in < > are for China certification

Model No.	A	B	C	D	E	F	G	H
ADK11E4-15A-**T	71	27(29)	14.5	59	116.5	50	Rc1/2	111.5
ADK11E4-20A-**T	80	32(35)	17.5	62.5	123	60	Rc3/4	118
ADK11E4-25A-**T	90	41(45)	21.5(22.5)	68	132.5(133.5)	71	Rc1	127.5(128.5)

Dimensions shown in ( ) are for stainless steel body.

● Conduit screw (G1/2)
ADK12E4-15A/20A/25A-**T



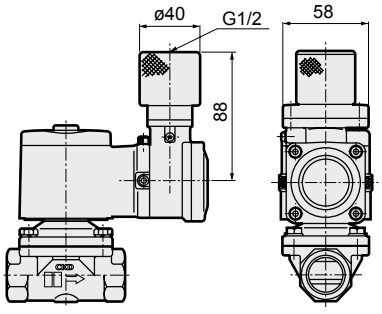
Dimensions in < > are for China certification

Model No.	A	B	C	D	E	F	G	H
ADK12E4-15A-**T	71	27(29)	14.5	79.5	137	50	Rc1/2	132
ADK12E4-20A-**T	80	32(35)	17.5	83	143.5	60	Rc3/4	138.5
ADK12E4-25A-**T	90	41(45)	21.5(22.5)	88.5	153(154)	71	Rc1	148(149)

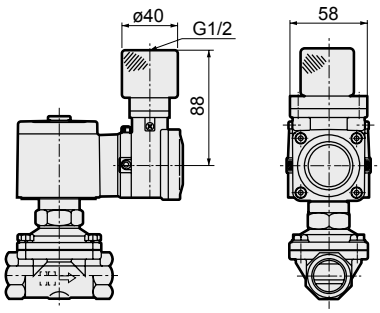
Dimensions shown in ( ) are for stainless steel body.

Optional dimensions CAD

● Pressure proof packing (G1/2) connection
ADK11E4-15A/20A/25A-** L,M



● Pressure proof packing (G1/2) connection
ADK12E4-15A/20A/25A-** L,M



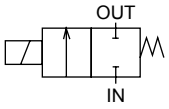
Explosion-proof direct acting 2-port solenoid valve
General purpose

AB41E2 Series

- Pressure and explosion proof construction d2G2 (flame-proof grade 2/ignitability G2)
- Japan Conformity Certificate No.: No. T64351
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- NC (open when energized)
- Port size: Rc1/4, Rc3/8

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AB41E2
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)/steam
Working pressure differential MPa	0 to 5 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	5 (≈730 psi, 50 bar) (1 (≈150 psi, 10 bar) when fluid is steam)
Proof pressure (water pressure) MPa	25 (≈3600 psi, 250 bar)
Fluid temperature °C	-10 (14°F) to 181 (357.8°F)
Ambient temperature °C	-10 (14°F) to 40 (104°F)
Thermal class	Class 180 (H)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G2)
Valve structure	Direct acting poppet structure
Valve seat leakage cm³/min(ANR)	300 or less (air)
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Max. working pressure differential (MPa) Air AC	Water(hot)/Kerosene AC	Oil (50 mm²/s) AC	Steam AC	Rated voltage	Apparent power (VA) When holding 50 Hz	When holding 60 Hz	When starting 50 Hz	When starting 60 Hz	Power consump (W) AC 50 Hz	AC 60 Hz	Weight (kg)
AB41E2-02	-1	Rc1/4	1.5	5.0	4.5	4.0	1.0	100 VAC 50/60 Hz 110 VAC 60 Hz	18	15	29	24	8	7	1.0
	-2		2.0	3.0	2.7	2.5	1.0								
	-3		3.0	1.5	1.3	0.9	1.0								
	-4		3.5	1.2	0.9	0.6	0.9								
	-5		4.0	1.0	0.7	0.5	0.7								
	-6		5.0	0.6	0.4	0.25	0.4								
	-7		7.0	0.25	0.2	0.15	0.2								
AB41E2-03	-1	Rc3/8	1.5	5.0	4.5	4.0	1.0	200 VAC 50/60 Hz 220 VAC 60 Hz							
	-2		2.0	3.0	2.7	2.5	1.0								
	-3		3.0	1.5	1.3	0.9	1.0								
	-4		3.5	1.2	0.9	0.6	0.9								
	-5		4.0	1.0	0.7	0.5	0.7								
	-6		5.0	0.6	0.4	0.25	0.4								
	-7		7.0	0.25	0.2	0.15	0.2								

*1: The voltage fluctuation range must be within -10 to +5% of the rated voltage.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Flow characteristics C[dm³/(s·bar)]	b	Cv
AB41E2-02/03	-1	Rc1/4 Rc3/8	1.5	0.29	0.53	0.1
	-2		2.0	0.53	0.52	0.15
	-3		3.0	1.1	0.52	0.31
	-4		3.5	1.7 [1.5]	0.49 [0.47]	0.42 [0.40]
	-5		4.0	2.1 [1.9]	0.48 [0.47]	0.54 [0.48]
	-6		5.0	3.0 [2.6]	0.42 [0.38]	0.8 [0.62]
	-7		7.0	4.8 [4.6]	0.29 [0.37]	1.0 [0.82]

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2 : Dimensions shown in [ ] are for stainless steel body.

How to order

AB41E2 - 02 - 4 - C 4 T B CN - AC100V

- AB41E2: Model No.
- 02: Ⓐ Port size
- 4: Ⓑ Orifice size
- C: Ⓒ Body/sealant combination
- 4: Ⓓ Coil
- T: Ⓔ External wire *1 pull method
- B: Ⓕ Other options
- CN: Ⓖ Organizations for explosive-proof certification
- AC100V: Ⓗ Voltage *3 *4

Code	Description	Code	Description	Code	Description
Ⓐ Port size					
02	Rc1/4	**2G**	G1/4	**2N**	1/4NPT
03	Rc3/8	**3G**	G3/8	**3N**	3/8NPT

Ⓑ Orifice size	
1	ø1.5
2	ø2
3	ø3
4	ø3.5
5	ø4
6	ø5
7	ø7

Ⓒ Body/sealant combination

		Body	Seal	Treatment	Remarks		
C	Std.	Copper alloy	PTFE	-	Air/water/kerosene/oil/ steam (up to 181°C)	●	●
F	Option	Stainless steel	PTFE	-		●	●
K	Option	Copper alloy	PTFE	Oil-prohibited		●	●
N	Option	Stainless steel	PTFE	Oil-prohibited		●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ Coil	
4	Thermal class 180 (H) explosion-proof coil

Ⓔ External wire pull method		
T	Std.	Conduit screw connection (G1/2) *5
L	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4
M	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4

Ⓕ Other options	
Blank	No option
B	With mounting plate

Ⓖ Organizations for explosive-proof certification	
Blank	Japan certification (TIIS) *6
CN	China certification (NEPSI) *7

Ⓗ Voltage	
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz, 220 VAC 60 Hz

[Example of model No.]

AB41E2-02-4-C4TBCN-AC100V

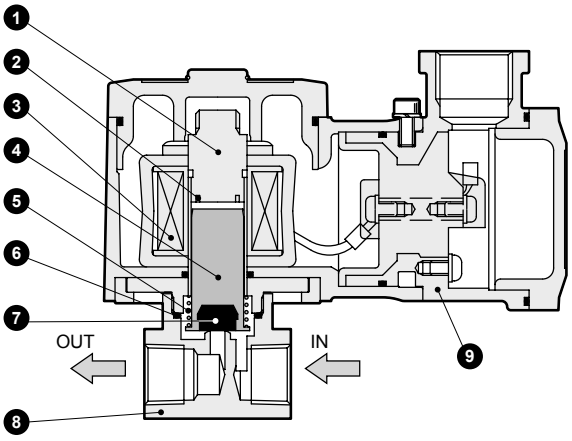
Model: AB41E2

- Ⓐ Port size : Rc1/4
- Ⓑ Orifice size : ø3.5
- Ⓒ Body/sealant combination : Body - copper alloy/sealant - PTFE
- Ⓓ Coil : Thermal class 180 (H) explosion-proof coil
- Ⓔ External wire pull method : Conduit screw connection (1/2NPT)
- Ⓕ Other options : With mounting plate
- Ⓖ Organizations for explosive-proof certification : China Certification (NEPSI)
- Ⓗ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information.
Note that the conduit connection (G3/4) is not available.
*2 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
*3 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz.
*4 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
*5 : China certification will be 1/2 NPT.
*6 : Japan certification (TIIS) is included.
*7 : China certification (NEPSI) is included.

Internal structure and parts list



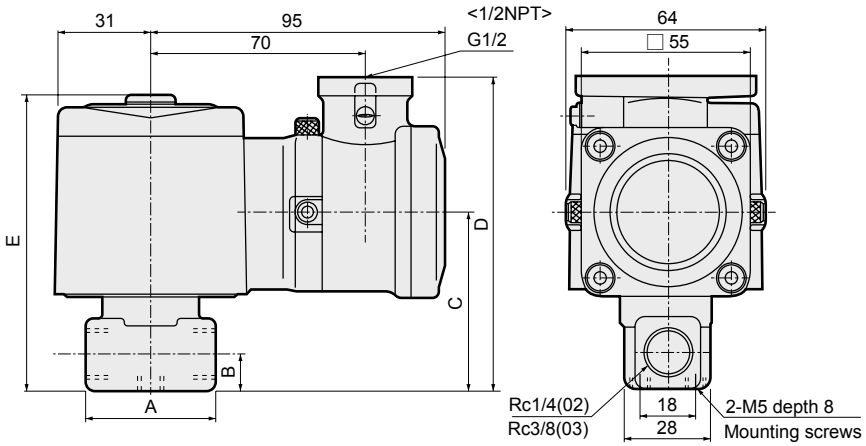
Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv., 316L/403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	O-ring	PTFE	Tetrafluoroethylene resin
7	Valve seal	PTFE	Tetrafluoroethylene resin
8	Body	C3771(SUS303)	Copper alloy (stainless steel)
9	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions

● Conduit screw (G1/2) connection
AB41E2-02/03-1 to 7-*4T

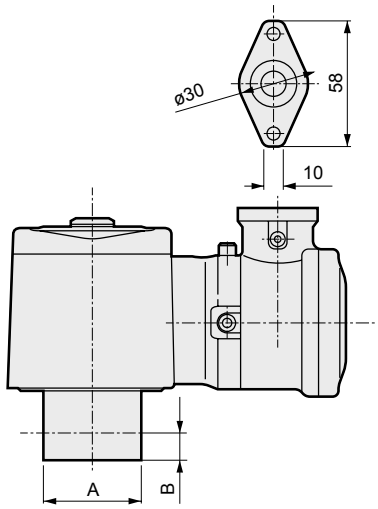


Dimensions in < > are for China certification

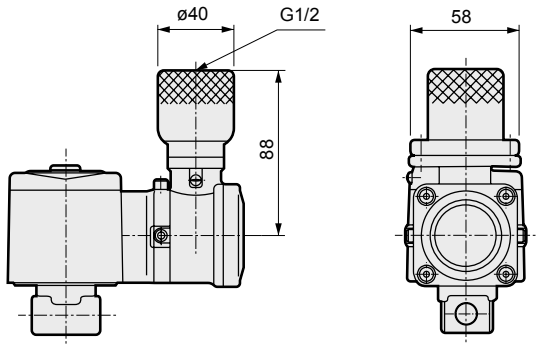
Model No.	A	B	C	D	E
AB41E2-02-1 to 6	36	11	54	97	92
AB41E2-02-7 AB41E2-03-1 to 7	40	12	57	100	95

Optional dimensions

● Stainless steel body
AB41E2-02/03-1 to 7- F,N

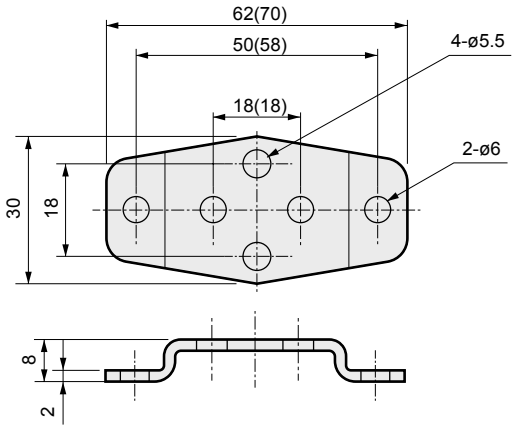


● Pressure proof packing (G1/2) connection
AB41E2-02/03-1 to 7- L,M



Model No.	A	B
AB41E2-02-1 to 6□	ø37.5	11
AB41E2-02-7□ AB41E2-03-1 to 7□	ø45	12

● Mounting plate
AB41E2-02/03-1 to 7-*** B AB



Dimensions shown in ( ) are for mounting plate No. 2.

Mounting plate model	Compatibility	
AB4-GE-100106-MOUNT-PLATE-KIT (Mounting plate No.1)	● AB41E2-02/03-1 to 7 ● AB41E2-02-1 to 6	Copper alloy body Stainless steel body
AB4-GE-100159-MOUNT-PLATE-KIT (Mounting plate No.2)	● AB41E2-02-7 ● AB41E2-03-1 to 7	Stainless steel body Stainless steel body

* Material: Steel/Zinc plated

Explosion-proof pilot operated 2-port solenoid valve
General purpose

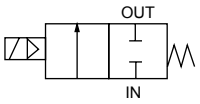
AP11E2/AP12E2 Series

- Pressure and explosion proof construction d2G2 (flame-proof grade 2/ignitability G2)
- NC (open when energized), NO (closed when energized)
- Japan Conformity Certificate No. AP11E2: No. T64351, AP12E2: No. T64354
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- Port size: Rc1/2 to Rc1 ● Piston drive

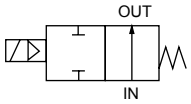
RoHS CAD

JIS symbol

● AP11E2: NC (open when energized)



● AP12E2: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AP11E2/AP12E2
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)/steam
Working pressure differential MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	2 (≈290 psi, 20 bar) (1 (≈150 psi, 10 bar) when fluid is steam)
Proof pressure (water pressure) MPa	10 (≈1500 psi, 100 bar)
Fluid temperature °C	5 (41°F) to 181 (357.8°F)
Ambient temperature °C	-10 (14°F) to 40 (104°F)
Thermal class	Class 180 (H)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G2)
Valve structure	Pilot operated poppet, piston drive
Valve seat leakage (*1) cm³/min(ANR)	300 or less (air)
Mounting orientation	Free (within working pressure range)
Degree of protection	IP65 or equivalent

*1: Pneumatic pressure used for measurement is 0.05 to 1.2 MPa for AP11E2 (NC [open when energized]), and 0.05 to 0.5 MPa for AP12E2 (NO [closed when energized]).

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)				Rated voltage	Apparent power (VA)				Power consump (W)		Weight (kg)
					Air	Water/kerosene	Oil (50 mm²/s)	Steam		When holding		When starting		AC		
					AC	AC	AC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	
NC (open when energized)																
AP11E2	-15A	Rc1/2	15	0.05 (≈7.3 psi, 0.5 bar)	1.2	1.0	0.6	1.0	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz	18	15	29	24	8	7	1.9
	-20A	Rc3/4	20													2.3
	-25A	Rc1	25													3.0
NO (closed when energized)																
AP12E2	-15A	Rc1/2	15	0.05 (≈7.3 psi, 0.5 bar)	0.5	0.5	0.5	0.5	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz	22	18	35	29	8.7	6.7	1.9
	-20A	Rc3/4	20													2.3
	-25A	Rc1	25													3.0

* The voltage fluctuation range must be within -10 to +5% of the rated voltage.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Flow characteristics			
				C[dm³/(s·bar)]	b	Cv	S(mm²)
NC (open when energized)							
AP11E2	-15A	Rc1/2	15	21	0.22	4.5	-
	-20A	Rc3/4	20	-	-	9.3	162
	-25A	Rc1	25	-	-	12.0	231
NO (closed when energized)							
AP12E2	-15A	Rc1/2	15	21	0.22	4.5	-
	-20A	Rc3/4	20	-	-	9.3	162
	-25A	Rc1	25	-	-	12.0	231

* Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 × C.

How to order

AP1①E2 - 15A - C 4 T CN - AC100V

- Model No.
- A Actuation
- B Port size *2
- C Body/sealant combination
- D Coil
- E External wire pull method *3
- F Organizations for explosive-proof certification
- G Voltage *5 *6

Code	Description	AP11E2	AP12E2
A Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●
B Port size			
15A	Rc1/2	●	●
20A	Rc3/4	●	●
25A	Rc1	●	●

C Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks		
C	Standard	Bronze	PTFE	Fluoro rubber	-	Air/water/kerosene/oil/ steam (up to 181°C)	●	●
F	Option	Stainless steel	PTFE	Fluoro rubber			●	●
K		Bronze	PTFE	Fluoro rubber	Oil-prohibited		●	●
N		Stainless steel	PTFE	Fluoro rubber			●	●

Refer to Intro Page 39 for reference on material combinations.

Code	Description	AP11E2	AP12E2
D Coil			
4	Thermal class 180 (H) explosion-proof coil	●	●
E External wire pull method			
T (Standard)	Conduit screw connection (G1/2) *7	●	●
L (Option)	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●
M (Option)	Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●
F Organizations for explosive-proof certification			
Blank	Japan certification (TIIS) *8	●	●
CN	China certification (NEPSI) *9	●	●
G Voltage			
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz	●	●
AC200V	200 VAC 50/60 Hz, 220 VAC 60 Hz	●	●

[Example of model No.]

AP11E2-15A-C4TCN-AC100V

Model: AP11E2

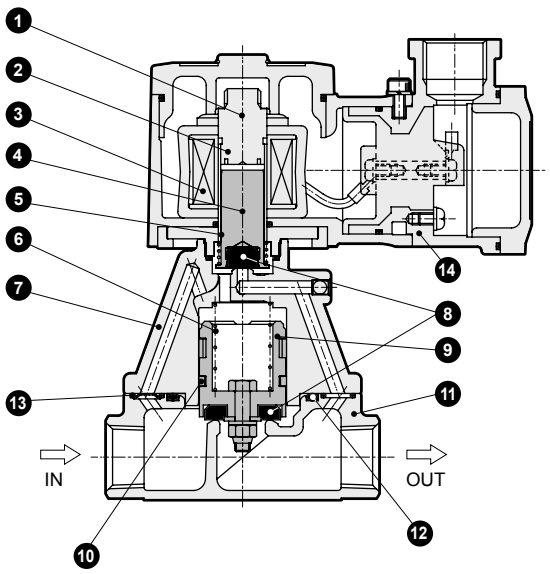
- A Actuation : NC (open when energized)
- B Port size : Rc1/2
- C Body/sealant combination : Body - bronze, valve seal - PTFE, O-ring - fluoro rubber
- D Coil : Thermal class 180 (H) explosion-proof coil
- E External wire pull method : Conduit screw connection (1/2NPT)
- F Organizations for explosive-proof certification : China Certification (NEPSI)
- G Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*3 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information.
Note that the conduit connection (G3/4) is not available.
*4 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
*5 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz.
*6 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
*7 : China certification will be 1/2 NPT.
*8 : Japan certification (TIIS) is included.
*9 : China certification (NEPSI) is included.

Internal structure and parts list

● AP11E2 Series



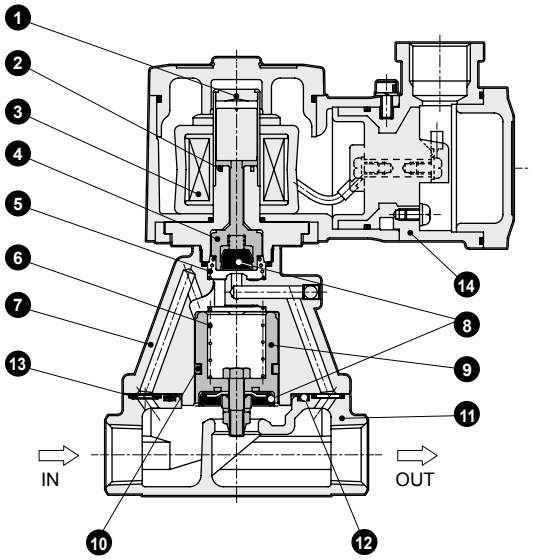
(The figure shows the closing operation)

Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	——	——
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	PTFE	Tetrafluoroethylene resin
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (Stainless steel)
10	Piston ring	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	FKM	Fluoro rubber
13	Orifice plate	SUS304(SUS303)	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AP12E2 Series



(The figure shows the opening operation)

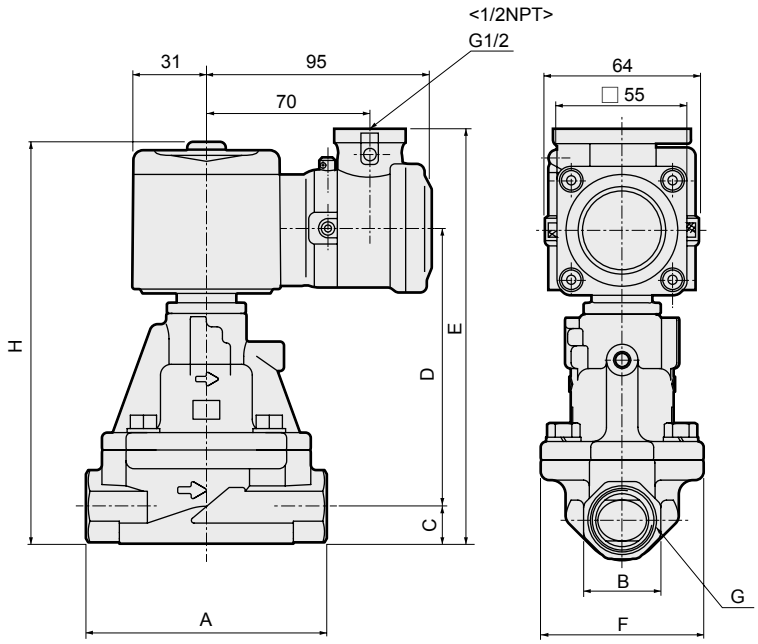
Cannot be disassembled

No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./SUS316L/SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	——	——
4	NO valve	SUS303/PFA	Stainless steel/ perfluoroalkoxy resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	PTFE	Tetrafluoroethylene resin
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/copper alloy (Stainless steel)
10	Piston ring	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	FKM	Fluoro rubber
13	Orifice plate	SUS304(SUS303)	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions

● Conduit screw (G1/2) connection
AP11E2
AP12E2 -15A/20A/25A-*4T

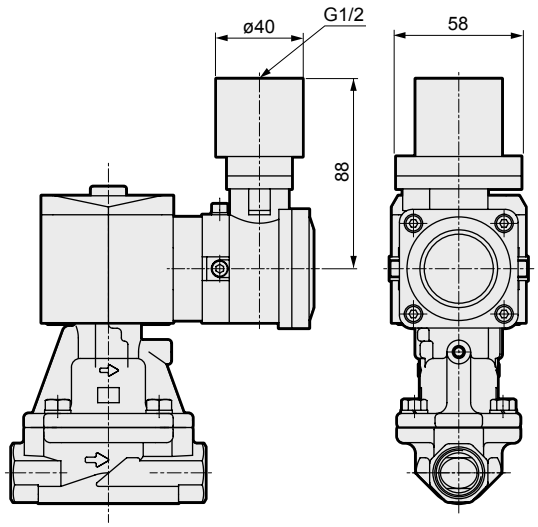


Dimensions in < > are for China certification

Model No.	A	B	C	D	E	F	G	H
AP11E2-15A-*4T	90	27	14	94.5	151.5	57	Rc1/2	146.5
AP11E2-20A-*4T	100	32	17	103.5	163.5	65	Rc3/4	158.5
AP11E2-25A-*4T	110	41	20.5	118	181.5	76	Rc1	176.5
AP12E2-15A-*4T	90	27	14	98.5	155.5	57	Rc1/2	150.5
AP12E2-20A-*4T	100	32	17	107.5	167.5	65	Rc3/4	162.5
AP12E2-25A-*4T	110	41	20.5	122	185.5	76	Rc1	180.5

Optional dimensions

● Pressure proof packing (G1/2) connection
AP11E2
AP12E2 -15A/20A/25A-** L,M



Explosion-proof pilot operated 2-port solenoid valve
General purpose

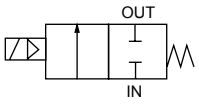
AP21E2/AP22E2 Series

- Pressure and explosion proof construction d2G2 (flame-proof grade 2/ignitability G2)
- NC (open when energized), NO (closed when energized)
- Japan Conformity Certificate No. AP21E2: No. T64351, AP22E2: No. T64354
- China Conformity Certificate No. 2020322307003155
- China explosion-proof standard NEPSI acquired GYB20. 2593X
- Port size: Rc1¼ to Rc2, 32 to 50 flange ● Piston drive

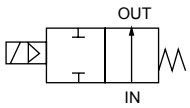
RoHS CAD

JIS symbol

● AP21E2: NC (open when energized)



● AP22E2: NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	AP21E2/AP22E2
Working fluid	Air/water/kerosene/oil (50 mm²/s or less)/steam
Working pressure differential MPa	0.05 to 1.2 (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	1.6 (≈230 psi, 16 bar) (1 (≈140 psi, 10 bar) when fluid is steam)
Proof pressure (water pressure) MPa	3.2 (≈460 psi, 32 bar)
Fluid temperature °C	5 (41°F) to 181 (357.8°F)
Ambient temperature °C	-10 (14°F) to 40 (104°F)
Thermal class	Class 180 (H)
Atmosphere	Outdoors/explosive gas (flame-proof grade 1 to 2/ignitability G1 to G2)
Valve structure	Pilot operated poppet, piston drive
Valve seat leakage (*1) cm³/min(ANR)	400 or less (air)
Mounting orientation	Free (within working pressure range)
Degree of protection	IP65 or equivalent

*1: Pneumatic pressure used for measurement is 0.05 to 1.2 MPa for AP21E2 (NC [open when energized]), and 0.05 to 0.5 MPa for AP22E2 (NO [closed when energized]).

Individual specifications

Item / Model No.		Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa) Air AC	Water/kerosene AC	Oil (50 mm²/s) AC	Steam AC	Rated voltage	Apparent power (VA) When holding 50 Hz	When holding 60 Hz	When starting 50 Hz	When starting 60 Hz	Power consump (W) AC 50 Hz	AC 60 Hz	Weight (kg)
NC (open when energized)																
AP21E2	-32A	Rc1¼	35	0.05 (≈7.3 psi, 0.5 bar)	1.2 (≈170 psi, 12 bar)	1.0 (≈140 psi, 10 bar)	0.6 (≈87 psi, 6 bar)	1.0 (≈140 psi, 10 bar)	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz	18	15	29	24	8	7	4.0
	-32F	32 flange														7.5
	-40A	Rc1½	43													5.0
	-40F	40 flange														8.5
	-50A	Rc2	53													6.5
	-50F	50 flange														10.5
NO (closed when energized)																
AP22E2	-32A	Rc1¼	35	0.05 (≈7.3 psi, 0.5 bar)	0.5 (≈73 psi, 5 bar)	0.5 (≈73 psi, 5 bar)	0.5 (≈73 psi, 5 bar)	0.5 (≈73 psi, 5 bar)	100 VAC 50/60 Hz 110 VAC 60 Hz 200 VAC 50/60 Hz 220 VAC 60 Hz	22	18	35	29	8.7	6.7	4.0
	-32F	32 flange														7.5
	-40A	Rc1½	43													5.0
	-40F	40 flange														8.5
	-50A	Rc2	53													6.5
	-50F	50 flange														10.5

*1 : The model numbers above are for the standard products. Refer to How to order for other combinations.
*2 : The voltage fluctuation range must be within -10 to +5% of the rated voltage.

Flow characteristics

Model No.		Port size	Orifice size (mm)	Cv	Effective cross-sectional area (mm^2)
NC (open when energized)					
AP21E2	-32A	Rc1 1/4	35	25	460
	-32F	32 flange			
	-40A	Rc1 1/2	43	34	625
	-40F	40 flange			
	-50A	Rc2	53	53	975
	-50F	50 flange			
NO (closed when energized)					
AP22E2	-32A	Rc1 1/4	35	25	460
	-32F	32 flange			
	-40A	Rc1 1/2	43	34	625
	-40F	40 flange			
	-50A	Rc2	53	53	975
	-50F	50 flange			

How to order

AP2①E2 - 32F - C 4 T CN - AC100V

- Model No.
- Ⓐ Actuation
- Ⓑ Port size *2 *3
- Ⓒ Body/sealant combination
- Ⓓ Coil
- Ⓔ External wire pull method *4
- Ⓕ Organizations for explosive-proof certification
- Ⓖ Voltage *6 *7

Code	Description	Model No. AP21E2	Model No. AP22E2
Ⓐ Actuation			
1	NC (open when energized)	●	
2	NO (closed when energized)		●
Ⓑ Port size			
32A	Rc1 1/4	●	●
32F	32 flange	●	●
40A	Rc1 1/2	●	●
40F	40 flange	●	●
50A	Rc2	●	●
50F	50 flange	●	●

Ⓒ Body/sealant combination

		Body	Valve seal	O-ring	Treatment	Remarks		
C	Standard	Bronze	PTFE	Fluoro rubber	-	Air/water/kerosene/oil/steam (up to 181°C)	●	●
F	Option	Stainless steel	PTFE	Fluoro rubber	-		●	●
K	Option	Bronze	PTFE	Fluoro rubber	Oil-prohibited		●	●
N	Option	Stainless steel	PTFE	Fluoro rubber	Oil-prohibited		●	●

Refer to Intro Page 39 for reference on material combinations.

Ⓓ Coil				
4		Thermal class 180 (H) explosion-proof coil	●	●
Ⓔ External wire pull method				
T	Standard	Conduit screw connection (G1/2) *8	●	●
L	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø7.5 to 8.4	●	●
M	Option	Pressure proof packing seal (G1/2) connection, cable O.D. ø8.5 to 9.4	●	●
Ⓕ Organizations for explosive-proof certification				
Blank		Japan certification (TIIS) *9	●	●
CN		China certification (NEPSI) *10	●	●
Ⓖ Voltage				
AC100V		100 VAC 50/60 Hz, 110 VAC 60 Hz	●	●
AC200V		200 VAC 50/60 Hz, 220 VAC 60 Hz	●	●

[Example of model No.]

AP21E2-32F-C4TCN-AC100V

Model: AP21E2

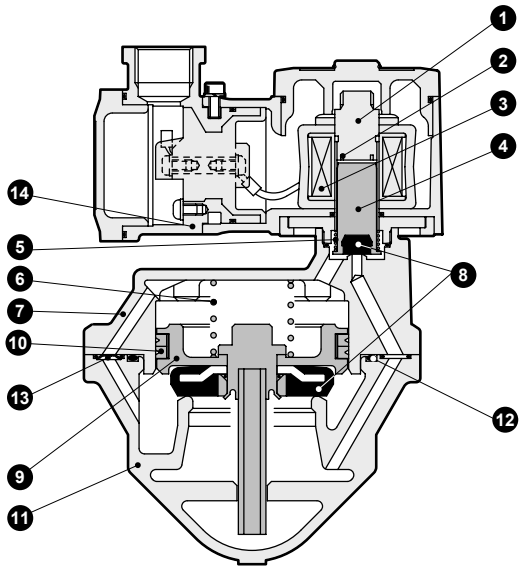
Ⓐ Actuation : NC (open when energized)
Ⓑ Port size : 32 flange
Ⓒ Body/sealant combination : Body - bronze/valve seal - PTFE/O-ring - fluoro rubber
Ⓓ Coil : Thermal class 180 (H) explosion-proof coil
Ⓔ External wire pull method : Conduit screw connection (1/2NPT)
Ⓕ Organizations for explosive-proof certification : China Certification (NEPSI)
Ⓖ Voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : The combinations indicated with ● above are available.
*2 : The companion flange is JIS B2210 10K.
(Flange is not enclosed with the product and must be purchased separately.)
*3 : As G and NPT threads can also be used for piping port threads, contact CKD for details.
*4 : A pressure proof packing seal (G3/4) connection is also available. Contact CKD for more information.
Note that the conduit connection (G3/4) is not available.
*5 : Tropicalization (rust-proof coating) is available as a measure against rust. Contact CKD for more information.
*6 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and 200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz.
*7 : Other voltages as below are also available. Contact CKD for details.
12, 24, 48, 110, 115, 120, 220, 240, 380, 400, 415, 440, 480, 500 VAC
*8 : China certification will be 1/2 NPT.
*9 : Japan certification (TIIS) is included.
*10 : China certification (NEPSI) is included.

Internal structure and parts list

● AP21E2 Series



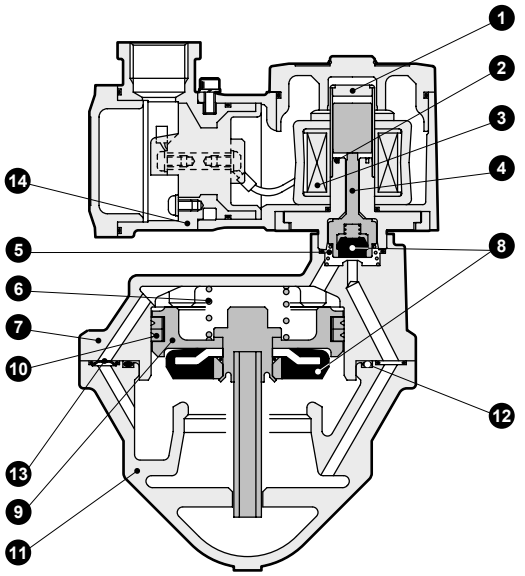
(The figure shows the closing operation)

Cannot be disassembled

No.	Part name	Material	
1	Core assembly	SUS405 or equiv./SUS316L/ SUS403	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	——	——
4	Plunger	SUS405 or equiv.	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	PTFE	Tetrafluoroethylene resin
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/ copper alloy (stainless steel)
10	Seal ring set	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	FKM	Fluoro rubber
13	Orifice plate	SUS304	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

● AP22E2 Series



(The figure shows the opening operation)

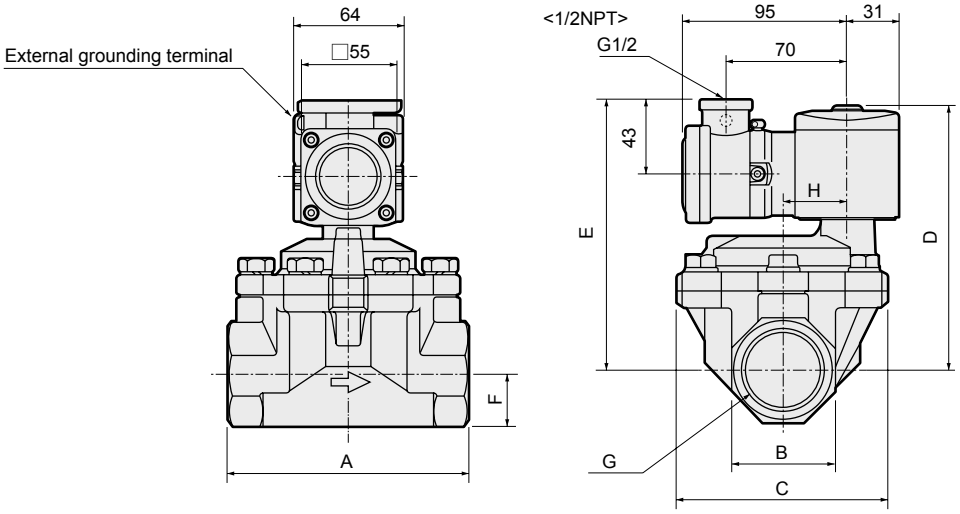
Cannot be disassembled

No.	Part name	Material	
1	Plunger/core assembly	SUS405 or equiv./SUS316L/ SUS304	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	——	——
4	NO valve	SUS303/PFA	Stainless steel/ perfluoroalkoxy resin
5	Spring	SUS304	Stainless steel
6	Valve spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
8	Valve seal	PTFE	Tetrafluoroethylene resin
9	Main valve assembly	C3604/SUS303/SUS304 (SUS303/SUS304)	Stainless steel/ copper alloy (stainless steel)
10	Seal ring set	SUS304/PTFE	Stainless steel/ tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
12	O-ring	FKM	Fluoro rubber
13	Orifice plate	SUS304	Stainless steel
14	Coil case	ADC12	Aluminum die-casting

( ) shows options.

Dimensions CAD

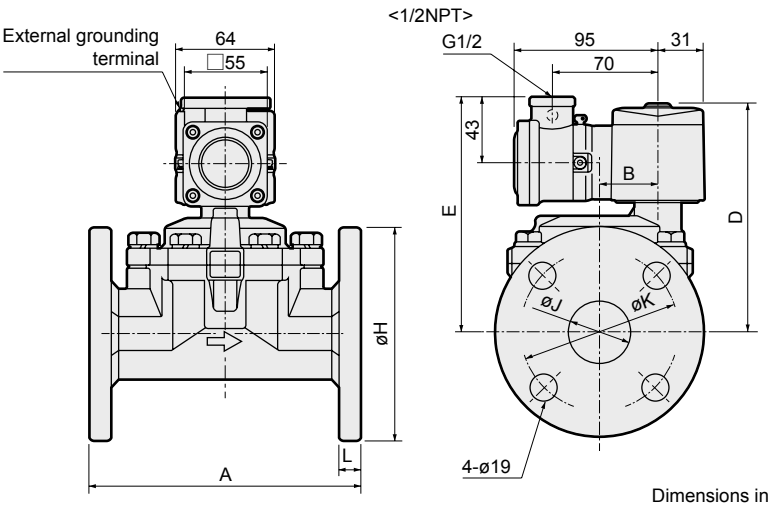
● Conduit screw (G1/2) connection (Rc screw-in)
AP21E2
AP22E2 -32A/40A/50A-*4T



Dimensions in < > are for China certification

Model No.	A	B	C	D	E	F	G	H
AP21E2-32A-*4T	125	54	112	147	152	27	Rc1¼	32
AP21E2-40A-*4T	140	60	122	153	158	30	Rc1½	38
AP21E2-50A-*4T	160	74	132	161	166	37	Rc2	45
AP22E2-32A-*4T	125	54	112	151	156	27	Rc1¼	32
AP22E2-40A-*4T	140	60	122	157	162	30	Rc1½	38
AP22E2-50A-*4T	160	74	132	165	170	37	Rc2	45

● Conduit screw (G1/2) connection (flange)
AP21E2
AP22E2 -32F/40F/50F-*4T



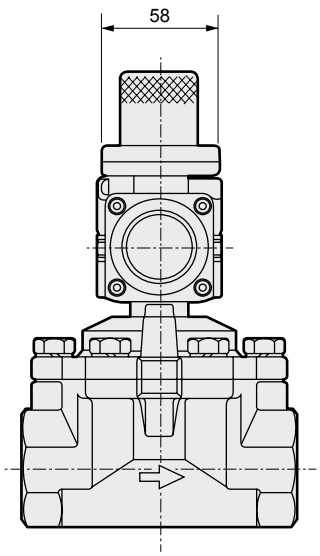
Dimensions in < > are for China certification

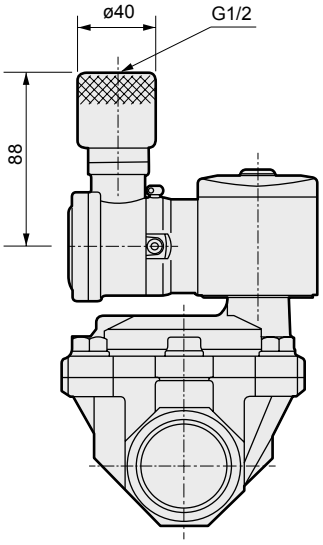
Model No.	A	B	D	E	H	J	K	L
AP21E2-32F-*4T	170	32	147	152	135	36(35)	100	12
AP21E2-40F-*4T	180	38	153	158	140	42	105	14
AP21E2-50F-*4T	180	45	161	166	155	53(52)	120	14
AP22E2-32F-*4T	170	32	151	156	135	36(35)	100	12
AP22E2-40F-*4T	180	38	157	162	140	42	105	14
AP22E2-50F-*4T	180	45	165	170	155	53(52)	120	14

Dimensions shown in ( ) are for stainless steel body.

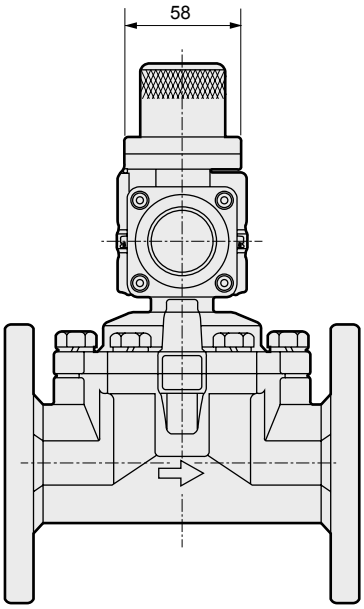
Optional dimensions

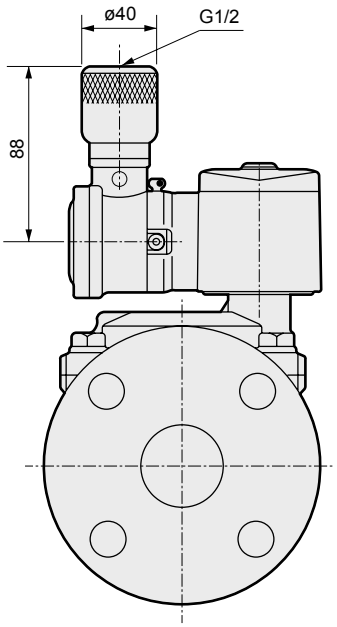
● Pressure proof packing (G1/2) connection (Rc screw-in)
AP21E2
AP22E2 -32A/40A/50A-** L,M





● Pressure proof packing (G1/2) connection (flange)
AP21E2
AP22E2 -32F/40F/50F-** L,M





Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

Explosion-proof direct acting/pilot operated 2, 3-port solenoid valve

Design/selection

⚠CAUTION

1 Selection reference

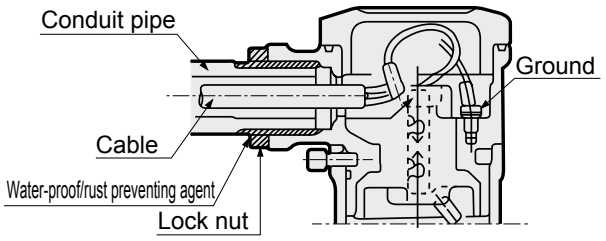
Thoroughly read and comprehend the section "Standards and certification" (Intro Pages 55 and 56) for the selection standards for the explosion-proof solenoid valve.

Mounting, piping and wiring

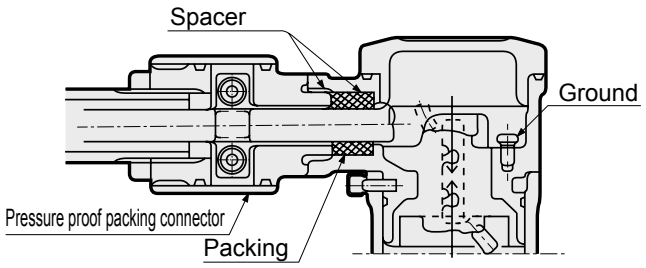
⚠CAUTION

1 Wiring

(1) Wire as shown in the figure below.

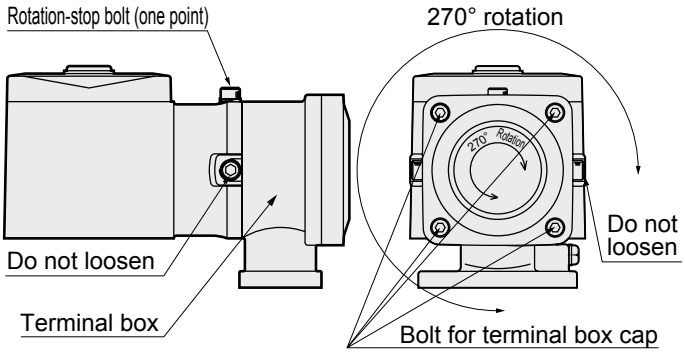


[For conduit thread]



[For pressure proof packing]

(2) Terminal box rotates 270°. The orientation can be changed by loosening the rotation-stop bolt. After wiring and setting the wiring direction, tighten the rotation-stop bolt with a torque of 0.6 to 0.8 N·m to fix the terminal box. If the rotation-stop bolt is loose, the terminal box could fall off during use. Furthermore, rotation of the terminal box may result in damage to the rotating unit or disconnection of an internal wire. When laying the electric wires, do not loosen any bolts other than the four terminal box cap bolts and rotation-stop bolt. The explosion-proof performance cannot be guaranteed.



(3) Include a fuse (1 A) in the electrical circuit.

Maintenance

⚠CAUTION

1 Maintenance of coil case

Do not disassemble an explosion-proof solenoid valve used in an explosive hazard area, even when repair is necessary. Since the coil case section has a pressure and explosion-proof structure, if it must be disassembled for inspection, contact CKD.

To guarantee the performance of the explosion-proof valve, CKD requests that customers return the valves temporarily for repair at the CKD manufacturing plant.

For precautions other than the above, refer to the precautions given on pages 242, 243, 324 and 325 for the basic solenoid valves (direct acting general purpose, pilot operated general purpose and pilot kick general purpose).

HVB/HVL

Solenoid valve for high vacuum

■ **Vacuum/inert gas/air/nitrogen**

Overview

Advanced technology, such as leakage amount stability (vacuum holding force) and increased seal life, is required when the degree of vacuum increases.
The HVB Series introduces special technology throughout for the valve seat shape, seal material and surface processing, etc. Stable performance is realized even at high vacuum. Use this for various vacuum devices, including electronic beams, molecular accelerators and vacuum deposition.
The HVL Series is the conventional solenoid valve for high vacuum to which a device is added to provide a several-second delay when opening the valve. This prevents various troubles in vacuum devices during power failures.
Use this to prevent release to atmospheric pressure at a power failure, or to prevent oil from entering the piping if the manual valve is not properly opened after the power stops.

Features

Special packing
Long-lasting FKM packing seal.
High corrosion resistance
Stainless steel body.
High vacuum retention
Stable vacuum retention with minimum leakage.
Allows the use of back pressure (reverse vacuum)
* Compatible models only
Easy maintenance
Simple structure enabling easy maintenance.

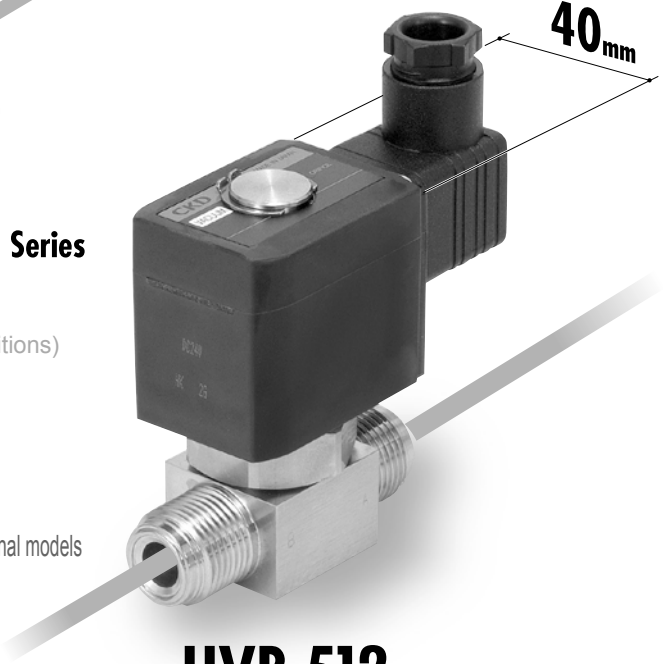
CONTENTS

⚠ Always read the precautions in the Introduction and on page 499 before use.

HVB Series solenoid valve for high vacuum

HVB 312 Series

HVB 212 Series



HVB 512 Series

Durability 2 million cycles (* under CKD's conditions)

Reliable, high quality valve maintains high performance
even after continous use for long periods.

Low power consumption About 40 % less than conventional models

Power consumption has been significantly reduced.
Supports effective energy saving in long-term energized conditions.

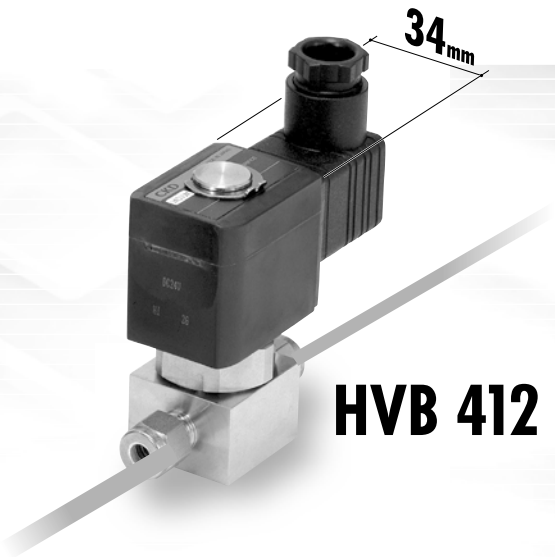
Vacuum leakage 1×10^{-9} Pa·m³/s or less

High vacuum retention with stable internal/external leakage.

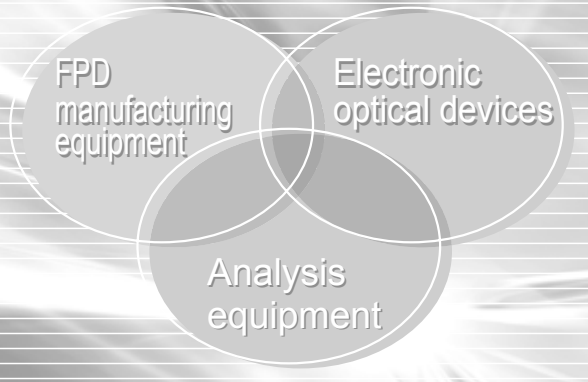
Solenoid valve for high vacuum

High Vacuum HVB Series

with high vacuum retention and superb durability.



HVB 412 Series

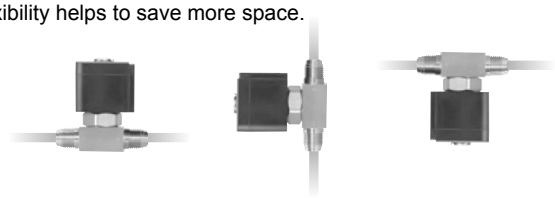


Wide range of choices

Orifice size: ø1 / ø2 / ø3 / ø4.5 / ø6,
coil width: 22 / 28 / 34 / 40 mm.

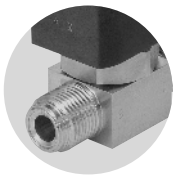
Free mounting orientation

Mountable in any orientation depending on the installation space.
This flexibility helps to save more space.

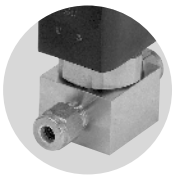


4 types of connection

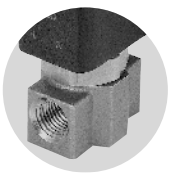
● JXR male fitting
Connectable to
VCR female fitting.



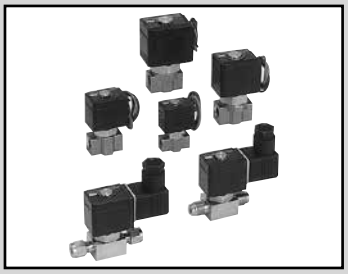
● Double barbed fitting



● NPT
Rc



Series variation	Coil width (mm)				Orifice (mm)					Connection			
	22	28	34	40	ø1	ø2	ø3	ø4.5	ø6	JXR	Double barbed fitting	NPT	Rc
HVB 212 Series	●				●	●				1/4"	1/4"	1/8"	1/8"
HVB 312 Series		●				●	●			1/4"	1/4"	1/8"·1/4"	1/8"·1/4"
HVB 412 Series			●				●	●	●	1/4"·3/8"	1/4"·3/8"	1/4"·3/8"	1/4"·3/8"
HVB 512 Series				●				●	●	1/4"·3/8"	1/4"·3/8"	1/4"·3/8"	1/4"·3/8"



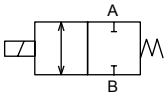
Solenoid valve for high vacuum

HVB$^{2}_{3}_{4}_{5}$12 Series

- Orifice: ø1, ø2, ø3, ø4.5, ø6
- NC (open when energized)

JIS symbol

- NC (open when energized)



Common specifications

Item	HVB*12
Working fluid	Air/vacuum/inert gas (*1)
Proof pressure MPa	5.0 (≈730 psi, 50 bar)
Fluid temperature °C	5 (41°F) to 55 (131°F)
Ambient temperature °C	0 (32°F) to 55 (131°F) (no freezing)
Thermal class	Class 130 (B)
Voltage fluctuation range	Rated voltage ±10%
Atmosphere	No explosive or corrosive atmospheres
Valve structure	Direct acting poppet structure
Valve seat leakage Pa·m³/sHe	1.0 x 10^{-9} or less (*2)
External leakage Pa·m³/sHe	1.0 x 10^{-9} or less
Mounting orientation	Unrestricted
Durability	2 million times

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size (*3)	Orifice size (mm)	Cv (*5)	Working pressure Pa(abs)(*10)	Max. working pressure differential (*6)(MPa)	Back pressure (*7)(MPa)	Rated voltage	Power consump (W) AC	Power consump (W) DC	Weight (*9)(kg)
NC (open when energized)										
HVB212	1/4" JXR male fitting 1/4" double barbed fitting NPT1/8, Rc1/8	1	0.04	1.0×10^{-6} to 1.0×10^{6}	1.0	0.6	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	4.3	4	0.16
		2	0.17	1.0×10^{-6} to 0.3×10^{6}	0.3	0.15				
HVB312	1/4" JXR male fitting 1/4" double barbed fitting NPT1/8, 1/4, Rc1/8, 1/4	2	0.17	1.0×10^{-6} to 0.8×10^{6}	0.8	0.5		6.5	6	0.29
		3	0.33	1.0×10^{-6} to 0.3×10^{6}	0.3	0.25				
HVB412	1/4" JXR male fitting 1/4" double barbed fitting NPT1/4, Rc1/4	3	0.33	1.0×10^{-6} to 1.0×10^{6}	1.0	0.4		8.3	8 (*8)	0.50
		4.5	0.6	1.0×10^{-6} to 0.3×10^{6}	0.3	0.2				
	3/8" JXR male fitting 3/8" double barbed fitting NPT3/8, Rc3/8	6	1.05	1.0×10^{-6} to 0.2×10^{6}	0.1	0.05				
HVB512	1/4" JXR male fitting 1/4" double barbed fitting NPT1/4, Rc1/4	4.5	0.6	1.0×10^{-6} to 0.8×10^{6}	0.8	0.2		11.8	11.5	0.69
	3/8" JXR male fitting 3/8" double barbed fitting NPT3/8, Rc3/8	6	1.05	1.0×10^{-6} to 0.3×10^{6}	0.3	0.15				

*1 : The number of durability times may become much lower depending on the degree of dryness.
*2 : When port A is on the vacuum side.
*3 : JXR fitting can be connected to VCR fitting.
*4 : The leakage current must be less than the values shown below.
*5 : Cv shown in the table are values for NPT connection.
*6 : The max. working pressure differential is the difference between port B (high-pressure side) and port A (low-pressure side).
7 : Atmospheric pressure at port B that can be applied from port A. (B port vacuum is unusable for HVB412--6)
*8 : 8.6 (W) for 12 VDC.
*9 : Weights shown in the table are for grommet lead wire/NPT connection.
*10 : The working pressure range vacuum does not guarantee the vacuum attainment time or that the vacuum will not change.
*11 : FKM is used for sealant material, so consider the generation of discharge gas during use.
*12 : Grease for high vacuum is used on the O-rings of gas contacting parts.

Leakage current	Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
	HVB*12	2 mA or less	1 mA or less	1 mA or less	2 mA or less

How to order

HVB 2 12 - 4RM - 2 - 2C B - DC24V

Ⓐ Series size (coil width)
Ⓑ Connection
Ⓒ Orifice size
Ⓓ Coil option *1 *2
Ⓔ Other options
Ⓕ Voltage

Code	Description	Model No. HVB212	HVB312	HVB412	HVB512
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Connection (refer to Table 1)					
4RM	1/4" JXR male fitting	●	●	●	●
6RM	3/8" JXR male fitting			●	●
4S	1/4" double barbed fitting	●	●	●	●
6S	3/8" double barbed fitting			●	●
6N	NPT1/8	●	●		
8N	NPT1/4		●	●	●
10N	NPT3/8			●	●
6	Rc1/8	●	●		
8	Rc1/4		●	●	●
10	Rc3/8			●	●
Ⓒ Orifice size (refer to Table 1)					
Z	ø1	●			
2	ø2	●	●		
3	ø3		●	●	
5	ø4.5			●	●
6	ø6			●	●
Ⓓ Coil option					
For AC					
2CR	Standard: Grommet lead wire/with full-wave rectifier	●	●	●	●
For DC					
2C	Std.: Grommet lead wire	●	●	●	●
2CS	Option: Grommet lead wire with surge suppressor	●	●	●	●
2G	Option: With DIN terminal box (Pg11)	●	●	●	●
2HS	Option: With DIN terminal box with lamp/surge suppressor (Pg11)	●	●	●	●
Ⓔ Other options					
Blank	Std.: None	●	●	●	●
B	Option: Mounting plate	●	●	●	●
Ⓕ Voltage					
AC100V	100 VAC 50/60 Hz	●	●	●	●
AC200V	200 VAC 50/60 Hz	●	●	●	●
DC24V	24 VDC	●	●	●	●
DC12V	12 VDC	●	●	●	●

Select from the combinations indicated with ● above.

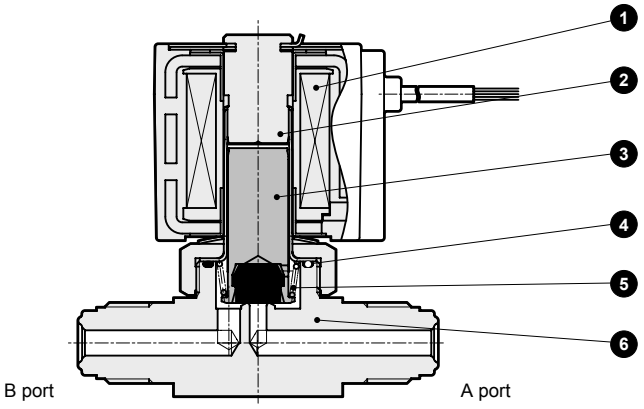
Table 1: Table of fitting and orifice size combination

	Connection Ⓑ			Ⓒ Orifice Z	2	3	5	6
	Ⓑ	Fitting	Size	ø1	ø2	ø3	ø4.5	ø6
HVB212	4RM	JXR male	1/4"	●	●			
	4S	Double barbed	1/4"	●	●			
	6N	NPT	1/8"	●	●			
	6	Rc	1/8"	●	●			
HVB312	4RM	JXR male	1/4"		●	●		
	4S	Double barbed	1/4"		●	●		
	6N	NPT	1/8"		●	●		
	8N	NPT	1/4"		●	●		
	6	Rc	1/8"		●	●		
	8	Rc	1/4"		●	●		
HVB412	4RM	JXR male	1/4"			●	●	
	6RM	JXR male	3/8"					●
	4S	Double barbed	1/4"			●	●	
	6S	Double barbed	3/8"					●
	8N	NPT	1/4"			●	●	
	10N	NPT	3/8"					●
	8	Rc	1/4"			●	●	
	10	Rc	3/8"					●
HVB512	4RM	JXR male	1/4"				●	
	6RM	JXR male	3/8"					●
	4S	Double barbed	1/4"				●	
	6S	Double barbed	3/8"					●
	8N	NPT	1/4"				●	
	10N	NPT	3/8"					●
	8	Rc	1/4"				●	
	10	Rc	3/8"					●

[Example of model No.]
HVB212-4RM-2-2CB-DC24V
Model: HVB212
Ⓐ Series size : 22 mm
Ⓑ Connection : 1/4" JXR male fitting
Ⓒ Orifice size : ø2
Ⓓ Coil option : Grommet lead wire
Ⓔ Other options : Mounting plate
Ⓕ Voltage : 24 VDC

*1 : Surge suppressor is included as standard in the models with full-wave rectifier.
*2 : For HVB212 Item Ⓓ 2G/2HS, the compact terminal box (Pg9) is used.

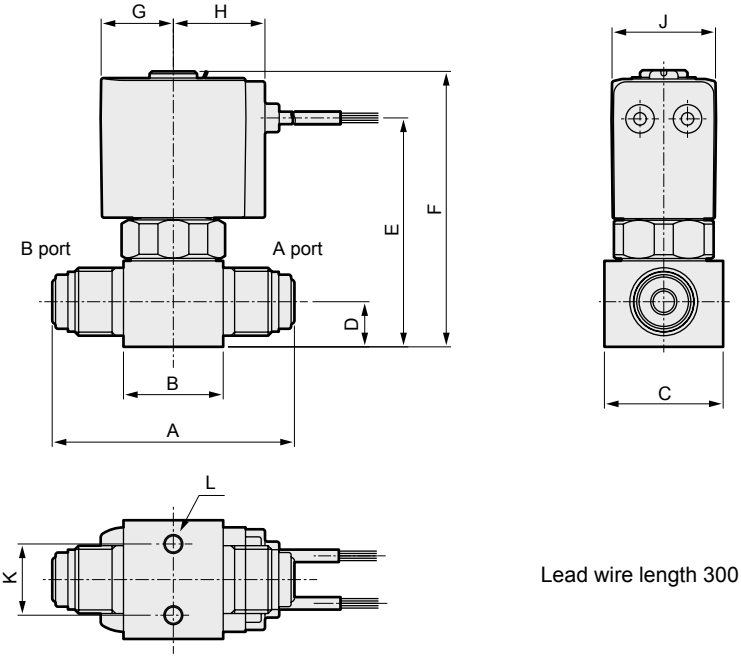
Internal structure and parts list



No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	(Molded coil)		4	O-ring	FKM	Fluoro rubber
2	Core assembly	SUS405, SUS316L	Stainless steel	5	Spring	SUS304	Stainless steel
3	Plunger assembly	SUS405, FKM	Stainless steel, fluoro rubber	6	Body	SUS304 or SCS13	Stainless steel

Dimensions CAD

● Grommet lead wire (voltage: DC type)/JXR male fitting
HVB*12- 4RM / 6RM -*- 2C

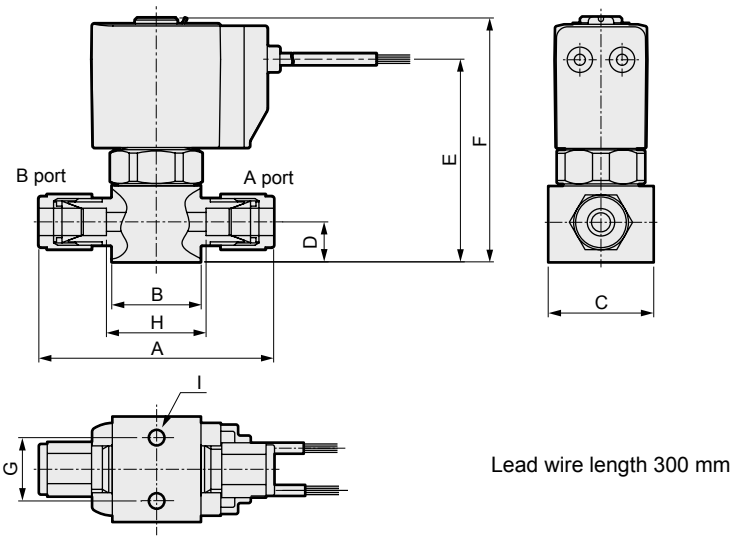


Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	J	K	L
HVB212-4RM	51	21	25	9.5	48	58	15.5	19.5	22	15	M4 x 0.7 depth 6
HVB312-4RM	64	30	25	9.5	53.5	64.5	18.5	22.5	28	18	M5 x 0.8 depth 8
HVB412-4RM	64	34	32	11.6	66	79.5	22.5	26	34	18	M5 x 0.8 depth 8
HVB412-6RM	75	34	32	11.6	66	79.5	22.5	26	34	18	M5 x 0.8 depth 8
HVB512-4RM	64	34	32	11.6	71.5	86.5	26	29.5	40	18	M5 x 0.8 depth 8
HVB512-6RM	75	34	32	11.6	71.5	86.5	26	29.5	40	18	M5 x 0.8 depth 8

Dimensions CAD

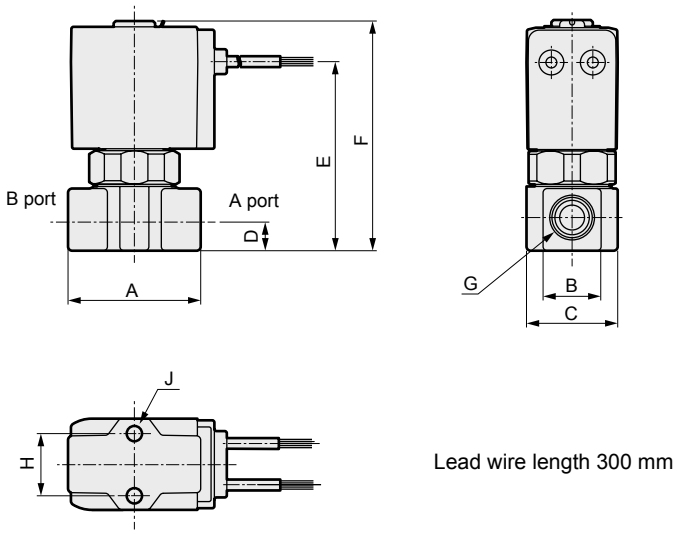
● Grommet lead wire (voltage: DC type)/double barbed fitting
HVB*12-[4S / 6S]-*-[2C]



Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	I
HVB212-4S	(56)	21	25	9.5	48	58	15	22	M4 x 0.7 depth 6
HVB312-4S	(69)	30	25	9.5	53.5	64.5	18	35	M5 x 0.8 depth 8
HVB412-4S	(69)	34	32	11.6	66	79.5	18	35	M5 x 0.8 depth 8
HVB412-6S	(78)	34	32	11.6	66	79.5	18	43.5	M5 x 0.8 depth 8
HVB512-4S	(69)	34	32	11.6	71.5	86.5	18	35	M5 x 0.8 depth 8
HVB512-6S	(78)	34	32	11.6	71.5	86.5	18	43.5	M5 x 0.8 depth 8

● Grommet lead wire (voltage: DC type)/NPT type Rc screw-in
HVB*12-[6N / 8N / 10N / 6 / 8 / 10]-*-[2C]



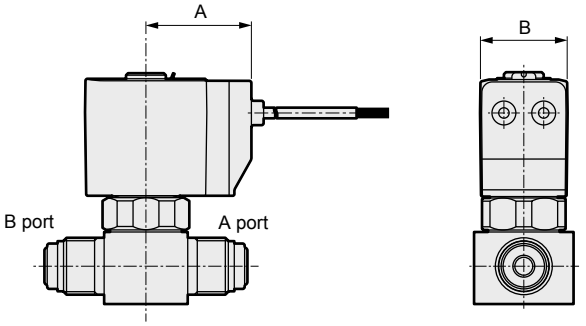
Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	J
HVB212-6N/6	32	14	22	8	45.5	56	NPT1/8	15	M4 x 0.7 depth 6
HVB312-$^{6}_{8}$N/$^{6}_{8}$	36	18	28	11	57.5	68.5	NPT1/8, NPT1/4	18	M5 x 0.8 depth 6
HVB412-$^{8}_{10}$N/$^{8}_{10}$	40	21	34	12	67	81	NPT1/4, NPT3/8	18	M5 x 0.8 depth 8
HVB512-$^{8}_{10}$N/$^{8}_{10}$	40	21	34	12	73.5	89	NPT1/4, NPT3/8	18	M5 x 0.8 depth 8

Optional dimensions

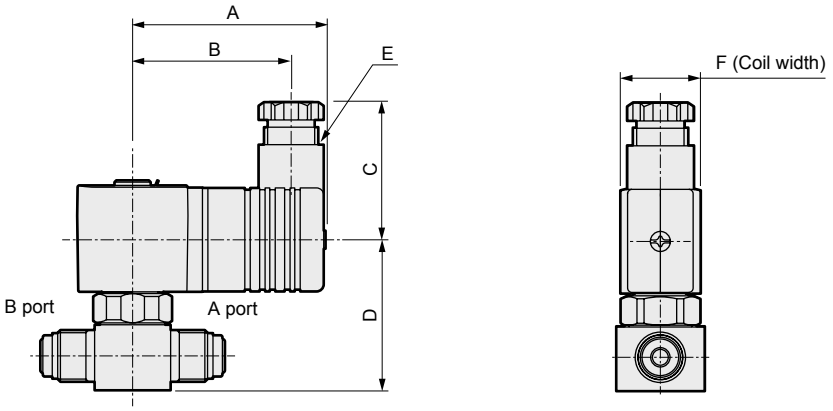
● Grommet lead wire (voltage: AC)/full-wave rectifier HVB*12-*-*- 2CR

Refer to the dimensions of grommet lead wire (DC type) on pages 486 and 487 for common dimensions.

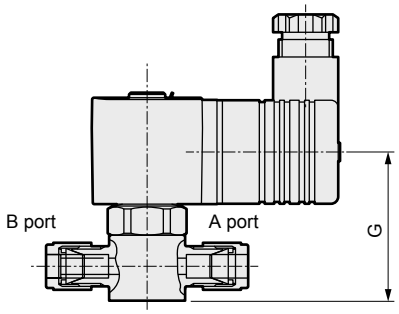


Model No.	A	B
HVB212	26.5	22
HVB312	29.5	28
HVB412	34	34
HVB512	37.5	40

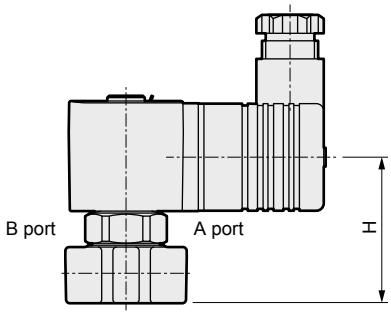
● DIN terminal box (with lamp/surge suppressor)
HVB*12-*-*- 2G 2HS



JXR male fitting: 4RM, 6RM



Double barbed fitting: 4S, 6S



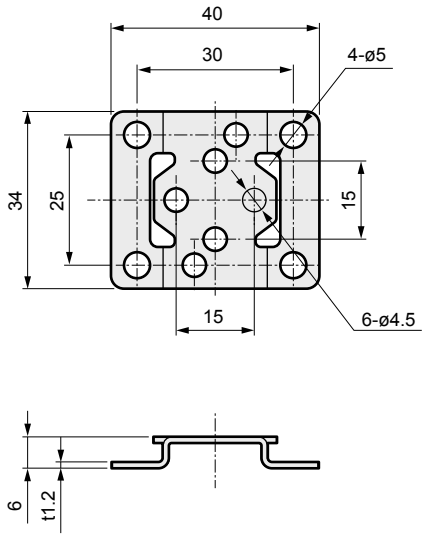
NPT:6N, 8N, 10N
Rc thread: 6, 8, 10

Model No.	A	B	C	D	E	F	G	H
HVB212	53	44	38	41.5	Pg9	22	41.5	39
HVB312	58.5	47	42	47.5	Pg11	28	47.5	51
HVB412	62	50.5	42	59.5	Pg11	34	59.5	61
HVB512	65.5	54	42	67	Pg11	40	67	69.5

Optional dimensions

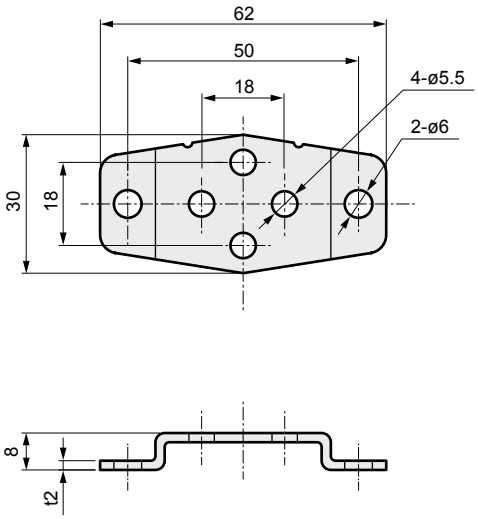
● Mounting plate
HVB212-*-*-* B

Material: Steel
Nickel plating treatment



● Mounting plate
HVB$^{3}_{4}_{5}$12-*-*-* B

Material: Steel
Nickel plating treatment



Solenoid valve for high vacuum

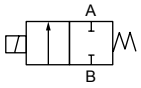
HVB112 Series

- NC (open when energized)
- Port size: NPT1/8, 1/4" JXR female fitting

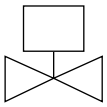
RoHS CAD

JIS symbol

● NC (open when energized)



Mounting orientation



Specifications

Item		HVB112-6N-*	HVB112-8R-*
Working fluid		Vacuum/inert gas (*1)	
Working pressure	Pa(abs)	1.3×10^{-6} to 3×10^{5} (*3)	
Max. working pressure differential	MPa	0.3	
Valve seat leakage	$Pa \cdot m^3/s$ (He)	1.0×10^{-9} or less	
External leakage	$Pa \cdot m^3/s$ (He)	1.0×10^{-9} or less	
Proof pressure	MPa	0.5 (≈73 psi, 5 bar)	
Back pressure (*2)	MPa	0.2 (≈29 psi, 2 bar)	
Fluid temperature	°C	5 (41°F) to 55 (131°F)	
Ambient temperature	°C	0 (32°F) to 55 (131°F)	
Orifice size	mm	1.6	
Cv		0.09	
Frequency	times/min. or less	60	
Port size		NPT1/8	1/4" JXR female fitting
Mounting orientation		Vertical direction with the coil on top	
Weight	kg	0.15	0.24
Electrical specifications			
Rated voltage		100/200 VAC(50/60 Hz), 24 VDC	
Voltage fluctuation range		Rated voltage ±10%	
Power consumption	W	4.0	
Thermal class		Class 130 (B)	
Temperature rise	K	70	

*1 : The number of durability times may decrease sharply depending on the degree of dryness.
*2 : Atmospheric pressure at port B that can be applied from port A
*3 : The working pressure vacuum does not guarantee the vacuum attainment time or that the vacuum will not change.
*4 : FKM is used for sealant material, so consider the generation of discharge gas during use.
*5 : Grease for high vacuum is used on the O-rings of gas contacting parts.

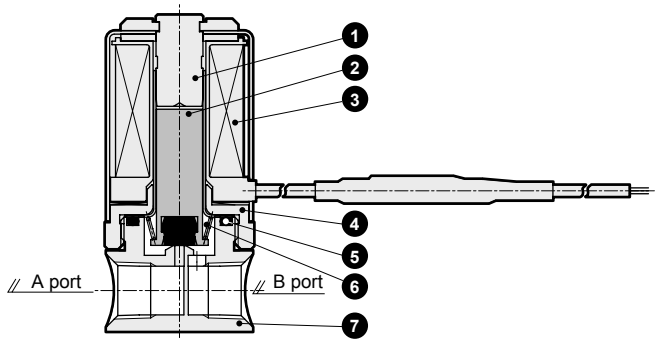
How to order

HVB 112 - **6N** - 5 - **AC100V**

- HVB: Model No.
- 6N: Ⓐ Port size
- 5: Orifice size ø1.6
- AC100V: Ⓑ Voltage

Code	Description
Ⓐ Port size	
6N	NPT1/8
8R	1/4" JXR female fitting
Ⓑ Voltage	
AC100V	100 VAC(50/60 Hz)
AC200V	200 VAC(50/60 Hz)
DC24V	24 VDC

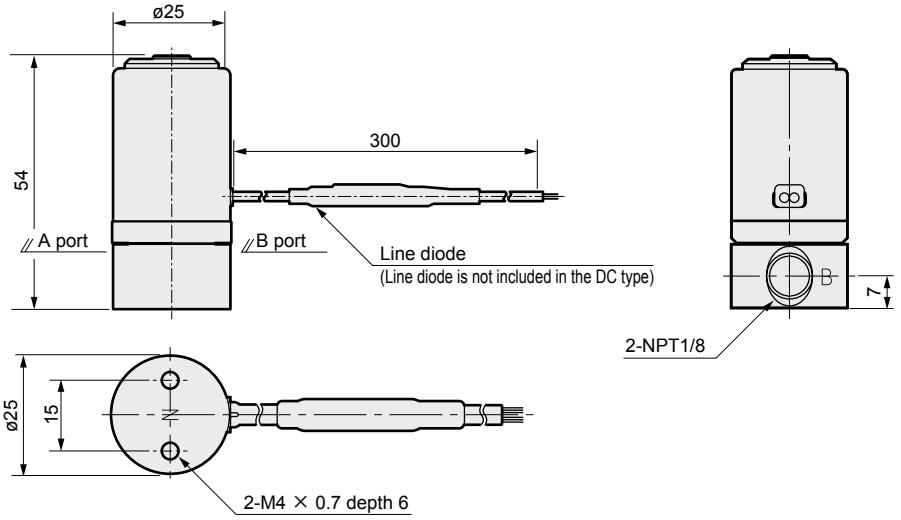
Internal structure and parts list



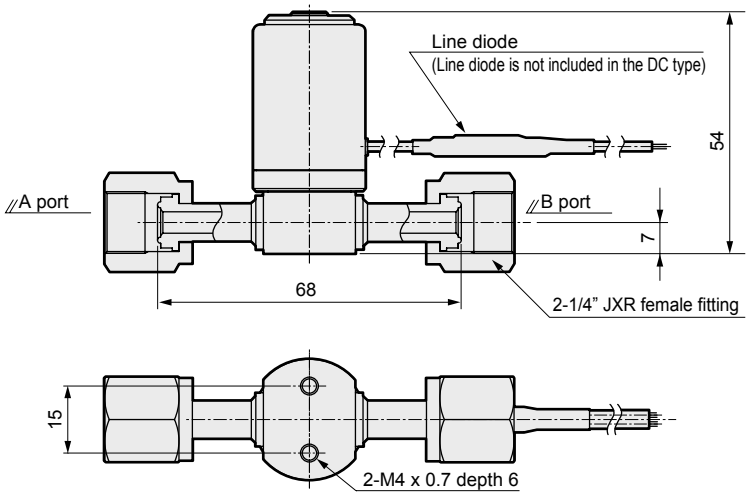
No.	Part name	Material
1	Core assembly	SUS316 SUS405
2	Plunger assembly	SUS405 FKM
3	Coil assembly	
4	Core B	SUM22
5	O-ring	FKM
6	Spring	SUS304
7	Body	SUS303

Dimensions and optional dimensions

● HVB112



● With JXR fitting
HVB112- 8R



Note: Line diode is not included in the DC type.

Solenoid valve for high vacuum

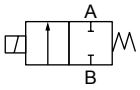
HVB$^{6}_{7}$12 Series

- NC (open when energized)
- Port size: Flange ø48, ø52

RoHS

JIS symbol

- NC (open when energized)



Specifications

Model No.		HVB612-12F			HVB712-15F			
Item		-8B	-8H	-12B	-12B	-12H	-15B	-15H
Working fluid		Vacuum and inert gas (*1)						
Working pressure	Pa(abs)	1.3×10^{-6} to 2.0×10^{5}	1.3×10^{-6} to 3.0×10^{5}	1.3×10^{-6} to 1.0×10^{5}	1.3×10^{-6} to 1.5×10^{5}	1.3×10^{-6} to 3.0×10^{5}	1.3×10^{-6} to 1.0×10^{5}	1.3×10^{-6} to 1.0×10^{5}
Max. working pressure differential	MPa	0.2	0.3	0.1	0.15	0.3	0.1	0.1
Orifice size	mm	8		12	12		15	
Cv	Straight	1.8		2.7	3.2		4.3	
	L direction	2.1		3.2	3.6		4.7	
Back pressure (*2)	MPa	0.1		0.02	0.1		0.02	0.1
Valve seat leakage	$Pa\cdot m^3/s$ (He)	1.0×10^{-9} or less						
External leakage	$Pa\cdot m^3/s$ (He)	1.0×10^{-9} or less						
Proof pressure	MPa	0.5 (≈73 psi, 5 bar)						
Fluid temperature	°C	5 (41°F) to 55 (131°F)						
Ambient temperature	°C	0 (32°F) to 55 (131°F)						
Frequency	times/min. or less	10						
Mounting orientation		Unrestricted						
Port size		ø48 flange			ø52 flange			
Weight	kg	1.15			2.0			
Electrical specifications								
Rated voltage		100/200 VAC (50/60 Hz), 24 VDC						
Voltage fluctuation range		Rated voltage ±10%						
Power consumption	W	14.3	28	14.3	19	AC:32.5 DC:40	19	AC:32.5 DC:40
Thermal class		B	H	B	B	H	B	H
Temperature rise	K	75	125	75	75	125	75	125

*1 : The number of durability times may decrease sharply depending on the degree of dryness.
*2 : Atmospheric pressure at port B that can be applied from port A.
(Reverse vacuum is not possible with HVB612-12F-12B and HVB712-15F-15B.)
*3 : Grease for high vacuum is used on the O-rings of gas contacting parts.
*4 : The working pressure vacuum does not guarantee the vacuum attainment time or that the vacuum will not change.
*5 : FKM is used for sealant material, so consider the generation of discharge gas during use.

How to order

HVB 6 12 - 12F - 8 B - 3N - AC100V

Model No.

Ⓐ Series

Ⓑ Connection

Ⓒ Orifice size

Ⓓ Thermal class *1

Ⓔ Option *2

Ⓕ Voltage *3

Code	Description	Model No. HVB612	Model No. HVB712
Ⓐ Series size			
6	60 mm	●	
7	70 mm		●
Ⓑ Connection			
12F	Flange ø48	●	
15F	Flange ø52		●
Ⓒ Orifice size			
8	ø8	●	
12	ø12	●	●
15	ø15		●
Ⓓ Thermal class			
B	Class 130 (B)	●	●
H	Class 180 (H)	●	●
Ⓔ Option			
Blank	None	●	●
3M	HP terminal box G1/2	●	●
3N	HP terminal box with lamp G1/2	●	●
F	With companion flange	●	●
3MF	HP terminal box G1/2 + companion flange	●	●
3NF	HP terminal box with lamp G1/2 + Companion flange	●	●
Ⓕ Voltage			
AC100V	100 VAC (50/60 Hz) with full-wave rectifier	●	●
AC200V	200 VAC (50/60 Hz) with full-wave rectifier	●	●
DC24V	24 VDC	●	●

[Example of model No.]

HVB612-12F-8B-3N-AC100V

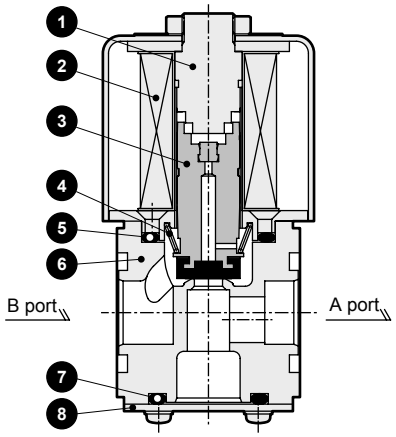
Model: HVB612

Ⓐ Series : 60 mm
Ⓑ Connection : Flange ø48
Ⓒ Orifice size : ø8
Ⓓ Thermal class : Class 130 (B)
Ⓔ Option : HP terminal box with light G1/2
Ⓕ Voltage : 100 VAC (50/60 Hz)

⚠ Precautions for model No. selection

*1 : For Item Ⓓ H, HVB612 with orifice size ø12 is not available.
*2 : For 3M/3N/3MF/3NF of Item Ⓔ with H selected for Item Ⓓ, AC voltage type is not available.
*3 : Surge suppressor is included as standard in the models with full-wave rectifier.

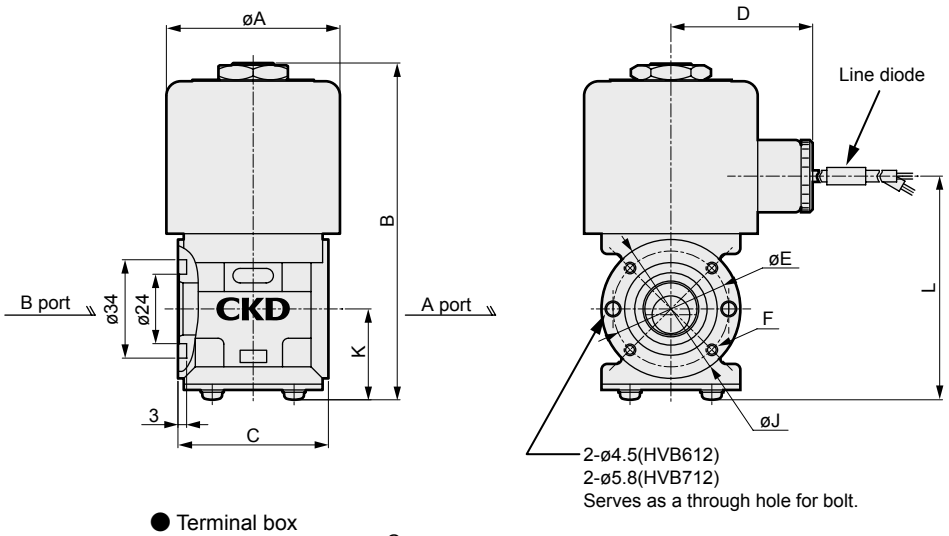
Internal structure and parts list



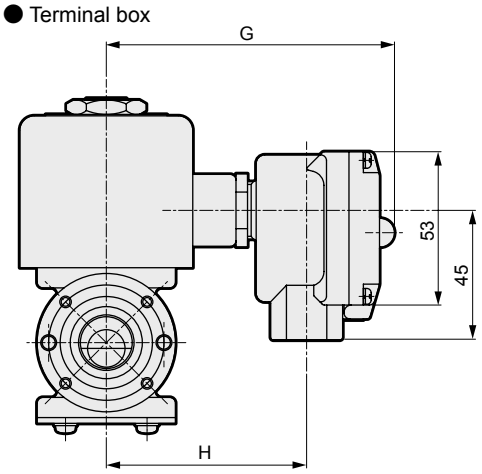
No.	Part name	Material
1	Core assembly	SUS405, SUS316, SUS403
2	Coil assembly	
3	Plunger assembly	SUS405, FKM, PFA, PET
4	Spring	SUS304
5	O-ring	FKM
6	Body	SCS13
7	O-ring	FKM
8	Bottom cover	SUS304

Dimensions and optional dimensions

● HVB$^{6}_{7}$12



● Terminal box

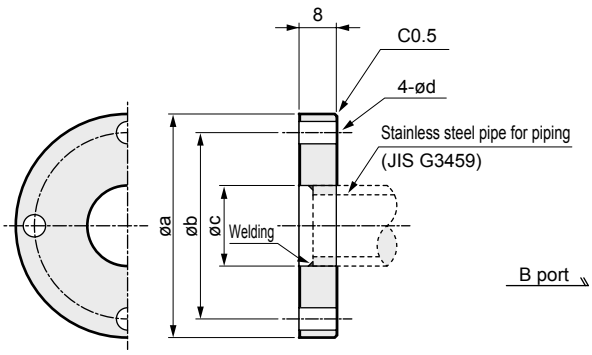


Model No.	Dimensions										
	A	B	C	D	E	F	G	H	J	K	L
HVB612	60	117	52	49	40	4-M4	101	70	48	32	77
HVB712	70	145	55	54	42.4	4-M5	106	75	52	33	107

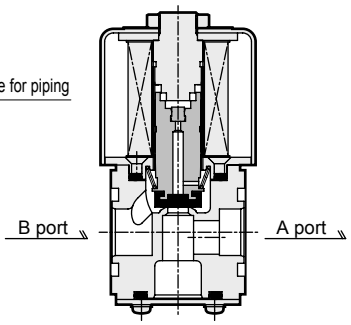
Note: The line diode is enclosed only with the AC of thermal class H. Therefore, a terminal box cannot be assembled with this series.
Note: Mounting bolts and O-rings are attached when the companion flange is ordered.

Dimensions

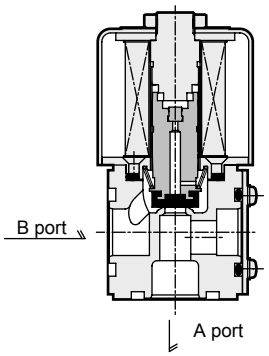
● Companion flange dimensions



● Straight piping



● Radial piping



Companion flange dimensions

Model No.	Companion flange dimensions				Mounting bolt	O-ring
	a	b	c	d		
HVB612	48	40±0.2	17.3 +0.5 0	4.8	M4-14	JIS B2401 V-24
HVB712	52	42.4±0.2	21.7 +0.5 0	5.8	M5-14	

* Mounting bolts and O-rings are attached when the companion flange is ordered.

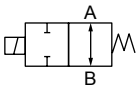
Delay vacuum solenoid valve

HVL12 Series

● Off-delay function solenoid valve

RoHS

JIS symbol



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			HVL12
Working fluid			Air, nitrogen (*1)
Working pressure	Pa(abs)		1.3×10^{-6} to 2.0×10^{5}
Max. working pressure differential	MPa		0.2 (≈29 psi, 2 bar)
Valve seat leakage	Pa·m³/s (He)		1.3×10^{-9} or less
External leakage	Pa·m³/s (He)		1.3×10^{-9} or less
Proof pressure	MPa		0.5 (≈73 psi, 5 bar)
Fluid temperature	°C		5 (41°F) to 50 (122°F)
Ambient temperature	°C		0 (32°F) to 50 (122°F)
Orifice size	mm		1.2
Mounting orientation			Unrestricted
Weight	kg	AC	0.5
(*2)		DC	0.2
Frequency			0.5 times/min. or less
Port size			Rc1/8, 1/4" double barbed fitting, NW10.16 vacuum clamp fitting
Cv			0.05
Max. set delay time			AC: 8 sec, DC: 10 sec (±35%)
Rated voltage			24 VDC, 100 VAC, 200 VAC
Voltage fluctuation range			Rated voltage ±10%
Power consumption	W		4

*1 : Durability may decrease sharply depending on the degree of dryness.
*2 : Weight shown in the table is for port size Rc1/8.
*3 : Do not handle by the lead wire only.
*4 : Always use the M4 screws on the bottom of the case when mounting.
*5 : Do not fix the valve by the port piping only.
Use the valve in a place where vibration does not affect the performance.
*6 : The DC type has polarity. Connect the red lead wire to the plus (+) side and the black to the minus (-) side.

How to order

HVL 1 2 - 4S 6 - 5 - AC100V

- HVL — Model No.
- 4S — Ⓐ Port A connection *1
- 6 — Ⓑ Port B connection *1
- 5 — Ⓒ Voltage
- AC100V — Voltage

Ⓐ Port A connection *1	
6	Rc1/8
4S	1/4" double barbed fitting
10K	NW10 vacuum clamp fitting
16K	NW16 vacuum clamp fitting

Ⓑ Port B connection *1	
6	Rc1/8

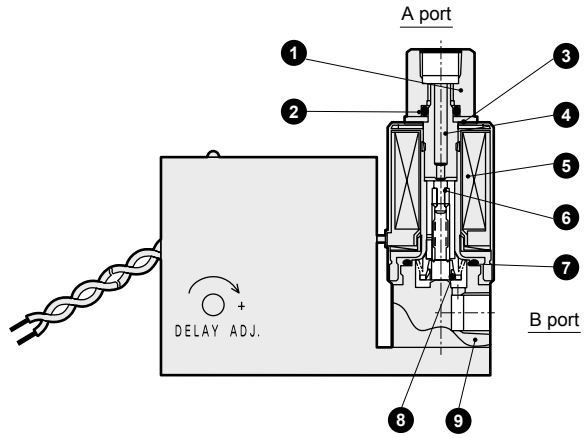
Ⓒ Voltage	
DC24V	24 VDC
AC100V	100 VAC
AC200V	200 VAC

⚠ Precautions for model No. selection

*1: If you order the same model No. of ports A and B, specify only a single model No.
Example: When ports A and B are both Rc1/8
HVL12-6-5-voltage (correct)
HVL12-66-5-voltage (wrong)

Internal structure and parts list

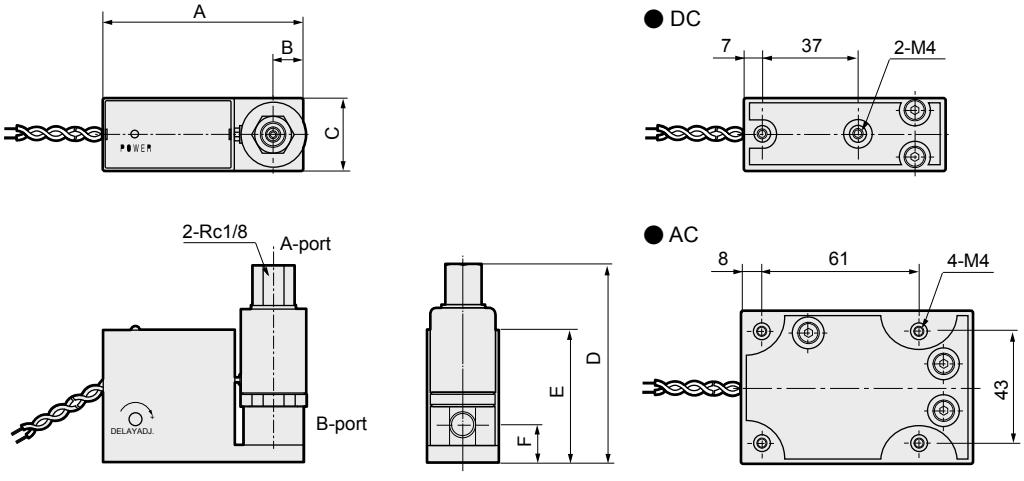
● HVL12-6-5



No.	Part name	Material
1	Socket	SUS303
2	O-ring	FKM
3	Washer	SUS304
4	Core assembly	SUS316L, SUS405
5	Coil assembly	PBT
6	Plunger assembly	SUS405, FKM, PTFE
7	O-ring	FKM
8	Spring	SUS304
9	Body	SUS303

Dimensions

● HVL12-6-5

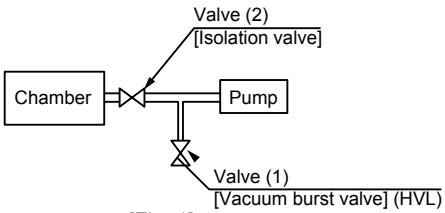


Model No. \ Code	A	B	C	D	E	F
HVL12-DC24V	78	11.5	28	76	51	14.5
HVL12-AC100, 200V	90	11.5	59	76	62	14.5

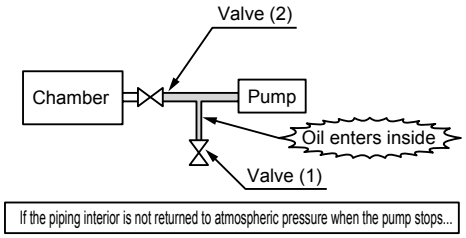
Main applications

Intended use of delay vacuum solenoid valve (HVL Series)

Preventing entry of oil in case of power failure



[Fig. 1]

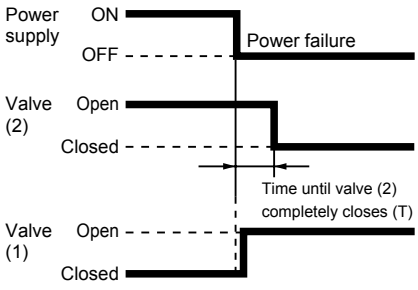


[Fig. 2]

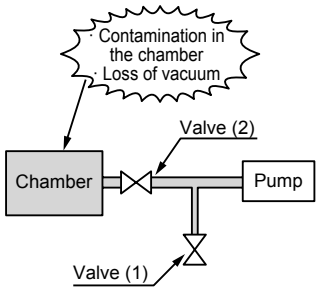
Normally, after the machine has stopped, the pipe between the chamber and pump is released to atmospheric pressure with valve (1) to prevent the oil from rising (from entering the pipes). However, to protect the chamber (to maintain vacuum and prevent contamination), it is necessary to release the pipe to atmospheric pressure after the valve (2) has completely closed.

If valve (1) opens before valve (2) completely closes...

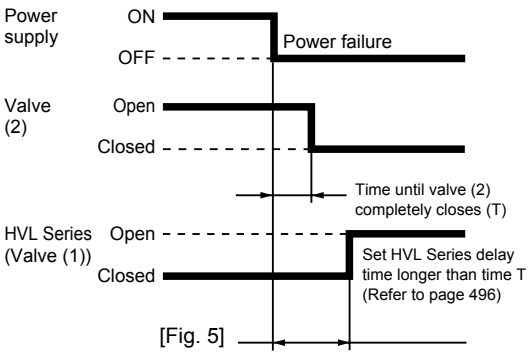
Prevent oil rising and protect the chamber with the HVL Series!!



[Fig. 3]



[Fig. 4]



[Fig. 5]

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Solenoid valve for high vacuum (HVB/HVL)

Design/selection

⚠ CAUTION

1 Working fluids

· The high vacuum device is designed for controlling gases (inert gas, air, vacuum). If other fluids (active gas, fluids, solids, etc.) pass through, the product may fail to operate normally or may display decreased performance.

Mounting, installation and adjustment

⚠ WARNING

1 Mounting

· Incorrect mounting and piping will result in product trouble, may cause trouble in the user's system, and may result in death or serious injury. The user is responsible for making sure that the operator has read the instruction manual and fully comprehends the system.

After mounting, carry out an appropriate function test to confirm that the product is correctly mounted.

⚠ CAUTION

1 Direction when connecting pipes (some models)

· The vacuum valve is basically designed so that all connection ports can be connected to the vacuum pump. However, with some models (see below), the connection port to the vacuum pump is limited to one direction.

[Table 1] Models with designated vacuum pump connection ports

Model	Vacuum pump connection port
HVB612-12F-12B	A port
HVB712-15F-15B	A port

When using a port other than the designated port when connecting to the vacuum pump with the models in the table above, trouble such as seal failure or operation failure could result.

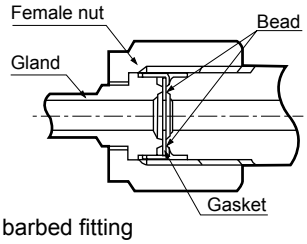
2 Tightening the fitting

· Make sure that there is no dirt, scratches or burrs on the seal section before tightening the fitting with the following procedures.

(1) Fitting tightening method

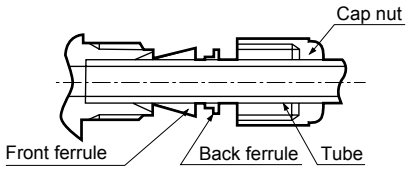
● JXR fitting (when the gasket material is nickel/SUS316)

Tighten the nut by hand until the gasket contacts the bead surface, and then tighten another 1/8 turn with a tool. (Consult with CKD for all other materials.)



● Double barbed fitting

Confirm that the front ferrule, back ferrule and nuts are properly attached, and then insert the tube until it contacts the back of the body. Tighten the nuts as far as possible by hand, and then tighten 1 1/4 turn with a tool.



(2) After tightening the fitting, always carry out a leak test, and confirm that there are no leaks.

3 High temperature caution during solenoid valve coil energizing

· The coil section of the solenoid valve (HVB/HVL) heats up when energized. In particular, the class H specification coil (some HVB models) will become very hot when energized. There is a risk of burns if these coils are touched directly.

4 Cautions for wiring the solenoid valve

(1) As a guide, use a wire with a nominal cross section of 0.5 mm^2 or more. Make sure that excessive force is not applied to the lead wire.

(2) Use within the allowable voltage range. Usage outside the allowable voltage range may lead to operation faults or coil damage.

(3) Provide a circuit breaker, such as a fuse, on the control circuit to protect the electrical equipment.

(4) Use of a switching circuit which does not generate contact chattering will increase the solenoid valve's durability.

(5) If the electric circuit system is susceptible to solenoid surges, provide measures such as inserting a surge absorber in parallel to the solenoid.

When using the product

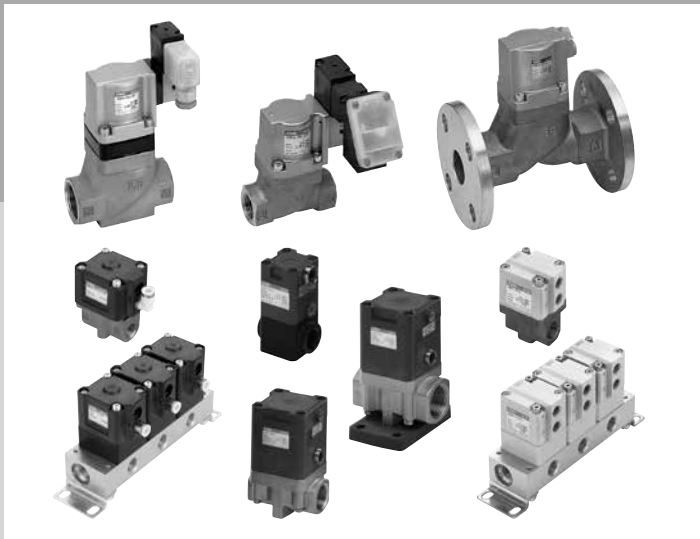
⚠ CAUTION

1 Electric shock risk: Solenoid valve electrical wiring (bare, live parts)

· There is a risk of electric shock due to touching the electrical wiring connections (bare, live parts) of the solenoid valve (HVB/HVL).
Always turn the power OFF before disassembly and inspection. Never touch the live parts with wet hands.

SAB/SVB/NAB
LAD/NAD
(Cylinder valve)
Air operated 2-port valve

■ **For water/air/gas/low vacuum/steam**



Overview

In addition to water, air, gas, low vacuum and steam, high viscosity fluids and powder mixed fluids are also available.

Using external pilot air, this is a cylinder-actuated air-operated valve. Air operated SAB, solenoid valve mounted SVB, compact NAB and manifold GNAB Series are available in the series to meet various fluid control needs.

Features

Wide variation

A wide range of variations from Rc1/4 to 80 flange are available for various bore sizes.

Also suitable for explosive atmospheres

Options selectable

3 types: NC, NO and double acting are available.

External pilot air operated cylinder actuation guarantees reliable actuation.

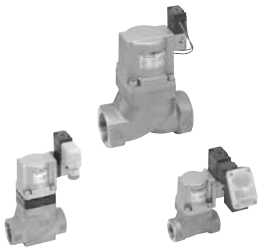
CONTENTS

⚠ Always read the precautions in the Introduction and on page 566 before use.

Series variation

Air operated 2-port valve (cylinder valve)

● Cylinder valve

Classification		Model	No. of ports	Actuation			Rc1/4	Rc3/8	Rc1/2	
				NC	NO	Double acting				
Cylinder valve	Air operated 	For water/liquids **SAB*W**	2-port	●	●	●	●	●	●	
		For air/gas **SAB*A**		●	●	●	●	●	●	
		For low vacuum **SAB*V**		●	●	●	●	●	●	
		For steam/water/air **SAB*S**		●	●	●	●	●	●	
	With solenoid valve 	For water/liquids **SVB*W**		●	●		●	●	●	
		For air/gas **SVB*A**		●	●		●	●	●	
		For low vacuum **SVB*V**		●	●		●	●	●	
		For steam/water/air **SVB*S**		●	●		●	●	●	
Compact cylinder valve	Air operated 	General purpose **NAB***		●	●	●	●	●		
		For low vacuum **NAB*V**		●	●	●	●	●		
	Air operated manifold 	General purpose **GNAB***		●	●	●	A port ●	C port ●		
		For low vacuum **GNAB*V**		●	●	●	A port ●	C port ●		

● Diaphragm cylinder valve

Series	Model No.	Working pressure		Actuation			Orifice size			
		Low vacuum	Positive pressure	NC	NO	Double acting	ø7	ø8	ø12	ø20
Diaphragm 	**LAD*-10A**		●	●	●	●		●		
	LAD*-15A		●	●	●	●			●	
	LAD*-20A		●	●	●	●				●
	LAD*-25A		●	●	●	●				●
Diaphragm single unit 	**NAD*-10**		●	●	●	●	●			
	NAD*V-10	●	●	●	●	●	●			
Diaphragm manifold 	**GNAD*-10**		●	●	●	●	●			
	GNAD*V-10	●	●	●	●	●	●			

* Female thread is available in G thread and NPT thread. Note that compact cylinder valves are made-to-order products.

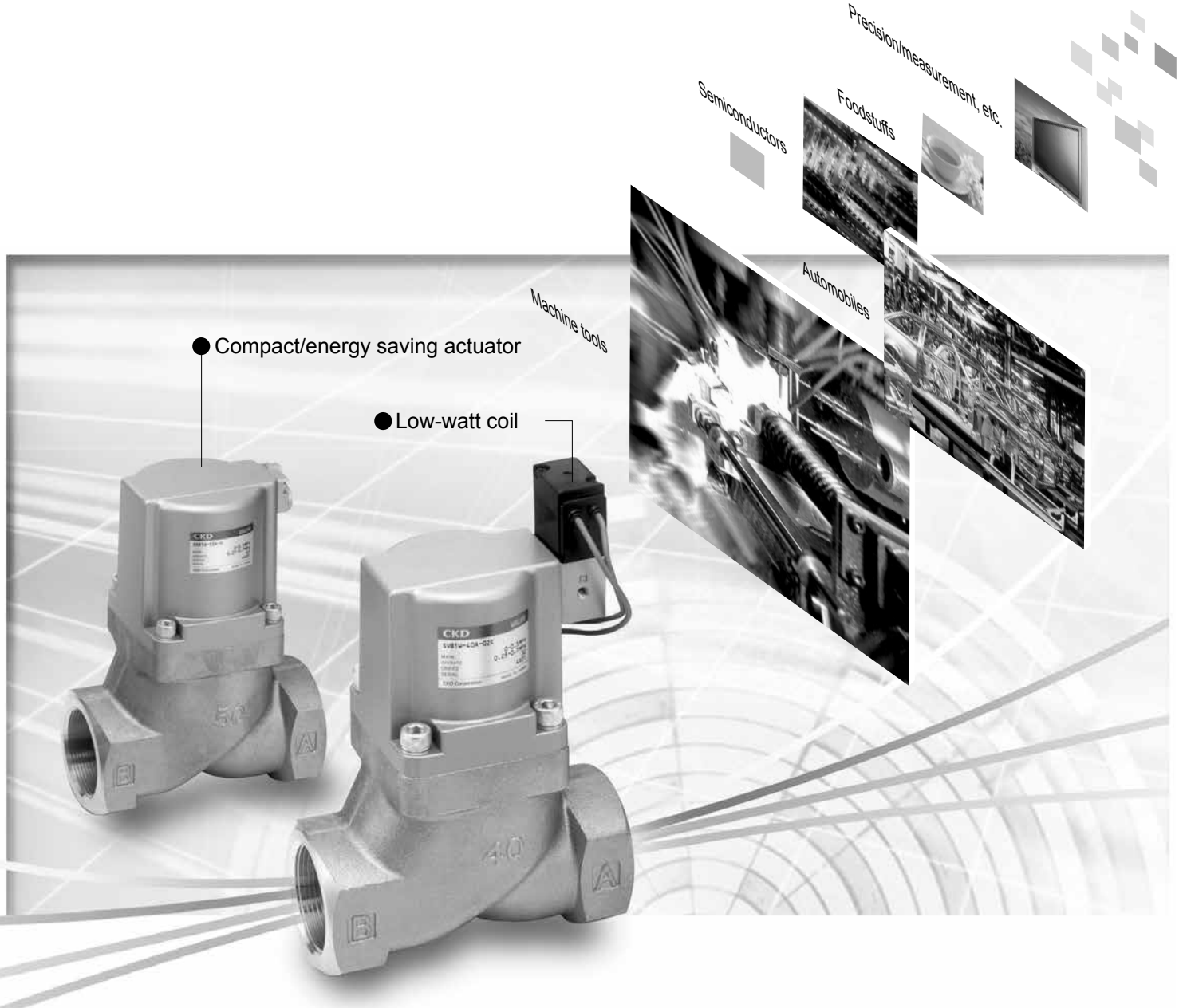
Port size											Page
	Rc3/4	Rc1	Rc1 1/4	32 Flange	Rc1 1/2	40 Flange	Rc2	50 Flange	65 Flange	80 Flange	
	●	●	●	●	●	●	●	●	●	●	506
	●	●	●	●	●	●	●	●	●	●	510
	●	●	●	●	●	●	●	●			514
	●	●	●	●	●	●	●	●			518
	●	●	●	●	●	●	●	●	●	●	522
	●	●	●	●	●	●	●	●	●	●	530
	●	●	●	●	●	●	●	●			534
	●	●	●	●	●	●	●	●			538
											544
											544
											548
											548

Port size					Diaphragm material		Body material				Sub-plate		Page
	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	EPDM	PTFE	PPS	SCS13	SUS303	PP	SUS303	A6063	
		●				●	●	●	●					556
			●			●	●	●	●					
				●		●	●	●	●					
					●	●	●	●	●					
		●				●			●					560
		●				●			●					
	A port ●	C port ●				●				●	●	●	●	562
	A port ●	C port ●				●				●	●	●	●	

Note: G thread and NPT thread are made-to-order products. Contact CKD for details.

Control of multi-type fluids.

Energy efficient and compact. SAB/SVB Series



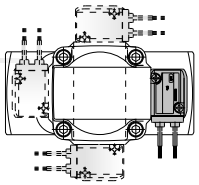
Reliable and resistant against foreign matter. Can be used with a wide variety of fluids.

In addition to water, air, gas, low vacuum and steam, high viscosity fluids and powder mixed fluids can be used, supporting a wide range of applications and areas.

SAB·SVB Series

Air operated 2-port valve

Allows flexible installation of actuator



Can be rearranged in 4 directions.

Safe and reliable operation

External pilot air operated cylinder actuation.
Accurate and resistant against foreign matter, it is a highly reliable product.
Can be used safely and securely.

Suitable for explosive atmosphere

With its completely air operated structure, SAB can be used even in a flammable atmosphere.

A variety of choices

Available in 2 types of body material (copper alloy/ stainless steel) and 4 types of sealing material (nitrile rubber/fluoro rubber/ethylene propylene rubber/ tetrafluoroethylene resin), according to the working fluid. Furthermore, the series offers 13 types of bore size and 3 types of actuation, as well as with solenoid valve for cylinder drive. The ideal model can be selected from the extensive lineup.

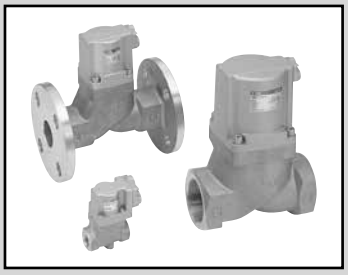
Steam valves with solenoid valves are available

New series of air operated for steam and solenoid valve mounted have been introduced. In particular, advanced technology has enabled commercialization of the first solenoid valve mounted by adopting heat-resistant and insulating materials.

SAB/SVB Series variation

Model	Applicable fluid	Port size									
		8A	10A	15A	20A	25A	32A/F	40A/F	50A/F	65F	80F
2-port valve											
SAB/SVB*W	For water/ liquids	●	●	●	●	●	●	●	●	●	●
SAB/SVB*A	For air/ gas	●	●	●	●	●	●	●	●	●	●
SAB/SVB*V	For low vacuum	●	●	●	●	●	●	●	●		
SAB/SVB*S	For steam	●	●	●	●	●	●	●	●		

* Female thread is available in G thread and NPT thread.



Air operated 2-port valve
(cylinder valve)

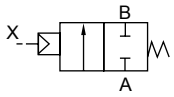
SAB*W Series

- NC, NO, double acting
- Port size: Rc1/4 to Rc2, 32 to 80 flange
- Working fluids: Water, non-corrosive liquid

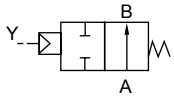
RoHS CAD

JIS symbol

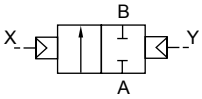
● NC



● NO



● Double acting



Common specifications

1 MPa = 10 bar

Item	SAB1W	SAB2W	SAB3W
Actuation	NC	NO	Double acting
Working fluid	Water/non-corrosive liquid (*1)		
Fluid viscosity mm²/s	500 or less		
Working pressure MPa	0 (≈0 psi) to 0.7 (≈100 psi)(*2)	0 (≈0 psi, 0 bar) to 1 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)		
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing) (*3)		
Ambient temperature °C	-10 (14°F) to 60 (140°F)		
Valve seat leakage cm³/min	0 (water pressure)		
Mounting orientation	Unrestricted		
Pilot fluid	Air		
Water hammer value MPa	1 (≈150 psi, 10 bar) or less (according to the Water Supply Act)		

*1 : Refer to the working fluid check list on Intro Page 39.
*2 : Note that this differs with the type, so refer to the working pressure in the individual specifications.
*3 : -10 to 90°C for fluoro rubber seal (FKM).

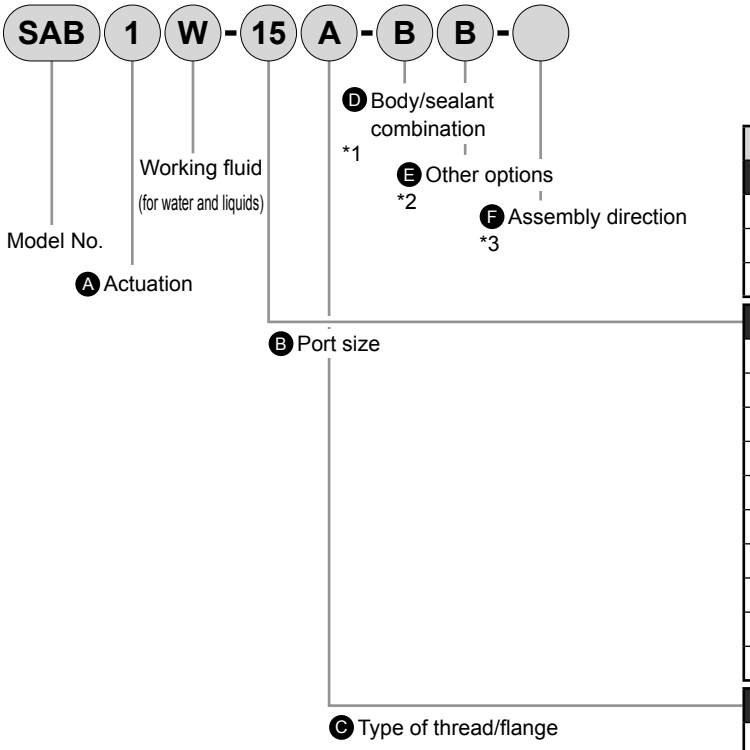
Individual specifications

1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Cv	Working pressure (MPa)			Pilot pressure (MPa)			Pilot port size	Weight (kg)		
				NC	NO	Double acting	NC	NO	Double acting		NC	NO	Double acting
SAB*W-8A	Rc 1/4	10	2.3	0 (≈0 psi) to 0.7 (≈100 psi)	0 (≈0 psi) to 1 (≈150 psi)		0.35 (≈51 psi) to 0.7 (≈100 psi)	(*1)		Rc1/8	0.3		
SAB*W-10A	Rc 3/8	10	2.6								0.3		
SAB*W-15A	Rc 1/2	15	5.6								0.6		
SAB*W-20A	Rc 3/4	16	8								0.8		
SAB*W-25A	Rc 1	20	12								1.1		
SAB*W-32A	Rc 1¼	26	20	0 (≈0 psi) to 0.5 (≈73 psi)	0 (≈0 psi) to 1 (≈150 psi)		0.25 (≈36 psi) to 0.7 (≈100 psi)	(*1)			2.3	2.2	2.2
SAB*W-32F	32 flange	26	20								5.3	5.2	5.2
SAB*W-40A	Rc 1½	32	32								3.4	3.2	3.2
SAB*W-40F	40 flange	32	32								6.5	6.3	6.3
SAB*W-50A	Rc 2	42	50								5.5	5.2	5
SAB*W-50F	50 flange	42	50								9.4	9.1	8.9
SAB*W-65F(*2)	65 flange	65	70								20.5	19	18
SAB*W-80F(*2)	80 flange	79	100								25	23	22

*1 : Refer to page 568 for the pilot air pressure for the NO and double acting.
*2 : Port sizes 65 flange/80 flange are made-to-order products.
*3 : Female thread is available in G thread and NPT thread.

How to order



Code	Description
Ⓐ Actuation	
1	NC
2	NO
3	Double acting
Ⓑ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
32	1 1/4, 32 (Flange)
40	1 1/2, 40 (Flange)
50	2, 50 (Flange)
65	65 (Flange) (made-to-order product)
80	80 (Flange) (made-to-order product)
Ⓒ Type of thread/flange	
A	Rc(8A to 50A)
F	Flange (32F to 80F)
G	G(8G to 50G)
N	NPT(8N to 50N)

Ⓓ Body/sealant combination

		Body	Seal
0	Standard	Bronze	Nitrile rubber
B	Option	Bronze	Fluoro rubber
P		Bronze	Ethylene propylene rubber
D		Stainless steel	Nitrile rubber
E		Stainless steel	Fluoro rubber
R		Stainless steel	Ethylene propylene rubber

Ⓔ Other options	
Blank	No option
B	Mounting plate *2
Ⓕ Assembly direction	
Blank	No option
R	Mounting plate assembly position reversed

Refer to the figure below for the layout drawing.

⚠ Precautions for model No. selection

*1 : The body/sealant combination code is O or B for port size 65F and 80F. Note that the body is made of cast iron.
*2 : The mounting plate (Item Ⓔ B) is available only for port size 8 to 32.
*3 : Reversed mounting plate (Item Ⓕ B-R) is available for port size 15 to 32.
*4 : Clockwise when viewed from above with the port A on the right.

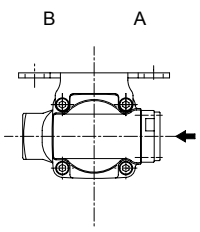
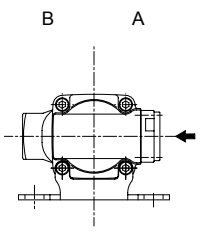
[Example of model No.]

SAB1W-15A-BB

Model: SAB

Ⓐ Actuation : NC
Ⓑ Port size : 1/2
Ⓒ Type of thread/flange : Rc
Ⓓ Body/sealant combination : Body - bronze, sealant - fluoro rubber
Ⓔ Other options : With mounting plate
Ⓕ Assembly direction : No option

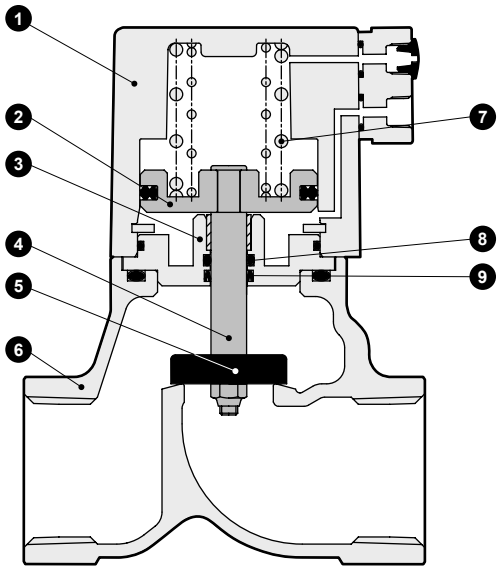
Item Ⓕ Assembly direction

SAB [Air operated] *2/4		
Code	B (with mounting plate)	B-R *3
Direction	No rotation	Mounting plate reversed
Layout		

⬅ shows pilot port IN.

Internal structure and parts list

● SAB1W

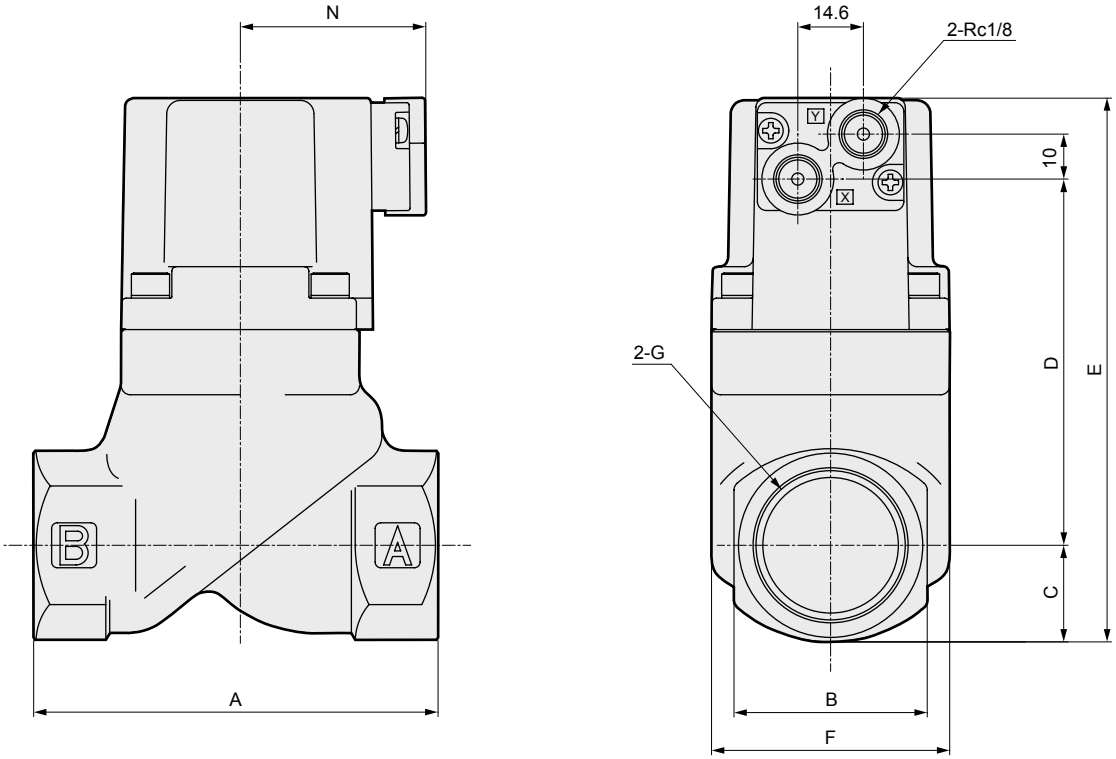


No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	C3604(SUS304)	Copper alloy (stainless steel)
4	Piston rod	SUS304	Stainless steel
5	Main valving element	NBR(FKM, EPDM) SUS304	Nitrile rubber (fluoro rubber, ethylene propylene rubber) stainless steel
6	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
7	Spring	SWP	Piano wire
8	O-ring	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)
9	MY packing	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)

*1 : ( ) shows options.
*2 : For 65F and 80F, the body is FC250 (cast iron), and the main valving element material is FKM.

Dimensions CAD

● SAB*W-8* to 50* (female thread)

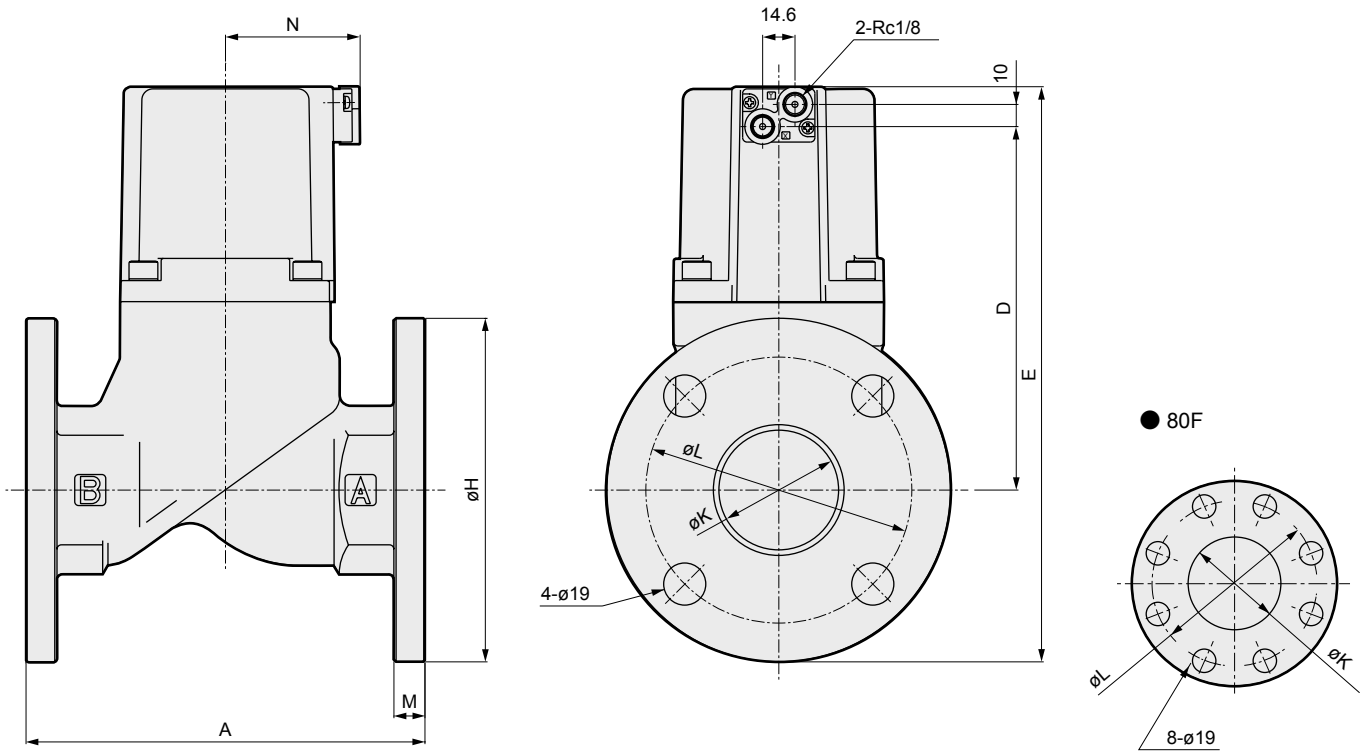


Model No.	A	B	C	D	E	F	G	N
SAB*W-8A/G/N	50	24	12	41.5	71.5	32	Rc1/4 / G1/4 / 1/4-18NPT	37(42)
SAB*W-10A/G/N							Rc3/8 / G3/8 / 3/8-18NPT	
SAB*W-15A/G/N	71	28	14.5	61.5	94	43	Rc1/2 / G1/2 / 1/2-14NPT	38(43)
SAB*W-20A/G/N	80	35	17.5	71	106.5	43	Rc3/4 / G3/4 / 3/4-14NPT	38(43)
SAB*W-25A/G/N	90	43	21	81.5	120.5	53	Rc1/G1/1-11.5NPT	41.5(46.5)
SAB*W-32A/G/N	125	55	27.5	109.5	155	63	Rc1 1/4 / G1 1/4 / 1 1/4-11.5 NPT	46(51)
SAB*W-40A/G/N	140	61	30.5	130.5	179	77	Rc1 1/2 / G1 1/2 / 1 1/2-11.5 NPT	53(58)
SAB*W-50A/G/N	160	76	38	164	220	95	Rc2/G2/2-11.5NPT	61(66)

*1: ( ) shows values for G thread.

Dimensions

● SAB*W-32F to 80F (flange)

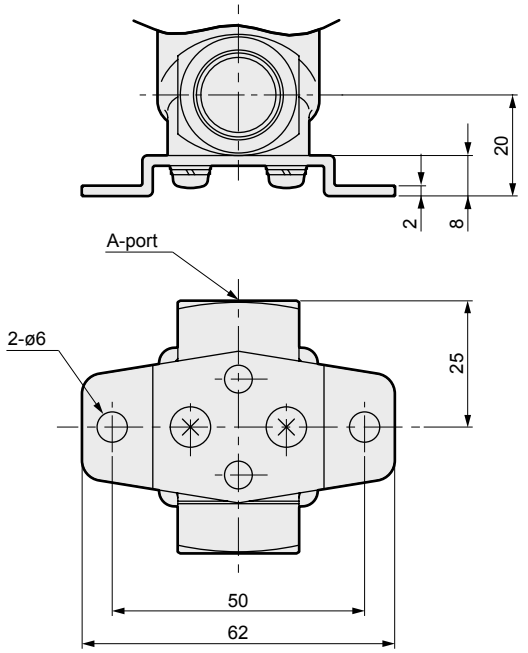


Model No.	A	D	E	H	K	L	M	N
SAB*W-32F	170	109.5	195	135	36	100	12	46
SAB*W-40F	180	130.5	218.5	140	42	105	12	53
SAB*W-50F	180	164	259.5	155	54	120	14	61
SAB*W-65F	210	199	347.5	175	68	140	16	101
SAB*W-80F	240	214	367.5	185	82	150	16	111

Optional dimensions

● Mounting plate
SAB*W-8*/10*-* B

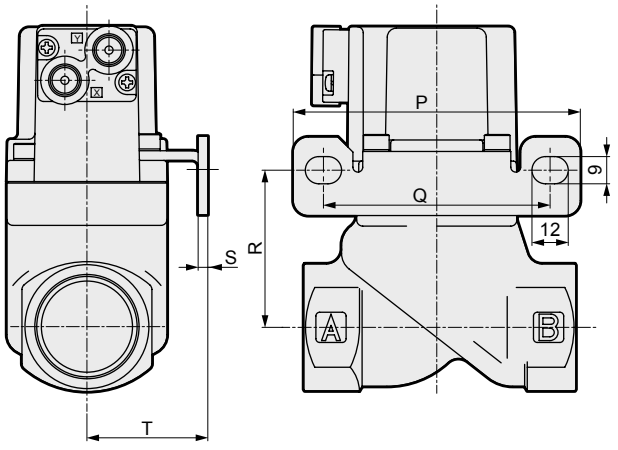
Material: Steel
Zinc plated



* Use the body mounting screws if fixing without a mounting plate.
(Thread size: M4 depth 8 pitch 19)

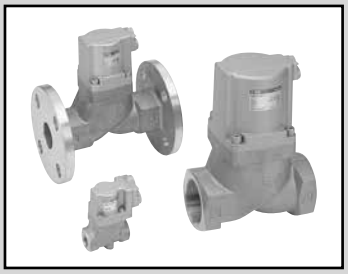
● Mounting plate
SAB*W-15* to 32*-* B / B-R

Material: Steel
Zinc plated



* The figure shows B.

Model No.	P	Q	R	S	T
SAB*W-15A/G/N	90	70	39	2.3	30
SAB*W-20A/G/N	90	70	48.5	2.3	30
SAB*W-25A/G/N	95	75	52	3.2	40
SAB*W-32A/G/N	105	85	66.5	3.2	45



Air operated 2-port valve
(cylinder valve)

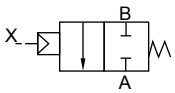
SAB*A Series

- NC, NO, double acting
- Port size: Rc1/4 to Rc2 32 to 80 flange
- Working fluid: Air, gas

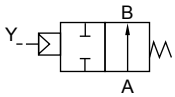
RoHS CAD

JIS symbol

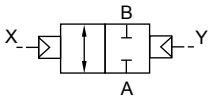
● NC



● NO



● Double acting



Common specifications

1 MPa = 10 bar

Item	SAB1A	SAB2A	SAB3A
Actuation	NC	NO	Double acting
Working fluid	Air/gas (*1)		
Working pressure MPa	0 (≈0 psi) to 0.9 (≈130 psi)	0 (≈0 psi, 0 bar) to 1 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)		
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing) (*2)		
Ambient temperature °C	-10 (14°F) to 60 (140°F)		
Valve seat leakage cm^3/min	0.12 or less (pneumatic pressure)		
Mounting orientation	Unrestricted		
Pilot fluid	Air		
Pilot pressure MPa	0.35 (≈51 psi) to 0.7 (≈100 psi)	Refer to page 568.	

*1 : Refer to the working fluid check list on Intro Page 39.
*2 : -10 to 90°C for fluoro rubber seal (FKM).

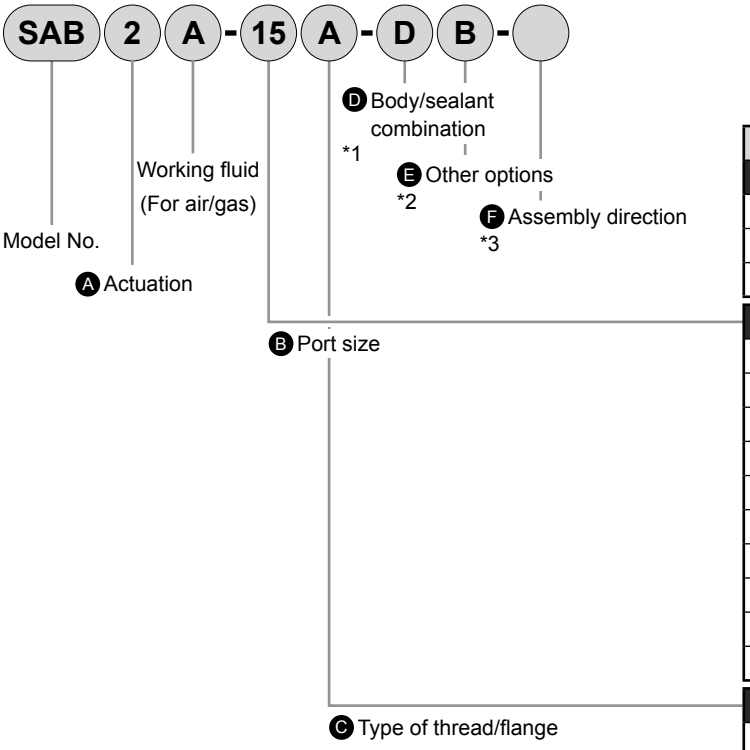
Individual specifications

1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	C [$dm^3/(s \cdot bar)$]	b	S (mm^2)	Allowable back pressure (MPa)	Pilot port size	Weight (kg)
NC								
SAB1A-8A	Rc1/4	10	8.3	0.4	-	0.5 (≈73 psi)	Rc1/8	0.3
SAB1A-10A	Rc3/8	10	11	0.4	-			0.3
SAB1A-15A	Rc1/2	15	-	-	120	0.1 (≈15 psi, 1 bar)		0.6
SAB1A-20A	Rc3/4	16	-	-	150			0.8
SAB1A-25A	Rc1	20	-	-	240			1.1
SAB1A-32A	Rc1 1/4	26	-	-	390			2.2
SAB1A-32F	32 flange	26	-	-	390			5.2
SAB1A-40A	Rc1 1/2	32	-	-	610			3.2
SAB1A-40F	40 flange	32	-	-	610			6.3
SAB1A-50A	Rc2	42	-	-	920			5.2
SAB1A-50F	50 flange	42	-	-	920			9.1
SAB1A-65F(*2)	65 flange	65	-	-	1290			19.5
SAB1A-80F(*2)	80 flange	79	-	-	1840			23.5
NO								
SAB2A-8A	Rc1/4	10	8.9	0.4	-	0.1 (≈15 psi, 1 bar)	Rc1/8	0.3
SAB2A-10A	Rc3/8	10	12	0.3	-			0.3
SAB2A-15A	Rc1/2	15	-	-	140			0.6
SAB2A-20A	Rc3/4	16	-	-	180			0.8
SAB2A-25A	Rc1	20	-	-	280			1.1
SAB2A-32A	Rc1 1/4	26	-	-	450	0.05 (≈7.3 psi, 0.5 bar)		2.2
SAB2A-32F	32 flange	26	-	-	450			5.2
SAB2A-40A	Rc1 1/2	32	-	-	680			3.2
SAB2A-40F	40 flange	32	-	-	680			6.3
SAB2A-50A	Rc2	42	-	-	1020			5.2
SAB2A-50F	50 flange	42	-	-	1020			9.1
SAB2A-65F(*2)	65 flange	65	-	-	1290			19
SAB2A-80F(*2)	80 flange	79	-	-	1840			23
Double acting (*1)								
SAB3A-8A	Rc1/4	10	8.3(8.9)	0.4	-	1 (≈150 psi, 10 bar)	Rc1/8	0.3
SAB3A-10A	Rc3/8	10	11(12)	0.4(0.3)	-			0.3
SAB3A-15A	Rc1/2	15	-	-	120(140)			0.6
SAB3A-20A	Rc3/4	16	-	-	150(180)			0.8
SAB3A-25A	Rc1	20	-	-	240(280)			1.1
SAB3A-32A	Rc1 1/4	26	-	-	390(450)			2.2
SAB3A-32F	32 flange	26	-	-	390(450)			5.2
SAB3A-40A	Rc1 1/2	32	-	-	610(680)			3.2
SAB3A-40F	40 flange	32	-	-	610(680)			6.3
SAB3A-50A	Rc2	42	-	-	920(1020)			5.2
SAB3A-50F	50 flange	42	-	-	920(1020)			9.1
SAB3A-65F(*2)	65 flange	65	-	-	1290			18
SAB3A-80F(*2)	80 flange	79	-	-	1840			22

*1 : ( ) of C, b and S columns of double acting shows the flow rates of when port A is pressurized.
*2 : Port sizes 65 flange/80 flange are made-to-order products.
*3 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*4 : Female thread is available in G thread and NPT thread.

How to order



Code	Description
Ⓐ Actuation	
1	NC
2	NO
3	Double acting
Ⓑ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
32	1 1/4, 32 (Flange)
40	1 1/2, 40 (Flange)
50	2, 50 (Flange)
65	65 (Flange) (made-to-order product)
80	80 (Flange) (made-to-order product)
Ⓒ Type of thread/flange	
A	Rc(8A to 50A)
F	Flange (32F to 80F)
G	G(8G to 50G)
N	NPT(8N to 50N)

Ⓓ Body/sealant combination

		Body	Seal
0	Standard	Bronze	Nitrile rubber
B	Option	Bronze	Fluoro rubber
P		Bronze	Ethylene propylene rubber
D		Stainless steel	Nitrile rubber
E		Stainless steel	Fluoro rubber
R		Stainless steel	Ethylene propylene rubber

Ⓔ Other options	
Blank	No option
B	Mounting plate *2
Ⓕ Assembly direction	
Blank	No option
R	Mounting plate assembly position reversed

Refer to the figure below for the layout drawing.

⚠ Precautions for model No. selection

*1 : The body/sealant combination code is O or B for port size 65F and 80F. Note that the body is made of cast iron.
*2 : The mounting plate (Item Ⓔ B) can be attached to only the female thread of port size 8 to 32.
*3 : Reversed mounting plate (Item Ⓕ B-R) is available for port size 15 to 32.
*4 : Clockwise when viewed from above with the port A on the right.

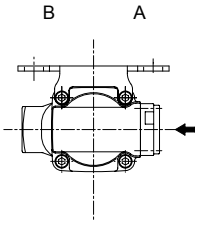
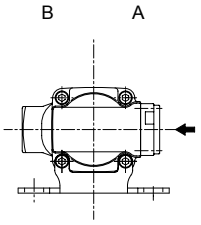
[Example of model No.]

SAB2A-15A-DB

Model: SAB

Ⓐ Actuation : NO
Ⓑ Port size : 1/2
Ⓒ Type of thread/flange : Rc
Ⓓ Body/sealant combination : Body - stainless steel, sealant - nitrile rubber
Ⓔ Other options : With mounting plate
Ⓕ Assembly direction : No option

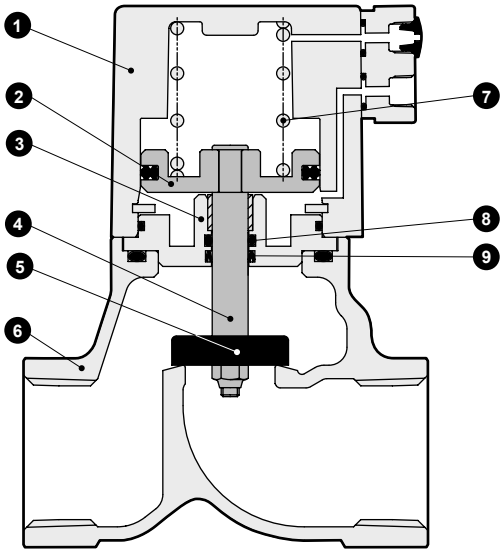
Item Ⓕ Assembly direction

SAB [Air operated] *2/4		
Code	B (with mounting plate)	B-R *3
Direction	No rotation	Mounting plate reversed
Layout		

⬅ shows pilot port IN.

Internal structure and parts list

● SAB1A

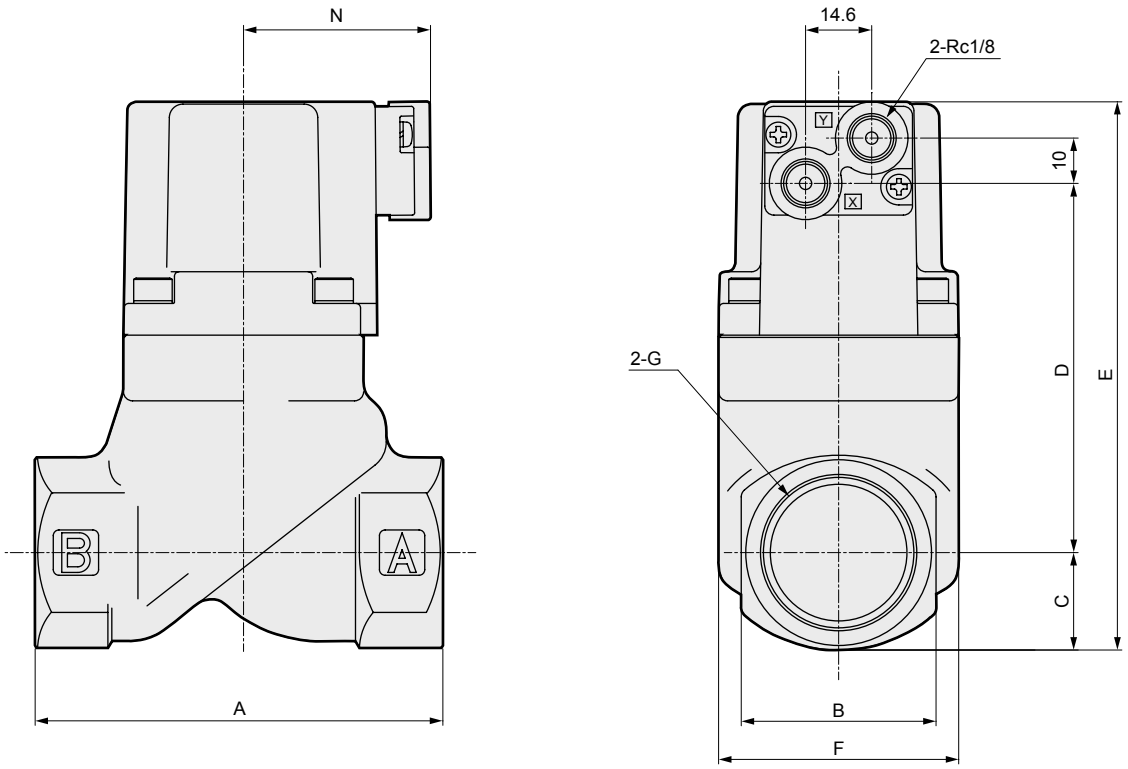


No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	C3604(SUS304)	Copper alloy (stainless steel)
4	Piston rod	SUS304	Stainless steel
5	Main valving element	NBR(FKM, EPDM) SUS304	Nitrile rubber (fluoro rubber, ethylene propylene rubber) stainless steel
6	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
7	Spring	SWP	Piano wire
8	O-ring	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)
9	MY packing	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)

*1 : ( ) shows options.
*2 : For 65F and 80F, the body is FC250 (cast iron), and the main valving element material is FKM.

Dimensions CAD

● SAB*A-8* to 50* (female thread)

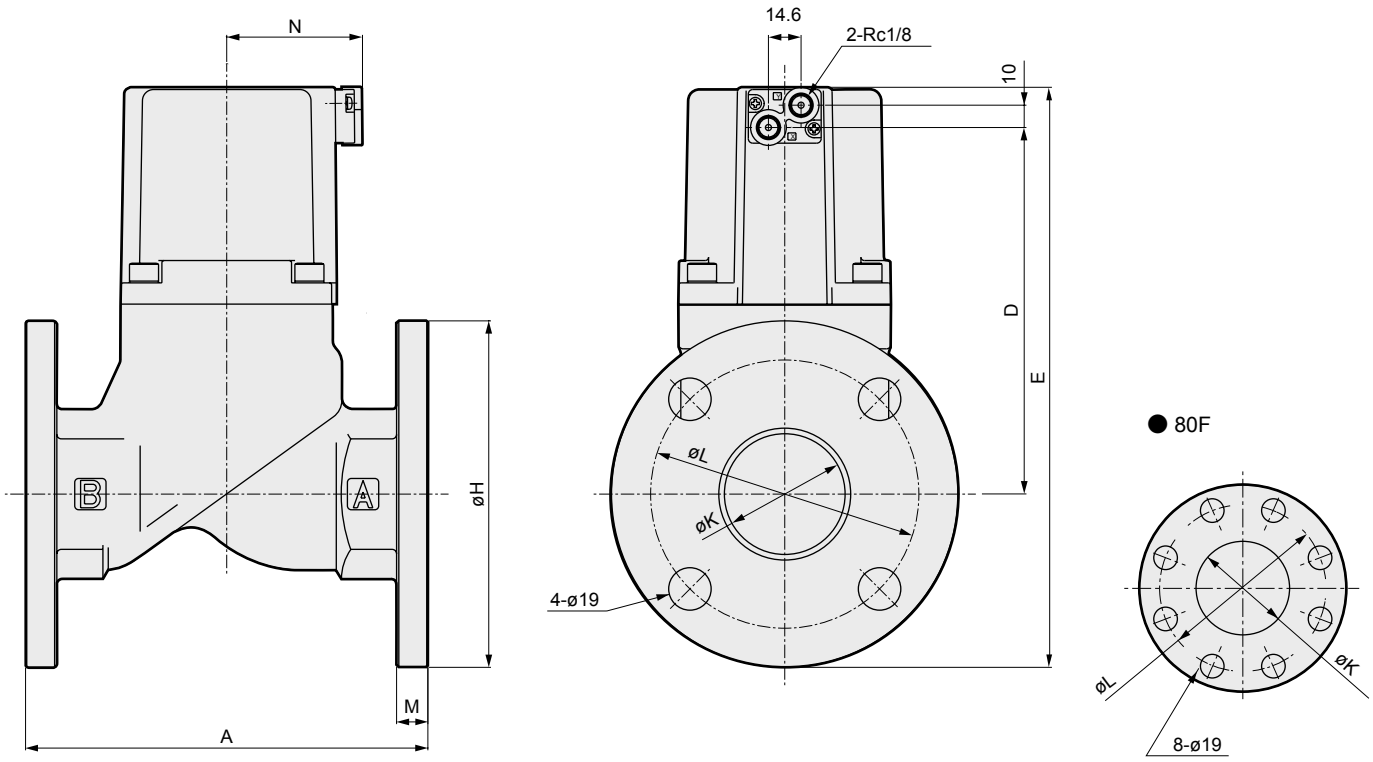


Model No.	A	B	C	D	E	F	G	N
SAB*A-8A/G/N	50	24	12	41.5	71.5	32	Rc1/4 / G1/4 / 1/4-18NPT	37(42)
SAB*A-10A/G/N							Rc3/8 / G3/8 / 3/8-18NPT	
SAB*A-15A/G/N	71	28	14.5	61.5	94	43	Rc1/2 / G1/2 / 1/2-14NPT	38(43)
SAB*A-20A/G/N	80	35	17.5	71	106.5	43	Rc3/4 / G3/4 / 3/4-14NPT	38(43)
SAB*A-25A/G/N	90	43	21	81.5	120.5	53	Rc1/G1/1-11.5NPT	41.5(46.5)
SAB*A-32A/G/N	125	55	27.5	109.5	155	63	Rc1 1/4 / G1 1/4 / 1 1/4-11.5 NPT	46(51)
SAB*A-40A/G/N	140	61	30.5	130.5	179	77	Rc1 1/2 / G1 1/2 / 1 1/2-11.5 NPT	53(58)
SAB*A-50A/G/N	160	76	38	164	220	95	Rc2/G2/2-11.5NPT	61(66)

*1: ( ) shows values for G thread.

Dimensions

● SAB*A-32F to 80F (flange)

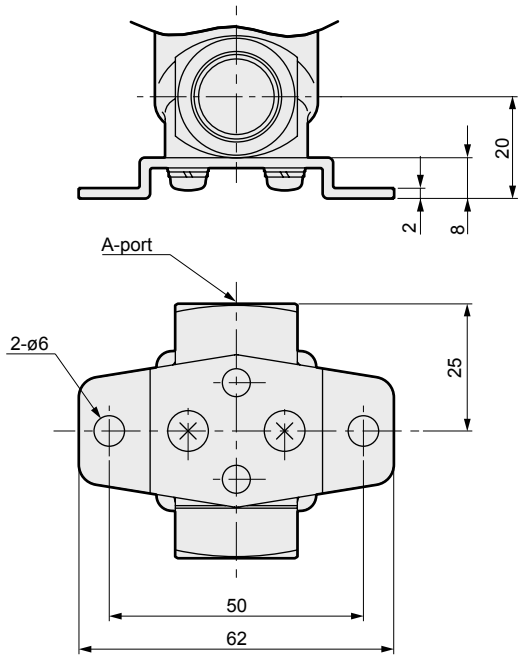


Model No.	A	D	E	H	K	L	M	N
SAB*A-32F	170	109.5	195	135	36	100	12	46
SAB*A-40F	180	130.5	218.5	140	42	105	12	53
SAB*A-50F	180	164	259.5	155	54	120	14	61
SAB*A-65F	210	199	347.5	175	68	140	16	101
SAB*A-80F	240	214	367.5	185	82	150	16	111

Optional dimensions

● Mounting plate
SAB*A-8*/10*-* B

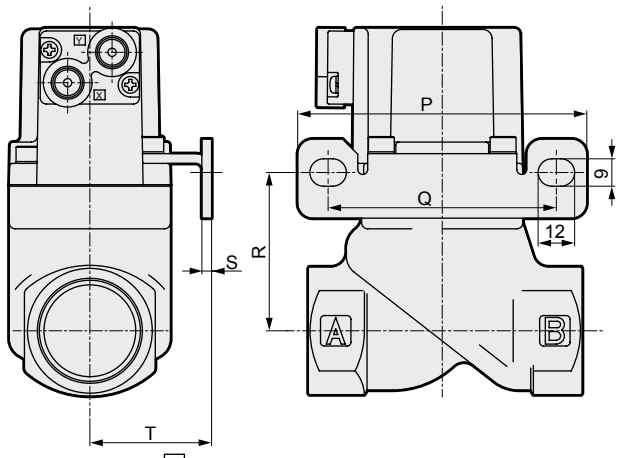
Material: Steel
Zinc plated



* Use the body mounting screws if fixing without a mounting plate.
(Thread size: M4 depth 8 pitch 19)

● Mounting plate
SAB*A-15* to 32*-* B / B-R

Material: Steel
Zinc plated



* The figure shows B.

Model No.	P	Q	R	S	T
SAB*A-15A/G/N	90	70	39	2.3	30
SAB*A-20A/G/N	90	70	48.5	2.3	30
SAB*A-25A/G/N	95	75	52	3.2	40
SAB*A-32A/G/N	105	85	66.5	3.2	45

Air operated 2-port valve
(cylinder valve)

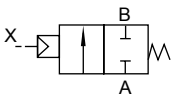
SAB*V Series

- NC, NO, double acting
- Port size: Rc1/4 to Rc2, 32 to 50 flange
- Working fluid: Low vacuum

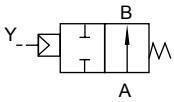
RoHS CAD

JIS symbol

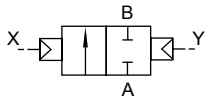
● NC



● NO



● Double acting



Common specifications

Item	SAB1V	SAB2V	SAB3V
Actuation	NC	NO	Double acting
Working fluid	Low vacuum (air, water) (*1)		
Working pressure Pa(abs)	1.3 x 10^2 to 7 x 10^5 (refer to the working pressure in the individual specifications.)		
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)		
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing) (*2)		
Ambient temperature °C	-10 (14°F) to 60 (140°F)		
Valve seat leakage Pa·m^3/s He	1.33 x 10^{-3} or less		
Pilot fluid	Air		
Mounting orientation	Unrestricted		

*1 : Refer to the working fluid check list on Intro Page 39.
*2 : -10 to 90°C for fluoro rubber seal (FKM).

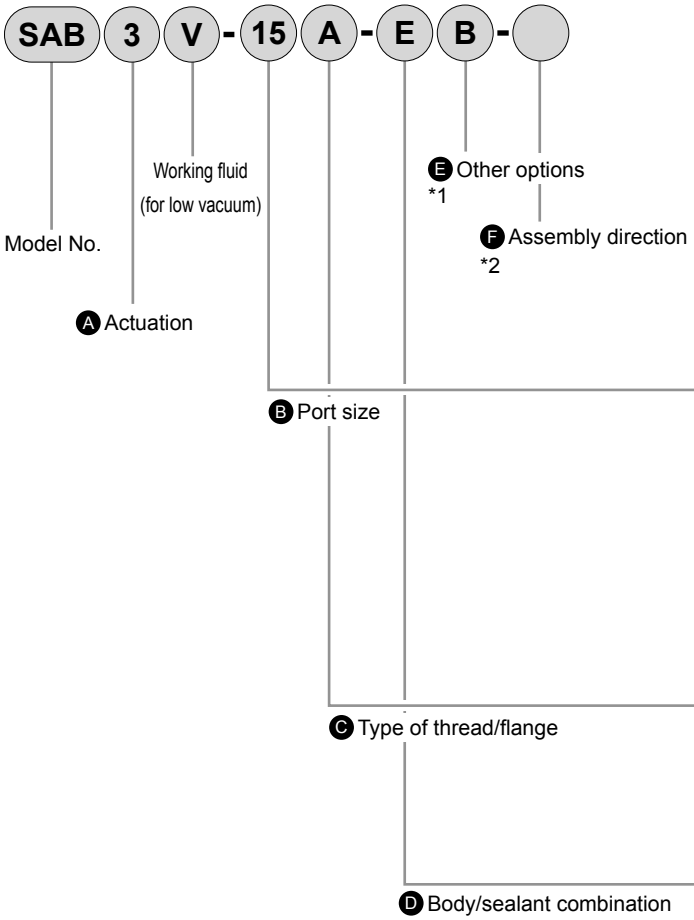
Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	C [dm^3/(s·bar)]	b	S (mm^2)	Working pressure Pa (abs) NC	Working pressure Pa (abs) NO	Working pressure Pa (abs) Double acting	Pilot pressure (MPa) NC	Pilot pressure (MPa) NO	Pilot pressure (MPa) Double acting	Pilot port size	Weight (kg) NC	Weight (kg) NO	Weight (kg) Double acting
SAB*V-8A	Rc1/4	10	8.9	0.4	-								0.3		
SAB*V-10A	Rc3/8	10	12	0.3	-	1.3×10^2	1.3×10^2		0.35				0.3		
SAB*V-15A	Rc1/2	15	-	-	140	to	to		to				0.6		
SAB*V-20A	Rc3/4	16	-	-	180	7×10^5	1×10^6		0.7				0.8		
SAB*V-25A	Rc1	20	-	-	280								1.1		
SAB*V-32A	Rc1 1/4	26	-	-	450					(*1)		Rc1/8	2.3	2.2	2.2
SAB*V-32F	32 flange	26	-	-	450	1.3×10^2	1.3×10^2		0.25				5.3	5.2	5.2
SAB*V-40A	Rc1 1/2	32	-	-	680	to	to		to				3.4	3.2	3.2
SAB*V-40F	40 flange	32	-	-	680	5×10^5	1×10^6		0.7				6.5	6.3	6.3
SAB*V-50A	Rc2	42	-	-	1020								5.5	5.2	5
SAB*V-50F	50 flange	42	-	-	1020								9.4	9.1	8.9

*1 : Refer to page 568 for the pilot air pressure for the NO and double acting.
*2 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*3 : Female thread is available in G thread and NPT thread.

How to order



Code	Description
Ⓐ Actuation	
1	NC
2	NO
3	Double acting
Ⓑ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
32	1 1/4, 32 (Flange)
40	1 1/2, 40 (Flange)
50	2, 50 (Flange)
Ⓒ Type of thread/flange	
A	Rc(8A to 50A)
F	Flange (32F to 50F)
G	G(8G to 50G)
N	NPT(8N to 50N)

Ⓓ Body/sealant combination

		Body	Seal
0	Standard	Bronze	Nitrile rubber
B	Option	Bronze	Fluoro rubber
P		Bronze	Ethylene propylene rubber
D		Stainless steel	Nitrile rubber
E		Stainless steel	Fluoro rubber
R		Stainless steel	Ethylene propylene rubber

Code	Description
Ⓔ Other options	
Blank	No option
B	Mounting plate *2
Ⓕ Assembly direction	
Blank	No option
R	Mounting plate assembly position reversed

Refer to the figure below for the layout drawing.

⚠ Precautions for model No. selection

*1 : The mounting plate (Item Ⓔ B) can be attached to only the female thread of port size 8 to 32.
*2 : Reversed mounting plate (Item Ⓕ B-R) is available for port size 15 to 32.
*3 : Clockwise when viewed from above with the port A on the right.

[Example of model No.]

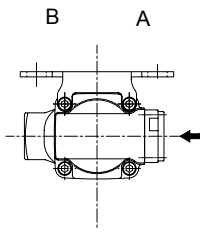
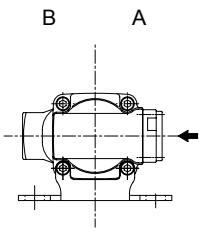
SAB3V-15A-EB

Model: SAB

Ⓐ Actuation	: Double acting
Ⓑ Port size	: 1/2
Ⓒ Type of thread/flange	: Rc
Ⓓ Body/sealant combination	: Body - stainless steel, sealant - fluoro rubber
Ⓔ Other options	: With mounting plate
Ⓕ Assembly direction	: No option

Item Ⓕ Assembly direction

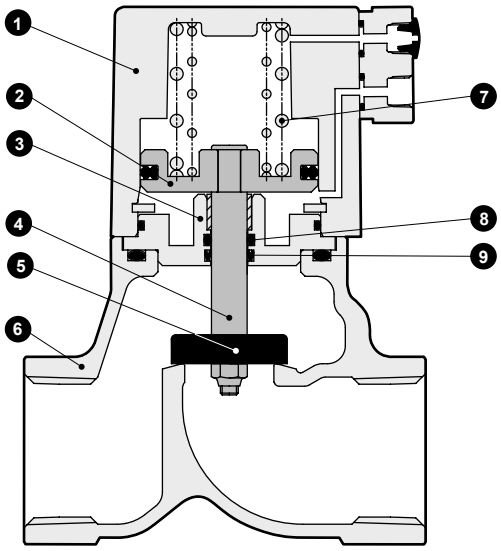
SAB [Air operated] *1/3

Code	B (with mounting plate)	B-R *2
Direction	No rotation	Mounting plate reversed
Layout		

⬅shows pilot port IN.

Internal structure and parts list

● SAB1V

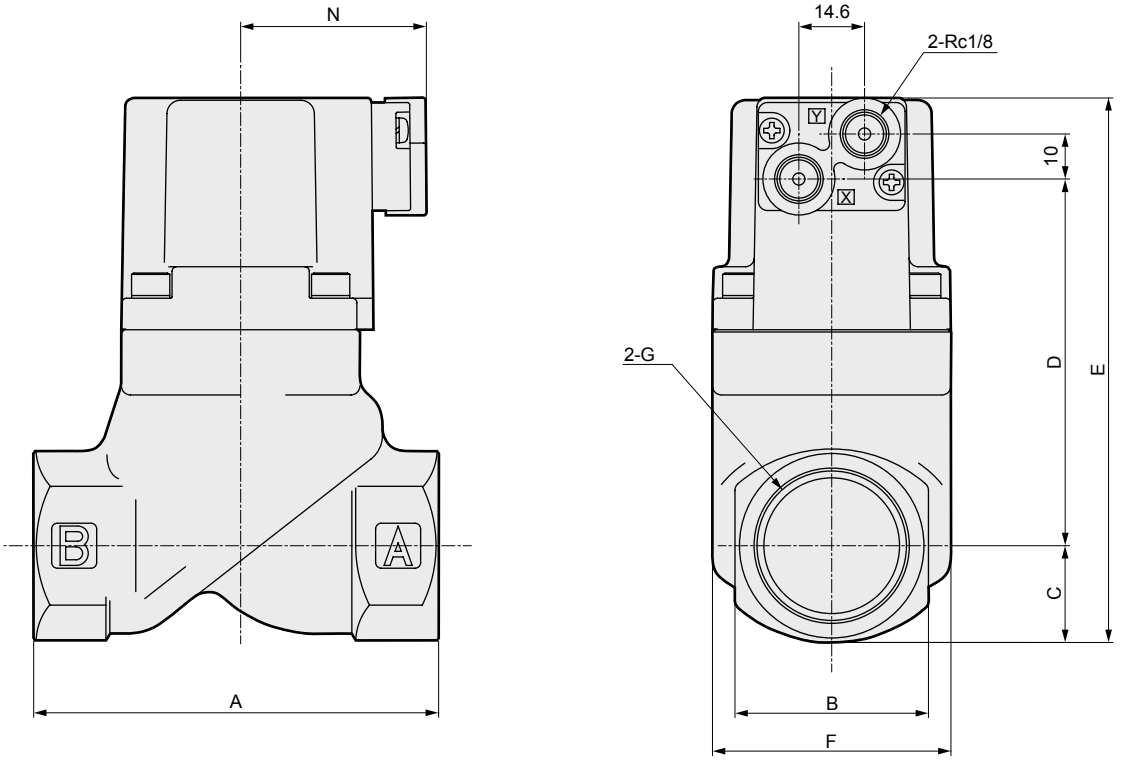


No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	C3604(SUS304)	Copper alloy (stainless steel)
4	Piston rod	SUS304	Stainless steel
5	Main valving element	NBR(FKM, EPDM) SUS304	Nitrile rubber (fluoro rubber, ethylene propylene rubber) stainless steel
6	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
7	Spring	SWP	Piano wire
8	O-ring	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)
9	MY packing	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)

( ) shows options.

Dimensions CAD

● SAB*V-8* to 50* (female thread)

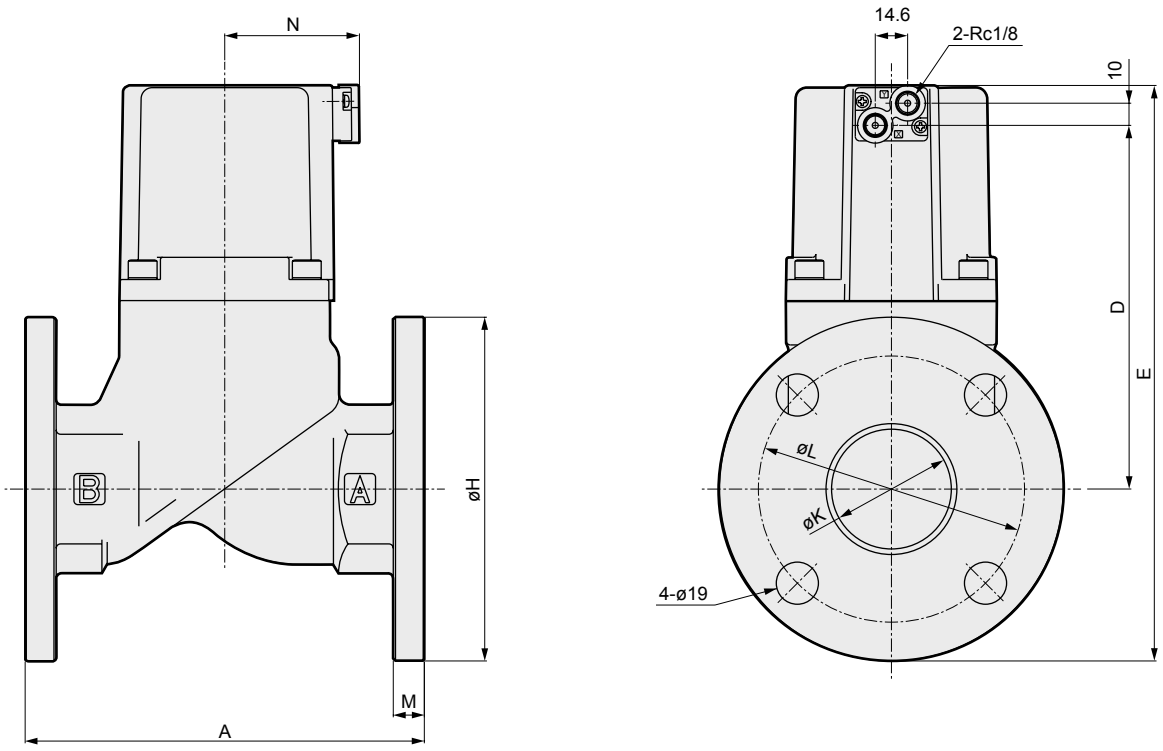


Model No.	A	B	C	D	E	F	G	N
SAB*V-8A/G/N	50	24	12	41.5	71.5	32	Rc1/4 / G1/4 / 1/4-18NPT	37(42)
SAB*V-10A/G/N							Rc3/8 / G3/8 / 3/8-18NPT	
SAB*V-15A/G/N	71	28	14.5	61.5	94	43	Rc1/2 / G1/2 / 1/2-14NPT	38(43)
SAB*V-20A/G/N	80	35	17.5	71	106.5	43	Rc3/4 / G3/4 / 3/4-14NPT	38(43)
SAB*V-25A/G/N	90	43	21	81.5	120.5	53	Rc1/G1/1-11.5NPT	41.5(46.5)
SAB*V-32A/G/N	125	55	27.5	109.5	155	63	Rc1 1/4 / G1 1/4 / 1 1/4-11.5 NPT	46(51)
SAB*V-40A/G/N	140	61	30.5	130.5	179	77	Rc1 1/2 / G1 1/2 / 1 1/2-11.5 NPT	53(58)
SAB*V-50A/G/N	160	76	38	164	220	95	Rc2/G2/2-11.5NPT	61(66)

*1: ( ) shows values for G thread.

Dimensions

● SAB*V-32F to 50F (flange)

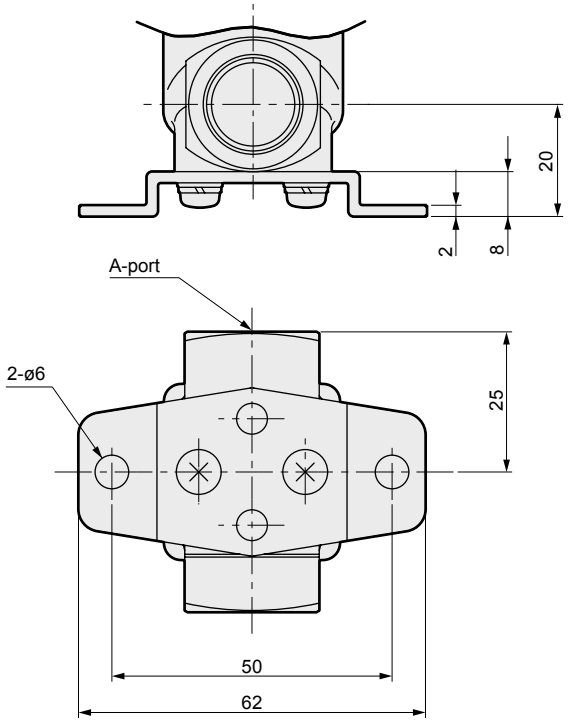


Model No.	A	D	E	H	K	L	M	N
SAB*V-32F	170	109.5	195	135	36	100	12	46
SAB*V-40F	180	130.5	218.5	140	42	105	12	53
SAB*V-50F	180	164	259.5	155	54	120	14	61

Optional dimensions

● Mounting plate
SAB*V-8*/10*-* B

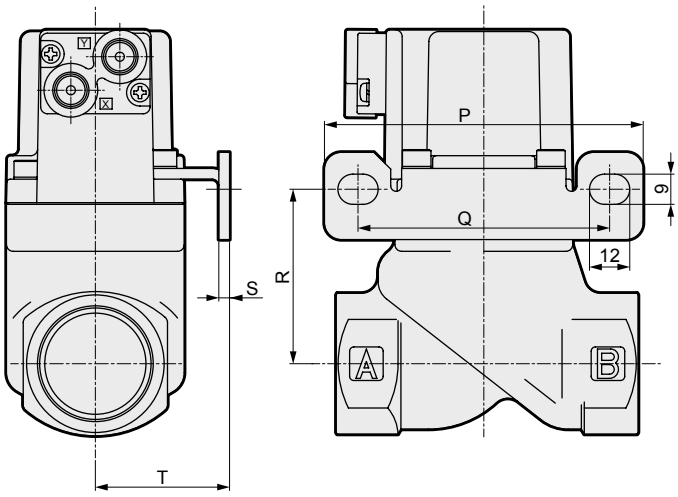
Material: Steel
Zinc plated



* Use the body mounting screws if fixing without a mounting plate.
(Thread size: M4 depth 8 pitch 19)

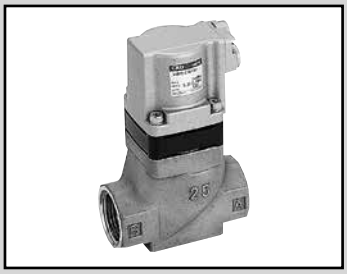
● Mounting plate
SAB*V-15* to 32*-* B / B-R

Material Steel
Zinc plated



* The figure shows B .

Model No.	P	Q	R	S	T
SAB*V-15A/G/N	90	70	39	2.3	30
SAB*V-20A/G/N	90	70	48.5	2.3	30
SAB*V-25A/G/N	95	75	52	3.2	40
SAB*V-32A/G/N	105	85	66.5	3.2	45



Air operated 2-port valve
(cylinder valve)

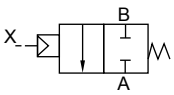
SAB*S Series

- NC, NO, double acting
- Port size: Rc1/4 to Rc2, 32 to 50 flange
- Working fluids: Steam, water, air

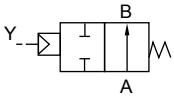
RoHS CAD

JIS symbol

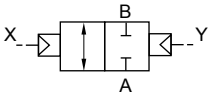
● NC



● NO



● Double acting



Common specifications

1 MPa = 10 bar

Item	SAB1S	SAB2S	SAB3S
Actuation	NC	NO	Double acting
Working fluid	Steam/water/air/non-corrosive liquid (*1)		
Fluid viscosity mm²/s	500 or less		
Working pressure MPa	0 (≈0 psi, 0 bar) to 1 (≈150 psi, 10 bar)		
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)		
Fluid temperature °C	-10 (14°F) to 184 (363.2°F) (no freezing)		
Ambient temperature °C	-10 (14°F) to 90 (194°F)		
Valve seat leakage cm³/min	300 or less (at pneumatic pressure 0.02 to 1 MPa)		
Pilot fluid	Air		
Pilot pressure MPa	0.35 (≈51 psi) to 0.7 (≈100 psi)	Refer to page 568.	
Mounting orientation	Unrestricted		

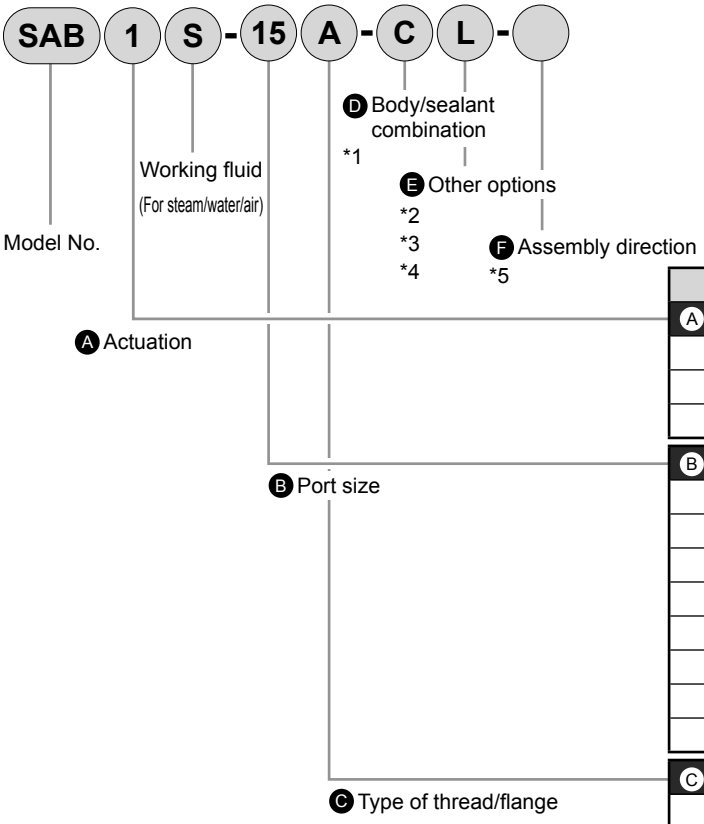
*1: Refer to the working fluid check list on Intro Page 39.

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	C [dm³/(s·bar)]	b	S (mm²)	Cv	Pilot port size	Weight (kg)
NC: Normally closed								
SAB1S-8A	Rc1/4	10	8.3	0.4	-	2.1	Rc1/8	0.3
SAB1S-10A	Rc3/8	10	11	0.4	-	2.5		0.3
SAB1S-15A	Rc1/2	15	-	-	120	5.5		0.6
SAB1S-20A	Rc3/4	16	-	-	150	7		0.8
SAB1S-25A	Rc1	20	-	-	240	11		1.1
SAB1S-32A	Rc1¼	26	-	-	390	18.5		2.2
SAB1S-32F	32 flange	26	-	-	390	18.5		5.2
SAB1S-40A	Rc1½	32	-	-	610	29		3.2
SAB1S-40F	40 flange	32	-	-	610	29		6.3
SAB1S-50A	Rc2	42	-	-	920	43		5.2
SAB1S-50F	50 flange	42	-	-	920	43		9.1
NO: Normally open type								
SAB2S-8A	Rc1/4	10	8.9	0.4	-	2.3	Rc1/8	0.3
SAB2S-10A	Rc3/8	10	12	0.3	-	2.6		0.3
SAB2S-15A	Rc1/2	15	-	-	140	5.6		0.6
SAB2S-20A	Rc3/4	16	-	-	180	8		0.8
SAB2S-25A	Rc1	20	-	-	280	12		1.1
SAB2S-32A	Rc1¼	26	-	-	450	20		2.2
SAB2S-32F	32 flange	26	-	-	450	20		5.2
SAB2S-40A	Rc1½	32	-	-	680	32		3.2
SAB2S-40F	40 flange	32	-	-	680	32		6.3
SAB2S-50A	Rc2	42	-	-	1020	50		5.2
SAB2S-50F	50 flange	42	-	-	1020	50		9.1
Double acting (*1)								
SAB3S-8A	Rc1/4	10	8.3(8.9)	0.4	-	2.1(2.3)	Rc1/8	0.3
SAB3S-10A	Rc3/8	10	11(12)	0.4(0.3)	-	2.5(2.6)		0.3
SAB3S-15A	Rc1/2	15	-	-	120(140)	5.5(5.6)		0.6
SAB3S-20A	Rc3/4	16	-	-	150(180)	7(8)		0.8
SAB3S-25A	Rc1	20	-	-	240(280)	11(12)		1.1
SAB3S-32A	Rc1¼	26	-	-	390(450)	18.5(20)		2.2
SAB3S-32F	32 flange	26	-	-	390(450)	18.5(20)		5.2
SAB3S-40A	Rc1½	32	-	-	610(680)	29(32)		3.2
SAB3S-40F	40 flange	32	-	-	610(680)	29(32)		6.3
SAB3S-50A	Rc2	42	-	-	920(1020)	43(50)		5.2
SAB3S-50F	50 flange	42	-	-	920(1020)	43(50)		9.1

*1 : ( ) of C, b and S columns of double acting shows the flow rates of when port A is pressurized.
*2 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*3 : Female thread is available in G thread and NPT thread.

How to order



Code	Description
A Actuation	
1	NC
2	NO
3	Double acting
B Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
32	1 1/4, 32 (Flange)
40	1 1/2, 40 (Flange)
50	2, 50 (Flange)
C Type of thread/flange	
A	Rc(8A to 50A)
F	Flange (32F to 50F)
G	G(8G to 50G)
N	NPT(8N to 50N)

D Body/sealant combination

	Body	Seal	O-ring	Remarks
C	Bronze	Tetrafluoroethylene resin	Fluoro rubber	Steam/air/ water
E	Stainless steel	Tetrafluoroethylene resin	Fluoro rubber	
F	Stainless steel	Tetrafluoroethylene resin	Tetrafluoroethylene resin	Solvent-based

E Other options	
Blank	No option
B	Mounting plate *2
L	With indicator
F Assembly direction	
Blank	No option
R	Mounting plate assembly position reversed

Refer to the figure below for the layout drawing.

Precautions for model No. selection

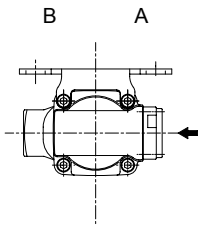
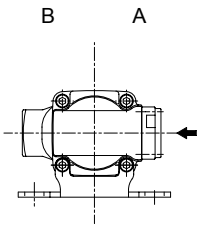
*1 : When the working fluid is steam, select C or E.
*2 : The mounting plate (Item E B) can be attached to only the female thread of port size 8 to 32.
*3 : Indicator (Item E L) can be attached to only the NC (actuation 1).
*4 : To add both the mounting plate and indicator options, specify Item E as BL.
*5 : Reversed mounting plate (Item E B-R) is available for port size 15 to 32.
*6 : Clockwise when viewed from above with the port A on the right.

[Example of model No.]

SAB1S-15A-CL

Model: SAB
A Actuation : NC
B Port size : 1/2
C Type of thread/flange : Rc
D Body/sealant combination : Body - bronze, sealant - tetrafluoroethylene resin
E Other options : Indicator
F Assembly direction : No option

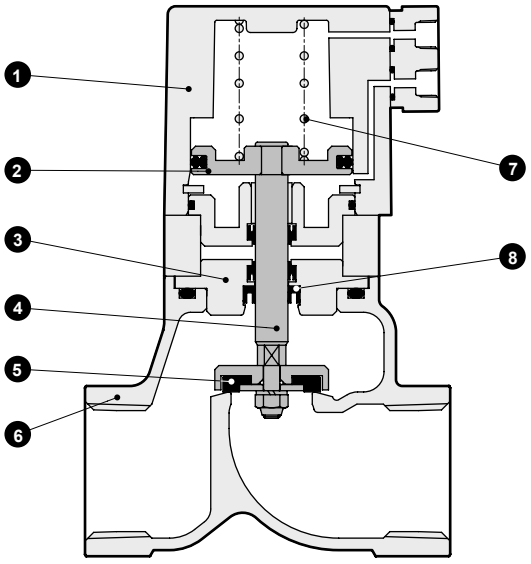
Item F Assembly direction

SAB [Air operated] *2/6		
Code	B (with mounting plate)	B-R *5
Direction	No rotation	Mounting plate reversed
Layout		

←shows pilot port IN.

Internal structure and parts list

● SAB1S

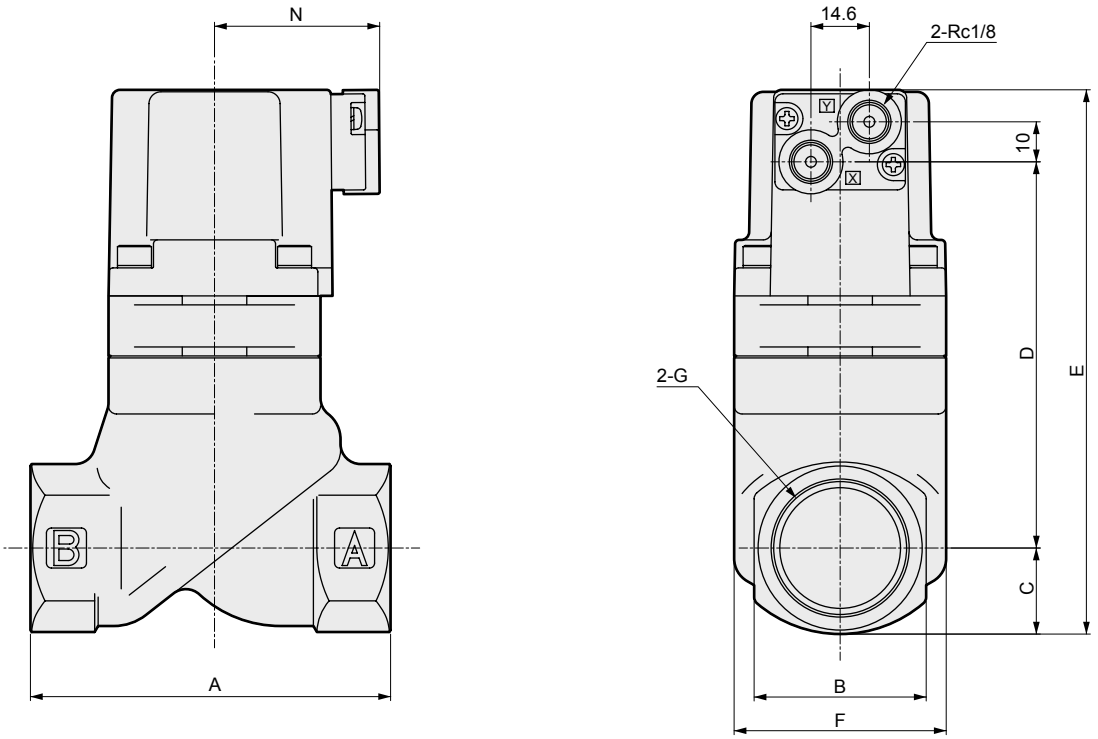


No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	C3604(SUS304)	Copper alloy (stainless steel)
4	Piston rod	SUS304	Stainless steel
5	Main valving element	PTFE	Tetrafluoroethylene resin
6	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
7	Spring	SWP	Piano wire
8	Rod packing	PTFE	Tetrafluoroethylene resin

( ) shows options.

Dimensions CAD

● SAB*S-8* to 50* (female thread)

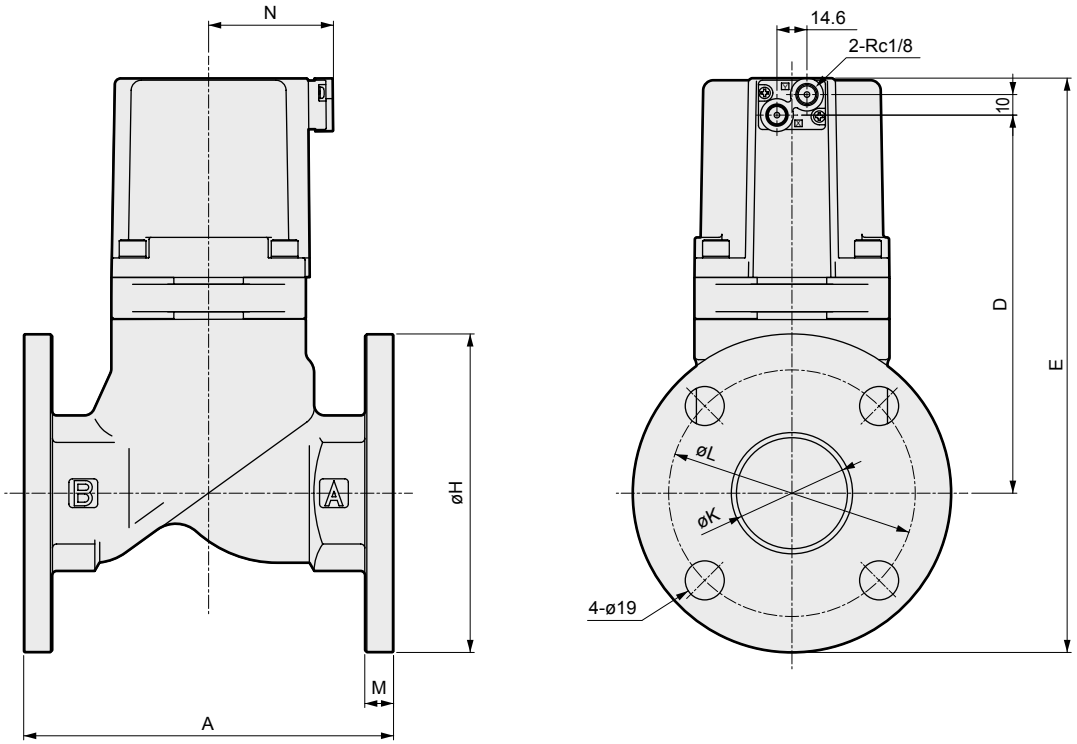


Model No.	A	B	C	D	E	F	G	N
SAB*S-8A/G/N	50	24	12	52.5	82.5	32	Rc1/4 / G1/4 / 1/4-18NPT	37(42)
SAB*S-10A/G/N							Rc3/8 / G3/8 / 3/8-18NPT	
SAB*S-15A/G/N	71	28	14.5	77.5	110	43	Rc1/2 / G1/2 / 1/2-14NPT	38(43)
SAB*S-20A/G/N	80	35	17.5	87	122.5	43	Rc3/4 / G3/4 / 3/4-14NPT	38(43)
SAB*S-25A/G/N	90	43	21	98	137	53	Rc1/G1/1-11.5NPT	41.5(46.5)
SAB*S-32A/G/N	125	55	27.5	124.5	170	63	Rc1 1/4 / G1 1/4 / 1 1/4-11.5 NPT	46(51)
SAB*S-40A/G/N	140	61	30.5	150.5	199	77	Rc1 1/2 / G1 1/2 / 1 1/2-11.5 NPT	53(58)
SAB*S-50A/G/N	160	76	38	184	240	95	Rc2/G2/2-11.5NPT	61(66)

*1: ( ) shows values for G thread.

Dimensions CAD

● SAB*S-32F to 50F (flange)

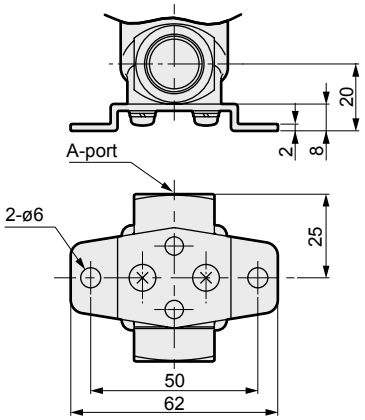


Model No.	A	D	E	H	K	L	M	N
SAB*S-32F	170	124.5	210	135	36	100	12	46
SAB*S-40F	180	150.5	238.5	140	42	105	12	53
SAB*S-50F	180	184	279.5	155	54	120	14	61

Optional dimensions CAD

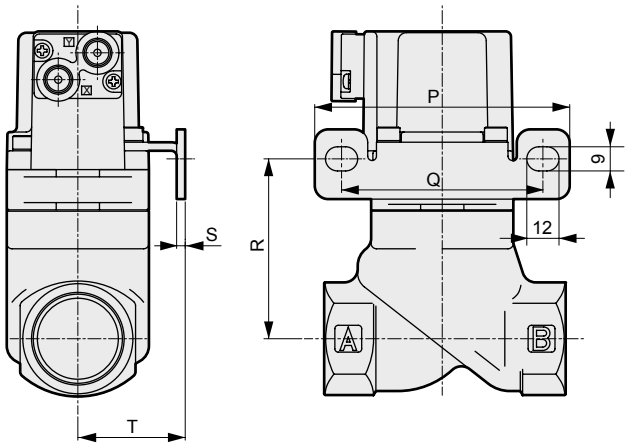
● Mounting plate
SAB*S-8*/10*-* B

Material: Steel
Zinc plated

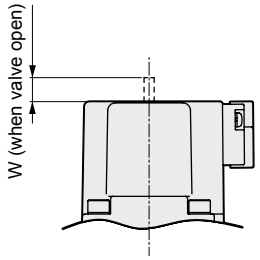


● Mounting plate
SAB*S-15* to 32*-* B / B-R

Material: Steel
Zinc plated



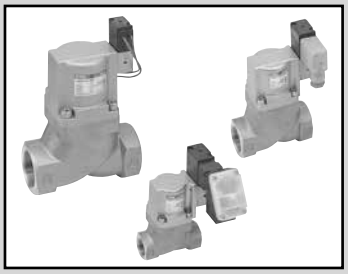
● Indicator
SAB1S-8* to 50*-* L



Model No.	W
SAB1S-8A/G/N	4
SAB1S-10A/G/N	4
SAB1S-15A/G/N	6.5
SAB1S-20A/G/N	6.5
SAB1S-25A/G/N	7
SAB1S-32A/G/N/F	8
SAB1S-40A/G/N/F	10.5
SAB1S-50A/G/N/F	13

* The figure shows B .

Model No.	P	Q	R	S	T
SAB*S-15A/G/N	90	70	55	2.3	30
SAB*S-20A/G/N	90	70	64.5	2.3	30
SAB*S-25A/G/N	95	75	68.5	3.2	40
SAB*S-32A/G/N	105	85	81.5	3.2	45



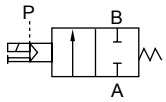
Air operated 2-port valve with solenoid valve (cylinder valve)

SVB*W Series

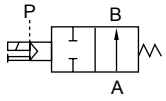
- NC (open when energized), NO (closed when energized)
- Port size: Rc1/4 to Rc2, 32 to 80 flange
- Working fluids: Water, non-corrosive liquid

JIS symbol

● NC (open when energized)



● NO (closed when energized)



Common specifications

Item	SVB1W	SVB2W
Actuation	NC (open when energized)	NO (closed when energized)
Working fluid	Water/non-corrosive liquid (*1)	
Fluid viscosity mm²/s	500 or less	
Working pressure MPa	0 (≈0 psi) to 0.7 (≈100 psi)(*2)	0 (≈0 psi) to 1 (≈150 psi)
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm³/min	0 (water pressure)	
Mounting orientation	Unrestricted	
Pilot fluid	Air	
Water hammer value (reference) MPa	1 (≈150 psi, 10 bar) or less (according to the Water Supply Act)	

*1 : Refer to the working fluid check list on Intro Page 39.
*2 : Note that this differs with the type, so refer to the working pressure in the individual specifications.

Electrical specifications			
Rated voltage		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	When starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)		Grommet lead wire	IPX2
		With DIN terminal box (Pg9)	IPX5
		With T type terminal box (G1/2)	IPX5

*1: Use the product within ±10% of the rated voltage.

Individual specifications

1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Cv	Working pressure (MPa)		Pilot pressure (MPa)		Pilot port size	Weight (kg)	
				NC	NO	NC	NO		NC	NO
SVB*W-8A	Rc1/4	10	2.3	0 (≈0 psi) to 0.7 (≈100 psi)	0 (≈0 psi) to 1 (≈150 psi)	0.35 (≈51 psi) to 0.7 (≈100 psi)	(*1)	Rc1/8	0.5	
SVB*W-10A	Rc3/8	10	2.6						0.5	
SVB*W-15A	Rc1/2	15	5.6						0.8	
SVB*W-20A	Rc3/4	16	8						1	
SVB*W-25A	Rc1	20	12						1.3	
SVB*W-32A	Rc1 1/4	26	20	0 (≈0 psi) to 0.5 (≈73 psi)	0 (≈0 psi) to 1 (≈150 psi)	0.25 (≈36 psi) to 0.7 (≈100 psi)	(*1)		2.5	2.4
SVB*W-32F	32 flange	26	20						5.5	5.4
SVB*W-40A	Rc1 1/2	32	32						3.6	3.4
SVB*W-40F	40 flange	32	32						6.7	6.5
SVB*W-50A	Rc2	42	50						5.7	5.4
SVB*W-50F	50 flange	42	50						9.6	9.3
SVB*W-65F(*2)	65 flange	65	70						20.5	19
SVB*W-80F(*2)	80 flange	79	100						25	23

*1 : Refer to page 568 for pilot air pressure for the NO.
*2 : Port sizes 65 flange/80 flange are made-to-order products.
*3 : Female thread is available in G thread and NPT thread.

How to order

● With solenoid valve

SVB 1 W - 15 A - B 2G S - ○ - AC100V

- SVB: Model No.
- 1: Ⓐ Actuation
- W: Working fluid (for water and liquids)
- 15: Ⓑ Port size
- A: Ⓒ Type of thread/flange
- B: Ⓓ Body/sealant combination *1
- 2G: Ⓔ Coil
- S: Ⓕ Other options *2 *3 *4 *5
- ○: Ⓖ Assembly direction *6
- AC100V: Ⓗ Voltage

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
2	NO (closed when energized)
Ⓑ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
32	1 1/4, 32 (Flange)
40	1 1/2, 40 (Flange)
50	2, 50 (Flange)
65	65 (Flange) (made-to-order product)
80	80 (Flange) (made-to-order product)
Ⓒ Type of thread/flange	
A	Rc(8A to 50A)
F	Flange (32F to 80F)
G	G(8G to 50G)
N	NPT(8N to 50N)

Ⓓ Body/sealant combination

		Body	Seal
0	Standard	Bronze	Nitrile rubber
B	Option	Bronze	Fluoro rubber
P	Option	Bronze	Ethylene propylene rubber
D	Option	Stainless steel	Nitrile rubber
E	Option	Stainless steel	Fluoro rubber
R	Option	Stainless steel	Ethylene propylene rubber

Ⓔ Coil

2C	Standard	Grommet lead wire
2G	Option	With DIN terminal box (Pg9)
2H	Option	DIN terminal box with lamp (Pg9)
3T	Option	With T type terminal box (G1/2)
3R	Option	T type terminal box with lamp (G1/2)

Ⓕ Other options	
Blank	No option
S	With surge suppressor
B	Mounting plate *2

Ⓖ Assembly direction	
Blank	No option
X	Cylinder cover rotated 90°
Y	Cylinder cover rotated 180°
Z	Cylinder cover rotated 270°
R	Coil reversed 180° (with solenoid valve) Mounting plate/coil reversed 180° (with solenoid valve)

Refer to page 525 for the layout drawing.

Ⓗ Voltage	
AC100V	100 VAC 50/60 Hz 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz 220 VAC 60 Hz
DC24V	24 VDC

⚠ Precautions for model No. selection

*1 : The body/sealant combination code is O or B for port size 65F and 80F. Note that the body is made of cast iron.
*2 : The mounting plate (Item Ⓕ B) can be attached to only the female thread of port size 8 to 32.
*3 : To add both the surge suppressor and mounting plate options, specify Ⓕ as SB.
*4 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*5 : Manual override (non-locking) is provided as standard.
*6 : Assembly direction option can be selected for 8 to 50 only.

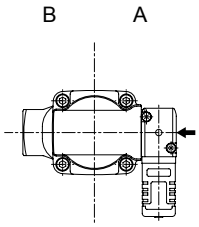
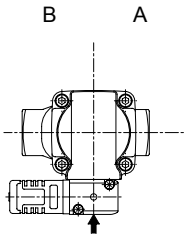
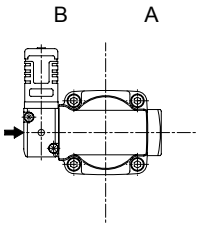
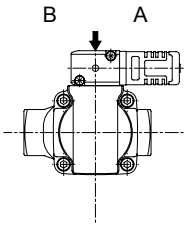
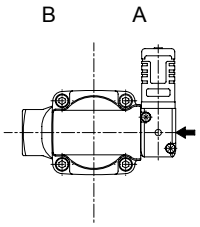
[Example of model No.]

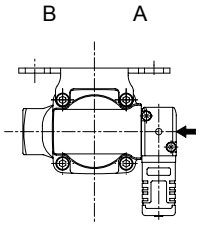
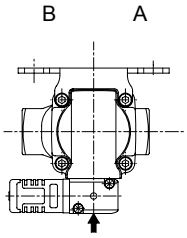
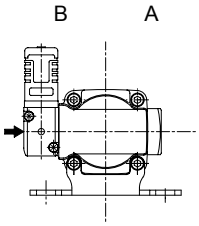
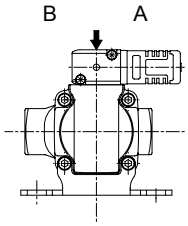
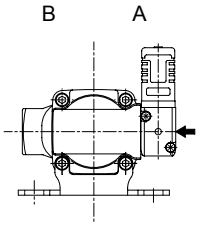
SVB1W-15A-B2GS-AC100V

Model: SVB

Ⓐ Actuation	: NC (open when energized)
Ⓑ Port size	: 1/2
Ⓒ Type of thread/flange	: Rc
Ⓓ Body/sealant combination	: Body - bronze, sealant - fluoro rubber
Ⓔ Coil	: With DIN terminal box (Pg9)
Ⓕ Other options	: With surge suppressor
Ⓖ Assembly direction	: No option
Ⓗ Voltage	: 100 VAC 50/60 Hz, 110 VAC 60 Hz

Item Ⓖ Assembly direction

SVB [With solenoid valve] *7					
Code	Blank (standard)	X *6	Y *6	Z *6	R *6
Direction	No rotation	Cylinder cover rotated 90°	Cylinder cover rotated 180°	Cylinder cover rotated 270°	Coil reversed
Layout					

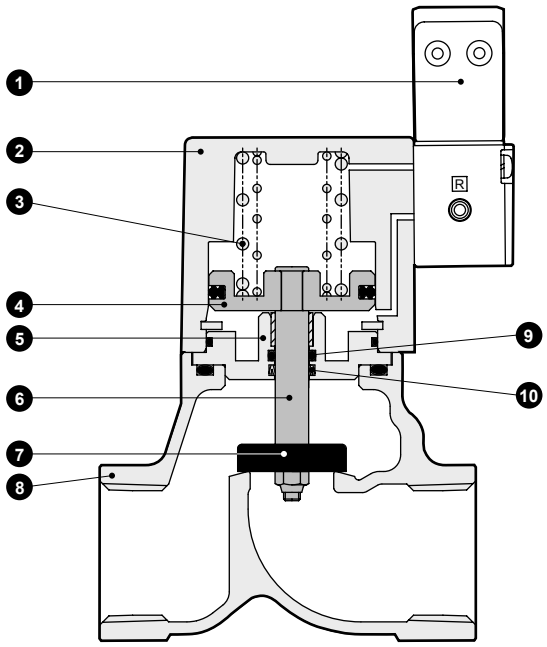
SVB [With solenoid valve] *2/7					
Code	B (with mounting plate)	B-X *6	B-Y *6/8	B-Z *6/8	B-R *6/9
Direction	No rotation	Cylinder cover rotated 90°	Cylinder cover rotated 180° Mounting plate reversed	Cylinder cover rotated 270° Mounting plate reversed	Coil reversed Mounting plate reversed
Layout					

*7 : Clockwise angle when viewed from above with the port A on the right.
*8 : The mounting plate will be reversed 180° and attached.
*9 : The mounting plate for port size 10A is installed at the bottom, so only the coil position is reversed.

←shows pilot port IN.

Internal structure and parts list

● SVB1W

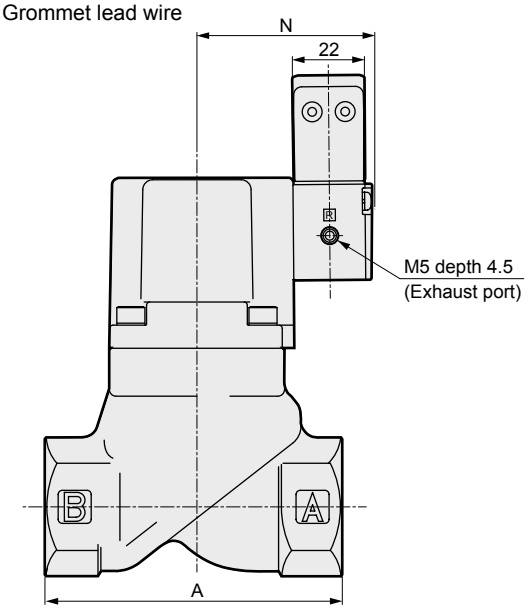


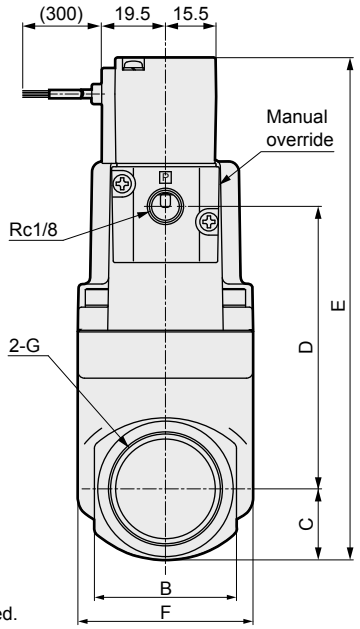
No.	Part name	Material	
1	Pilot solenoid valve	-	-
2	Cylinder guard	ADC12	Aluminum die-casting
3	Spring	SWP	Piano wire
4	Piston	A2017	Aluminum
5	Adaptor	C3604(SUS304)	Copper alloy (stainless steel)
6	Piston rod	SUS304	Stainless steel
7	Main valving element	NBR(FKM, EPDM) SUS304	Nitrile rubber (fluoro rubber, ethylene propylene rubber) stainless steel
8	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
9	O-ring	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)
10	MY packing	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)

*1 : ( ) shows options.
*2 : For 65F and 80F, the body is FC250 (cast iron), and the main valving element material is FKM.

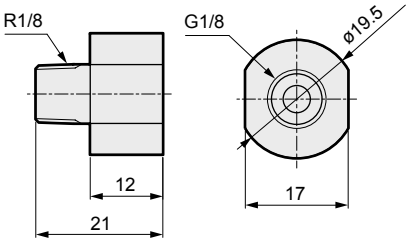
Dimensions CAD

● SVB*W-8* to 50*-*2C (female thread)
Grommet lead wire





● G thread conversion connector

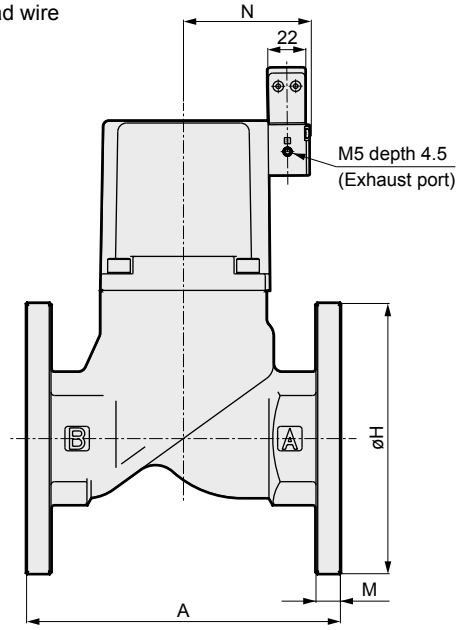


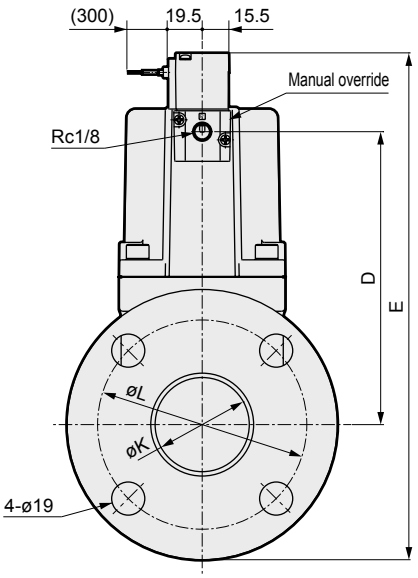
* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	N
SVB*W-8A/G/N	50	24	12	45.5	102.5	32	Rc1/4 / G1/4 / 1/4-18NPT	48.5
SVB*W-10A/G/N							Rc3/8 / G3/8 / 3/8-18NPT	
SVB*W-15A/G/N	71	28	14.5	65.5	125	43	Rc1/2 / G1/2 / 1/2-14NPT	49.5
SVB*W-20A/G/N	80	35	17.5	75	137.5	43	Rc3/4 / G3/4 / 3/4-14NPT	49.5
SVB*W-25A/G/N	90	43	21	85.5	151.5	53	Rc1/G1/1-11.5NPT	53
SVB*W-32A/G/N	125	55	27.5	113.5	186	63	Rc1 $^1/_4$ / G1 $^1/_4$ / 1 $^1/_4$-11.5 NPT	57.5
SVB*W-40A/G/N	140	61	30.5	134.5	210	77	Rc1 $^1/_2$ / G1 $^1/_2$ / 1 $^1/_2$-11.5 NPT	64.5
SVB*W-50A/G/N	160	76	38	168	251	95	Rc2/G2/2-11.5NPT	72.5

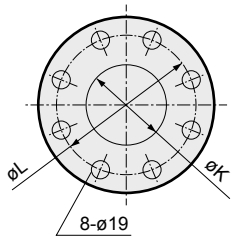
*1: For G thread, a G thread conversion connector is inserted to port P.

● SVB*W-32F to 80F-*2C (flange)
Grommet lead wire





● 80F

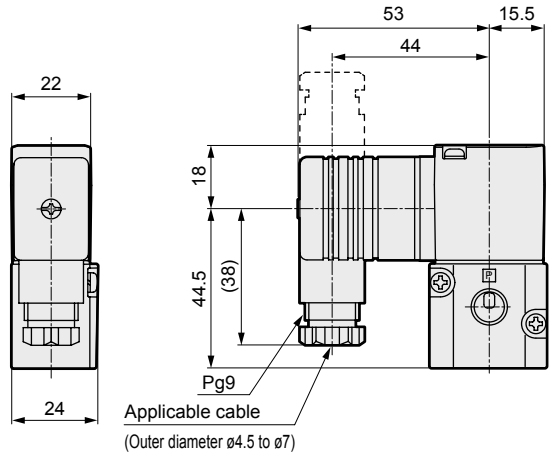


* The figure shows the unit with no assembly direction option selected.

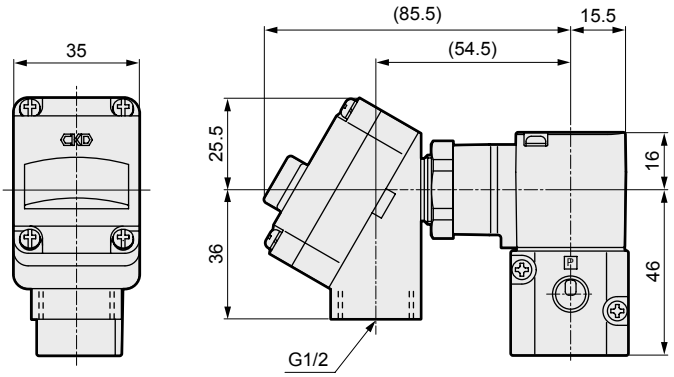
Model No.	A	D	E	H	K	L	M	N
SVB*W-32F	170	113.5	226	135	36	100	12	57.5
SVB*W-40F	180	134.5	249.5	140	42	105	12	64.5
SVB*W-50F	180	168	291	155	54	120	14	72.5
SVB*W-65F	210	203	347.5	175	68	140	16	113
SVB*W-80F	240	218	367.5	185	82	150	16	123

Optional dimensions

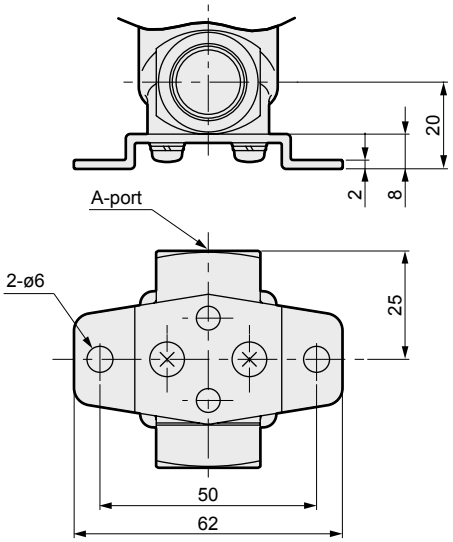
● DIN terminal box (Pg9)　DIN terminal box with lamp (Pg9)
SVB*W-*-* 2G 2H



● T type terminal box (G1/2)　T type terminal box with lamp (G1/2)
SVB*W-*-* 3T 3R



● Mounting plate　Material: Steel
SVB*W-8*/10*-** B　Zinc plated

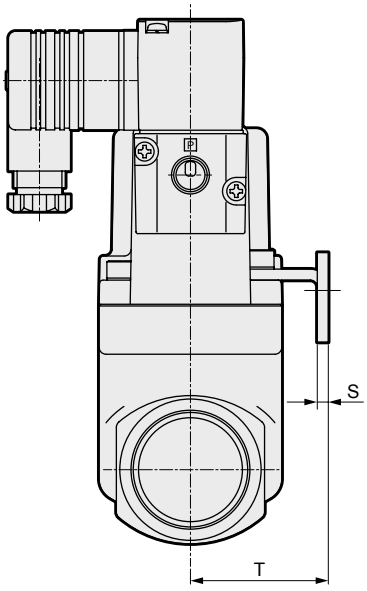


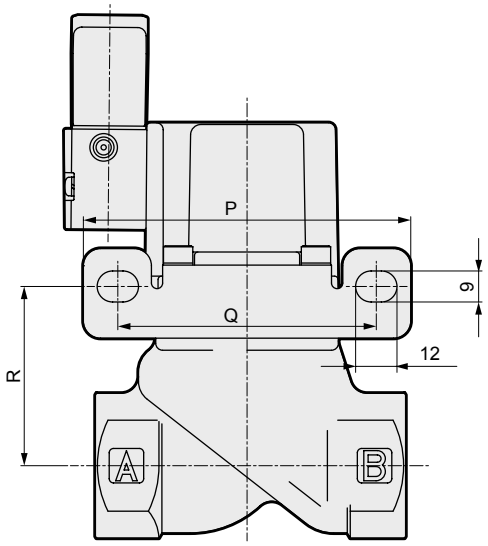
* Use the body mounting screws if fixing without a mounting plate.
(Thread size: M4 depth 8 pitch 19)

Optional dimensions

● Mounting plate
SVB*W-15* to 32*-** B / B-R / B-Y

Material: Steel
Zinc plated

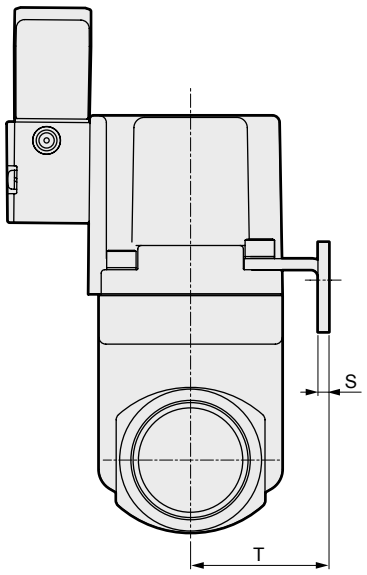


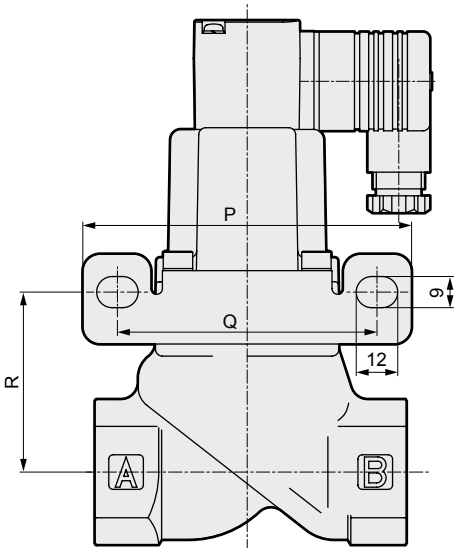


* The figure shows B .

● Mounting plate
SVB*W-15* to 32*-** B-X / B-Z

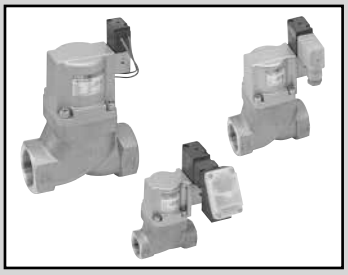
Material: Steel
Zinc plated





* The figure shows B-X .

Model No.	P	Q	R	S	T
SVB*W-15A/G/N	90	70	39	2.3	30
SVB*W-20A/G/N	90	70	48.5	2.3	30
SVB*W-25A/G/N	95	75	52	3.2	40
SVB*W-32A/G/N	105	85	66.5	3.2	45



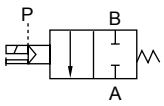
Air operated 2-port valve with solenoid valve (cylinder valve)

SVB*A Series

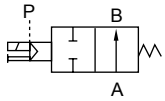
- NC (open when energized), NO (closed when energized)
- Port size: Rc1/4 to Rc2, 32 to 80 flange
- Working fluid: Air, inert gas

JIS symbol

- NC (open when energized)



- NO (closed when energized)



Common specifications

Item	SVB1A	SVB2A
Actuation	NC (open when energized)	NO (closed when energized)
Working fluid	Air/inert gas (*1)	
Working pressure MPa	0 (≈0 psi, 0 bar) to 0.9 (≈130 psi, 9 bar)	0 (≈0 psi, 0 bar) to 1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm^3/min	0.12 or less (pneumatic pressure)	
Pilot fluid	Air	
Pilot pressure MPa	0.35 (≈51 psi, 3.5 bar) to 0.7 (≈100 psi, 7 bar)	Refer to page 568.
Mounting orientation	Unrestricted	

*1: Refer to the working fluid check list on Intro Page 39.

Electrical specifications			
Rated voltage		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	When starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)	Grommet lead wire		IPX2
	With DIN terminal box (Pg9)		IPX5
	With T type terminal box (G1/2)		IPX5

*1: Use the product within ±10% of the rated voltage.

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	C [$dm^3/(s \cdot bar)$]	b	S (mm^2)	Allowable back pressure (MPa)	Pilot port size	Weight (kg)
NC								
SVB1A-8A	Rc1/4	10	8.3	0.4	-	0.5 (≈73 psi, 5 bar)	Rc1/8	0.5
SVB1A-10A	Rc3/8	10	11	0.4	-			0.5
SVB1A-15A	Rc1/2	15	-	-	120	0.1 (≈15 psi, 1 bar)		0.8
SVB1A-20A	Rc3/4	16	-	-	150			1
SVB1A-25A	Rc1	20	-	-	240			1.3
SVB1A-32A	Rc1 1/4	26	-	-	390			2.4
SVB1A-32F	32 flange	26	-	-	390			5.4
SVB1A-40A	Rc1 1/2	32	-	-	610			3.4
SVB1A-40F	40 flange	32	-	-	610			6.5
SVB1A-50A	Rc2	42	-	-	920			5.4
SVB1A-50F	50 flange	42	-	-	920			9.3
SVB1A-65F(*2)	65 flange	65	-	-	1290			19.5
SVB1A-80F(*2)	80 flange	79	-	-	1840			23.5
NO								
SVB2A-8A	Rc1/4	10	8.9	0.4	-	0.1 (≈15 psi, 1 bar)	Rc1/8	0.5
SVB2A-10A	Rc3/8	10	12	0.3	-			0.5
SVB2A-15A	Rc1/2	15	-	-	140			0.8
SVB2A-20A	Rc3/4	16	-	-	180			1
SVB2A-25A	Rc1	20	-	-	280			1.3
SVB2A-32A	Rc1 1/4	26	-	-	450	0.05 (≈7.3 psi, 0.5 bar)		2.4
SVB2A-32F	32 flange	26	-	-	450			5.4
SVB2A-40A	Rc1 1/2	32	-	-	680			3.4
SVB2A-40F	40 flange	32	-	-	680			6.5
SVB2A-50A	Rc2	42	-	-	1020			5.4
SVB2A-50F	50 flange	42	-	-	1020			9.3
SVB2A-65F(*2)	65 flange	65	-	-	1290			19
SVB2A-80F(*2)	80 flange	79	-	-	1840			23

*1 : Refer to page 568 for pilot air pressure for the NO.
*2 : Port sizes 65 flange/80 flange are made-to-order products.
*3 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*4 : Female thread is available in G thread and NPT thread.

How to order

● With solenoid valve

SVB 1 A - 15 A - B 2G S - ( ) - AC100V

- SVB — Model No.
- 1 — Working fluid (For air/gas)
- A — Actuation
- 15 — B Port size
- A — C Type of thread/flange
- B — D Body/sealant combination *1
- 2G — E Coil
- S — F Other options *2 *3 *4 *5
- ( ) — G Assembly direction *6
- AC100V — H Voltage

Code	Description
A Actuation	
1	NC (open when energized)
2	NO (closed when energized)
B Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
32	1 1/4, 32 (Flange)
40	1 1/2, 40 (Flange)
50	2, 50 (Flange)
65	65 (Flange) (made-to-order product)
80	80 (Flange) (made-to-order product)
C Type of thread/flange	
A	Rc(8A to 50A)
F	Flange (32F to 80F)
G	G(8G to 50G)
N	NPT(8N to 50N)

D Body/sealant combination		Body	Seal
0	Standard	Bronze	Nitrile rubber
B	Option	Bronze	Fluoro rubber
P	Option	Bronze	Ethylene propylene rubber
D	Option	Stainless steel	Nitrile rubber
E	Option	Stainless steel	Fluoro rubber
R	Option	Stainless steel	Ethylene propylene rubber

E Coil		
2C	Standard	Grommet lead wire
2G	Option	With DIN terminal box (Pg9)
2H	Option	DIN terminal box with lamp (Pg9)
3T	Option	With T type terminal box (G1/2)
3R	Option	T type terminal box with lamp (G1/2)

F Other options	
Blank	No option
S	With surge suppressor
B	Mounting plate *2

G Assembly direction	
Blank	No option
X	Cylinder cover rotated 90°
Y	Cylinder cover rotated 180°
Z	Cylinder cover rotated 270°
R	Coil reversed 180° (with solenoid valve) Mounting plate/coil reversed 180° (with solenoid valve)

Refer to page 525 for the layout drawing.

H Voltage	
AC100V	100 VAC 50/60 Hz 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz 220 VAC 60 Hz
DC24V	24 VDC

⚠ Precautions for model No. selection

*1 : The body/sealant combination code is O or B for port size 65F and 80F. Note that the body is made of cast iron.
*2 : The mounting plate (Item F B) can be attached to only the female thread of port size 8 to 32.
*3 : To add both the surge suppressor and mounting plate options, specify F as SB.
*4 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*5 : Manual override (non-locking) is provided as standard.
*6 : Assembly direction option can be selected for 8 to 50 only.

[Example of model No.]

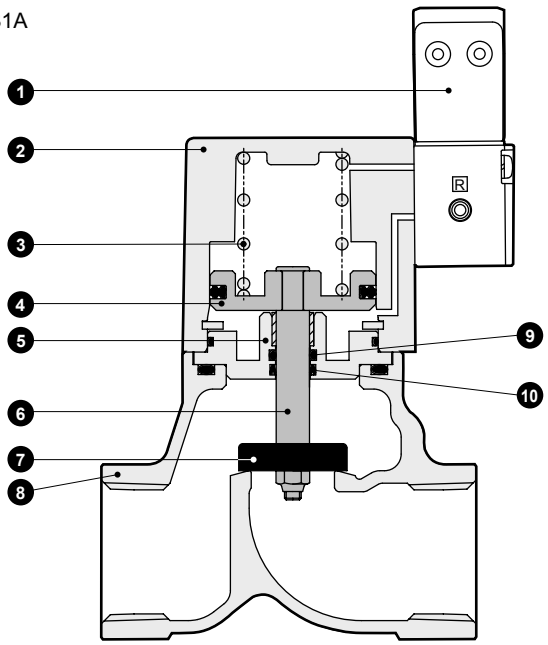
SVB1A-15A-B2GS-AC100V

Model: SVB

A Actuation	: NC (open when energized)
B Port size	: 1/2
C Type of thread/flange	: Rc
D Body/sealant combination	: Body - bronze, sealant - fluoro rubber
E Coil	: With DIN terminal box (Pg9)
F Other options	: With surge suppressor
G Assembly direction	: No option
H Voltage	: 100 VAC 50/60 Hz, 110 VAC 60 Hz

Internal structure and parts list

● SVB1A

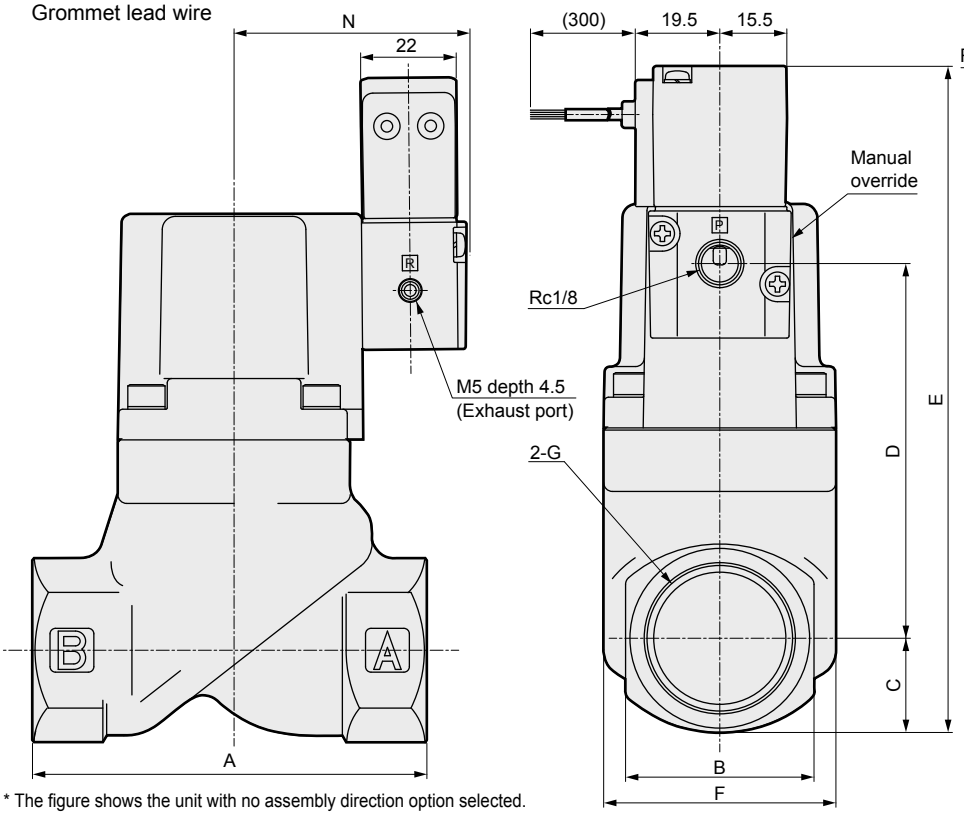


No.	Part name	Material	
1	Pilot solenoid valve	-	-
2	Cylinder guard	ADC12	Aluminum die-casting
3	Spring	SWP	Piano wire
4	Piston	A2017	Aluminum
5	Adaptor	C3604(SUS304)	Copper alloy (stainless steel)
6	Piston rod	SUS304	Stainless steel
7	Main valving element	NBR(FKM, EPDM) SUS304	Nitrile rubber (fluoro rubber, ethylene propylene rubber) stainless steel
8	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
9	O-ring	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)
10	MY packing	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)

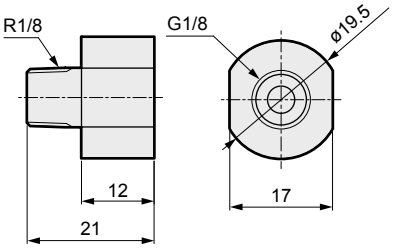
*1 : ( ) shows options.
*2 : For 65F and 80F, the body is FC250 (cast iron), and the main valving element material is FKM.

Dimensions CAD

● SVB*A-8* to 50*-*2C (female thread)
Grommet lead wire



● G thread conversion connector



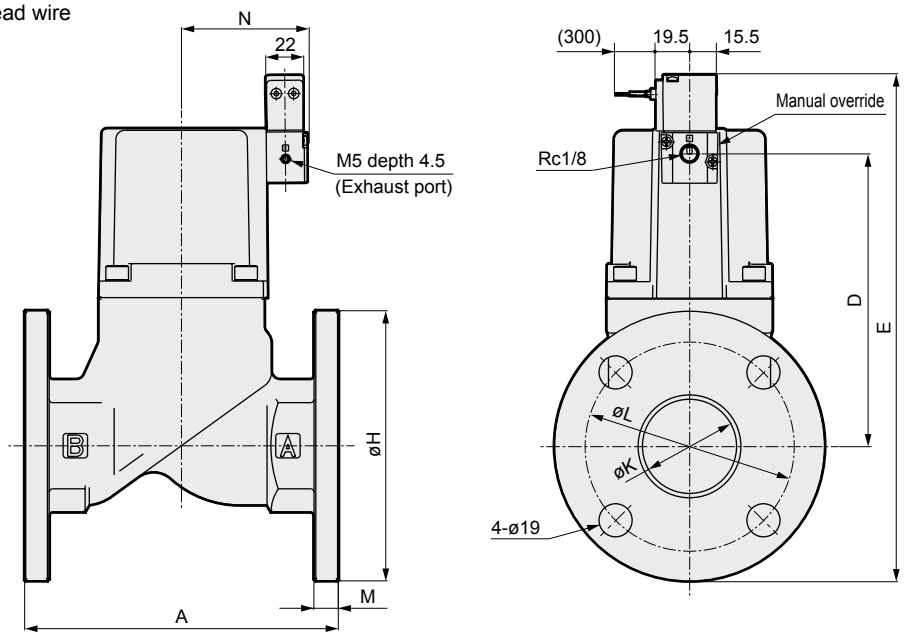
* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	N
SVB*A-8A/G/N	50	24	12	45.5	102.5	32	Rc1/4 / G1/4 / 1/4-18NPT	48.5
SVB*A-10A/G/N							Rc3/8 / G3/8 / 3/8-18NPT	
SVB*A-15A/G/N	71	28	14.5	65.5	125	43	Rc1/2 / G1/2 / 1/2-14NPT	49.5
SVB*A-20A/G/N	80	35	17.5	75	137.5	43	Rc3/4 / G3/4 / 3/4-14NPT	49.5
SVB*A-25A/G/N	90	43	21	85.5	151.5	53	Rc1/G1/1-11.5NPT	53
SVB*A-32A/G/N	125	55	27.5	113.5	186	63	Rc1 1/4 / G1 1/4 / 1 1/4-11.5 NPT	57.5
SVB*A-40A/G/N	140	61	30.5	134.5	210	77	Rc1 1/2 / G1 1/2 / 1 1/2-11.5 NPT	64.5
SVB*A-50A/G/N	160	76	38	168	251	95	Rc2/G2/2-11.5NPT	72.5

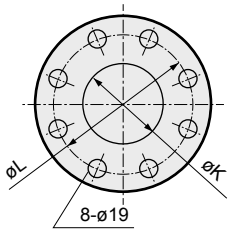
*1: For G thread, a G thread conversion connector is inserted to port P.

Dimensions

● SVB*A-32F to 80F-*2C (flange)
Grommet lead wire



● 80F

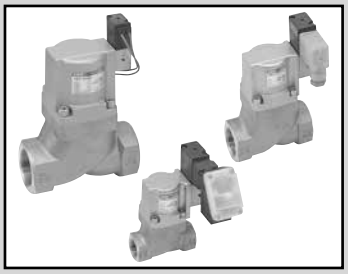


* The figure shows the unit with no assembly direction option selected.

Model No.	A	D	E	H	K	L	M	N
SVB*A-32F	170	113.5	226	135	36	100	12	57.5
SVB*A-40F	180	134.5	249.5	140	42	105	12	64.5
SVB*A-50F	180	168	291	155	54	120	14	72.5
SVB*A-65F	210	203	347.5	175	68	140	16	113
SVB*A-80F	240	218	367.5	185	82	150	16	123

Optional dimensions

Dimensions of DIN terminal box, T type terminal box and mounting plate are the same as those of SVB*W Series. Refer to pages 528 and 529.



Air operated 2-port valve with solenoid valve (cylinder valve)

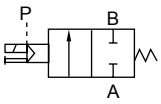
SVB*V Series

- NC (open when energized), NO (closed when energized)
- Port size: Rc1/4 to Rc2, 32 to 50 flange
- Working fluid: Low vacuum

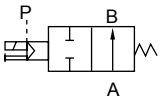
CE Refer to the Ending for details. RoHS CAD

JIS symbol

● NC (open when energized)



● NO (closed when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	SVB1V	SVB2V
Actuation	NC (open when energized)	NO (closed when energized)
Working fluid	Low vacuum (air, water) (*1)	
Working pressure Pa(abs)	1.3 x 10^2 to 7 x 10^5 (refer to the working pressure range in the individual specifications.)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage Pa·m^3/s He	1.33 x 10^{-3} or less	
Pilot fluid	Air	
Mounting orientation	Unrestricted	

*1: Refer to the working fluid check list on Intro Page 39.

Electrical specifications			
Rated voltage		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	When starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)		Grommet lead wire	IPX2
		With DIN terminal box (Pg9)	IPX5
		With T type terminal box (G1/2)	IPX5

*1: Use the product within ±10% of the rated voltage.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	C [dm^3/(s·bar)]	b	S (mm^2)	Working pressure Pa (abs) NC	Working pressure Pa (abs) NO	Pilot pressure (MPa) NC	Pilot pressure (MPa) NO	Pilot port size	Weight (kg) NC	Weight (kg) NO
SVB*V-8A	Rc1/4	10	8.3	0.4	-	1.3×10^2 to 7×10^5	1.3×10^2 to 1×10^6	0.35 (≈51 psi) to 0.7 (≈100 psi)	(*1)	Rc1/8	0.5	
SVB*V-10A	Rc3/8	10	12	0.3	-						0.5	
SVB*V-15A	Rc1/2	15	-	-	140						0.8	
SVB*V-20A	Rc3/4	16	-	-	180						1	
SVB*V-25A	Rc1	20	-	-	280						1.3	
SVB*V-32A	Rc1 1/4	26	-	-	450	1.3×10^2 to 5×10^5	1.3×10^2 to 1×10^6	0.25 (≈36 psi) to 0.7 (≈100 psi)	(*1)		2.5	2.4
SVB*V-32F	32 flange	26	-	-	450						5.5	5.4
SVB*V-40A	Rc1 1/2	32	-	-	680						3.6	3.4
SVB*V-40F	40 flange	32	-	-	680						6.7	6.5
SVB*V-50A	Rc2	42	-	-	1020						5.7	5.4
SVB*V-50F	50 flange	42	-	-	1020						9.6	9.3

*1 : Refer to page 568 for pilot air pressure for the NO.
*2 : Female thread is available in G thread and NPT thread.

How to order

● With solenoid valve

SVB 1 V - 15 A - B 2G S - [ ] - AC100V

- SVB: Model No.
- 1: Ⓐ Actuation
- V: Working fluid (for low vacuum)
- 15: Ⓑ Port size
- A: Ⓒ Type of thread/flange
- B: Ⓓ Body/sealant combination
- 2G: Ⓔ Coil
- S: Ⓕ Other options
- [ ]: Ⓖ Assembly direction
- AC100V: Ⓗ Voltage

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
2	NO (closed when energized)
Ⓑ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
32	1 1/4, 32 (Flange)
40	1 1/2, 40 (Flange)
50	2, 50 (Flange)
Ⓒ Type of thread/flange	
A	Rc(8A to 50A)
F	Flange (32F to 50F)
G	G(8G to 50G)
N	NPT(8N to 50N)

Ⓓ Body/sealant combination

		Body	Seal
0	Standard	Bronze	Nitrile rubber
B	Option	Bronze	Fluoro rubber
P	Option	Bronze	Ethylene propylene rubber
D	Option	Stainless steel	Nitrile rubber
E	Option	Stainless steel	Fluoro rubber
R	Option	Stainless steel	Ethylene propylene rubber

Ⓔ Coil

2C	Standard	Grommet lead wire
2G	Option	With DIN terminal box (Pg9)
2H	Option	DIN terminal box with lamp (Pg9)
3T	Option	With T type terminal box (G1/2)
3R	Option	T type terminal box with lamp (G1/2)

Ⓕ Other options	
Blank	No option
S	With surge suppressor
B	Mounting plate *1

Ⓖ Assembly direction	
Blank	No option
X	Cylinder cover rotated 90°
Y	Cylinder cover rotated 180°
Z	Cylinder cover rotated 270°
R	Coil reversed 180° (with solenoid valve) Mounting plate/coil reversed 180° (with solenoid valve)

Refer to page 525 for the layout drawing.

Ⓗ Voltage	
AC100V	100 VAC 50/60 Hz 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz 220 VAC 60 Hz
DC24V	24 VDC

⚠ Precautions for model No. selection

*1 : The mounting plate (Item Ⓕ B) can be attached to only the female thread of port size 8 to 32.
*2 : To add both the surge suppressor and mounting plate options, specify Item Ⓕ as SB.
*3 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*4 : Manual override (non-locking) is provided as standard.

[Example of model No.]

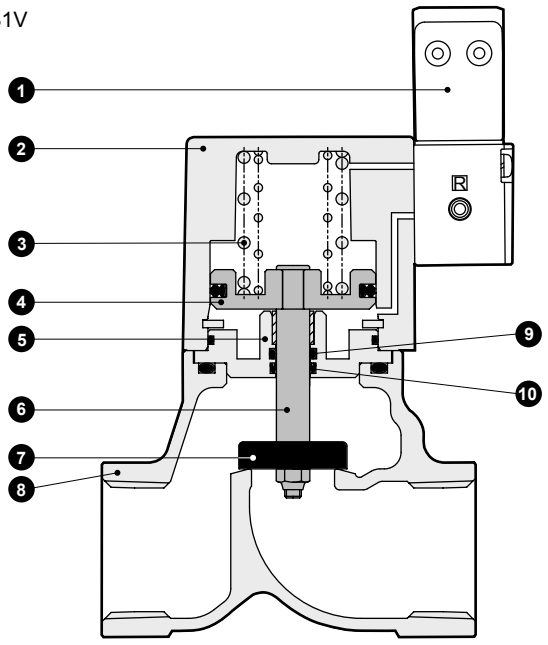
SVB1V-15A-B2GS-AC100V

Model: SVB

Ⓐ Actuation	: NC (open when energized)
Ⓑ Port size	: 1/2
Ⓒ Type of thread/flange	: Rc
Ⓓ Body/sealant combination	: Body - bronze, sealant - fluoro rubber
Ⓔ Coil	: With DIN terminal box (Pg9)
Ⓕ Other options	: With surge suppressor
Ⓖ Assembly direction	: No option
Ⓗ Voltage	: 100 VAC 50/60 Hz, 110 VAC 60 Hz

Internal structure and parts list

● SVB1V

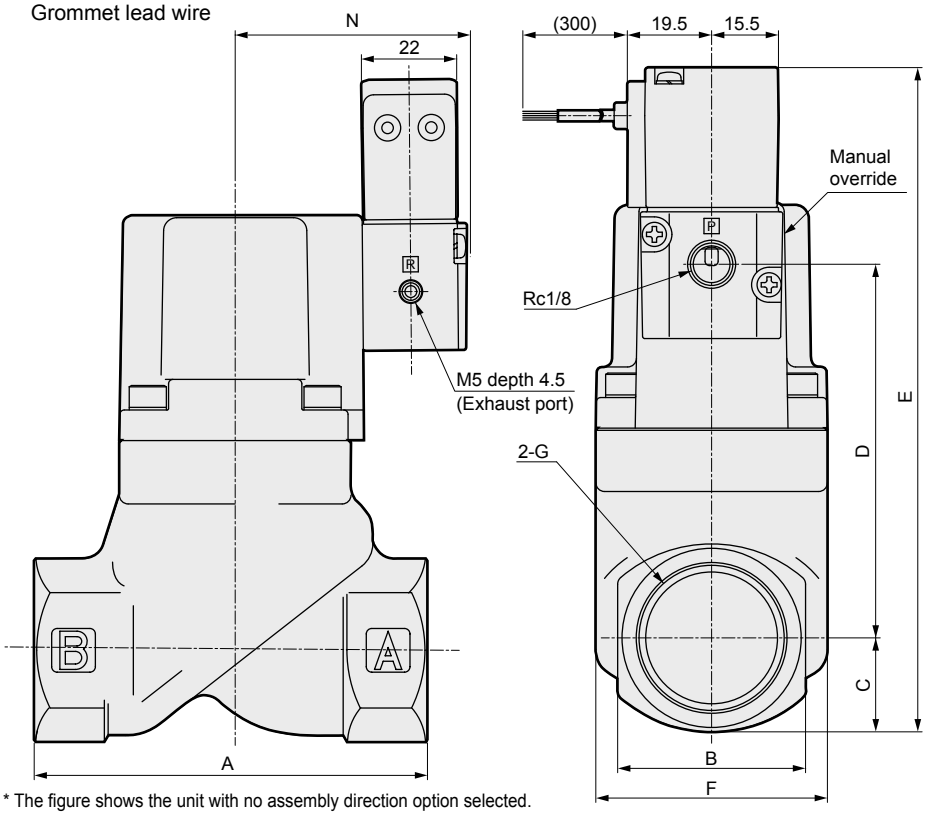


No.	Part name	Material	
1	Pilot solenoid valve	-	-
2	Cylinder guard	ADC12	Aluminum die-casting
3	Spring	SWP	Piano wire
4	Piston	A2017	Aluminum
5	Adaptor	C3604(SUS304)	Copper alloy (stainless steel)
6	Piston rod	SUS304	Stainless steel
7	Main valving element	NBR(FKM, EPDM) SUS304	Nitrile rubber (fluoro rubber, ethylene propylene rubber) stainless steel
8	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
9	O-ring	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)
10	MY packing	NBR(FKM, EPDM)	NBR (FPM, EPM rubber)

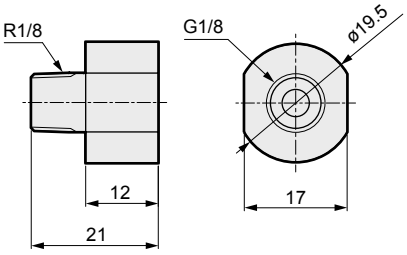
( ) shows options.

Dimensions CAD

● SVB*V-8* to 50*-*2C (female thread)
Grommet lead wire



● G thread conversion connector



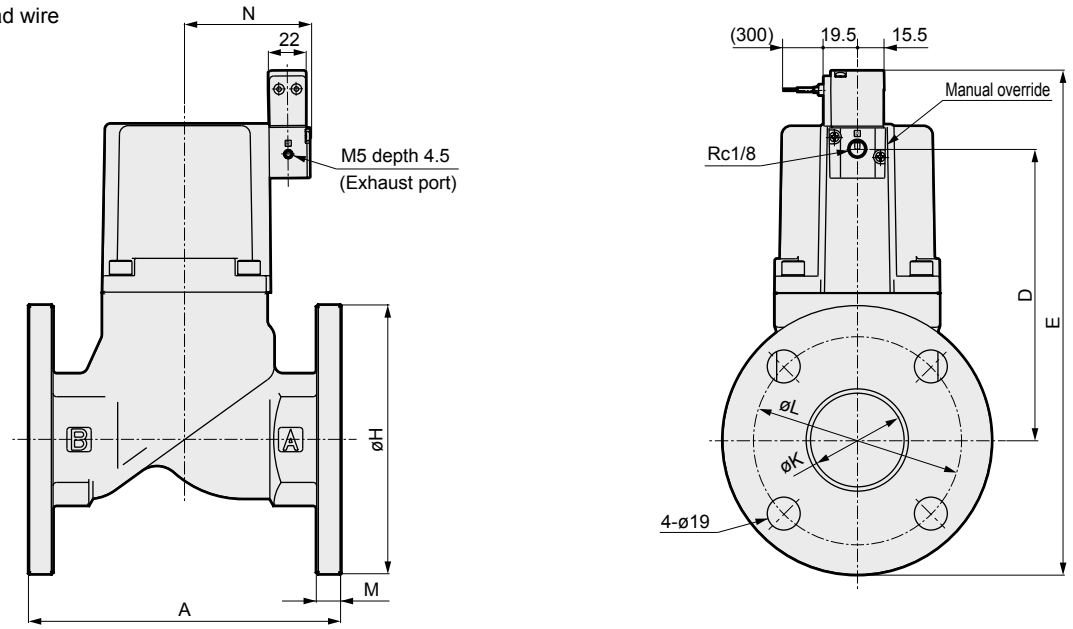
* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	N
SVB*V-8A	50	24	12	45.5	102.5	32	Rc1/4 / G1/4 / 1/4-18NPT	48.5
SVB*V-10A							Rc3/8 / G3/8 / 3/8-18NPT	
SVB*V-15A	71	28	14.5	65.5	125	43	Rc1/2 / G1/2 / 1/2-14NPT	49.5
SVB*V-20A	80	35	17.5	75	137.5	43	Rc3/4 / G3/4 / 3/4-14NPT	49.5
SVB*V-25A	90	43	21	85.5	151.5	53	Rc1/G1/1-11.5NPT	53
SVB*V-32A	125	55	27.5	113.5	186	63	Rc1 1/4 / G1 1/4 / 1 1/4-11.5 NPT	57.5
SVB*V-40A	140	61	30.5	134.5	210	77	Rc1 1/2 / G1 1/2 / 1 1/2-11.5 NPT	64.5
SVB*V-50A	160	76	38	168	251	95	Rc2/G2/2-11.5NPT	72.5

*1: For G thread, a G thread conversion connector is inserted to port P.

Dimensions

● SVB*V-32F to 50F-*2C (flange)
Grommet lead wire



* The figure shows the unit with no assembly direction option selected.

Model No.	A	D	E	H	K	L	M	N
SVB*V-32F	170	113.5	226	135	36	100	12	57.5
SVB*V-40F	180	134.5	249.5	140	42	105	12	64.5
SVB*V-50F	180	168	291	155	54	120	14	72.5

Optional dimensions

Dimensions of DIN terminal box, T type terminal box and mounting plate are the same as those of SVB*W Series. Refer to pages 528 and 529.

Air operated 2-port valve with solenoid valve (cylinder valve)

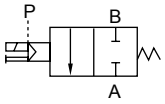
SVB*S Series

- NC (open when energized), NO (closed when energized)
- Port size: Rc1/4 to Rc2, 32 to 50 flange
- Working fluids: Steam, water, air

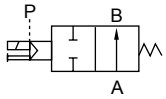
CE Refer to the Ending for details. RoHS CAD

JIS symbol

● NC (open when energized)



● NO (closed when energized)



Common specifications

1 MPa = 10 bar

Item	SVB1S	SVB2S
Actuation	NC (open when energized)	NO (closed when energized)
Working fluid	Steam/water/air/non-corrosive liquid (*1)	
Fluid viscosity mm²/s	500 or less	
Working pressure MPa	0 (≈0 psi, 0 bar) to 1 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)	
Fluid temperature °C	-10 (14°F) to 184 (363.2°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm³/min	300 or less (at pneumatic pressure 0.02 to 1 MPa)	
Pilot fluid	Air	
Pilot pressure MPa	0.35 (≈51 psi) to 0.7 (≈100 psi)	Refer to page 568.
Mounting orientation	Unrestricted	

*1: Refer to the working fluid check list on Intro Page 39.

Electrical specifications			
Rated voltage		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	When starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)		Grommet lead wire	IPX2
		With DIN terminal box (Pg9)	IPX5
		With T type terminal box (G1/2)	IPX5

*1: Use the product within ±10% of the rated voltage.

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	C [dm³/(s·bar)]	b	S (mm²)	Cv	Pilot port size	Weight (kg)
NC: Normally closed								
SVB1S-8A	Rc1/4	10	8.3	0.4	-	2.1	Rc1/8	0.5
SVB1S-10A	Rc3/8	10	11	0.4	-	2.5		0.5
SVB1S-15A	Rc1/2	15	-	-	120	5.5		0.8
SVB1S-20A	Rc3/4	16	-	-	150	7		1
SVB1S-25A	Rc1	20	-	-	240	11		1.4
SVB1S-32A	Rc1¼	26	-	-	390	18.5		2.6
SVB1S-32F	32 flange	26	-	-	390	18.5		5.6
SVB1S-40A	Rc1½	32	-	-	610	29		3.7
SVB1S-40F	40 flange	32	-	-	610	29		6.8
SVB1S-50A	Rc2	42	-	-	920	43		5.6
SVB1S-50F	50 flange	42	-	-	920	43		9.5
NO: Normally open type								
SVB2S-8A	Rc1/4	10	8.9	0.4	-	2.3	Rc1/8	0.5
SVB2S-10A	Rc3/8	10	12	0.3	-	2.6		0.5
SVB2S-15A	Rc1/2	15	-	-	140	5.6		0.8
SVB2S-20A	Rc3/4	16	-	-	180	8		1
SVB2S-25A	Rc1	20	-	-	280	12		1.4
SVB2S-32A	Rc1¼	26	-	-	450	20		2.6
SVB2S-32F	32 flange	26	-	-	450	20		5.6
SVB2S-40A	Rc1½	32	-	-	680	32		3.7
SVB2S-40F	40 flange	32	-	-	680	32		6.8
SVB2S-50A	Rc2	42	-	-	1020	50		5.6
SVB2S-50F	50 flange	42	-	-	1020	50		9.5

*1 : Refer to page 568 for pilot air pressure for the NO.
*2 : Female thread is available in G thread and NPT thread.

How to order

● With solenoid valve

SVB 1 S - 15 A - E 2G L - ( ) - AC100V

- SVB: Model No.
- 1: Ⓐ Actuation
- S: Working fluid (For steam/water/air)
- 15: Ⓑ Port size
- A: Ⓒ Type of thread/flange
- E: Ⓓ Body/sealant combination *1
- 2G: Ⓔ Coil
- L: Ⓕ Other options *2 *3 *4 *5 *6
- ( ): Ⓖ Assembly direction
- AC100V: Ⓗ Voltage

Code	Description
Ⓐ Actuation	
1	NC (open when energized)
2	NO (closed when energized)
Ⓑ Port size	
8	1/4
10	3/8
15	1/2
20	3/4
25	1
32	1 1/4, 32 (Flange)
40	1 1/2, 40 (Flange)
50	2, 50 (Flange)
Ⓒ Type of thread/flange	
A	Rc(8A to 50A)
F	Flange (32F to 50F)
G	G(8G to 50G)
N	NPT(8N to 50N)

Ⓓ Body/sealant combination

	Body	Seal	O-ring	Remarks
C	Bronze	TFE resin	Fluoro rubber	Steam/ air/water
E	Stainless steel	TFE resin	Fluoro rubber	
F	Stainless steel	TFE resin	TFE resin	Solvent-based

Ⓔ Coil		
2C	Standard	Grommet lead wire
2G	Option	With DIN terminal box (Pg9)
2H		DIN terminal box with lamp (Pg9)
3T		With T type terminal box (G1/2)
3R		T type terminal box with lamp (G1/2)

Ⓕ Other options	
Blank	No option
S	With surge suppressor
B	Mounting plate *2
L	With indicator

Ⓖ Assembly direction	
Blank	No option
X	Cylinder cover rotated 90°
Y	Cylinder cover rotated 180°
Z	Cylinder cover rotated 270°
R	Coil reversed 180° (with solenoid valve) Mounting plate/coil reversed 180° (with solenoid valve)

Refer to page 525 for the layout drawing.

Ⓗ Voltage	
AC100V	100 VAC 50/60 Hz 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz 220 VAC 60 Hz
DC24V	24 VDC

⚠ Precautions for model No. selection

*1 : When the working fluid is steam, select C or E.
*2 : The mounting plate (Item Ⓕ B) can be attached to only the female thread of port size 8 to 32.
*3 : Indicator (Item Ⓕ L) can be attached to only the NC (actuation 1).
*4 : To add multiple options for Item Ⓕ, specify as below.
Surge suppressor + mounting plate → SB
Surge suppressor + indicator → SL
Mounting plate + indicator → BL
Surge suppressor + mounting plate + indicator → SBL
*5 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*6 : Manual override (non-locking) is provided as standard.

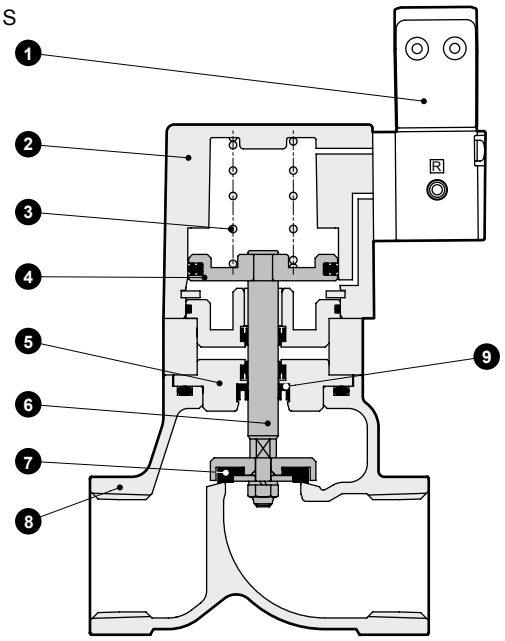
[Example of model No.]

SVB1S-15A-E2GL-AC100V

Model: SVB
Ⓐ Actuation : NC (open when energized)
Ⓑ Port size : 1/2
Ⓒ Type of thread/flange : Rc
Ⓓ Body/sealant combination : Body - stainless steel, sealant - tetrafluoroethylene resin
Ⓔ Coil : With DIN terminal box (Pg9)
Ⓕ Other options : Indicator
Ⓖ Assembly direction : No option
Ⓗ Voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

Internal structure and parts list

● SVB1S

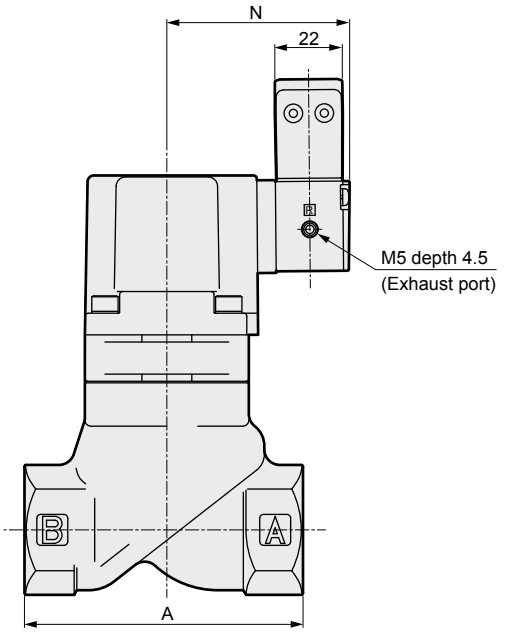


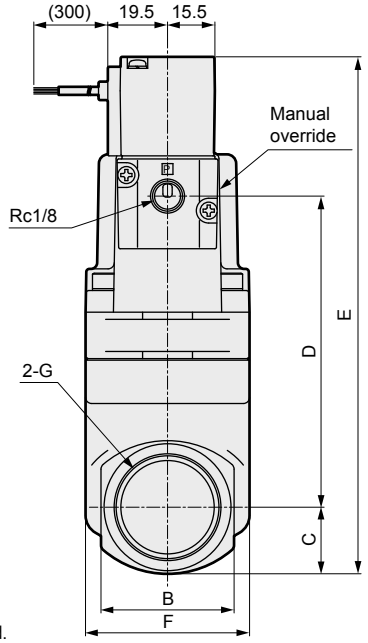
No.	Part name	Material	
1	Pilot solenoid valve	-	-
2	Cylinder guard	ADC12	Aluminum die-casting
3	Spring	SWP	Piano wire
4	Piston	A2017	Aluminum
5	Adaptor	C3604(SUS304)	Copper alloy (stainless steel)
6	Piston rod	SUS304	Stainless steel
7	Main valving element	PTFE	Tetrafluoroethylene resin
8	Body	CAC408(SUS13)	Bronze casting (stainless steel casting)
9	Rod packing	PTFE	Tetrafluoroethylene resin

( ) shows options.

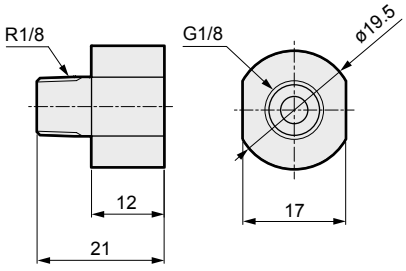
Dimensions CAD

● SVB*S-8* to 50*-*2C (female thread)
Grommet lead wire





● G thread conversion connector

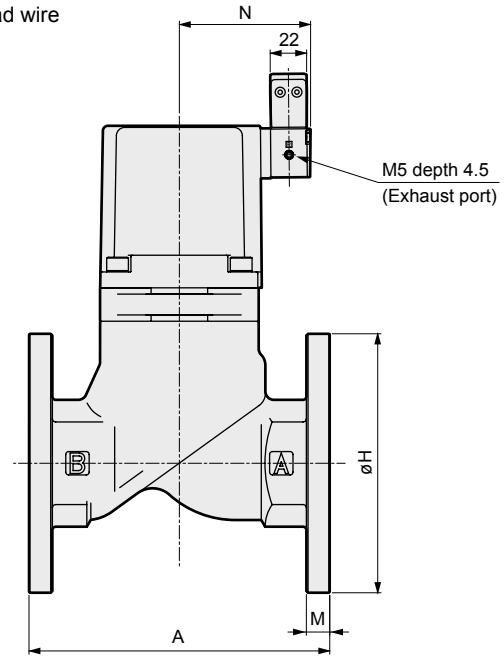


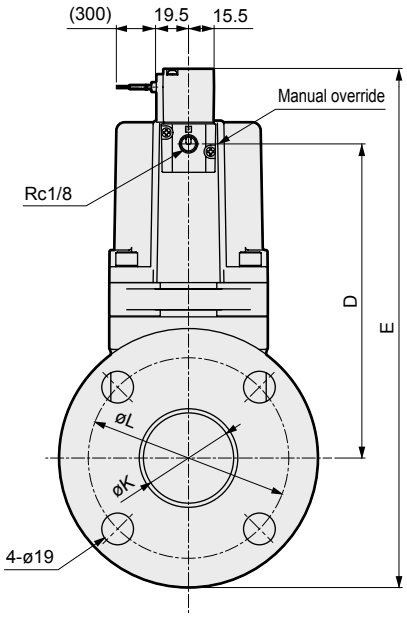
* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	N
SVB*S-8A/G/N	50	24	12	56.5	113.5	32	Rc1/4 / G1/4 / 1/4-18NPT	54.5
SVB*S-10A/G/N							Rc3/8 / G3/8 / 3/8-18NPT	
SVB*S-15A/G/N	71	28	14.5	81.5	141	43	Rc1/2 / G1/2 / 1/2-14NPT	55.5
SVB*S-20A/G/N	80	35	17.5	91	153.5	43	Rc3/4 / G3/4 / 3/4-14NPT	55.5
SVB*S-25A/G/N	90	43	21	102	168	53	Rc1/G1/1-11.5NPT	59
SVB*S-32A/G/N	125	55	27.5	128.5	201	63	Rc1 1/4 / G1 1/4 / 1 1/4-11.5 NPT	63.5
SVB*S-40A/G/N	140	61	30.5	154.5	230	77	Rc1 1/2 / G1 1/2 / 1 1/2-11.5 NPT	70.5
SVB*S-50A/G/N	160	76	38	188	271	95	Rc2/G2/2-11.5NPT	78.5

*1: For G thread, a G thread conversion connector is inserted to port P.

● SVB*S-32F to 50F-*2C (flange)
Grommet lead wire



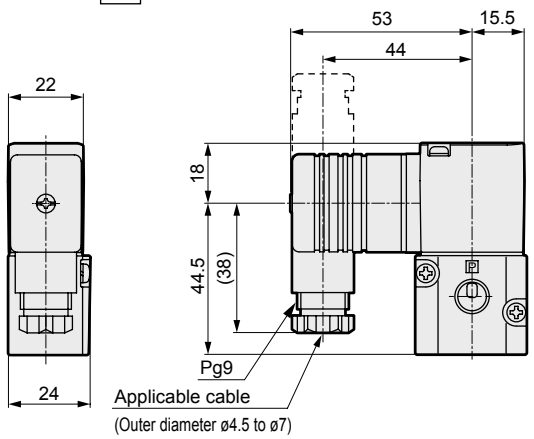


* The figure shows the unit with no assembly direction option selected.

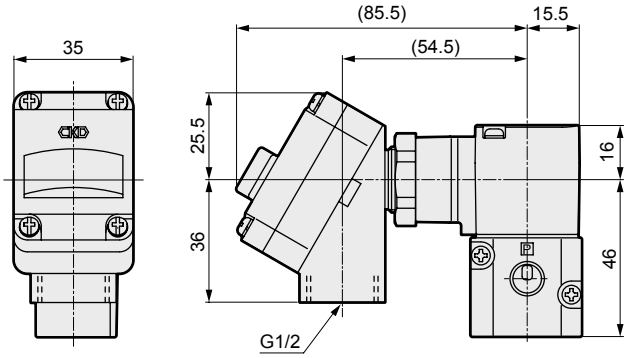
Model No.	A	D	E	H	K	L	M	N
SVB*S-32F	170	128.5	241	135	36	100	12	63.5
SVB*S-40F	180	154.5	269.5	140	42	105	12	70.5
SVB*S-50F	180	188	311	155	54	120	14	78.5

Optional dimensions

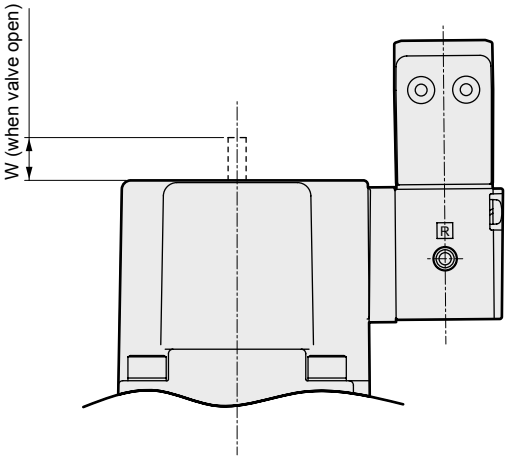
● DIN terminal box (Pg9) DIN terminal box with lamp (Pg9)
SVB*S-*-* 2G 2H



● T type terminal box (G1/2) T type terminal box with lamp (G1/2)
SVB*S-*-* 3T 3R



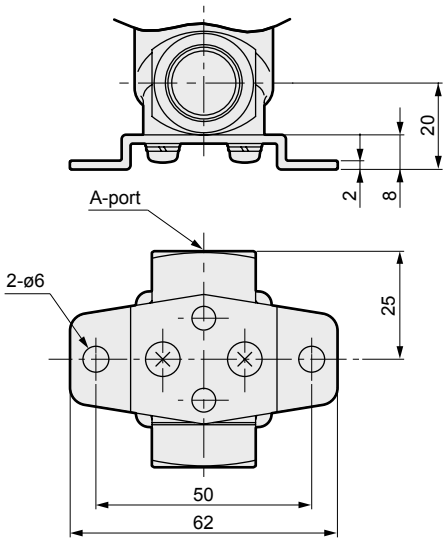
● Indicator
SVB1S-8* to 50*-** L



Model No.	W
SVB1S-8A/G/N	4
SVB1S-10A/G/N	4
SVB1S-15A/G/N	6.5
SVB1S-20A/G/N	6.5
SVB1S-25A/G/N	7
SVB1S-32A/G/N/F	8
SVB1S-40A/G/N/F	10.5
SVB1S-50A/G/N/F	13

● Mounting plate
SVB*S-8*/10*-** B

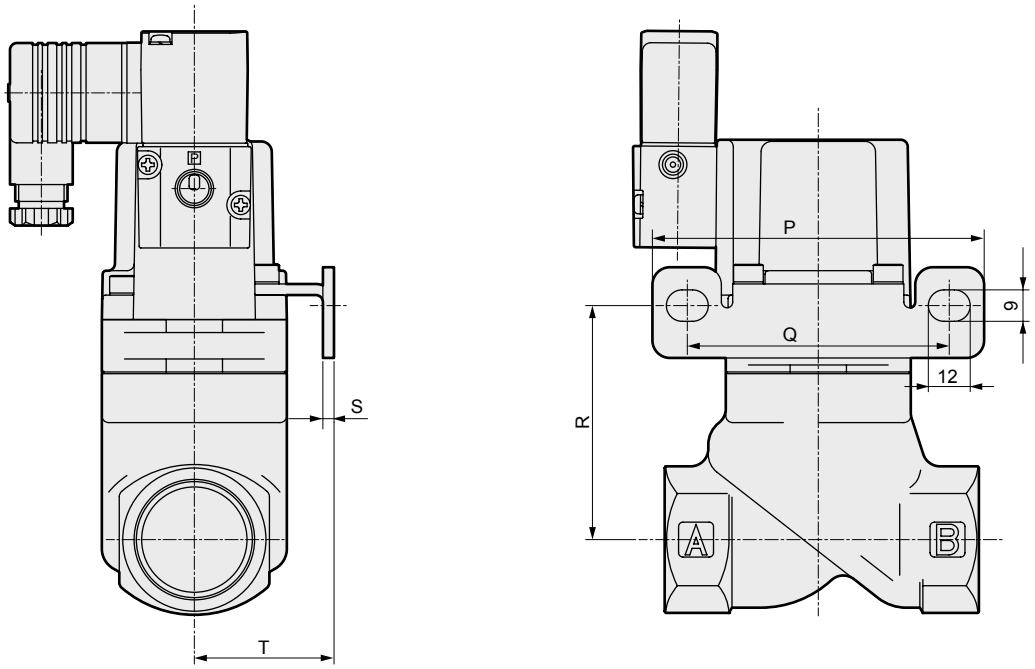
Material: Steel
Zinc plated



Optional dimensions

● Mounting plate
SVB*S-15* to 32*-** B / B-R / B-Y

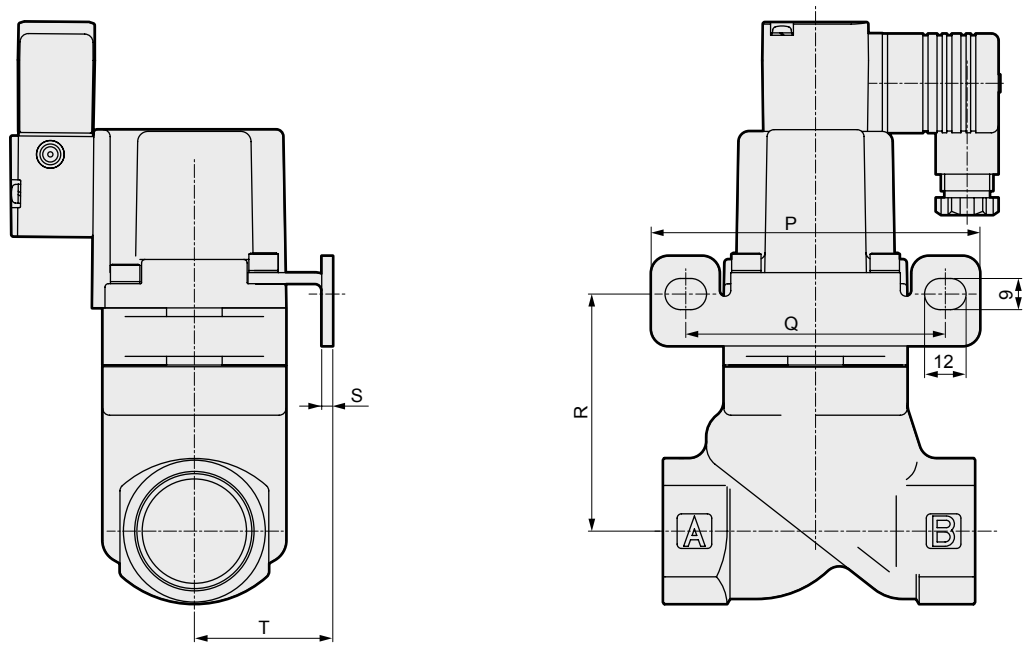
Material: Steel
Zinc plated



* The figure shows B.

● Mounting plate
SVB*S-15* to 32*-** B-X / B-Z

Material: Steel
Zinc plated



* The figure shows B-X.

Model No.	P	Q	R	S	T
SVB*S-15A/G/N	90	70	55	2.3	30
SVB*S-20A/G/N	90	70	64.5	2.3	30
SVB*S-25A/G/N	95	75	68.5	3.2	40
SVB*S-32A/G/N	105	85	81.5	3.2	45

Air operated 2-port valve, single unit
(Compact cylinder valve)

NAB*/NAB*V Series

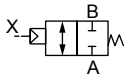
- NC, NO, double acting
- Port size: Rc1/4, Rc3/8
- Working fluids: Air, water, gas, low vacuum

RoHS CAD

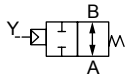
JIS symbol

● NAB*
(*1)

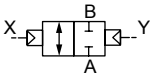
NC



NO



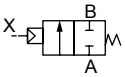
Double acting



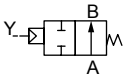
*1: If port B is normally pressurized, refer to the individual precautions on page 567 (*1 and *2).

● NAB*V

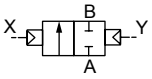
NC



NO



Double acting



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	NAB*			NAB*V		
	NAB1	NAB2	NAB3	NAB1V	NAB2V	NAB3V
Actuation	NC	NO	Double acting	NC	NO	Double acting
Working fluid	Air/water/gas (*2)			Low vacuum (air, water) (*2)		
Fluid viscosity mm^2/s	500 or less					
Working pressure	0 (≈0 psi) to 0.7 MPa (≈100 psi)			1.3×10^2 to 7×10^5Pa(abs)		
Proof pressure (water pressure) MPa	1.4 (≈200 psi, 14 bar)					
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing) (*3)					
Ambient temperature °C	-10 (14°F) to 60 (140°F)					
Valve seat leakage	0.12 cm^3/min or less (pneumatic pressure)			1.33 x 10^{-3} Pa·m^3/sHe or less		
Port size	Rc1/4, Rc3/8					
Orifice size mm	7					
Cv	1.2					
C $[dm^3/(s\cdot bar)]$	5.2 (*4)					
b	0.3					
Weight kg	0.28 (depends on type)					
Mounting orientation	Unrestricted					
Pilot fluid	Air					
Pilot pressure MPa	0.25 to 0.7	(*5)		0.25 to 0.7	(*5)	
Pilot port size	Rc1/8 (depends on type)					

*2 : Refer to the working fluid check list on Intro Page 39.
*3 : The same for nitrile rubber seal and fluoro rubber seal.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : Refer to page 568 for the pilot air pressure for the NO and double acting.

How to order

NAB 1 V - 8 - D2 B - CL4

Model No.

Ⓐ Actuation

Ⓑ Working fluid

Ⓒ Port size

Ⓓ Cylinder cover/body/sealant combination
*6
*7

Ⓔ Other options

Ⓕ Pilot port size
*6

Code	Description
Ⓐ Actuation	
1	NC
2	NO
3	Double acting
Ⓑ Working fluid	
Blank	General purpose (air/water/gas)
V	Low vacuum (air/water)
Ⓒ Port size	
8	Rc1/4
10	Rc3/8

Ⓓ Cylinder cover/body/sealant combination

	Cylinder guard	Body	Seal
02	Polyphenylene sulfide	Copper alloy	Nitrile rubber
B2	Polyphenylene sulfide	Copper alloy	Fluoro rubber
D2	Polyphenylene sulfide	Stainless steel	Nitrile rubber
E2	Polyphenylene sulfide	Stainless steel	Fluoro rubber
Blank	Aluminum die-casting	Copper alloy	Nitrile rubber
B	Aluminum die-casting	Copper alloy	Fluoro rubber
D	Aluminum die-casting	Stainless steel	Nitrile rubber
E	Aluminum die-casting	Stainless steel	Fluoro rubber

Ⓔ Other options	
Blank	No option
B	Mounting plate
Ⓕ Pilot port size	
C18	ø1.8 push-in fitting for fiber tube
CL18	ø1.8 radial push-in fitting for fiber tube
C4	ø4 push-in fitting
CL4	ø4 radial push-in fitting
C6	ø6 push-in fitting
CL6	ø6 radial push-in fitting
Blank	Rc1/8

⚠ Precautions for model No. selection

*6 : For Item Ⓓ02/B2/D2/E2, select Item Ⓕ.(If Item Ⓓis blank/B/D/E, pilot port size is Rc1/8.)
*7 : If selecting Item Ⓓas Blank for material combination and Item ⒺOther options, specify Item Ⓓas 0.

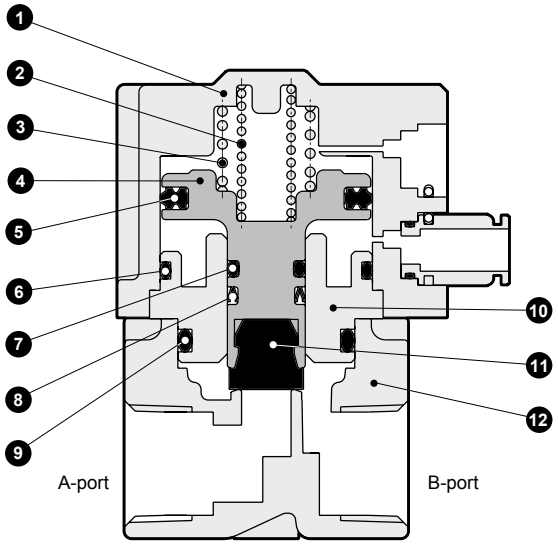
[Example of model No.]

NAB1V-8-D2B-CL4

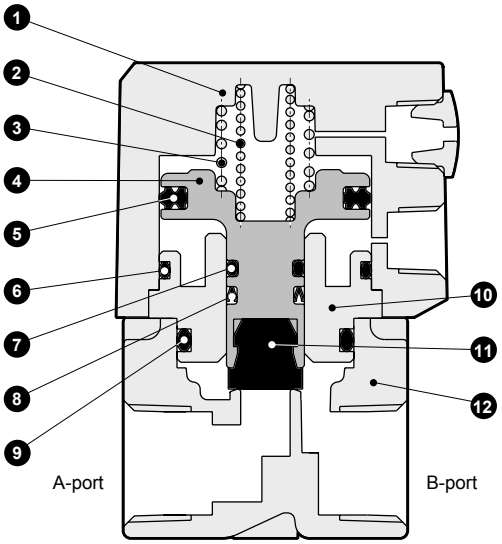
Model: NAB
Ⓐ Actuation : NC
Ⓑ Working fluid : Low vacuum (air, water)
Ⓒ Port size : Rc1/4
Ⓓ Cylinder cover/body/sealant combination
: Cylinder cover - polyphenylene sulfide
Body - stainless steel
Sealant - nitrile rubber
Ⓔ Other options : Mounting plate
Ⓕ Pilot port size : ø4 radial push-in fitting

Internal structure and parts list

● NAB1-*-02/B2/D2/E2



● NAB1-*

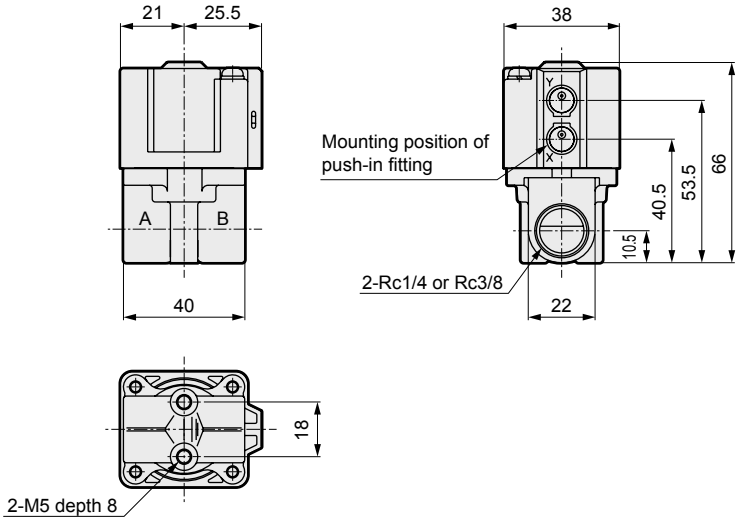


No.	Part name	Material	
1	Cylinder guard	PPS(ADC12)	Polyphenylene sulfide (aluminum die-casting)
2	Spring	SWP	Piano wire
3			
4	Piston	PPS	Polyphenylene sulfide
5	PSD packing	NBR	Nitrile rubber
6	O-ring	NBR	Nitrile rubber
7	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
8	MY packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
10	Adaptor	C3604(SUS303)	Copper alloy (stainless steel)
11	Valving element	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Body	C3771(SCS13)	Copper alloy (stainless steel casting)

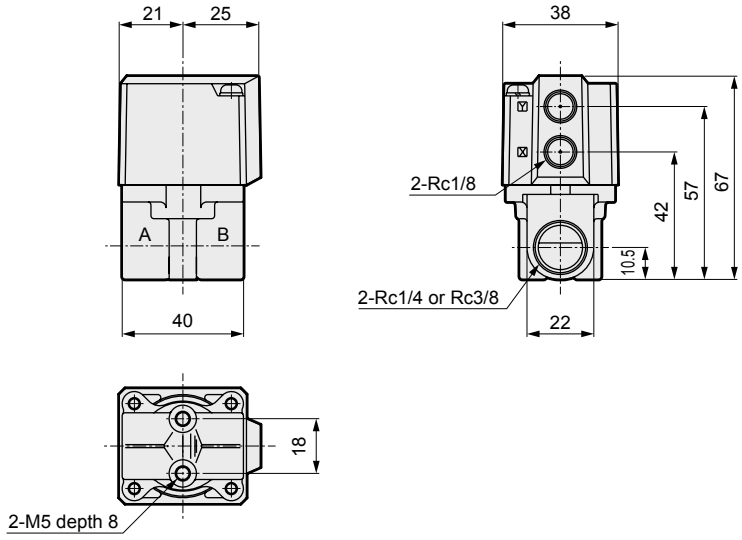
( ) shows options.

Dimensions

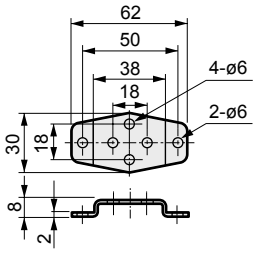
● NAB*-8/10-02/B2/D2/E2
NAB*V-8/10-02/B2/D2/E2



● NAB*-8/10
NAB*V-8/10



● Mounting plate
NAB*-8/10-** B
NAB*V-8/10-** B

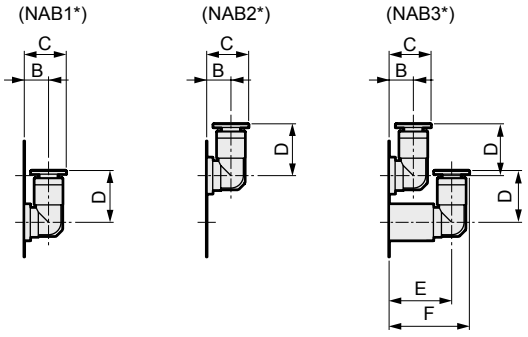


Material: Steel
Zinc plated

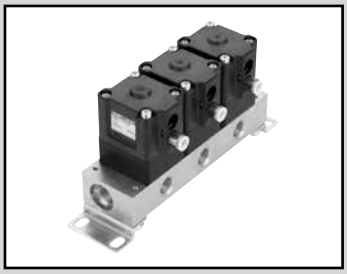
● Axial push-in fitting
NAB*-8/10-02/B2/D2/E2
NAB*V-8/10-02/B2/D2/E2

Pilot port size	A
C4	7
C6	8.5
C18	3.5

● Radial push-in fitting
NAB*-8/10-02/B2/D2/E2
NAB*V-8/10-02/B2/D2/E2



Pilot port size	B	C	D	E	F
CL4	6.5	11.5	14	17	22
CL6	7.5	12.5	16	18	23
CL18	4	7	8.5	11	14



Air operated 2-port valve, manifold
(Compact cylinder valve)

GNAB*/GNAB*V Series

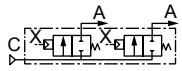
- NC, NO, double acting
- Port size: Rc1/4, Rc3/8
- Working fluids: Air, water, gas, low vacuum

RoHS CAD

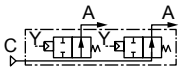
JIS symbol

● Common supply
(port C pressurization, port A vacuum pump side)

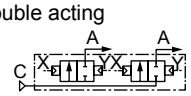
NC



NO

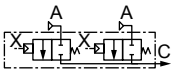


Double acting

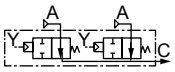


● Individual supply
(port A pressurization, port C vacuum pump side)

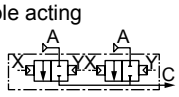
NC



NO



Double acting



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	GNAB*			GNAB*V		
	GNAB1	GNAB2	GNAB3	GNAB1V	GNAB2V	GNAB3V
Actuation	NC	NO	Double acting	NC	NO	Double acting
Working fluid	Air/water/gas (*1)			Low vacuum (air, water) (*1)		
Fluid viscosity mm^2/s	500 or less					
Working pressure	0 (≈0 psi) to 0.7 MPa (≈100 psi)			1.3×10^2 to 7×10^5Pa(abs)		
Proof pressure (water pressure) MPa	1.4 (≈200 psi, 14 bar)					
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing) (*2)					
Ambient temperature °C	-10 (14°F) to 60 (140°F)					
Valve seat leakage	0.12 cm^3/min or less (pneumatic pressure)			1.33 x 10^{-3} Pa·m^3/sHe or less		
Orifice size mm	7					
Cv	1.0					
C $[dm^3/(s\cdot bar)]$	3.8 (*3)					
b	0.3					
Mounting orientation	Unrestricted					
Pilot fluid	Air					
Pilot pressure MPa	0.25 to 0.7	(*4)		0.25 to 0.7	(*4)	
Pilot port size	Rc1/8 (depends on type)					

*1 : Refer to the working fluid check list on Intro Page 39.
*2 : The same for nitrile rubber seal and fluoro rubber seal.
*3 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*4 : Refer to page 568 for the pilot air pressure for the NO and double acting.

How to order

GNAB 2 V - 1 - 2 - B2 - CL4

Model No.

Ⓐ Actuation

Ⓑ Working fluid

Ⓒ Air supply category

Ⓓ Manifold station No.

Ⓔ Cylinder cover/sub-plate/body/sealant combination *5

Ⓕ Pilot port size *5

Code	Description
Ⓐ Actuation	
1	NC
2	NO
3	Double acting
Ⓑ Working fluid	
Blank	General purpose (air/water/gas)
V	Low vacuum (air/water)
Ⓒ Air supply category	
1	Common supply (port C pressurization), port A vacuum pump side
5	Individual supply (port A pressurization), port C vacuum pump side
Ⓓ Manifold station No.	
2 to 10	2 stations to 10 stations
0	Actuator only

Ⓔ Cylinder cover/sub-plate/body/sealant combination

	Cylinder guard	Sub-plate	Body	Seal
02	Polyphenylene sulfide	Copper alloy	Polypropylene	Nitrile rubber
B2	Polyphenylene sulfide	Copper alloy	Polypropylene	Fluoro rubber
62	Polyphenylene sulfide	Stainless steel	Polypropylene	Nitrile rubber
72	Polyphenylene sulfide	Stainless steel	Polypropylene	Fluoro rubber
D2	Polyphenylene sulfide	Stainless steel	Stainless steel	Nitrile rubber
E2	Polyphenylene sulfide	Stainless steel	Stainless steel	Fluoro rubber
12	Polyphenylene sulfide	Aluminum	Polypropylene	Nitrile rubber
22	Polyphenylene sulfide	Aluminum	Polypropylene	Fluoro rubber
Blank	Aluminum die-casting	Copper alloy	Polypropylene	Nitrile rubber
B	Aluminum die-casting	Copper alloy	Polypropylene	Fluoro rubber
6	Aluminum die-casting	Stainless steel	Polypropylene	Nitrile rubber
7	Aluminum die-casting	Stainless steel	Polypropylene	Fluoro rubber
D	Aluminum die-casting	Stainless steel	Stainless steel	Nitrile rubber
E	Aluminum die-casting	Stainless steel	Stainless steel	Fluoro rubber
1	Aluminum die-casting	Aluminum	Polypropylene	Nitrile rubber
2	Aluminum die-casting	Aluminum	Polypropylene	Fluoro rubber

Ⓕ Pilot port size	
C18	ø1.8 push-in fitting for fiber tube
CL18	ø1.8 radial push-in fitting for fiber tube
C4	ø4 push-in fitting
CL4	ø4 radial push-in fitting
C6	ø6 push-in fitting
CL6	ø6 radial push-in fitting
Blank	Rc1/8

⚠ Precautions for model No. selection

*5 : For Item Ⓔ02/B2/62/72/D2/E2/12/22, select Item Ⓕ.
(If Item Ⓔis blank/B/6/7/D/E1/2, pilot port size will be Rc1/8.)

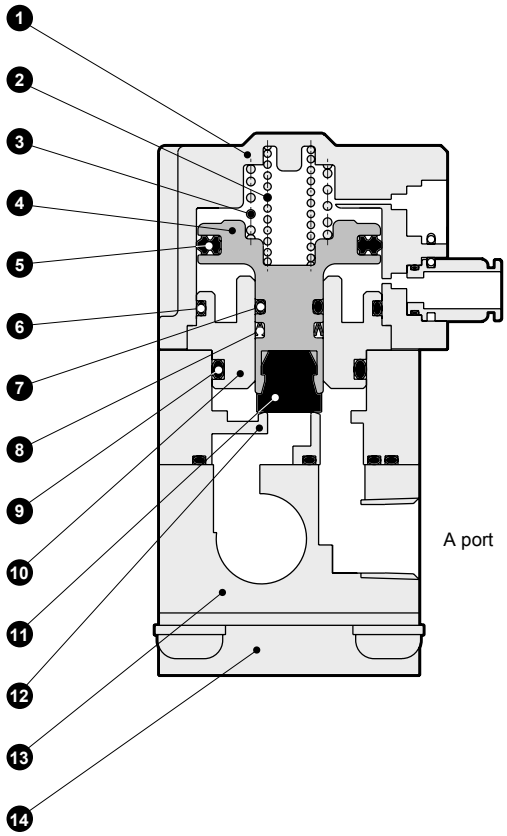
[Example of model No.]

GNAB2V-1-2-B2-CL4

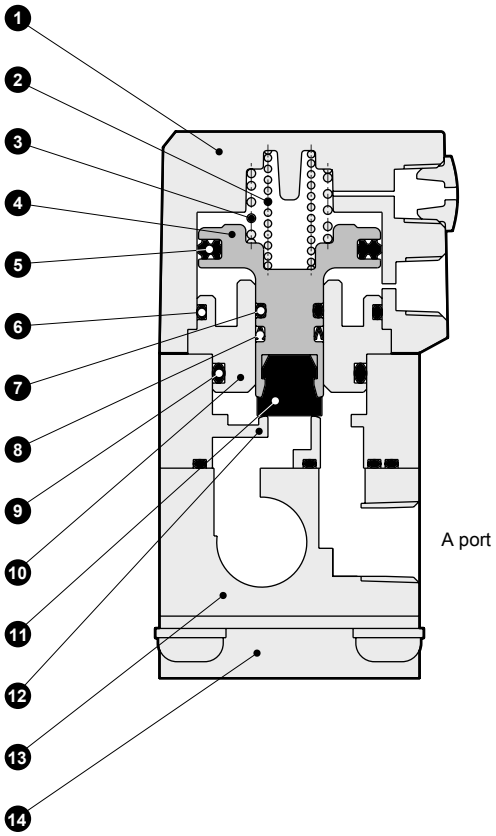
Model: GNAB
Ⓐ Actuation : NO
Ⓑ Working fluid : Low vacuum (air, water)
Ⓒ Air supply category : Port A vacuum pump side
Ⓓ Manifold station No.: 2 stations
Ⓔ Cylinder cover/sub-plate/body/sealant combination
: Cylinder cover - polyphenylene sulfide
Sub-plate - copper alloy
Body - polypropylene
Sealant - fluoro rubber
Ⓕ Pilot port size : ø4 radial push-in fitting

Internal structure and parts list

● GNAB1-1-*-02/B2/D2/E2/12/22



● GNAB1-1-*



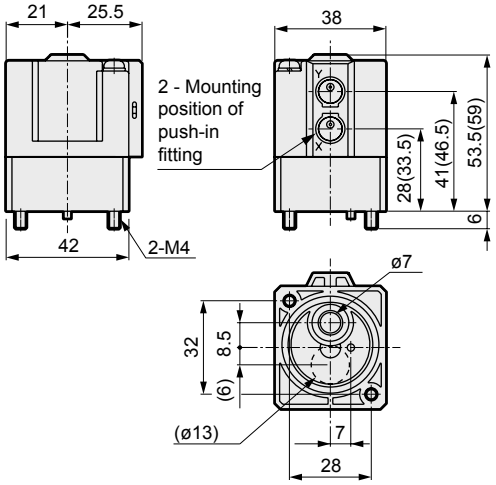
No.	Part name	Material	
1	Cylinder guard	PPS(ADC12)	Polyphenylene sulfide (aluminum die-casting)
2	Spring	SWP	Piano wire
3			
4	Piston	PPS	Polyphenylene sulfide
5	PSD packing	NBR	Nitrile rubber
6	O-ring	NBR	Nitrile rubber
7	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
8	MY packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
10	Adaptor	C3604(SUS303)	Copper alloy (stainless steel)
11	Valving element	NBR(FKM)	Nitrile rubber (fluoro rubber)
12	Body	PP(SUS303)	Polypropylene (stainless steel)
13	Sub-plate	C3604(SUS303, A6063)	Copper alloy (stainless steel/aluminum)
14	Mounting plate	SPC	Steel

( ) shows options.

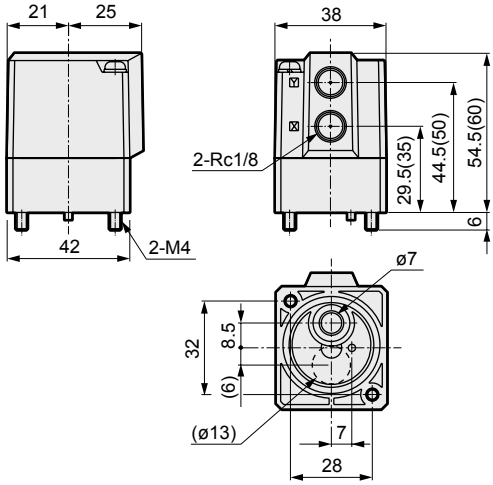
Dimensions: Actuator

Common supply (port C pressurization, port A vacuum pump side)

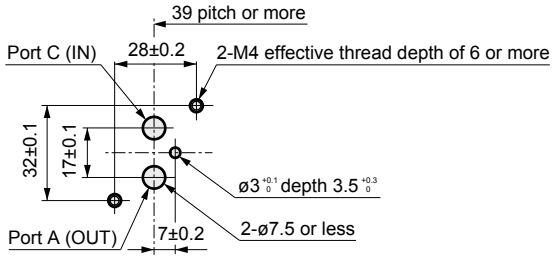
● GNAB*-1-0-02/B2/D2/E2/12/22
GNAB*V-1-0-02/B2/D2/E2/12/22



● GNAB*-1-0-Blank/B/D/E/1/2
GNAB*V-1-0-Blank/B/D/E/1/2

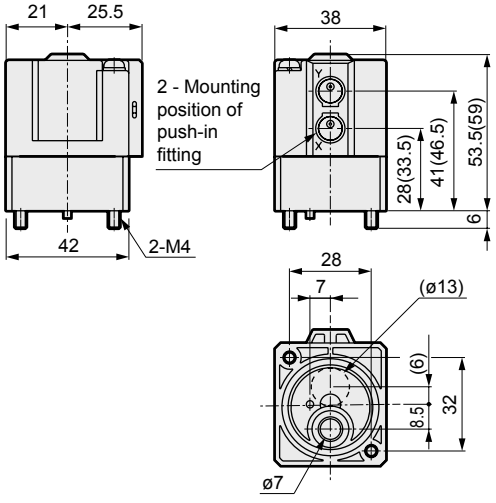


● Actuator installation dimensions

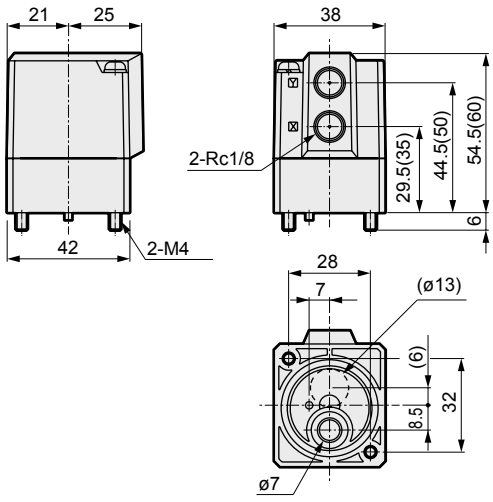


Individual supply (port A pressurization, port C vacuum pump side)

● GNAB*-5-0-02/B2/D2/E2/12/22
GNAB*V-5-0-02/B2/D2/E2/12/22

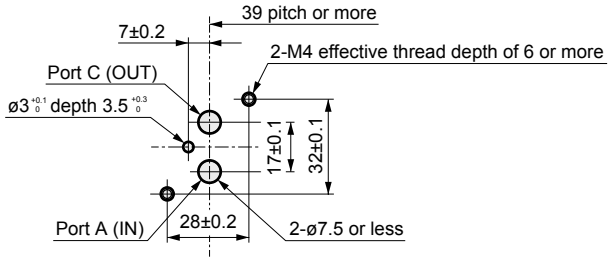


● GNAB*-5-0-Blank/B/D/E/1/2
GNAB*V-5-0-Blank/B/D/E/1/2



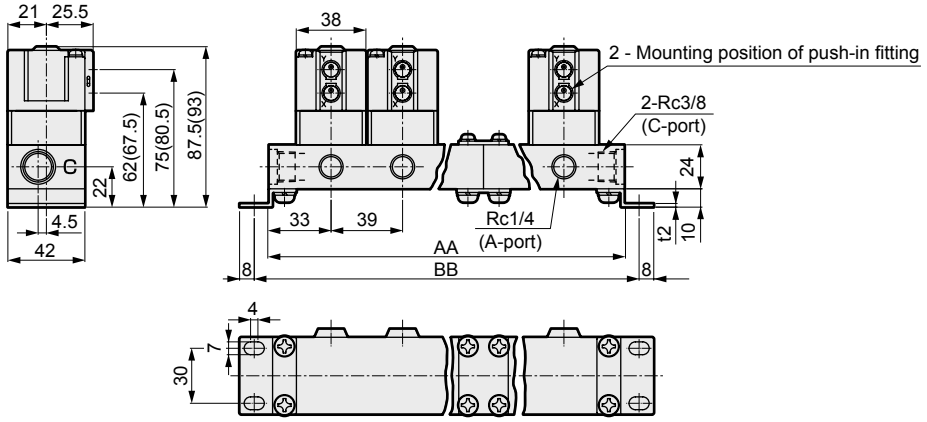
*1: Dimensions shown in ( ) are for stainless steel body.

● Actuator installation dimensions

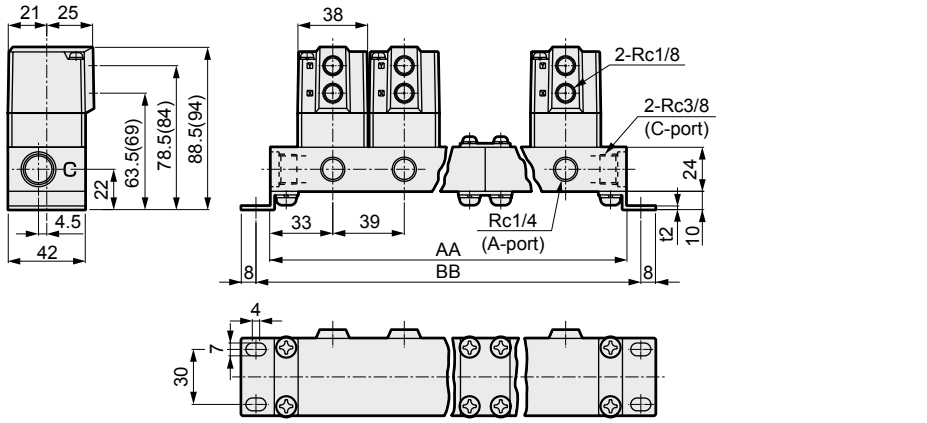


Dimensions: Manifold

● GNAB*-$\frac{1}{5}$-[2 to 10]-02/B2/62/72/D2/E2/12/22
GNAB*V-$\frac{1}{5}$-[2 to 10]-02/B2/62/72/D2/E2/12/22



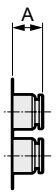
● GNAB*-$\frac{1}{5}$-[2 to 10]-Blank/B/6/7/D/E/1/2
GNAB*V-$\frac{1}{5}$-[2 to 10]-Blank/B/6/7/D/E/1/2



Station	Copper alloy/stainless steel sub-plate		Aluminum sub-plate		Manifold	Station	Copper alloy/stainless steel sub-plate		Aluminum sub-plate		Manifold
No.	AA	BB	AA	BB	configuration *1	No.	AA	BB	AA	BB	configuration *1
2	106	122	105	121	2 stations x 1	7	329	345	327	343	5 stations + 2 stations
3	145	161	144	160	3 stations x 1	8	368	384	366	382	5 stations + 3 stations
4	211	227	210	226	2 stations x 2	9	435	451	432	448	3 stations x 3
5	223	239	222	238	5 stations x 1	10	446	462	444	460	5 stations x 2
6	290	306	288	304	3 stations x 2						

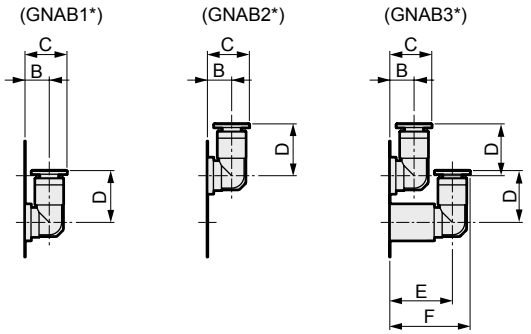
*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : Contact CKD for 11 stations or more.
*3 : Dimensions shown in ( ) are for stainless steel body.

● Axial push-in fitting
GNAB*-$\frac{1}{5}$-[2 to 10]-02/B2/62/72/D2/E2/12/22
GNAB*V-$\frac{1}{5}$-[2 to 10]-02/B2/62/72/D2/E2/12/22



Pilot port size	A
C4	7
C6	8.5
C18	3.5

● Radial push-in fitting
GNAB*-$\frac{1}{5}$-[2 to 10]-02/B2/62/72/D2/E2/12/22
GNAB*V-$\frac{1}{5}$-[2 to 10]-02/B2/62/72/D2/E2/12/22



Pilot port size	B	C	D	E	F
CL4	6.5	11.5	14	17	22
CL6	7.5	12.5	16	18	23
CL18	4	7	8.5	11	14

MEMO

Grease-free specifications.

The diaphragm completely separates the flow path and sliding part.
Prevents the entry of oil or foreign matter
Diaphragm cylinder valve LAD/NAD Series.

Sliding part separated from flow path

Cylinder and flow path are completely separated by the diaphragm.
The flow route needs no grease since it has no sliding piston rod.

Compatible with various fluids

Compatible with various fluids including general fluids, nitrogen gas and pure water.

Compact and handles large flow rate

Not Subject to the Export Trade Control Order

Does not apply to any material combination available.

LAD Series

Lightweight

Keeps weight low by adopting the resin (PPS) actuator.

With flow rate adjustment (option)

Saves space by integrating the flow rate adjustment mechanism into the body.

Body and seal material options

Two body options available

PPS body — Metal-free flow path.

Stainless steel body — Usable with metal piping that requires antistatic properties and ideal for controlling organic solvents.

Two sealant options available

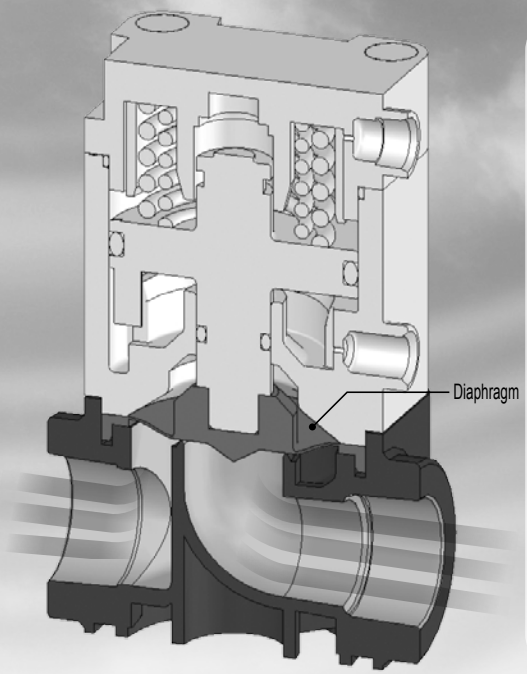
PTFE diaphragm — With a solid record in the semiconductor industry.

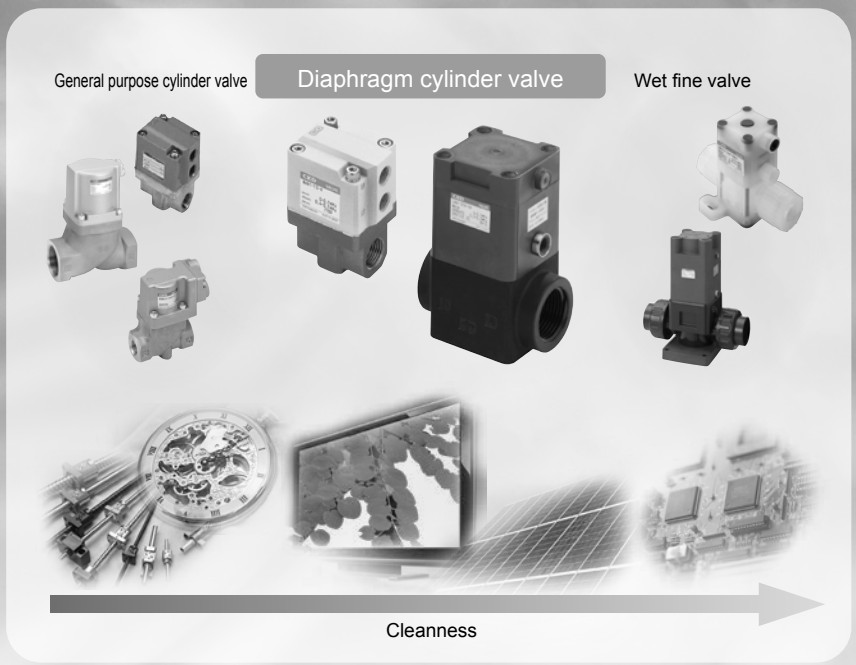
EPDM diaphragm — High strength, offering a wide working pressure range.

LAD Series variation

Series	Model No.	Orifice size				Port size					Diaphragm material		Body material			
		ϕ7	ϕ8	ϕ12	ϕ20	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	EPDM	PTFE	PPS	SCS13	SUS303	PP
LAD	LAD*-10A		●				●				●	●	●	●		
	LAD*-15A			●				●			●	●	●	●		
	LAD*-20A				●				●		●	●	●	●		
	LAD*-25A				●					●	●	●	●	●		

* Because the connection is by screws, particles are generated during installation.
Also, operation may generate particles during use, especially with the EPDM diaphragm. Check the compatibility for the application.



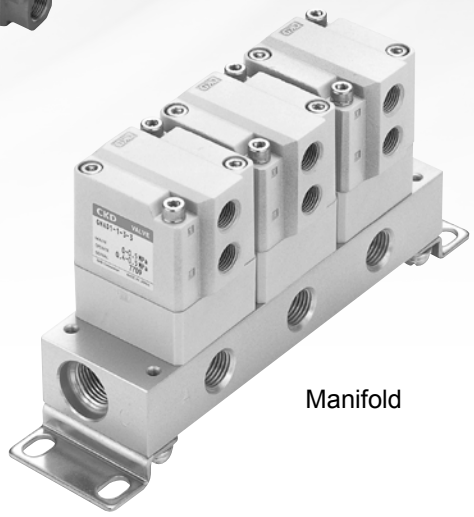


NAD Series

Space-saving with manifold

Manifold is available.

Saves piping space and reduces piping hours.



Manifold

The same dimensions as the general purpose cylinder valve

As the dimensions are the same as those of general purpose cylinder valve NAB Series,
this product can simply replace the existing NAB Series if you prefer the grease-free system.

NAD Series variation

Series	Model No.	Orifice size				Port size					Diaphragm material		Body material				Sub-plate	
		ø7	ø8	ø12	ø20	Rc1/4	Rc3/8	Rc1/2	Rc3/4	Rc1	EPDM	PTFE	PPS	SCS13	SUS303	PP	SUS303	A6063
NAD	NAD*-10	●	●	●	●	●	●	●	●	●	●	●		●	●			
	NAD*V-10	●	●	●	●	●	●	●	●	●	●	●		●	●			
GNAD	GNAD*-10	●	●	●	●	A port	C port	●	●	●	●	●			●	●	●	●
	GNAD*V-10	●	●	●	●	A port	C port	●	●	●	●	●			●	●	●	●

* Because the connection is by screws, particles are generated during installation.
Also, operation may generate particles during use, especially with the EPDM diaphragm. Check the compatibility for the application.

Diaphragm cylinder valve

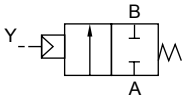
LAD Series

- NC, NO, double acting
- Port size: Rc3/8, Rc1/2, Rc3/4, Rc1
- Working fluid: Pure water, water, air, N_2 gas

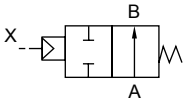
RoHS CAD

JIS symbol

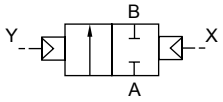
● NC



● NO



● Double acting



Common specifications (PTFE diaphragm)

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			LAD1	LAD2	LAD3
Actuation			NC	NO	Double acting
Working fluid			Water, pure water, air, N_2 gas, non-corrosive/non-absorbable fluid (*1)		
Fluid temperature		°C	5 (41°F) to 90 (194°F) (*2)		
Proof pressure (water pressure)		MPa	0.9 (≈130 psi, 9 bar)		
Working pressure (A→B)		MPa	0 (≈0 psi, 0 bar) to 0.3 (≈44 psi, 3 bar)		
Valve seat leakage		cm^3/min	0 (water pressure), 1 or less (pneumatic pressure)		
Back pressure		MPa	0 (≈0 psi, 0 bar) to 0.1 (≈15 psi, 1 bar)		
Ambient temperature		°C	0 (32°F) to 60 (140°F)		
Mounting orientation			Unrestricted		
Operating section	Pilot fluid		Air		
	Pilot pressure	MPa	0.3 (≈44 psi, 3 bar) to 0.5 (≈73 psi, 5 bar)		0.3 to 0.4
	Pilot port size		Rc1/8 (*3)		

*1 : Check the compatibility of product component materials, working fluids and atmosphere.
Strong acids and highly absorbable fluids cannot be used.
*2 : 5 to 100°C for stainless steel body (SCS13).
*3 : With stainless steel stiffening ring.

Individual specifications (PTFE diaphragm)

Item / Model No.	Port size	Orifice size mm	Cv	Frequency cycle/min.	Weight kg	
					PPS body	SCS13 body
LAD*-10A	Rc3/8	8	1.7	30 or less	0.15	0.3
LAD*-15A	Rc1/2	12	3.3	20 or less	0.28	0.6
LAD*-20A	Rc3/4	20	8.5	20 or less	0.55	1.1
LAD*-25A	Rc1	20	8.5	20 or less	0.60	1.2

Common specifications (EPDM diaphragm)

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			LAD1	LAD2	LAD3
Actuation			NC	NO	Double acting
Working fluid			Water, air, N_2 gas, non-corrosive/non-absorbable fluid (*1)		
Fluid temperature		°C	0 (32°F) to 60 (140°F) (no freezing)		
Proof pressure (water pressure)		MPa	1.5 (≈220 psi, 15 bar) (refer to the proof pressure in the individual specifications.)		
Working pressure (A→B)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar) (refer to the working pressure range in the individual specifications.)		
Valve seat leakage		cm^3/min	0 (water pressure), 0.12 or less (pneumatic pressure)		
Back pressure		MPa	0 (≈0 psi, 0 bar) to 0.1 (≈15 psi, 1 bar)		
Ambient temperature		°C	0 (32°F) to 60 (140°F)		
Mounting orientation			Unrestricted		
Operating section	Pilot fluid		Air		
	Pilot pressure	MPa	0.3 (≈44 psi, 3 bar) to 0.5 (≈73 psi, 5 bar)		0.3 to 0.4
	Pilot port size		Rc1/8 (*2)		

*1 : Check the compatibility of product component materials, working fluids and atmosphere.
Strong acids and highly absorbable fluids cannot be used.
*2 : With stainless steel stiffening ring.

Individual specifications (EPDM diaphragm)

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Proof pressure (water pressure) MPa	Working pressure (A→B) MPa	Orifice size mm	Cv	Frequency cycle/min.	Weight kg	
							PPS body	SCS13 body
LAD*-10A	Rc3/8	1.5	0.5	8	1.7	30 or less	0.15	0.3
LAD*-15A	Rc1/2	1.5	0.5	12	3.3	20 or less	0.28	0.6
LAD*-20A	Rc3/4	1.2	0.4	20	8.5	20 or less	0.55	1.1
LAD*-25A	Rc1	1.2	0.4	20	8.5	20 or less	0.60	1.2

How to order

LAD 1 - 15A - C B

Model No.

Ⓐ Actuation

Ⓑ Port size

Ⓒ Material combination

Ⓓ Other options

Code	Description
Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Ⓑ Port size	
10A	Rc3/8
15A	Rc1/2
20A	Rc3/4
25A	Rc1

Ⓒ Material combination	Body	Diaphragm
P	PPS	EPDM
C	PPS	PTFE
R	SCS13	EPDM
F	SCS13	PTFE

Ⓓ Other options	
Blank	No option
1	With flow rate adjustment
B	Mounting plate

*1 : To add both the flow rate adjustment and mounting plate,specify as “1B”.
*2 : For the “indicator” option, contact CKD.

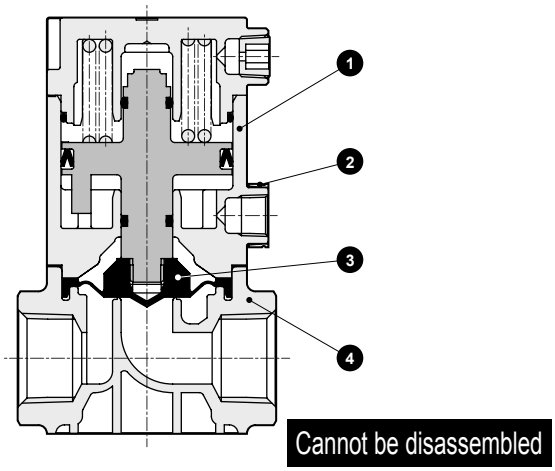
[Example of model No.]

LAD1-15A-CB

Model: Diaphragm cylinder valve LAD
Ⓐ Actuation : NC
Ⓑ Port size : Rc1/2
Ⓒ Material combination : Body - PPS, diaphragm - PTFE
Ⓓ Other options : With mounting plate

Internal structure and parts list

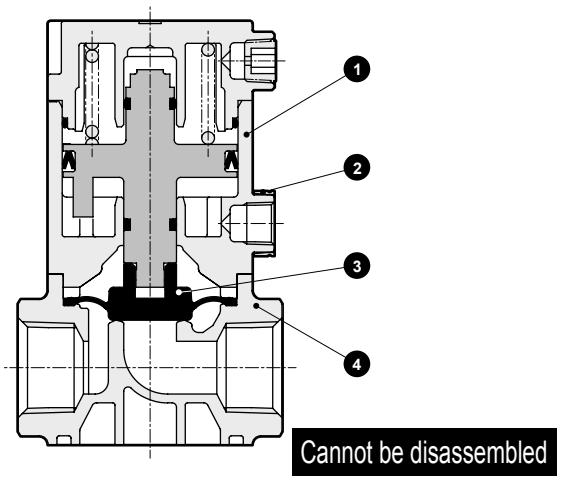
● PTFE diaphragm



No.	Part name	Material	
1	Actuator assembly	PPS	Polyphenylene sulfide
		FKM	Fluoro rubber
2	Reinforcement ring	SUS 304	Stainless steel
3	Diaphragm	PTFE	Tetrafluoroethylene resin
4	Body	PPS (SCS13)	Polyphenylene sulfide (Stainless steel casting)

( ) shows options.

● EPDM diaphragm

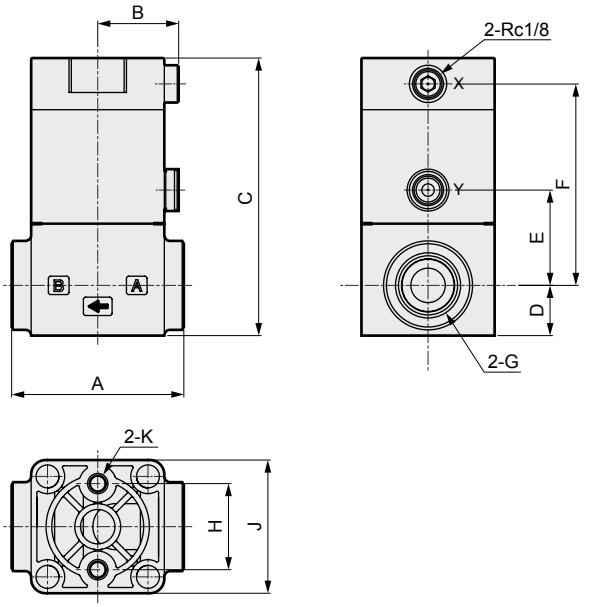


No.	Part name	Material	
1	Actuator assembly	PPS	Polyphenylene sulfide
		FKM	Fluoro rubber
2	Reinforcement ring	SUS 304	Stainless steel
3	Diaphragm	EPDM,SUS303	Ethylene propylene rubber/stainless steel
4	Body	PPS (SCS13)	Polyphenylene sulfide (Stainless steel casting)

( ) shows options.

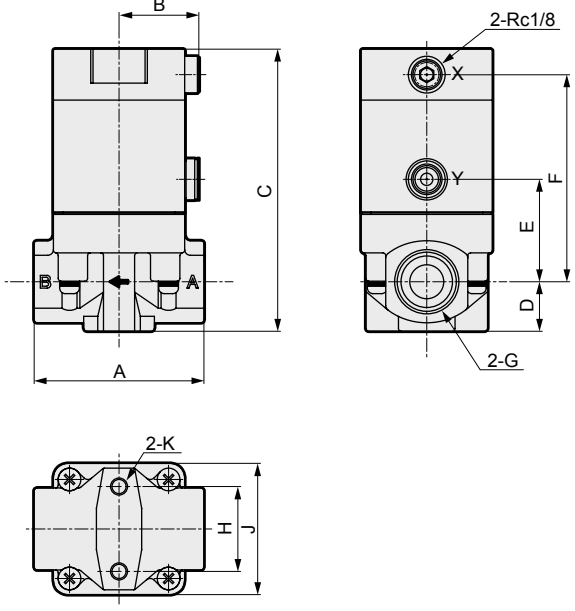
Dimensions CAD

● PPS body



Model No.	A	B	C	D	E	F	G	H	J	K
LAD*-10A	47	23	77	14.5	25.5	55.5	Rc3/8	20	36	M5 depth 7
LAD*-15A	60	28	96.5	17.5	33	70	Rc1/2	30	46.5	M6 depth 8
LAD*-20A	75	35	114.5	22	40.5	83	Rc3/4	38	60	M6 depth 10
LAD*-25A	85	35	121.5	25.5	44	86.5	Rc1	38	60	M6 depth 10

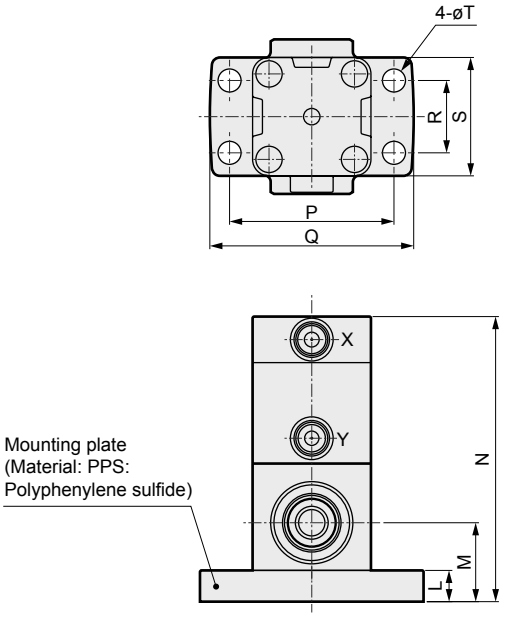
● Stainless steel body



Model No.	A	B	C	D	E	F	G	H	J	K
LAD*-10A	47	23	80	14.5	28.5	58.5	Rc3/8	20	36	M5 depth 7
LAD*-15A	60	28	99.5	17.5	36	73	Rc1/2	30	46.5	M6 depth 8
LAD*-20A	75	35	117.5	22	43.5	86	Rc3/4	38	60	M6 depth 10
LAD*-25A	85	35	121.5	25.5	44	86.5	Rc1	38	60	M6 depth 10

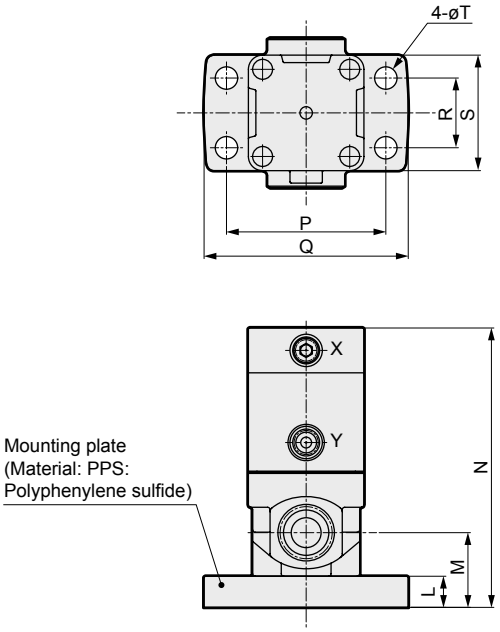
Optional dimensions

● Mounting plate (PPS body)



Model No.	L	M	N	P	Q	R	S	T
LAD*-10A	9.5	24	86.5	50	62	22	36	7
LAD*-15A	12.5	30	109	64	82	28	46.5	9
LAD*-20A	13	35	127.5	78	96	40	60	9
LAD*-25A	13	38.5	134.5	78	96	40	60	9

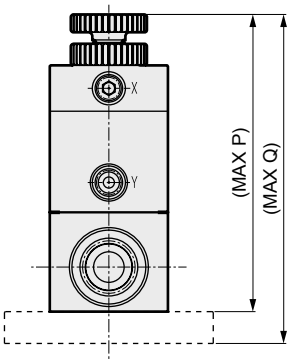
● Mounting plate (stainless steel body)



Model No.	L	M	N	P	Q	R	S	T
LAD*-10A	9.5	24	89.5	50	62	22	36	7
LAD*-15A	12.5	30	112	64	82	28	46.5	9
LAD*-20A	13	35	130.5	78	96	40	60	9
LAD*-25A	13	38.5	134.5	78	96	40	60	9

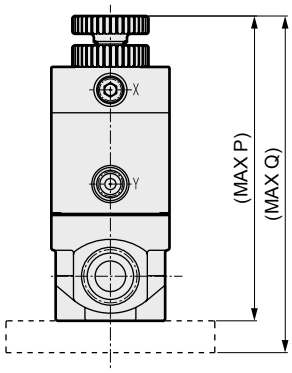
Optional dimensions

● With flow rate adjustment (PPS body)



Model No.	P no mounting plate	Q +mounting plate
LAD*-10A	102	111.5
LAD*-15A	120.5	133
LAD*-20A	145.5	158.5
LAD*-25A	152.5	165.5

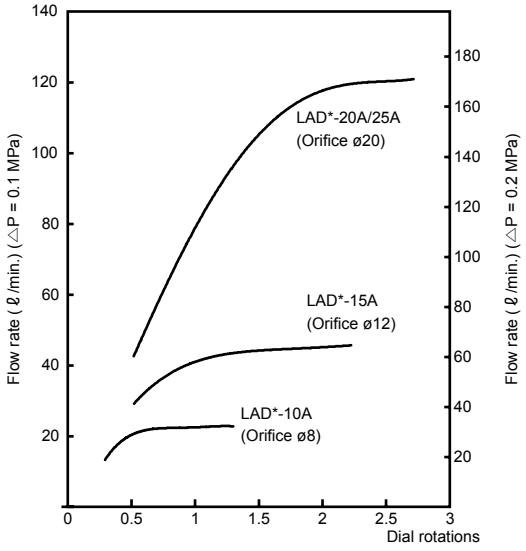
● With flow rate adjustment (stainless steel body)



Model No.	P no mounting plate	Q +mounting plate
LAD*-10A	105	114.5
LAD*-15A	123.5	136
LAD*-20A	148.5	161.5
LAD*-25A	152.5	165.5

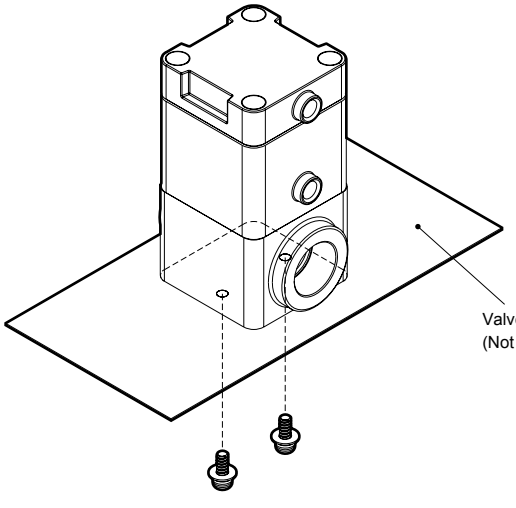
Flow characteristics

● With flow rate adjustment (water)
Rotations - flow rate

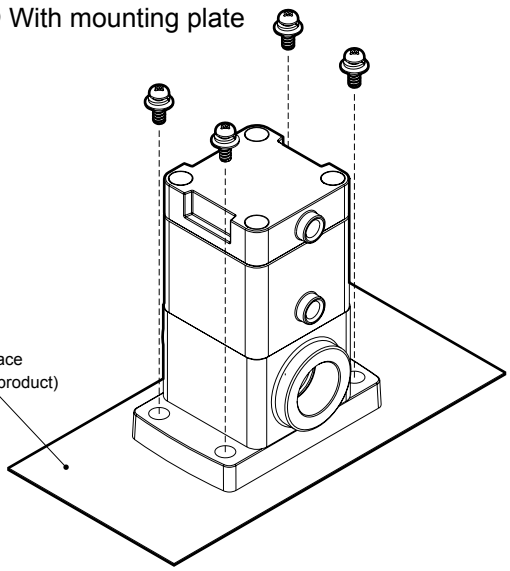


*1: During use, keep the adjusting dial open 1/4 or more rotation from the fully closed position for port size 10 A, and 1/2 or more rotation for other port sizes. If used below this level, vibration or flow rate fluctuation may occur depending on the working conditions.

Mounting of product (example)



● With mounting plate



*1 : Apply the recommended tightening torque (refer to the safety precautions).
*2 : Mounting screws are not included in the product.

Diaphragm cylinder valve, single unit

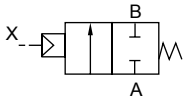
NAD*/NAD*V Series

- NC, NO, double acting
- Port size: Rc3/8
- Working fluid
  NAD* : Air, inert gas, water, non-corrosive liquid
  NAD*V: Low vacuum

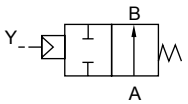
RoHS

JIS symbol

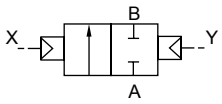
- NC



- NO



- Double acting



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	NAD1-10	NAD2-10	NAD3-10	NAD1V-10	NAD2V-10	NAD3V-10
Actuation	NC	NO	Double acting	NC(normally closed)	NO	Double acting
Working fluid	Air, inert gas, water, non-corrosive/non-absorbable liquid			Low vacuum (air/water)		
Fluid viscosity mm²/s	500 or less					
Working pressure	0 to 0.5 MPa (secondary pressure 0.4 MPa or less)			1.3 x 10^2 to 5 x 10^5 Pa (abs) (secondary pressure 4 x 10^5 Pa (abs) or less)		
Proof pressure (water) MPa	1.0 (≈150 psi, 10 bar)					
Fluid temperature °C	-10 (14°F) to 50 (122°F) (no freezing)					
Ambient temperature °C	-10 (14°F) to 50 (122°F)					
Valve seat leakage	0.12 cm^3/min or less (pneumatic pressure)			1.33 x 10^{-3} Pa·m^3/sHe or less		
Port size	Rc3/8			Rc3/8		
Orifice size mm	7					
Cv	1.1					
C [dm^3/(s·bar)]	4.4					
b	0.3			0.1		
Weight kg	0.32					
Mounting orientation	Unrestricted					
Pilot fluid	Air					
Pilot pressure MPa	0.4 (≈58 psi, 4 bar) to 0.5 (≈73 psi, 5 bar)					
Pilot port size	Rc1/8					

*1: Effective cross-sectional area "S" and sonic conductance "C" are converted as S ≈ 5.0 x C.

How to order

NAD 1 ( ) - 10 - R B

Model No.

Ⓐ Actuation

Code	Description
Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Ⓑ Working fluid

Code	Description
Ⓑ Working fluid	
Blank	Air, inert gas, water
V	Low vacuum

Ⓒ Port size

Code	Description
Ⓒ Port size	
10	Rc3/8

Ⓓ Body/sealant combination

Code	Body	Seal
Ⓓ Body/sealant combination		
R	Stainless steel	Ethylene propylene rubber

Ⓔ Other options

Code	Description
Ⓔ Other options	
Blank	No option
B	Mounting plate

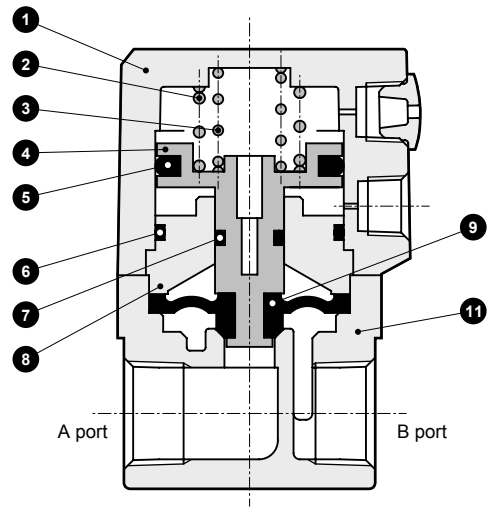
[Example of model No.]

NAD1-10-RB

Model: NAD
Ⓐ Actuation : NC
Ⓑ Working fluid : Air, inert gas, water
Ⓒ Port size : Rc3/8
Ⓓ Body/sealant combination : Body - stainless steel/sealant - ethylene propylene rubber
Ⓔ Other options : With mounting plate

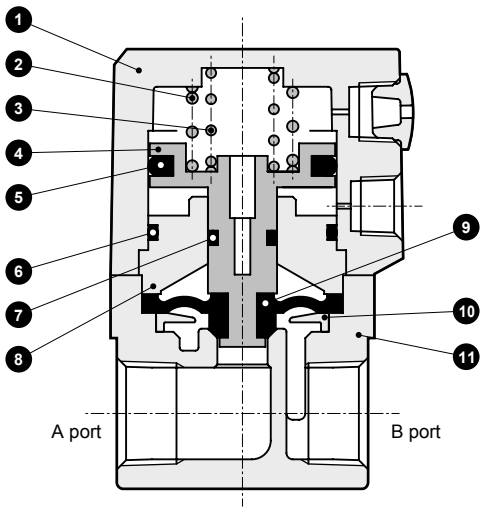
Internal structure and parts list

● NAD1



Cannot be disassembled

● NAD1V

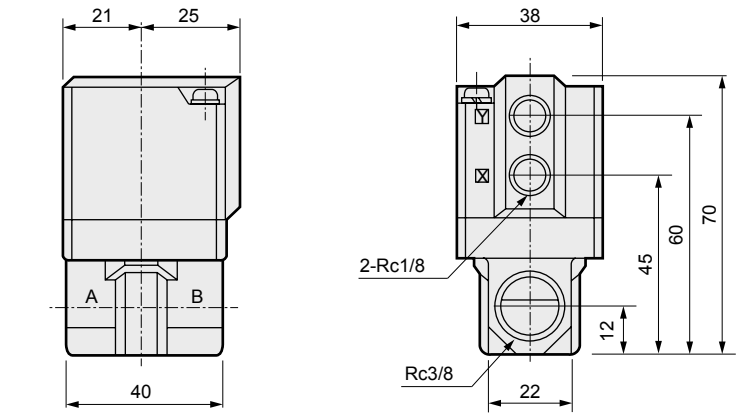


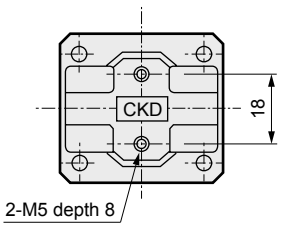
Cannot be disassembled

No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Spring	SWP	Piano wire
3			
4	Piston	PPS	Polyphenylene sulfide
5	PSD packing	NBR	Nitrile rubber
6	O-ring	NBR	Nitrile rubber
7	O-ring	FKM	Fluoro rubber
8	Adaptor	A5056	Aluminum
9	Diaphragm	EPDM	Ethylene propylene rubber
10	Retainer	PP	Polypropylene
11	Body	SCS13	Stainless steel casting

Dimensions

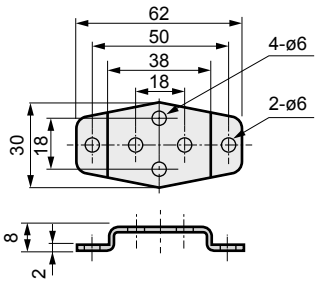
● NAD**-10

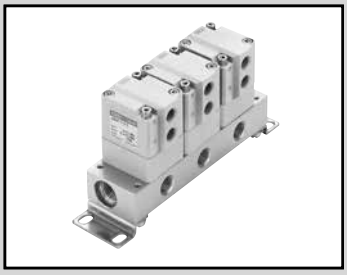




● Mounting plate NAD**-10-RB

Material: Steel
Zinc plated





Diaphragm cylinder valve, manifold

GNAD*/GNAD*V Series

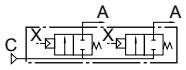
- NC, NO, double acting
- Port size: Rc1/4, Rc3/8
- Working fluid
  GNAD* : Air, inert gas, water, non-corrosive liquid
  GNAD*V : Low vacuum

RoHS

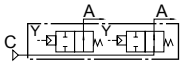
JIS symbol

- Common supply
  (port C pressurization, port A vacuum pump side)

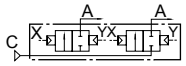
NC



NO

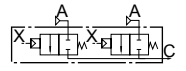


Double acting

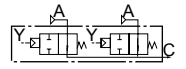


- Individual supply
  (port A pressurization, port C vacuum pump side)

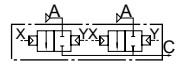
NC



NO



Double acting



Specifications

Item	GNAD1-1/5	GNAD2-1/5	GNAD3-1/5	GNAD1V-1/5	GNAD2V-1/5	GNAD3V-1/5
Actuation	NC	NO	Double acting	NC	NO	Double acting
Working fluid	Air, inert gas, water, non-corrosive/non-absorbable liquid			Low vacuum (air/water)		
Fluid viscosity mm²/s	500 or less					
Working pressure	0 to 0.5 MPa (secondary pressure 0.4 MPa or less)			1.3 x 10^2 to 5 x 10^5 Pa (abs) (secondary pressure 4 x 10^5 Pa (abs) or less)		
Proof pressure (water) MPa	1.0 (≈150 psi, 10 bar)					
Fluid temperature °C	-10 (14°F) to 50 (122°F) (no freezing)					
Ambient temperature °C	-10 (14°F) to 50 (122°F)					
Valve seat leakage	0.12 cm^3/min or less (pneumatic pressure)			1.33 x 10^{-3} Pa·m^3/sHe or less		
Orifice size mm	7					
Cv	0.7					
C [dm^3/(s·bar)]	3.4					
b	0.1			-		
Mounting orientation	Unrestricted					
Pilot fluid	Air					
Pilot pressure MPa	0.4 (≈58 psi, 4 bar) to 0.5 (≈73 psi, 5 bar)					
Pilot port size	Rc1/8					

*1: Effective cross-sectional area “S” and sonic conductance “C” are converted as S ≈ 5.0 x C.

How to order

GNAD 1 ( ) - 1 - 3 - R

Model No.

Ⓐ Actuation

Code	Description
Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Ⓑ Working fluid

Code	Description
Ⓑ Working fluid	
Blank	Air, inert gas, water
V	Low vacuum

Ⓒ Air supply category

Code	Description
Ⓒ Air supply category	
1	Common supply
5	Individual supply

Ⓓ Manifold station No.

Code	Description
Ⓓ Manifold station No.	
2	2 stations
to	to
10	10 stations
0	Actuator only

Ⓔ Sub-plate/body/sealant combination

Code	Sub-plate	Body	Seal
Ⓔ Sub-plate/body/sealant combination			
R	Stainless steel	Stainless steel	EPM rubber
8	Stainless steel	Polypropylene	EPM rubber
3	Aluminum	Polypropylene	EPM rubber

[Example of model No.]

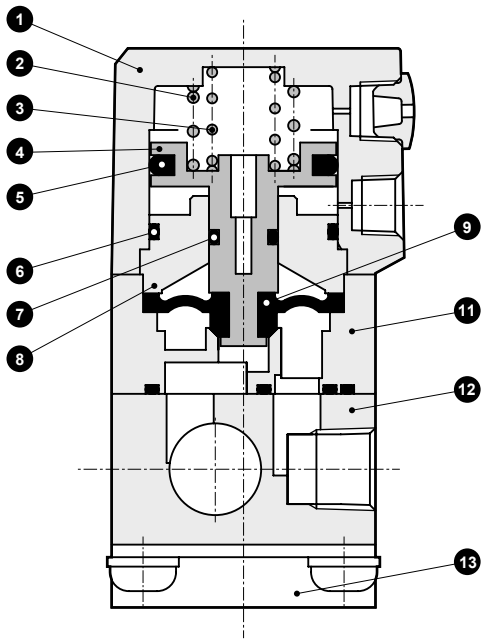
GNAD1-1-3-R

Model: GNAD

Ⓐ Actuation : NC
Ⓑ Working fluid : Air, inert gas, water
Ⓒ Air supply category : Common supply
Ⓓ Manifold station No. : 3 stations
Ⓔ Sub-plate/body/sealant combination : Sub-plate - stainless steel/body - stainless steel/sealant - ethylene propylene rubber

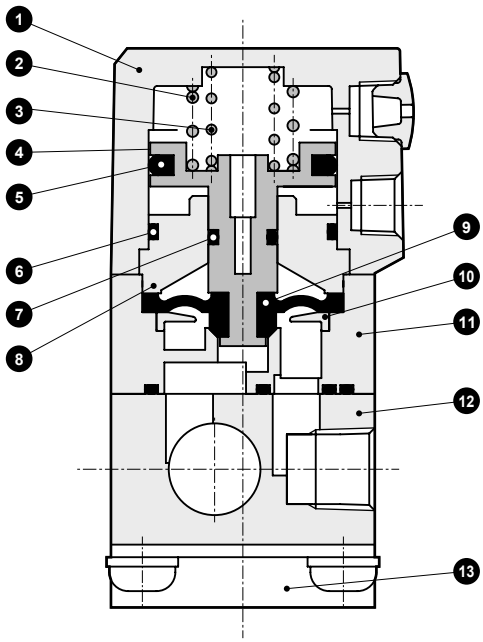
Internal structure and parts list

● GNAD1



Cannot be disassembled

● GNAD1V

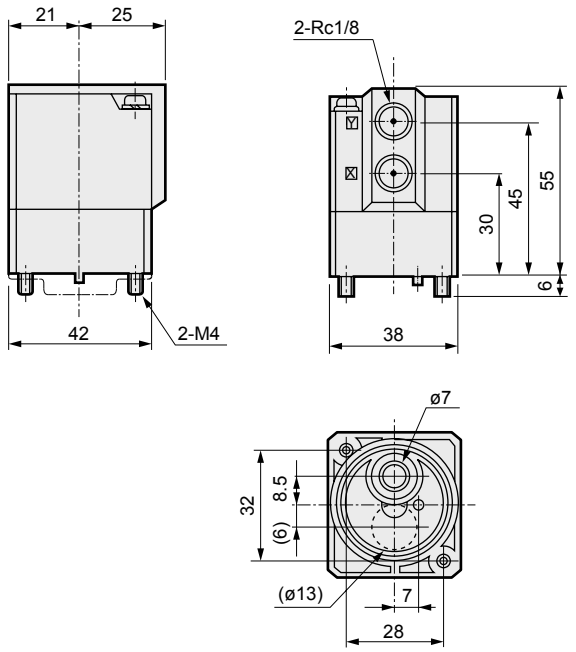


Cannot be disassembled

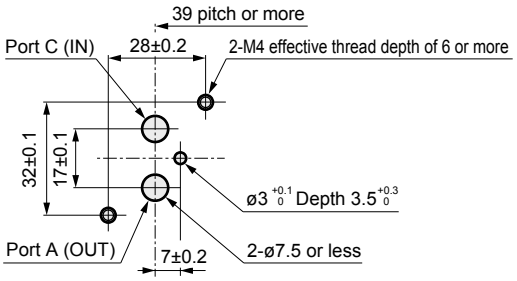
No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Spring	SWP	Piano wire
3			
4	Piston	PPS	Polyphenylene sulfide
5	PSD packing	NBR	Nitrile rubber
6	O-ring	NBR	Nitrile rubber
7	O-ring	FKM	Fluoro rubber
8	Adaptor	A5056	Aluminum
9	Diaphragm	EPDM	Ethylene propylene rubber
10	Retainer	PP	Polypropylene
11	Body	PP(SUS303)	Polypropylene (stainless steel)
12	Sub-plate	SUS303(A6063)	Stainless steel (aluminum)
13	Mounting plate	SPC	Steel

Dimensions: Actuator

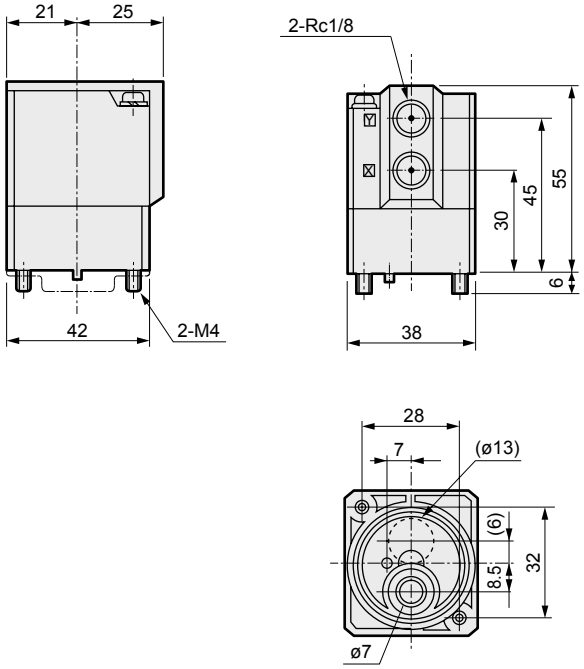
● Common supply
GNAD1/2/3-1-0



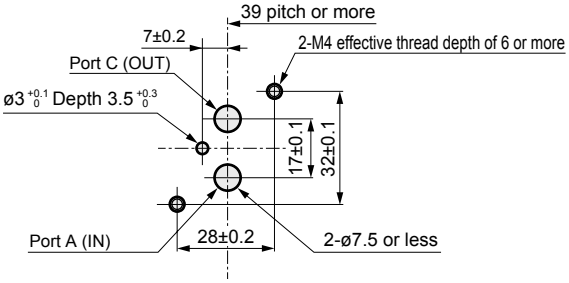
● Actuator installation dimensions



● Individual supply
GNAD1/2/3-5-0



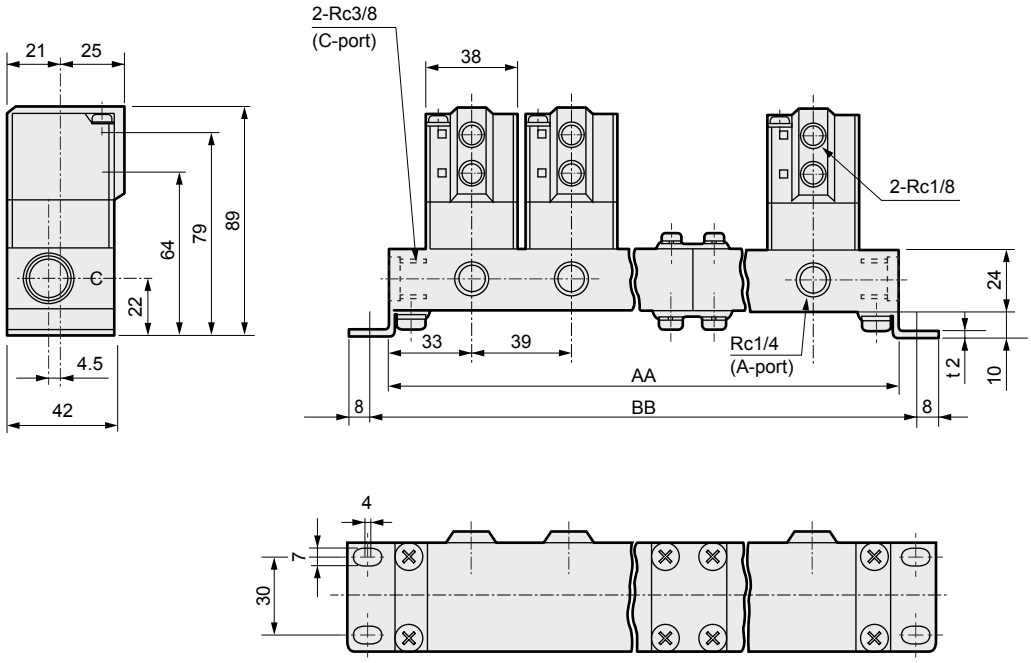
● Actuator installation dimensions



*1 : Dimensions shown in ( ) are for stainless steel option.
*2 : For the product's protection, the product is delivered with a plate attached at the bottom of the body. Remove this plate before starting use.

Dimensions: Manifold

● GNAD1/2/3-$\frac{1}{5}$ - 2 to 10



Sub-plate material / Station No.	Stainless steel AA	Stainless steel BB	Aluminum AA	Aluminum BB	Manifold configuration *1	Sub-plate material / Station No.	Stainless steel AA	Stainless steel BB	Aluminum AA	Aluminum BB	Manifold configuration *1
2	106	122	105	121	2 stations x 1	**7**	329	345	327	343	2 stns. + 5 stns.
3	145	161	144	160	3 stations x 1	**8**	368	384	366	382	5 stns. + 3 stns.
4	211	227	210	226	2 stations x 2	**9**	435	451	432	448	3 stations x 3
5	223	239	222	238	5 stations x 1	**10**	446	462	444	460	5 stations x 2
6	290	306	288	304	3 stations x 2						

*1 : Manifold configuration combines 2-station, 3-station and 5-station units.
*2 : Contact CKD for 11 stations or more.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Air operated 2-port valve (cylinder valve) SAB/SVB/NAB

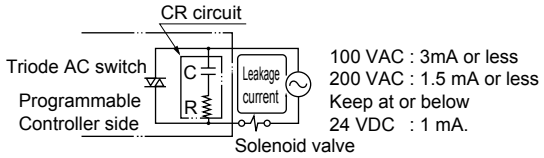
Design/selection

1. Safety design

⚠ CAUTION

■ Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications. Failure to observe this could lead to malfunctions.



100 VAC : 3mA or less
200 VAC : 1.5 mA or less
Keep at or below
24 VDC : 1 mA.

2. Working fluid

⚠ WARNING

■ Working fluids

(1) Do not use any fluid other than the working fluids specified in the catalog.
(2) Before starting use, check the compatibility between the product and working fluid with the working fluid check list (Intro Page 39).
(3) The durability of the rod packing (MY packing) decreases sharply if the working fluid is of poor quality and/or contains powder, sludge or foreign matter.
If rod packing sealing is poor, working fluid could leak into the cylinder and flow back into pilot air piping, damaging the devices in the air circuit.
Perform periodic maintenance or take other appropriate measures.

■ Grease for special fluids

For cylinder valve, grease is applied to the piston rod sealant sections. When using special fluids, specify the type of grease.

[Example] Oxygen : fluorine grease
Medium vacuum : silicone grease
Fluids for foods : Vaseline
Dry air for painting : Vaseline

■ Fluid temperature

Be sure to use the coolant check valve within the specified fluid temperature range.

⚠ CAUTION

■ External pilot air

(1) Draining: Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). This is a factor that significantly reduces the reliability of the pneumatic components. For drainage measures, improve air quality by dehumidifying with an after cooler or dryer, removing foreign matter with a filter, and removing tar with a tar removal filter, etc.
(2) Pre-lubrication: This series is pre-lubricated, so no lubrication is required. However, once lubrication has been started, it must be continued so that the lubricant does not run out. Use turbine oil Class 1 ISO VG32 (#90) or equivalent for lubrication.
(3) Filter - Install a filter with a 5 μm or less filter element.

3. Working environment

⚠ WARNING

■ SVB Series cannot be used in an explosive gas atmosphere. When using in an explosive gas atmosphere, change to the SAB Series, and provide a separate explosion-proof solenoid valve on the pilot air circuit.

■ If there are high levels of dust in the area, install a downward-facing silencer or elbow fitting on the exhaust port so that dust does not enter.

■ Take appropriate safeguards when using this product in places where it can be exposed to dripping water.

■ Make sure that there is no torsion, tension or moment load applied to the fitting when using NAB or GNAB models with fittings.

Mounting, installation and adjustment

1. Piping

⚠ CAUTION

■ Make sure not to use the wrong supply port when connecting the pipes to the product.

■ Do not pipe using the solenoid valve section. There is a risk of damage. (For solenoid valve mounted)

■ If C18 and L18 are selected as pilot port size for NAB and GNAB, use the fiber tube for push-in fitting for pilot air piping.

■ When piping the GNAB Series, check the supply port on the pilot operation side.

Model No.	Pilot operation side supply port
GNAB1/GNAB1V	X
GNAB2/GNAB2V	Y
GNAB3/GNAB3V	X and Y

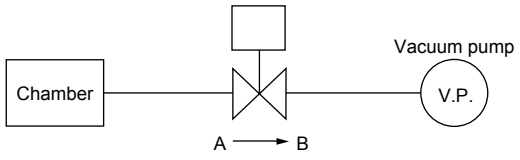
■ When piping the NAB/SAB/SVB Series, check the supply ports on the body side and pilot operation side.

Model No.	Body side supply port	Pilot operation side supply port
NAB1-8/10	A or B *1) *2)	X
NAB2-8/10	A or B *1) *2)	Y
NAB3-8/10	A or B *1) *2)	X and Y
NAB1V-8/10	A *3)	X
NAB2V-8/10	A *3)	Y
NAB3V-8/10	A *3)	X and Y
SAB1W	A	X
SAB2W	A	Y
SAB3W	A	X and Y
SAB1A	B	X
SAB2A	A	Y
SAB3A	A or B *1)	X and Y
SAB1V	A *3)	X
SAB2V	A *3)	Y
SAB3V	A *3)	X and Y
SAB1S	B	X
SAB2S	A	Y
SAB3S	A or B *1) *2)	X and Y
SVB1W	A	P
SVB2W	A	P
SVB1A	B	P
SVB2A	A	P
SVB1V	A *3)	P
SVB2V	A *3)	P
SVB1S	B	P
SVB2S	A	P

*1) When both ports A and B are pressurized, connect the normally pressurized side to port A.
If port B is connected to the normally pressurized side, the durability could degrade further than when port A is connected.

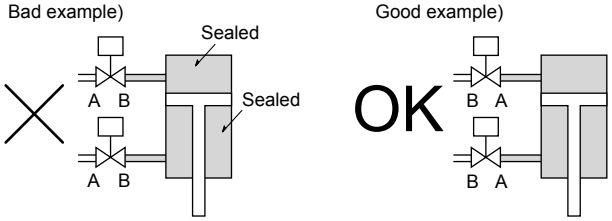
*2) If the working fluid is an incompressible fluid, e.g. water, connect the normally pressurized side to port A in order to prevent water hammer.

*3) For SAB$\frac{1}{3}$V, SVB$\frac{1}{2}$V, and NAB$\frac{1}{3}$ body-side supply ports, connect the chamber (vacuum holding side) to port A.

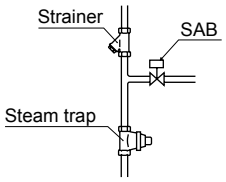


When using for vacuum burst, etc., set the pressurized port to port A.

■ When operating a hydraulic cylinder with a cylinder valve for water, if valve port B is piped to the cylinder, pressure in the port and piping rises and excessive pressure is applied on the valve body, leading to damage. In this case, pipe the valve port A to the cylinder side.



■ When using the valve for steam, external leakage could occur depending on fluid properties. Install a steam trap by tilting piping, etc., and remove drainage to prevent the inside of the pipe from rusting.

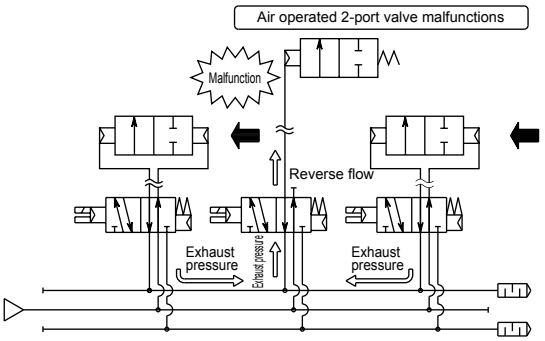


■ Refer to the table below for tightening torque of the pilot air piping.

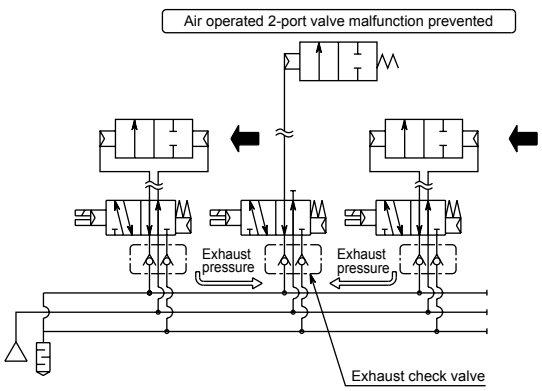
Piping nominal diameter	Recommended piping tightening torque (Nm)
Rc1/8	7 to 9

■ If a manifold is used on the SAB/NAB/GNAB Series operation valve, the exhaust pressure could be drawn in from other valves, which causes malfunctions such as a momentary opening of the valve. When using a manifold on an operation valve, use a valve with a built-in “exhaust check valve”. Similar problems could occur if exhaust is led in from the SVB Series exhaust (R) port, so when piping the exhaust (R) port, do not connect with other exhaust circuits.
A check valve is built into the CKD pilot operated 3, 5-port valve 4G Series.

Example of pneumatic pressure system that may malfunction



4G series pneumatic pressure system



Mounting, installation and adjustment

2. Wiring

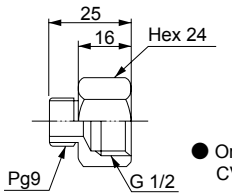
⚠ CAUTION

■ When using an explosion-proof solenoid valve, follow the Recommended Practices for Explosion-protected Electrical Installations in General Industries when wiring.

■ Wiring for models with solenoid valve

(1) Refer to Connections on Intro Pages 65 and 66 when wiring to a DIN terminal box or T type terminal box.

(2) The thread size for the junction box outlets of the DIN terminal box can be changed from Pg9 to G1/2 using the optional connector below.



● Order Model No.:
CVS2-CONNECTOR-F4-202936

(3) Coil direction can be changed 180°. To reverse the electrical connection direction, rotate only the coil. Do not lose internal parts when removing the coil.

Use/maintenance

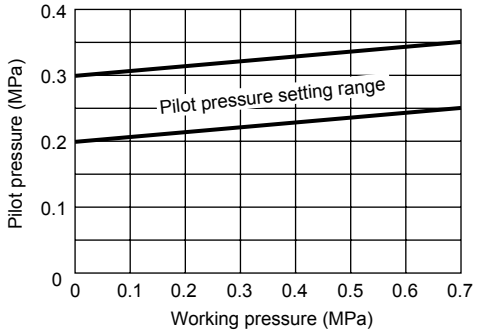
1. Maintenance and inspection

⚠ CAUTION

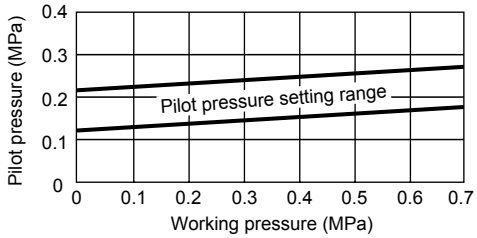
■ Pilot pressure

Set pilot air pressure within the specified range.
Set the pilot pressure for the NAB/GNAB/SAB/SVB Series NO and double acting as shown in the graph below. If the product is used with a pressure below the range shown in the graph, sealant failure may occur; if the product is used with a pressure above the range shown in the graph, durability may be compromised.
The NC is recommended when the pilot pressure cannot be controlled.

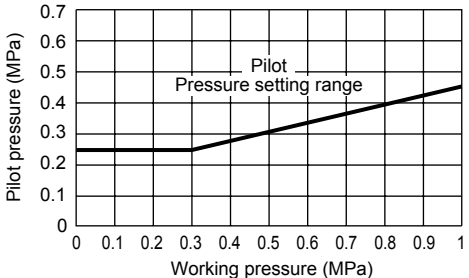
● NAB$^{2}_{2V}$ Series/GNAB$^{2}_{2V}$ Series



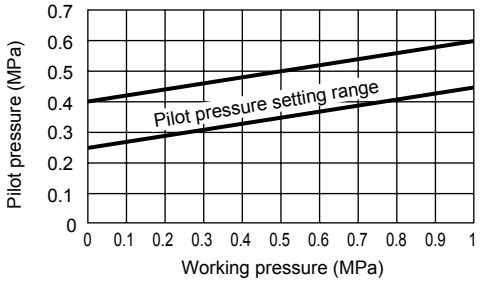
● NAB$^{3}_{3V}$ Series/GNAB$^{3}_{3V}$ Series



● SAB$^{2}_{3}{}^{W}_{V}$Series/SVB2$^{W}_{V}$Series



● SAB$^{2}_{3}$S Series/SVB2S Series



2. Disassembly/assembly

⚠ WARNING

■ A spring is used in the cylinder cover. When disassembling this type, be careful as the spring could pop out and cause injuries.
The NC has a snap ring to prevent the spring from popping out. Do not remove the snap ring.

■ When loosening the lock nut (*1) that fixes the piston rod and the main valving element, take the following precautions in order to prevent the piston rod from seizing:

*1 In the case of 8A and 10A, the lock nut that fixes the piston rod and piston

Remove any dirt and foreign matter from the thread part.

(1) Apply lubricant to the gap between the nut and the rod

(2) thread part.
When reusing the main valving element, make sure that no lubricant adheres thereto.
Fix the piston rod, attach a wrench to the lock nut, and

(3) carefully and gently turn it.
If the external thread part of the piston rod is damaged, it cannot be reused. In this case, replace the kit including the piston rod.

■ Pilot solenoid valve (with solenoid valve) assembly procedure

If the pilot solenoid valve has been disassembled, assemble it as follows.

(1) Coil side

· Disassembly

Loosen the cross-recessed pan head machine screw and lift up the coil assembly. Take out the outer spring, plunger assembly, and O-ring.

· Reassembly

Assemble the parts in the sequence of O-ring, plunger assembly, outer spring and coil assembly. Tighten the cross-recessed pan machine screws with a torque of 0.7 to 1.1 N·m.

(2) Cover side

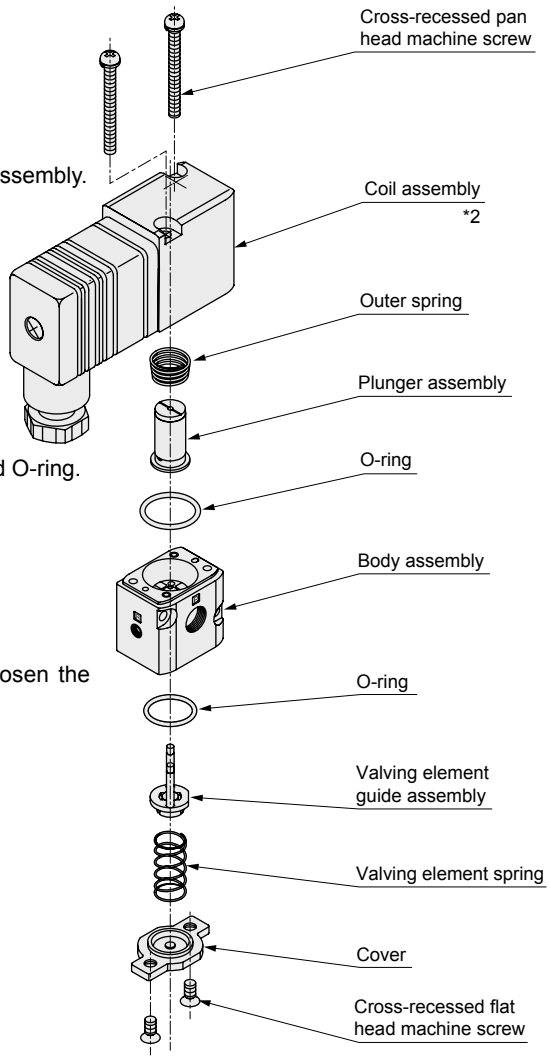
· Disassembly

Loosen the cross-recessed flat head screw to remove the cover. Take out the valving element spring, valving element guide assembly, and O-ring.

· Reassembly

Set the parts in the sequence of O-ring, valving element guide assembly, valving element spring and cover. Tighten the flat-head cross-recessed screw with a torque of 0.7 to 1.1 N·m.

*1 : Be careful not to lose components such as springs during disassembly.
*2 : The orientation of the coil assembly can be changed 180 degrees. Loosen the cross-recessed pan head machine screw to adjust the orientation.
*3 : Plunger is coated with turbine oil for lubrication.



■ For SVB*W/SVB*A/SVB*V

Model No. of pilot solenoid valve (actuator assembly kit)

CVSE2-ACTUATOR-0 *1 □□ - Rated voltage

Specify the coil option code in the *1 field.

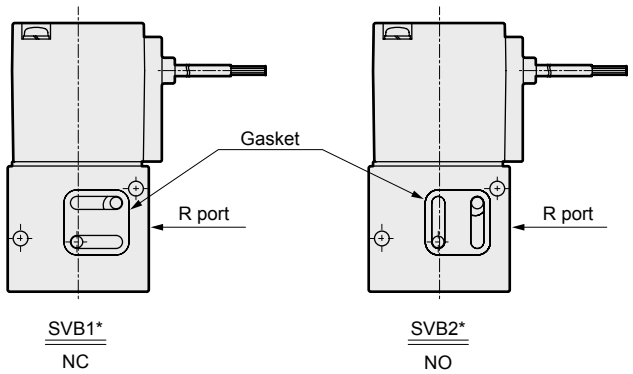
■ Model No. of pilot solenoid valve (actuator assembly kit) for SVB*S

SVB-ACTUATOR-C *1 □□ - Rated voltage

Specify the coil option code in the *1 field.

■ Orientation of gasket (models with solenoid valve)

The gasket has an orientation. Make sure to check the orientation when re-assembling.



Safety Precautions

Be sure to read this section before use.

Product-specific cautions: Diaphragm cylinder valve LAD Series

Design/selection

1. Checking the specifications

⚠ WARNING

■ Incorrect equipment selection and handling can cause problems not only in this product, but also to your system. For equipment selection and handling, it is the customer's responsibility to check the specifications of this product and the compatibility with your system before use.

■ Working fluids
For information on the compatibility of product materials, working fluids, and ambient atmospheres, refer to the compatibility checklist on page 572 as a basic reference. For fluids not listed in the checklist or new fluids (including different concentration levels), contact and inquire with CKD beforehand.

■ Back pressure
Always use the product within the specified back pressure range in the specifications. Make sure that the back pressure does not exceed the allowable range due to water head pressure caused by raised piping or led in from another line.

■ Ambient environment
(1) Do not allow fluid to come into contact with the product body.
(2) Do not use this product outdoors or in a place where it can be subjected to vibration or impact, or near a heat source.
(3) Avoid using this product in a place where it can be exposed to direct sunlight or UV light.

2. Design

⚠ WARNING

■ When using a working fluid that may be hazardous to the human body, isolate the valve so that no one can approach it.

■ Liquid ring
When the valve opens and closes, the diaphragm moves up and down, which accordingly causes the flow path capacity to change inside the valve. For this reason, if the fluid is an incompressible fluid (liquid), extreme pressures will be created in the valve when operating under conditions that seal the fluid in the valve (liquid ring). In this case, install a release valve on the primary or secondary side of the valve, preventing a liquid ring circuit from forming.

■ With the Rc screw, the screw-in part may leak due to thermal cycling. When using the product under these conditions, select the fitting integrated from the "AMD" Series of air operated valves for chemical liquids.

⚠ CAUTION

■ Because the connection is by screws, particles are generated during installation. Operation may generate particles during use, especially with the EPDM diaphragm. Check the compatibility for the application.

Mounting, installation and adjustment

1. Installation

⚠ WARNING

■ Incorrect mounting or piping will result in product trouble, may cause trouble in the user's system, and may result in death or serious injury. The user is responsible for making sure that the operator has read the instruction manual and fully comprehends the system, fluid characteristics, compatibility between the fluid and related products, and other safety-related information.

2. Piping

⚠ WARNING

■ Use resin fittings or piping material that conforms to JIS B 0203 pipe taper screw for ports A and B on the body. (when the body material is PPS)

■ An arrow is marked on the side of the body. Ensure that the piping is performed so that the flow of the fluid is consistent with the direction of the arrow.

■ For NC and NO, ports that are not pressurized with operating pressure should be open to the atmosphere. If direct intake and exhaust from the valve should be avoided due to reasons such as ambient atmospheric conditions or airborne dirt, remove the set screw and install piping in order to allow intake and exhaust elsewhere as preferable.

■ Use the driving solenoid valve connected to the drive unit according to the specifications or applications.

■ When installing piping, avoid any application of stress on the valve body, such as bending, tension, or compression. Also, make sure that the pipes' support position and method do not produce piping load on the valve.

■ Fix the equipment to the body or mounting plate in addition to using fittings as support when installing a valve.

■ Piping

The piping tightening torque for ports A and B of the body should be as shown in the table below. Make sure to fix the body before installing the piping so that no load, including bending, tension, or compression, is applied to the actuator assembly. Excessive tightening can result in damage to the product.

Port size	Recommended tightening torque (N·m)	
	Body material is resin	Body material is metal
10A	1.0 to 1.5	22 to 24
15A	2.0 to 2.5	28 to 30
20A	2.5 to 3.0	31 to 33
25A	3.0 to 4.0	36 to 38

■ When piping the LAD Series, check the supply port on the pilot operation side.

Model No.	Pilot operation side supply port
LAD1	Y
LAD2	X
LAD3	X and Y

■ Mounting

Refer to the following table for the tightening torque to use when using the set screws on the bottom of the resin body for installation.
Excessive tightening can result in damage to the product.

Port size	Thread size	Recommended tightening torque (N·m)
10A	M5	0.8 to 1.0
15A	M6	1.3 to 1.5
20A	M6	1.3 to 1.5
25A	M6	1.3 to 1.5

Use/maintenance

1. Before use

⚠ CAUTION

■ For information on the compatibility of product materials, working fluids, and ambient atmospheres, refer to the compatibility checklist on page 572 as a basic reference. For fluids not listed in the checklist or new fluids (including different concentration levels), contact and inquire with CKD beforehand.

● If the fluid is highly absorbable, such as liquid containing a surfactant, the fluid may permeate through the parts.

Conduct periodic inspections, and if there is any abnormality, take necessary measures such as replacing the parts.

■ When using gases such as N_2 gas or air, valve seat leakage up to 1 cm^3/min (at pneumatic pressure) may occur. (When the diaphragm material is PTFE)

■ Rapid changes in fluid temperature may cause the valve seat to warp unevenly, leading to valve seat leakage. (When the body material is PPS)

■ Do not overly tighten the flow rate adjustment knob.

■ If the diaphragm material is EPDM and the operation category is NO, using such a valve in closed condition over an extensive period of time may cause a delay in return or return failure due to the rubber getting stuck. In this case, remove the Y port set screw, and apply operating pressure to return the valve.

■ Turbulent flow occurs on the secondary side of the valve.
When installing a device that requires laminar flow, e.g. a flow rate meter, on the secondary side of the valve, make sure to keep enough distance between the valve and the device so that the device is not affected by turbulent flow.

■ Never attempt to disassemble the product. It is very dangerous, as some products include high-load springs.

■ Do not allow fluid to come into contact with the product body.

■ When using a model with flow rate adjustment, make sure to turn the adjusting dial at least the specified number of times from the closed state to ensure appropriate setting. If used below this level, vibration or flow rate fluctuation may occur depending on the working conditions. Changes in fluid temperature may also affect flow rate depending on the working conditions.

■ Water hammer and vibration may occur in certain fluid pressure conditions. In most cases, this can be resolved by adjusting the open-close speed using a speed controller, etc. If a problem persists, review and revise the fluid pressure and piping conditions.

2. Maintenance and inspection

⚠ DANGER

■ When replacing the valve, thoroughly replace the remaining fluid with pure water or air so that it does not affect the surrounding devices and humans.
While the upper side of the diaphragm (cylinder side) does not come into contact with the fluid, it may be exposed to fluid atmosphere due to gas permeation from the thin film part. For your safety, follow the precautions below:
(1) A small amount of permeating gas is released from the breathing hole located on the side of the cylinder by valve operation.
(2) When touching the valve, read the material safety data sheet (SDS) for the working fluid and wear the necessary protective gear.

■ Valves used with chemical liquids may have chemical atmosphere remaining between the actuator and the diaphragm. Never attempt to disassemble the product. If disassembly is necessary, contact CKD or a dealership.

■ Perform the following periodic inspection once or twice a year to ensure that the valve is achieving optimal functionality.
(1) Inspection for leakage to the valve exterior
(2) Inspection for leakage from port thread part
(3) Inspection for loosening in operating air piping and fallen tubes

⚠ WARNING

■ Always drain the operating air and fluid before performing maintenance.

■ Before starting maintenance or inspection, read the material safety data sheet (SDS) for the chemical liquid and wear the necessary protective gear.

⚠ CAUTION

■ When replacing a product, always replace it with a product with the same model No. Specifications may differ even when the appearance is the same.

■ Store unused products in a location where they are not exposed to direct sunlight or high temperatures. When handling the product, do not apply impact or damage it by throwing, dropping, or allowing it to catch on something.

Product and working fluid compatibility checklist

This checklist is created based on previous evaluations and experience, and does not guarantee performance.
When using chemical liquids, check with a chemical expert regarding the compatibility between the working fluid and the product material based on the table below in order to determine usability. Note that permeating gas can also affect product materials other than the wetted parts. This may cause leakage from the product or malfunctions.

Material combination code		P	C	R	F
Material	Body	PPS	PPS	SCS13	SCS13
	Diaphragm	EPDM	PTFE	EPDM	PTFE
Pure water		○	○	○	○
Sulfuric acid		×	×	×	×
Hydrochloric acid (5% or less)		○	○	×	×
Nitric acid		×	×	×	×
Hydrogen peroxide solution		×	×	×	×
Ozone water		×	×	×	×
Sodium hydroxide (30% or less)		○	○	○	○
Aqueous ammonia		△ *3	△ *3	△ *3	△ *3
Acetone		○	△ *3	○	△ *3
Isopropyl alcohol		○	○	○	○
Paint thinner		×	△ *3	×	△ *3
Air/N_2 gas		○	○	○	○

○: Usable △: Usable with conditions ×: Not usable
For fluids not listed above, contact CKD.
*1 : Part of the compatibility data is created based on materials provided by the respective material manufacturers. These are merely reference values, and do not guarantee actual usability with the product.
*2 : Highly absorbable fluids may cause very slight leakage along the thread parts or cavities of a stainless steel (SCS13) casting.
*3 : Contact CKD separately.

Product-specific cautions: Diaphragm cylinder valve NAD Series

Design/selection

1. Working fluid

⚠ CAUTION

■ External pilot air

(1) Draining: Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). This is a factor that significantly reduces the reliability of the pneumatic components. For drainage measures, improve air quality by dehumidifying with an after cooler or dryer, removing foreign matter with a filter, and removing tar with a tar removal filter, etc.

(2) No lubrication: No lubricant is required for this series. Do not lubricate.

(3) Filter: Install a filter with a 5 μm or less filter element.

2. Working environment

⚠ WARNING

■ If there are high levels of dust in the area, install a downward-facing silencer or elbow fitting on the exhaust port so that dust does not enter.

■ Take appropriate safeguards when using this product in places where it can be exposed to dripping water.

⚠ CAUTION

■ Because the connection is by screws, particles are generated during installation. Operation may generate particles during use, as the diaphragm is EPDM. Check the compatibility for the application.

Mounting, installation and adjustment

1. Piping

⚠ CAUTION

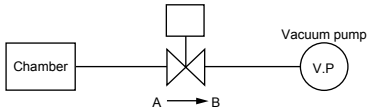
■ When piping the GNAD Series, check the supply port on the pilot operation side.

Model No.	Pilot operation side supply port
GNAD1/GNAD1V	X
GNAD2/GNAD2V	Y
GNAD3/GNAD3V	X and Y

■ When piping the NAD Series, check the supply ports on the body side and pilot operation side.

Model No.	Body side supply port	Pilot operation side supply port
NAD1-10/NAD1V-10	A	X
NAD2-10/NAD2V-10	A	Y
NAD3-10/NAD3V-10	A	X and Y

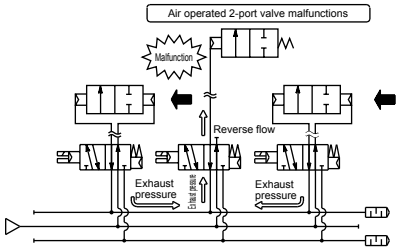
*1) With the NAD$\frac{1}{3}$V body side supply port, connect the chamber (vacuum holding side) to port A.



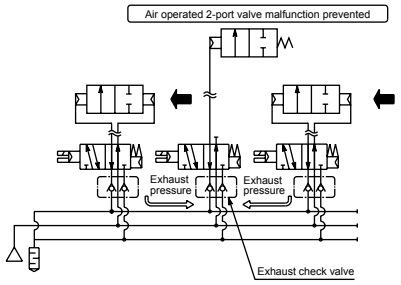
When using for vacuum burst, etc., set the pressurized port to port A.

■ If a manifold is used on the NAD Series operation valve, the exhaust pressure could be drawn in from other valves, causing malfunctions such as a momentary opening of the NAD. When using a manifold, use a valve with a built-in “exhaust check valve”.
A check valve is built into the CKD pilot operated 3, 5-port valve 4G Series.

Example of pneumatic pressure system that may malfunction



4G series pneumatic pressure system



Use/maintenance

1. Maintenance and inspection

⚠ CAUTION

■ Pilot pressure

Set pilot air pressure within the specified range. The product must be used with pilot pressure in the specified range for NO or double acting models in order to prevent sealing failure. The NC is recommended when the pilot pressure cannot be controlled.

■ External leakage

The center part of the diaphragm uses a ring seal. When the elasticity of the rubber deteriorates over time, fluid may pass through the seal. Additionally, if the fluid is highly absorbable, such as liquid containing a surfactant, the fluid may permeate through the parts. Conduct periodic inspections, and if there is any abnormality, take necessary measures such as replacing the parts.

2. Disassembly

⚠ CAUTION

■ It is prohibited to disassemble this valve. Disassembling this valve may result in losing the oil-prohibited properties in the parts that come into contact with the fluid.

Related products for water

CONTENTS

Karman vortex flow rate sensor for water

WFK2

■ **Sensors/controller/flow rate sensor**

CONTENTS

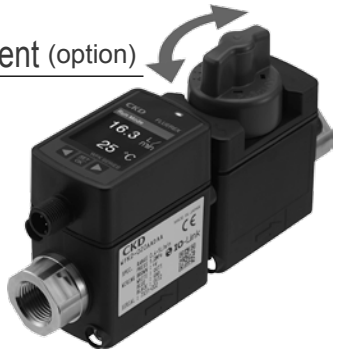
Diversified

Compatible with flow rates of 0.4 to 250 L/min

Compatible with a wide range of flow rates.

Easy flow rate adjustment (option)

Can be adjusted with a manual valve.



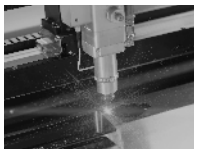
All models equipped as standard with water temperature measuring function

Saves space and wiring time with no need for a separately installed water temperature sensor.

Handles water up to 95°C


Molding machine cooling


Heated water for mold temperature controlling


Laser oscillator cooling

Various output functions available

OUT1

Analog output	NPN/PNP switchable output
› Instantaneous flow rate › Temperature	› Instantaneous flow rate 1/2 › Temperature 1/2 › Integrating flow
Pulse output	**External input**
› Integrating flow	› Integrating flow reset › Peak hold reset

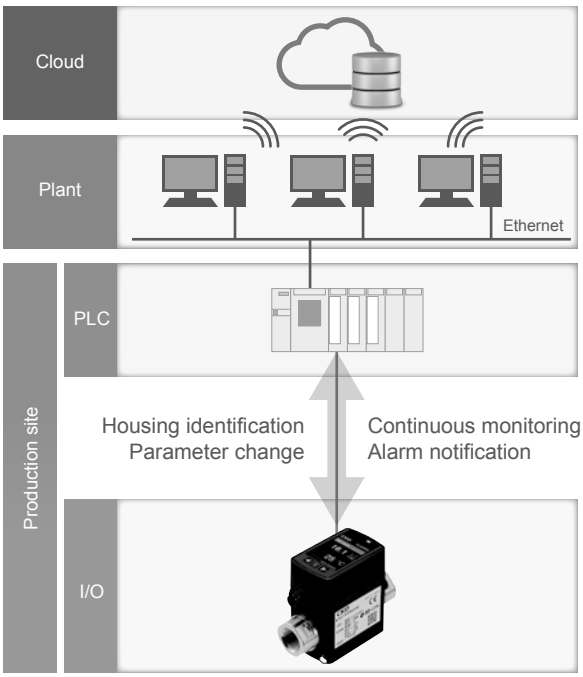
OUT2

Analog output	NPN/PNP switchable output
› Instantaneous flow rate › Temperature	› Instantaneous flow rate 1/2 › Temperature 1/2 › Integrating flow
Pulse output	**IO-Link**
› Integrating flow	

Introducing the IO-Link model

IO-Link

IO-Link is a digital communication standard for sensors/actuators at factory sites. (IEC 61131-9)
Unlike analog communication, it enables the transmission of parameters and event data.



Features of IO-Link

Constant monitoring via digital data is possible.

Parameters can be set and changed via the network, enabling remote operation of the device.

Model Nos. and serial Nos. can be checked via the network.

Settings can be copied from the master (scanner) side, making troublesome parameter resetting during maintenance unnecessary.

Device failure and disconnection can be confirmed.

The network can also be changed to Ethernet connection, making the device a part of IoT.

Easier to use

Display screen rotation

The liquid crystal display can be rotated 90° at a time without moving the body.
There is no interference even when installing in parallel.

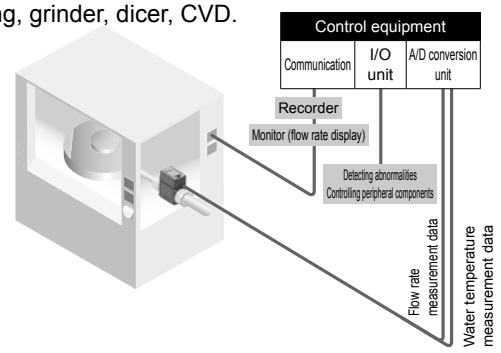
Easy to read 2-screen color liquid crystal display

Set values, temperature, etc., can be displayed simultaneously.

Examples of applications

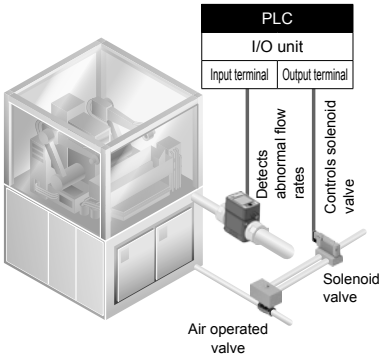
Semiconductor Semiconductor manufacturing equipment

Cooling and temperature control of semiconductor manufacturing equipment.
Etching, grinder, dicer, CVD.



Hardening Induction hardening device

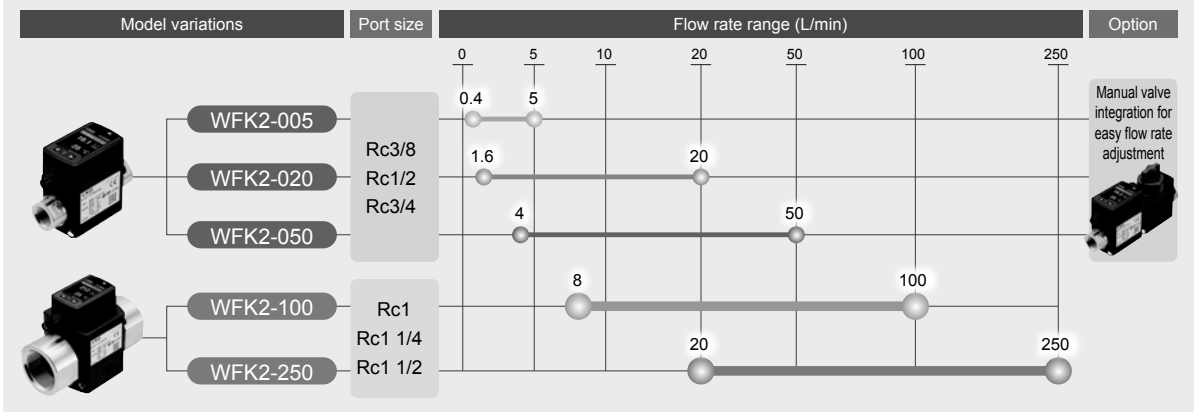
Quantitative management of cooling water.



Karman vortex flow rate sensor for water FLUEREX

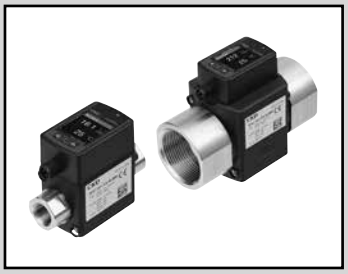
WFK2 SERIES

(Received the 2018 Good Design Award)



FP Food Process

Contact CKD for support for Food Manufacturing Processes FP Series.



FLUEREX (Karman vortex flow rate sensor for water)

WFK2 Series

● Flow rate range: 0.4 to 5, 1.6 to 20, 4 to 50, 8 to 100, 20 to 250 L/min

CE RoHS

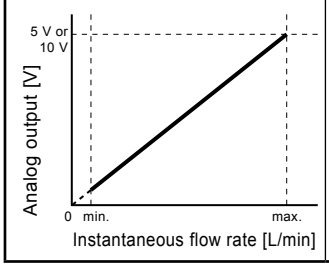
Specifications

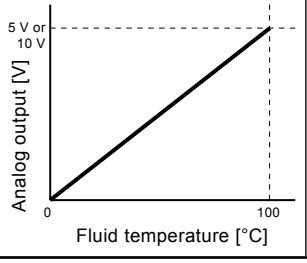
1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

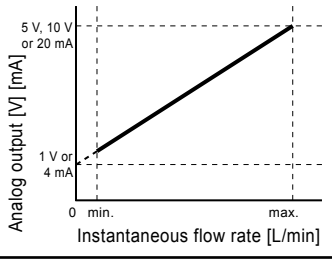
Item			WFK2-005	WFK2-020	WFK2-050	WFK2-100	WFK2-250
Connection	Port size	Rc, G, NPT	3/8, 1/2, 3/4			1, 1 1/4, 1 1/2	
	Port material		Stainless steel: SUS304				
Working conditions	Applicable fluids		Pure water, industrial water				
	Max. working pressure	MPa	1.0 (≈145 psi, 10 bar)				
	Proof pressure	MPa	1.5 (≈217 psi, 15 bar)				
	Manual valve internal leakage	mL/min	0			No manual valve settings	
	Manual valve allowable back pressure	MPa	0.3 (≈43 psi, 3 bar)			No manual valve settings	
	Ambient temperature	°C	0 (32°F) to 50 (122°F) (85% RH or less, no condensation)				
	Fluid temperature	°C	1 (33°F) to 95 (203°F)				
Flow rate	Flow rate range	L/min	0.4 to 5	1.6 to 20	4 to 50	8 to 100	20 to 250
	Repeatability (*1)		Analog accuracy: ±2.5%F.S. Display accuracy: ±2.5%F.S. ±1 digit (min. display unit)				
	Temperature characteristics (*1)		±5%F.S. (base temperature 25°C (77°F), 10 (50°F) to 50°C (122°F))				
	Low flow cut		5% of F.S.				
	Integrating flow range (*2)		99,999 L or 99,999 m^3 (unit selectable), reset when the power is turned off.				
	Integrated pulse rate (*2)	L/pulse	0.1, 0.5, 1	0.1, 0.5, 1, 10	0.5, 1, 10, 50	1, 10, 50, 100	10, 50, 100
	Pressure loss	MPa	0.07 (≈11 psi, 1 bar) (at F.S.)	0.05 (≈8 psi, 1 bar) (at F.S.)	0.05 (≈8 psi, 1 bar) (at F.S.)	0.05 (≈8 psi, 1 bar) (at F.S.)	0.03 (≈5 psi, 1 bar) (at F.S.)
	Response time (*3)	sec	0.25, 0.5, 1, 5, 10 (default 1)				
Temperature	Measurement temperature range	°C	0 (32°F) to 100 (212°F)				
	Accuracy	°C	Less than 50 (122°F): Analog accuracy ±2 (35°F), display accuracy ±2 (35°F) ±1 (33°F) digit (min. display unit 1)				
			50 (122°F) to 100 (212°F): Analog accuracy ±3 (37°F), display accuracy ±3 (37°F) ±1 (33°F) digit (min. display unit 1)				
Output	Display		Two-screen LCD display, instantaneous flow rate: 3 digits, water temperature: 2 digits, integrating flow: 5 digits, with screen rotation				
	Analog output (*4)		Standard: 0 to 5 VDC/1 to 5 VDC, option: 4 to 20 mADC, 0 to 10 VDC/1 to 10 VDC				
	Switch output		NPN or PNP transistor open collector output (can be switched from settings)				
		Max. load current	50 mA				
		Max. applied voltage	30 VDC				
		Internal voltage drop	2.0 V or less				
Power supply voltage			Analog output standard: 12 to 24 VDC ±10%, analog output option: 24 VDC ±10%				
Current consumption (*5)			50 mA or less				
Mounting	Mounting orientation		Unrestricted in vertical/horizontal direction				
	Straight piping section		None			IN side: 10 D, OUT side: 5 D	
	Degree of protection		IP65 or equivalent				
	Weight	g	3/8 (Rc, G, NPT): approx. 320 1/2 (Rc, G, NPT): approx. 320 3/4 (Rc, G, NPT): approx. 400			1 (Rc, G, NPT): approx. 870 1 1/4 (Rc, G, NPT): approx. 1,010 1 1/2 (Rc, G, NPT): approx. 1,100	

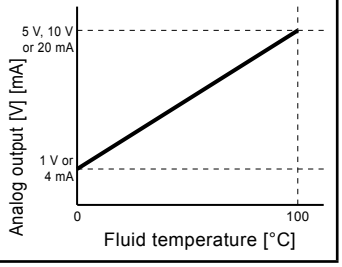
*1: Accuracy is the average value over 10 sec (for conditions not containing air bubbles). F.S. stands for full scale flow rate.
*2: The integrating flow is a calculated (reference) value. It is reset when the power is turned OFF. Errors may occur between the integrating flow display and integrated pulse output.
*3: The time to attain 70% of the original output after the normal flow rate (used) drops instantly to 0.
*4: Check the allowable load on the wiring method page.
*5: Current for when 24 VDC is connected, and no load is applied. Please note that the current consumption changes depending on the load connection status.

Switch/analog output Switch/analog output	0 to 5 VDC 0 to 10 VDC	Switch/analog output Switch/analog output Switch/analog output	1 to 5 VDC 1 to 10 VDC 4 to 20 mADC









Note: Output value without adjustment of original range analog output or span.

How to order

WFK2 - 005 AA A A N - A C

Ⓐ Flow rate range Ⓑ Port size Ⓒ IO-Link/analog output Ⓓ Display unit Ⓔ Manual valve Ⓕ Option (included cable) Ⓖ Bracket (Bracket included)

Code	Description	
Ⓐ Flow rate range		
005	0.4 to 5 L/min	
020	1.6 to 20 L/min	
050	4.0 to 50 L/min	
100	8.0 to 100 L/min	
250	20 to 250 L/min	
Ⓑ Port size		
AA	Rc 3/8	Flow rate range: 005, 020, 050
BA	Rc 1/2	
CA	Rc 3/4	
DA	Rc 1	Flow rate range: 100, 250
EA	Rc 1 1/4	
FA	Rc 1 1/2	
AB	G 3/8	Flow rate range: 005, 020, 050
BB	G 1/2	
CB	G 3/4	
DB	G 1	Flow rate range: 100, 250
EB	G 1 1/4	
FB	G 1 1/2	
AC	NPT 3/8	Flow rate range: 005, 020, 050
BC	NPT 1/2	
CC	NPT 3/4	
DC	NPT 1	Flow rate range: 100, 250
EC	NPT 1 1/4	
FC	NPT 1 1/2	
Ⓒ IO-Link/analog output "D," "E" and "F" have analog output specifications as with IO-Link not in use.		
A	Switch/analog output 0 to 5 VDC/1 to 5 VDC	
B	Switch/analog output 4 to 20 mA DC	
C	Switch/analog output 0 to 10 VDC/1 to 10 VDC	
D	IO-Link compatible 0 to 5 VDC/1 to 5 VDC	
E	IO-Link compatible 4 to 20 mA DC	
F	IO-Link compatible 0 to 10 VDC/1 to 10 VDC	
Ⓓ Display unit		
A	L/min L m^3 °C	
B	L/min us gal/min L m^3 us gal °C °F	*1
Ⓔ Manual valve		
N	Sensor only	
A	With manual valve (cock)	*2, *3
Ⓕ Option (included cable)		
Blank	None	
A	Standard cable (M12/4-conductor/ 3 m) included	
B	Double ended connector cable (M12/4-conductor/ 3 m) included	
Ⓖ Option (Bracket included)		
Blank	None	
C	Included bracket	*3

Precautions for model No. selection

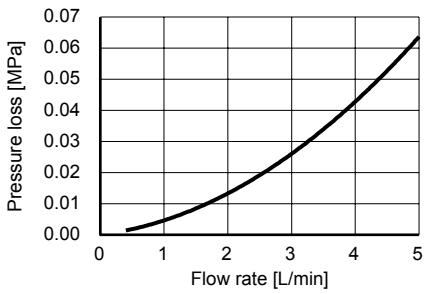
*1: The unit display "B" is for overseas use and cannot be used in Japan.
*2: Option A (with manual valve) has a flow rate range of 005, 020, or 050 only.
*3: When selecting Option A (with manual valve) and included bracket (C), two sets of brackets are included.

[Example of model No.]
WFK2-005AAAAN-AC

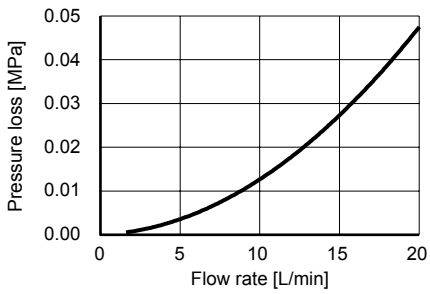
Ⓐ Flow rate range : 0.4 to 5 L/min
Ⓑ Port size : Rc3/8
Ⓒ IO-Link/analog output: Switch/analog output 0 to 5 VDC/1 to 5 VDC
Ⓓ Display unit : L/min L m^3 °C
Ⓔ Manual valve : Sensor only
Ⓕ Option : Standard cable included
Ⓖ Option : Bracket included

Pressure loss

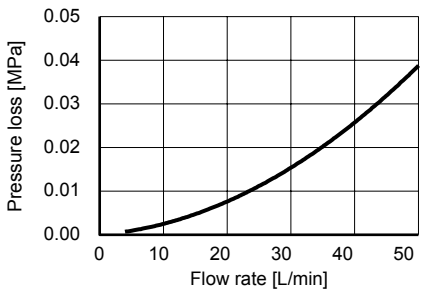
● WFK2-005



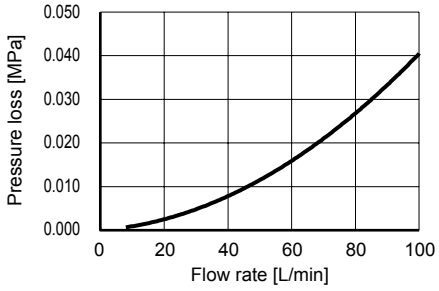
● WFK2-020



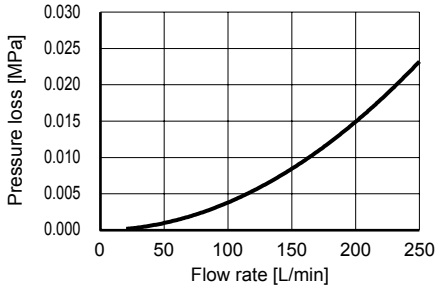
● WFK2-050



● WFK2-100

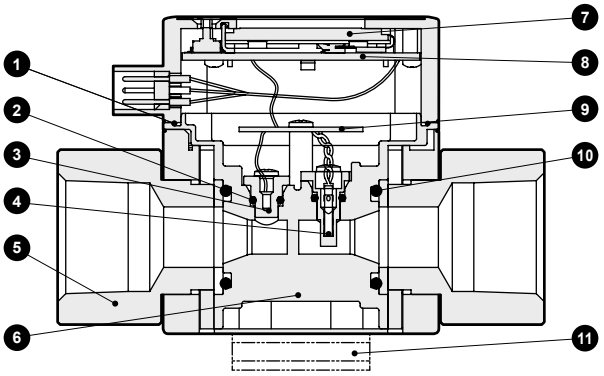


● WFK2-250

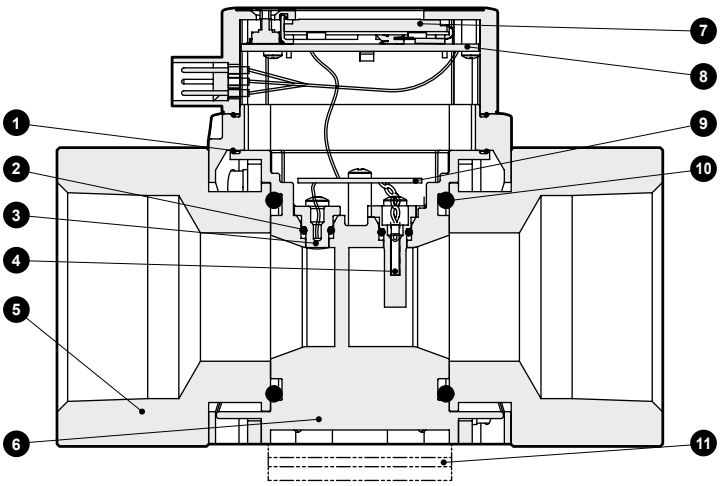


Internal structure and list

● WFK2-005, 020, 050



● WFK2-100, 250



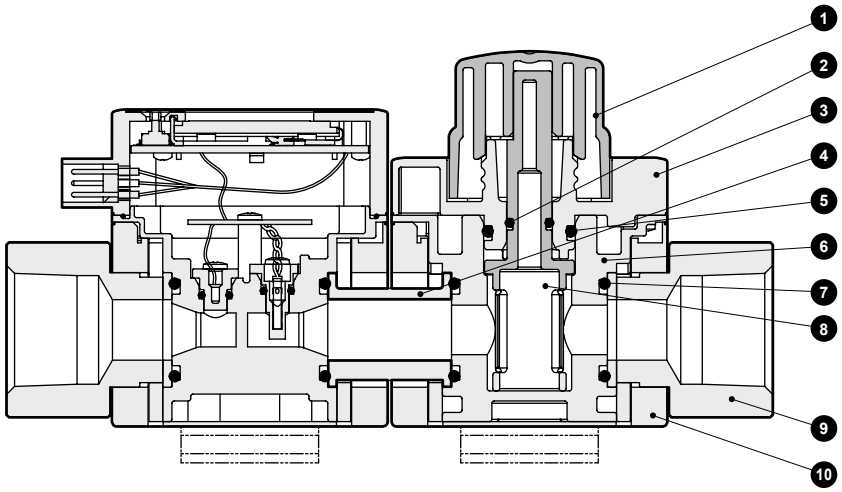
Cannot be disassembled

No.	Part name	Material		Quantity
1	Packing	FKM	Fluoro rubber	1 or 2
2	O-ring	FKM	Fluoro rubber	2
3	Temperature sensor	SUS316L	Thermistor	1
4	Karman vortex detection sensor	PPS resin	Piezoelectric element	1
5	Attachment	SUS304 or SCS13		2
6	Sensor body	PPS resin		1

No.	Part name	Material		Quantity
7	Liquid crystal			1
8	CPU board			1
9	Sensor board			1
10	O-ring	FKM	Fluoro rubber	2
11	Bracket (option)	SUS304 or SPCC		(1)

* Wetted parts are ②, ③, ④, ⑤, ⑥ and ⑩.

● WFK2-005, 020, 050****A



Cannot be disassembled

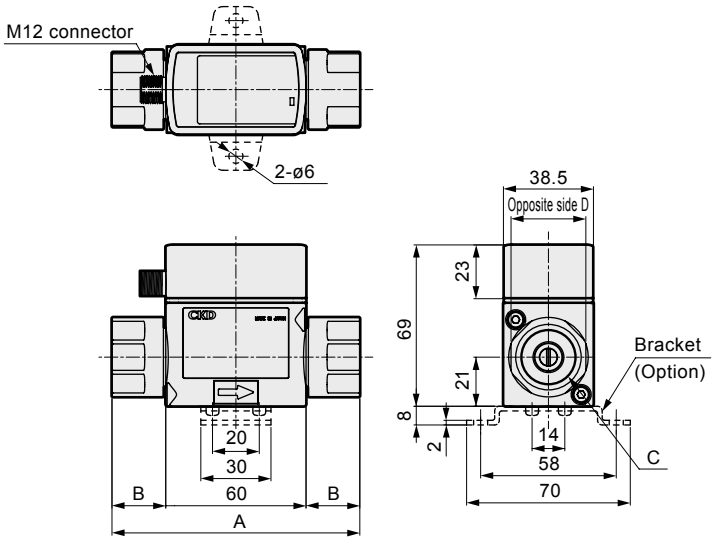
No.	Part name	Material		Quantity
1	Handle	POM resin		1
2	O-ring	FKM	Fluoro rubber	1
3	Stuffing	PPS resin		1
4	Spacer	SUS304 or SCS13		1
5	O-ring	FKM	Fluoro rubber	1
6	Cock body	PPS resin		1

No.	Part name	Material		Quantity
7	O-ring	FKM	Fluoro rubber	2
8	Cock	PPS resin		1
		FKM	Fluoro rubber	
9	Attachment	SUS304 or SCS13		2
10	External case	PBT resin		1

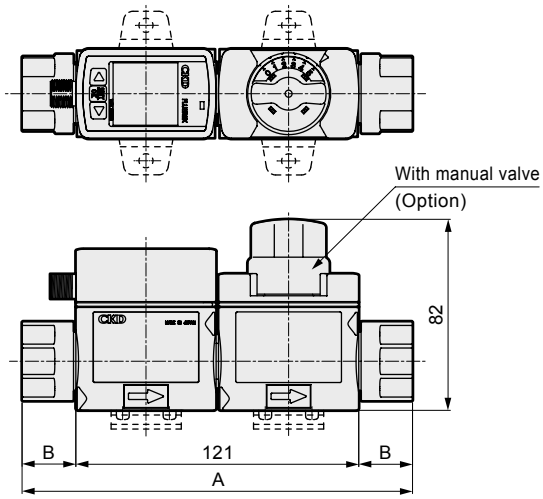
* Wetted parts are ②, ③, ④, ⑤, ⑥, ⑦, ⑧ and ⑨.

Dimensions

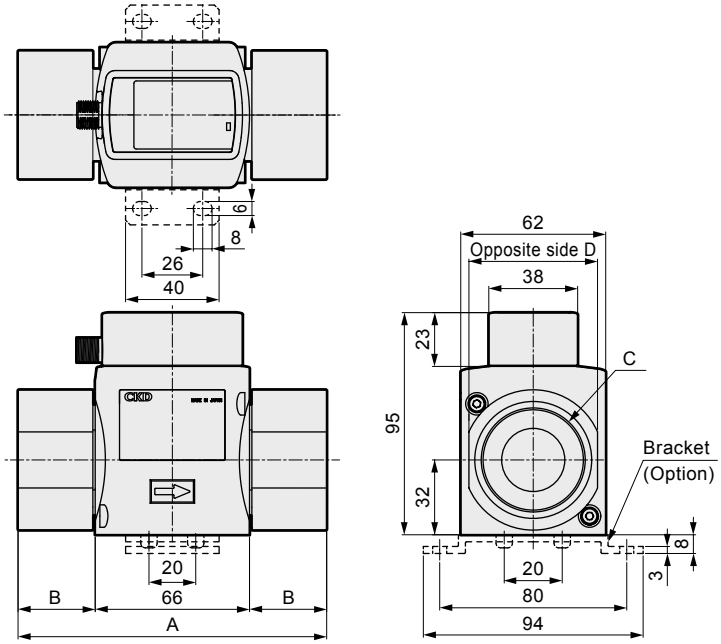
● WFK2-005, 020, 050



· With manual valve (cock type)



● WFK2-100, 250

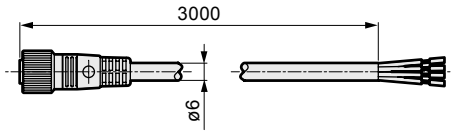


Model No.	A	B	C	Opposite side D
WFK2-[*1]A[*3]**N	90	15	Rc3/8	24
WFK2-[*1]B[*3]**N	90	15	Rc1/2	27
WFK2-[*1]C[*3]**N	106	23	Rc3/4	32
WFK2-[*2]D[*3]**N	106	20	Rc1	46
WFK2-[*2]E[*3]**N	125	29.5	Rc1 1/4	50
WFK2-[*2]F[*3]**N	132	33	Rc1 1/2	55
WFK2-[*1]A[*3]**A	151	15	Rc3/8	24
WFK2-[*1]B[*3]**A	151	15	Rc1/2	27
WFK2-[*1]C[*3]**A	167	23	Rc3/4	32

[*1]: Select from 005, 020, and 050
[*2]: Select from 100 and 250
[*3]: Select from A, G, and N (G thread and NPT thread also have the same dimensions)

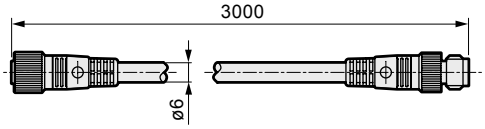
Optional dimensions

● Cable option
Common for WFK2
· Standard cable
Discrete option model No.: **WF-FL-280741**

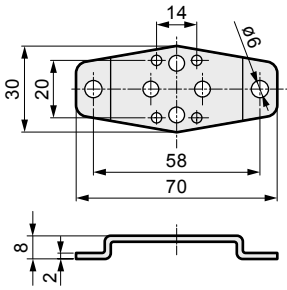


Finished O.D. 6 mm, core wire 0.5 mm² and insulation O.D. 1.9 mm

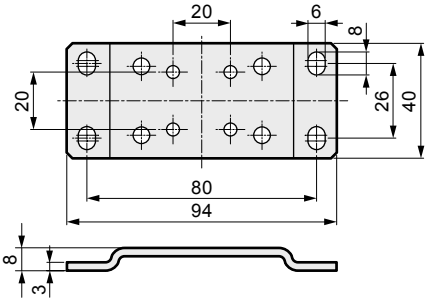
· Double ended connector cable
Discrete option model No.: **WF-FL-662453**



● Bracket option
WFK2-005, 020, 050
Discrete option model No.: **WF-FL-315544**



WFK2-100, 250
Discrete option model No.: **WF-FL-636342**



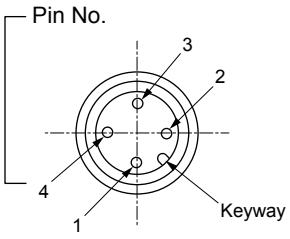
Wiring method

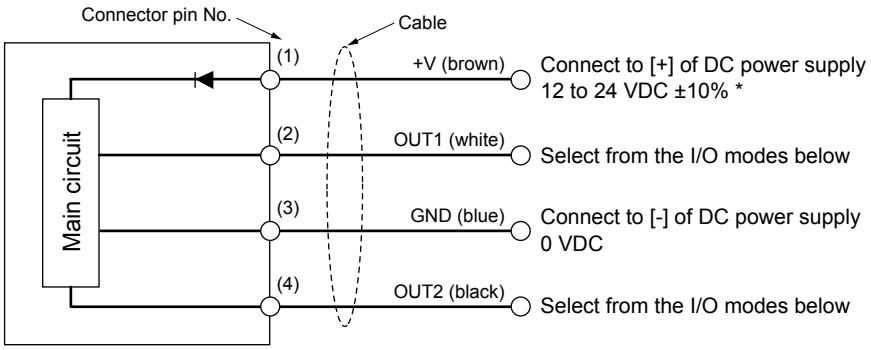
· Always read the safety precautions before wiring.

· The cable used is a 4-conductor cabtyre cable with a core wire of 0.5 mm^2.

***Keep the cable far away from power cords or other things that may cause noise. Noise can cause malfunctions.**

[Connector (male)]





*With standard analog output (0 to 5 V/1 to 5 V). With option (4 to 20 mA/0 to 10 V/1 to 10 V), it is 24 VDC ±10%.

I/O mode

OUT 1: Analog flow output, analog temperature output, flow switch 1 output, flow switch 2 output, temperature switch 1 output, temperature switch 2 output, integrated pulse output, integrated switch output, external input, Off

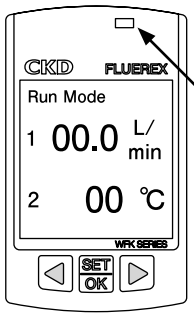
OUT 2: Analog flow output, analog temperature output, flow switch 1 output, flow switch 2 output, temperature switch 1 output, temperature switch 2 output, integrated pulse output, integrated switch output, external input, IO-Link, Off

Item	[A, D] 0 to 5 V/ 1 to 5 V	[B, E] 4 to 20 mA	[C, F] 0 to 10 V/ 1 to 10 V
Allowable load weight	50 kΩ or more	500 Ω or less	50 kΩ or more

IO-Link parameter specifications

1. General

Item	Details
Communication protocol	IO-Link
Communication protocol version	V1.1
Transmission bit rate	COM2 (38.4 kbps)
Port	M12 Class A
Process data (input)	4-byte
Process data (output)	0-byte
Min. cycle time	5 ms
Data storage	1 kbyte
SIO mode support	None



Power lamp (green)

· Lights when power supply is ON.
· Blinks during IO-Link communication.

2. Process data

Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Data name	MSB															LSB
	Flow rate															
Data range	Refer to Table 1															
Format	UInteger16															

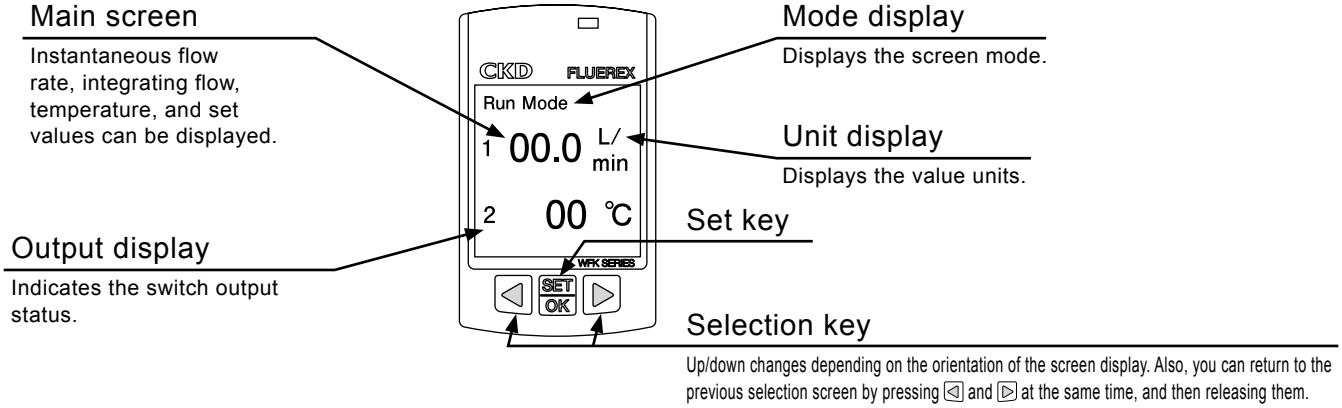
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Data name	Error	WARNING	–	–	Switch output				MSB							LSB
					4	3	2	1	Fluid temperature <Temperature>							
Data range	True/False								-10 to 110°C							
Format	Boolean								Integer8							

Data range (Table 1)

Flow rate range	005	020	050	100	250
Data range	0.00 to 5.50 L/min	0.0 to 22.0 L/min	0.0 to 55.0 L/min	0 to 110 L/min	0 to 275 L/min

* IODD file can be downloaded from the CKD website. (https://www.ckd.co.jp/english/)

Names and functions of display/operation section

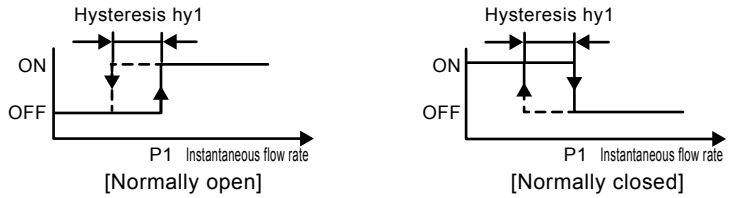


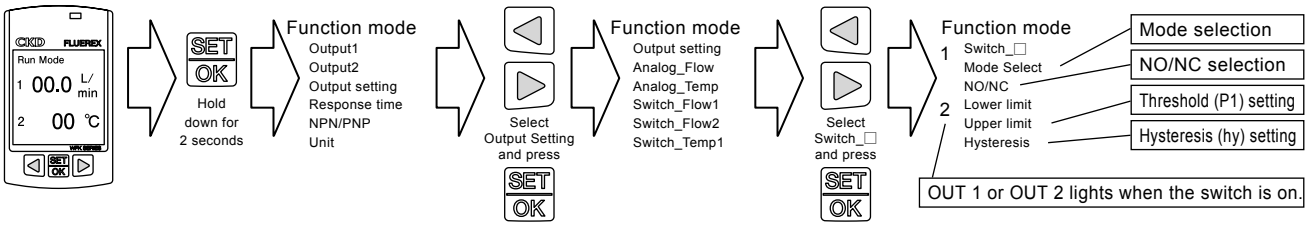
Output mode and output operation

1. Switch output

(1) Hysteresis mode

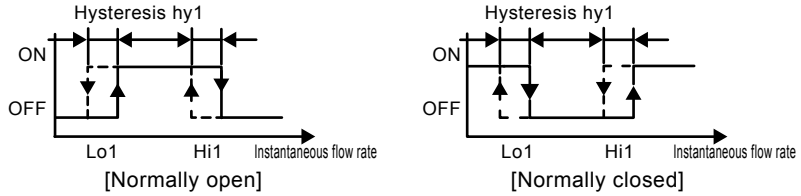
OUT 1 and 2 can both be set.
Can be set with instantaneous flow rate and temperature.
Can memorize 2 types each of instantaneous flow rate and temperature.

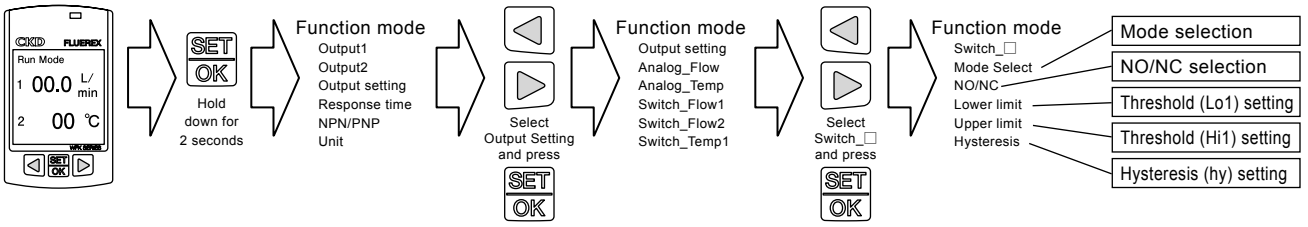




(2) Window mode

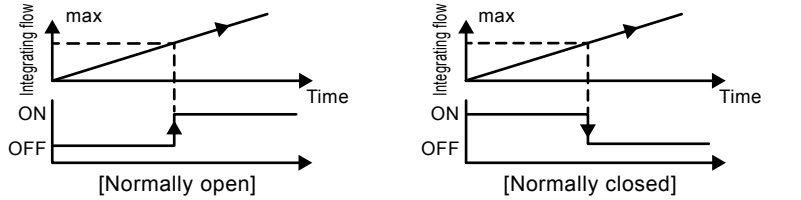
OUT 1 and 2 can both be set.
Can be set with instantaneous flow rate and temperature.
Can memorize 2 types each of instantaneous flow rate and temperature.

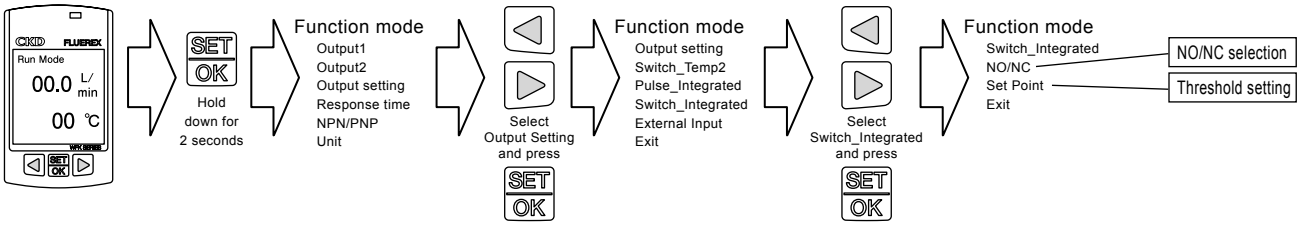




(3) Accumulated output mode

OUT 1 and 2 can both be set.
Integrating flow can be reset through turning the power OFF, button operation, or external input.

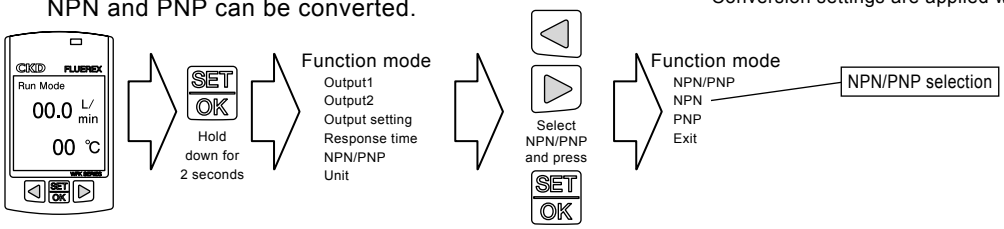




(4) NPN/PNP conversion

NPN and PNP can be converted.

*Perform NPN and PNP conversion when the switch output is OFF.
Conversion settings are applied when the power is turned back ON.

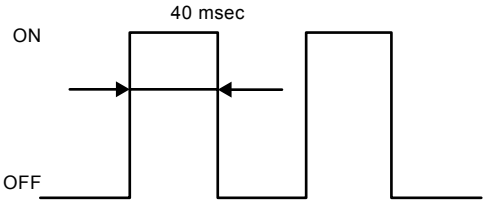


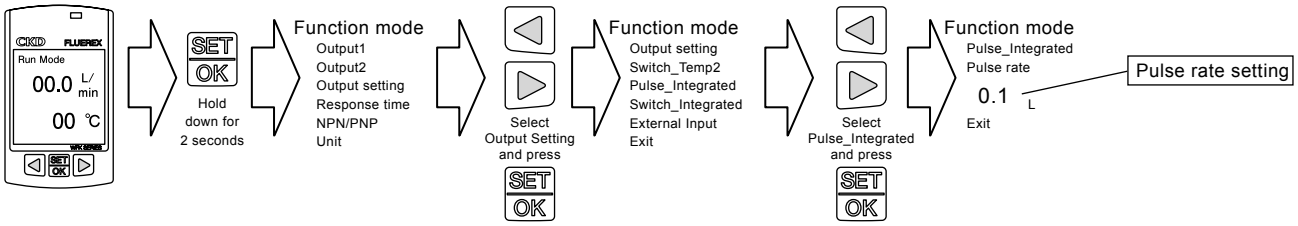
2. Integrated pulse output

Pulse output matches the integrating flow count.

Selectable pulse rates

Model	5 L	20 L	50 L	100 L	250 L
0.1 L	○	○			
0.5 L	○	○	○		
1 L	○	○	○	○	
10 L		○	○	○	○
50 L			○	○	○
100 L				○	○

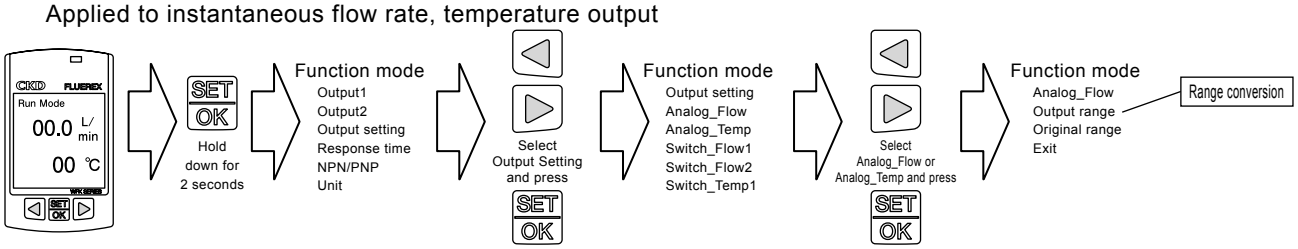




3. Analog output

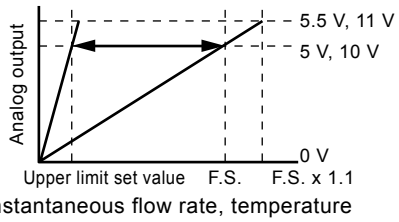
(1) Output conversion

0 to 5 V/1 to 5 V: Select between 0 to 5 V output and 1 to 5 V output
4 to 20 mA: No output conversion
0 to 10 V/1 to 10 V: Selectelect between 0 to 10 V output and 1 to 10 V output
Applied to instantaneous flow rate, temperature output

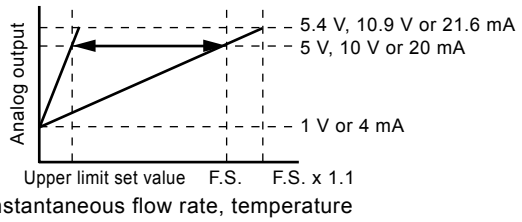


(2) Original analog output

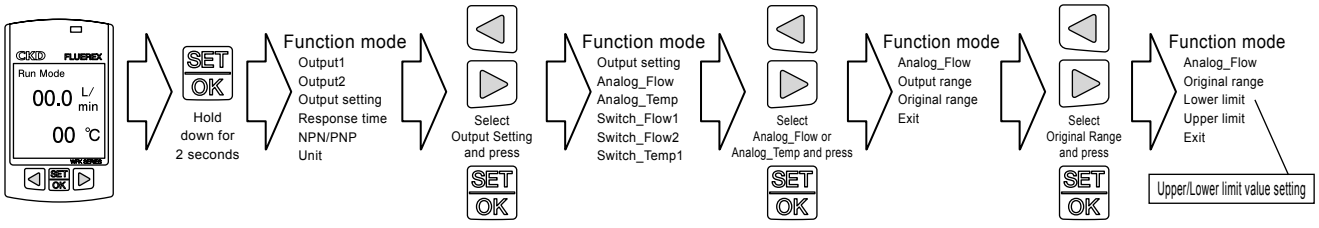
An analog output function that freely sets the upper and lower limits of normal analog output.
*The set range cannot be greater than the max. flow rate of each flow rate range



Instantaneous flow rate, temperature

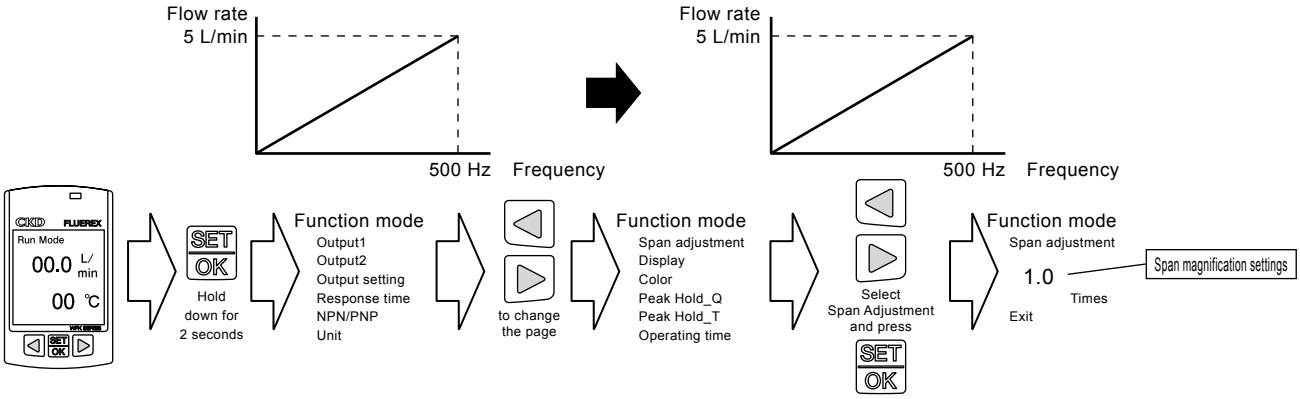


Instantaneous flow rate, temperature



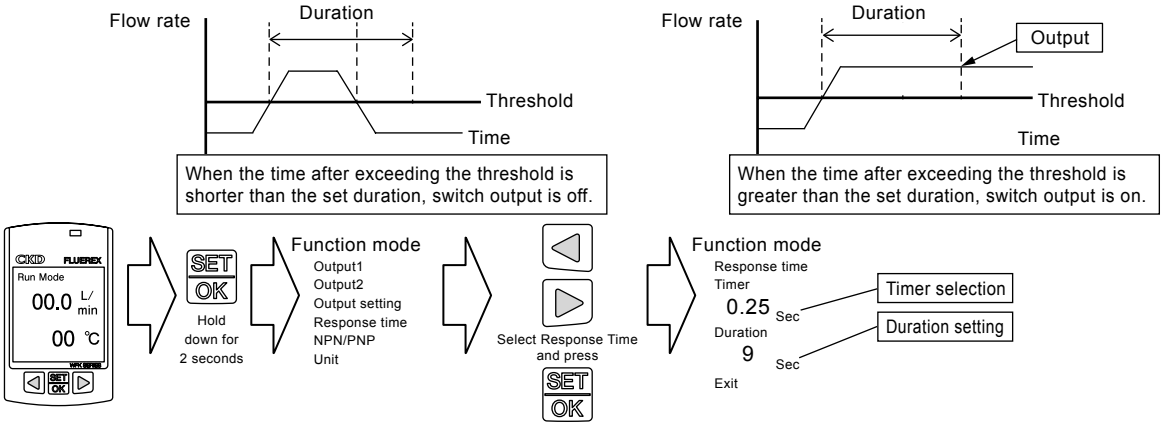
4. Span adjustment

Span adjustment can be set from 0.1 to 2.5 times with the initial flow rate value.
[Ex.] When set to 2.0 times



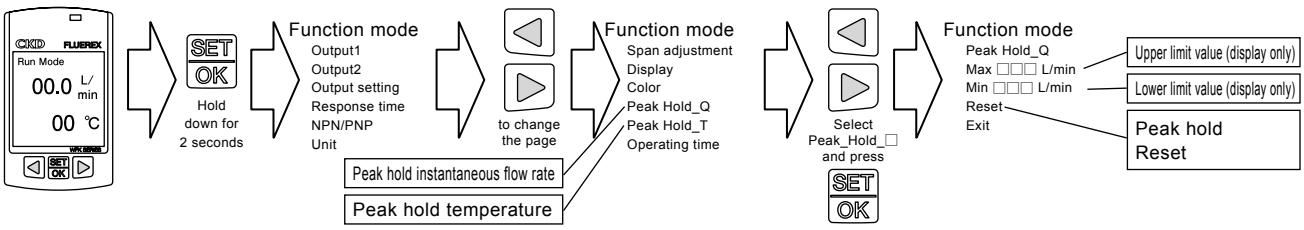
5. Setting response time

(1) Timer selection
Instantaneous flow rate response time (average movement time) can be changed.
Select from 0.25 sec, 0.5 sec, 1 sec, 5 sec, and 10 sec (1 sec at factory settings)
(2) Duration can be set from 0 to 9 sec
During switch output, the time it takes for the output to occur after exceeding the threshold can be set.



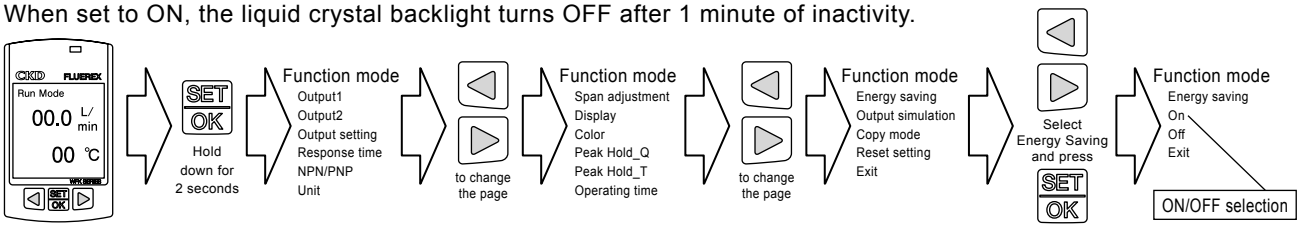
6. Peak hold function

The max. and min. flow rates of instantaneous flow rate and temperature can be confirmed.
The max. and min. flow rates can be reset through turning the power OFF, button operation, or external input.



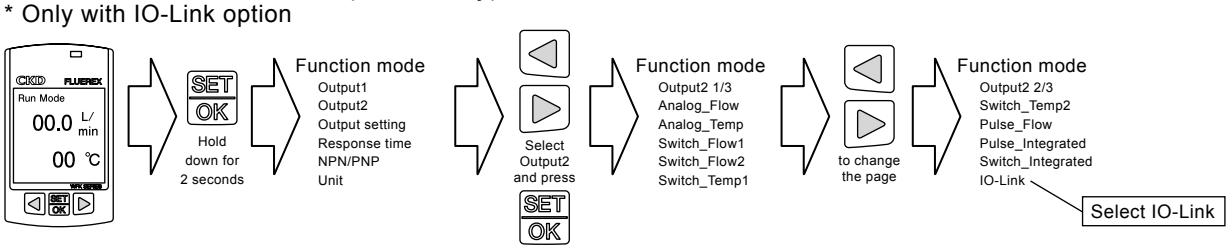
7. Energy Saving setting

Energy saving can be set to "ON" or "OFF".
When set to ON, the liquid crystal backlight turns OFF after 1 minute of inactivity.



8. IO-Link

Acquiring measurement data, changing the threshold, and other bi-direction communication are possible with an IO-Link connection (OUT2 only).
* Only with IO-Link option



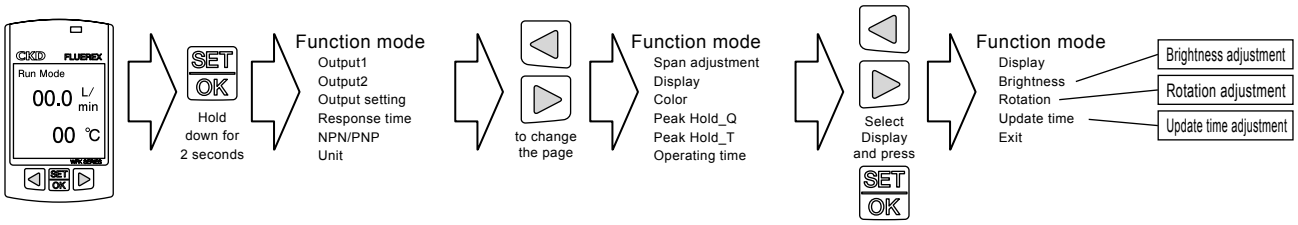
9. Screen display

(1) Display

Brightness: Select from 25%, 50%, 75%, and 100%.

Rotation: Select from 0°, 90°, 180°, and 270°.

Update time: Select from 0.25 sec, 0.5 sec, 1 sec, 5 sec, and 10 sec.



(2) Color

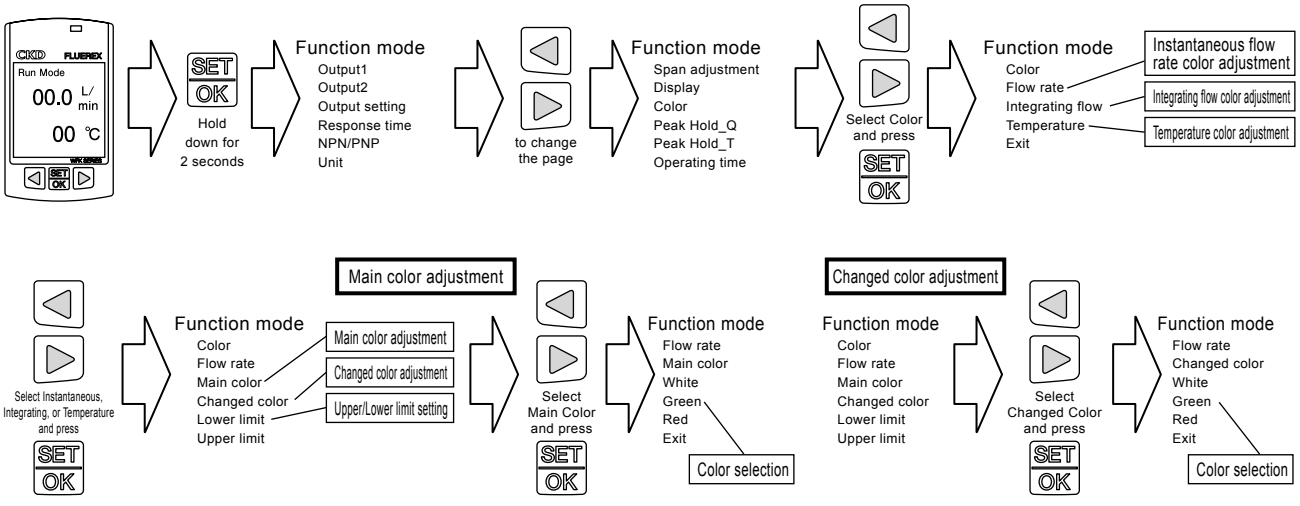
Main color: Changes the color of characters on the main display. (Select from white, green, and red)

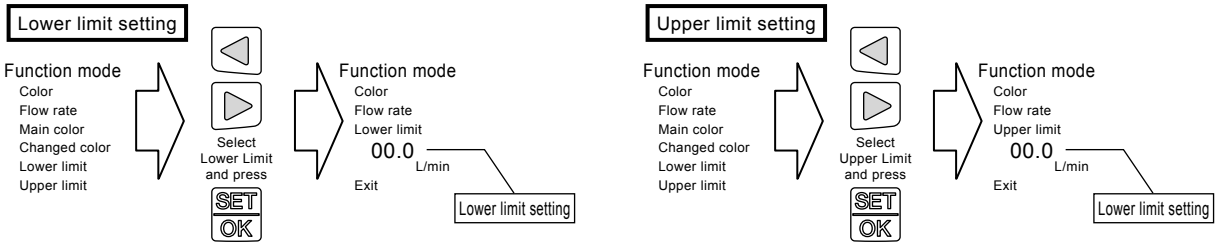
Changed color: Changes the color when the instantaneous flow rate, integrating flow rate, and temperature go above or below their set upper and lower limits.

Change character color: Select from white, green, and red

· Upper limit setting: Upper limits of instantaneous flow rate, integrating flow rate, and temperature at which character color changes.

· Lower limit setting: Lower limits of instantaneous flow rate, integrating flow rate, and temperature at which character color changes.



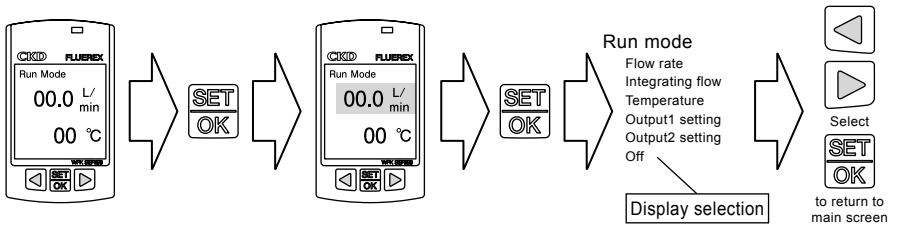


Refer to the instruction manual regarding operation of other functions (setting copy, external input, unit change, simulation output, power ON time display, all reset, etc.).

Easy setting function

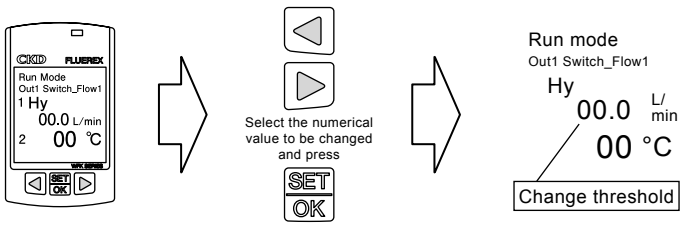
Frequently used settings can be set from the normal screen using shortcut operations.

Changing main screen display

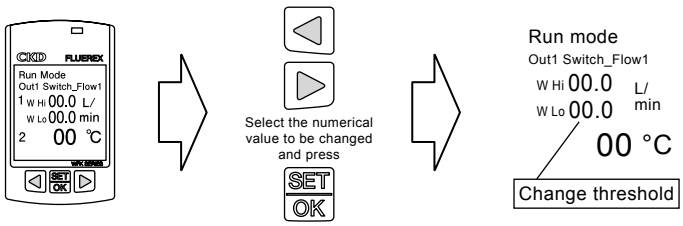


Switch setting

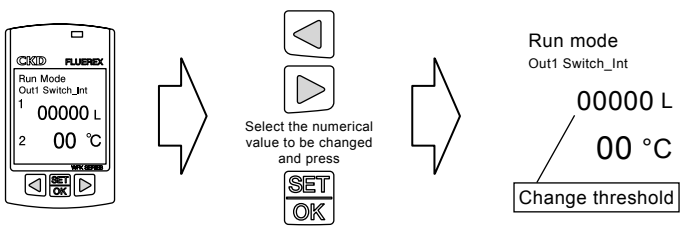
Hysteresis mode



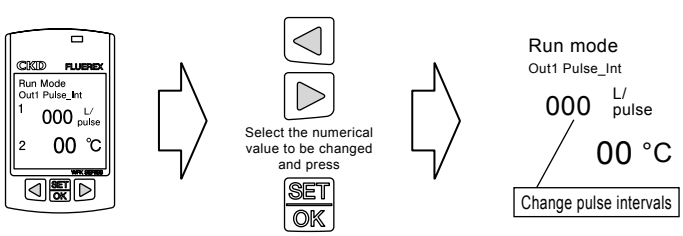
Window mode



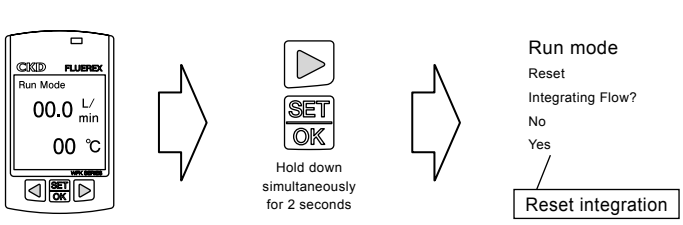
Integrated Switch setting



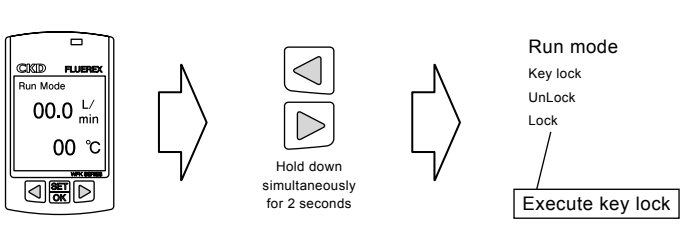
Integrated Pulse setting



Integration reset



Key lock



Water-use equipment

Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 59 for general precautions.

Design/selection

1. Working fluids

⚠ DANGER

■ Do not use in drinking water.
As it does not conform to the requirements of the Food Sanitation Act, do not use this product for applications that measure water entering the human body. Intended applications include industrial sensors.

■ Never use with a flammable fluid.

⚠ WARNING

■ This product cannot be used as a billing meter.
Do not use this product for commercial transactions as it is not compliant with the Measurement Act. It cannot be calibrated, so use it as an industrial sensor.

■ Applicable fluid is water (industrial water, pure water); do not use with any other fluid.

2. Working environment

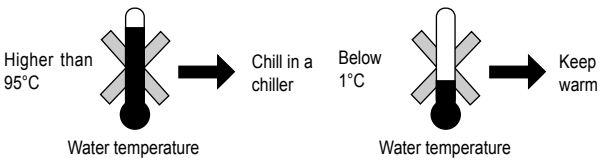
⚠ DANGER

■ Explosion-proof environments
Never use this product in an explosive gas atmosphere. The structure is not explosion-proof, and explosions or fires could occur.

⚠ WARNING

■ Corrosive environments
Do not use this product in an atmosphere containing corrosive gases such as sulfur dioxide.

■ Fluid temperature and ambient temperature
Use in a fluid temperature range of 1 to 95 °C, and an ambient temperature range of 0 to 50 °C. If the fluid temperature rises to 95 °C or higher, cool it down using a cooling system such as a chiller. As well, if there is a risk of freezing, drain the product or keep it warm to prevent freezing.
When the fluid and ambient temperatures are high, the product may also get hot. There is a risk of burns if it is touched directly. Even if the ambient temperature is within the specified range, do not use this product in a location where rapid changes in temperature can occur.



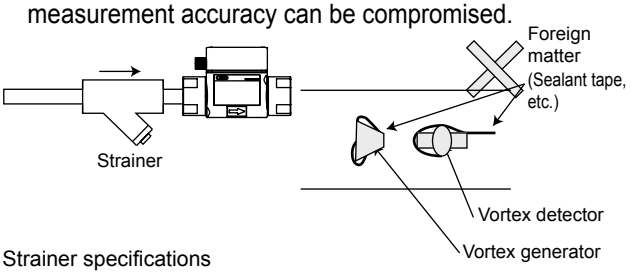
■ Max. working pressure
Do not use at a pressure exceeding the max. working pressure, as excessive pressure can cause product failure. To prevent the pressure from reaching the max. working pressure, particularly due to water hammer, take the following measures:
(1) Using a water hammer reduction valve or other similar mechanism, regulate the valve closing speed.
(2) Using elastic piping material, e.g. rubber hose, and an accumulator, absorb the impact pressure.
(3) Make the pipe length as short as possible.

■ Drip-proof environments
This product employs a dust-proof, drip-proof structure that provides reliability during maintenance and cleaning, during which it may be exposed to water splashing. However, avoid using this product in a location where it may be constantly exposed to water or intense splattering of water and/or oil.

■ Working conditions for CE compliance
This product is CE-marked, indicating conformity with the EMC Directives. The standard for the immunity for industrial environments applied to this product is EN61000-6-2; the following requirements must be satisfied in order to conform to this standard:
Conditions
- The evaluation of this product is performed by using a cable that has a power supply line and a signal line paired to assess the product's performance.
- This product is not equipped with surge protection. Implement surge protection measures on the system side.

⚠ CAUTION

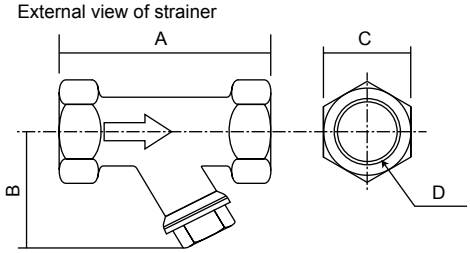
■ If there is a risk of foreign matter entering the fluid, install a filter (strainer) on the primary side. If foreign matter adheres to the vortex generator or vortex detector, measurement accuracy can be compromised.



Strainer specifications

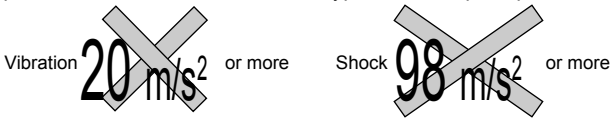
Item		Usage
Specification fluid		Water
Pressure resistance	MPa	2
Working pressure range	MPa	0 to 1
Operating ambient temperature range	°C	1 to 90
Main material		**Usage**
Body		Copper alloy casting
Strainer		Stainless steel

When using after adjusting to a small flow rate with the manual valve, the valve's opening (clearance) is very small. If there are large foreign bodies in the fluid, they may clog the clearance and reduce the flow rate.



Model No.	A	B	C	D
WF-FL-280730	70	44	23	Rc 3/8
WF-FL-280731	80	49	28	Rc 1/2
WF-FL-280732	100	57	35	Rc 3/4
WF-FL-280733	115	72	43	Rc 1
WF-FL-280734	135	82	52	Rc1 1/4
WF-FL-280735	160	98	59	Rc1 1/2

■ Vibration/impact
Avoid vibrations of 20 m/s^2 or more and shocks of 98 m/s^2 or more. This may cause malfunction and/or damage, as this product uses the Karman's vortex type detection principle.



Mounting, installation and adjustment

1. Wiring

⚠DANGER

■ Use with power supply voltage and output in the specified range.
Applying a voltage that is outside of the specified range may cause malfunction, damage to the sensor, electrical shock, and/or fire.
Do not use any load that exceeds the rated output. Using such a load may result in damage to the output part or fire.

⚠WARNING

■ Check the line color and terminal number when connecting wires.
An overcurrent protection circuit for the output transistor and a protection circuit for erroneous wiring, which uses diodes to prevent reverse connection, are implemented, but these do not protect against all incorrect wiring. Incorrect wiring can result in malfunction, failure, or damage to the sensor.
Check the instruction manual for wiring colors and terminal numbers in order to ensure correct wiring.

■ Ensure that wires are properly insulated.
Check that wires do not come into contact with other circuits, that no ground faults occur, and that the insulator between terminals is not defective. Otherwise, overcurrent may flow into the sensor, causing damage.

⚠CAUTION

■ Keep the cable far away from power cords or other things that may cause noise. Noise can cause malfunctions.

■ Keep unused wires from coming into contact with other wires.

■ Do not short-circuit the output transistor.
When a load is short-circuited, overcurrent protection circuit is triggered to prevent damage to the output transistor; however, if this state persists, the output transistor could be damaged.
Overcurrent Protection: Approx. 50 mA

■ Do not use a load that can produce surge voltage.
While an element that protects against surge is inserted, repeated exposure to surges can lead to damage. Use relays and solenoid valves that are equipped with surge absorption elements. If there is a surge source on the same power supply line, similarly implement surge protection.

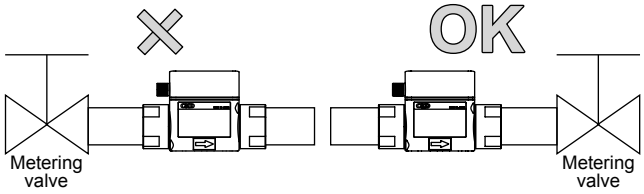
■ Make sure that the lead wire is free of repeated bends and tension. This may lead to disconnection.

2. Piping

⚠CAUTION

■ Pipes can be installed vertically, horizontally, or in any other orientation. Note that pipes should be installed so that the fluid constantly fills the piping while it flows through the pipes.
When installing a pipe vertically, making the fluid flow upward can reduce the influence of air bubbles inside.

■ If a pipe is narrowed just before the flow rate sensor, or if there is a valve or other restricting component on the primary side, cavitation occurs inside the pipe, preventing accurate measurement. For this reason, such piping should be installed on the secondary side of the sensor.
(Cavitation: Vapor cavities that form due to the static pressure at end points, such as a ship propeller, dropping below the vapor pressure of the water. Reduced efficiency or screw damage may result.)



■ Operating the pump with the secondary side valve closed may cause the flow rate sensor to detect pressure waves from the pump, resulting in incorrect indication.If this occurs, install the valve on the primary side. When doing so, ensure that a straight pipe with a diameter of 10 times or more bore size is installed between the valve and the flow rate sensor.

■ Using an elbow or bushing in the piping
When using an elbow or bushing in the piping, provide straight piping sections of at least 10 D on the IN side and 5 D on the OUT side when using a WFK2-100 or WFK2-250 Series model. Note that bore size change by bushing should be within one size. Without a straight pipe, measurement accuracy can be compromised due to disturbances in the flow rate and/or pressure distribution.
(Straight pipes are not necessary for the WFK2-005, WFK2-020, and WFK2-050 Series. However, it is recommended that a straight pipe is installed to ensure stable measurements.)
* "D" here indicates the inner diameter of the piping material. Refer to the table below for specific values.

Bore size	Rc3/8 (10 A)	Rc1/2 (15 A)	Rc3/4 (20 A)	Rc1 (25 A)	Rc1 1/4 (32 A)	Rc1 1/2 (40 A)
5D	50 mm	75 mm	100 mm	125 mm	160 mm	200 mm
10D	100 mm	150 mm	200 mm	250 mm	320 mm	400 mm

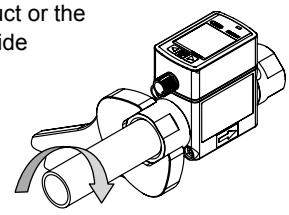
■ Use appropriate torque to tighten the pipes when connecting them.

- The purpose is to prevent water leakage and thread damage.
- First tighten the bolts by hand to ensure that the threads are not damaged, and then use a tool.

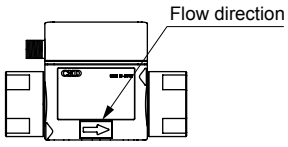
[Recommended values]

Port thread	Tightening torque N·m
Rc3/8	31 to 33
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86
Rc1 1/4	94 to 100
Rc1 1/2	104 to 108

- When mounting piping or fittings to this product, always hold the attachment on the mounting side with a tool. Holding the body of the product or the attachment on the opposite side may lead to damage.



■ When installing piping, align the fluid flow direction to the direction marked on the body. Connecting the pipe in the wrong direction prevents correct measurement of the flow rate.



■ Before installing piping, clean the pipes to remove foreign matter, cutting chips, residual testing water, etc.

■ Make sure that no force is applied to the resin parts when piping.

■ Make sure that the self-weight of the piping is not applied to the flow rate sensor.
It may lead to damage or external leakage. We recommend that piping be fixed during operation.

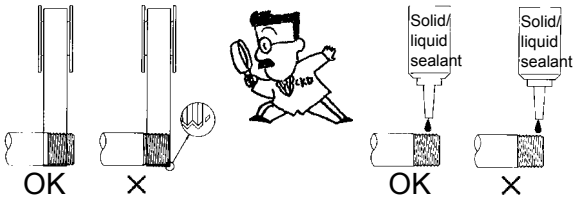
■ Make sure that no sealant tape or adhesive enters the pipes when connecting the piping.

■ When freezing may occur, take antifreezing measures with the devices used, such as draining the pipes of water.

■ If there is significant difference between the ambient temperature and the fluid temperature, condensation occurs, which can enter wiring parts and cause operation failure. If condensation should occur, ensure that the mounting orientation of the flow rate sensor is horizontal and the display is facing upward.

■ When connecting pipes, wrap sealant tape in the opposite direction from the threading, from the inside position to within 2 mm from the pipe end.

- If sealant tape protrudes from the pipe threads, it could be cut when screwing the bolts in. This could cause the tape to enter the valve, causing failures.
- When using a liquid sealant, make sure it does not adhere to resin parts. Otherwise resin parts could be damaged, which is dangerous.



Use/maintenance

1. Common

⚠CAUTION

- If a problem occurs during operation, immediately turn the power OFF, stop use, and contact your dealer. The display may become warm (approximately 40°C), but this is not an abnormality.
- Hardware check and other internal settings are performed during approximately the first two seconds after turning the power on. Display and output do not function normally during this period. Particularly, if a transistor output is used in the control of an interlock circuit, an abnormal stop may occur. Mask the output during this period.
- When changing the output set value, turn OFF the equipment first in order to prevent unexpected operation in the control system equipment.
- Ensure proper operation through periodic inspections.
- When removing the equipment, shut off the power, make sure that no water pressure is applied, and take other safety precautions beforehand.
- Do not disassemble or modify, as this may cause malfunction.
- When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent.
- Be sure to perform air blow from the downstream direction. Set pressure to 0.3 MPa or less.
- After adjusting the flow rate, be sure to fix the manual valve with the push lock.
- Do not turn the flow rate adjustment manual valve forcibly.

2. Applicable fluid

⚠CAUTION

- Follow the precautions below for the applicable fluids to be measured. If the following water quality standards are not met, performance may be compromised.
- The water quality of the applicable fluid should be according to the "Guideline of Water Quality for Refrigeration and Air Conditioning Equipment" (Water quality standard: Cooling system - Circulating type - Circulating water) provided by the Japan Refrigeration and Air Conditioning Industry Association.

Item	Chemical formula	Unit	Water quality standard
pH	–	pH (25°C)	6.5 to 8.2
Electrical conductivity	–	mS/m (25°C)	0.2 to 80 *1
Chloride ion	Cl^-	mg/L(ppm)	200 or less
Sulfate ion	SO_4^{2-}	mg/L(ppm)	200 or less
Acid consumption (pH4.8)	$CaCO_3$	mg/L(ppm)	100 or less
Total hardness	$CaCO_3$	mg/L(ppm)	200 or less
Calcium hardness	$CaCO_3$	mg/L(ppm)	150 or less
Ionized silica	SiO_2	mg/L(ppm)	50 or less
Iron	Fe	mg/L(ppm)	1.0 or less
Copper	Cu	mg/L(ppm)	0.3 or less
Sulfide ion	S^{2-}	mg/L(ppm)	Not detected
Ammonium ion	NH_4^+	mg/L(ppm)	1.0 or less
Residue chlorine	Cl	mg/L(ppm)	0.3 or less
Free carbonic acid	CO_2	mg/L(ppm)	4.0 or less
Stability index	–	–	6.0 to 7.0

*1 Electrical conductivity should be 0.2 mS/m and over.
For use in the range of 0.05 to 0.2 mS/m, consult with CKD.
Do not use for ultrapure water, i.e. water with electrical conductivity below 0.05 mS/m.

MEMO

Capacitance flow sensor

WFC

■ **Sensors/controller/flow rate sensor**

CONTENTS

Flow rate sensor with Flo-Thru structure

No clogging of foreign matter

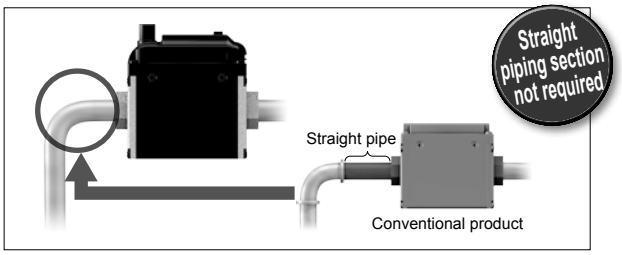
The Flo-Thru structure allows even water of poor quality to be used.

No detection failure

The capacitance structure reduces the likelihood of detection failures caused by foreign matter deposited onto the electrode.

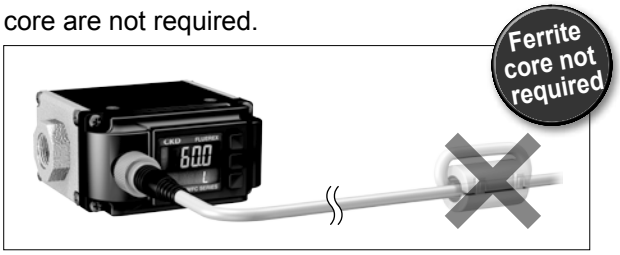
Improved installation

Ensures elbow piping repeatability.



Noise resistance

Stabilized power supply and anti-noise ferrite core are not required.

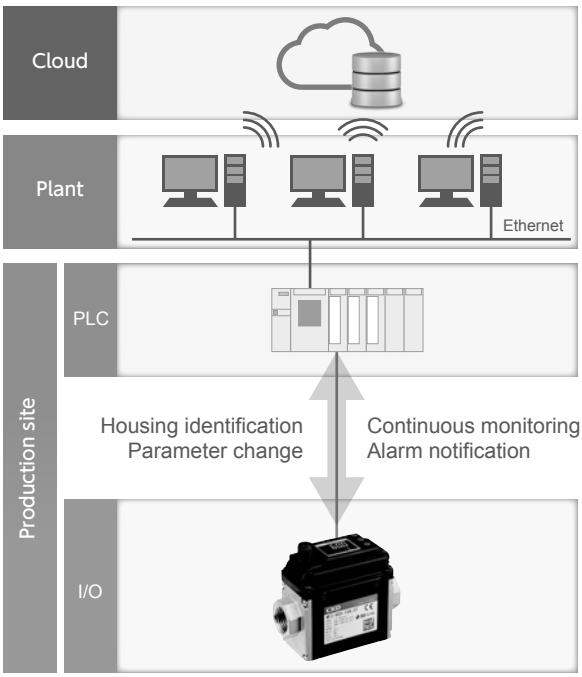


Introducing the IO-Link model

New

IO-Link

IO-Link is a digital communication standard for sensors/actuators at factory sites. (IEC 61131-9)
Unlike analog communication, it enables the transmission of parameters and event data.



Features of IO-Link

Constant monitoring via digital data is possible.

Parameters can be set and changed via the network, enabling remote operation of the device.

Model Nos. and serial Nos. can be checked via the network.

Settings can be copied from the master (scanner) side, making troublesome parameter resetting during maintenance unnecessary.

Device failure and disconnection can be confirmed.

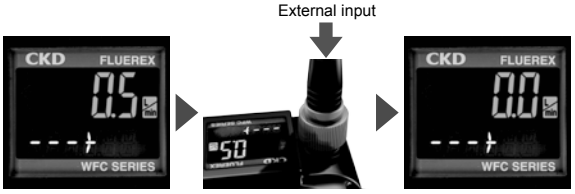
The network can also be changed to Ethernet connection, making the device a part of IoT.

Fluid temperature measuring function (option)

Saves space and wiring time with no need for a separately installed fluid temperature sensor.

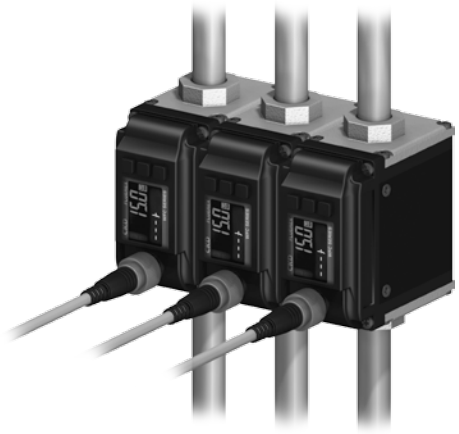
Remote zero adjustment

Allows zero point adjustment by external input.



Allows parallel installation

Changing the mode allows parallel installation.

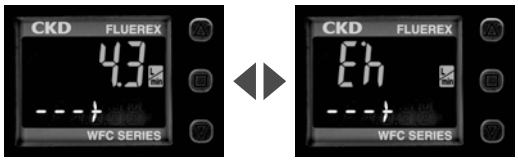


Max. working pressure 2.0 MPa

Usable even with medium pressure coolants.

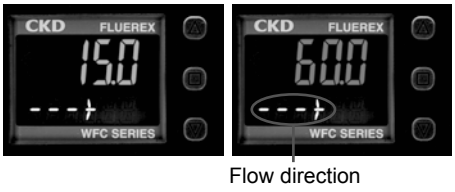
With 180° invertible display

It can be displayed flexibly to suit the device.



Improvement of visibility

The 2-color display and flow direction arrow allow easy recognition.



Easy setting

Settings can be easily changed using shortcut operation.

*For details, refer to page 609.

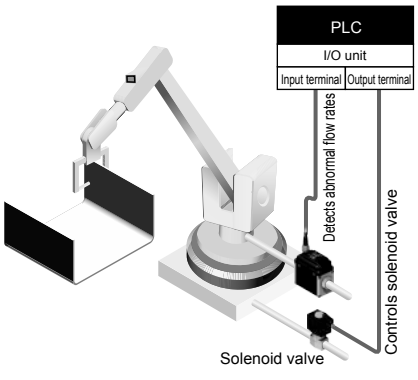
Capacitance flow sensor

WFC Series

Examples of applications

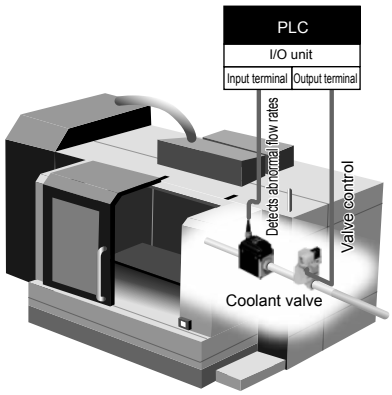
Welding Spot welding machine

Spot welding machine coolant control and flow rate abnormality detection for chip fallout



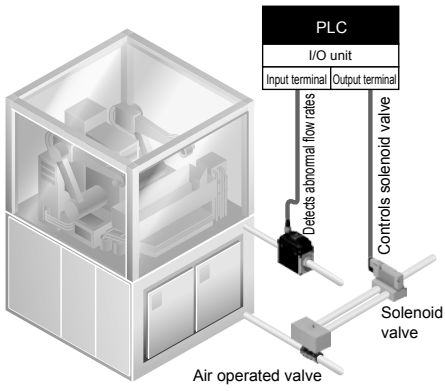
Machining Machine tools

Flow rate management of water-soluble coolant



Hardening Induction hardening device

Quantitative management of cooling water



Capacitance electromagnetic flow sensor

WFC Series

Type with IO-Link and fluid temperature measurement function

● Flow rate range: 0.5 to 15/2.0 to 60 L/min

CE RoHS

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			WFC-150	WFC-600	
Port size			Rc3/8, G3/8, 3/8NPT	Rc1/2, G1/2, 1/2NPT	Rc3/4, G3/4, 3/4NPT
Applicable fluids			Fluids (conductive fluids) that do not corrode water/wetted part materials		
Available fluid conductivity			5 μS/cm or more		
Detection			Capacitance		
Rated flow range			0.5 to 15 L/min	2.0 to 60 L/min	
Low flow cut flow rate *1			Measured range max. flow rate of 3%		
Working fluid temperature *8			0 (32°F) to 85°C (185°F) (no freezing)		
Display unit			Instantaneous flow rate L/min Integrating flow L, kL, ML Fluid temperature °C		
Flow rate	Repeatability *2		±2.0% F.S.		
	Ambient temperature characteristics *2		±5.0% F.S (base temperature 25°C (77°F))		
	Fluid temperature characteristics *2		±5.0% F.S (base temperature 25°C (77°F))		
Fluid temperature	Measurement range		0 (32°F) to 85°C (185°F) (operational range is -10 (14°F) to 110°C (230°F))		
	Measurement accuracy		±2°C (35°F) (less than 50°C (122°F)) *Difference between the fluid temperature and the ambient temperature within ±5°C (41°F) ±5°C (41°F) (50°C (122°F) and over) *Difference between the fluid temperature and the ambient temperature within -35°C (-31°F)		
Working pressure (according to the fluid temperature conditions) *8			0 (≈0 psi, 0 bar) to 1.0 MPa (≈145 psi, 10 bar) (0 (32°F) to 85°C (185°F)), 0 (≈0 psi, 0 bar) to 2.0 MPa (≈290 psi, 20 bar) (0 (32°F) to 50°C (122°F))		
Proof pressure			3.0 MPa (≈435 psi, 30 bar)		
Response time *3			0.1 s/0.25 s/0.5 s/1 s/2 s/5 s (default 1 s)		
Integrating flow range			0.0 to 99999999.9 L		
			0.1 L increments		
Pressure loss *9			0.02 MPa (≈3 psi, 1 bar) or less (at max. rated flow)		
Switch output			NPN or PNP MOS-FET output (switchable with settings)		
	Max. load current		50 mA		
	Max. applied voltage		30 VDC		
	Internal voltage drop		NPN: 2.0 V or less PNP: 2.4 V or less		
	Output protection		Overcurrent abnormal alarm, overcurrent protection		
	Output mode		Select from hysteresis mode, window comparator mode, integrated output mode, integrated pulse output mode, alarm output mode, and frequency pulse output mode		
Analog output		Voltage output	Voltage output: 1 to 5 V Load impedance: 50 kΩ or more		
		Current output	Current output: 4 to 20 mA Load impedance: 500 Ω or less		
Switch input		Input time	20 ms or more		
		Short-circuit current	Approx. 2 mA		
Display			2-screen display (main screen: green/red 2-color display, sub-screen: white) Screen flip possible Instantaneous flow rate: 3 digits Liquid temperature: 2 digits Integrating flow: 4 digits Screen refresh cycle 5 times/sec		
Power supply voltage			When setting switch output: 24 VDC ±10% (ripple P-P ±10% or less)		
			When setting IO-Link: 20 to 30 VDC (ripple P-P ±10% or less)		
Current consumption			65 mA or less (with 24 VDC, 25°C (77°F))		
Environmental resistance	Degree of protection		IP65 equiv. *5		
	Operating ambient temperature range		0 (32°F) to 50°C (122°F) (no condensation)		
	Ambient humidity range		35 to 85% RH (no condensation)		
Mounting orientation			Unrestricted in vertical/horizontal direction		
Compliant standards			EC Directives (EMC Directive, RoHS Directive)		
Material of wetted parts			PPS, FKM, CAC804, C6931		
Weight	Body *4		Approx. 460 g	Approx. 490 g	Approx. 520 g
	Cable	Cable	Approx. 170 g		
		L type cable			
		Two-sided connector cable	Approx. 180 g		
		L type two-sided connector cable	Approx. 100 g		
	Bracket		Approx. 30 g		

*1: Flow rate less than the low flow cut flow rate displays 0 L/min.
*2: Characteristics when the response time is 1 s.
*3: The response time to reach 63% of the value in relation to the step input.
*4: When using options, add the weight of optional parts.
*5: Degree of protection is when the cable option is mounted.
*6: Contact CKD when installing in parallel at intervals of less than 50 mm.
*7: Piping port and body metal part are grounded to DC (-)/blue wire. This product cannot be used in (+) ground power supply. Contact CKD if using in (+) ground power supply.
*8: Fluid temperature when the working pressure is 0 to 1.0 MPa. When working pressure is 0 to 2.0 MPa, use with a fluid temperature of 0 to 50 °C. (Refer to the graph on the following page for the usable range.)
*9: According to JIS B 8570-1.
*10: Refer to the instruction manual for IO-Link Parameter specifications. IODD files can be downloaded from the CKD website. (https://www.ckd.co.jp/english/)

How to order

WFC - 150 - 10A - CT - C3

- Ⓐ Flow rate range
- Ⓑ Port size
- Ⓒ IO-Link/fluid temperature measurement
- Ⓓ Option (included)

Code	Description
Ⓐ Flow rate range	
150	0.5 to 15 L/min
600	2.0 to 60 L/min

Ⓑ Port size			
	Flow rate range	150	600
10*	3/8	●	
15*	1/2		●
20*	3/4		●

*** Thread**	
A	Rc thread
G	G thread
N	NPT thread

Ⓒ IO-Link/fluid temperature measurement *1	
C	IO-Link compatible
CT	With IO-Link compatible, fluid temperature measurement function
T	With fluid temperature measuring function

Ⓓ Option (included) *2	
Blank	None
C3	Cable (M12/4-conductor/3 m) included
L3	L type cable (M12/4-conductor/3 m) included
B3	Two-sided connector cable (M12/4-conductor/3 m) included
G3	L type two-sided connector cable (M12/4-conductor/3 m) included
B	Bracket included

*1: Configuration to analog output/switch output is also possible. For details, refer to page 604.

*2: Codes of attachments are not indicated in the product body model No. display section.
For example, in the case of WFC-150-10A-CT-C3B
Product body (display): “WFC-150-10A-CT”
Cable (packaging display): “WFC-C3”
Bracket (packaging display): “WFC-B”
Of these three sets, "WFC-150-10A-CT-C3B" is displayed on the bag or box containing the entire package.

[Example of model No.]
WFC-150-10A-CT-C3B

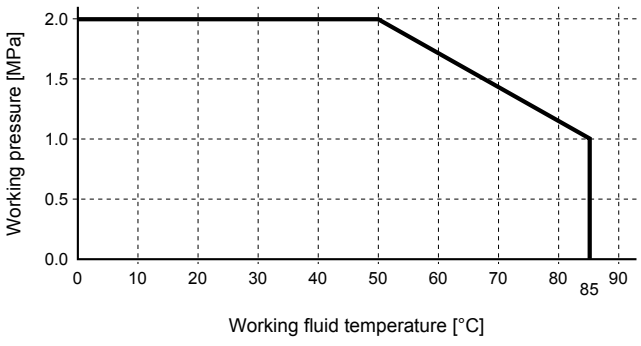
Ⓐ Flow rate range : 0.5 to 15 L/min
Ⓑ Port size : Rc3/8
Ⓒ IO-Link/fluid temperature measurement : With IO-Link compatible, fluid temperature measurement function
Ⓓ Option : Cable, bracket included

● Discrete option (cable, bracket) model No.

WFC - C3

Ⓓ Option

Operating ambient temperature range



Capacitance electromagnetic flow sensor

WFC Series

Standard

● Flow rate range: 0.5 to 15/2.0 to 60 L/min

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			WFC-150	WFC-600	
Port size			Rc3/8, G3/8, 3/8NPT	Rc1/2, G1/2, 1/2NPT	Rc3/4, G3/4, 3/4NPT
Applicable fluids			Fluids (conductive fluids) that do not corrode water/wetted part materials		
Available fluid conductivity			5 μS/cm or more		
Detection			Capacitance		
Rated flow range			0.5 to 15 L/min	2.0 to 60 L/min	
Low flow cut flow rate *1			Measured range max. flow rate of 3%		
Working fluid temperature *8			0 (32°F) to 85°C (185°F) (no freezing)		
Display unit			Instantaneous flow rate L/min Integrating flow L, kL, ML		
Repeatability *2			±2.0% F.S.		
Temperature characteristics	Ambient temperature characteristics *2		±5.0% F.S (base temperature 25°C (77°F))		
	Liquid temperature characteristics *2		±5.0% F.S (base temperature 25°C (77°F))		
Working pressure (according to the fluid temperature conditions) *8			0 (≈0 psi, 0 bar) to 1.0 MPa (≈145 psi, 10 bar) (0 (32°F) to 85°C (185°F)), 0 (≈0 psi, 0 bar) to 2.0 MPa (≈290 psi, 20 bar) (0 (32°F) to 50°C (122°F))		
Proof pressure			3.0 MPa (≈435 psi, 30 bar)		
Response time *3			0.25 s/0.5 s/1 s/2 s/5 s (default 1 s)		
Integrating flow range			0.0 to 99999999.9 L		
			0.1 L increments		
Pressure loss *9			0.02 MPa (≈3 psi, 1 bar) or less (at max. rated flow)		
Switch output			NPN or PNP transistor output		
	Max. load current		50 mA		
	Max. applied voltage		30 VDC		
	Internal voltage drop		NPN: 2.0 V or less PNP: 2.4 V or less		
	Output protection		Overcurrent abnormal alarm, overcurrent protection		
	Output mode		Select from hysteresis mode, window comparator mode, integrated output mode, integrated pulse output mode, and alarm output mode.		
Analog output		Voltage output	Voltage output: 1 to 5 V Load impedance: 50 kΩ or more		
		Current output	Current output: 4 to 20 mA Load impedance: 500 Ω or less		
Switch input		Input time	20 ms or more		
		Short-circuit current	Approx. 2 mA		
Display			2-screen display (main screen: green/red 2-color display, sub-screen: white) Screen flip possible Instantaneous flow rate: 3 digits Integrating flow: 4 digits Screen refresh cycle 5 times/sec		
Power supply voltage			24 VDC ±10% (ripple P-P ±10% or less)		
Current consumption			65 mA or less		
Environmental resistance	Degree of protection		IP65 equiv. *5		
	Operating ambient temperature range		0 (32°F) to 50°C (122°F) (no condensation)		
	Ambient humidity range		35 to 85% RH (no condensation)		
Mounting orientation			Unrestricted in vertical/horizontal direction		
Compliant standards			EC Directives (EMC Directive, RoHS Directive)		
Material of wetted parts			PPS, FKM, CAC804, C6931		
Weight	Body *4		Approx. 460 g	Approx. 490 g	Approx. 520 g
	Cable	Cable	Approx. 170 g		
		L type cable			
	Bracket		Approx. 30 g		

*1: Flow rate less than the low flow cut flow rate displays 0 L/min.
*2: Characteristics when the response time is 1 s.
*3: The response time to reach 63% of the value in relation to the step input.
*4: When using options, add the weight of optional parts.
*5: Degree of protection is when the cable option is mounted.
*6: Contact CKD when installing in parallel at intervals of less than 50 mm.
*7: Piping port and body metal part are grounded to DC (-)/blue wire. This product cannot be used in (+) ground power supply. Contact CKD if using in (+) ground power supply.
*8: Fluid temperature when the working pressure is 0 to 1.0 MPa. When working pressure is 0 to 2.0 MPa, use with a fluid temperature of 0 to 50 °C. (Refer to the graph on the following page for the usable range.)
*9: According to JIS B 8570-1.

How to order

WFC - 150 - 10A - N V - C3

- Ⓐ Flow rate range
- Ⓑ Port size
- Ⓒ Switch output
- Ⓓ Analog output
- Ⓔ Option (included)

Code	Description
Ⓐ Flow rate range	
150	0.5 to 15 L/min
600	2.0 to 60 L/min

Ⓑ Port size

	Flow rate range	150	600
10*	3/8	●	
15*	1/2		●
20*	3/4		●

*** Thread**	
A	Rc thread
G	G thread
N	NPT thread

Ⓒ Switch output	
N	NPN transistor output
P	PNP transistor output

Ⓓ Analog output	
V	Voltage output (1 to 5 V)
A	Current output (4 to 20 mA)

Ⓔ Option (included)	
Blank	No
C3	Cable (M12/4-conductor/3 m) included
L3	L type cable (M12/4-conductor/3 m) included
B	Bracket included

(Note) Codes of attachments are not indicated in the product body model No. display section.
For example, in the case of WFC-150-10A-NV-C3B
Product body (display): "WFC-150-10A-NV"
Cable (packaging display): "WFC-C3"
Bracket (packaging display): "WFC-B"
Of these three sets, "WFC-150-10A-NV-C3B" is displayed on the bag or box containing the entire package.

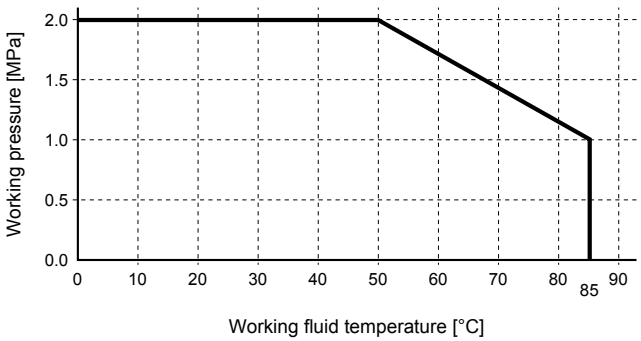
[Example of model No.]
WFC-150-10A-NV-C3B
Ⓐ Flow rate range : 0.5 to 15 L/min
Ⓑ Port size : Rc3/8
Ⓒ Switch output : NPN transistor output
Ⓓ Analog output : Voltage output (1 to 5 V)
Ⓔ Option : Cable, bracket included

● Discrete option (cable, bracket) model No.

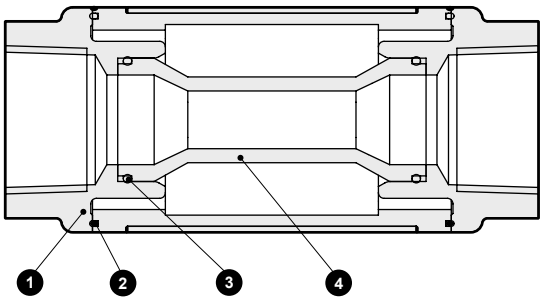
WFC - C3

Ⓔ Option

Operating ambient temperature range



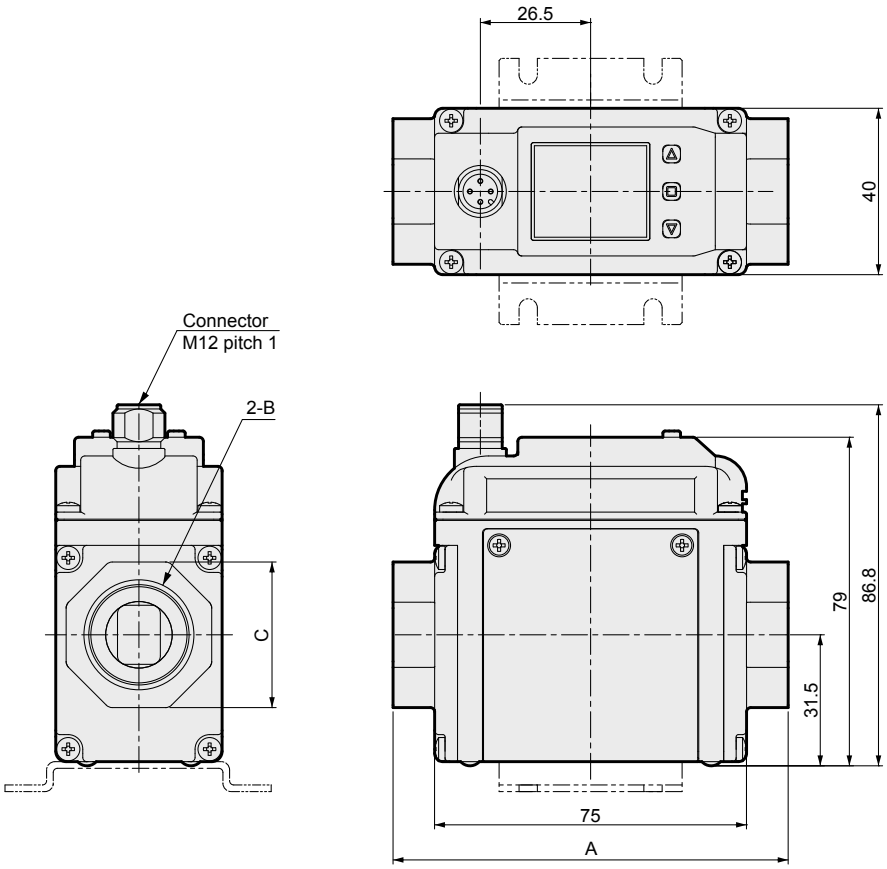
Internal structure diagram and parts list



* Shows the internal structure when the display screen is in front.

No.	Part name	Material		Quantity
1	Socket	CAC804 or C6931	Copper alloy	2
2	Packing	FKM	Fluoro rubber	2
3	O-ring	FKM	Fluoro rubber	2
4	Measuring tube	PPS resin		1

Dimensions

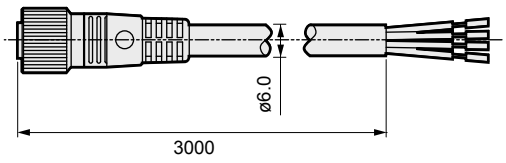


Model No.	A	B	C
WFC-150-10A	90	Rc3/8	24
WFC-150-10G		G3/8	
WFC-150-10N		3/8NPT	
WFC-600-15A	95	Rc1/2	28
WFC-600-15G		G1/2	
WFC-600-15N		1/2NPT	
WFC-600-20A		Rc3/4	35
WFC-600-20G		G3/4	
WFC-600-20N		3/4NPT	

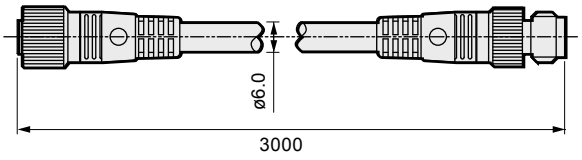
Optional dimensions

● Cable option

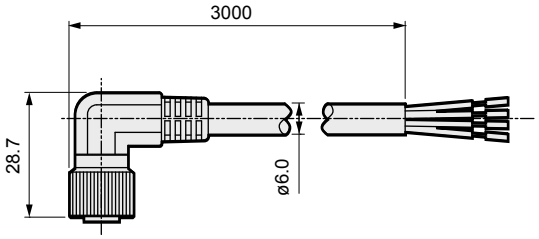
Discrete option model No: **WFC-C3**



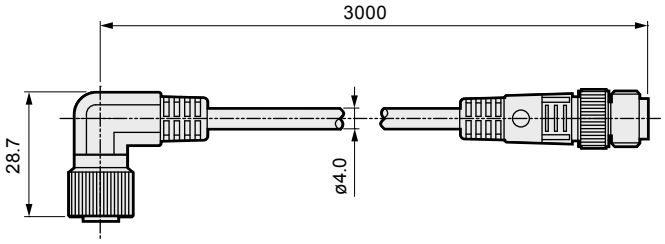
Discrete option model No: **WFC-B3**



Discrete option model No: **WFC-L3**

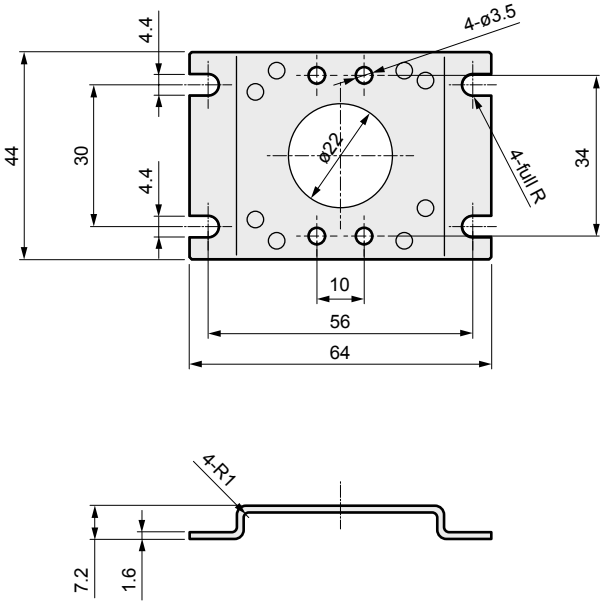


Discrete option model No: **WFC-G3**



● Bracket option

Discrete option model No: **WFC-B**

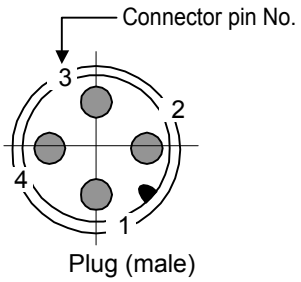


Wiring method

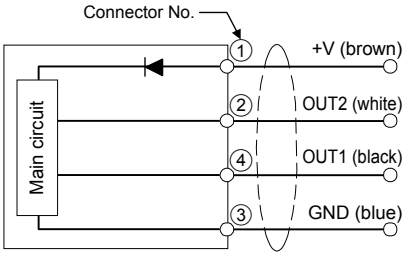
· Always read the safety precautions before wiring.

*Keep the cable far away from power cords or other things that may cause noise. Noise can cause malfunctions.

1) and 2) are used with the "Type with IO-Link and fluid temperature measurement function" wiring diagram, and 3) and 4) are used with the "Standard" wiring diagram.

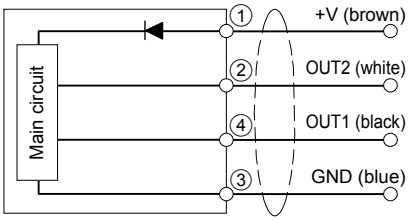


1) -C,-CT



+V (brown)	: Connect to DC power supply plus [+]	: 20 to 30 VDC (when setting IO-Link) 24 VDC ±10% (when setting switch output)
OUT2 (white)	: Off. (When OUT1 is IO-Link) Analog output/switch input (When OUT1 is switch output)	: Voltage or current in proportion to flow rate or temperature (for -CT) is output/Remote zero adjustment or integration reset
OUT1 (black)	: IO-Link/switch output	: IO-Link communication/ MAX. 30 VDC 50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

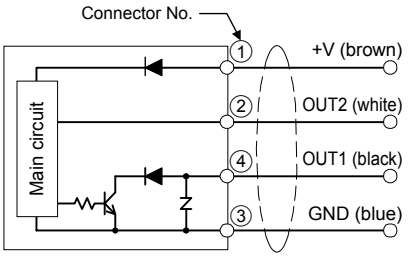
2) -T



+V (brown)	: Connect to [+] of DC power supply	: 24 VDC ±10%
OUT2 (white)	: Analog output/switch input	: Voltage or current proportional to flow rate or temperature is output Remote zero adjustment or integration reset
OUT1 (black)	: Switch output	: Max. 30 VDC 50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

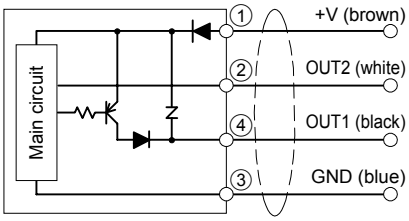
*With -C, -CT, and -T, the NPN/PNP of switch output can be switched from settings. The voltage/current of analog output can also be switched from settings.

3) -NV,-NA



+V (brown)	: Connect to [+] of DC power supply	: 24 VDC ±10%
OUT2 (white)	: Analog output/switch input	: Voltage or current proportional to flow rate is output/ Remote zero adjustment or integration reset
OUT1 (black)	: Switch output (NPN)	: Max. 30 VDC 50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

4) -PV, -PA



+V (brown)	: Connect to [+] of DC power supply	: 24 VDC ±10%
OUT2 (white)	: Analog output/switch input	: Voltage or current proportional to flow rate is output/ Remote zero adjustment or integration reset
OUT1 (black)	: Switch output (PNP)	: Max. 50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

*Wiring when cable option is mounted.

	Switch output	Analog output
-NV	NPN Transistor output	1 to 5 [V]
-NA		4 to 20 [mA]
-PV	PNP Transistor output	1 to 5 [V]
-PA		4 to 20 [mA]

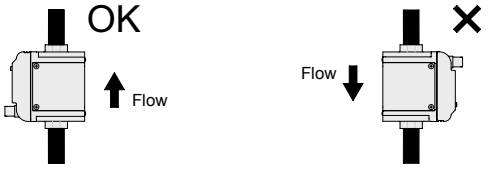
Piping method

[Piping]

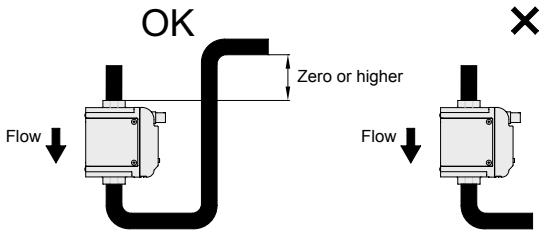
- Perform piping so that the flow path of the product is always full of water. If it is not full of water, a flow rate may be displayed even if the flow is halted.
- Perform zero adjustment operation after confirming that the flow path of the product is full of water and the flow is stationary.
- Do not allow gas to enter the piping.
- Though mounting orientation is unrestricted, display surface horizontal to the ground is recommended in lateral pull piping so as to be less susceptible to the influence of air bubbles.
- Set the flow direction for piping and flow rate sensor correctly.
- Provide flow rate adjusting valve, etc. on the downstream side of the sensor.

[Piping method]

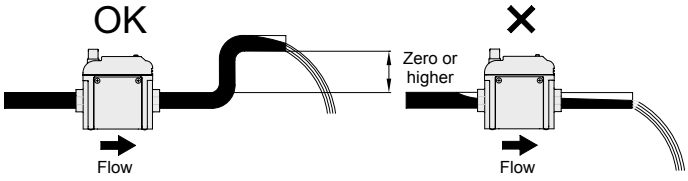
Install with the flow direction from bottom to top



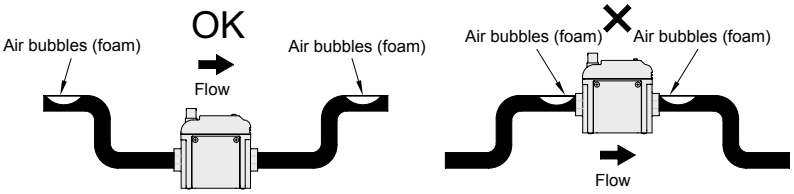
When the flow is from top to bottom
Route the downstream piping higher than the sensor position



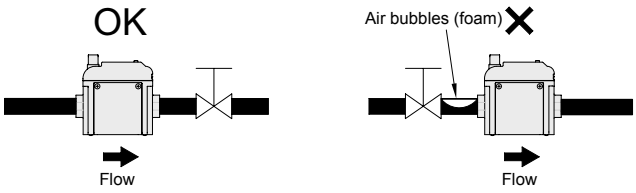
When the sensor downstream side is open to the atmosphere
Install the sensor below the discharge port



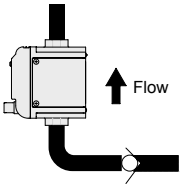
Mount the sensor in a position where air bubbles will not accumulate



Install a flow control valve, etc., downstream of the sensor



If the flow path may become empty due to reverse flow caused by water head pressure when water is stopped, installation of the check valve is recommended.



Use CKD's CCH Series check valve.

IO-Link parameter specifications

1. General

Item	Details
Communication protocol	IO-Link
Communication protocol version	V1.1
Transmission bit rate	COM2 (38.4 kbps)
Port	M12 Class A
Process data (input)	4-byte
Process data (output)	0-byte
Min. cycle time	5 ms
Data storage	1 kbyte
SIO mode support	None

2. Process data

Bit	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Data name	MSB															LSB
	Instantaneous flow rate															
Data range	Refer to Table 1															
Format	UInteger16															

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Data name	Error	WARNING	-	-	-	-	Switch output		MSB							LSB
							2	1	Fluid temperature							
Data range	True/False								-10 to 110°C							
Format	Boolean								Integer8							

Data range (Table 1)

Flow rate range	150	600
Data range	0.0 to 18.0 L/min	0.0 to 72.0 L/min

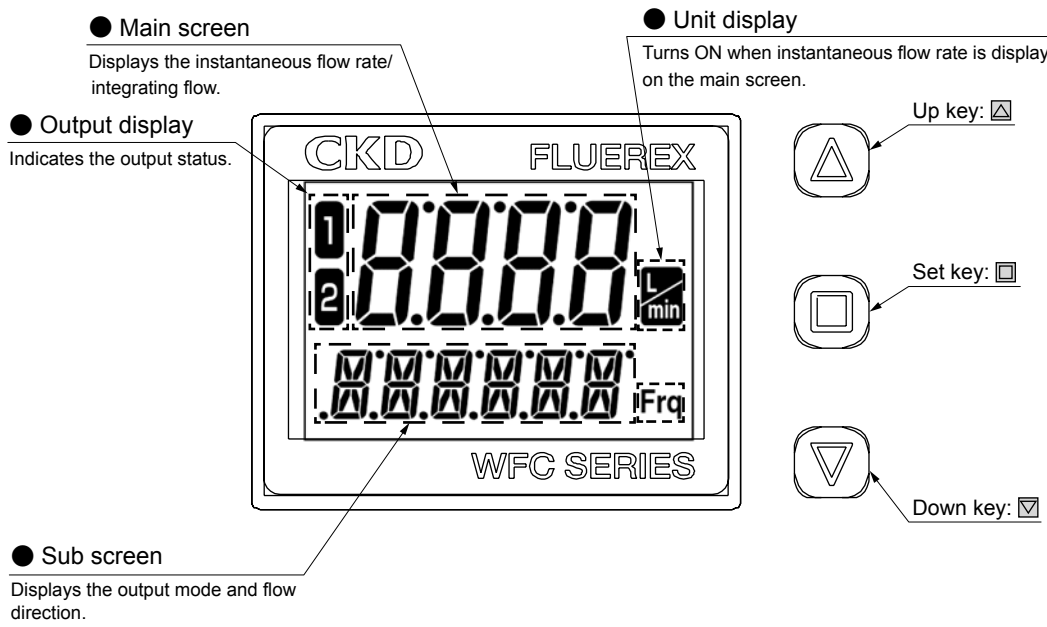
* IODD file can be downloaded from the CKD website. (https://www.ckd.co.jp/english/)

● Explanation of functions

Item	Explanation
Instantaneous flow rate	Instantaneous flow rate is sent to the master as cycle data.
Fluid temperature	Fluid temperature is sent to the master as cycle data.
Switch output function	The switch output operation function can be set. (Instantaneous flow rate, integrating flow, temperature)
Error notification	Errors and error details can be confirmed.
Peak hold function	The peak values of instantaneous flow rate and fluid temperature can be confirmed and reset.
Integrating flow	Integrating flow can be confirmed and reset.
Power ON time	Total power ON time can be confirmed. (Power ON time cannot be reset.)
Display setting	The display contents, colors, and vertical inversion of the main screen and sub screen can be changed.
Key lock	Button operations can be locked and unlocked.
Flow direction	Flow direction can be changed.
Integrating flow unit	Integrating flow unit can be changed.
Eco mode	ECO mode can be set to ON and OFF.
Parallel mode	Parallel mode can be set to ON and OFF.
Response time	Response time can be changed.
Optional characters	The optional characters to be displayed on the sub screen can be changed.
Low flow cut	The threshold at which the flow rate value becomes 0 can be set.
Zero adjustment	The zero point of flow rate can be set.
Reset function	The product can be returned to factory settings.
Data storage function	Set values can be uploaded to and downloaded from the master.
Unit identification function	Manufacturer, model No., serial No., and other information can be confirmed.

*Refer to the instruction manual for details on IO-Link parameter specifications.

Functions



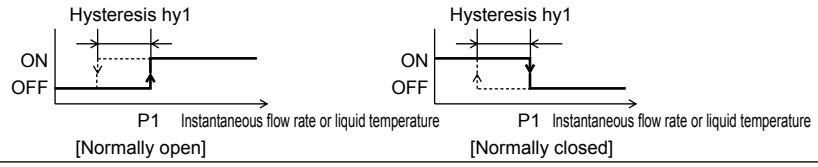
Measurement mode

[Normal screen]

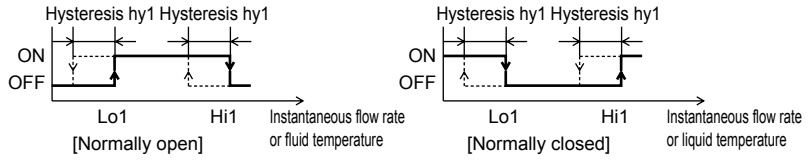
Instantaneous flow rate display	Hysteresis mode P1 5.0	Window comparator mode WINdoW	Accumulated output mode 1234L	Integrated pulse output mode 0.01L/P
	Analog output (flow rate) FS 10.0	Analog output (fluid temperature) FS 10	Switch input: remote zero adjustment ZERo	Digital input: Integration reset RESEt
	Alarm output mode ALARM	Fluid temperature c 100	Frequency pulse output mode FREQ-P	IO-Link communication mode ioL INK
	Flow direction ---→	←---	Select any character ******	No sub-screen display
Total integrating flow display	8888 L	Integrated unit can be switched to "L", "kL", "ML" with up key: ▲ and down key: ▼.		

Output mode and output operation

(1) Hysteresis mode

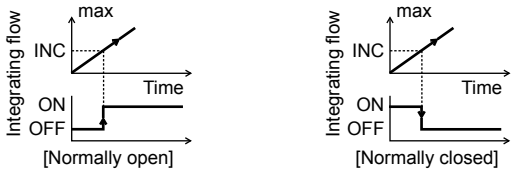


(2) Window comparator mode

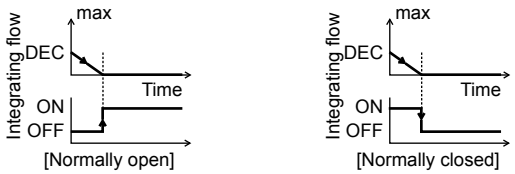


(3) Accumulated output mode

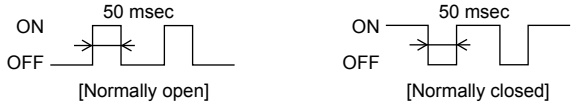
● Increment mode



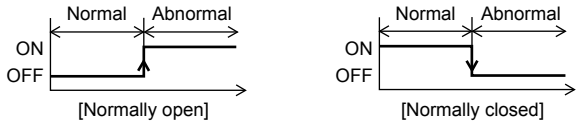
● Decrement mode



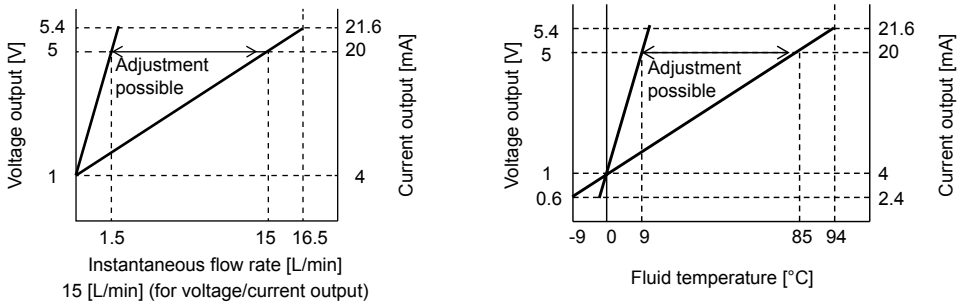
(4) Integrated pulse output



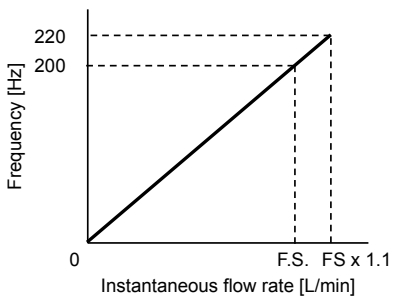
(5) Alarm output mode



(6) Analog output mode

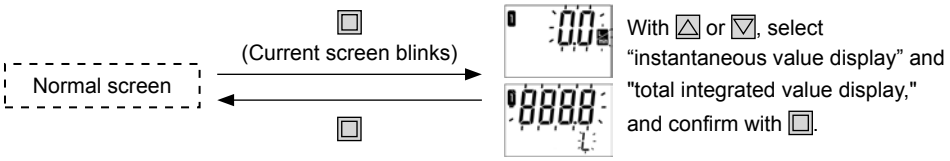
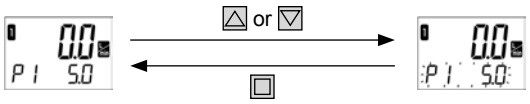
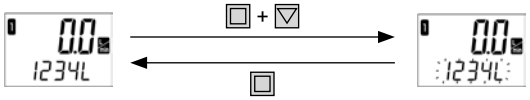
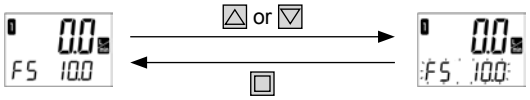
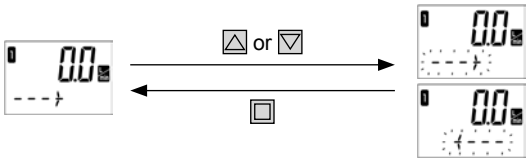
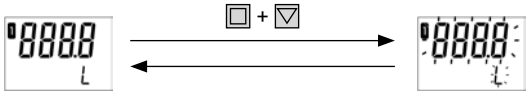
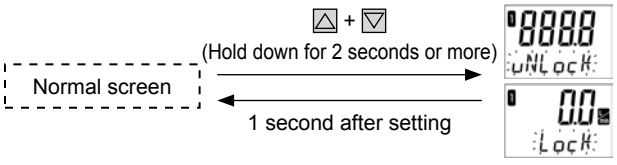


(7) Frequency pulse output mode



Easy setting (shortcut mode)

By shortcut operation, settings with high frequency of use can be moved from the normal screen to the settable state.

Main screen	 With △ or ▽, select “instantaneous value display” and "total integrated value display," and confirm with □.
Hysteresis mode	 Set judgment value with △ or ▽, and confirm with □.
Accumulated output mode	 Integrated value is reset with □.
Analog output mode	 Change F.S. with △ or ▽, and confirm with □.
Flow direction	 Change flow direction with △ or ▽, and confirm with □.
Total integrated value reset	 Reset with □. Cancel with △ or ▽ .
Setting key lock	 Change with △ or ▽, and confirm with □.

Water-use equipment

Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 59 for general precautions.

Design/selection

⚠ CAUTION

- Do not exceed the product's specified range.
- This product is for fluids that do not corrode water/ wetted part materials with conductivity 5 µS/cm or more. Fluids with low conductivity cannot be detected normally.
- Do not use with a positive ground.
- Do not use for applications in direct contact with beverages/foodstuffs/chemical liquids, etc.
- Do not use in flammable gas atmospheres.
- Observe the working fluid temperature and if using at low temperatures, take freeze prevention measures such as adding antifreeze.
- Observe the working pressure range for use.
- Observe the rated flow range for use.
- This product cannot be used as a billing meter. Do not use this product for commercial transactions as it is not compliant with the Measurement Act. It cannot be calibrated, so use it as an industrial sensor.

Mounting, installation and adjustment

⚠ WARNING

- Perform piping so that the flow path of the product is always full of water. If it is not full of water, a flow rate may be displayed even if the flow is halted.
- Perform zero adjustment operation after confirming that the flow path of the product is full of water and the flow is stationary.

⚠ CAUTION

- There is a risk of electric shock on touching the electrical wiring connections.
- Always turn the power OFF before carrying out wiring. Never touch the live parts with wet hands.
- Do not allow gas to enter the piping.
- Change the settings after stopping the equipment.
- After the power supply is turned ON, there is a 10-second warm-up period. Do not use display/ output during this time.
- Do not press the setting switch with sharp objects.
- Do not install the product in locations where it is exposed to strong light such as direct sunlight or to radiant heat.
- Though mounting orientation is unrestricted, display surface horizontal to the ground is recommended in lateral pull piping so as to be less susceptible to the influence of air bubbles.
- Set the flow direction for piping and flow rate sensor correctly.
- Do not drop, bump or apply excessive impact. In addition, when handling, hold the body of the product. (Do not hold by the cables.)
- Do not install this product in places where it is exposed to strong compression/tensile strength/ load/vibration after installation.
- Do not use the product as footing or place any heavy objects on top of the product.
- The product may be damaged if excessive load is applied. Also, make sure that load from piping is not applied.
- Make sure that sealing tape or adhesive does not protrude from the port threads.
- Keep the piping just before the sensor as straight as possible and ensure that there are no parts that disturb the flow such as protrusion of packing.
- Provide flow rate adjusting valve, etc., on the downstream side of the sensor.
- If there is foreign matter/oil in the piping, clean before mounting the sensor.
- Incorrect wiring could cause failure.
- Confirm the color of the wire when wiring.
- It is recommended to electrically isolate the power supply and receiver from other points.
- Do not apply excessive tensile strength to the cable.
- Do not turn the L type cable. There is a risk of damage.
- Do not wire together with the power wire/power cables.
- This product should not be used in the vicinity of high voltage equipment or motors.
- Do not place strong magnets or magnetic fields close to this product.

Use/maintenance

⚠ CAUTION

- When a liquid ring circuit is formed, the pressure could rise due to changes in the temperature and the product may be damaged. Prevent a liquid ring circuit by providing a relief valve in the system.
- When fluid is not flowing, be sure to turn OFF the power of the product. If it remains energized in a state where fluid is not flowing, there is a risk of malfunction.
- Do not disassemble this product. Products reassembled after disassembly cannot meet the specifications.

Karman vortex flow rate sensor for water

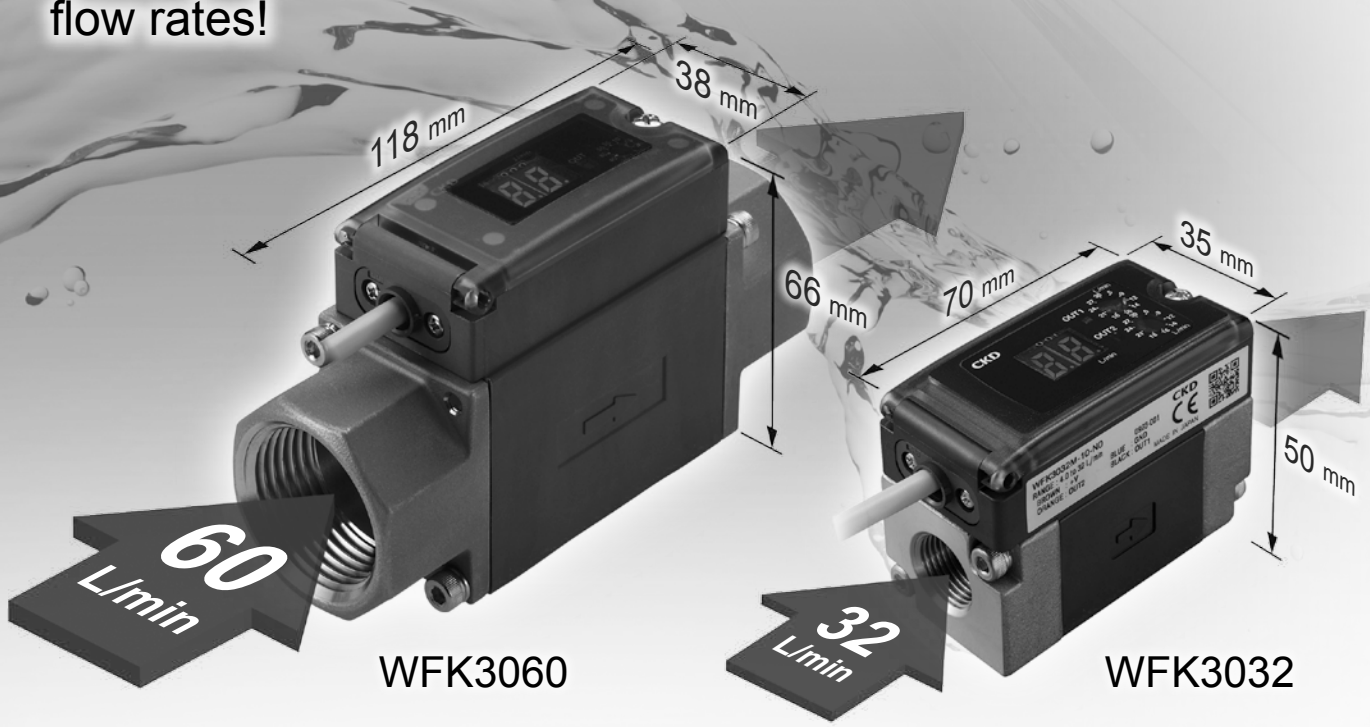
WFK (FLUEREX flow sensor)

■ Sensor/controller/flow rate sensor for water

CONTENTS

Size and range for easy design

Newly released compact flow rate sensor for large water flow rates!



Karman vortex flow rate sensor for water FLUEREX

WFK3000 SERIES

A wide variety of options and variations

C variations added

Model variations		Port size	Flow rate range (L/min)
WFK3000 S Series Analog 1-point output	WFK3004S	Rc3/8 Rc1/2	0.5 – 4.0
	WFK3012S		1.5 – 12
	WFK3032S		4.0 – 32
	WFK3060S	Rc3/4 Rc1	8.0 – 60
WFK3000 M Series Switch 2-point output	WFK3004M	Rc3/8 Rc1/2	0.5 – 4.0
	WFK3012M		1.5 – 12
	WFK3032M		4.0 – 32
	WFK3060M	Rc3/4 Rc1	8.0 – 60
WFK3000 C Series Analog 1-point output Switch 1-point output	WFK3004C	Rc3/8 Rc1/2	0.5 – 4.0
	WFK3012C		1.5 – 12
	WFK3032C		4.0 – 32
	WFK3060C	Rc3/4 Rc1	8.0 – 60

Easy operation without a manual

Sensor is ready for use as soon as wiring is completed.
Setting of switch is completed by simply turning the rotary switch.
Cumbersome switch setting not required.

Analog/ switch dual output supported

WFK3000S
Sensor type: Analog 1-point output

Power supply lamp
Water conduction lamp

WFK3000M
Switch type: Switch 2-point output

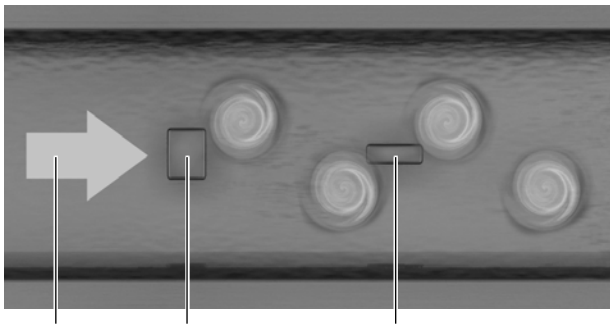
Output lamp
Instantaneous flow rate display
(integer part will be displayed for 10 L/min and over.)
Rotary switch
(set output in 10 steps)

WFK3000C
Sensor/switch type:
Analog 1-point / Switch 1-point output

Rotary switch
Output lamp
Instantaneous flow rate display
(integer part will be displayed for 10 L/min and over.)

Measuring method with high reliability

Highly reliable Karman's vortex used.
This method has no moving parts, unlike an impeller, eliminating problems caused by dirt and rust in piping.



Flow
Vortex generator
Detector

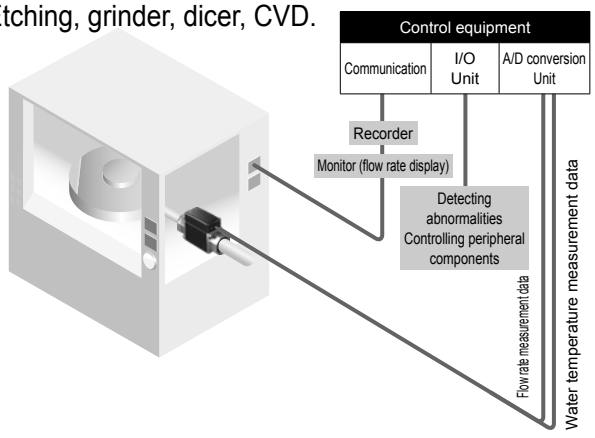
Degree of protection IP65 or equivalent

Safe to use in food equipment or similar equipment that requires drip-proofing.

Examples of applications

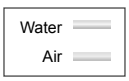
Semiconductor Semiconductor manufacturing equipment

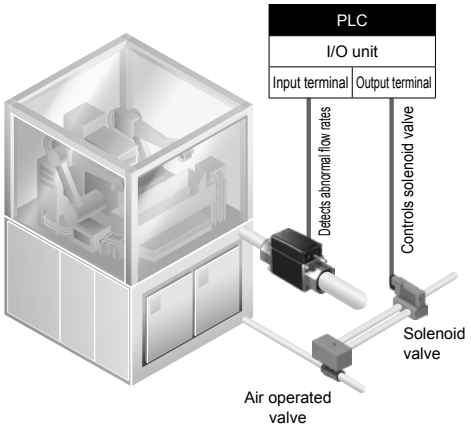
Cooling and temperature control of semiconductor manufacturing equipment.
Etching, grinder, dicer, CVD.



Hardening Induction hardening device

Quantitative management of cooling water.





Wiring method

· Always read the safety precautions before wiring.

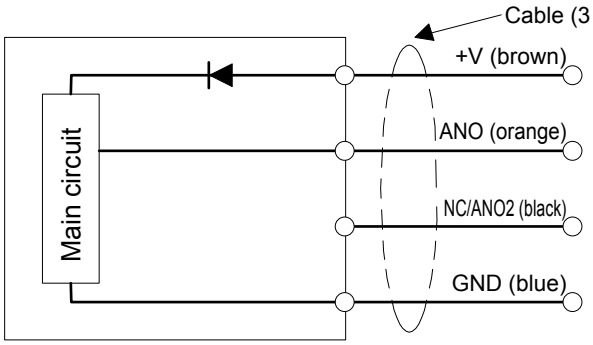
· The cable used is a 4-conductor cabtyre cable with a core wire of 0.2 mm^2.

· Optional

Sensor (analog output)	Switch (switch output)
-A0; (0 to 5 [V])	-N0; (NPN a-contact, 2 points)
-A1; (4 to 20 [mA])	-N1; (NPN b-contact, 2 points)
-A2; (1 to 5 [V]	-P0; (PNP a-contact, 2 points)
-A3; (0 to 10 [V])	-P1; (PNP b-contact, 2 points)

*Sensor/switch type alarm output is 1 point.

● WFK3***S (sensor voltage output: -A0, -A2, -A3)



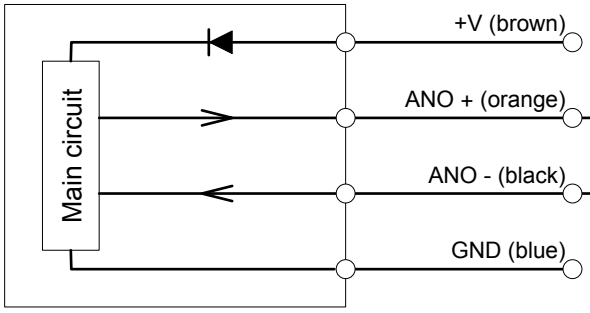
: Connect to [+] of DC power supply: 12 to 24 VDC ± 10%
(Option A3: 15 to 24 VDC ±10%)

: Analog output : Voltage in proportion to flow rate is output

: Standard: NC/
Option T : Temperature output (voltage output)

: Connect to [-] of DC power supply : 0 VDC

● WFK3***S (sensor current output: -A1)

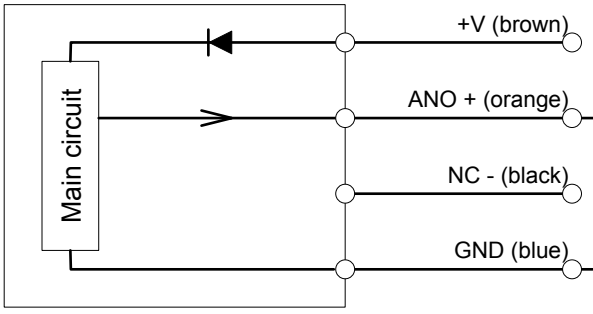


: Connect to [+] of DC power supply: 12 to 24 VDC ± 10%

: Connect to 4 to 20 mA input unit

: Connect to [-] of DC power supply: 0 VDC

*For WFK3004, 3012, and 3032 purchased before February 2020, the wiring method is as follows.



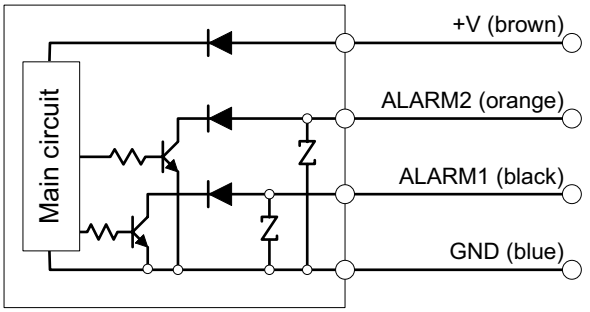
: Connect to [+] of DC power supply: 12 to 24 VDC ± 10%

: Connect to 4 to 20 mA input unit

: Connect to [-] of DC power supply: 0 VDC

*Note
When connecting two or more flow rate sensors to the upper-level input circuit (receiver), carefully prevent signal interference.

● WFK3***M (Switch NPN output: -N0, -N1)



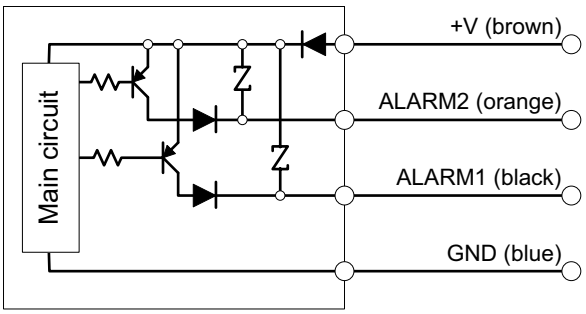
: Connect to [+] of DC power supply : 12 to 24 VDC ± 10%

: Switch 2 (OUT2) output : MAX 30 VDC/50 mA

: Switch 1 (OUT1) output : MAX 30 VDC/50 mA

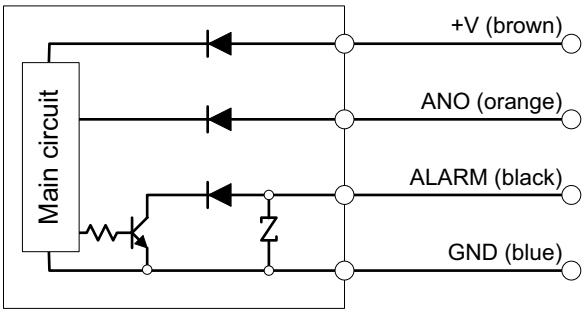
: Connect to [-] of DC power supply : 0 VDC

● WFK3***M (Switch PNP output: -P0, -P1)



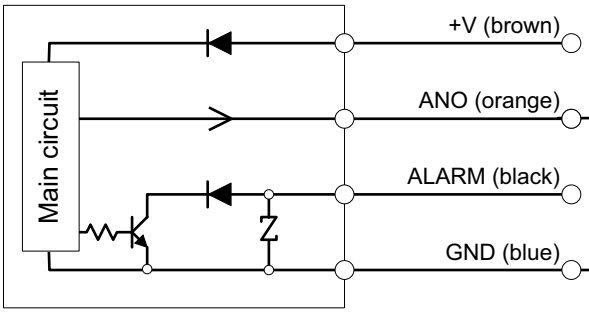
: Connect to [+] of DC power supply : 12 to 24 VDC ± 10%
: Switch 2 (OUT2) output : MAX 50 mA
: Switch 1 (OUT1) output : MAX 50 mA
: Connect to [-] of DC power supply : 0 VDC

● WFK3***C (sensor voltage output: -A0, -A2, -A3, switch type NPN output specifications: N0/N1)



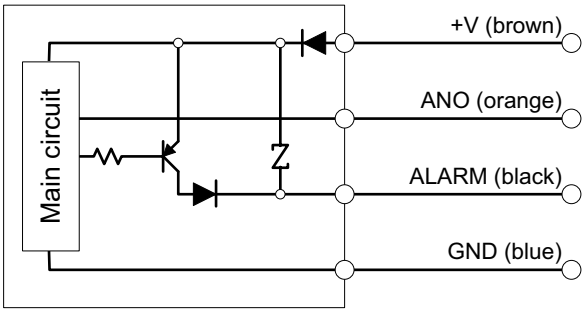
: Connect to [+] of DC power supply: 12 to 24 VDC ± 10%
(Option A3: 15 to 24 VDC ±10%)
: Analog output : Voltage in proportion to flow rate is output
: Switch (OUT) output : MAX 30 VDC/50 mA
: Connect to [-] of DC power supply : 0 VDC

● WFK3***C (sensor current output specifications: -A1, switch type NPN output specifications (N0, N1)



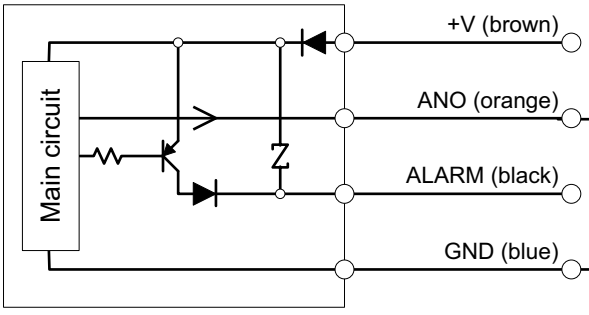
: Connect to [+] of DC power supply : 12 to 24 VDC ± 10%
: Connect to 4 to 20 mA input unit
: Switch (OUT) output
: MAX 30 VDC/50 mA
: Connect to [-] of DC power supply : 0 VDC

● WFK3***C (sensor type voltage output specifications: -A0/-A2/-A3, switch type PNP output specifications: P0,P1)



: Connect to [+] of DC power supply : 12 to 24 VDC ± 10%
(Option A3: 15 to 24 VDC ±10%)
: Analog output : Voltage in proportion to flow rate is output
: Switch (OUT) output : MAX 30 VDC/50 mA
: Connect to [-] of DC power supply : 0 VDC

● WFK3***C (sensor voltage output: -A1, switch type PNP output specifications: P0/P1)



: Connect to [+] of DC power supply : 12 to 24 VDC ± 10%
: Connect to 4 to 20 mA input unit
: Switch (OUT) output
: MAX 30 VDC/50 mA
: Connect to [-] of DC power supply : 0 VDC

FLUEREX flow sensor

WFK3000S Series

(Compact/equipment integrated sensor)

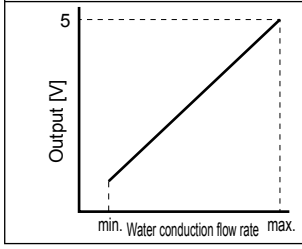
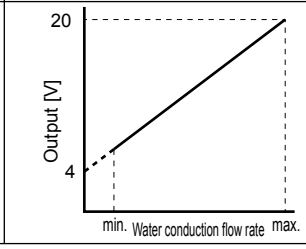
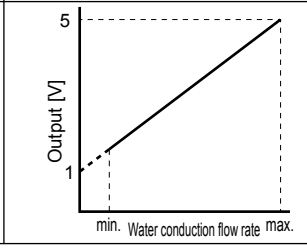
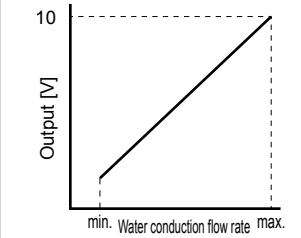
Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Model No. / Item			WFK3004S-10	WFK3004S-15	WFK3012S-10	WFK3012S-15	WFK3032S-10	WFK3032S-15	WFK3060S-20	WFK3060S-25
Flow rate range		L/min	0.5 to 4.0		1.5 to 12		4.0 to 32		8.0 to 60	
Port size		Rc	3/8	1/2	3/8	1/2	3/8	1/2	3/4	1
Port material			Stainless steel: SCS13							
Working conditions	Applicable fluids		Pure water, industrial water							
	Max. working pressure	MPa	1.0 (≈145 psi, 10 bar)							
	Proof pressure	MPa	1.5 (≈217 psi, 15 bar)							
	Ambient temperature	°C	0 (32°F) to 50 (122°F) (85%RH or less)							
	Fluid temperature	°C	1 (33°F) to 70 (158°F)							
Accuracy			±2.5% F.S.							
Temperature characteristics			± 5% F.S. (10 (50°F) to 50°C (122°F), base temperature 20°C (68°F))							
Pressure loss		MPa	0.06 (≈9 psi, 1 bar) or less (at 4.0 L/min)		0.05 (≈8 psi, 1 bar) or less (at 12 L/min)		0.06 (≈9 psi, 1 bar) or less (at 32 L/min)		0.05 (≈8 psi, 1 bar) or less (at 60 L/min)	
Response time			1 sec (*1)							
Output	Display		None							
	Analog output		Standard: 0 to 5 VDC/option: 4 to 20 mADC, 1 to 5 V, 0 to 10 V							
Power supply voltage			12 to 24 VDC ±10% (MAX 80 mA) Option A3 is 15 to 24 VDC							
Cable			3 m, 4-conductor, finished O.D. 4.8 mm, conductor 0.2 mm², insulation O.D. 1.3 mm							
Mounting	Mounting orientation		Unrestricted in vertical/horizontal direction							
	Straight piping section		Without (*2)						IN side: 10 D, OUT side 5 D	
	Degree of protection		IP65 or equivalent							
Weight		g	380	410	380	410	380	410	470	510
Bracket weight		g	28 (including screws)							

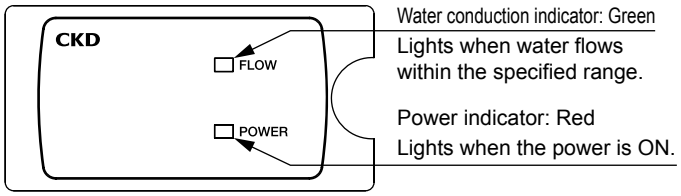
*1: The time to attain 70% of the original output after the normal flow rate (used) drops instantly to 0.
*2: Installing straight pipes (INside is 10D, OUTside is 5D) is recommended so that the piping conditions do not affect the performance (D is port size).

Analog output

-A0 (load 50 kΩ or more)	-A1 (load 500 Ω or less)	-A2 (load 50 kΩ or more)	-A3 (load 50 kΩ or more)
			

* min. is the minimum value and max. is the maximum value in the flow rate range.

Functions



Water conduction indicator: Green
Lights when water flows within the specified range.

Power indicator: Red
Lights when the power is ON.

FLUEREX flow sensor

WFK3000M Series

(Compact/equipment integrated switch)

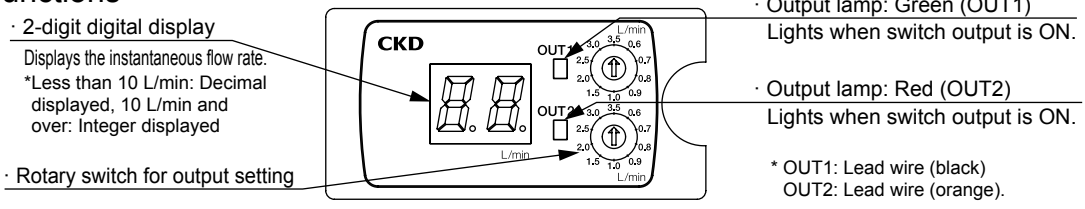
Specifications

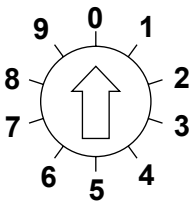
1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Model No. / Item			WFK3004M-10	WFK3004M-15	WFK3012M-10	WFK3012M-15	WFK3032M-10	WFK3032M-15	WFK3060M-20	WFK3060M-25
Flow rate range		L/min	0.5 to 4.0		1.5 to 12		4.0 to 32		8.0 to 60	
Port size		Rc	3/8	1/2	3/8	1/2	3/8	1/2	3/4	1
Port material			Stainless steel: SCS13							
Working conditions	Applicable fluids		Pure water, industrial water							
	Max. working pressure	MPa	1.0 (≈145 psi, 10 bar)							
	Proof pressure	MPa	1.5 (≈217 psi, 15 bar)							
	Ambient temperature	°C	0 (32°F) to 50 (122°F) (85%RH or less)							
	Fluid temperature	°C	1 (33°F) to 70 (158°F)							
Accuracy			±2.5% F.S. ±1 digit (1digit = 0.1 L/min (less than 10 L/min), 1 L/min (10 L/min and over))							
Temperature characteristics			± 5% F.S. (10 (50°F) to 50°C (122°F), base temperature 20°C (68°F))							
Pressure loss		MPa	0.06 (≈9 psi, 1 bar) or less (at 4.0 L/min)		0.05 (≈8 psi, 1 bar) or less (at 12 L/min)		0.06 (≈9 psi, 1 bar) or less (at 32 L/min)		0.05 (≈8 psi, 1 bar) or less (at 60 L/min)	
Response time			1 sec (*1)							
Output	Display		Instantaneous flow rate 2-digit LED display							
	Switch output	Number of points	2-point transistor output (select NPN/PNP)							
		Rating	MAX. 50 mADC							
		Internal voltage drop	(NPN) 2.0 V or less (PNP) 2.5 V or less							
Power supply voltage			12 to 24 VDC ±10% (MAX 80 mA)							
Cable			3 m, 4-conductor, finished O.D. 4.8 mm, conductor 0.2 mm², insulation O.D. 1.3 mm							
Mounting	Mounting orientation		Unrestricted in vertical/horizontal direction							
	Straight piping section		Without (*2)						IN side: 10 D, OUT side 5 D	
	Degree of protection		IP65 or equivalent							
Weight		g	380	410	380	410	380	410	470	510
Bracket weight		g	28 (including screws)							

*1: When the switch output is set to 70% of the normal flow rate (used), the time until the switch output occurs after the flow rate drops instantly to 0.
*2: Installing straight pipes (INside is 10D, OUTside is 5D) is recommended so that the piping conditions do not affect the performance (D is port size).

Functions





Allows you to set the switch output setting in 10 steps.

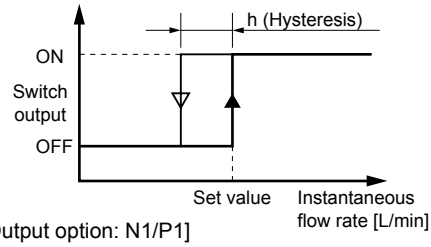
* Use a precision screwdriver or similar tool to set the rotary switch. Be extremely careful, since applying excessive force to the rotating part may result in contact failure.
* Be sure to align the arrow with the scale mark. If it is forcibly set at an intermediate point, the output may become unstable.
* Turn OFF the power before setting the switch output.
* After switch output setting, close the cover to display the set flow rate it will be .

Switch output setting value [L/min]

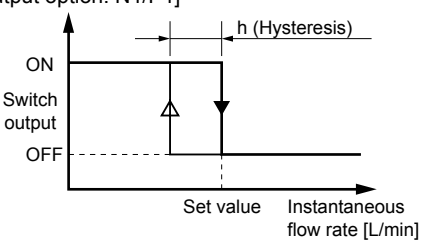
Rotary switch contact number	Model			
	WFK3004M	WFK3012M	WFK3032M	WFK3060M
1	0.6	2.0	5.0	10
2	0.7	3.0	9.0	15
3	0.8	4.0	12	20
4	0.9	5.0	14	25
5	1.0	6.0	16	30
6	1.5	7.0	18	35
7	2.0	8.0	21	40
8	2.5	9.0	24	45
9	3.0	10	27	50
0	3.5	11	30	55
Hysteresis	0.1	0.5	1.0	3.0

Switch output operation

[Output option: NO/PO]



[Output option: N1/P1]



FLUEREX flow sensor

WFK3000C Series

(Compact/equipment integrated sensor/switch)

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

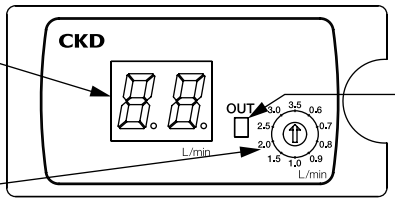
Model No. / Item			WFK3004C-10	WFK3004C-15	WFK3012C-10	WFK3012C-15	WFK3032C-10	WFK3032C-15	WFK3060C-20	WFK3060C-25
Flow rate range		L/min	0.5 to 4.0		1.5 to 12		4.0 to 32		8.0 to 60	
Port size		Rc	3/8	1/2	3/8	1/2	3/8	1/2	3/4	1
Port material			Stainless steel: SCS13							
Working conditions	Applicable fluids		Pure water, industrial water							
	Max. working pressure	MPa	1.0 (≈145 psi, 10 bar)							
	Proof pressure	MPa	1.5 (≈217 psi, 15 bar)							
	Ambient temperature	°C	0 (32°F) to 50 (122°F) (85%RH or less)							
	Fluid temperature	°C	1 (33°F) to 70 (158°F)							
Accuracy			±2.5% F.S. ±1 digit (1digit = 0.1 L/min (less than 10 L/min), 1 L/min (10 L/min and over))							
Temperature characteristics			± 5% F.S. (10 (50°F) to 50°C (122°F), base temperature 20°C (68°F))							
Pressure loss		MPa	0.06 (≈9 psi, 1 bar) or less (at 4.0 L/min)		0.05 (≈8 psi, 1 bar) or less (at 12 L/min)		0.06 (≈9 psi, 1 bar) or less (at 32 L/min)		0.05 (≈8 psi, 1 bar) or less (at 60 L/min)	
Response time			1 sec (*1)							
Output	Display		Instantaneous flow rate 2-digit LED display							
	Analog output		Standard: 0 to 5 VDC/option: 4 to 20 mADC, 1 to 5 V, 0 to 10 V							
	Switch output	Number of points	1-point transistor output (select NPN/PNP)							
		Rating	MAX. 50 mADC							
		Internal voltage drop	(NPN) 2.0 V or less (PNP) 2.5 V or less							
Power supply voltage			12 to 24 VDC ±10% (MAX 80 mA) Option A3 is 15 to 24 VDC							
Cable			3 m, 4-conductor, finished O.D. 4.8 mm, conductor 0.2 mm², insulation O.D. 1.3 mm							
Mounting	Mounting orientation		Unrestricted in vertical/horizontal direction							
	Straight piping section		Without (*2)						IN side: 10 D, OUT side 5 D	
	Degree of protection		IP65 or equivalent							
Weight		g	380	410	380	410	380	410	470	510
Bracket weight		g	28 (including screws)							

*1: When the switch output is set to 70% of the normal flow rate (used), the time until the switch output occurs after the flow rate drops instantly to 0.
*2: Installing straight pipes (INside is 10D, OUTside is 5D) is recommended so that the piping conditions do not affect the performance (D is port size).

Functions

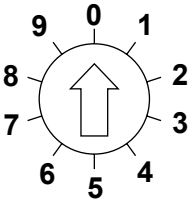
· 2-digit digital display
Displays the instantaneous flow rate.
*Less than 10 L/min: Decimal displayed, 10 L/min and over: Integer displayed

· Rotary switch for output setting



· Output lamp: Orange (OUT)
Lights when switch output is ON.

*OUT: Lead wire (black).



Allows you to set the switch output setting in 10 steps.

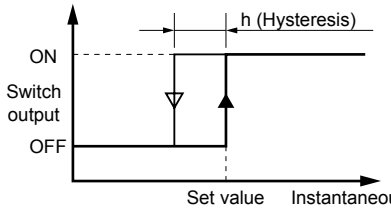
* Use a precision screwdriver or similar tool to set the rotary switch. Be extremely careful, since applying excessive force to the rotating part may result in contact failure.
* Be sure to align the arrow with the scale mark. If it is forcibly set at an intermediate point, the output may become unstable.
* Turn OFF the power before setting the switch output.
* After switch output setting, close the cover to display the set flow rate it will be .

Switch output setting value [L/min]

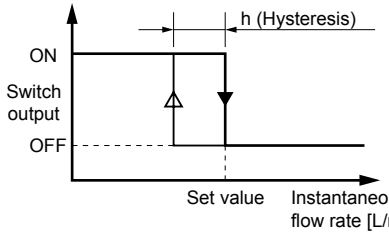
Rotary switch contact number	Model			
	WFK3004C	WFK3012C	WFK3032C	WFK3060C
1	0.6	2.0	5.0	10
2	0.7	3.0	9.0	15
3	0.8	4.0	12	20
4	0.9	5.0	14	25
5	1.0	6.0	16	30
6	1.5	7.0	18	35
7	2.0	8.0	21	40
8	2.5	9.0	24	45
9	3.0	10	27	50
0	3.5	11	30	55
Hysteresis	0.1	0.5	1.0	3.0

Switch output operation

[Output option: NO/PO]

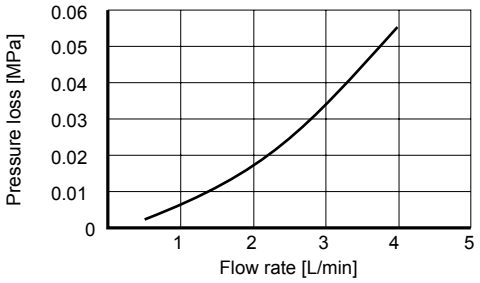


[Output option: N1/P1]

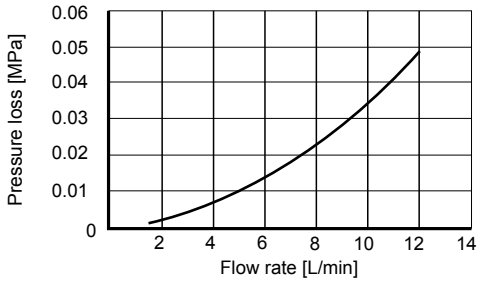


Pressure loss

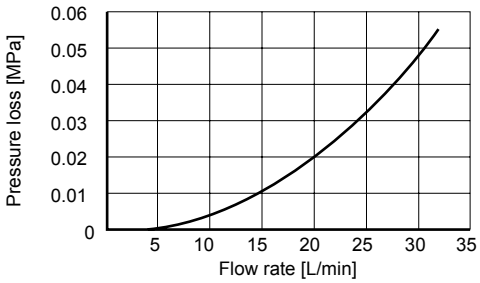
● WFK3004



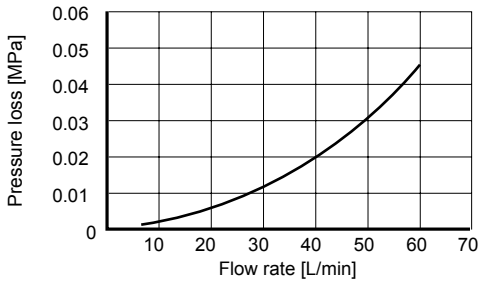
● WFK3012



● WFK3032



● WFK3060



How to order (Set model No.)

● Sensor

WFK 3 012 S- 10 - A0 B

- Ⓐ Shape
- Ⓑ Flow rate range
- Ⓒ Port size
- Ⓓ Analog output
- Ⓔ Bracket

Code	Description
Ⓐ Shape	
3	Compact for equipment integration

Ⓑ Flow rate range	
004	0.5 to 4.0 L/min
012	1.5 to 12 L/min
032	4.0 to 32 L/min
060	8.0 to 60 L/min

Ⓒ Port size

	Flow rate range	004	012	032	060
10	Rc3/8	●	●	●	-
15	Rc1/2	●	●	●	-
20	Rc3/4	-	-	-	●
25	Rc1	-	-	-	●

Ⓓ Analog output	
A0	0 to 5 VDC
A1	4 to 20 mADC
A2	1 to 5 VDC
A3	0 to 10 VDC

Ⓔ Bracket	
Blank	None
B	Bracket included (including mounting screws)

*1: Contact CKD for G thread and NPT thread support.

[Example of model No.]
WFK3004S-10-A0

- Ⓐ Shape : Compact for equipment integration
- Ⓑ Flow rate range : 0.5 to 4 L/min
- Ⓒ Port size : Rc3/8
- Ⓓ Analog output : 0 to 5 VDC
- Ⓔ Bracket : None

● Switch type

WFK 3 012 M- 10 - N0 B

- Ⓐ Shape
- Ⓑ Flow rate range
- Ⓒ Port size
- Ⓓ Alarm output model
- Ⓔ Bracket

Code	Description
Ⓐ Shape	
3	Compact for equipment integration

Ⓑ Flow rate range	
004	0.5 to 4.0 L/min
012	1.5 to 12 L/min
032	4.0 to 32 L/min
060	8.0 to 60 L/min

Ⓒ Port size

	Flow rate range	004	012	032	060
10	Rc3/8	●	●	●	-
15	Rc1/2	●	●	●	-
20	Rc3/4	-	-	-	●
25	Rc1	-	-	-	●

Ⓓ Alarm output model	
N0	NPN transistor output, 2 points (a contact)
N1	NPN transistor output, 2 points (b contact)
P0	PNP transistor output, 2 points (a contact)
P1	PNP transistor output, 2 points (b contact)

Ⓔ Bracket	
Blank	None
B	Bracket included (including mounting screws)

*1: Contact CKD for G thread and NPT thread support.

[Example of model No.]
WFK3012M-15-N1B

- Ⓐ Shape : Compact for equipment integration
- Ⓑ Flow rate range : 1.5 to 12 L/min
- Ⓒ Port size : Rc1/2
- Ⓓ Alarm output : NPN 2 output points (b contact)
- Ⓔ Bracket : Included

How to order

● Sensor/switch type

WFK 3 004 C- 10 - A0 N0 B

Ⓐ Shape
Ⓑ Flow rate range
Ⓒ Port size
Ⓓ Analog output
Ⓔ Alarm output model
Ⓕ Bracket

Code	Description
Ⓐ Shape	
3	Compact for equipment integration
Ⓑ Flow rate range	
004	0.5 to 4.0 L/min
012	1.5 to 12 L/min
032	4.0 to 32 L/min
060	8.0 to 60 L/min

Ⓒ Port size

	Flow rate range	004	012	032	060
10	Rc3/8	●	●	●	-
15	Rc1/2	●	●	●	-
20	Rc3/4	-	-	-	●
25	Rc1	-	-	-	●

Ⓓ Analog output	
A0	0 to 5 VDC
A1	4 to 20 mADC
A2	1 to 5 VDC
A3	0 to 10 VDC

Ⓔ Alarm output model	
N0	NPN transistor output, 1 point (a contact)
N1	NPN transistor output, 1 point (b contact)
P0	PNP transistor output, 1 point (a contact)
P1	PNP transistor output, 1 point (b contact)

Ⓕ Bracket	
Blank	None
B	Bracket included (including mounting screws)

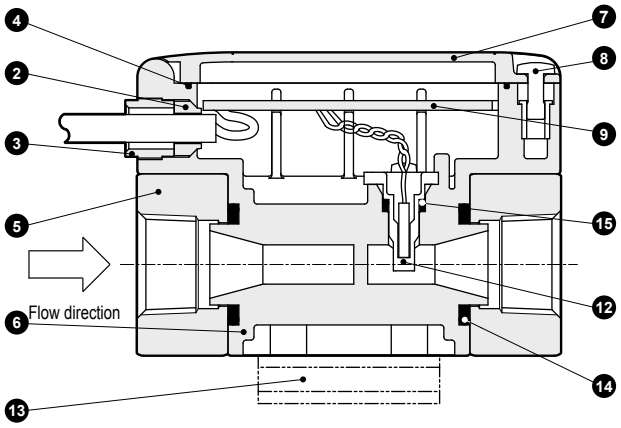
*1: Contact CKD for G thread and NPT thread support.

[Example of model No.]
WFK3004C-10-A0N0B

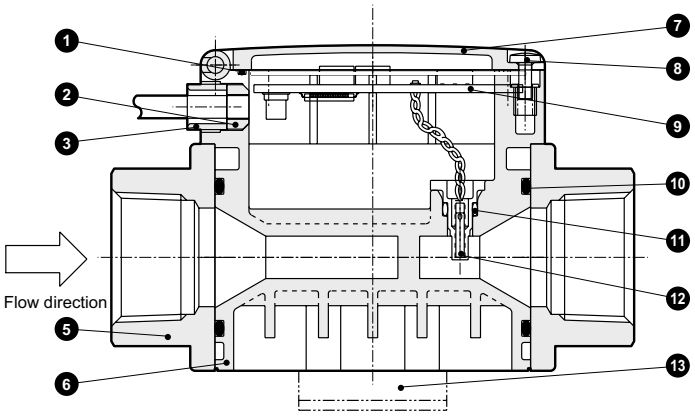
Ⓐ Shape : Compact for equipment integration
Ⓑ Flow rate range : 0.5 to 4 L/min
Ⓒ Port size : Rc3/8
Ⓓ Analog output : 0 to 5 VDC
Ⓔ Alarm output : NPN 1 output point (a contact)
Ⓕ Bracket : Included

Internal structure and parts list

● WFK3004□, WFK3012□, WFK3032□



● WFK3060□



Cannot be disassembled

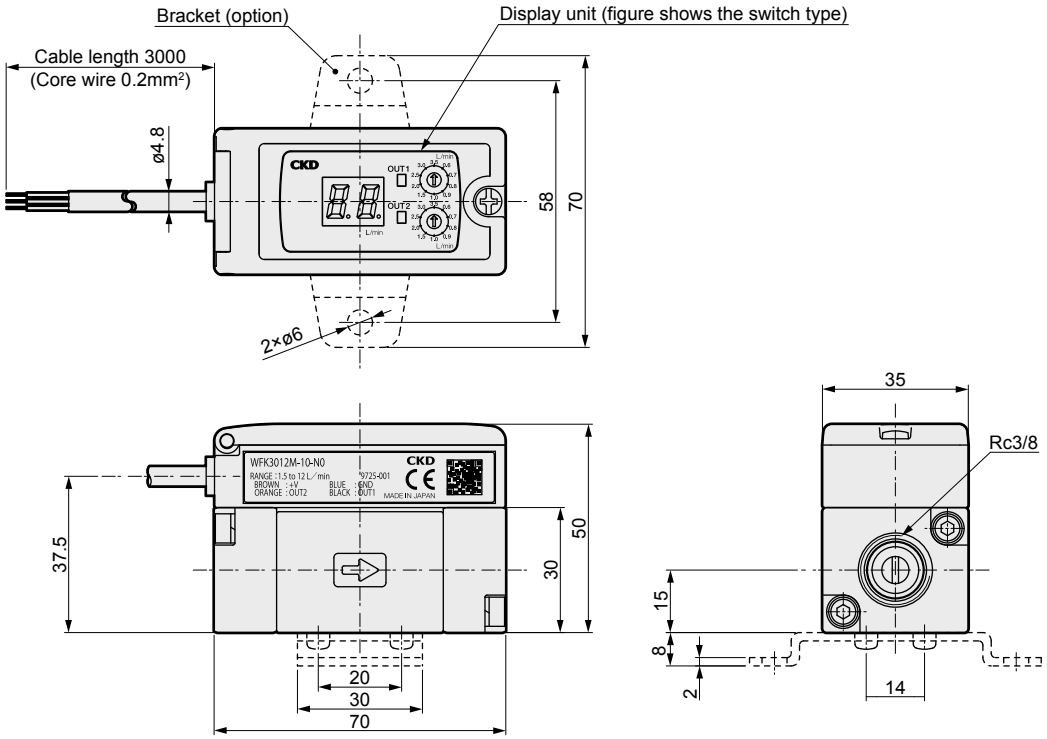
No.	Part name	Material		Quantity	No.	Part name	Material		Quantity
1	Cover packing	NBR	Nitrile rubber	1	9	Wiring section			1
2	Cable packing	NBR	Nitrile rubber	1	10	O-ring	NBR	Nitrile rubber	2
3	Cable gland	PPS resin		1	11	O-ring	NBR	Nitrile rubber	1
4	Cover packing	FKM	Fluoro rubber	1	12	Karman's vortex detection sensor	PPS resin (interior: piezo ceramic)		1
5	Attachment	SCS13	Stainless steel casting	2	13	Bracket (option)	SPC	Steel	(1)
6	Body	PPS resin		1				Zinc plated	
7	Cover	PC resin		1	14	O-ring	FKM	Fluoro rubber	2
8	Screw for cover			1	15	O-ring	FKM	Fluoro rubber	1

* Wetted parts are ⑤, ⑥, ⑩, ⑪, ⑫ , ⑭ and ⑮.

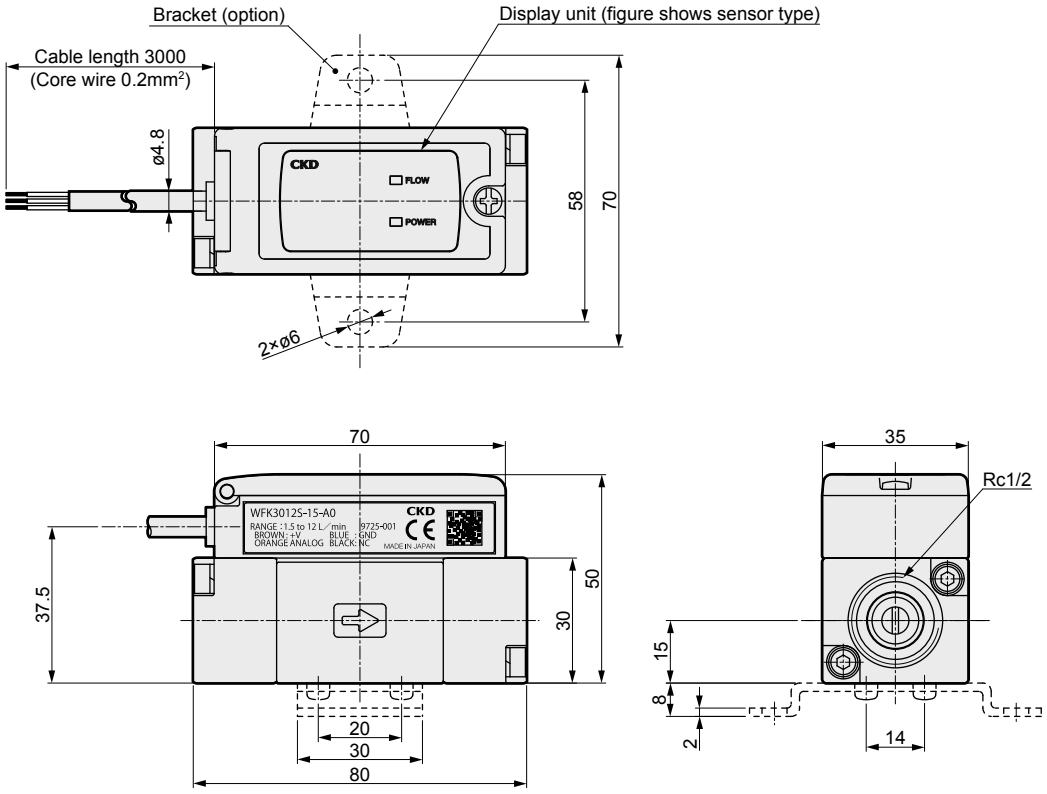
Dimensions

● WFK3004□, WFK3012□, WFK3032□

· Port size: 10 (Rc3/8)



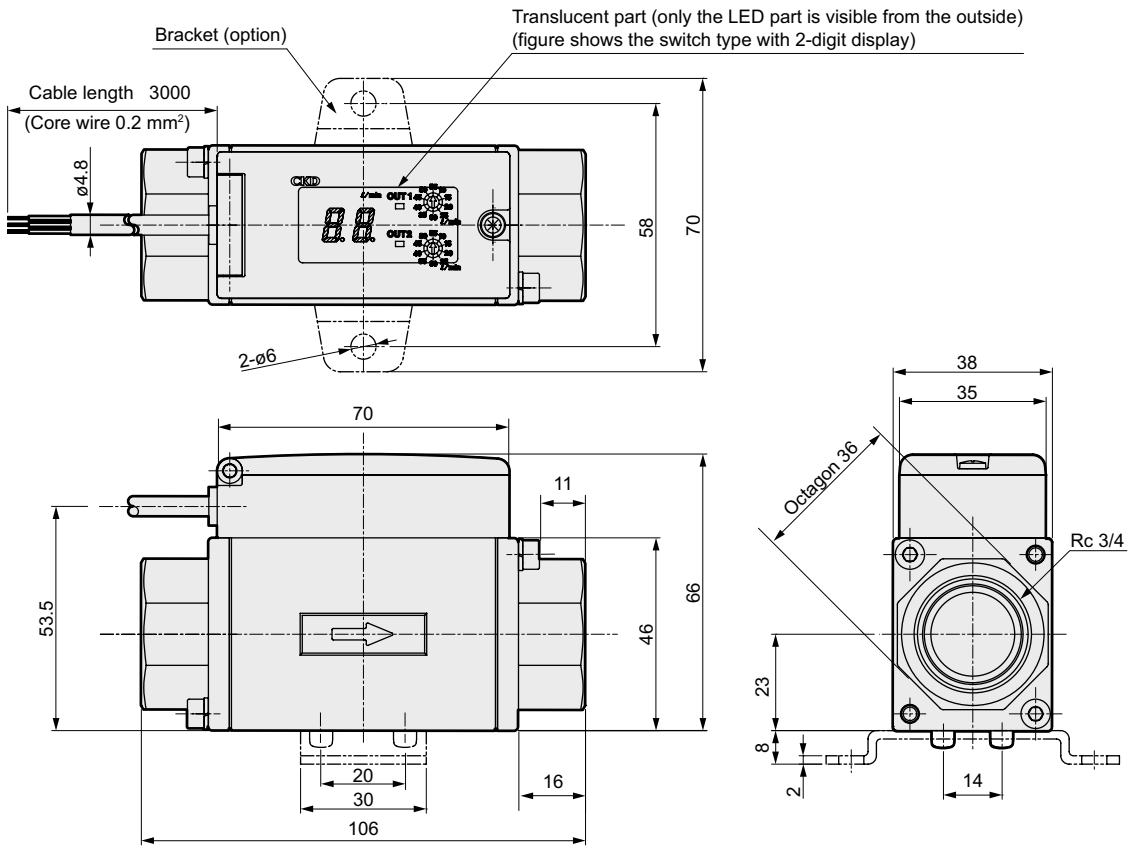
· Port size: 15 (Rc1/2)



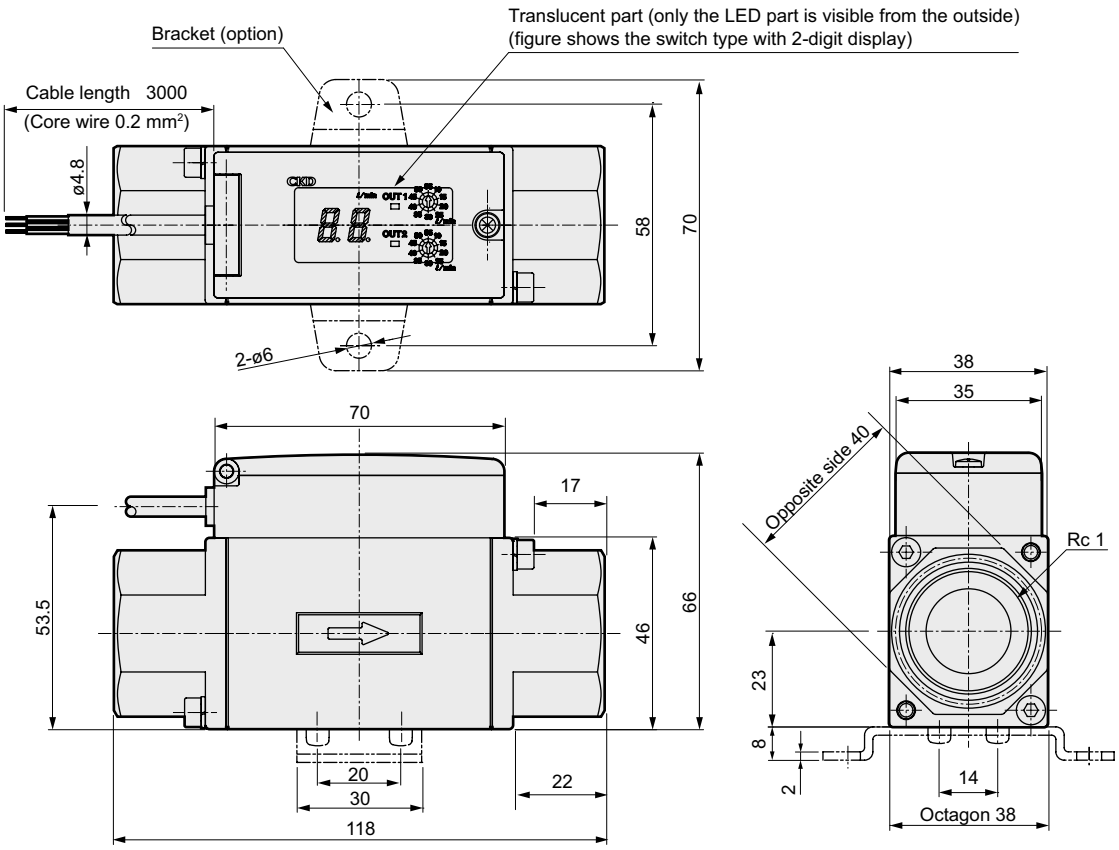
Dimensions

● WFK3060□

· Port size: 20 (Rc3/4)



· Port size: 25 (Rc1)



Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 59 for general precautions.

Design/selection

1. Working fluids

⚠ DANGER

■ Do not use in drinking water.
As it does not conform to the requirements of the Food Sanitation Act, do not use this product for applications that measure water entering the human body. Intended applications include industrial sensors.

■ Never use with a flammable fluid.

⚠ WARNING

■ This product cannot be used as a billing meter.
Do not use this product for commercial transactions as it is not compliant with the Measurement Act. It cannot be calibrated, so use it as an industrial sensor.

■ Applicable fluid is water (industrial water, pure water); do not use with any other fluid.

2. Working environment

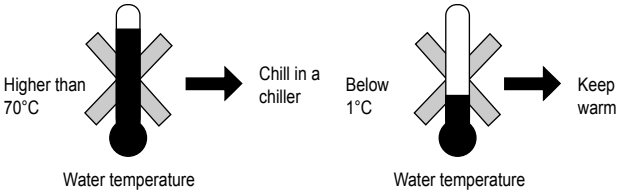
⚠ DANGER

■ Explosion-proof environments
Never use this product in an explosive gas atmosphere. The structure is not explosion-proof, and explosions or fires could occur.

⚠ WARNING

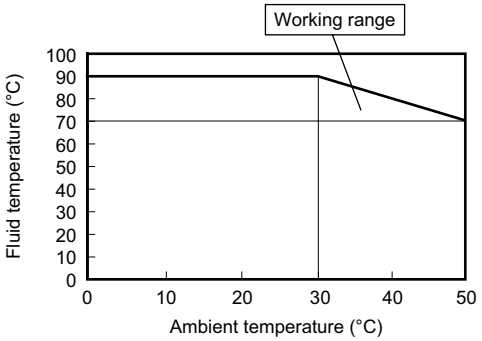
■ Corrosive environments
Do not use this product in an atmosphere containing corrosive gases such as sulfur dioxide.

■ Fluid temperature and ambient temperature
Use with fluid temperature within the range of 1 to 70°C. If the fluid temperature rises to 70°C and over, cool it down using a cooling system such as a chiller. As well, if there is a risk of freezing, drain the product or keep it warm to prevent freezing. Even if the ambient temperature is within the specified range, do not use this product in a location where rapid changes in temperature can occur.



Ambient temperature should be in the 0 to 50°C range.

However, the WFK3060 series supports the following range.



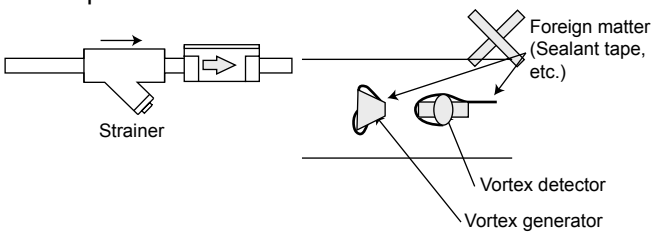
■ Max. working pressure
Do not use at a pressure exceeding the max. working pressure, as excessive pressure can cause product failure. To prevent the pressure from reaching the max. working pressure, particularly due to water hammer, take the following measures:
(1) Using a water hammer reduction valve or other similar mechanism, regulate the valve closing speed.
(2) Using elastic piping material, e.g. rubber hose, and an accumulator, absorb the impact pressure.
(3) Make the pipe length as short as possible.

■ Drip-proof environments
This product employs a dust-proof, drip-proof structure that provides reliability during maintenance and cleaning, during which it may be exposed to water splashing. However, avoid using this product in a location where it may be constantly exposed to water or intense splattering of water and/or oil.

■ Working conditions for CE compliance
This product is CE-marked, indicating conformity with the EMC Directives. The standard for the immunity for industrial environments applied to this product is EN61000-6-2; the following requirements must be satisfied in order to conform to this standard.
Conditions
- The evaluation of this product is performed by using a cable that has a power supply line and a signal line paired to assess the product's performance.
- This product is not equipped with surge protection. Implement surge protection measures on the system side.

⚠CAUTION

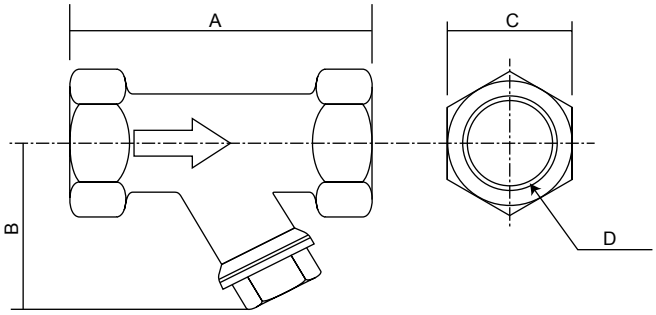
■ If there is a risk of foreign matter entering the fluid, install a filter (strainer) on the primary side. If foreign matter adheres to the vortex generator or vortex detector, measurement accuracy can be compromised.



Strainer specifications

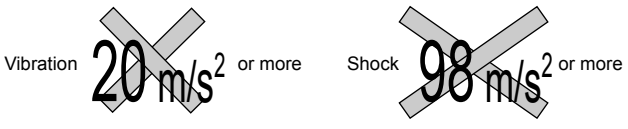
Item		Usage
Specification fluid		Water
Pressure resistance	MPa	2
Working pressure range	MPa	0 to 1
Operating ambient temperature range	°C	1 to 90
Main material		**Usage**
Body		Copper alloy casting
Strainer		Stainless steel

External view of strainer



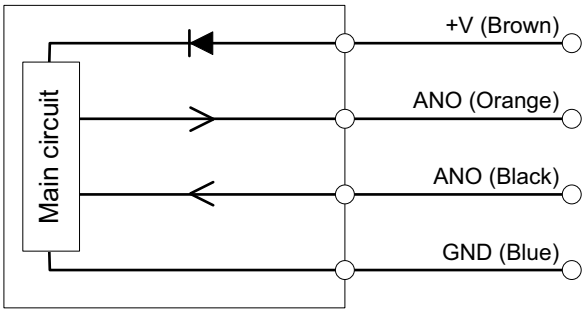
Model No.	A	B	C	D
WF-FL-280730	70	44	23	Rc 3/8
WF-FL-280731	80	49	28	Rc 1/2
WF-FL-280732	100	57	35	Rc 3/4
WF-FL-280733	115	72	43	Rc 1
WF-FL-280734	135	82	52	Rc1 1/4
WF-FL-280735	160	98	59	Rc1 1/2

■ Vibration/impact
Avoid vibrations of 20 m/s² or more and shocks of 98 m/s² or more. This may cause malfunction and/or damage, as this product uses the Karman's vortex type detection principle.

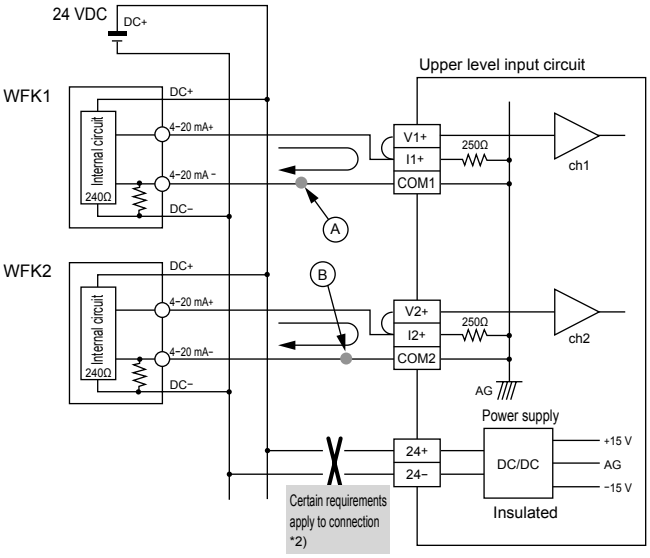


3. Analog output A1 (4-20 mA) connection

The following wiring diagram is for analog output A1 (4-20 mA) only



⚠CAUTION



*1) Connecting multiple analog output 4 to 20 mA sensors to the same common input circuit (host computer, PLC, etc.) as shown above causes interference between the signals, preventing correct operation. In this case, use the voltage output (standard, A2, A3).

* The voltage at point A and that at point B are connected inside the input circuit, which gives them the same electrical potential, creating an error in the respective analog outputs.

*2) If the power supply (24 VDC) of the upper level input circuit is not isolated, install separate power supplies for the input circuit and the sensor.

Mounting, installation and adjustment

1. Wiring

⚠DANGER

■ Use with power supply voltage and output in the specified range.
Applying a voltage that is outside of the specified range may cause malfunction, damage to the sensor, electrical shock, and/or fire.
Do not use any load that exceeds the rated output. Using such a load may result in damage to the output part or fire.

⚠WARNING

■ Check the line color and terminal number when connecting wires.
While an overcurrent protection circuit for the output transistor and a protection circuit for erroneous wiring, using diodes for preventing reverse connection, are implemented, these do not protect against all incorrect wiring. Incorrect wiring can result in malfunction, failure, or damage to the sensor. Check the instruction manual for wiring colors and terminal numbers in order to ensure correct wiring.

■ Ensure that wires are properly insulated.
Check that wires do not come into contact with other circuits, that no ground faults occur, and that the insulator between terminals is not defective. Otherwise, overcurrent may flow into the sensor, causing damage.

⚠CAUTION

■ Keep the cable away from all noise sources, including power distribution wires. Noise can cause malfunctions.

■ Keep unused wires from coming into contact with other wires.

■ Do not short-circuit the output transistor.
When a load is short-circuited, overcurrent protection circuit is triggered to prevent damage to the output transistor; however, if this state persists, the output transistor could be damaged.
Overcurrent protection: Approx. 50 mA

■ Do not use a load that can produce surge voltage.
While an element that protects against surge is inserted, repeated exposure to surges can lead to damage. Use relays and solenoid valves that are equipped with surge absorption elements. If there is a surge source on the same power supply line, similarly implement surge protection.

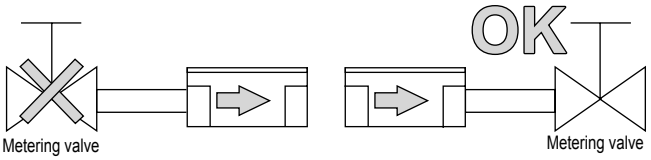
■ Make sure that the lead wire is free of repeated bends and tension. This may lead to disconnection.

2. Piping

⚠CAUTION

■ Pipes can be installed vertically, horizontally, or in any other orientation. Note that pipes should be installed so that the fluid constantly fills the piping while it flows through the pipes. When installing a pipe vertically, making the fluid flow upward can reduce the influence of air bubbles inside.

■ If a pipe is narrowed just before the flow rate sensor, or if there is a valve or other restricting component on the primary side, cavitation occurs inside the pipe, preventing accurate measurement. For this reason, such piping should be installed on the secondary side of the sensor. (Cavitation: Vapor cavities that form due to the static pressure at end points, such as a ship propeller, dropping below the vapor pressure of the water. Reduced efficiency or screw damage may result.)



However, operating the pump with the secondary side valve closed may cause the flow rate sensor to detect pressure waves from the pump, resulting in incorrect indication. If this occurs, install the valve on the primary side. When doing so, ensure that a straight pipe with a diameter of 10 times or more bore size is installed between the valve and the flow rate sensor.

■ Using an elbow or bushing in the piping

When using an elbow or bushing in the piping, provide straight piping sections of at least 10 D on the IN side and 5 D on the OUT side when using a WFK3060 Series model. Note that bore size change by bushing should be within one size. Without a straight pipe, measurement accuracy can be compromised due to disturbances in the flow rate and/or pressure distribution. (Straight pipes are not necessary for the WFK3004, 3012, and 3032 Series. However, it is recommended that a straight pipe is installed to ensure stable measurements.)
* "D" here indicates the inner diameter of the piping material. Refer to the table below for specific values.

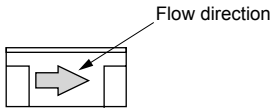
Bore size	Rc3/8 (10 A)	Rc1/2 (15 A)	Rc3/4 (20 A)	Rc1 (25 A)
5D	50 mm	75 mm	100 mm	125 mm
10D	100 mm	150 mm	200 mm	250 mm

■ Use appropriate torque to tighten the pipes when connecting them.
- The purpose is to prevent water leakage and thread damage.
- First tighten the bolts by hand to ensure that the threads are not damaged, and then use a tool.

[Recommended values]

Port thread	Tightening torque N·m
Rc3/8	31 to 33
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86

■ When installing piping, align the fluid flow direction to the direction marked on the body. Connecting the pipe in the wrong direction causes the flow rate to be indicated as less than the actual flow rate or zero.



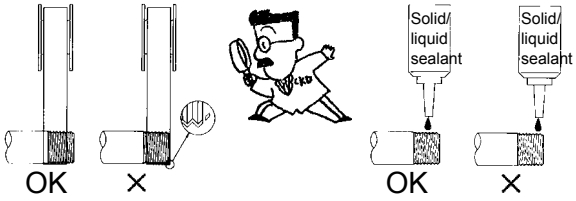
■ Before piping, clean out the interior of the pipes to get rid of any foreign matter, cutting chips and residual water.

■ Make sure that no force is applied to the resin parts when piping. Also, make sure that no sealant tape or adhesive enters the pipes when connecting the piping.

■ If there is significant difference between the ambient temperature and the fluid temperature, condensation will occur, which can enter wiring parts and cause operation failure. If condensation should occur, ensure that the mounting orientation of the flow rate sensor is horizontal and the display is facing upward.

■ When connecting pipes, wrap sealant tape in the opposite direction from the threading, from the inside position to within 2 mm from the pipe end.

- If sealant tape protrudes from the pipe threads, it could be cut when screwing the bolts in. This could cause the tape to enter the solenoid valve, causing failures.
- When using a liquid sealant, make sure it does not adhere to resin parts.Otherwise resin parts could be damaged, which is dangerous.



Use/maintenance

1. Common

⚠CAUTION

■ If a problem occurs during operation, immediately turn the power OFF, stop use, and contact your dealer. The display may become warm (approximately 40°C), but this is not an abnormality.

■ Hardware check and other internal settings are performed during approximately the first two seconds after turning the power on. Display and output do not function normally during this period. Particularly, if a transistor output is used in the control of an interlock circuit, an abnormal stop may occur. Mask the output during this period.

■ When changing the output set value, turn OFF the equipment first in order to prevent unexpected operation in the control system equipment.

■ Ensure proper operation through periodic inspections.

■ When removing the equipment, shut off the power, make sure that no water pressure is applied, and take other safety precautions beforehand.

■ Do not disassemble or modify, as this may cause malfunction.

■ When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent.

2. Applicable fluid

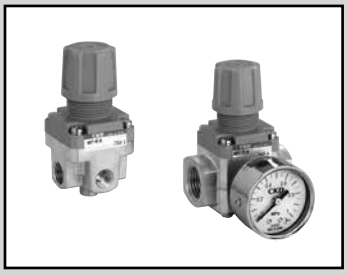
⚠CAUTION

■ Follow the precautions below for the applicable fluids to be measured. If the following water quality standards are not met, performance may be compromised.

■ The water quality of the applicable fluid should be according to the "Guideline of Water Quality for Refrigeration and Air Conditioning Equipment" (Water quality standard: Cooling system - Circulating type - Circulating water) provided by the Japan Refrigeration and Air Conditioning Industry Association.

Item	Chemical formula	Unit	Water quality standard
pH	–	pH (25°C)	6.5 to 8.2
Electrical conductivity	–	mS/m (25°C)	0.2 to 80 *1
Chloride ion	Cl^-	mg/L(ppm)	200 or less
Sulfate ion	SO_4^{2-}	mg/L(ppm)	200 or less
Acid consumption (pH4.8)	$CaCO_3$	mg/L(ppm)	100 or less
Total hardness	$CaCO_3$	mg/L(ppm)	200 or less
Calcium hardness	$CaCO_3$	mg/L(ppm)	150 or less
Ionized silica	SiO_2	mg/L(ppm)	50 or less
Iron	Fe	mg/L(ppm)	1.0 or less
Copper	Cu	mg/L(ppm)	0.3 or less
Sulfide ion	S^{2-}	mg/L(ppm)	Not detected
Ammonium ion	NH_4^+	mg/L(ppm)	1.0 or less
Residue chlorine	Cl	mg/L(ppm)	0.3 or less
Free carbonic acid	CO_2	mg/L(ppm)	4.0 or less
Stability index	–	–	6.0 to 7.0

*1 Electrical conductivity should be 0.2 [mS/m] and over. For use in the range of 0.05 to 0.2 [mS/m], consult with CKD. Do not use for ultrapure water, i.e. water with electrical conductivity below 0.05 [mS/m].



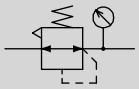
Regulator for water

WR1/WR2 Series

Easy-to-use compact regulator for water

- Port size: Rc1/8 to Rc1/2

JIS symbol



RoHS

Features

- Specially designed knob shape for easy pressure adjustment
- A single push can lock the pressure adjustment knob.
- Mesh filter is supplied as standard.
- RoHS compliant

Main applications

- Control pressure : An arbitrary pressure can be obtained even if the flow rate is unstable.
- Flow rate control : The desired flow rate can be attained when used together with a metering valve.
- Protecting equipment : Equipment can be protected from primary side pressure fluctuations.

Equipment examples: Laser processing machine, welding machine, dental instrument, etc.

Specifications

1 MPa = 10 bar

Item	WR1	WR2
Working fluid	General industrial pure water, compressed air	
Max. working pressure MPa	1.0 (≈150 psi, 10 bar)	
Proof pressure MPa	1.75 (≈250 psi, 17.5 bar)	
Ambient / fluid temperatures °C	5 (41°F) to 60 (140°F)	
Set pressure MPa	Standard: 0.05 (≈7.3 psi) to 0.70 (≈100 psi) Low pressure: 0.02 (≈2.9 psi) to 0.35 (≈51 psi)	
Pressure relief	Non-relief	
Port size (IN/OUT)	Rc1/8, Rc1/4	Rc3/8, Rc1/2
Pressure gauge port size	Rc1/8	
Weight kg	0.22	0.41(Rc3/8), 0.44(Rc1/2)
Standard specifications	With mesh filter	

Option weight

* Add to the weight of the standard accessories. Unit: kg

	Panel mount	Pressure gauge	Bracket
Code	P	G	B
WR1/WR2	0.025	0.086	0.03

How to order

WR1 - 8 - N L - G

Ⓐ Model No.
Ⓑ Port size
Ⓒ Option
Ⓓ Attachment

Code		Description	Ⓐ Model No. WR1	Ⓐ Model No. WR2
Ⓑ Port size				
6		Rc1/8	●	
8		Rc1/4	●	
10		Rc3/8		●
15		Rc1/2		●
Ⓒ Option				
Panel mount *1	**Blank**	Without nut	●	●
	P	With nut	●	●
Pressure range	**Blank**	0.05 to 0.7 MPa	●	●
	L	0.02 to 0.35 MPa	●	●
Ⓓ Attachment				
Blank		Not attached	●	●
B	***1**	Bracket	●	●
G	***2**	Pressure gauge (G49D-6-P10)	●	●

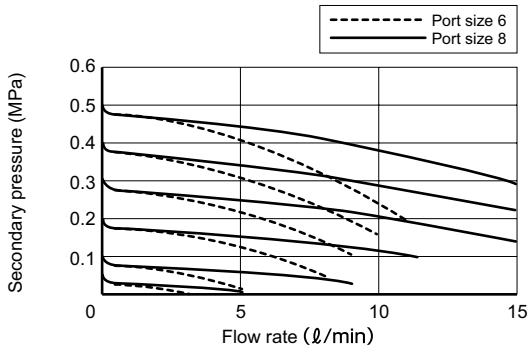
*1 : "B" bracket attached is available only for option code P (panel mount). A panel mounting nut cannot be retrofitted in a product without panel mounting nut.

*2 : If the pressure range "L" is selected, the pressure gauge G49D-6-P04 for 0.4 MPa will be attached.

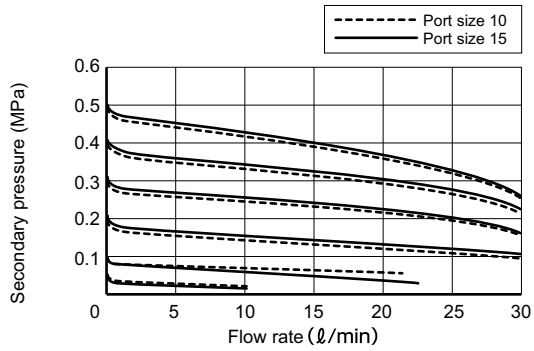
*3 : One plug (R1/8) is included with the product.

Flow characteristics (water) Primary pressure 0.7 MPa

●WR1-6-N, WR1-8-N

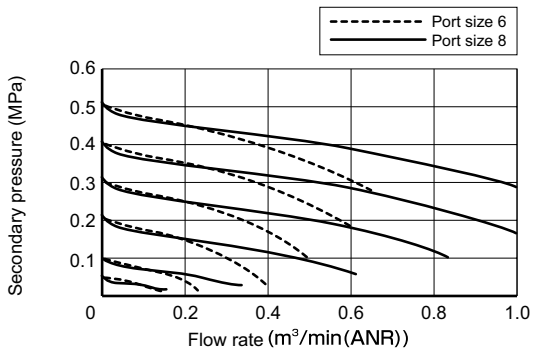


●WR2-10-N, WR2-15-N

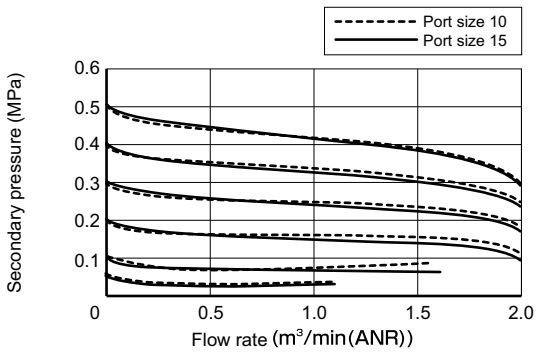


Flow characteristics (air) Primary pressure 0.7 MPa

●WR1-6-N, WR1-8-N

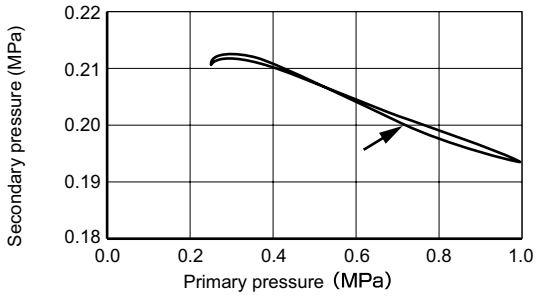


●WR2-10-N, WR2-15-N

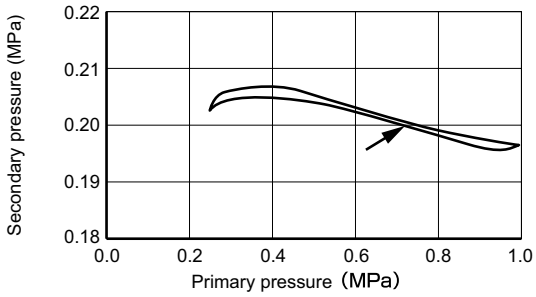


Pressure characteristics (water/air) set point ↗

●WR1

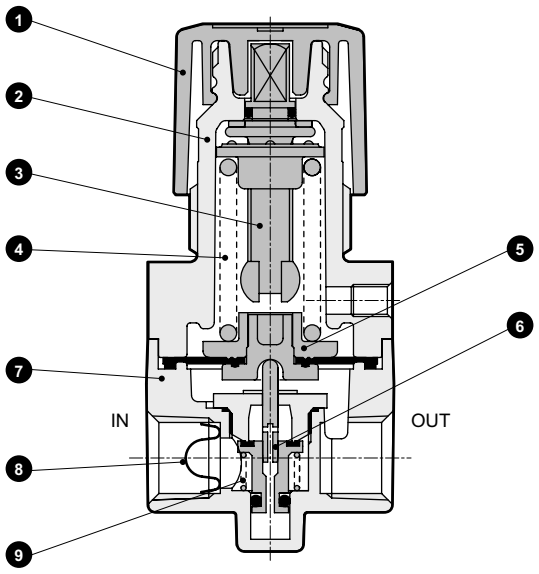


●WR2

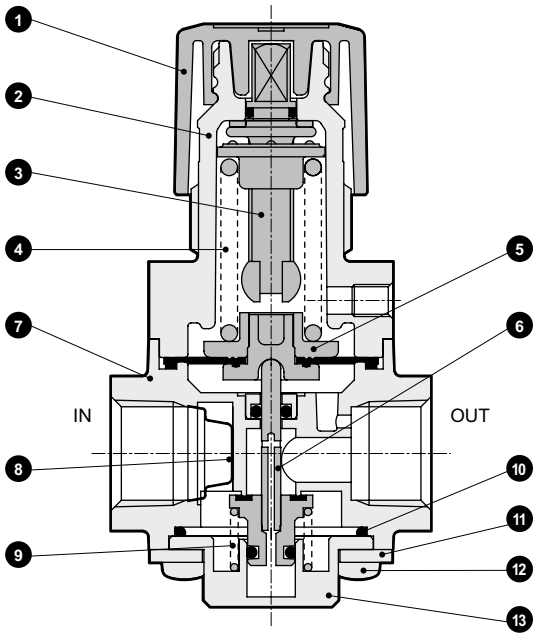


Internal structure and parts list

●WR1



●WR2



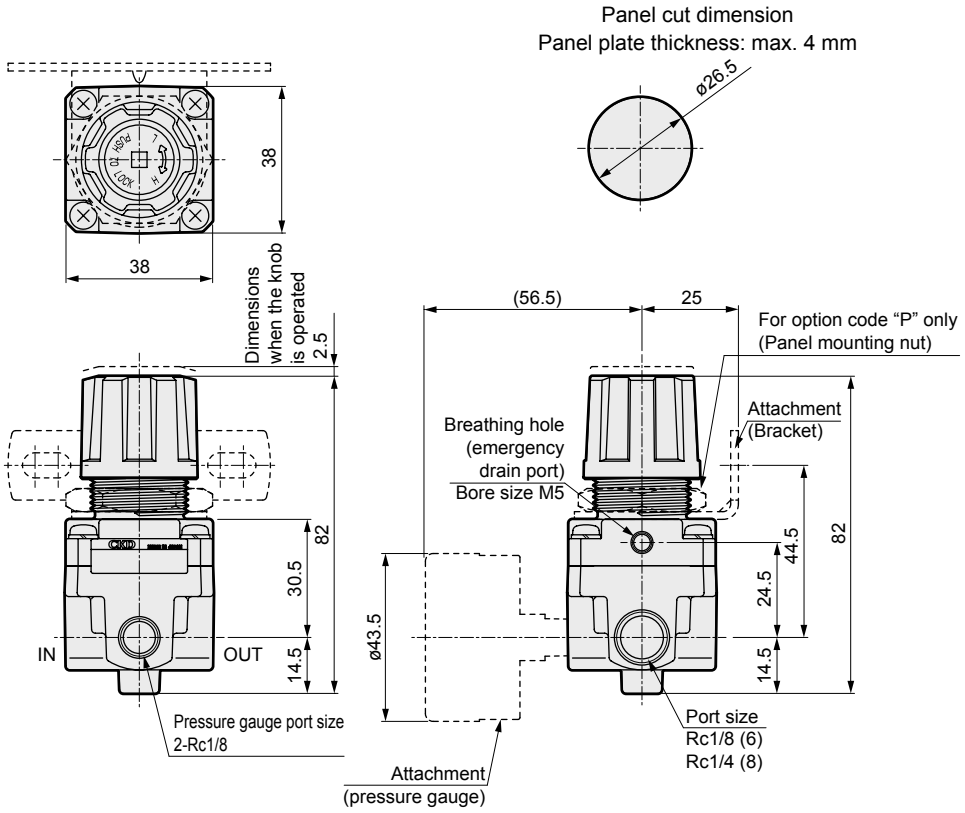
No.	Part name	Material
1	Knob	Polyacetal resin
2	Cover	PBT resin
3	Pressure adjusting screw assembly	Steel, polyacetal resin, nitrile rubber
4	Spring	Steel
5	Diaphragm assembly	Nitrile rubber, polyacetal resin
6	Valve assembly	Copper alloy, stainless steel, nitrile rubber
7	Body assembly	Copper alloy, nitrile rubber, polyacetal resin*

No.	Part name	Material
8	Mesh filter	Stainless steel
9	Bottom spring	Stainless steel
10	O-ring	Nitrile rubber
11	Plate	Stainless steel
12	Thread	Steel (nickel plating)
13	Bottom cap	Copper alloy

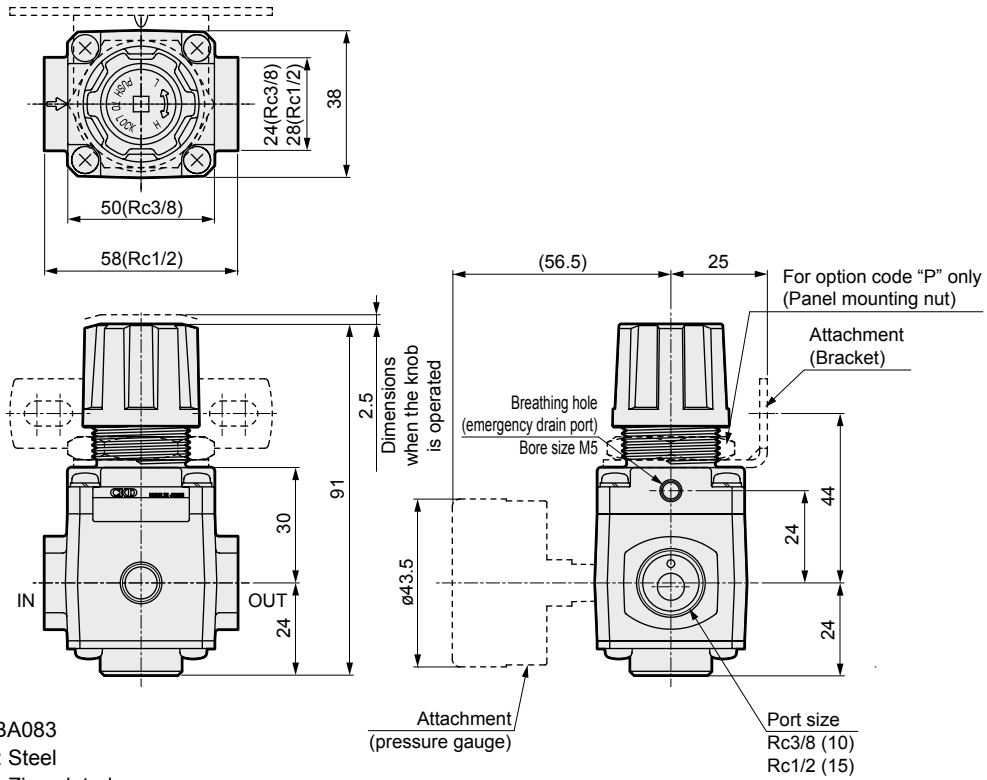
* WR1 only

Dimensions

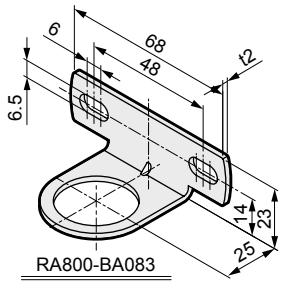
●WR1



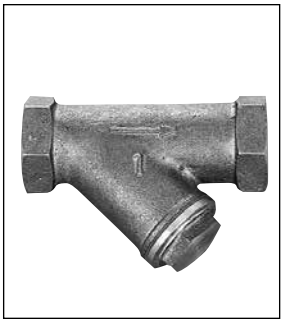
●WR2



● Bracket: RA800-BA083
· Material: Steel
Zinc plated



Y shaped strainer

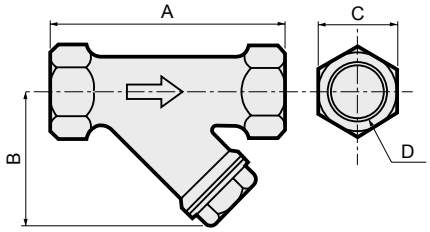


This Y shaped strainer is used to remove foreign matter in the fluid flowing in the pipe. Maintenance of the strainer is very easy.

Specifications

Item		
Working fluid		Water
Proof pressure	MPa	2 (≈290 psi, 20 bar)
Working pressure	MPa	0 (≈0 psi, 0 bar) to 1 (≈150 psi, 10 bar)
Operating ambient temperature	°C	0 (32°F) to 60 (140°F)

Dimensions



Model No.	A	B	C	D	Weight (kg)
YS-02	64	40	23	Rc1/4	0.2
YS-03	64	40	23	Rc3/8	0.2
YS-04	84	53	29	Rc1/2	0.3
YS-06	96	60	35	Rc3/4	0.4
YS-10	116	65	41	Rc1	0.7
YS-12	142	76	54	Rc1 1/4	1.3
YS-14	160	96	58	Rc1 1/2	1.8
YS-20	180	110	75	Rc2	2.8

● Main material

Body	Bronze casting
Strainer	Stainless steel

● Strainer mesh

YS-02 YS-03	120 mesh
YS-04 to YS-20	80 mesh

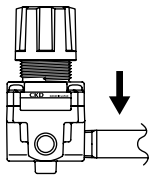
Product-specific cautions: Regulator for water WR1/WR2 Series

Design/selection

⚠WARNING

- Use the product in the range of conditions specified for the product.
- This product is designed for industrial use. Do not use for medical purposes, or in any equipment or circuit that concerns human life.
- Output pressure exceeding the regulator's set pressure could result in damage or faulty operation of the secondary side devices. Be sure to install a safety device.
- Piping load torque
  Avoid applying piping load or torque to the body or pipes.

Max. torque	Rc1/8, Rc1/4	Rc3/8, Rc1/2
N·m	15	50



⚠CAUTION

- Certain fluids (water quality) can shorten expected useful life to a significant degree. Use general pure water for industrial use. Do not use any liquid or fluid that is intended for the removal of foreign matter or water stains, or that can lead to corrosion or rubber swelling.
- Mesh filters are provided to remove initial foreign matter, such as sealant tape. If it is known that foreign matter is in the fluid, install a strainer before the regulator. Check for clogging in the mesh filters and strainers.
- Vibration may occur depending on the usage and piping conditions. Lower the primary pressure if vibrations occur.
- When the primary pressure is released, the secondary pressure may flow to the primary side. If a problem occurs in another device due to the inflow of secondary side fluid to the primary side, provide a circuit to retain the pressure.
- The setting range for the regulator's secondary pressure should be within 85% of that of the primary side. Otherwise, the pressure drop may increase.

Mounting, installation and adjustment

⚠CAUTION

- Install the product where it is not exposed to direct sunlight.
- When using this product in a cold climate, take the necessary measures to prevent freezing.
- Flush and clean the pipes.Dirt or foreign matter remaining in the piping will deteriorate product performance.
- Make sure that no foreign matter enters the pipes when connecting the pipes and fittings.When screwing in piping or fittings, check that swarf from port threads or sealant does not get inside. Dirt or foreign matter remaining in the piping will deteriorate product performance.
- Match the flow direction and the direction of the arrow on the made from for correct connection. This product does not operate when it is connected in the opposite direction.
- Secure sufficient space for maintenance and inspection.
- Do not install this product in a location where it may be subject to vibrations or shocks.
- Use appropriate torque to hold the body and tighten the pipes when connecting them. (The following table shows the recommended torque values.) The product may be damaged if excessive torque is applied.

Max. torque	M5	Rc1/8	Rc1/4	Rc3/8	Rc1/2
N·m	0.2 to 0.3	18 to 20	23 to 25	31 to 33	41 to 43

- Use a pressure gauge and pipe plug to block the pressure gauge connection port.
- It is recommended that pipes be connected to the breathing port when using this equipment. This ensures safe water discharge even if a crack occurs in the diaphragm due to excessive pressure, pressure fluctuation, or freezing.
- When the panel mounting nut is loosened, the nut acts as a jack and enables the knob to be removed easily. Be sure to install the nut before installing the knob.

Use/maintenance

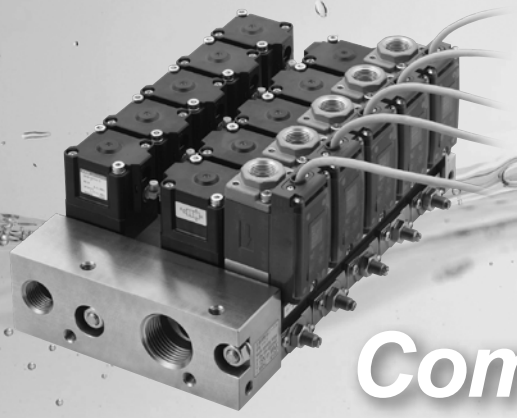
⚠CAUTION

- Do not modify this product.
- Before conducting maintenance, stop the supply of the fluid and make sure that there is no residual pressure.
- Do not store this product in a hot, humid atmosphere or atmospheric conditions outside of the specified range for a prolonged period of time. This can lead to deterioration of the resin and rubber parts.
- Release the lock before adjusting the pressure. Forcibly turning a locked pressure adjustment knob could cause damage.
- Adjust pressure in the direction of the pressure increase. The correct pressure cannot be set if pressure is adjusted downward.
- This product uses pressure reduction; as such, pressure cannot be reduced if the secondary side is not consuming.
- The facilities pressure changes from the initial setting due to the working environment and conditions, as well as aging of part materials. Check the pressure regularly, and reset if conditions have changed.

MEMO

Next-gen water control

Various water fluid control components fitted into a space-saving structure



No piping!
Footprint is

80%less

Compact

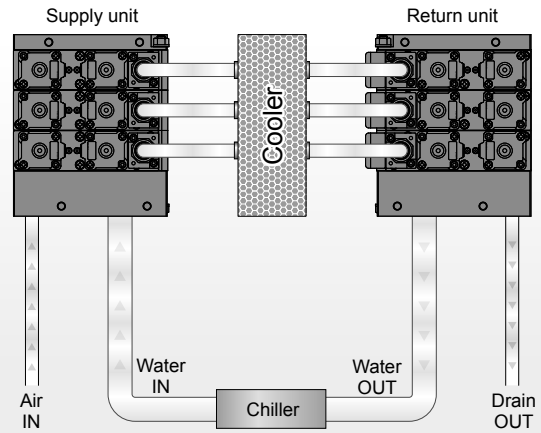
- No more individual piping work
- Preventing pipe leakage
- Minimizing design and arrangement work

WXU Series

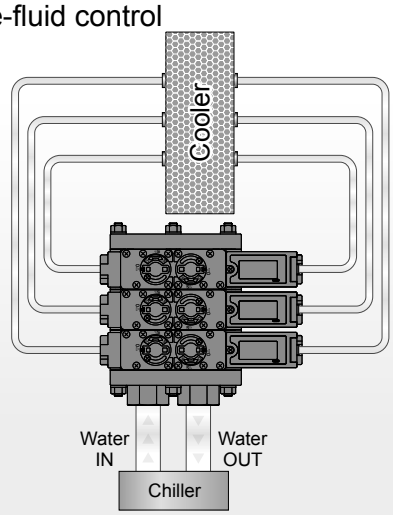
Integrated unit for water control

System image

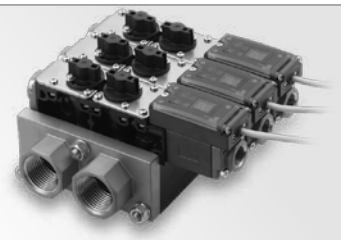
Two-fluid control



One-fluid control



WXU-H — One-fluid control

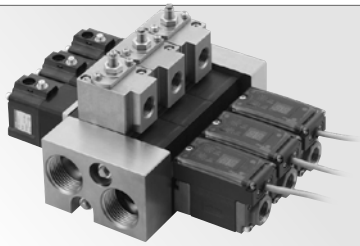


- A single unit serves as supply and return units of coolant piping.
- Valves can be mounted individually on the supply side and return side.
- By adopting a cock valve, open and close can be done with one action, and visual confirmation is easy.
- Built-in structure and light valve housing make handling easier.

WXU-HC — One-fluid control

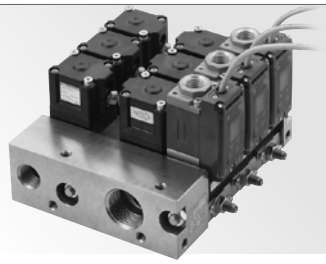
- A single-fluid cock valve that serves as both supply and return for the coolant piping in the same manner as WXU-H.
- Equipped with a capacitance electromagnetic flow sensor to reduce the risk of detection error due to water quality.

WXU-J — One-fluid control



- A single unit serves as supply and return units of coolant piping.
- Valves and needles mounted on the supply side can be controlled individually (on/off) for each system.
- Mounted needle allows easy adjustment of the flow rate.

WXU-P — Two-fluid control



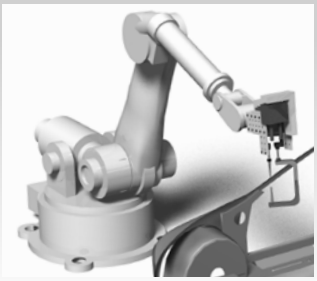
- Separate units for supply and return enable passing of two kinds of fluid (e.g., water and air).
- Suitable for a system with both coolant and air such as sputtering equipment.
- Individual control (water conduction/air purge control) by system is possible.

Applications

LCD semiconductor Vacuum deposition apparatus

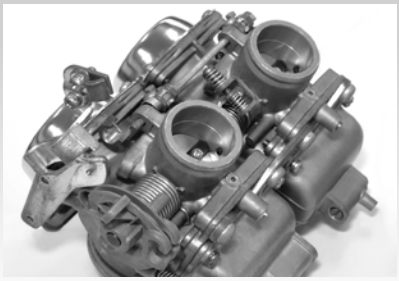
WXU-P/H

Spot welding apparatus



WXU-HC

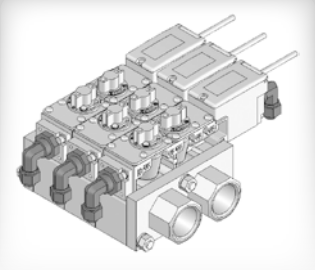
Casting



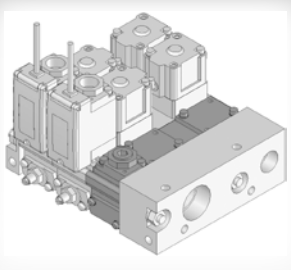
WXU-P/J/H

Customization examples

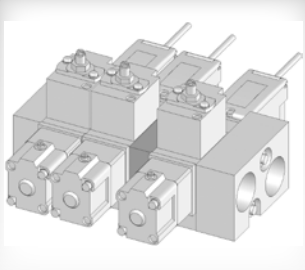
Customization is possible according to your specific needs.



With fitting

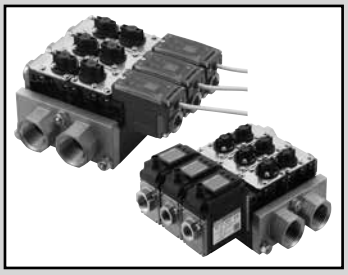


Masking



Intermediate block

- Separately installed display [sensor section]
- Analog + SW output [sensor section]
- Branched (WXU-P)
- Without cylinder valve (WXU-J)



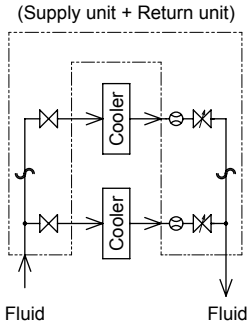
Integrated unit for water control One-fluid control

WXU-H/HC Series

- Port size: Rc3/8, Rc1/2, Rc1
- Flow rate range: 0.5 to 32 L/min

RoHS

[Application example]



A single unit serves as supply and return units of coolant piping.
Each circuit can be controlled separately.
Adjust flow rate by using the valve at return side.

Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		WXU-H/HC
Working fluid		Water/hot water
Working pressure MPa		0 (≈0 psi, 0 bar) to 0.7 (≈101 psi, 7 bar)
Proof pressure (water pressure) MPa		1.4 (≈203 psi, 14 bar)
Fluid temperature °C		WXU-H: 1 (33°F) to 70 (158°F)/WXU-HC: 1 (33°F) to 85 (185°F)
Ambient temperature °C		5 (41°F) to 50 (122°F)
Atmosphere		Place free of corrosive gas and explosive gas
Flow rate adjusting range %		0 to 100 (water) [with closing function]
Station No.		2 to 10 stations
Mounting orientation		Unrestricted
Sealant		Fluoro rubber
Port size	IN/OUT port	Rc1
	Branching ports	Rc3/8 or Rc1/2

Weight

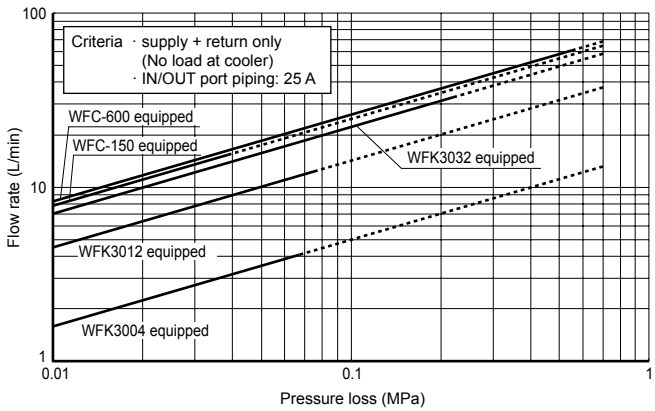
In-block (kg)		0.67
End block (kg)		0.63
One-station assembly (kg)		0.76
One-station assembly (WFC equipped) (kg)		1.00

Flow characteristics

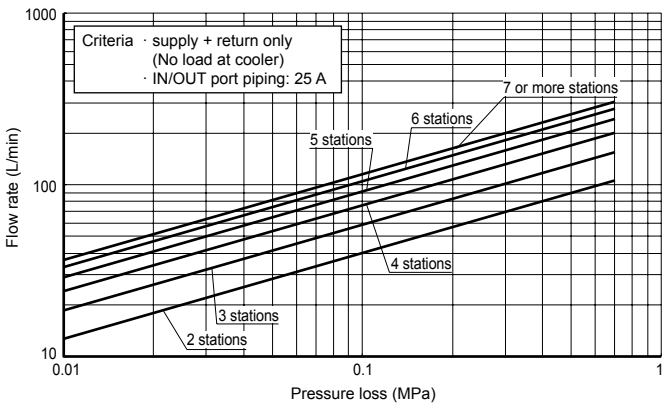
Supply/drain category	Configuration Flow rate sensor	Cv
Supply side (one station)	-	3.00
Return side (one station)	WFK3004	0.35
	WFK3012	1.05
	WFK3032	1.80
	WFC-150	2.10
	WFC-600	2.30

Note: Make sure to check the flow rate of one station (each system) and overall unit. (Page 663 "Reading the Flow Properties Table" serves as a reference.)

● One station



● Overall unit



When the configuration of all one-station assembly machines is identical, the entire unit can be displayed in the model number by selecting the codes.
When assembling a unit from different configurations of one-station assembly machines, specify the configuration in "Manifold specifications" (page 659).

How to order

● Karman vortex flow rate sensor

WXU-H - 6 - L - 15 - 12 - A0N0

Ⓐ Station No.

Code	Description
Ⓐ Station No.	
2	2 stations
to	to
10	10 stations

Ⓑ In-block position

Code	Description
Ⓑ In-block position	
L	Left
R	Right
W	Both sides

Ⓒ Port size (branching port)

Code	Description
Ⓒ Port size (branching port)	
10	Rc3/8
15	Rc1/2

Ⓓ Flow rate range for flow sensor

Code	Description
Ⓓ Flow rate range for flow sensor	
04	0.5 to 4.0 L/min
12	1.5 to 12 L/min
32	4.0 to 32 L/min

Ⓔ Flow rate sensor output (1)

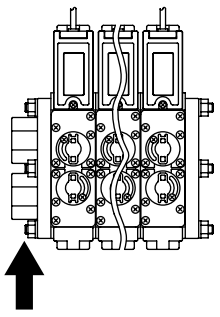
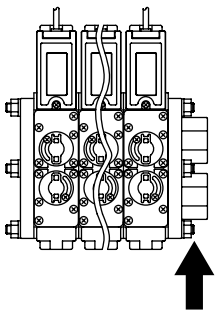
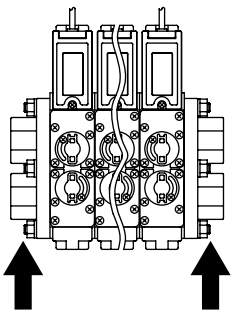
Ⓕ Flow rate sensor output (2)

Ⓔ Flow rate sensor output (1)		Ⓕ Flow rate sensor output (2)				
		Blank	**N0**	**N1**	**P0**	**P1**
		Not required	Transistor output 1 point			
			NPN a contact	NPN b contact	PNP a contact	PNP b contact
A0	0 to 5 VDC	●	●	●	●	●
A1	4 to 20 mADC	●	●	●	●	●
A2	1 to 5 VDC	●	●	●	●	●
A3	0 to 10 VDC	●	●	●	●	●
N0	NPN transistor output, 2 points (a contact)	●				
N1	NPN transistor output, 2 points (b contact)	●				
P0	PNP transistor output, 2 points (a contact)	●				
P1	PNP transistor output, 2 points (b contact)	●				

[Example of model No.]
WXU-H-6-L-15-12-A0N0

Model name: Integrated unit for water control
One-fluid control
Ⓐ Station No. : 6 stations
Ⓑ In-block position : Left
Ⓒ Port size : Rc1/2
Ⓓ Flow rate range for flow sensor : 1.5 to 12 L/min
Ⓔ Flow rate sensor output (1) : 0 to 5 VDC
Ⓕ Flow rate sensor output (2) : NPN transistor output, 1 points (a contact)

Ⓑ In-block position

Code	L	R	W
Description	Left	Right	Both sides
Layout			

When the configuration of all one-station assembly machines is identical, the entire unit can be displayed in the model number by selecting the codes.
When assembling a unit from different configurations of one-station assembly machines, specify the configuration in "Manifold specifications" (page 660).

How to order

● Electromagnetic flow sensor

WXU-HC - 6 - L - 10 - 150 - N V - C3

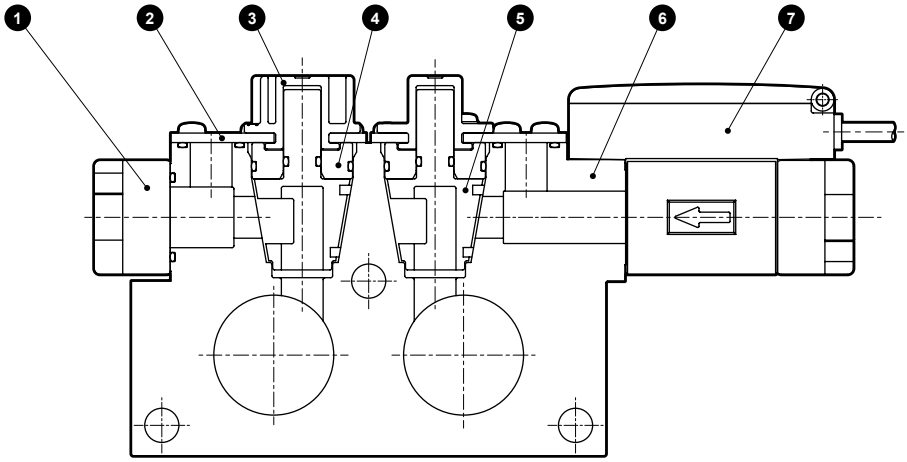
Ⓐ Station No.
Ⓑ In-block position
Ⓒ Port size (branching port)
Ⓓ Flow rate range for flow sensor
Ⓔ Switch output
Ⓕ Analog output
Ⓖ Cable

Code	Description		
Ⓐ Station No.			
2	2 stations		
to	to		
10	10 stations		
Ⓑ In-block position			
L	Left		
R	Right		
W	Both sides		
Ⓒ Port size (branching port)			
Flow rate range for flow sensor		150	600
10	Rc3/8	●	
15	Rc1/2		●
Ⓓ Flow rate range for flow sensor			
150	0.5 to 15 L/min		
600	2.0 to 60 L/min		
Ⓔ Switch output			
N	NPN transistor output		
P	PNP transistor output		
Ⓕ Analog output			
V	1 to 5 VDC		
A	4 to 20 mADC		
Ⓖ Cable			
Blank	None		
C3	Cable (M12/4-conductor/3 m included)		
L3	L type cable (M12/4-conductor/3 m included)		

[Example of model No.]
WXU-HC-6-L-10-150-NV-C3
Model name: Integrated unit for water control One-fluid control
Ⓐ Station No. : 6 stations
Ⓑ In-block position : Left
Ⓒ Port size : Rc3/8
Ⓓ Flow rate range : 0.5 to 15 L/min
Ⓔ Switch output : NPN transistor output
Ⓕ Analog output : 1 to 5 VDC
Ⓖ Cable : Included

Internal structure diagram and parts list

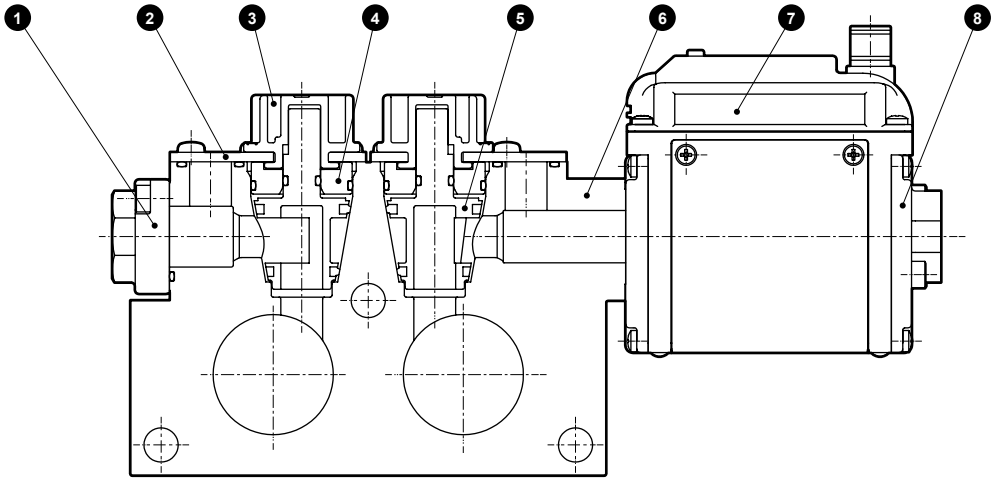
● Karman vortex flow rate sensor



[Valve is fully opened at shipment.]

No.	Part name	Material	
1	Attachment	SCS13	Stainless steel casting
2	Plate	SUS304	Stainless steel
3	Knob	PBT	Polybutylene terephthalate
4	Spacer	PPS	Polyphenylene sulfide
5	Cock	PPS FKM	Polyphenylene sulfide Fluoro rubber
6	Base	PPS	Polyphenylene sulfide
7	Flow rate sensor [WFK3000 Series]		

● Electromagnetic flow sensor

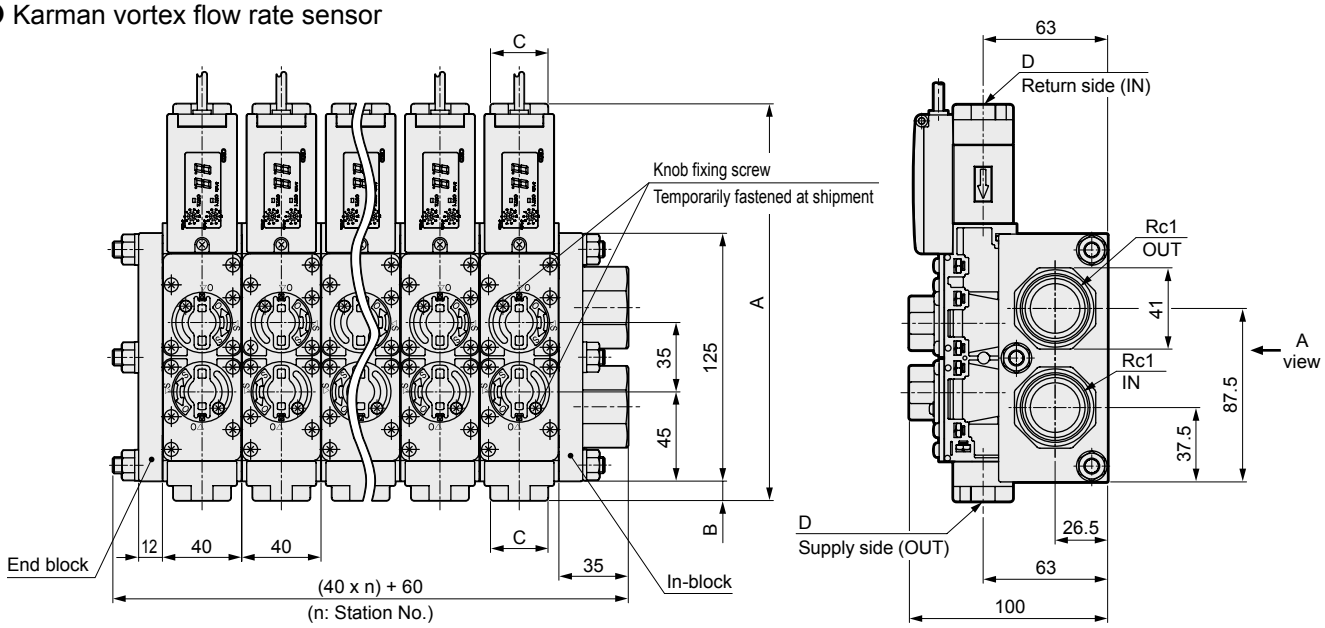


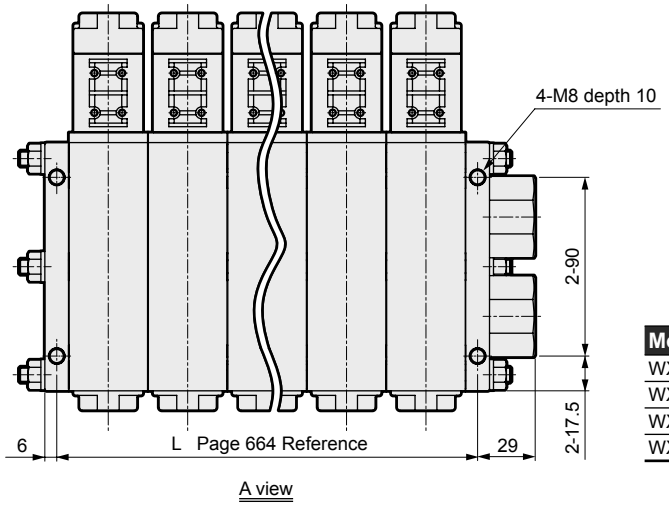
[Valve is fully opened at shipment.]

No.	Part name	Material	
1	Attachment	SCS13	Stainless steel casting
2	Plate	SUS304	Stainless steel
3	Knob	PBT	Polybutylene terephthalate
4	Spacer	PPS	Polyphenylene sulfide
5	Cock	PPS FFM	Polyphenylene sulfide Fluoro rubber
6	Base	PPS	Polyphenylene sulfide
7	Flow rate sensor [WFC Series]		
8	Socket	CAC804 or C6931	Copper alloy

Dimensions

● Karman vortex flow rate sensor

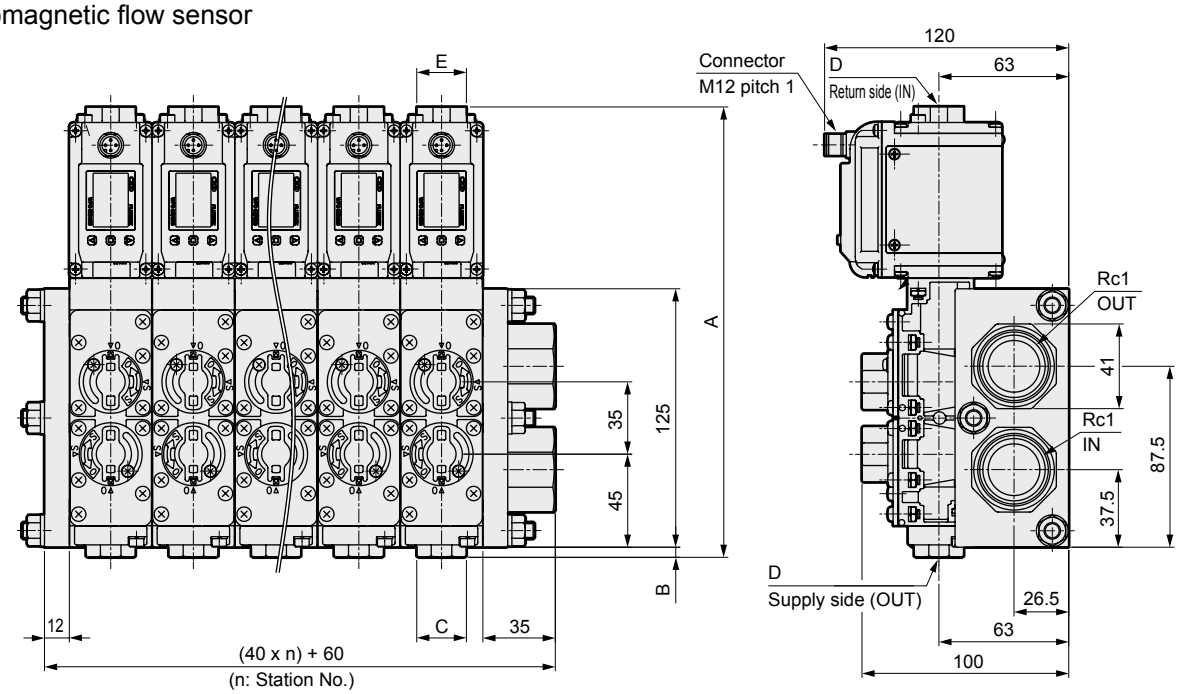


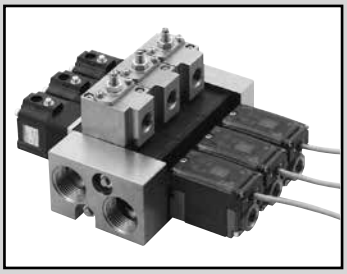


A view

Model No.	A	B	C	D	E
WXU-H-***-10-**	190	5	24	Rc3/8	-
WXU-H-***-15-**	200	10	29	Rc1/2	-
WXU-HC-***-10-150-***	218	5	24	Rc3/8	24
WXU-HC-***-15-600-***	228	10	29	Rc1/2	28

● Electromagnetic flow sensor





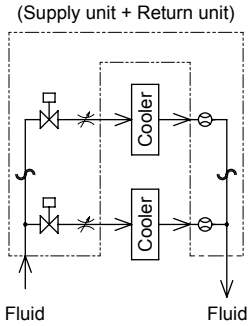
Integrated unit for water control One-fluid control

WXU-J Series

- Port size: Rc3/8, Rc1/2, Rc3/4, Rc1
- Flow rate range: 0.5 to 32 L/min

RoHS

[Application example]



A single unit serves as supply and return units of coolant piping.
A single unit serves as supply.
Each circuit can be controlled separately.

Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		WXU-J
Working fluid		Water/hot water
Working pressure MPa		0 (≈0 psi, 0 bar) to 0.4 (≈58 psi, 4 bar) (*)
Proof pressure (water pressure) MPa		1.0 (≈145 psi, 10 bar)
Fluid temperature °C		1 (33°F) to 70 (158°F)
Ambient temperature °C		5 (41°F) to 50 (122°F)
Atmosphere		Place free of corrosive gas and explosive gas
Flow rate adjusting range %		0 to 100 (water) [with closing function]
Station No.		2 to 10 stations
Mounting orientation		Unrestricted
Sealant		Fluoro rubber
Port size	IN/OUT port	Rc3/4 or Rc1
	Branching ports	Rc3/8 or Rc1/2

Note: Contact CKD about use at pressures higher than working pressure.

Weight

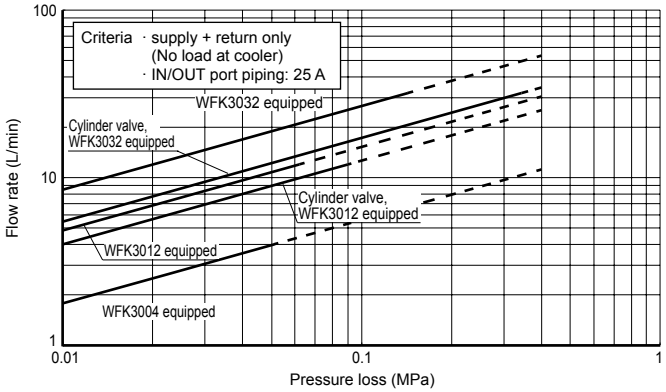
		Port size	-
In-block (kg)		20A	1.30
		25A	1.20
End block (kg)			1.05
One-station assembly (kg)		Supply side Cylinder valve	-
		Large flow rate specifications	1.29
		None	1.05

Flow characteristics

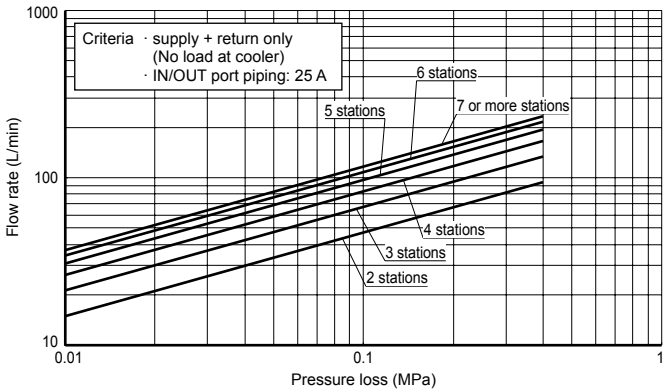
Supply/drain category	Configuration		Cv
	Cylinder valve	Flow rate sensor	
Supply side (one station)	Large flow rate specifications	-	1.34
	None	-	2.51
Return side (one station)	-	WFK3004	0.41
		WFK3012	1.18
		WFK3032	2.82

Note: Make sure to check the flow rate of one station (each system) and overall unit.
(Page 663 "Reading the Flow Properties Table" serves as a reference.)

● One station



● Overall unit



When the configuration of all one-station assembly machines is identical, the entire unit can be displayed in the model number by selecting the codes.
When assembling a unit from different configurations of one-station assembly machines, specify the configuration in "Manifold specifications" (page 661).

How to order

WXU-J - 6 - L - 25 - B1 - 15 - 12 - A0N0

- A Station No.
- B In-block position
- C Port size (IN/OUT port)
- D Valve actuation
- E Port size (branching port)
- F Flow rate range for flow sensor
- G Flow rate sensor output (1)
- H Flow rate sensor output (2)

Code	Description
A Station No.	
2	2 stations
to	to
10	10 stations
B In-block position	
L	Left
R	Right
W	Both sides
C Port size (IN/OUT port)	
20	Rc3/4
25	Rc1
D Valve actuation	
B1	NC (normally closed) (large flow rate specifications)
B2	NO (normally open) (large flow rate specifications)
00	None
E Port size (branching port)	
10	Rc3/8
15	Rc1/2
F Flow rate range for flow sensor	
04	0.5 to 4.0 L/min
12	1.5 to 12 L/min
32	4.0 to 32 L/min

G Flow rate sensor output (1)		H Flow rate sensor output (2)				
		Blank	**N0**	**N1**	**P0**	**P1**
		Not required	Transistor output 1 point			
			NPN a contact	NPN b contact	PNP a contact	PNP b contact
A0	0 to 5 VDC	●	●	●	●	●
A1	4 to 20 mADC	●	●	●	●	●
A2	1 to 5 VDC	●	●	●	●	●
A3	0 to 10 VDC	●	●	●	●	●
N0	NPN transistor output, 2 points (a contact)	●				
N1	NPN transistor output, 2 points (b contact)	●				
P0	PNP transistor output, 2 points (a contact)	●				
P1	PNP transistor output, 2 points (b contact)	●				

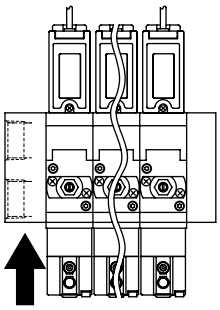
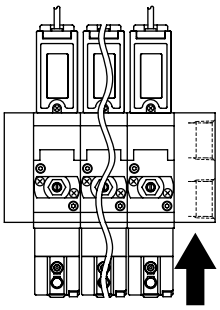
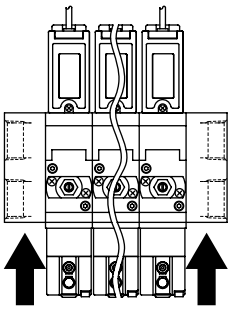
[Example of model No.]

WXU-J-6-L-25-B1-15-12-A0N0

Model name: Integrated unit for water control One-fluid control

- A Station No. : 6 stations
- B In-block position : Left
- C Port size : Rc1
- D Valve actuation : NC (normally closed) (large flow rate specifications)
- E Port size : Rc1/2
- F Flow rate range for flow sensor : 1.5 to 12 L/min
- G Flow rate sensor output (1) : 0 to 5 VDC
- H Flow rate sensor output (2) : NPN transistor output, 1 point (a contact)

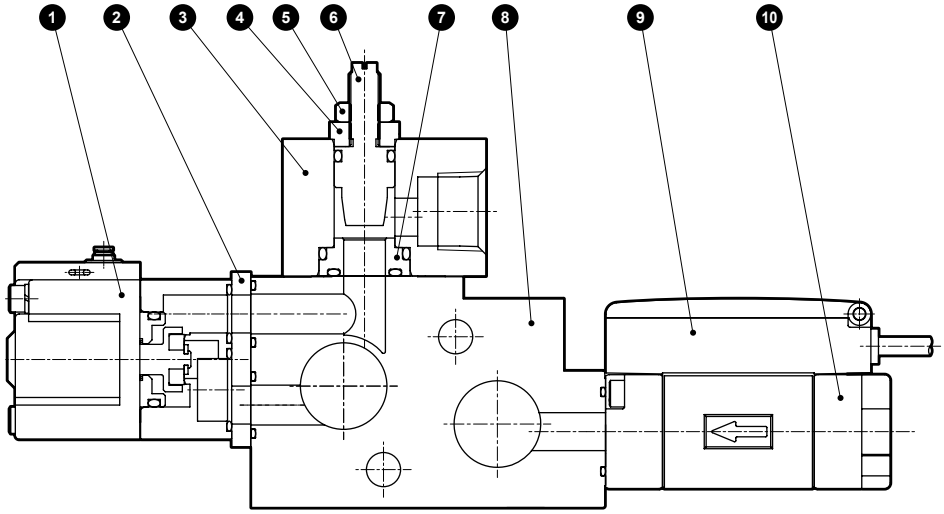
Ⓑ In-block position

Code	L	R	W
Description	Left	Right	Both sides
Layout			

Internal structure diagram and parts list

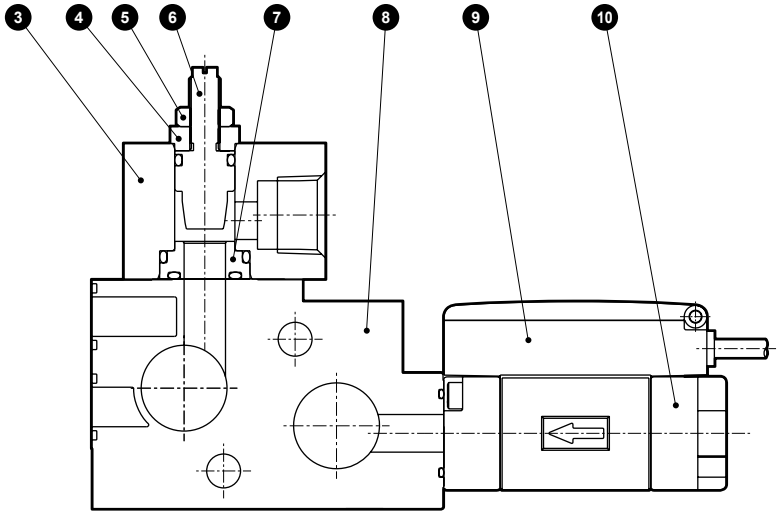
● One-station assembly

· With valve



(Needle is fully opened at shipment.)

· Without valve

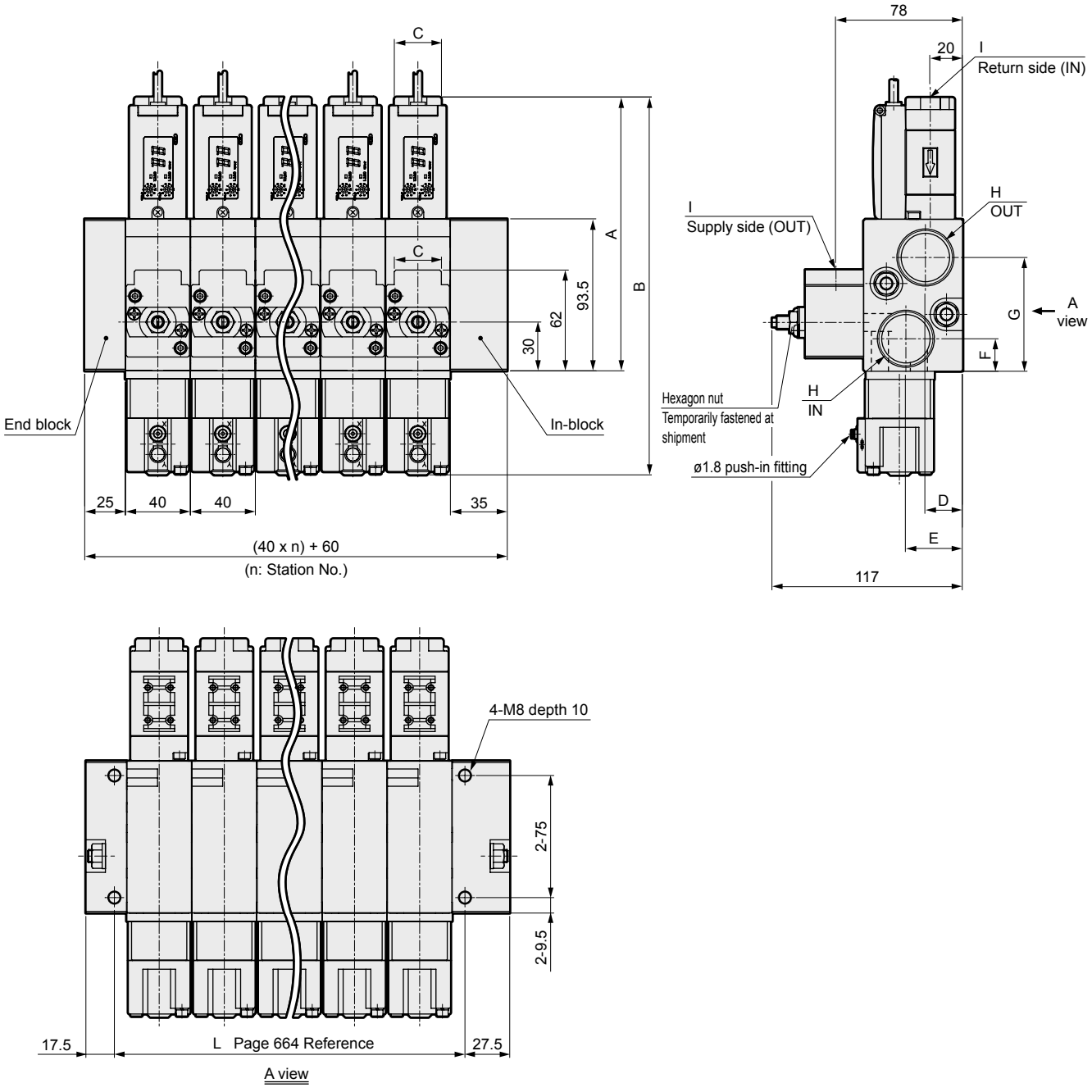


(Needle is fully opened at shipment.)

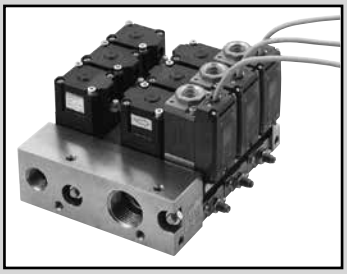
No.	Part name	Material	
1	Cylinder valve [GNAB Series]		
2	Plate	SUS304	Stainless steel
3	Needle block	SUS304	Stainless steel
4	Needle stopper	SUS304	Stainless steel
5	Hexagon nut	SWCH	Carbon steel for cold rolling

No.	Part name	Material	
6	Needle	SUS304	Stainless steel
7	Valve body	PP	Polypropylene
8	Base	PPS	Polyphenylene sulfide
9	Flow rate sensor [WFK3000 Series]		
10	Attachment	SCS13	Stainless steel casting

Dimensions



Model No.	A	B	C	D	E	F	G	H	I
WXU-J-***-20-***-10	164	228	24	22	33	24	65	Rc3/4	Rc3/8
WXU-J-***-25-***-10	164	228	24	23	35	20	70	Rc1	Rc3/8
WXU-J-***-20-***-15	169	233	29	22	33	24	65	Rc3/4	Rc1/2
WXU-J-***-25-***-15	169	233	29	23	35	20	70	Rc1	Rc1/2



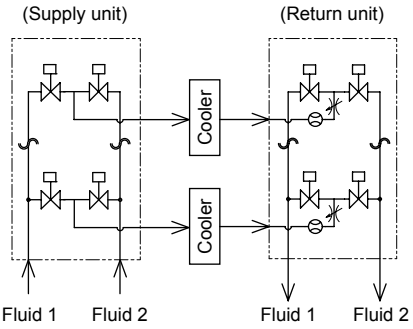
Integrated unit for water control Two-fluid control

WXU-P Series

- Port size: Rc3/8, Rc1/2, Rc1
- Flow rate range: 0.5 to 32 L/min

RoHS

[Application example]



It enables flow of two kinds of fluid (e.g., water and air).
Suitable for systems with both coolant and air purge.
Each circuit can be controlled separately.
(2 units are used)

Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		WXU-P
Working fluid		Water, hot water, air
Working pressure MPa		0 (≈0 psi, 0 bar) to 0.4 (≈58 psi, 4 bar) (*)
Proof pressure (water pressure) MPa		1.0 (≈145 psi, 10 bar)
Fluid temperature °C		1 (33°F) to 70 (158°F)
Ambient temperature °C		5 (41°F) to 50 (122°F)
Atmosphere		Place free of corrosive gas and explosive gas
Flow rate adjusting range %		15 to 100 (water)
Station No.		2 to 6 stations
Mounting orientation		Unrestricted
Sealant		Fluoro rubber
Port size	Port for fluid 1	Rc1
	Port for fluid 2	Rc1/2
	Branching ports	Rc3/8 or Rc1/2

Note: Contact CKD about use at pressures higher than working pressure.

Weight

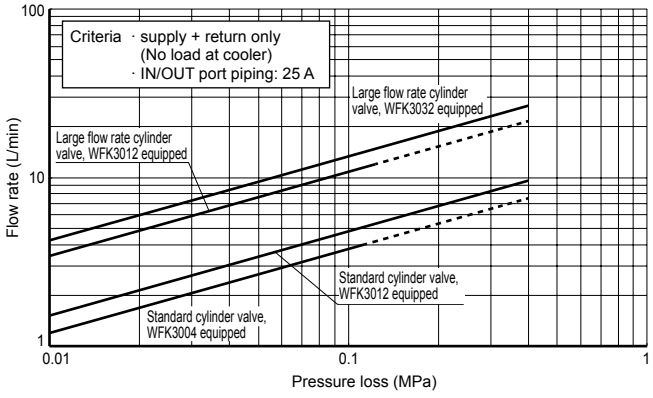
In-block (kg)				2.60
End block (kg)				0.70
One-station assembly (kg)	Supply/drain category	For fluid 1 Cylinder valve	For fluid 2 Cylinder valve	-
	Supply side	Standard specifications	Standard specifications	0.87
		Large flow rate specifications	Standard specifications	0.90
	Return side	Standard specifications	Standard specifications	1.14
		Large flow rate specifications	Standard specifications	1.17

Flow characteristics

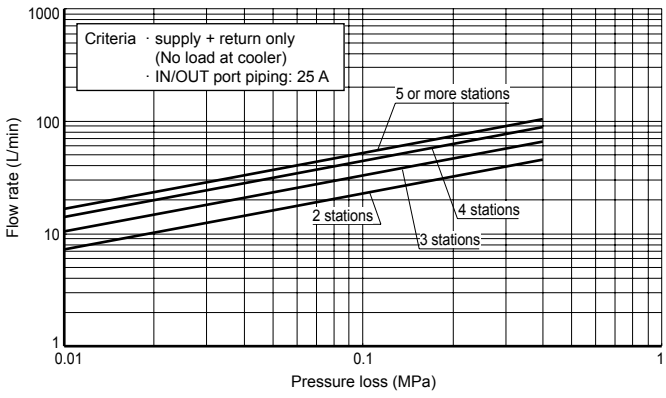
Supply/drain category	Configuration		Fluid 1 side Cv	Fluid 2 side	
	Cylinder valve	Flow rate sensor		C [dm³/(s·bar)]	b
Supply side (one station)	Standard specifications	-	0.44	1.4	0.2
	Large flow rate specifications	-	1.28	3.0	0.1
Return side (one station)	Standard specifications	WFK3004	0.33	1.4	0.2
		WFK3012	0.52		
	Large flow rate specifications	WFK3012	0.94	3.0	0.1
		WFK3032	1.37		

Note: Make sure to check the flow rate of one station (each system) and overall unit. (Page 663 "Reading the Flow Properties Table" serves as a reference.)

● One station



● Overall unit



When the configuration of all one-station assembly machines is identical, the entire unit can be displayed in the model number by selecting the codes.
When assembling a unit from different configurations of one-station assembly machines, specify the configuration in "Manifold specifications" (page 662).

How to order

WXU-P - R - 6 - L - S 1 1 - N - 15 - 12 - A0N0

- R: Ⓐ Supply/drain category
- 6: Ⓑ Station No.
- L: Ⓒ In-block position
- S: Ⓓ Valve size for fluid 1
- 1: Ⓔ Valve actuation for fluid 1
- 1: Ⓕ Valve actuation for fluid 2
- N: Ⓖ Flow rate adjustment function
- 15: Ⓗ Port size (branching port)
- 12: Ⓘ Flow rate range for flow sensor
- A0N0: Ⓙ Flow rate sensor output (1), Ⓚ Flow rate sensor output (2)

[Example of model No.]

WXU-P-R-6-L-S11-N-15-12-A0N0

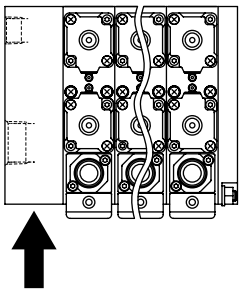
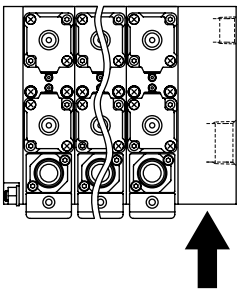
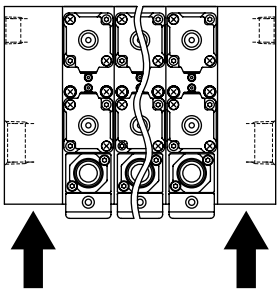
Model name: Integrated unit for water control Two-fluid control

- Ⓐ Supply/drain category : Return side
- Ⓑ Station No. : 6 stations
- Ⓒ In-block position : Left
- Ⓓ Valve size for fluid 1 : Standard specifications
- Ⓔ Valve actuation for fluid 1 : NC (normally closed)
- Ⓕ Valve actuation for fluid 2 : NC (normally closed)
- Ⓖ Flow rate adjustment function : With flow rate adjustment function
- Ⓗ Port size : Rc1/2
- Ⓘ Flow rate range for flow sensor : 1.5 to 12 L/min
- Ⓙ Flow rate sensor output (1) : 0 to 5 VDC
- Ⓚ Flow rate sensor output (2) : NPN transistor output, 1 point (a contact)

Ⓙ Flow rate sensor output (1)		Ⓚ Flow rate sensor output (2)				
		Blank	N0	N1	P0	P1
		Not required	Transistor output 1 point			
			NPN a contact	NPN b contact	PNP a contact	PNP b contact
A0	0 to 5 VDC	●	●	●	●	●
A1	4 to 20 mADC	●	●	●	●	●
A2	1 to 5 VDC	●	●	●	●	●
A3	0 to 10 VDC	●	●	●	●	●
N0	NPN transistor output 2 points (a contact)	●				
N1	NPN transistor output 2 points (b contact)	●				
P0	PNP transistor output 2 points (a contact)	●				
P1	PNP transistor output 2 points (b contact)	●				
000	Without flow rate sensor (ⒶSupply/drain category "S")	●				

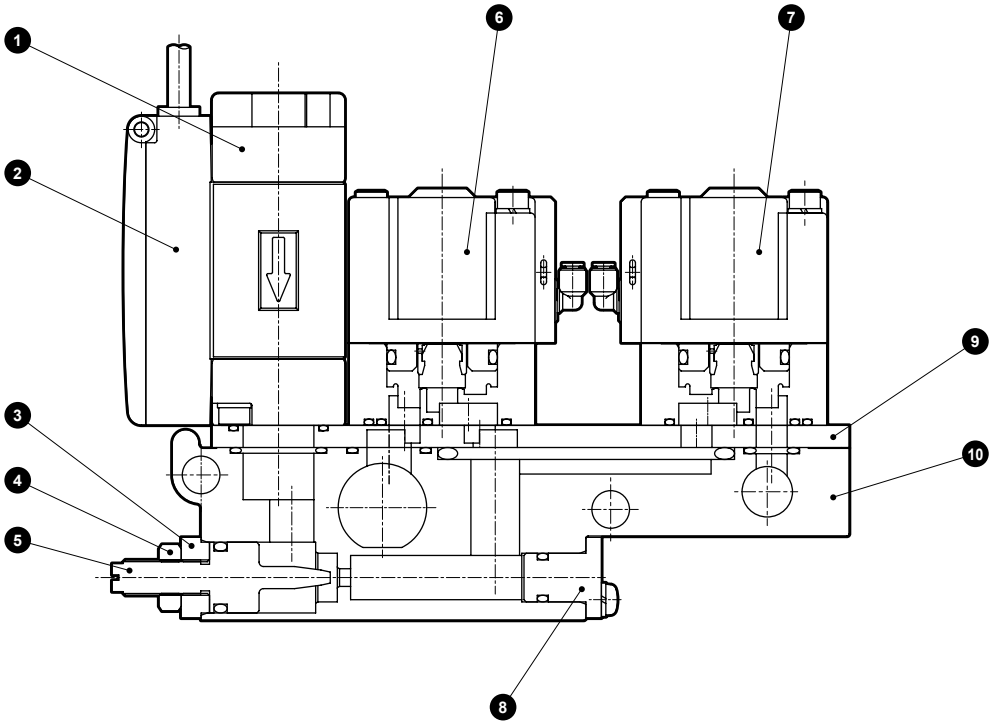
Code	Description
Ⓐ Supply/drain category	
S	Supply side
R	Return side
Ⓑ Station No.	
2	2 stations
to	to
6	6 stations
Ⓒ In-block position	
L	Left
R	Right
W	Both sides
Ⓓ Valve size for fluid 1	
S	Standard specifications
B	Large flow rate specifications
Ⓔ Valve actuation for fluid 1	
1	NC (normally closed)
2	NO (normally open)
Ⓕ Valve actuation for fluid 2	
1	NC (normally closed)
2	NO (normally open)
Ⓖ Flow rate adjustment function	
N	With flow rate adjustment function
0	None
Ⓗ Port size (branching port)	
10	Rc3/8
15	Rc1/2
Ⓘ Flow rate range for flow sensor	
04	0.5 to 4.0 L/min
12	1.5 to 12 L/min
32	4.0 to 32 L/min
00	Without flow sensor (ⒶSupply/drain category "S")

C In-block position

Code	L	R	W
Description	Left	Right	Both sides
Layout			

Internal structure diagram and parts list

● One-station assembly

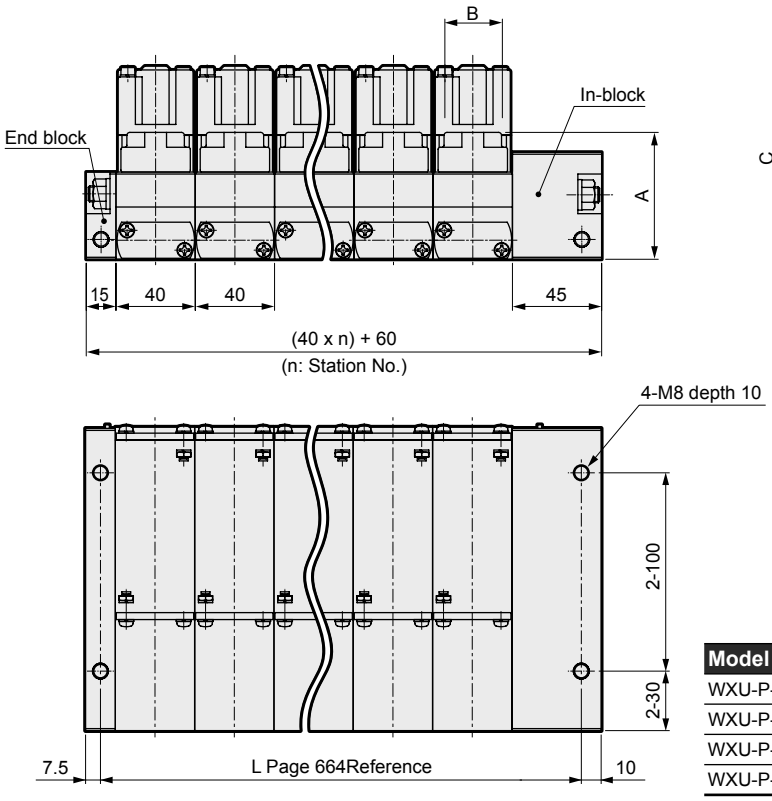


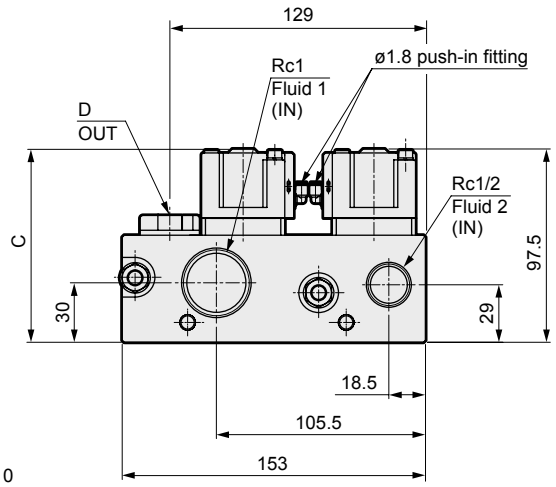
(Needle is fully opened at shipment.)

No.	Part name	Material	
1	Attachment	SCS13	Stainless steel casting
2	Flow rate sensor [WFK3000 Series]		
3	Needle stopper	SUS304	Stainless steel
4	Hexagon nut	SWCH	Carbon steel for cold rolling
5	Needle	SUS304	Stainless steel
6	Cylinder valve for fluid 1 [GNAB Series]		
7	Cylinder valve for fluid 2 [GNAB Series]		
8	Plug	SUS304	Stainless steel
9	Plate	SUS304	Stainless steel
10	Base	PPS	Polyphenylene sulfide

Dimensions

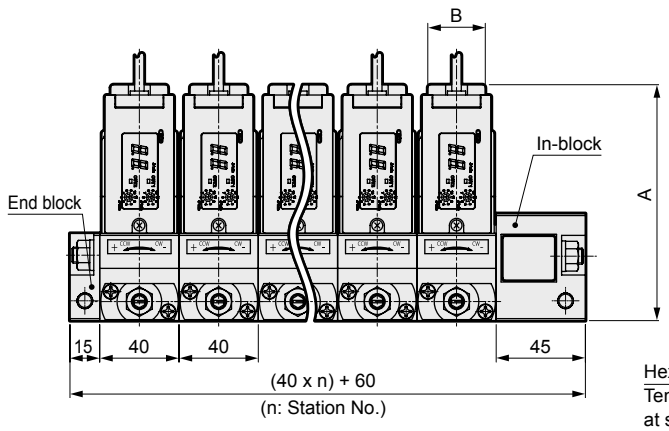
● WXU-P-S

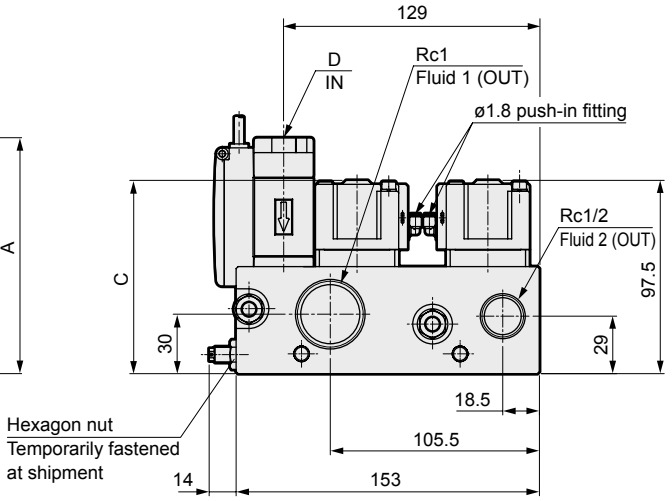


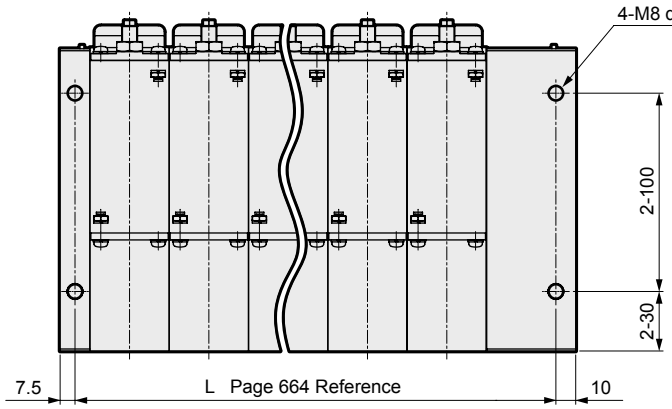


Model No.	A	B	C	D
WXU-P-S-***-S-***-10	59	24	97.5	Rc3/8
WXU-P-S-***-B-***-10	59	24	103	Rc3/8
WXU-P-S-***-S-***-15	64	29	97.5	Rc1/2
WXU-P-S-***-B-***-15	64	29	103	Rc1/2

● WXU-P-R







Model No.	A	B	C	D
WXU-P-R-***-S-***-10	114	24	97.5	Rc3/8
WXU-P-R-***-B-***-10	114	24	103	Rc3/8
WXU-P-R-***-S-***-15	119	29	97.5	Rc1/2
WXU-P-R-***-B-***-15	119	29	103	Rc1/2

Specifications of mounted devices

■ Specifications of valve part

Item	GNAB-X□	
	Standard specifications	Large flow rate specifications
Valve seat leakage cm³/min	0.12 or less (pneumatic pressure)	
Orifice size mm	7	10
Cv	1.0	1.6
C[dm³/(s·bar)]	3.8 (*1)	-
b	0.3	-
Pilot pressure MPa	NC (normally closed): 0.25 to 0.7 NO (normally open): (*2)	
Pilot connection	ø1.8 push-in fitting for fiber tube (* Contact CKD separately for other connections.)	

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*2: Refer to page 667 for pilot air pressure for NO flow characteristics.

■ Specifications of WFK30**S flow sensor part (sensor)

· Flow rate sensor output (1): -A0, -A1, -A2, -A3
· Flow rate sensor output (2): Blank

Item	04 (WFK3004S)	12 (WFK3012S)	32 (WFK3032S)
Flow rate range L/min	0.5 to 4.0	1.5 to 12	4.0 to 32
Accuracy	±2.5% F.S.		
Analog output	-A0: 0 to 5 VDC, -A1: 4 to 20 mADC, -A2: 1 to 5 VDC, -A3: 0 to 10 VDC		
Service voltage	12 to 24 VDC ±10% (MAX 80 mA) -A3 is 15 to 24 VDC		

■ Specifications of WFK30**C flow sensor part (sensor/switch)

· Flow rate sensor output (1): -A0, -A1, -A2, -A3
· Flow rate sensor output (2): N0, N1, P0, P1

Item		04 (WFK3004C)	12 (WFK3012C)	32 (WFK3032C)
Flow rate range L/min		0.5 to 4.0	1.5 to 12	4.0 to 32
Accuracy		±2.5% F.S. ±1 digit		
Output	Display	Instantaneous flow rate 2-digit LED display		
	Analog output	-A0: 0 to 5 VDC, -A1: 4 to 20 mADC, -A2: 1 to 5 VDC, -A3: 0 to 10 VDC		
	Switch output	1-point transistor output (select NPN/PNP) Max. 50 mADC Internal voltage drop: (NPN) 2.0 V or less, (PNP) 2.5 V or less		
Service voltage		12 to 24 VDC ±10% (MAX 80 mA)		

■ Specifications of WFK30**M flow sensor part (switch)

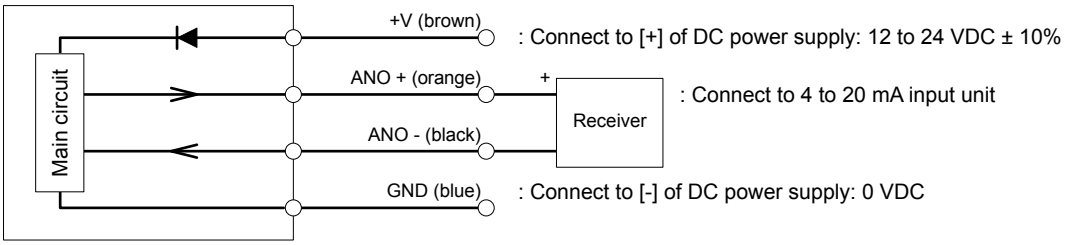
· Flow rate sensor output (1): -N0, -N1, -P0, -P1
· Flow rate sensor output (2): Blank

Item		04 (WFK3004M)	12 (WFK3012M)	32 (WFK3032M)
Flow rate range L/min		0.5 to 4.0	1.5 to 12	4.0 to 32
Accuracy		±2.5% F.S. ±1 digit		
Output	Display	Instantaneous flow rate 2-digit LED display		
	Switch output	2-point transistor output (select NPN/PNP) Max. 50 mADC Internal voltage drop: (NPN) 2.0 V or less, (PNP) 2.5 V or less		
Service voltage		12 to 24 VDC ±10% (MAX 80 mA)		

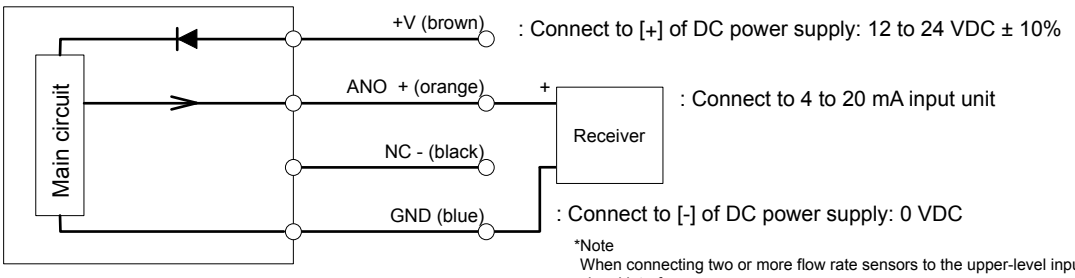
Flow rate sensor wiring method

· Always read the safety precautions before wiring.
· 4-conductor cabtyre cable 0.2 mm² is used.

■ WFK30**S
● Flow rate sensor output (1): -A1 ● Flow rate sensor output (2): Blank



or

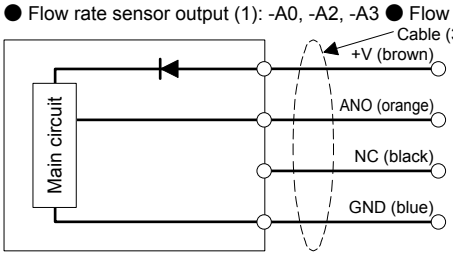


*Note
When connecting two or more flow rate sensors to the upper-level input circuit (receiver), carefully prevent signal interference.
(Refer to page 668 "2. Analog output A1 (4 to 20 mA) connection")

Specifications of mounted devices

■ WFK30**S

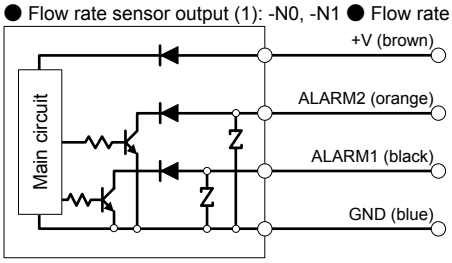
● Flow rate sensor output (1): -A0, -A2, -A3 ● Flow rate sensor output (2): Blank



+V (brown)	: Connect to [+] of DC power supply	: 12 to 24 VDC ± 10% (Option A3: 15 to 24 VDC ±10%)
ANO (orange)	: Analog output	: Voltage in proportion to flow rate is output
NC (black)	: Spare conductor	: Connect nothing
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

■ WFK30**M

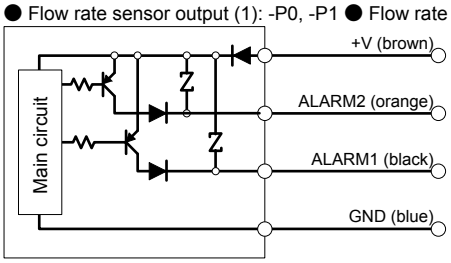
● Flow rate sensor output (1): -N0, -N1 ● Flow rate sensor output (2): Blank



+V (brown)	: Connect to [+] of DC power supply	: 12 to 24 VDC ± 10%
ALARM2 (orange)	: Switch 2 (OUT2) output	: Max. 30 VDC/50 mA
ALARM1 (black)	: Switch 1 (OUT1) output	: Max. 30 VDC/50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

■ WFK30**M

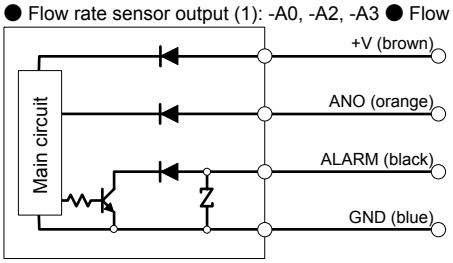
● Flow rate sensor output (1): -P0, -P1 ● Flow rate sensor output (2): Blank



+V (brown)	: Connect to [+] of DC power supply	: 12 to 24 VDC ± 10%
ALARM2 (orange)	: Switch 2 (OUT2) output	: Max. 50 mA
ALARM1 (black)	: Switch 1 (OUT1) output	: Max. 50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

■ WFK30**C

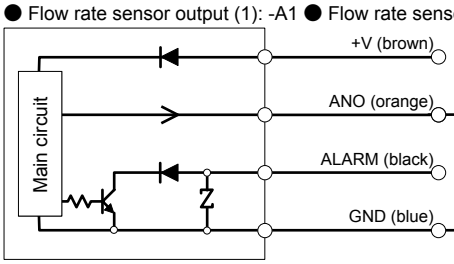
● Flow rate sensor output (1): -A0, -A2, -A3 ● Flow rate sensor output (2): N0, N1



+V (brown)	: Connect to [+] of DC power supply	: 12 to 24 VDC ± 10% (Option A3 is 15 to 24 VDC ±10%)
ANO (orange)	: Analog output	: Voltage in proportion to flow rate is output
ALARM (black)	: Switch (OUT) output	: Max. 30 VDC/50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

■ WFK30**C

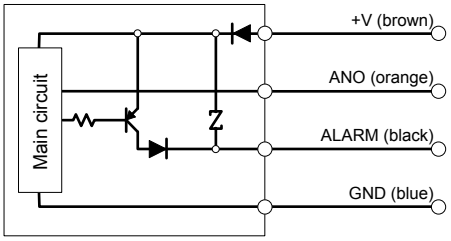
● Flow rate sensor output (1): -A1 ● Flow rate sensor output (2): N0, N1



+V (brown)	: Connect to [+] of DC power supply	: 12 to 24 VDC ± 10%
ANO (orange)	: Connect to 4 to 20 mA input unit	
ALARM (black)	: Switch (OUT) output	: Max. 30 VDC/50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

■ WFK30**C

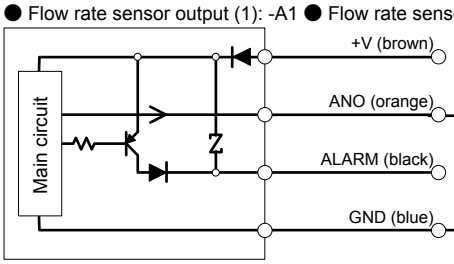
● Flow rate sensor output (1): -A0, -A2, -A3 ● Flow rate sensor output (2): P0, P1



+V (brown)	: Connect to [+] of DC power supply	: 12 to 24 VDC ± 10% (Option A3 is 15 to 24 VDC ±10%)
ANO (orange)	: Analog output	: Voltage in proportion to flow rate is output
ALARM (black)	: Switch (OUT) output	: Max. 30 VDC/50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

■ WFK30**C

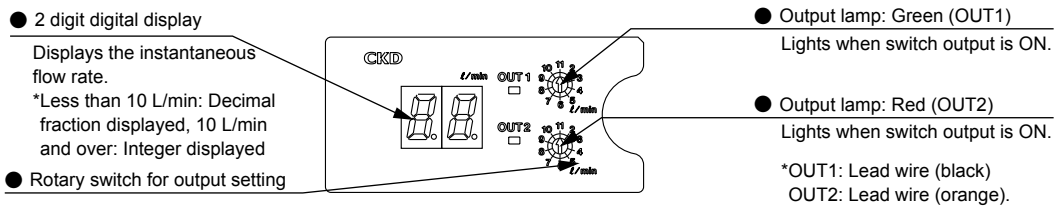
● Flow rate sensor output (1): -A1 ● Flow rate sensor output (2): P0, P1

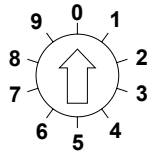


+V (brown)	: Connect to [+] of DC power supply	: 12 to 24 VDC ± 10%
ANO (orange)	: Connect to 4 to 20 mA input unit	
ALARM (black)	: Switch (OUT) output	: Max. 30 VDC/50 mA
GND (blue)	: Connect to [-] of DC power supply	: 0 VDC

Functions

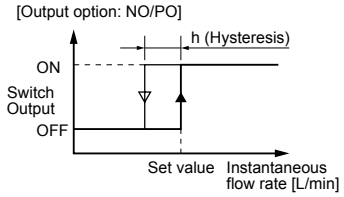
● Switch (WFK30**M)

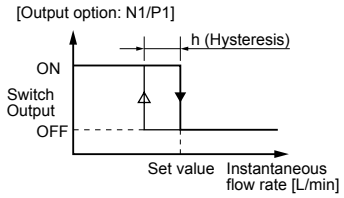




Allows you to set the switch output setting in 10 steps.
* Use a precision screwdriver or similar tool to set the rotary switch. Be extremely careful, since applying excessive force to the rotating part may result in contact failure.
* Be sure to align the arrow with the scale mark. If it is forcibly set at an intermediate point, the output may become unstable.
* Turn OFF the power before setting the switch output.
* After switch output setting, close the cover to display the set flow rate.

Switch output operation

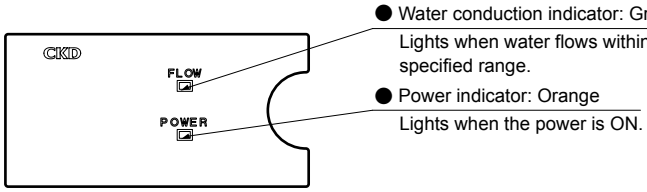




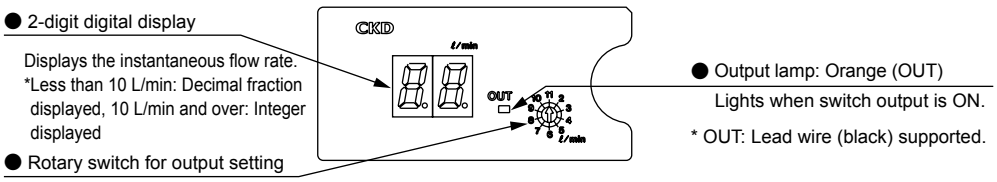
Switch output setting value [L/min]

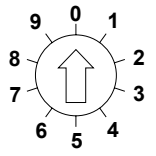
Rotary switch Contact No.	Model		
	WFK3004M	WFK3012M	WFK3032M
1	0.6	2.0	5.0
2	0.7	3.0	9.0
3	0.8	4.0	12
4	0.9	5.0	14
5	1.0	6.0	16
6	1.5	7.0	18
7	2.0	8.0	21
8	2.5	9.0	24
9	3.0	10	27
0	3.5	11	30
Hysteresis	0.1	0.5	1.0

● Sensor (WFK30**S)



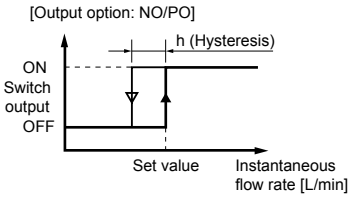
● Sensor/switch (WFK30**C)

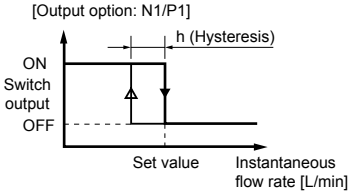




Allows you to set the switch output setting in 10 steps.
* Use a precision screwdriver or similar tool to set the rotary switch. Be extremely careful, since applying excessive force to the rotating part may result in contact failure.
* Be sure to align the arrow with the scale mark. If it is forcibly set at an intermediate point, the output may become unstable.
* Turn OFF the power before setting the switch output.
* After switch output setting, close the cover to display the set flow rate.

Switch output operation





Switch output setting value [L/min]

Rotary switch Contact No.	Model		
	WFK3004C	WFK3012C	WFK3032C
1	0.6	2.0	5.0
2	0.7	3.0	9.0
3	0.8	4.0	12
4	0.9	5.0	14
5	1.0	6.0	16
6	1.5	7.0	18
7	2.0	8.0	21
8	2.5	9.0	24
9	3.0	10	27
0	3.5	11	30
Hysteresis	0.1	0.5	1.0

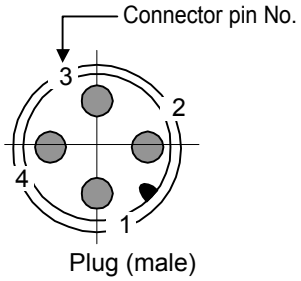
■ Specifications of WFC flow sensor part

Item			150 (WFC-150)	600 (WFC-600)
Rated flow range			0.5 to 15 L/min	2.0 to 60 L/min
Available fluid conductivity			5 μS/cm or more	
Repeatability *1)			±6.0% F.S	
Response time *2)			0.25 s/0.5 s/1 s/2 s/5 s (default 1 s)	
Switch output			NPN or PNP transistor output	
	Max. load current		50 mA	
	Max. applied voltage		30 VDC	
	Internal voltage drop		NPN: 2.0 V or less PNP: 2.4 V or less	
Analog output		Voltage output	Voltage output: 1 to 5 V Load impedance: 50 kΩ or more	
		Current output	Current output: 4 to 20 mA, load impedance 500 Ω or less	
Display			Dual screen display (top: 4-digit 7 segment green/red, bottom: 6-digit 11 segment white)	
Power supply voltage			24 VDC ±10% (ripple P-P ±10% or less)	
Current consumption			65 mA or less	

*1: Characteristics when the response time is 5 s.
*2: The response time to reach 63% of the value in relation to the step input.
*3: Piping port and body metal part are grounded to DC (-)/blue wire. This product cannot be used in (+) ground power supply.

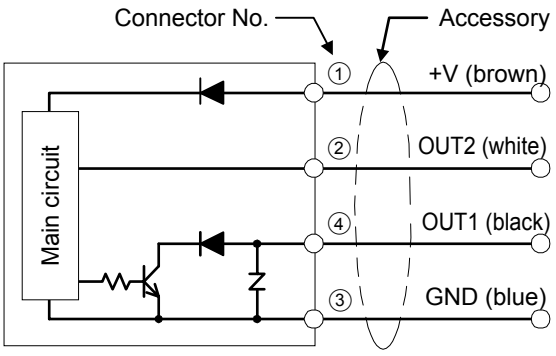
Wiring method

· Always read the safety precautions before wiring.
Connectors used are Correns Corp. VA connectors (model No.: TM-4DSX3HG4) made by Correns Corporation. Specifications: For DC, 4-conductor 0.5 mm^2
Cable model No.: TM-4DSX3HG4
L type cable model No.: VA-4DLX3HG4



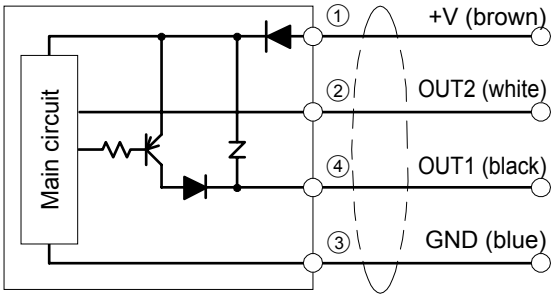
	Switch output	Analog output
-NV	NPN transistor output	1 to 5 [V]
-NA		4 to 20 [mA]
-PV	PNP transistor output	1 to 5 [V]
-PA		4 to 20 [mA]

1) -NV,-NA



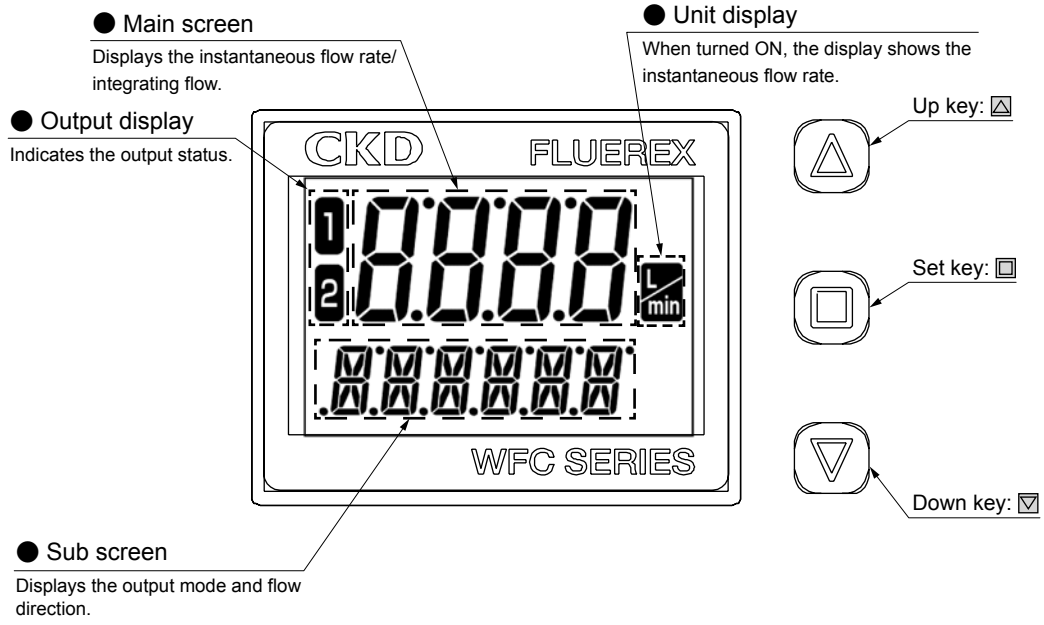
: Connect to [+] of DC power supply: 24 VDC ± 10%
: Analog output/switch input : Outputs voltage or current in proportion to flow rate/ Remote zero adjustment or integration reset
: Switch output (NPN) : Max. 30 VDC, 50 mA
: Connect to [-] of DC power supply : 0 VDC

2) -PV, -PA

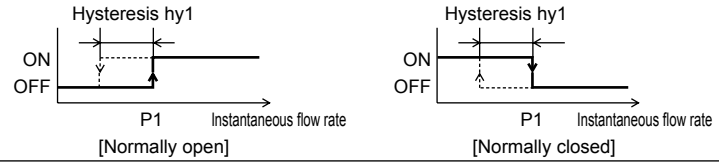
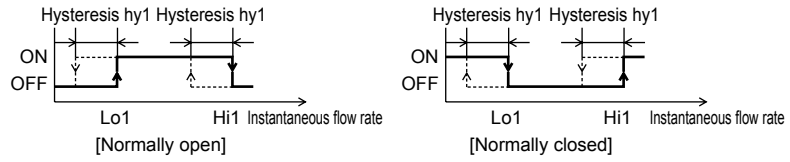
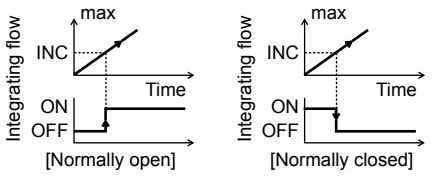
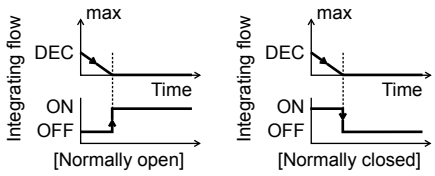
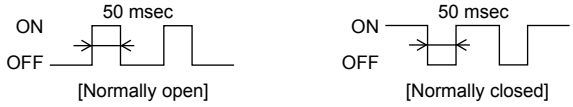
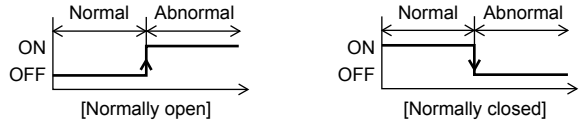
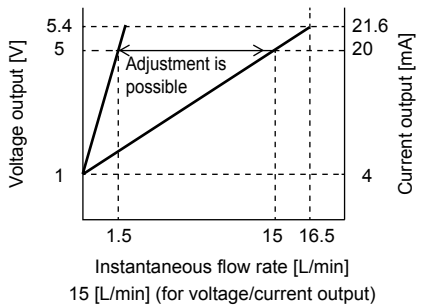


: Connect to [+] of DC power supply: 24 VDC ± 10%
: Analog output/switch input : Outputs voltage or current in proportion to flow rate/ Remote zero adjustment or integration reset
: Switch output (PNP) : Max. 50 mA
: Connect to [-] of DC power supply : 0 VDC

Functions

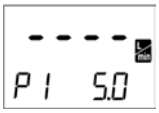
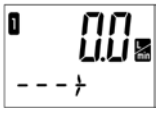
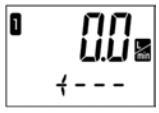


Output mode and output operation

(1) Hysteresis mode	
(2) Window comparator mode	
(3) Accumulated output mode	● Increment mode  ● Decrement mode 
(4) Integrated pulse output	
(5) Alarm output mode	
(6) Analog output mode	

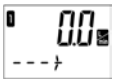
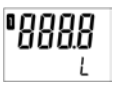
Measurement mode

[Normal screen]

Instantaneous flow rate Display	Hysteresis mode 	Window comparator mode 	Accumulated output mode 	Integrated pulse output mode 
	Analog output 	Digital input: Remote zero adjustment 	Digital input: Integration reset 	Alarm output mode 
	Flow direction  		Select any character 	No sub-screen display 
Total integrating flow Display		Integrated unit can be switched to "L", "kL", "ML" with up key: ▲ and down key: ▼ .		

Easy setting (shortcut mode)

By shortcut operation, settings with high frequency of use can be moved from the normal screen to the settable state.

Main screen	Normal screen ⇄ (□ / Current screen blinks / □) →  Select "Instantaneous value display" or "total integrated value display" with △ or ▽ and confirm with □.
Hysteresis mode	 △ or ▽ / □ →  Set judgment value with △ or ▽ and confirm with □.
Accumulated output mode	 □ or ▽ / □ →  Reset integrated value with □.
Analog output mode	 △ or ▽ / □ →  Change F.S. with △ or ▽, and confirm with □.
Flow direction	 △ or ▽ / □ →  Change flow direction with △ or ▽, and confirm with □.
Total integrated value reset	 □ + ▽ →  Reset with □. Cancel with △ or ▽ .
Setting key lock	Normal screen ⇄ (△ + ▽ / Hold down for 2 seconds or more / 1 second after setting) →  Change with △ or ▽, and confirm with □.

MEMO

How to fill out WXU-P manifold specifications sheet

Supply side/Return side

Create manifold specifications for both supply side and return side.

* Layout position is 1, 2... from the left with flow sensor cover facing the front. (Refer to the figure below)

Part name	Specifications	Model No.	Layout position L	1	2	3	4	5	6	R	Quantity
In-block	Rc1, Rc1/2	-	○								1
End block	-	-								○	1
Cylinder valve at fluid 2 side [Dedicated product for integrated unit for water control]	NC	**GNAB-X2144-5**		○	○	○					3
	NO	**GNAB-X2190-5**					○	○			2
	Masking plate	-									
Cylinder valve at fluid 1 side [Dedicated product for integrated unit for water control]	NC (Standard specifications)	**GNAB-X2144-5**			○	○					2
	NO (Standard specifications)	**GNAB-X2190-5**					○				1
	NC (Large flow rate specifications)	**GNAB-X2145-5**		○							1
	NO (Large flow rate specifications)	**GNAB-X2224-5**						○			1
	Masking plate	-									
Branching port size (Supply side only)	Rc3/8	-									
	Rc1/2	-									
Flow rate sensor [Dedicated product for integrated unit for water control] (Return side only)	Select from the following and enter in the table at right. (Refer to page 651 "Specification of mounted devices")										
	Flow rate range: 04/12/32 Port size: 10/15 Flow rate sensor output (1)(2) : Refer to *1 (table below)	**WFK30** 04 15 - A0 Blank		○							1
		WFK30 32 15 - A3 Blank			○	○					2
		WFK30 04 15 - N0 Blank					○				1
		WFK30 32 15 - P0 N0						○			1
		WFK30 - - - - -									
	For port only Rc3/8	-									
	For port only Rc1/2	-									
Needle valve	For standard specifications / For large flow rate specifications: It depends on the model number of the cylinder valve at fluid 1 side.	-		○	○	○	○	○			5
Partition plug	Fluid 1 side	-				○					1
	Fluid 2 side	-				○					1
Remarks											

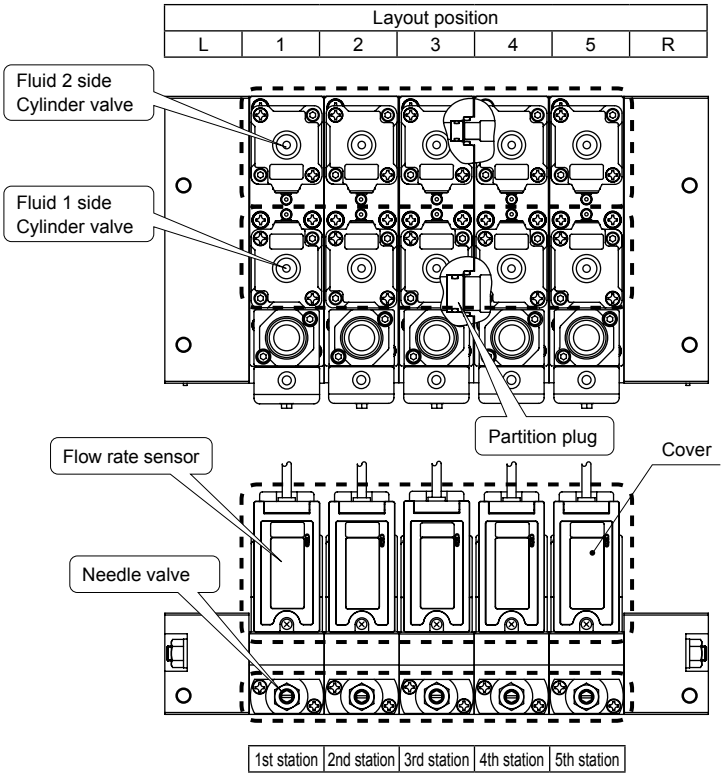
Specify device to be mounted for each station.

Fill in total quantity.

Flow rate sensor output: (1) Flow rate range, Port size; (2) Flow rate sensor output

*1) Output variations of water flow rate sensor

		Flow rate sensor output (2)				
		Not required	Transistor output 1 point			
			NPN a contact	NPN b contact	PNP a contact	PNP b contact
Flow rate sensor output (1)		Blank	N0	N1	P0	P1
A0	0 to 5 VDC	●	●	●	●	●
A1	4 to 20 mADC	●	●	●	●	●
A2	1 to 5 VDC	●	●	●	●	●
A3	0 to 10 VDC	●	●	●	●	●
N0	NPN transistor 2 output points (a contact)	●				
N1	NPN transistor 2 output points (b contact)	●				
P0	PNP transistor 2 output points (a contact)	●				
P1	PNP transistor 2 output points (b contact)	●				



Layout position illustration

WXU-H Manifold Specifications

● Contact ● Quantity set(s) ● Delivery date

Receipt No.	Order No.

Date issued / /

Company

Contact

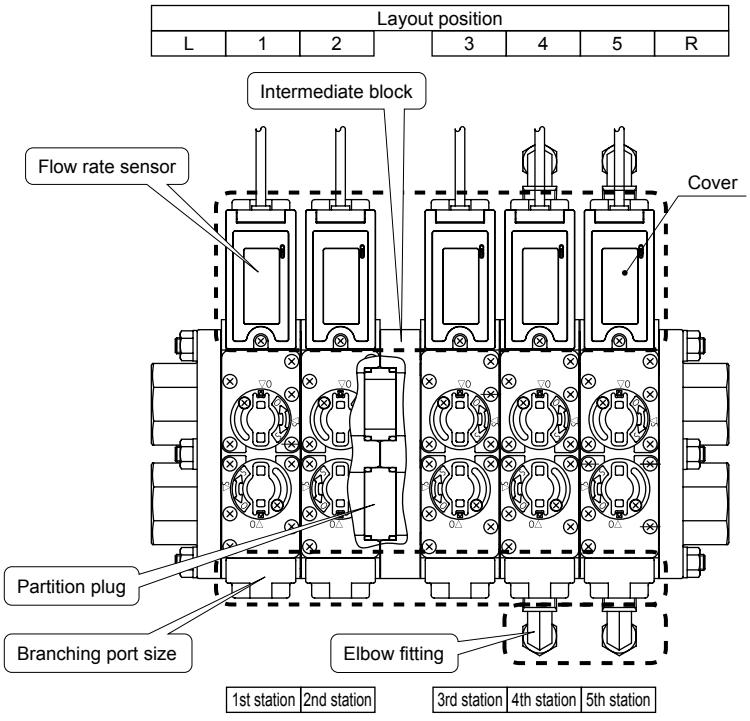
Purchase order No.

* Layout position is 1, 2... from the left with flow sensor cover facing the front. (Refer to the figure below)

Part name	Specifications		Model No.	Layout position L	1	2	3	4	5	6	7	8	9	10	R	Quantity
In-block	Rc1		-													
End block	-		-													
Flow rate sensor [Dedicated product for integrated unit for water control] (Return side only)	Select from the following and enter in the table at right. (Refer to page 651 "Specification of mounted devices")		WFK30 [Flow rate range] [Connection Bore size] - [Flow rate sensor output (1)] [Flow rate sensor output (2)]													
	Flow rate range: 04/12/32 Port size: 10/15 Flow rate sensor output (1)(2) : Refer to *1 (table below)		WFK30 [Flow rate range] [Connection Bore size] - [Flow rate sensor output (1)] [Flow rate sensor output (2)]													
	For port only	Rc3/8	-													
		Rc1/2	-													
Branching port size (Supply side OUT port)	Rc3/8		-													
	Rc1/2		-													
Partition plug	With intermediate block (Width 20 mm)	Supply side	-													
		Return side	-													
Elbow fitting (stainless steel) (Supply unit + Return unit Piped on both sides)	Tube, Thread size (inch)	Compatible tube O.D. x I.D. (mm)	Quick seal fittings manufactured by NITTA Co., Ltd.													
	3/8	9.53 x 6.99	L1N3/8-PT3/8-S													
	1/2	12.70 x 9.56	L1N1/2-PT1/2-S													
Remarks																

*1) Output variations of water flow rate sensor

Flow rate sensor output (1)		Flow rate sensor output (2)				
		Not required	Transistor output 1 point			
			NPN a contact	NPN b contact	PNP a contact	PNP b contact
		Blank	N0	N1	P0	P1
A0	0 to 5 VDC	●	●	●	●	●
A1	4 to 20 mADC	●	●	●	●	●
A2	1 to 5 VDC	●	●	●	●	●
A3	0 to 10 VDC	●	●	●	●	●
N0	NPN transistor 2 output points (a contact)	●				
N1	NPN transistor 2 output points (b contact)	●				
P0	PNP transistor 2 output points (a contact)	●				
P1	PNP transistor 2 output points (b contact)	●				



Layout position illustration

WXU-HC Manifold Specifications

● Contact ● Quantity set(s) ● Delivery date

Receipt No.	Order No.

Date issued / /

Company

Contact

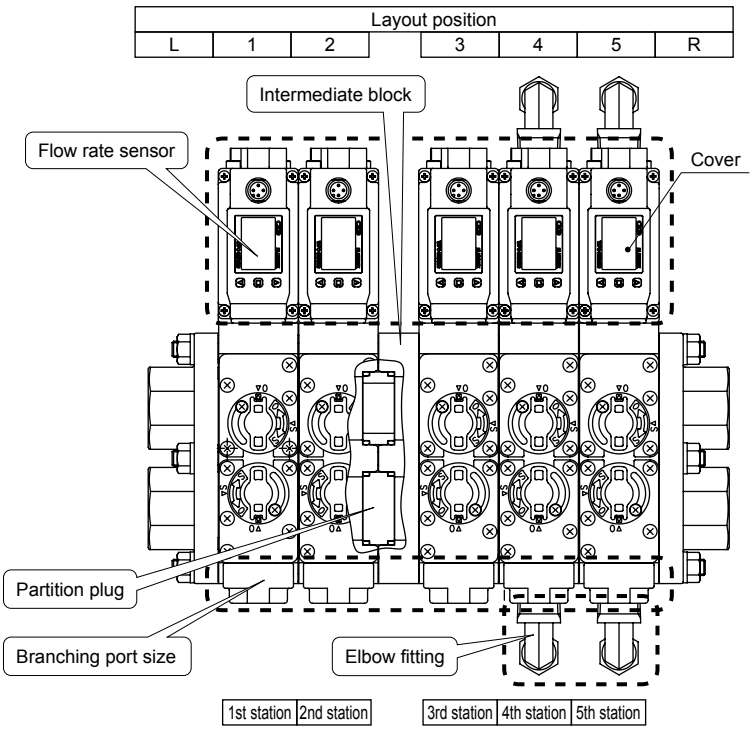
Purchase order No.

* Layout position is 1, 2... from the left with the monitor of flow sensor facing the front. (Refer to the figure below)

Part name	Specifications		Model No.				Layout position L	1	2	3	4	5	6	7	8	9	10	R	Quantity
In-block	Rc1		-																
End block	-		-																
Flow rate sensor [Dedicated product for integrated unit for water control]	Select from the following and enter in the table at right.			Flow rate range / Port size		Output													
	● Flow rate range/Port size: 150-10 W to 600-15 W ● Output: Refer to *1 (table below).		**WFC-**	-	-														
			WFC-	-	-														
			WFC-	-	-														
			WFC-	-	-														
			WFC-	-	-														
	For port only	Rc3/8	-																
		Rc1/2	-																
	M12 connector cable		-																
	M12L connector cable		-																
Branching port size (Supply side OUT port)	Rc3/8		-																
	Rc1/2		-																
Partition plug	With intermediate block (Width 20 mm)	Supply side	-																
		Return side	-																
Stainless steel fitting (Elbow) Insert type	Tube, Thread size (inch)	Compatible tube O.D. x I.D. (mm)	Quick seal fittings manufactured by NITTA Co., Ltd.																
	3/8	9.53 x 6.99																	
	1/2	12.70 x 6.56																	
Remarks																			

*1) Output variations of water flow rate sensor

Output	Switch output	Analog output
NV	NPN-Tr output	Voltage output (1 to 5 V)
NA	NPN-Tr output	Current output (4 to 20 mA)
PV	PNP-Tr output	Voltage output (1 to 5 V)
PA	PNP-Tr output	Current output (4 to 20 mA)



Layout position illustration

WXU-J Manifold Specifications

● Contact ● Quantity set(s) ● Delivery date

Receipt No.	Order No.

Date issued / /

Company

Contact

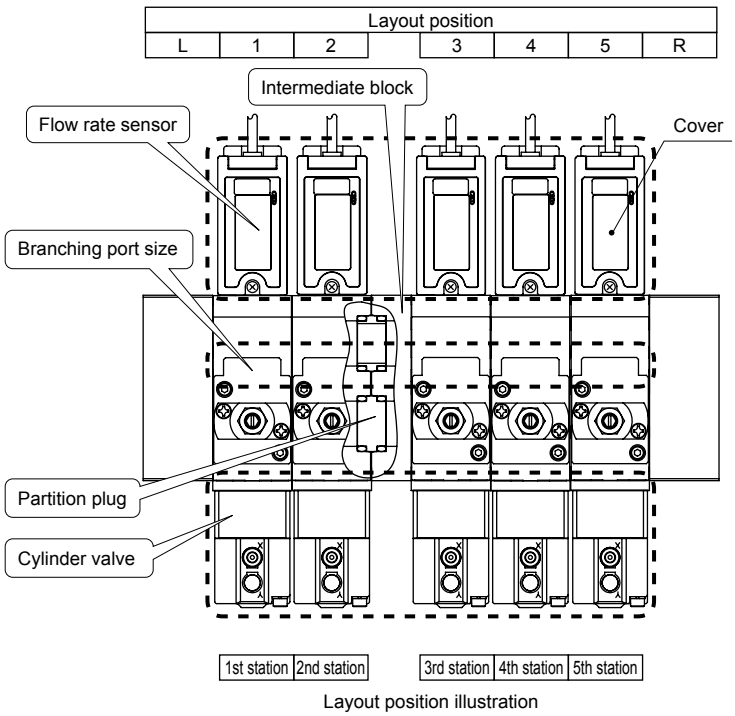
Purchase order No.

* Layout position is 1, 2... from the left with flow sensor cover facing the front. (Refer to the figure below)

Part name	Specifications		Model No.	Flow rate range	Port size		Flow rate sensor output (1)	Flow rate sensor output (2)	Layout position L	1	2	3	4	5	6	7	8	9	10	R	Quantity
In-block	Rc3/4		-																		
	Rc1		-																		
End block	-		-																		
Cylinder valve [Dedicated product for integrated unit for water control]	NC		**GNAB-X2225-1**																		
	NO		**GNAB-X2226-1**																		
	Masking plate		-																		
Flow rate sensor [Dedicated product for integrated unit for water control] (Return side only)	Select from the following and enter in the table at right. (Refer to page 651 "Specification of mounted devices")		**WFK30**			-															
	Flow rate range: 04/12/32		**WFK30**			-															
	Port size: 10/15		**WFK30**			-															
	Flow rate sensor output (1)(2) : Refer to *1 (table below)		**WFK30**			-															
			WFK30			-															
	For port only	Rc3/8	-																		
		Rc1/2	-																		
Branching port size (Supply side OUT port)	Rc3/8		-																		
	Rc1/2		-																		
Partition plug	With intermediate block (Width 20 mm)	Supply side	-																		
		Return side	-																		
Remarks																					

*1) Output variations of water flow rate sensor

Flow rate sensor output (1)		Flow rate sensor output (2)				
		Not required	Transistor output 1 point			
			NPN a contact	NPN b contact	PNP a contact	PNP b contact
		Blank	N0	N1	P0	P1
A0	0 to 5 VDC	●	●	●	●	●
A1	4 to 20 mADC	●	●	●	●	●
A2	1 to 5 VDC	●	●	●	●	●
A3	0 to 10 VDC	●	●	●	●	●
N0	NPN transistor 2 output points (a contact)	●				
N1	NPN transistor 2 output points (b contact)	●				
P0	PNP transistor 2 output points (a contact)	●				
P1	PNP transistor 2 output points (b contact)	●				



Layout position illustration

WXU-P Manifold Specifications

● Contact ● Quantity set(s) ● Delivery date

Receipt No.	Order No.

Date issued / /

Company

Contact

Purchase order No.

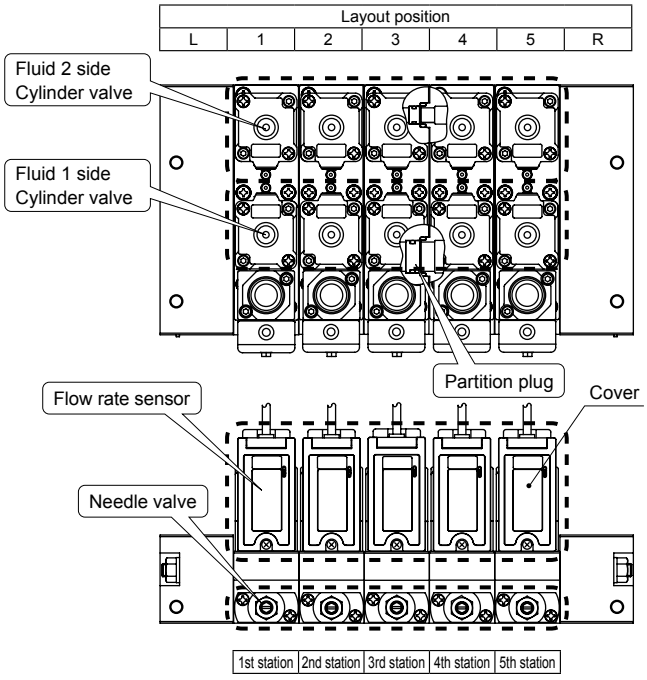
Supply side/Return side

* Layout position is 1, 2... from the left with flow sensor cover facing the front. (Refer to the figure below)

Part name	Specifications	Model No.	Layout position L	1	2	3	4	5	6	R	Quantity
In-block	Rc1, Rc1/2	-									
End block	-	-									
Cylinder valve at fluid 2 side [Dedicated product for integrated unit for water control]	NC	**GNAB-X2144-5**									
	NO	**GNAB-X2190-5**									
	Masking plate	-									
Cylinder valve at fluid 1 side [Dedicated product for integrated unit for water control]	NC (Standard specifications)	**GNAB-X2144-5**									
	NO (Standard specifications)	**GNAB-X2190-5**									
	NC (Large flow rate specifications)	**GNAB-X2145-5**									
	NO (Large flow rate specifications)	**GNAB-X2224-5**									
	Masking plate	-									
Branching port size (Supply side only)	Rc3/8	-									
	Rc1/2	-									
Flow rate sensor [Dedicated product for integrated unit for water control] (Return side only)	Select from the following and enter in the table at right. (Refer to page 651 "Specification of mounted devices")										
		WFK30 Flow rate range / Port size / - / Flow rate sensor output (1) / (2)									
	Flow rate range: 04/12/32 Port size: 10/15 Flow rate sensor output (1)(2) : Refer to *1 (table below)	**WFK30** -									
		WFK30 -									
		WFK30 -									
		WFK30 -									
	Port only For Rc3/8	-									
	Port only For Rc1/2	-									
Needle valve	For standard specifications / For large flow rate specifications: It depends on the model number of the cylinder valve at fluid 1 side.	-									
Partition plug	Fluid 1 side	-									
	Fluid 2 side	-									
Remarks											

*1) Output variations of water flow rate sensor

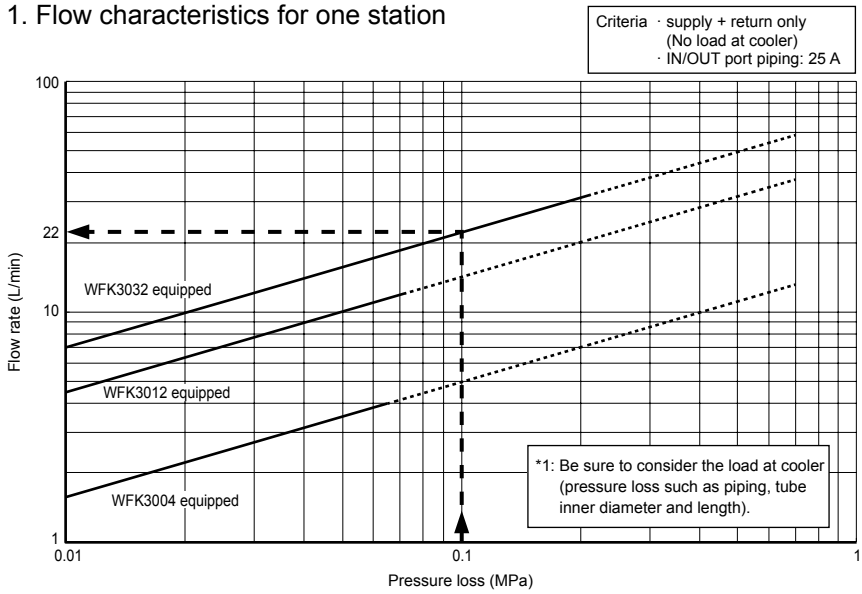
Flow rate sensor output (1)		Flow rate sensor output (2) Not required	Transistor output 1 point NPN a contact	NPN b contact	PNP a contact	PNP b contact
		Blank	**N0**	**N1**	**P0**	**P1**
A0	0 to 5 VDC	●	●	●	●	●
A1	4 to 20 mADC	●	●	●	●	●
A2	1 to 5 VDC	●	●	●	●	●
A3	0 to 10 VDC	●	●	●	●	●
N0	NPN transistor 2 output points (a contact)	●				
N1	NPN transistor 2 output points (b contact)	●				
P0	PNP transistor 2 output points (a contact)	●				
P1	PNP transistor 2 output points (b contact)	●				



Layout position illustration

Reading the Flow Properties Table

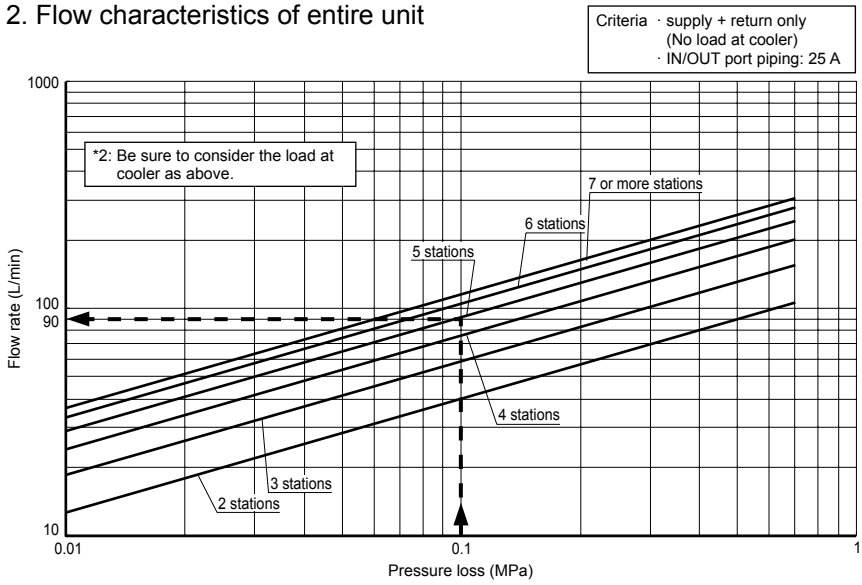
1. Flow characteristics for one station



Example 1:
What is the maximum flow rate when water (specific gravity = 1) is passed through WXU-H with WFK3032 at △P = 0.15 MPa (P_1 - P_2)?
(chiller load is 0.05 MPa.)

Q = 22 L/min
(pressure loss: 0.1 MPa (0.15 - 0.05).)

2. Flow characteristics of entire unit



Example 2:
What is the maximum flow rate when water (specific gravity = 1) is passed through WXU-H at △P = 0.15 MPa (P_1 - P_2)?
(chiller load is 0.05 MPa.)

Q = 90 L/min
(pressure loss: 0.1 MPa (0.15 - 0.05).)

Flow rate calculation method

SI units

$$Q = 45.16\ Cv \frac{\sqrt{P_1 - P_2}}{\sqrt{G}}$$

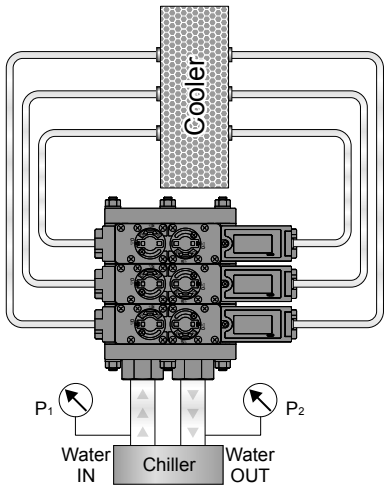
Q: Flow rate ℓ/min

P_1: Primary pressure MPa

P_2: Secondary pressure MPa

G: Specific gravity (water = 1)

Cv: Flow coefficient

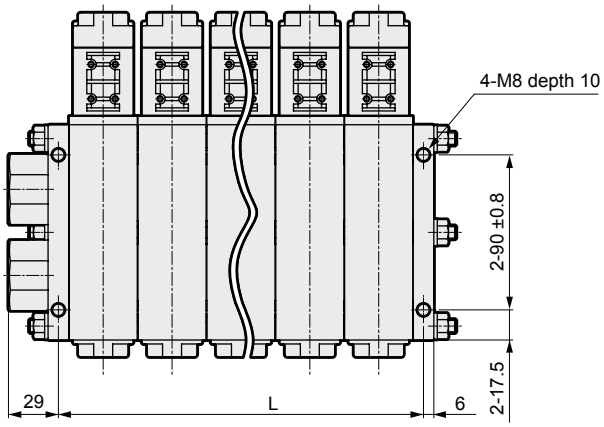


Pressure loss
△P
△P = P_1 - P_2

Pitch (L) for fixing main body

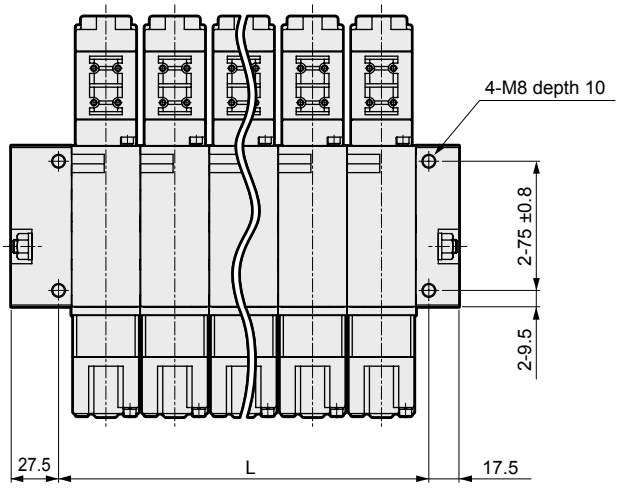
Pitch (L) for each type is shown as follows.
Consider mounting holes by adopting a slotted hole at one side, etc.

● WXU-H/HC



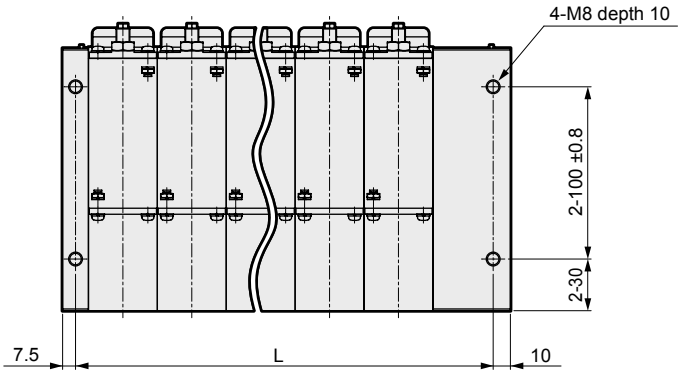
Station No.	2	3	4	5	6	7	8	9	10
L: Screw pitch	92 $^{+1}_{-2}$	132 $^{+1.5}_{-2.5}$	172 $^{+1.5}_{-3}$	212 $^{+2}_{-3.5}$	252 $^{+2}_{-4}$	292 $^{+2}_{-4.5}$	332 $^{+2.5}_{-5}$	372 $^{+2.5}_{-5.5}$	412 $^{+3}_{-6}$

● WXU-J



Station No.	2	3	4	5	6	7	8	9	10
L: Screw pitch	95 ±1	135 ±1.5	175 ±1.5	215 ±2	255 ±2	295 ±2	335 ±2.5	375 ±2.5	415 ±3

● WXU-P



Station No.	2	3	4	5	6
L: Screw pitch	122.5 ±2	162.5 ±2	202.5 ±2.5	242.5 ±2.5	282.5 ±2.5

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Product-specific cautions: Integrated unit for water control WXU Series

Design/selection

1. Safety design

⚠WARNING

■ This product cannot be used as an emergency shut off valve.
The valves listed in this catalog are not designed as valves to ensure safety such as emergency shut off valves. When using in such a system, always take separate measures that will ensure safety.

■ Take measures to prevent physical harm or property damage in the event of failure of this product.

⚠CAUTION

■ Liquid ring
When liquid is to be passed, and a circuit of the liquid seal is formed, the pressure could rise due to changes in the temperature and operation may be disabled or some components may be damaged. Prevent a liquid ring circuit by providing a relief valve in the system.

■ Vibration
Install this product in a place not subject to vibration.

2. Working fluid

⚠WARNING

■ Working fluids
Do not use any fluid other than the working fluids specified in the catalog.

■ Quality of fluid
Iron rust and debris in the fluid can cause operation faults or leaks and deteriorate product performance. Provide measures to remove foreign matter.

■ Fluid temperature
Use the product within the fluid temperature range.

3. Working environment

⚠WARNING

■ Only explosion-proof solenoid valves and air operated valves can be used in an explosive atmosphere.
Select either an explosion-proof solenoid valve or air operated valve for use within an explosive atmosphere.

■ Do not use this product in a corrosive gas atmosphere or an atmosphere that could affect the component materials.

■ Do not use this product near a heat generating source or in a location where it may be exposed to radiant heat.

■ Use this product within the specified ambient temperature range.
Even if the ambient temperature is within the specified range, do not use this product in a location where rapid changes in temperature can occur.

■ When using this product in a cold climate, take the necessary measures to prevent freezing.

4. Securing of space

⚠CAUTION

■ Securing maintenance space
Secure sufficient space for maintenance and inspection.

Mounting, installation and adjustment

1. Mounting

⚠CAUTION

■ Be sure to read the instruction manual thoroughly before installing the product.

■ After installation, check for leaks from pipes, for proper wire connections and that the product is installed correctly.

■ Be sure to secure the product by using the mounting screws for in-block, end block and intermediate block.

2. Piping

⚠CAUTION

■ Observe the effective thread length for the piping threads. Chamfer the end of the thread section by approx. a half-pitch.

■ Before piping, flush the inside of the pipe with 0.3 MPa of air, and remove foreign matter such as dirt, metal chips, rust and sealing tape.

■ If excessive sealant (sealing tape, gel-type sealant) is applied when piping, it could enter the product and cause malfunctions.

■ When applying or wrapping sealant on the piping material, apply or wind it from the pipe end along the thread section, and leave 1.5 to 2 threads uncovered.

■ Dirt or foreign matter in fluid (including water scale and slime) could prevent the product from functioning correctly. Install a suitable 80 mesh or more filter for water flow, and a 5 µm or less filter for air flow.
For use with flow rate lowered via needle, the needle opening (clearance) is minimal. Any foreign matter in the fluid larger than this clearance may clog, causing the flow rate to decrease.

■ Make sure not to use the wrong supply port when connecting the pipes to the product.

■ Make sure to secure the metal part of the port so that no force is applied to the resin parts when piping. The resin parts could be damaged.

■ Refer to the table below for the piping tightening torque.

Piping nominal diameter	Recommended piping tightening torque (Nm)
Rc3/8	22 to 24
Rc1/2	28 to 30
Rc3/4	31 to 33
Rc1	36 to 38

3. Wiring

⚠CAUTION

■ Use within the allowable voltage range. Usage outside of the allowable voltage range may lead to malfunction.

Use/maintenance

1. Maintenance and inspection

⚠WARNING

■ Do not touch the electrical wiring connections (bare, live parts) with hands or body when they are energized. There is a risk of electric shock.
Touching electrical wiring connections while power is on may lead to electrical shock.

■ Use within the working pressure range.

■ To ensure ideal use, inspect the product every six months. This frequency varies with the frequency of use.

⚠CAUTION

■ Make sure to tighten the lock nut (WXU-P/WXU-J) or knob fixing screw (WXU-H) after adjusting the flow rate.

■ Avoid forcefully over-rotating the needle for flow rate adjustment.

■ Do not use valves as footing or place any heavy objects on top of the valves.

■ If the product has been out of use for one month or more, perform a test run before starting the actual operation.

■ Read the instruction manual thoroughly and make sure you understand the content before performing maintenance.

■ Always turn the power OFF and release any fluids or pressure before starting maintenance.

■ Pay attention to clogging of the strainer and filter.

2. Disassembly/assembly

⚠CAUTION

■ When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent. (Note that the rubber parts must be replaced. There is a risk of expansion.)

■ When the product will not be used for one month or more after using water or hot water, completely remove any water or hot water left in the product. Water or hot water residue will cause rusting and may lead to malfunction or leaks.
If residual water cannot be eliminated, operate the valve several times a day and pass water through to ensure optimum use.

■ Contact CKD with questions about consumable parts, etc.

Product-specific cautions: Air operated 2-port valve (cylinder valve)

Design/selection

1. Working fluid

⚠CAUTION

■ External pilot air

(1) Draining: Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). This is a factor that significantly reduces the reliability of the pneumatic components. For drainage measures, improve air quality by dehumidifying with an after cooler or dryer, removing foreign matter with a filter, and removing tar with a tar removal filter, etc.

(2) Pre-lubrication: This series is pre-lubricated, so no lubricator is required. However, once lubrication has been started, it must be continued so that the lubricant does not run out. Use turbine oil Class 1 ISO VG32 (#90) or equivalent for lubrication.

(3) Filter: Install a filter with a 5 μm or less filter element.

Use/maintenance

1. Before use

⚠CAUTION

■ Under some fluid pressure conditions, water hammer may occur. Suppress water hammer by adjusting the valve open/close speed, etc.

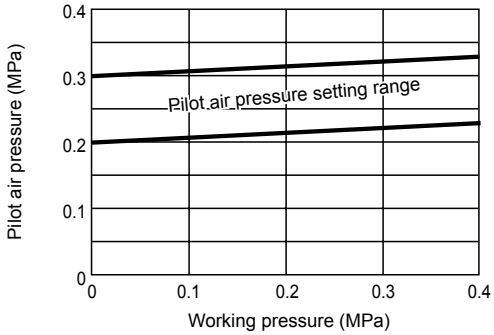
2. Maintenance and inspection

⚠CAUTION

■ Pilot air pressure

Use the product with a pilot air pressure in the specified range. Set NO pilot air pressure as shown in the graph below. A sealing failure or damaged seal part could occur if pressure is set at or below the range shown in the graph at right.
NC should be selected when the pilot air cannot be controlled.

● GNAB Series NO



Water-use equipment

Safety Precautions

Be sure to read this section before use.
Refer to "Pneumatic, Vacuum and Auxiliary Components (No. CB-024SA)" for general precautions for flow sensor.

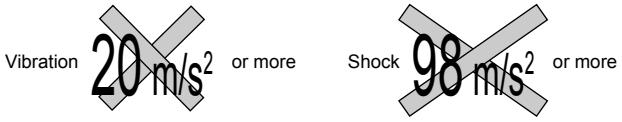
Product-specific cautions: Karman's vortex flow rate sensor for water WFK3000 Series

Design/selection

1. Working environment

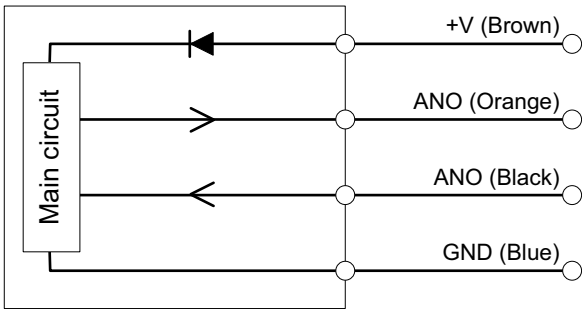
⚠ CAUTION

■ Vibration/impact
Avoid vibrations of 20 m/s^2 or more and shocks of 98 m/s^2 or more. This may cause malfunction and/or damage, as this product uses the Karman's vortex type detection principle.

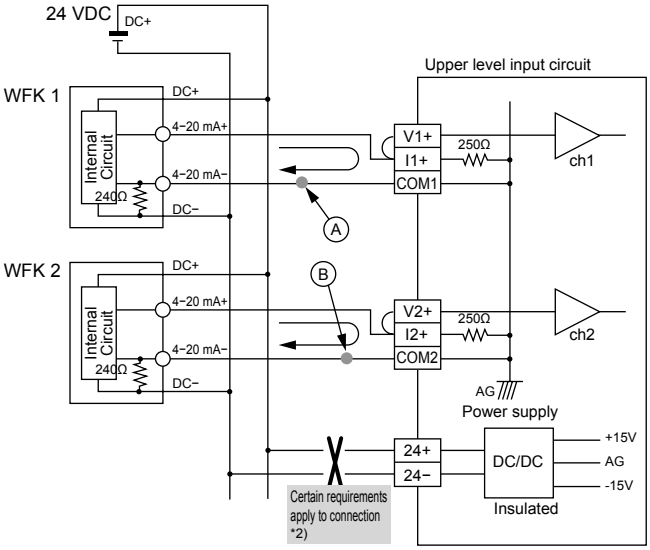


2. Analog output A1 (4-20 mA) connection

The following wiring diagram is for analog output A1 (4-20 mA) only



⚠ CAUTION



*1) Connecting multiple analog output 4 to 20 mA sensors to the same common input circuit (host computer, PLC, etc.) as shown above causes interference between the signals, preventing correct operation. In this case, use the voltage output (standard, A2, A3).

* The voltage at point A and that at point B are connected inside the input circuit, which gives them the same electrical potential, creating an error in the respective analog outputs.

*2) If the power supply (24 VDC) of the upper level input circuit is not isolated, install separate power supplies for the input circuit and the sensor.

Mounting, installation and adjustment

1. Wiring

⚠ DANGER

■ Use with power supply voltage and output in the specified range.
Applying a voltage that is outside of the specified range may cause malfunction, damage to the sensor, electrical shock, and/or fire.
Do not use any load that exceeds the rated output. Using such a load may result in damage to the output part or fire.

⚠ WARNING

■ Check the line color and terminal number when connecting wires.
While an overcurrent protection circuit for the output transistor and a protection circuit for erroneous wiring, using diodes for preventing reverse connection, are implemented, these do not protect against all incorrect wiring. Incorrect wiring can result in malfunction, failure, or damage to the sensor. Check the instruction manual for line colors and terminal numbers in order to ensure correct wiring.

■ Ensure that wires are properly insulated.
Check that wires do not come into contact with other circuits, that no ground faults occur, and that the insulator between terminals is not defective. Otherwise, overcurrent may flow into the sensor, causing damage.

⚠CAUTION

■ Keep the cable away from all noise sources, including power distribution wires. Noise can cause malfunctions.

■ Keep unused wires from coming into contact with other wires.

■ Do not short-circuit the output transistor.
When a load is short-circuited, overcurrent protection circuit is triggered to prevent damage to the output transistor; however, if this state persists, the output transistor could be damaged.
Overcurrent protection: Approx. 50 mA

■ Do not use a load that can produce surge voltage.
While a surge protection element is inserted, repeated exposure to surges can lead to damage. Use relays and solenoid valves that are equipped with surge absorption elements. If there is a surge source on the same power supply line, similarly implement surge protection.

■ Make sure that the lead wire is free of repeated bends and tension. This may lead to disconnection.

2. Piping

⚠CAUTION

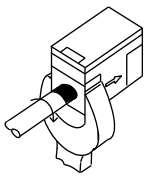
■ Pipes can be installed in any orientation, vertical, horizontal, etc. Note that pipes should be installed so that the fluid constantly fills the piping while it flows through the pipes. When installing a pipe vertically, making the fluid flow upward can reduce the influence of air bubbles inside.

■ Make sure that the self-weight of the piping is not applied to the flow rate sensor. It may lead to damage or external leakage. We recommend that piping be fixed during operation.

■ Use appropriate torque to tighten the pipes when connecting them.
The purpose is to prevent water leakage and thread damage. First tighten the bolts by hand to ensure that the threads are not damaged, then use a tool.

Port thread	Tightening torque
Rc3/8 (10 A)	31 to 33 [N·m]
Rc1/2 (15 A)	41 to 43 [N·m]
Rc3/4 (20 A)	62 to 65 [N·m]
Rc1 (25 A)	83 to 86 [N·m]

■ When mounting piping or fittings to this product, always hold the attachment on the mounting side with a tool. Holding the body of the product or the attachment on the opposite side may lead to damage.



Use/maintenance

1. Common

⚠CAUTION

■ If a problem occurs during operation, immediately turn the power OFF, stop use, and contact your dealer. The display may become warm (approximately 40°C), but this is not an abnormality.

■ Hardware check and other internal settings are performed during the first two seconds or so after turning ON the power. Display and output do not function normally during this period. Particularly, if a transistor output is used in the control of an interlock circuit, an abnormal stop may occur. Mask the output during this period.

■ When changing the output set value, turn OFF the equipment first in order to prevent unexpected operation in the control system equipment.

■ Air flow rate cannot be measured.

2. Applicable fluid

⚠CAUTION

■ Follow the precautions below for the applicable fluids to be measured.If the following water quality standards are not met, performance may be compromised.

■ The water quality of the applicable fluid should be according to the "Guideline of Water Quality for Refrigeration and Air Conditioning Equipment" (Water quality standard: Cooling system - Circulating type - Circulating water) provided by the Japan Refrigeration and Air Conditioning Industry Association.

Item	Chemical formula	Unit	Water quality standard
pH	–	pH (25°C)	6.5 to 8.2
Electrical conductivity	–	mS/m (25°C)	0.2 to 80 *1
Chloride ion	Cl^-	mg/L(ppm)	200 or less
Sulfate ion	SO_4^{2-}	mg/L(ppm)	200 or less
Acid consumption (pH4.8)	$CaCO_3$	mg/L(ppm)	100 or less
Total hardness	$CaCO_3$	mg/L(ppm)	200 or less
Calcium hardness	$CaCO_3$	mg/L(ppm)	150 or less
Ionized silica	SiO_2	mg/L(ppm)	50 or less
Iron	Fe	mg/L(ppm)	1.0 or less
Copper	Cu	mg/L(ppm)	0.3 or less
Sulfide ion	S^{2-}	mg/L(ppm)	Not detected
Ammonium ion	NH_4^+	mg/L(ppm)	1.0 or less
Residue chlorine	Cl	mg/L(ppm)	0.3 or less
Free carbonic acid	CO_2	mg/L(ppm)	4.0 or less
Stability index	–	–	6.0 to 7.0

*1 Electrical conductivity should be 0.2 mS/m (2 μS/cm).
For use in the range of 0.05 to 0.2 mS/m (0.5 to 2 μS/cm), consult with CKD.
Do not use for ultrapure water, i.e. water with electrical conductivity below 0.05 mS/m (0.5 μS/cm).

Safety Precautions

Be sure to read this section before use.
Refer to "Pneumatic, Vacuum and Auxiliary Components (No. CB-024SA)" for general precautions.

Product-specific cautions: Capacitance electromagnetic flow sensor WFC Series

Design/selection

⚠ CAUTION

- Do not exceed the product's specified range.
- This product is for fluids that do not corrode water/wetted part materials with conductivity 5 μS/cm (0.5 mS/m). Fluids with low conductivity cannot be detected normally.
- Do not use with a positive ground.
- Do not use for applications in direct contact with beverages/foodstuffs/chemical liquids, etc.
- Do not use in flammable gas atmospheres.
- Observe the working fluid temperature and if using at low temperatures, take freeze prevention measures such as adding antifreeze.
- Observe the working pressure range for use.
- Observe the rated flow range for use.
- This product cannot be used as a billing meter. Do not use this product for commercial transactions as it is not compliant with the Measurement Act. It cannot be calibrated, so use it as an industrial sensor.

Mounting, installation and adjustment

⚠ WARNING

- Perform piping so that the flow path of the product is always full of water. If it is not full of water, a flow rate may be displayed even if the flow is halted.
- Perform zero adjustment operation after confirming that the flow path of the product is full of water and the flow is stationary.

⚠ CAUTION

- There is a risk of electric shock on touching the electrical wiring connections.
- Always turn the power OFF before carrying out wiring. Never touch the live parts with wet hands.
- Do not allow gas to enter the piping.
- Change the settings after stopping the equipment.
- After the power supply is turned ON, there is a 10-second warm-up period. Do not use display/output during this time.
- Do not press the setting switch with sharp objects.
- Do not install the product in locations where it is exposed to strong light such as direct sunlight or to radiant heat.
- Though mounting orientation is unrestricted, display surface horizontal to the ground is the recommended mounting orientation in lateral pull piping so as to be less susceptible to the influence of air bubbles.
- Set the flow direction for piping and flow rate sensor correctly.
- Do not drop, bump or apply excessive impact. In addition, when handling, hold the body of the product. (Do not hold by the cables.)
- Do not install this product in places where it is exposed to strong compression/tensile strength/load/vibration after installation.
- Do not use the product as footing or place any heavy objects on top of the product.
- The product may be damaged if excessive load is applied. Also, make sure that load from piping is not applied.
- Make sure that sealing tape or adhesive does not protrude from the port threads.
- Keep the piping just before the sensor as straight as possible and ensure that there are no parts that disturb the flow such as protrusion of packing.
- Provide flow rate adjusting valve, etc., on the downstream side of the sensor.
- If there is foreign matter/oil in the piping, clean before mounting the sensor.
- Incorrect wiring could cause failure.
- Confirm the color of the wire when wiring.
- It is recommended to electrically isolate the power supply and receiver from other points.
- Do not apply excessive tensile strength to the cable.
- Do not turn the L type cable. There is a risk of damage.
- Do not wire together with the power wire/power cables.
- This product should not be used in the vicinity of high voltage equipment or motors.
- Do not place strong magnets or magnetic fields close to this product.

Use/maintenance

⚠ CAUTION

- When a liquid ring circuit is formed, the pressure could rise due to changes in the temperature and the product may be damaged. Prevent a liquid ring circuit by providing a relief valve in the system.
- When fluid is not flowing, be sure to turn OFF the power of the product. If it remains energized in a state where fluid is not flowing, there is a risk of malfunction.
- Do not disassemble this product. Products reassembled after disassembly cannot meet the specifications.

NP/NAP/NVP

Large flow rate 3-port valve

Pilot operated solenoid valve/external pilot operated air drive poppet valve

Overview

Large flow rate 3-way valve with sealing strength enabled by its poppet structure.
NP Series, internal pilot suitable for cylinder driving up to ø400.
NAP/NVP Series, external pilot compatible with both positive pressure and negative pressure (vacuum). Two types are available to suit the application.

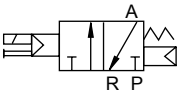
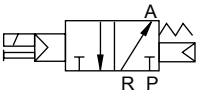
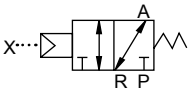
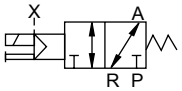
Features

Two types available

- Internal pilot NP Series
  NC (open when energized),
  NO (closed when energized)
- External pilot NAP, NVP Series
  Universal

Large flow rate with compact and lightweight body (Effective cross-sectional area: up to 630 mm^2)
Operable without lubrication
Unrestricted mounting orientation
External pilot is compatible with both positive and negative pressures Poppet structure

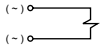
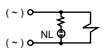
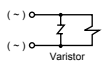
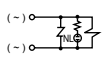
CONTENTS

Series external appearance		Model No.		JIS symbol	Flow characteristics C [$dm^3/(s \cdot bar)$] *1	Flow characteristics b	Flow characteristics S (mm^2)	Voltage (V)	
Internal pilot with solenoid valve (NC/NO)	NP13/NP14 	3-port	NP13	NC 	P→A 10A to 20A 15 to 35	P→A 10A to 20A 0.27 to 0.31	P→A 25A to 50A 200 to 660	100 AC 200 AC 24 DC Custom made 110 AC 220 AC	
			NP14	NO 	R→A 10A to 20A 15 to 41	R→A 10A to 20A 0.21 to 0.31	R→A 25A to 50A 210 to 630		
Air operated (Universal)	NAP11 		NAP11		P→A 10A to 20A 15 to 35	P→A 10A to 20A 0.27 to 0.31	P→A 25A to 50A 200 to 660		
Pneumatic, solenoid valve(Universal)	NVP11 		NVP11		P→A 10A to 20A 15 to 35	P→A 10A to 20A 0.27 to 0.31	P→A 25A to 50A 200 to 660	100 AC 200 AC 24 DC Custom made 110 AC 220 AC	

*1: Effective cross-sectional area “S” and sonic conductance “C” are converted as S ≈ 5.0 x C.

Port size of port A/P							Coil housing					Page
Female thread												
Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2	Grommet coil	DIN terminal box (Pg thread)	DIN terminal box with lamp (Pg thread)	With T type terminal box (G1/2)	T type terminal box with lamp (G1/2)	
●	●	●	●	●	●	●	●	●	●	●	●	674
●	●	●	●	●	●	●	●	●	●	●	●	
●	●	●	●	●	●	●						680
●	●	●	●	●	●	●	●	●	●	●	●	684

Electric connection circuit diagram

Option	Wiring circuit		Coil housing
	AC	DC	
-			Grommet coil (2C) DIN terminal box (2G) T type terminal box (3T)
With indicator lamp			DIN terminal box (2H) T type terminal box (3R)
With surge suppressor			Grommet coil (2CS, Rc1 1/4 to Rc2) DIN terminal box (2GS) T type terminal box (3TS)
With surge suppressor and indicator lamp			DIN terminal box (2HS) T type terminal box (3RS)
Surge suppressor attached			Grommet coil (2CS, Rc3/8 to Rc1)

Internal pilot 3-port valve with solenoid valve

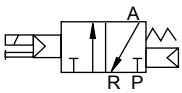
NP13/NP14 Series

- NC (open when energized), NO (closed when energized)
- Port size: Rc3/8 to Rc2

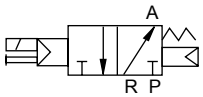
CE Refer to the Ending for details. RoHS CAD

JIS symbol

● NC (open when energized)



● NO (closed when energized)



Common specifications

°F = 9/5°C + 32

Item	NP13	NP14
Actuation	NC (open when energized)	NO (closed when energized)
Fluid pressure supply port	P port	R port
Working fluid	Compressed air	
Proof pressure MPa	1.2 (≈170 psi, 12 bar)	
Working pressure MPa	0.2 (≈29 psi, 2 bar) to 0.8 (≈120 psi, 8 bar)	
Fluid temperature °C	5 (41°F) to 60 (140°F)	
Ambient temperature °C	10A to 25A: -5 to 60 and 32A to 50A: -5 to 40 for both NP13/NP14	
Thermal class	Class 130 (B)	
Lubrication	No lubrication (use turbine oil Class 1 ISO VG32 for lubrication.)	
Valve seat leakage cm^3/min	1 or less (at pneumatic pressure 0.2 (≈29 psi) to 0.8 MPa (≈120 psi))	
Valve structure	Internal pilot balance poppet structure	
Mounting orientation	Unrestricted	

Individual specifications

Item / Model No.	Port size: P, A ports	Port size: R port	Orifice size (mm)	Response time (ms)	Rated voltage	Apparent power (VA): When holding 50 Hz	Apparent power (VA): When holding 60 Hz	Apparent power (VA): When starting 50 Hz	Apparent power (VA): When starting 60 Hz	Power consumption (W): AC 50/60 Hz	Power consumption (W): DC	Weight (kg)
NC (open when energized) (port P pressurization)												
NP13-10A	Rc3/8	Rc1/2	14.8 or equiv.	30 or less (*1)	100, 200 VAC (50/60 Hz) 110, 220 VAC (60 Hz) 24 VDC	3.6	2.8	11	9	1.9/1.5	4	0.7
NP13-15A	Rc1/2											0.7
NP13-20A	Rc3/4	Rc1	25.4 or equiv.	60 or less (*1)								1.5
NP13-25A	Rc1											1.5
NP13-32A	Rc1 1/4	Rc2	41.4 or equiv.	120 or less (*1)		15	11	40	35	7.5/6.0	8	4.5
NP13-40A	Rc1 1/2											4.5
NP13-50A	Rc2											4.4
NO (closed when energized) (port R pressurization)												
NP14-10A	Rc3/8	Rc1/2	14.8 or equiv.	30 or less (*1)	100, 200 VAC (50/60 Hz) 110, 220 VAC (60 Hz) 24 VDC	3.6	2.8	11	9	1.9/1.5	4	0.7
NP14-15A	Rc1/2											0.7
NP14-20A	Rc3/4	Rc1	25.4 or equiv.	60 or less (*1)								1.5
NP14-25A	Rc1											1.5
NP14-32A	Rc1 1/4	Rc2	41.4 or equiv.	120 or less (*1)		15	11	40	35	7.5/6.0	8	4.5
NP14-40A	Rc1 1/2											4.5
NP14-50A	Rc2											4.4

*1 : The response time is the value at 0.5 MPa supply pressure, with no lubrication, and with the power ON. It depends on the pressure and the lubricant quality.

*2 : Use the product within ±10% of the rated voltage.

Flow characteristics

Model No.	P→A				A→R			
	C[dm³/(s·bar)]	b	Cv	S(mm²)	C[dm³/(s·bar)]	b	Cv	S(mm²)
NC (open when energized) (port P pressurization)								
NP13-10A	15	0.31	3.4	-	16	0.28	3.4	-
NP13-15A	18	0.29	3.6	-	17	0.26	3.6	-
NP13-20A	35	0.27	8.4	-	41	0.21	8.6	-
NP13-25A	-	-	8.6	200	-	-	9.0	210
NP13-32A	-	-	25.8	600	-	-	26.2	610
NP13-40A	-	-	27.0	630	-	-	26.6	620
NP13-50A	-	-	28.2	660	-	-	27.0	630
Model No.	**R→A**				**A→P**			
	C[dm³/(s·bar)]	b	Cv	S(mm²)	C[dm³/(s·bar)]	b	Cv	S(mm²)
NO (closed when energized) (port R pressurization)								
NP14-10A	15	0.31	3.4	-	15	0.33	3.4	-
NP14-15A	17	0.30	3.6	-	18	0.31	3.6	-
NP14-20A	41	0.21	8.6	-	35	0.27	8.4	-
NP14-25A	-	-	9.0	210	-	-	8.6	200
NP14-32A	-	-	26.2	610	-	-	25.8	600
NP14-40A	-	-	26.6	620	-	-	27.0	630
NP14-50A	-	-	27.0	630	-	-	28.2	660

*1 : Effective cross-sectional area “S” and sonic conductance “C” are converted as S ≈ 5.0 x C.

How to order

NP1 3 - 15A - 1 2G S - 1

Model No.

Ⓐ Actuation

Ⓑ Port size

Ⓒ Body/sealant combination

Ⓓ Coil housing *1

Ⓔ Other *2 options

Ⓕ Rated voltage

Code		Description
Ⓐ Actuation		
3		NC (open when energized)
4		NO (closed when energized)
Ⓑ Port size		
10A		Rc3/8
15A		Rc1/2
20A		Rc3/4
25A		Rc1
32A		Rc1 1/4
40A		Rc1 1/2
50A		Rc2
Ⓒ Body/sealant combination		
	Body	Seal
1	Aluminum	Nitrile rubber
Ⓓ Coil housing		
2C	Std.	Grommet coil
2G	Option	DIN terminal box (Pg thread)
2H	Option	DIN terminal box with lamp (Pg thread)
3T	Option	With T type terminal box (G1/2)
3R	Option	T type terminal box with lamp (G1/2)
Ⓔ Other options		
Blank		No option
S		With surge suppressor
Ⓕ Rated voltage		
1	Standard	100 VAC(50/60 Hz), 110 VAC(60 Hz)
2	Standard	200 VAC(50/60 Hz), 220 VAC(60 Hz)
3	Standard	24 VDC
AC110V	Custom	110 VAC(50/60 Hz)
AC220V	Custom	220 VAC(50/60 Hz)

⚠ Precautions for model No. selection

*1 : Pg thread of the DIN terminal box is Pg9 for port size 10A to 25A, and Pg11 for 32A to 50A.
*2 : When selecting the grommet coil, the optional surge suppressor is attached (port size 10A to 25A) or incorporated (port size 32A to 50A). When selecting the coil with a terminal box, it is mounted in the terminal box.
*3 : Manual override (non-locking) is provided as standard.

[Example of model No.]

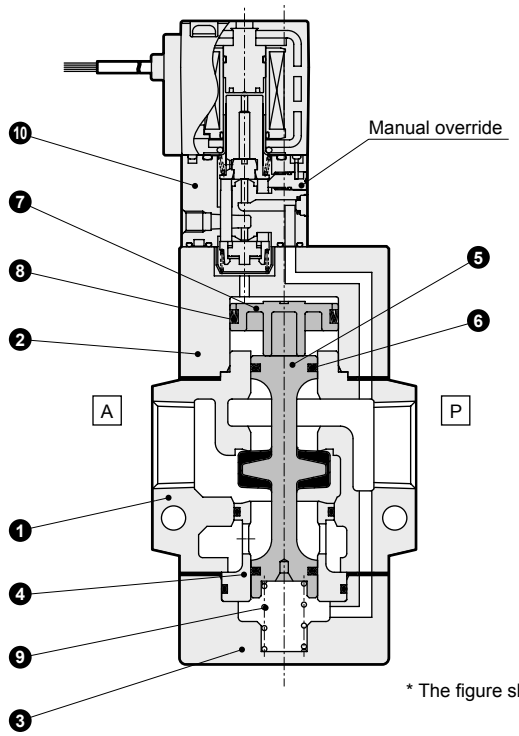
NP13-15A-12GS-1

Model: NP

Ⓐ Actuation : NC (open when energized)
Ⓑ Port size : Rc1/2
Ⓒ Body/sealant combination
: Body/aluminum, sealant/nitrile rubber
Ⓓ Coil housing : With DIN terminal box
Ⓔ Other options: With surge suppressor
Ⓕ Voltage : 100 VAC(50/60 Hz), 110 VAC(60 Hz)

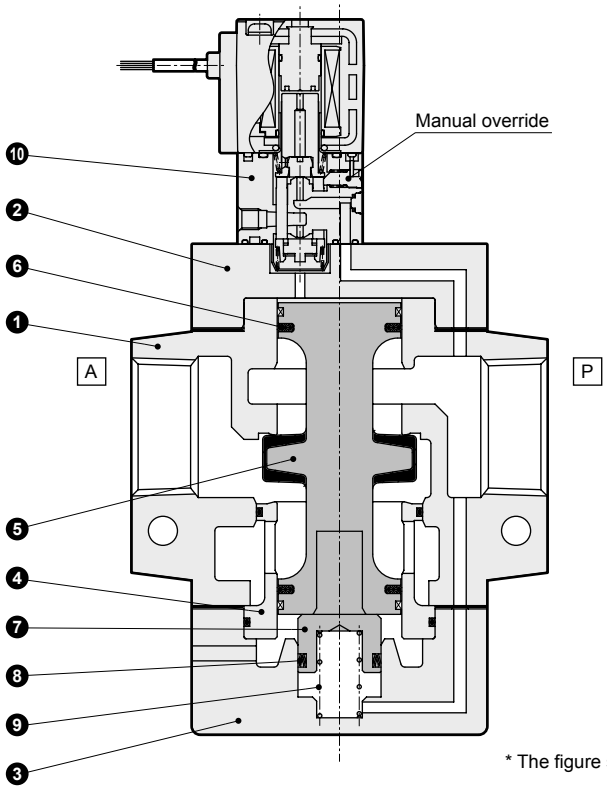
Internal structure and parts list

● NP$^{13}_{14}$-10A/15A



* The figure shows NP13.

● NP$^{13}_{14}$-20A to 50A



* The figure shows NP13.

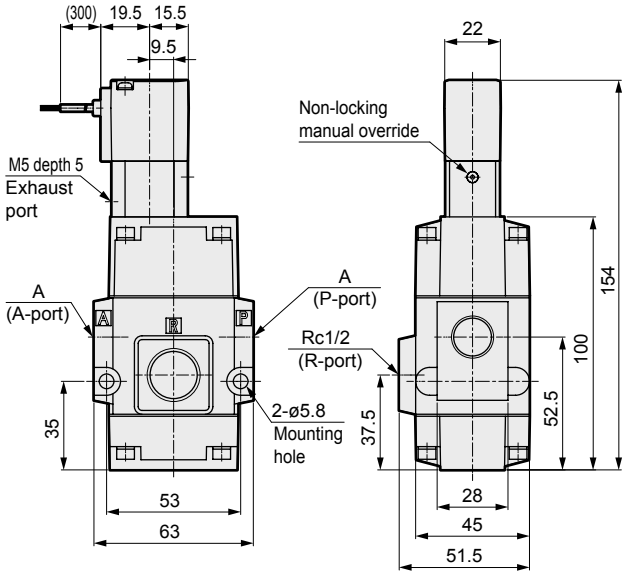
No.	Part name	Material	
1	Body	AC4C	Aluminum casting
2	Stuffing	AC4C	Aluminum casting
3	Cap	AC4C	Aluminum casting
4	Valve seat	C3604	Copper alloy
5	Valve stem	NBR, A2017	Nitrile rubber, aluminum

No.	Part name	Material	
6	Packing	NBR	Nitrile rubber
7	Piston	POM	Acetal resin
8	MY packing	NBR	Nitrile rubber
9	Spring	SUS304	Stainless steel
10	Pilot solenoid valve	-	-

Dimensions CAD

● Grommet coil

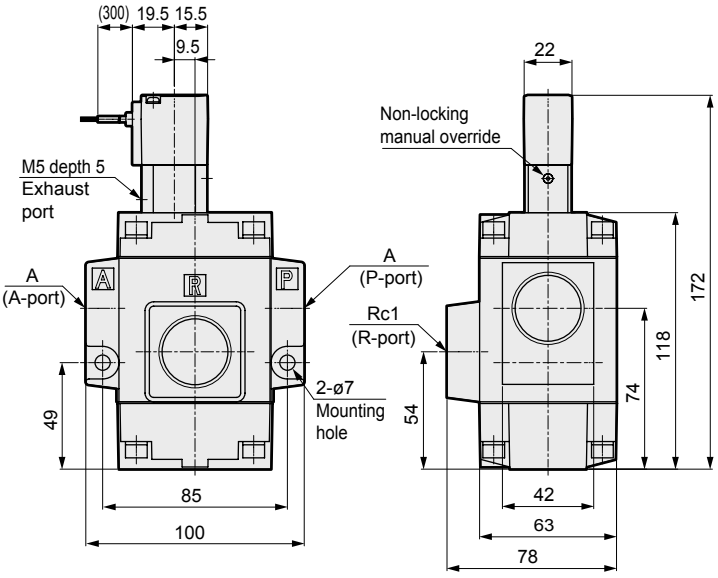
NP$^{13}_{14}$-10A/15A-12C



Model No.	A
NP1*-10A-1**	Rc3/8
NP1*-15A-1**	Rc1/2

● Grommet coil

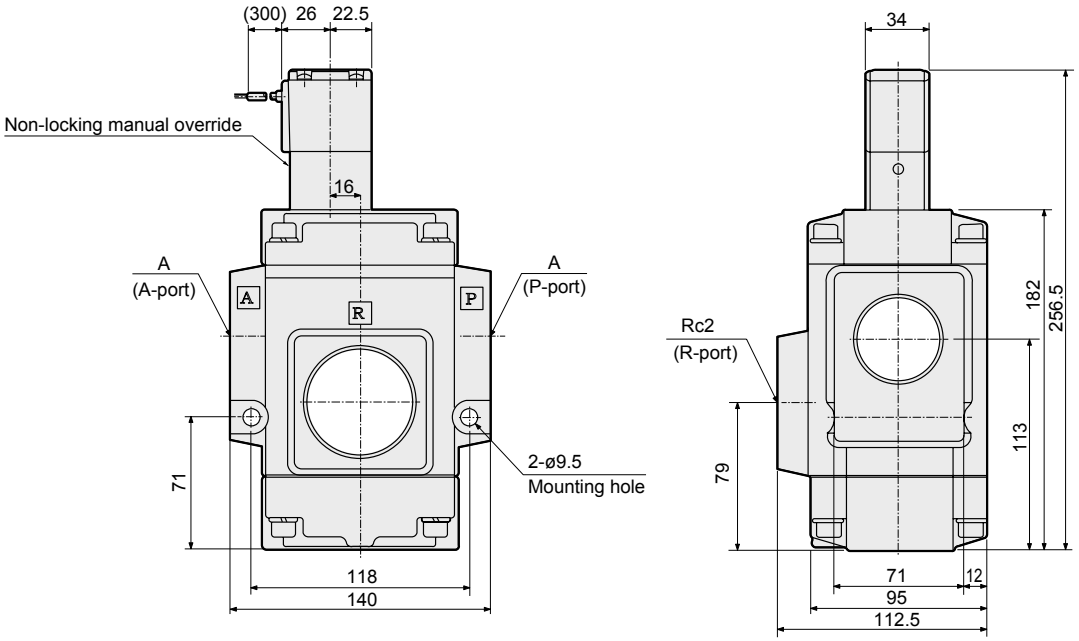
NP$^{13}_{14}$-20A/25A-12C



Model No.	A
NP1*-20A-1**	Rc3/4
NP1*-25A-1**	Rc1

● Grommet coil

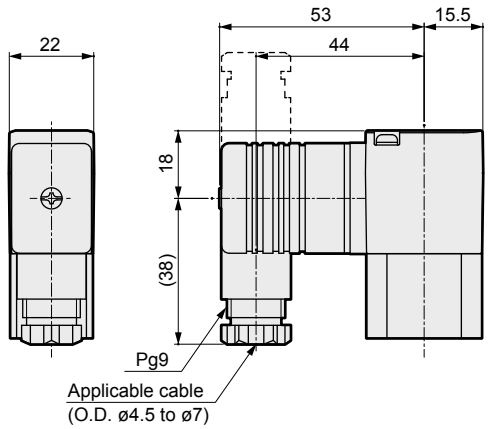
NP$^{13}_{14}$-32A/40A/50A-12C



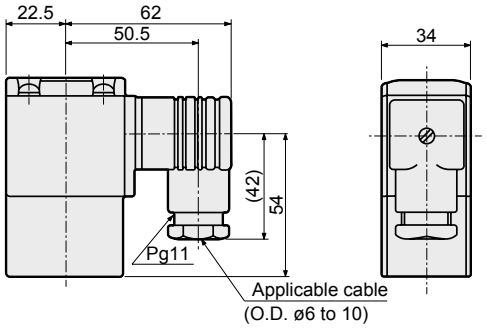
Model No.	A
NP1*-32A-1**	Rc1 1/4
NP1*-40A-1**	Rc1 1/2
NP1*-50A-1**	Rc2

Optional dimensions

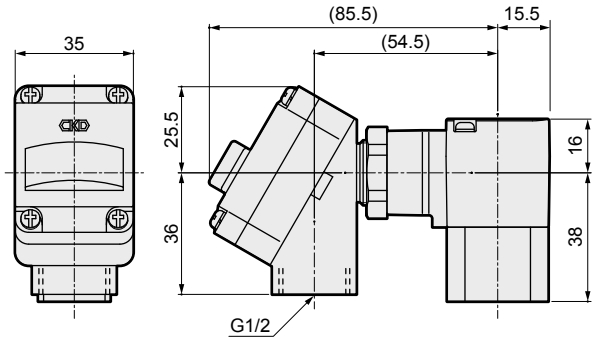
● With DIN terminal box (Pg9)
NP$^{13}_{14}$-10A/15A/20A/25A-1 2G 2H



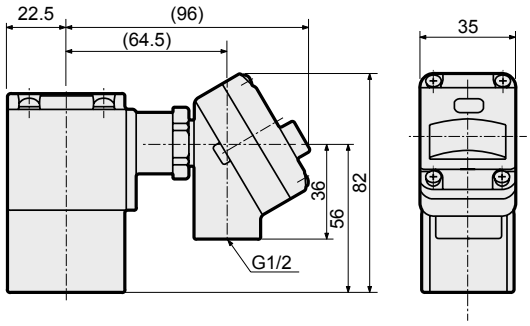
● With DIN terminal box (Pg11)
NP$^{13}_{14}$-32A/40A/50A-1 2G 2H



● With T type terminal box (G1/2)
NP$^{13}_{14}$-10A/15A/20A/25A-1 3T 3R



● With T type terminal box (G1/2)
NP$^{13}_{14}$-32A/40A/50A-1 3T 3R



Air operated 3-port valve

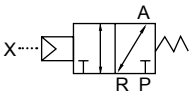
NAP11 Series

- Universal
- Port size: Rc3/8 to Rc2

RoHS CAD

JIS symbol

● Universal



Common specifications

1 MPa = 10 bar

Item	NAP11
Actuation	Universal
Working fluid	Compressed air, low vacuum
Proof pressure MPa	1.2 (≈170 psi, 12 bar)
Working pressure MPa	0 (≈0 psi) to 0.8 (≈120 psi) (1.3×10^2 to 8×10^5 Pa (abs) when used in vacuum)
Fluid temperature °C	5 (41°F) to 60 (140°F)
Ambient temperature °C	-5 (23°F) to 60 (140°F)
Lubrication	No lubrication (use turbine oil Class 1 ISO VG32 for lubrication)
Valve seat leakage cm^3/min	1 or less (at pneumatic pressure 0.02 (≈2.9 psi) to 0.8 MPa (≈120 psi))
Valve structure	External pilot balance poppet structure
Mounting orientation	Unrestricted
Pilot fluid	Air
Pilot pressure MPa	0.35 (≈51 psi, 3.5 bar) to 0.7 (≈100 psi, 7 bar)
Pilot port size (port X)	Rc1/8

Individual specifications

Item / Model No.	Port size: P, A ports	Port size: R port	Orifice size (mm)	Response time (ms)	Weight (kg)
NAP11-10A	Rc3/8	Rc1/2	14.8 or equiv.	30 or less (*1)	0.6
NAP11-15A	Rc1/2				0.6
NAP11-20A	Rc3/4	Rc1	25.4 or equiv.	60 or less (*1)	1.4
NAP11-25A	Rc1				1.4
NAP11-32A	Rc1 1/4	Rc2	41.4 or equiv.	120 or less (*1)	4.2
NAP11-40A	Rc1 1/2				4.2
NAP11-50A	Rc2				4.1

*1 : The response time is the value at 0.5 MPa supply pressure, with no lubrication, and with the power ON. It depends on the pressure and the lubricant quality.

Flow characteristics

Model No.	P→A				A→R			
	C[$dm^3/(s \cdot bar)$]	b	Cv	S(mm^2)	C[$dm^3/(s \cdot bar)$]	b	Cv	S(mm^2)
NAP11-10A	15	0.31	3.4	-	16	0.28	3.4	-
NAP11-15A	18	0.29	3.6	-	17	0.26	3.6	-
NAP11-20A	35	0.27	8.4	-	41	0.21	8.6	-
NAP11-25A	-	-	8.6	200	-	-	9.0	210
NAP11-32A	-	-	25.8	600	-	-	26.2	610
NAP11-40A	-	-	27.0	630	-	-	26.6	620
NAP11-50A	-	-	28.2	660	-	-	27.0	630

*1 : Effective cross-sectional area “S” and sonic conductance “C” are converted as S ≈ 5.0 x C.

How to order

NAP1 1 - 15A - 1

Model No.

Ⓐ Actuation

Ⓑ Port size

Ⓒ Body/sealant combination

Code	Description
Ⓐ Actuation	
1	Universal
Ⓑ Port size	
10A	Rc3/8
15A	Rc1/2
20A	Rc3/4
25A	Rc1
32A	Rc1 1/4
40A	Rc1 1/2
50A	Rc2

Ⓒ Body/sealant combination		
	Body	Seal
1	Aluminum	Nitrile rubber

[Example of model No.]

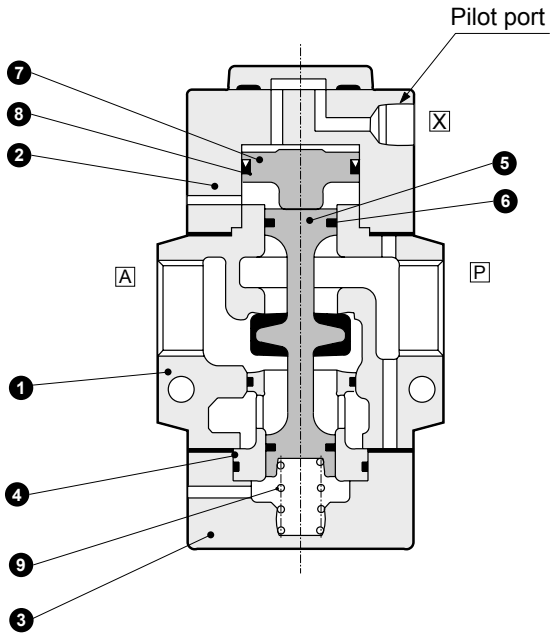
NAP11-15A-1

Model: NAP

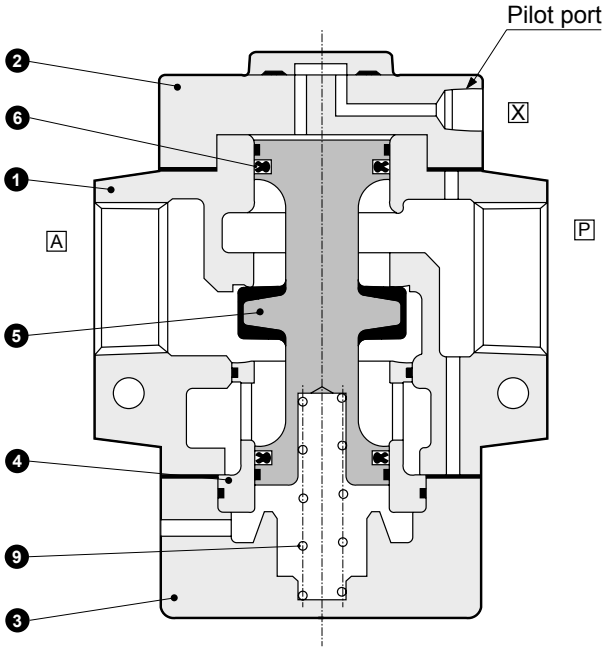
Ⓐ Actuation: Universal
Ⓑ Port size : Rc1/2
Ⓒ Body/sealant combination
: Body/aluminum, sealant/nitrile rubber

Internal structure and parts list

● NAP11-10A/15A



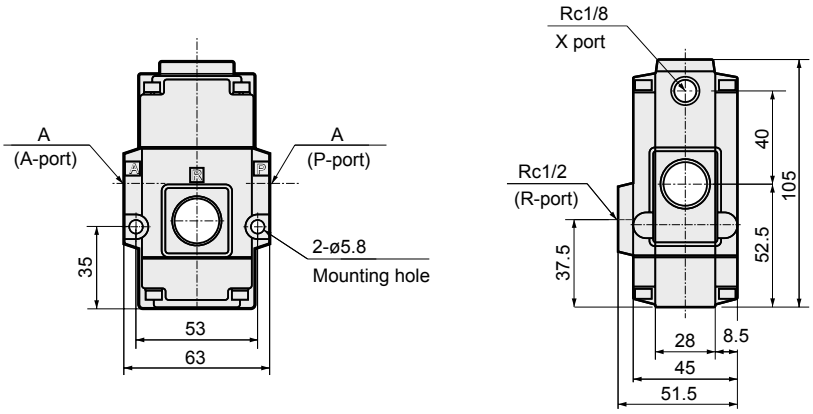
● NAP11-20A/25A/32A/40A/50A



No.	Part name	Material		No.	Part name	Material	
1	Body	AC4C	Aluminum casting	6	Packing	NBR	Nitrile rubber
2	Stuffing	AC4C	Aluminum casting	7	Piston	POM	Acetal resin
3	Cap	AC4C	Aluminum casting	8	MY packing	NBR	Nitrile rubber
4	Valve seat	C3604	Copper alloy	9	Spring	SWP	Piano wire
5	Valve stem	NBR, A2017	Nitrile rubber, aluminum				

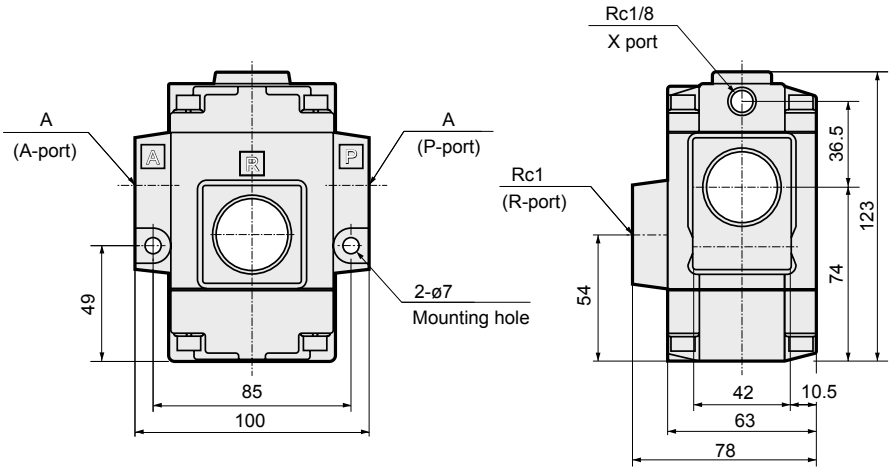
Dimensions

● NAP11-10A/15A-1



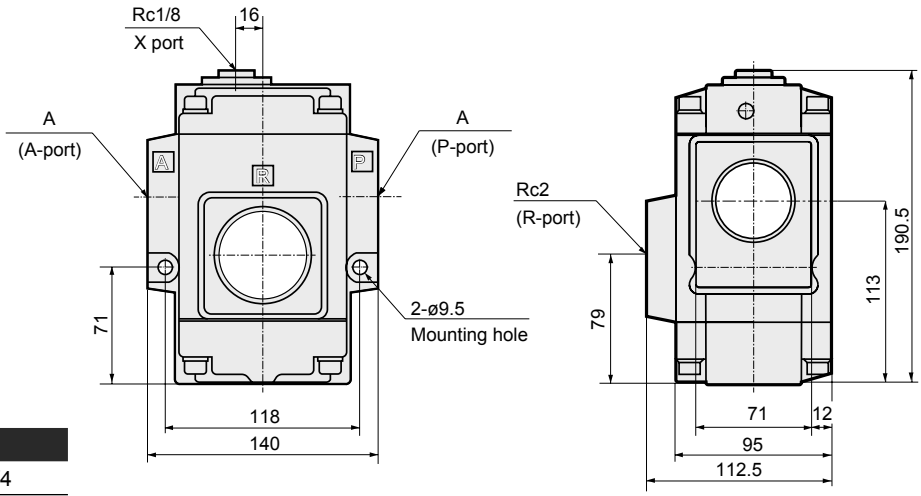
Model No.	A
NAP11-10A-1	Rc3/8
NAP11-15A-1	Rc1/2

● NAP11-20A/25A-1



Model No.	A
NAP11-20A-1	Rc3/4
NAP11-25A-1	Rc1

● NAP11-32A/40A/50A-1



Model No.	A
NAP11-32A-1	Rc1 1/4
NAP11-40A-1	Rc1 1/2
NAP11-50A-1	Rc2

Air operated 3-port valve with solenoid valve

NVP11 Series

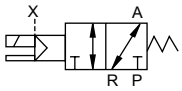
- Universal
- Port size: Rc3/8 to Rc2

CE Refer to the Ending for details.

RoHS CAD

JIS symbol

- Universal



Common specifications

1 MPa = 10 bar

Item	NVP11
Actuation	Universal
Working fluid	Compressed air, low vacuum
Proof pressure MPa	1.2 (≈170 psi, 12 bar)
Working pressure MPa	0 (≈0 psi) to 0.8 (≈120 psi) (1.3 x 10^2 to 8 x 10^5 Pa (abs) when used in vacuum)
Fluid temperature °C	5 (41°F) to 60 (140°F)
Ambient temperature °C	10A to 25A: -5 (23°F) to 60 (140°F) and 32A to 50A: -5 (23°F) to 40 (104°F)
Thermal class	Class 130 (B)
Lubrication	No lubrication (use turbine oil Class 1 ISO VG32 for lubrication)
Valve seat leakage cm^3/min	1 or less (at pneumatic pressure 0.02 (≈2.9 psi) to 0.8 MPa (≈120 psi))
Valve structure	External pilot balance poppet structure
Mounting orientation	Unrestricted
Pilot fluid	Air
Pilot pressure MPa	0.35 (≈51 psi, 3.5 bar) to 0.7 (≈100 psi, 7 bar)
Pilot port size (port X)	Rc1/8

Individual specifications

Item / Model No.	Port size: P, A ports	Port size: R port	Orifice size (mm)	Response time (ms)	Rated voltage	Apparent power (VA): When holding 50 Hz	Apparent power (VA): When holding 60 Hz	Apparent power (VA): When starting 50 Hz	Apparent power (VA): When starting 60 Hz	Power consumption (W): AC 50/60 Hz	Power consumption (W): DC	Weight (kg)
NVP11-10A	Rc3/8	Rc1/2	14.8 or equiv.	30 or less (*1)	100, 200 VAC (50/60 Hz)	3.6	2.8	11	9	1.9/1.5	4	0.7
NVP11-15A	Rc1/2											0.7
NVP11-20A	Rc3/4	Rc1	25.4 or equiv.	60 or less (*1)	110, 220 VAC (60 Hz)							1.5
NVP11-25A	Rc1											1.5
NVP11-32A	Rc1 1/4	Rc2	41.4 or equiv.	120 or less (*1)	24 VDC	15	11	40	35	7.5/6.0	8	4.5
NVP11-40A	Rc1 1/2											4.5
NVP11-50A	Rc2											4.4

*1 : The response time is the value at 0.5 MPa supply pressure, with no lubrication, and with the power ON.
It depends on the pressure and the lubricant quality.
*2 : Use the product within ±10% of the rated voltage.

Flow characteristics

Model No.	P→A: C[dm^3/(s·bar)]	P→A: b	P→A: Cv	P→A: S(mm^2)	A→R: C[dm^3/(s·bar)]	A→R: b	A→R: Cv	A→R: S(mm^2)
NVP11-10A	15	0.31	3.4	-	16	0.28	3.4	-
NVP11-15A	18	0.29	3.6	-	17	0.26	3.6	-
NVP11-20A	35	0.27	8.4	-	41	0.21	8.6	-
NVP11-25A	-	-	8.6	200	-	-	9.0	210
NVP11-32A	-	-	25.8	600	-	-	26.2	610
NVP11-40A	-	-	27.0	630	-	-	26.6	620
NVP11-50A	-	-	28.2	660	-	-	27.0	630

*1 : Effective cross-sectional area “S” and sonic conductance “C” are converted as S ≈ 5.0 x C.

How to order

NVP1 1 - 15A - 1 2G S - 1

Model No.

Ⓐ Actuation

Ⓑ Port size

Ⓒ Body/sealant combination

Ⓓ Coil housing *1

Ⓔ Other options *2

Ⓕ Rated voltage

Code		Description
Ⓐ Actuation		
1		Universal
Ⓑ Port size		
10A		Rc 3/8
15A		Rc 1/2
20A		Rc 3/4
25A		Rc 1
32A		Rc 1 1/4
40A		Rc 1 1/2
50A		Rc 2
Ⓒ Body/sealant combination		
	Body	Seal
1	Aluminum	Nitrile rubber
Ⓓ Coil housing		
2C	Std.	Grommet coil
2G	Option	DIN terminal box (Pg thread)
2H	Option	DIN terminal box with lamp (Pg thread)
3T	Option	With T type terminal box (G1/2)
3R	Option	T type terminal box with lamp (G1/2)
Ⓔ Other options		
Blank		No option
S		With surge suppressor
Ⓕ Rated voltage		
1	Standard	100 VAC 50/60 Hz, 110 VAC 60 Hz
2	Standard	200 VAC 50/60 Hz, 220 VAC 60 Hz
3	Standard	24 VDC
AC110V	Custom	110 VAC 50/60 Hz
AC220V	Custom	220 VAC 50/60 Hz

⚠ Precautions for model No. selection

*1 : Pg thread of the DIN terminal box is Pg9 for port size 10A to 25A, and Pg11 for 32A to 50A.
*2 : When selecting the grommet coil, the optional surge suppressor is attached (port size 10A to 25A) or incorporated (port size 32A to 50A). When selecting the coil with a terminal box, it is mounted in the terminal box.
*3 : Manual override (non-locking) is provided as standard.

[Example of model No.]

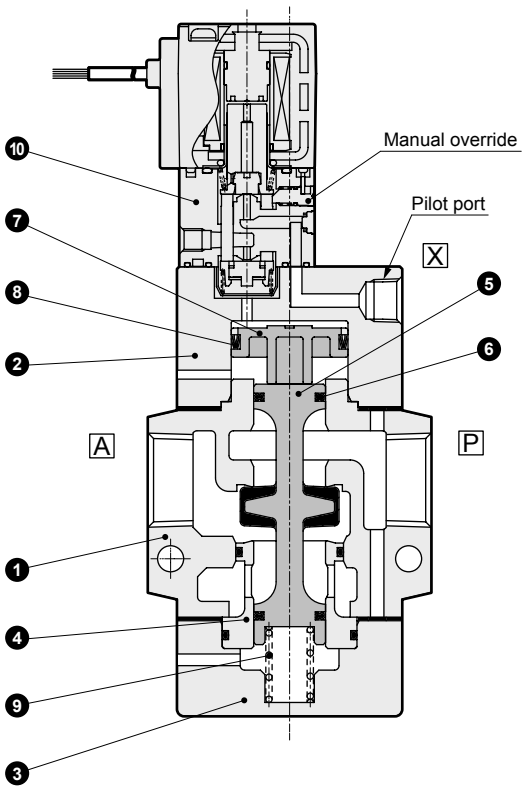
NVP11-15A-12GS-1

Model: NVP

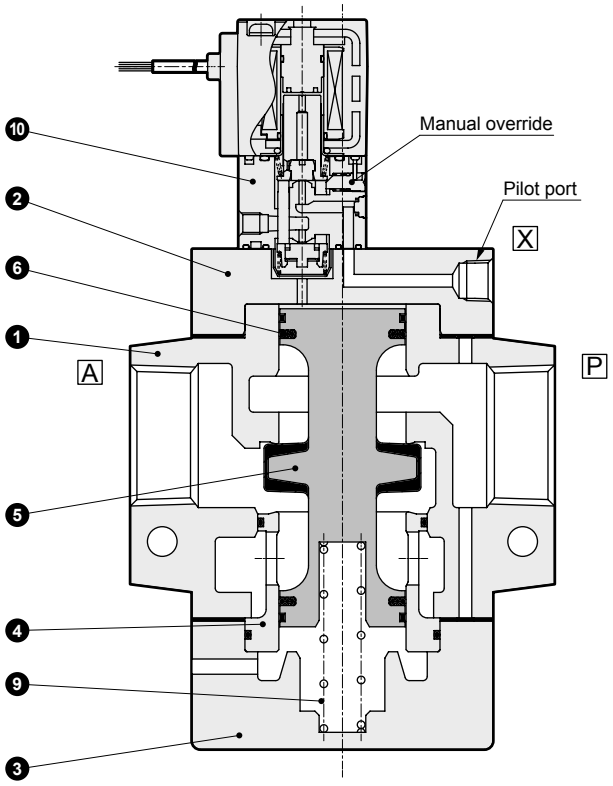
Ⓐ Actuation : Universal
Ⓑ Port size : Rc1/2
Ⓒ Body/sealant combination
: Body/aluminum, sealant/nitrile rubber
Ⓓ Coil housing : With DIN terminal box
Ⓔ Other options : With surge suppressor
Ⓕ Voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

Internal structure and parts list

● **NVP11-10A/15A**



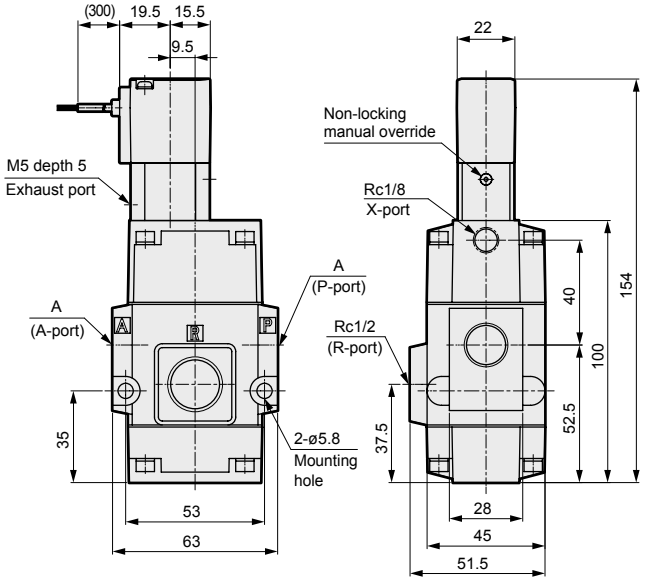
● **NVP11-20A/25A/32A/40A/50A**



No.	Part name	Material		No.	Part name	Material	
1	Body	AC4C	Aluminum casting	6	Packing	NBR	Nitrile rubber
2	Stuffing	AC4C	Aluminum casting	7	Piston	POM	Acetal resin
3	Cap	AC4C	Aluminum casting	8	MY packing	NBR	Nitrile rubber
4	Valve seat	C3604	Copper alloy	9	Spring	SWP	Piano wire
5	Valve stem	NBR, A2017	Nitrile rubber, aluminum	10	Pilot solenoid valve	-	-

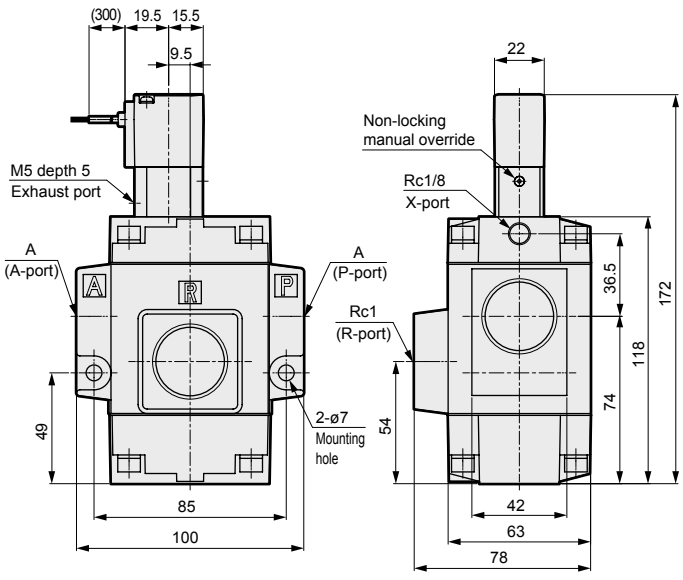
Dimensions

● Grommet coil
NVP11-10A/15A-12C



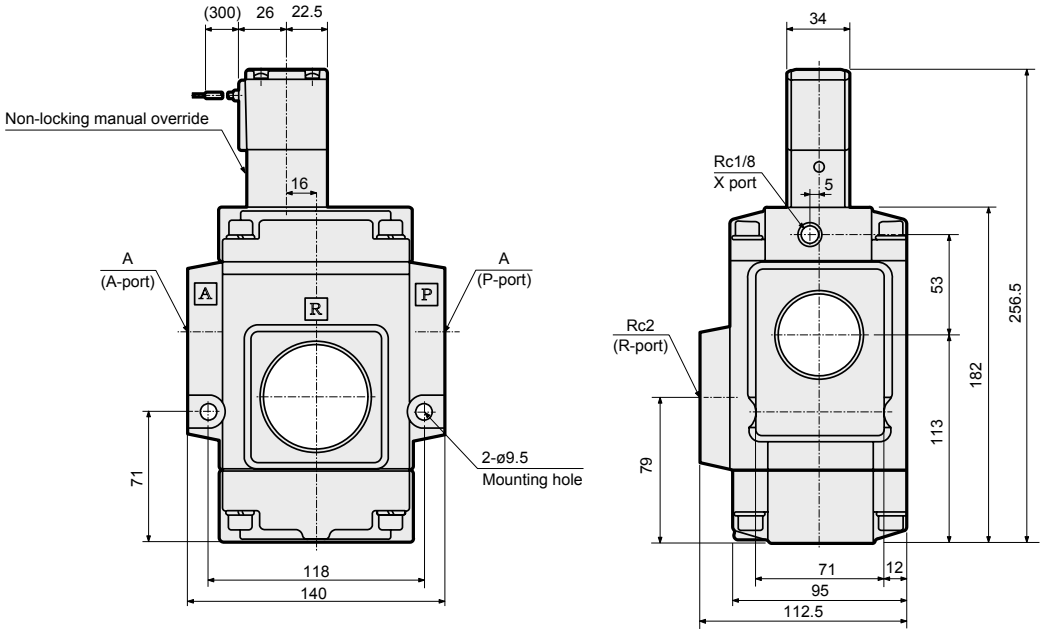
Model No.	A
NVP11-10A-1**	Rc3/8
NVP11-15A-1**	Rc1/2

● Grommet coil
NVP11-20A/25A-12C



Model No.	A
NVP11-20A-1**	Rc3/4
NVP11-25A-1**	Rc1

● Grommet coil
NVP11-32A/40A/50A

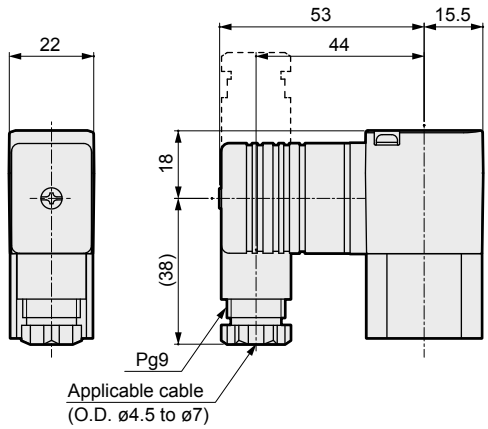


Model No.	A
NVP11-32A-1**	Rc1 1/4
NVP11-40A-1**	Rc1 1/2
NVP11-50A-1**	Rc2

Optional dimensions CAD

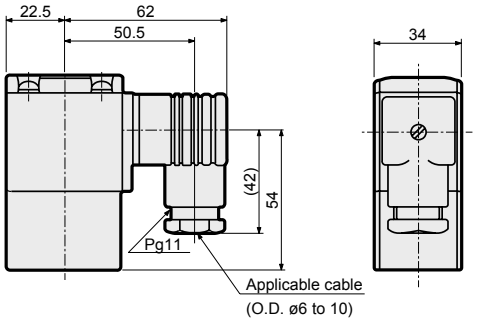
● With DIN terminal box (Pg9)

NVP11-10A/15A/20A/25A-1 **2G** **2H**



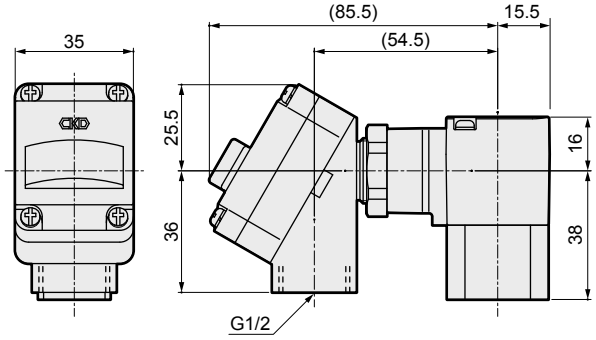
● With DIN terminal box (Pg11)

NVP11-32A/40A/50A-1 **2G** **2H**



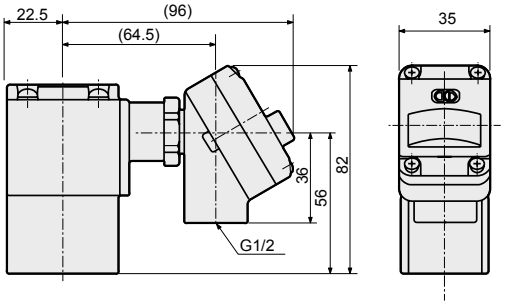
● With T type terminal box (G1/2)

NVP11-10A/15A/20A/25A-1 **3T** **3R**



● With T type terminal box (G1/2)

NVP11-32A/40A/50A-1 **3T** **3R**



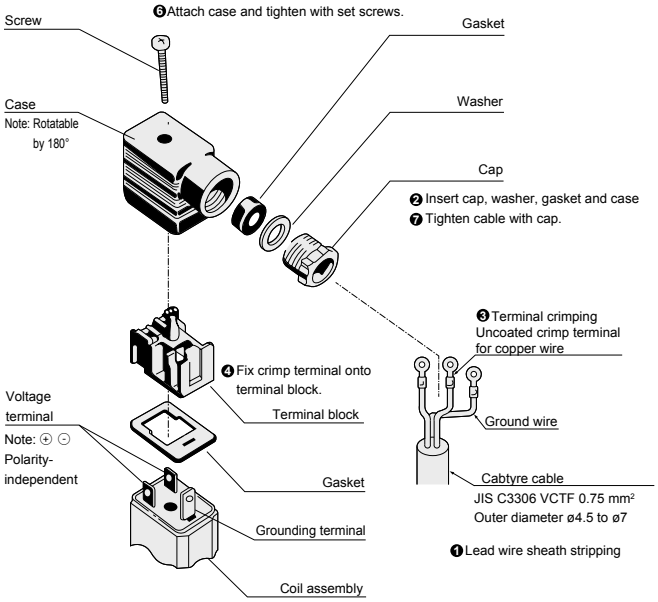
How to connect terminal box

DIN terminal box (Pg9), DIN terminal box with lamp (Pg9)

(1) Use the following cabtyre cable.
· Cable O.D.: ø4.5 to ø7 · Nominal sectional area: 0.75 mm²

(2) Put the crimp terminal for copper wire on the cabtyre cable's lead wire and crimp the terminal. The terminal box thread size is M3.

(3) Tighten the screws with the following tightening torque.
· Set screw tightening torque: 0.5 N·m
· Terminal screw tightening torque: 0.5 N·m



Wire with steps ❶ to ❼.

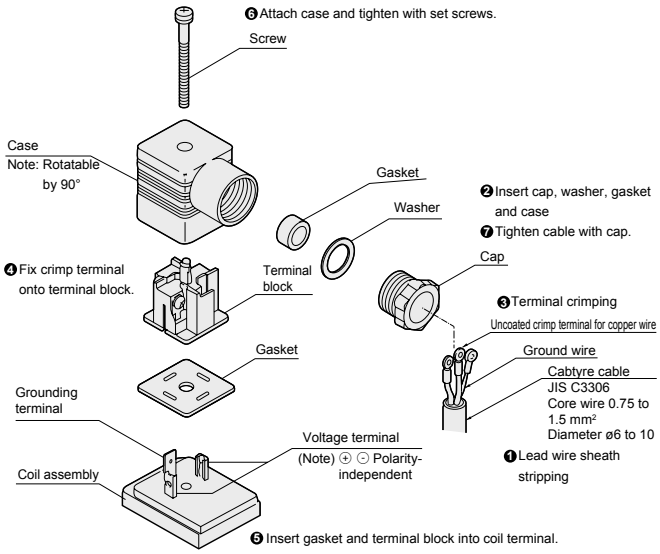
* The orientation of the cord can be changed by removing the terminal block from the case, rotating it by 180°, and then replacing the block into the case.

DIN terminal box (Pg11), DIN terminal box with lamp (Pg11)

(1) Use the following cabtyre cable.
· Cable O.D.: ø6 to ø10 · Nominal sectional area: 0.5 to 1.5 mm²

(2) Put the crimp terminal for copper wire on the cabtyre cable's lead wire and crimp the terminal. The terminal box thread size is M3.

(3) Tighten the screws with the following tightening torque.
· Set screw tightening torque: 0.5 N·m
· Terminal screw tightening torque: 0.5 N·m



Wire with steps ❶ to ❼.

* The orientation of the cord can be changed by removing the terminal block from the case, rotating it by 90°, and then replacing the block into the case.

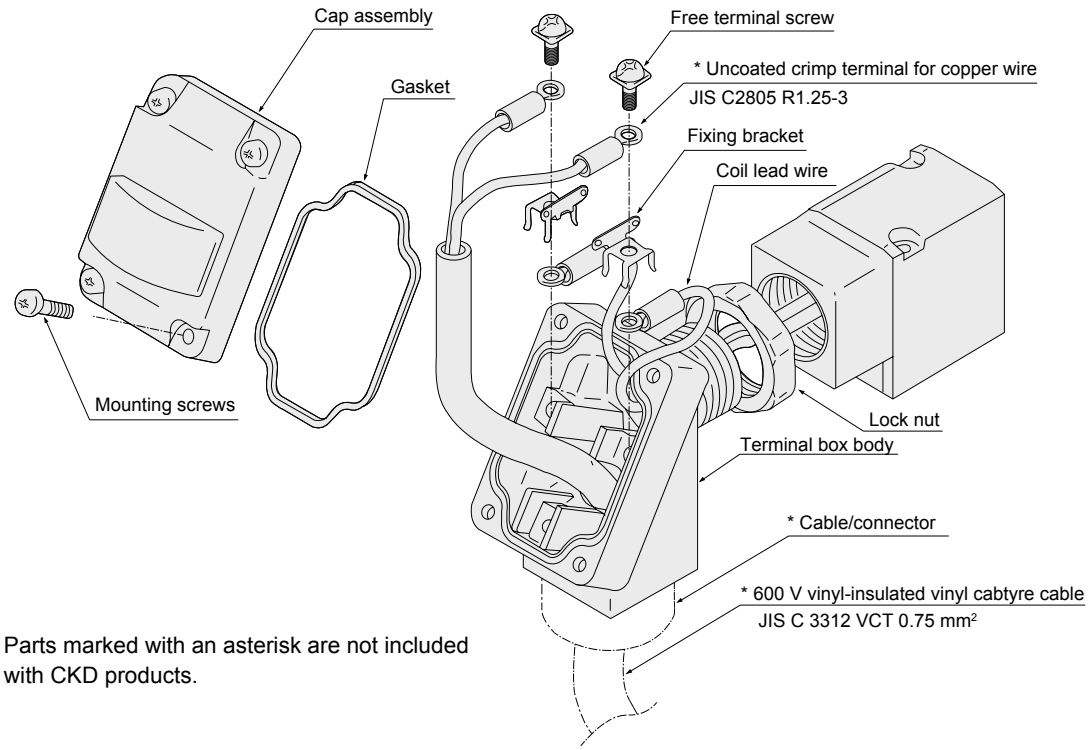
How to connect terminal box

T type terminal box (G1/2), T type terminal box with lamp (G1/2)

(1) Use the following cabtyre cable.
· Nominal sectional area: 0.75 mm²

(2) Put the crimp terminal for copper wire on the cabtyre cable's lead wire and crimp the terminal. The terminal box thread size is M3.

(3) Tighten the screws with the following tightening torque.
· Mounting screw tightening torque: 0.5 N·m ·Terminal screw tightening torque: 0.5 N·m



Parts marked with an asterisk are not included with CKD products.

* Changing the orientation of T type terminal box

Use the following steps to change the orientation of the T type terminal box from the default state.

(1) Hold the width across flats (25 width) of the T type terminal box with a tool (adjustable wrench, wrench, etc.), and loosen it by turning counterclockwise.

(2) Loosen the lock nut.

(3) Rotate the T type terminal box clockwise to approx. 15° before the required position.

(4) Tighten the lock nut to the coil side by hand until it is lightly tightened.

(5) Hold the width across flats of the T type terminal box with a tool, and rotate it (approx. 15°) to tighten it to the required position.

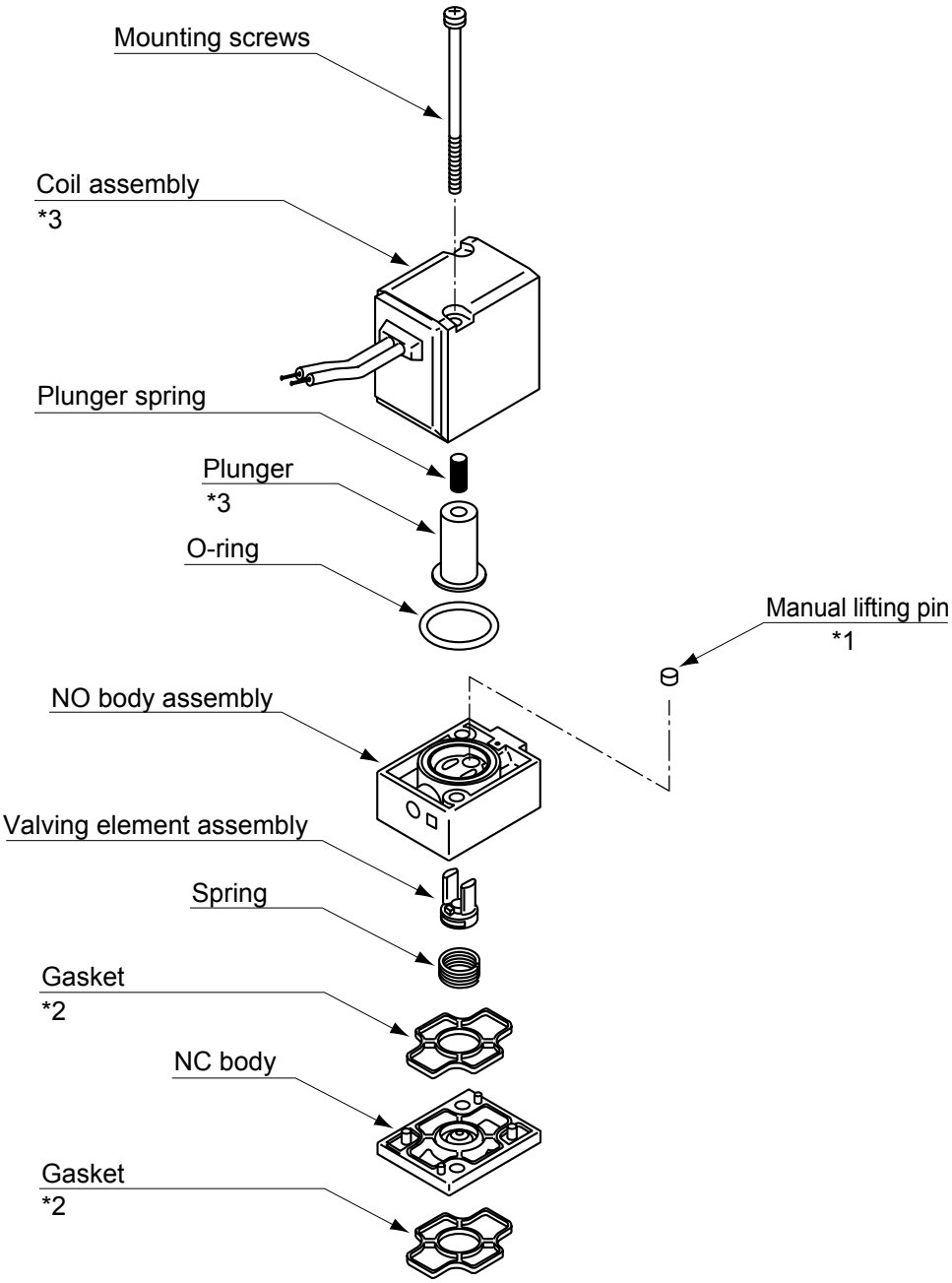
Note: When further tightening the terminal box to change the orientation from the default position, rotate it within 1/2 turn.

NVP11,NP13,NP14-10A to 25A

1 Pilot solenoid valve assembling procedure (for types with solenoid valve)

If the pilot solenoid valve has been disassembled, assemble it as follows.

After disassembly, assemble the manual override section (green) onto the port A side of the body.



*1 : Do not lose components such as manual lifting pins during disassembly.
*2 : The gasket has an orientation. Be careful when setting in the NC body.
*3 : Coil assembly and plunger are different between AC voltage and DC voltage. Replace them as a set when necessary.
*4 : Plunger is coated with turbine oil for lubrication.

■ Remarks

● Model No. of pilot solenoid valve (actuator assembly kit) for NVP11-10A to 25A, NP$^{13}_{14}$-10A to 25A

CVS2-B-0 □□ -(Rated voltage)

↑ Coil option code

Safety Precautions

Be sure to read this section before use.
Refer to Intro Page 59 for general precautions for using valves.

Product-specific cautions: 3-port large flow rate valve NP/NAP/NVP Series

Design/selection

⚠WARNING

■ Ambient environment

(1) NP and NVP Series cannot be used in an explosive gas atmosphere. When using in an explosive gas atmosphere, change to the NAP Series, and provide a separate explosion-proof solenoid valve on the pilot air circuit.
(2) If there are high levels of dust in the area, install a downward-facing silencer or elbow fitting on the exhaust port so that dust does not enter.

■ This product cannot be used as an emergency shut off valve.

It is not designed to function as a safety valve, such as an emergency shut off valve. When using in such a system, always take separate measures that will ensure safety.

■ Fluid temperature

Be sure to use the coolant check valve within the specified fluid temperature range.

■ Ambient environment

(1) Do not use this product in a corrosive gas atmosphere or an atmosphere that could affect the component materials.
(2) Do not use this product near a heat generating source or in a location where it may be exposed to radiant heat.
(3) Use this product within the operating ambient temperature.
(4) When using this product in a cold climate, take the necessary measures to prevent freezing.
(5) Take appropriate safeguards according to the degree of protection listed in the catalog specifications. Consult with CKD when using outdoors.
(6) Take appropriate safeguards when using this product in places where oil or welding spatter, etc. could come in contact with it.

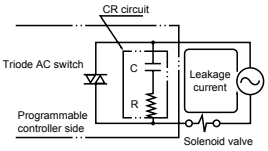
⚠CAUTION

■ Ultra dry air

The inside of the valve is pre-lubricated with grease.
This valve may not be appropriate if ultra dry air quality is required at the end of the circuit.

■ Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.
Failure to observe this could lead to malfunctions.



Voltage / Bore size	100 VAC	200 VAC	24 VDC
10 to 25A	3 (6) mA or less	1.5 (3) mA or less	1.8 (3) mA or less
32 to 50A	6 mA or less	3 mA or less	1 mA or less

The values in ( ) are for models with surge suppressors.

■ Precautions for external pilot air

(1) Draining: Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). This is a factor that significantly reduces the reliability of the pneumatic components. For drainage measures, improve air quality by dehumidifying with an after cooler or dryer, removing foreign matter with a filter, and removing tar with a tar removal filter, etc.
(2) Pre-lubrication: This series is pre-lubricated, so no lubrication is required. However, once lubrication has been started, it must be continued so that the lubricant does not run out. Use turbine oil Class 1 ISO VG32 (#90) or equivalent for lubrication.
(3) Filter: Install a filter with a 5 μm or less filter element.
(4) If pilot air is supplied, the valve may operate even if the pressure is less than the working pressure range.

■ Min. working pressure

The pressure must be 0.2 MPa and over to operate the NP Series. If the piping cross-section area on the fluid inlet is reduced, the operation may become unstable due to a pressure drop during valve operation.

■ Securing maintenance space

Secure sufficient space for maintenance and inspection.

■ Vibration

Install this product in a place not subject to vibration.

Mounting, piping and wiring

1. Installation

⚠ CAUTION

■ (1) Be sure to read the instruction manual thoroughly before installing the product.
(2) In the case of models with solenoid valves, do not apply external force to the coil during installation.
(3) After installation, check for leaks from pipes, for proper wire connections and that the product is installed correctly.

2. Piping

⚠ CAUTION

■ Refer to the table below for the piping tightening torque.

Piping nominal diameter	Recommended piping tightening torque (Nm)
Rc1/8	7 to 9
Rc3/8	22 to 24
Rc1/2	28 to 30
Rc3/4	31 to 33
Rc1	36 to 38
Rc1 1/4	40 to 42
Rc1 1/2	48 to 50
Rc2	54 to 56

■ Do not pipe using the solenoid valve section. There is a risk of damage. (NP/NVP only)

■ Observe the effective thread length for the piping threads. Chamfer the end of the thread section by approx. a half-pitch.

■ Before piping, flush the inside of the pipe with 0.3 MPa of air, and remove foreign matter such as dirt, metal chips, rust and sealing tape.

■ If excessive sealant (sealing tape, gel-type sealant) is applied when piping, it could enter the product and cause malfunctions.

■ When applying or wrapping sealant on the piping material, apply or wind it from the pipe end along the thread section, and leave 1.5 to 2 threads uncovered.

■ Dirt or foreign matter in fluid could prevent the product from functioning correctly. Install a 5 µm or finer air filter.

■ Make sure not to use the wrong supply port when connecting the pipes to the product.

■ Install a by-pass circuit and use an elbow union for piping to simplify the maintenance and repair work.

■ When controlling fluid in a tank, pipe at a level slightly above the bottom of the tank.

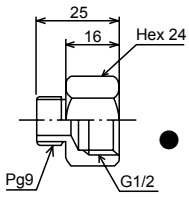
■ If a manifold is used on the solenoid valve for control, use a solenoid valve with a built-in “exhaust check valve” to avoid malfunctions caused by other exhaust pressures. (NAP only)

3. Wiring (for NP/NVP)

⚠ CAUTION

■ Refer to the technical data on pages 689 and 690 for connection methods to a DIN terminal box or T type terminal box.

■ When changing the nominal thread size from Pg9 to G1/2 for the DIN terminal box’s junction box outlets, use the optional connector shown below.



● Order Model No.:
CVS2-CONNECTOR-F4-202936

■ Coil direction can be changed 180°.
To reverse the electrical connection direction, rotate only the coil. The valve will not function if the pilot solenoid valve body is moved.

■ Use with the allowable voltage range. Usage outside the allowable voltage range may lead to malfunction or coil damage.

■ Provide a circuit breaker, such as a fuse, on the control circuit to protect electrical equipment.

■ If the electric circuit system is vulnerable to solenoid surge, use a solenoid with a surge suppressor (optional), or insert a surge absorber, etc., in parallel to the solenoid.

■ As a guide, use a wire with a nominal cross section of 0.5 mm^2 or more. Make sure that excessive force is not applied to the lead wire.

■ Use of a switching circuit which does not generate contact chattering extends the useful life of solenoid valves/motor driven valves.

Use/maintenance

1. Common

⚠WARNING

■ Do not touch coils or actuators with hands or body while the power is ON or immediately after it is turned OFF.
The solenoid valve coil and actuator will heat up when energized. Depending on the product, direct contact could cause burns.

■ Do not touch the electrical wiring connections (bare, live parts) with hands or body when they are energized. There is a risk of electric shock.
Touching electrical wiring connections while power is on may lead to electrical shock.

■ Use within the working pressure range.

2. Using the product

⚠CAUTION

■ Using with vacuum
The NVP and NAP Series can be used for both negative pressure (vacuum) and positive pressure. As a balance poppet valve structure is incorporated, a pressurized or vacuum connection can be made from any port.

■ Transfer circuit
When using a vacuum absorbing pad (suction bowl) for the transfer circuit, install a filter between the suction pad and valve so that foreign matter does not enter the valve. Otherwise, leakage may result.

■ Leaving under elevated pressure
If the valve is left under elevated pressure for three days or longer, the starting response could be delayed.

■ Response time
The response times given in the catalog are the times when energized at a pressure of 0.5 MPa and without lubrication.

■ Do not use valves as footing or place any heavy objects on top of the valves.

■ If the product has been out of use for one month or more, perform a test run before starting the actual operation.

3. Maintenance

⚠CAUTION

■ Pilot solenoid valves (NP/NVP)

Port size 10A to 25A
Pilot solenoid valve (actuator assembly kit) for CVS2:
CVS2-B-0 [*1] - (Rated voltage)
is built in. If the pilot solenoid valve has been disassembled, follow the assembly procedure provided on page 691 of the technical data.

Port size 32A to 50A
Special purpose valve: GFAG41-1-0-1 [*1] N - [*2]
is built in.
The tightening torque for the coil assembly mounting screw is 1.1 to 1.8 N·m when disassembling or assembling.
After disassembly, assemble the manual override section (green) onto the port A side of the body.

Note: [*1] is the coil housing code.
[*2] is the rated voltage code.

■ Carefully read the instruction manual before starting maintenance.

■ Always turn the power OFF and release any fluids or pressure before starting maintenance.

■ To ensure optimum use, inspect the product every six months.

■ When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent. (Note that the rubber parts must be replaced. There is a risk of expansion.)

■ Contact CKD with questions about repair parts, etc.

SNP

3-port solenoid valve with spool position detection

Overview

A 3-port solenoid valve that discharges residual pressure through the compressed air supply portion of equipment or systems.
Double-shut off unit and output function in opened and closed states can be selected to help the equipment or system comply with safety standards.

Features

Serves as a solenoid residual pressure exhaust valve for pneumatic systems.

Signal output of the valve's open/close state is possible by detecting the main valve spool position with the safety limit switch.

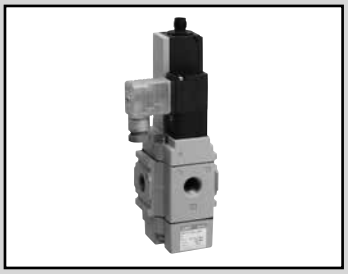
Two modules can be connected to configure a double breaker circuit.

When a circuit corresponding to ISO safety standard (ISO 13849-1) is required, it can be used as a residual pressure exhaust valve.

Can be modular-integrated into the FRL unit.

Reduces piping space.

CONTENTS



3-port solenoid valve with spool position detection

SNP Series

● Port size: Rc3/8 to Rc3/4

RoHS CAD

Specifications

Model		SNP		
Port size		Rc3/8	Rc1/2	Rc3/4
Actuation		NC (open when energize)		
Fluid pressure supply port		P-port		
Working fluid		Compressed air		
Proof pressure	MPa	1.05 (≈150 psi, 10.5 bar)		
Working pressure range	MPa	0.2 (≈29 psi, 2 bar) to 0.7 (≈100 psi, 7 bar)		
Fluid temperature	°C	5 (41°F) to 60 (140°F)		
Ambient temperature	°C	-5 (23°F) to 60 (140°F)		
Weight	kg	0.8(1.7) *1		1.8(3.7) *1
Orifice size	mm	14.8 or equiv.		25.4 or equiv.
Valve seat leakage		1 or less (at pneumatic pressure 0.2 (≈29 psi, 2 bar) to 0.7 MPa (≈100 psi, 7 bar))		
Valve structure		Internal pilot balance poppet structure		
Mounting orientation		Unrestricted		

*1: Values in ( ) are the weight for modules

Electrical specifications				
Rated voltage	(*2)	100 VAC (50/60 Hz) · 110 VAC (60 Hz), 200 VAC (50/60 Hz) · 220 V (60 Hz), 24 VDC		
Apparent power (VA)	When holding	3.6 (50 Hz), 2.8 (60 Hz)		
	When starting	11 (50 Hz), 9 (60 Hz)		
Power consumption (W)	AC	1.9 (50 Hz), 1.5 (60 Hz)		
	DC	2.0		
Thermal class		B		
Degree of protection (IEC standards 529)		DIN terminal box (Pg 9)		IPX5
		DIN terminal box (M12-4P connector)		

*2: The voltage range must be within ±10% of the rated voltage.
*3: Contact CKD for details on reliability data (B10).

Limit switch specifications

Limit switch specifications		
Manufacturer model	D4N-1B31	D4N-9B31
Terminal	Pg13.5	M12-4P connector
Contact resistance	25 mΩ or less	
Minimum applicable load	5 VDC 1 mA resistance load	
Rated insulation voltage [1 to 5 V]	300	
Insulation resistance MΩ	100	
Electric shock protection class	Class II	
Pollution degree (working environment)	3 (EN60947-5-1)	
Conditional short-circuit current A	100	

* Refer to the manufacturer's catalog for details.

Flow characteristics

Model No.		P→A		A→R	
		C[dm³/(s/bar)]	S(mm²)	C[dm³/(s/bar)]	S(mm²)
Single unit	SNP-10A	13	64	14	70
	SNP-15A	15	76	16	80
	SNP-20A	34	170	36	180
2 stations	SNP-10A	10	50	14	70
	SNP-15A	12	59	16	80
	SNP-20A	26	130	36	180

How to order

SNP - 1R - 15A - 0 2HS L B3 S1 - 1

- Ⓐ Station No.
- Ⓑ Port size
- Ⓒ Sealant
- Ⓓ Coil option
- Ⓔ Limit switch
- Ⓕ Bracket *1
- Ⓖ Silencer *2
- Ⓗ Voltage

Code	Description
Ⓐ Station No.	
1R	Single unit (terminal box right-facing)
1L	Single unit (terminal box left-facing)
2	2 modules
Ⓑ Port size	
10A	Rc3/8
15A	Rc1/2
20A	Rc3/4
Ⓒ Sealant	
0	NBR
Ⓓ Coil option	
2G	DIN terminal box
2HS	DIN terminal box with lamp/surge suppressor
2J	DIN terminal box (M12-4P connector)
2KS	DIN terminal box with lamp/surge suppressor (M12-4P connector)
Ⓔ Limit switch	
L	Pg13.5 (D4N-1B31: OMRON)
M	M12-4P connector (D4N-9B31: OMRON)
Ⓕ Bracket	***1**

		10A	15A	20A
Blank	No option	●	●	●
B3	With bracket (2000 Series, 3000 Series)	●	●	
B4	With bracket (4000 Series)	●	●	
B8	With bracket (8000 Series)			●

Ⓖ Silencer	
Blank	No option
S1	Sintered metal
S2	Resin
Ⓗ Voltage	
1	100 VAC 50 Hz/60 Hz / 110 VAC 60 Hz
2	200 VAC 50 Hz/60 Hz / 220 VAC 60 Hz
3	24 VDC

Precautions for model No. selection

*1 : The bracket can be selected when station No. Ⓐ is "2".
*2 : Silencer is attached to the product

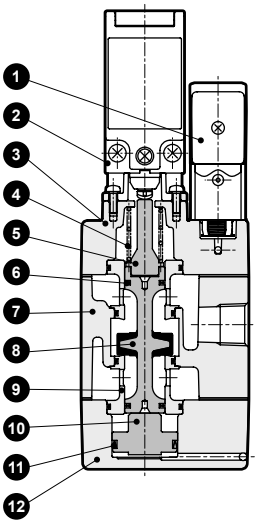
[Example of model No.]

SNP-1R-15A-02HSLB3S1-1

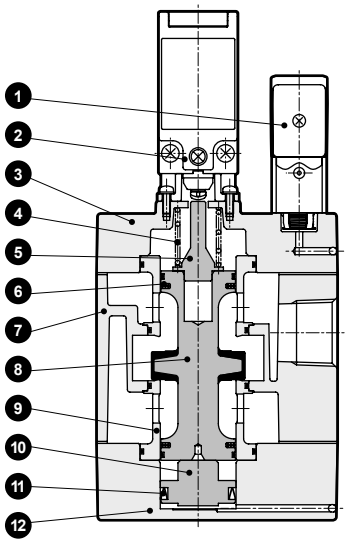
Ⓐ Station No.	: Single unit (terminal box right-facing)
Ⓑ Port size	: Rc1/2
Ⓒ Sealant	: NBR
Ⓓ Coil option	: DIN terminal box with lamp/surge suppressor
Ⓔ Limit switch	: Pg13.5
Ⓕ Bracket	: With bracket
Ⓖ Silencer	: Sintered metal
Ⓗ Voltage	: 100 VAC 50 Hz/60 Hz

Internal structure and parts list

● SNP-1*-10A/15A



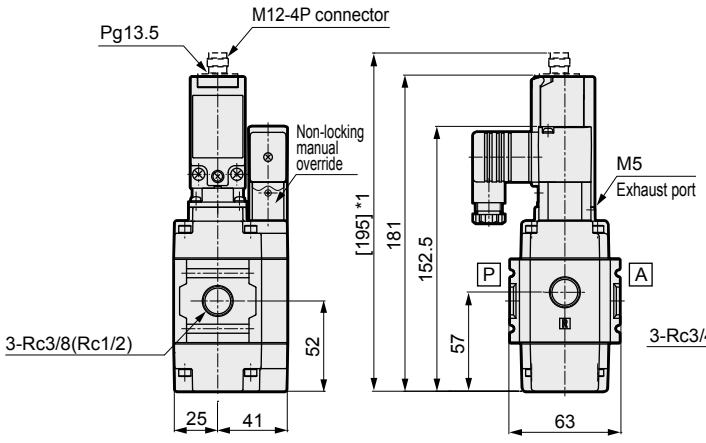
●SNP-1*-20A



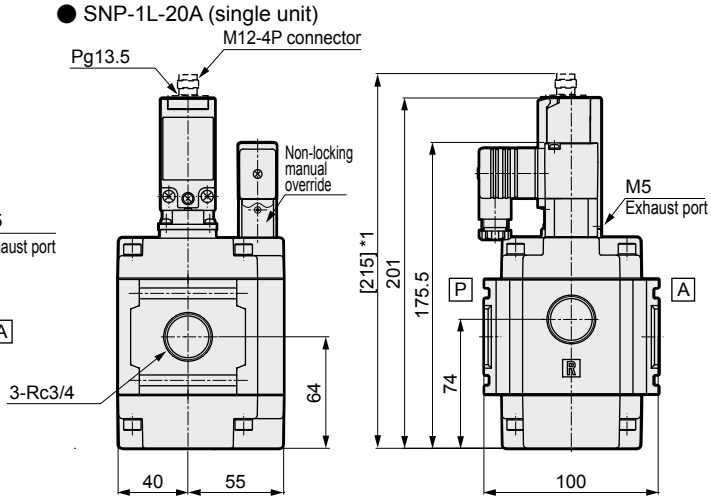
No.	Part name	Material	
1	Pilot solenoid valve	-	
2	Limit switch	-	
3	Body	ADC12	Aluminum die-casting
4	Spring	SWP	Piano wire
5	Indicator	A2017	Aluminum
6	PSD packing	NBR	Nitrile rubber
7	Body	ADC12	Aluminum die-casting
8	Valve stem	NBR,A2017	Nitrile rubber, aluminum
9	Valve seat	A5056	Aluminum
10	Piston	A2017	Aluminum
11	MY packing	NBR	Nitrile rubber
12	Cap	ADC12	Aluminum die-casting

Dimensions

● SNP-1L-10A/15A (single unit)

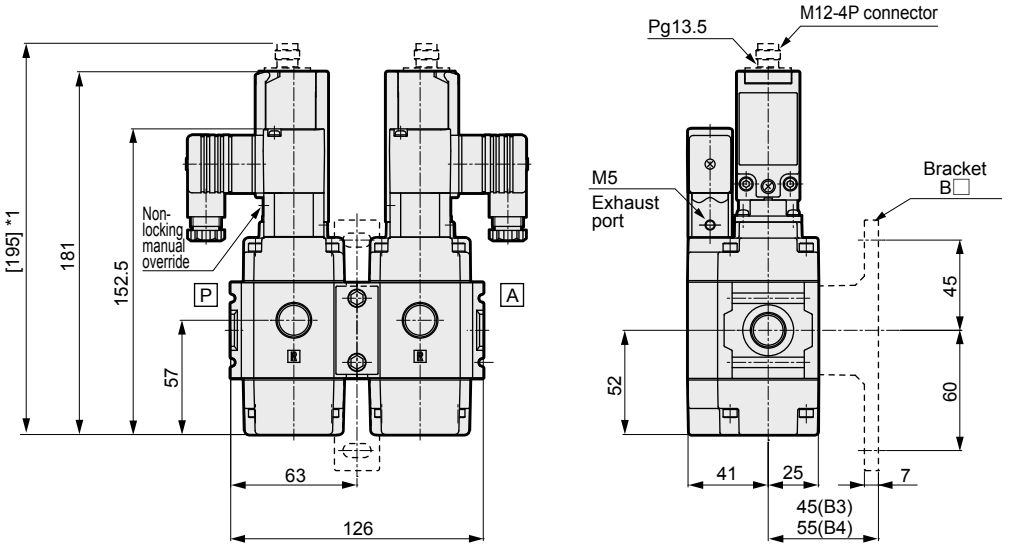


● SNP-1L-20A (single unit)



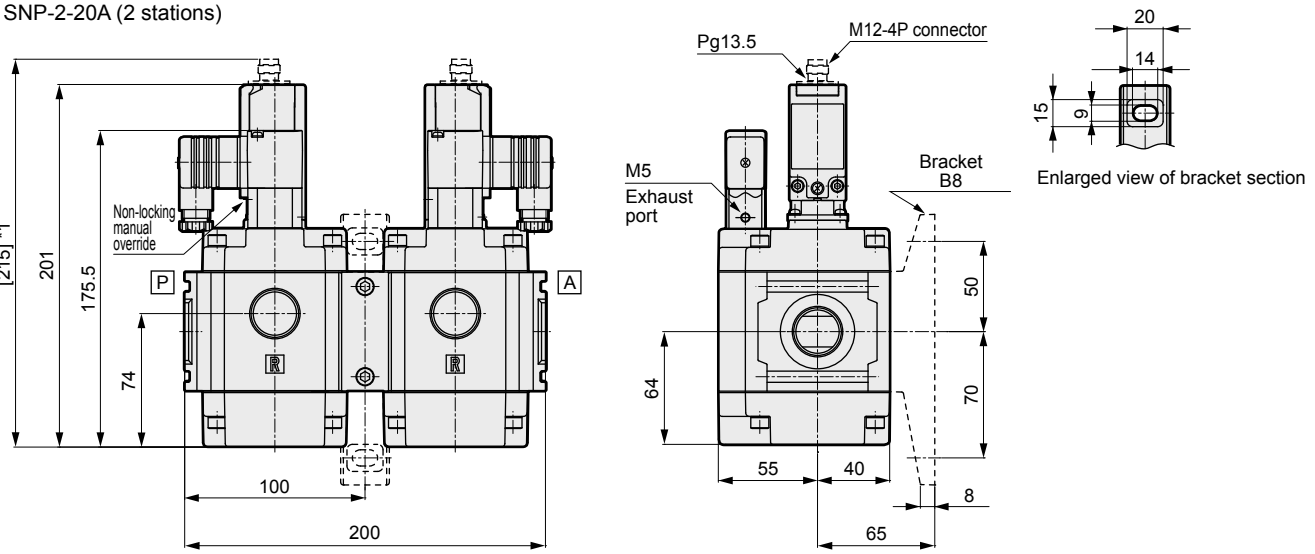
*1 : [ ] shows dimensions when M12-4P connector (M) is selected
*2 : For 1R, the wiring of the terminal box and limit switch is positioned to the right.

● SNP-2-10A/15A (2 stations)



*1 : [ ] shows dimensions when M12-4P connector (M) is selected

● SNP-2-20A (2 stations)

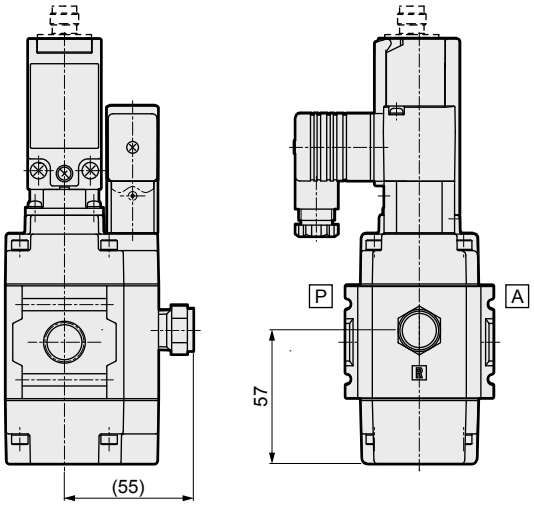


*1 : [ ] shows dimensions when M12-4P connector (M) is selected

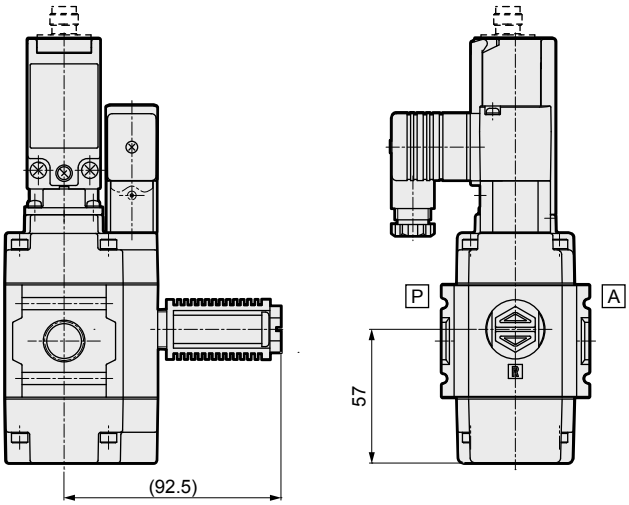
Optional dimensions with silencer

* Silencer is attached with the product.

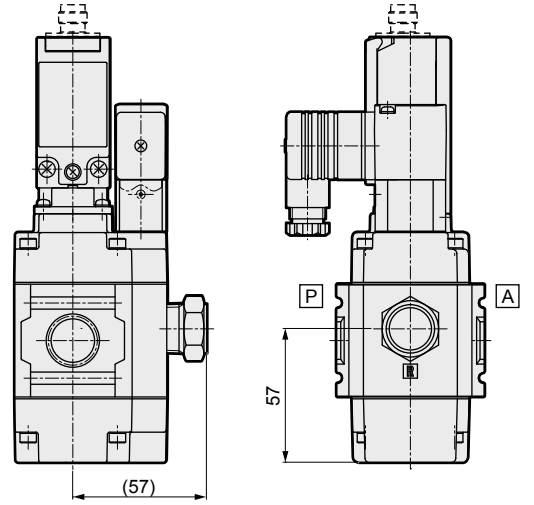
●SNP-1L-10A-*S1



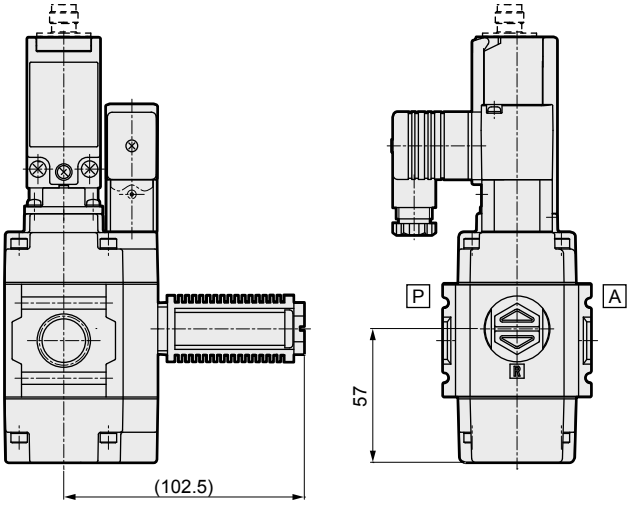
●SNP-1L-10A-*S2



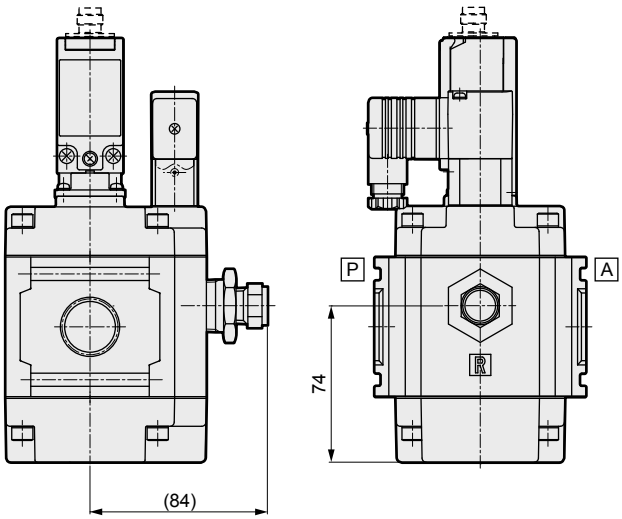
●SNP-1L-15A-*S1



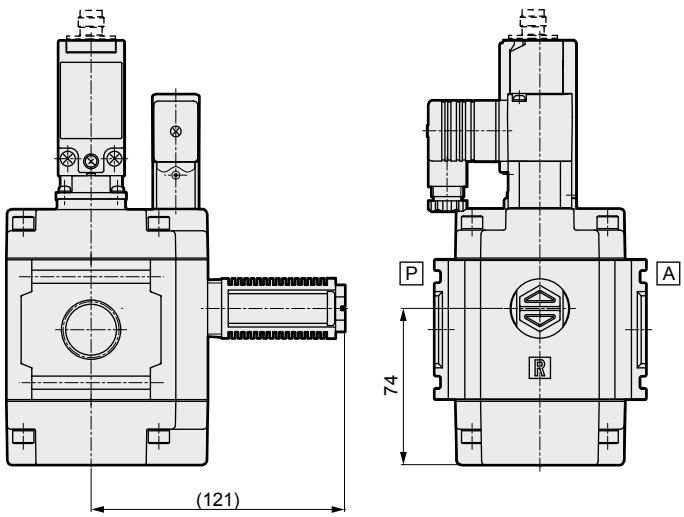
●SNP-1L-15A-*S2



●SNP-1L-20A-*S1

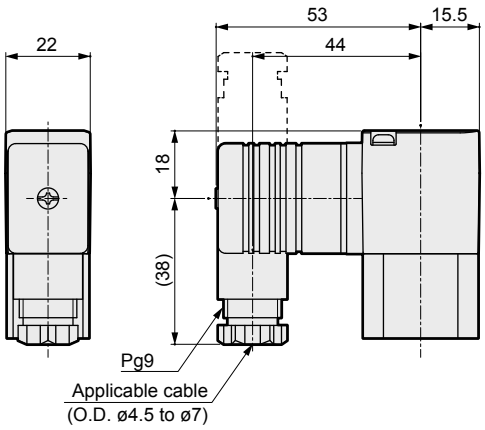


●SNP-1L-20A-*S2

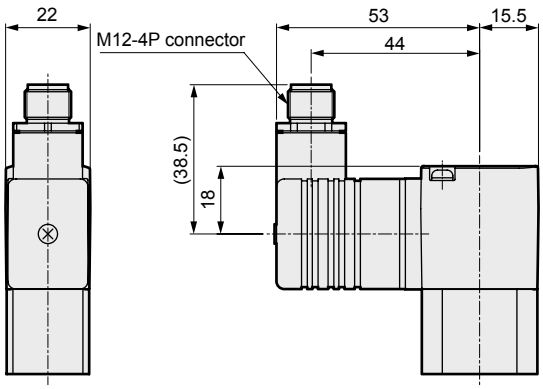


Coil optional dimensions

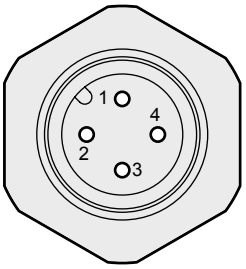
● DIN terminal box (Pg9)
DIN terminal box with lamp/surge suppressor (Pg9)
SNP-* 2G / 2HS



● DIN terminal box (M12-4P connector)
DIN terminal box with lamp/surge suppressor (M12-4P connector)
SNP-* 2J / 2KS



Connector pin array



PIN No.	Applications
1PIN	Ground
2PIN	(Not used)
3PIN	Power supply -
4PIN	Power supply +

* As it is a screw-in, the connector pin positions may not be the same as those shown above.

How to connect limit switch

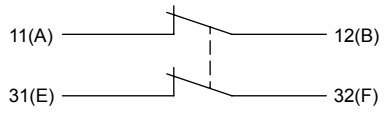
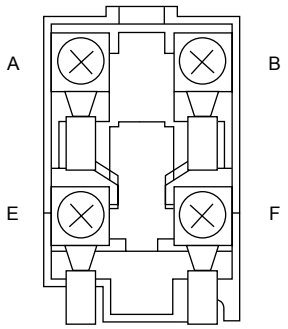
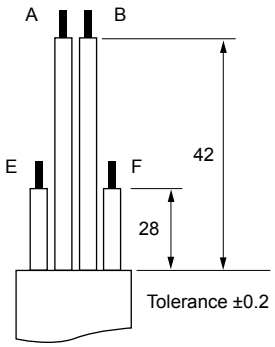
Applicable to products with the limit switch option code “L” and “M”.

(1) When connecting to the terminal via insulating tube and M3.5 crimp terminal, place the crimp terminals as shown in Figure 2-7 so as not to ride over the case or cover.

(2) The applicable lead wire size is AWG 20 to 18 (0.5 to 0.75 mm^2).
The lead wire should be processed in accordance with the length in Figure 2-7. The excess lead wire may come into contact with the cover and cause it to be lifted.

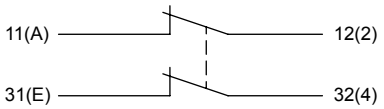
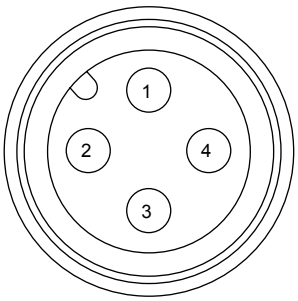
CAUTION	Do not push a crimp terminal or the like into the gap of the pipe case, as it may cause the case to be damaged or deformed. Be sure to use the crimp terminal with the thickness of 0.5 mm or less to avoid interference with the inside of the switch case.

·For the limit switch option code "L"

Circuit configuration	Crimp terminal layout drawing	Lead wire processing drawing
		

(Figure 2-7)

·For the limit switch option code "M"

Circuit configuration	Connector pin No.
	

(Figure 2-8)

(3) When mounting a connector to the conduit port, be sure to use a connector with the thread length of 9 mm or less so as not to interfere with the built-in switch.
Recommended connector : ST-13.5 5301-5030 (LAPP)
Recommended seal packing : JPK-16, GP-13.5 or GPM20

(4) For the tightening torque of each part, please refer to Table 2-3.

Table 2-3 Applicable tightening torque

Screw tightening point	Recommended tightening torque values
Terminal thread	0.6 to 0.8 [N m]
Cover set screw	0.5 to 0.7 [N m]
Connector	1.8 to 2.2 [N m]

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

3-port solenoid valve with spool position detection (SNP)

Design/selection

⚠ WARNING

1 Ambient environment

(1) SNP Series cannot be used in an explosive gas atmosphere.

(2) If there are high levels of dust in the area, install a downward-facing silencer or elbow fitting on the exhaust port so that dust does not enter.

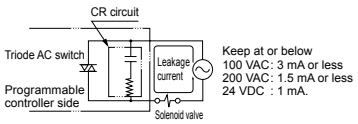
⚠ CAUTION

1 Ultra dry air

The inside of the valve is pre-lubricated with grease. This valve may not be appropriate if ultra dry air quality is required at the end of the circuit.

2 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications. Failure to observe this could lead to malfunctions.



3 Min. working pressure

The pressure must be 0.2 MPa and over to operate the SNP Series. If the piping cross-section area on the fluid inlet is reduced, the operation may become unstable due to a pressure drop during valve operation which causes the pressure inside the valve to drop.

4 Fluid supply side piping

Ensure that the effective cross-sectional area of the fluid supply side (P port) pipe is twice the pipe composite effective cross-sectional area to be connected to the outlet side (A port) and exhaust side (R port). The min. working pressure may not be attainable due to insufficient flow during valve operation.

Mounting, installation and adjustment

⚠ CAUTION

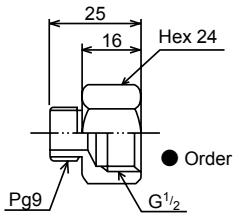
1 Piping

Do not pipe using the solenoid valve and limit switch. There is a risk of damage.

2 Wiring

(1) Refer to Connections on Intro Page 65 when wiring to a DIN terminal box.

(2) When changing the nominal thread size from Pg9 to G1/2 for the DIN terminal box's junction box outlets, use the optional connector shown at the right.



● Order Model No.: CVS2-CONNECTOR-F4-202936

(3) Coil direction can be changed 180°.

To reverse the electrical connection direction, rotate only the coil. The valve will not function if the pilot solenoid valve body is moved.

(4) When using a connector for the limit switch, be sure to use one with thread length of 9 mm or less.

Recommended connector: ST-13.5 5301-5030 (LAPP)

Recommended seal packing: JPK-16, GP-13.5 or GPM20

Use/maintenance

⚠ CAUTION

1 Transfer circuit

When using a vacuum absorbing pad (suction bowl) for the transfer circuit, install a filter between the suction pad and valve so that foreign matter does not enter the valve. Otherwise, leakage may result.

2 Leaving under elevated pressure

If the valve is left under elevated pressure for three days or longer, the starting response could be delayed.

3 Pilot solenoid valves

Pilot solenoid valve for CVSE2 (actuator assembly kit):

Equipped with CVSE2-ACTUATOR-0 [*1] T- [Rated voltage].

After disassembly, assemble the manual override section (green) onto the port P side of the body.

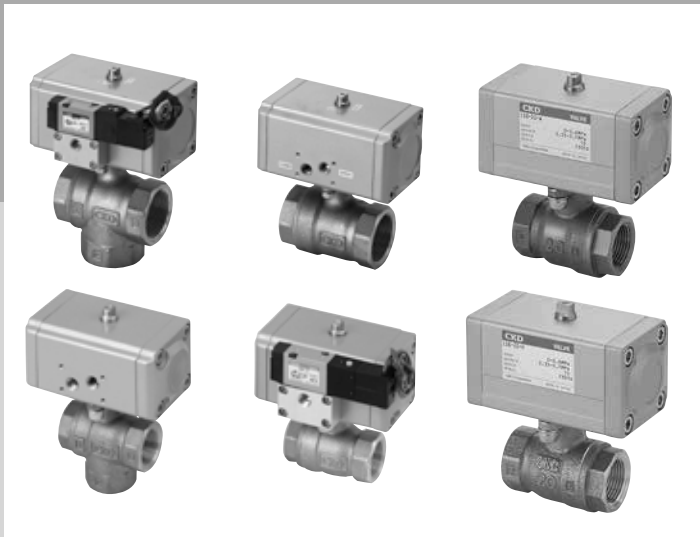
Note: [*1] is the coil housing code.

[*2] is the rated voltage code.

CHB/CHG/CSB

(compact rotary valve)
Air operated 2, 3-port ball valve

For water/air/oil (500 mm^2/s or less) /steam



Overview

The actuator has a double piston air operated structure provided with rack and pinion. The valve is a ball valve configured of materials and a structure resistant to water and hot water scales. This compact and accurate high power 2, 3-port valve (Rc3/8 to Rc2) can handle various fluids including water, hot water, air and oil.

Features

New structure for guaranteed actuation

An air operated double piston rack and pinion method has been incorporated. It is highly reliable and ensures precise operation.

Compatible with pilot operated valve

A solenoid valve for switching the actuator section helps reduce design and installation steps and save space.

Suitable for explosive atmosphere

With its completely air operated structure, this valve can be safely used even in a flammable atmosphere. It is also usable outdoors. (Excluding models with solenoid valves for switching.)

Resistant to foreign material and scale

This valve operates both forward and in reverse, enabling foreign matter to be easily removed even if it enters the valve. The valve's structure and material make it resistant to cold and hot water deposits.

Compact/lightweight/large flow rate

Compact, lightweight, and capable of large flow rate control.

Extensive models

Seven sizes from 10A to 50A. Two types of body material, bronze (CAC408) and stainless steel (SCS13), can meet various fluid control needs.

CONTENTS

⚠ Always read the precautions in the Introduction and on page 736 before use.

Series variation

Air operated 2, 3-port ball valve (compact rotary valve)

Actuation		Model	Bore shape	Working fluid	
Double acting	Air operated	2-port valve (CHB)	Standard bore	Water/air/oil (500 mm^2/s or less)	
		2-port valve (CHBF)	Full bore		
		3-port valve (CHG)	Standard bore		
		2-port valve (CSB)	Standard bore	Steam/water	
		2-port valve (CSBF)	Full bore		
	With solenoid valve	2-port valve (CHB-V)	Standard bore	Water/air/oil (500 mm^2/s or less)	
		2-port valve (CHBF-V)	Full bore		
		3-port valve (CHG-V)	Standard bore		
Single acting (Spring return)	Air operated	2-port valve (CHB-R)	Standard bore	Water/air/oil (500 mm^2/s or less)	
		2-port valve (CHBF-R)	Full bore		
		3-port valve (CHG-R)	Standard bore		
		2-port valve (CSB-R)	Standard bore	Steam/water	
		2-port valve (CSBF-R)	Full bore		
	With solenoid valve	2-port valve (CHB-X)	Standard bore	Water/air/oil (500 mm^2/s or less)	
		2-port valve (CHBF-X)	Full bore		
		3-port valve (CHG-X)	Standard bore		

Note: For details on differences by bore shape, refer to the orifice size and dimensions on each page.

	Body material		Port size (upper: nominal, lower: bore size)							Page
	Bronze	Stainless steel	10A	15A	20A	25A	32A	40A	50A	
			3/8	1/2	3/4	1	1¼	1½	2	
	●	●	●*	●	●	●	●	●	●	706
	●	●		●	●	●	●	●		706
	●	●		●	●	●	●	●	●	712
	●	●	●*	●	●	●	●	●	●	732
	●			●	●	●	●	●		732
	●	●	●*	●	●	●	●	●	●	718
	●	●		●	●	●	●	●		718
	●	●		●	●	●	●	●	●	724
	●	●	●*	●	●	●	●	●	●	706
	●	●		●	●	●	●	●		706
	●	●		●	●	●	●	●	●	712
	●	●	●*	●	●	●	●			732
	●			●	●	●				732
	●	●	●*	●	●	●	●	●	●	718
	●	●		●	●	●	●	●		718
	●	●		●	●	●	●	●	●	724

Models with * are standard bore but have full bore structure.

Air operated 2-port ball valve
(compact rotary valve)

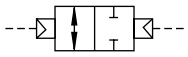
CHB/CHB-R* Series
CHBF/CHBF-R* Series

● Port size: Rc3/8 to Rc2

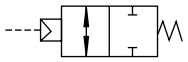
RoHS CAD

JIS symbol

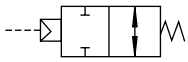
● CHB/CHBF
(Double acting)



● CHB-R1
CHBF-R1
(Single acting-NC)



● CHB-R2
CHBF-R2
(Single acting-NO)



Common specifications

Item		Double acting CHB (Standard bore) CHBF (Full bore)	Single acting CHB-R* (Standard bore) CHBF-R* (Full bore)
Actuation		Air operated: Double acting	Air operated: Single acting
Working fluid		Water/air/oil (500 mm^2/s or less)	
Working pressure MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa		2.0 (≈290 psi, 20 bar)	
Fluid temperature °C		0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C		-10 (14°F) to 60 (140°F) (no freezing)	
Working environment		Indoors	
Mounting orientation		Unrestricted	
Frequency Cycle/min.		1 or less	
Rotary actuator	Pilot fluid	Compressed air	
	Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water) MPa	1.5 (≈220 psi, 15 bar)	
	Working pressure MPa	0.35 (≈51 psi, 3.5 bar) to 0.7 (≈100 psi, 7 bar)	0.4 (≈58 psi, 4 bar) to 0.7 (≈100 psi, 7 bar)
	Fluid temperature °C	5 (41°F) to 60 (140°F)	
	Port size	Rc1/8	Rc1/8

Individual specifications

Item / Model No.		Port size	Orifice size (mm)	Cv	Weight (kg)	
					Double acting	Single acting
Standard bore	CHB-(R*-)10	Rc3/8	10	10	1.0	1.0
	CHB-(R*-)15	Rc1/2	10	6	1.0	1.0
	CHB-(R*-)20	Rc3/4	15	16	1.2	1.2
	CHB-(R*-)25	Rc1	20	29	1.3	2.1
	CHB-(R*-)32	Rc1¼	25	50	2.0(2.1)	2.4(2.5)
	CHB-(R*-)40	Rc1½	32	98	2.5(2.6)	4.6(4.7)
	CHB-(R*-)50	Rc2	40	125	3.2(3.3)	5.4(5.5)
Full bore	CHBF-(R*-)15	Rc1/2	15	23	1.1(1.1)	1.2(1.2)
	CHBF-(R*-)20	Rc3/4	20	51	1.3(1.3)	2.1(2.1)
	CHBF-(R*-)25	Rc1	25	66	2.0(2.0)	2.4(2.4)
	CHBF-(R*-)32	Rc1¼	32	114	2.5(2.5)	4.7(4.7)
	CHBF-(R*-)40	Rc1½	40	176	3.2(3.2)	5.4(5.4)

1 : CHB-(R-)10 is a full bore type. Weight shown in ( ) is for stainless steel body.
*2 : Weight increases by 0.2 kg with one limit switch and by 0.3 kg with two limit switches.
3 : Limit switch of CHB-R-40/50 and CHBF-R*-32/40 is made to order.

How to order

CHB - R1 - 15 - E - W
CHBF

Model No.

Ⓐ Actuator

Ⓑ Port size
*1

Ⓒ Body material

Ⓓ Limit switch
*2
*3

Code	Description	Model No. CHB (Standard bore)	Model No. CHBF (Full bore)
Ⓐ Actuator			
Blank	Double acting	●	●
R1	Single acting NC	●	●
R2	Single acting NO	●	●
Ⓑ Port size			
10	Rc3/8	●	
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	
Ⓒ Body material			
Blank	Bronze	●	●
E	Stainless steel	●	●
N	Stainless steel Oil-prohibited specifications	●	●
Ⓓ Limit switch			
Blank	Without switch	●	●
H	Detection at valve open	●	●
V	Detection at valve closed	●	●
W	With 2 switches	●	●

*1 : When port size is 10, the valve is full bore but the model is CHB.
2 : Limit switch of CHB-R-40/50 and CHBF-R*-32/40 is made to order.
*3 : OMRON D4E-1G20N

[Example of model No.]

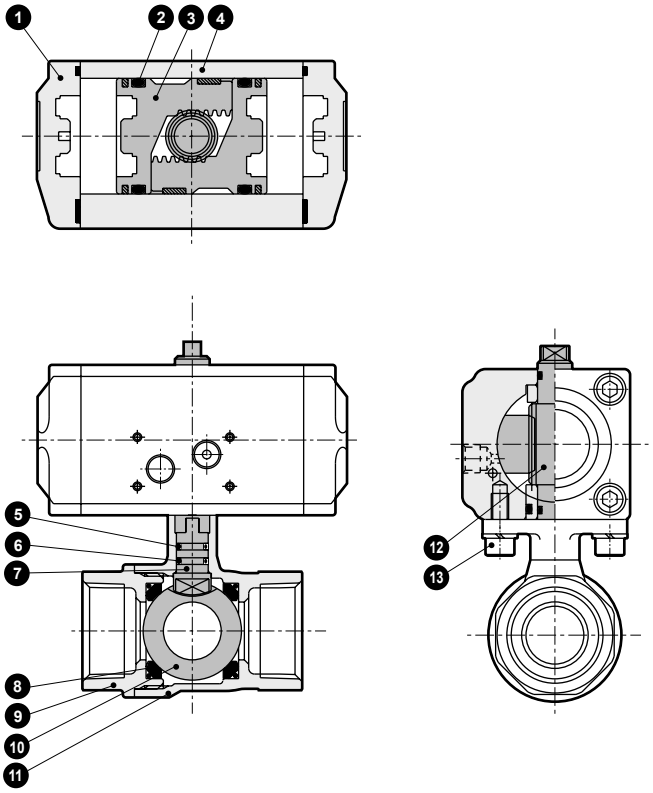
CHB-R1-15-E-W

Model No.: CHB (standard bore)

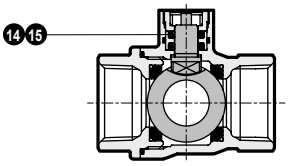
Ⓐ Actuator : Single acting NC
Ⓑ Port size : Rc1/2
Ⓒ Body material : Stainless steel
Ⓓ Limit switch : 2 switches

Internal structure and parts list: CHB/CHBF Series

● CHB-10/15/20/25
CHBF-15/20



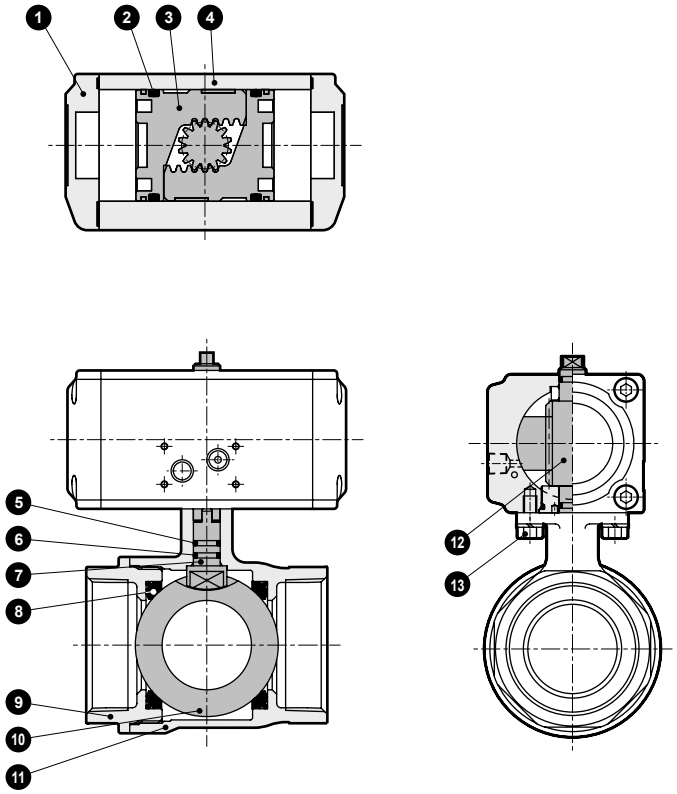
● Oil-prohibited specifications (ball valve)
CHB-10/15/20/25-N



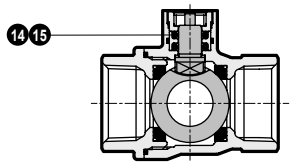
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
6	O-ring	FKM	Fluoro rubber
7	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon socket head cap screw	SUSXM7	Stainless steel
14	O-ring	FKM	Fluoro rubber
15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

● CHB-32/40/50
CHBF-25/32/40



● Oil-prohibited specifications (ball valve)
CHB-32/40/50-N

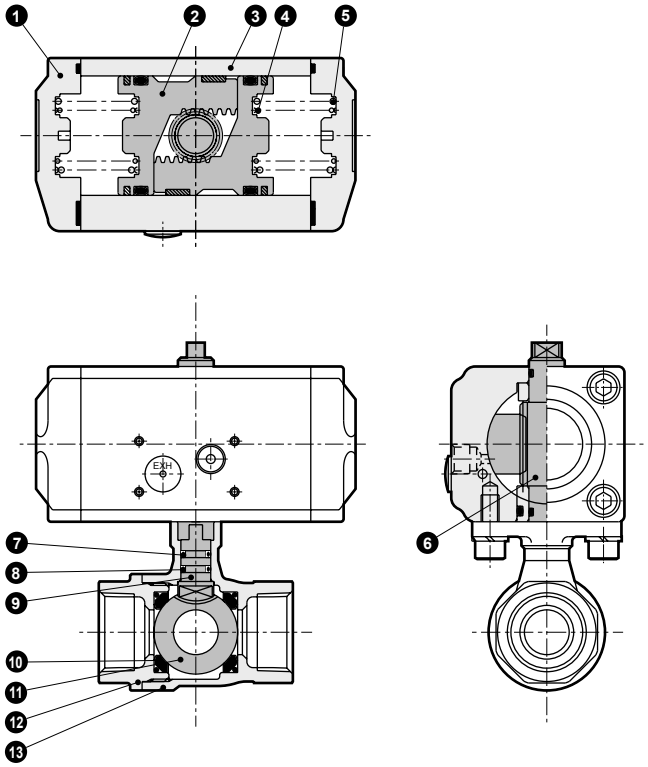


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
6	O-ring	FKM	Fluoro rubber
7	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon head bolt	SUSXM7	Stainless steel
14	O-ring	FKM	Fluoro rubber
15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

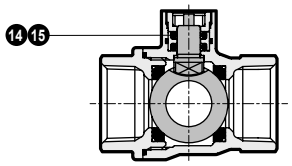
Materials shown in ( ) are for stainless steel body.

Internal structure and parts list: CHB-R*/CHBF-R* Series

● CHB-R*-10/15/20
CHBF-R*-15



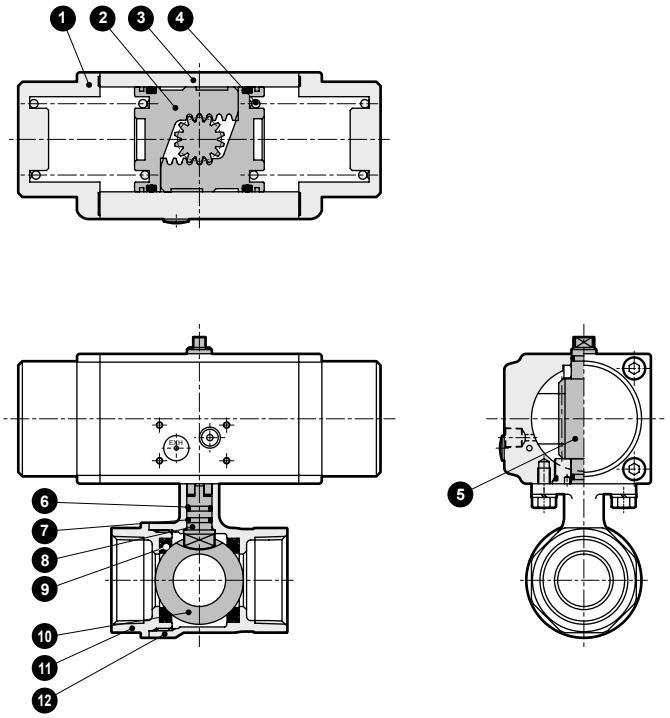
● Oil-prohibited specifications (ball valve)
CHB-R*-10/15/20-N



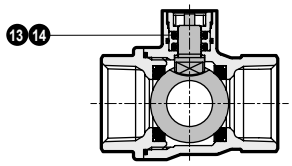
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Spring	SWP	Piano wire
6	Stem	SUS303	Stainless steel
7	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
8	O-ring	FKM	Fluoro rubber
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
10	Valve seat	PTFE	Tetrafluoroethylene resin
11	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
12	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
13	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
14	O-ring	FKM	Fluoro rubber
15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

● CHB-R*-25/32/40/50
CHBF-R*-20/25/32/40



● Oil-prohibited specifications (ball valve)
CHB-R*-25/32/40/50-N

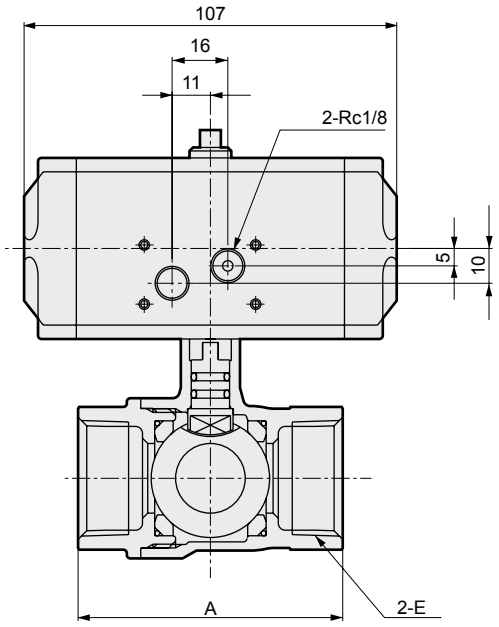


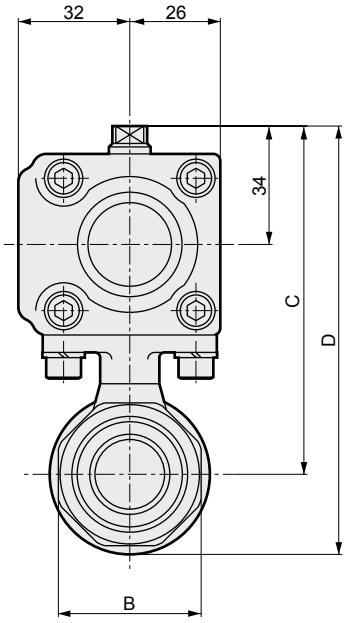
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Stem	SUS303	Stainless steel
6	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
7	O-ring	FKM	Fluoro rubber
8	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
9	Valve seat	PTFE	Tetrafluoroethylene resin
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
12	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
13	O-ring	FKM	Fluoro rubber
14	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

Dimensions: CHB/CHBF Series

● CHB-10/15/20/25
CHBF-15/20





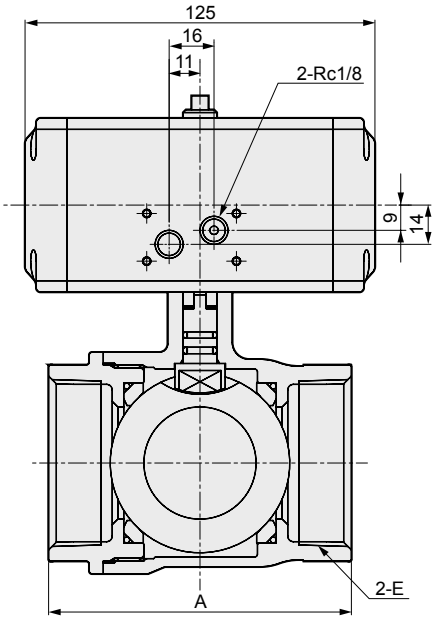
Model No.	A	B	C	D	E
CHB-10	50(56)	24(28)	91	106(107)	Rc3/8
CHB-15	56	28	91	106(107)	Rc1/2
CHB-20	65	34	97	116.5(117.5)	Rc3/4
CHB-25	76	41	100	123(124)	Rc1

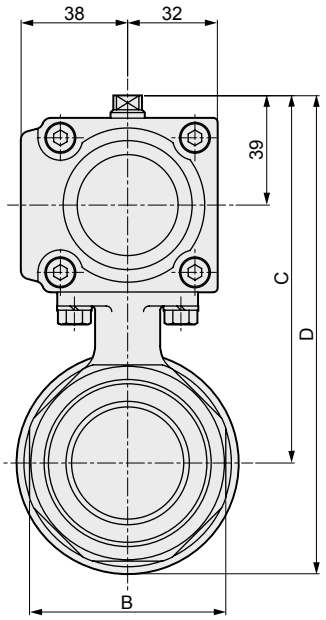
Dimensions shown in ( ) are for stainless steel body.

Model No.	A	B	C	D	E
CHBF-15	65	28	97	116.5(117.5)	Rc1/2
CHBF-20	71	34	100	123(124)	Rc3/4

Dimensions shown in ( ) are for stainless steel body.

● CHB-32/40/50
CHBF-25/32/40





Model No.	A	B	C	D	E
CHB-32	84	50	116	143.5(145.5)	Rc1¼
CHB-40	94	57	122	155.5(157.5)	Rc1½
CHB-50	108	70	131	170.5(171.5)	Rc2

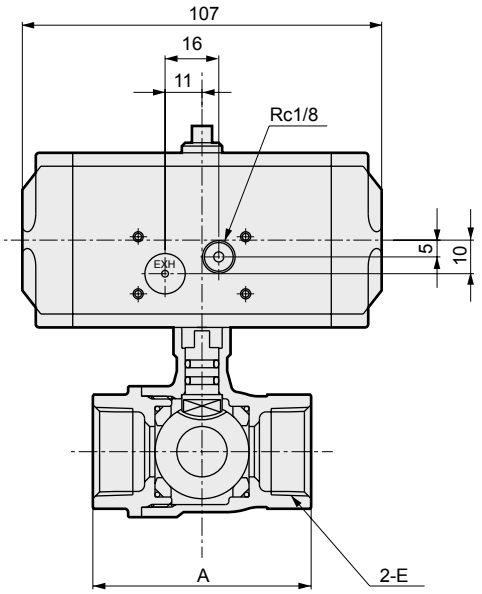
Dimensions shown in ( ) are for stainless steel body.

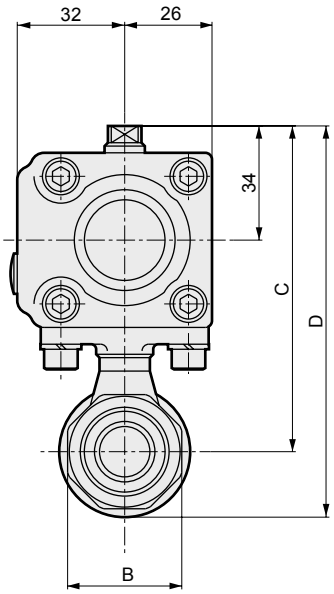
Model No.	A	B	C	D	E
CHBF-25	84	41	116	143.5(144.5)	Rc1
CHBF-32	95	50	122	155.5(156.5)	Rc1¼
CHBF-40	107	57	131	170.5(171.5)	Rc1½

Dimensions shown in ( ) are for stainless steel body.

Dimensions: CHB-R*/CHBF-R* Series

● CHB-R*-10/15/20
CHBF-R*-15





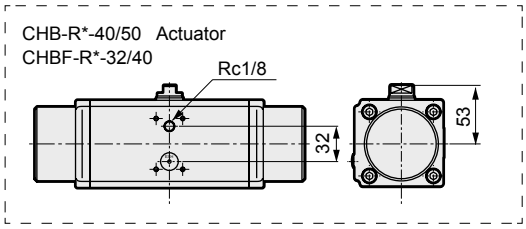
Model No.	A	B	C	D	E
CHB-R*-10	50(56)	24(28)	91	106(107)	Rc3/8
CHB-R*-15	56	28	91	106(107)	Rc1/2
CHB-R*-20	65	34	97	116.5(117.5)	Rc3/4

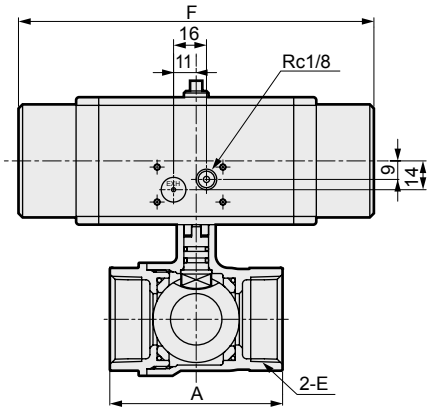
Dimensions shown in ( ) are for stainless steel body.

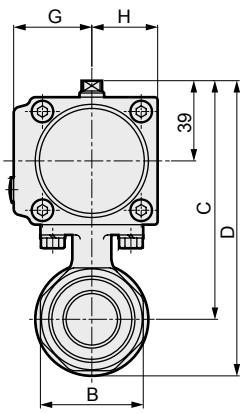
Model No.	A	B	C	D	E
CHBF-R*-15	65	28	97	116.5(117.5)	Rc1/2

Dimensions shown in ( ) are for stainless steel body.

● CHB-R*-25/32/40/50
CHBF-R*-20/25/32/40







Model No.	A	B	C	D	E	F	G	H
CHB-R*-25	76	41	110	133(134)	Rc1	173	38	32
CHB-R*-32	84	50	116	143.5(145.5)	Rc1¼	173	38	32
CHB-R*-40	94	57	156.5	190(192)	Rc1½	244	43	38
CHB-R*-50	108	70	165.5	205(206)	Rc2	244	43	38

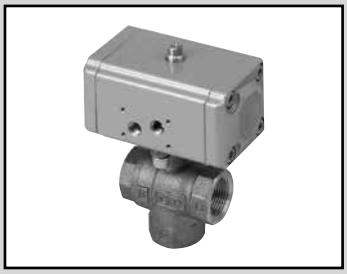
Dimensions shown in ( ) are for stainless steel body.

Model No.	A	B	C	D	E	F	G	H
CHBF-R*-20	71	34	110	133(134)	Rc3/4	173	38	32
CHBF-R*-25	84	41	116	143.5(144.5)	Rc1	173	38	32
CHBF-R*-32	95	50	156.5	190(191)	Rc1¼	244	43	38
CHBF-R*-40	107	57	165.5	205(206)	Rc1½	244	43	38

Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

For the external dimensions of types with limit switch, refer to page 730.



Air operated 3-port ball valve
(compact rotary valve)

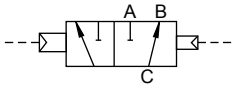
CHG/CHG-R* Series

● Port size: Rc1/2 to Rc2

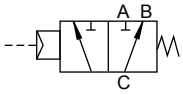
RoHS CAD

JIS symbol

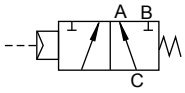
● CHG (double acting)



● CHG-R1 (single acting - normally B-C path)



● CHG-R2 (single acting - normally A-C path)



Common specifications

Item		CHG (double acting)	CHG-R* (single acting)
Actuation		Air operated: Double acting	Air operated: Single acting
Working fluid		Water/air/oil (500 mm^2/s or less)	
Working pressure MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa		2.0 (≈290 psi, 20 bar)	
Fluid temperature °C		0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C		-10 (14°F) to 60 (140°F) (no freezing)	
Working environment		Indoors	
Mounting orientation		Unrestricted	
Frequency Cycle/min.		1 or less	
Pressurization direction		Port C pressurization only	
Flow path shape		Multi-fluid (90° rotation switching)	
Rotary actuator	Pilot fluid	Compressed air	
	Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water) MPa	1.5 (≈220 psi, 15 bar)	
	Working pressure MPa	0.35 (≈51 psi, 3.5 bar) to 0.7 (≈100 psi, 7 bar)	0.4 (≈58 psi, 4 bar) to 0.7 (≈100 psi, 7 bar)
	Fluid temperature °C	5 (41°F) to 60 (140°F)	
	Port size	Rc1/8	Rc1/8

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Cv	Weight (kg)	
				Double acting	Single acting
CHG-(R*-)15	Rc1/2	10	3	1.0	1.1
CHG-(R*-)20	Rc3/4	14	6	1.2	1.3
CHG-(R*-)25	Rc1	19	11	1.4	2.2
CHG-(R*-)32	Rc1 1/4	23	16	2.2	2.6
CHG-(R*-)40	Rc1 1/2	30	28	2.7	4.9
CHG-(R*-)50	Rc2	38	47	3.5	5.6

*1 : Weight increases by 0.2 kg with one limit switch and by 0.3 kg with two limit switches.
2 : Limit switch of CHG-R-40/50 is made to order.

How to order

CHG - R1 - 20 - E - W

Model No.

Ⓐ Actuator

Ⓑ Port size

Ⓒ Body material

Ⓓ Limit switch
*1
*2

Code	Description
Ⓐ Actuator	
Blank	Double acting
R1	Single acting, normally B-C path
R2	Single acting, normally A-C path
Ⓑ Port size	
15	Rc1/2
20	Rc3/4
25	Rc1
32	Rc1 1/4
40	Rc1 1/2
50	Rc2
Ⓒ Body material	
Blank	Bronze
E	Stainless steel
N	Stainless steel/oil-prohibited specifications
Ⓓ Limit switch	
Blank	Without switch
H	A-C path detection
V	B-C path detection
W	With 2 switches

1 : Limit switch of CHG-R-40/50 is made to order.
*2 : OMRON D4E-1G20N

[Example of model No.]

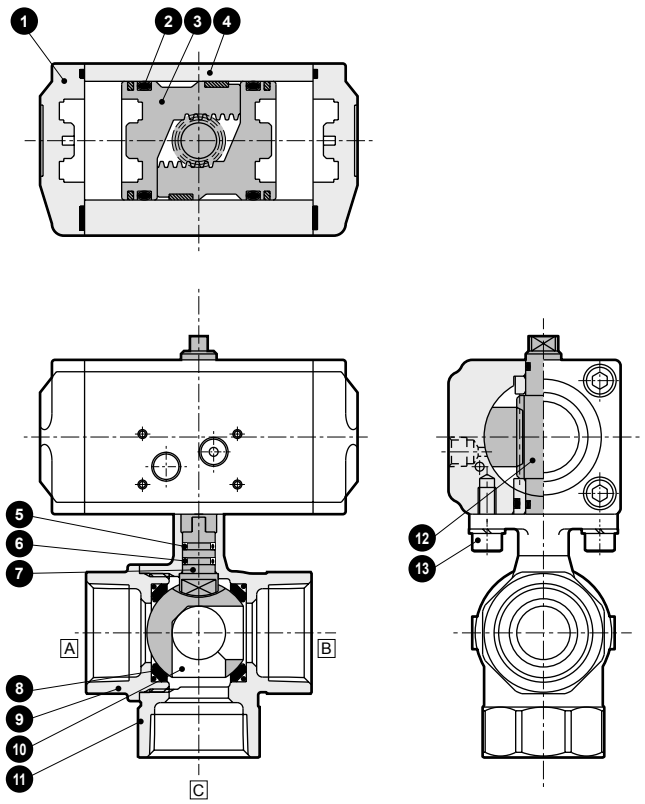
CHG-R1-20-E-W

Model: CHG

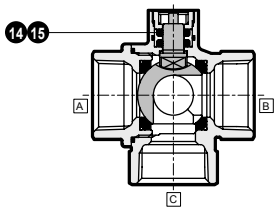
Ⓐ Actuator : Single acting, normally B-C path
Ⓑ Port size : Rc3/4
Ⓒ Body material : Stainless steel
Ⓓ Limit switch : 2 switches

Internal structure and parts list: CHG Series

● CHG-15/20/25



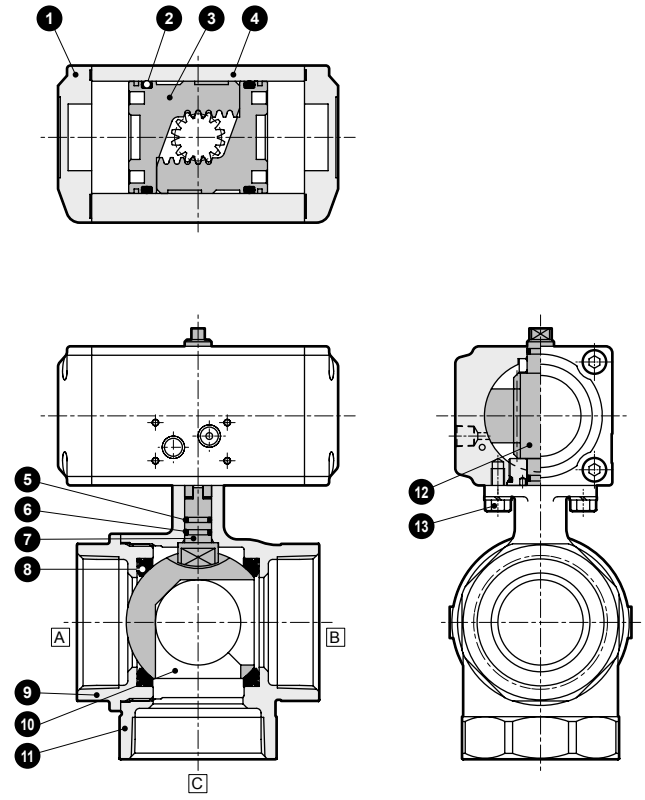
● Oil-prohibited specifications (ball valve)
CHG-15/20/25-N



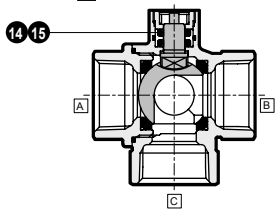
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
6	O-ring	FKM	Fluoro rubber
7	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon socket head cap screw	SUSXM7	Stainless steel
14	O-ring	FKM	Fluoro rubber
15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

● CHG-32/40/50



● Oil-prohibited specifications (ball valve)
CHG-32/40/50-N

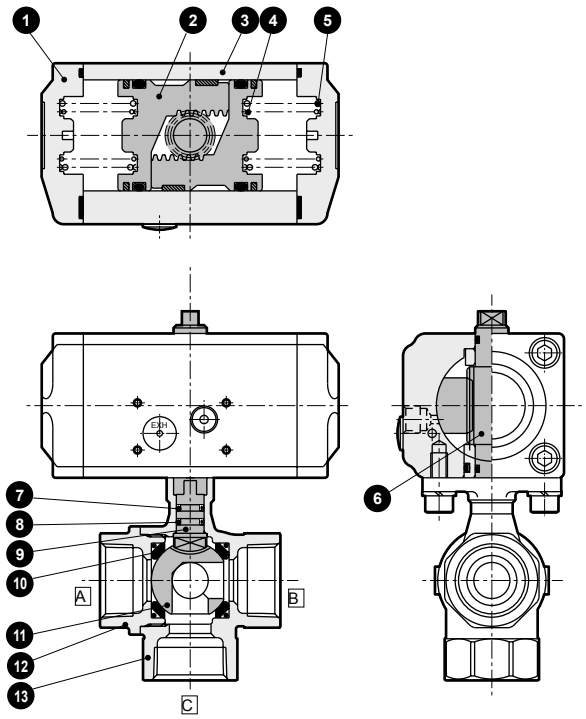


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
6	O-ring	FKM	Fluoro rubber
7	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon head bolt	SUSXM7	Stainless steel
14	O-ring	FKM	Fluoro rubber
15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

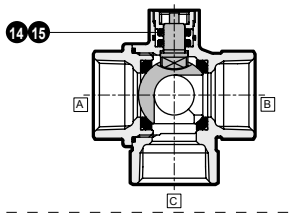
Materials shown in ( ) are for stainless steel body.

Internal structure and parts list: CHG-R* Series

● CHG-R*-15/20



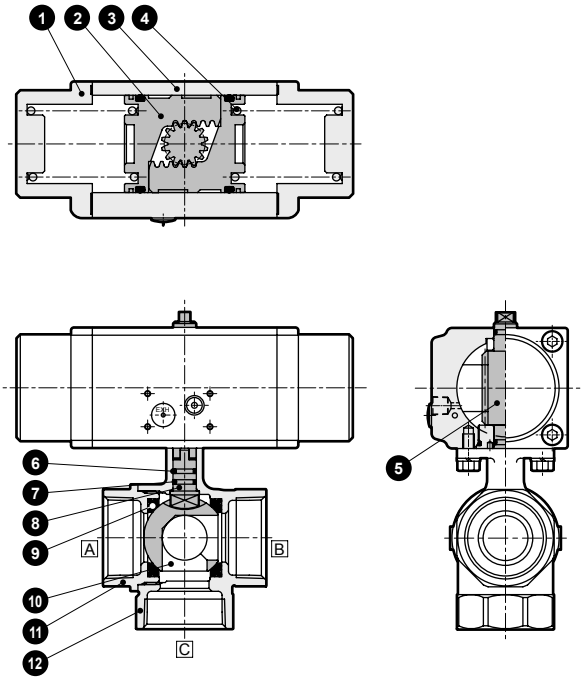
● Oil-prohibited specifications (ball valve)
CHG-R*-15/20-N



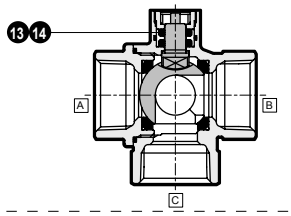
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Spring	SWP	Piano wire
6	Stem	SUS303	Stainless steel
7	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
8	O-ring	FKM	Fluoro rubber
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
10	Valve seat	PTFE	Tetrafluoroethylene resin
11	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
12	Valve cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
13	Valve body	CAC408(SCS13)	Bronze casting (stainless steel casting)
14	O-ring	FKM	Fluoro rubber
15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

● CHG-R*-25/32/40/50



● Oil-prohibited specifications (ball valve)
CHG-R*-25/32/40/50-N

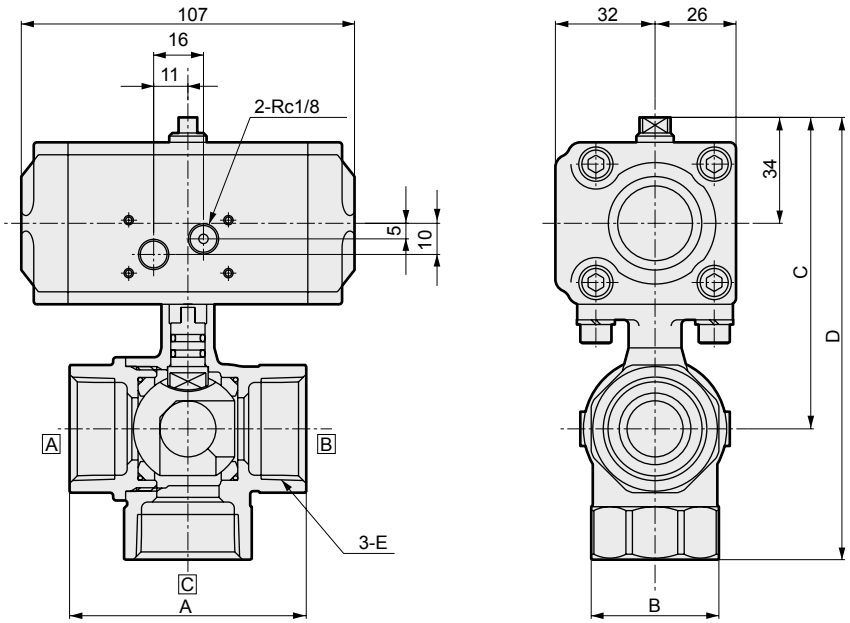


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Stem	SUS303	Stainless steel
6	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
7	O-ring	FKM	Fluoro rubber
8	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
9	Valve seat	PTFE	Tetrafluoroethylene resin
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	Valve body	CAC408(SCS13)	Bronze casting (stainless steel casting)
13	O-ring	FKM	Fluoro rubber
14	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

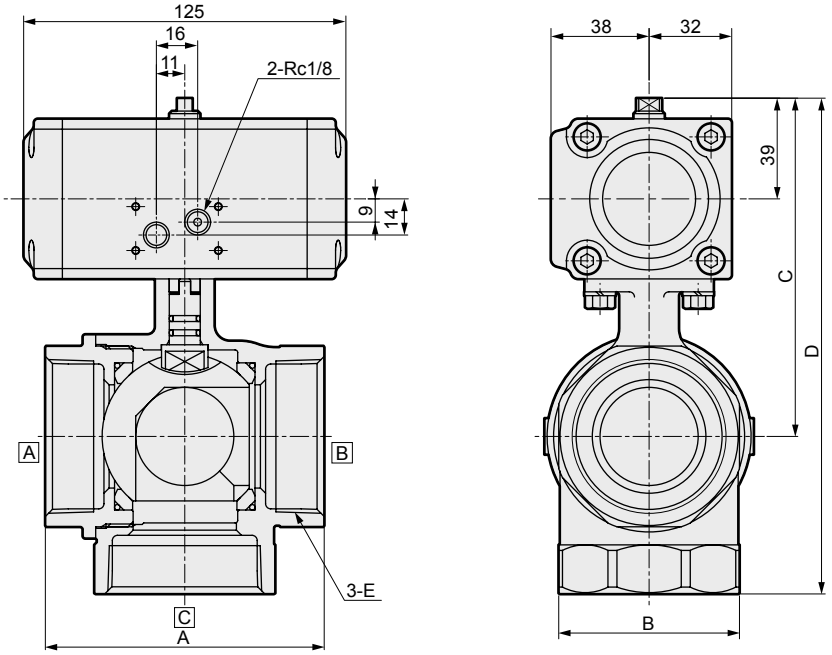
Dimensions: CHG Series

● CHG-15/20/25



Model No.	A	B	C	D	E
CHG-15	56	28	91	121	Rc1/2
CHG-20	65	34	97	133	Rc3/4
CHG-25	76	41	100	142	Rc1

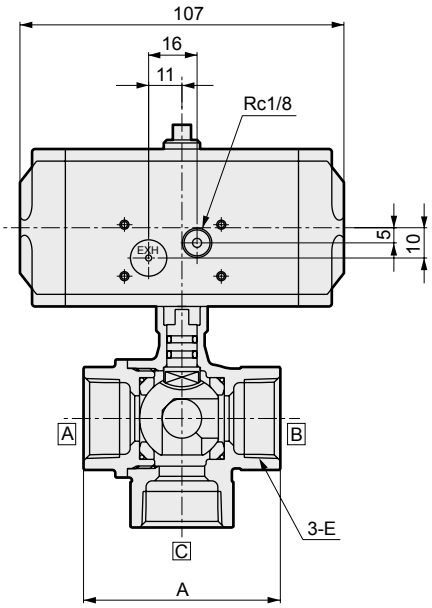
● CHG-32/40/50

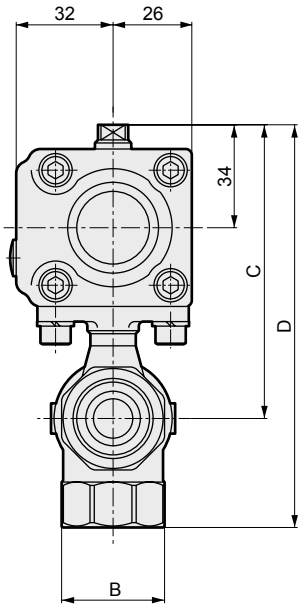


Model No.	A	B	C	D	E
CHG-32	84	50	116	163	Rc1¼
CHG-40	94	57	122	175	Rc1½
CHG-50	108	70	131	192	Rc2

Dimensions: CHG-R* Series

● CHG-R*-15/20

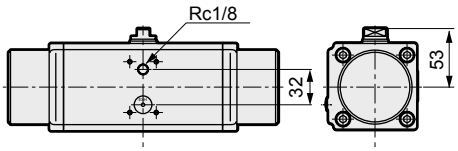


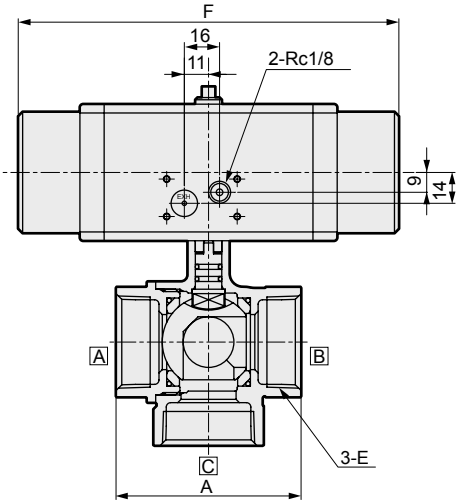


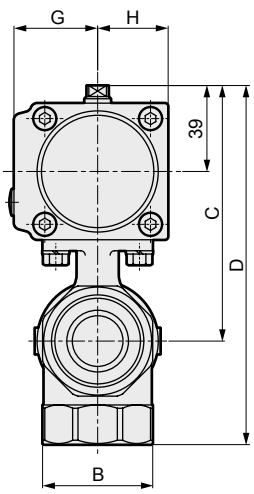
Model No.	A	B	C	D	E
CHG-R*-15	56	28	91	121	Rc1/2
CHG-R*-20	65	34	97	133	Rc3/4

● CHG-R*-25/32/40/50

● CHG-R*-40/50 Actuator







Model No.	A	B	C	D	E	F	G	H
CHG-R*-25	76	41	110	152	Rc1	173	38	32
CHG-R*-32	84	50	116	163	Rc1 1/4	173	38	32
CHG-R*-40	94	57	156.5	209.5	Rc1 1/2	244	43	38
CHG-R*-50	108	70	165.5	226.5	Rc2	244	43	38

Optional dimensions

For the external dimensions of types with limit switch, refer to page 730.

Air operated 2-port ball valve with solenoid valve
(compact rotary valve)

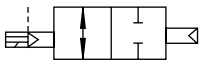
CHB-V*/CHB-X*
CHBF-V*/CHBF-X* Series

● Port size: Rc3/8 to Rc2

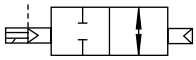
RoHS CAD

JIS symbol

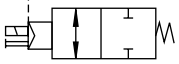
● CHB-V1
CHBF-V1
(Double acting-NC)



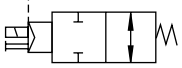
● CHB-V2
CHBF-V2
(Double acting-NO)



● CHB-X1
CHBF-X1
(Single acting-NC)



● CHB-X2
CHBF-X2
(Single acting-NO)



Common specifications

1 MPa = 10 bar

Item			Double acting CHB-V* (Standard bore) CHBF-V* (Full bore)	Single acting CHB-X* (Standard bore) CHBF-X* (Full bore)
Actuation			With solenoid valve: Double acting	With solenoid valve: Single acting
Working fluid			Water/air/oil (500 mm^2/s or less)	
Working pressure MPa			0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa			2.0 (≈290 psi, 20 bar)	
Fluid temperature °C			0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C			-10 (14°F) to 60 (140°F) (no freezing)	
Working environment			Indoors	
Mounting orientation			Unrestricted	
Frequency Cycle/min.			1 or less	
Rotary actuator	Pilot fluid		Compressed air	
	Lubrication		Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water) MPa		1.05 (≈150 psi, 10.5 bar)	
	Working pressure MPa		0.35 (≈51 psi) to 0.7 (≈100 psi)	0.4 (≈58 psi) to 0.7 (≈100 psi)
	Fluid temperature °C		5 (41°F) to 60 (140°F)	
	Port size	P-port	Rc1/8	
		R port	Rc1/8	
Electrical specifications				
Rated voltage			100 VAC(50/60 Hz),200 VAC(50/60 Hz),24 VDC	
Starting current (A) (With indicator lamp)		100 VAC	0.056/0.044(50/60 Hz)	
		200 VAC	0.028/0.022(50/60 Hz)	
		24 VDC	0.075(0.083)	
Holding current (A)		100 VAC	0.028/0.022(50/60 Hz)	
		200 VAC	0.014/0.011(50/60 Hz)	
		24 VDC	0.075	
Power consumption (W) (With indicator lamp)		100 VAC	1.8/1.4(1.9/1.5)(50/60 Hz)	
		200 VAC	1.8/1.4(1.9/1.5)(50/60 Hz)	
		24 VDC	1.8(2.0)	
Thermal class			Class 130 (B)	
Degree of protection			Dust-proof	
Voltage fluctuation range			±10%	

Individual specifications

Item / Model No.		Port size	Orifice size (mm)	Cv	Weight (kg) Double acting	Weight (kg) Single acting
Standard bore	CHB-V*/X*-10-*	Rc3/8	10	10	1.2	1.2
	CHB-V*/X*-15-*	Rc1/2	10	6	1.2	1.2
	CHB-V*/X*-20-*	Rc3/4	15	16	1.4	1.2
	CHB-V*/X*-25-*	Rc1	20	29	1.5	2.1
	CHB-V*/X*-32-*	Rc1 1/4	25	50	2.2(2.3)	2.6(2.7)
	CHB-V*/X*-40-*	Rc1 1/2	32	98	2.7(2.8)	4.8(4.9)
	CHB-V*/X*-50-*	Rc2	40	125	3.4(3.5)	5.6(5.7)
Full bore	CHBF-V*/X*-15-*	Rc1/2	15	23	1.3(1.3)	1.4(1.4)
	CHBF-V*/X*-20-*	Rc3/4	20	51	1.5(1.5)	2.3(2.3)
	CHBF-V*/X*-25-*	Rc1	25	66	2.2(2.2)	2.6(2.6)
	CHBF-V*/X*-32-*	Rc1 1/4	32	114	2.7(2.7)	4.9(4.9)
	CHBF-V*/X*-40-*	Rc1 1/2	40	176	3.4(3.4)	5.6(5.6)

1 : CHB-V/X*-10-* is a full bore. Materials shown in ( ) are for stainless steel body.
*2 : Weight increases by 0.2 kg with one limit switch and by 0.3 kg with two limit switches.
3 : Limit switch of CHB-X-40/50-* and CHBF-X*-32/40-* is made to order.

How to order

CHB - V1 - 25 - O B - W S - AC100V
CHBF

Model No.

Ⓐ Actuator

Ⓑ Port size *1

Ⓒ Body material

Ⓓ Coil option

Ⓔ Limit switch *2 *3

Ⓕ Other options *4

Ⓖ Voltage

Code	Description	Model No. CHB (Standard bore)	Model No. CHBF (Full bore)
Ⓐ Actuator			
V1	Double acting NC (open when energized)	●	●
V2	Double acting NO (closed when energized)	●	●
X1	Single acting NC (open when energized)	●	●
X2	Single acting NO (closed when energized)	●	●
Ⓑ Port size			
10	Rc3/8	●	
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	
Ⓒ Body material			
0	Bronze	●	●
E	Stainless steel	●	●
N	Stainless steel/oil-prohibited specifications	●	●
Ⓓ Coil option			
Blank	Grommet lead wire	●	●
B	With compact terminal box	●	●
L	Compact term box, lamp (anti-surge in DC)	●	●
C	C type connector with lead wire	●	●
C2	C type connector with lead wire with surge suppressor and indicator lamp	●	●
D	D type connector with lead wire	●	●
D2	D type connector with lead wire with surge suppressor and indicator lamp	●	●
Ⓔ Limit switch			
Blank	Without switch	●	●
H	Detection at valve open	●	●
V	Detection at valve closed	●	●
W	With 2 switches	●	●
Ⓕ Other options			
Blank	None	●	●
S	Metering valve with silencer *4	●	●
Ⓖ Voltage			
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz	●	●
AC200V	200 VAC 50/60 Hz, 220 VAC 60 Hz	●	●
DC24V	24 VDC	●	●

*1: When port size is 10, the valve is full bore but the model is CHB.
2: Limit switch of CHB-X-40/50-* and CHBF-X*-32/40-* is made to order.
*3: OMRON D4E-1G20N
*4: CKD SMW2-6A is attached with the product.

[Example of model No.]

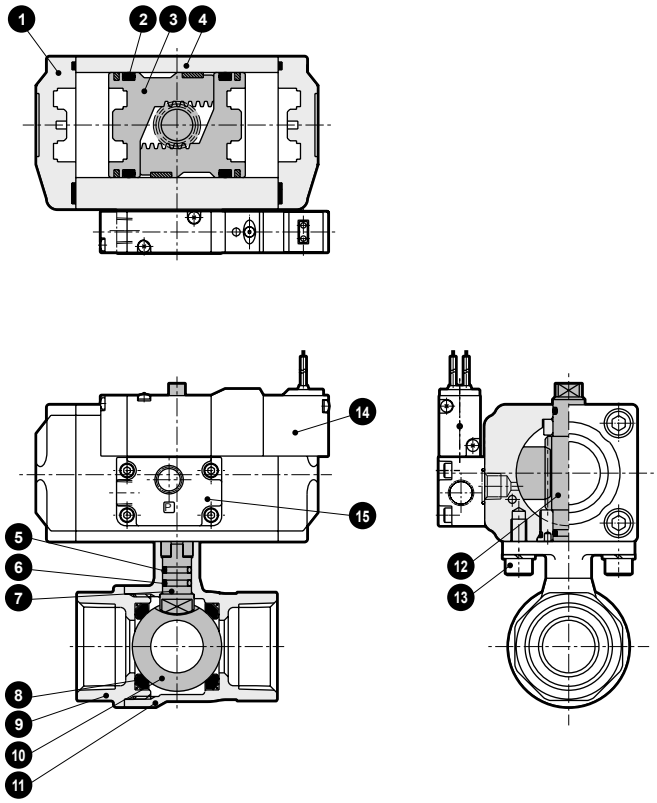
CHB-V1-25-OB-WS-AC100V

Model No.: CHB (standard bore)

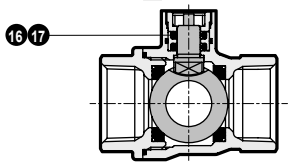
Ⓐ Actuator : Double acting NC (open when energized)
Ⓑ Port size : Rc1
Ⓒ Body material : Bronze
Ⓓ Coil option : Compact terminal box
Ⓔ Limit switch : 2 switches
Ⓕ Other options : Metering valve with silencer
Ⓖ Voltage : 100 VAC 50/60 Hz. 110 VAC 60 Hz

Internal structure and parts list: CHB-V*/CHBF-V* Series

● CHB-V*-10/15/20/25-*
CHBF-V*-15/20-*



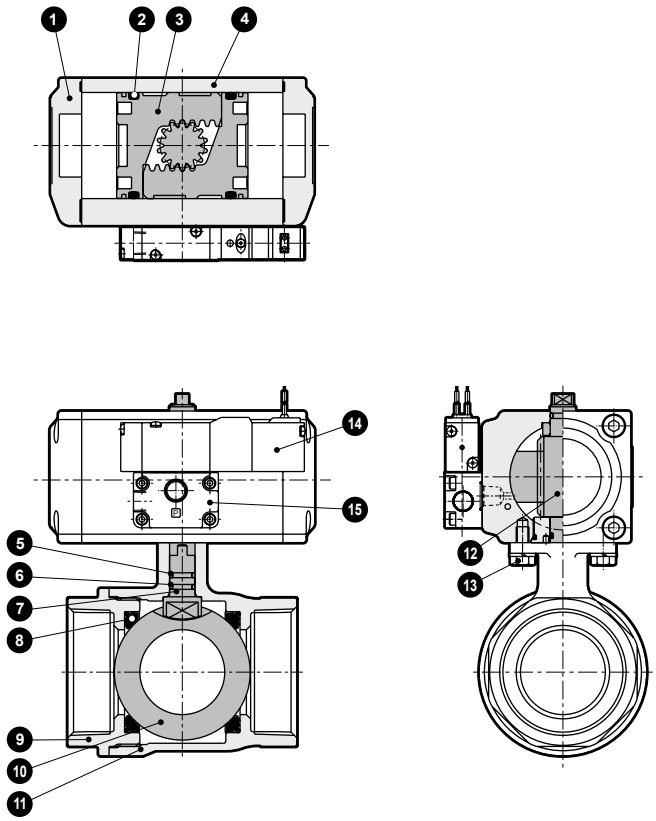
● Oil-prohibited specifications (ball valve)
CHB-V*-10/15/20/25-N



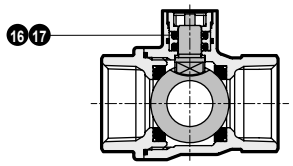
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
6	O-ring	FKM	Fluoro rubber
7	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon socket head cap screw	SUSXM7	Stainless steel
14	Solenoid valves [4KB119-00]		
15	Block	ADC12	Aluminum die-casting
16	O-ring	FKM	Fluoro rubber
17	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

● CHB-V*-32/40/50-*
CHBF-V*-25/32/40-*



● Oil-prohibited specifications (ball valve)
CHB-V*-32/40/50-N

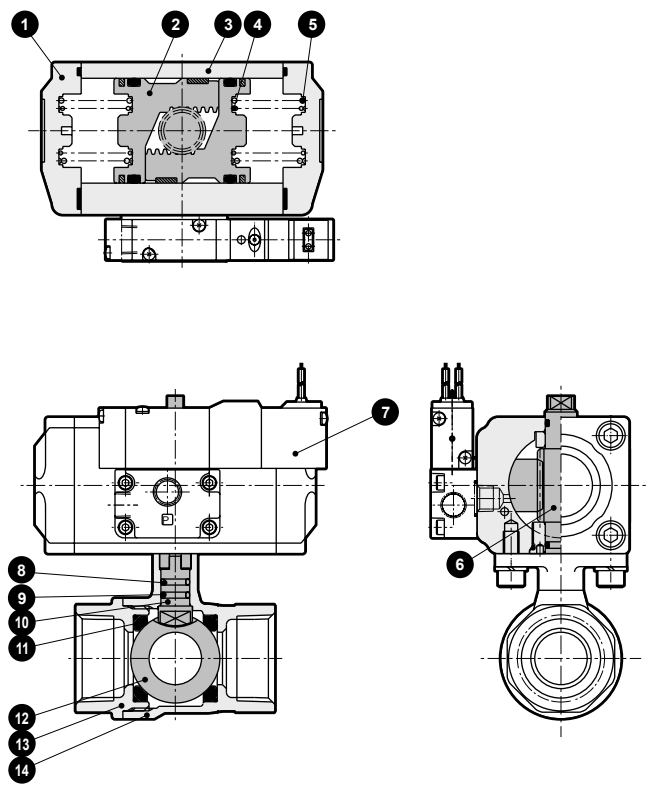


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
6	O-ring	FKM	Fluoro rubber
7	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon head bolt	SUSXM7	Stainless steel
14	Solenoid valves [4KB119-00]		
15	Block	ADC12	Aluminum die-casting
16	O-ring	FKM	Fluoro rubber
17	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

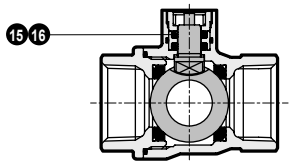
Materials shown in ( ) are for stainless steel body.

Internal structure and parts list: CHB-X*/CHBF-X* Series

● CHB-X*-10/15/20-*
CHBF-X*-15-*



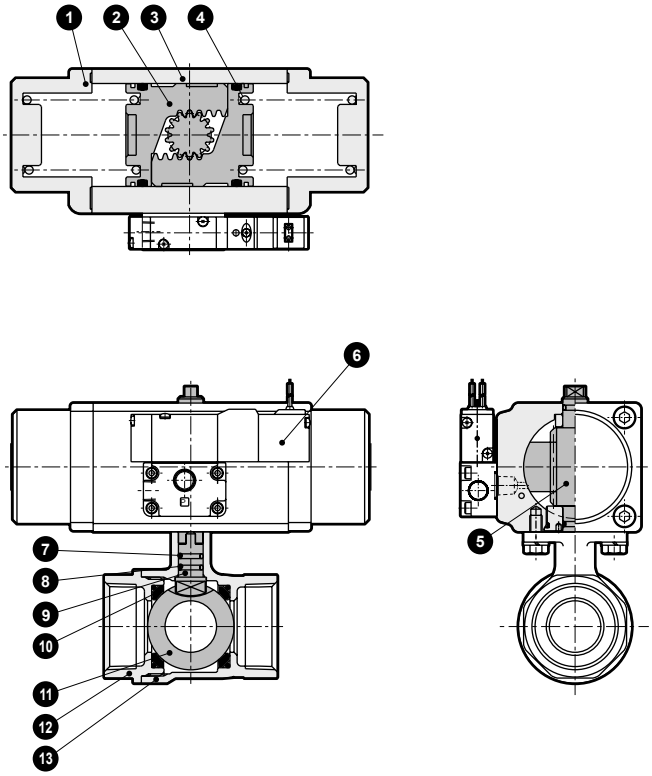
● Oil-prohibited specifications (ball valve)
CHB-X*-10/15/20-N



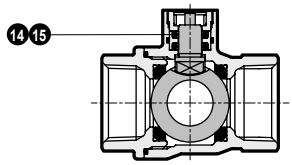
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Spring	SWP	Piano wire
6	Stem	SUS303	Stainless steel
7	Solenoid valves [4KB119-00]		
8	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	O-ring	FKM	Fluoro rubber
10	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
11	Valve seat	PTFE	Tetrafluoroethylene resin
12	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
13	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
14	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
15	O-ring	FKM	Fluoro rubber
16	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

● CHB-X*-25/32/40/50-*
CHBF-X*-20/25/32/40-*



● Oil-prohibited specifications (ball valve)
CHB-X*-25/32/40/50-N

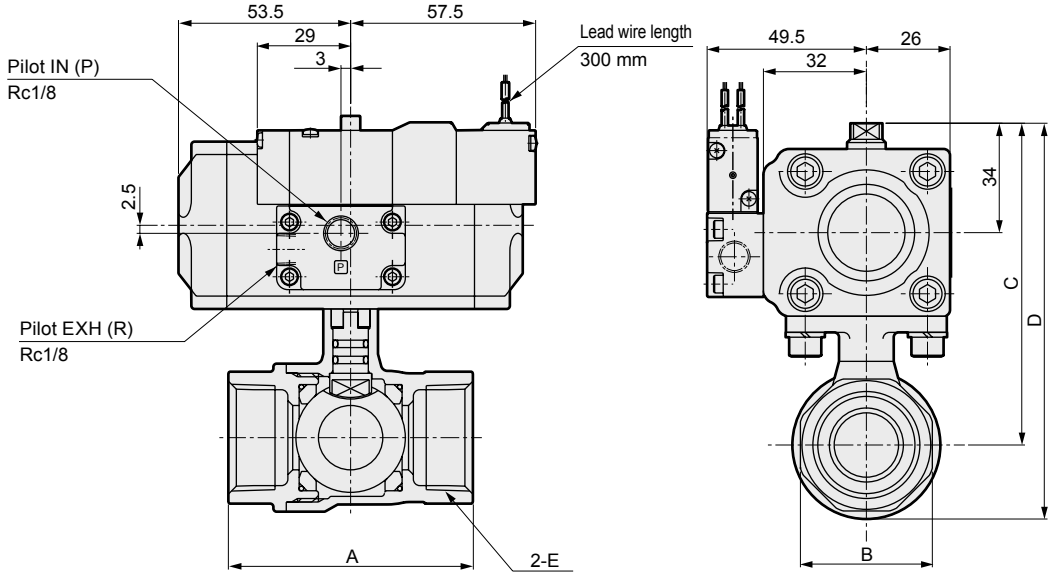


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Stem	SUS303	Stainless steel
6	Solenoid valves [4KB119-00]		
7	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
8	O-ring	FKM	Fluoro rubber
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
10	Valve seat	PTFE	Tetrafluoroethylene resin
11	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
12	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
13	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
14	O-ring	FKM	Fluoro rubber
15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

Dimensions: CHB-V*/CHBF-V* Series

● CHB-V*-10/15/20/25-*
CHBF-V*-15/20-*



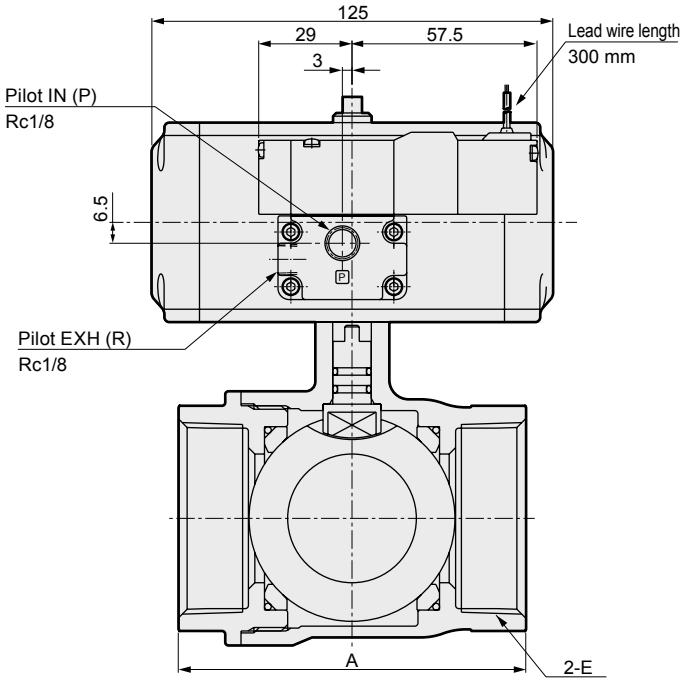
Model No.	A	B	C	D	E
CHB-V*-10-*	50(56)	24(28)	91	106(107)	Rc3/8
CHB-V*-15-*	56	28	91	106(107)	Rc1/2
CHB-V*-20-*	65	34	97	116.5(117.5)	Rc3/4
CHB-V*-25-*	76	41	100	123(124)	Rc1

Dimensions shown in ( ) are for stainless steel body.

Model No.	A	B	C	D	E
CHBF-V*-15-*	65	28	97	116.5(117.5)	Rc1/2
CHBF-V*-20-*	71	34	100	123(124)	Rc3/4

Dimensions shown in ( ) are for stainless steel body.

● CHB-V*-32/40/50-*
CHBF-V*-25/32/40-*



Model No.	A	B	C	D	E
CHB-V*-32-*	84	50	116	143.5(145.5)	Rc1 1/4
CHB-V*-40-*	94	57	122	155.5(157.5)	Rc1 1/2
CHB-V*-50-*	108	70	131	170.5(171.5)	Rc2

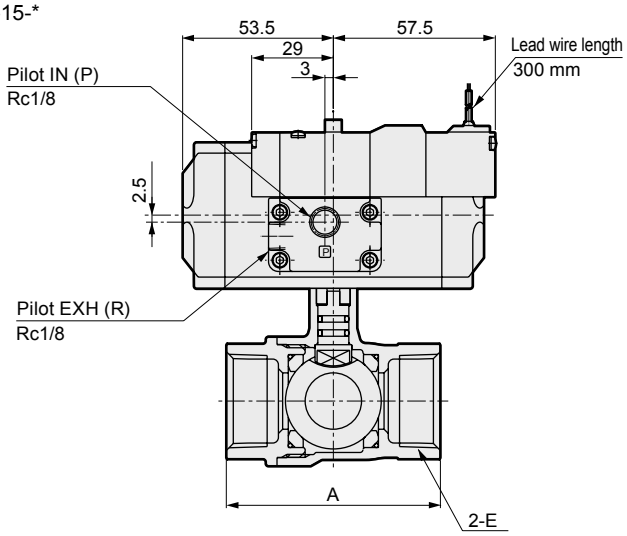
Dimensions shown in ( ) are for stainless steel body.

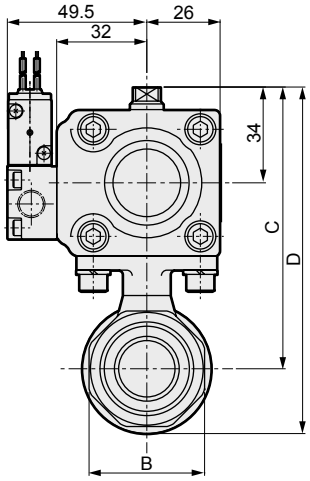
Model No.	A	B	C	D	E
CHBF-V*-25-*	84	41	116	143.5(144.5)	Rc1
CHBF-V*-32-*	95	50	122	155.5(156.5)	Rc1 1/4
CHBF-V*-40-*	107	57	131	170.5(171.5)	Rc1 1/2

Dimensions shown in ( ) are for stainless steel body.

Dimensions: CHB-X*/CHBF-X* Series

● CHB-X*-10/15/20-*
CHBF-X*-15-*





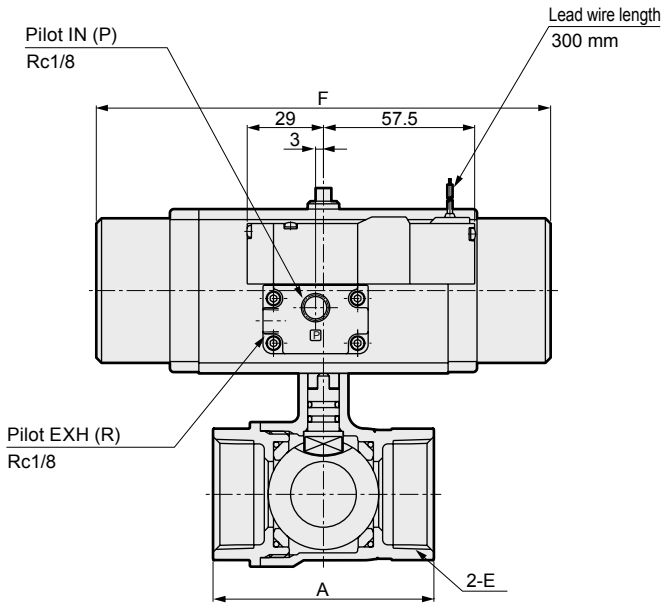
Model No.	A	B	C	D	E
CHB-X*-10-*	50(56)	24(28)	91	106(107)	Rc3/8
CHB-X*-15-*	56	28	91	106(107)	Rc1/2
CHB-X*-20-*	65	34	97	116.5(117.5)	Rc3/4

Dimensions shown in ( ) are for stainless steel body.

Model No.	A	B	C	D	E
CHBF-X*-15-*	65	28	97	116.5(117.5)	Rc1/2

Dimensions shown in ( ) are for stainless steel body.

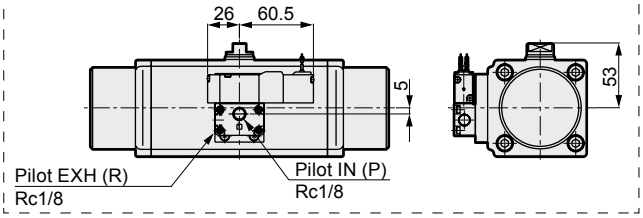
● CHB-X*-25/32/40/50-*
CHBF-X*-20/25/32/40-*

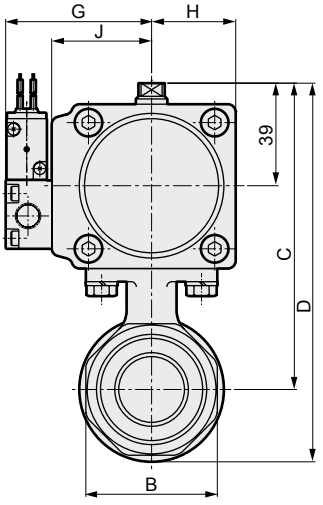


Model No.	A	B	C	D	E	F	G	H	J
CHB-X*-25-*	76	41	110	133(134)	Rc1	173	55.5	32	38
CHB-X*-32-*	84	50	116	143.5(145.5)	Rc1 1/4	173	55.5	32	38
CHB-X*-40-*	94	57	156.5	190(192)	Rc1 1/2	244	70.5	38	43
CHB-X*-50-*	108	70	165.5	205(206)	Rc2	244	70.5	38	43

Dimensions shown in ( ) are for stainless steel body.

● CHB-X*-40/50 Actuator
CHBF-X*-32/40



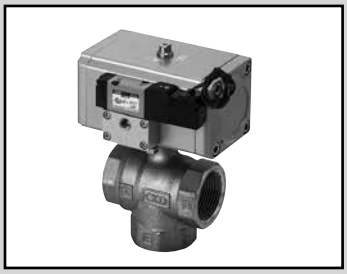


Model No.	A	B	C	D	E	F	G	H	J
CHBF-X*-20-*	71	34	110	133(134)	Rc3/4	173	55.5	32	38
CHBF-X*-25-*	84	41	116	143.5(144.5)	Rc1	173	55.5	32	38
CHBF-X*-32-*	95	50	156.5	190(191)	Rc1 1/4	244	70.5	38	43
CHBF-X*-40-*	107	57	165.5	205(206)	Rc1 1/2	244	70.5	38	43

Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

For the external dimensions of the type with a limit switch and coil options, refer to page 730.



Air operated 3-port ball valve with solenoid valve
(compact rotary valve)

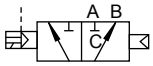
CHG-V*/CHG-X* Series

● Port size: Rc1/2 to Rc2

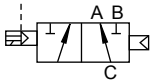
RoHS CAD

JIS symbol

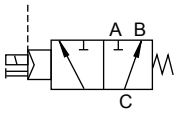
● CHG-V1 (double acting - normally B-C path)



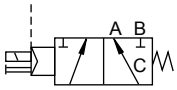
● CHG-V2 (double acting - normally A-C path)



● CHG-X1 (single acting - normally B-C path)



● CHG-X2 (single acting - normally A-C path)



Common specifications

1 MPa = 10 bar

Item			CHG-V* (Double acting)	CHG-X* (Single acting)
Actuation			With solenoid valve: Double acting	With solenoid valve: Single acting
Working fluid			Water/air/oil (500 mm²/s or less)	
Working pressure MPa			0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa			2.0 (≈290 psi, 20 bar)	
Fluid temperature °C			0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C			-10 (14°F) to 60 (140°F) (no freezing)	
Working environment			Indoors	
Mounting orientation			Unrestricted	
Frequency Cycle/min.			1 or less	
Pressurization direction			Port C pressurization only	
Flow path shape			Multi-fluid (90° rotation switching)	
Rotary actuator	Pilot fluid		Compressed air	
	Lubrication		Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water) MPa		1.05 (≈150 psi, 10.5 bar)	
	Working pressure MPa		0.35 (≈51 psi) to 0.7 (≈100 psi)	0.4 (≈58 psi) to 0.7 (≈100 psi)
	Fluid temperature °C		5 (41°F) to 60 (140°F)	
	Port size	P-port	Rc1/8	
		R port	Rc1/8	
Electrical specifications				
Rated voltage			100 VAC(50/60 Hz), 200 VAC(50/60 Hz), 24 VDC	
Starting current (A) (With indicator lamp)		100 VAC	0.056/0.044(50/60 Hz)	
		200 VAC	0.028/0.022(50/60 Hz)	
		24 VDC	0.075(0.083)	
Holding current (A)		100 VAC	0.028/0.022(50/60 Hz)	
		200 VAC	0.014/0.011(50/60 Hz)	
		24 VDC	0.075	
Power consumption (W) (With indicator lamp)		100 VAC	1.8/1.4(1.9/1.5)(50/60 Hz)	
		200 VAC	1.8/1.4(1.9/1.5)(50/60 Hz)	
		24 VDC	1.8(2.0)	
Thermal class			Class 130 (B)	
Degree of protection			Dust-proof	
Voltage fluctuation range			±10%	

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Cv	Weight (kg)	
				Double acting	Single acting
CHG-V*/X*-15-*	Rc1/2	10	3	1.2	1.3
CHG-V*/X*-20-*	Rc3/4	14	6	1.4	1.5
CHG-V*/X*-25-*	Rc1	19	11	1.6	2.4
CHG-V*/X*-32-*	Rc1 1/4	23	16	2.4	2.8
CHG-V*/X*-40-*	Rc1 1/2	30	28	2.9	5.1
CHG-V*/X*-50-*	Rc2	38	47	3.7	5.8

*1 : Weight increases by 0.2 kg with one limit switch and by 0.3 kg with two limit switches.
2 : Limit switch of CHG-X-40/50-* is made to order.

How to order

CHG - X1 - 15 - E B - W S - AC200V

Model No.

Ⓐ Actuator

Code	Description
Ⓐ Actuator	
V1	Double acting, normally B-C path
V2	Double acting, normally A-C path
X1	Single acting, normally B-C path
X2	Single acting, normally A-C path

Ⓑ Port size

Code	Description
Ⓑ Port size	
15	Rc1/2
20	Rc3/4
25	Rc1
32	Rc1 1/4
40	Rc1 1/2
50	Rc2

Ⓒ Body material

Code	Description
Ⓒ Body material	
0	Bronze
E	Stainless steel
N	Stainless steel/oil-prohibited specifications

Ⓓ Coil option

Code	Description
Ⓓ Coil option	
Blank	Grommet lead wire
B	With compact terminal box
L	Compact term box, lamp (anti-surge in DC)
C	C type connector with lead wire
C2	C type connector with lead wire with surge suppressor and indicator lamp
D	D type connector with lead wire
D2	D type connector with lead wire with surge suppressor and indicator lamp

Ⓔ Limit switch
*1
*2

Code	Description
Ⓔ Limit switch	
Blank	Without switch
H	A-C path detection
[1 to 5 V]	B-C path detection
W	With 2 switches

Ⓕ Other options
*3

Code	Description
Ⓕ Other options	
Blank	None
S	Metering valve with silencer *3

Ⓖ Voltage

Code	Description
Ⓖ Voltage	
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz, 220 VAC 60 Hz
DC24V	24 VDC

1 : Limit switch of CHG-X-40/50-* is made to order.
*2 : OMRON D4E-1G20N
*3 : CKD SMW2-6A is attached with the product.

[Example of model No.]

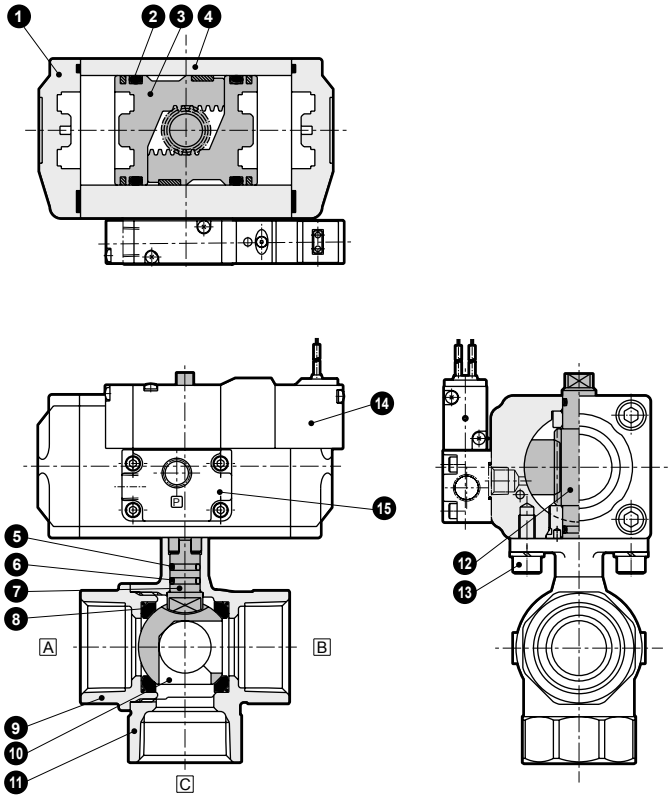
CHG-X1-15-EB-WS-AC200V

Model: CHG

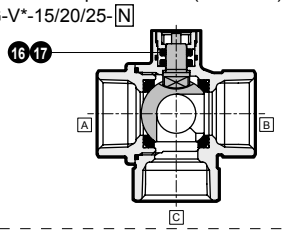
Ⓐ Actuator : Single acting, normally B-C path
Ⓑ Port size : Rc1/2
Ⓒ Body material : Stainless steel
Ⓓ Coil option : Compact terminal box
Ⓔ Limit switch : 2 switches
Ⓕ Other options : Metering valve with silencer
Ⓖ Voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

Internal structure and parts list: CHG-V* Series

● CHG-V*-15/20/25-*



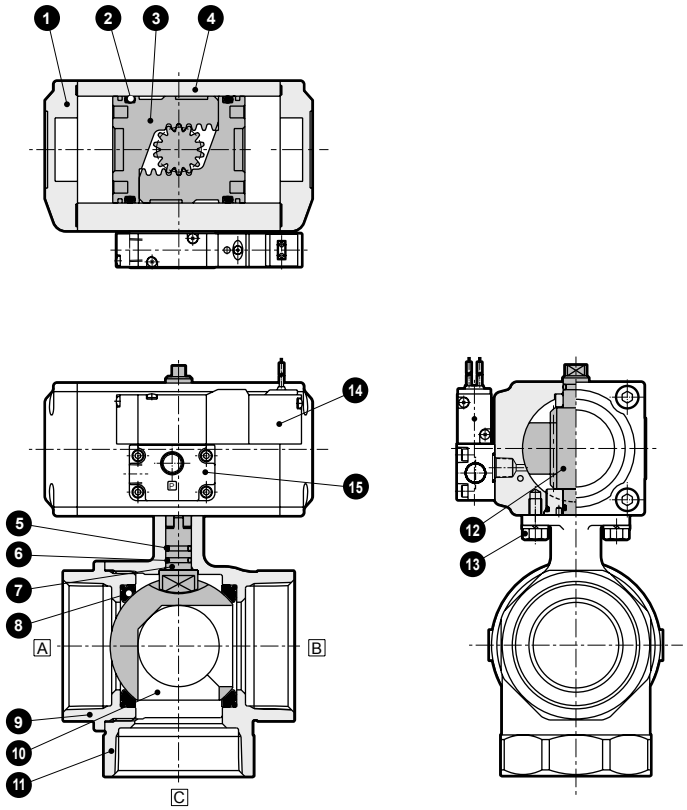
● Oil-prohibited specifications (ball valve)
CHG-V*-15/20/25-N



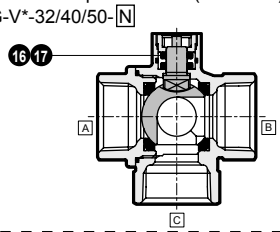
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
6	O-ring	FKM	Fluoro rubber
7	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon socket head cap screw	SUSXM7	Stainless steel
14	Solenoid valves [4KB119-00]		
15	Block	ADC12	Aluminum die-casting
16	O-ring	FKM	Fluoro rubber
17	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

● CHG-V*-32/40/50-*



● Oil-prohibited specifications (ball valve)
CHG-V*-32/40/50-N

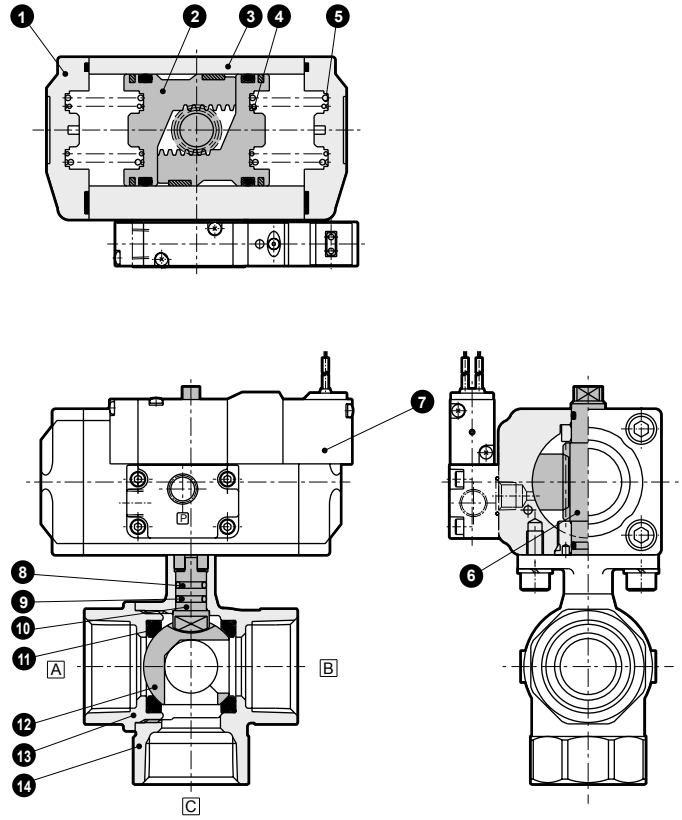


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	NBR	Nitrile rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
6	O-ring	FKM	Fluoro rubber
7	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
8	Valve seat	PTFE	Tetrafluoroethylene resin
9	Valve cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
10	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
11	Valve body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	Stem	SUS303	Stainless steel
13	Hexagon head bolt	SUSXM7	Stainless steel
14	Solenoid valves [4KB119-00]		
15	Block	ADC12	Aluminum die-casting
16	O-ring	FKM	Fluoro rubber
17	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

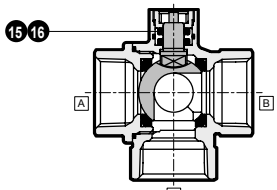
Materials shown in ( ) are for stainless steel body.

Internal structure and parts list: CHG-X* Series

● CHG-X*-15/20-*



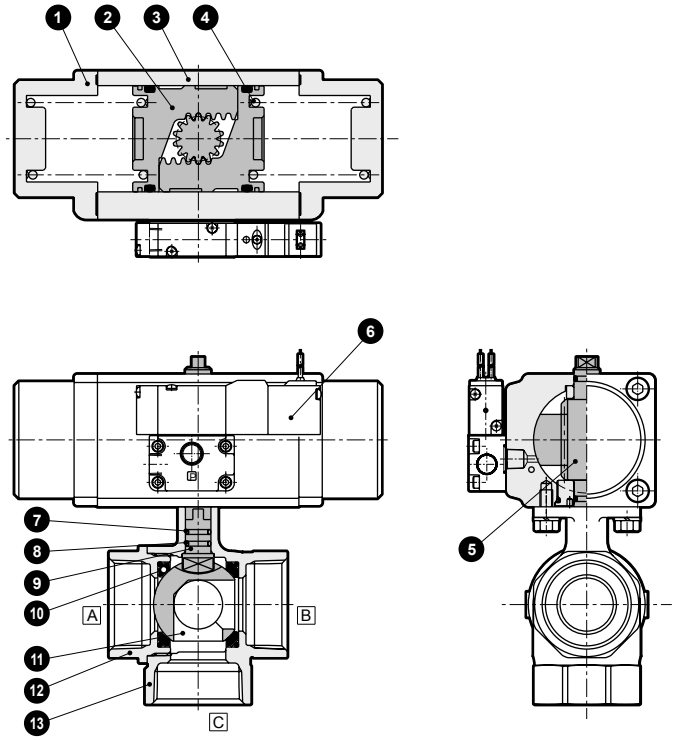
● Oil-prohibited specifications (ball valve)
CHG-X*-15/20-N



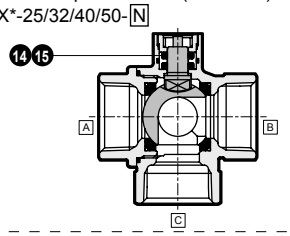
No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Spring	SWP	Piano wire
6	Stem	SUS303	Stainless steel
7	Solenoid valves [4KB119-00]		
8	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	O-ring	FKM	Fluoro rubber
10	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
11	Valve seat	PTFE	Tetrafluoroethylene resin
12	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
13	Valve cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
14	Valve body	CAC408(SCS13)	Bronze casting (stainless steel casting)
15	O-ring	FKM	Fluoro rubber
16	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

● CHG-X*-25/32/40/50-*



● Oil-prohibited specifications (ball valve)
CHG-X*-25/32/40/50-N

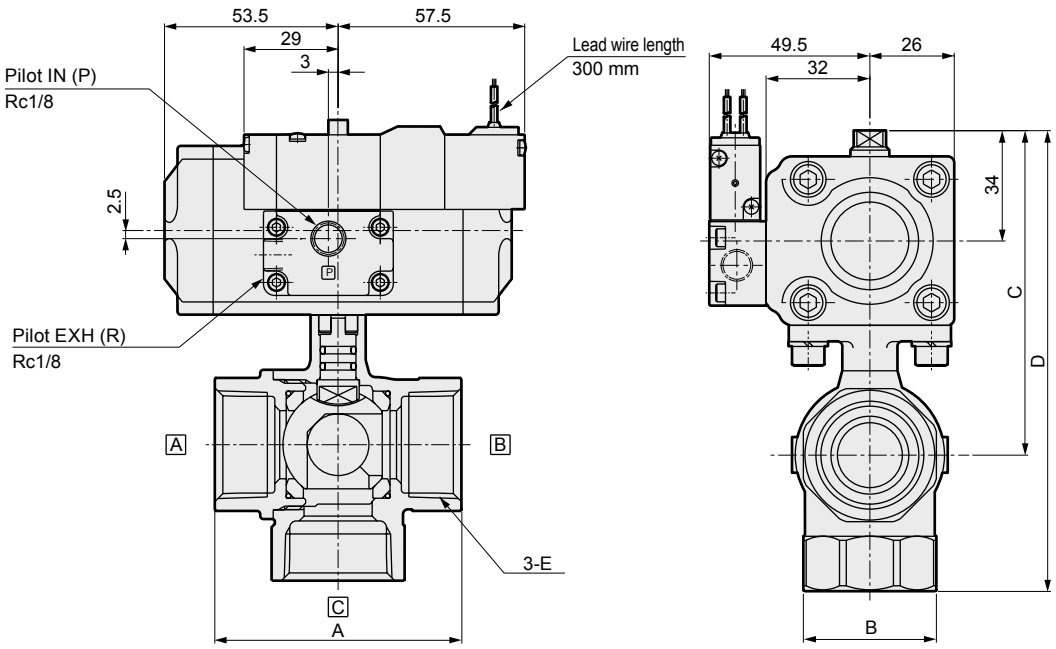


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	Stem	SUS303	Stainless steel
6	Solenoid valves [4KB119-00]		
7	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
8	O-ring	FKM	Fluoro rubber
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
10	Valve seat	PTFE	Tetrafluoroethylene resin
11	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
12	Valve cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
13	Valve body	CAC408(SCS13)	Bronze casting (stainless steel casting)
14	O-ring	FKM	Fluoro rubber
15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene

Materials shown in ( ) are for stainless steel body.

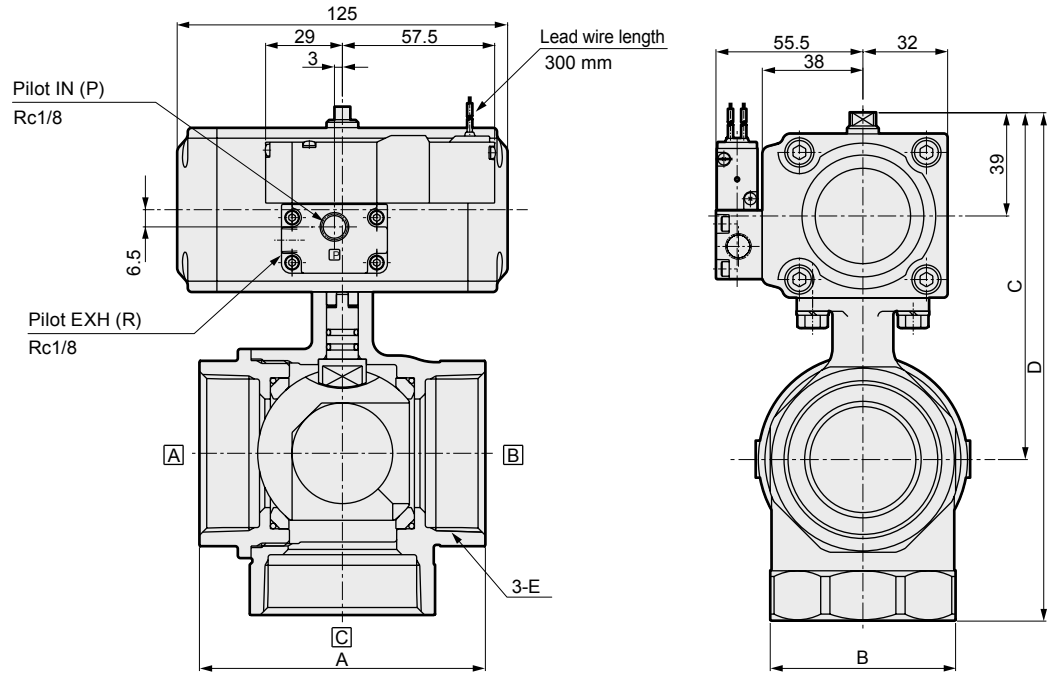
Dimensions: CHG-V* Series

● CHG-V*-15/20/25-*



Model No.	A	B	C	D	E
CHG-V*-15-*	56	28	91	121	Rc1/2
CHG-V*-20-*	65	34	97	133	Rc3/4
CHG-V*-25-*	76	41	100	142	Rc1

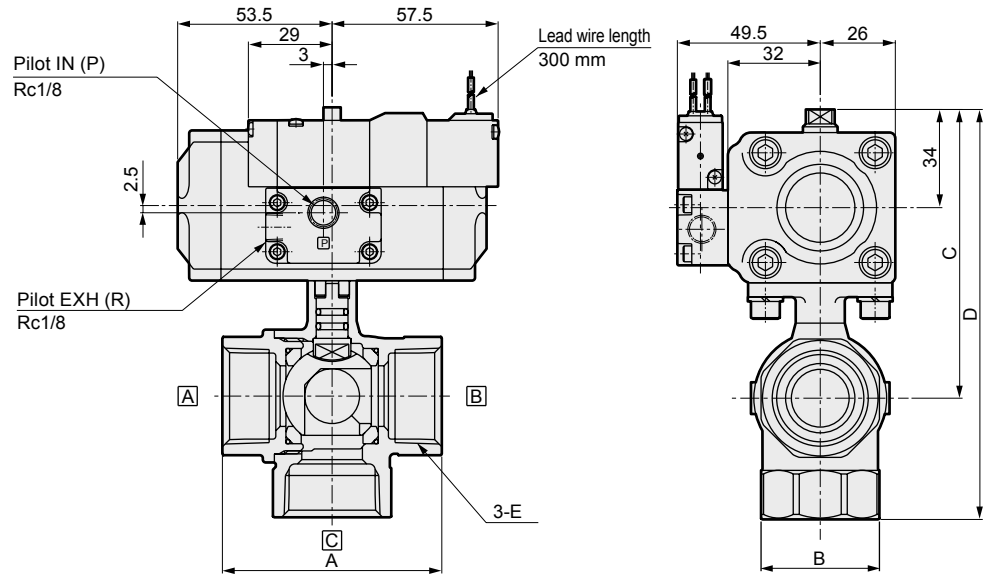
● CHG-V*-32/40/50-*



Model No.	A	B	C	D	E
CHG-V*-32-*	84	50	116	163	Rc1¼
CHG-V*-40-*	94	57	122	175	Rc1½
CHG-V*-50-*	108	70	131	192	Rc2

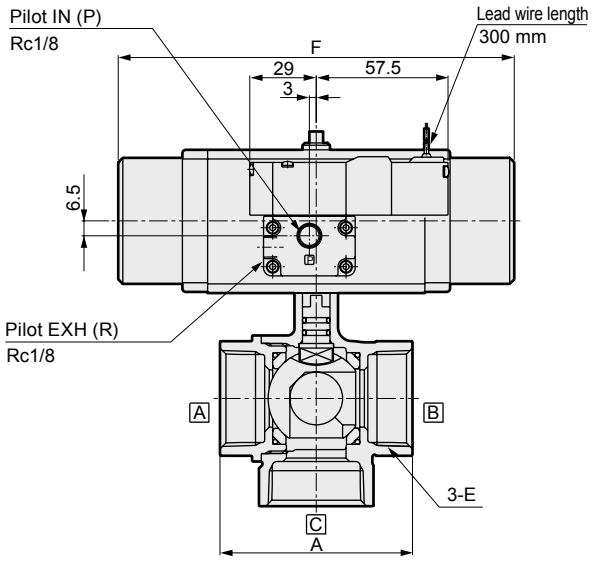
Dimensions: CHG-X* Series

● CHG-X*-15/20-*

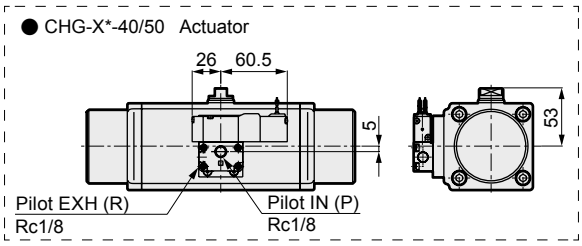


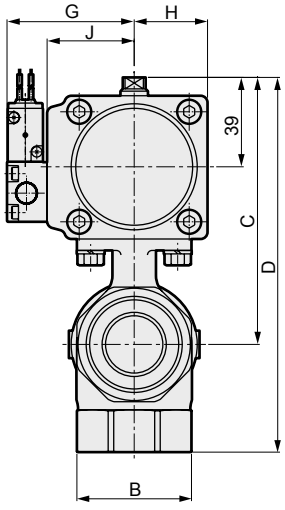
Model No.	A	B	C	D	E
CHG-X*-15-*	56	28	91	121	Rc1/2
CHG-X*-20-*	65	34	97	133	Rc3/4

● CHG-X*-25/32/40/50-*



● CHG-X*-40/50 Actuator





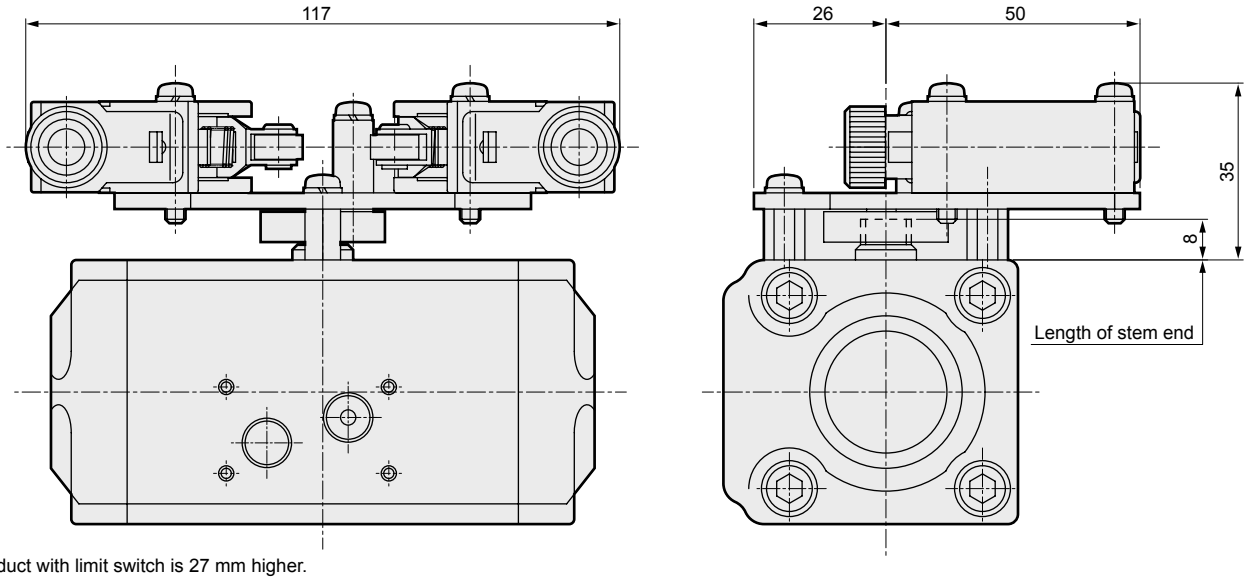
Model No.	A	B	C	D	E	F	G	H	J
CHG-X*-25-*	76	41	110	152	Rc1	173	55.5	32	38
CHG-X*-32-*	84	50	116	163	Rc1 1/4	173	55.5	32	38
CHG-X*-40-*	94	57	156.5	209.5	Rc1 1/2	244	70.5	38	43
CHG-X*-50-*	108	70	165.5	226.5	Rc2	244	70.5	38	43

Optional dimensions

For the external dimensions with a limit switch and coil options, refer to page 730.

Optional dimensions CAD

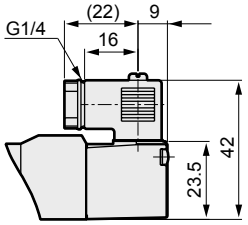
● Limit switch



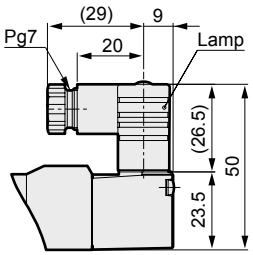
* Product with limit switch is 27 mm higher.

● Compact terminal box: (B [without indicator lamp]/L [with indicator lamp])

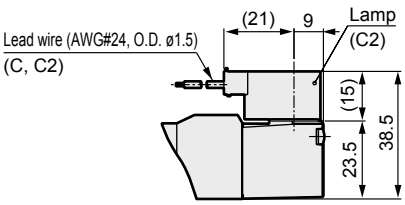
Without indicator lamp



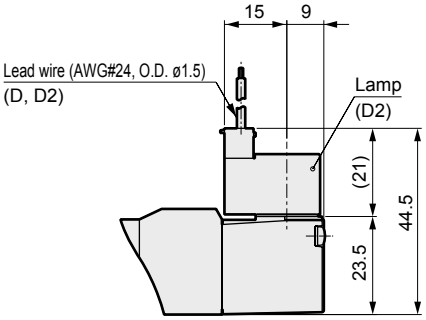
With indicator lamp



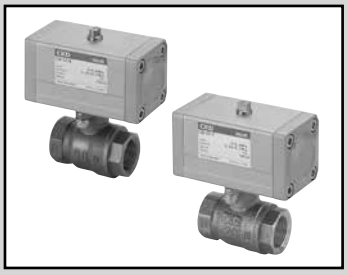
● C type connector: (C/C2)



● D type connector: (D/D2)



MEMO



Air operated 2-port ball valve
(compact rotary valve)

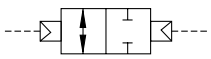
CSB/CSB-R* Series
CSBF/CSBF-R* Series

● Port size: Rc3/8 to Rc2

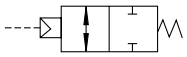
RoHS

JIS symbol

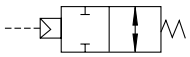
● CSB/CSBF
(Double acting)



● CSB-R1
CSBF-R1
(Single acting-NC)



● CSB-R2
CSBF-R2
(Single acting-NO)



Common specifications

1 MPa = 10 bar

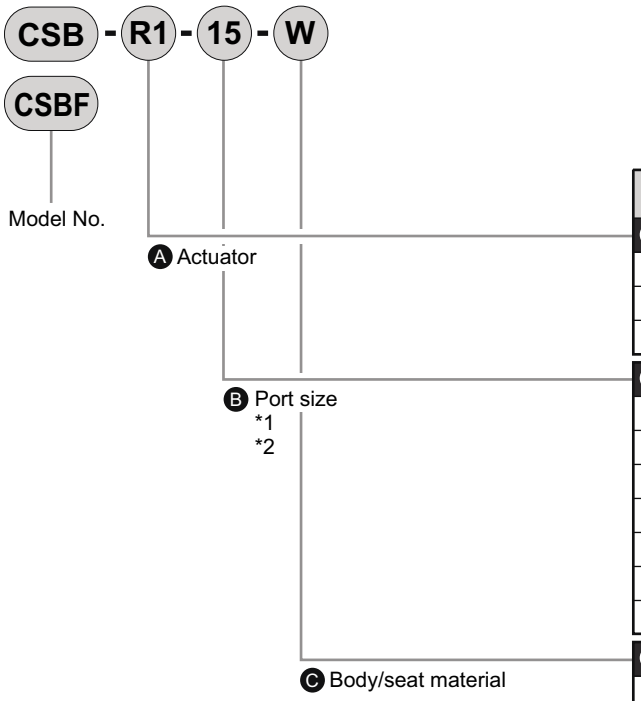
Item		Double acting	Single acting
		CSB (Standard bore) CSBF (Full bore)	CSB-R* (Standard bore) CSBF-R* (Full bore)
Actuation		Air operated: Double acting	Air operated: Single acting
Working fluid		Steam/water	
Working pressure MPa		0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)	
Proof pressure (water pressure) MPa		2.0 (≈290 psi, 20 bar)	
Fluid temperature °C		0 (32°F) to 164 (327.2°F) (no freezing)	
Ambient temperature °C		-10 (14°F) to 60 (140°F) (no freezing)	
Working environment		Indoors	
Mounting orientation		Unrestricted	
Frequency Cycle/min.		1 or less	
Rotary actuator	Pilot fluid	Compressed air	
	Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water) MPa	1.5 (≈220 psi, 15 bar)	
	Working pressure MPa	0.35 (≈51 psi) to 0.7 (≈100 psi)	0.4 (≈58 psi) to 0.7 (≈100 psi)
	Fluid temperature °C	5 (41°F) to 60 (140°F)	
	Port size	Rc1/8	

Individual specifications

Item / Model No.		Port size	Orifice size (mm)	Cv	Weight (kg)	
					Double acting	Single acting
Standard bore	CSB-(R*-)10	Rc3/8	10	10	1.0	1.1
	CSB-(R*-)15	Rc1/2	10	6	1.0	1.1
	CSB-(R*-)20	Rc3/4	15	16	1.2	1.3
	CSB-(R*-)25	Rc 1	20	29	1.3	2.2
	CSB-(R*-)32	Rc1¼	25	50	2.2(2.3)	2.7(2.8)
	CSB-40	Rc1½	32	98	2.6(2.7)	-
	CSB-50	Rc 2	40	125	3.4(3.5)	-
Full bore	CSBF-(R*-)15	Rc1/2	15	23	1.2	1.3
	CSBF-(R*-)20	Rc3/4	20	51	1.3	2.2
	CSBF-(R*-)25	Rc 1	25	66	2.2	2.7
	CSBF-32	Rc1¼	32	114	2.6	-
	CSBF-40	Rc1½	40	176	3.4	-

1 : CSB-(R-)10 is a full bore type.
Weight shown in ( ) is for stainless steel body.
2 : CSB-R-40/50 and CSBF-R*-32/40 are not provided.

How to order



Code	Description	Model No. CSB (Standard bore)	Model No. CSBF (Full bore)
A Actuator			
Blank	Double acting	●	●
R1	Single acting NC	●	●
R2	Single acting NO	●	●
B Port size			
10	Rc3/8	●	
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	
C Body/seat material			
H	Copper alloy - reinforced PTFE	●	●
W	Stainless steel - reinforced PTFE	●	

*1 : When port size is 10, the valve is full bore but the model No. is CSB.
2 : CSB-R-40/50 and CSBF-R*-32/40 are not provided.

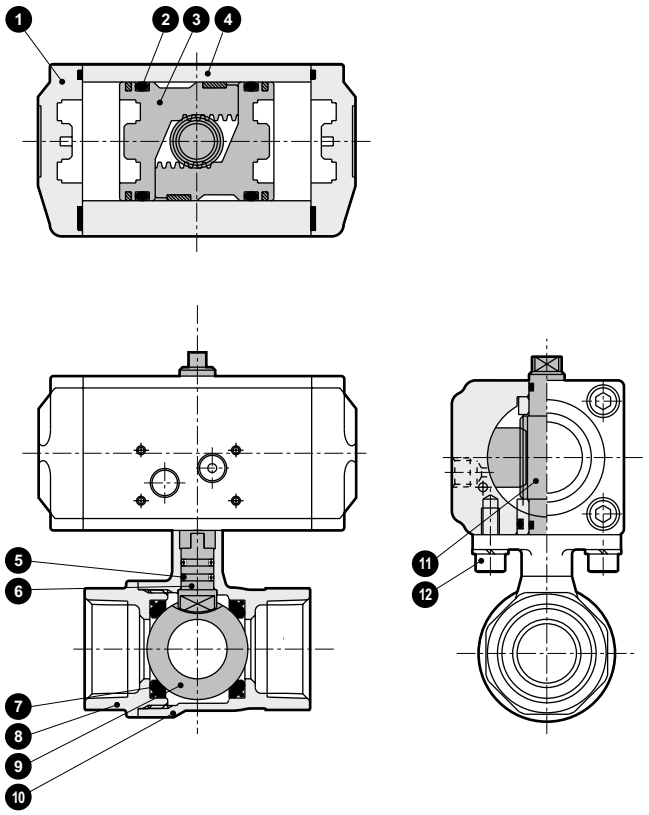
[Example of model No.]

CSB-R1-15-W

Model: CSB (standard bore)
A Actuator : Single acting NC
B Port size : Rc1/2
C Body/seat material : Stainless steel - reinforced PTFE

Internal structure and parts list: CSB/CSBF Series

● CSB-10/15/20/25/32/40/50
CSBF-15/20/25/32/40

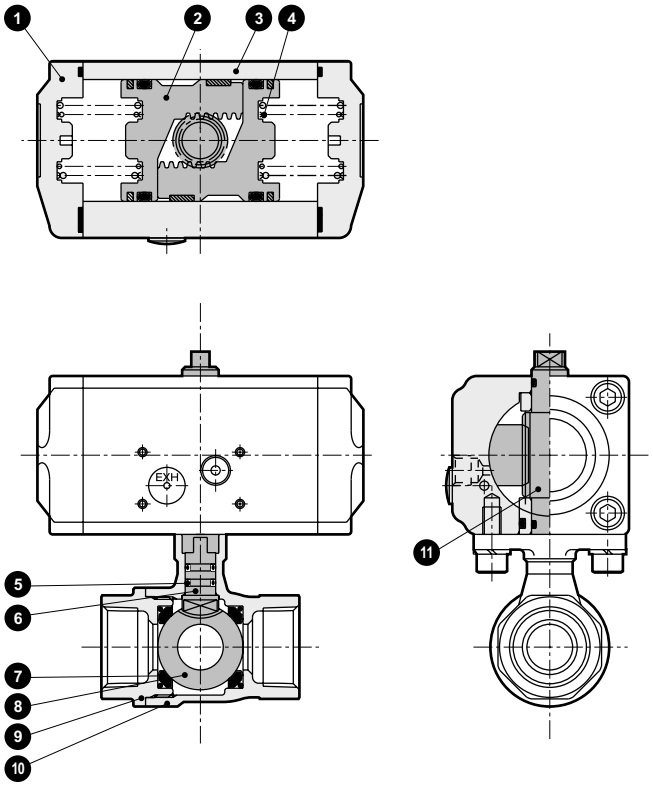


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	O-ring	FKM	Fluoro rubber
3	Piston	ADC12	Aluminum die-casting
4	Cylinder body	A6063	Aluminum
5	O-ring	FKM	Fluoro rubber
6	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
7	Valve seat	Reinforced PTFE	Tetrafluoroethylene resin
8	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
9	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
10	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
11	Stem	SUS303	Stainless steel
12	Hexagon socket head cap screw	SUSXM7	Stainless steel

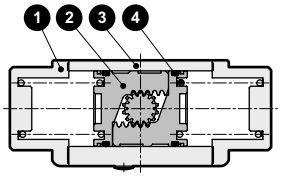
Materials shown in ( ) are for stainless steel body.
*1: Hexagon head bolt for CSB-32 to 50 and CSBF-25 to 40

Internal structure and parts list: CSB-R*/CSBF-R* Series

● CSB-R*-10/15/20/25/32
CSBF-R*-15/20/25



CSB-R*-25/32 Actuator
CSBF-R*-20/25

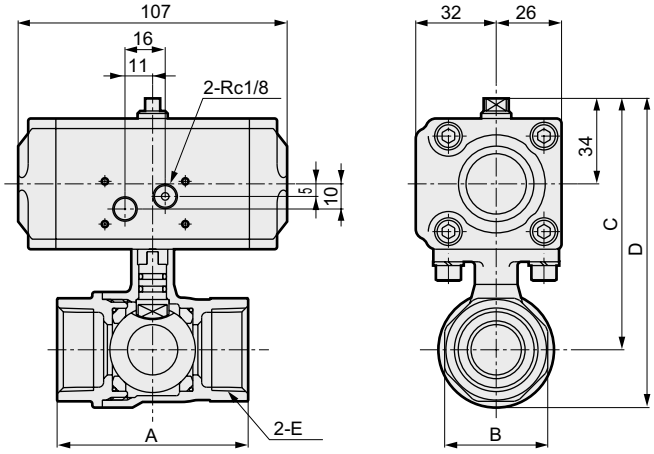


No.	Part name	Material	
1	Cylinder cap	ADC12	Aluminum die-casting
2	Piston	ADC12	Aluminum die-casting
3	Cylinder body	A6063	Aluminum
4	Spring	SWP	Piano wire
5	O-ring	FKM	Fluoro rubber
6	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
7	Valve seat	Reinforced PTFE	Tetrafluoroethylene resin
8	Valve ball	C3771, Cr plating (SUS304)	Copper alloy, chrome plating (stainless steel)
9	Valve cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
10	Valve body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
11	Stem	SUS303	Stainless steel

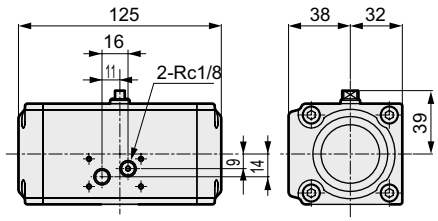
Materials shown in ( ) are for stainless steel body.

Dimensions: CSB/CSBF Series

● CSB-10/15/20/25/32/40/50
CSBF-15/20/25/32/40



CSB-32/40/50 Actuator
CSBF-25/32/40



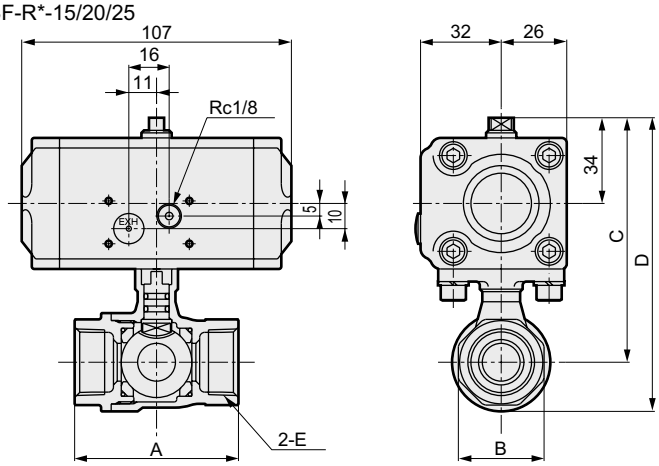
Model No.	A	B	C	D	E
CSB-10	50(56)	24(28)	91	106(107)	Rc3/8
CSB-15	56	28	91	106(107)	Rc1/2
CSB-20	65	34	97	116.5(117.5)	Rc3/4
CSB-25	76	41	100	123(124)	Rc1
CSB-32	84	50	116	143.5(145.5)	Rc1 1/4
CSB-40	94	57	122	155.5(157.5)	Rc1 1/2
CSB-50	108	70	131	170.5(171.5)	Rc2

Model No.	A	B	C	D	E
CSBF-15	65	28	97	116.5	Rc1/2
CSBF-20	71	34	100	123	Rc3/4
CSBF-25	84	41	116	143.5	Rc1
CSBF-32	95	50	122	155.5	Rc1 1/4
CSBF-40	107	57	131	170.5	Rc1 1/2

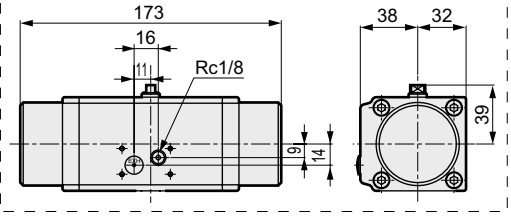
Materials shown in ( ) are for stainless steel body.

Dimensions: CSB-R*/CSBF-R* Series

● CSB-R*-10/15/20/25/32
CSBF-R*-15/20/25



CSB-R*-25/32 Actuator
CSBF-R*-20/25



Model No.	A	B	C	D	E
CSB-R*-10	50(56)	24(28)	91	106(107)	Rc3/8
CSB-R*-15	56	28	91	106(107)	Rc1/2
CSB-R*-20	65	34	97	116.5(117.5)	Rc3/4
CSB-R*-25	76	41	110	133(134)	Rc1
CSB-R*-32	84	50	116	143.5(145.5)	Rc1 1/4

Model No.	A	B	C	D	E
CSBF-R*-15	65	28	97	116.5	Rc1/2
CSBF-R*-20	71	34	110	133	Rc3/4
CSBF-R*-25	84	41	116	143.5	Rc1

Materials shown in ( ) are for stainless steel body.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

Air operated 2, 3-port ball valve (compact rotary valve)

Design/selection

⚠WARNING

1 Ambient environment

(1) If there are high levels of dust in the area, install a downward-facing silencer or elbow fitting on the exhaust port so that dust does not enter.

(2) Types with a solenoid valve cannot be used in an explosive gas atmosphere. When using in an explosive gas atmosphere, change to the CHB, CHBF, CHG, CHB-R, CHBF-R or CHG-R Series, and provide a separate explosion-proof solenoid valve on the pilot air circuit.

(3) Protect the product appropriately if it is exposed to water or oil.

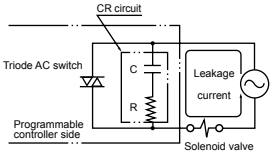
⚠CAUTION

1 Fluid viscosity

Generally, the valve can be used with a fluid viscosity of up to 500 mm^2/s. However, the properties may differ according to the fluid, so contact CKD.

2 Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications. Failure to observe this could lead to malfunctions.



Keep at or below
100 VAC : 3 mA or less,
200 VAC : 1.5 mA or less,
24 VDC : 1.8 mA.

3 Notes for external pilot air

(1) Draining: Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). This is a factor that significantly reduces the reliability of the pneumatic components. For drainage measures, improve air quality by dehumidifying with an after cooler or dryer, removing foreign matter with a filter, and removing tar with a tar removal filter, etc.

(2) Pre-lubrication: This series is pre-lubricated, so no lubrication is required. However, once lubrication has been started, it must be continued so that the lubricant does not run out. Use turbine oil Class 1 ISO VG32 (#90) or equivalent for lubrication.

(3) Filter: Install a filter with a 5 μm or less filter element.

4 Limit switch

Refer to the table below for the rated values of limit switch.

Rated voltage (V)	Non-inductive load (A)			
	Resistance load		Lamp load	
	Normally closed circuit	Normally open circuit	Normally closed circuit	Normally open circuit
AC250	5		1.5	
DC30	5		-	

*1 : The values above show steady current.
*2 : Lamp load is assumed to have 10 times the inrush current.
*3 : The max. inrush current is 10 A.
*4 : Contact CKD when using with small load.
*5 : OMRON D4E-1G20N limit switch is used. Observe the specification range of the limit switch.

Mounting, piping and wiring

⚠CAUTION

1 Mounting

(1) Always hold the body when handling or installing the product. Do not pull the lead wires or drop the product.

2 Piping

(1) Fix the product when tightening or reinstalling the piping. When piping to the body side, fix the body, and when piping to the cap side, fix the cap.

(2) Fix and support the pipes so that the weight and vibration of the pipes are not directly applied on the valves.

(3) Be sure to observe the specified pressurization direction for 3-port valve (port C pressurization only).

(4) Refer to the table below for tightening torque of the pilot air piping.

Piping nominal diameter	Recommended piping tightening torque (Nm)
Rc1/8	7 to 9

(5) Do not pipe using the solenoid valve section. There is a risk of damage. (For solenoid valve mounted)

3 Wiring (for solenoid valve mounted)

(1) The CKD 4-way valve (4KB119) is used for the pilot operated solenoid valve. Refer to the general catalog of “Pneumatic Valves” for details on the wiring methods.

When using the product

⚠CAUTION

1 Preventing water hammer
To prevent water hammer, restrict the exhaust side with a metering valve with silencer and a speed controller, etc.

2 Frequency of use
Observe the specified frequency of use. Overuse will lower the durability.

3 Manual operation procedure (double acting only)
Exhaust residual pressure in the actuator by turning OFF the pilot air. Place an adjustable wrench on the stem on the top of the actuator and turn it slowly.
* The single acting (CHB-R, CHBF-R, CHG-R, CHB-X, CHBF-X, CHG-X, CSB-R, CSBF-R Series) cannot be manually operated because a spring is incorporated.

4 Do not touch the stem at the top of the actuator by hand during operation.
Doing so is dangerous since the stem is rotating during operation.

5 Do not reduce the operating air too much when adjusting the open/close speed. Otherwise operation may become unstable.

Maintenance

⚠WARNING

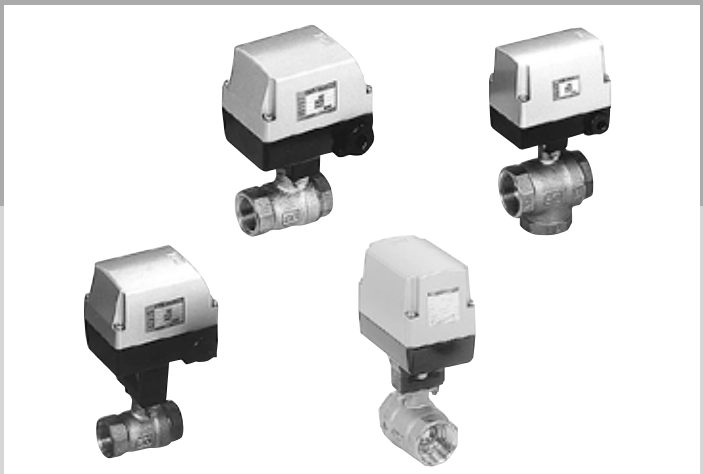
1 Handling single acting actuator
Do not disassemble the single acting actuator section. The powerful spring incorporated will pop out when disassembling.

2 Precautions when replacing the ball valve and actuator
(1) Before replacement, be sure to release the pilot air/fluid pressure and check that internal pressure is not applied inside the ball valve.
(2) When replacing, check that the actuator axis and the ball valve axis are not mis-aligned.
(3) When tightening two hexagon socket head cap screws or hexagon head bolts, assemble carefully in several actions to ensure that the tightening is uniform. (Recommended tightening torque 4.5 to 5.5 N·m)

MXB/MXG

Motorized 2, 3-port ball valve

■ **For water/air/oil/steam**



Overview

The ball open/close structure can successfully remove water hammer noise.
This valve is suitable for water and hot water controls, and oil and steam applications. Compact as it is, the flow rate is large and the pressure loss is minimal.
The excellent sealing performance and durability allow for use in various applications.

Features

High sealability
High seal performance achieved by the back-up O-ring.

No burn damage even if motor is locked
Impedance and thermal protections ensure that the motor does not burn even if the ball locks.
* Be sure to observe the specified frequency of use.

Forward and reverse rotation (excluding MH$^{B}_{G}$4 Series)

No limits to pressurization direction
(excluding 3-port valves)

Signal detection and manual override are provided.
Actuator protection
IPX3 “rainproof”
(Standard and option T/K only
MH$^{B}_{G}$4 Series is excluded)

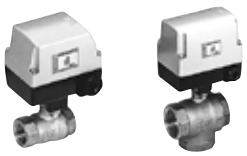
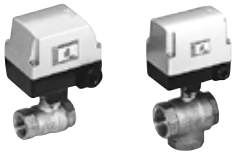
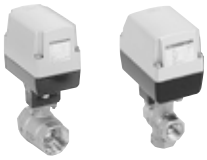
Motorized proportional control ball valves are also available

CONTENTS

⚠ Always read the precautions in the Introduction and on page 784 before use.

Series variation

Motorized 2, 3-port ball valve

Applications/purposes	Model		Bore shape	
General control	Standard 	MXB1	Standard bore	
		MXB1F	Full bore	
		MXG1	Standard bore	
Parallel operation with other valves is possible. Valve is opened/closed with ON-OFF contact.	With relay 	MXB1D	Standard bore	
		MXB1DF	Full bore	
		MXG1D	Standard bore	
For pure water, washing	Oil-prohibited specifications 	MXB1-N	Standard bore	
		MXG1-N		
		MXB1D-N		
		MXG1D-N		
For steam/water	For steam 	MSB1	Standard bore	
		MSB1F	Full bore	
		MSB1D	Standard bore	
		MSB1DF	Full bore	
Accurate flow control	Proportional control 	MXBC2	Standard bore	
		MXGC2		
Compact	Miniature 	MHB4	Reduced bore	
		MHG4		

	Fluid				Port size (upper: nominal, lower: bore size)							Page
	Water	Air	Oil	Steam	10A	15A	20A	25A	32A	40A	50A	
					3/8	1/2	3/4	1	$1^1/_4$	$1^1/_2$	2	
	●	●	●		●*1	●	●	●	●	●	●	742
	●	●	●			●	●	●	●	●		742
	●	●	●			●	●	●	●	●	●	746
	●	●	●		●*1	●	●	●	●	●	●	750
	●	●	●			●	●	●	●	●		750
	●	●	●			●	●	●	●	●	●	754
	●	●			●	●	●	●	●	●	●	758
	●	●				●	●	●	●	●	●	762
	●	●			●	●	●	●	●	●	●	758
	●	●				●	●	●	●	●	●	762
	●			●	●*1	●	●	●	●	●	●	766
	●			●		●	●	●	●	●		766
	●			●	●*1	●	●	●	●	●	●	770
	●			●		●	●	●	●	●		770
	●				●*1	●	●	●				774
	●					●	●	●				774
	●	●	●		●	●	●					778
	●	●	●		●	●	●					778

*1 : The models are standard bore but have a full bore structure.
*2 : For details on differences by bore shape, refer to the orifice size and dimensions on each page.

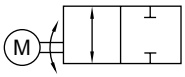
Motorized 2-port ball valve

MXB1/MXB1F Series

● Port size: Rc3/8 to Rc2

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXB1 (standard bore)/MXB1F (full bore)						
Working fluid			Water, air, oil (500 mm²/s or less)						
Working pressure MPa			0 to 1.0 (refer to the working pressure in the individual specifications.)						
Proof pressure (water pressure) MPa			2.0 (≈290 psi, 20 bar)						
Fluid temperature °C			0 (32°F) to 80 (176°F) (no freezing)						
Ambient temperature °C			-10 (14°F) to 50 (122°F)						
Ambient humidity %			95 or less						
Mounting orientation			From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)						
Pressurization direction			Arbitrary						
Degree of protection			IPX3 “rainproof” (standard and option T only)						
Electrical specifications			MXB1-10	MXB1-15	MXB1-20	MXB1-25	MXB1-32	MXB1-40	MXB1-50
				MXB1F-15	MXB1F-20		MXB1F-25	MXB1F-32	MXB1F-40
Rated voltage *1			100 VAC(50/60 Hz), 200 VAC(50/60 Hz), 12 VDC, 24 VDC						
Apparent power VA	Operating	100 VAC	4.9/5.9(50/60 Hz)				13/15(50/60 Hz)		
		200 VAC	5.4/6.2(50/60 Hz)				13/15(50/60 Hz)		
	Starting	100 VAC	4.9/5.9(50/60 Hz)				13/15(50/60 Hz)		
		200 VAC	5.4/6.2(50/60 Hz)				13/15(50/60 Hz)		
Average current value A *2		12 VDC	1.1				1.5		
		24 VDC	0.7				1.0		
Starting current A *2		12 VDC	1.8 or less				3 or less		
		24 VDC	1.2 or less				2 or less		
Power consumption W		AC	7				15		
		12 VDC	13				18		
		24 VDC	17				24		

MXB1 (standard bore) individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXB1-10 *3	MXB1-15	MXB1-20	MXB1-25	MXB1-32	MXB1-40	MXB1-50
Port size			Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Orifice size mm			10	10	15	20	25	32	40
Cv			10	6	16	29	50	98	125
Working pressure MPa			0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)						0 to 0.5
Response time sec		AC	10/8(50/60 Hz)				13/11(50/60 Hz)		
		DC	8				10.5		
Frequency		AC	2 times/min. or less				1 time/min. or less		
	*4	DC	1 time/min. or less				1 time/2 mins. or less		
Weight kg	Bronze body		1.2	1.2	1.4	1.5	2.5	3.0	3.7
	Stainless steel body		1.2	1.2	1.4	1.5	2.6	3.1	3.8

MXB1F (full bore) individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		MXB1F-15	MXB1F-20	MXB1F-25	MXB1F-32	MXB1F-40
Port size		Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2
Orifice size mm		15	20	25	32	40
Cv		23	51	66	114	176
Working pressure MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)				0 to 0.5
Response time sec	AC	10/8(50/60 Hz)		13/11(50/60 Hz)		
	DC	8		10.5		
Frequency	AC	2 times/min. or less		1 time/min. or less		
*4	DC	1 time/min. or less		1 time/2 mins. or less		
Weight kg		1.4	1.5	2.5	3.0	3.7

*1 : Use the product within ±10% of the rated voltage.
*2 : Current values at the rated voltage.
*3 : MXB1-10 is a full bore.
*4 : Be sure to observe the specified frequency of use.
*5 : Consult with CKD for specifications not indicated above.

How to order

MXB1 - 32 - 0 T M - 1
MXB1F

Model No.

Ⓐ Port size

Ⓑ Body/seat material

Ⓒ Other options
*1
*2

Ⓓ Manual override
*3

Ⓔ Voltage

Code	Description	Model No. MXB1 (Standard bore)	Model No. MXB1F (Full bore)
Ⓐ Port size			
10	Rc3/8 *4	●	
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	
Ⓑ Body/seat material			
0	Body - bronze/seat - PTFE	●	●
H	Body - bronze/seat - reinforced PTFE	●	●
E	Body - stainless steel/seat - PTFE	●	
W	Body - stainless steel/seat - reinforced PTFE	●	

Ⓒ Other options

	Description	Applications	Remarks		
Blank	5-conductor cable 0.5 mm² (with output lead wire)	-	-	●	●
T	3-conductor cable 0.75 mm² (without signal output)	When output lead wire is not required	3-conductor cabtyre cable used	●	●
B	With round terminal box (5 terminals)	When the lead wires are different in length	-	●	●
L	Round terminal box with lamp (Lit when open, 3 terminals)	Fully open confirmation by lamp	Lit only when fully open	●	●
R	Round terminal box with lamp (Lit when closed, 3 terminals)	Fully closed confirmation by lamp	Lit only when fully closed	●	●

Ⓓ Manual override			
Blank	None	●	●
M	Manual override	●	●
Ⓔ Voltage			
1	100 VAC(50/60 Hz)	●	●
2	200 VAC(50/60 Hz)	●	●
3	24 VDC	●	●
4	12 VDC	●	●

*1 : When selecting both without signal output (Item Ⓒ T) and round terminal box (Item Ⓒ B) as options, designate Item Ⓒ as TB. A 3-terminal round terminal box will be provided.
*2 : Combination of Item Ⓒ LR/TL/TR/BL/BR is not available.
*3 : When the manual override (Item Ⓓ M) is selected, available port sizes are 32, 40 and 50 for MXB1. For MXB1F, available port sizes are 25, 32 and 40. Manual override is provided as standard with other port size.
*4 : When port size is 10, the valve is full bore but the model No. is MXB1.

[Example of model No.]

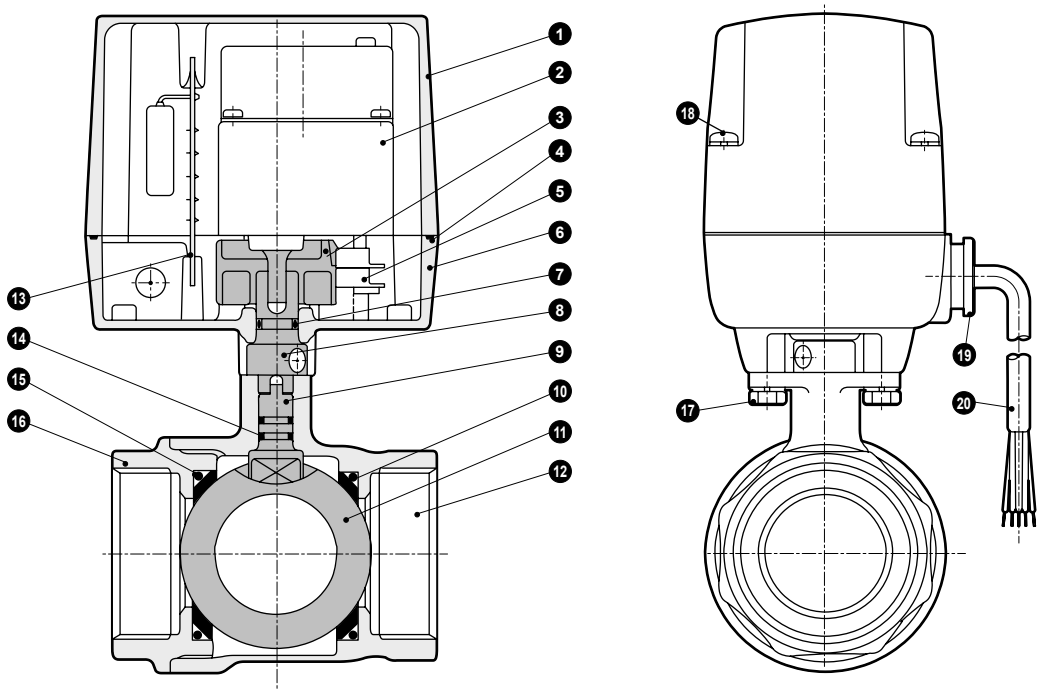
MXB1F-32-0TM-1

Model: MXB1F (full bore)

Ⓐ Port size : Rc1 1/4
Ⓑ Body/seat material : Body - bronze/seat - PTFE
Ⓒ Other options : 3-conductor cable (without output lead wire)
Ⓓ Manual override : Selected
Ⓔ Voltage : 100 VAC (50/60 Hz)

Internal structure and parts list

● MXB1/MXB1F



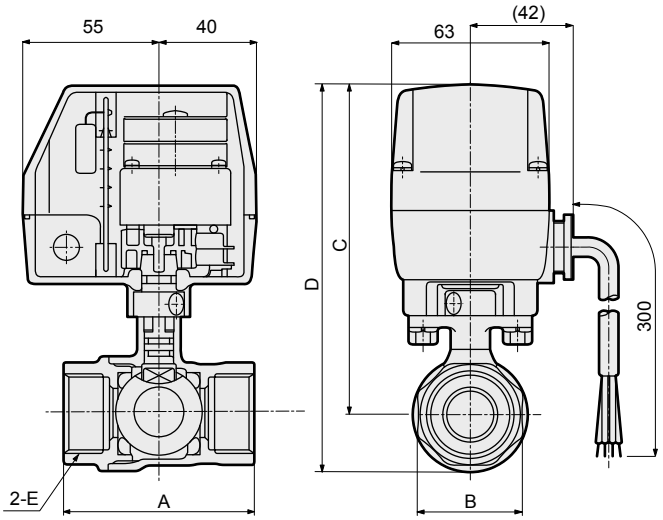
No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	11	Valve ball	C3771(SUS304)	Copper alloy *2 (stainless steel)
2	Geared motor	-	-	12	Body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
3	Cam	PA	Polyamide resin	13	P plate assembly	PF	Phenolic resin
4	Gasket	NBR	Nitrile rubber	14	O-ring *1	FKM/NBR	Fluoro rubber/nitrile rubber
5	Micro switch	-	-	15	O-ring	FKM	Fluoro rubber
6	Adaptor	ZDC2	Zinc alloy die-casting	16	Cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
7	O-ring	NBR	Nitrile rubber	17	Hexagon head bolt	SWRM	Carbon steel wire for cold rolling
8	Intermediate bush	SUS303	Stainless steel	18	Phillips pan head machine screw	SWRM	Carbon steel wire for cold rolling
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)	19	Bushing	PF	Phenolic resin
10	Ball seat	PTFE	Tetrafluoroethylene resin	20	Cabtyre cable	0.5 mm^2, 5-conductor	-

Materials shown in ( ) are for stainless steel body.

*1 : The upper O-ring is NBR, and the lower is FKM. For stainless steel body, FKM is used for both upper and lower O rings.
*2 : Valve ball is hard chrome plated copper alloy.

Dimensions

● MXB1-10/15/20/25-*
● MXB1F-15/20-*

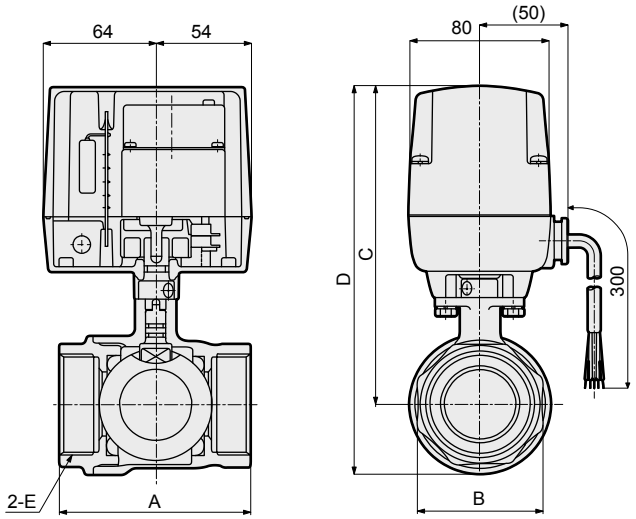


Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXB1-10-*	50(56)	24(28)	124.5	139.5(140.5)	Rc3/8
MXB1-15-*	56	28	124.5	139.5(140.5)	Rc1/2
MXB1-20-*	65	34	130.5	150(151)	Rc3/4
MXB1-25-*	76	41	133.5	156.5(157.5)	Rc1
MXB1F-15-*	65	28	130.5	150	Rc1/2
MXB1F-20-*	71	34	133.5	156.5	Rc3/4

*1 : Dimensions shown in ( ) are for stainless steel body.

● MXB1-32/40/50-*
● MXB1F-25/32/40-*



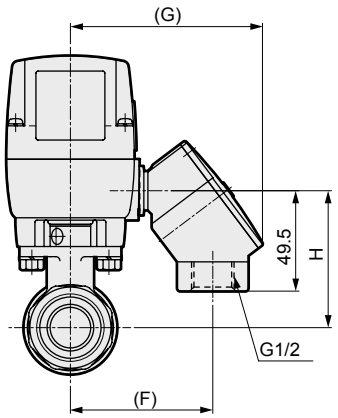
Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXB1-32-*	84	50	166	193.5(195.5)	Rc1¼
MXB1-40-*	94	57	172	205.5(207.5)	Rc1½
MXB1-50-*	108	70	181	220.5(221.5)	Rc2
MXB1F-25-*	84	41	166	193.5	Rc1
MXB1F-32-*	95	50	172	205.5	Rc1¼
MXB1F-40-*	107	57	181	220.5	Rc1½

*1 : For valves with manual override “M”, the MSB1 Series yoke is inserted between the valve body and actuator, making dimensions C and D 22 mm longer.
*2 : Dimensions shown in ( ) are for stainless steel body.

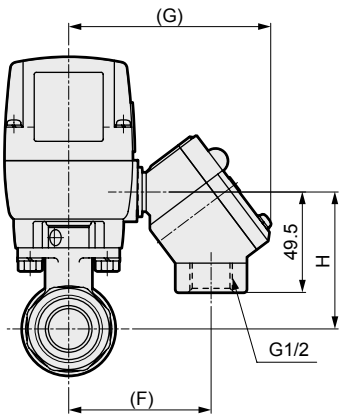
Optional dimensions

● With round terminal box
MXB1/MXB1F-[bore size]-*[B]



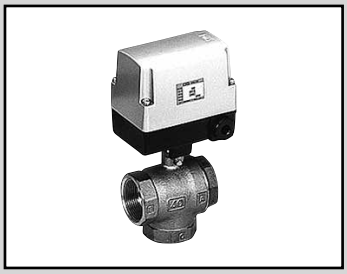
Bore size		F	G	H
MXB1	MXB1F			
10	-	74	98	58.5
15	-	74	98	58.5
20	15	74	98	64.5
25	20	74	98	67.5
32	25	82	106	77.5 (*1)
40	32	82	106	83.5 (*1)
50	40	82	106	92.5 (*1)

● Round terminal box with lamp
MXB1/MXB1F-[bore size]-*[L/R]



Bore size		F	G	H
MXB1	MXB1F			
10	-	74	102	58.5
15	-	74	102	58.5
20	15	74	102	64.5
25	20	74	102	67.5
32	25	82	110	77.5 (*1)
40	32	82	110	83.5 (*1)
50	40	82	110	92.5 (*1)

*1 : For valves with manual override “M”, the MSB1 Series yoke is inserted between the valve body and actuator, making dimensions 22 mm longer.



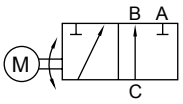
Motorized 3-port ball valve

MXG1 Series

● Port size: Rc1/2 to Rc2

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXG1					
Working fluid			Water, air, oil (500 mm²/s or less)					
Working pressure	MPa		0 to 1.0 (refer to the working pressure in the individual specifications.)					
Proof pressure (water pressure)	MPa		2.0 (≈290 psi, 20 bar)					
Fluid temperature	°C		0 (32°F) to 80 (176°F) (no freezing)					
Ambient temperature	°C		-10 (14°F) to 50 (122°F)					
Ambient humidity	%		95 or less					
Mounting orientation			From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)					
Pressurization direction			Port C pressurization only					
Degree of protection			IPX3 “rainproof” (standard and option T only)					
Electrical specifications			**MXG1-15**	**MXG1-20**	**MXG1-25**	**MXG1-32**	**MXG1-40**	**MXG1-50**
Rated voltage		*1	100 VAC(50/60 Hz), 200 VAC(50/60 Hz), 12 VDC, 24 VDC					
Apparent power	VA	Operating 100 VAC	4.9/5.9(50/60 Hz)			13/15(50/60 Hz)		
		Operating 200 VAC	5.4/6.2(50/60 Hz)			13/15(50/60 Hz)		
		Starting 100 VAC	4.9/5.9(50/60 Hz)			13/15(50/60 Hz)		
		Starting 200 VAC	5.4/6.2(50/60 Hz)			13/15(50/60 Hz)		
Average current value *2	A	12 VDC	1.1			1.5		
		24 VDC	0.7			1.0		
Starting current *2	A	12 VDC	1.8 or less			3 or less		
		24 VDC	1.2 or less			2 or less		
Power consumption	W	AC	7			15		
		12 VDC	13			18		
		24 VDC	17			24		

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXG1-15	MXG1-20	MXG1-25	MXG1-32	MXG1-40	MXG1-50
Port size			Rc1/2	Rc3/4	Rc1	Rc1¼	Rc1½	Rc2
Orifice size	mm		10	14	19	23	30	38
Cv			3	6	11	16	28	47
Working pressure	MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)					0 to 0.5
Response time	sec	AC	20/16(50/60 Hz)			26/22(50/60 Hz)		
		DC	16			21		
Frequency *3		AC	1 time/min. or less			1 time/2 mins. or less		
		DC	1 time/2 mins. or less			1 time/5 mins. or less		
Weight	kg	Bronze body	1.3	1.4	1.7	2.7	3.2	4.1
		S.S. body	1.3	1.4	1.7	2.8	3.3	4.2

*1 : Use the product within ±10% of the rated voltage.
*2 : Current values at the rated voltage.
*3 : Be sure to observe the specified frequency of use.
*4 : For specifications other than above, contact CKD separately.

How to order

MXG1 - 20 - 0 K - 2

Model No.

Ⓐ Port size

Ⓑ Body/seat material

Ⓒ Other options
*1
*2

Ⓓ Voltage

Code	Description
Ⓐ Port size	
15	Rc1/2
20	Rc3/4
25	Rc1
32	Rc1 1/4
40	Rc1 1/2
50	Rc2
Ⓑ Body/seat material	
0	Body - bronze/seat - PTFE
H	Body - bronze/seat - reinforced PTFE
E	Body - stainless steel/seat - PTFE
W	Body - stainless steel/seat - reinforced PTFE

Ⓒ Other options

	Description	Applications	Remarks
Blank	5-conductor cable 0.5 mm² (with output lead wire)	-	-
T	3-conductor cable 0.75 mm² (no sig output)	When output lead wire is not required	3-conductor cabtyre cable used
B	Round terminal box (5 terminals)	When lead wires have varied lengths	-
L	Round term box, lamp (Lit when A-C in operation, 3 term)	A-C path completion confirmation by lamp	Lit only when A-C path operation is complete
R	Round term box, lamp (Lit when B-C in operation, 3 term)	B-C path completion confirmation by lamp	Lit only when B-C path operation is complete
K	Multi-fluid (90° rotation switching, Response time 1/2)	To remove load to pump	Fluids may mix somewhat during switching

Ⓓ Voltage	
1	100 VAC(50/60 Hz)
2	200 VAC(50/60 Hz)
3	24 VDC
4	12 VDC

*1 : If several options of Item Ⓒ are necessary, select from the following combinations. TB, TK, BK, LK, RK, TBK
TB means a 3-terminal round terminal box.
*2 : Combination of Item Ⓒ LR/TL/TR/BL/BR is not available.

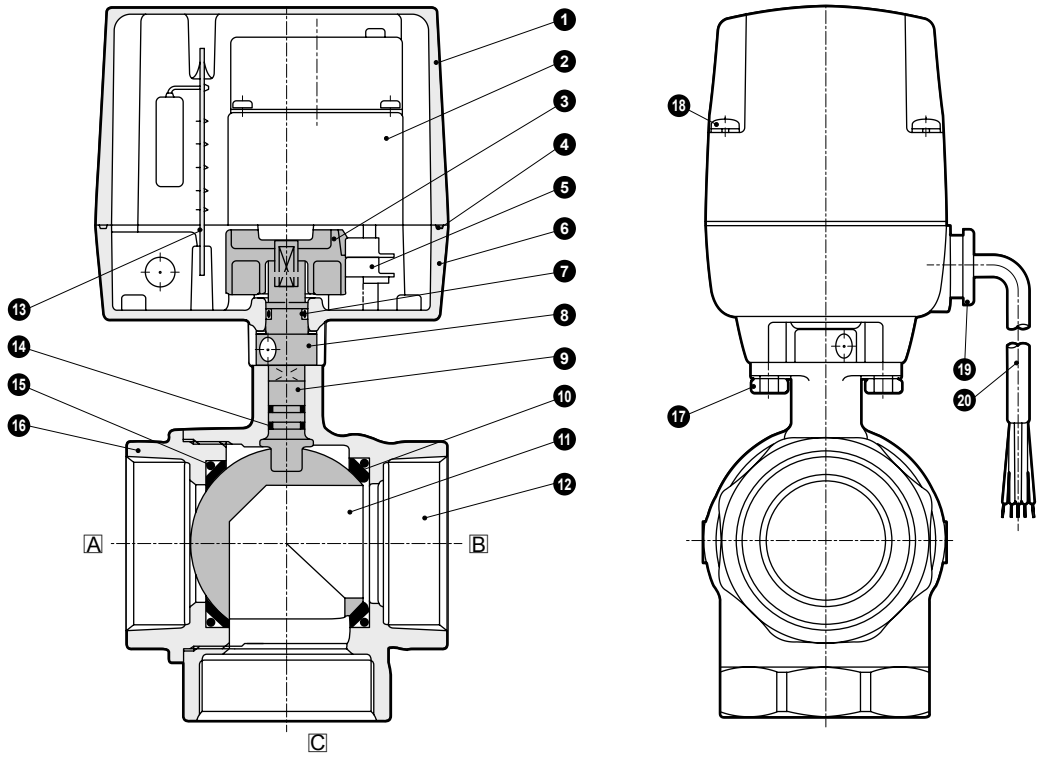
[Example of model No.]

MXG1-20-0K-2
Model: MXG1

Ⓐ Port size : Rc3/4
Ⓑ Body/seat material : Body - bronze/seat - PTFE
Ⓒ Other options : Multi-fluid (90° rotation switching, response time 1/2)
Ⓓ Voltage : 200 VAC (50/60 Hz)

Internal structure and parts list

● MXG1



No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	11	Valve ball	C3771(SUS304)	Copper alloy *2 (stainless steel)
2	Geared motor	-	-	12	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
3	Cam	PA	Polyamide resin	13	P plate assembly	PF	Phenolic resin
4	Gasket	NBR	Nitrile rubber	14	O-ring *1	FKM/NBR	Fluoro rubber/nitrile rubber
5	Micro switch	-	-	15	O-ring	FKM	Fluoro rubber
6	Adaptor	ZDC2	Zinc alloy die-casting	16	Cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
7	O-ring	NBR	Nitrile rubber	17	Hexagon head bolt	SWCH	Carbon steel wire for cold rolling
8	Intermediate bush	SUS303	Stainless steel	18	Philips pan head machine screw	SWCH	Carbon steel wire for cold rolling
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)	19	Bushing	PF	Phenolic resin
10	Ball seat	PTFE	Tetrafluoroethylene resin	20	Cabtyre cable	0.5 mm^2, 5-conductor	-

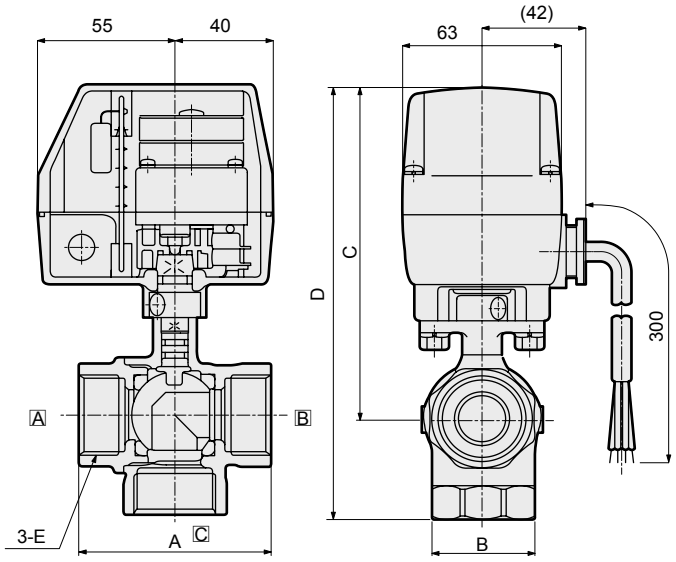
Materials shown in ( ) are for stainless steel body.

*1 : The upper O-ring is NBR, and the lower is FKM. For stainless steel body, FKM is used for both upper and lower O rings.

*2 : Valve ball is hard chrome plated copper alloy.

Dimensions

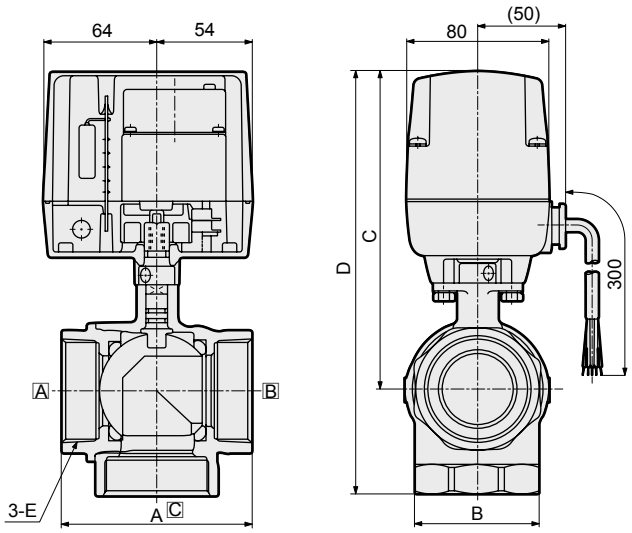
● MXG1-15/20/25-*



Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXG1-15-*	56	28	124.5	154.5	Rc1/2
MXG1-20-*	65	34	130.5	166.5	Rc3/4
MXG1-25-*	76	41	133.5	175.5	Rc1

● MXG1-32/40/50-*

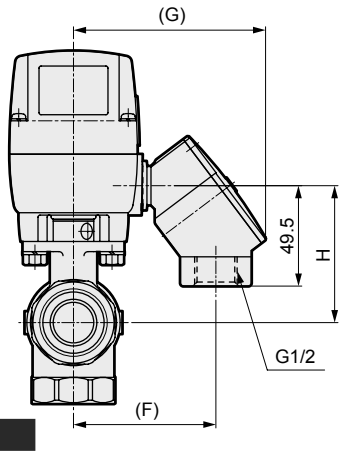


Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXG1-32-*	84	50	166	213	Rc1 1/4
MXG1-40-*	94	57	172	225	Rc1 1/2
MXG1-50-*	108	70	181	242	Rc2

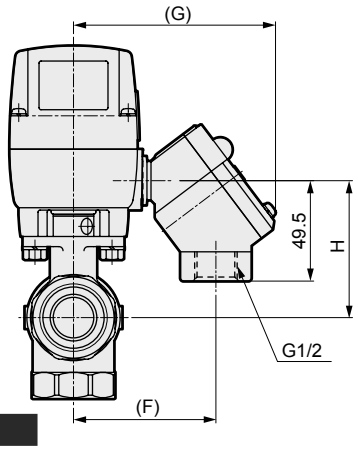
Optional dimensions

● With round terminal box
MXG1-bore size-*B

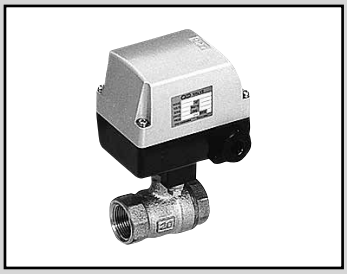


Bore size	F	G	H
15	74	98	58.5
20	74	98	64.5
25	74	98	67.5
32	82	106	77.5
40	82	106	83.5
50	82	106	92.5

● Round terminal box with lamp
MXG1-bore size-* L/R



Bore size	F	G	H
15	74	102	58.5
20	74	102	64.5
25	74	102	67.5
32	82	110	77.5
40	82	110	83.5
50	82	110	92.5



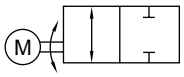
Motorized 2-port ball valve with relay

MXB1D/MXB1DF Series

● Port size: Rc3/8 to Rc2

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXB1D (standard bore)/MXB1DF (full bore)						
Working fluid			Water, air, oil (500 mm²/s or less)						
Working pressure	MPa		0 to 1.0 (refer to the working pressure in the individual specifications.)						
Proof pressure (water pressure)	MPa		2.0 (≈290 psi, 20 bar)						
Fluid temperature	°C		0 (32°F) to 80 (176°F) (no freezing)						
Ambient temperature	°C		-10 (14°F) to 50 (122°F)						
Ambient humidity	%		95 or less						
Mounting orientation			From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)						
Pressurization direction			Arbitrary						
Degree of protection			IPX3 “rainproof” (standard and option T only)						
Electrical specifications			**MXB1D-10**	**MXB1D-15**	**MXB1D-20**	**MXB1D-25**	**MXB1D-32**	**MXB1D-40**	**MXB1D-50**
				MXB1DF-15	**MXB1DF-20**		**MXB1DF-25**	**MXB1DF-32**	**MXB1DF-40**
Rated voltage		*1	100 VAC(50/60 Hz), 200 VAC(50/60 Hz)						
Apparent power	VA	Operating 100 VAC	6.0/6.8(50/60 Hz)				14/16(50/60 Hz)		
		Operating 200 VAC	6.6/7.2(50/60 Hz)				14/16(50/60 Hz)		
		When starting 100 VAC	6.0/6.8(50/60 Hz)				14/16(50/60 Hz)		
		When starting 200 VAC	6.6/7.2(50/60 Hz)				14/16(50/60 Hz)		
Power consumption	W		8				16		

MXB1D (standard bore) individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXB1D-10 *2	MXB1D-15	MXB1D-20	MXB1D-25	MXB1D-32	MXB1D-40	MXB1D-50
Port size			Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Orifice size	mm		10	10	15	20	25	32	40
Cv			10	6	16	29	50	98	125
Working pressure	MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)						0 to 0.5
Response time	sec	50 Hz	10				13		
		60 Hz	8				11		
Frequency		*3	2 times/min. or less				1 time/min. or less		
Weight	kg	Bronze body	1.2	1.3	1.4	1.6	2.6	3.0	3.8
		Stainless steel body	1.2	1.3	1.4	1.6	2.7	3.1	3.9

MXB1DF (full bore) individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXB1DF-15	MXB1DF-20	MXB1DF-25	MXB1DF-32	MXB1DF-40
Port size			Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2
Orifice size	mm		15	20	25	32	40
Cv			23	51	66	114	176
Working pressure	MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)				0 to 0.5
Response time	sec	50 Hz	10		13		
		60 Hz	8		11		
Frequency		*3	2 times/min. or less		1 time/min. or less		
Weight	kg		1.4	1.6	2.6	3.0	3.8

*1 : Use the product within ±10% of the rated voltage.
*2 : MXB1D-10 is a full bore.
*3 : Be sure to observe the specified frequency of use.
*4 : Consult with CKD for specifications not indicated above.

How to order

MXB1D - **32** - **0** **T** **M** - **1**

MXB1DF

Model No.

Ⓐ Port size

Ⓑ Body/seat material

Ⓒ Other options *1 *2

Ⓓ Manual override *3

Ⓔ Voltage

Code	Description	Model No. MXB1D (Standard bore)	Model No. MXB1DF (Full bore)
Ⓐ Port size			
10	Rc3/8 *4	●	
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	
Ⓑ Body/seat material			
0	Body - bronze/seat - PTFE	●	●
H	Body - bronze/seat - reinforced PTFE	●	●
E	Body - stainless steel/seat - PTFE	●	
W	Body - stainless steel/seat - reinforced PTFE	●	
Ⓒ Other options			
	Description / **Applications** / **Remarks**		
Blank	5-conductor cable 0.5 mm² (with output lead wire) / - / -	●	●
T	3-conductor cable 0.75 mm² (without signal output) / When output lead wire is not required / 3-conductor cabtyre cable used	●	●
B	Round terminal box (5 terminals) / When the lead wires are different in length / -	●	●
L	Round terminal box with lamp (lit when open, 3 terminals) / Fully open confirmation by lamp / Lit only when fully open	●	●
R	Round terminal box with lamp (lit when closed, 3 terminals) / Fully closed confirmation by lamp / Lit only when fully closed	●	●
Ⓓ Manual override			
Blank	None	●	●
M	Manual override	●	●
Ⓔ Voltage			
1	100 VAC(50/60 Hz)	●	●
2	200 VAC(50/60 Hz)	●	●

*1 : When selecting both without signal output (Item ⒸT) and round terminal box (Item ⒸB) as options, designate Item Ⓒ as TB. A 3-terminal round terminal box will be provided.
*2 : Combination of Item Ⓒ LR/TL/TR/BL/BR is not available.
*3 : When the manual override (Item Ⓓ M) is selected, available port sizes are 32, 40 and 50 for MXB1D. For MXB1DF, available port sizes are 25, 32 and 40.
Manual override is provided as standard with other port size.
*4 : When port size is 10, the valve is full bore but the model No. is MXB1D.

[Example of model No.]

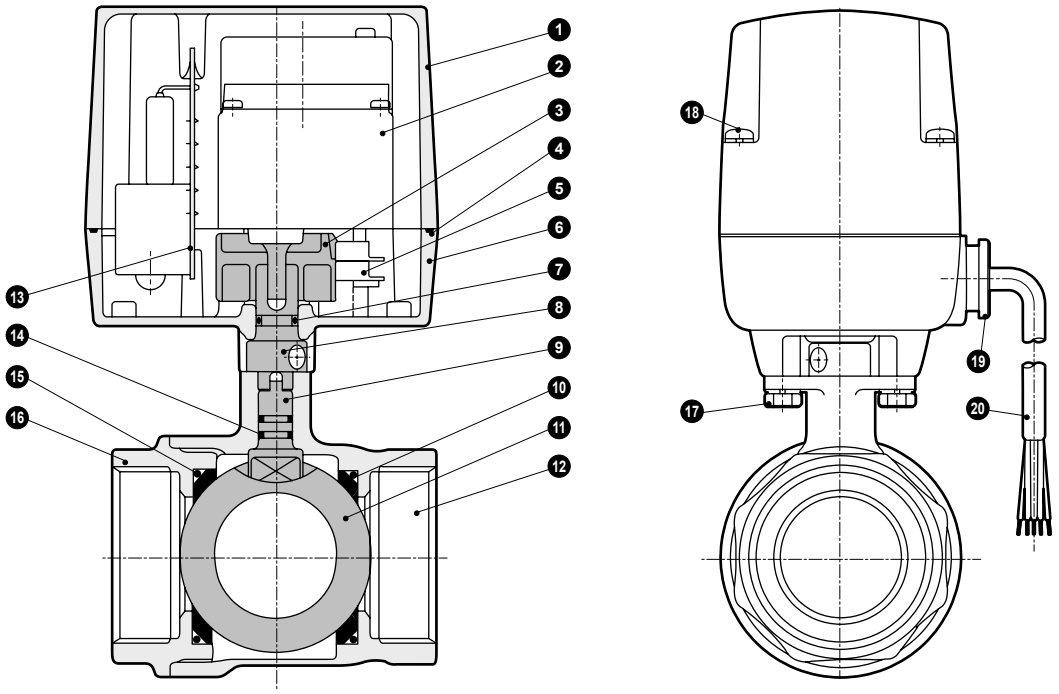
MXB1DF-32-0TM-1

Model: MXB1DF (full bore)

Ⓐ Port size : Rc1 1/4
Ⓑ Body/seat material : Body - bronze/seat - reinforced PTFE
Ⓒ Other options : 3-conductor cable (without output lead wire)
Ⓓ Manual override : Selected
Ⓔ Voltage : 100 VAC (50/60 Hz)

Internal structure and parts list

● MXB1D/MXB1DF



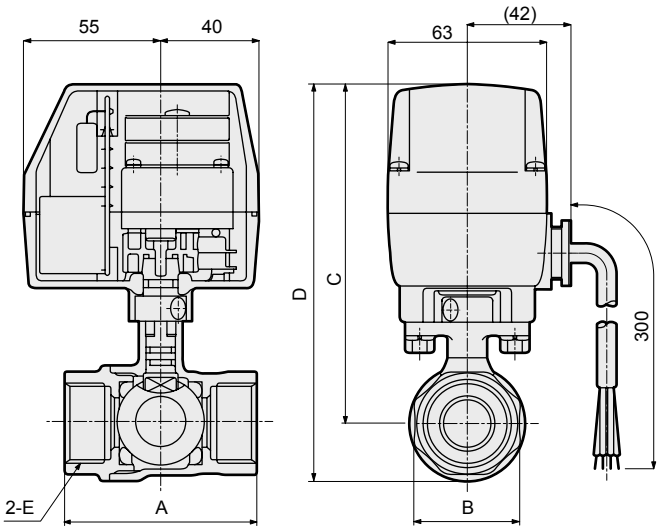
No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	11	Valve ball	C3771(SUS304)	Copper alloy *2 (stainless steel)
2	Geared motor	-	-	12	Body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
3	Cam	PA	Polyamide resin	13	P plate assembly	PF	Phenolic resin
4	Gasket	NBR	Nitrile rubber	14	O-ring *1	FKM/NBR	Fluoro rubber/nitrile rubber
5	Micro switch	-	-	15	O-ring	FKM	Fluoro rubber
6	Adaptor	ZDC2	Zinc alloy die-casting	16	Cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
7	O-ring	NBR	Nitrile rubber	17	Hexagon head bolt	SWCH	Carbon steel wire for cold rolling
8	Intermediate bush	SUS303	Stainless steel	18	Phillips pan head machine screw	SWCH	Carbon steel wire for cold rolling
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)	19	Bushing	PF	Phenolic resin
10	Ball seat	PTFE	Tetrafluoroethylene resin	20	Cabtyre cable	0.5 mm^2, 5-conductor	-

Materials shown in ( ) are for stainless steel body.

*1 : The upper O-ring is NBR, and the lower is FKM. For stainless steel body, FKM is used for both upper and lower O rings.
*2 : Valve ball is hard chrome plated copper alloy.

Dimensions

● MXB1D-10/15/20/25-*
● MXB1DF-15/20-*

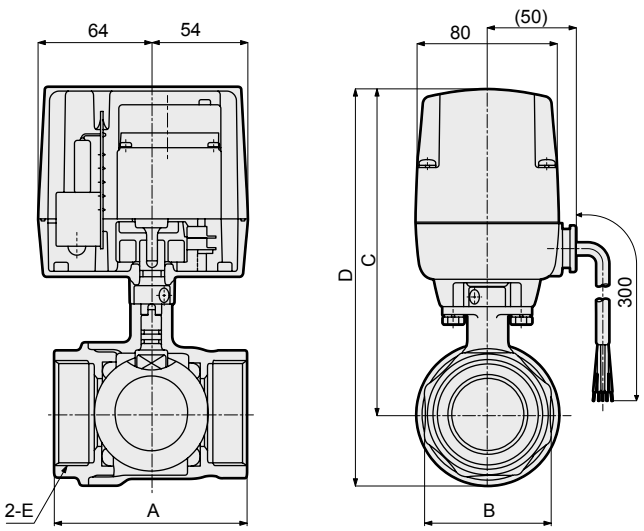


Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXB1D-10-*	50(56)	24(28)	124.5	139.5(140.5)	Rc3/8
MXB1D-15-*	56	28	124.5	139.5(140.5)	Rc1/2
MXB1D-20-*	65	34	130.5	150(151)	Rc3/4
MXB1D-25-*	76	41	133.5	156.5(157.5)	Rc1
MXB1DF-15-*	65	28	130.5	150	Rc1/2
MXB1DF-20-*	71	34	133.5	156.5	Rc3/4

*1 : Dimensions shown in ( ) are for stainless steel body.

● MXB1D-32/40/50-*
● MXB1DF-25/32/40-*



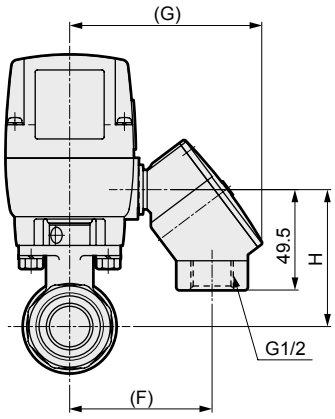
Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXB1D-32-*	84	50	166	193.5(195.5)	Rc1¼
MXB1D-40-*	94	57	172	205.5(207.5)	Rc1½
MXB1D-50-*	108	70	181	220.5(221.5)	Rc2
MXB1DF-25-*	84	41	166	193.5	Rc1
MXB1DF-32-*	95	50	172	205.5	Rc1¼
MXB1DF-40-*	107	57	181	220.5	Rc1½

*1 : For valves with manual override “M”, the MSB1 Series yoke is inserted between the valve body and actuator, making dimensions C and D 22 mm longer.
*2 : Dimensions shown in ( ) are for stainless steel body.

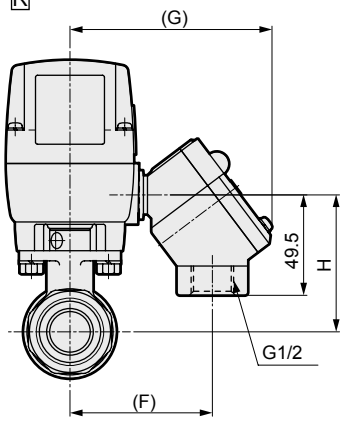
Optional dimensions

● With round terminal box
MXB1D/MXB1DF-bore size-*B



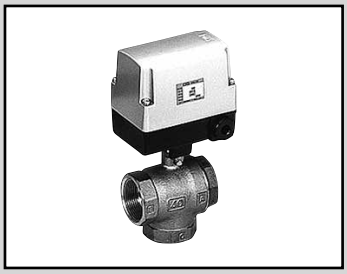
Bore size		F	G	H
MXB1D	MXB1DF			
10	-	74	98	58.5
15	-	74	98	58.5
20	15	74	98	64.5
25	20	74	98	67.5
32	25	82	106	77.5 (*1)
40	32	82	106	83.5 (*1)
50	40	82	106	92.5 (*1)

● Round terminal box with lamp
MXB1D/MXB1DF-bore size-*L/R



Bore size		F	G	H
MXB1D	MXB1DF			
10	-	74	102	58.5
15	-	74	102	58.5
20	15	74	102	64.5
25	20	74	102	67.5
32	25	82	110	77.5 (*1)
40	32	82	110	83.5 (*1)
50	40	82	110	92.5 (*1)

*1 : For valves with manual override “M”, the MSB1 Series yoke is inserted between the valve body and actuator, making dimensions 22 mm longer.



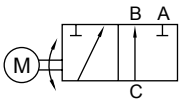
Motorized 3-port ball valve with relay

MXG1D Series

● Port size: Rc1/2 to Rc2

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXG1D					
Working fluid			Water, air, oil (500 mm²/s or less)					
Working pressure	MPa		0 to 1.0 (refer to the working pressure in the individual specifications.)					
Proof pressure (water pressure)	MPa		2.0 (≈290 psi, 20 bar)					
Fluid temperature	°C		0 (32°F) to 80 (176°F) (no freezing)					
Ambient temperature	°C		-10 (14°F) to 50 (122°F)					
Ambient humidity	%		95 or less					
Mounting orientation			From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)					
Pressurization direction			Port C pressurization only					
Degree of protection			IPX3 “rainproof” (standard and option T only)					
Electrical specifications			**MXG1D-15**	**MXG1D-20**	**MXG1D-25**	**MXG1D-32**	**MXG1D-40**	**MXG1D-50**
Rated voltage		*1	100 VAC(50/60 Hz), 200 VAC(50/60 Hz)					
Apparent power	VA	Operating 100 VAC	6.0/6.8(50/60 Hz)			14/16(50/60 Hz)		
		Operating 200 VAC	6.6/7.2(50/60 Hz)			14/16(50/60 Hz)		
		When starting 100 VAC	6.0/6.8(50/60 Hz)			14/16(50/60 Hz)		
		When starting 200 VAC	6.6/7.2(50/60 Hz)			14/16(50/60 Hz)		
Power consumption	W		8			16		

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MXG1D-15	MXG1D-20	MXG1D-25	MXG1D-32	MXG1D-40	MXG1D-50
Port size			Rc1/2	Rc3/4	Rc1	Rc1¼	Rc1½	Rc2
Orifice size	mm		10	14	19	23	30	38
Cv			3	6	11	16	28	47
Working pressure	MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)					0 to 0.5
Response time	sec	50 Hz	20			26		
		60 Hz	16			22		
Frequency		*2	1 time/min. or less			1 time/2 mins. or less		
Weight	kg	Bronze body	1.3	1.5	1.7	2.7	3.3	4.2
		Stainless steel body	1.3	1.5	1.7	2.8	3.4	4.3

*1 : Use the product within ±10% of the rated voltage.
*2 : Be sure to observe the specified frequency of use.
*3 : For specifications other than above, contact CKD separately.

How to order

MXG1D - 20 - 0 K - 2

Model No.

Ⓐ Port size

Ⓑ Body/seat material

Ⓒ Other options
*1
*2

Ⓓ Voltage

Code	Description
Ⓐ Port size	
15	Rc1/2
20	Rc3/4
25	Rc1
32	Rc1 1/4
40	Rc1 1/2
50	Rc2
Ⓑ Body/seat material	
0	Body - bronze/seat - PTFE
H	Body - bronze/seat - reinforced PTFE
E	Body - stainless steel/seat - PTFE
W	Body - stainless steel/seat - reinforced PTFE

Ⓒ Other options

	Description	Applications	Remarks
Blank	5-conductor cable 0.5 mm² (with output lead wire)	-	-
T	3-conductor cable 0.75 mm² (no sig output)	When output lead wire is not required	3-conductor cabtyre cable used
B	Round terminal box (5 terminals)	When lead wires have varied lengths	-
L	Round term box, lamp (Lit when A-C in operation, 3 term)	A-C path completion confirmation by lamp	Lit only when A-C path operation is complete
R	Round term box, lamp (Lit when B-C in operation, 3 term)	B-C path completion confirmation by lamp	Lit only when B-C path operation is complete
K	Multi-fluid (90°rotation switching, Response time 1/2)	To remove load to pump	Fluids may mix somewhat during switching

Ⓓ Voltage	
1	100 VAC(50/60 Hz)
2	200 VAC(50/60 Hz)

*1 : If several options of Item Ⓒ are necessary, select from the following combinations
TB, TK, BK, LK, RK, TBK
TB means a 3-terminal round terminal box.
*2 : Combination of Item Ⓒ LR/TL/TR/BL/BR is not available.

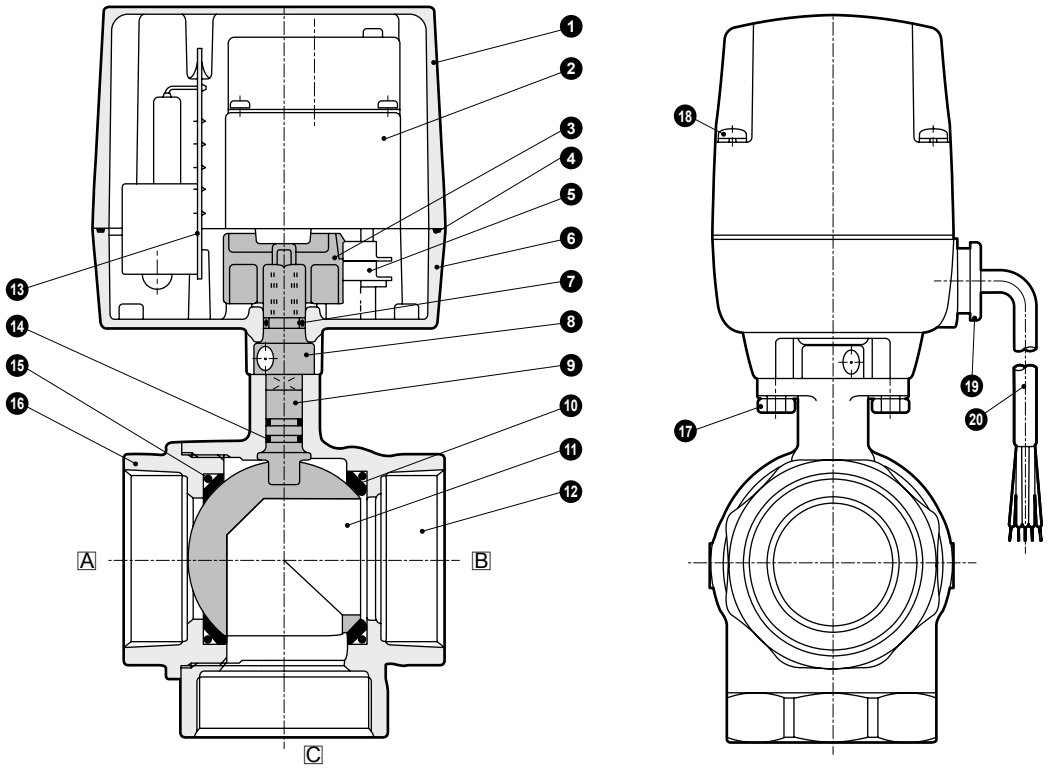
[Example of model No.]

MXG1D-20-0K-2
Model: MXG1D

Ⓐ Port size : Rc3/4
Ⓑ Body/seat material : Body - bronze/seat - PTFE
Ⓒ Other options : Multi-fluid (90° rotation switching, response time 1/2)
Ⓓ Voltage : 200 VAC (50/60 Hz)

Internal structure and parts list

● MXG1D



No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	11	Valve ball	C3771(SUS304)	Copper alloy *2 (stainless steel)
2	Geared motor	-	-	12	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
3	Cam	PA	Polyamide resin	13	P plate assembly	PF	Phenolic resin
4	Gasket	NBR	Nitrile rubber	14	O-ring *1	FKM/NBR	Fluoro rubber/nitrile rubber
5	Micro switch	-	-	15	O-ring	FKM	Fluoro rubber
6	Adaptor	ZDC2	Zinc alloy die-casting	16	Cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
7	O-ring	NBR	Nitrile rubber	17	Hexagon head bolt	SWCH	Carbon steel wire for cold rolling
8	Intermediate bush	SUS303	Stainless steel	18	Phillips pan head machine screw	SWCH	Carbon steel wire for cold rolling
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)	19	Bushing	PF	Phenolic resin
10	Ball seat	PTFE	Tetrafluoroethylene resin	20	Cabtyre cable	0.5 mm^2, 5-conductor	-

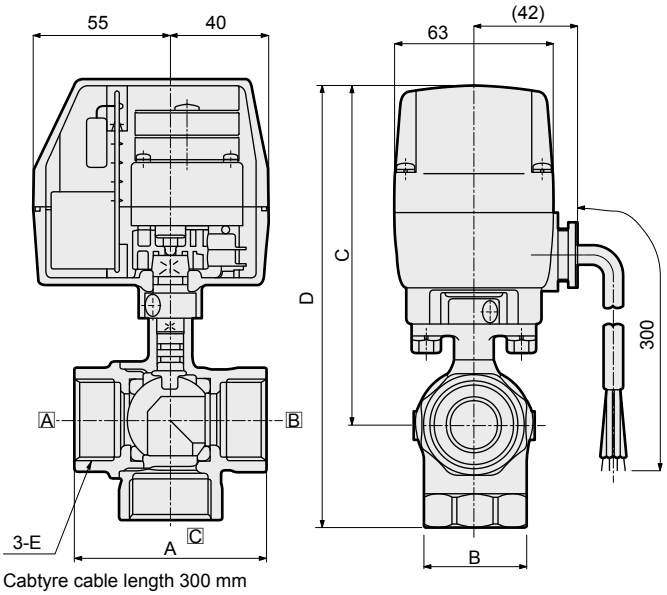
Materials shown in ( ) are for stainless steel body.

*1 : The upper O-ring is NBR, and the lower is FKM. For stainless steel body, FKM is used for both upper and lower O rings.

*2 : Valve ball is hard chrome plated copper alloy.

Dimensions

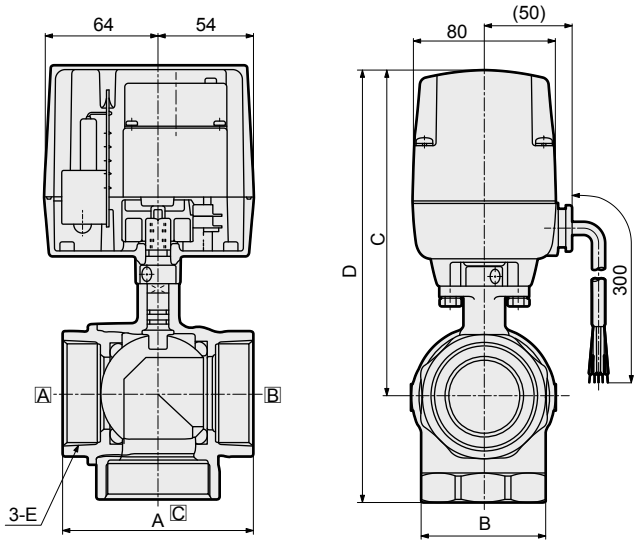
● MXG1D-15/20/25-*



Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXG1D-15-*	56	28	124.5	154.5	Rc1/2
MXG1D-20-*	65	34	130.5	166.5	Rc3/4
MXG1D-25-*	76	41	133.5	175.5	Rc1

● MXG1D-32/40/50-*

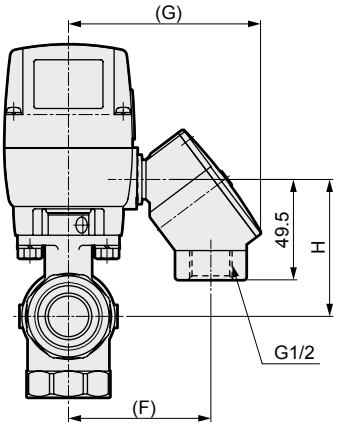


Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXG1D-32-*	84	50	166	213	Rc1¼
MXG1D-40-*	94	57	172	225	Rc1½
MXG1D-50-*	108	70	181	242	Rc2

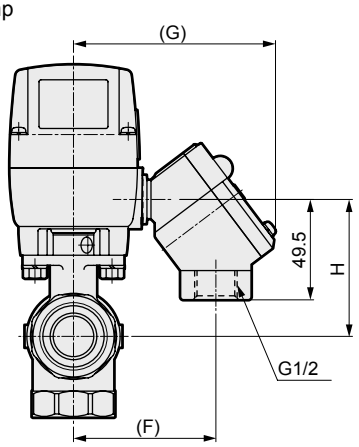
Optional dimensions

● With round terminal box
MXG1D-bore size-*B

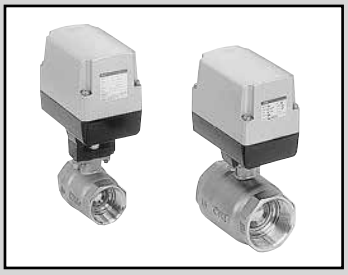


Bore size	F	G	H
15	74	98	58.5
20	74	98	64.5
25	74	98	67.5
32	82	106	77.5
40	82	106	83.5
50	82	106	92.5

● Round terminal box with lamp
MXG1D-bore size-*L/R



Bore size	F	G	H
15	74	102	58.5
20	74	102	64.5
25	74	102	67.5
32	82	110	77.5
40	82	110	83.5
50	82	110	92.5



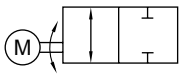
Oil-prohibited motorized 2-port ball valve

MXB1-N/MXB1D-N Series

● Port size: Rc3/8 to Rc2

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	MXB1 (standard)/MXB1D (with relay)
Working fluid	Water, air
Working pressure MPa	0 to 1.0 (refer to the working pressure in the individual specifications.)
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)
Fluid temperature °C	0 (32°F) to 80 (176°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Ambient humidity %	95 or less
Mounting orientation	From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)
Pressurization direction	Arbitrary
Degree of protection	IPX3 "rainproof" (standard and option T only)

Electrical specifications

Item			MXB1-10	MXB1-15	MXB1-20	MXB1-25	MXB1-32	MXB1-40	MXB1-50
Rated voltage *1			100 VAC(50/60 Hz), 200 VAC(50/60 Hz), 12 VDC, 24 VDC						
Apparent power VA	Operating	100 VAC	4.9/5.9(50/60 Hz)				13/15(50/60 Hz)		
		200 VAC	5.4/6.2(50/60 Hz)				13/15(50/60 Hz)		
	Starting	100 VAC	4.9/5.9(50/60 Hz)				13/15(50/60 Hz)		
		200 VAC	5.4/6.2(50/60 Hz)				13/15(50/60 Hz)		
Average current value A *2		12 VDC	1.1				1.5		
		24 VDC	0.7				1.0		
Starting current A *2		12 VDC	1.8 or less				3 or less		
		24 VDC	1.2 or less				2 or less		
Power consumption W		AC	7				15		
		12 VDC	13				18		
		24 VDC	17				24		

Item			MXB1D-10	MXB1D-15	MXB1D-20	MXB1D-25	MXB1D-32	MXB1D-40	MXB1D-50
Rated voltage *1			100 VAC(50/60 Hz), 200 VAC(50/60 Hz)						
Apparent power VA	Operating	100 VAC	6.0/6.8(50/60 Hz)				14/16(50/60 Hz)		
		200 VAC	6.6/7.2(50/60 Hz)				14/16(50/60 Hz)		
	Starting	100 VAC	6.0/6.8(50/60 Hz)				14/16(50/60 Hz)		
		200 VAC	6.6/7.2(50/60 Hz)				14/16(50/60 Hz)		
Power consumption W			8				16		

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		MXB1-10 / MXB1D-10	MXB1-15 / MXB1D-15	MXB1-20 / MXB1D-20	MXB1-25 / MXB1D-25	MXB1-32 / MXB1D-32	MXB1-40 / MXB1D-40	MXB1-50 / MXB1D-50
Port size		Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Orifice size mm		10	10	15	20	25	32	40
Cv		10	6	16	29	50	98	125
Working pressure MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)						0 to 0.5
Response time sec	AC	10/8(50/60 Hz)				13/11(50/60 Hz)		
	DC	8				10.5		
Frequency *3	AC	2 times/min. or less				1 time/min. or less		
	DC	1 time/min. or less				1 time/2 mins. or less		
Weight kg	MXB1	1.2	1.2	1.4	1.5	2.6	3.1	3.8
	MXB1D	1.2	1.3	1.4	1.6	2.7	3.1	3.9

*1 : Use the product within ±10% of the rated voltage.
*2 : Current values at the rated voltage.
*3 : Be sure to observe the specified frequency of use.
*4 : Consult with CKD for specifications not indicated above.

How to order

MXB1 - 32 - N T M - 1

MXB1D

Model No.

Ⓐ Port size

Ⓑ Body/seat material

Ⓒ Other options
*1
*2

Ⓓ Manual override
*3

Ⓔ Voltage

Code	Description	Model No. MXB1	Model No. MXB1D
Ⓐ Port size			
10	Rc3/8	●	●
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	●
Ⓑ Body/seat material			
N	Body - stainless steel/seat - PTFE/oil-prohibited specifications	●	●

Ⓒ Other options

	Description	Applications	Remarks		
Blank	5-conductor cable 0.5 mm² (with output lead wire)	-	-	●	●
T	3-conductor cable 0.75 mm² (without signal output)	When output lead wire is not required	3-conductor cabtyre cable used	●	●
B	With round terminal box (5 terminals)	When the lead wires are different in length	-	●	●
L	Round terminal box with lamp (lit when open, 3 terminals)	Fully open confirmation by lamp	Lit only when fully open	●	●
R	Round terminal box with lamp (lit when closed, 3 terminals)	Fully closed confirmation by lamp	Lit only when fully closed	●	●

Ⓓ Manual override			
Blank	None	●	●
M	Manual override	●	●
Ⓔ Voltage			
1	100 VAC(50/60 Hz)	●	●
2	200 VAC(50/60 Hz)	●	●
3	24 VDC	●	
4	12 VDC	●	

*1 : When selecting both without signal output (Item Ⓒ T) and round terminal box (Item Ⓒ B) as options, designate Item Ⓒ as TB. A 3-terminal round terminal box will be provided.
*2 : Combination of Item Ⓓ LR/TL/TR/BL/BR is not available.
*3 : When the manual override (Item Ⓒ M) is selected, available port sizes are 32, 40 and 50. Manual override is provided as standard with other port size.

[Example of model No.]

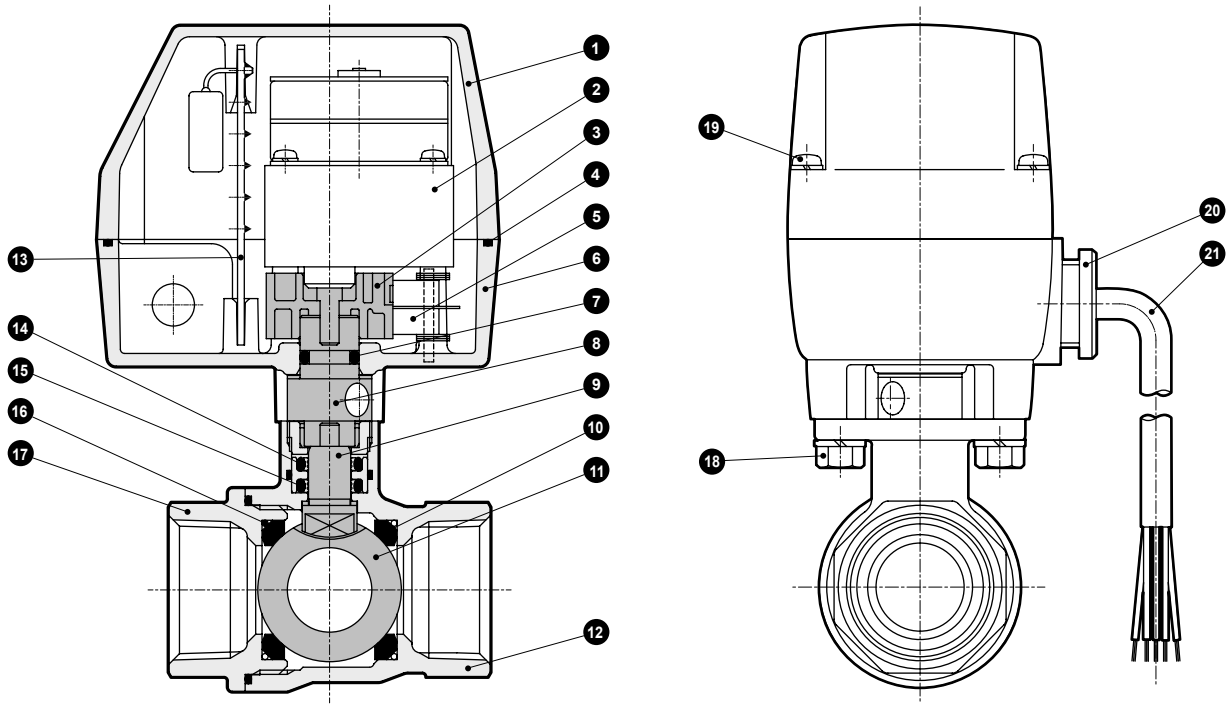
MXB1-32-NTM-1

Model: MXB1 (standard)

Ⓐ Port size : Rc1 1/4
Ⓑ Body material : Body - stainless steel/seat - PTFE/oil-prohibited specifications
Ⓒ Other options : 3-conductor cable (without output lead wire)
Ⓓ Manual override : Selected
Ⓔ Voltage : 100 VAC (50/60 Hz)

Internal structure and parts list

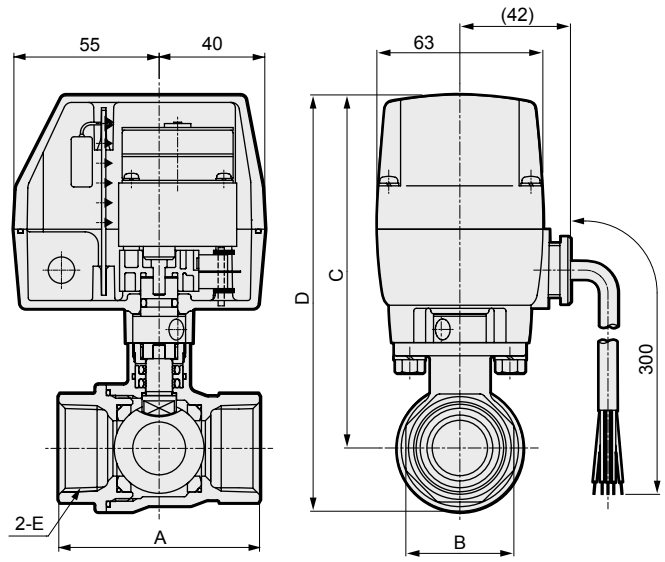
● MXB1/MXB1D



No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	11	Valve ball	SUS304	Stainless steel
2	Geared motor	-	-	12	Body	SCS13	Stainless steel casting
3	Cam	PA	Polyamide resin	13	P plate assembly	PF	Phenolic resin
4	Gasket	NBR	Nitrile rubber	14	O-ring	FKM	Fluoro rubber
5	Micro switch	-	-	15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene
6	Adaptor	ZDC2	Zinc alloy die-casting	16	O-ring	FKM	Fluoro rubber
7	O-ring	NBR	Nitrile rubber	17	Cap	SCS13	Stainless steel casting
8	Intermediate bush	SUS303	Stainless steel	18	Hexagon head bolt	SWCH	Carbon steel wire for cold rolling
9	Shaft	SUS304	Stainless steel	19	Phillips pan head machine screw	SWCH	Carbon steel wire for cold rolling
10	Ball seat	PTFE	Tetrafluoroethylene resin	20	Bushing	PF	Phenolic resin
				21	Cabtyre cable	0.5 mm^2, 5-conductor	-

Dimensions

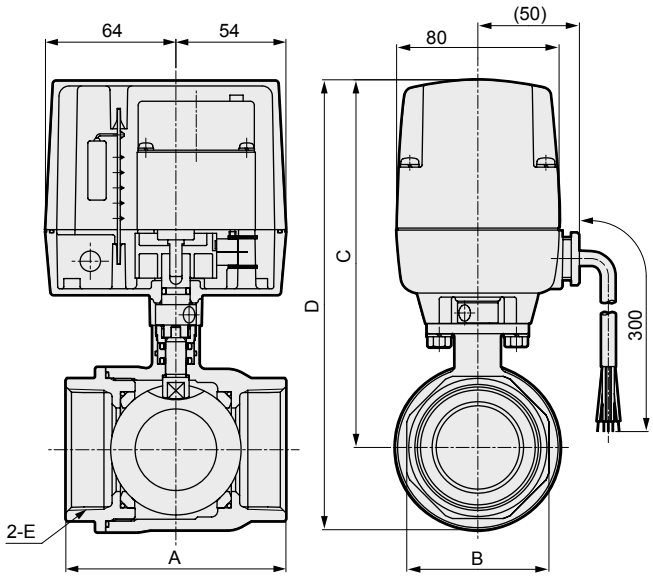
● MXB1/MXB1D-10/15/20/25-N



Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXB1(D)-10-N	56	28	124.5	140.5	Rc3/8
MXB1(D)-15-N	56	28	124.5	140.5	Rc1/2
MXB1(D)-20-N	65	34	130.5	151	Rc3/4
MXB1(D)-25-N	76	41	133.5	157.5	Rc1

● MXB1/MXB1D-32/40/50-N



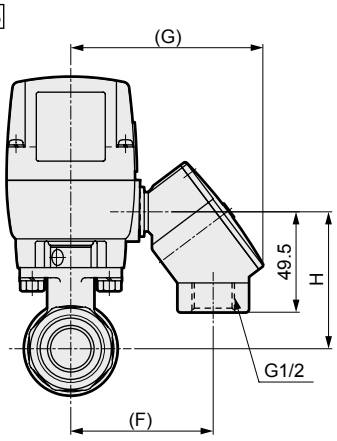
Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXB1(D)-32-N	84	50	166	195.5	Rc1¼
MXB1(D)-40-N	94	57	172	207.5	Rc1½
MXB1(D)-50-N	108	70	181	221.5	Rc2

*1 : For valves with manual override "M", the MSB1 Series yoke is inserted between the valve body and actuator, making dimensions C and D 22 mm longer.

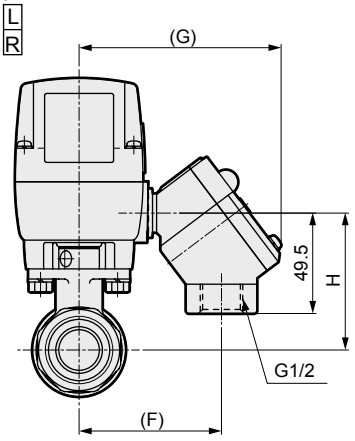
Optional dimensions

● With round terminal box
MXB1/MXB1D-[bore size]-N[B]



Bore size	F	G	H
10	74	98	58.5
15	74	98	58.5
20	74	98	64.5
25	74	98	67.5
32	82	106	77.5 (*1)
40	82	106	83.5 (*1)
50	82	106	92.5 (*1)

● Round terminal box with lamp
MXB1/MXB1D-[bore size]-N[L/R]



Bore size	F	G	H
10	74	102	58.5
15	74	102	58.5
20	74	102	64.5
25	74	102	67.5
32	82	110	77.5 (*1)
40	82	110	83.5 (*1)
50	82	110	92.5 (*1)

*1 : For valves with manual override "M", the MSB1 Series yoke is inserted between the valve body and actuator, making dimensions 22 mm longer.

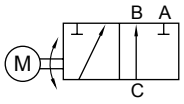
Oil-prohibited motorized 3-port ball valve

MXG1-N/MXG1D-N Series

● Port size: Rc1/2 to Rc2

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	MXG1 (standard)/MXG1D (with relay)
Working fluid	Water, air
Working pressure MPa	0 to 1.0 (refer to the working pressure in the individual specifications.)
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)
Fluid temperature °C	0 (32°F) to 80 (176°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 50 (122°F)
Ambient humidity %	95 or less
Mounting orientation	From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)
Pressurization direction	Port C pressurization only
Degree of protection	IPX3 "rainproof" (standard and option T only)

Electrical specifications

Item			MXG1-15	MXG1-20	MXG1-25	MXG1-32	MXG1-40	MXG1-50
Rated voltage *1			100 VAC(50/60 Hz), 200 VAC(50/60 Hz), 12 VDC, 24 VDC					
Apparent power VA	Operating	100 VAC	4.9/5.9(50/60 Hz)			13/15(50/60 Hz)		
	Operating	200 VAC	5.4/6.2(50/60 Hz)			13/15(50/60 Hz)		
	Starting	100 VAC	4.9/5.9(50/60 Hz)			13/15(50/60 Hz)		
	Starting	200 VAC	5.4/6.2(50/60 Hz)			13/15(50/60 Hz)		
Average current value A		12 VDC	1.1			1.5		
*2		24 VDC	0.7			1.0		
Starting current A		12 VDC	1.8 or less			3 or less		
*2		24 VDC	1.2 or less			2 or less		
Power consumption W		AC	7			15		
		12 VDC	13			18		
		24 VDC	17			24		

Item			MXG1D-15	MXG1D-20	MXG1D-25	MXG1D-32	MXG1D-40	MXG1D-50
Rated voltage *1			100 VAC(50/60 Hz), 200 VAC(50/60 Hz)					
Apparent power VA	Operating	100 VAC	6.0/6.8(50/60 Hz)			14/16(50/60 Hz)		
	Operating	200 VAC	6.6/7.2(50/60 Hz)			14/16(50/60 Hz)		
	Starting	100 VAC	6.0/6.8(50/60 Hz)			14/16(50/60 Hz)		
	Starting	200 VAC	6.6/7.2(50/60 Hz)			14/16(50/60 Hz)		
Power consumption W			8			16		

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		MXG1-15 / MXG1D-15	MXG1-20 / MXG1D-20	MXG1-25 / MXG1D-25	MXG1-32 / MXG1D-32	MXG1-40 / MXG1D-40	MXG1-50 / MXG1D-50
Port size		Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Orifice size mm		10	14	19	23	30	38
Cv		3	6	11	16	28	47
Working pressure MPa		0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)					0 to 0.5
Response time sec	AC	20/16(50/60 Hz)			26/22(50/60 Hz)		
	DC	16			21		
Frequency	AC	1 time/min. or less			1 time/2 mins. or less		
*3	DC	1 time/2 mins. or less			1 time/5 mins. or less		
Weight kg	MXG1	1.3	1.4	1.7	2.7	3.2	4.1
	MXG1D	1.3	1.5	1.7	2.7	3.3	4.2

*1 : Use the product within ±10% of the rated voltage.
*2 : Current values at the rated voltage.
*3 : Be sure to observe the specified frequency of use.
*4 : Consult with CKD for specifications not indicated above.

How to order

MXG1 - **20** - **N** **K** - **2**

MXG1D

Model No.

Ⓐ Port size

Ⓑ Body/seat material

Ⓒ Other options
*1
*2

Ⓓ Voltage

Code	Description	Model No. MXG1	Model No. MXG1D
Ⓐ Port size			
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	●
Ⓑ Body/seat material			
N	Body - stainless steel/seat - PTFE/oil-prohibited specifications	●	●

Ⓒ Other options

	Description	Applications	Remarks		
Blank	5-conductor cable 0.5 mm² (with output lead wire)	-	-	●	●
T	3-conductor cable 0.75 mm² (without signal output)	When output lead wire is not required	3-conductor cabtyre cable used	●	●
B	Round terminal box (5 terminals)	When the lead wires are different in length	-	●	●
L	Round term box, lamp (lit when A-C operates, 3 term)	A-C path completion confirmation by lamp	Lit when A-C path completed	●	●
R	Round term box, lamp (lit when B-C in operation, 3 term)	B-C path completion confirmation by lamp	Lit when B-C path completed	●	●
K	Multi-fluid (90°rotation switching Response time 1/2)	To remove load to pump	Fluids may mix somewhat during switching	●	●

Ⓓ Voltage			
1	100 VAC(50/60 Hz)	●	●
2	200 VAC(50/60 Hz)	●	●
3	24 VDC	●	
4	12 VDC	●	

*1 : If several options of Item Ⓒ are necessary, select from the following combinations. TB, TK, BK, LK, RK, TBK. A 3-terminal round terminal box will be provided.
*2 : Combination of Item Ⓒ LR/TL/TR/BL/BR is not available.

[Example of model No.]

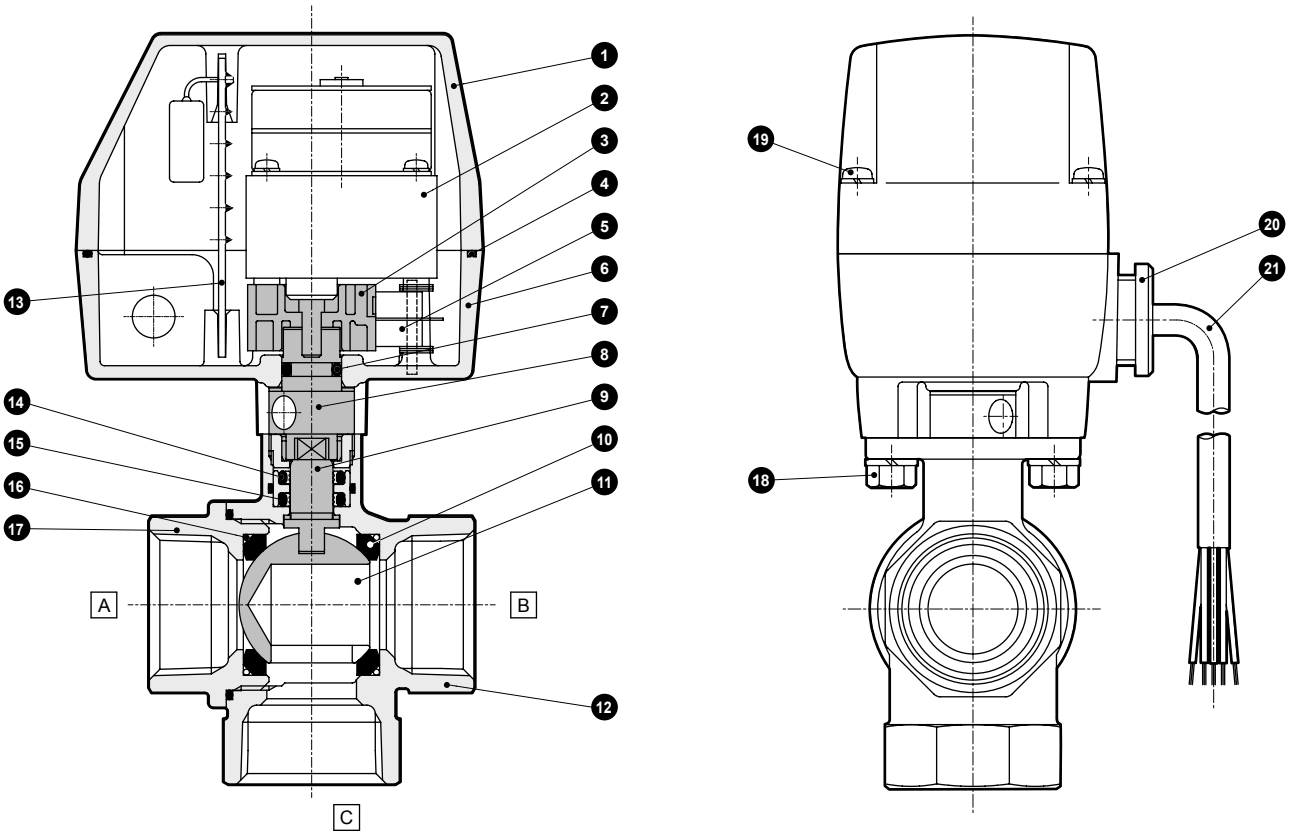
MXG1-20-NK-2

Model: MXG1

Ⓐ Port size : Rc3/4
Ⓑ Body/seat material : Body - stainless steel/seat - PTFE/oil-prohibited specifications
Ⓒ Other options : Multi-fluid (90° rotation switching, response time 1/2)
Ⓓ Voltage : 200 VAC (50/60 Hz)

Internal structure and parts list

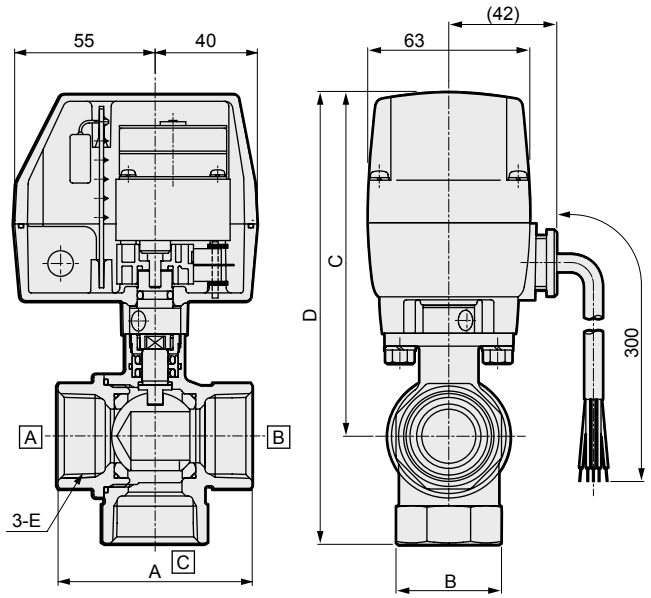
● MXG1/MXG1D



No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	11	Valve ball	SUS304	Stainless steel
2	Geared motor	-	-	12	Body	SCS13	Stainless steel casting
3	Cam	PA	Polyamide resin	13	P plate assembly	PF	Phenolic resin
4	Gasket	NBR	Nitrile rubber	14	O-ring	FKM	Fluoro rubber
5	Micro switch	-	-	15	Seal ring	UHMW-PE	Ultra-high molecular weight polyethylene
6	Adaptor	ZDC2	Zinc alloy die-casting	16	O-ring	FKM	Fluoro rubber
7	O-ring	NBR	Nitrile rubber	17	Cap	SCS13	Stainless steel casting
8	Intermediate bush	SUS303	Stainless steel	18	Hexagon head bolt	SWCH	Carbon steel wire for cold rolling
9	Shaft	SUS304	Stainless steel	19	Phillips pan head machine screw	SWCH	Carbon steel wire for cold rolling
10	Ball seat	PTFE	Tetrafluoroethylene resin	20	Bushing	PF	Phenolic resin
				21	Cabtyre cable	0.5 mm^2, 5-conductor	-

Dimensions

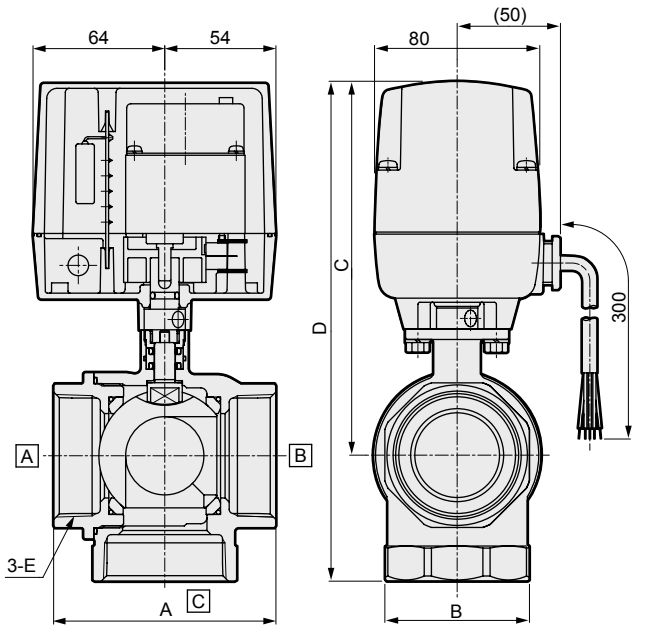
● MXG1/MXG1D-15/20/25-N



Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXG1(D)-15-N	56	28	124.5	154.5	Rc1/2
MXG1(D)-20-N	65	34	130.5	166.5	Rc3/4
MXG1(D)-25-N	76	41	133.5	175.5	Rc1

● MXG1/MXG1D-32/40/50-N

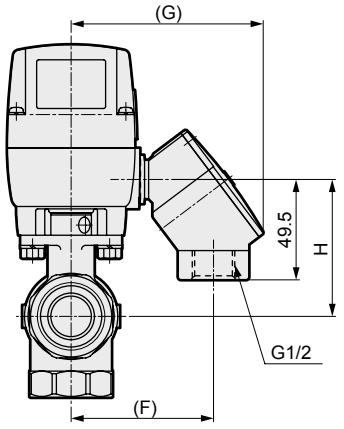


Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MXG1(D)-32-N	84	50	166	213	Rc1¼
MXG1(D)-40-N	94	57	172	225	Rc1½
MXG1(D)-50-N	108	70	181	242	Rc2

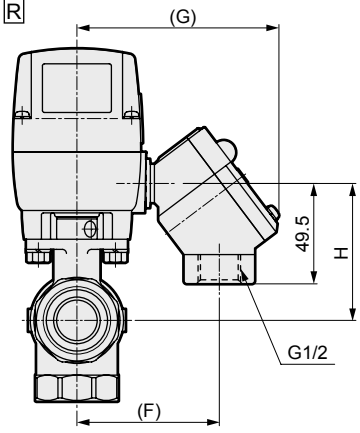
Optional dimensions

● With round terminal box
MXG1/MXG1D-bore size-N B



Bore size	F	G	H
15	74	98	58.5
20	74	98	64.5
25	74	98	67.5
32	82	106	77.5
40	82	106	83.5
50	82	106	92.5

● Round terminal box with lamp
MXG1/MXG1D-bore size-N L R



Bore size	F	G	H
15	74	102	58.5
20	74	102	64.5
25	74	102	67.5
32	82	110	77.5
40	82	110	83.5
50	82	110	92.5

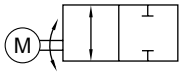
Motorized 2-port ball valve for steam

MSB1/MSB1F Series

● Port size: Rc3/8 to Rc2

RoHS CAD

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MSB1 (standard bore)/MSB1F (full bore)						
Working fluid			Steam, water						
Working pressure MPa			0 to 0.6 (refer to the working pressure in the individual specifications.)						
Proof pressure (water pressure) MPa			2.0 (≈290 psi, 20 bar)						
Ambient temperature °C			-10 (14°F) to 50 (122°F)						
Ambient humidity %			95 or less						
Mounting orientation			From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)						
Pressurization direction			Arbitrary						
Degree of protection			IPX3 "rainproof" (standard and option T only)						
Electrical specifications			**MSB1-10**	**MSB1-15**	**MSB1-20**	**MSB1-25**	**MSB1-32**	**MSB1-40**	**MSB1-50**
				MSB1F-15	**MSB1F-20**		**MSB1F-25**	**MSB1F-32**	**MSB1F-40**
Rated voltage *1			100 VAC(50/60 Hz), 200 VAC(50/60 Hz)						
Apparent power VA	Operating	100 VAC	4.9/5.9(50/60 Hz)				13/15(50/60 Hz)		
		200 VAC	5.4/6.2(50/60 Hz)				13/15(50/60 Hz)		
	Starting	100 VAC	4.9/5.9(50/60 Hz)				13/15(50/60 Hz)		
		200 VAC	5.4/6.2(50/60 Hz)				13/15(50/60 Hz)		
Power consumption W		AC	7				15		

MSB1 (standard bore) individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar, °F = 9/5°C + 32

Item			MSB1-10 *2	MSB1-15	MSB1-20	MSB1-25	MSB1-32	MSB1-40	MSB1-50
Port size			Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Orifice size mm			10	10	15	20	25	32	40
Cv			10	6	16	29	50	98	125
Working pressure MPa			0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)						0 to 0.5
Fluid temperature °C			0 (32°F) to 164 (327.2°F) (no freezing)						0 to 158
Response time sec		50 Hz	10				13		
		60 Hz	8				11		
Frequency *3			1 time/min. or less						
Weight kg	Bronze body		1.3	1.3	1.4	1.6	2.6	3.1	3.8
	Stainless steel body		1.5	1.5	1.6	1.8	2.8	3.3	4.0

MSB1F (full bore) individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar, °F = 9/5°C + 32

Item			MSB1F-15	MSB1F-20	MSB1F-25	MSB1F-32	MSB1F-40
Port size			Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2
Orifice size mm			15	20	25	32	40
Cv			23	51	66	114	176
Working pressure MPa			0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)				0 to 0.5
Fluid temperature °C			0 (32°F) to 164 (327.2°F) (no freezing)				0 to 158
Response timesec		50 Hz	10		13		
		60 Hz	8		11		
Frequency *3			1 time/min. or less				
Weight kg			1.4	1.6	2.6	3.1	3.8

*1 : Use the product within ±10% of the rated voltage.
*2 : MSB1-10 is a full bore.
*3 : Be sure to observe the specified frequency of use.
*4 : Consult with CKD for specifications not indicated above.

How to order

MSB1 - 32 - H T M - 1

MSB1F

Model No.

Ⓐ Port size

Ⓑ Body/seat material

Ⓒ Other options *1 *2

Ⓓ Manual override *3

Ⓔ Voltage

Code	Description	Model No. MSB1 (standard bore)	Model No. MSB1F (Full bore)
Ⓐ Port size			
10	Rc3/8 *4	●	
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	
Ⓑ Body/seat material			
H	Body - bronze/seat - reinforced PTFE	●	●
W	Stainless steel - reinforced PTFE	●	

Ⓒ Other options

	Description	Applications	Remarks		
Blank	5-conductor cable 0.5 mm² (with output lead wire)	-	-	●	●
T	3-conductor cable 0.75 mm² (without signal output)	When output lead wire is not required	3-conductor cabtyre cable used	●	●
B	Round terminal box (5 terminals)	When the lead wires are different in length	-	●	●
L	Round terminal box with lamp (Lit when open, 3 terminals)	Fully open confirmation by lamp	Lit only when fully open	●	●
R	Round terminal box with lamp (Lit when closed, 3 terminals)	Fully closed confirmation by lamp	Lit only when fully closed	●	●

Ⓓ Manual override			
Blank	None	●	●
M	Manual override	●	●
Ⓔ Voltage			
1	100 VAC(50/60 Hz)	●	●
2	200 VAC(50/60 Hz)	●	●

*1 : When selecting both without signal output (Item Ⓒ T) and round terminal box (Item Ⓒ B) as options, designate Item Ⓒ as TB. A 3-terminal round terminal box will be provided.
*2 : Combination of Item Ⓒ LR/TL/TR/BL/BR is not available.
*3 : When the manual override (Item Ⓓ M) is selected, available port sizes are 32, 40 and 50 for MSB1. For MSB1F, available port sizes are 25, 32 and 40.
Manual override is provided as standard with other port size.
*4 : When port size is 10, the valve is full bore but the model No. is MSB1.

[Example of model No.]

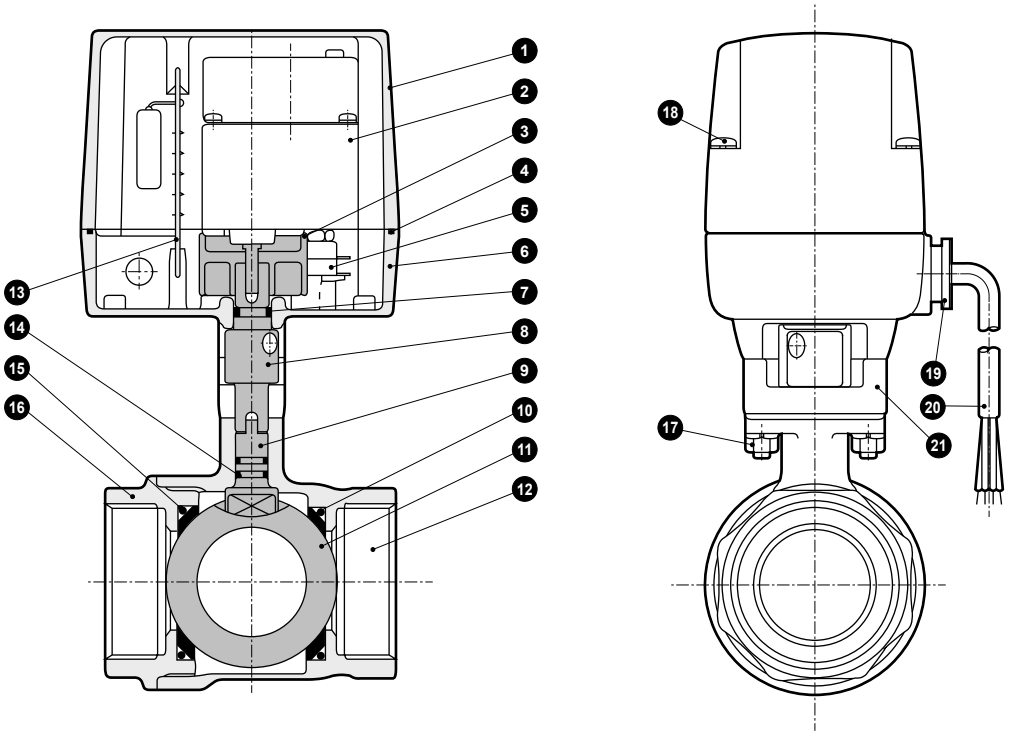
MSB1-32-HTM-1

Model: MSB1 (standard bore)

Ⓐ Port size : Rc1 1/4
Ⓑ Body/seat material : Body - bronze/seat - reinforced PTFE
Ⓒ Other options : 3-conductor cable (without output lead wire)
Ⓓ Manual override : Selected
Ⓔ Voltage : 100 VAC (50/60 Hz)

Internal structure and parts list

● MSB1/MSB1F



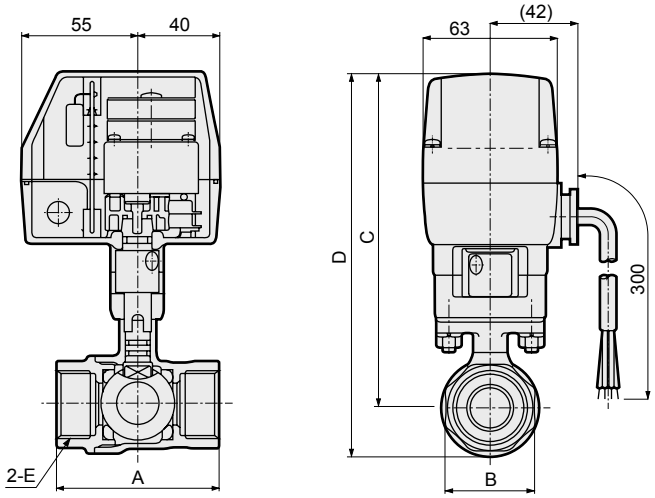
No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	11	Valve ball	C3771(SUS304)	Copper alloy *1 (stainless steel)
2	Geared motor	-	-	12	Body	CAC408	Bronze casting (stainless steel casting)
3	Cam	PA	Polyamide resin	13	P plate assembly	PF	Phenolic resin
4	Gasket	NBR	Nitrile rubber	14	O-ring	FKM	Fluoro rubber
5	Micro switch	-	-	15	O-ring	FKM	Fluoro rubber
6	Adaptor	ZDC2	Zinc alloy die-casting	16	Cap	CAC408	Bronze casting (stainless steel casting)
7	O-ring	NBR	Nitrile rubber	17	Hexagon nut	SWCH	Carbon steel wire for cold rolling
8	Intermediate bush	SUS303	Stainless steel	18	Phillips pan head machine screw	SWCH	Carbon steel wire for cold rolling
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)	19	Bushing	PF	Phenolic resin
10	Ball seat	Reinforced PTFE	-	20	Cabtyre cable	0.5 mm^2, 5-conductor	-
				21	Yoke	PM-HH	Phenolic resin

Materials shown in ( ) are for stainless steel body.

*1 : Valve ball is hard chrome plated copper alloy.

Dimensions CAD

● MSB1-10/15/20/25-*
● MSB1F-15/20-H

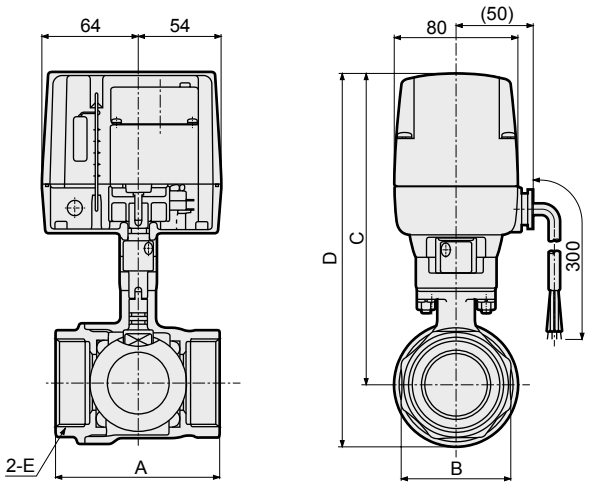


Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MSB1-10-*	50(56)	24(28)	146.5	161.5(162.5)	Rc3/8
MSB1-15-*	56	28	146.5	161.5(162.5)	Rc1/2
MSB1-20-*	65	34	152.5	172(173)	Rc3/4
MSB1-25-*	76	41	155.5	178.5(179.5)	Rc1
MSB1F-15-H	65	28	152.5	172	Rc1/2
MSB1F-20-H	71	34	155.5	178.5	Rc3/4

*1 : Dimensions shown in ( ) are for stainless steel body.

● MSB1-32/40/50-*
● MSB1F-25/32/40-H



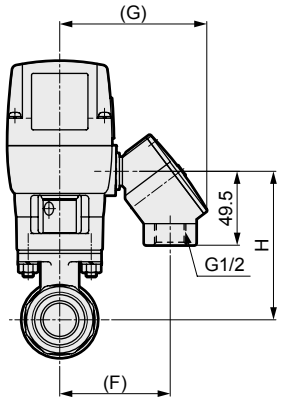
Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MSB1-32-*	84	50	188	215.5(217.5)	Rc1 1/4
MSB1-40-*	94	57	194	227.5(229.5)	Rc1 1/2
MSB1-50-*	108	70	203	242.5(243.5)	Rc2
MSB1F-25-H	84	41	188	215.5	Rc1
MSB1F-32-H	95	50	194	227.5	Rc1 1/4
MSB1F-40-H	107	57	203	242.5	Rc1 1/2

*1 : Dimensions are the same even with manual override "M".
*2 : Dimensions shown in ( ) are for stainless steel body.

Optional dimensions

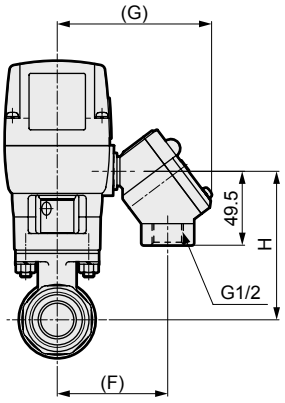
● With round terminal box
MSB1-[bore size]-*[B]
MSB1F-[bore size]-H[B]



Bore size		F	G	H
MSB1	MSB1F			
10	-	74	98	80.5
15	-	74	98	80.5
20	15	74	98	86.5
25	20	74	98	89.5
32	25	82	106	99.5
40	32	82	106	105.5
50	40	82	106	114.5

*1 : Dimensions of the large bore size (32 to 50) are the same even with manual override "M".

● Round terminal box with lamp
MSB1-[bore size]-*[L/R]
MSB1F-[bore size]-H[L/R]



Bore size		F	G	H
MSB1	MSB1F			
10	-	74	102	80.5
15	-	74	102	80.5
20	15	74	102	86.5
25	20	74	102	89.5
32	25	82	110	99.5
40	32	82	110	105.5
50	40	82	110	114.5

*1 : Dimensions of the large bore size (32 to 50) are the same even with manual override "M".

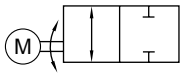
Motorized 2-port ball valve for steam with relay

MSB1D/MSB1DF Series

● Port size: Rc3/8 to Rc2

RoHS

JIS symbol



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MSB1D (standard bore)/MSB1DF (full bore)						
Working fluid			Steam, water						
Working pressure MPa			0 to 0.6 (refer to the working pressure in the individual specifications.)						
Proof pressure (water pressure) MPa			2.0 (≈290 psi, 20 bar)						
Ambient temperature °C			-10 (14°F) to 50 (122°F)						
Ambient humidity %			95 or less						
Mounting orientation			From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)						
Pressurization direction			Arbitrary						
Degree of protection			IPX3 "rainproof" (standard and option T only)						
Electrical specifications			**MSB1D-10**	**MSB1D-15**	**MSB1D-20**	**MSB1D-25**	**MSB1D-32**	**MSB1D-40**	**MSBD1-50**
			MSB1DF-15		**MSB1DF-20**		**MSB1DF-25**	**MSB1DF-32**	**MSB1DF-40**
Rated voltage *1			100 VAC(50/60 Hz), 200 VAC(50/60 Hz)						
Apparent power VA	Operating	100 VAC	6.0/6.8(50/60 Hz)				14/16(50/60 Hz)		
		200 VAC	6.6/7.2(50/60 Hz)				14/16(50/60 Hz)		
	Starting	100 VAC	6.0/6.8(50/60 Hz)				14/16(50/60 Hz)		
		200 VAC	6.6/7.2(50/60 Hz)				14/16(50/60 Hz)		
Power consumption W			8				16		

MSB1D (standard bore) individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar, °F = 9/5°C + 32

Item		MSB1D-10 *2	MSB1D-15	MSB1D-20	MSB1D-25	MSB1D-32	MSB1D-40	MSB1D-50
Port size		Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Orifice size mm		10	10	15	20	25	32	40
Cv		10	6	16	29	50	98	125
Working pressure MPa		0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)						0 to 0.5
Fluid temperature °C		0 (32°F) to 164 (327.2°F) (no freezing)						0 to 158
Response time sec	50 Hz	10				13		
	60 Hz	8				11		
Frequency *3		1 time/min. or less						
Weight kg	Bronze body	1.3	1.3	1.5	1.6	2.6	3.1	3.9
	Stainless steel body	1.5	1.5	1.7	1.8	2.8	3.3	4.1

MSB1DF (full bore) individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar, °F = 9/5°C + 32

Item		MSB1DF-15	MSB1DF-20	MSB1DF-25	MSB1DF-32	MSB1DF-40
Port size		Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2
Orifice size mm		15	20	25	32	40
Cv		23	51	66	114	176
Working pressure MPa		0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)				0 to 0.5
Fluid temperature °C		0 (32°F) to 164 (327.2°F) (no freezing)				0 to 158
Response time sec	50 Hz	10		13		
	60 Hz	8		11		
Frequency *3		1 time/min. or less				
Weight kg		1.5	1.6	2.6	3.1	3.9

*1 : Use the product within ±10% of the rated voltage.
*2 : MSB1D-10 is a full bore.
*3 : Be sure to observe the specified frequency of use.
*4 : Consult with CKD for specifications not indicated above.

How to order

MSB1D - **32** - **H** **T** **M** - **1**

MSB1DF

Model No.

Ⓐ Port size

Ⓑ Body/seat material

Ⓒ Other options
*1
*2

Ⓓ Manual override
*3

Ⓔ Voltage

Code	Description	Model No. MSB1D (Standard bore)	Model No. MSB1DF (Full bore)
Ⓐ Port size			
10	Rc3/8 *4	●	
15	Rc1/2	●	●
20	Rc3/4	●	●
25	Rc1	●	●
32	Rc1 1/4	●	●
40	Rc1 1/2	●	●
50	Rc2	●	
Ⓑ Body/seat material			
H	Body - bronze/seat - reinforced PTFE	●	●
W	Stainless steel - reinforced PTFE	●	

Ⓒ Other options

	Description	Applications	Remarks		
Blank	5-conductor cable 0.5 mm² (with output lead wire)	-	-	●	●
T	3-conductor cable 0.75 mm² (without signal output)	When output lead wire is not required	3-conductor cabtyre cable used	●	●
B	Round terminal box (5 terminals)	When the lead wires are different in length	-	●	●
L	Round terminal box with lamp (Lit when open, 3 terminals)	Fully open confirmation by lamp	Lit only when fully open	●	●
R	Round terminal box with lamp (Lit when closed, 3 terminals)	Fully closed confirmation by lamp	Lit only when fully closed	●	●

Ⓓ Manual override			
Blank	None	●	●
M	Manual override	●	●
Ⓔ Voltage			
1	100 VAC(50/60 Hz)	●	●
2	200 VAC(50/60 Hz)	●	●

*1 : When selecting both without signal output (Item ⒸT) and round terminal box (Item ⒸB) as options, designate Item Ⓒ as TB. A 3-terminal round terminal box will be provided.
*2 : Combination of Item Ⓒ LR/TL/TR/BL/BR is not available.
*3 : When the manual override (Item Ⓓ M) is selected, available port sizes are 32, 40 and 50 for MSB1D. For MSB1DF, available port sizes are 25, 32 and 40.
Manual override is provided as standard with other port size.
*4 : When port size is 10, the valve is full bore but the model No. is MSB1D.

[Example of model No.]

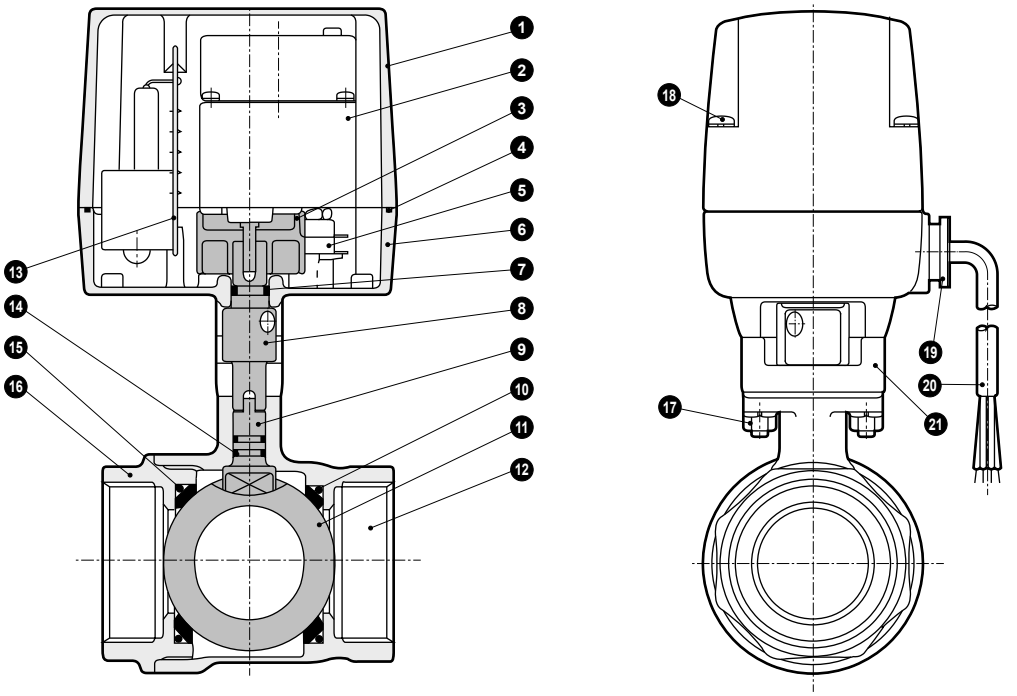
MSB1D-32-HTM-2

Model: MSB1D (standard bore)

Ⓐ Port size : Rc1 1/4
Ⓑ Body/seat material : Body - bronze/seat - reinforced PTFE
Ⓒ Other options : 3-conductor cable (without output lead wire)
Ⓓ Manual override : Selected
Ⓔ Voltage : 200 VAC (50/60 Hz)

Internal structure and parts list

● MSB1D/MSB1DF



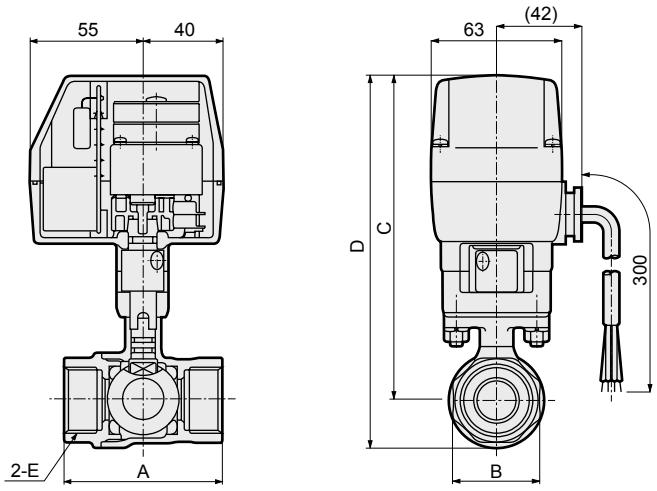
No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	11	Valve ball	C3771(SUS304)	Copper alloy *1 (stainless steel)
2	Geared motor	-	-	12	Body	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
3	Cam	PA	Polyamide resin	13	P plate assembly	PF	Phenolic resin
4	Gasket	NBR	Nitrile rubber	14	O-ring	FKM	Fluoro rubber
5	Micro switch	-	-	15	O-ring	FKM	Fluoro rubber
6	Adaptor	ZDC2	Zinc alloy die-casting	16	Cap	CAC408/CAC407 (SCS13)	Bronze casting (stainless steel casting)
7	O-ring	NBR	Nitrile rubber	17	Hexagon nut	SWCH	Carbon steel wire for cold rolling
8	Intermediate bush	SUS303	Stainless steel	18	Phillips pan head machine screw	SWCH	Carbon steel wire for cold rolling
9	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)	19	Bushing	PF	Phenolic resin
10	Ball seat	Reinforced PTFE	-	20	Cabtyre cable	0.5 mm^2, 5-conductor	-
				21	Yoke	PM-HH	Phenolic resin

Materials shown in ( ) are for stainless steel body.

*1 : Valve ball is hard chrome plated copper alloy.

Dimensions

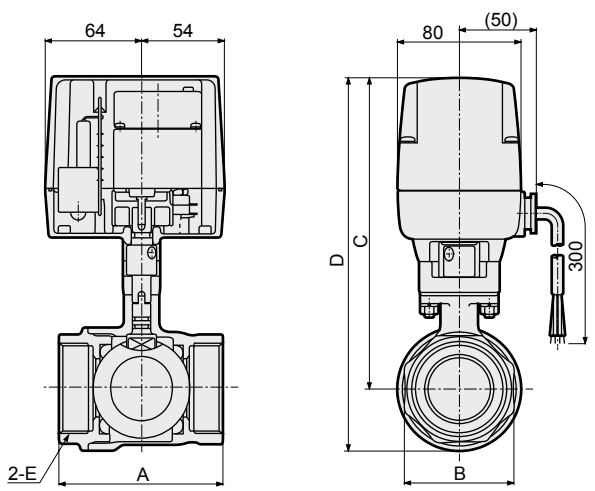
● MSB1D-10/15/20/25-*
● MSB1DF-15/20-H



Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MSB1D-10-*	50(56)	24(28)	146.5	161.5(162.5)	Rc3/8
MSB1D-15-*	56	28	146.5	161.5(162.5)	Rc1/2
MSB1D-20-*	65	34	152.5	172(173)	Rc3/4
MSB1D-25-*	76	41	155.5	178.5(179.5)	Rc1
MSB1DF-15-H	65	28	152.5	172	Rc1/2
MSB1DF-20-H	71	34	155.5	178.5	Rc3/4

● MSB1D-32/40/50-*
● MSB1DF-25/32/40-H



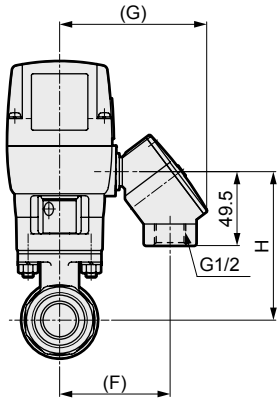
Cabtyre cable length 300 mm

Model No.	A	B	C	D	E
MSB1D-32-*	84	50	188	215.5(217.5)	Rc1¼
MSB1D-40-*	94	57	194	227.5(229.5)	Rc1½
MSB1D-50-*	108	70	203	242.5(243.5)	Rc2
MSB1DF-25-H	84	41	188	215.5	Rc1
MSB1DF-32-H	95	50	194	227.5	Rc1¼
MSB1DF-40-H	107	57	203	242.5	Rc1½

*1 : Dimensions are the same even with manual override "M".

Optional dimensions

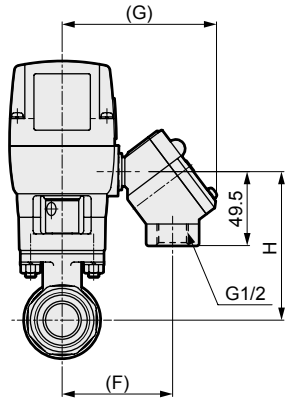
● With round terminal box
MSB1D-[bore size]-*[B]
MSB1DF-[bore size]-H[B]



Bore size		F	G	H
MSB1D	MSB1DF			
10	-	74	98	80.5
15	-	74	98	80.5
20	15	74	98	86.5
25	20	74	98	89.5
32	25	82	106	99.5
40	32	82	106	105.5
50	40	82	106	114.5

*1 : Dimensions of the large bore size (32 to 50) are the same even with manual override "M".

● Round terminal box with lamp
MSB1D-[bore size]-*[L/R]
MSB1DF-[bore size]-H[L/R]



Bore size		F	G	H
MSB1D	MSB1DF			
10	-	74	102	80.5
15	-	74	102	80.5
20	15	74	102	86.5
25	20	74	102	89.5
32	25	82	110	99.5
40	32	82	110	105.5
50	40	82	110	114.5

*1 : Dimensions of the large bore size (32 to 50) are the same even with manual override "M".

Motorized 2-, 3-port proportional control ball valve

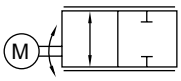
MXBC2/MXGC2 Series

● Port size: Rc3/8 to Rc1

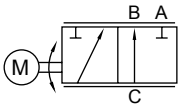
RoHS CAD

JIS symbol

● MXBC2



● MXGC2



Common specifications

Item	MXBC2	MXGC2
Working fluid	Water	
Working pressure MPa	0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)	
Fluid temperature °C	0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 50 (122°F)	
Ambient humidity %	95 or less	
Mounting orientation	From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)	
Pressurization direction	Arbitrary	Port C pressurization only
Degree of protection	IPX3 "rainproof"	

Electrical specifications

Item	MXBC2	MXGC2
Rated voltage *1	24 VDC	
Current consumption (average) mA	750±100	
Input signal	0 (4) to 20 mA DC, internal impedance 240 Ω (when fully closed: 0 mA)	
Response time sec	Fully open - fully closed 8	A-C path - B-C path 8
Resolution	1.3% or less	

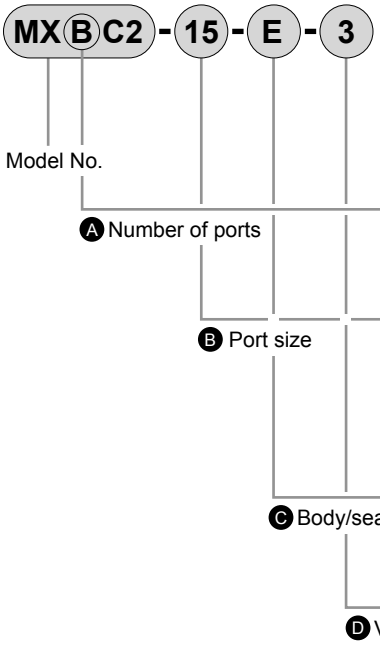
*1 : Use the product within ±5% of the rated voltage.

Individual specifications

Item	2-port valve				3-port valve		
	MXBC2-10	MXBC2-15	MXBC2-20	MXBC2-25	MXGC2-15	MXGC2-20	MXGC2-25
Port size	Rc3/8	Rc1/2	Rc3/4	Rc1	Rc1/2	Rc3/4	Rc1
Orifice size mm	10	10	15	20	10	14	19
Cv	10	6	16	29	3	6	11
Motor load hour rate *3	Active for 3 sec./off for 5 sec.						
Weight kg	2.0	2.0	2.2	2.3	2.2	2.3	2.5

*3 : Refer to Control methods (page 786) for cautions about the motor load hour rate.

How to order



Code	Description	Remarks
A Number of ports		
B	2-port	
G	3-port	Multi-fluid
B Port size		
10	Rc3/8	Only MXBC2 (2-port valve) is available.
15	Rc1/2	
20	Rc3/4	
25	Rc1	
C Body/seat material		
O	Body - bronze/seat - PTFE	
E	Body - stainless steel/seat - PTFE	
D Voltage		
3	24 VDC	

[Example of model No.]

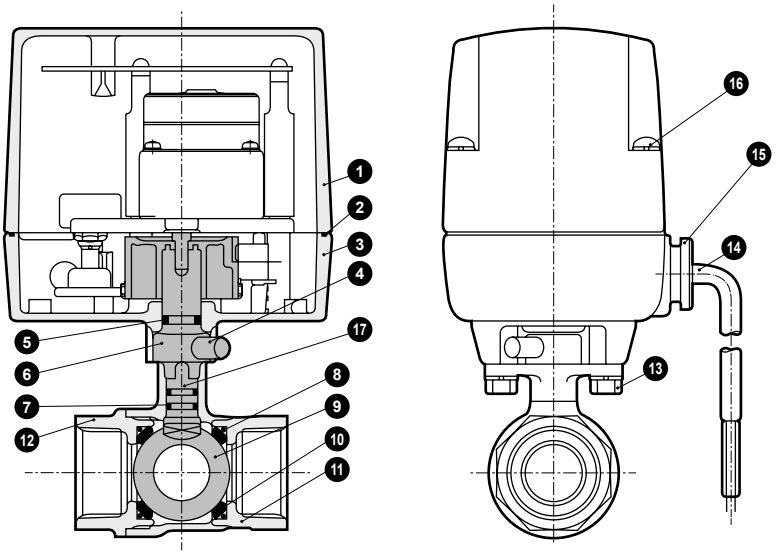
MXBC2-15-E-3

Model: MXBC2

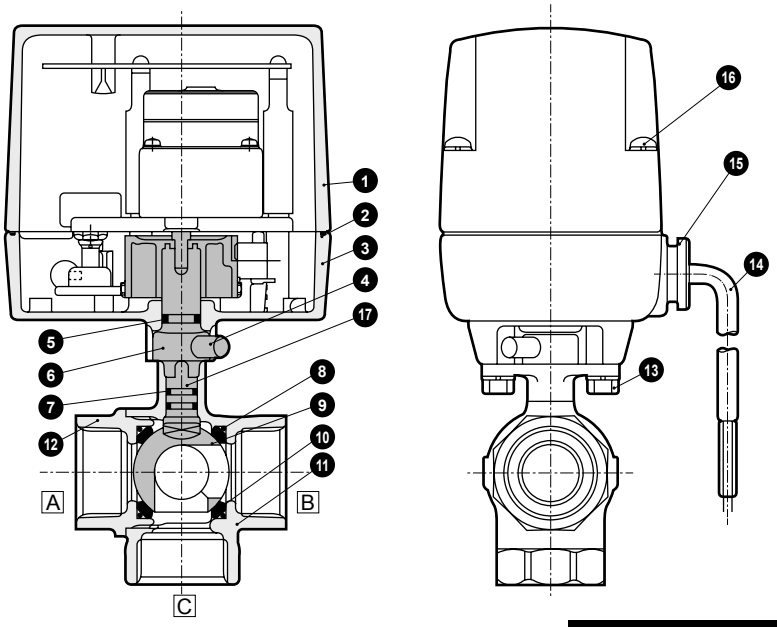
A Number of ports : 2-port valve
B Port size : Rc1/2
C Body/seat material : Body - stainless steel/valve seat - PTFE
D Voltage : 24 VDC

Internal structure and parts list

● MXBC2-10/15/20/25-0



● MXGC2-15/20/25-0



Cannot be disassembled

No.	Part name	Material		No.	Part name	Material	
1	Bonnet	ADC12	Aluminum die-casting	10	Ball seat	PTFE	Tetrafluoroethylene resin
2	Gasket	NBR	Nitrile rubber	11	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
3	Adaptor	ZDC2	Zinc alloy die-casting	12	Cap	CAC408(SCS13)	Bronze casting (stainless steel casting)
4	Stopper	C2700	Copper alloy	13	Hexagon head bolt	SWCH	Carbon steel wire for cold rolling
5	O-ring	FKM	Fluoro rubber	14	Cord	0.75 mm^2, 3-conductor	-
6	Intermediate bush	SUS303	Stainless steel	15	Bushing	PF	Phenolic resin
7	O-ring	FKM,NBR *1	Fluoro rubber, nitrile rubber	16	Phillips pan head machine screw	SWCH	Carbon steel wire for cold rolling
8	O-ring	FKM	Fluoro rubber	17	Shaft	SUS303(SUS304)	Stainless steel (stainless steel)
9	Valve ball	C3771(SUS304)	Copper alloy *2 (stainless steel)				

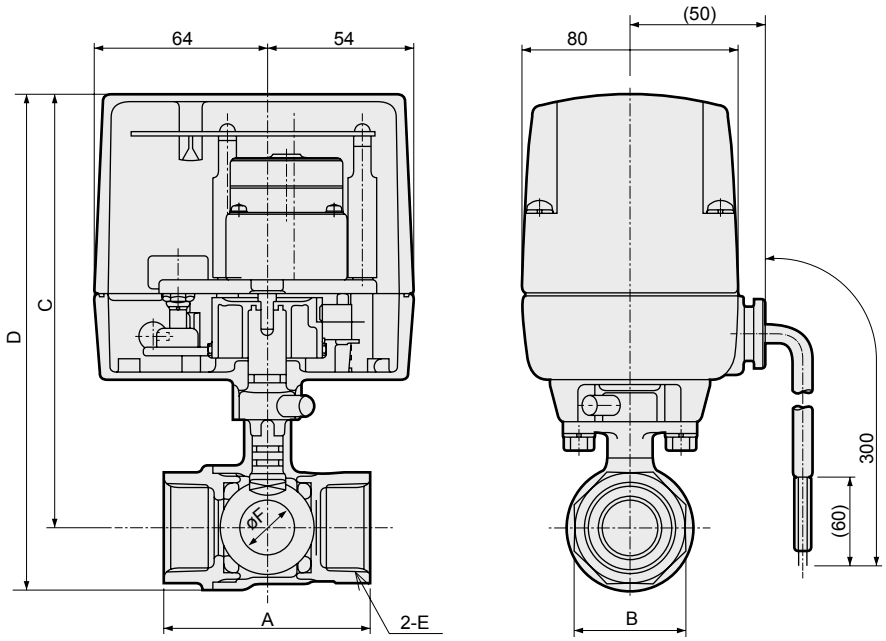
Materials shown in ( ) are for stainless steel body.

*1 : The upper O-ring is NBR, and the lower is FKM. For stainless steel body, FKM is used for both upper and lower O rings.

*2 : Valve ball is hard chrome plated copper alloy.

Dimensions CAD

● MXBC2-10/15/20/25-0

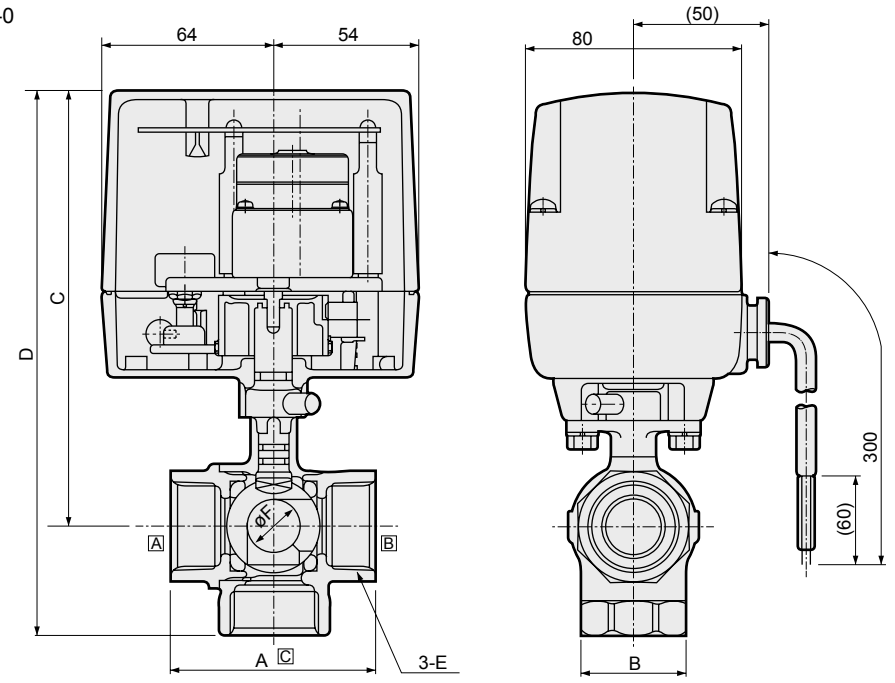


Cabtyre cable length 300 mm

Model No.	A	B	C	D	E	F
MXBC2-10	50(56)	24(28)	151	166(167)	Rc3/8	10
MXBC2-15	56	28	151	166(167)	Rc1/2	10
MXBC2-20	65	34	157	176.5(177.5)	Rc3/4	15
MXBC2-25	76	41	160	183(184)	Rc1	20

Dimensions shown in ( ) are for stainless steel body.

● MXGC2-15/20/25-0



Cabtyre cable length 300 mm

Model No.	A	B	C	D	E	F
MXGC2-15	56	28	151	181	Rc1/2	10
MXGC2-20	65	34	157	193	Rc3/4	14
MXGC2-25	76	41	160	202	Rc1	19

Miniature motorized 2, 3-port ball valve

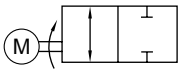
MHB4/MHG4 Series

● Port size: Rc3/8 to Rc3/4

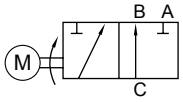
RoHS CAD

JIS symbol

● MHB4



● MHG4



Common specifications

Item			MHB4/MHG4
Working fluid			Water, air, oil (500 mm²/s or less)
Working pressure	MPa		0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)
Proof pressure (water pressure)	MPa		1.0 (≈150 psi, 10 bar)
Fluid temperature	°C		0 (32°F) to 80 (176°F) (no freezing)
Ambient temperature	°C		-10 (14°F) to 50 (122°F)
Ambient humidity	%		70 or less
Mounting orientation			From vertical direction with the actuator on the top to horizontal direction. (Refer to page 784.)
Rated voltage		*1	100 VAC(50/60 Hz)
Apparent power	VA	Operating 100 VAC	4.4/3.5(50/60 Hz)
		Starting 100 VAC	4.4/3.5(50/60 Hz)
Power consumption	W		5
Frequency			1 time/min. or less

Individual specifications

Item		2-port valve			3-port valve		
		MHB4-10-25	MHB4-15-25	MHB4-20-25	MHG4-10-25	MHG4-15-25	MHG4-20-25
Port size		Rc3/8	Rc1/2	Rc3/4	Rc3/8	Rc1/2	Rc3/4
Orifice size	mm	8	8	10	8	8	10
Cv		3.3	3.0	4.7	1.8	1.1	3.0
Response time	sec 50 Hz	4.5			9		
	60 Hz	3.8			7.5		
Weight	kg	0.42	0.44	0.51	0.45	0.49	0.57
Pressurization direction		Arbitrary			Port C pressurization only		

*1 : Use the product within ±10% of the rated voltage.
*2 : Consult with CKD for specifications not indicated above.
*3 : The protection degree is JIS CO920 IPX2 "Drip proof type II", only when vertically mounted with the actuator positioned upward.

How to order

MH Ⓑ 4 - 20 - 25 - AC100V

Model No.

Working pressure
0 to 0.5 MPa

Ⓐ Number of ports

Ⓑ Port size

Ⓒ Voltage

Code	Description
Ⓐ Number of ports	
B	2-port
G	3-port
Ⓑ Port size	
10	Rc3/8
15	Rc1/2
20	Rc3/4
Ⓒ Voltage	
AC100V	100 VAC(50/60 Hz)

[Example of model No.]

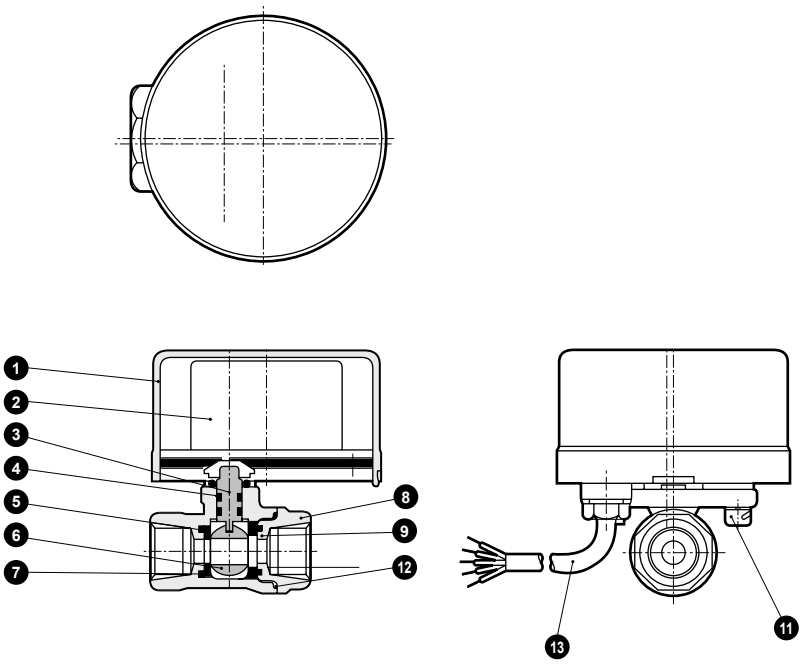
MHB4-20-25-AC100V

Model: MHB4

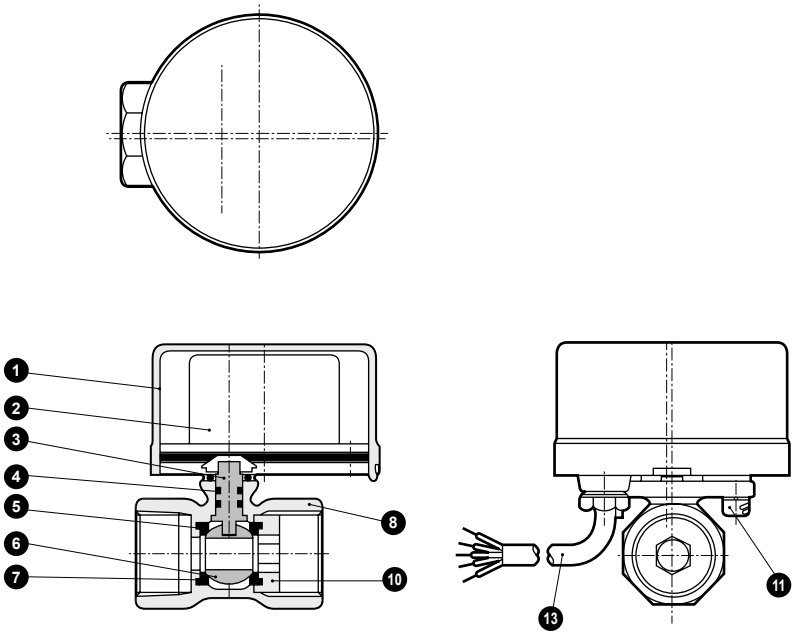
Ⓐ Number of ports : 2-port valve
Ⓑ Port size : Rc3/4
Ⓒ Voltage : 100 VAC (50/60 Hz)

Internal structure and parts list: MHB4 Series

● MHB4-10-25



● MHB4-15/20-25



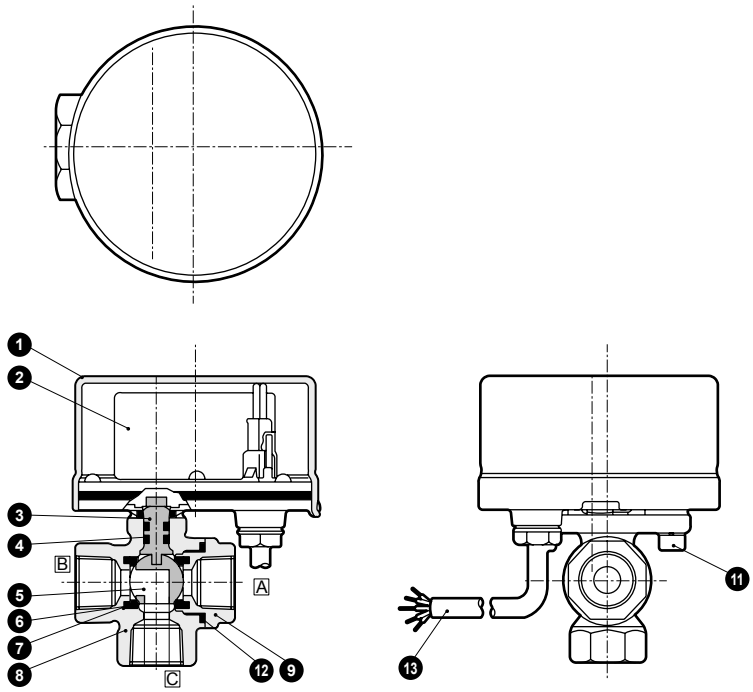
Cannot be disassembled

No.	Part name	Material		No.	Part name	Material	
1	Cover	PP	Polypropylene resin	7	Valve seat	PTFE	Tetrafluoroethylene resin
2	Motor assembly	-	-	8	Body	CAC407/CAC408	Bronze casting
3	Shaft	SUS303	Stainless steel	9	Cap	CAC407	Bronze casting
4	O-ring	FKM	Fluoro rubber	10	Insert	CAC407	Bronze casting
5	O-ring	FKM	Fluoro rubber	11	Hexagon socket head cap screw	SCM435	Alloy steel
6	Valve ball	C3771	Copper alloy *1	12	O-ring	FKM	Fluoro rubber
				13	Cabtyre cable	0.3 mm^2, 5-conductor	-

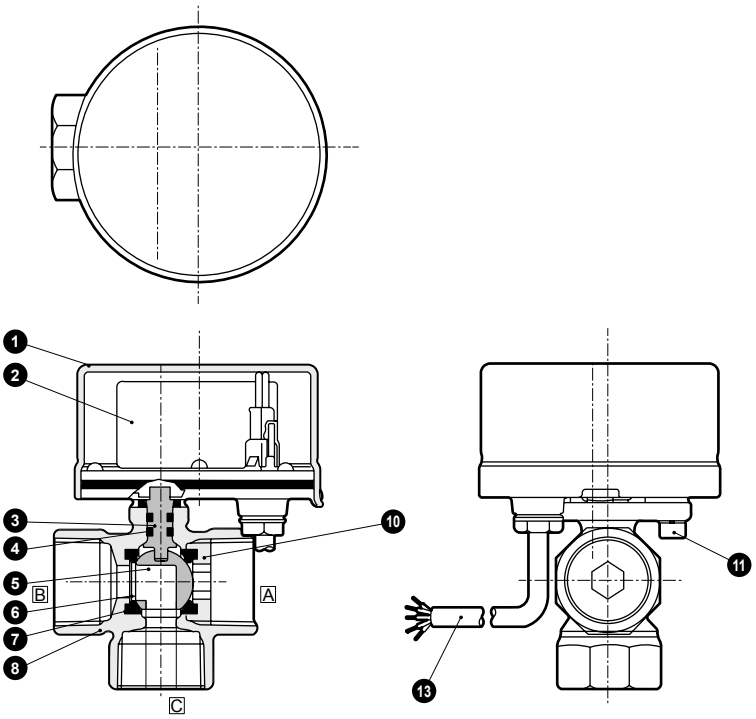
*1 : Valve ball is hard chrome plated copper alloy.

Internal structure and parts list: MHG4 Series

● MHG4-10-25



● MHG4-15/20-25



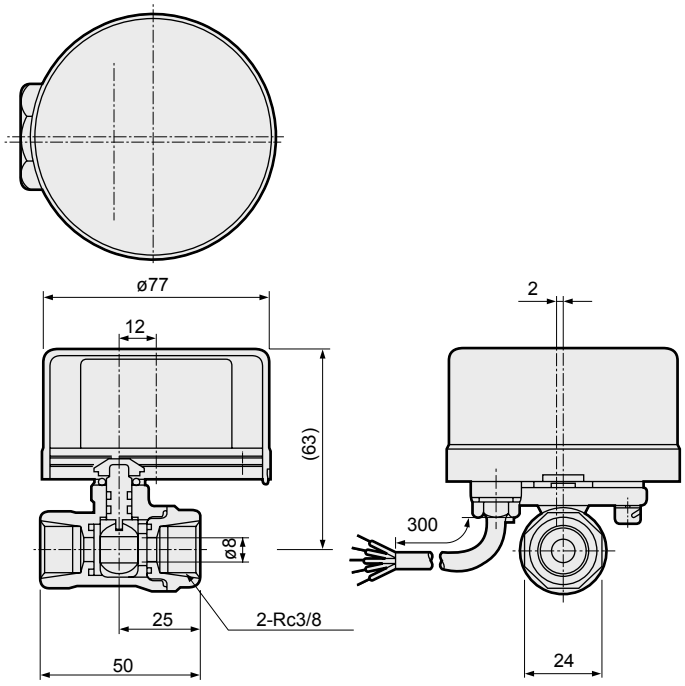
Cannot be disassembled

No.	Part name	Material		No.	Part name	Material	
1	Cover	PP	Polypropylene resin	7	O-ring	FKM	Fluoro rubber
2	Motor assembly	-	-	8	Body	CAC407	Bronze casting
3	Shaft	SUS303	Stainless steel	9	Cap	CAC407	Bronze casting
4	O-ring	FKM	Fluoro rubber	10	Insert	CAC407	Bronze casting
5	Valve ball	C3771	Copper alloy *1	11	Hexagon socket head cap screw	SCM435	Alloy steel
6	Valve seat	PTFE	Tetrafluoroethylene resin	12	O-ring	FKM	Fluoro rubber
				13	Cabtyre cable	0.3 mm^2, 5-conductor	-

*1 : Valve ball is hard chrome plated copper alloy.

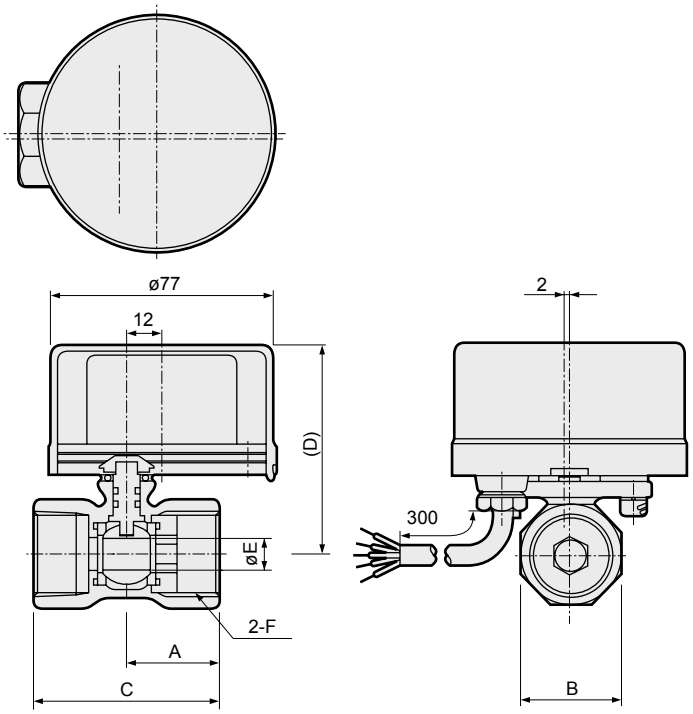
Dimensions: MHB4 Series

● MHB4-10-25



Cabtyre cable length 300 mm

● MHB4-15/20-25



Cabtyre cable length 300 mm

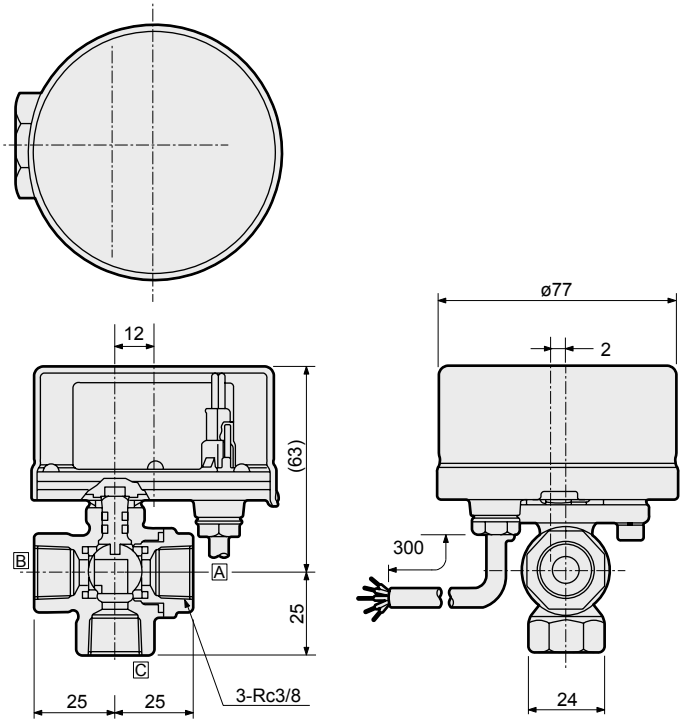
Model No.	A	B	C	D	E	F
MHB4-15-25	27	27	56	63	8	Rc1/2
MHB4-20-25	30	32	63	66	10	Rc3/4

⚠ Safety precautions

● Since this valve rotates one way only, reversing is impossible during operation. For example, if the operation switch is turned to close while the valve is on the way from closed to open, the valve will fully open once and then close.

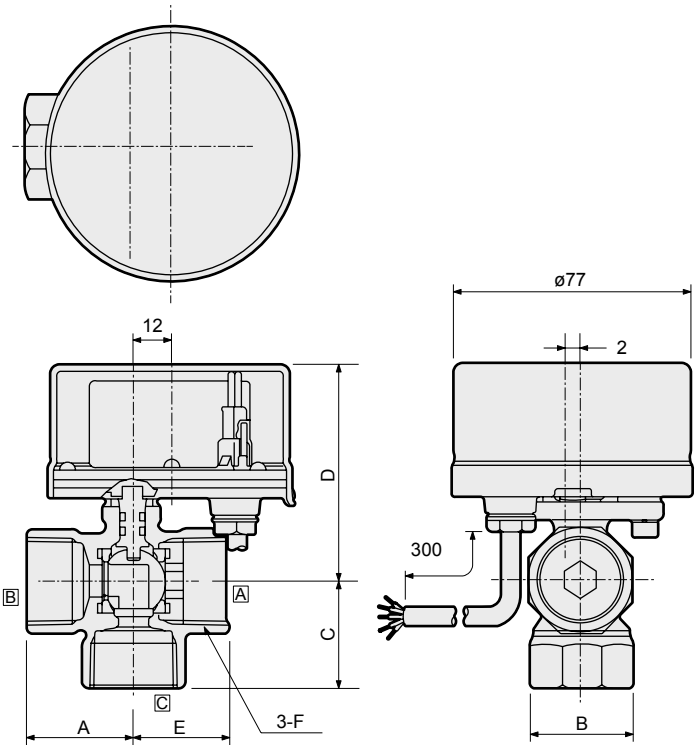
Dimensions: MHG4 Series

● MHG4-10-25



Cabtyre cable length 300 mm

● MHG4-15/20-25



Cabtyre cable length 300 mm

Model No.	A	B	C	D	E	F
MHG-4-15-25	29	27	29	63	27	Rc1/2
MHG-4-20-25	33	32	33	66	30	Rc3/4

⚠ Safety precautions

● Since this valve rotates one way only, reversing is impossible during operation. For example, part-way in the operation from the B-C path to the A-C path, if the operation switch is returned to the B-C path, the valve will first open to the A-C path before opening the B-C path.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Motorized ball valve (MXB1.MXB1F.MXG1.MXB1D.MXB1DF.MXG1D.MSB1. MSB1F.MSB1D.MSB1DF.MHB4.MHG4)

Design/selection

⚠CAUTION

1 Fluid viscosity

Generally, the valve can be used with a fluid viscosity of up to 500 mm^2/s. However, the properties may differ according to the fluid, so contact CKD.

2 Fluid quality

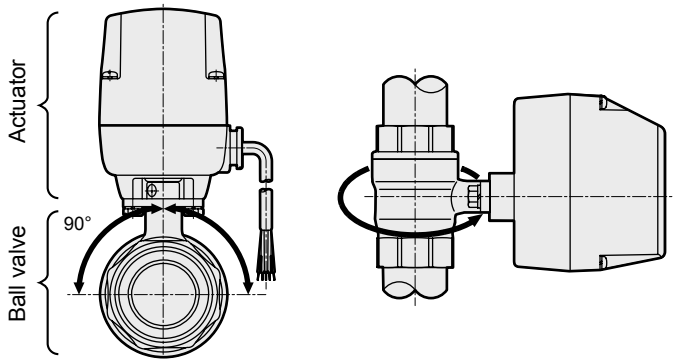
Iron rust and debris in the fluid can cause operation faults or leaks and deteriorate product performance.

Mounting, piping and wiring

⚠CAUTION

1 Mounting

(1) Always hold the body when handling or installing the product. Do not pull the lead wires or drop the product.
(2) Install the valve within the range between vertical position with actuator facing upward and horizontal position.
(3) Do not install the product outdoors.



[Horizontal piping]

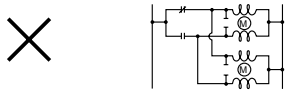
[Vertical piping]

2 Piping

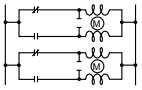
(1) Fix the product when tightening or reinstalling the piping. When piping to the body side, fix the body, and when piping to the cap side, fix the cap.
(2) Fix and support the pipes so that the weight and vibration of the pipes are not directly applied on the valves.
(3) Be sure to observe the specified direction for the increase in pressurization of the 3-way valve.
(4) When using heat insulating material, do not cover the actuator.

3 Wiring

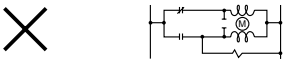
(1) Wiring diagram is on page 787 or pasted on the bonnet. Wire as shown in the wiring diagram.
(2) For the DC type, use a high-capacity power supply. A full-wave or half wave rectified bridge is affected by ripples, so always use a stabilized power supply. Since a stepper motor is used, noise will be generated at the power line. Thus, use noise filters on devices susceptible to noise, such as computers connected to the common power supply.
(3) Avoid using a changeover switch with red and black lead wires as the signals could be input simultaneously.
(4) Parallel operation of motor driven ball valves (excluding MXB1D/MXB1DF/MXG1D/MSB1D/MSB1DF) Do not operate more than one ball valve in parallel using the same contact. Otherwise, malfunction will occur.



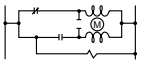
In parallel operation, insert a separate contact for each ball valve.

OK 

(5) Parallel operation with other valves (excluding MXB1D/MXB1DF/MXG1D/MSB1D/MSB1DF) Do not operate in parallel with other products having different resistance, such as a solenoid valve or contact protection element, using the same contact. Otherwise, malfunction will occur.



In parallel operation, insert a contact between the ball valve and solenoid valve, etc.

OK 

(6) When not using output lead wire, cut the exposed portion of the yellow and green core wires and insulate.
(7) When using the output lead wire for large capacity loads, minute loads, etc., observe the specification range of the micro switch.

Model No.	Manufacturer/model No.
MXB1/MXB1F.MXG1/MXB1D/MXB1DF/ MXG1D/MSB1/MSB1F/MSB1D/MSB1DF	OMRON SS-5
MHB4/MHG4	Panasonic Electric Works AH1680

(8) When using in a place where water splashes on the valve, take measures to protect the lead wire connection section.
(9) When wiring a terminal box with indicator lamp, do not remove the cover with force.
Otherwise, the crimp terminals inside could bend, and indicator lamp faults or insulation faults could occur.

When using the product

⚠ WARNING

1 Frequency of use

Be sure to observe the frequency of use (motor load time factor). Otherwise, the thermal protector could operate and stop the valve. In the locked state, a continuously energized state could be created, placing a load on the gears and coils. Turn the power OFF immediately, and resolve the problem. If operation is continued, misoperations or reduced durability could result.

⚠ CAUTION

1 Switching signals

Switch the valve signal so that the next signal is input after the valve operation ends.
If operation is stopped or if the signal is switched midway, operation failures may occur and the durability may decline.

2 Manual operation

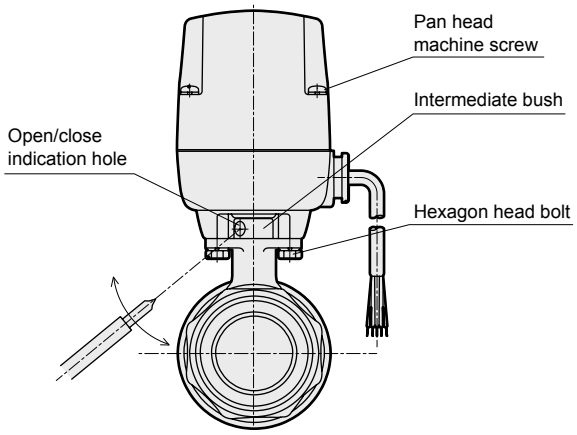
This applies to the MXB1, MXB1F, MXB1D, MXB1DF, MSB1, MSB1F, MSB1D and MSB1DF. For the large bore sizes (standard pore: Rc1¼ to Rc2, full bore: Rc1 to Rc1½), this applies to valves with manual override "M".

[How to operate the manual override]

- For the small port sizes (standard bore: Rc3/8 to Rc1, full bore: Rc1/2 to Rc3/4), insert a hard tool such as a Phillips screwdriver into the open/close indication hole of the motorized valve intermediate bush and turn it slowly.
- For the large port sizes (standard bore: Rc1¼ to Rc2, full bore: Rc1 to Rc1½) with manual override "M", insert a hard tool such as Phillips screwdriver under the connection key of the intermediate bush and turn it slowly with the clutch disengaged.
- Turn the knob from the closed to open position and then from the open to closed in about 20 seconds.
- For both the large and small port sizes, rotating in the counterclockwise direction looking at the valve from above will lead to "opening", and rotating in the clockwise direction will lead to "closing".

[Precautions for manual operation]

- Make sure to turn the power OFF before the operation.
- Do not apply sudden force when rotating the screwdriver. The gears could be damaged.
- For the large port sizes (standard bore: Rc1¼ to Rc2, full bore: Rc1 to Rc1½) with manual override "M", always return the clutch after manual operation, and make sure that the clutch is securely engaged before starting operation.
- Only perform manual operation in emergencies.



Maintenance

⚠ WARNING

1 Do not detach the bonnet.

Touching electrical parts inside may cause electric shock.

2 Do not disassemble the product.

If a fault occurs, do not disassemble the product. Contact your nearest dealer or CKD Sales Office.
Disassembling will prevent smooth investigation of the cause.

3 Precautions when replacing the ball valve and actuator

(1) Before replacement, be sure to shut off the power source, release the fluid pressure and check that internal pressure is not applied inside the ball valve.
(2) When replacing, check that the actuator axis and the ball valve axis are not mis-aligned.
(3) When tightening two hexagon socket head cap screws or hexagon head bolts, assemble carefully in several actions to ensure that the tightening is uniform. (Recommended tightening torque 5 to 7.5 N·m)

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Motorized proportional control ball valve (MXBC2, MXGC2)

Design/selection

⚠CAUTION

1 Power supply

Select power supply allowing for sufficient capacity (50 W class is recommended). Do not use a full-wave rectified bridge as it will be affected by ripples or zero voltage, etc., Instead, use a stabilized power supply.

2 Control method

Use a controller or thermostat having a PID function, and keep the motor load hour rate at 10% or less. When using for ON/OFF control or control with a high motor load hour rate, the service life will be shortened, and the thermal protector could be activated thanks to motor heating. This will temporarily shut off the motor power and prevent normal operation. Lowering the motor load hour rate will allow the durability of the entire device to be lengthened, so carefully consider the control methods and motor load hour rate. When the thermal protector is in operation, do not forcefully operate manually.

3 Durability

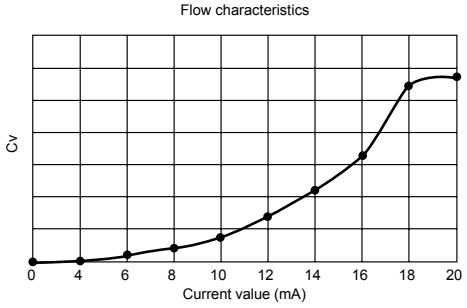
The seal performance of ball valve and durability of internal gear and other wearing parts largely depends on the control method (frequency of use).
As an example, if the equipment is active for 1 sec. and inactive for 10 secs. for 8 hours per day, the estimated service life is 1 to 1.5 years.

4 Input signal and Cv

The initial adjustment of the opening of ball valve and the input signal is as shown in the table below.

Input signal	Ball valve open/close position
0 mA	Fully closed position
20 mA	Fully opened position

As shown below, the Cv variation by 1 step will increase in the areas where the Cv is small or near the max. flow rate. Thus, avoid usage in these ranges, and obtain stability through control so that the expression max. Cv x 1/2 = required flow rate is satisfied.



As the angle for the ball valve to start opening and the Cv corresponding to the input signal differ depending on the unit, check the input signal and flow rate of individual units.

5 Noise

When using outdoor piping, use resin piping to prevent damage from lightning. Since a stepper motor is used, noise will be generated at the power line. Thus, use noise filters on devices susceptible to noise, such as computers connected to the common power supply.

6 Actual control

(1) Temperature control: When controlling the heating or cooling temperature, attention must be paid to the balance of the applied and lost heat. If the heat is not balanced, the control will not stabilize, and vibration could occur, causing a large error. Design the device with balance in mind, considering the required fluid flow rate and temperature with respect to the target temperature.
(2) Constant flow rate control: The resolution of the ball valve is 1.3% or less. Thus, it may not be possible to attain the required flow rate if more precise resolution is required. When using at high pressures, note that this resolution limit is particularly apparent.

7 Fluid viscosity

The valve can be used with a fluid viscosity of up to 500 mm^2/s. However, as the properties may differ according to the fluid, consult with CKD.

[Other] Refer to page 784 for the precautions regarding the motorized ball valve.

Mounting, piping and wiring

⚠WARNING

1 Wiring

Refer to page 784.

[Other] Refer to page 784 for the precautions regarding the motorized ball valve.

When using the product

⚠WARNING

[Other] Refer to page 785 for the precautions regarding the motorized ball valve.

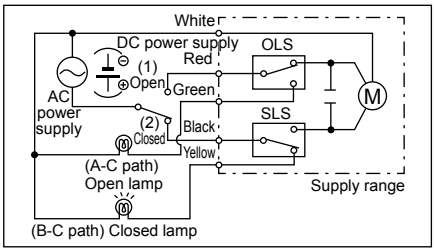
Maintenance

⚠WARNING

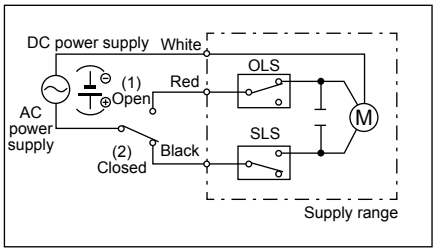
[Other] Refer to page 785 for the precautions regarding the motorized ball valve.

MX$^{B}_{G}$1 / MXB1F / MSB1 / MSB1F wiring diagram

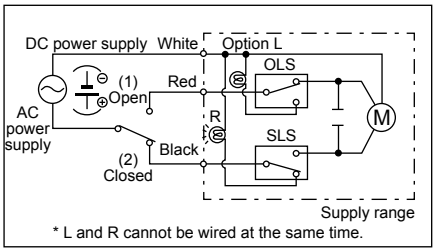
● Standard



● Option: T (3-conductor cable)



● Option: L, R (with lamp)

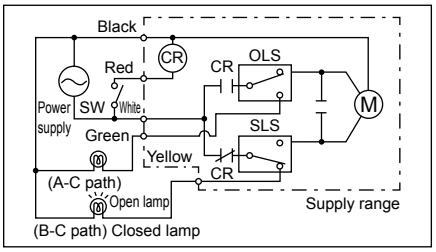


* L and R cannot be wired at the same time.

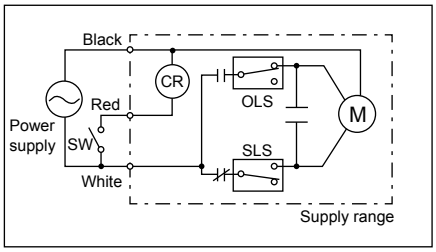
2-port valve	
Opening	(1) White - red After opening, the micro switch (OLS) functions and stops the motor.
Closing	(2) White - black After closing, the micro switch (SLS) functions and stops the motor.
3-port valve	
Lit when A-C path operates	(1) White - red After A-C path operation, the micro switch (OLS) functions and stops the motor.
Lit when B-C path operates	(2) White - black After B-C path operation, the micro switch (SLS) functions and stops the motor.

MX$^{B}_{G}$1D / MXB1DF / MSB1D / MSB1DF (with relay) wiring diagram

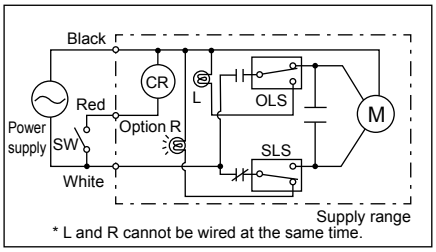
● Standard



● Option: T (3-conductor cable)



● Option: L, R (with lamp)

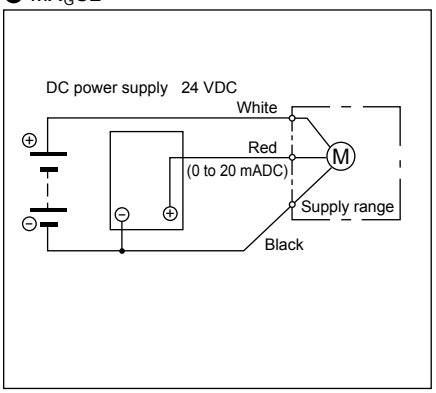


* L and R cannot be wired at the same time.

2-port valve	
Opening	SW: ON (black - white, red) After opening, the micro switch (OLS) functions and stops the motor.
Closing	SW: OFF (black - white) After closing, the micro switch (SLS) functions and stops the motor.
3-port valve	
Lit when A-C path operates	SW: ON (black - white, red) After A-C path operation, the micro switch (OLS) functions and stops the motor.
Lit when B-C path operates	SW: OFF (black - white) After B-C path operation, the micro switch (SLS) functions and stops the motor.

MX$^{B}_{G}$C2 (Motorized proportional control ball valve) wiring diagram

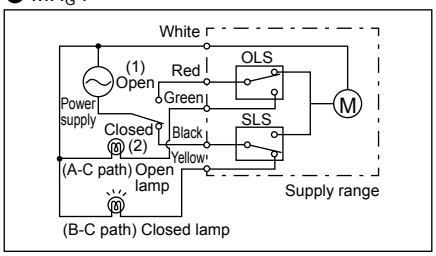
● MX$^{B}_{G}$C2



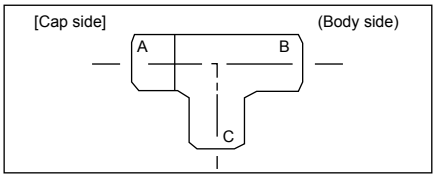
2-port valve	
Opening	20 mA
Closing	0(4) mA
3-port valve	
Lit when A-C path operates	20 mA
Lit when B-C path operates	0(4) mA

MH$^{B}_{G}$4 wiring diagram

● MH$^{B}_{G}$4



2-port valve	
Opening	(1): White - red
Closing	(2): White - black
3-port valve	
A-C path	(1): White - red
B-C path	(2): White - black

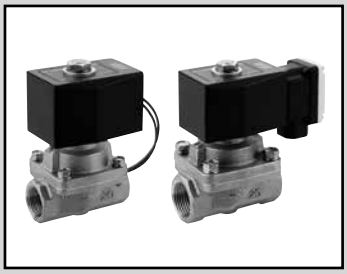


Other general purpose control systems

Multi-type fluid control is made possible

CONTENTS

⚠ Always read the precautions on page 808 before use.



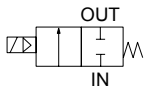
Pilot kick 2-port solenoid valve for steam

SPK Series

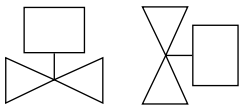
- NC (open when energized)
- Working fluid: Steam
- Port size: Rc1/2 to Rc1

RoHS CAD

JIS symbol



Mounting orientation



Common specifications

Item	SPK11
Working fluid	Steam
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)
Max. working pressure MPa	1 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	2 (≈290 psi, 20 bar)
Fluid temperature °C	5 (41°F) to 180 (356°F)
Ambient temperature °C	-10 (14°F) to 60 (140°F)
Thermal class	Class 180 (H)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Pilot kick poppet, piston drive
Valve seat leakage (*2) cm^3/min(ANR)	400 or less (air)
Mounting orientation	Limited to the range of vertical orientation with the coil on top to horizontal orientation (*3).

*1 : No freezing.
*2 : Value at pneumatic pressure of 0.05 to 1.0 MPa. When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.
*3 : Limited to vertical orientation when used at a pressure less than 0.05 MPa.

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Rated voltage	Apparent power (VA) When holding 50 Hz	Apparent power (VA) When holding 60 Hz	Apparent power (VA) When starting 50 Hz	Apparent power (VA) When starting 60 Hz	Power consump (W) AC 50/60 Hz	Weight (kg)
SPK11-15A	Rc1/2	16	100 VAC 110 VAC 200 VAC 220 VAC	12	10	42	36	5.6/4.7	1.0
SPK11-20A	Rc3/4	23							1.3
SPK11-25A	Rc1	28							1.7

*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : The voltage fluctuation range must be within ±10% of the rated voltage. If the pressure difference is more than 0.7 MPa, it should be within -5% to +10%.

How to order

SPK11 - 15 A - C 4A G S - AC100V

- SPK11 — Model No.
- 15 — Ⓐ Port size
- A — Ⓑ Thread *3
- C — Ⓒ Body material
- 4A — Ⓓ Coil housing
- G — Ⓔ Coil option
- S — Ⓕ Surge suppressor
- AC100V — Ⓖ Rated voltage

Code	Description
Ⓐ Port size	
15	1/2
20	3/4
25	1
Ⓑ Thread	
A	Rc
G	G (made-to-order product)
N	NPT (made-to-order product)
Ⓒ Body material	
C	Bronze
K	Bronze/oil-prohibited
F	Stainless steel
N	Stainless steel/oil-prohibited
Ⓓ Coil housing	
4A	Lead wire
4M	Terminal box
4N	Terminal box with lamp
Ⓔ Coil option	
Blank	No option
G *1	Conduit CTC19
H *1	Conduit G1/2
Ⓕ Surge suppressor	
Blank	Without surge suppressor
S *2	Surge suppressor attached
Ⓖ Rated voltage	
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz, 220 VAC 60 Hz
AC110V	110 VAC 50/60 Hz, 121 VAC 60 Hz
AC220V	220 VAC 50/60 Hz, 242 VAC 60 Hz

Precautions for model No. selection

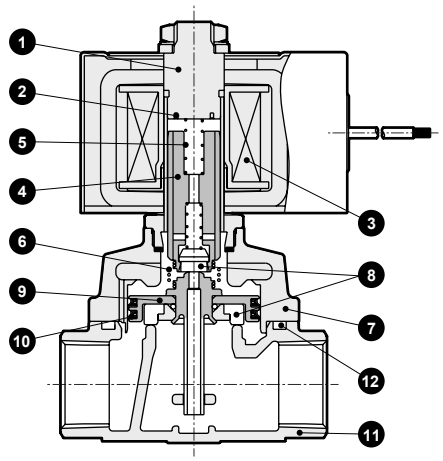
*1 : "G" and "H" are available only when the coil housing (D) is "4A".
*2 : "S" is available only when the coil housing (D) is "4A".
*3 : When ordering a stainless steel body with G bolts or NPT bolts, contact CKD.

[Example of model No.]

SPK11-15A-C4AGS-AC100V

- Ⓐ Port size : 1/2
- Ⓑ Thread : Rc
- Ⓒ Body material : Bronze
- Ⓓ Coil housing : Lead wire
- Ⓔ Coil option : Conduit CTC19
- Ⓕ Surge suppressor : Surge suppressor attached
- Ⓖ Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

Internal structure and parts list

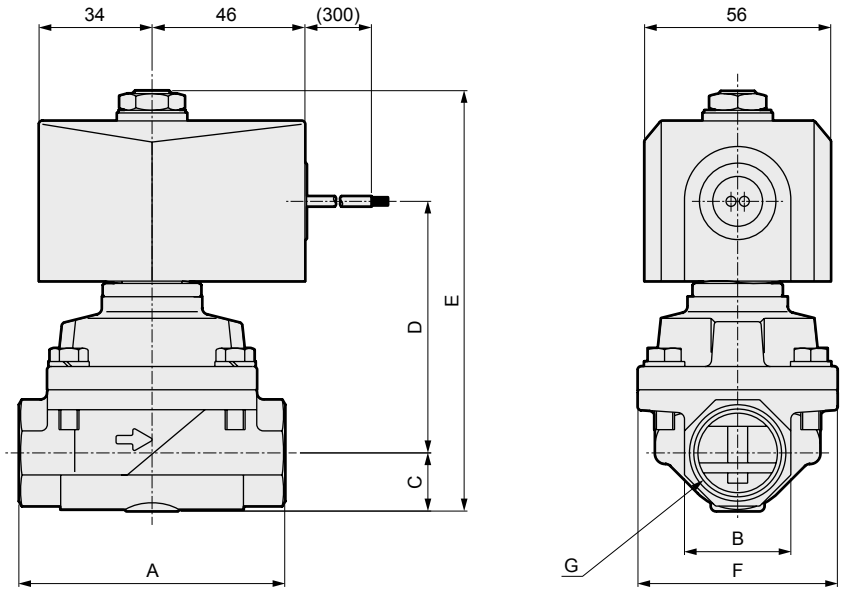


No.	Part name	Material	
1	Core assembly	SUS 405 or equiv./SUS 316L/SUS 430	Stainless steel
2	Shading coil	Cu (Ag for stainless steel body)	Copper (silver for stainless steel body)
3	Coil	-	-
4	Plunger assembly	SUS 405 or equiv./SUS 304/PFA	Stainless steel
5	Plunger spring	SUS304	Stainless steel
6	Kick spring	SUS304	Stainless steel
7	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
8	Seal	PTFE/PFA	Tetrafluoroethylene resin
9	Main valve assembly	SUS303/SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
10	Seal ring set	SUS304/PTFE	Stainless steel/tetrafluoroethylene resin
11	Body	CAC408(SCS13)	Bronze casting (stainless steel casting)
12	Square ring	PTFE	Tetrafluoroethylene resin

Dimensions

● Lead wire

SPK 11-15A/20A/25A-*4A



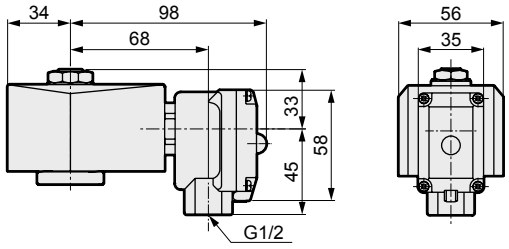
Model No.	A	B	C	D	E	F	G
SPK11-15A-*4A	71	27(29)	14.5	72	119.5	50	Rc1/2
SPK11-20A-*4A	80	32(35)	17.5	76	126.5	60	Rc3/4
SPK11-25A-*4A	90	41(45)	21.5(22.5)	82	136.5(137.5)	71	Rc1

*1 : Dimensions shown in ( ) are for stainless steel body.
*2 : The dimensions are the same for port sizes of G and NPT threads.

Optional dimensions

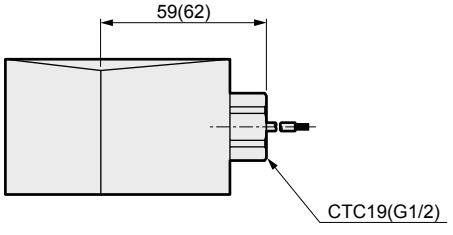
● Terminal box

SPK11-15A to 25A-*4 [M] [N]



● Conduit

SPK11-15A to 25A-*4A [G] [H]



Dimensions shown in ( ) are for G1/2.

Pilot operated 2-port solenoid valve

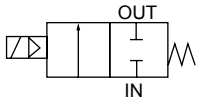
KZV3 Series

● Port size: Rc1/2 to Rc2

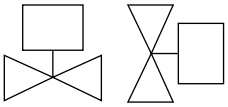
RoHS CAD

JIS symbol

● NC (open when energized)



Mounting orientation



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	KZV3-15A	KZV3-20A	KZV3-25A	KZV3-32A	KZV3-40A	KZV3-50A
Working fluid	Steam/water/oil (20 mm^2/s or less)			Steam/water/oil (50 mm^2/s or less)		
Port size	Rc1/2	Rc3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Orifice size mm	16	23	28	35	43	53
Cv	4.5	8.6	12	25	34	53
S mm^2	88	162	231	460	625	975
Working pressure differential MPa	0 to 1 (oil only 0 to 0.7) (*1)			0.05 to 1 (oil only 0.05 to 0.6)		
Proof pressure (water pressure) MPa	4 (≈580 psi, 40 bar)			3.2 (≈460 psi, 32 bar)		
Fluid temperature °C	5 (41°F) to 180 (356°F)					
Ambient temperature °C	-10 (14°F) to 60 (140°F)					
Atmosphere	Place free of corrosive gas and explosive gas					
Valve structure	Pilot kick poppet, piston drive			Pilot operated poppet, piston drive		
Mounting orientation	Limited to the range of vertical orientation with the coil on top to horizontal orientation (*2).			Limited to the range of vertical orientation with the coil on top to horizontal orientation		
Weight kg	1.3	1.6	2	4	5	6.5
Electrical specifications						
Rated voltage	100/200 VAC connection method selection, 50/60 Hz common					
Apparent power VA (When holding)	50 Hz:36, 60 Hz:30					
Apparent power VA (When starting)	50 Hz:180, 60 Hz:150					
Power consumption W	50 Hz:20, 60 Hz:18					
Thermal class	Class 180 (H)					
Degree of protection	IP65 equiv. (*3)					

*1 : When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.
*2 : Limited to vertical orientation when used at a pressure less than 0.05 MPa.
*3 : IP21 equivalent when using terminal box 4M, 4N.

How to order

KZV3 - 15A - ○ - ○

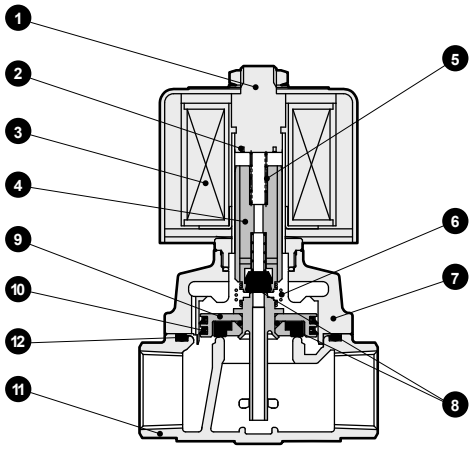
Ⓐ Port size
Ⓑ Body material
Ⓒ Option

Code	Description
Ⓐ Port size	
15A	Rc1/2
20A	Rc3/4
25A	Rc1
32A	Rc1 1/4
40A	Rc1 1/2
50A	Rc2
Ⓑ Body material	
Blank	Bronze
F	Stainless steel
Ⓒ Option	
Blank	None
4M	Terminal box
4N	Terminal box with lamp

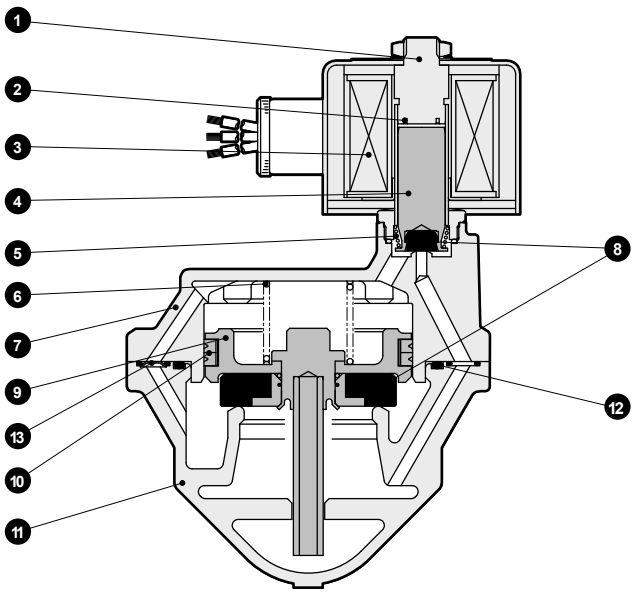
[Example of model No.]
KZV3-15A-F-4M
Model: KZV3
Ⓐ Port size : Rc1/2
Ⓑ Body material : Stainless steel
Ⓒ Option : Terminal box

Internal structure and parts list

● KZV3-15A to 25A



● KZV3-32A to 50A

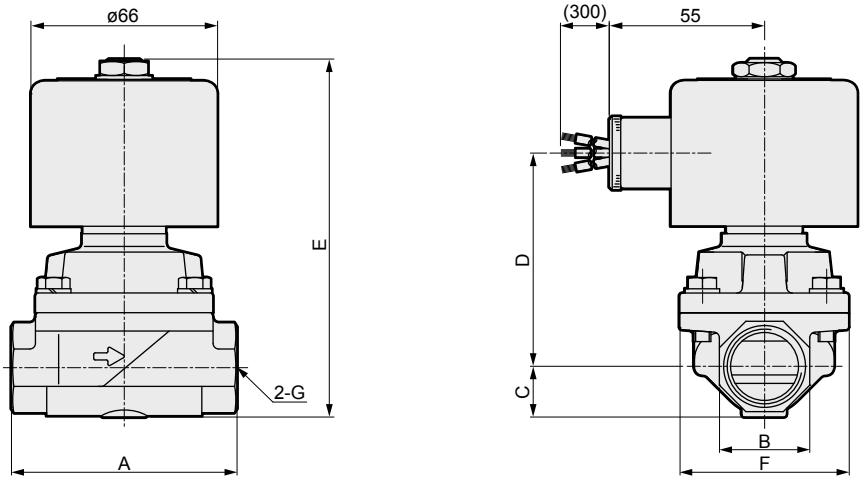


No.	Part name	Material
1	Core assembly	Stainless steel
2	Shading coil	Copper (silver for stainless steel body)
3	Coil	-
4	Plunger assembly	Stainless steel
5	Plunger spring	Stainless steel
6	Spring	Stainless steel
7	Body	Bronze casting (stainless steel casting)
8	Seal	Tetrafluoroethylene resin
9	Main valve assembly	Copper alloy/stainless steel (stainless steel)
10	Seal ring set	Stainless steel/tetrafluoroethylene resin
11	Body	Bronze casting (stainless steel casting)
12	O-ring	Fluoro rubber
13	Orifice plate	Stainless steel

( ) shows options.

Dimensions

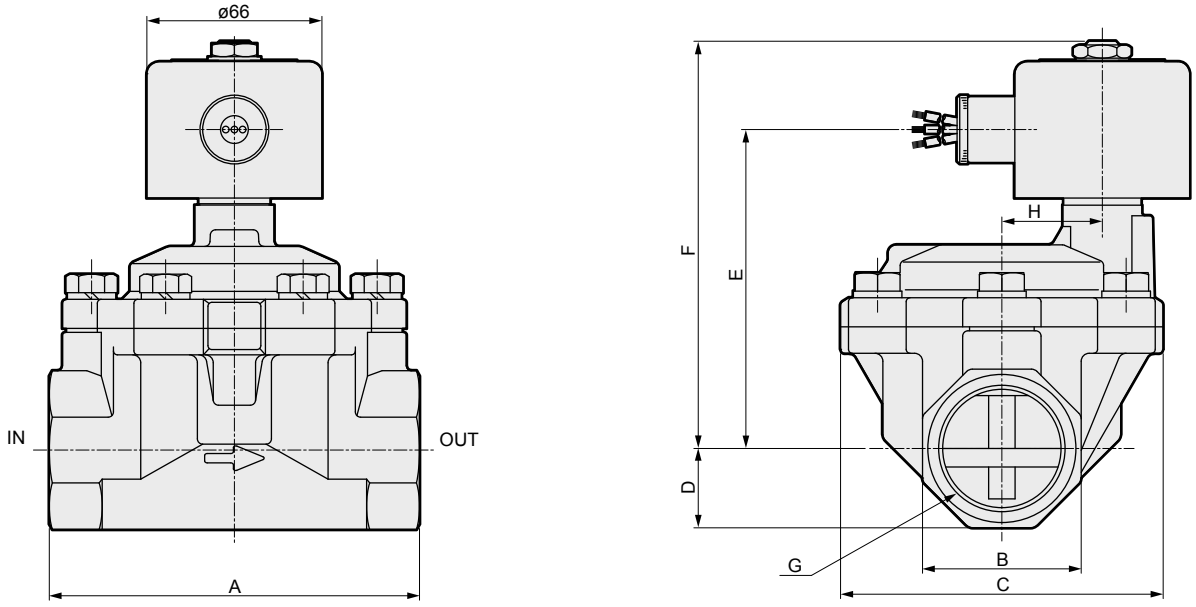
● KZV3-15A to 25A



Model No.	A	B	C	D	E	F	G
KZV3-15A	71	27(29)	14.5	72	119.5	50	Rc1/2
KZV3-20A	80	32(35)	17.5	76	126.5	60	Rc3/4
KZV3-25A	90	41(45)	21.5(22.5)	82	136.5(137.5)	71	Rc1

*1 : Dimensions shown in ( ) are for stainless steel body.

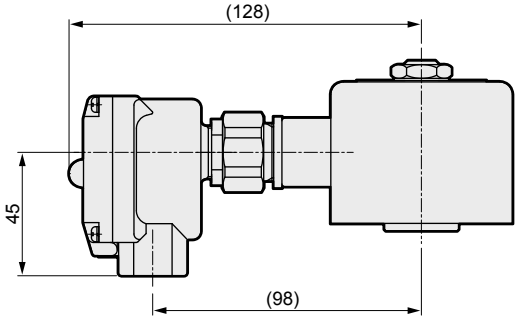
● KZV3-32A to 50A



Model No.	A	B	C	D	E	F	G	H
KZV3-32A	125	54	112	27	115	148	Rc1 1/4	32
KZV3-40A	140	60	122	30	121	154	Rc1 1/2	38
KZV3-50A	160	74	132	37	129	162	Rc2	45

Optional dimensions

● Terminal box
KZV3-15A to 50A-*-4M
4N



MEMO

MEMO

MEMO

Pilot operated 2-port solenoid valve

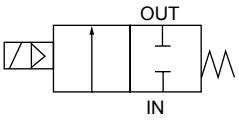
PVS Series

- NC (open when energized), NO (closed when energized)
- Working fluid: Steam/water/air
- Port size: Rc1/2, Rc3/4, Rc1, 32 to 80 flange

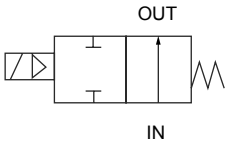
RoHS

JIS symbol

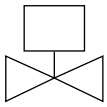
- NC (open when energized)



- NO (closed when energized)



Mounting orientation



Stable operation and long service life general purpose valve

- The use of a 3-port pilot valve enables stable operation
- Packless pipe double structure
- Short plunger stroke length
- NC (open when energized)/NO (closed when energized)

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	PVS-15A-210	PVS-20A-210	PVS-25A-210	PVS-32A-210	PVS-40A-210	PVS-50A-210	PVS-65A-210	PVS-80A-210
Working fluid	Steam/water/air							
Port size	Rc1/2	Rc3/4	Rc1	32 flange	40 flange	50 flange	65 flange	80 flange
Orifice size mm	15	20	25	32	40	50	65	80
Cv	3.1	5.4	10	22	30	48	68	100
Max. working pressure MPa	1.0 (≈150 psi, 10 bar)							
Working pressure differential MPa	0.05 (≈7.3 psi, 0.5 bar) to 1 (≈150 psi, 10 bar)							
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)							
Fluid temperature °C	5 (41°F) to 185 (365°F)							
Ambient temperature °C	0 (32°F) to 70 (158°F)							
Valve seat leakage cm^3/min	400 or less (at pneumatic pressure 0.05 to 1 MPa)					800 or less (at pneumatic pressure 0.05 to 1 MPa)		
Mounting orientation	Limited to vertical orientation with the coil on top.							
Weight kg	2.2	2.6	3.1	8.5	9.8	14.2	21.8	25.1
Electrical specifications								
Rated voltage	100 VAC 50/60 Hz, 200 VAC 50/60 Hz							
Apparent power VA When holding	37 [43]					85 [102]		
Apparent power VA When starting	130 [151]					300 [360]		
Power consumption W	29					70		
Thermal class	Class 180 (H)							

*1 : Values in [ ] are for NO.

How to order

PVS - 15A - 210 ○ - 4M - AC100V

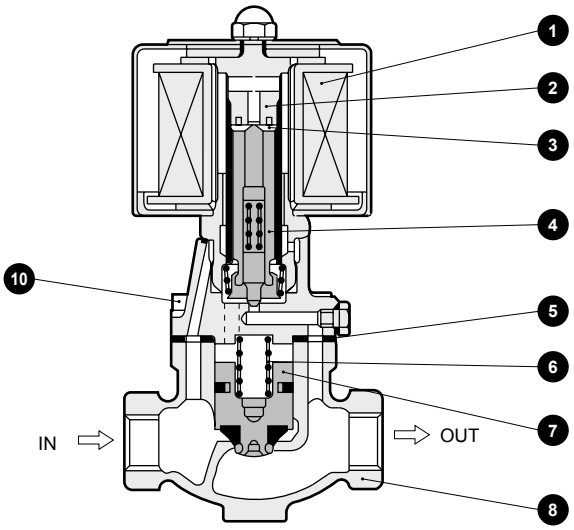
Ⓐ Port size
Ⓑ Actuation
Ⓒ Coil option
Ⓓ Voltage

Code	Description
Ⓐ Port size	
15A	Rc1/2
20A	Rc3/4
25A	Rc1
32A	32 flange
40A	40 flange
50A	50 flange
65A	65 flange
80A	80 flange
Ⓑ Actuation	
Blank	NC (open when energized)
NO	NO (closed when energized)
Ⓒ Coil option	
Blank	Open frame lead wire coil
4M	HP terminal box (G1/2)
4N	HP terminal box with lamp (G1/2)
Ⓓ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

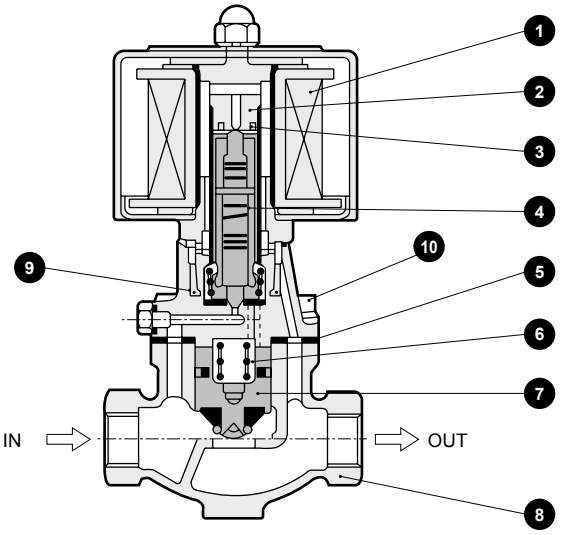
* Glands for terminal box are available. Contact CKD for details.

Internal structure and parts list

● NC (open when energized)
PVS-15A to 80A-210



● NO (closed when energized)
PVS-15A to 80A-210NO



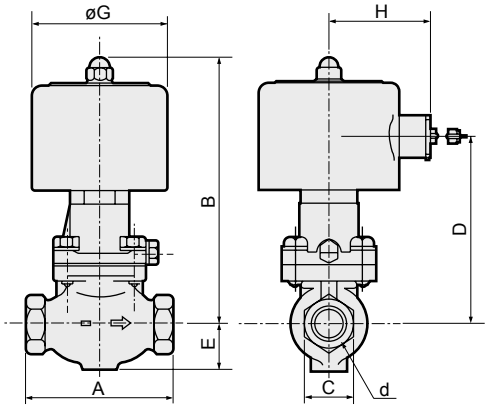
NO (closed when energized) keep the main valve open using the fluid pressure on the IN side when no current is applied.

No.	Part name	Material		No.	Part name	Material	
1	Coil	——	——	6	Spring *1	SUS304	Stainless steel
2	Core assembly	SUS405 or equiv.	Stainless steel	7	Main valve	SUS304/PTFE	Stainless steel Tetrafluoroethylene resin
3	Shading coil	C1100T	Copper	8	Body	CAC408	Bronze casting
4	Plunger	SUS405 or equiv.	Stainless steel	9	O-ring	FKM	Fluoro rubber
5	Gasket	PTFE	Tetrafluoroethylene resin	10	Bolt	SWRM	Steel

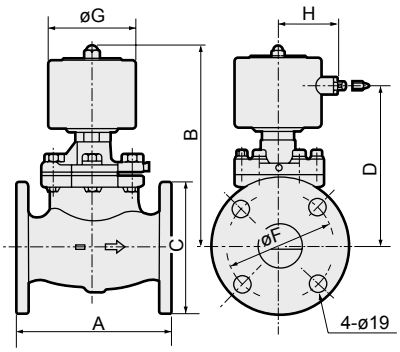
*1 : A spring is not available for 50A to 80A.
*2 : After an entire day of use, tighten the bolt again.

Dimensions

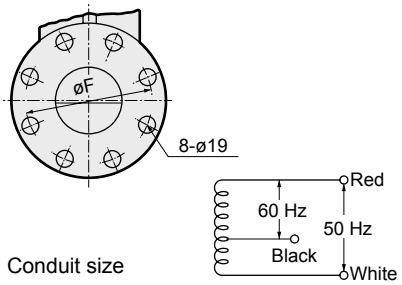
● PVS-15A to 25A-210



● PVS-32A to 80A-210



● PVS-80A-210



● Conduit size
Thin steel conduit thread
JIS C 8305 CTC19

● Lead wire

30/0.18 (0.75 mm²) silicone rubber insulated glass fiber braided wire	
Length	300 mm

* d is the port size (refer to the left page).

Model No.	A	B	C	D	E	F	G	H
PVS-15A-210	90	152	29	107	27	—	84	61
PVS-20A-210	100	159	35	114	31	—	84	61
PVS-25A-210	110	170	46	125	33	—	84	61
PVS-32A-210	170	181	135	136	—	100	84	61
PVS-40A-210	180	191	140	146	—	105	84	61
PVS-50A-210	180	237	155	177	—	120	100	69
PVS-65A-210	210	263	175	203	—	140	100	69
PVS-80A-210	240	290	185	230	—	150	100	69

Pilot kick 2-port solenoid valve for air

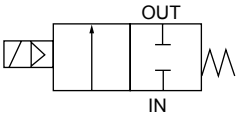
PKA Series

- NC (open when energized)
- Working fluid: Air
- Port size: Rc1/2, Rc3/4, Rc1, 32 to 50 flange

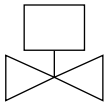
RoHS

JIS symbol

- NC (open when energized)



Mounting orientation



Operation is possible with zero differential pressure and also with low vacuum.

- Stable operation under both low and high pressures
- Operation is possible with zero differential pressure

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar, °F = 9/5°C + 32

Item	PKA-04-27	PKA-06-27	PKA-10-27	PKA-12-27	PKA-14-27	PKA-20-25
Working fluid	Air					
Port size	Rc1/2	Rc3/4	Rc1	32 flange	40 flange	50 flange
Orifice size mm	15	20	25	35	40	50
C[dm³/(s·bar)]	20	-	-	-	-	-
b	0.30	-	-	-	-	-
s(mm²)	-	128	220	404	552	883
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 0.7 (≈100 psi, 7 bar)					0 to 0.5
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)					1.0
Fluid temperature °C	5 (41°F) to 60 (140°F)					
Ambient temperature °C	0 (32°F) to 65 (149°F)			0 (32°F) to 45 (113°F)		0 to 40
Valve seat leakage cm³/min	1 or less. For stainless steel bodies, 400 or less. (*1)			2 or less (*1)		
Mounting orientation	Limited to vertical orientation with the coil on top.					
Weight kg	1.8	2.2	2.9	9	10	13
Electrical specifications						
Rated voltage	100 VAC 50/60 Hz, 200 VAC 50/60 Hz					
Apparent power VA When holding	30			75		90
Apparent power VA When starting	80			150		180
Power consumption W	22			57		68
Thermal class	Class 130 (B)					

*1 : For PKA-04 to 14, the value at pneumatic pressure 0.05 to 0.7 MPa is shown. For PKA-20, the value at pneumatic pressure 0.05 to 0.5 MPa is shown.
When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.

*2 : Effective cross-sectional area "S" and sonic conductance "C" are converted as S ≈ 5.0 x C.

How to order

PKA - 04 - 27 - C - 3M - AC100V

Fixed code (25 for PKA-20)

Ⓐ Port size

Ⓑ Body material

Ⓒ Coil option

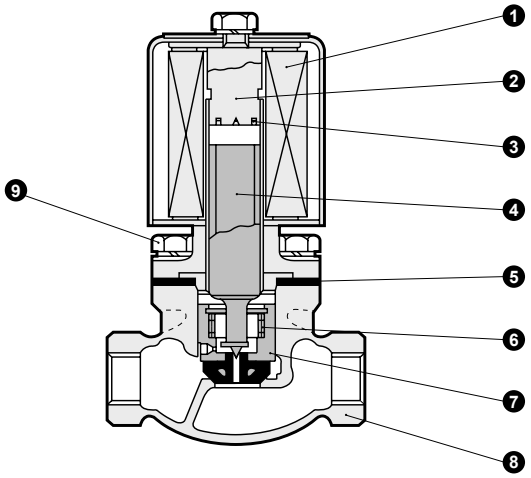
Ⓓ Voltage

Code	Description
Ⓐ Port size	
04	Rc1/2
06	Rc3/4
10	Rc1
12	32 flange
14	40 flange
20	50 flange
Ⓑ Body material	
Blank	Bronze
C (*3)	Stainless steel
Ⓒ Coil option	
Blank	Open frame lead wire coil
3M	HP terminal box (G1/2)
3N	HP terminal box with lamp (G1/2)
Ⓓ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

* Glands for terminal box are available. Contact CKD for details.

*3: For Item Ⓐ 12, 14, 20, stainless steel (Item Ⓑ C) is not available.

Internal structure and parts list

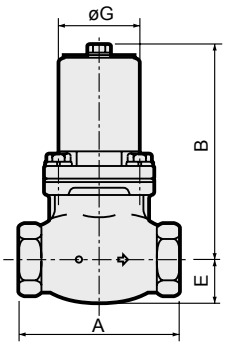


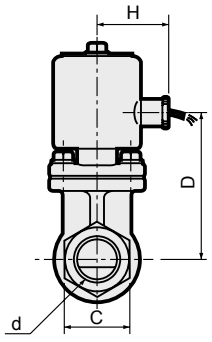
No.	Part name	Material		No.	Part name	Material	
1	Coil	-	-	6	Spring	SUS304	Stainless steel
2	Core assembly	SUS405 or equiv., SUS316L	Stainless steel	7	Main valve	C3604/NBR (SUS304, PTFE)	Copper alloy/nitrile rubber (Stainless steel, tetrafluoroethylene resin)
3	Shading coil	Cu(Ag)	Copper (silver)	8	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
4	Plunger	SUS405 or equiv.	Stainless steel	9	Bolt	SWRM(SUS304)	Steel (stainless steel)
5	Gasket	Inorganic fiber (PTFE)	- (Tetrafluoroethylene resin)				

Materials shown in ( ) are for stainless steel body.

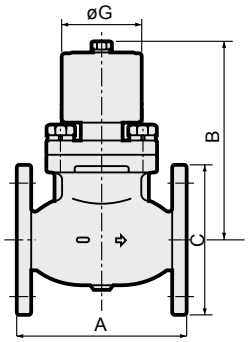
Dimensions

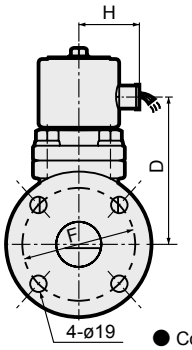
● PKA-04 to 10-27

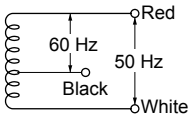




● PKA-12 to 20-27(25)







● Conduit size
Thin steel conduit thread
JIS C 8305 CTC19

● Lead wire

30/0.18 (0.75 mm²) heat resistant vinyl stranded wire	
Length	300 mm

* d is the port size (refer to the left page).

Model No.	A	B	C	D	E	F	G	H
PKA-04-27	90	126	29	88	23(27)	—	60	49
PKA-06-27	100	133	35	95	26(29)	—	60	49
PKA-10-27	110	145	44(46)	107	30(33)	—	60	49
PKA-12-27	170	180	135	128	—	100	84	66
PKA-14-27	180	185	140	133	—	105	84	66
PKA-20-25	180	205	155	155	—	120	84	66

Dimensions shown in ( ) are for stainless steel body.

Pilot kick 2-port solenoid valve for water

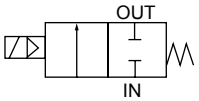
PKW Series

- NC (open when energized)
- Working fluid: Water
- Port size: Rc1/2, Rc3/4, Rc1, 32 to 50 flange

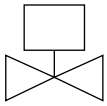
RoHS

JIS symbol

- NC (open when energized)



Mounting orientation



Operation is possible with zero differential pressure. Stainless steel body option is available.

- Stable operation under both low and high pressures
- Use in high humidity (95% or less) environment is possible
- Operation is possible with zero differential pressure

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar, °F = 9/5°C + 32

Item	PKW-04-27	PKW-06-27	PKW-10-27	PKW-12-27	PKW-14-27	PKW-20-25
Working fluid	Water					
Port size	Rc1/2	Rc3/4	Rc1	32 flange	40 flange	50 flange
Orifice size mm	15	20	25	35	40	50
Cv	4	7	12	22	30	48
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 0.7 (≈100 psi, 7 bar)					0 to 0.5
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)					1.0
Fluid temperature °C	5 (41°F) to 60 (140°F)					
Ambient temperature °C	0 (32°F) to 65 (149°F)			0 (32°F) to 45 (113°F)		0 to 40
Valve seat leakage cm^3/min	0 (at water pressure 0.05 to 0.7 (0.5) MPa). For stainless steel, 5 or less.					
Mounting orientation	Limited to vertical orientation with the coil on top.					
Weight kg	1.8	2.2	2.9	9	10	13
Electrical specifications						
Rated voltage	100 VAC 50/60 Hz, 200 VAC 50/60 Hz					
Apparent power VA When holding	30			75		90
Apparent power VA When starting	80			150		180
Power consumption W	22			57		68
Thermal class	Class 130 (B)					

*1 : When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.

How to order

PKW - 04 - 27 - C - 3M - AC100V

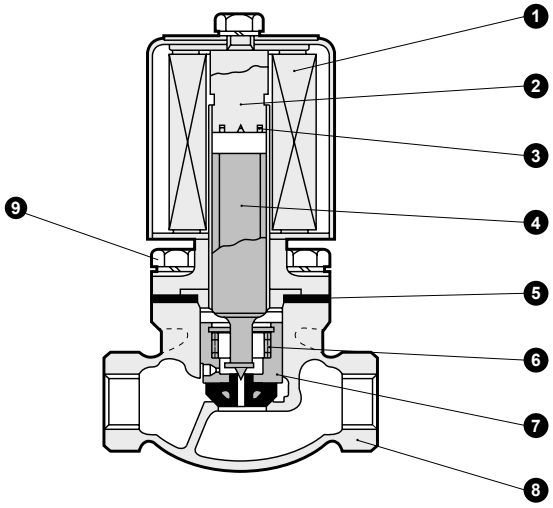
- 04 : Ⓐ Port size
- 27 : Fixed code (25 for PKW-20)
- C : Ⓑ Body material
- 3M : Ⓒ Coil option
- AC100V : Ⓓ Voltage

Code	Description
Ⓐ Port size	
04	Rc1/2
06	Rc3/4
10	Rc1
12	32 flange
14	40 flange
20	50 flange
Ⓑ Body material	
Blank	Bronze
C (*2)	Stainless steel
Ⓒ Coil option	
Blank	Open frame lead wire coil
3M	HP terminal box (G1/2)
3N	HP terminal box with lamp (G1/2)
Ⓓ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

* Glands for terminal box are available. Contact CKD for details.

*2: For Item Ⓐ 12, 14, 20, stainless steel (Item Ⓑ C) is not available.

Internal structure and parts list

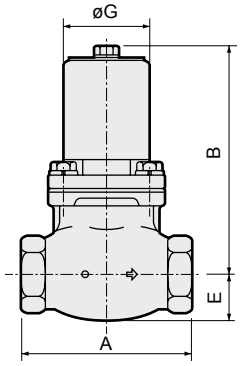


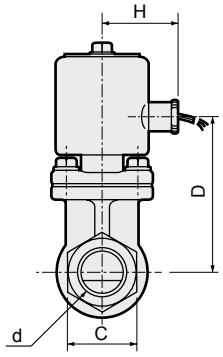
No.	Part name	Material		No.	Part name	Material	
1	Coil	-	-	6	Spring	SUS304	Stainless steel
2	Core assembly	SUS405 or equiv., SUS316L	Stainless steel	7	Main valve	C3604/NBR (SUS304, PTFE)	Copper alloy/nitrile rubber (Stainless steel, tetrafluoroethylene resin)
3	Shading coil	Cu(Ag)	Copper (silver)	8	Body	CAC408(SCS13)	Bronze casting (S.S. casting)
4	Plunger	SUS405 or equiv.	Stainless steel	9	Bolt	SWRM(SUS304)	Steel (stainless steel)
5	Gasket	Inorganic fiber (PTFE)	- (Tetrafluoroethylene resin)				

Materials shown in ( ) are for stainless steel body.

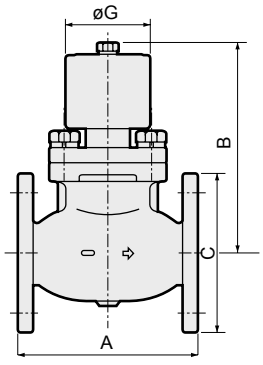
Dimensions

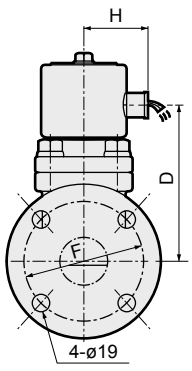
● PKW-04 to 10-27

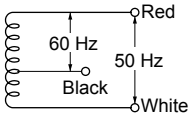




● PKW-12 to 20-27(25)







● Conduit size
Thin steel conduit thread
JIS C 8305 CTC19

● Lead wire

30/0.18 (0.75 mm²) heat resistant vinyl stranded wire	
Length	300 mm

* d is the port size (refer to the left page).

Model No.	A	B	C	D	E	F	G	H
PKW-04-27	90	126	29	88	23(27)	—	60	49
PKW-06-27	100	133	35	95	26(29)	—	60	49
PKW-10-27	110	145	44(46)	107	30(33)	—	60	49
PKW-12-27	170	180	135	128	—	100	84	66
PKW-14-27	180	185	140	133	—	105	84	66
PKW-20-25	180	205	155	155	—	120	84	66

Dimensions shown in ( ) are for stainless steel body.

Pilot kick 2-port solenoid valve for steam

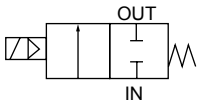
PKS Series

- NC (open when energized)
- Working fluid: Steam
- Port size: Rc1/2, Rc3/4, Rc1, 32 to 50 flange

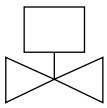
RoHS

JIS symbol

- NC (open when energized)



Mounting orientation



Operation is possible with zero differential pressure.

- Stable operation under both low and high pressures
- Operation is possible with zero differential pressure

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar, °F = 9/5°C + 32

Item	PKS-04-27	PKS-06-27	PKS-10-27	PKS-12-27	PKS-14-27	PKS-20-25
Working fluid	Steam					
Port size	Rc1/2	Rc3/4	Rc1	32 flange	40 flange	50 flange
Orifice size mm	15	20	25	35	40	50
Cv	4	7	12	22	30	48
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 0.7 (≈100 psi, 7 bar)					0 to 0.5
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)					1.0
Fluid temperature °C	5 (41°F) to 175 (347°F)					5 to 160
Ambient temperature °C	0 (32°F) to 70 (158°F)					
Valve seat leakage cm^3/min	400 or less [at pneumatic pressure 0.05 to 0.7 (0.5) MPa]					
Mounting orientation	Limited to vertical orientation with the coil on top.					
Weight kg	1.8	2.2	2.9	9	10	13
Electrical specifications						
Rated voltage	100 VAC 50/60 Hz, 200 VAC 50/60 Hz					
Apparent power VA When holding	30			75		90
Apparent power VA When starting	80			150		180
Power consumption W	22			60		61
Thermal class	Class 180 (H)					

Note: When used at a pressure less than 0.05 MPa, the sealant may be unstable. Contact CKD in this case.

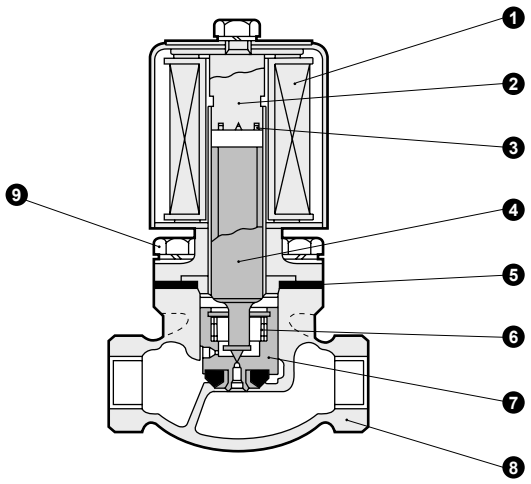
How to order

PKS - 04 - 27 - 4M - AC100V

- 27: Fixed code (25 for PKS-20)
- 04: Ⓐ Port size
- 4M: Ⓑ Coil option
- AC100V: Ⓒ Voltage

Code	Description
Ⓐ Port size	
04	Rc1/2
06	Rc3/4
10	Rc1
12	32 flange
14	40 flange
20	50 flange
Ⓑ Coil option	
Blank	Open frame lead wire coil
4M	HP terminal box (G1/2)
4N	HP terminal box with lamp (G1/2)
Ⓒ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

Internal structure and parts list

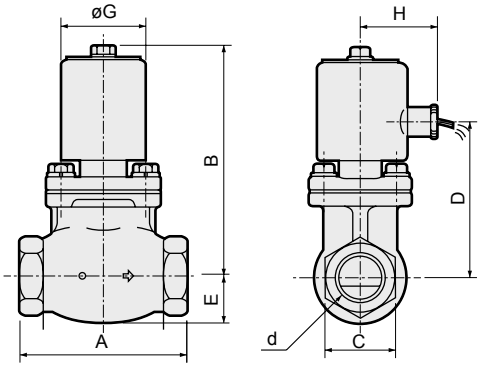


No.	Part name	Material		No.	Part name	Material	
1	Coil	-	-	6	Spring	SUS304	Stainless steel
2	Core assembly	SUS405 or equiv., SUS316L	Stainless steel	7	Main valve	SUS304/PTFE	Stainless steel Tetrafluoroethylene resin
3	Shading coil	Cu	Copper	8	Body	CAC408	Bronze
4	Plunger	SUS405 or equiv.	Stainless steel	9	Bolt	SWRM	Steel
5	Gasket	PTFE	Tetrafluoroethylene resin				

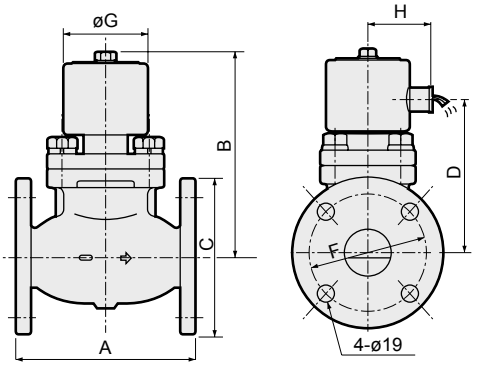
*1 : After an entire day of use, tighten the bolt again.

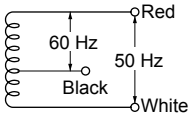
Dimensions

● PKS-04 to 10-27



● PKS-12 to 20-27(25)





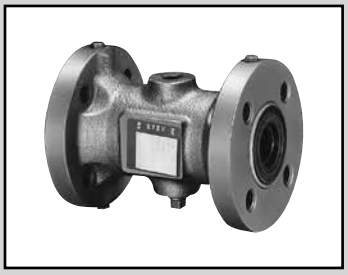
● Conduit size
Thin steel conduit thread
JIS C 8305 CTC19

● Lead wire

30/0.18 (0.75 mm²) silicone insulated glass fiber braided wire	
Length	300 mm

* d is the port size (refer to the left page).

Model No.	A	B	C	D	E	F	G	H
PKS-04-27	90	126	29	88	23	—	60	49
PKS-06-27	100	133	35	95	26	—	60	49
PKS-10-27	110	145	44	107	30	—	60	49
PKS-12-27	170	180	135	128	—	100	84	66
PKS-14-27	180	185	140	133	—	105	84	66
PKS-20-25	180	205	155	155	—	120	84	66



Direct pressure automatic pinch valve

NPV2 Series

- Working fluid: Gas/water/sludge/powder
- Port size: 25 to 100 flange (JIS10K)

For various fluids including gas, water, sludge, powder, etc.

- Completely closed structure, explosion-proof available
- Zero fluid resistance and no clogging
- Won't clog even with solids
- Vibration/noise absorption by using a rubber sleeve.
- Flange packing seal not required

Specifications

Item		NPV2-25A-N	NPV2-40A-N	NPV2-50A-N	NPV2-65A-N	NPV2-80A-N	NPV2-100A-N
Working fluid		Gas/water/sludge/powder/non-corrosive fluids (refer to Intro Page 39 for details.)					
Connection		25 flange	40 flange	50 flange	65 flange	80 flange	100 flange
Bore size	mm	25	40	50	65	80	98
Cv		35	90	150	250	390	627
Working pressure	MPa	0.05 (≈7.3 psi, 0.5 bar) to 0.4 (≈58 psi, 4 bar)					
Proof pressure	MPa	1.0 (≈150 psi, 10 bar)					
Operating pressure	MPa	0.2 (≈29 psi, 2 bar) to 0.3 (≈44 psi, 3 bar) higher than working pressure					
Fluid temperature	°C	5 (41°F) to 60 (140°F)					
Mounting orientation		Unrestricted					
Weight	kg	4.6	5.9	7.1	9.7	11.8	16.8

*1 : Set the lowest operating pressure possible that does not cause leakage.
*2 : When the secondary side is open, be sure to fasten the sleeve using a companion flange.

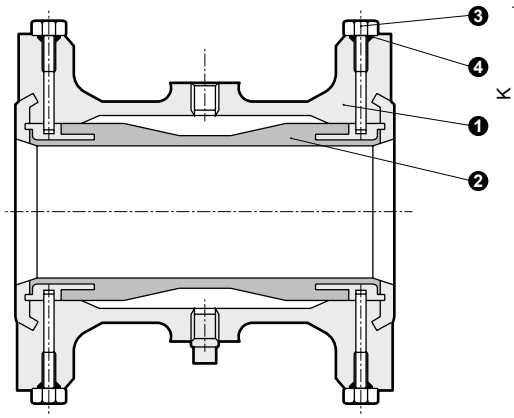
How to order

NPV2 - 25A - N

Model No. Ⓐ Port size Ⓑ Rubber sleeve material

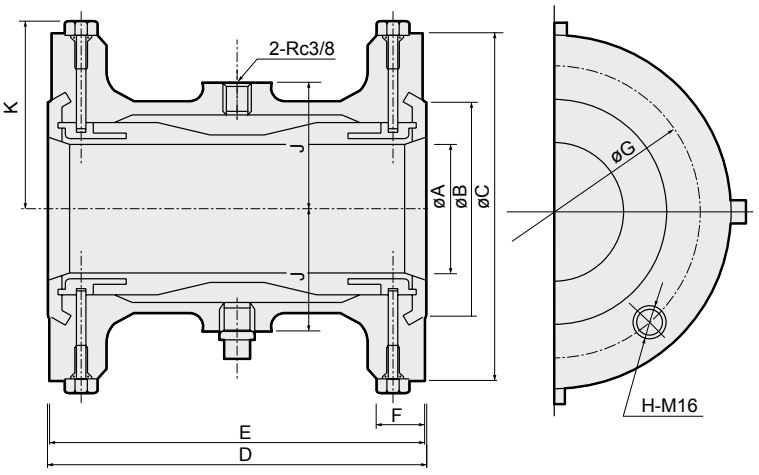
Code	Description
Ⓐ Port size	
25A	25 flange
40A	40 flange
50A	50 flange
65A	65 flange
80A	80 flange
100A	100 flange
Ⓑ Rubber sleeve material	
N	Chloroprene rubber

Internal structure and parts list



No.	Part name	Material	
1	Body	FC250	Cast iron
2	Sleeve	CR	Chloroprene rubber
3	Bolt	SUS304	Stainless steel
4	O-ring	NBR	Nitrile rubber

Dimensions



Model No.	A	B	C	D	E	F	G	H	J	K
NPV2-25A	25	63	125	161	160	18	90	4	43	66
NPV2-40A	40	75	140	161	160	20	105	4	49	75
NPV2-50A	50	90	155	171	170	20	120	4	55	82
NPV2-65A	65	109	175	186.5	185	22	140	4	63	94
NPV2-80A	80	121	185	231.5	230	22	150	8	78	97
NPV2-100A	98	147	210	286.5	285	24	175	8	89	111

Manual pinch valve

HPV Series

- Working fluid: Water/sludge/powder
- Port size: 25 to 100 flange (JIS10K)

For various fluids including water, sludge, powder, etc.

- Completely closed structure
- Zero fluid resistance and no clogging
- Won't clog even with solids
- Consumables are rubber sleeve only
- Flange packing seal not required

Specifications

Item		HPV-25A	HPV-40A	HPV-50A	HPV-65A	HPV-80A	HPV-100A
Working fluid		Water/sludge/powder/non-corrosive fluids (refer to Intro Page 39 for details.)					
Connection		25 flange	40 flange	50 flange	65 flange	80 flange	100 flange
Bore size	mm	25	40	50	65	80	100
Cv		35	90	200	350	490	620
Proof pressure	MPa	1.0 (≈150 psi, 10 bar)					
Working pressure	MPa	0.05 (≈7.3 psi, 0.5 bar) to 0.5 (≈73 psi, 5 bar)					
Fluid temperature	°C	5 (41°F) to 60 (140°F)					

*1 : Use in the fully open or fully closed position.
*2 : When the secondary side is open, be sure to fasten the sleeve using a companion flange.

How to order

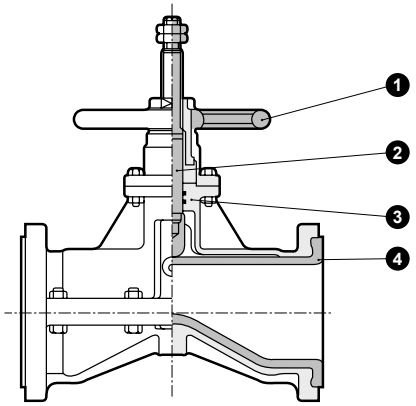
HPV - 25A - T

Ⓐ Port size

Ⓑ Rubber sleeve material

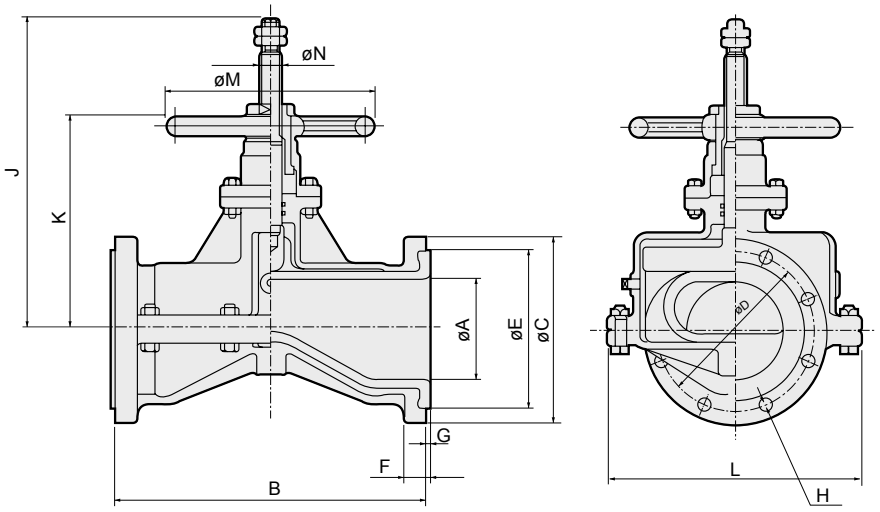
Code	Description
Ⓐ Port size	
25A	25 flange
40A	40 flange
50A	50 flange
65A	65 flange
80A	80 flange
100A	100 flange
Ⓑ Rubber sleeve material	
T	Natural rubber
N	Chloroprene rubber

Internal structure and parts list



No.	Part name	Material	
1	Handle	FC250	Cast iron
2	Stem	SUS403	Stainless steel
3	Body	FC250	Cast iron
4	Sleeve	Natural rubber or chloroprene rubber	

Dimensions



Model No.	A	B	Flange						J	K	L	M	N
			C	D	E	F	G	H					
HPV-25A	25	149	125	90	70	16	3	4-ø19	202	139	126	160	18
HPV-40A	40	184	140	105	85	18	3	4-ø19	249	168	167	180	20
HPV-50A	50	211	155	120	100	18	4.5	4-ø19	269	181	203	180	20
HPV-65A	65	260	175	140	120	18	5	4-ø19	324	210	234	200	22
HPV-80A	80	289	185	150	130	18	5.5	8-ø19	363	240	261	224	24
HPV-100A	100	338	210	175	155	20	6	8-ø19	421	272	294	280	28

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

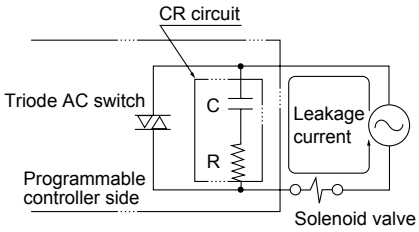
Pilot operated solenoid valve SPK Series for steam

⚠CAUTION Design/selection

■ Leakage current from other fluid control components

● When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.

Voltage / Model No.	AC	
	100 V	200 V
SPK	6 mA or less	3 mA or less



⚠CAUTION Mounting, installation and adjustment

■ Mounting

(1) As a general rule, the mounting orientation is vertical, with the coil on top.

■ Piping

(1) If the pipe vibrates when the solenoid valve is opened and closed, securely fix the piping.
(2) Steam generated from a boiler will contain a large amount of drainage. Always install a drain trap.
(3) When passing steam, the make-up water in the boiler will contain substances such as "calcium salt" and "magnesium salt". As these substances will react with oxygen and carbon dioxide, and cause scales and sludge to form, always install a "water softener" and a filter for steam.
(4) When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.
(5) If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. For the fluid inlet, use piping of a piping size that matches the port size of the valve. Do not use a needle valve.

⚠CAUTION Use/maintenance

■ Sudden leakage

● With the pilot operated or pilot kick 2-port valve, if the pressure is suddenly applied while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.

■ Operation

● Do not apply back pressure. This could lead to malfunction.

■ Thermal insulation cover

● Use an insulating cover structure that can be disassembled for maintenance purposes.
Avoid placing an insulating cover on the entire solenoid valve or on the coil section. The coil could burn.

● Tightening torque

● When disassembling or assembling, tighten the body bolt, core assembly and nut with the following tightening torques.
When tightening body bolts, do not tighten each bolt in one go; instead, take several turns to complete the tightening of each bolt, tightening the bolts across from each other.
After the assembly is completed, apply steam pressure to check for leakage.

		Body bolt tightening torque	Core assembly tightening torque	Nut tightening torque
SPK11	15A 20A	7 to 8 Nm	50 to 80 Nm	8 to 16 Nm
	25A	15 to 19 Nm		

Mounting, installation and adjustment

1. Installation

⚠CAUTION

■Be sure to read the instruction manual thoroughly before installing the product.

■Do not apply external force to the coil during installation.

■When installing the valve, make sure that no tension is applied to the coil lead wire.

■When carrying the product, hold the body. (Do not dangle the product from the lead wire when carrying it.)

■After installation, check for leaks from pipes, for proper wire connections and that the product is installed correctly.

2. Piping

⚠CAUTION

■Observe the effective thread length for the piping threads. Chamfer the end of the thread section by approx. a half-pitch.

■Before piping, flush the inside of the pipe with 0.3 MPa of air, and remove foreign matter such as dirt, metal chips, rust and sealing tape.

■If excessive sealant (sealing tape, gel-type sealant) is applied when piping, it could enter the product and cause malfunctions.

■When applying or wrapping sealant on the piping material, apply or wind it from the pipe end along the thread section, and leave 1.5 to 2 threads uncovered.

■Dirt or foreign matter in fluid could prevent the product from functioning correctly. As a guideline, install an 80 mesh or more filter for water flow.

■Make sure not to use the wrong supply port when connecting the pipes to the product.

■Install a by-pass circuit and use an elbow union for piping to simplify the maintenance and repair work.

■When controlling fluid in a tank, pipe at a level slightly above the bottom of the tank so that the foreign matter accumulated at the bottom does not flow out.

■If the pipe vibrates when the solenoid valve is opened and closed, securely fix the piping.

■For steam fluids, steam generated from a boiler will contain a large amount of drainage. Always install a drain trap.

■For steam fluids, the make-up water in the boiler will contain substances such as “calcium salt” and “magnesium salt”. As these substances will react with oxygen and carbon gas, and cause scales and sludge to form, always install a “water softener” and a filter for steam.

■When the regulator and solenoid valve are directly coupled, the parts could mutually vibrate, causing resonance and chattering.

■If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to differential pressure failure during valve operation. For the fluid inlet, use piping of a piping size that matches the port size of the valve. Do not use a needle valve.

■Thermal insulation cover

When using an insulating cover for piping, use an insulating cover structure that can be disassembled for maintenance purposes. Avoid placing an insulating cover on the entire solenoid valve or on the coil section. The coil could burn.

■Refer to the table below for the piping tightening torque.

Piping nominal diameter	Recommended piping tightening torque (Nm)
Rc1/4	23 to 25
Rc3/8	31 to 33
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86
Rc1 1/4	97 to 100
Rc1 1/2	104 to 108
Rc2	132 to 136

3. Wiring

⚠CAUTION

■For 200 VAC wiring, never wire with the blue wire (100 VAC). The coil could burn.

■Use with the allowable voltage range. Usage outside the allowable voltage range may lead to malfunction or coil damage.

■Provide a circuit breaker, such as a fuse, on the control circuit to protect electrical equipment.

■If the electric circuit system is vulnerable to solenoid surge, insert a surge absorber in parallel to the solenoid.

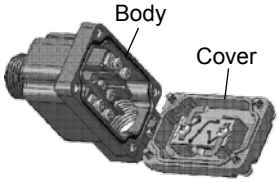
■As a guide, use a wire with a nominal cross section of 0.5 mm^2 or more. Make sure that excessive force is not applied to the lead wire.

■Use of a switching circuit which does not generate contact chattering will increase the durability of the solenoid valves and motor driven valves.

■How to connect HP terminal box

● Mounting

·Install this product in a place not subject to vibration.
·Secure sufficient space for maintenance and repair work.



● Wiring

·Provide a circuit breaker, such as a fuse, on the control circuit.
·Use a wire with a nominal cross section of 0.5 mm^2 or more.
·Protect the wiring with a conduit if required. When attaching the conduit fitting, fix by holding the width across flats of the terminal box body.
·For terminal box wiring, use a round crimp terminal for copper wire (JIS C2805 R1.25-3).
·The tightening torque of terminal screws and cover fixing screws is 0.5 N·m.
·The structure uses position locking to keep the cover from detaching from the body. Note that the cover may be damaged if load is applied to it while it is open.

Use/maintenance

1. When using the product

⚠CAUTION

■Sudden leakage

With the pilot operated 2-port valve, if the pressure is suddenly applied when the pump starts while the valve is closed, the valve may open for an instant causing fluid to leak. Caution is required during use.

■Operation

Do not apply back pressure. This could lead to malfunction.

■Water hammer

If the water hammer poses problems, consider using the CKD “RSV type” solenoid valve or a motor valve.

2. Maintenance and inspection

⚠WARNING

■Do not touch coils or actuators with hands or body while the power is ON or immediately after it is turned OFF.

The solenoid valve coil and actuator will heat up when energized. Depending on the product, direct contact could cause burns and so use caution.

■Do not touch the electrical wiring connections (bare, live parts) with hands or body when they are energized. There is a risk of electric shock.

Touching electrical wiring connections while power is on may lead to electrical shock. When disassembling or assembling, make sure to turn the power OFF in advance.

■Use this product under the max. working pressure and max. working pressure differential.

■To ensure ideal use, inspect the product every six months. This frequency varies with the frequency of use.

⚠CAUTION

■Do not use valves as footing or place any heavy objects on top of the valves.

■If you use the products under a continuously energized state or infrequently, contact CKD.

■If the product has been out of use for one month or more, perform a test run before starting the actual operation.

■Carefully read the instruction manual before starting maintenance.

■Always turn the power OFF and release any fluids or pressure before starting maintenance.

■Pay attention to clogging of the strainer and filter.

3. Disassembly/assembly

⚠CAUTION

■When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent. (Note that the rubber parts must be replaced. There is a risk of expansion.)

■When the product will not be used for one month or more after using water or hot water, completely remove any water or hot water left in the product. Water or hot water residue will cause rusting and may lead to malfunction or leaks.

If residual water cannot be eliminated, operate the valve several times a day and pass water through to ensure optimum use.

■Contact CKD with questions about repair parts, etc.

■Tightening torque

When disassembling or assembling, tighten the body bolt, core assembly and nut with the following tightening torques.

		Body bolt tightening torque	Core assembly tightening torque	Nut tightening torque
KZV3	8A 10A	3 to 4 Nm	45 to 60 Nm	8 to 16 Nm
	15A 20A	5 to 7 Nm		
	25A	9 to 12 Nm		
	32A 40A 50A	18 to 28 Nm		

SWD/MWD

Weir diaphragm valve

■ **Water/pure water/chemical liquids**

Overview

Weir diaphragm valve ideal for controlling a variety of fluids in medical and pharmaceutical manufacturing processes where high sterility is required.
Internal fixed parts can be washed and steam sterilized without removing the piping.
Air operated valve SWD and manual MWD are available.

Features

Structural design that prevents accumulation of liquids
The pocket between the body and diaphragm is eliminated and the growth of bacteria is prevented with a structure that prevents accumulation of liquids.

High replaceability
Dead space where fluids can stagnate is small, washing replaceability is high, and high-level cleaning can be done in a short time.

Maintainability
Replaceability is greatly improved by the positioning mechanism and thin film of its original diaphragm.

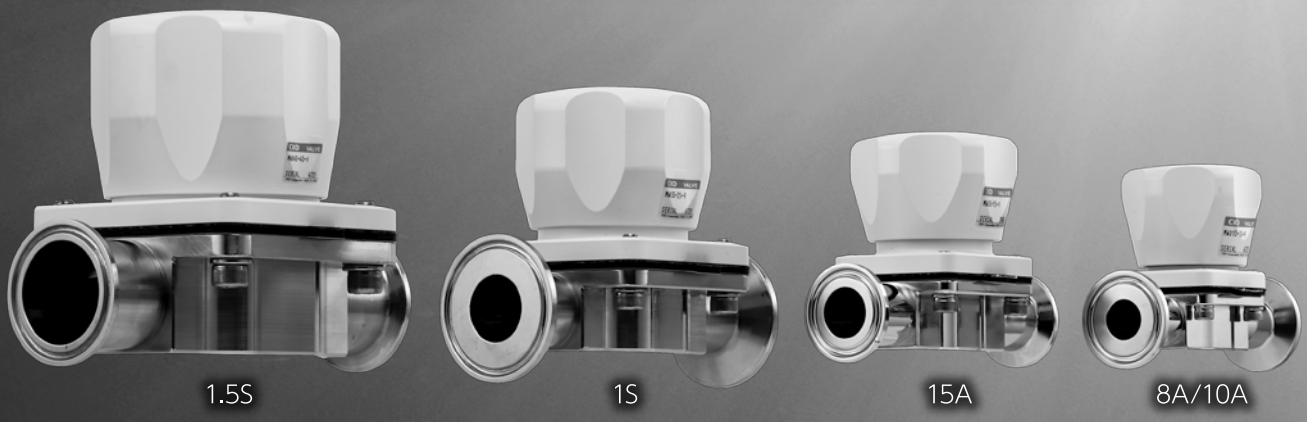
Compact
Air operated SWD has downsized the cylinder part by using thin film for the diaphragm. Manual MWD also contributes to the space saving of equipment and facilities by adopting a compact handle.

CONTENTS

⚠ Always read the precautions in the Introduction and on page 821 before use.

Perfect for strict cleanliness. Easier to use.

New lineup of manual MWD Series.
Wide piping bore size variation allows for selection to suit the usage sites of various devices.



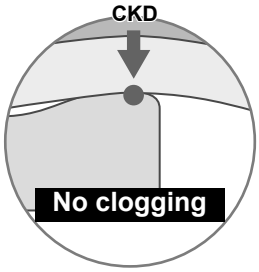
Manual MWD Series

The 3 key points to achieving excellent cleanliness and ease of use

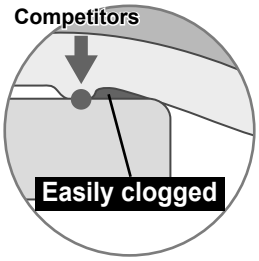
1 Clean

Realizing highly aseptic conditions

The external seal of the diaphragm periphery adopts a flat structure eliminating the pocket between the diaphragm and body. There is no residual fluid in the pocket, so the valve stays cleaner.



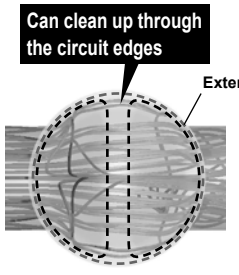
SWD/MWD Series



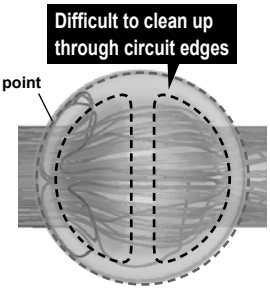
If using an external seal with a protruding diaphragm

High replaceability reduces cleaning time

Designed to have little dead space in which fluid may be trapped, allowing the circuit to be thoroughly cleaned. The high liquid replaceability contributes to reduced cleaning time.



SWD/MWD Series



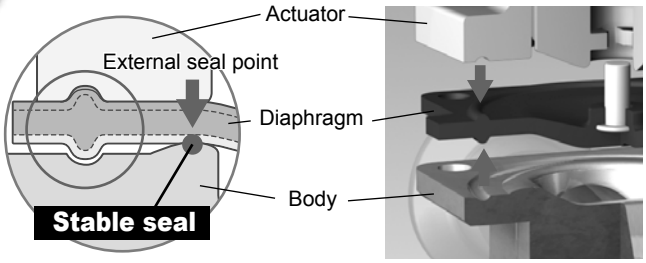
If using an external seal with a protruding diaphragm

Air operated SWD Series

2 Maintainability

Realizes a reduction in maintenance time

Using a more appropriate diaphragm makes its replacement easy and allows secure positioning of the diaphragm with a unique mechanism.
Retains an easily assembled and secure seal to realize a reduction in maintenance time.



Groove matching positioning allows a stable seal

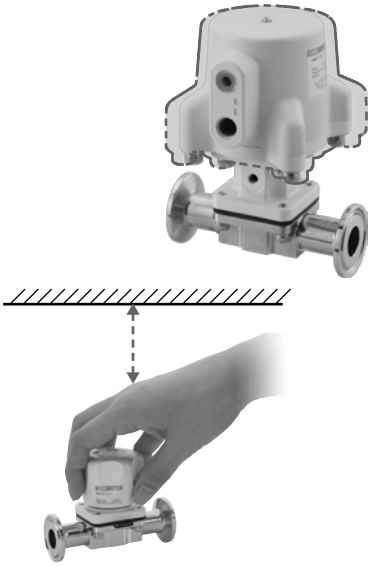
3 Compact

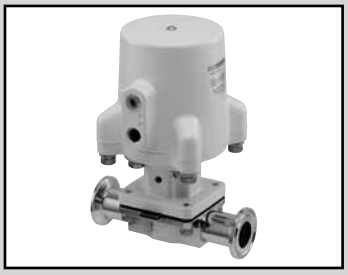
Improved freedom in device design (air operated)

Years of pneumatic cylinder production have created unique technology, with which we keep the actuator compact in relation to the valve bore size.
This contributes to equipment/facility space saving.

Secures maintenance space (manual)

Adopts a compact manual handle to secure sufficient space within the device, making valve operation easier.





Weir diaphragm valve Air operated

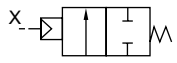
SWD Series

● Connection: ISO ferrule

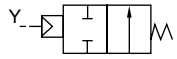
RoHS CAD

JIS symbol

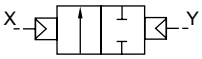
● NC



● NO



● Double acting



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			SWD*1	SWD*2	SWD*3
Actuation			NC	NO	Double acting
Working fluid			Water, pure water, chemical liquids (fluids that do not corrode wetted part materials)		
Fluid temperature		°C	5 (41°F) to 90 (194°F) (During steam sterilization 130°C (266°F), allowable for 20 minutes or less)		
Proof pressure		MPa	2.0 (≈290 psi, 20 bar)		
Working pressure		MPa	0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)		
Valve seat leakage		cm^3/min	0 (water pressure)		
Ambient temperature		°C	0 (32°F) to 60 (140°F)		
Frequency		Cycle/min.	20		
Operating port			Rc1/8		
Operating pressure	SWD1*-8	MPa	0.35 (≈51 psi) to 0.7 (≈100 psi)	0.25 (≈36 psi) to 0.35 (≈51 psi)	0.2 (≈29 psi) to 0.3 (≈44 psi)
	SWD1*-10				
	SWD2*-15				
	SWD3*-25		0.4 to 0.7	0.3 to 0.35	0.25 to 0.3
	SWD4*-40			0.35 to 0.4	0.3 to 0.35
Cv	SWD1*-8		2.3		
	SWD1*-10		2.6		
	SWD2*-15		4.5		
	SWD3*-25		13		
	SWD4*-40		27		
Material	Diaphragm		PTFE/EPDM		
	Body		SUS316L (buff polishing #400 or equiv., electrolytic polishing)		
	Actuator		ADC12 (fluoro resin coating)		

How to order

SWD 1 1 - 8 - F

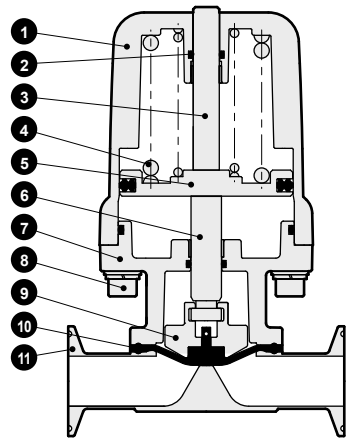
- Model No.
- Ⓐ Series
- Ⓑ Actuation
- Ⓒ Port size
- Ⓓ Actuator/diaphragm/body material combination

Code	Description	Model No. SWD1	SWD2	SWD3	SWD4
Ⓐ Series					
1	Size 1	●			
2	Size 2		●		
3	Size 3			●	
4	Size 4				●
Ⓑ Actuation					
1	NC	●	●	●	●
2	NO	●	●	●	●
3	Double acting	●	●	●	●
Ⓒ Port size					
8	Clamp fitting 8A	●			
10	Clamp fitting 10A	●			
15	Clamp fitting 15A		●		
25	Clamp fitting 25A (1S)			●	
40	Clamp fitting 40A (1.5S)				●

Ⓓ Actuator/diaphragm/body material combination

	Actuator	Diaphragm	Body				
F	ADC12	PTFE/EPDM	SUS316L	●	●	●	●

Internal structure and parts list

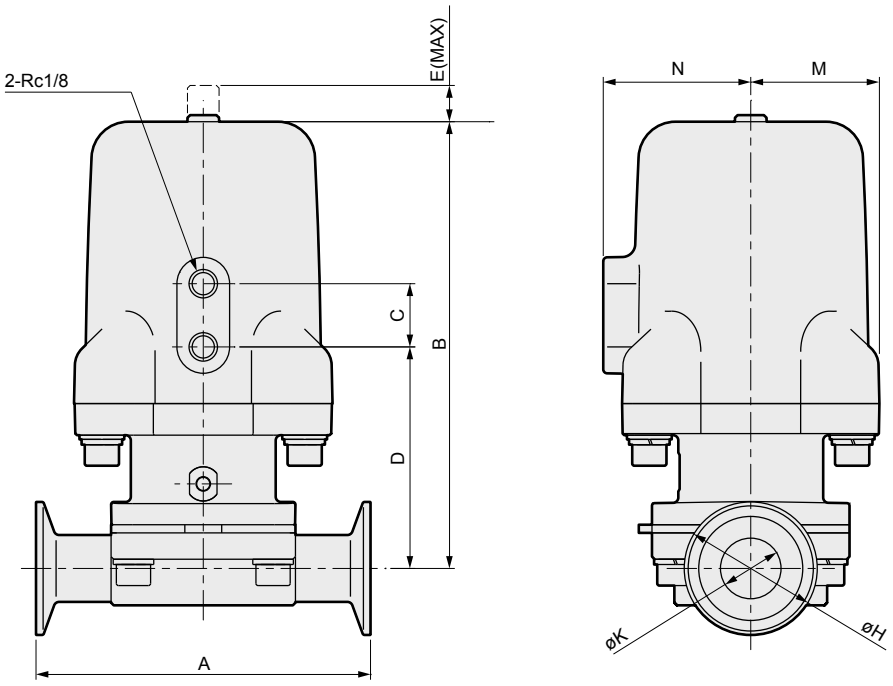


No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	O-ring	FKM	Fluoro rubber
3	Indicator	SUS304	Stainless steel
4	Spring	SUS304 (or SWP)	Stainless steel or piano wire
5	Piston	A2017	Aluminum
6	Piston rod	SUS304	Stainless steel
7	Rod cover, yoke	ADC12	Aluminum die-casting
8	Hexagon socket head cap screw	SUS304, SUSXM7	Stainless steel
9	Compressor	SCS13	Stainless steel
10	Diaphragm	PTFE, EPDM, SUS303, SUS304	Fluoro resin, ethylene propylene rubber, stainless steel
11	Body	SUS316L	Stainless steel

* For repair parts, refer to page 820.
Wetted parts material are of two types: PTFE (diaphragm), SUS316L (body).

Dimensions

● SWD



Model No.	A	B	C	D	E	H	K	M	N
SWD1*-8-F	90	99.5	22	60	7	34	10.5	32	40
SWD1*-10-F	90	101	22	61.5	7	34	14	32	40
SWD2*-15-F	108	130	22	73	8.5	34	17.5	38	46.5
SWD3*-25-F	127	170	24	84	12.5	50.5	23	49	56
SWD4*-40-F	159	212	28	97	16.5	50.5	35.7	57	66

Weir diaphragm valve Manual

MWD Series

● Connection: ISO ferrule

RoHS CAD

Specifications

Item			MWD10-8	MWD10-10	MWD20-15	MWD30-25	MWD40-40
Working fluid			Water, pure water, chemical liquids (fluids that do not corrode wetted part materials)				
Fluid temperature		°C	5 (41°F) to 90 (194°F) (During steam sterilization 130°C (266°F), allowable for 20 minutes or less)				
Proof pressure		MPa	2.0 (≈290 psi, 20 bar)				
Working pressure		MPa	0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)				
Valve seat leakage		cm^3/min	0 (water pressure)				
Ambient temperature		°C	0 (32°F) to 60 (140°F)				
Cv			2.3	2.6	4.5	13	27
Operating section	Operating torque	N·m	0.7 to 1.1	0.7 to 1.1	1.0 to 1.5	1.7 to 3.0	3.0 to 4.0
Material	Diaphragm		PTFE/EPDM				
	Body		SUS316L (buff polishing #400 or equiv., electrolytic polishing)				
	Actuator		A5056 (fluoro resin coating)				

How to order

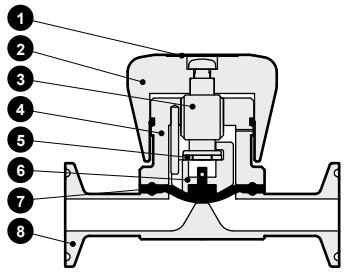
MWD **1** **0** - **8** - **F**

- Model No.
- Ⓐ Series
- Ⓑ Port size
- Ⓒ Actuator/diaphragm/body material combination

Code	Description	Model No. MWD1	MWD2	MWD3	MWD4
Ⓐ Series					
1	Size 1	●			
2	Size 2		●		
3	Size 3			●	
4	Size 4				●
Ⓑ Port size					
8	Clamp fitting 8A	●			
10	Clamp fitting 10A	●			
15	Clamp fitting 15A		●		
25	Clamp fitting 25A (1S)			●	
40	Clamp fitting 40A (1.5S)				●

Ⓒ Actuator/diaphragm/body material combination							
	Actuator	Diaphragm	Body				
F	A5056	PTFE/EPDM	SUS316L	●	●	●	●

Internal structure and parts list

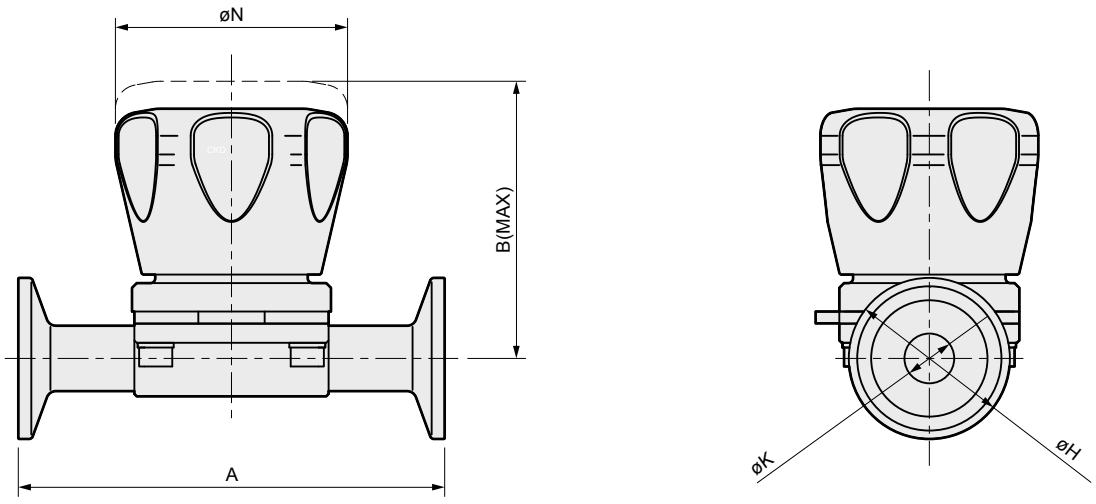


No.	Part name	Material	
1	Indicator	PET	Polyethylene terephthalate
2	Handle	A5056	Aluminum
3	Rod	SUS304	Stainless steel
4	Bonnet	A5056	Aluminum
5	Bearing	-	-
6	Compressor	SCS13	Stainless steel
7	Diaphragm	PTFE, EPDM, SUS303, SUS304	Fluoro resin, ethylene propylene rubber, stainless steel
8	Body	SUS316L	Stainless steel

* For repair parts, refer to page 820.
Wetted parts material are of two types: PTFE (diaphragm), SUS316L (body).

Dimensions

● MWD



Model No.	A	B	H	K	N
MWD10-8-F	90	58.5	34	10.5	49
MWD10-10-F	90	60.7	34	14	49
MWD20-15-F	108	71.5	34	17.5	59
MWD30-25-F	127	88.7	50.5	23	69
MWD40-40-F	159	107.6	50.5	35.7	89

Weir diaphragm valve Manual
Spring seal

MWD-S Series

● Connection: ISO ferrule

Made-to-order product

RoHS

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			MWD10-8	MWD10-10	MWD20-15	MWD30-25	MWD40-40
Working fluid			Water, pure water, chemical liquids (fluids that do not corrode wetted part materials)				
Fluid temperature		°C	5 (41°F) to 90 (194°F) (during steam sterilization 130°C (266°F), allowable for 20 minutes or less)				
Proof pressure		MPa	2.0 (≈290 psi, 20 bar)				
Working pressure		MPa	0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)				
Valve seat leakage		cm^3/min	0 (water pressure)				
Ambient temperature		°C	0 (32°F) to 60 (140°F)				
Cv			2.3	2.6	4.5	13	27
Material	Diaphragm		PTFE/EPDM				
	Body		SUS316L (buff polishing #400 or equiv., electrolytic polishing)				
	Actuator		A5056 (fluoro resin coating)				

How to order

MWD 1 0- 8 - F - S

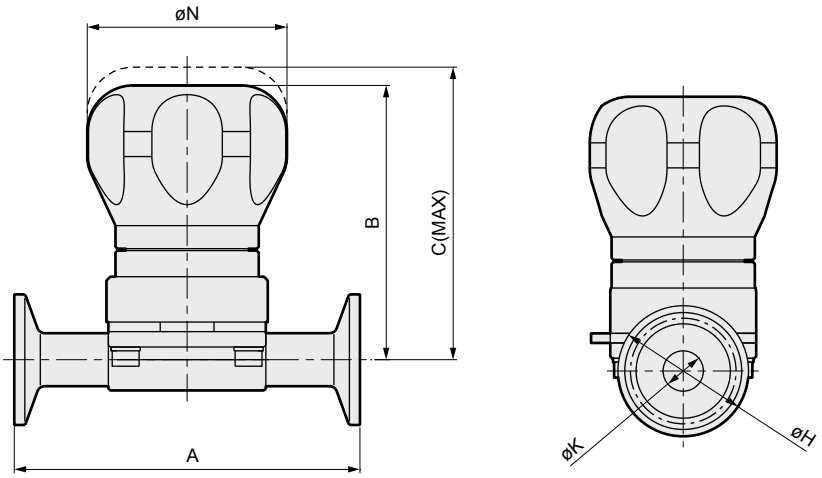
- 1: Model No.
- 0: Ⓐ Series
- 8: Ⓑ Port size
- F: Ⓒ Actuator/diaphragm/body material combination

Code	Description	Model No. MWD1	MWD2	MWD3	MWD4
Ⓐ Series					
1	Size 1	●			
2	Size 2		●		
3	Size 3			●	
4	Size 4				●
Ⓑ Port size					
8	Clamp fitting nominal diameter 8A	●			
10	Clamp fitting nominal diameter 10A	●			
15	Clamp fitting nominal diameter 15A		●		
25	Clamp fitting nominal diameter 25A (1S)			●	
40	Clamp fitting nominal diameter 40A (1.5S)				●

Ⓒ Actuator/diaphragm/body material combination

	Actuator	Diaphragm	Body				
F	A5056	PTFE/EPDM	SUS316L	●	●	●	●

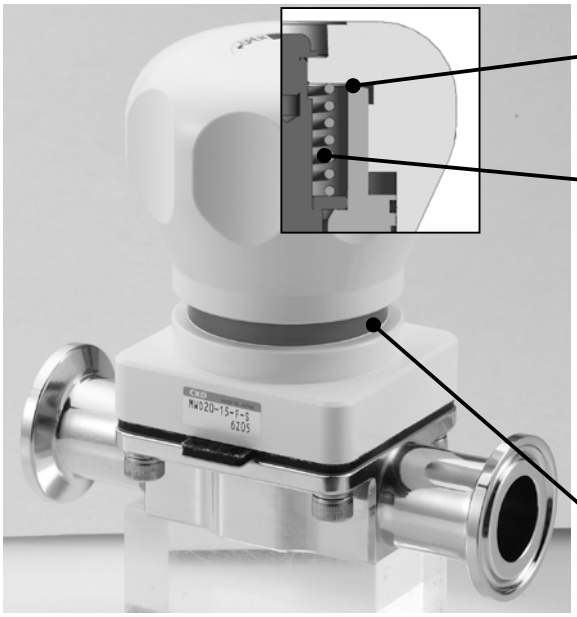
Dimensions



Model No.	A	B	C	H	K	N
MWD10-8-F-S	90	71	79	34	10.5	52
MWD10-10-F-S	90	74	81	34	14	52
MWD20-15-F-S	108	84	94	34	17.5	66
MWD30-25-F-S	127	119	133	50.5	23	80
MWD40-40-F-S	159	146	163	50.5	35.7	89

Features

No more diaphragm damage due to overtightening.



Handle stopper mechanism

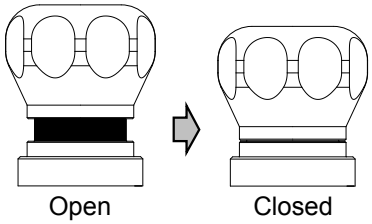
Lets you sense when tightening is finished.

Spring seal

Just turn the handle until tightening is finished, for consistently optimal sealing force.
No handle tightening torque control required.
Significant improvement of diaphragm durability at high temperatures.
The spring conforms to loosening due to temperature changes, meaning that no retightening after SIP is required.

Indicator equipment

Open/close status is visually apparent even from a distance.

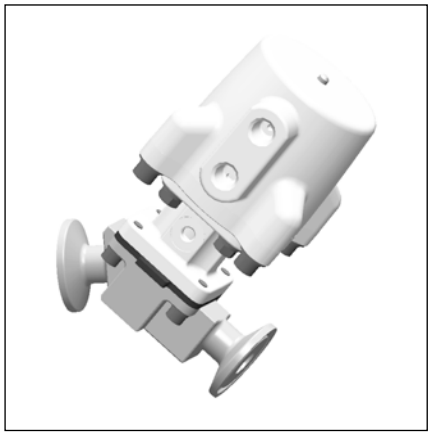


Made-to-order products (1S, 1.5S)

With opening adjustment mechanism

With open/close switch

Specially shaped body



How to order repair parts

SWD - 1 PE

Model No. Ⓐ Series

Code	Description
Ⓐ **Series**	
1	Size 1
2	Size 2
3	Size 3
4	Size 4

* SWD, MWD common model No.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Product-specific cautions: Weir diaphragm valve: SWD/MWD Series

Design/selection

⚠ WARNING

■ This product cannot be used as an emergency shut off valve.
- ●It is not designed to function as a safety valve, such as an emergency shut off valve. When using in such a system, always take separate measures that will ensure safety.

■ Incorrect equipment selection and handling can cause problems not only in this product, but also to your system. For equipment selection and handling, it is the customer's responsibility to check the specifications of this product and the compatibility with your system before use.

■ Take measures to prevent physical harm or property damage in the event of failure of this product.

■ Liquid ring
- ●When the valve opens and closes, the diaphragm moves up and down, which causes the flow path capacity to change inside the valve. For this reason, if the fluid is an incompressible fluid (liquid), extreme pressures will be created in the valve when operating under conditions that seal the fluid in the valve (liquid ring). In this case, install a release valve on the primary or secondary side of the valve, preventing a liquid ring circuit from forming.

■ Working fluids
- ●Check the compatibility of product component materials and working fluids.

■ Fluid temperature
- ●Use within the specified fluid temperature range.

■ Fluid pressure range
- ●Use within the specified working pressure range.

■ Foreign matter such as rust or debris in fluid causes operation faults or leaks, and lowers product performance. Provide measures to remove foreign matter.

■ Use in high temperatures and steam
- ●When hot fluid flows during steam sterilization, the valve body becomes hot, so do not touch with your hand or body. There is a risk of burns if these coils are touched directly.

⚠ CAUTION

■ Rapid changes in fluid temperature may cause internal leakage.

■ While the upper side of the diaphragm (actuator side) does not come into contact with the fluid, due to changes in fluid and fluid temperature, fluid may permeate and turn into fluid atmosphere.

■ As for compressed air for actuator operation, use air or inert gas passed through a filter with a filtration rating of 5 µm or more.

■ If the product has been out of use for one month or more, perform a test run before starting actual operation.

■ When the product will not be used for one month or more, completely remove any water left in the product. Water residue will cause rusting and may lead to malfunction or leaks.
If residual water cannot be eliminated, operate the valve several times a day and pass water through to ensure ideal use.

■ When the operating air supply time or exhaust time is short, the valve actuation may be unable to keep up.

■ Do not allow fluid to come into contact with the product body.

■ Water hammer and vibration may occur in certain fluid pressure and piping conditions. In most cases, this can be resolved by adjusting the open-close speed using a speed controller, etc. If a problem persists, review and revise the fluid pressure and piping conditions.

■ If you use the product infrequently, contact CKD.

■ Indicator rises during valve opening. Since grease is applied to the indicator part, be careful of adhesion.

■ Do not use valves as footing or place any heavy objects on top of the valves.

■ Use the operating air pressure within the specified working pressure range.

■ Observe the operating frequency. Operating frequency is 20 times/min or less.

Mounting, installation and adjustment

⚠ WARNING

■ Before piping the product, flush the inside of the pipe and remove foreign matter such as debris, metal chips, rust and sealing tape. Debris or foreign matter in the fluid may prevent the valve from functioning correctly. When there is contamination, install a filter on the primary side of the valve according to the circuit used.

■ Protect the valve so that dust does not get inside. If there are high levels of dust in the area, install a downward-facing silencer or elbow fitting on the exhaust port of the valve operating part so that dust does not enter

■ When installing piping, avoid any application of stress on the valve body, such as bending, tension, or compression. Fix and support the pipes so that the weight and vibration of the pipes are not directly applied on the valves.

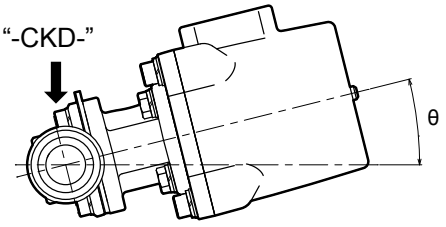
■ Refer to the table below for the tightening torque of the operating port piping.

Operating port size	Recommended piping tightening torque
Rc1/8	3 to 5 N·m

■ For horizontal piping, liquid accumulation in the valve can be minimized (see Table 1, Fig. 1) by tilting the valve and piping. Pipe so that the “-CKD-” mark stamped on the body piping section is directly above.

Table 1. Port size and valve tilt angle

Model No.	Port size	Valve tilt angle (θ°)
SWD1*-8, MWD10-8	8A	23
SWD1*-10, MWD10-10	10A	11
SWD2*-15, MWD20-15	15A	14
SWD3*-25, MWD30-25	25A(1S)	34
SWD4*-40, MWD40-40	40A(1.5S)	32



(Fig. 1) Valve tilt angle

■ Piping of body

●The ferrule part dimensions are ISO compliant. Assemble using gaskets and clamps of appropriate size.

Use/maintenance

⚠ CAUTION

■ Before replacing the valve, thoroughly replace the remaining fluid with pure water so that it does not affect the surrounding devices and humans and purge with dry air or inert gas. When touching the valve, read the material safety data sheet (SDS) for the working fluid and wear the necessary protective gear.

■ If the product has been out of use for one month or more, perform a test run before starting the actual operation.

■ Defects occurring in disassembled/replaced products and parts are excluded from the warranty scope.

⚠ WARNING

■ Handling the actuator

Never attempt to disassemble the actuator. It is very dangerous, as a high-load spring is incorporated. If disassembly is necessary, contact CKD or a dealership.

■ Before disassembling, be sure to release the operating air/fluid pressure and check that pressure is not applied inside the valve.

■ Before replacing the diaphragm, thoroughly replace the remaining fluid with pure water so that it does not affect the surrounding devices and humans and purge with dry air or inert gas. When touching the fluid passage section of the valve, read the safety data sheet (SDS) for the working fluid and wear the necessary protective gear.

■ Use the designated diaphragm for diaphragm replacement.

Dust collection devices

■ **For compressed air**

Overview

For dust removal of a bag filter type dust collector, a wide variety of dust collectors such as the large port size dust collector PD Series are now available.

Features

[Large port size dust collector]

Long service life diaphragm structure

Spring-less special diaphragm structure and high wear resistant moving parts enable 2.5 times longer service life (compared to conventional parts). (PD3/PDV3 (urethane diaphragm))

A large volume of air can be injected instantly. High speed of opening and closing dramatically increases the efficiency of air shots.

The integrated structure of diaphragm used for the main valve section enables parts to be easily replaced.

(PD3/PDV3 (urethane diaphragm))

[Controller]

Double-striking available

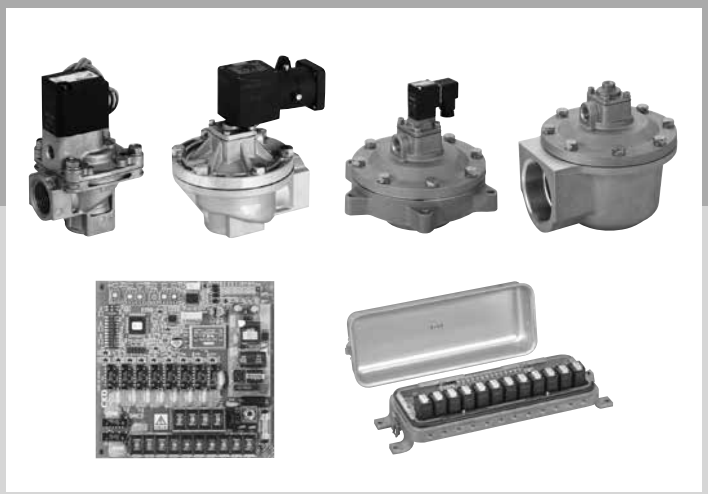
The valve can be set to single or double-striking, depending on the application. (Note that double-striking is not possible when intermission time is set.)

Easy to change the number of steps

No sequence circuit necessary

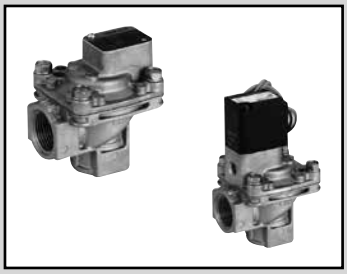
Simple expansion circuit does not require sequence circuit.

Possible to set intermission per cycle



CONTENTS

⚠ Always read the precautions in the Introduction and on page 850 before use.



Pilot operated 2-port valve for dust collector
(Large port size dust collector)

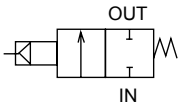
PD3/PDV3-20A/25A/40A Series

- Air operated/with solenoid valve
- Port size: Rc3/4, Rc1, IN: Rc1 1/2-OUT: ø48, Rc1 1/2

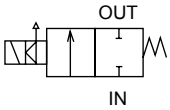
RoHS CAD

JIS symbol

● PD3 (Air operated)



● PDV3 (With solenoid valve)



Common specifications

Item		Air operated	With solenoid valve
		PD3	PDV3
Working fluid		Air (no corrosive gas)	
Min. working pressure differential MPa		0.1 (≈15 psi, 1 bar)	
Max. working pressure differential MPa		0.7 (≈100 psi, 7 bar)	
Max. working pressure MPa		0.7 (≈100 psi, 7 bar)	
Proof pressure (water pressure) MPa		2.0 (≈290 psi, 20 bar)	
Fluid temperature °C		-10 (14°F) to 60 (140°F), -10 (14°F) to 100 (212°F) for fluoro rubber seal (no freezing)	
Ambient temperature °C		-10 (14°F) to 60 (140°F), -10 (14°F) to 100 (212°F) for fluoro rubber seal	
Atmosphere		Place free of corrosive gas and explosive gas	
Valve structure		Pilot operated poppet structure	
Valve seat leakage cm^3/min		300 or less, urethane rubber used for sealant material: 50 or less	
Pilot port size		Rc1/8	
Mounting orientation		Unrestricted	
Working environment		Indoors/outdoors	Indoors
Electrical specifications		**PDV3**	
Rated voltage		100 VAC (50/60 Hz)/110 VAC (60 Hz), 200 VAC (50/60 Hz)/220 VAC (60 Hz), 12 VDC, 24 VDC	
Voltage fluctuation range		-10 to +10% of rated voltage	
Apparent power (VA)	Holding	7.5(50 Hz), 5.5(60 Hz)	
	Starting	20(50 Hz), 17(60 Hz)	
Power consumption (W)	AC	4.0(50 Hz), 3.4(60 Hz)	
	DC	6.5	
Thermal class		Class 130 (B) (coil option 4A: Class 180 (H) or equivalent)	
Degree of protection		IP65 or equivalent (*1)	

*1 : The T type terminal box is IP61 or equivalent.

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Cv	Weight (kg)
● Air operated				
PD3-20A	Rc3/4	23	11	0.26
PD3-25A	Rc1	28	18	0.40
PD3-40A	IN:Rc1 1/2 - OUT: O.D. ø48 Length 52	37	45	0.86
PD3-40A-RC	Rc1 1/2	37	45	0.75
● With solenoid valve				
PDV3-20A	Rc3/4	23	11	0.41
PDV3-25A	Rc1	28	18	0.55
PDV3-40A	IN:Rc1 1/2 - OUT: O.D. ø48 Length 52	37	45	1.01
PDV3-40A-RC	Rc1 1/2	37	45	0.90

*1 : For a solenoid valve for driving the air operated PD3, use FAB31-6-3 (page 52), AB31-01-3 (page 154), AB41E4-02-3-03T (explosion proof, page 424) or PJVB (page 842).
*2 : The combination of PD3 and PJVB is recommended for outdoor use.
*3 : Contact CKD when using as a dust collector for ash treatment or combustion gas at a waste incinerator.

How to order

● Air operated

PD3 - 20A - N

● With solenoid valve

PDV3 - 20A - N 2C - AC100V

Model No.

Ⓐ Port size *2

Ⓑ Sealant *2 *3 *4

Ⓒ Coil option *4 *5

Ⓓ Voltage *5 *6

Code	Description	Model No. PD3	Model No. PDV3
Ⓐ Port size			
20A	Rc3/4	●	●
25A	Rc1	●	●
40A	IN: Rc1 1/2, OUT: O.D. ø48, length 52	●	●
40A-RC	Rc1 1/2	●	●
Ⓑ Sealant			
Blank	Urethane rubber	●	●
N	Nitrile rubber	●	●
F	Fluoro rubber	●	●
Ⓒ Coil option			
2C	Std. Grommet lead wire		●
2CS	Option Grommet lead wire with surge suppressor		●
2E	Option With DIN terminal box (G1/2)		●
2ES	Option With DIN terminal box/surge suppressor (G1/2)		●
2G	Option With DIN terminal box (Pg11)		●
2H	Option DIN terminal box/with lamp (Pg11)		●
2HS	Option DIN terminal box with lamp/surge suppressor (Pg11)		●
2CG	Option Conduit (CTC19)		●
2CH	Option Conduit (G1/2)		●
3T	Option With T type terminal box (G1/2)		●
3R	Option T type terminal box with lamp (G1/2)		●
3RS	Option T type terminal box with lamp/surge suppressor (G1/2)		●
4A	Option Grommet lead wire (thermal class H or equivalent)		●
Ⓓ Voltage			
AC100V	100 VAC(50/60 Hz)/110 VAC(60 Hz)		●
AC200V	200 VAC(50/60 Hz)/220 VAC(60 Hz)		●
DC24V	24 VDC		●
DC12V	12 VDC		●

*1 : The combinations indicated with ● above are available.
*2 : Item Ⓑ Blank (sealant material: urethane rubber) is not available when port size is 40A or 40A-RC.
*3 : When Item Ⓑ is N or F (sealant material: nitrile rubber or fluoro rubber), the main valve material is nylon resin.
*4 : For PDV3 Series, when Item Ⓑ is F (sealant material: fluoro rubber), only 4A is available for Item Ⓒ (coil option).
*5 : When Item Ⓒ (coil option) is 4A, only AC voltage is available.
*6 : For voltages other than above, contact CKD.

[Example of model No.]

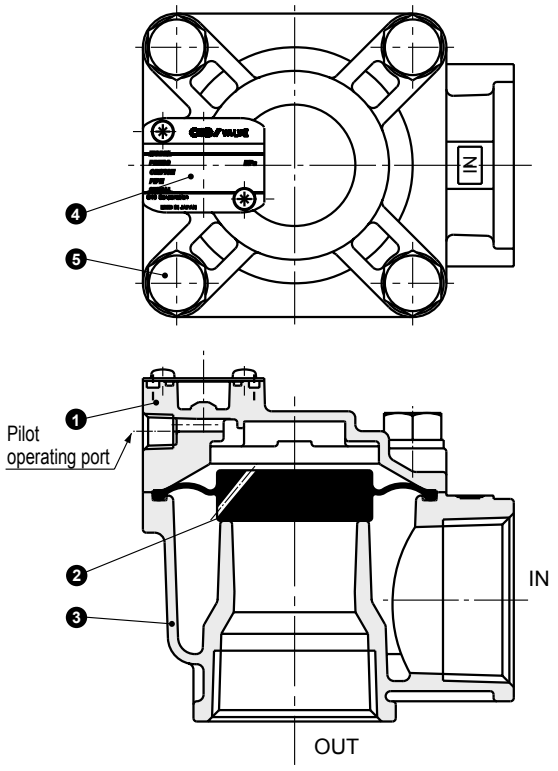
PDV3-20A-2C-AC100V

Model : PDV3

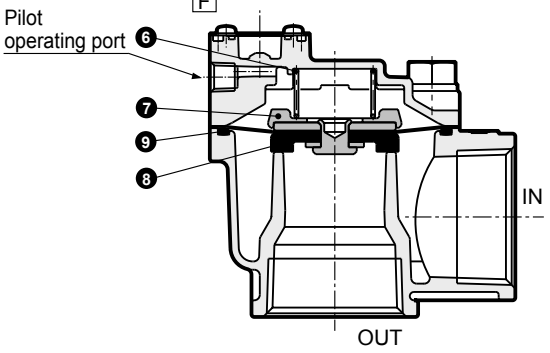
Ⓐ Port size : Rc3/4
Ⓑ Sealant : Urethane rubber
Ⓒ Coil option : Grommet lead wire
Ⓓ Voltage : 100 VAC(50/60 Hz)/110 VAC(60 Hz)

Internal structure and parts list: Air operated

● Sealant material: Urethane rubber
PD3-20A/25A



● Sealant material: Nitrile rubber/fluoro rubber
PD3-20A/25A/40A-[N][F] *1
PD3-40A-RC-[N][F]

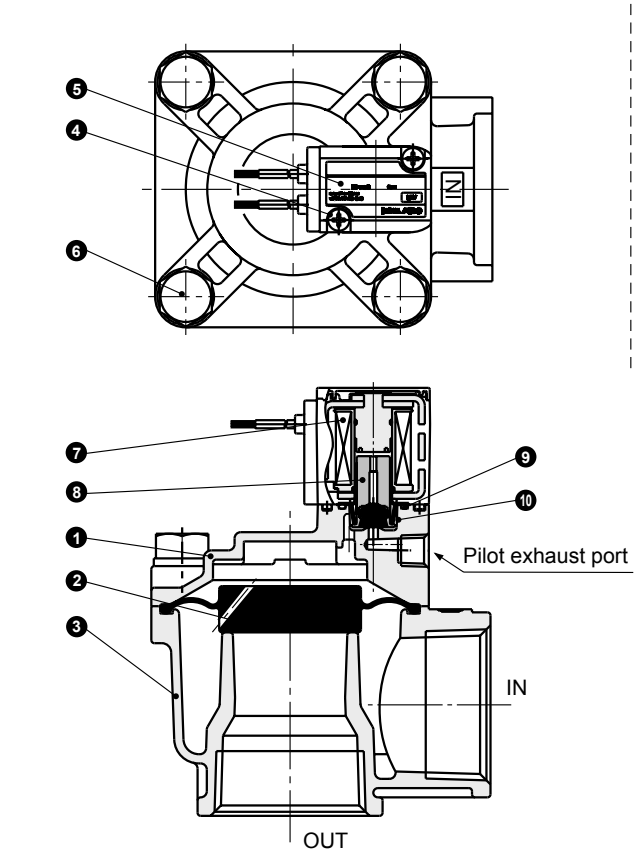


*1 : The shape of 40A body is different from the figure above.

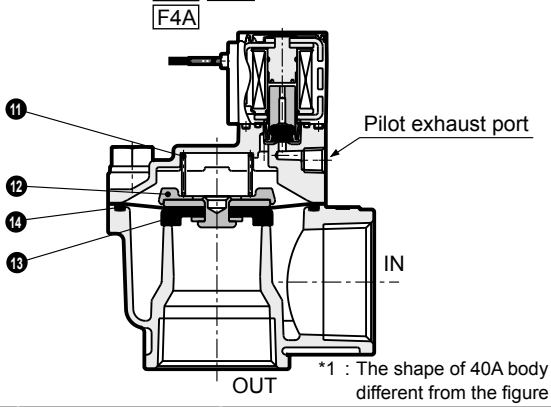
No.	Part name	Material	
1	Cover	ADC12	Aluminum die-casting
2	Diaphragm	U	Urethane rubber
3	Body	ADC12	Aluminum die-casting
4	Nameplate	A1200P	Aluminum
5	Hexagon head bolt	SUSXM7	Stainless steel
6	Spring	SUS304	Stainless steel
7	Spacer	PA	Nylon resin
8	Diaphragm assembly	SUS304, PA	Stainless steel, nylon resin
		NBR or FKM	Nitrile rubber or fluoro rubber
9	O-ring	NBR or FKM	Nitrile rubber or fluoro rubber

Internal structure and parts list: With solenoid valve

● Sealant material: Urethane rubber
PDV3-20A/25A-2C (Grommet lead wire)



● Sealant material: Nitrile rubber/fluoro rubber
PDV3-20A/25A/40A-[N2C] *1
PDV3-40A-RC-[N2C][F4A][F4A]

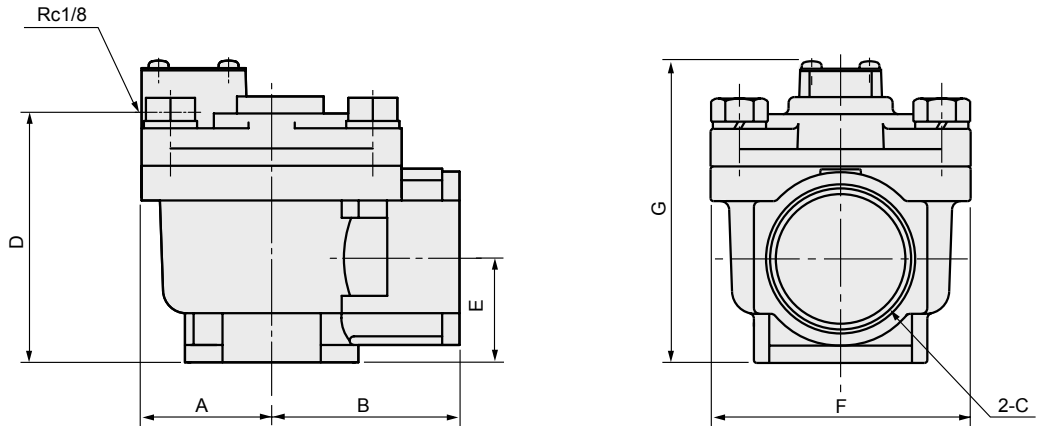


*1 : The shape of 40A body is different from the figure above.

No.	Part name	Material	
1	Cover	ADC12	Aluminum die-casting
2	Diaphragm	U	Urethane rubber
3	Body	ADC12	Aluminum die-casting
4	Phillips pan head machine screw, captive spring washer	SWRM	Carbon steel wire for cold rolling
5	Nameplate	PET	Polyethylene terephthalate
6	Hexagon head bolt	SUSXM7	Stainless steel
7	Coil assembly	Class B molded coil	
8	Plunger assembly	K-M31, NBR or FKM	Stainless steel/nitrile rubber or fluoro rubber
9	O-ring	NBR or FKM	Nitrile rubber or fluoro rubber
10	Plunger spring	SUS304	Stainless steel
11	Spring	SUS304	Stainless steel
12	Spacer	PA	Nylon resin
13	Diaphragm assembly	SUS304, PA	Stainless steel, nylon resin
		NBR or FKM	Nitrile rubber or fluoro rubber
14	O-ring	NBR or FKM	Nitrile rubber or fluoro rubber

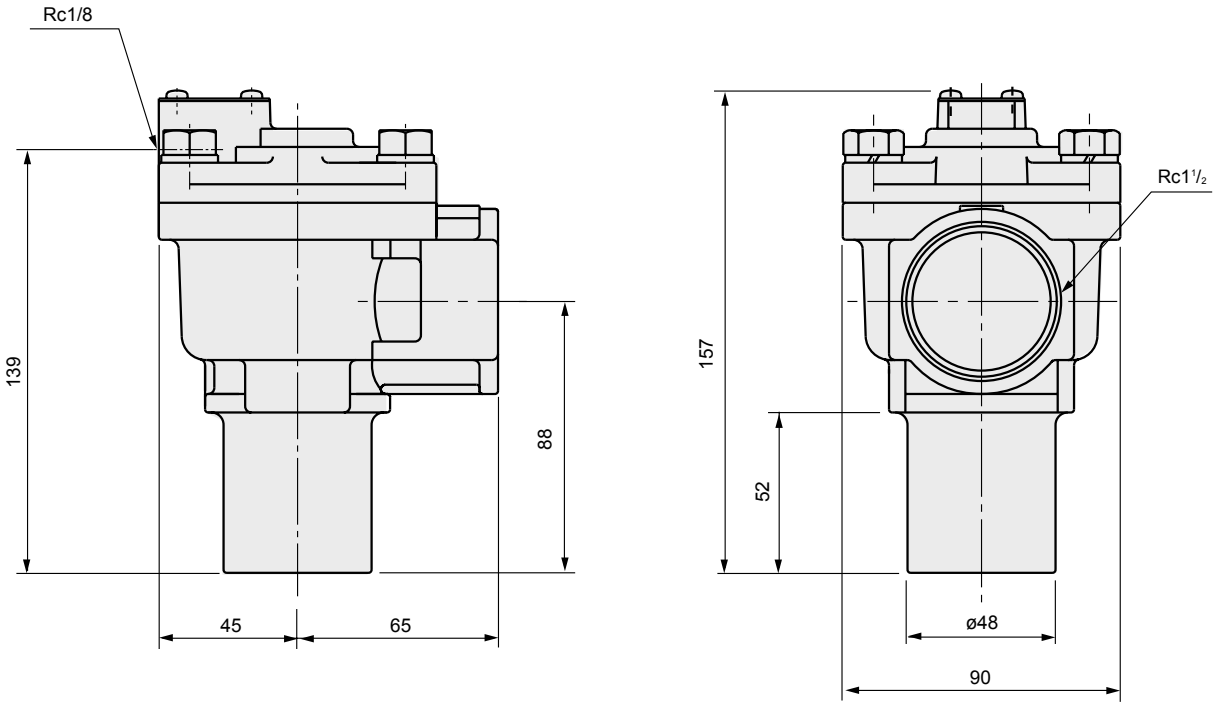
Dimensions: PD3 Series

● Air operated
PD3-20A/25A
PD3-40A-RC



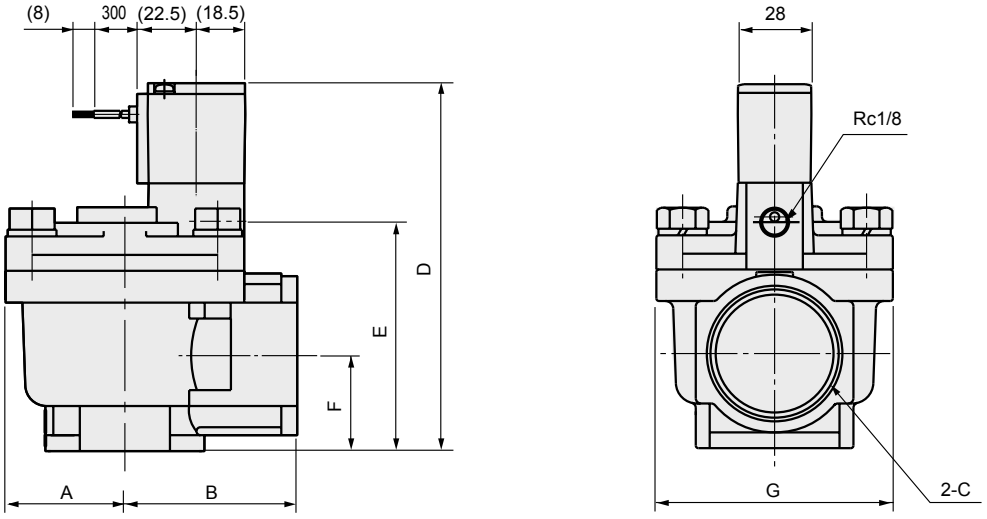
Model No.	A	B	C	D	E	F	G
PD3-20A	31.5	40	Rc3/4	64	31	60	83
PD3-25A	37.5	45	Rc1	76	39	71	95
PD3-40A-RC	45	65	Rc1 1/2	86	36	90	105

● Air operated
PD3-40A



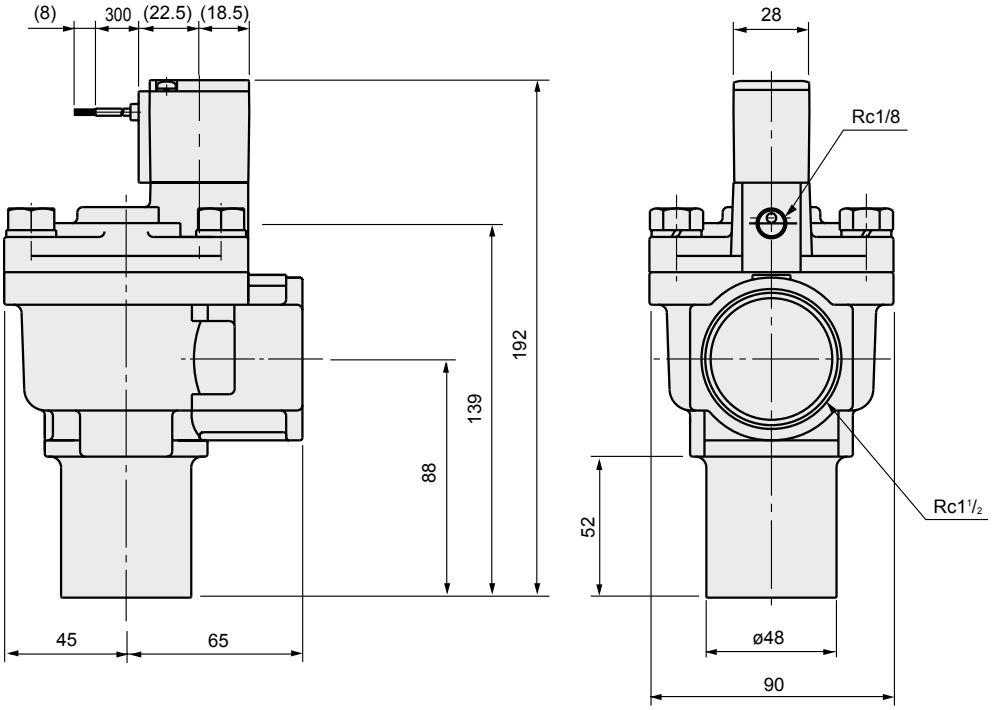
Dimensions: PDV3 Series

● Grommet lead wire with solenoid valve
PDV3-20A/25A-2C
PDV3-40A-RC



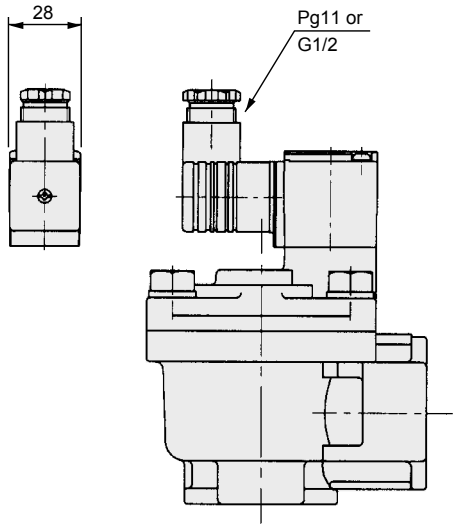
Model No.	A	B	C	D	E	F	G
PDV3-20A	31.5	40	Rc3/4	117	64	31	60
PDV3-25A	37.5	45	Rc1	129	76	39	71
PDV3-40A-RC	45	65	Rc1 1/2	140	87	36	90

● Grommet lead wire with solenoid valve
PDV3-40A-2C

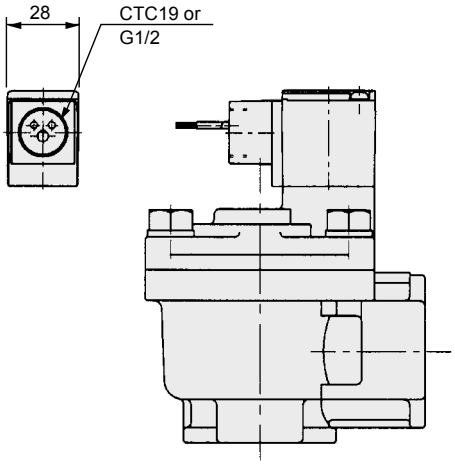


Optional dimensions

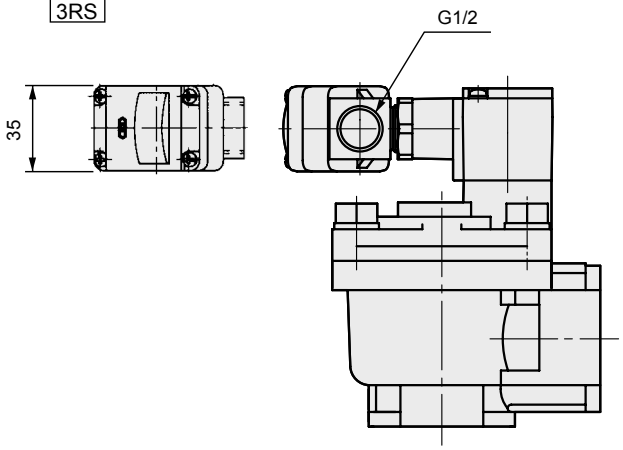
● DIN terminal box (with lamp/surge suppressor)
DIN terminal box with lamp
PDV3-*- 2E/2ES
2G
2H/2HS

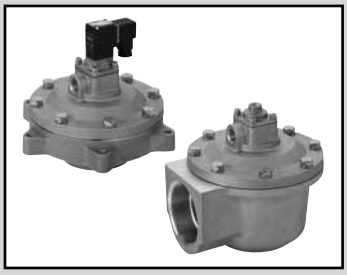


● Conduit (CTC19 / G1/2)
PDV3-*- 2CG
2CH



● T type terminal box (G1/2) (with lamp/surge suppressor)
T type terminal box with lamp (G1/2)
PDV3-*- 3T
3R
3RS





Pilot operated 2-port valve for large-diameter dust collector
(Large port size dust collector)

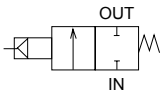
PD3/PDV3-65A/80A Series

- Air operated/with solenoid valve
- Port size: Rc2$^{1}/_{2}$, Rc3

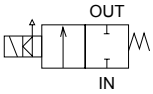
RoHS

JIS symbol

- PD3 (air operated)



- PDV3 (with solenoid valve)



Common specifications

Item		Air operated	With solenoid valve
		PD3	PDV3
Working fluid		Air (no corrosive gas)	
Min. working pressure differential	MPa	0.2 (≈29 psi, 2 bar)	
Max. working pressure differential	MPa	0.8 (≈120 psi, 8 bar)	
Max. working pressure	MPa	0.8 (≈120 psi, 8 bar)	
Proof pressure (water pressure)	MPa	1.5 (≈220 psi, 15 bar)	
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature	°C	-10 (14°F) to 60 (140°F)	
Atmosphere		Place free of corrosive gas and explosive gas	
Valve structure		Pilot operated poppet structure	
Valve seat leakage	cm^3/min	300 or less	
Pilot port size		Rc1/4	-
Mounting orientation		Unrestricted	
Working environment		Indoors/outdoors	Indoors
Electrical specifications		**PDV3**	
Rated voltage		100 VAC(50/60 Hz)/110 VAC(60 Hz), 200 VAC(50/60 Hz), 220 VAC(50/60 Hz)	
Voltage fluctuation range		-10 to +10% of rated voltage	
Apparent power (VA)	Holding	7.5(50 Hz), 5.5(60 Hz)	
	Starting	20(50 Hz), 17(60 Hz)	
Power consumption (W)	AC	4.0(50 Hz), 3.4(60 Hz)	
Thermal class		Class 130 (B)	
Degree of protection		IP65 or equivalent	

*1 : Use PJVB-8-5 as a solenoid valve for driving the air operated PD3.
*2 : Contact CKD when using as a dust collector for ash treatment or combustion gas at a waste incinerator.
*3 : The combination of PD3 and PJVB-8-5 is recommended for outdoor use.

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Cv	Weight (kg)
● Air operated				
PD3-65A	Rc2$^{1}/_{2}$	68	100	3.2
PD3-80A	Rc3	82	155	4.6
● With solenoid valve				
PDV3-65A	Rc2$^{1}/_{2}$	68	100	3.4
PDV3-80A	Rc3	82	155	4.8

How to order

● Air operated

PD3 - 80A - N

● With solenoid valve

PDV3 - 80A - N 2C - AC200V

Model No.
Ⓐ Port size
Ⓑ Sealant
Ⓒ Coil option
Ⓓ Voltage

Code	Description		Model No. PD3	Model No. PDV3
Ⓐ Port size				
65A	Rc2 1/2		●	●
80A	Rc3		●	●
Ⓑ Sealant				
N	Nitrile rubber		●	●
Ⓒ Coil option				
2C	Standard	Grommet lead wire		●
2E	Option	With DIN terminal box (G1/2)		●
2G	Option	With DIN terminal box (Pg11)		●
2H	Option	DIN terminal box/with lamp (Pg11)		●
Ⓓ Voltage				
AC100V	100 VAC(50/60 Hz), 110 VAC(60 Hz)			●
AC200V	200 VAC(50/60 Hz)			●
AC220V	220 VAC(50/60 Hz)			●

[Example of model No.]

PDV3-80A-N2C-AC200V

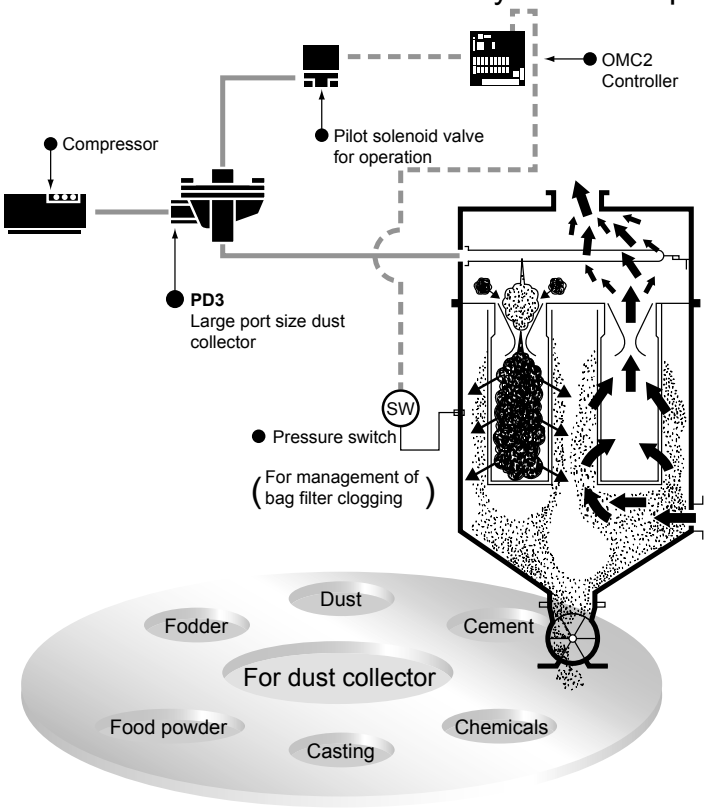
Model: PDV3
Ⓐ Port size : Rc3
Ⓑ Sealant : Nitrile rubber
Ⓒ Coil option : Grommet lead wire
Ⓓ Voltage : 200 VAC(50/60 Hz)

Features

(1) Large flow rate
Port sizes 65A and 80A added to the PD3/PDV3 Series.

(2) RoHS compliant

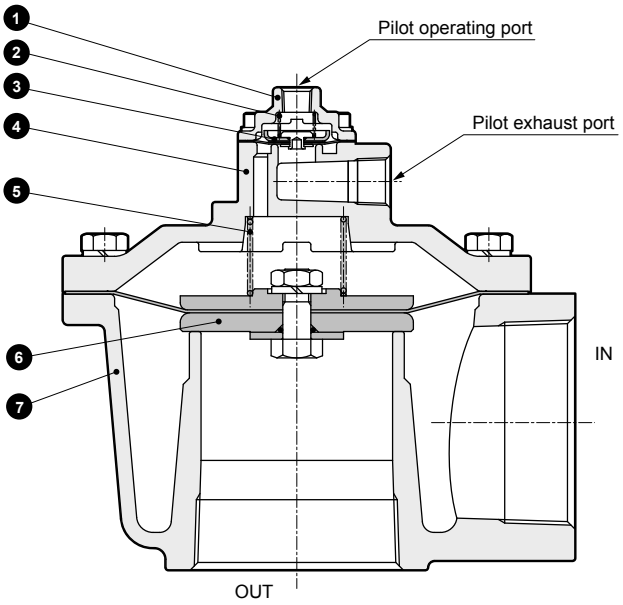
■ Dust collector valve control system example



Internal structure and parts list: Air operated

● Sealant material: Nitrile rubber

·PD3-65A/80A-N

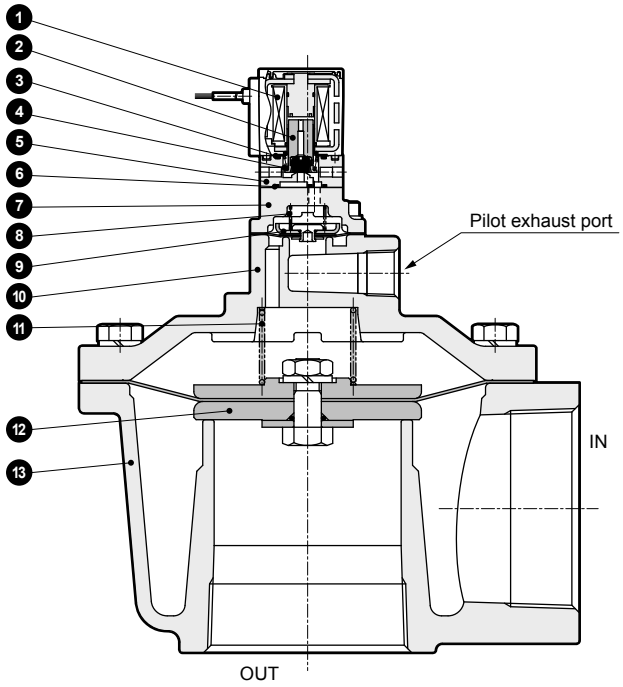


No.	Part name	Material	
1	Cap	ADC12	Aluminum die-casting
2	Pilot spring	SUS304	Stainless steel
3	Pilot diaphragm assembly	SUS304,NBR PTFE	Stainless steel, nitrile rubber Tetrafluoroethylene resin
4	Body	AC4C	Aluminum casting
5	Mainspring	SUS304	Stainless steel
6	Main diaphragm assembly	SUS304,A2017 NBR,PA	Stainless steel, aluminum Nitrile rubber, nylon resin
7	Body	AC4C	Aluminum casting

Internal structure and parts list: With solenoid valve

● Sealant material: Nitrile rubber

·PDV3-65A/80A-N

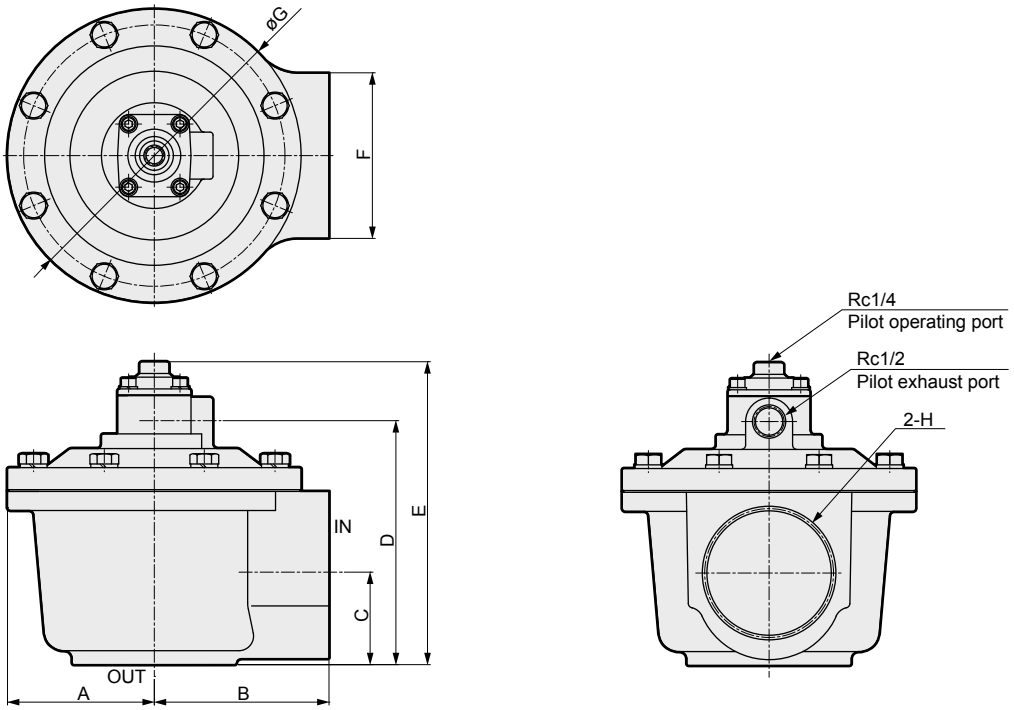


No.	Part name	Material	
1	Coil assembly	Class B molded coil	
2	Plunger assembly	K-M31,NBR PET	Stainless steel, nitrile rubber Polyethylene terephthalate
3	O-ring	NBR	Nitrile rubber
4	Plunger spring	SUS304	Stainless steel
5	Body	PPS	Polyphenylene sulfide
6	Gasket	NBR	Nitrile rubber
7	Cap	AC4C	Aluminum casting
8	Pilot spring	SUS304	Stainless steel
9	Pilot diaphragm assembly	SUS304,NBR PTFE	Stainless steel, nitrile rubber, tetrafluoroethylene resin
10	Body	AC4C	Aluminum casting
11	Mainspring	SUS304	Stainless steel
12	Main diaphragm assembly	SUS304,A2017 NBR,PA	Stainless steel, aluminum Nitrile rubber, nylon resin
13	Body	AC4C	Aluminum casting

Dimensions: PD3 Series

● Air operated

·PD3-65A/80A-N

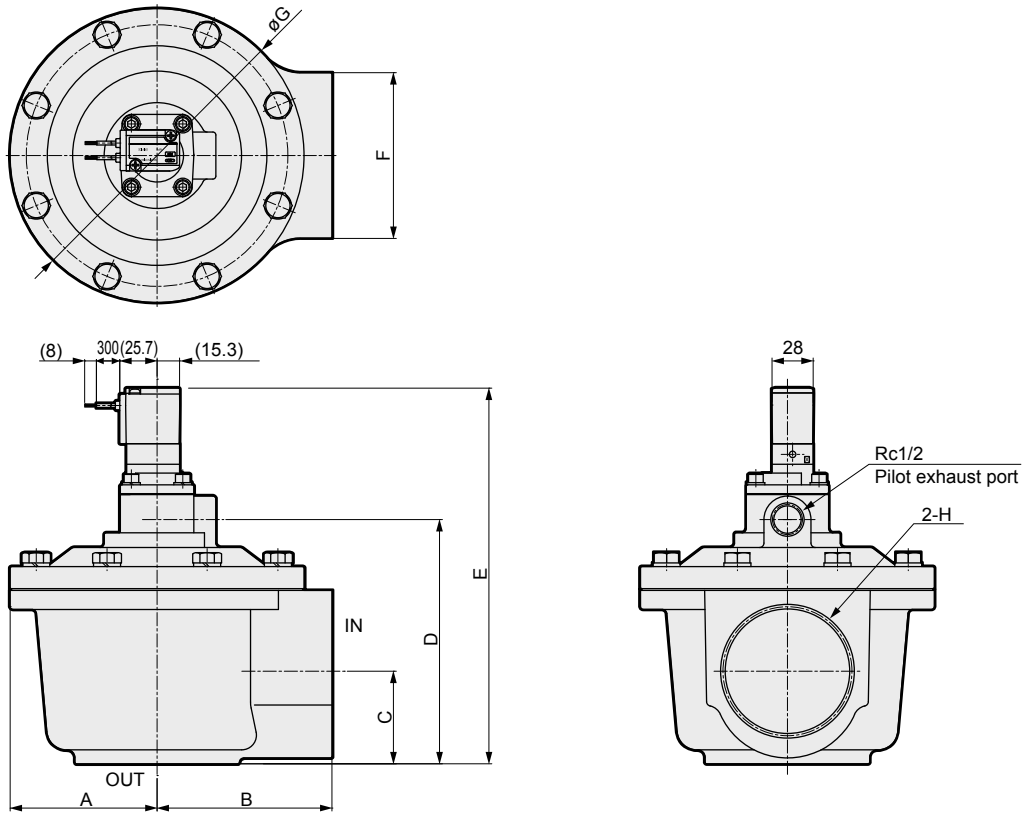


Model No.	A	B	C	D	E	F	G	H
PD3-65A-N	92	117.5	48	141	181	92	ø184	Rc2 1/2
PD3-80A-N	100	119	63	166	206	110	ø200	Rc3

Dimensions

● Grommet lead wire with solenoid valve

·PDV3-65A/80A-N2C

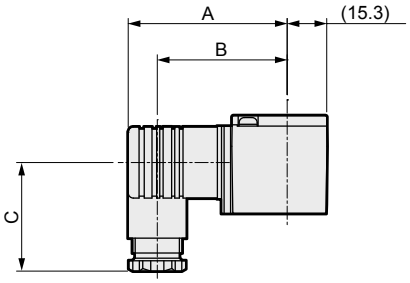


Model No.	A	B	C	D	E	F	G	H
PDV3-65A-N	92	117.5	48	141	230	92	ø184	Rc2$^{1}/_{2}$
PDV3-80A-N	100	119	63	166	256	110	ø200	Rc3

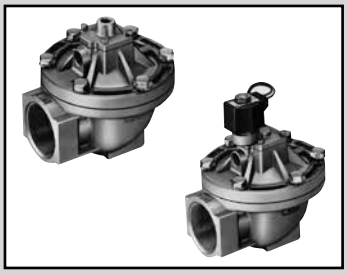
Optional dimensions

● DIN terminal box (with lamp)

·PDV3-65A/80A-N 2E 2G 2H



Model No.	A	B	C	D
PDV3-65A/80A-N2E	62.7	51.2	45	G1/2
PDV3-65A/80A-N2G	61.7	50.2	39	Pg11
PDV3-65A/80A-N2H	61.7	50.2	39	Pg11



Pilot operated 2-port valve for dust collector
(Large port size dust collector)

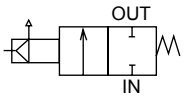
PD2/PDV2 Series

- Air operated/with solenoid valve
- Port size: Rc2

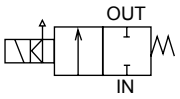
RoHS

JIS symbol

- PD2 (Air operated)



- PDV2 (With solenoid valve)



Specifications

Item	Air operated	With solenoid valve
	PD2-50A	PDV2-50A
Working fluid	Air (no corrosive gas)	
Min. working pressure differential MPa	0.1 (≈15 psi, 1 bar)	
Max. working pressure differential MPa	0.7 (≈100 psi, 7 bar)	
Max. working pressure MPa	0.7 (≈100 psi, 7 bar)	
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F), -10 (14°F) to 100 (212°F) for fluoro rubber seal (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F), -10 (14°F) to 100 (212°F) for fluoro rubber seal	
Atmosphere	Place free of corrosive gas and explosive gas	
Valve structure	Pilot operated poppet structure	
Valve seat leakage cm^3/min	50 or less	
Port size	Rc2	
Orifice size mm	53	
Cv	62	
Pilot port size	Rc1/4	-
Weight kg	1.9	2.1
Mounting orientation	Unrestricted	
Working environment	Indoors/outdoors	Indoors
Electrical specifications	**PDV2**	
Rated voltage	100 VAC (50/60 Hz)/110 VAC (60 Hz), 200 VAC (50/60 Hz)/220 VAC (60 Hz), 12 VDC, 24 VDC/48 VDC/100 VDC	
Voltage fluctuation range	-10 to +10% of rated voltage	
Apparent power VA	12(50 Hz), 10(60 Hz)	
Power consumption W	11(DC)	
Thermal class	Class 130 (B) (coil option 4A: Class 180 (H))	

*1 : For a solenoid valve for driving the air operated PD2-50A, use FAB31-8-3 (page 52), AB31-02-3 (page 154), AB41E4-02-3-03T (explosion-proof, page 424) or PJVB (page 842).
*2 : Contact CKD when using as a dust collector for ash treatment or combustion gas at a waste incinerator.
*3 : The combination of PD2 and PJVB is recommended for outdoor use.

How to order

● Air operated

PD2 - 50A - ( ) S

● With solenoid valve

PDV2 - 50A - ( ) 2E - S - AC100V

Model No.

Port size
Rc2

Ⓐ Sealant
*2

Ⓑ Coil option
*2
*3

Ⓒ Other options
*2

Ⓓ Voltage
*3
*4

Code		Description	Model No. PD2	Model No. PDV2
Ⓐ Sealant				
Blank		Nitrile rubber	●	●
F		Fluoro rubber	●	●
Ⓑ Coil option				
Blank	Std.	Grommet lead wire		●
2E	Option	With DIN terminal box (G1/2)		●
2G	Option	With DIN terminal box (Pg11)		●
2H	Option	DIN terminal box with small lamp (Pg11)		●
3A	Option	Open frame lead wire		●
3M	Option	Open frame + HP terminal box (G1/2)		●
3N	Option	Open frame + HP terminal box with lamp (G1/2)		●
4A	Option	Open frame lead wire (thermal class H)		●
Ⓒ Other options				
Blank		No option	●	●
S		Silencer (SLW-10A) (attached with the product)	●	●
Ⓓ Voltage				
AC100V		100 VAC(50/60 Hz)/110 VAC(60 Hz)		●
AC200V		200 VAC(50/60 Hz)/220 VAC(60 Hz)		●
DC12V		12 VDC		●
DC24V		24 VDC		●
DC48V		48 VDC		●
DC100V		100 VDC		●

*1 : The combinations indicated with ● above are available.
*2 : For Item Ⓐ F (sealant material: fluoro rubber), only Item Ⓑ 4A (coil option) and Item Ⓒ Blank (without option) are available.
*3 : When Item Ⓑ (coil option) is "blank" or 4A, only AC voltage is available.
*4 : For voltages other than above, contact CKD.

[Example of model No.]

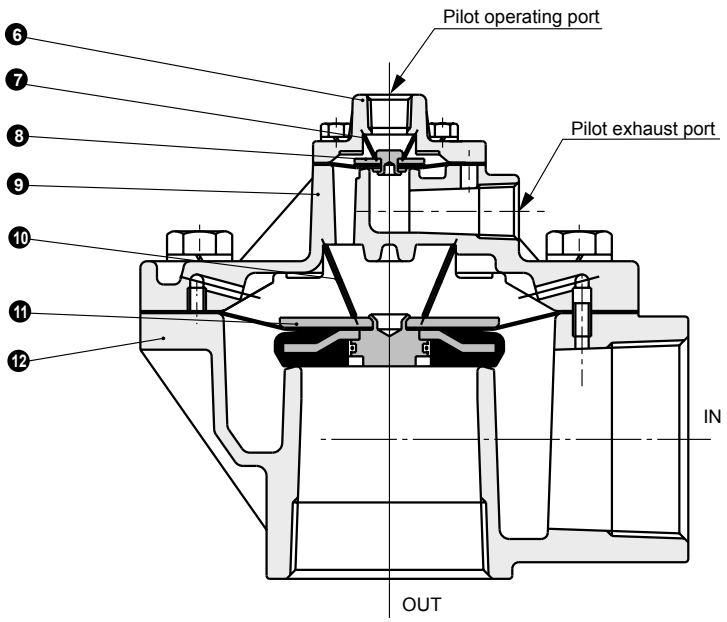
PDV2-50A-2E-S-AC100V

Model: PDV2 (port size Rc2)

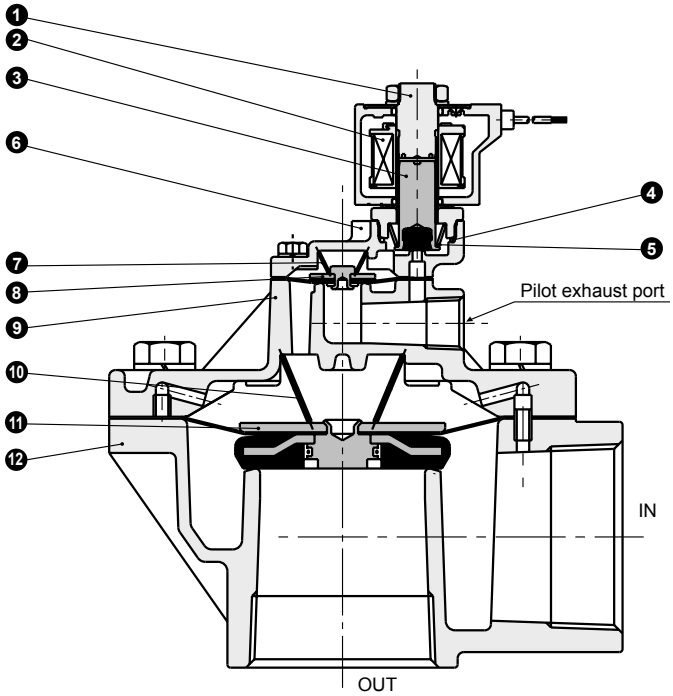
Ⓐ Sealant : Nitrile rubber
Ⓑ Coil option : With DIN terminal box (G1/2)
Ⓒ Other options : With silencer
Ⓓ Voltage : 100 VAC(50/60 Hz)/110 VAC(60 Hz)

Internal structure and parts list

● Air operated
PD2-50A



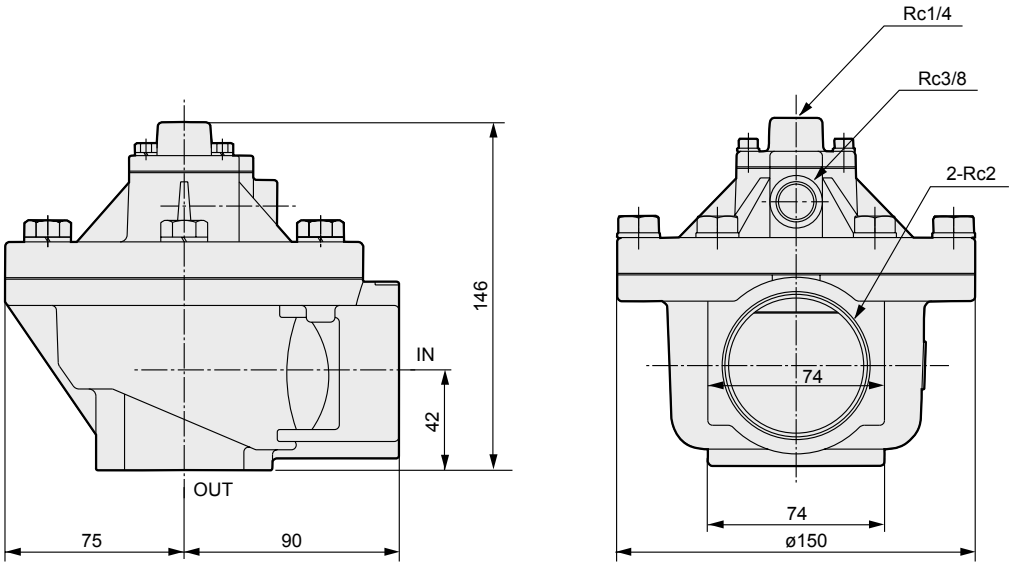
● Grommet lead wire with solenoid valve
PDV2-50A



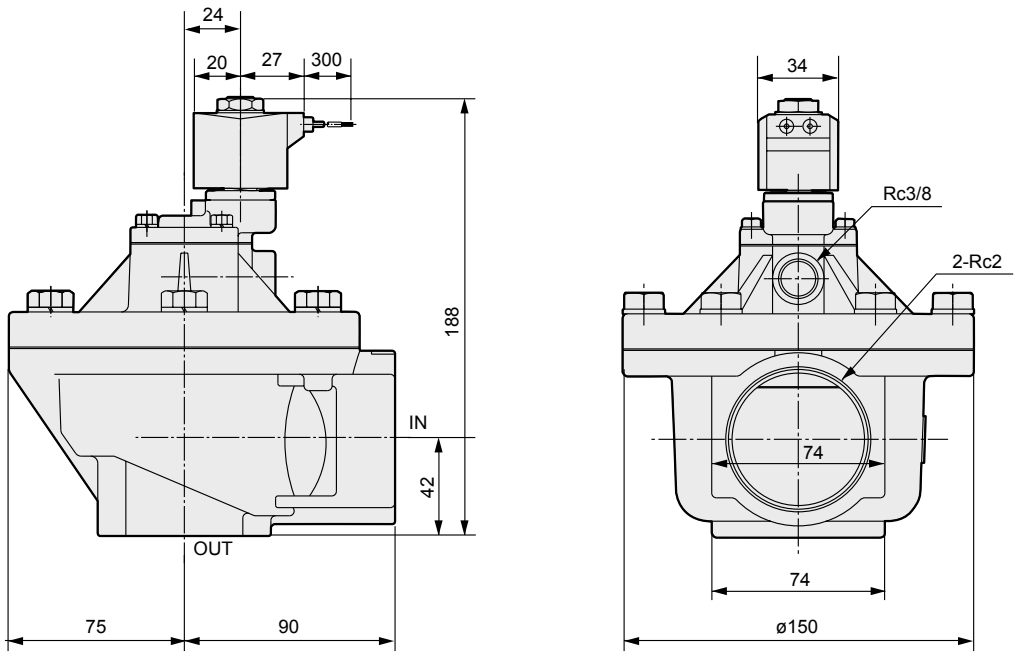
No.	Part name	Material		No.	Part name	Material	
1	Core assembly	SUS405, 403, 316L	Stainless steel	7	Pilot spring	SUS304	Stainless steel
2	Coil assembly			8	Pilot diaphragm assembly	SUS304, NBR or FKM, PTFE	S.S., NBR or FPM, TFE resin
3	Plunger assembly	SUS405, NBR or FKM	Stainless steel, nitrile rubber or fluoro rubber	9	Body	ADC12	Aluminum die-casting
4	O-ring	NBR or FKM	Nitrile rubber or fluoro rubber	10	Mainspring	SUS304	Stainless steel
5	Plunger spring	SUS304	Stainless steel	11	Main diaphragm assembly	SUS304, 316L, NBR or FKM	Stainless steel, nitrile rubber or fluoro rubber
6	Cap	ADC12	Aluminum die-casting	12	Body	ADC12	Aluminum die-casting

Dimensions

● Air operated
PD2-50A

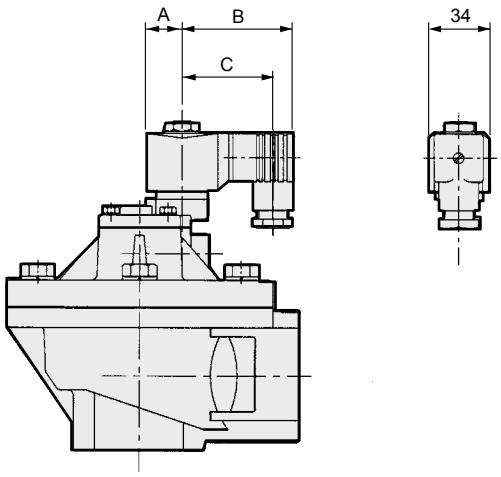


● Grommet lead wire with solenoid valve
PDV2-50A

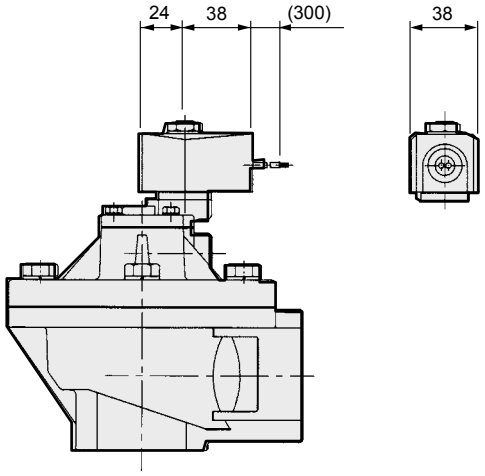


Optional dimensions

● With DIN terminal box
DIN terminal box with small lamp
PDV2-50A-[2E / 2G / 2H]



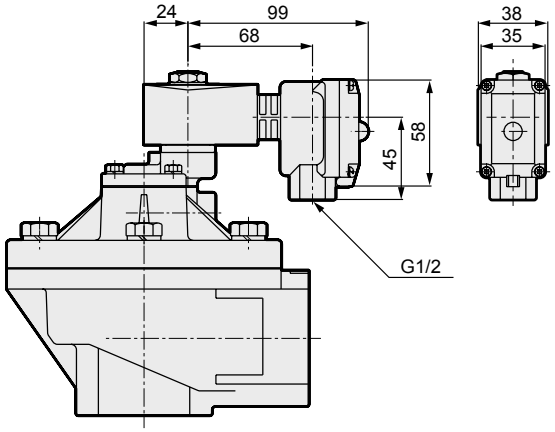
● Open frame lead wire
PDV2-50A-[3A / 4A]



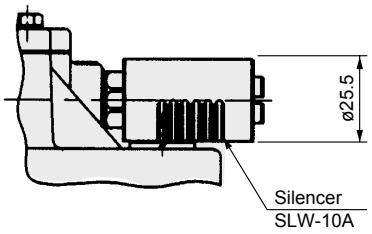
Voltage	A	B	C
AC	20	62	50.5(50)
DC	21	63.5	52(51.5)

* Dimensions shown in ( ) are for 2E.

● Open frame with square terminal box
Open frame with square terminal box with lamp
PDV2-50A-[3M / 3N]



● Silencer (screw)
PD2/PDV2-*[S]



MEMO

Control box manifold solenoid valve
(2-port solenoid valve for large port size dust collector control)

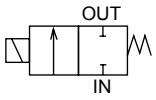
PJVB Series

- For air operated PD3 Series
- NC (open when energized)
- Port size: Rc1/8, Rc1/4

RoHS CAD

JIS symbol

● NC (open when energized)



Specifications

Item		PJVB-6/8-3	PJVB-8-5
Working fluid		Air (no corrosive gas)	
Working pressure MPa		0 (≈0 psi, 0 bar) to 0.7 (≈100 psi, 7 bar)	
Proof pressure (water pressure) MPa		1.1 (≈160 psi, 11 bar)	
Fluid temperature °C		-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C		-10 (14°F) to 60 (140°F)	
Atmosphere		Place free of corrosive gas and explosive gas	
Valve structure		Direct acting poppet structure (NC)	
Port size		Rc1/8 / Rc1/4	Rc1/4
Orifice size mm		3	5
Rating		Intermittent rating (ON: 1 sec. or less, OFF: 1 sec. or more)	Intermittent rating (ON: 1 sec. or less, OFF: 10 sec. or more)
Box specifications			
Case material		Aluminum	
Hole for conduit		G1	
Mounting orientation		Place sub-plate downward.	
Degree of protection		IP64 or equivalent	
Rough size mm		140 x 510 x 105 (depth x width x height/solenoid valve 2 to 12 stations)	
Electrical specifications			
Rated voltage		100 VAC(50/60 Hz)/110 VAC(60 Hz), 200 VAC(50/60 Hz)/220 VAC(60 Hz)	
Voltage fluctuation range		-10 to +10% of rated voltage	
Apparent power (VA)	Holding	7.5(50 Hz), 5.5(60 Hz)	21.3(50 Hz), 13.4(60 Hz)
	Starting	20(50 Hz), 17(60 Hz)	40.6(50 Hz), 33.0(60 Hz)
Power consumption W		4.0(50 Hz), 3.4(60 Hz)	9.8(50 Hz), 6.6(60 Hz)
Thermal class		Class 130 (B)	

How to order

PJVB - 6 - 3 - 10 - AC100V

- PJVB: Model No.
- 6: Ⓐ Port size *1
- 3: Ⓑ Orifice size *1
- 10: Ⓒ Station No.
- AC100V: Ⓓ Voltage *2

Code	Description	Weight (kg)
Ⓐ Port size		
6	Rc1/8	
8	Rc1/4	
Ⓑ Orifice size		
3	ø3	
5	ø5	
Ⓒ Station No.		
2	2 stations	4.1
3	3 stations	4.3
4	4 stations	4.5
5	5 stations	4.7
6	6 stations	4.9
7	7 stations	5.1
8	8 stations	5.3
9	9 stations	5.5
10	10 stations	5.7
11	11 stations	5.9
12	12 stations	6.1
Ⓓ Voltage		
AC100V	100 VAC(50/60 Hz)/110 VAC(60 Hz)	
AC200V	200 VAC(50/60 Hz)/220 VAC(60 Hz)	

*1 : Port size R 1/8 (Ⓐ6) is not available for orifice size ø5.
*2 : For voltages other than above, contact CKD. DC voltage can be made to order only for orifice size ø3.
*3 : The type with surge suppressor can be made to order at orifice size ø3 only.

[Example of model No.]

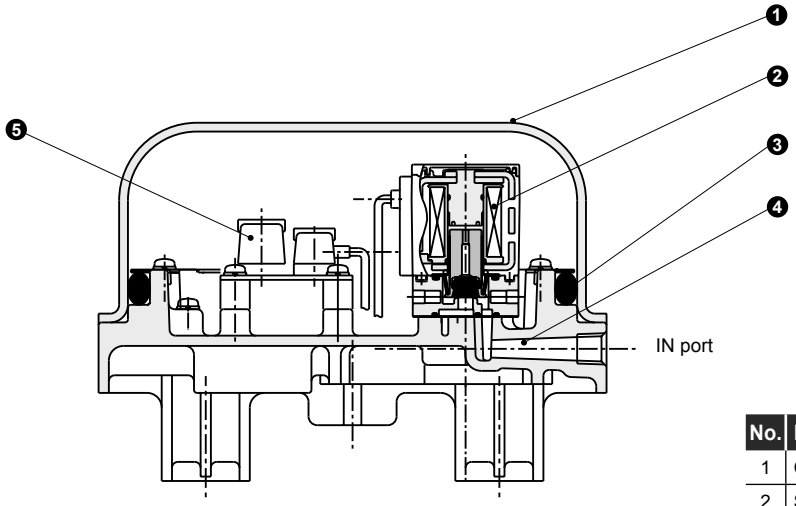
PJVB-6-3-10-AC100V

Model: PJBV

Ⓐ Port size : Rc1/8
Ⓑ Orifice size : ø3
Ⓒ Station No. : 10 stations
Ⓓ Voltage : 100 VAC(50/60 Hz)/110 VAC(60 Hz)

Internal structure and parts list

● PJVB-6/8-3-2 to 12
PJVB-8-5-2 to 12

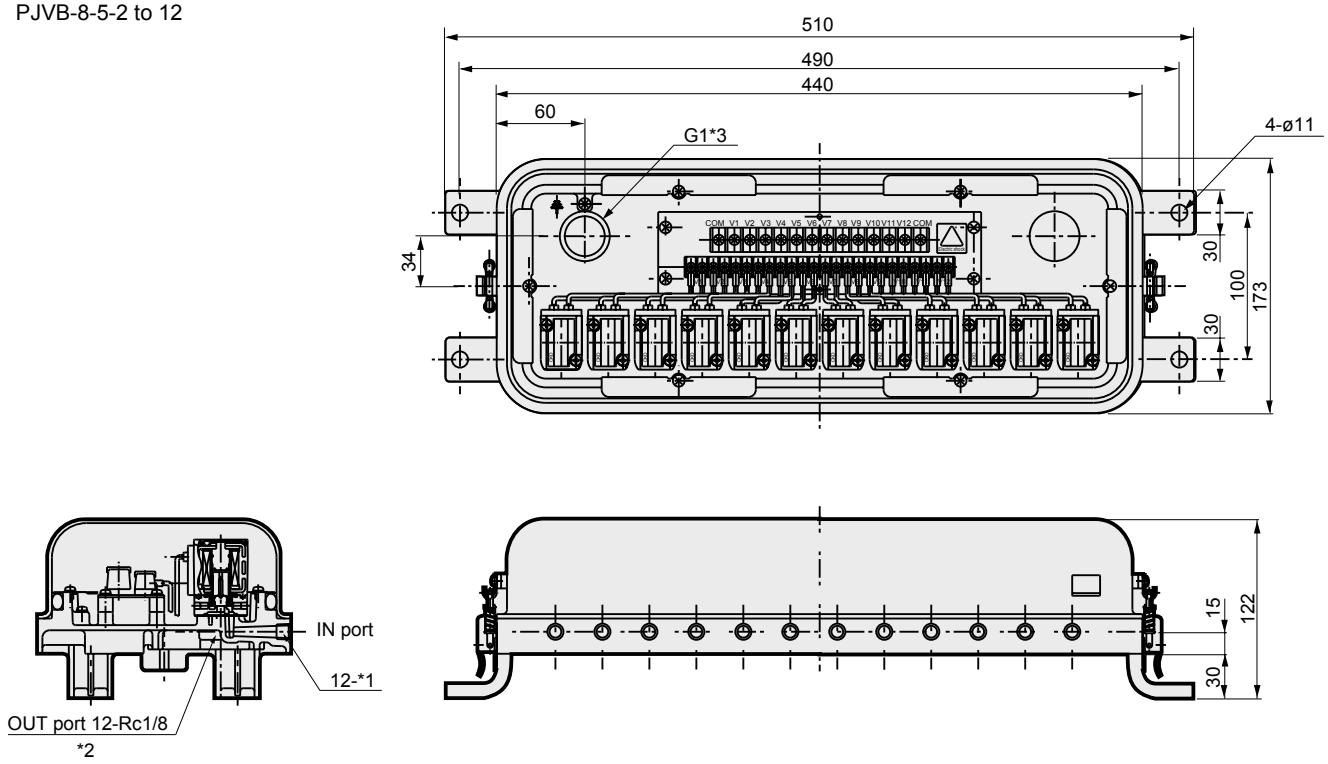


No.	Part name	Material	
1	Cover	A1100P	Aluminum
2	Solenoid valve	GFAB31-X0930, GFAB31-X0931(*1)	
3	O-ring	NBR	Nitrile rubber
4	Sub-plate	ADC12	Aluminum die-casting
5	Terminal block set		

*1 : GFAB31-X0930 (order model No.: PJVB-3-ACT) for PJVB-6/8-3, and GFAB31-X0931 (order model No.: PJVB-5-ACT) for PJVB-8-5.

Dimensions CAD

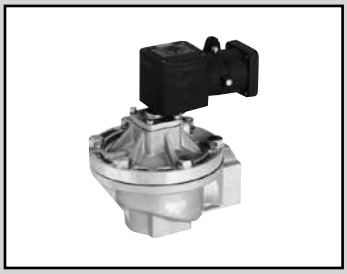
● Box: Solenoid valve 2 to 12 stations
PJVB-6/8-3-2 to 12
PJVB-8-5-2 to 12



*1 : IN port size

Model No.	
PJVB-6-3-station No.-voltage	Rc1/8
PJVB-8-3-station No.-voltage	Rc1/4
PJVB-8-5-station No.-voltage	Rc1/4

*2 : Silencer (SLW-6A) can be attached to OUT port.
*3 : "2-G1" type is also available. (Made-to-order product)



Explosion-proof 2-port solenoid valve for dust collector
(explosion-proof large port size dust collector)

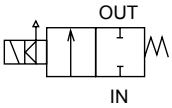
PDVE4 Series

- Pressure and explosion proof construction: d2G4 (flame-proof grade d2/ignitability G4)
- NC (open when energized)
- Port size: Rc3/4, Rc1, IN: 1 1/2-OUT: ø48, Rc1 1/2
- Certification No.: T64349

RoHS

JIS symbol

● NC (open when energized)



Common specifications

Item		PDVE4
Working fluid		Air (no corrosive gas)
Min. working pressure differential	MPa	0.1 (≈15 psi, 1 bar)
Max. working pressure differential	MPa	0.7 (≈100 psi, 7 bar)
Max. working pressure	MPa	0.7 (≈100 psi, 7 bar)
Proof pressure (water pressure)	MPa	2.0 (≈290 psi, 20 bar), 1.5 (≈217 psi, 15 bar)
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature	°C	-10 (14°F) to 50 (122°F)
Atmosphere		Place free of corrosive gas/explosive gas, etc. (flame-proof grade 1 to 2/ignitability G1 to G4)
Valve structure		Pilot operated poppet structure (NC)
Mounting orientation		Unrestricted
Electrical specifications		
Rated voltage		100 VAC(50/60 Hz)/110 VAC(60 Hz), 200 VAC(50/60 Hz)/220 VAC(60 Hz)
Voltage fluctuation range		-10 to +5% of rated voltage
Apparent power (VA)	Holding	18(50 Hz), 15(60 Hz)
	Starting	29(50 Hz), 24(60 Hz)
Power consumption	W	8(50 Hz), 7(60 Hz)
Thermal class		Class 130 (B)

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Cv	Weight (kg)
PDVE4-20A	Rc3/4	23	11	1.21
PDVE4-25A	Rc1	28	18	1.36
PDVE4-40A	IN:Rc1 1/2 - OUT: O.D. ø48 Length 52	37	45	1.78
PDVE4-40A-RC	Rc1 1/2	37	45	1.67
PDVE4-50A	Rc2	53	62	2.76

How to order

PDVE4 - 20A - 3T - AC100V

- PDVE4: Model No.
- 20A: Ⓐ Port size and diaphragm material *1 *2 *3
- 3T: Coil code
- AC100V: Ⓑ Rated voltage

Code	Description	Diaphragm material: Urethane rubber	Diaphragm material: Nitrile rubber
Ⓐ Port size and diaphragm material			
20A	Rc3/4	●	
25A	Rc1	●	
40A	IN:Rc1 1/2 OUT: O.D. ø48, length 52		●
40A-RC	Rc1 1/2		●
50A	Rc2		●
Ⓑ Rated voltage			
AC100V	100 VAC(50/60 Hz)/110 VAC(60 Hz)	*For voltages other than above, contact CKD.*	
AC200V	200 VAC(50/60 Hz)/220 VAC(60 Hz)		

[Example of model No.]

PDVE4-25A-3T-AC100V

Model PDVE4

Ⓐ Port size and diaphragm material : Rc1, diaphragm - urethane rubber

Ⓑ Rated voltage : 100 VAC(50/60 Hz)/110 VAC(60 Hz)

*1 : For Item Ⓐ (Port size) 20A/25A, diaphragm material is urethane rubber. (Nitrile rubber diaphragm can be made to order.)

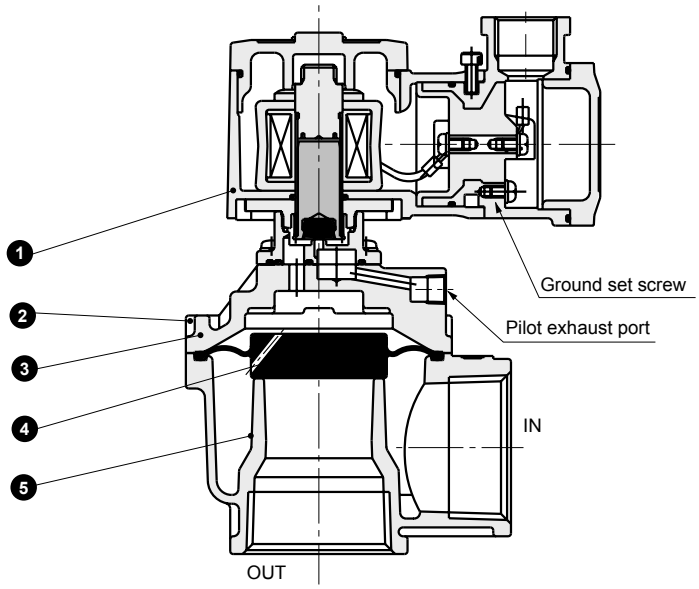
*2 : For Item Ⓐ (Port size) 40A/40A-RC/50A, diaphragm material is nitrile rubber. (Urethane rubber diaphragm is not available.)

*3 : For Item Ⓐ (Port size) 40A/40A-RC, main valving element material is nylon resin.

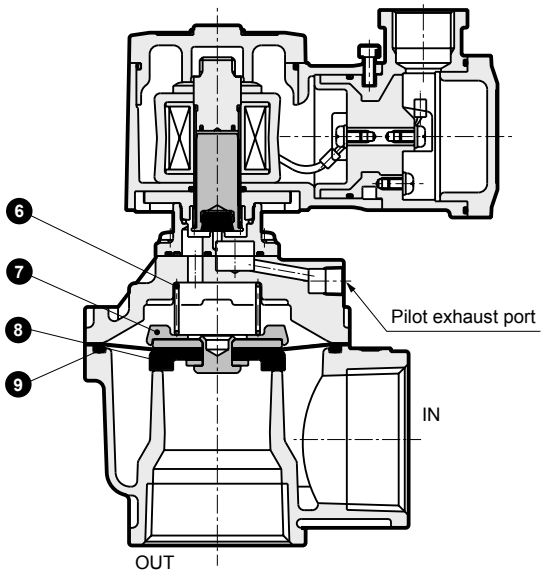
*4 : Contact CKD when using as a dust collector for ash treatment or combustion gas at a waste incinerator.

Internal structure and parts list

● 20A/25A

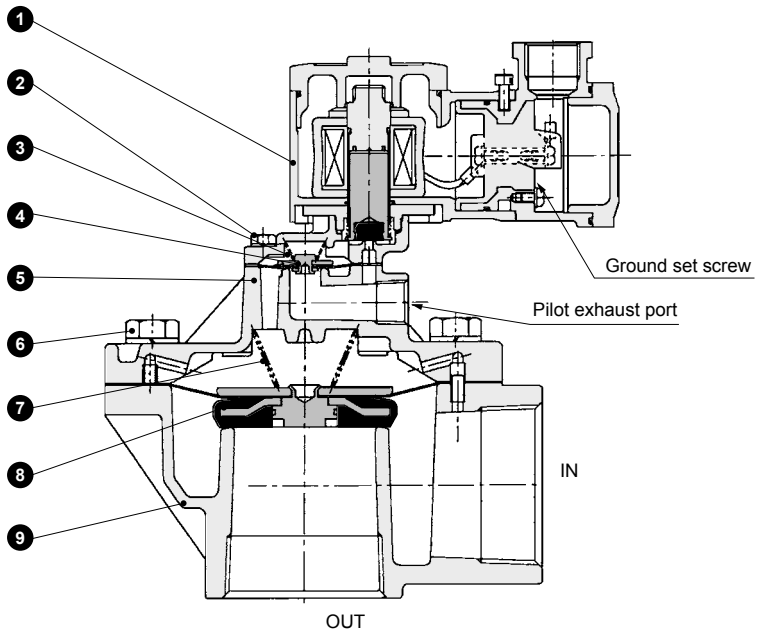


● 40A-RC/40A
* The shape of 40A body is different from the figure below.



No.	Part name	Material		No.	Part name	Material	
1	Explosion-proof solenoid valve			6	Spring	SUS304	Stainless steel
2	Hex upset bolt	SUS304	Stainless steel	7	Spacer	PA	Nylon resin
3	Cover	AC4C	Aluminum casting	8	Diaphragm assembly	SUS304, PA NBR	Stainless steel, nylon resin Nitrile rubber
4	Diaphragm	U	Urethane rubber				
5	Body	ADC12	Aluminum die-casting	9	O-ring	NBR	Nitrile rubber

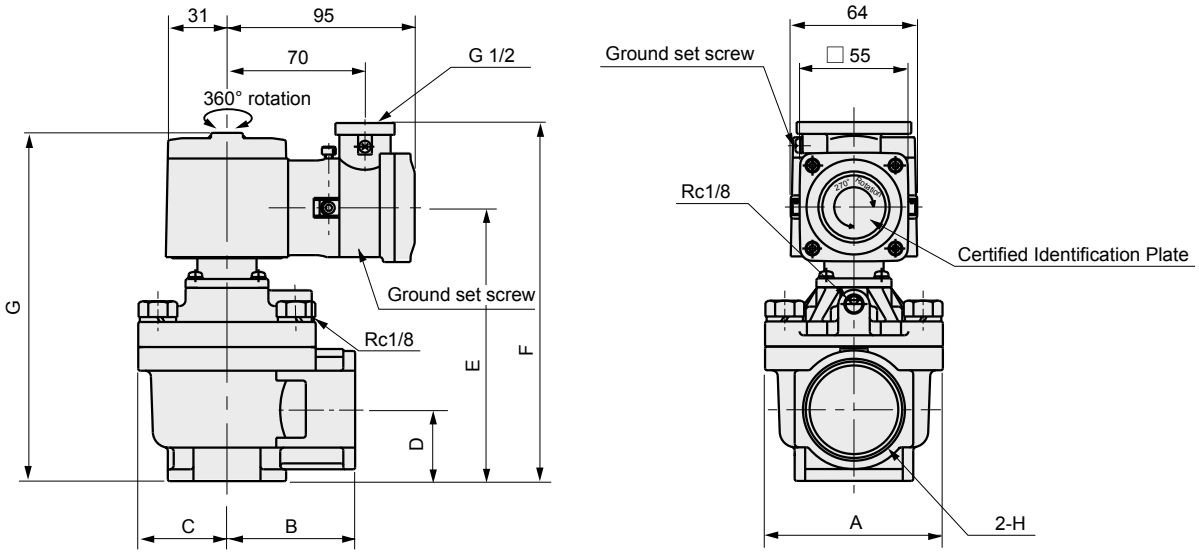
● 50A



No.	Part name	Material		No.	Part name	Material	
1	Explosion-proof solenoid valve			6	Hexagon head bolt	SUS304	Stainless steel
2	Hex upset bolt	SUS304	Stainless steel	7	Mainspring	SUS304	Stainless steel
3	Pilot spring	SUS304	Stainless steel	8	Main diaphragm assembly	SUS304, 316L, NBR	Stainless steel, nitrile rubber
4	Pilot diaphragm assembly	SUS304, NBR, PTFE	S.S., NBR, TFE resin	9	Body	ADC12	Aluminum die-casting
5	Body	ADC12	Aluminum die-casting				

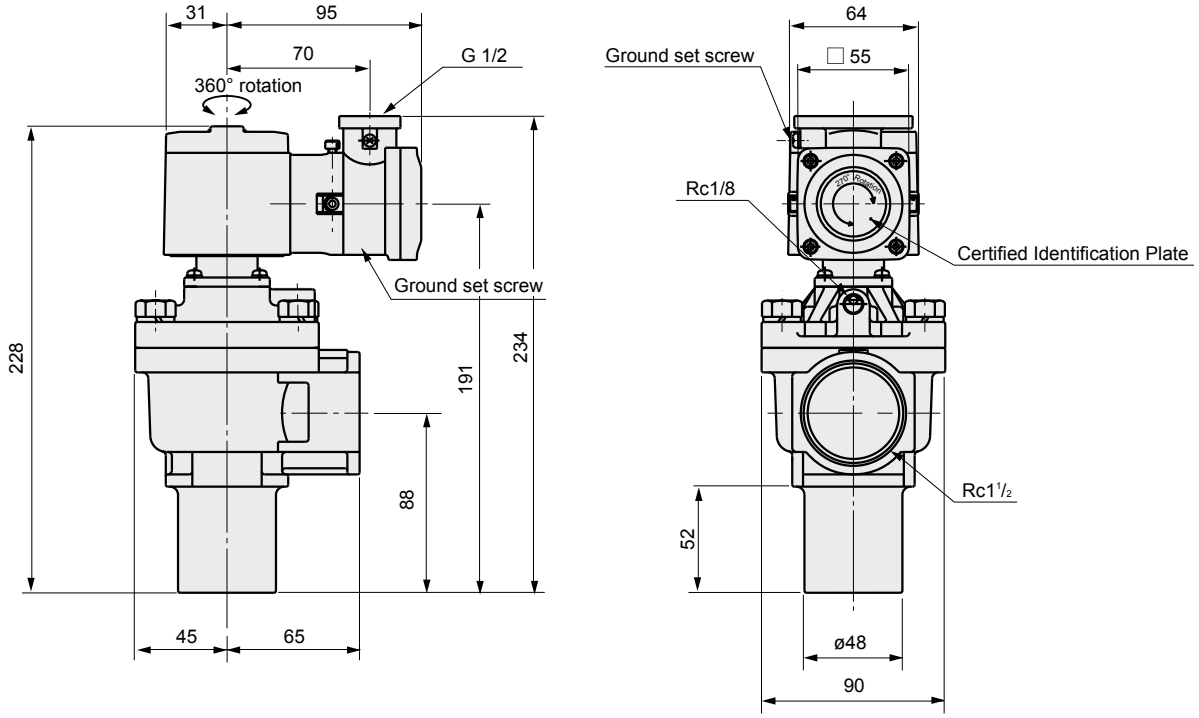
Dimensions

● 20A/25A/40A-RC



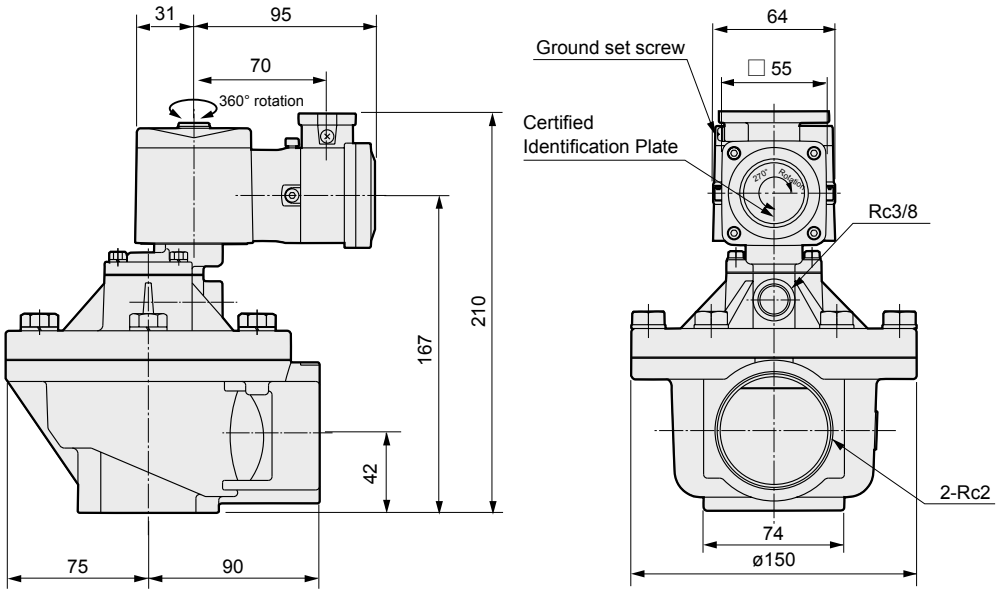
Model No.	A	B	C	D	E	F	G	H
PDVE4-20A-3T	60	40	31.5	31	113	156	150	Rc3/4
PDVE4-25A-3T	71	45	37.5	39	126	169	163	Rc1
PDVE4-40A-RC-3T	90	65	45	36	139	182	176	Rc1 1/2

● 40A



Dimensions

● 50A



Sequential fluid control components for large port size dust collector valve
(Controller for large port size dust collector valve)

OMC2 Series

● Step No.: 6, 10

RoHS

Specifications

Item		OMC2-6	OMC2-10
Number of output steps		6	10
Power supply voltage V		100 to 220 AC ±10% (50/60 Hz) *1	
Power consumption VA		5 or less (controller only)	
Power supply fuse		3A 250V	
Operating ambient temperature °C		-10 (14°F) to 60 (140°F)	
Operating ambient humidity % RH		80 or less	
Storage ambient temperature °C		-20 (-4°F) to 70 (158°F)	
Pulse ON time setting range		(01 to 99) × (0.01 sec. or 0.1 sec. or 1 sec. or 10 sec.)	
Pulse OFF time setting range		(01 to 99) × (1 sec. or 10 sec.)	
Set time accuracy		Set time ± 5% + max. 1/2 cycle (commercial frequency)	
Operation mode	Independent	Continuous run mode with a single unit	
	Linked	Serial connection interlock mode between master unit and slave unit	
Pulse repetition rate		Single- or double-striking (double-striking is not possible when interval time is set)	
Stop		Immediate stop or cycle stop (select either one.)	
Interval time		1 to 99 min. (enabled only when single-striking is set)	
Insulation resistance		10 MΩ or more (500 VDC)	
Withstand voltage		No failure after 1 minute of 1,500 VAC application	
Output circuit leakage current		1 mA or less at 100 VAC, 1.3 mA or less at 200 VAC, 1.4 mA or less at 220 VAC	
Weight kg		0.3	

*1 : The voltage of the connected valve must match the power supply voltage.

How to order

OMC2 - 6

Model No.

Ⓐ Step No.

Code	Description
Ⓐ Step No.	
6	6 steps
10	10 steps

[Example of model No.]

OMC2-6

Model : OMC2

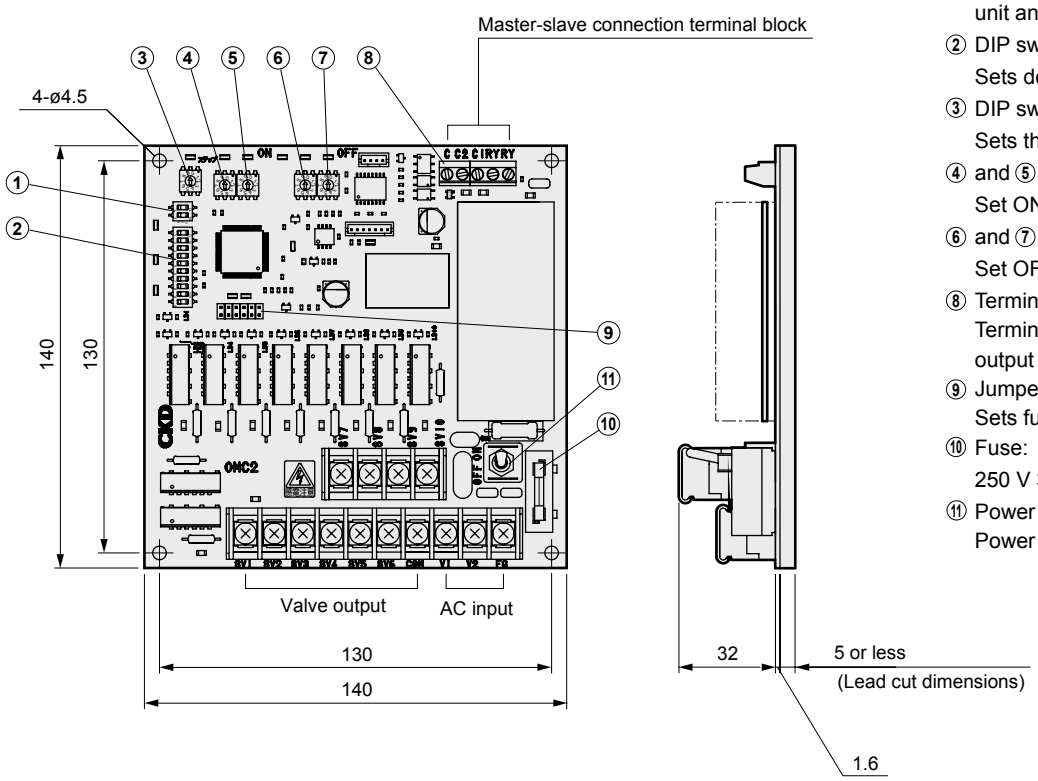
Ⓐ Step No. : 6

⚠ Note on solenoid valve model No. selection

OMC2 can be used with the solenoid valve PDV3, PDV2, PJVB or PDVE4. Select a solenoid valve with a rated voltage matching the system's power supply voltage. If the OMC2 power supply voltage is 100 VAC, select the solenoid valve for 100 VAC. If the OMC2 power supply voltage is 200 VAC, select the solenoid valve for 200 VAC.

Dimensions

● OMC2-6/10

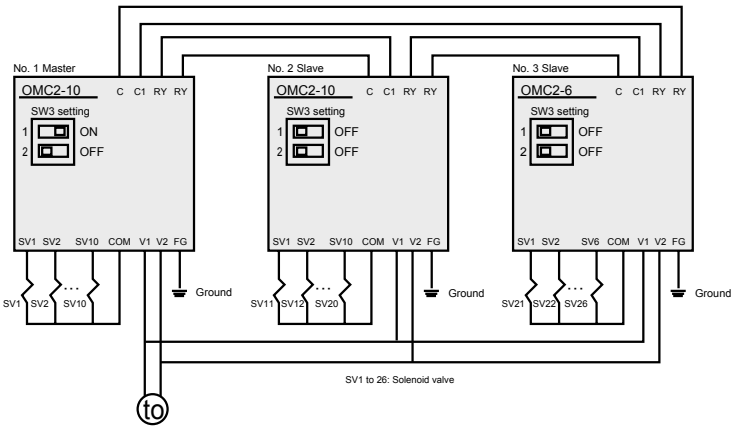


● Switches

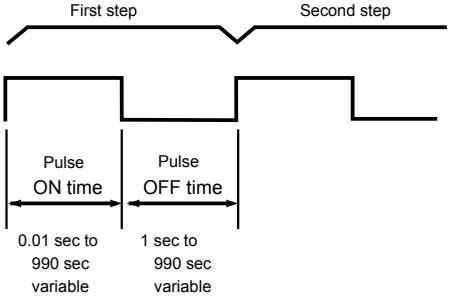
① DIP switch:
Sets switching of single unit, master unit and slave unit.
② DIP switch:
Sets double-striking or interval timer.
③ DIP switch:
Sets the number of steps.
④ and ⑤ DIP switches:
Set ON time.
⑥ and ⑦ DIP switches:
Set OFF time.
⑧ Terminal block:
Terminal block for external sequence output terminal and stop input terminal.
⑨ Jumper:
Sets functions.
⑩ Fuse:
250 V 3 A
⑪ Power supply switch:
Power supply switch

Wiring diagram

● Controller wiring diagram with more than 10 steps



● Time setting
Pulse ON and OFF times can be separately set as shown below.



Pulse ON and OFF times after the second step are the same as those of the first step.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

Large port size dust collector (PD/PDV/PJVB)

Design/selection

⚠ WARNING

1 Ambient environment

(1) If the gases treated by the dust collector include corrosive gases, make sure that the corrosive gases are not led toward the valve. In addition, pipe the valve so that there is no condensation at the OUT port section.

(2) When using outdoors or where the product could come in contact with water drops, use the PDVE4 Series or PD2 or PD3 Series. (Silencer cannot be used outdoors.) PDV2 and PDV3 cannot be used in such places. Provide a cover or install a panel.

(3) Do not use the urethane rubber in dust collectors for waste incineration.

2 Take measures to prevent physical harm or property damage in the event of failure of this product.

3 Refer to the specifications for the scope of each PD Series product warranty and for details on compensation.

⚠ CAUTION

1 Min. working pressure

The min. working differential pressure required for the PD2, PDV2, PD3, PDV3 and PDVE4 types is 0.1 MPa. If the piping cross-sectional area on the fluid inlet is reduced, the operation may become unstable due to a differential pressure fault during valve operation. The piping on the fluid inlet must have a size that matches the valve port size, and must have no restricted sections.

2 Air supply rate

Maintain the header tank air supply rate at two to three times the rate used by the dust collector.

3 Supply air

Do not lubricate the air supplied to the valve with a lubricator.

4 Header tank capacity (PD2/PDV2/PD3/PDV3)

If the header tank is small, the tank pressure may decrease during valve operation, causing vibrations. The recommended capacity is what is shown in the table or higher.

Min. header tank capacity (recommended) 20A to 50A

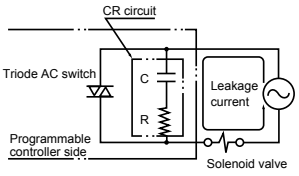
Power ON time		100 ms		200 ms	
Tank pressure		0.3 to 0.5 MPa	0.5 to 0.7 MPa	0.3 to 0.5 MPa	0.5 to 0.7 MPa
Tank capacity	20A	20 ℓ	30 ℓ	40 ℓ	60 ℓ
	25A	30 ℓ	40 ℓ	60 ℓ	80 ℓ
	40A	50 ℓ	80 ℓ	100 ℓ	160 ℓ
	50A	170 ℓ	200 ℓ	340 ℓ	400 ℓ

Min. header tank capacity (recommended) 65A to 80A, 80M

Power ON time		100 ms		200 ms	
Tank pressure		0.2 to 0.5 MPa	0.5 to 0.8 MPa	0.2 to 0.5 MPa	0.5 to 0.8 MPa
Tank capacity	65A	300 ℓ	480 ℓ	600 ℓ	960 ℓ
	80A	500 ℓ	800 ℓ	1000 ℓ	1600 ℓ

5 Leakage current from other fluid control components (PDV3/PDV2)

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications.



Model No. \ Voltage	100 VAC	200 VAC	220 VAC	24 VDC	12 VDC
PDV3/PDV2	6 mA or less	3 mA or less	2.7 mA or less	1 mA or less	2 mA or less

Mounting, piping and wiring

⚠ CAUTION

1 Wiring

(1) The solenoid valve has no polarity.

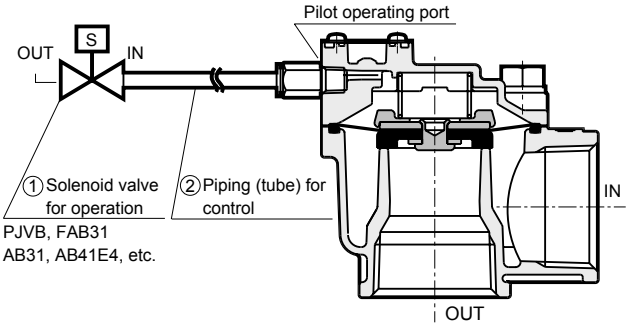
(2) When using an explosion-proof solenoid valve, follow the Recommended Practices for Explosion-protected Electrical Installations in General Industries when wiring.

2 Piping the valve for control

Connect the IN port of the solenoid valve for control (① in the figure below) to the pilot operating port of the pilot operated air operated valve (PD2 or PD3), and leave the OUT port of the solenoid valve for control open to the atmosphere (install a silencer if needed). Do not supply air from an external source to a pilot operating port.

The response of the pilot operated air operated valve (PD2 or PD3) changes based on the effective cross-sectional area of the solenoid valve for control and the inner diameter and length of tubing (② in the figure below) connecting the pilot operating port.

The effective cross-sectional area of the solenoid valve for control should be 5.8 to 15 mm^2 (equivalent to an orifice diameter of ø3 to 5). Tubing should have an inner diameter of 4 mm or 6 mm and be 1 m long or less.



When using the product

⚠CAUTION

1 If the pilot air discharge noise could cause noise disturbances, install a silencer on the exhaust port. If installed on a pilot exhaust port, the silencer may be clogged and malfunction over time. Replace the silencer periodically.
Guideline for replacement: Every six months or 100,000 operation cycles.

2 Set the power ON time according to the dust collector's dust collection efficiency.

Maintenance

⚠CAUTION

1 Periodically drain the drainage if accumulated in the air filter.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

Controller for large port size dust collector valve (OMC2)

Mounting, piping and wiring

⚠WARNING

1 There is a risk of electric shock if the electrical wiring connections (bare, live parts) of the large port size dust collector valve controller are touched.

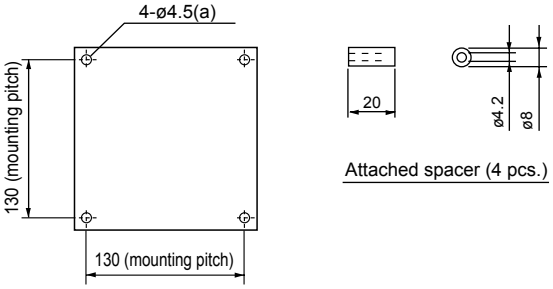
(1) Always turn the power OFF before carrying out electrical wiring. Do not touch parts other than the switches, terminal block and jumpers.

⚠CAUTION

1 Fixing method

(1) Install the product so that it is not exposed to dust or water.

(2) There are four holes (a) on the large port size dust collector valve controller as shown below. Use M4 screws, etc., to securely fix the controller. Use the enclosed spacers as required.



2 Wiring method

Turn the power OFF before starting work.

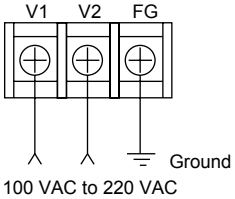
(1) Terminal block cable (for TB4): Use a vinyl sheath cable with a section area of 0.75 mm^2 to 2 mm^2.

(2) Terminal processing: Attach a crimp terminal to the end of the wires connected to the AC input and valve output (TB1, TB2). (thread size M3)

3 AC input and ground

(1) Always ground the ground cable to prevent electric shocks.

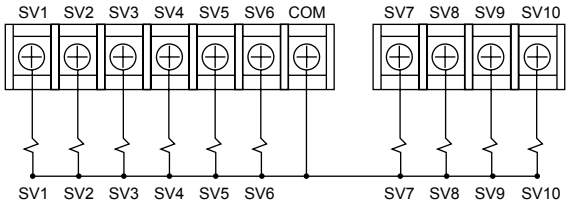
(2) Confirm the rated voltage of the valve used, and connect the corresponding voltage to the AC input terminal (V1, V2).



4 Valve output

(1) Connect in order from SV1 on the valve output terminal block for the number of valves to be used.

(2) After wiring, put the clear terminal cover on the terminal.



When using the product

⚠CAUTION

1 Confirmation before use

(1) Turn the main power OFF.

(2) Confirm that the large port size dust collector valve controller is securely fixed so that it will not fall off.

(3) After checking wiring, put the terminal cover on the terminal.

(4) Confirm that the screws on the wired terminal block are not loose.

(5) Check the power supply voltage with a tester, etc. The voltage fluctuation range must be within ±10% of the rated voltage.

(6) When selecting the solenoid valve, consider the value indicated for the output circuit leakage current in specifications.

2 Notes for appropriate use

(1) Do not touch with wet hands.

(2) Always turn the power switch OFF before changing the settings (touching the jumper or DIP switches) as there is a risk of electric shock.

(3) Do not disassemble or modify the product.

(4) Do not insert a socket into the jumper (J6).

(5) Do not use the pulse-jet valve controller in areas where the ambient temperature is -10°C or less or +60°C or more.

CVE2/CVSE2
CVE3/CVSE3
GCVE2/GCVSE2

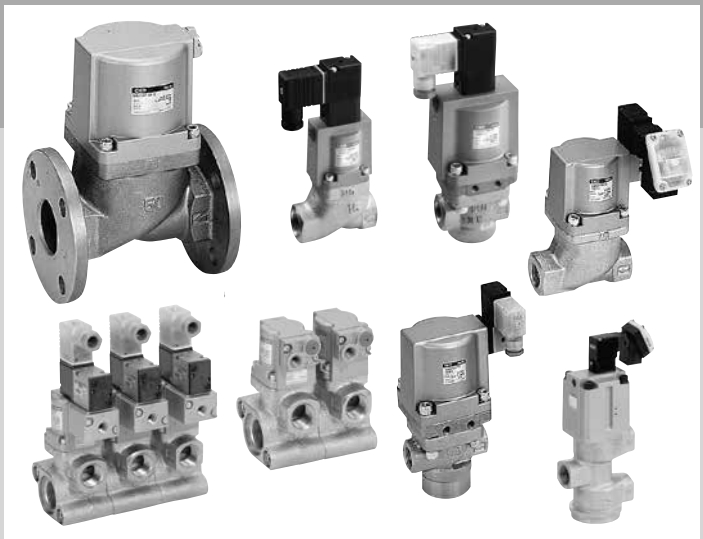
(Coolant valve)

Air operated 2, 3-port valve (coolant control)

■ **For coolant**

Overview

This is a reliable 2, 3-port coolant valve with cylinder drive method. This valve for machine tool coolant control incorporates a metal seal to prevent the entry of cutting chips, abrasive grains and foreign matter, and ensures highly reliable control.
Both the air operated and types with solenoid valves can improve the total accuracy of all types of machine tools, etc.



Features

Highly corrosion-resistant material
Cast iron body, and stainless steel metal seal used in valve seat. NBR or FKM packing seal can be selected. Materials optimal for coolant are used.

Reliable operation
External pilot air operated cylinder guarantees reliable actuation.

Structure that avoids engaging the water hammer.
(2-port valve only)

Resistant to foreign matter
Metal seal.

Also suitable for explosive atmospheres.
(air operated)

CONTENTS

⚠ Always read the precautions in the Introduction and on page 900 before use.

Series variation

Air operated 2, 3-port valve (coolant control) (coolant valve)

Number of ports	Classification			Model	Configuration	Working pressure MPa	Rc3/8	Rc1/2
2-port		For low pressure	Air operated	CVE2-***-05	Single unit	0 to 0.5	●	●
			With solenoid valve	CVSE2-***-05			●	●
			Air operated	CVE2-***-10		0 to 1.0	●	●
			With solenoid valve	CVSE2-***-10			●	●
		For medium pressure	Air operated	CVE2-***-16		0 to 1.6	●	●
			With solenoid valve	CVSE2-***-16			●	●
			Air operated	CVE2-***-30		0 to 3.0	●	●
			With solenoid valve	CVSE2-***-30			●	●
		For high pressure	Air operated	CVE2-***-70		0 to 7.0	●	●
			With solenoid valve	CVSE2-***-70			●	●
		For low pressure	Air operated	GCVE2-***-05	Module	0 to 0.5		●*
			With solenoid valve	GCVSE2-***-05				●*
			Air operated	GCVE2-***-10		0 to 1.0		●*
			With solenoid valve	GCVSE2-***-10				●*
		For medium pressure	Air operated	GCVE2-***-16		0 to 1.6		●*
			With solenoid valve	GCVSE2-***-16				●*
3-port		For low pressure	Air operated	CV3E-***-03	Single unit	0 to 0.3		
			With solenoid valve	CVS3E-***-03				
		For medium pressure	Air operated	CVE3-***-35		0 to 3.5	●	●
			With solenoid valve	CVSE3-***-35			●	●
		For high pressure	Air operated	CVE3-***-70		0 to 7.0	●	●
			With solenoid valve	CVSE3-***-70			●	●

	Port size										Page
	Rc3/4	Rc1	Rc1 1/4	32 flange	Rc1 1/2	40 flange	Rc2	50 flange	65 flange	80 flange	
	●	●	●	●	●	●	●	●	●	●	856
	●	●	●	●	●	●	●	●	●	●	856
	●	●	●	●	●	●	●	●	●	●	856
	●	●	●	●	●	●	●	●	●	●	856
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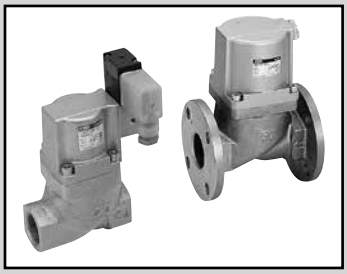
* OUT port size



Air operated 2-port valve for low pressure (coolant valve)

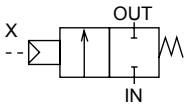
CVSE2/CVSE22-05/10 Series
CVE2/CVE22-05/10 Series

- NC, NO
- Port size: Rc3/8 to Rc2, 32 to 80 flange
- Low pressure 0.5 MPa, 1.0 MPa

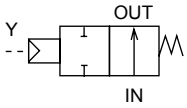
Refer to the Ending for details.

JIS symbol

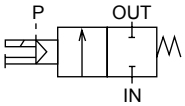
- CVE2 (air operated)
  : NC



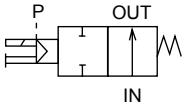
- CVE22 (air operated)
  : NO



- CVSE2 (with solenoid valve)
  : NC



- CVSE22 (with solenoid valve)
  : NO



Common specifications for 0.5 MPa

Model No.	CVE2/CVSE2	CVE22/CVSE22
Actuation	NC	NO
Working fluid	Coolant/other non-corrosive liquids (*1)	
Fluid viscosity mm^2/s	500 or less	
Working pressure MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm^3/min	20 or less (water pressure) (*2)	
Mounting orientation	Unrestricted	
Pilot fluid	Air	
Pilot pressure MPa	0.25 (≈36 psi, 2.5 bar) to 0.7 (≈100 psi, 7 bar)	
Water hammer value (for reference) MPa	1 or less (steel pipe 10 m, total pressure 0.5 MPa, flow rate 5 m/sec.)	

*1 : Fluids that do not affect cast iron (nickel plating), stainless steel, nitrile rubber or fluoro rubber
*2 : 1 cm^3/min or less for port size 10A (Rc3/8)

Electrical specification (with solenoid valve/common specifications)			
Rated voltage		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	Starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)	Grommet lead wire	IPX2	
	With DIN terminal box (Pg9)	IPX5	
	DIN terminal box (M12-4P connector)	IPX5	
	With T type terminal box (G1/2)	IPX5	

*3 : The voltage fluctuation range must be within ±10% of the rated voltage.

Individual specifications for 0.5 MPa

Item / Model No.	Port size	Orifice size (mm)	Cv	Pilot port size	Weight (kg)	
					CVE2(2)	CVSE2(2)
CVE2 (2)/CVSE2 (2) -10A-05	Rc3/8	10	2.8	Rc1/8	0.35	0.45
CVE2 (2)/CVSE2 (2) -15A-05	Rc1/2	14	6.5		0.6	0.7
CVE2 (2)/CVSE2 (2) -20A-05	Rc3/4	19	11		1.2	1.3
CVE2 (2)/CVSE2 (2) -25A-05	Rc1	24	18		1.8	1.9
CVE2 (2)/CVSE2 (2) -32A-05	Rc1 1/4	31	28		2.7	2.8
CVE2 (2)/CVSE2 (2) -32F-05	32 flange	31	28		5.3	5.4
CVE2 (2)/CVSE2 (2) -40A-05	Rc1 1/2	40	43		4.4	4.5
CVE2 (2)/CVSE2 (2) -40F-05	40 flange	40	43		7.0	7.1
CVE2 (2)/CVSE2 (2) -50A-05	Rc2	50	70		6.5	6.6
CVE2 (2)/CVSE2 (2) -50F-05	50 flange	50	70		9.6	9.7
CVE2 (2)/CVSE2 (2) -65F-05	65 flange	65	70		19.5	19.5
CVE2 (2)/CVSE2 (2) -80F-05	80 flange	79	100		24.0	24.0

Common specifications for 1.0 MPa

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Model No.	CVE2/CVSE2	CVE22/CVSE22
Actuation	NC	NO
Working fluid	Coolant/other non-corrosive liquids (*1)	
Fluid viscosity mm^2/s	500 or less	
Working pressure MPa	0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm^3/min	20 or less (water pressure) (*2)	
Mounting orientation	Unrestricted	
Pilot fluid	Air	
Pilot pressure MPa	0.25 (≈36 psi, 2.5 bar) to 0.7 (≈100 psi, 7 bar)	
Water hammer value (for reference) MPa	2 or less (steel pipe 10 m, total pressure 1 MPa, flow rate 5 m/sec.)	

*1 : Fluids that do not affect cast iron (nickel plating), stainless steel, nitrile rubber or fluoro rubber
*2 : 1 cm^3/min or less for port size 10A (Rc3/8)

Electrical specification (with solenoid valve/common specifications)			
Rated voltage		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	Starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)		Grommet lead wire	IPX2
		With DIN terminal box (Pg9)	IPX5
		DIN terminal box (M12-4P connector)	IPX5
		With T type terminal box (G1/2)	IPX5

*3 : The voltage fluctuation range must be within ±10% of the rated voltage.

Individual specifications for 1.0 MPa

Item / Model No.	Port size	Orifice size (mm)	Cv	Pilot port size	Weight (kg)	
					CVE2(2)	CVSE2(2)
CVE2 (2)/CVSE2 (2) -10A-10	Rc3/8	7	1.7	Rc1/8	0.35	0.45
CVE2 (2)/CVSE2 (2) -15A-10	Rc1/2	10	4.5		0.6	0.7
CVE2 (2)/CVSE2 (2) -20A-10	Rc3/4	14	7		1.2	1.3
CVE2 (2)/CVSE2 (2) -25A-10	Rc1	17	11		1.8	1.9
CVE2 (2)/CVSE2 (2) -32A-10	Rc1 1/4	23	20		2.7	2.8
CVE2 (2)/CVSE2 (2) -32F-10	32 flange	23	20		5.3	5.4
CVE2 (2)/CVSE2 (2) -40A-10	Rc1 1/2	29	30		4.4	4.5
CVE2 (2)/CVSE2 (2) -40F-10	40 flange	29	30		7.0	7.1
CVE2 (2)/CVSE2 (2) -50A-10	Rc2	35	48		6.5	6.6
CVE2 (2)/CVSE2 (2) -50F-10	50 flange	35	48		9.6	9.7
CVE2 (2)/CVSE2 (2) -65F-10	65 flange	49	50		19.5	19.5
CVE2 (2)/CVSE2 (2) -80F-10	80 flange	57	73		24.0	24.0

How to order

● Air operated

CVE2 2 - 20A - 10 - 0 B -

● With solenoid valve

CVSE2 2 - 15A - 05 - 0 2G S - - 1

Ⓐ Actuation
Ⓑ Port size
Ⓒ Working pressure
Ⓓ Body/sealant combination
Ⓔ Coil *1 *2
Ⓕ Other options *3 *4 *5 *6 *7 *8
Ⓖ Assembly direction *8
Ⓗ Voltage

Model No.	
Air operated (2-port)	CVE2
With solenoid valve (2-port)	CVSE2

[Example of model No.]

CVSE22-15A-05-02GS-1

Model: CVSE2 : With solenoid valve (2-port)
Ⓐ Actuation : NO
Ⓑ Port size : Rc1/2
Ⓒ Working pressure : 0 to 0.5 MPa
Ⓓ Body/sealant combination : Body - cast iron (plating), sealant - nitrile rubber
Ⓔ Coil : With DIN terminal box (Pg9)
Ⓕ Other options : With surge suppressor
Ⓖ Assembly direction : No option
Ⓗ Voltage : 100 VAC(50/60 Hz), 110 VAC(60 Hz)

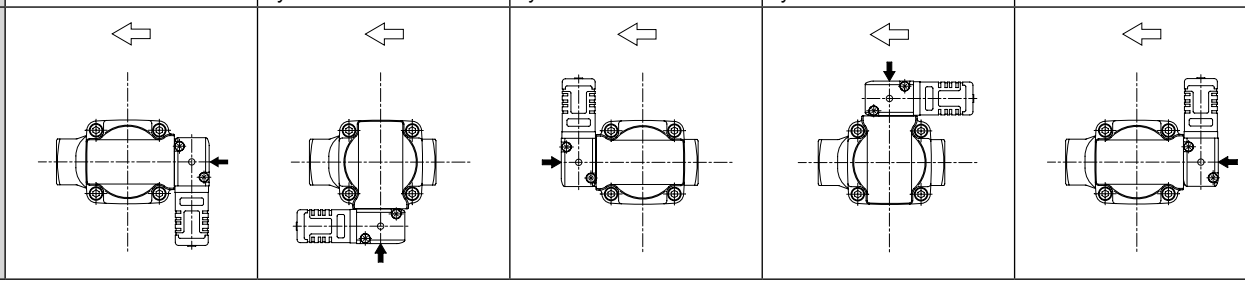
*1 : Surge suppressor is not available for Item Ⓔ 2J.
*2 : Item Ⓔ 2K is available only for the type with surge suppressor and should be specified as 2KS.
*3 : The mounting plate (Item Ⓕ B) is provided and can be assembled to port size 10A, 15A, 20A and 25A only.
*4 : Top mounted solenoid valve (Item Ⓕ T) is available only for port sizes 15A, 20A and 25A.
*5 : To add both the surge suppressor and mounting plate options, specify Item Ⓕ as SB. For a solenoid valve mounted on top, indicate as STB.
*6 : The surge suppressor is attached with the lead wire coil. When selecting a coil with a terminal box, the surge suppressor is mounted in the terminal box.
*7 : A manual override (non-locking) is provided as standard for the solenoid valve mounted.
*8 : Assembly direction option cannot be selected for the type with top mounted solenoid valve (Item Ⓕ T).

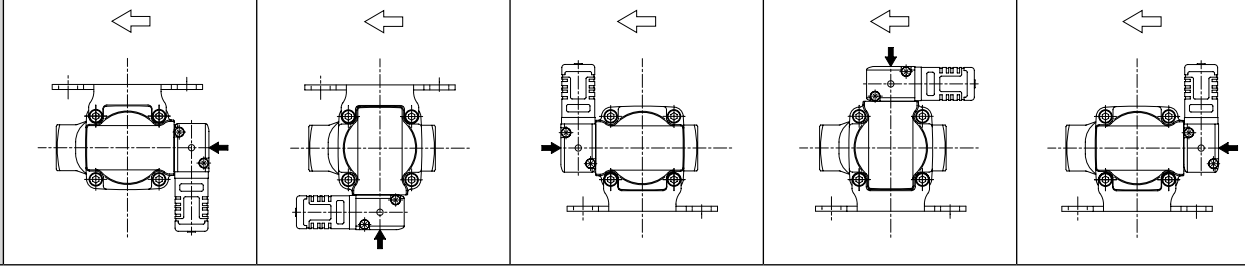
Code	Description			Model No. CVE2	Model No. CVSE2
Ⓐ Actuation					
Blank	NC			●	●
2	NO			●	●
Ⓑ Port size					
10A	Rc3/8			●	●
15A	Rc1/2			●	●
20A	Rc3/4			●	●
25A	Rc1			●	●
32A	Rc1 1/4			●	●
32F	32 flange			●	●
40A	Rc1 1/2			●	●
40F	40 flange			●	●
50A	Rc2			●	●
50F	50 flange			●	●
65F	65 flange			●	●
80F	80 flange			●	●
Ⓒ Working pressure					
05	0 to 0.5 MPa			●	●
10	0 to 1.0 MPa			●	●
Ⓓ Body/sealant combination					
		Body	**Seal**		
0	Standard	Cast iron (plating)	Nitrile rubber	●	●
B	Option	Cast iron (plating)	Fluoro rubber	●	●
Ⓔ Coil					
2C	Standard	Grommet lead wire			●
2G	Option	With DIN terminal box (Pg9)			●
2H		DIN terminal box with lamp (Pg9)			●
2J		DIN terminal box (M12-4P connector)			●
2K		DIN term box, lamp (M12-4P connector)			●
3T		With T type terminal box (G1/2)			●
3R		T type terminal box with lamp (G1/2)			●
Ⓕ Other options					
Blank	No option			●	●
S	With surge suppressor				●
T	Top mounted solenoid valve				●
B	Mounting plate			●	●
Ⓖ Assembly direction					
Blank	No option			●	●
X	Cylinder cover rotated 90°				●
Y	Cylinder cover rotated 180°				●
Z	Cylinder cover rotated 270°				●
R	Mounting plate reversed 180° [air operated]/ coil reversed 180° [with solenoid valve] Mounting plate/coil reversed 180° [with solenoid valve]			●	●

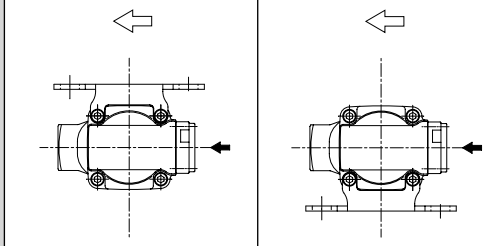
Refer to page 859 for the layout drawing.

Ⓗ Voltage			
1	100 VAC(50/60 Hz) 110 VAC(60 Hz)		●
2	200 VAC(50/60 Hz) 220 VAC(60 Hz)		●
3	24 VDC		●

Item Ⓖ Assembly direction

CVSE2 [With solenoid valve] *9					
Code	Blank (standard)	X *10	Y *10	Z *10	R *10
Direction	No rotation	Cylinder cover rotated 90°	Cylinder cover rotated 180°	Cylinder cover rotated 270°	Coil reversed
Layout					

CVSE2 [With solenoid valve] *3/9					
Code	B (with mounting plate)	B-X	B-Y *11	B-Z *11	B-R *12
Direction	No rotation	Cylinder cover rotated 90°	Cylinder cover rotated 180° Mounting plate reversed	Cylinder cover rotated 270° Mounting plate reversed	Coil reversed Mounting plate reversed
Layout					

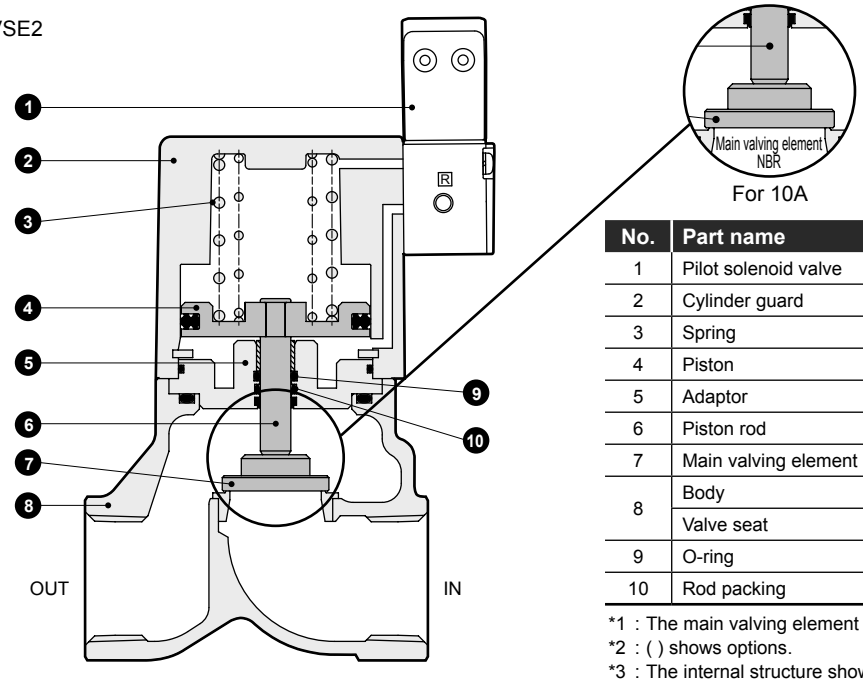
CVE2 [Air operated] *3/9		
Code	B (with mounting plate)	B-R *13
Direction	No rotation	Mounting plate reversed
Layout		

⇦shows flow path direction and ⬅ shows pilot port IN.

*9 : Clockwise angle when viewed from above with the IN port on the right.
*10 : Not available for port size 65F/80F.
*11 : The mounting plate will be reversed 180° and attached.
*12 : The mounting plate for port size 10A is installed at the bottom, so only the coil position is reversed.
*13 : Not available for port size 10A.

Internal structure and parts list

● CVSE2

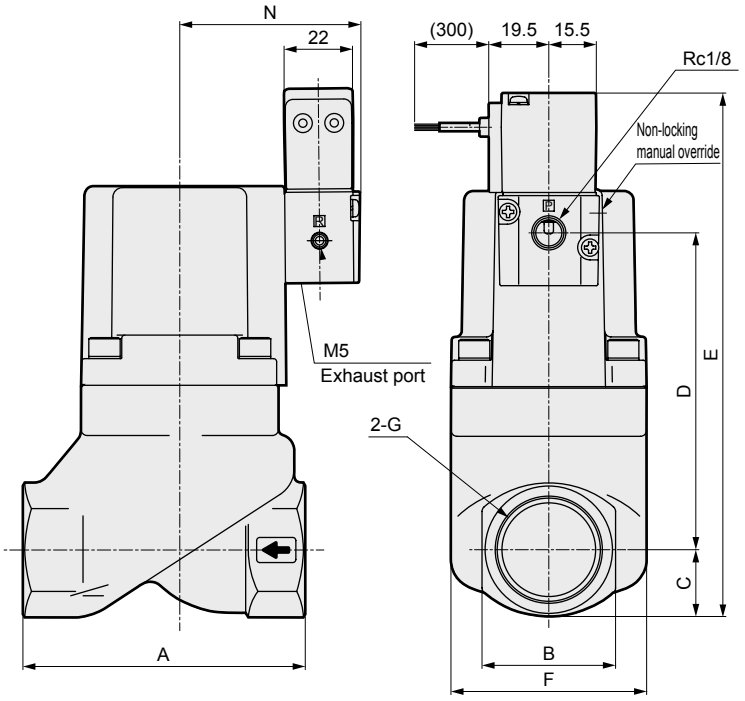


No.	Part name	Material	
1	Pilot solenoid valve	-	
2	Cylinder guard	ADC12	Aluminum die-casting
3	Spring	SWP	Piano wire
4	Piston	A2017	Aluminum
5	Adaptor	SUS303	Stainless steel
6	Piston rod	SUS304	Stainless steel
7	Main valving element	SUS420J2	Stainless steel*1
8	Body	FCD450	Cast iron (plating)
	Valve seat	SUS420J2	Stainless steel
9	O-ring	NBR(FKM)	Nitrile rubber (Fluoro rubber) *2
10	Rod packing	NBR(FKM)	Nitrile rubber (Fluoro rubber) *2

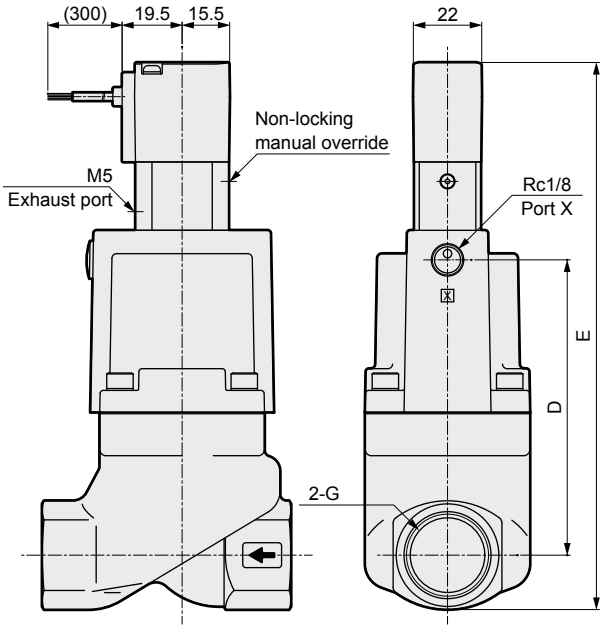
*1 : The main valving element material of 10A is NBR or FKM.
*2 : ( ) shows options.
*3 : The internal structure shown is of 15A to 50A.
For 10A, 65F and 80F, contact CKD separately.

Dimensions CAD

● CVSE2/CVSE22-10A to 50A-05/10-*2C
(Rc screw-in)



● CVSE2/CVSE22-15A to 25A-05/10-*2CT
(Solenoid valve mounted on the top)



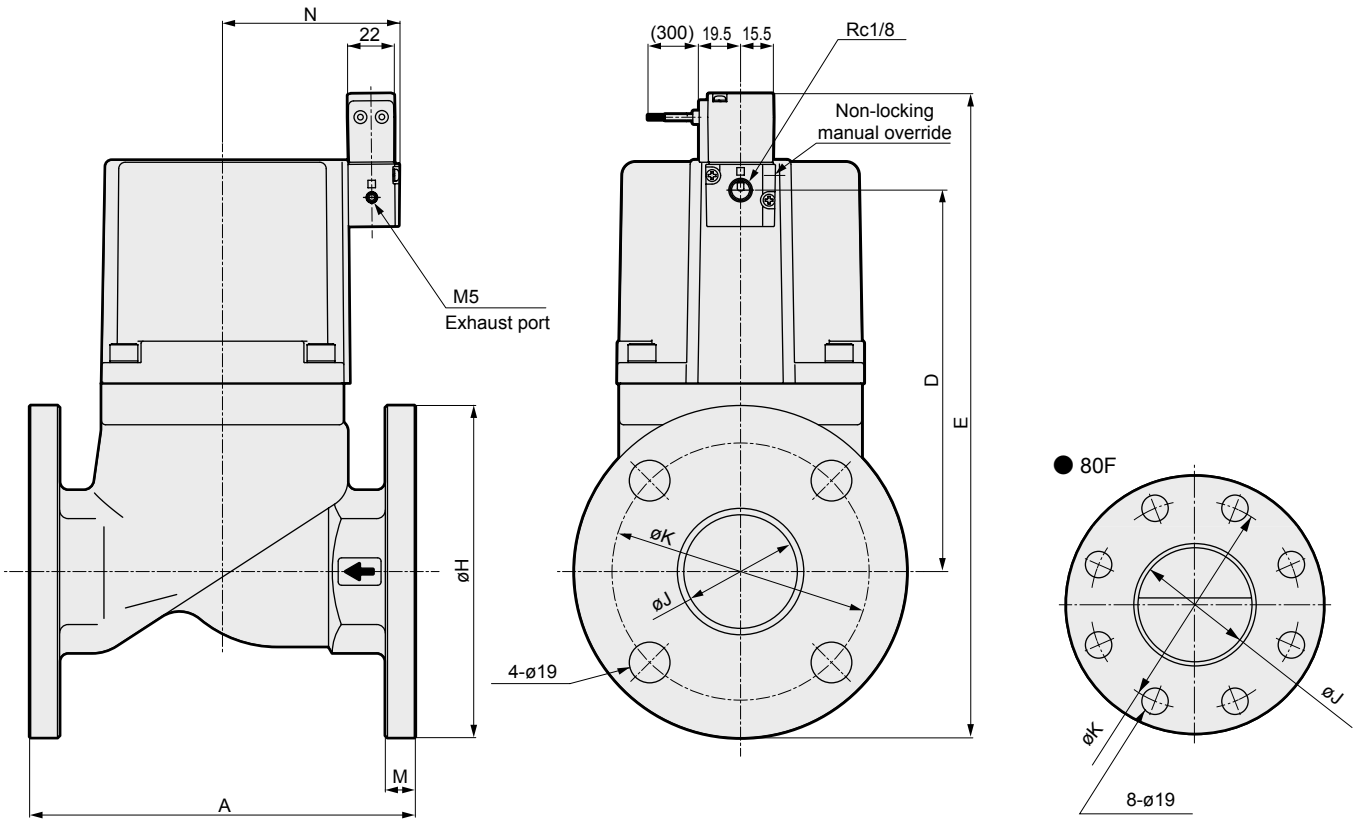
* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	N
CVSE*-10A-05/10-*2C	50	24	12	47.5	104.5	32	Rc3/8	48.5
CVSE*-15A-05/10-*2C	71	29	14.5	71.5	131	43	Rc1/2	49.5
CVSE*-20A-05/10-*2C	80	35	17.5	83.5	146	53	Rc3/4	53
CVSE*-25A-05/10-*2C	90	43	21.5	102	168.5	63	Rc1	57.5
CVSE*-32A-05/10-*2C	125	55	27.5	130.5	203	77	Rc1 1/4	64.5
CVSE*-40A-05/10-*2C	140	61	30.5	156.5	232	95	Rc1 1/2	72.5
CVSE*-50A-05/10-*2C	160	76	38	178	261	113	Rc2	82.5

Model No.	D	E
CVSE2*-15A-05/10-*2CT	83	161
CVSE2*-20A-05/10-*2CT	95	176
CVSE2*-25A-05/10-*2CT	113	198

Dimensions

● CVSE2/CVSE22-32F to 80F-05/10-*2C (flange)



* The figure shows the unit with no assembly direction option selected.

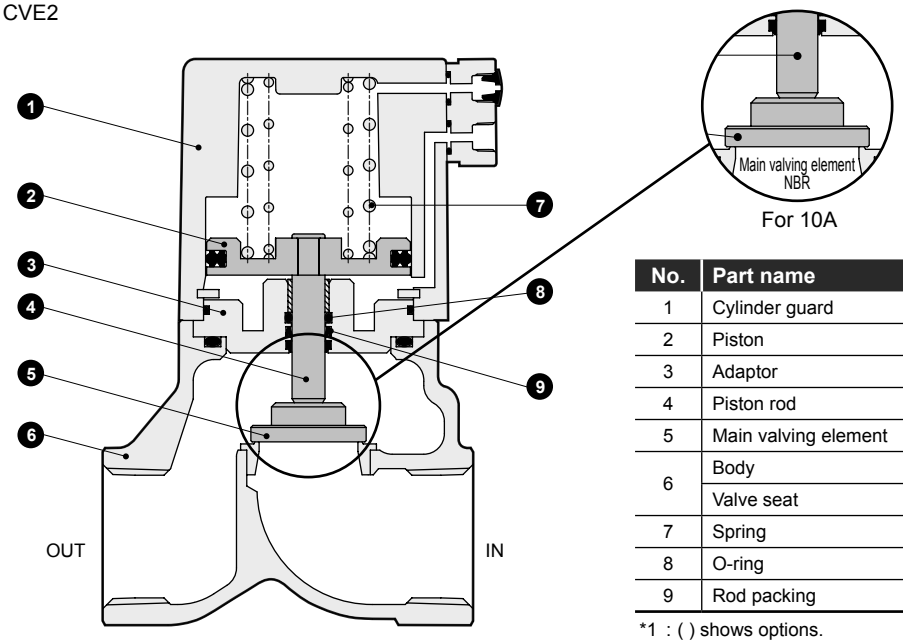
Model No.	A	D	E	H	J	K	M	N
CVSE*-32F-05/10-*2C	170	130.5	243	135	35	100	12	64.5
CVSE*-40F-05/10-*2C	180	156.5	271.5	140	41	105	12	72.5
CVSE*-50F-05/10-*2C	180	178	300.5	155	53	120	14	82.5
CVSE*-65F-05/10-*2C	210	203	347.5	175	68	140	16	113
CVSE*-80F-05/10-*2C	240	218	367.5	185	82	150	16	123

Optional dimensions

Refer to pages 864 and 865 for coil options and mounting plates.

Internal structure and parts list

● CVE2

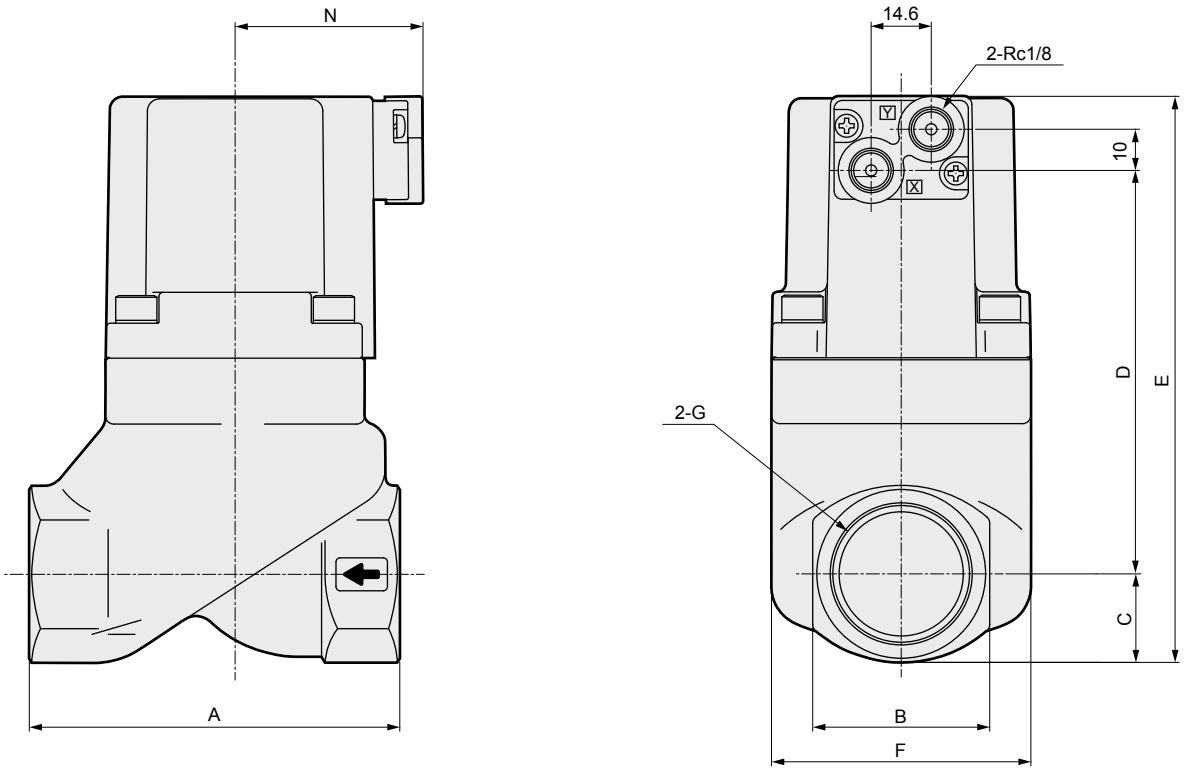


No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Piston rod	SUS304	Stainless steel
5	Main valving element	SUS420J2	Stainless steel
6	Body	FCD450	Cast iron (plating)
	Valve seat	SUS420J2	Stainless steel
7	Spring	SWP	Piano wire
8	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)

*1 : ( ) shows options.
*2 : The internal structure shown is of 15A to 50A.
For 10A, 65F and 80F, contact CKD separately.

Dimensions CAD

● CVE2/CVE22-10A to 50A-05/10-** (Rc screw-in)

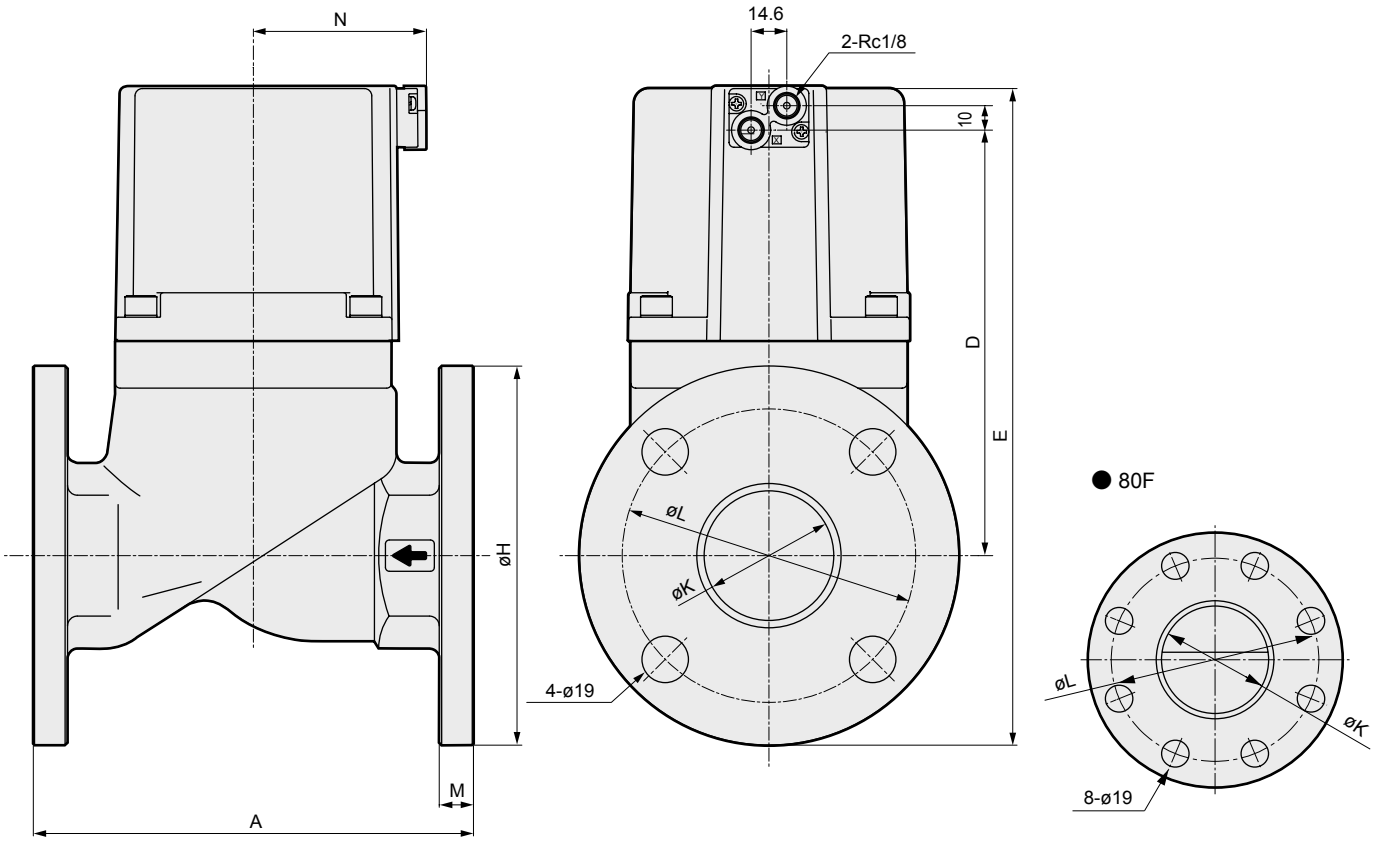


* Pilot pressurization port is port X for the NC and port Y for the NO.

Model No.	A	B	C	D	E	F	G	N
CVE*-10A-05/10-*	50	24	12	43.5	73.5	32	Rc3/8	37
CVE*-15A-05/10-*	71	29	14.5	67.5	100	43	Rc1/2	38
CVE*-20A-05/10-*	80	35	17.5	79.5	115	53	Rc3/4	41.5
CVE*-25A-05/10-*	90	43	21.5	98	137.5	63	Rc1	46
CVE*-32A-05/10-*	125	55	27.5	126.5	172	77	Rc1¼	53
CVE*-40A-05/10-*	140	61	30.5	152.5	201	95	Rc1½	61
CVE*-50A-05/10-*	160	76	38	174	230	113	Rc2	71

Dimensions

● CVE2/CVE22-32F to 80F-05/10-** (flange)



Model No.	A	D	E	H	K	L	M	N
CVE*-32F-05/10-*	170	126.5	212	135	35	100	12	53
CVE*-40F-05/10-*	180	152.5	240.5	140	41	105	12	61
CVE*-50F-05/10-*	180	174	269.5	155	53	120	14	71
CVE*-65F-05/10-*	210	199	347.5	175	68	140	16	101
CVE*-80F-05/10-*	240	214	367.5	185	82	150	16	111

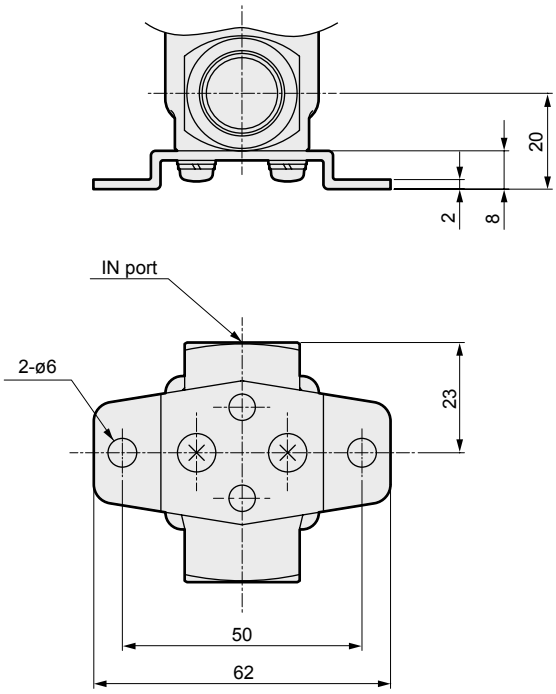
Optional dimensions

Refer to page 864 for mounting plates.

Optional dimensions CAD

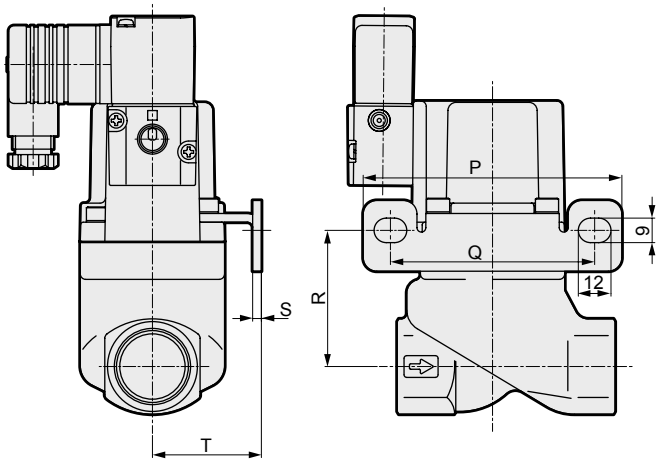
● Mounting plate
CVE2/CVE22 -10A-05/10-**B
CVSE2/CVSE22

Material: Steel
Zinc plated



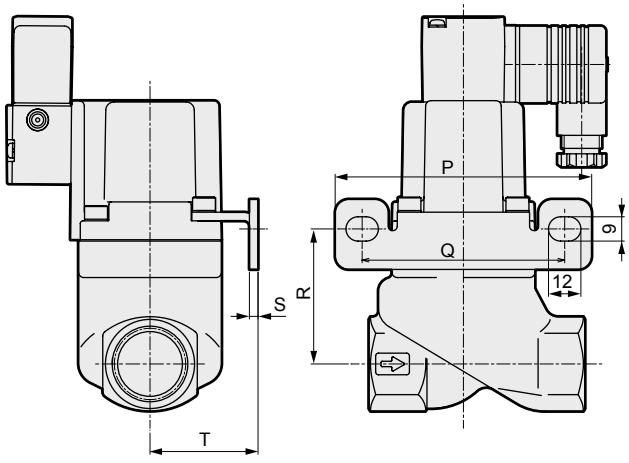
* Use the body mounting screws if fixing without a mounting plate.
(thread size: M4 depth 7)

● Mounting plate
CVE2/CVE22
CVSE2/CVSE22 -15A/20A/25A-05/10-**B/B-R/B-Y



* The figure shows B.

● Mounting plate
CVE2/CVE22
CVSE2/CVSE22 -15A/20A/25A-05/10-**B-X/B-Z



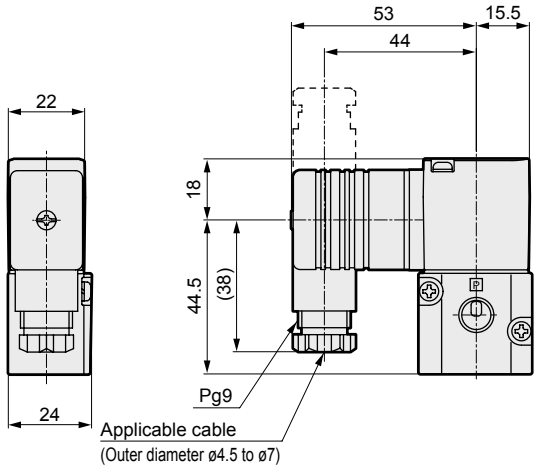
* The figure shows B-X.

Material: Steel
Zinc plated

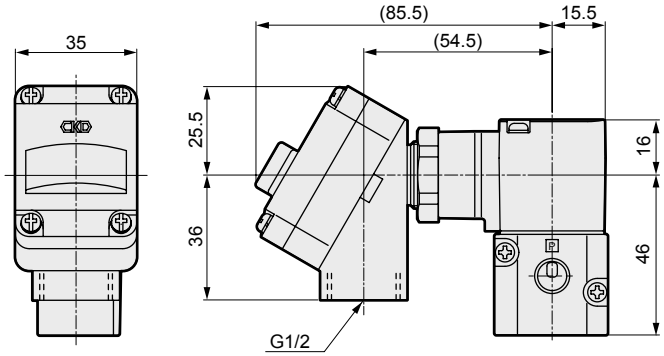
Model No.	P	Q	R	S	T
CV*E2*-15A-05/10-**B	90	70	45	2.3	30
CV*E2*-20A-05/10-**B	95	75	50	3.2	40
CV*E2*-25A-05/10-**B	105	85	55	3.2	45

Optional dimensions

● With DIN terminal box (Pg9)
DIN terminal box with lamp (Pg9)
CVSE2/CVSE22-*-05/10-* [2G / 2H]

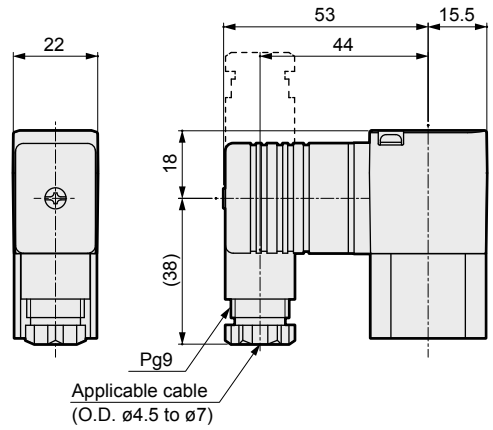


● With T type terminal box (G1/2)
T type terminal box with lamp (G1/2)
CVSE2/CVSE22-*-05/10-* [3T / 3R]

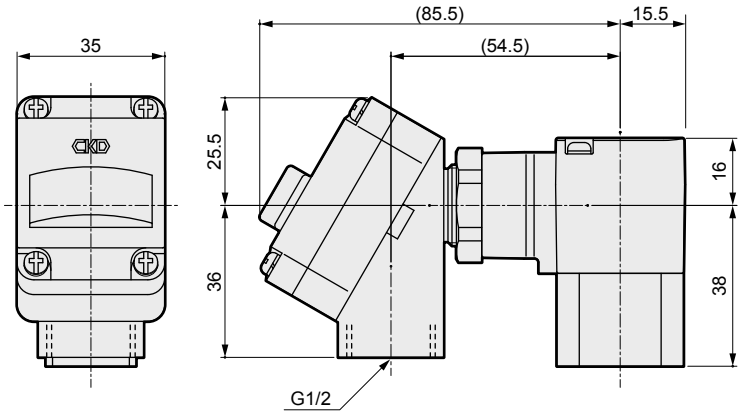


Optional dimensions: Top mounted solenoid valve

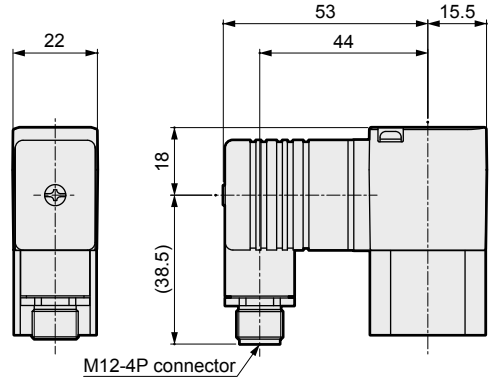
● DIN terminal box (Pg 9)
DIN terminal box with lamp (Pg 9)
CVSE2/CVSE22-*-05/10/16/30-* [2G / 2H] T



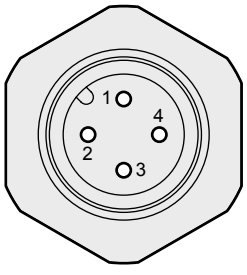
● T type terminal box (G1/2)
T type terminal box with lamp (G1/2)
CVSE2/CVSE22-*-05/10/16/30-* [3T / 3R] T



● DIN terminal box (M12-4P connector)
DIN terminal box with lamp/surge suppressor (M12-4P connector)
CVSE2/CVSE22-*-05/10/16/30-* [2J / 2KS] T

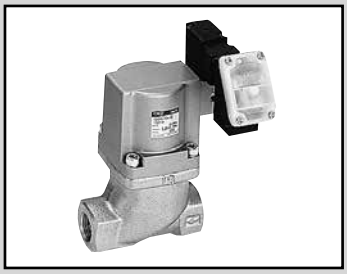


Connector pin array



PIN No.	Applications
1PIN	Ground
2PIN	(Not used)
3PIN	Power supply -
4PIN	Power supply +

* As it is a screw-in, the connector pin positions may not be the same as those shown above.



Air operated 2-port valve for medium pressure (coolant valve)

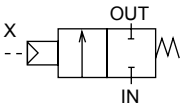
CVSE2/CVSE22-16/30 Series
CVE2/CVE22-16/30 Series

- NC, NO
- Port size: Rc3/8 to Rc1
- Medium pressure 1.6 MPa, 3.0 MPa

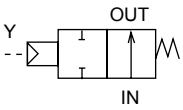
CE Refer to the Ending for details. RoHS CAD

JIS symbol

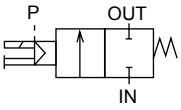
- CVE2 (air operated)
  : NC



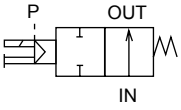
- CVE22 (air operated)
  : NO



- CVSE2 (with solenoid valve)
  : NC



- CVSE22 (with solenoid valve)
  : NO



Common specifications for 1.6 MPa

Model No.	CVE2/CVSE2	CVE22/CVSE22
Actuation	NC	NO
Working fluid	Coolant/other non-corrosive liquids (*1)	
Fluid viscosity mm^2/s	500 or less	
Working pressure MPa	0 (≈0 psi, 0 bar) to 1.6 (≈230 psi, 16 bar)	
Proof pressure (water pressure) MPa	6.0 (≈870 psi, 60 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm^3/min	20 or less (water pressure)	
Mounting orientation	Unrestricted	
Pilot fluid	Air	
Pilot pressure MPa	0.25 (≈36 psi, 2.5 bar) to 0.7 (≈100 psi, 7 bar)	

*1 : Fluids that do not affect cast iron (nickel plating), stainless steel, steel, nitrile rubber or fluoro rubber

Electrical specification (with solenoid valve/common specifications)			
Rated voltage (*2)		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	When starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)		With DIN terminal box (Pg9)	IPX5
		DIN terminal box (M12-4P connector)	IPX5
		With T type terminal box (G1/2)	IPX5

*2 : The voltage fluctuation range must be within ±10% of the rated voltage.

Individual specifications for 1.6 MPa

Item / Model No.	Port size	Orifice size (mm)	Cv	Pilot port size	Weight (kg)	
					CVE2(2)	CVSE2(2)
CVE2 (2)/CVSE2 (2) -10A-16	Rc3/8	10.5	3.6	Rc1/8	0.9	1.0
CVE2 (2)/CVSE2 (2) -15A-16	Rc1/2	10.5	4.6		0.9	1.0
CVE2 (2)/CVSE2 (2) -20A-16	Rc3/4	14.5	7		1.3	1.4
CVE2 (2)/CVSE2 (2) -25A-16	Rc1	18.5	11.5		2.2	2.3

Common specifications for 3.0 MPa

Model No.	CVE2/CVSE2	CVE22/CVSE22
Actuation	NC	NO
Working fluid	Coolant/other non-corrosive liquids (*1)	
Fluid viscosity mm^2/s	500 or less	
Working pressure MPa	0 (≈0 psi, 0 bar) to 3.0 (≈440 psi, 30 bar)	
Proof pressure (water pressure) MPa	6.0 (≈870 psi, 60 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm^3/min	20 or less (water pressure)	
Mounting orientation	Unrestricted	
Pilot fluid	Air	
Pilot pressure MPa	0.25 (≈36 psi, 2.5 bar) to 0.7 (≈100 psi, 7 bar)	

*1 : Fluids that do not affect cast iron (nickel plating), stainless steel, steel, nitrile rubber or fluoro rubber

Electrical specification (with solenoid valve/common specifications)			
Rated voltage (*2)		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	When starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		B	
Degree of protection (IEC standards 529)		With DIN terminal box (Pg9)	IPX5
		DIN terminal box (M12-4P connector)	IPX5
		With T type terminal box (G1/2)	IPX5

*2 : The voltage fluctuation range must be within ±10% of the rated voltage.

Individual specifications for 3.0 MPa

Item / Model No.	Port size	Orifice size (mm)	Cv	Pilot port size	Weight (kg)	
					CVE2(2)	CVSE2(2)
CVE2 (2)/CVSE2 (2) -10A-30	Rc3/8	8	2.6	Rc1/8	0.9	1.0
CVE2 (2)/CVSE2 (2) -15A-30	Rc1/2	10.5	4.2		1.3	1.4
CVE2 (2)/CVSE2 (2) -20A-30	Rc3/4	14	7.5		2.2	2.3
CVE2 (2)/CVSE2 (2) -25A-30	Rc1	18.5	11		3.4	3.5

How to order

● Air operated

CVE2 2 - 20A - 30 - 0 B -

● With solenoid valve

CVSE2 2 - 15A - 16 - 0 2G S - - 1

Model No.	
Air operated (2-port)	CVE2
With solenoid valve (2-port)	CVSE2

Ⓐ Actuation
Ⓑ Port size
Ⓒ Working pressure
Ⓓ Body/sealant combination
Ⓔ Coil *1 *2
Ⓕ Other options *3 *4 *5 *6 *7 *8
Ⓖ Assembly direction *8
Ⓗ Voltage

Code	Description	Body	Seal	Model No. CVE2	Model No. CVSE2
Ⓐ Actuation					
Blank	NC			●	●
2	NO			●	●
Ⓑ Port size					
10A	Rc3/8			●	●
15A	Rc1/2			●	●
20A	Rc3/4			●	●
25A	Rc1			●	●
Ⓒ Working pressure					
16	0 to 1.6 MPa			●	●
30	0 to 3.0 MPa			●	●
Ⓓ Body/sealant combination					
0	Standard	Cast iron (plating)	Nitrile rubber	●	●
B	Option	Cast iron (plating)	Fluoro rubber	●	●
Ⓔ Coil					
2G	With DIN terminal box (Pg9)				●
2H	DIN terminal box with lamp (Pg9)				●
2J	DIN terminal box (M12-4P connector)				●
2K	DIN terminal box with lamp (M12-4P connector)				●
3T	With T type terminal box (G1/2)				●
3R	T type terminal box with lamp (G1/2)				●
Ⓕ Other options					
Blank	No option			●	●
S	With surge suppressor				●
T	Top mounted solenoid valve				●
B	Mounting plate			●	●
Ⓖ Assembly direction					
Blank	No option			●	●
X	Cylinder cover rotated 90°				●
Y	Cylinder cover rotated 180°				●
Z	Cylinder cover rotated 270°				●
R	Mounting plate reversed 180° [air operated] Coil reversed 180° [with solenoid valve] Mounting plate/coil reversed 180° [with solenoid valve]			●	●
Refer to page 869 for the layout drawing.					
Ⓗ Voltage					
1	100 VAC(50/60 Hz) 110 VAC(60 Hz)				●
2	200 VAC(50/60 Hz) 220 VAC(60 Hz)				●
3	24 VDC				●

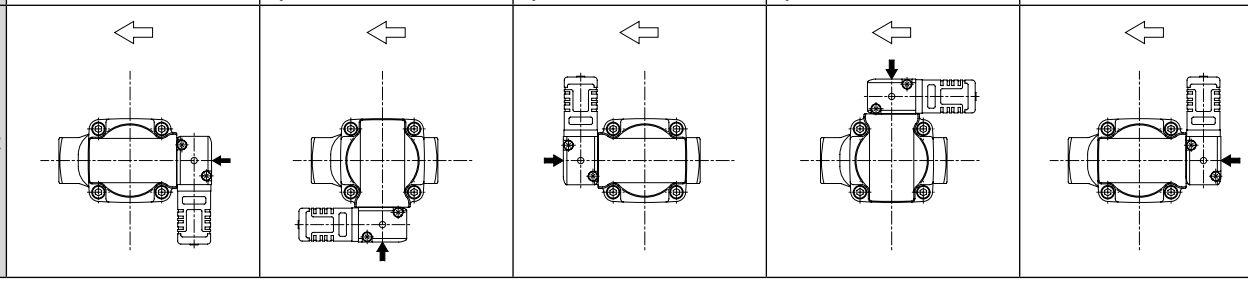
[Example of model No.]

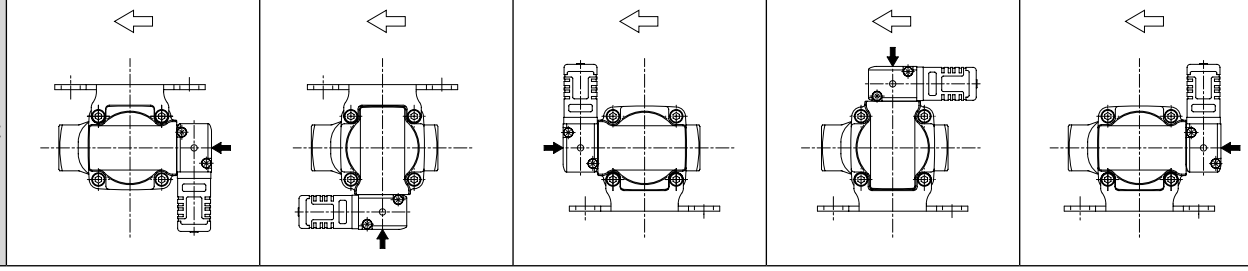
CVSE22-15A-16-02GS-1

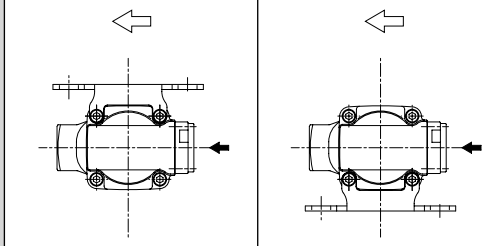
Model: CVSE2 : With solenoid valve (2-port)
Ⓐ Actuation : NO
Ⓑ Port size : Rc1/2
Ⓒ Working pressure : 0 to 1.6 MPa
Ⓓ Body/sealant combination
: Body - cast iron (plating), sealant - nitrile rubber
Ⓔ Coil : With DIN terminal box (Pg9)
Ⓕ Other options : With surge suppressor
Ⓖ Assembly direction : No option
Ⓗ Voltage : 100 VAC(50/60 Hz), 110 VAC(60 Hz)

*1 : Surge suppressor is not available for Item Ⓔ 2J.
*2 : Item Ⓔ 2K is available only for the type with surge suppressor and should be specified as 2KS.
*3 : Mounting plate (Item Ⓕ B) cannot be attached if the combination of Item Ⓑ and Item Ⓒ codes is 20A-30, 25A-16, or 25A-30.
*4 : Top mounted solenoid valve (Item Ⓕ T) is not available if the combination of Item Ⓑ and Item Ⓒ codes is 20A-30, 25A-16, or 25A-30.
*5 : To add both the surge suppressor and mounting plate options, specify Item Ⓕ as SB. For a solenoid valve mounted on top, indicate as STB.
*6 : The surge suppressor is mounted in the terminal box.
*7 : A manual override (non-locking) is provided as standard for the solenoid valve mounted.
*8 : Assembly direction option cannot be selected for the type with top mounted solenoid valve (Item Ⓕ T).

Item Ⓖ Assembly direction

CVSE2 [With solenoid valve] *9					
Code	Blank (standard)	X	Y	Z	R
Direction	No rotation	Cylinder cover rotated 90°	Cylinder cover rotated 180°	Cylinder cover rotated 270°	Coil reversed
Layout					

CVSE2 [With solenoid valve] *3/9					
Code	B (with mounting plate)	B-X	B-Y *10	B-Z *10	B-R
Direction	No rotation	Cylinder cover rotated 90°	Cylinder cover rotated 180° Mounting plate reversed	Cylinder cover rotated 270° Mounting plate reversed	Coil reversed Mounting plate reversed
Layout					

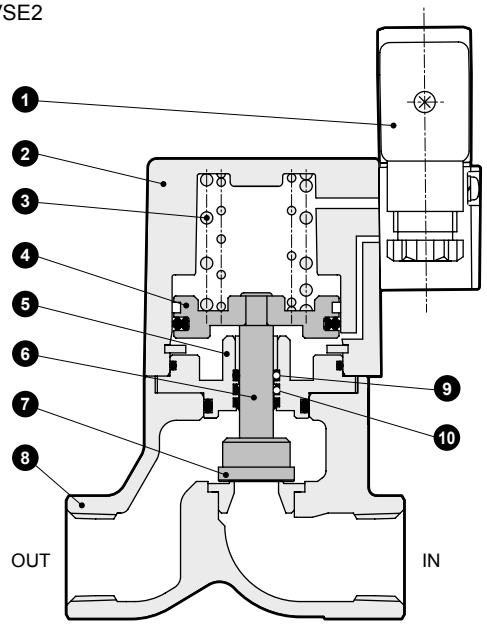
CVE2 [Air operated] *3/9		
Code	B (with mounting plate)	B-R
Direction	No rotation	Mounting plate reversed
Layout		

⇦ shows flow path direction and ⬅ shows pilot port IN.

*9 : Clockwise angle when viewed from above with the IN port on the right.
*10 : The mounting plate will be reversed 180° and attached.

Internal structure and parts list

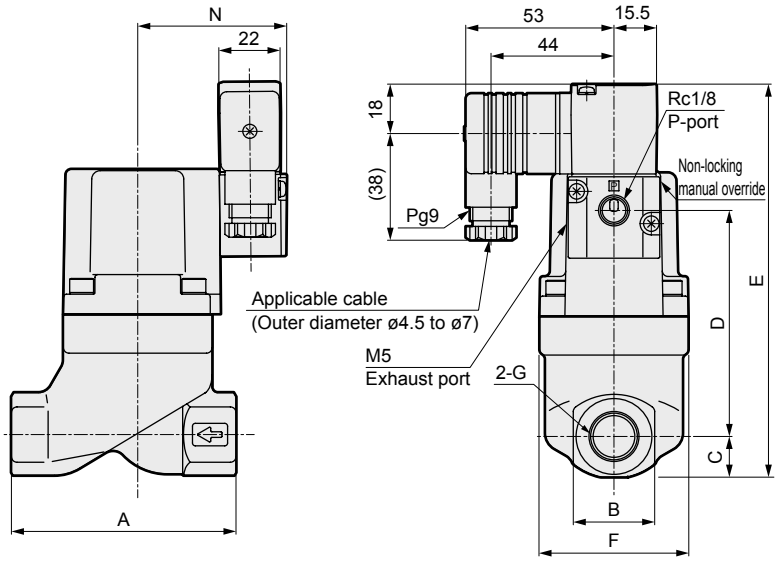
● CVSE2



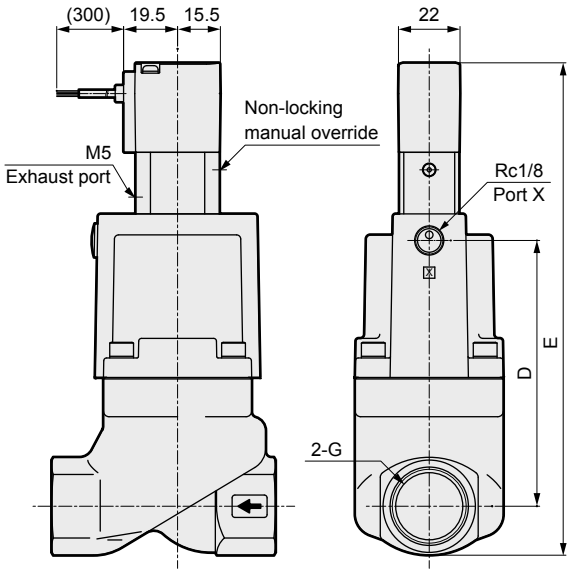
No.	Part name	Material	
1	Pilot solenoid valve	-	
2	Cylinder guard	ADC12	Aluminum die-casting
3	Spring	SWP	Piano wire
4	Piston	A2017	Aluminum
5	Adaptor	SUS303	Stainless steel
6	Piston rod	SUS304	Stainless steel
7	Main valving element	SUS420J2	Stainless steel
8	Body	FCD450	Cast iron (plating)
	Valve seat	SUS420J2	Stainless steel
9	O-ring	NBR(FKM)	Nitrile rubber (Fluoro rubber)
10	Rod packing	NBR(FKM)	Nitrile rubber (Fluoro rubber)

Dimensions CAD

● With DIN terminal box (Pg9)
CVSE2/CVSE22-10A to 25A-16/30-*2G



● CVSE2/CVSE22-10A to 20A-16-**T
● CVSE2/CVSE22-10A to 15A-30-**T



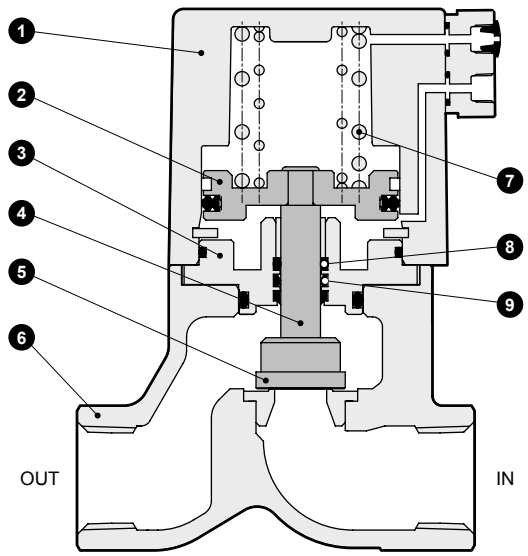
* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	N
CVSE2*-10A-16-*2G	80	29	14.5	80.5	140	53	Rc3/8	53
CVSE2*-15A-16-*2G	80	29	14.5	80.5	140	53	Rc1/2	53
CVSE2*-20A-16-*2G	90	35	17.5	100.5	163	63	Rc3/4	57.5
CVSE2*-25A-16-*2G	90	43	21.5	120	186.5	77	Rc1	64.5
CVSE2*-10A-30-*2G	80	29	14.5	80.5	140	53	Rc3/8	53
CVSE2*-15A-30-*2G	90	35	17.5	100.5	163	63	Rc1/2	57.5
CVSE2*-20A-30-*2G	90	43	21.5	120	186.5	77	Rc3/4	64.5
CVSE2*-25A-30-*2G	90	43	21.5	145.5	212	95	Rc1	72.5

Model No.	D	E
CVSE2*-10A-16-**T	92	170
CVSE2*-15A-16-**T	92	170
CVSE2*-20A-16-**T	111.5	192.5
CVSE2*-10A-30-**T	92	170
CVSE2*-15A-30-**T	111.5	192.5

Internal structure and parts list

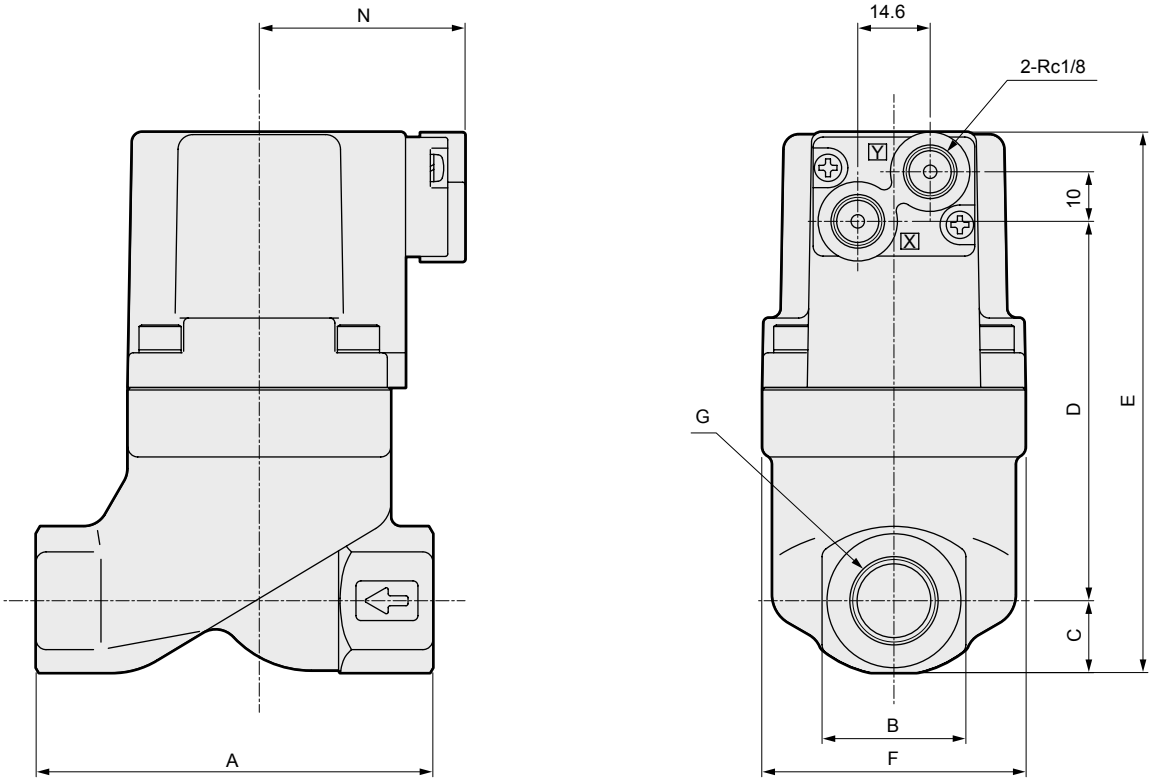
● CVE2



No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Piston rod	SUS304	Stainless steel
5	Main valving element	SUS420J2	Stainless steel
6	Body	FCD450	Cast iron (plating)
	Valve seat	SUS420J2	Stainless steel
7	Spring	SWP	Piano wire
8	O-ring	NBR(FKM)	Nitrile rubber (Fluoro rubber)
9	Rod packing	NBR(FKM)	Nitrile rubber (Fluoro rubber)

Dimensions CAD

● CVE2/CVE22-10A to 25A-16/30-**



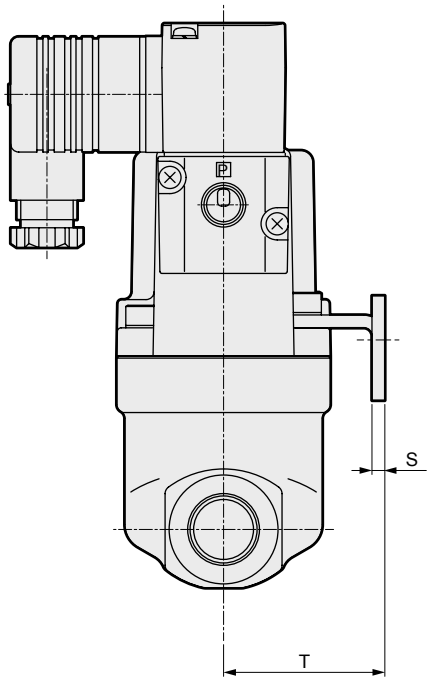
* Pilot pressurization port is port X for the NC and port Y for the NO.

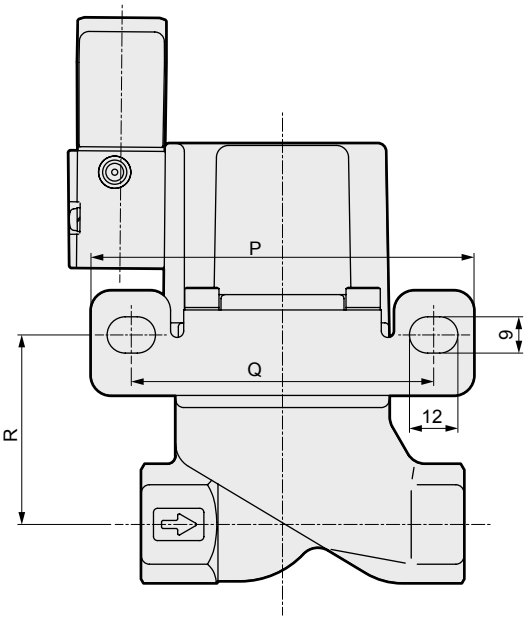
Model No.	A	B	C	D	E	F	G	N
CVE2*-10A-16-*	80	29	14.5	76.5	109	53	Rc3/8	41.5
CVE2*-15A-16-*	80	29	14.5	76.5	109	53	Rc1/2	41.5
CVE2*-20A-16-*	90	35	17.5	96.5	132	63	Rc3/4	46
CVE2*-25A-16-*	90	43	21.5	116	155.5	77	Rc1	53
CVE2*-10A-30-*	80	29	14.5	76.5	109	53	Rc3/8	41.5
CVE2*-15A-30-*	90	35	17.5	96.5	132	63	Rc1/2	46
CVE2*-20A-30-*	90	43	21.5	116	155.5	77	Rc3/4	53
CVE2*-25A-30-*	90	43	21.5	141.5	181	95	Rc1	61

Optional dimensions CAD

● Mounting plate
CVE2/CVE22
CVSE2/CVSE22 -10A to 20A-16/30-** B / B-R / B-Y

Material: Steel
Zinc plated

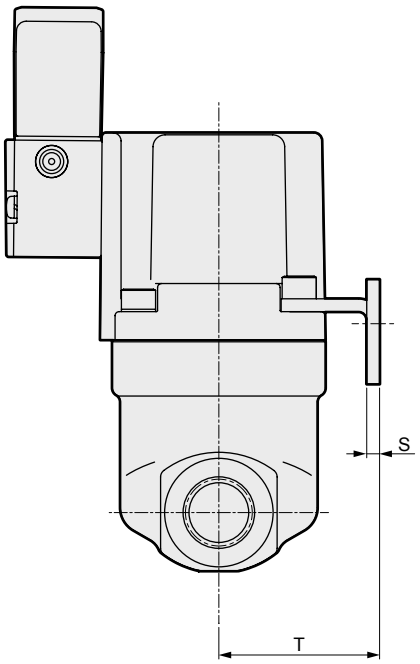


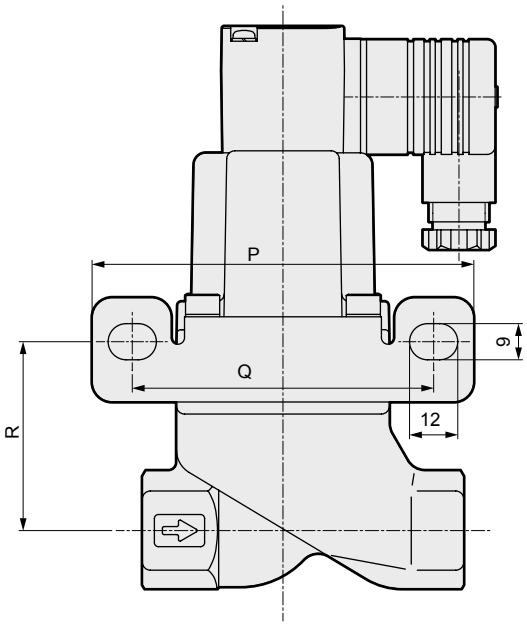


* The figure shows B.

● Mounting plate
CVE2/CVE22
CVSE2/CVSE22 -10A to 20A-16/30-** B-X / B-Z

Material: Steel
Zinc plated





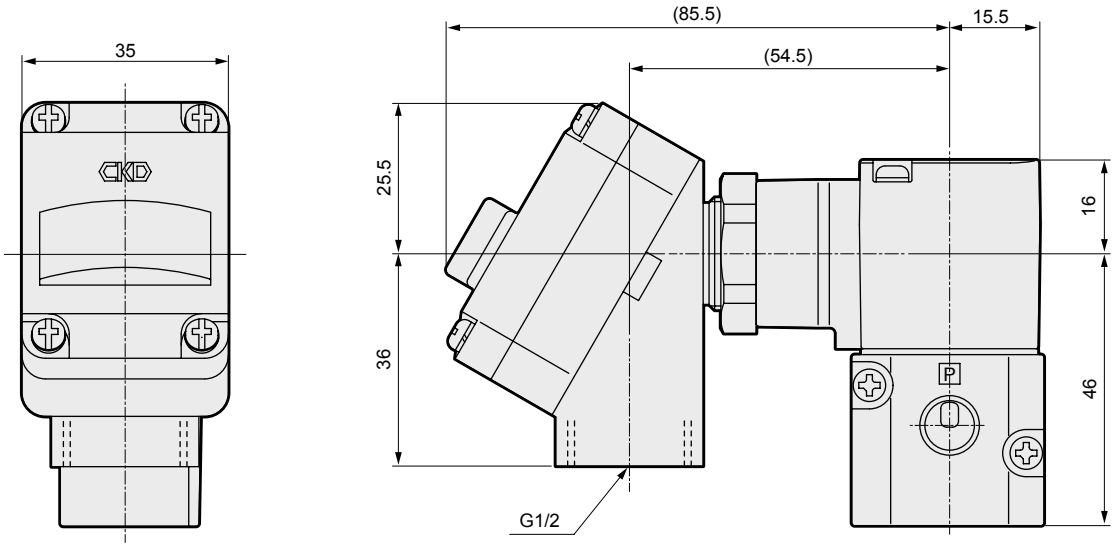
* The figure shows B-X.

Model No.	P	Q	R	S	T
CV*E2*-10A-16-*B	95	75	47	3.2	40
CV*E2*-15A-16-*B	95	75	47	3.2	40
CV*E2*-20A-16-*B	105	85	53.5	3.2	45
CV*E2*-10A-30-*B	95	75	47	3.2	40
CV*E2*-15A-30-*B	105	85	53.5	3.2	45

* A mounting plate is provided only with the models listed above.

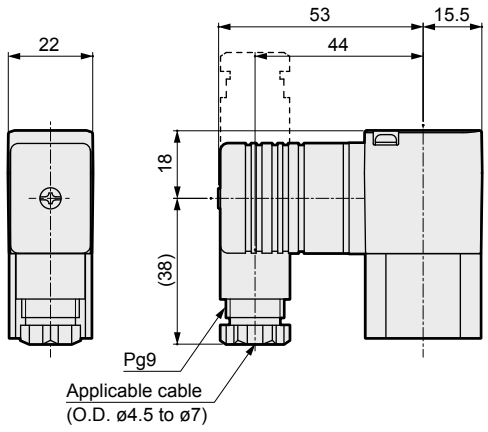
Optional dimensions

● With T type terminal box (G1/2)
T type terminal box with lamp (G1/2)
CVSE2/CVSE22-*-16/30-* [3T / 3R]

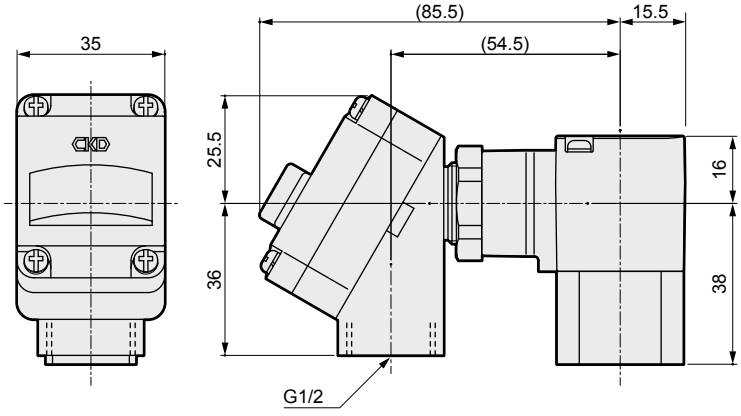


Optional dimensions: Top mounted solenoid valve

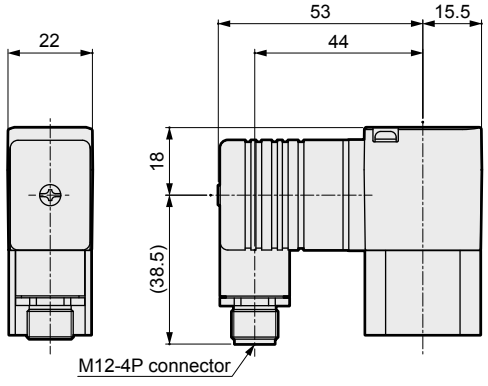
● DIN terminal box (Pg 9)
DIN terminal box with lamp (Pg 9)
CVSE2/CVSE22-*-05/10/16/30-* [2G / 2H] T



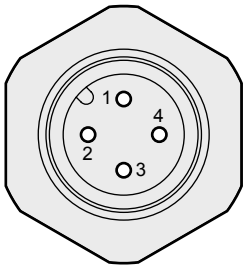
● T type terminal box (G1/2)
T type terminal box with lamp (G1/2)
CVSE2/CVSE22-*-05/10/16/30-* [3T / 3R] T



● DIN terminal box (M12-4P connector)
DIN terminal box with lamp/surge suppressor (M12-4P connector)
CVSE2/CVSE22-*-05/10/16/30-* [2J / 2KS] T

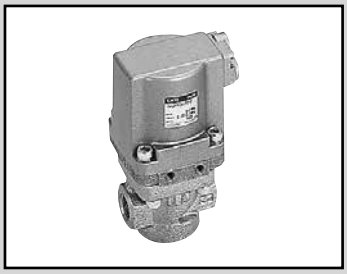


Connector pin array



PIN No.	Applications
1PIN	Ground
2PIN	(Not used)
3PIN	Power supply -
4PIN	Power supply +

* As it is a screw-in, the connector pin positions may not be the same as those shown above.



Air operated 2-port valve for high pressure (coolant valve)

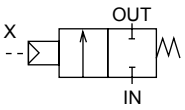
CVSE2/CVSE22-70 Series
CVE2/CVE22-70 Series

- NC, NO
- Port size: Rc3/8 to Rc1
- High pressure 7.0 MPa

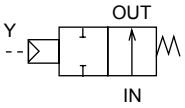
CE Refer to the Ending for details. RoHS CAD

JIS symbol

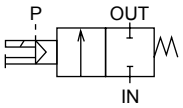
- CVE2 (air operated) : NC



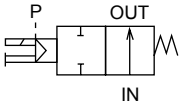
- CVE22 (air operated) : NO



- CVSE2 (with solenoid valve) : NC



- CVSE22 (with solenoid valve) : NO



Common specifications

Model No.		CVE2/CVSE2	CVE22/CVSE22
Actuation		NC	NO
Working fluid		Coolant/other non-corrosive liquids (*1)	
Fluid viscosity	mm^2/s	500 or less	
Working pressure	MPa	0 (≈0 psi, 0 bar) to 7.0 (≈1000 psi, 70 bar)	
Proof pressure (water pressure)	MPa	14 (≈2000 psi, 140 bar)	
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature	°C	-10 (14°F) to 60 (140°F)	
Valve seat leakage	cm^3/min	20 or less (water pressure)	
Mounting orientation		Unrestricted	
Pilot fluid		Air	
Pilot pressure	MPa	0.25 (≈36 psi, 2.5 bar) to 0.7 (≈100 psi, 7 bar)	

*1 : Fluids that do not affect cast iron (nickel plating), stainless steel, steel, nitrile rubber or fluoro rubber

Electrical specification (with solenoid valve/common specifications)			
Rated voltage	(*2)	100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	Starting	11(50 Hz), 9(60 Hz)	
Power consumption	AC	1.9(50 Hz), 1.5(60 Hz)	
(W)	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)		With DIN terminal box (Pg9)	IPX5
		DIN terminal box (M12-4P connector)	IPX5
		With T type terminal box (G1/2)	IPX5

*2 : The voltage fluctuation range must be within ±10% of the rated voltage.

Individual specifications for 7.0 MPa

Item / Model No.	Port size	Orifice size (mm)	Cv	Pilot port size	Weight (kg)	
					CVE2(2)	CVSE2(2)
CVE2 (2)/CVSE2 (2) -10A-70	Rc3/8	6.5	1.7	Rc1/8	1.4	1.5
CVE2 (2)/CVSE2 (2) -15A-70	Rc1/2	8	2.8		2.4	2.5
CVE2 (2)/CVSE2 (2) -20A-70	Rc3/4	10.5	4.7		3.9	4.0
CVE2 (2)/CVSE2 (2) -25A-70	Rc1	13	7.0		6.1	6.2

How to order

● Air operated

CVE2 2 - 20A - 70 - 0 B

● With solenoid valve

CVSE2 2 - 15A - 70 - 0 2G S - - 1

Ⓐ Actuation

Ⓑ Port size

Model No.	
Air operated (2-port)	CVE2
With solenoid valve (2-port)	CVSE2

Ⓒ Working pressure

Ⓓ Body/sealant combination

Ⓔ Coil *1 *2

Ⓕ Other options *3 *4 *5 *6 *7 *10

Ⓖ Assembly direction *8 *10

Ⓗ Voltage

[Example of model No.]

CVSE22-15A-70-02GS-1

Model: CVSE2 : With solenoid valve (2-port)

Ⓐ Actuation : NO

Ⓑ Port size : Rc1/2

Ⓒ Working pressure : 0 to 7.0 MPa

Ⓓ Body/sealant combination : Body - cast iron (plating), sealant - nitrile rubber

Ⓔ Coil : With DIN terminal box (Pg9)

Ⓕ Other options : With surge suppressor

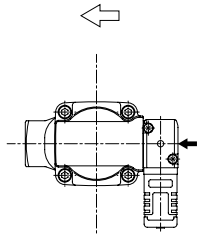
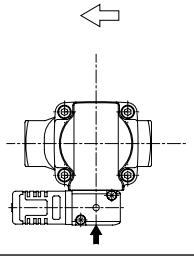
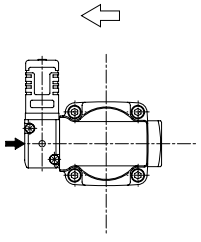
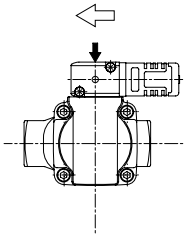
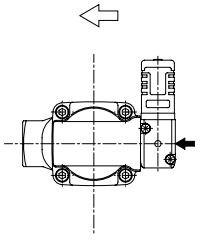
Ⓖ Assembly direction : No option

Ⓗ Voltage : 100 VAC(50/60 Hz), 110 VAC(60 Hz)

*1 : Surge suppressor is not available for Item Ⓔ 2J.
*2 : Item Ⓔ 2K is available only for the type with surge suppressor and should be specified as 2KS.
*3 : To add both the surge suppressor and mounting plate options, specify Item Ⓕ as SB. For a solenoid valve mounted on top, indicate as STB.
*4 : Top mounted solenoid valve (Item Ⓕ T) is available only for port size 10 A.
*5 : The surge suppressor is mounted in the terminal box.
*6 : A manual override (non-locking) is provided as standard for the solenoid valve mounted.
*7 : Mounting plate is attached.
*8 : Assembly direction option cannot be selected for the air operated.
*9 : Clockwise angle when viewed from above with the IN port on the right.
*10 : Assembly direction option cannot be selected for the type with top mounted solenoid valve (Item Ⓕ T).

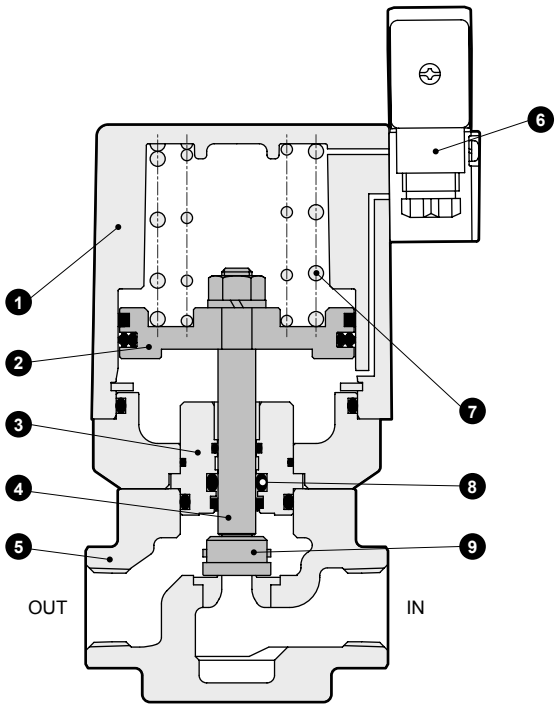
Code	Description	Model No. CVE2	Model No. CVSE2
Ⓐ Actuation			
Blank	NC	●	●
2	NO	●	●
Ⓑ Port size			
10A	Rc3/8	●	●
15A	Rc1/2	●	●
20A	Rc3/4	●	●
25A	Rc1	●	●
Ⓒ Working pressure			
70	0 to 7.0 MPa	●	●
Ⓓ Body/sealant combination			
		Body: Cast iron (plating) / Seal: Nitrile rubber	
0	Standard	●	●
B	Option	●	●
Ⓔ Coil			
2G	With DIN terminal box (Pg9)		●
2H	DIN terminal box with lamp (Pg9)		●
2J	DIN terminal box (M12-4P connector)		●
2K	DIN terminal box with lamp (M12-4P connector)		●
3T	With T type terminal box (G1/2)		●
3R	T type terminal box with lamp (G1/2)		●
Ⓕ Other options			
Blank	No option	●	●
S	With surge suppressor		●
T	Top mounted solenoid valve		●
B	Mounting plate	●	●
Ⓖ Assembly direction			
Blank	No option	●	●
X	Cylinder cover rotated 90°		●
Y	Cylinder cover rotated 180°		●
Z	Cylinder cover rotated 270°		●
R	Coil reversed 180° [with solenoid valve]		●
Refer to the figure below for the layout drawing.			
Ⓗ Voltage			
1	100 VAC(50/60 Hz) 110 VAC(60 Hz)		●
2	200 VAC(50/60 Hz) 220 VAC(60 Hz)		●
3	24 VDC		●

Item Ⓖ Assembly direction

CVSE2 [With solenoid valve] *9					
Code	Blank (standard)	X	Y	Z	R
Direction	No rotation	Cylinder cover rotated 90°	Cylinder cover rotated 180°	Cylinder cover rotated 270°	Coil reversed
Layout					

Internal structure and parts list

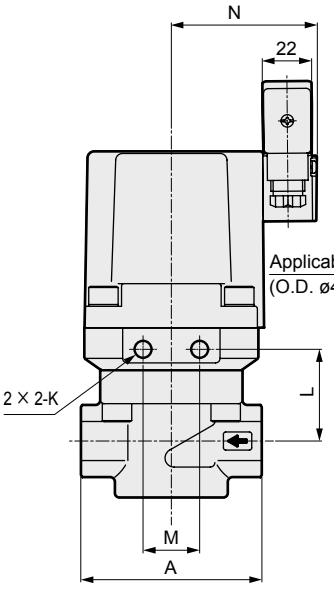
● CVSE2

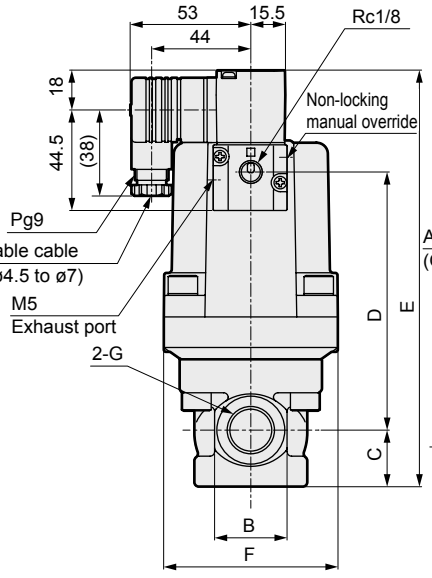


No.	Part name	Material	
1	Cylinder guard	ADS12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Piston rod	SUS304	Stainless steel
5	Body	FCD450	Cast iron (plating)
6	Pilot solenoid valve	-	-
7	Spring	SWP	Piano wire
8	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Main valving element	SUS420J2	Stainless steel

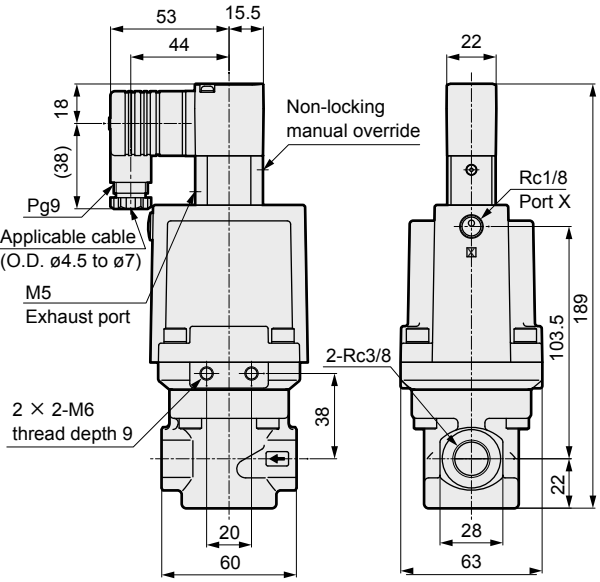
Dimensions CAD

● With DIN terminal box (Pg9)
CVSE2/CVSE22-10A to 25A-70-*2G





● CVSE2/CVSE22-10A-70-*2GT

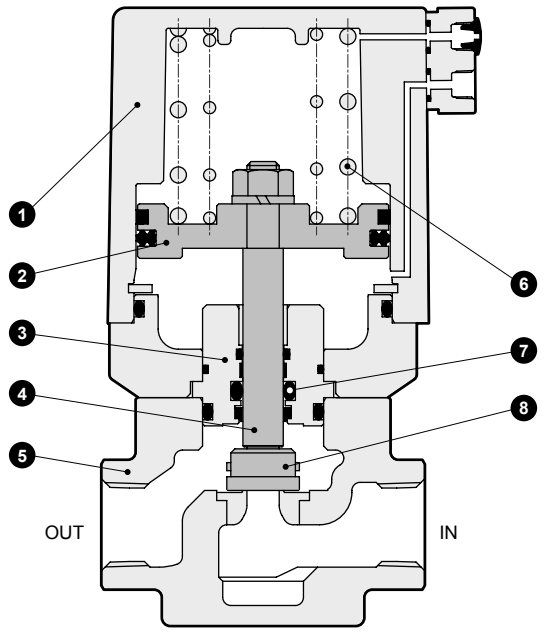


* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	K	L	M	N
CVSE2/CVSE22-10A-70-*2G	60	28	22	92.5	159.5	63	Rc3/8	M6 thread depth 9	38	20	57.5
CVSE2/CVSE22-15A-70-*2G	80	32	25	114	184	77	Rc1/2	M8 thread depth 10	40.5	25	64.5
CVSE2/CVSE22-20A-70-*2G	90	40	29	136.5	210.5	95	Rc3/4	M8 thread depth 10	45.5	25	72.5
CVSE2/CVSE22-25A-70-*2G	110	48	33.5	149.5	228	113	Rc1	M12 thread depth 14	49	45	82.5

Internal structure and parts list

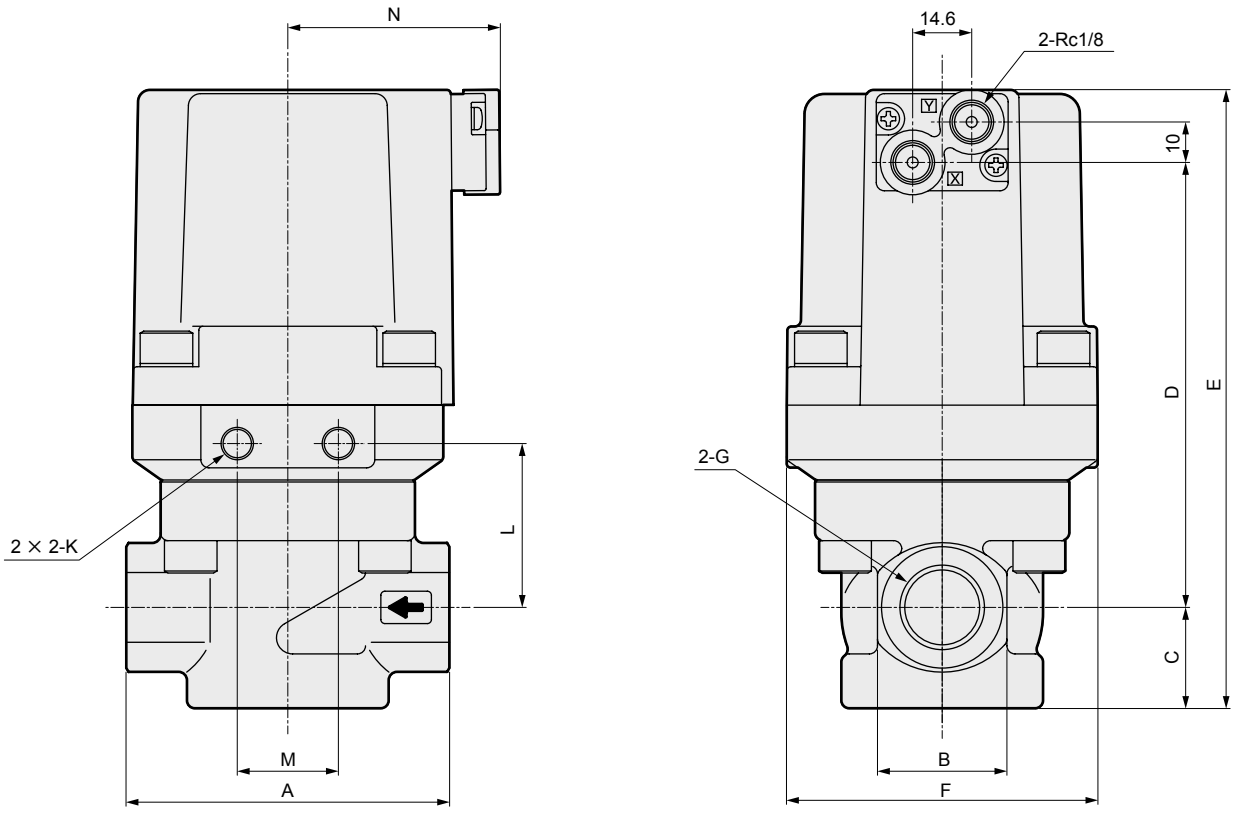
● CVE2



No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Piston rod	SUS304	Stainless steel
5	Body	FCD450	Cast iron (plating)
6	Spring	SWP	Piano wire
7	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
8	Main valving element	SUS420J2	Stainless steel

Dimensions CAD

● CVE2/CVE22-10A to 25A-70-**



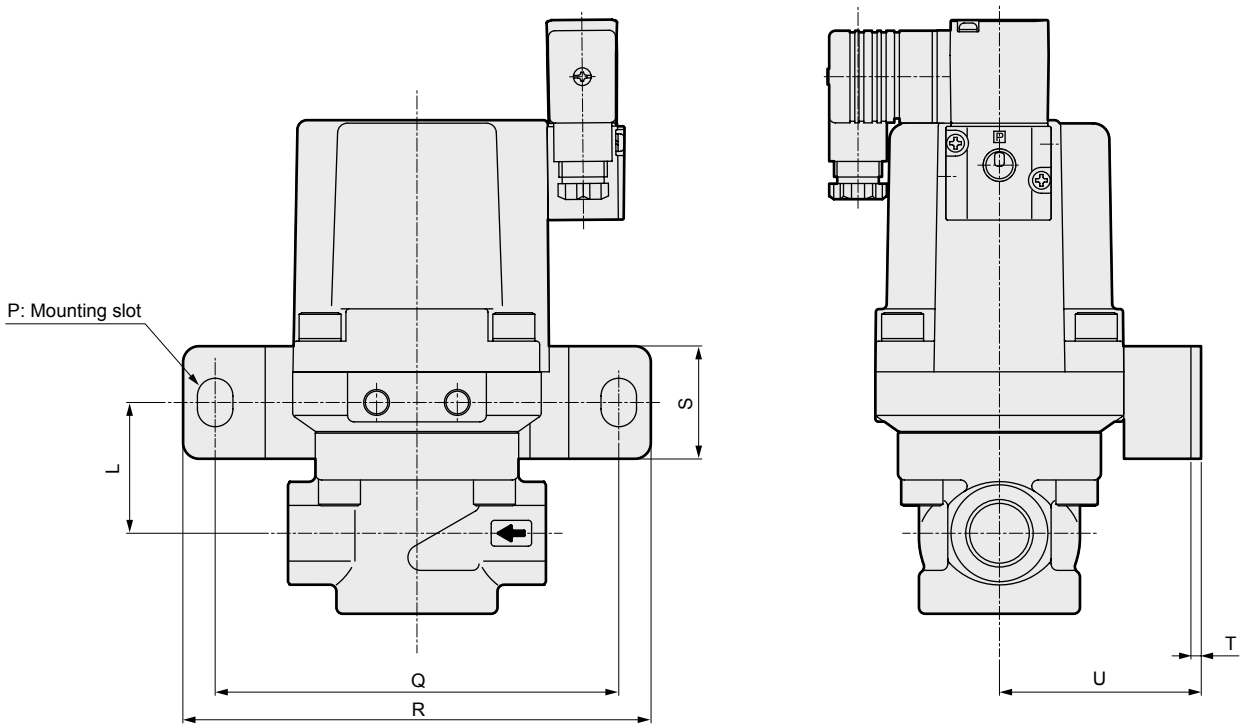
* Pilot pressurization port is port X for the NC and port Y for the NO.

Model No.	A	B	C	D	E	F	G	K	L	M	N
CVE2/CVE22-10A-70-*	60	28	22	88.5	128.5	63	Rc3/8	M6 thread depth 9	38	20	46
CVE2/CVE22-15A-70-*	80	32	25	110	153	77	Rc1/2	M8 thread depth 10	40.5	25	53
CVE2/CVE22-20A-70-*	90	40	29	132.5	179.5	95	Rc3/4	M8 thread depth 10	45.5	25	61
CVE2/CVE22-25A-70-*	110	48	33.5	145.5	197	113	Rc1	M12 thread depth 14	49	45	71

Optional dimensions CAD

● Mounting plate
CVE2/CVE22
CVSE2/CVSE22
-10A to 25A-70-** B / B-R / B-Y

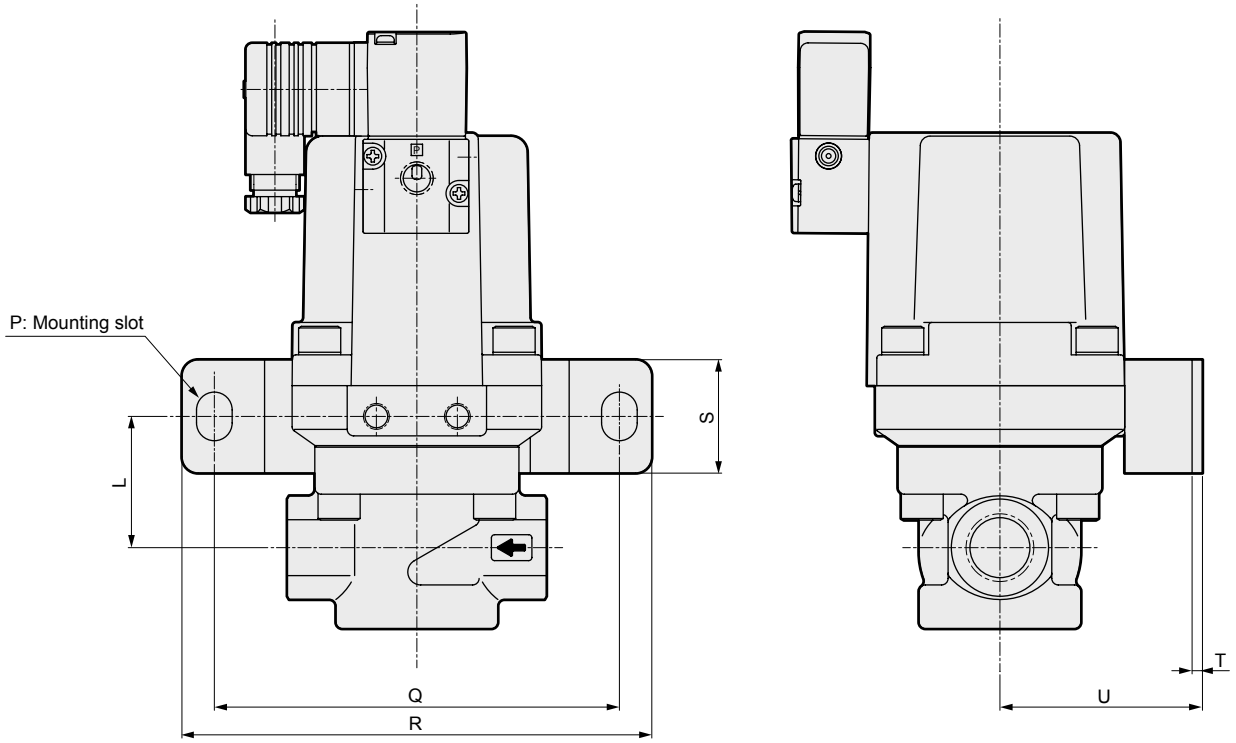
Material: Steel
Zinc plated



* The figure shows B.

● Mounting plate
CVE2/CVE22
CVSE2/CVSE22
-10A to 25A-70-** B-X / B-Z

Material: Steel
Zinc plated

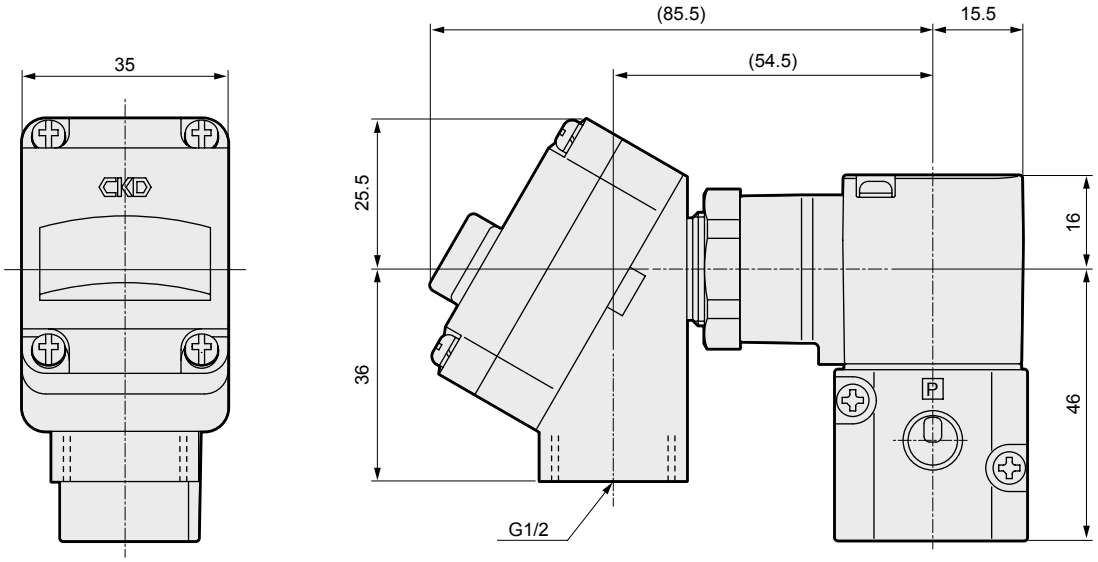


* The figure shows B-X.

Model No.	L	P	Q	R	S	T	U
CV*E2*-10A-70-*B	38	9 × 12	85	100	25	3.2	45
CV*E2*-15A-70-*B	40.5	11 × 15	125	145	35	3.2	62.5
CV*E2*-20A-70-*B	45.5	11 × 15	125	145	35	3.2	71.5
CV*E2*-25A-70-*B	49	14 × 20	160	190	40	4	84

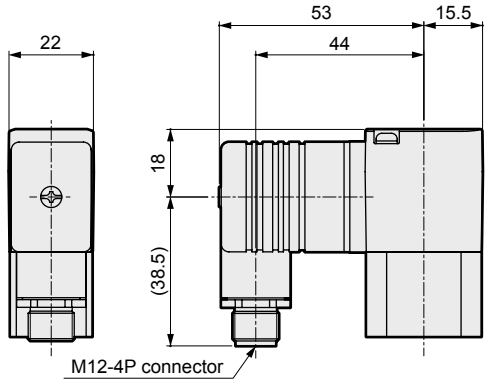
Optional dimensions

● With T type terminal box (G1/2)
T type terminal box with lamp (G1/2)
CVSE2/CVSE22-*-70-* 3T / 3R

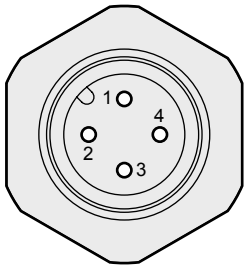


Optional dimensions: Top mounted solenoid valve

● DIN terminal box (M12-4P connector)
DIN terminal box with lamp/surge suppressor (M12-4P connector)
CVSE2/CVSE22-10A-70-* 2J / 2KS T



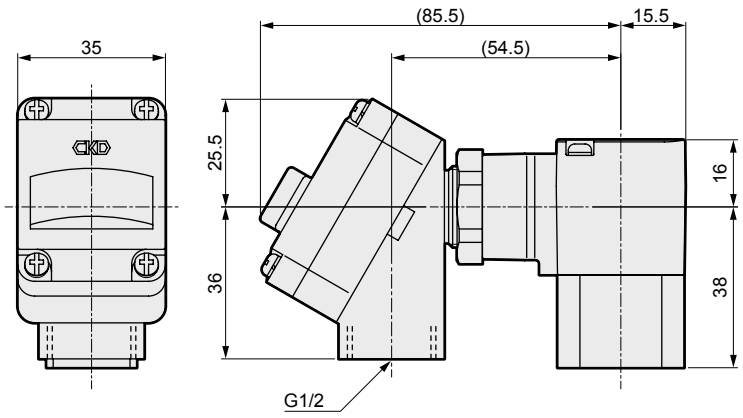
Connector pin array

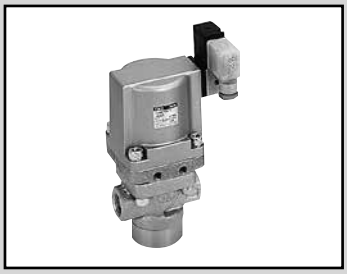


PIN No.	Applications
1PIN	Ground
2PIN	(Not used)
3PIN	Power supply -
4PIN	Power supply +

* As it is a screw-in, the connector pin positions may not be the same as those shown above.

● T type terminal box (G1/2)
T type terminal box with lamp (G1/2)
CVSE2/CVSE22-*-10A-70-* 3T / 3R T





Air operated 3-port valve for medium/high pressure (coolant valve)

CVSE3-35/70 Series
CVE3-35/70 Series

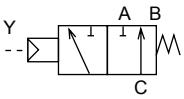
- Directional (C-port pressurization only)
- Medium pressure 3.5 MPa: Port size: Rc3/8 to Rc2
- High pressure 7.0 MPa: Port size: Rc3/8 to Rc1

CE Refer to the Ending for details.

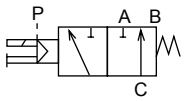
RoHS CAD

JIS symbol

● CVE3 (air operated)



● CVSE3 (with solenoid valve)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Actuation	Directional (C-port pressurization only)
Working fluid	Coolant/other non-corrosive liquids (*1)
Fluid viscosity mm²/s	500 or less
Working pressure MPa	0 to 7.0 (refer to the working pressure in the individual specifications.)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Ambient temperature °C	-10 (14°F) to 60 (140°F)
Valve seat leakage cm³/min	20 or less (water pressure)
Mounting orientation	Unrestricted
Pilot fluid	Air
Pilot pressure MPa	0.25 (≈36 psi, 2.5 bar) to 0.5 (≈73 psi, 5 bar)

*1 : Fluids that do not affect cast iron (nickel plating), stainless steel, nitrile rubber or fluoro rubber

Electrical specifications			
Rated voltage (*2)		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)	
	Starting	11(50 Hz), 9(60 Hz)	
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)	With DIN terminal box (Pg9)	IPX5	
	DIN terminal box (M12-4P connector)	IPX5	
	With T type terminal box (G1/2)	IPX5	

*2 : The voltage fluctuation range must be within ±10% of the rated voltage.

Individual specifications for 3.5 MPa, 7.0 MPa

1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)		Cv		Pilot port size	Working pressure (MPa)	Proof pressure (water pressure) (MPa)	Weight (kg)	
		NC side	NO side	NC side	NO side				CVE3	CVSE3
CVE3/CVSE3-10A-35	Rc 3/8	5.8 or equiv.	4.5	1.3	1	Rc1/8	0 (≈0 psi) to 3.5 (≈510 psi)	7 (≈1000 psi, 70 bar)	1.0	1.1
CVE3/CVSE3-15A-35	Rc 1/2	7.1 or equiv.	6	2.2	1.8				1.6	1.7
CVE3/CVSE3-20A-35	Rc 3/4	8.9 or equiv.	8	3.6	3				2.7	2.8
CVE3/CVSE3-25A-35	Rc 1	13.2 or equiv.	9	6	3.8				4.3	4.4
CVE3/CVSE3-32A-35	Rc 1¼	22 or equiv.	20	23	18.5				13.8	13.9
CVE3/CVSE3-40A-35	Rc 1½	22 or equiv.	20	23	17				13.5	13.6
CVE3/CVSE3-50A-35	Rc 2	28.5 or equiv.	26	31	27				22.7	22.8
CVE3/CVSE3-10A-70	Rc 3/8	5.8 or equiv.	4.5	1.3	1		0 (≈0 psi) to 7.0 (≈1000 psi)	14 (≈2000 psi, 140 bar)	1.4	1.5
CVE3/CVSE3-15A-70	Rc 1/2	7.1 or equiv.	6	2.2	1.8				2.4	2.5
CVE3/CVSE3-20A-70	Rc 3/4	8.9 or equiv.	8	3.6	3				3.9	3.9
CVE3/CVSE3-25A-70	Rc 1	10.7 or equiv.	9	4.9	3.8				6.1	6.1

How to order

● Air operated

CVE3 - 20A - 70 - 0 B

● With solenoid valve

CVSE3 - 15A - 35 - 0 2G S - □ - 1

Ⓐ Port size

Ⓕ Assembly direction *8 *10

Model No.	
Air operated (3-port)	CVE3
With solenoid valve (3-port)	CVSE3

Ⓑ Working pressure

Ⓒ Body/sealant combination

Ⓓ Coil *1 *2

Ⓔ Other options *3*4 *5*6 *7*10

Ⓖ Voltage

[Example of model No.]

CVSE3-15A-35-02GS-1

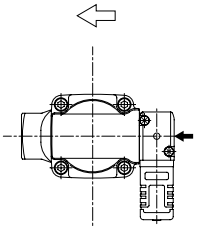
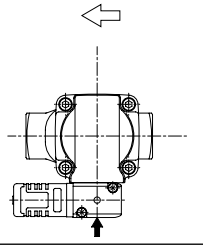
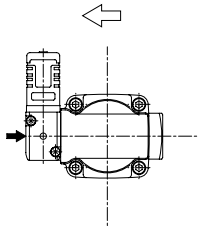
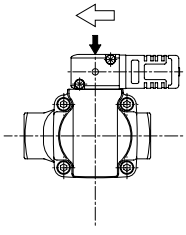
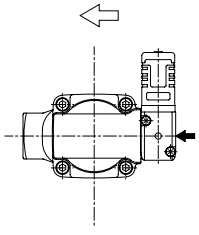
Model: CVSE3 : With solenoid valve (3-port)
Ⓐ Port size : Rc1 / 2
Ⓑ Working pressure : 0 to 3.5 MPa
Ⓒ Body/sealant combination : Body - cast iron (plating), sealant - nitrile rubber
Ⓓ Coil : With DIN terminal box (Pg9)
Ⓔ Other options : With surge suppressor
Ⓕ Assembly direction : No option
Ⓖ Voltage : 100 VAC(50/60 Hz), 110 VAC(60 Hz)

*1 : Surge suppressor is not available for Item Ⓓ 2J.
*2 : Item Ⓓ 2K is available only for the type with surge suppressor and should be specified as 2KS.
*3 : The mounting plate (Item Ⓔ B) is attached and can be assembled to port sizes 10A, 15A, 20A and 25A only.
*4 : Top mounted solenoid valve (Item Ⓔ T) is available only when the combination of Item Ⓐ and Item Ⓑ codes is 10A-35, 10A-70, or 15A-35.
*5 : To add both the surge suppressor and mounting plate options, specify Item Ⓔ as SB. For a solenoid valve mounted on top, indicate as STB.
*6 : The surge suppressor is mounted in the terminal box.
*7 : A manual override (non-locking) is provided as standard for the solenoid valve mounted.
*8 : Assembly direction option cannot be selected for the air operated and 32A to 50A.
*9 : Clockwise angle when viewed from above with the IN port on the right.
*10 : Assembly direction option cannot be selected for the type with top mounted solenoid valve (Item Ⓕ T).

Code	Description	Model No. CVE3 Medium pressure (3.5 MPa)	CVE3 High pressure (7.0 MPa)	CVSE3 Medium pressure (3.5 MPa)	CVSE3 High pressure (7.0 MPa)
Ⓐ Port size					
10A	Rc3/8	●	●	●	●
15A	Rc1/2	●	●	●	●
20A	Rc3/4	●	●	●	●
25A	Rc1	●	●	●	●
32A	Rc1 1/4	●		●	
40A	Rc1 1/2	●		●	
50A	Rc2	●		●	
Ⓑ Working pressure					
35	0 to 3.5 MPa	●		●	
70	0 to 7.0 MPa		●		●
Ⓒ Body/sealant combination					
		Body	Seal		
0	Standard	Cast iron (plating)	Nitrile rubber	●	●	●	●
B	Option	Cast iron (plating)	Fluoro rubber	●	●	●	●
Ⓓ Coil					
2G	With DIN terminal box (Pg9)			●	●
2H	DIN terminal box with lamp (Pg9)			●	●
2J	DIN terminal box (M12-4P connector)			●	●
2K	DIN terminal box with lamp (M12-4P connector)			●	●
3T	With T type terminal box (G1/2)			●	●
3R	T type terminal box with lamp (G1/2)			●	●
Ⓔ Other options					
Blank	No option	●	●	●	●
S	With surge suppressor			●	●
T	Top mounted solenoid valve			●	●
B	Mounting plate	●	●	●	●
Ⓕ Assembly direction					
Blank	No option	●	●	●	●
X	Cylinder cover rotated 90°			●	●
Y	Cylinder cover rotated 180°			●	●
Z	Cylinder cover rotated 270°			●	●
R	Coil reversed 180° [with solenoid valve]			●	●
	Refer to the figure below for the layout drawing.				
Ⓖ Voltage					
1	100 VAC(50/60 Hz), 110 VAC(60 Hz)			●	●
2	200 VAC(50/60 Hz), 220 VAC(60 Hz)			●	●
3	24 VDC			●	●

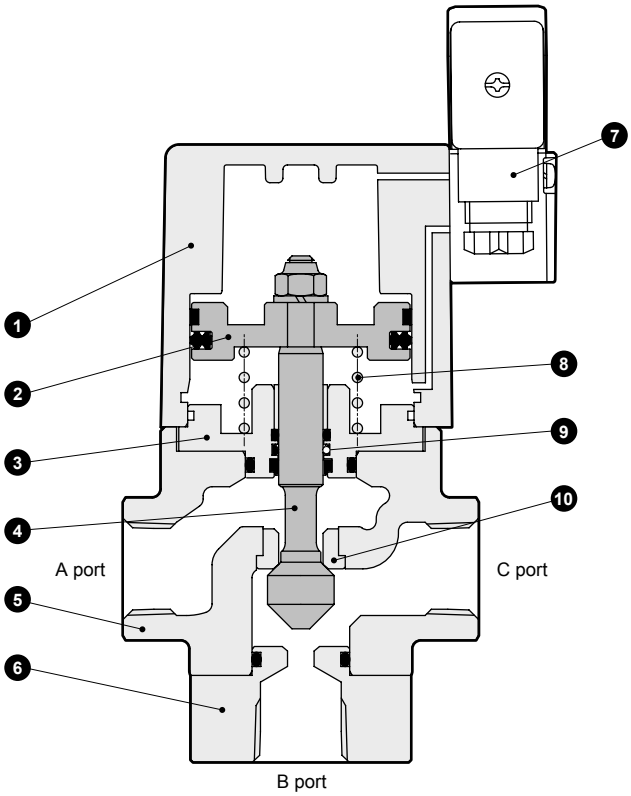
Item Ⓕ Assembly direction

CVSE3 [With solenoid valve] *9

Code	Blank (standard)	X	Y	Z	R
Direction	No rotation	Cylinder cover rotated 90°	Cylinder cover rotated 180°	Cylinder cover rotated 270°	Coil reversed
Layout					

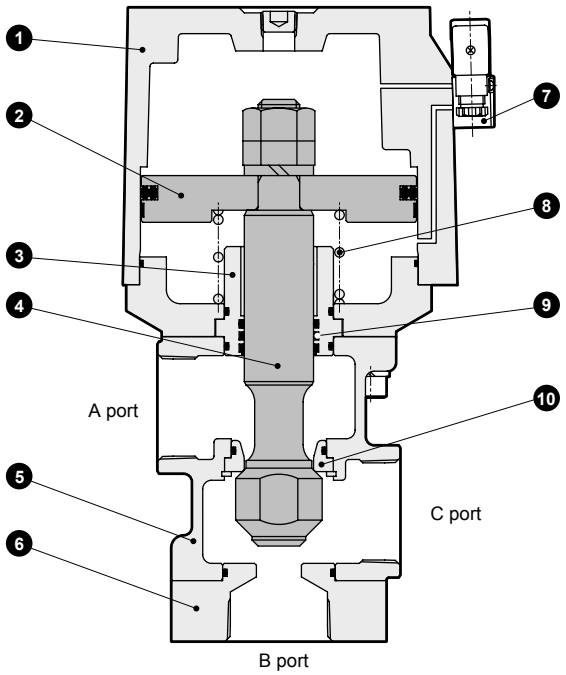
Internal structure and parts list

● CVSE3-10A to 25A-35



No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Valve stem	SUS420J2	Stainless steel
5	Body	FCD450	Cast iron (plating)
6	NO body	SUS303	Stainless steel
7	Pilot solenoid valve	-	-
8	Spring	SWP	Piano wire
9	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
10	NC valve seat	SUS303	Stainless steel

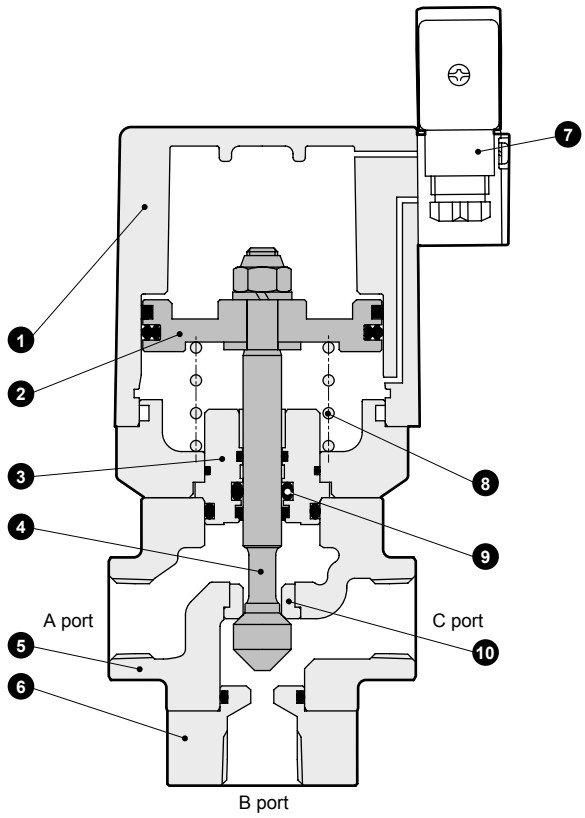
● CVSE3-32A/40A/50A-35



No.	Part name	Material	
1	Cylinder guard	AC7A	Aluminum casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Valve stem	SUS420J2	Stainless steel
5	Body	FCD450	Cast iron (plating)
6	NO body	SUS303	Stainless steel
7	Pilot solenoid valve	-	
8	Spring	SWP	Piano wire
9	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
10	NC valve seat	SUS303	Stainless steel

Internal structure and parts list

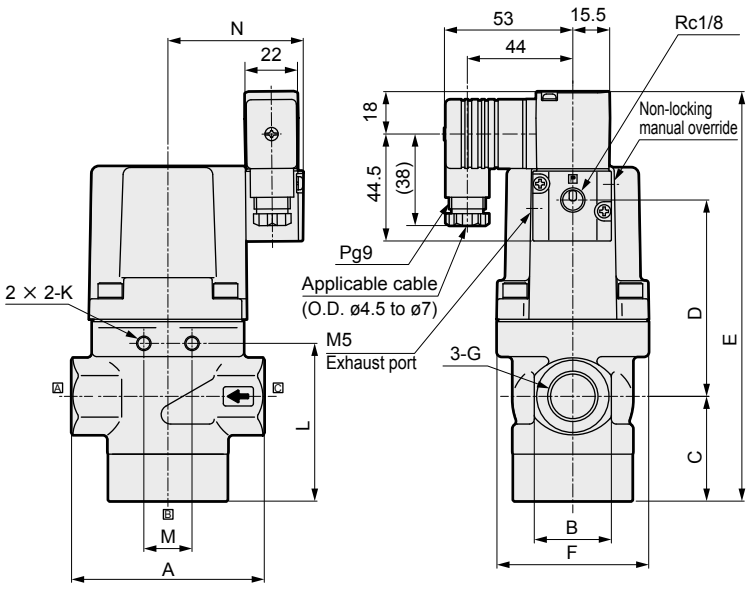
● CVSE3-10A to 25A-70



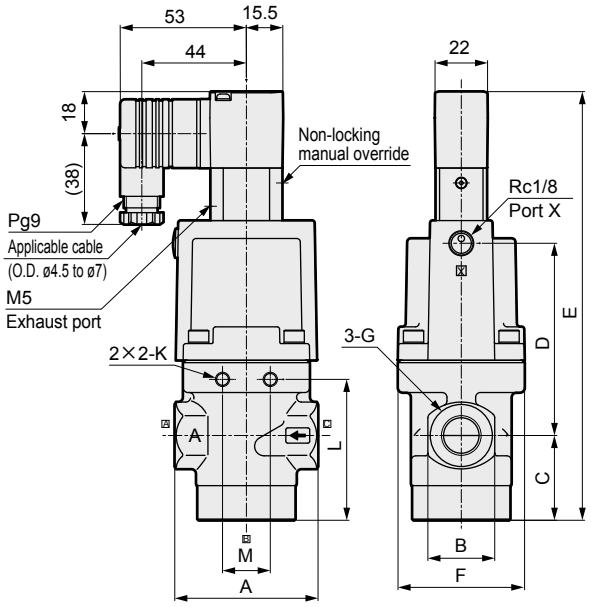
No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Valve stem	SUS420J2	Stainless steel
5	Body	FCD450	Cast iron (plating)
6	NO body	SUS303	Stainless steel
7	Pilot solenoid valve	-	-
8	Spring	SWP	Piano wire
9	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
10	NC valve seat	SUS303	Stainless steel

Dimensions CAD

● With DIN terminal box (Pg9)
CVSE3-10A to 25A-35-*2G



● With DIN terminal box (Pg9)
CVSE3-10A/15A-35-*2GT

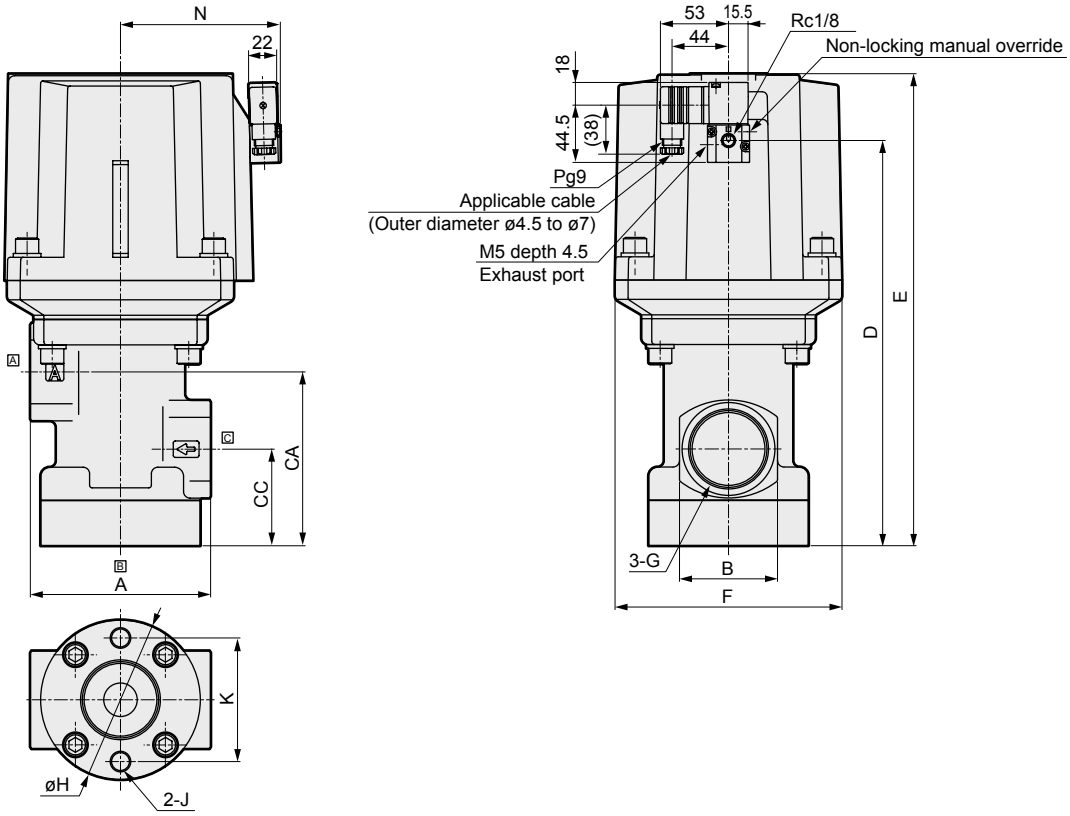


* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	K	L	M	N
CVSE3-10A-35-*2G	60	28	35.5	69	149.5	53	Rc3/8	M6 thread depth 9	59	20	53
CVSE3-15A-35-*2G	80	32	43.5	81.5	170	63	Rc1/2	M6 thread depth 9	65.5	20	57.5
CVSE3-20A-35-*2G	90	40	52	102	199	77	Rc3/4	M8 thread depth 10	79.5	25	64.5
CVSE3-25A-35-*2G	110	48	61	122.5	228.5	95	Rc1	M8 thread depth 10	91	25	72.5

Model No.	D	E
CVSE3-10A-35-*2GT	80.5	179.5
CVSE3-15A-35-*2GT	92.5	199.5

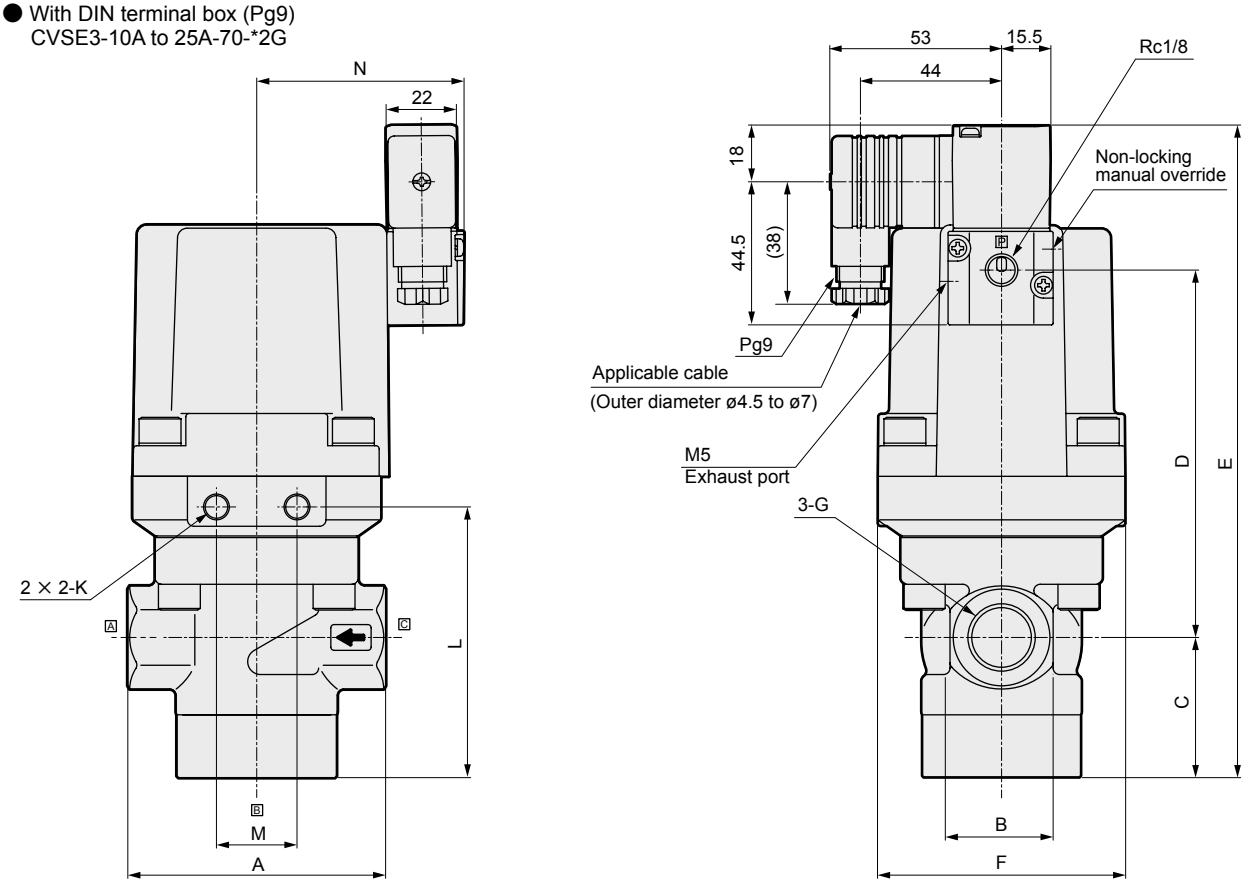
● With DIN terminal box (Pg9)
CVSE3-32A/40A/50A-35-*2G



Model No.	A	B	CA	CC	D	E	F	G	H	J	K	N
CVSE3-32A-35-*2G	120	61	118	63	264.5	309.5	145	Rc1¼	ø109	M12 depth 30	90	103
CVSE3-40A-35-*2G	120	61	118	63	264.5	309.5	145	Rc1½	ø109	M12 depth 30	90	103
CVSE3-50A-35-*2G	140	76	135	75	314	366	176	Rc2	ø124	M16 depth 35	96	123

Dimensions CAD

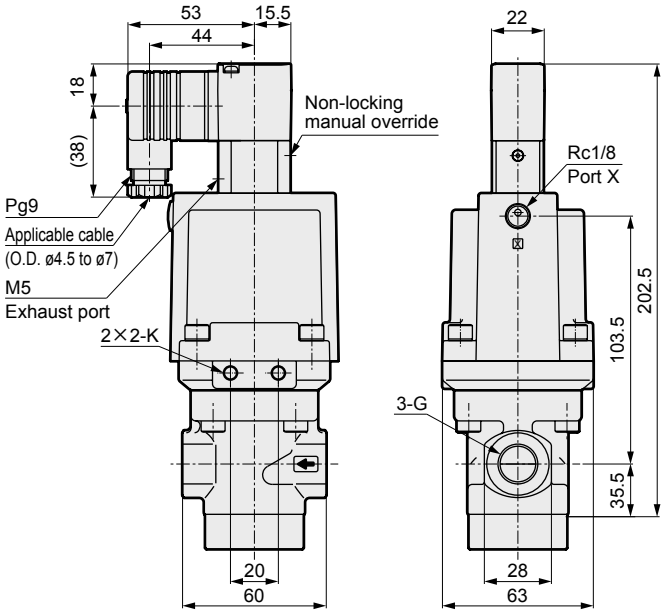
● With DIN terminal box (Pg9)
CVSE3-10A to 25A-70-*2G



* The figure shows the unit with no assembly direction option selected.

Model No.	A	B	C	D	E	F	G	K	L	M	N
CVSE3-10A-70-*2G	60	28	35.5	92.5	173	63	Rc3/8	M6 thread depth 9	73.5	20	57.5
CVSE3-15A-70-*2G	80	32	43.5	114	202.5	77	Rc1/2	M8 thread depth 10	84	25	64.5
CVSE3-20A-70-*2G	90	40	52	136.5	233.5	95	Rc3/4	M8 thread depth 10	97.5	25	72.5
CVSE3-25A-70-*2G	110	48	61	149.5	255.5	113	Rc1	M12 thread depth 14	110	45	82.5

● With DIN terminal box (Pg9)
CVSE3-10A-70-*2GT

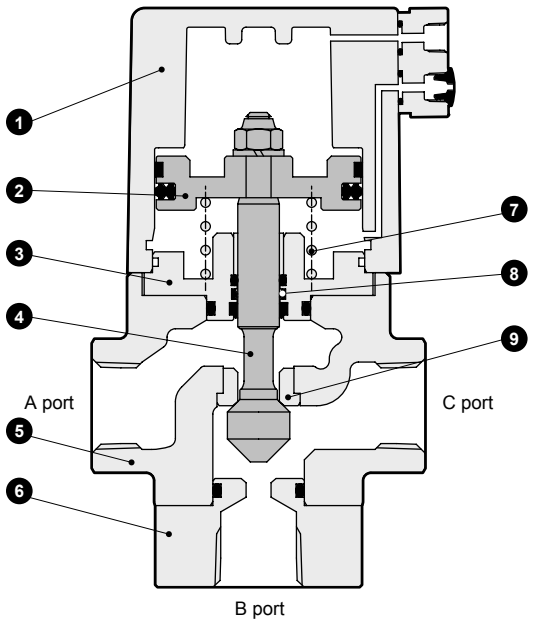


Optional dimensions

Refer to page 890 for coil options and mounting plates.

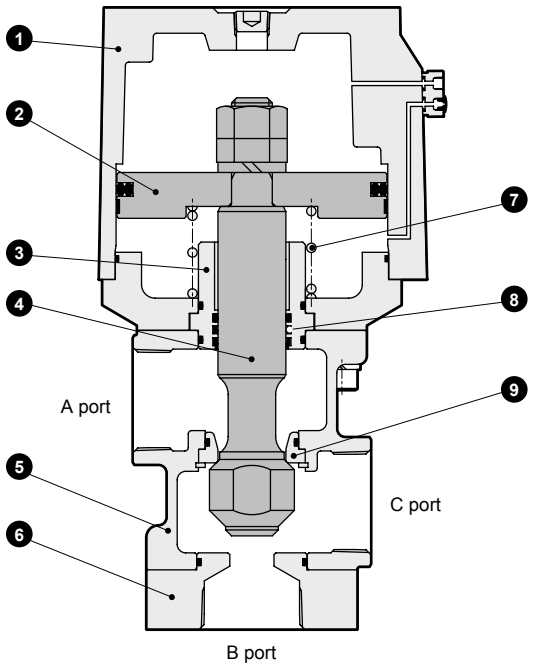
Internal structure and parts list

● CVE3-10A to 25A-35



No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Valve stem	SUS420J2	Stainless steel
5	Body	FCD450	Cast iron (plating)
6	NO body	SUS303	Stainless steel
7	Spring	SWP	Piano wire
8	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	NC valve seat	SUS303	Stainless steel

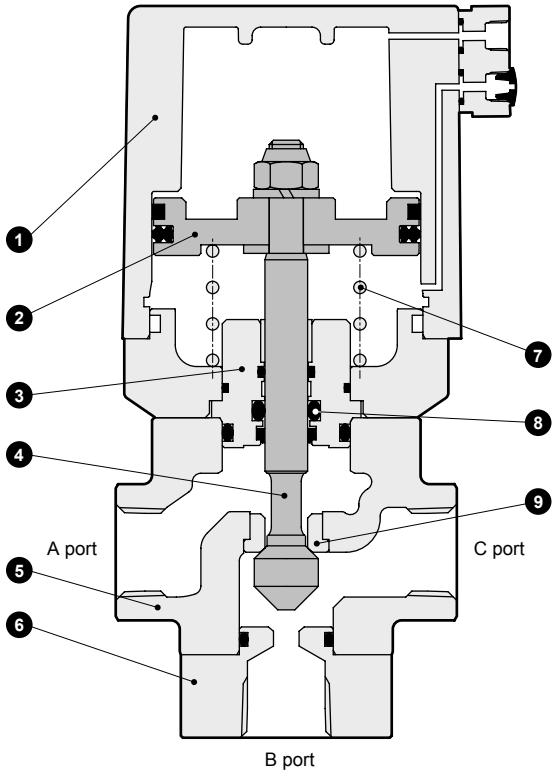
● CVE3-32A/40A/50A-35



No.	Part name	Material	
1	Cylinder guard	AC7A	Aluminum casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Valve stem	SUS420J2	Stainless steel
5	Body	FCD450	Cast iron
6	NO body	SUS303	Stainless steel
7	Spring	SWP	Piano wire
8	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	NC valve seat	SUS303	Stainless steel

Internal structure and parts list

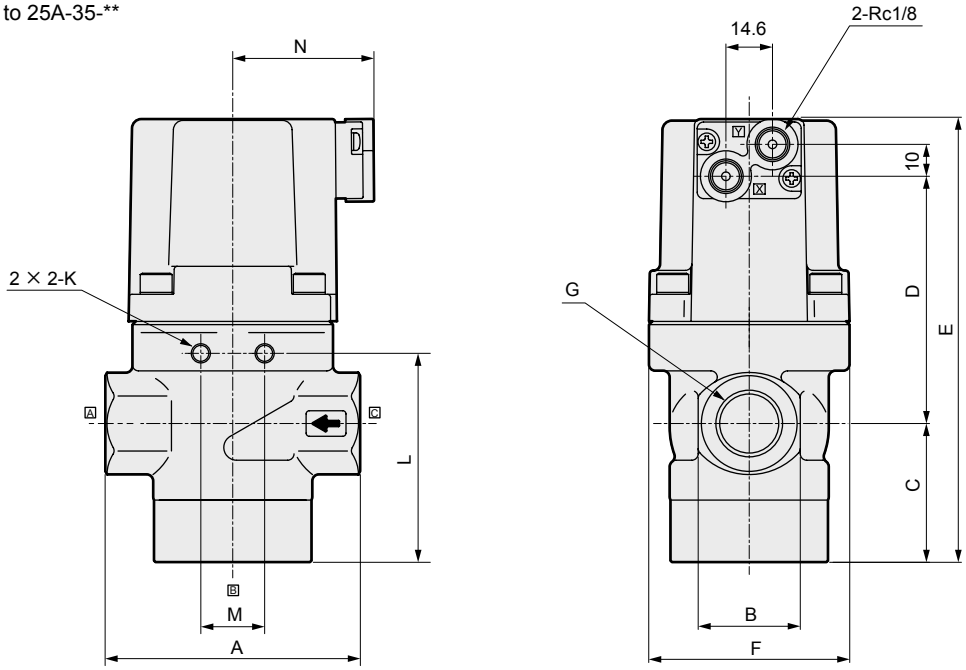
● CVE3-10A to 25A-70



No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Piston	A2017	Aluminum
3	Adaptor	SUS303	Stainless steel
4	Valve stem	SUS420J2	Stainless steel
5	Body	FCD450	Cast iron
6	NO body	SUS303	Stainless steel
7	Spring	SWP	Piano wire
8	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	NC valve seat	SUS303	Stainless steel

Dimensions CAD

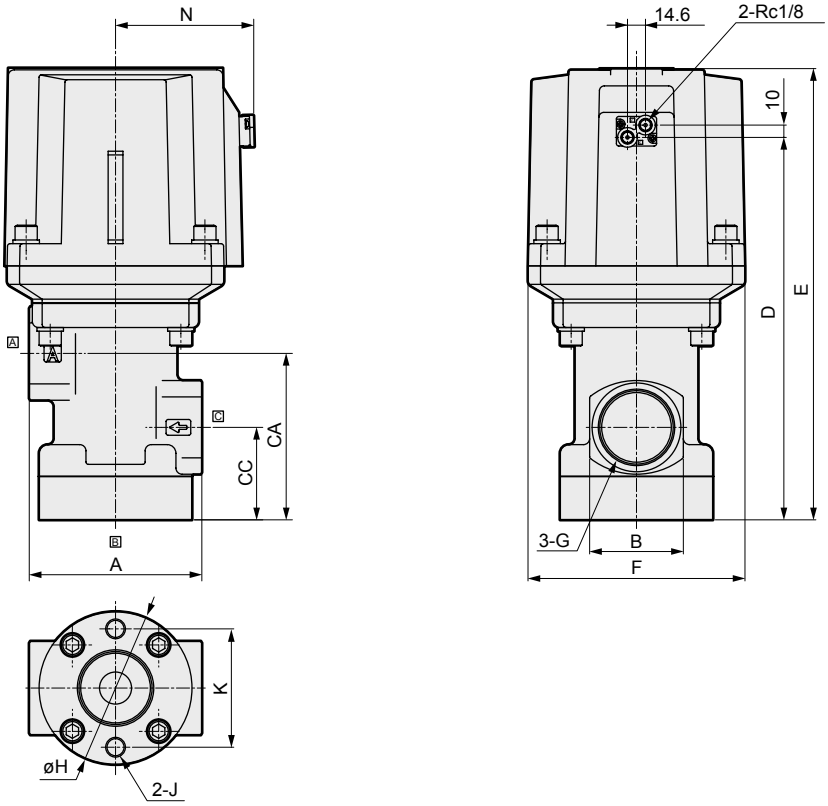
● CVE3-10A to 25A-35-**



* The flow path becomes C → A when port Y is pressurized.

Model No.	A	B	C	D	E	F	G	K	L	M	N
CVE3-10A-35-*	60	28	35.5	65	118.5	53	Rc3/8	M6 thread depth 9	59	20	41.5
CVE3-15A-35-*	80	32	43.5	77.5	139	63	Rc1/2	M6 thread depth 9	65.5	20	46
CVE3-20A-35-*	90	40	52	98	168	77	Rc3/4	M8 thread depth 10	79.5	25	53
CVE3-25A-35-*	110	48	61	118.5	197.5	95	Rc1	M8 thread depth 10	91	25	61

● CVE3-32A/40A/50A-35-**

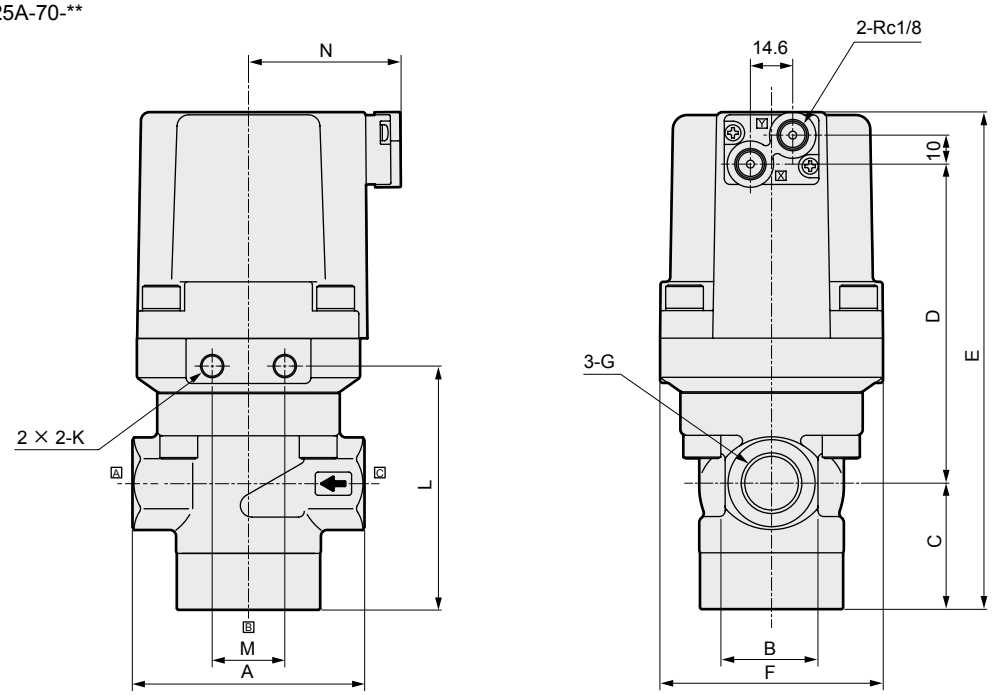


* The flow path becomes C → A when port Y is pressurized.

Model No.	A	B	CA	CC	D	E	F	G	H	J	K	N
CVE3-32A-35-*	120	61	118	63	260.5	301	145	Rc1¼	ø109	M12 depth 30	90	91
CVE3-40A-35-*	120	61	118	63	260.5	301	145	Rc1½	ø109	M12 depth 30	90	91
CVE3-50A-35-*	140	76	135	75	310	366	176	Rc2	ø124	M16 depth 35	96	111

Dimensions CAD

● CVE3-10A to 25A-70-**



* The flow path becomes C → A when port Y is pressurized.

Model No.	A	B	C	D	E	F	G	K	L	M	N
CVE3-10A-70-*	60	28	35.5	88.5	142	63	Rc3/8	M6 thread depth 9	73.5	20	46
CVE3-15A-70-*	80	32	43.5	110	171.5	77	Rc1/2	M8 thread depth 10	84	25	53
CVE3-20A-70-*	90	40	52	132.5	202.5	95	Rc3/4	M8 thread depth 10	97.5	25	61
CVE3-25A-70-*	110	48	61	145.5	224.5	113	Rc1	M12 thread depth 14	110	45	71

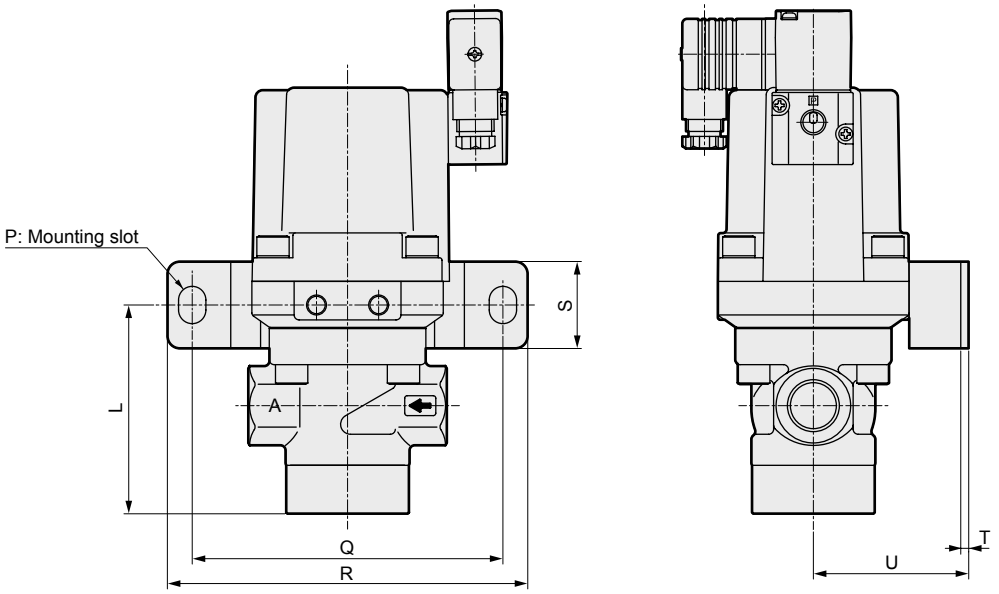
Optional dimensions

Refer to page 890 for mounting plates.

Optional dimensions CAD

● Mounting plate
CVE3/CVSE3-10A to 25A-35/70-** B / B-R / B-Y

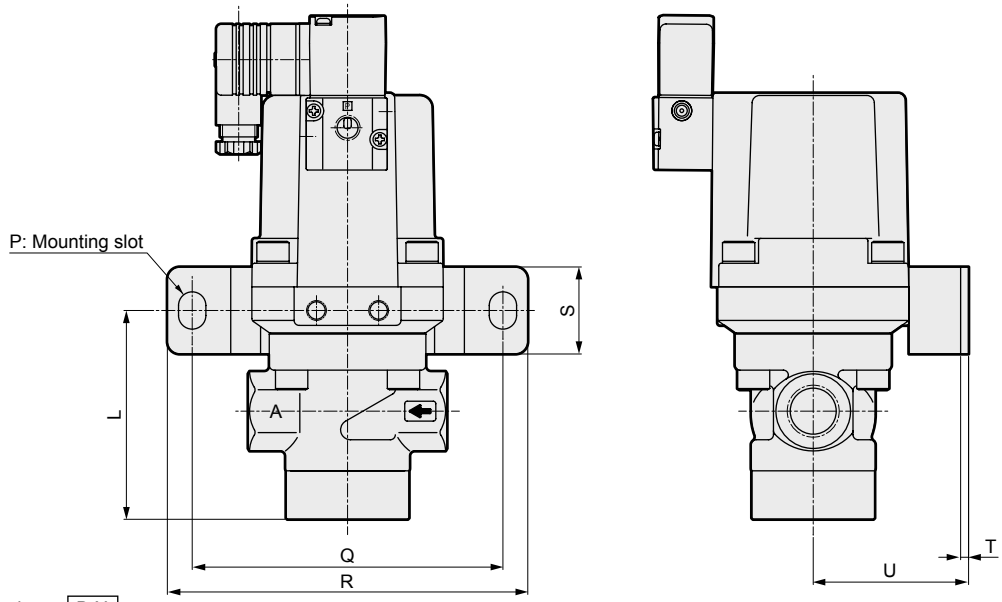
Material: Steel
Zinc plated



* The figure shows B.

● Mounting plate
CVE3/CVSE3-10A to 25A-35/70-** B-X / B-Z

Material: Steel
Zinc plated



* The figure shows B-X.

Model No.	L	P	Q	R	S	T	U
CV*E3-10A-35-*B	59	9×12	85	100	25	3.2	40
CV*E3-15A-35-*B	65.5	9×12	85	100	25	3.2	45
CV*E3-20A-35-*B	79.5	11×15	125	145	35	3.2	62.5
CV*E3-25A-35-*B	91	11×15	125	145	35	3.2	71.5
CV*E3-10A-70-*B	73.5	9×12	85	100	25	3.2	45
CV*E3-15A-70-*B	84	11×15	125	145	35	3.2	62.5
CV*E3-20A-70-*B	97.5	11×15	125	145	35	3.2	71.5
CV*E3-25A-70-*B	110	14×20	160	190	40	4	84

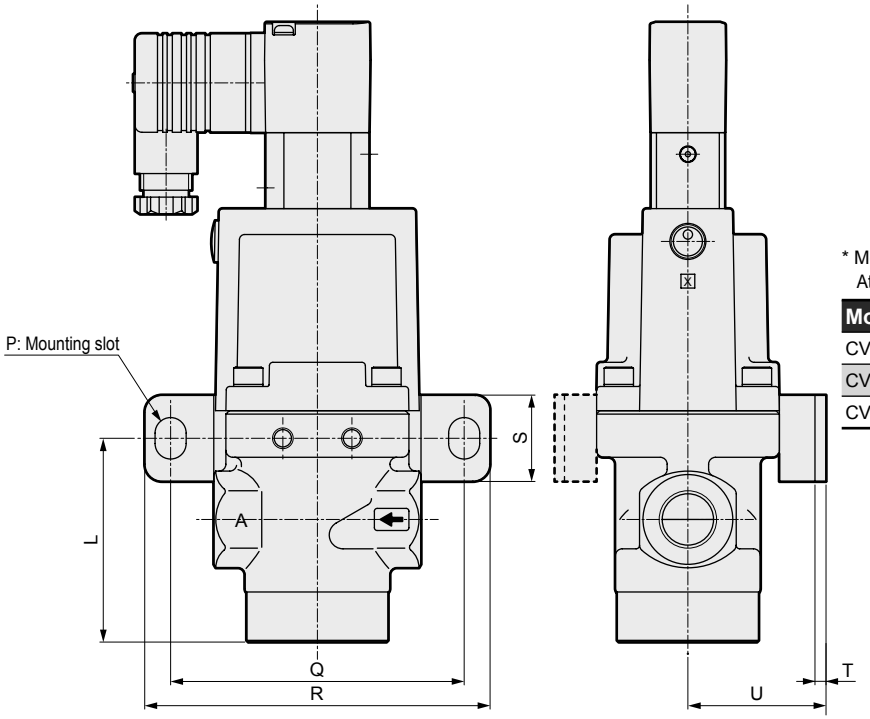
● With T type terminal box (G1/2)
T type terminal box with lamp (G1/2)
CVSE3-*-35/70-* 3T / 3R

Refer to page 879 for the optional dimensions.

Optional dimensions: Top mounted solenoid valve

●Mounting plate
CVSE3-10A/15A-35-**TB
CVSE3-10A-70-**TB

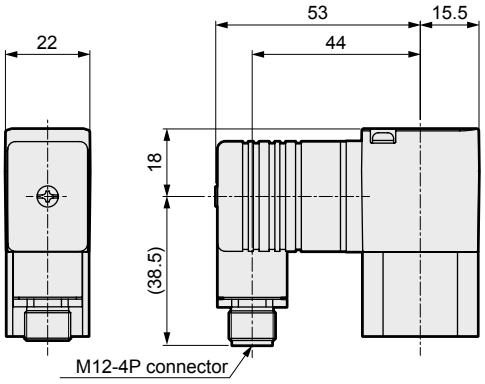
Material: Steel
Zinc plated



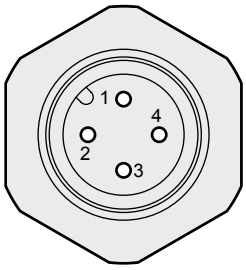
* Mounting plate is attached.
Attach it to the position of the solid line or dotted line in the figure.

Model No.	L	P	Q	R	S	T	U
CVSE3-10A-35-**TB	59	9×12	85	100	25	3.2	40
CVSE3-15A-35-**TB	65.5	9×12	85	100	25	3.2	45
CVSE3-10A-70-**TB	73.5	9×12	85	100	25	3.2	45

● DIN terminal box (M12-4P connector)
DIN terminal box with lamp/surge suppressor (M12-4P connector)
CVSE3-*-35/70-* [2J / 2KS] T



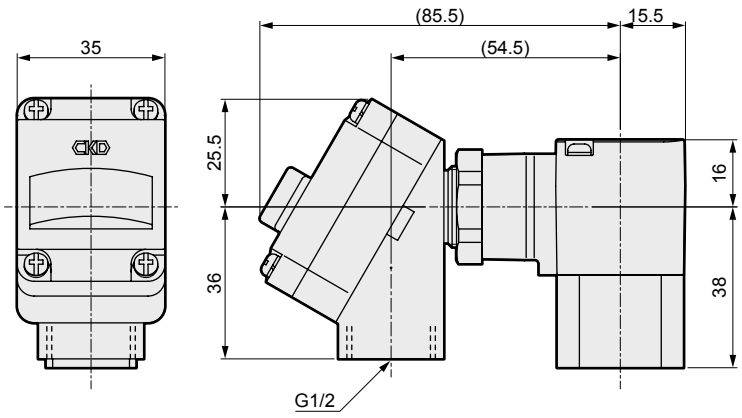
Connector pin array

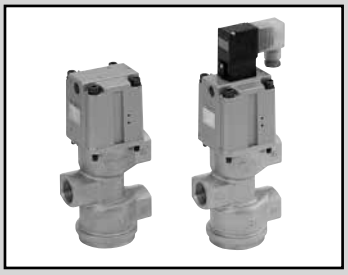


PIN No.	Applications
1PIN	Ground
2PIN	(Not used)
3PIN	Power supply -
4PIN	Power supply +

* As it is a screw-in, the connector pin positions may not be the same as those shown above.

● T type terminal box (G1/2)
T type terminal box with lamp (G1/2)
CVSE3-*-35/70-* [3T / 3R] T





Air operated 3-port valve for low pressure (coolant control) (coolant valve)

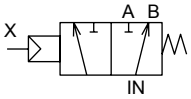
CV3E/CVS3E Series

● Port size: Rc3/4, Rc1

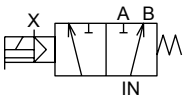
RoHS CAD

JIS symbol

● Air operated (CV3E)



● With solenoid valve (CVS3E)



Common specifications

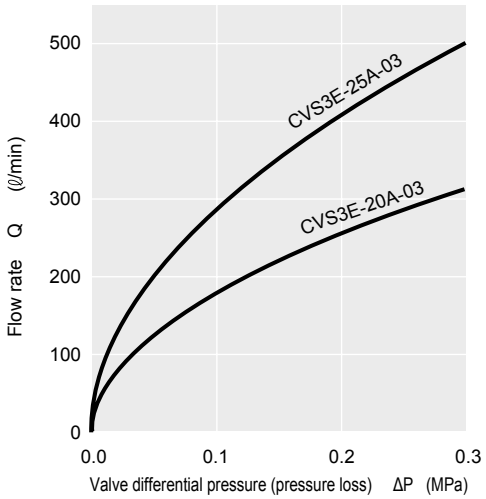
Item	CV3E/CVS3E	
	20A	25A
Actuation	Directional (COM port pressurization only)	
Working fluid	Coolant	
Fluid viscosity mm²/s	500 or less	
Working pressure MPa	0 (≈0 psi, 0 bar) to 0.3 (≈44 psi, 3 bar)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm³/min	20 or less	
Orifice size mm	22.8 or equiv.	29.3 or equiv.
Cv	12.5	20
Port size	Rc3/4	Rc1
Weight kg	2.2(2.1) *1	3.9(3.8) *1
Pilot fluid	Air	
Pilot pressure MPa	0.25 (≈36 psi, 2.5 bar) to 0.5 (≈73 psi, 5 bar)	
Pilot port size	Rc1/4	
Mounting orientation	Unrestricted	

*1: Weights in ( ) are for air operated (CV3E).

Electrical specification (with solenoid valve/common specifications)			
Rated voltage		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC	
Apparent power VA	Holding	3.6(50 Hz), 2.8(60 Hz)	
	Starting	11(50 Hz), 9(60 Hz)	
Power consumption W	AC	1.9(50 Hz), 1.5(60 Hz)	
	DC	2.0	
Thermal class		Class 130 (B)	
Degree of protection (IEC standards 529)		With DIN terminal box (Pg9)	IPX5
		With T type terminal box (G1/2)	IPX6

*2: The voltage fluctuation range must be within ±10% of the rated voltage.

Flow characteristics



Note: Calculated value at specific gravity 1.

How to order

● Air operated

CV3E - 20A - 03 - B

● With solenoid valve

CVS3E - 25A - 03 - 0 - 2H - S - 2

Ⓐ Port size

Working pressure
0 to 0.3 MPa

Ⓑ Packing seal/gasket material

Ⓒ Coil

Ⓓ Other options

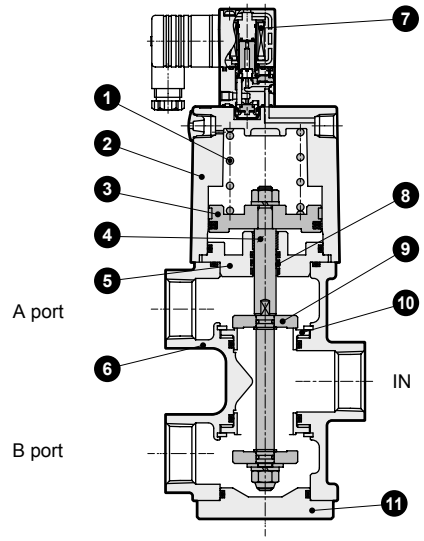
Ⓔ Rated voltage

Model No.	
Air operated (3-port)	CV3E
With solenoid valve (3-port)	CVS3E

Code	Description		Model No. CV3E	Model No. CVS3E
Ⓐ Port size				
20A	Rc3/4		●	●
25A	Rc1		●	●
Ⓑ Packing seal/gasket material				
0	Standard	Nitrile rubber	●	●
B	Option	Fluoro rubber	●	●
Ⓒ Coil				
2G	With DIN terminal box (Pg9)			●
2H	DIN terminal box with lamp (Pg9)			●
3T	With T type terminal box (G1/2)			●
3R	T type terminal box with lamp (G1/2)			●
Ⓓ Other options				
Blank	Standard	No option		●
S	Option	With surge suppressor		●
Ⓔ Rated voltage				
1	100 VAC(50/60 Hz), 110 VAC(60 Hz)			●
2	200 VAC(50/60 Hz), 220 VAC(60 Hz)			●
3	24 VDC			●

The combinations indicated with ● in the above table are available.

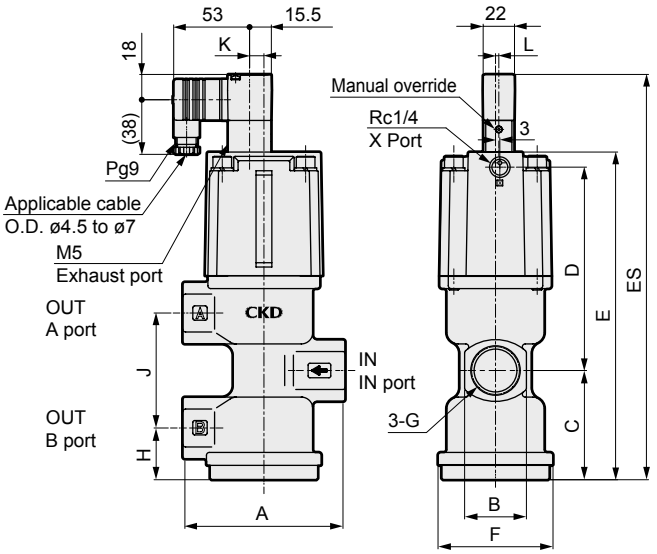
Internal structure and parts list



No.	Part name	Material	
1	Spring	SWP	Piano wire
2	Cylinder guard	ADC12	Aluminum die-casting
3	Piston	A2017	Aluminum
4	Piston rod	SUS304	Stainless steel
5	Adaptor	SUS303	Stainless steel
6	Body	FCD450	Cast iron (plating)
7	Pilot solenoid valve	-	-
8	Rod packing	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	Main valving element	SUS440	Stainless steel
10	Valve seat	SUS440	Stainless steel
11	Bottom cap	SUS303	Stainless steel

Dimensions CAD

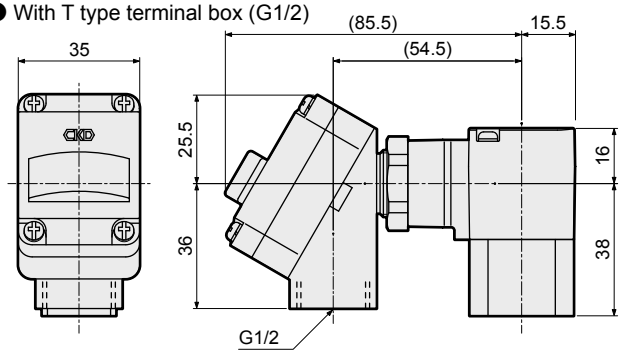
● With DIN terminal box (Pg9)

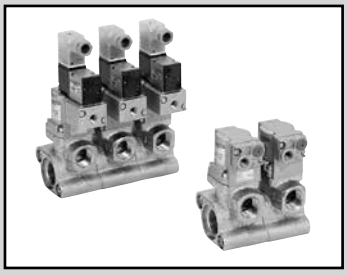


No.	A	B	C	D	E	ES	F	G	H	J	K	L
CV(S)3E-20A	90	35	64	112	186	240	65	Rc3/4	31.5	65	4	1.5
CV(S)3E-25A	110	43	76	141.5	233	282	80	Rc1	36	80	14	2.3

*1: Dimension E indicates the total height of the air operated, and dimension ES indicates that of the solenoid valve mounted.

● With T type terminal box (G1/2)





Modular coolant valve

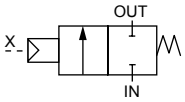
GCVE2/GCVSE2 Series

- NC, NO
- Port size: Rc1/2, Rc3/4 (OUT port)
- Low pressure 0.5 MPa, 1.0 MPa, Medium pressure 1.6 MPa

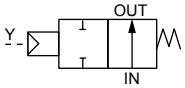
RoHS CAD

JIS symbol

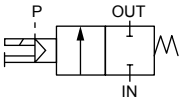
● GCVE2 (air operated)
: NC



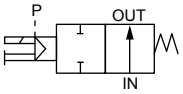
● GCVE22 (air operated)
: NO



● GCVSE2 (with solenoid valve)
: NC



● GCVSE22 (with solenoid valve)
: NO



Specifications

1 MPa = 10 bar

Model No.	0.5 MPa		1.0 MPa		1.6 MPa	
	GCVE2/GCVSE2	GCVE22/GCVSE22	GCVE2/GCVSE2	GCVE22/GCVSE22	GCVE2/GCVSE2	GCVE22/GCVSE22
Actuation	NC	NO	NC	NO	NC	NO
Working fluid	Coolant/other non-corrosive liquids (*1)					
Fluid viscosity mm²/s	500 or less					
Working pressure MPa	0 (≈0 psi) to 0.5 (≈73 psi)		0 (≈0 psi) to 1.0 (≈150 psi)		0 (≈0 psi) to 1.6 (≈230 psi)	
Proof pressure (water pressure) MPa	2.0 (≈290 psi, 20 bar)		2.0 (≈290 psi, 20 bar)		6.0 (≈870 psi, 60 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)					
Ambient temperature °C	-5 (23°F) to 50 (122°F)					
Valve seat leakage cm³/min	20 or less (water pressure)					
Mounting orientation	Unrestricted					
Pilot fluid	Air					
Pilot pressure MPa	0.25 (≈36 psi, 2.5 bar) to 0.7 (≈100 psi, 7 bar)					

*1: Fluids that do not affect cast iron (nickel plating), stainless steel, nitrile rubber or fluoro rubber, and epoxy resin adhesive

Electrical specification (with solenoid valve/common specifications)		
Rated voltage		100 VAC (50/60 Hz) / 110 VAC (60 Hz), 200 VAC (50/60 Hz) / 220 VAC (60 Hz), 24 VDC
Starting current (A)		100 VAC:0.068/0.054, 200 VAC:0.034/0.027, 24 VDC:-
Holding current (A)		100 VAC:0.041/0.032, 200 VAC:0.021/0.016, 25 VDC:0.075
Power consumption (W)	AC	2.2 (50Hz), 1.8 (60Hz) [With lamp] 2.4 (50Hz), 2.0 (60Hz)
	DC	1.8 [With lamp] 2.0
Thermal class		Class 130 (B)
Degree of protection (IEC standards 529)		IPX5

*2: The voltage fluctuation range must be within ±10% of the rated voltage.

Individual specifications for 0.5 MPa

Item / Model No.	Port size: OUT port	Port size: IN port	Orifice size (mm)	Cv	Pilot port size	Weight (kg) *3: GCVE2(2)	Weight (kg) *3: GCVSE2(2)
GCVE2(2)/GCVSE2(2)-[Station No.]-15A-05	Rc1/2	Rc3/4	14	5	Rc1/8	1.0	1.2
GCVE2(2)/GCVSE2(2)-[Station No.]-20A-05	Rc3/4	Rc1	19	10		1.5	1.7

Individual specifications for 1.0 MPa

Item / Model No.	Port size: OUT port	Port size: IN port	Orifice size (mm)	Cv	Pilot port size	Weight (kg) *3: GCVE2(2)	Weight (kg) *3: GCVSE2(2)
GCVE2(2)/GCVSE2(2)-[Station No.]-15A-10	Rc1/2	Rc3/4	10	3.5	Rc1/8	1.0	1.2
GCVE2(2)/GCVSE2(2)-[Station No.]-20A-10	Rc3/4	Rc1	14	6.5		1.5	1.7

Individual specifications for 1.6 MPa

Item / Model No.	Port size: OUT port	Port size: IN port	Orifice size (mm)	Cv	Pilot port size	Weight (kg) *3: GCVE2(2)	Weight (kg) *3: GCVSE2(2)
GCVE2(2)/GCVSE2(2)-[Station No.]-15A-16	Rc1/2	Rc3/4	7	1.7	Rc1/8	1.0	1.2
GCVE2(2)/GCVSE2(2)-[Station No.]-20A-16	Rc3/4	Rc1	10.5	4		1.5	1.7

*3: Weight for 1 station. Multiply the weight times the station No. to calculate the total weight of modules.

How to order

● Air operated

GCVE2 2 - 2 - 15A - 05 - 0

● With solenoid valve

GCVSE2 2 - 5 - 20A - 10 - 0 2H S - 1

*1

Ⓐ Actuation *2

Ⓑ Module station No. *3

● In regard to expansion
For expansion, select B: Through-hole type.
Connection parts are sold separately.
Refer to page 896.

Ⓒ Port size (OUT port size) *4

Ⓓ Working pressure *5

Ⓔ Body/sealant combination

Ⓕ Coil

Ⓖ Other options *6 *7 *8

Ⓗ Voltage

		Model No.	
		GCVE2	GCVSE2
Ⓐ Actuation			
Blank	NC	●	●
2	NO	●	●
Ⓑ Module station No.			
A	1-station Thread	●	●
B	1-station Through-hole type	●	●
2	2 stations	●	●
3	3 stations	●	●
4	4 stations	●	●
5	5 stations	●	●
Ⓒ Port size (OUT port size)			
15A	Rc1/2 (IN port: Rc3/4)	●	●
20A	Rc3/4 (IN port: Rc1)	●	●
Ⓓ Working pressure			
05	0 to 0.5 MPa	●	●
10	0 to 1.0 MPa	●	●
16	0 to 1.6 MPa	●	●
Ⓔ Body/sealant combination			
		Body	Seal
O	Standard	Cast iron (plating)	Nitrile rubber	●	●
B	Option	Cast iron (plating)	Fluoro rubber	●	●
Ⓕ Coil			
2G	With DIN terminal box (Pg9)		●
2H	DIN terminal box with lamp (Pg9)		●
Ⓖ Other options			
Blank	No option	●	●
S	With surge suppressor		●
B	With mounting plate	●	●
Ⓗ Voltage			
1	100 VAC(50/60 Hz) 110 VAC(60 Hz)		●
2	200 VAC(50/60 Hz) 220 VAC(60 Hz)		●
3	24 VDC		●

[Example of model No.]

GCVSE22-5-20A-10-02HS-1

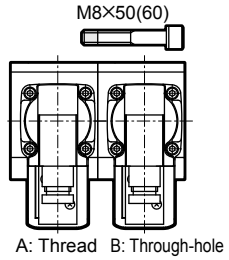
Model: GCVSE2 : With solenoid valve
Ⓐ Actuation : NO
Ⓑ Module station No. : 5 stations
Ⓒ Port size : Rc3/4 (OUT port)
Ⓓ Working pressure : 0 to 1.0 MPa
Ⓔ Body/sealant combination
: Body - cast iron (plating)/ sealant - nitrile rubber
Ⓕ Coil : DIN terminal box with lamp (Pg9)
Ⓖ Other options : With surge suppressor
Ⓗ Voltage : 100 VAC(50/60 Hz), 110 VAC(60 Hz)

*1 : Combined GCVE2 and GCVSE2 modules can be custom made. Contact CKD for details.
*2 : Mixed modules with different actuation (Item Ⓐ) can be custom made. Contact CKD for details.
*3 : The max. station number is 5.
*4 : Combining 15A and 20A modules is not possible due to the limits of the structure.
*5 : Combining modules with different working pressure (Item Ⓓ) is not possible due to the limits of the structure.
*6 : Surge suppressor (-S) of coil 2G (Item Ⓕ) is attached externally. (2H is integrated.)
*7 : Mounting plate is attached.
*8 : To add both the surge suppressor and mounting plate options, specify Item Ⓖ as SB.

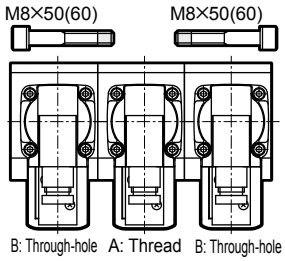
● Module configuration

● Modules are sealed with connection O-rings and fixed with hexagon socket head cap screws.
Two types of body shape are available: A (thread) and B (through-hole).
See the configurations by station No. as below.

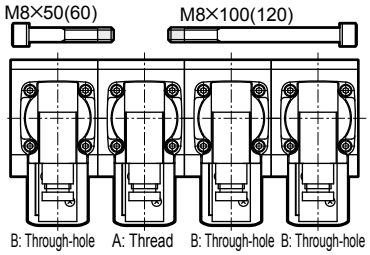
2 stations



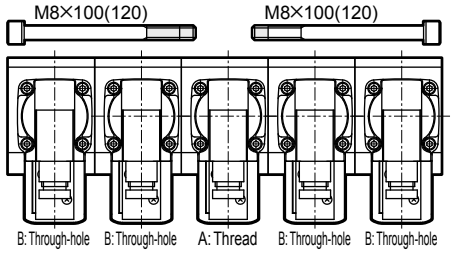
3 stations



4 stations



5 stations



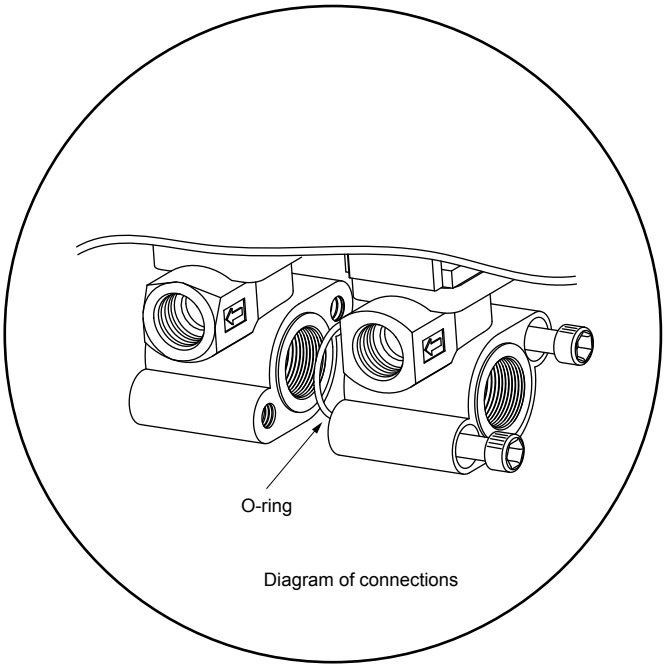


Diagram of connections

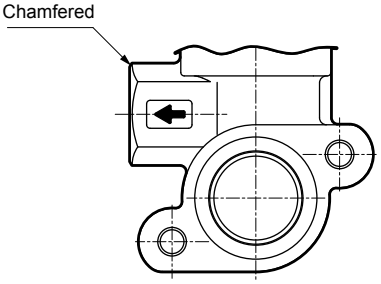
* Dimensions shown in ( ) are for OUT port size 20A.

● Connection parts

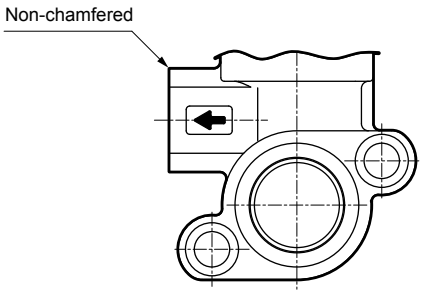
Order Model No.	
GCVE2-15A-50-0-JOINT-KIT	Connection screw (M8 × 50, 2 pcs.), connection O-ring (nitrile rubber, 1 pce), washer (2 pcs.)
GCVE2-20A-60-0-JOINT-KIT	Connection screw (M8 × 60, 2 pcs.), connection O-ring (nitrile rubber, 1 pce), washer (2 pcs.)
GCVE2-15A-50-B-JOINT-KIT	Connection screw (M8 × 50, 2 pcs.), connection O-ring (fluoro rubber, 1 pce), washer (2 pcs.)
GCVE2-20A-60-B-JOINT-KIT	Connection screw (M8 × 60, 2 pcs.), connection O-ring (fluoro rubber, 1 pce), washer (2 pcs.)
GCVE2-15A-100-0-JOINT-KIT	Connection screw (M8 × 100, 2 pcs.), connection O-ring (nitrile rubber, 2 pce), washer (2 pcs.)
GCVE2-20A-120-0-JOINT-KIT	Connection screw (M8 × 120, 2 pcs.), connection O-ring (nitrile rubber, 2 pce), washer (2 pcs.)
GCVE2-15A-100-B-JOINT-KIT	Connection screw (M8 × 100, 2 pcs.), connection O-ring (fluoro rubber, 2 pce), washer (2 pcs.)
GCVE2-20A-120-B-JOINT-KIT	Connection screw (M8 × 120, 2 pcs.), connection O-ring (fluoro rubber, 2 pce), washer (2 pcs.)

■ How to identify type A (screw) and type B (through-hole)

● OUT port thread part shapes are different.



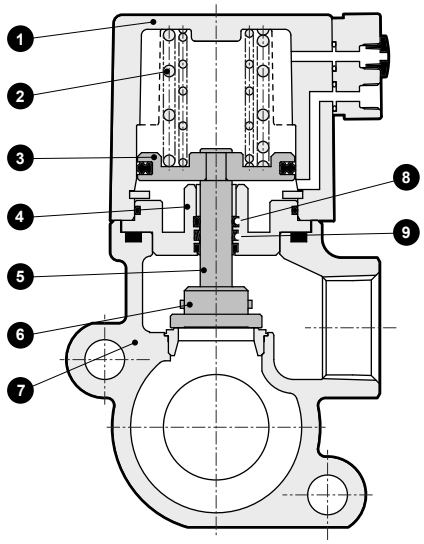
A: Thread



B: Through-hole

Internal structure and parts list

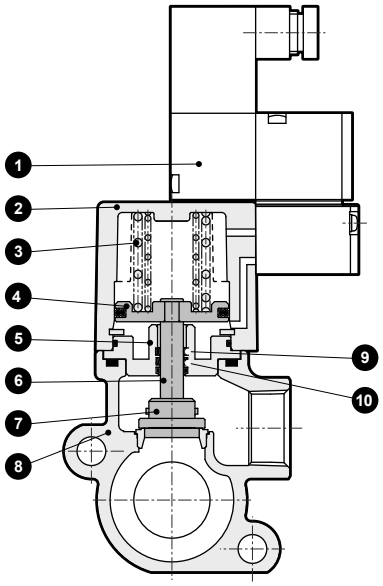
● GCVE2- station No. - bore size -05/10/16



GCVE2

No.	Part name	Material	
1	Cylinder guard	ADC12	Aluminum die-casting
2	Spring	SWP	Piano wire
3	Piston	A2017	Aluminum
4	Adaptor	SUS303	Stainless steel
5	Piston rod	SUS304	Stainless steel
6	Main valving element	SUS420J2	Stainless steel
7	Body	FCD450	Cast iron (plating)
	Valve seat	SUS420J2	Stainless steel
8	O-ring	NBR(FKM)	Nitrile rubber (Fluoro rubber)
9	Rod packing	NBR(FKM)	Nitrile rubber (Fluoro rubber)

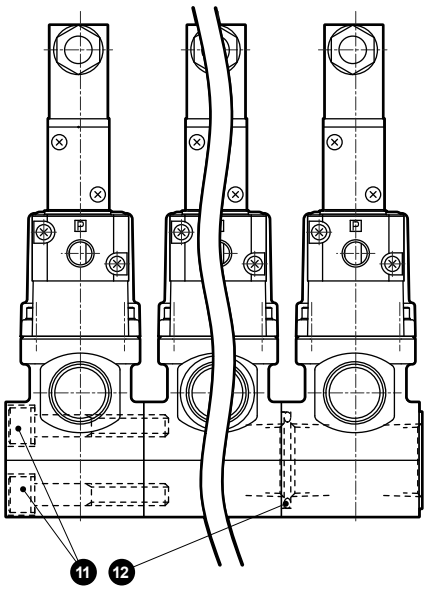
● GCVSE2- station No. - bore size -05/10/16



GCVSE2

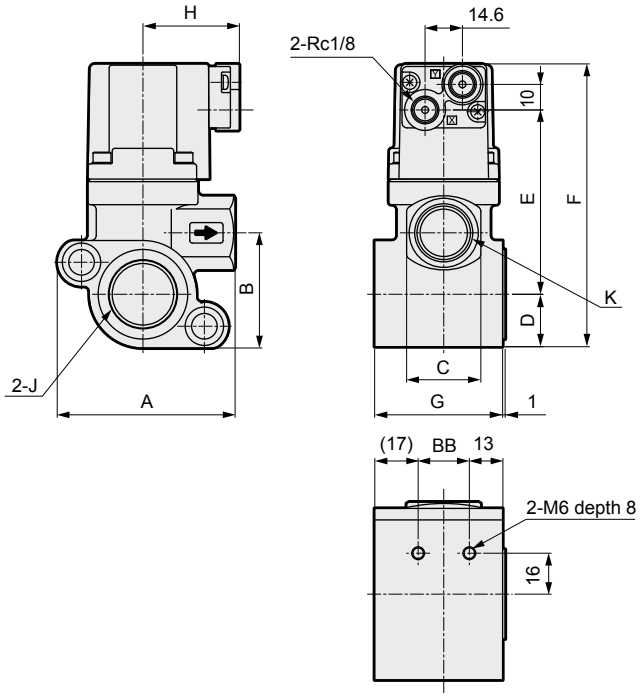
No.	Part name	Material	
1	Pilot solenoid valve	-	
2	Cylinder guard	ADC12	Aluminum die-casting
3	Spring	SWP	Piano wire
4	Piston	A2017	Aluminum
5	Adaptor	SUS303	Stainless steel
6	Piston rod	SUS304	Stainless steel
7	Main valving element	SUS420J2	Stainless steel
8	Body	FCD450	Cast iron (plating)
	Valve seat	SUS420J2	Stainless steel
9	O-ring	NBR(FKM)	Nitrile rubber (Fluoro rubber)
10	Rod packing	NBR(FKM)	Nitrile rubber (Fluoro rubber)
11	Hexagon socket head cap screw	SCM435	Iron
12	O-ring	NBR(FKM)	Nitrile rubber (Fluoro rubber)

● Modules



Dimensions

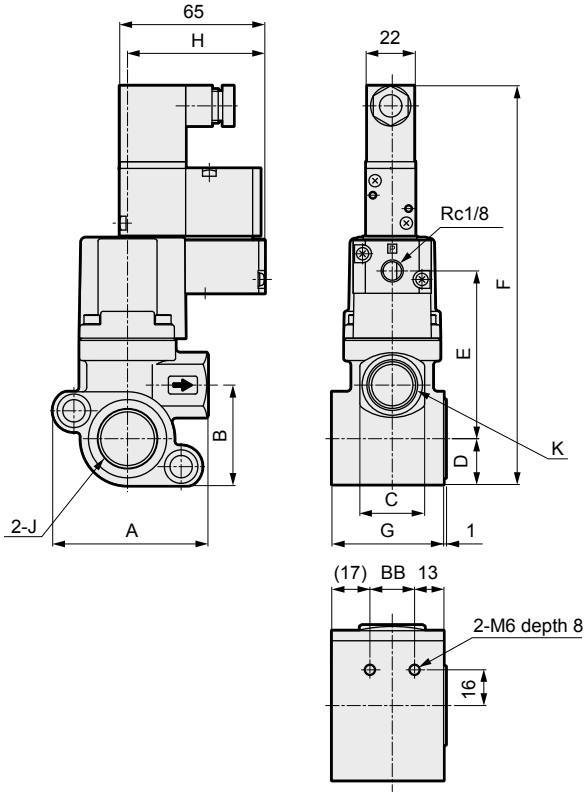
● GCVE2/GCVE22



* Pilot pressurization port is port X for the NC and port Y for the NO.

Model No.	A	B	C	D	E	F	G	H	J	K	BB
GCVE2 (2) -15A-05/10/16	69.5	44.5	29	20.5	72	110.5	50	38	Rc3/4	Rc1/2	20
GCVE2 (2) -20A-05/10/16	78.5	50	35	25	85.5	128.5	60	41.5	Rc1	Rc3/4	30

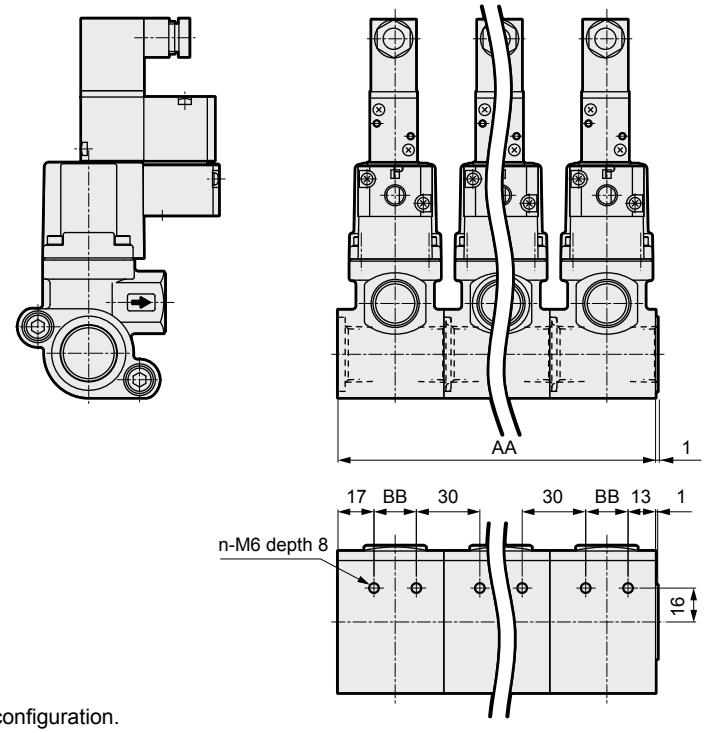
● GCVSE2/GCVSE22



Model No.	A	B	C	D	E	F	G	H	J	K	BB
GCVSE2 (2) -15A-05/10/16	69.5	44.5	29	20.5	75	179	50	62	Rc3/4	Rc1/2	20
GCVSE2 (2) -20A-05/10/16	78.5	50	35	25	89	197	60	65	Rc1	Rc3/4	30

Dimensions

● Modules



*1: Refer to page 896 for module configuration.

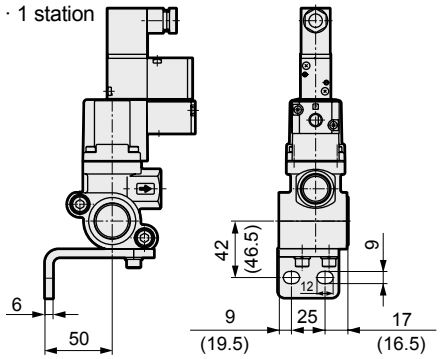
Station No.	AA		BB		n	Module configuration *1
	15A	20A	15A	20A		
Single unit	50	60	20	30	2	A
2 stations	100	120	20	30	4	A+B
3 stations	150	180	20	30	6	B+A+B
4 stations	200	240	20	30	8	B+A+B+B
5 stations	250	300	20	30	10	B+B+A+B+B

Optional dimensions

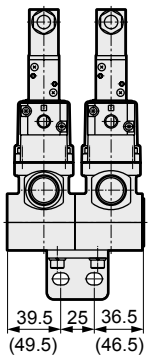
● Mounting plate
GCVE2/GCVE22
GCVSE2/GCVSE22 -15A/20A-**B

Material: Steel
Zinc plated

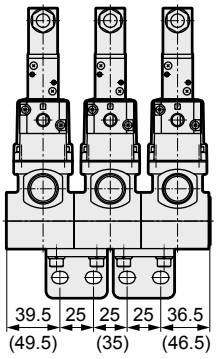
· 1 station



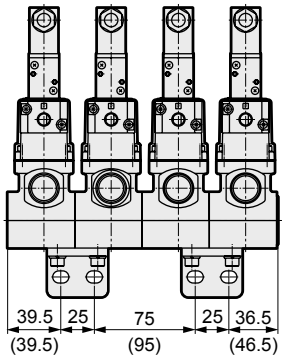
· 2 stations



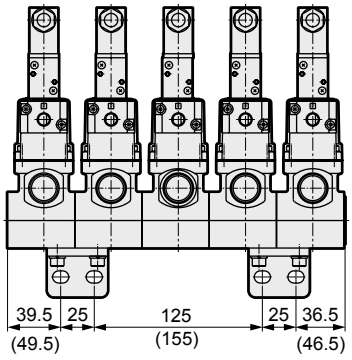
· 3 stations



· 4 stations



· 5 stations



* Dimensions shown in ( ) are for OUT port size 20A.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Air operated 2, 3-port valve (coolant valve) (CVE/CVSE)

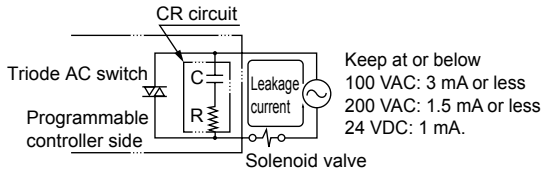
Design/selection

1. Safety design

⚠ CAUTION

■ Leakage current from other fluid control components

When operating the solenoid valve with a programmable controller, etc., check that the output leakage current from the programmable controller is within the following specifications. Failure to observe this could lead to malfunctions.



2. Working fluid

⚠ WARNING

■ Working fluids

Compatibility has not been evaluated with all coolants. Particularly, if coolant contains high levels of chlorine or sulfur, materials used at wetted parts could be adversely affected. Non-corrosive fluids refer to fluids that are mutually unaffected when they contact the valve's wetted part materials.

Wetted part materials: Cast iron (nickel plating), stainless steel, nitrile rubber or fluoro rubber, and epoxy resin adhesive.

■ External pilot air

(1) Draining: Compressed air contains a large amount of drainage (water, oil oxides, tar, foreign matter). This is a factor that significantly reduces the reliability of the pneumatic components. For drainage measures, improve air quality by dehumidifying with an after cooler or dryer, removing foreign matter with a filter, and removing tar with a tar removal filter, etc.

(2) Pre-lubrication: This series is pre-lubricated, so no lubrication is required. However, once lubrication has been started, it must be continued so that the lubricant does not run out. Use turbine oil Class 1 ISO VG32 (#90) or equivalent for lubrication.

(3) Filter: Install a filter with a 5 μm or less filter element.

3. Working environment

⚠ WARNING

■ CVSE Series cannot be used in an explosive gas atmosphere. When using in an explosive gas atmosphere, change to the CVE Series, and provide a separate explosion-proof solenoid valve on the pilot air circuit.

■ If there are high levels of dust in the area, install a downward-facing silencer or elbow fitting on the exhaust port so that dust does not enter.

■ Take appropriate safeguards when using this product in places where it can be exposed to dripping water.

4. How to use

⚠ CAUTION

■ Pilot pressure

Set pilot air pressure within the specified range.

Mounting, installation and adjustment

1. Piping

⚠ CAUTION

■ Do not pipe using the solenoid valve section. There is a risk of damage. (For solenoid valve mounted)

■ When piping the CVE/CVSE Series, check the supply ports on the body side and pilot operation side.

Model No.	Body side supply port	Pilot operation side supply port
CVE2	IN	X
CVE22		Y
CVSE2/CVSE22		P
CVE3		Y
CVSE3		P

Note) Pipe the unit side supply port so that the arrow on the body matches the fluid flow direction. If supplied in reverse, internal components could be damaged when the valve operates.

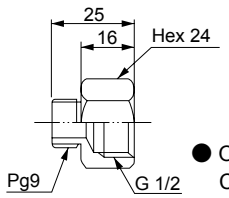
2. Wiring

⚠CAUTION

■ Wiring for models with solenoid valve

(1) Refer to Connections on Intro Pages 65 and 66 when wiring to a DIN terminal box or T type terminal box.

(2) The thread size for the junction box outlets of the DIN terminal box can be changed from Pg9 to G1/2 using the optional connector below.



● Order Model No.:
CVS2-CONNECTOR-F4-202936

(3) Coil direction can be changed 180°. To reverse the electrical connection direction, rotate only the coil. Do not lose internal parts when removing the coil.

Use/maintenance

1. Maintenance and inspection

⚠CAUTION

■ Pilot pressure

Set pilot air pressure within the specified range.

■ If water hammer occurs when a 3-port coolant valve for medium/high pressure operates, reduce the noise as follows.

(1) Install a metering valve on the valve IN side, then adjust the metering valve to reach the required flow rate. If these countermeasures fail, contact CKD.

2. Disassembly/assembly

⚠WARNING

■ A spring is used in the cylinder cover. When disassembling this type, be careful as the spring could pop out and cause injuries.
The NC 2-port valve has a snap ring to prevent the spring from popping out. Do not remove the snap ring.

Modular coolant valve (GCVE2/GCVSE2)

Mounting, installation and adjustment

1. Piping

⚠CAUTION

■ Do not support the valve body only with piping. Use the set screws on the lower part of the body to fix it to the equipment.

■ Refer to the table below for the piping tightening torque.

Piping nominal diameter	Recommended piping tightening torque (N·m)
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86

■ Tightening torque should be 30 to 36 N·m when tightening the fixing hexagon socket head cap screws to add/remove valves.
Make sure that the O-ring is fixed in position and the spigot is securely engaged before tightening additional valves.
After assembling, check for leakage from the connection parts before use.

■ Pilot solenoid valve (with solenoid valve) assembly procedure

If the pilot solenoid valve has been disassembled, assemble it as follows.

(1) Coil side

· Disassembly

Loosen the cross-recessed pan head machine screw and lift up the coil assembly. Take out the outer spring, plunger assembly, and O-ring.

· Reassembly

Assemble the parts in the sequence of O-ring, plunger assembly, outer spring and coil assembly. Tighten the cross-recessed pan head machine screws with a torque of 0.7 to 1.1 N·m.

(2) Cover side

· Disassembly

Loosen the cross-recessed flat head screw to remove the cover. Take out the valving element spring, valving element guide assembly, and O-ring.

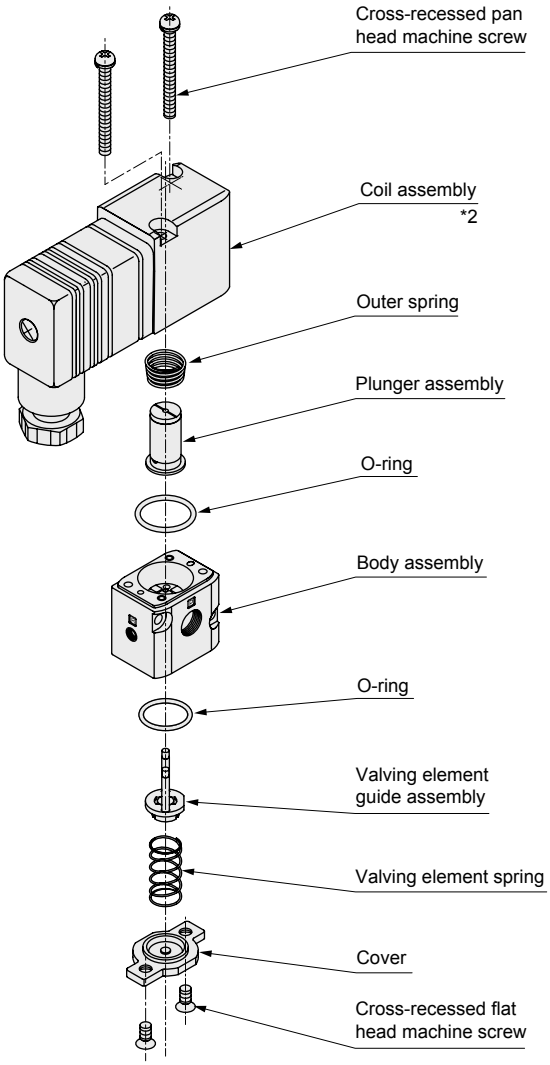
· Reassembly

Set the parts in the sequence of O-ring, valving element guide assembly, valving element spring and cover. Tighten the flat-head cross-recessed screw with a torque of 0.7 to 1.1 N·m.

*1 : Be careful not to lose components such as springs during disassembly.

*2 : The orientation of the coil assembly can be changed 180 degrees. Loosen the cross-recessed pan head machine screw to adjust the orientation.

*3 : Plunger is coated with turbine oil for lubrication.



■ Model No. of pilot solenoid valve (actuator assembly kit) for CVSE

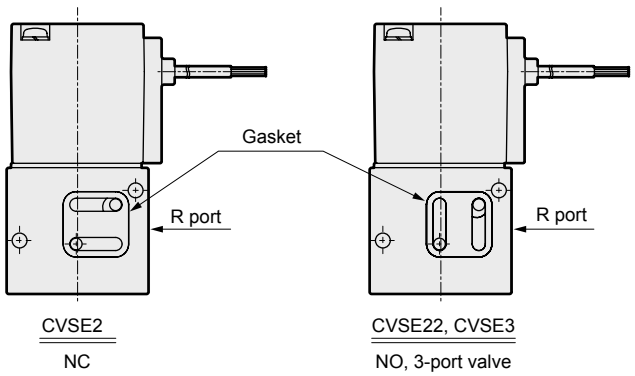
CVSE2-ACTUATOR-0 [*1] [ ] - (Rated voltage)

*1 : Specify the coil option code in the *1 field.

*2 : Contact your CKD Sales Representative about the pilot solenoid valve (actuator assembly kit) for CVS3E.

■ Orientation of gasket (models with solenoid valve)

The gasket has an orientation. Make sure to check the orientation when re-assembling.



MEMO

CCH/CPE/CPD

Peripheral components for coolant

■ Check valve/sensors/pressure sensor

[CCH]

Overview

Check valve dedicated for liquids, enhancing coolant valve performance.
Like the valves, it reduces pressure loss and realizes larger flow rates.
Its internal structure prevents the entry of foreign matter and guarantees reliable performance.

Features

- Foreign matter proof internal structure and large flow rate structure
- FKM sealant for high reliability
- Internal sealing: O-ring seal + metal touch
- Working pressure: High pressure up to 7.0 MPa can be used.

[CPE/CPD]

Overview

These low- and high-pressure switches are compatible with coolant. The diaphragm structure used at pressurized section achieves superior stability, so the product can be used to check the pressure of coolant in machine tools, and to check the pressure of water or oil in other industrial machines.

Features

Degree of protection IP65 or equivalent (dust proof/jet proof)

The high-pressure switch incorporates an electronic structure, enabling highly accurate detection and setting.

CONTENTS

⚠ Always read the precautions in the Introduction and on page 916 before use.

Check valve (for liquids)

CCH Series

● Working pressure: 0.05 to 7.0 MPa

RoHS

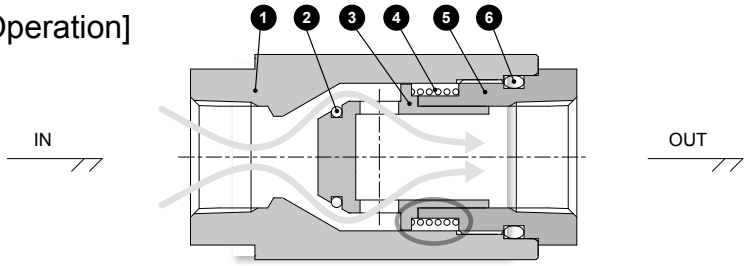
JIS symbol

Specifications

Item	CCH-10	CCH-15	CCH-20
Working fluid	Coolant/water/other non-corrosive liquids (*1)		
Fluid viscosity mm^2/s	500 or less		
Max. working pressure MPa	7.0 (≈1000 psi, 70 bar)		
Proof pressure (water pressure) MPa	14.0 (≈2000 psi, 140 bar)		
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)		
Ambient temperature °C	-10 (14°F) to 60 (140°F)		
Cracking pressure kPa	6 (≈870 psi, 60 bar) (reference value) (*2)		
Valve seat leakage cm^3/min	1.0 or less (water pressure)		
Port size	Rc3/8	Rc1/2	Rc3/4
Cv	3.6	6.9	11.0
Weight kg	0.27	0.44	0.88
Mounting orientation	Unrestricted		

*1 : Liquids that do not affect stainless steel, chrome plating, or fluoro rubber
*2 : Cracking pressure shows the pressure permitting a 5 mL/min (air) flow rate.
The value may increase depending on the type and viscosity of the liquid.
When the valve is used for the first time after being unused for a long time, the initial cracking pressure may be higher than normal.

[Operation]



The spring and main valving element are not in the flow path while the coolant is passing, and thus problems due to catching foreign matters and clogging are minimized.

How to order

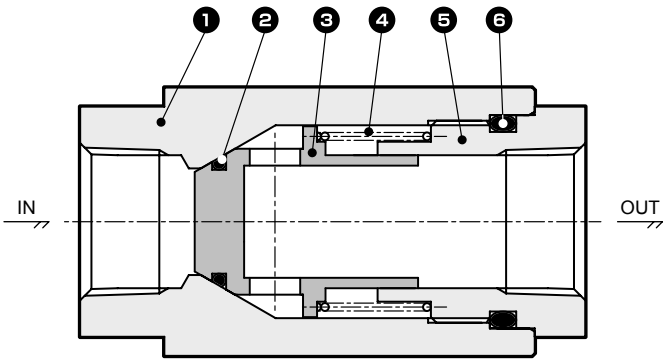
CCH - 10 A

Ⓐ Port size
Ⓑ Thread

Ⓐ Port size	
10	3/8
15	1/2
20	3/4

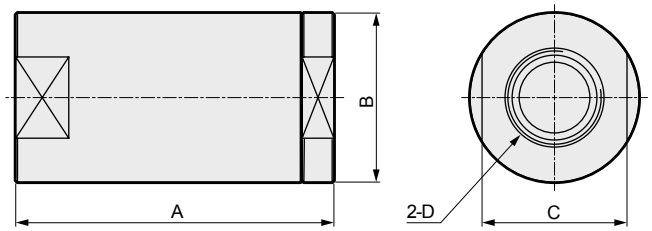
Ⓑ Thread	
A	Rc thread
G	G thread
N	NPT thread

Internal structure and parts list



No.	Part name	Material	
1	Body	SUS303	Stainless steel
2	O-ring	FKM	Fluoro rubber
3	Main valving element	SUS303	Stainless steel (chrome plating)
4	Spring	SUS304	Stainless steel
5	Cap	SUS303	Stainless steel
6	O-ring	FKM	Fluoro rubber

Dimensions



Model No.	A	B	C	D
CCH-10A/G/N	62	ø32	27	Rc3/8 / G3/8 / 3/8NPT
CCH-15A/G/N	75	ø38	34	Rc1/2 / G1/2 / 1/2NPT
CCH-20A/G/N	90	ø48	41	Rc3/4 / G3/4 / 3/4NPT

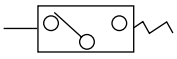
Mechanical pressure switch for coolant (for low pressure)

CPE Series

● Pressure adjusting range: 0.05 to 0.8 MPa

RoHS CAD

JIS symbol



Specifications

1 MPa = 10 bar

Item	CPE
Working fluid	Coolant, air, other non-corrosive liquids, gases
Rated pressure MPa	0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)
Pressure adjusting range MPa	0.05 (≈7.3 psi, 0.5 bar) to 0.8 (≈120 psi, 8 bar)
Fluid temperature °C	0 (32°F) to 50 (122°F)
Ambient temperature °C	0 (32°F) to 50 (122°F)
Port size	Rc1/4
Micro switch	Z-15GD-B (OMRON)
Contact array	1ab
Hysteresis MPa	0.04 (≈5.8 psi) or less (set pressure 0.05 (≈7.3 psi) to 0.3 (≈44 psi))
	0.1 (≈15 psi) or less (set pressure 0.31 (≈45 psi) to 0.8 (≈120 psi))
Repeatability MPa	±0.02 (≈2.9 psi, 0.2 bar)
Allowable operation frequency times/min.	20
Rated voltage	100 VAC, 200 VAC, 24 VDC
Insulation resistance MΩ	100 or more (with 500 VDC megger)
Weight kg	0.58
Mounting orientation	Vertical direction with the adjusting screw up
Degree of protection	IP65 (dust proof/jet-proof) equivalent

Micro switch rated

Load circuit		Non-inductive load (A)				Inductive load (A)			
		Resistance load		Lamp load		Inductive load		Electric motor load	
		N.C	N.O	N.C	N.O	N.C	N.O	N.C	N.O
Voltage	125 VAC	15		3	1.5	15		3	2.5
	250 VAC	15		2.5	1.25	15		3	1.5
	30 VDC	6		3	1.5	5		5	2.5

How to order

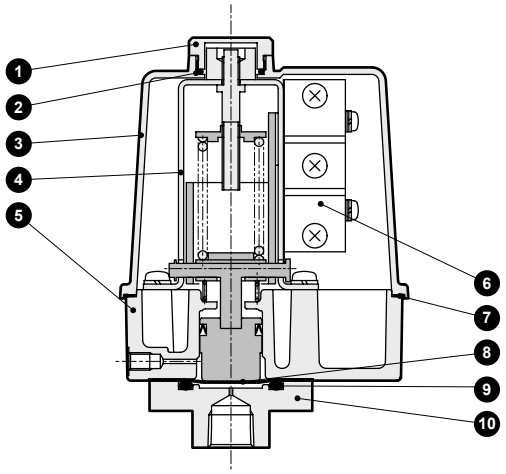
CPE - 8 - 0 G - 3

- CPE — Model No.
- 8 — Ⓐ Connection port
- 0 — Ⓑ Sealant
- G — Ⓒ Switch
- 3 — Ⓓ Lamp

Code	Description
Ⓐ Connection port	
8	Rc1/4 downward
Ⓑ Sealant	
0	Nitrile rubber
B	Fluoro rubber
Ⓒ Switch	
G	Standard
Ⓓ Lamp	
1	For 100/200 VAC
3	For 24 VDC

Internal structure and parts list

● CPE

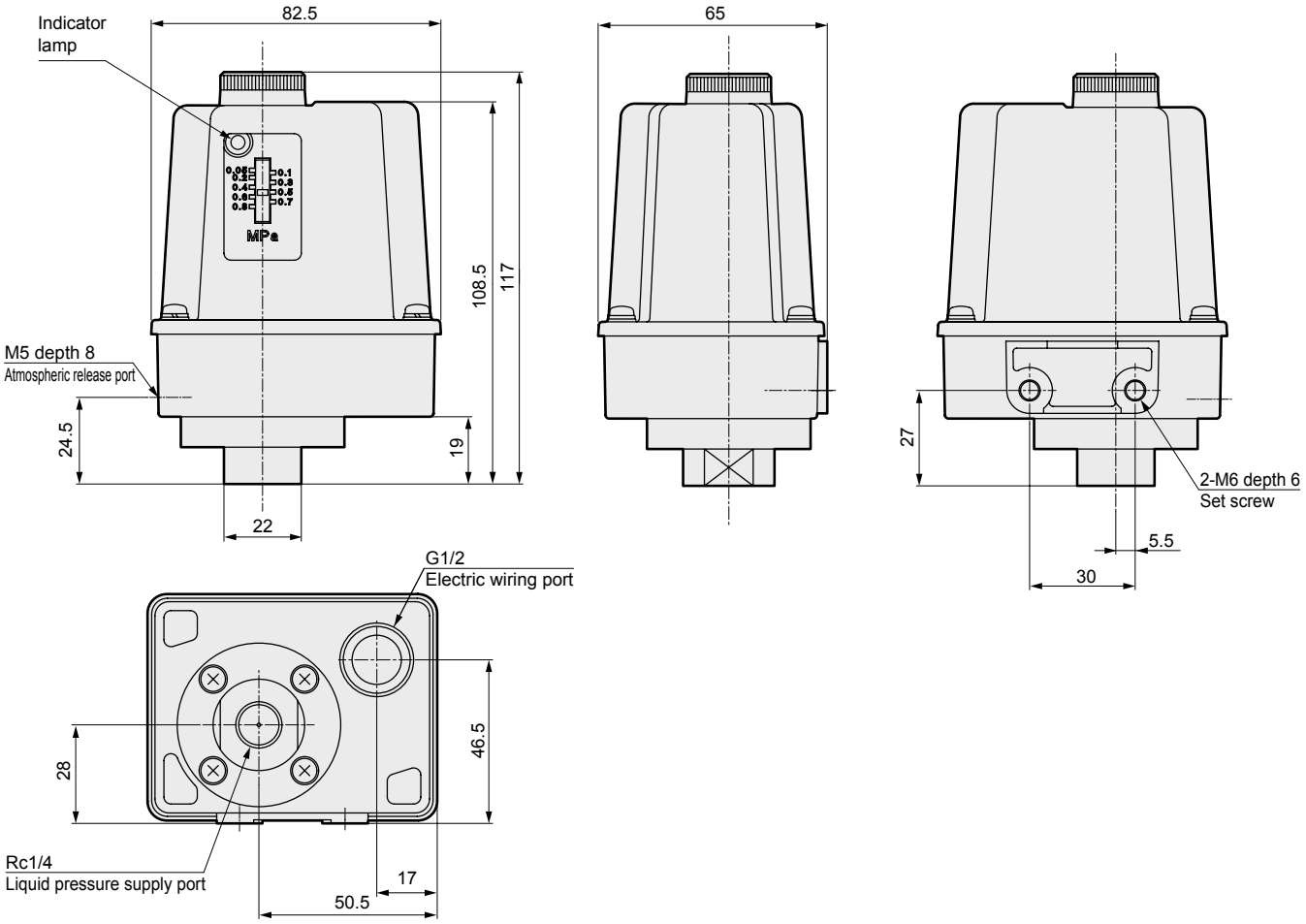


No.	Part name	Material	
1	Cap	A 5056	Aluminum
2	O-ring	NBR	Nitrile rubber
3	Cover	ABS	ABS resin
4	Frame	SPC	Steel
5	Body	ADC12	Aluminum die-casting
6	Micro switch	-	-
7	Gasket	NBR	Nitrile rubber
8	Diaphragm	NBR(FKM)	Nitrile rubber (fluoro rubber)
9	O-ring	NBR(FKM)	Nitrile rubber (fluoro rubber)
10	Port	SUS 303	Stainless steel

Options are shown in ( ).

Dimensions CAD

● CPE



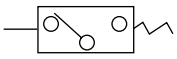
Electronic pressure switch for coolant (with digital display)

CPD Series

● Pressure adjusting range: 0 to 7 MPa

RoHS CAD

JIS symbol



Specifications

°F = 9/5°C + 32

Item	CPD
Pressure sensitive element	Stainless steel diaphragm pressure sensor
Working fluid	Coolant/other non-corrosive fluids
Rated pressure MPa	0 (≈0 psi, 0 bar) to 7 (≈1000 psi, 70 bar)
Proof pressure (water pressure) MPa	10.5 (≈1500 psi, 105 bar)
Pressure adjusting range MPa	0 (≈0 psi, 0 bar) to 7 (≈1000 psi, 70 bar)
Fluid temperature °C	0 (32°F) to 50 (122°F)
Ambient temperature °C	0 (32°F) to 50 (122°F)
Ambient humidity % RH	0 to 85 (no condensation)
Port size	Rc1/4
Display	3-digit LED display, character height 8 mm
Display accuracy (25°C)	±2%F.S. (±0.14 MPa (≈20 psi, 1.4 bar))
Temperature characteristics (0 to 50°C)	±4%F.S. (±0.28 MPa (≈41 psi, 2.8 bar))
Repeatability MPa	±0.02 (≈2.9 psi, 0.2 bar)
Power supply voltage	12 to 24 VDC ± 10% (ripple rate 1% or less)
Current consumption mA	50 or less
Output response time msec	Approx. 5
Switch output	NPN transistor open collector output 2 points
Switch output current mA	MAX 50
Switch output voltage drop V	2.4 or less
Set value hold	EEPROM
Lead wire	Oil resistant vinyl cable 4-conductor (0.2 mm^2) 1 m
Weight kg	0.36
Mounting orientation	Unrestricted
Degree of protection	IP65 (dust proof/jet-proof) or equivalent

How to order

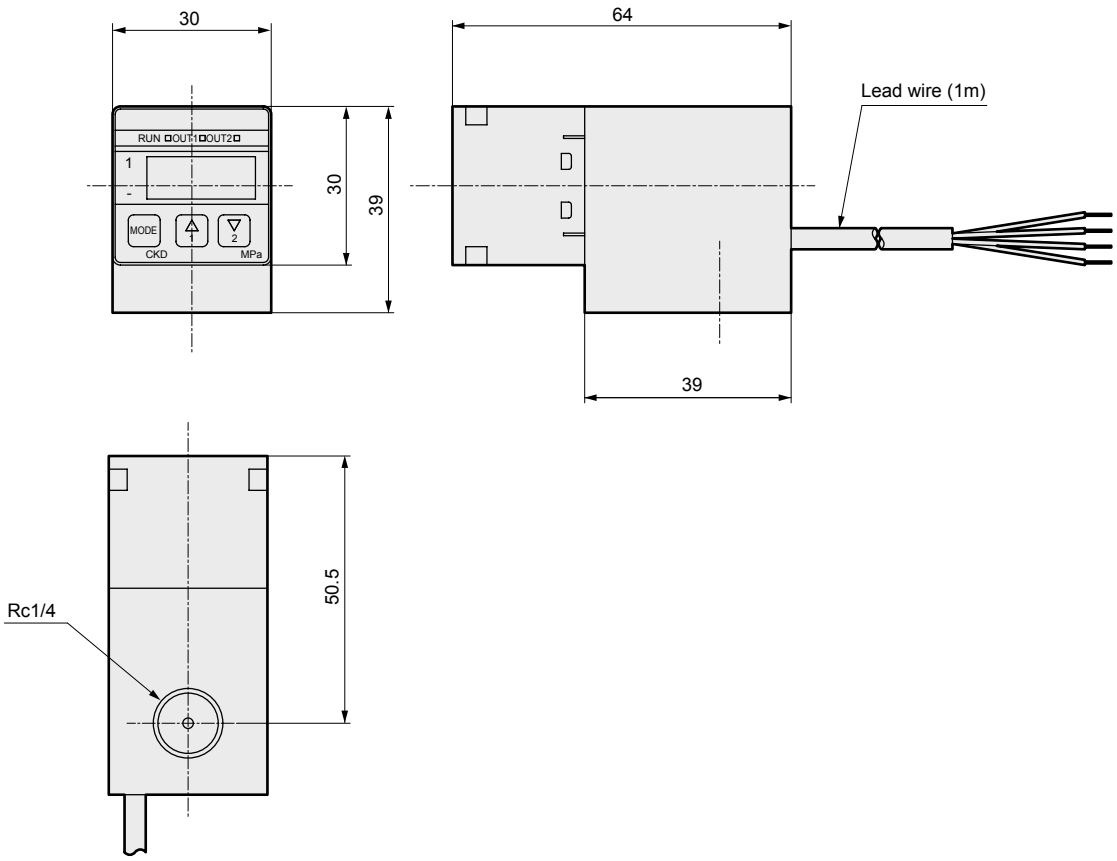
CPD - P70 N - 8

- CPD — Model No.
- P70 — Ⓐ Rated pressure
- N — Ⓑ Switch output
- 8 — Ⓒ Connection port

Code	Description
Ⓐ Rated pressure	
P70	0 to 7 MPa
Ⓑ Switch output	
N	NPN transistor output 2 point
Ⓒ Connection port	
8	Rc1/4 downward

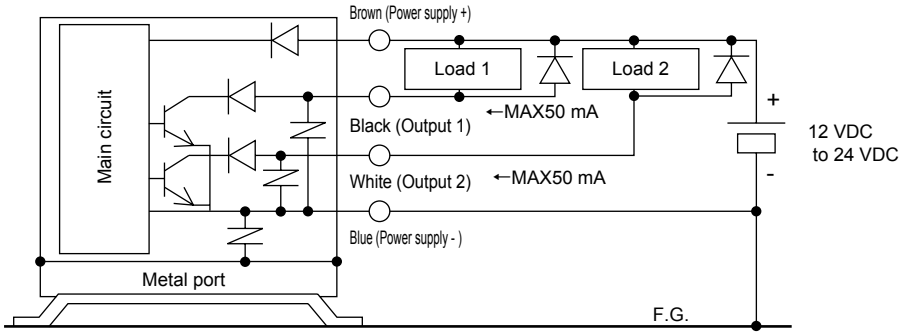
Dimensions

● CPD

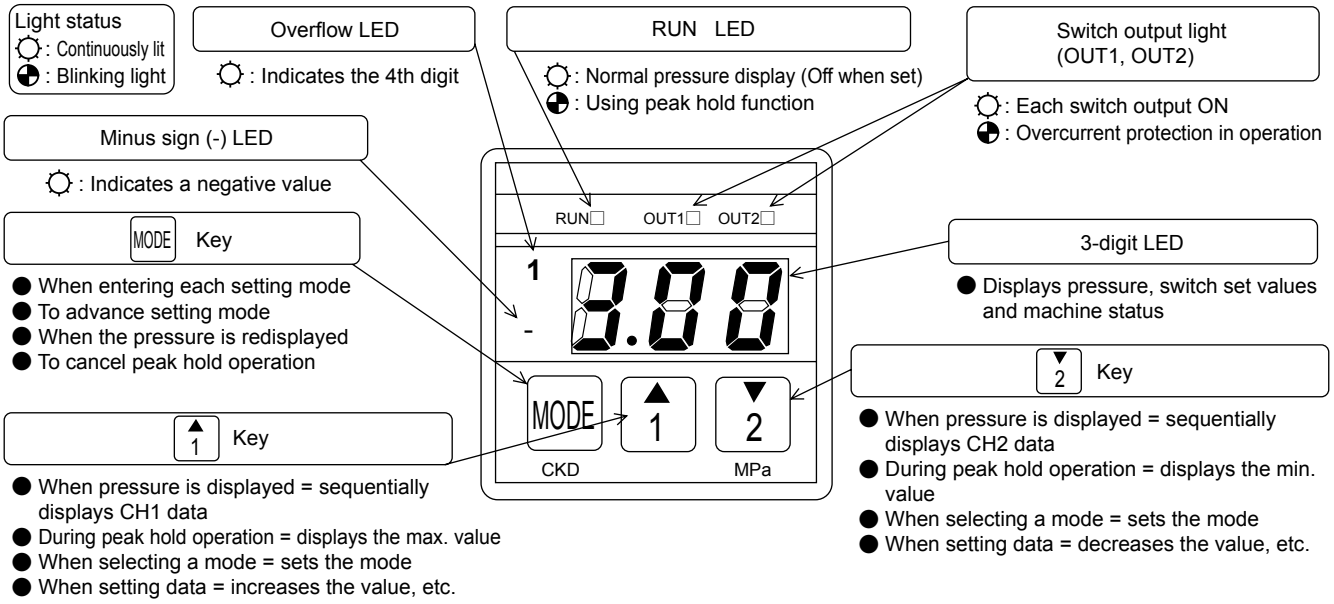


Wiring method

Cannot be disassembled



Display and function



LED display

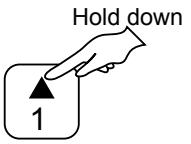
Numbers and letters are displayed with a combination of LED displays.

Numerals	0	1	2	3	4	5	6	7	8	9
Display	0	1	2	3	4	5	6	7	8	9

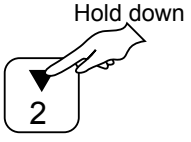
Numerals	A	B (b)	C	D (d)	H	I (i)	J	L	N (n)	O (o)	P
Display	A	b	C	d	H	i	J	L	n	o	P

Confirmation of set value

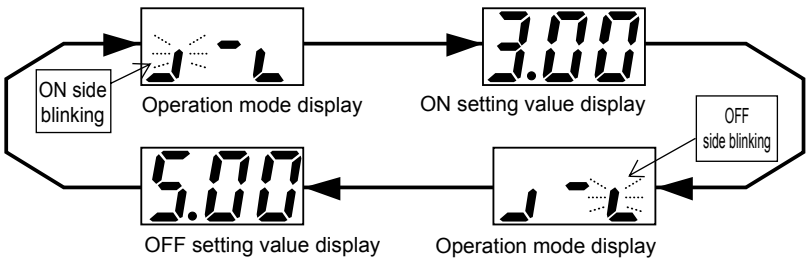
CH1 data display



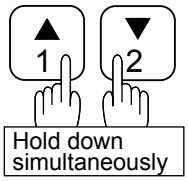
CH2 data display



By pressing each key during pressure display, the switch data ON setting/OFF setting/operation waveform, zero point adjustment value, pressure range, and output can be confirmed.
Switch operation is not affected during the next operation.



Zero point adjustment value/model No. display

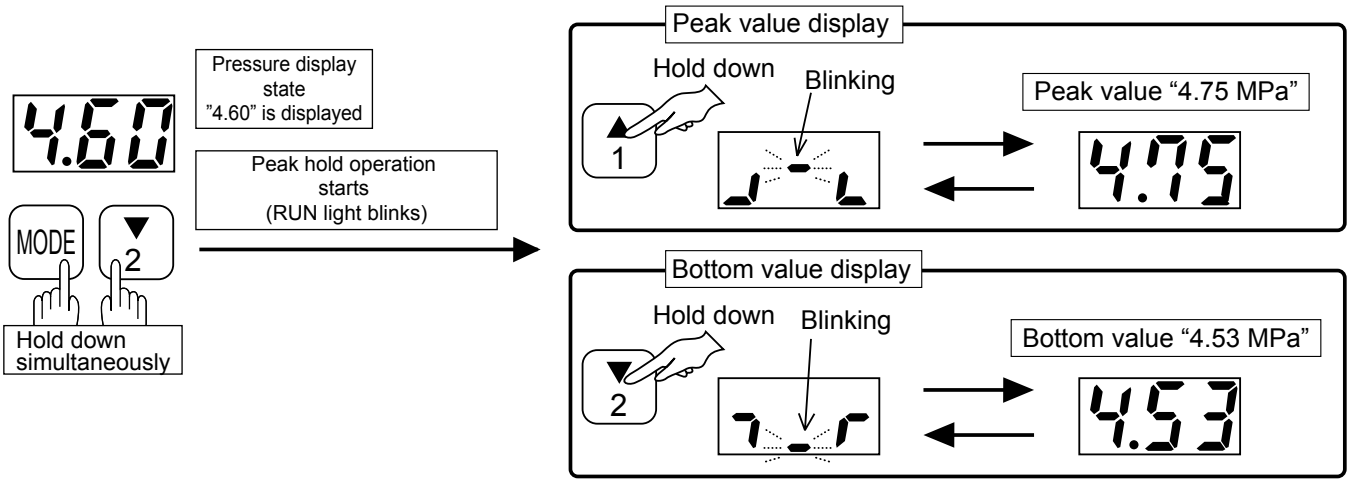


The zero point adjustment value and model No. are displayed alternately.
The switch operation is not affected during this operation.

Operation method of each function

Peak hold function

The pressure value for a set period is displayed to see the max. and min. values.
Use this to check the stability of source pressure and working pressure, etc. The peak hold operation does not affect this product's basic functions such as switch operations or pressure display.



Switch output function

Refer to following page for operation method.

The CPD has 2-point switch output and operates in four modes and stopping. The switch is started by setting the required operation mode (refer to the switch operation mode on page 915) and by making two settings, ON and OFF, that regulate the operation pressure.
Determine the required operation mode and ON and OFF setting values before making settings.
Select and set the following data to operate the switch.

CH1: Operation mode	CH1: ON set value	CH1: OFF set value
CH2: Operation mode	CH2: ON set value	CH2: OFF set value

Switch output test function

Refer to following page for operation method.

Use this function to forcibly turn the switch output ON and confirm the wiring connection or initial operation of the input device.

*1: Use this test function to check the wiring connection and input device operation. Avoid using this function instead of actual signals when executing the sequence program while the machinery and equipment are operating.

Zero point adjustment function

Refer to following page for operation method.

Deviation of the display from the zero point is compensated in the atmospheric pressure pressurized state.

*2: The above settings and test significantly affect the output signal and display. Before this operation, be sure to stop the machinery and equipment using this product and confirm that safety can be ensured in case of incorrect operation or display. Using this function while the machinery and equipment are operating is dangerous and may cause incorrect operation or display.
*3: To avoid incorrect operation, all keys must be held down for a set time to select the mode.

Operation chart for switch output function, forced output function, zero point adjustment function

For safety, if no key is operated for two seconds and over before the mode is set, the pressure display is redisplayed.

MODE Hold down

Blinking

When the MODE key is held down longer, the pressure is redisplayed.

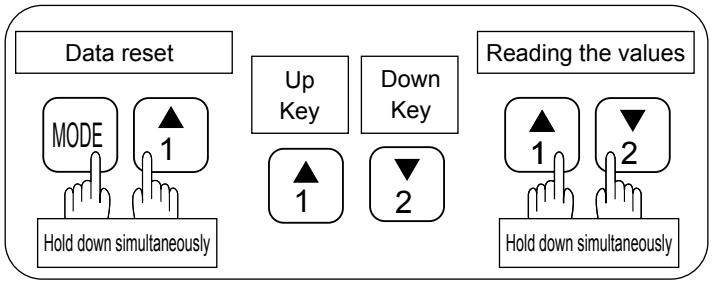
Blinking

Separate

MODE

Basic key operation

These key operations are valid in the switch operation pattern setting, ON/OFF setting, and zero point adjustment mode.



Setting data for the switch output function

Blinking

Set

Press 1 time

Switch CH1 Changing operation mode

Channel 1 display

Alternating display

Operation mode display (Refer to the following page)

Change mode with UP/DOWN keys

MODE

Press 1 time

Switch CH1 Data setting ON/OFF

ON point waveform display

OFF point waveform display

Alternating display

Once Push

Set value display

Change the value with UP/DOWN keys

MODE

Press 1 time

Switch CH2 Changing operation mode

Alternating display

MODE

Press 1 time

Switch CH2 Setting ON/OFF data

Set this switch in the same way as switch CH1.

For pressure display

MODE

Press 1 time

Press 1 time

MODE

Press 1 time

Switch output forced ON mode

Blinking

Set

MODE

Press 1 time

CH1 output ON

1 Hold down

CH2 output ON

2 Hold down

For pressure display

MODE

Press 1 time

MODE Press 1 time

Zero point adjustment mode

Blinking

Set

1

Press 1 time

"AdJ" Display

Alternating display

Zero point adjustable value display

Reading the adjustment value

1 2

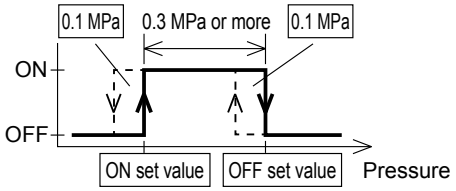
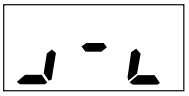
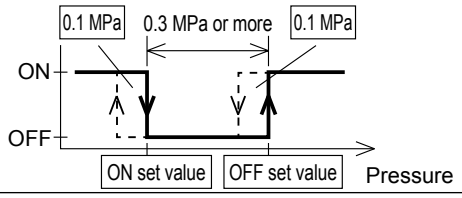
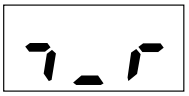
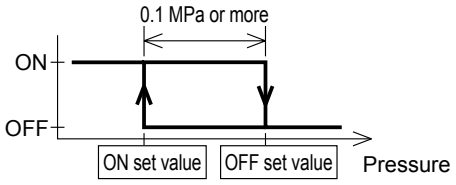
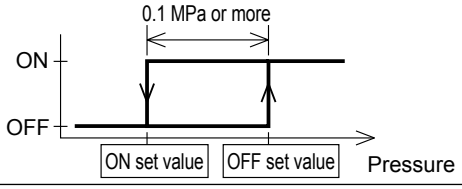
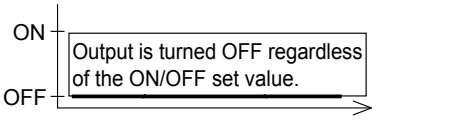
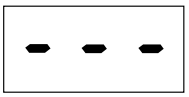
Hold down simultaneously

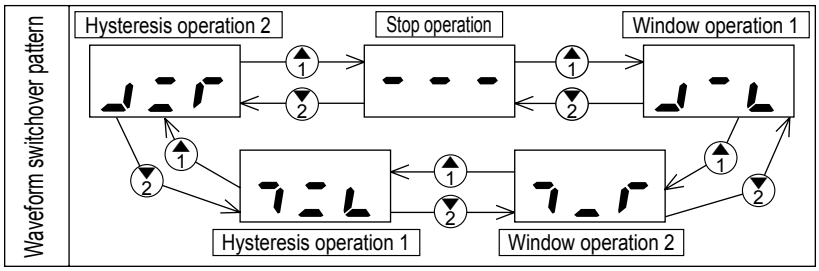
For pressure display

MODE

Press 1 time

Switch operation mode

Operation mode name	Operation waveform	LED operation waveform display	Applications
1 Window operation 1 (ON when inside range)			The ON signal will be output as a normal signal if the pressure is within the appropriate range.
2 Window operation 2 (ON when outside range)			The ON signal will be output as an error signal if the pressure is an abnormal value.
3 Hysteresis operation 1 (ON at low pressure)			The ON signal will be output if the pressure has sufficiently dropped.
4 Hysteresis operation 2 (ON at high pressure)			The ON signal will be output if the pressure becomes sufficiently high.
5 Stop operation			When not using the switch output, stop the operation to prevent damage and accidents.



*1: For window operation, provide an interval of 0.3 MPa or more between the two set values. A hysteresis of 0.1 MPa is automatically added to each ON and OFF.

*2: For hysteresis operation, provide an interval of 0.1 MPa or more between the two set values. If the two settings are the same, operation may not take place or may be unstable.

*3: The left side of the operation waveform indicates low pressure and the right side high pressure.

*4: The magnitude relation of the ON set value and OFF set value is determined when the operation mode is determined, and cannot be reversed. With this product, however, operation of the designated operation pattern is the priority. When two setting values are input, the device automatically judges their magnitude and assigns them setting values as ON and OFF accordingly. Thus, even if ON and OFF setting values are input in reverse by mistake, they will be corrected and operation will take place in the specified mode.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Coolant check valve CCH Series

⚠WARNING Design/selection

■ Working fluids

(1) Compatibility has not been evaluated with all coolants. Particularly, if coolant contains high levels of chlorine or sulfur, materials used at wetted parts could be adversely affected. Non-corrosive fluids refer to fluids that are mutually unaffected when they contact the valve's wetted part materials.
Wetted part materials: Stainless steel, chrome plating, fluoro rubber

(2) Internal parts may wear when the check valve operates. Caution is required because wear chips could enter the secondary side of the check valve.

■ Quality of fluid

Iron rust and debris in the fluid can cause operation faults or leaks and deteriorate product performance.

■ Fluid temperature

Be sure to use the coolant check valve within the specified fluid temperature range.

⚠CAUTION Usage

■ Check the IN and OUT directions before piping.

■ If the product is used at a low flow rate, differential pressure will be insufficient and chattering may occur. In this case, take measures such as increasing the flow rate.

■ Refer to the table below for the piping tightening torque.

[Piping tightening torque]

Piping nominal diameter	Recommended piping tightening torque (Nm)
Rc3/8	31 to 33
Rc1/2	41 to 43
Rc3/4	62 to 65

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Mechanical pressure switch for coolant (for low pressure) CPE Series

⚠CAUTION Design/selection

1 The lamp is connected to the micro switch's NC and NO terminals. An extremely small current flows even when the load (relay, etc.) is not energized, so take care when selecting the load.
100 VAC 1.5 mA 200 VAC 2.0 mA
24 VDC 1.5 mA

2 Select with considerations to rush current.

Micro switch contact specifications

Rush current	Normally closed circuit	Max. 30 A
	Normally open circuit	Max. 15A

Starting current should be measured beforehand.

3 Never use this product in an explosive gas atmosphere.

- The pressure switch does not have an explosive-proof structure. Never use in an explosive gas atmosphere as explosions or fires could result.

⚠CAUTION Mounting, installation and adjustment

1 Install a damper, absorber or accumulator as necessary if the water hammer, rush pressure or pulsation must be reduced.
Pressure exceeding proof pressure even momentarily could damage the CPE.

2 Atmospheric release port

· When trouble occurs in the diaphragm, the fluid is discharged from the atmospheric release port to prevent the fluid from entering wiring components. Pipe the atmospheric release port to a place where no problem occurs even if the fluid is discharged into the atmosphere at atmospheric pressure.

· Take appropriate measures to prevent coolant fluid or dust from entering from the atmospheric release port.

3 To wire the switch, loosen cover tightening screws, remove the cover, and wire to the micro switch inside.

4 Check that internal wiring does not touch moving parts. Switch accuracy could be adversely affected.

5 The cover is made of ABS resin, so avoid use in hot areas. Hold the port section when piping and installing.

6 Pressure setting method

· Remove the cap on the top of the cover, loosen the nut, and set pressure with the adjusting screw. The set pressure rises when the nut is turned to the plus (+) side and falls when turned to the minus (-) side. (Required tools: 13 m/m wrench, flathead screwdriver)
Fix with a nut after setting.

· The scale plate is for reference. (scale error: within ±0.05 MPa). Use a separate pressure gauge for confirmation when precise setting is required.

· The pressure displayed with the scale plate is the value when the switch is turned ON.

7 To turn the lamp ON at the set pressure or lower, and OFF at the set pressure or more, wire to the micro switch COM terminal and NC terminal.
Attach the Pressure Rise → Lamp ON plate at a visible place of the cover.
(Refer to Fig. 1)

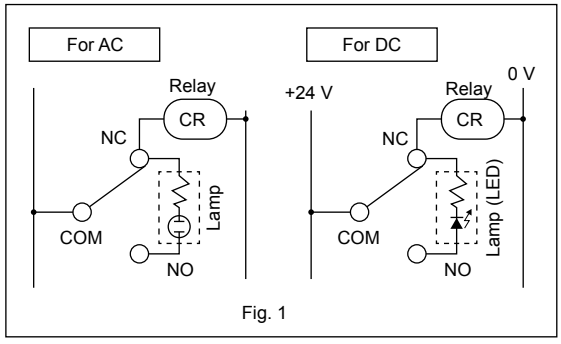


Fig. 1

8 To turn the lamp ON at the set pressure or lower, and OFF at the set pressure or more, wire to the micro switch COM terminal and NO terminal.
Attach the Pressure Rise → Lamp OFF plate at a visible place of the cover.
(Refer to Fig. 2)

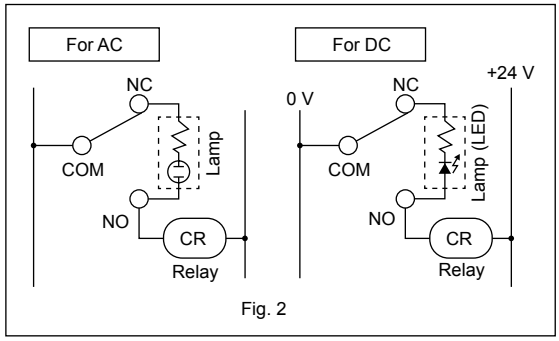


Fig. 2

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Electronic pressure switch for coolant (with digital display) CPD Series

⚠WARNING Design/selection

1 Use this product in accordance with specifications.
- Use for applications, or at load currents, voltages, temperatures, impacts or sites outside of the specifications could result in damage or malfunctions.

2 Do not use with high pressure gas.
- This product is not approved under the High Pressure Gas Safety Act. Do not use for devices subject to the High Pressure Gas Safety Act.

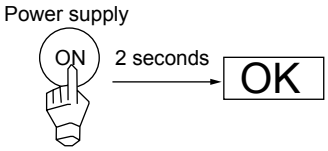
3 Never use this product in an explosive gas atmosphere.
- The pressure switch does not have an explosive-proof structure. Never use in an explosive gas atmosphere as explosions or fires could result.

4 Be careful of internal voltage drop.
- When using with a voltage less than the specified voltage, the pressure switch may be activated correctly, but the load may not function correctly. Check the load working voltage to see that the following expression is satisfied:

Power supply voltage - internal voltage drop > load working voltage

⚠CAUTION Design/selection

1 This product self-diagnoses the internal circuit immediately after power is turned ON, so pressure is not detected immediately. Set the control circuit so signals are ignored for 2 seconds after power is turned ON.



2 This product's overcurrent protection turns the output OFF when an overcurrent is detected. However, the output is repeatedly turned ON for a short time at a set cycle. This causes power supply voltage to fluctuate and may adversely affect peripheral devices. Thank you for your understanding.

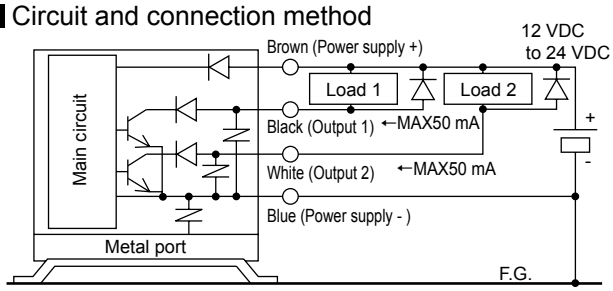
3 Determine the setting taking error caused by accuracy and temperature characteristics into consideration.

4 Take care when using this product for an interlock circuit.
- When using the pressure switch for an interlock signal requiring high reliability, provide a double interlock by installing a mechanical protection function or a switch (sensor) other than a pressure switch as a safeguard against failure.
  Regularly inspect and confirm that the interlock activates correctly.

5 Take the following countermeasures to prevent malfunction caused by noise.
- Install a line filter in the AC power supply line.
- Use a surge suppressor such as a CR or diode on the inductive load (solenoid valve, relay, etc.) and remove noise from the source.
- Separate wiring from strong magnetic fields.
- Connect wiring with shielded wire.
- Ground the shield wire on the power supply side.

6 Working environment
- Check the temperature of fluid being measured and the environmental temperature in piping.

7 Circuit and connection method



- Install the CPD on a frame or panel connected to the frame ground (F.G.) and, if necessary, directly connect from the CPD port to the F.G. When leading fluids in from an external device, connect via a relay fitting connected to the F.G. (To provide safety when using conductive fluids)

- This CPD power supply is a DC stabilized power supply completely isolated from the AC primary side. Connect either the "+" side or "-" side of the power to the FG. A varistor (limit voltage approx. 40 V) is connected between the internal power circuit and port installation section of this CPD to prevent dielectric breakdown of the sensor. Avoid withstand voltage and insulation resistance tests between the CPD's internal power supply circuit and port installation section. Disconnect CPD wiring first if this testing is required. An excessive potential difference between the CPD power supply and port installation section could burn internal parts.
  After installing, connecting and wiring the CPD, electrical welding of the device/frame, short-circuit accidents, etc., could cause welding current, excessively high voltage caused by welding, or surge voltage, etc., to run through the wiring, ground wire, or fluid path connected between the above devices, damaging wires or devices. Conduct any work such as electrical welding after removing this device and disconnecting all electric wires connected to the FG.

Precautions for each model series: product-specific cautions

Electronic pressure switch for coolant (with digital display) CPD Series

⚠WARNING Mounting, installation and adjustment

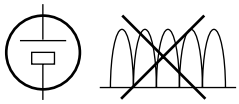
1 Avoid incorrect connection.

- Incorrect connection could result in fatal damage not only to the product itself but also to peripheral devices.

⚠CAUTION Mounting, installation and adjustment

■ Wiring

1 Use a DC stabilized power supply within the rating that is insulated from the AC power supply. A non-insulated power supply could result in electrical shock. If the power supply is not stabilized, the peak voltage could exceed the rating, damaging the product or compromising accuracy.



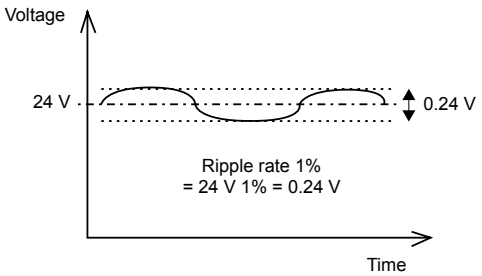
2 Stop the control unit, machinery and equipment and turn the power OFF before wiring. Starting operation immediately after wiring could result in unpredictable and dangerous operation. Conduct an energized test with the control unit, machinery and equipment stopped, and check switch data and unit settings before starting operation.

3 Turn power OFF before wiring this product. Discharge static electricity from personnel and tools before and during work.

4 Use a stabilized noise-free power supply with a ripple voltage 1% or less.

5 Install the product and wiring as far away as possible from sources of noise such as power distribution wires. Take separate measures against surge generated from inductive loads that enters the power wire.

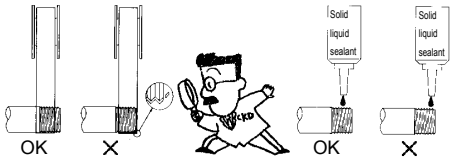
6 Do not start the control unit, machinery and equipment immediately after wiring. Unpredictable signals could be output due to incorrectly set values. Conduct an energized test with the control unit, machinery and equipment stopped, and set required switches.



7 Sufficiently flush the piping before connecting. Prevent pipe from catching tips of sealing tape when piping.

8 When connecting pipes, wrap sealing tape in the opposite direction from the threading, from the inside position to within 2 mm from the pipe end.

- If sealing tape protrudes from the pipe threads, it could be cut when screwing the bolts in. This could cause the tape to enter the pneumatic components, causing failures.



9 Tighten pipes with the appropriate torque.

- Using the appropriate torque can ensure the prevention of leakage and screw damage.
- First tighten the bolts by hand to ensure that the threads are not damaged, then use a tool.

Port thread	Tightening torque N·m
Rc1/4	23 to 25

10 Wind sealing tape or apply a sealant, and screw in without tightening excessively. Apply a wrench to the metal section when tightening.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series: product-specific cautions

Electronic pressure switch for coolant (with digital display) CPD Series

⚠CAUTION Mounting, installation and adjustment

■ Installation

11 Install a damper, absorber or accumulator as necessary if the water hammer, rush pressure or pulsation must be reduced. Pressure exceeding proof pressure even momentarily could damage the CPD.

12 CPD detects every 2.5 msec. Therefore, the switch may activate if the pressure fluctuates even momentarily. Provide sufficient allowance to the setting or use a control circuit or program that ignores momentary changes in switch output.

13 Stop the machinery and equipment and confirm safety before setting switch outputs.

14 Operate keys manually. If sharp instruments, such as knives or screwdrivers, are allowed to contact the plastic film on the operation section, they may damage the film and compromise its protective functions.

15 Avoid connecting the output for a relay contact, operation switch, or other component output in parallel with the PC to the product's output, or short-circuiting the input terminal of the PC to which this product is connected with the power supply cable's negative side to test the input device. This product's output circuit could be damaged.

16 Switch data can be set to values that exceed the rating range, or to unrealistic values, but operation and accuracy at such values are not guaranteed. Confirm that settings enable the target operation. Ensure the following difference between data A and B to stabilize operation:

Operation mode	Data difference
Hysteresis operation	0.1 MPa or more
Window operation	0.3 MPa or more

Do not set as follows : {Data A = Data B / ON point = OFF point}

17 Precautions for protection functions

- The product may be prone to damage when in a state of being unpacked or being installed. The protective functions are effective when the product is correctly installed, wired and piped. Provide protection so that water and other substances do not come in contact until installation is completed.
- Wire and pipe the product after fixing it at the installation site. Check surrounding safety and that water and other substances do not come in contact before starting wiring. Continue to provide protection after the product is connected. (The current could leak at the connection section, and water could run along the cable and enter the case.)

⚠WARNING Use/maintenance

1 Do not apply overcurrent.

- If overcurrent flows to the pressure switch due to a load short-circuit, etc., the pressure switch will be damaged with a risk of ignition. Provide an overcurrent protection circuit, such as a fuse, for the output wire and power cable as needed.

Precautions for each model series: product-specific cautions

Electronic pressure switch for coolant (with digital display) CPD Series

⚠CAUTION Use/maintenance

1 This product must not be disassembled.

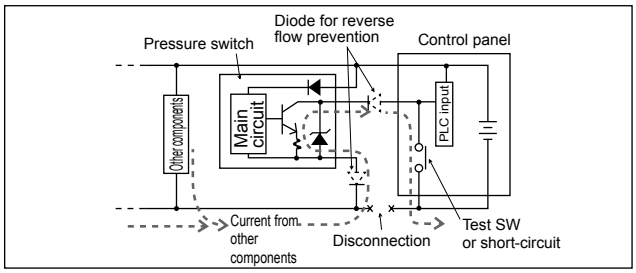
- The product could be damaged or its performance compromised if it is disassembled. CKD does not guarantee performance after disassembly. Remove the entire installation section (pressurized port section) when replacing or moving the product.

2 Stop machinery and equipment, then check the safety before operating the product.

3 CPD detects every 2.5 msec. Whereas, the display is updated 4 times a second. and cannot track fast pressure changes. The switch could therefore start operating at quickly changing pressure even when the display does not indicate the switch setting.

4 The case is made of resin. Do not use solvent, alcohol or detergent in cleaning, or resin could absorb it. There is a risk of affecting the resin. Wipe off dirt with a rag soaked in a diluted neutral detergent solution and wrung out well.

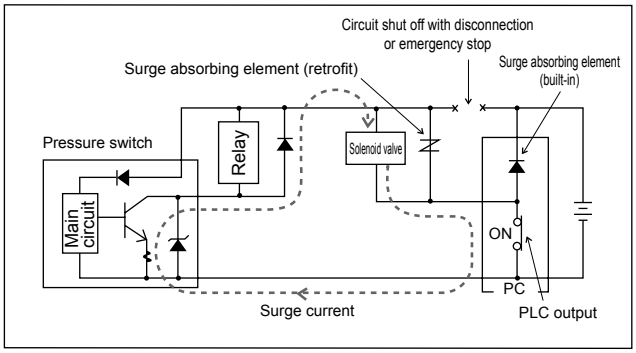
5 Pay attention to reverse currents caused by disconnected wires and wiring resistance.
When other devices, including pressure switches, are connected to the same power supply as the pressure switch, and the output cable and power cable's minus side are short-circuited or the power supply's minus side is disconnected to check operation of the input device from the control panel, reverse current could flow to the pressure switch's output circuit and cause damage.



Take the following measures to prevent damage caused by reverse current:

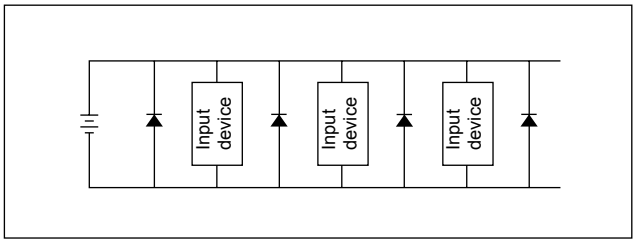
(1) Avoid centralizing current at the power cable, especially a negative power cable, and use a wire as thick as possible.
(2) Limit the number of devices connected to the same power supply as the pressure switch.
(3) Insert a diode in serial with the pressure switch's output cable to prevent reversal of current.
(4) Insert a diode in serial with the pressure switch's power cable minus side to prevent reversal of current.

6 Care must be taken for surge current leading.
When pressure switch power is shared with an inductive load that generates surges, such as a solenoid valve or relay, if the circuit is cut off while the inductive load is functioning, surge current could enter the output circuit and cause damage depending on where the surge absorbing element is installed.



Take the measures below to prevent damage from sneak surge current.

(1) Separate the power supply for the output system comprising the inductive load, such as the solenoid valve and relay, and the input system, such as the pressure switch.
(2) If a separate power supply cannot be used, directly install a surge absorption element for all inductive loads. Consider that the surge absorption element connected to the PLC, etc., protects only the individual device.
(3) Connect a surge absorption element to places on the power wiring shown in the figure below, as a measure against disconnections in unspecified areas.



When the devices are connected to a connector, the output circuit could be damaged by the above phenomenon if the connector is disconnected while the power is ON. Turn power OFF before connecting or disconnecting the connector.

7 If the pipe is clogged, remove the hexagon socket taper screw plug on the back, and clean out the pipe. After cleaning out the pipe, wind sealing tape or apply sealant, and tighten with an appropriate torque. Apply a wrench to the metal section when tightening.

Thread	Tightening torque N·m
Rc3/8	31 to 33

Components for Life Science

■ Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)

Overview

Thanks to the great advances of recent medical sectors, high-functionality, high-performance and high-accuracy biomedical inspections and devices are required in clinical medicine.
To respond to the needs of components for life science, CKD has produced various control valves for the five functional targets below.

Features

Silence
The valves were designed to operate very quietly with environments like hospitals in mind.

Minimal residue
Fluid accumulation has been minimized for accurate and reliable inspections.

Maintenance-free
The life of the parts has been increased, and a maintenance-free design has been incorporated to improve the reliability of the devices.

High corrosion resistance
High corrosion resistant materials have been adopted to ensure the purity of inspection fluids.

Wide variety
A wide variety of models compatible with various reagents and testing fluids is available.

CONTENTS

⚠ Always read the precautions in the Introduction and on page 973 before use.

			Model	No. of Ports	Material		Fluid					
					Seal	Body	Pure water	Normal saline	Reagent	Waste liquid	Cleaning solution	
Solenoid valve	Metal-free	Diaphragm	MR10R	2 / 3	FKM	PEEK	●	●	●	●	●	
			MR16	2 / 3	FKM EPDM	PEEK	●	●	●	●	●	
			MKB3	2	FKM EPDM	PPS	●	●	●	●	●	
			MAB1	2	PTFE	PTFE	●	●	●	●	●	
			MAG1	3	PTFE	PTFE	●	●	●	●	●	
			MYB1	2	FKM	PPS	●	●	●	●	●	
			MYG1	3	FKM	PPS	●	●	●	●	●	
			MYB2	2	FKM	PPS	●	●	●	●	●	
			MYG2	3	FKM	PPS	●	●	●	●	●	
			MYB3	2	FKM	PPS	●	●	●	●	●	
			MYG3	3	FKM	PPS	●	●	●	●	●	
			MEB2	2	PTFE FFKM	PPS	●	●	●	●	●	
			MEG2	3	PTFE FFKM	PPS	●	●	●	●	●	
			MJB3	2	FKM	PPS PSU	●	●	●	●	●	
			EMB21	2	PTFE	SUS316	●					
						PTFE	●	●	●	●	●	
			EMB41/51	2	PTFE	PTFE	●	●	●	●	●	
		Lever	HMTB1	2	NBR FKM EPDM	PPS	●	●	●		●	
			HMTG1	3			●	●	●		●	
	High corrosion resistance	Poppet	USB2/3	2	NBR FKM	PPS	●					
			USG2/3	3	NBR FKM	PPS	●					
			UMB1	2	FKM	SUS304 or equivalent	●					
			UMG1	3	FKM	SUS304 or equivalent	●					
			HB	2	NBR FKM PTFE	SUS316	●					
	General purpose		USB2/3	2	NBR (FKM)	C3604 SUS304						
			USG2/3	3	NBR (FKM)	C3604 SUS304						
Pinch valve	Metal-free		HYN	2 / 3	–	–	●	●	●	●	●	

Note: Check the compatibility between working fluid and body/sealant materials when selecting.

Orifice size (mm)																			Page
	0.5	0.9	1	1.2	1.5	1.6	1.8	2	2.3	3	3.2	4	5	6	7	8	10	12	15	
			●																	927
						●														932
					●															937
						● 1.6 Equiv.														940
						● 1.6 Equiv.														940
								● 2.0 Equiv.												943
								● 2.0 Equiv.												943
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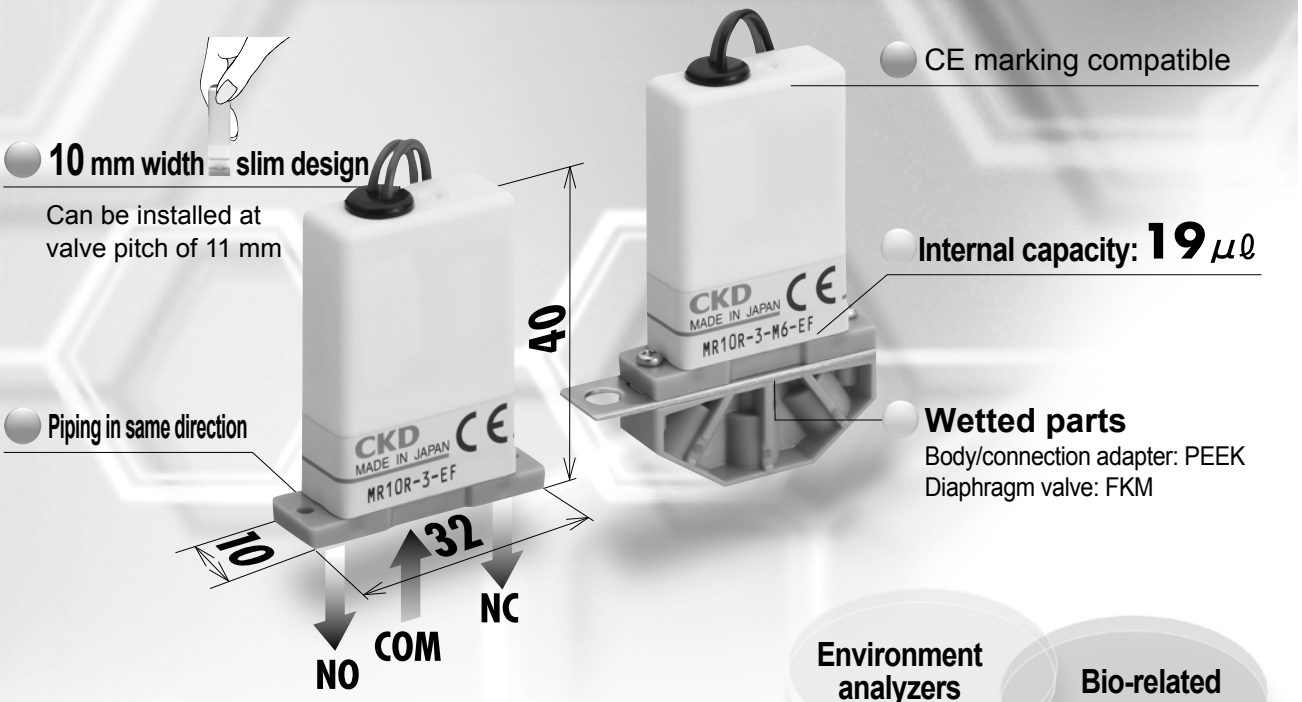
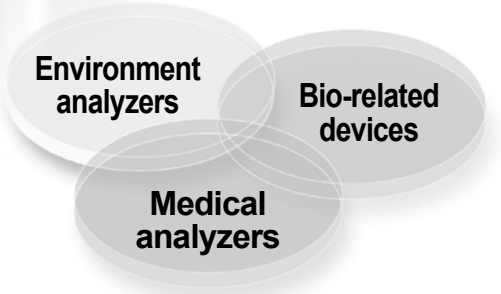
			●		●	●			●	●	●	●			●					967
			●	●	●	●	●		●		●									28
			●	●	●		●	●												32
			● Bore size							● Bore size				● Bore size						971

MR10R Series

Working pressure 0.2 MPa, ultra-compact/space saving.

High analysis accuracy controls even minute amounts of chemical liquids.





Ideal for analyzer dispensing

Metal parts have been eliminated from this metal-free, compact MR10R Series 2, 3 port solenoid valve for chemical liquids. Resin and rubber are used for wetted parts.
The slim, space-saving, outstanding installation, safety, reliability, and long-life design ensure high overall performance.

Long life up to 10 million times

Results of tests under CKD test conditions.

Internal capacity: 19 μℓ

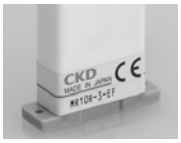
The inside of the solenoid valve is easy to wash.
Reagent wastes are reduced.

Heat-suppressing design

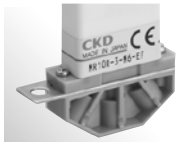
The effect of heat radiated from the coils onto the analysis accuracy is minimized, and power is conserved.

Two piping methods

Select piping suited to your application.

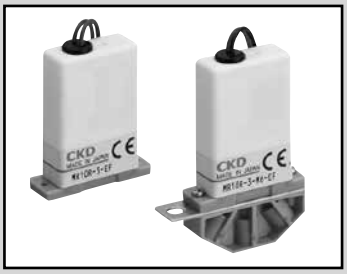


● Actuator



● Direct piping

Same shape adopted for 2 port valve and 3 port valve



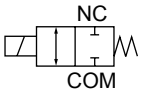
Metal-free 2, 3-port solenoid valve for chemical liquids

MR10R Series

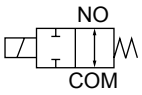
- NC (open when energized), NO (closed when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Port size: M5, M6, 1/4-28UNF

JIS symbol

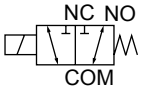
- 2-port: NC (open when energized)



- 2-port: NO (closed when energized)



- 3-port: Universal



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		2-port		3-port
		MR10R-2NC	MR10R-2NO	MR10R-3
Actuation		NC (open when energized)	NO (closed when energized)	Universal
Working fluid		Water, pure water, chemical liquids (fluids that do not corrode wetted part materials)		
Proof pressure MPa		0.4 (≈58 psi, 4 bar) (water pressure)		
Working pressure MPa		-0.08 (≈-11 psi, 0 bar) to 0.2 (≈29 psi, 2 bar)		
Fluid temperature °C		5 (41°F) to 50 (122°F)		
Ambient temperature °C		5 (41°F) to 50 (122°F)		
Atmosphere		No explosive or corrosive atmospheres		
Valve seat leakage cm^3/min		0 (water pressure)		
Port size		M5, M6, 1/4-28UNF		
Orifice size mm		1		
Cv		0.03		
Volumetric capacity µl		19 (*1)		
Valve structure		Diaphragm direct acting (rocker)		
Mounting orientation		Unrestricted (*2)		
Weight g		18 (actuator), 22 (direct piping)		
Electrical specifications				
Rated voltage		24 VDC/12 VDC		
Voltage fluctuation range		±5%		
Power consumption W	When starting	3.6 (24 VDC)/4.2 (12 VDC) (*3)		
	When holding	1		
Leakage current mA		1.0 or less (24 VDC)/2.0 or less (12 VDC) (*4)		
Thermal class		Class 130 (B)		

*1: Volume of wetted parts formed by the body and diaphragm. Note that piping volume is excluded.
*2: Install vertically so that the coil where little fluid accumulates is at the top.
*3: Time from energizing to 50 ms.
*4: The leakage current from the control circuit must be equal to or less than the values shown in the table.
*5: For 0.1% or less effective chlorine concentration of sodium hypochlorite (soda), perform functional testing according to the application before use. Do not attempt to use effective chlorine concentration exceeding 0.1%.
*6: As this product has an integrated electronic circuit board, do not use it in very humid atmospheres.
*7: Solenoid valve has polarity. Connect the red lead wire to the plus (+) side.
*8: After the solenoid valve is completely switched OFF, set an interval of 1 seconds or more before switching it ON the next time.

How to order

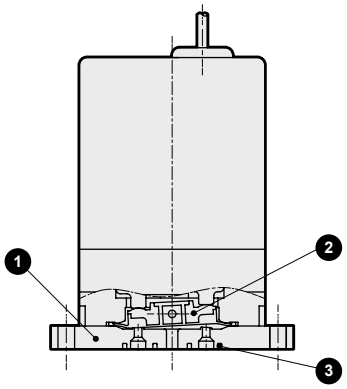
MR10R - **2NC** - **M6** - **EF** - **DC24V**

- MR10R: Model No.
- 2NC: Ⓐ No. of Ports/type
- M6: Ⓑ Port size
- EF: Ⓒ Material combination
- DC24V: Ⓓ Voltage

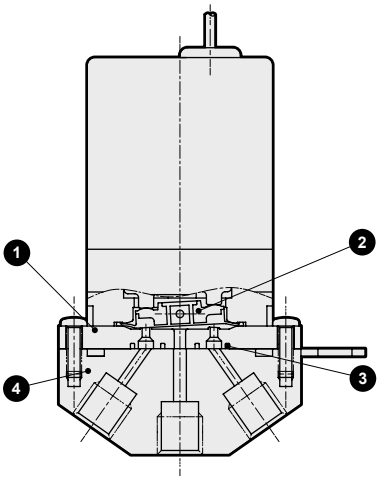
Code	Description	
Ⓐ No. of Ports/type		
2NC	2-port/NC (open when energized)	
2NO	2-port/NO (closed when energized)	
3	3-port/universal	
Ⓑ Port size		
Blank	Actuator	
M5	M5 (direct piping)	
M6	M6 (direct piping)	
4U	1/4-28UNF (direct piping)	
Ⓒ Material combination		
	Body material	Sealant
EF	PEEK	FKM
Ⓓ Voltage		
DC24V	24 VDC	
DC12V	12 VDC	

Internal structure and main part material

● Actuator



● Direct piping

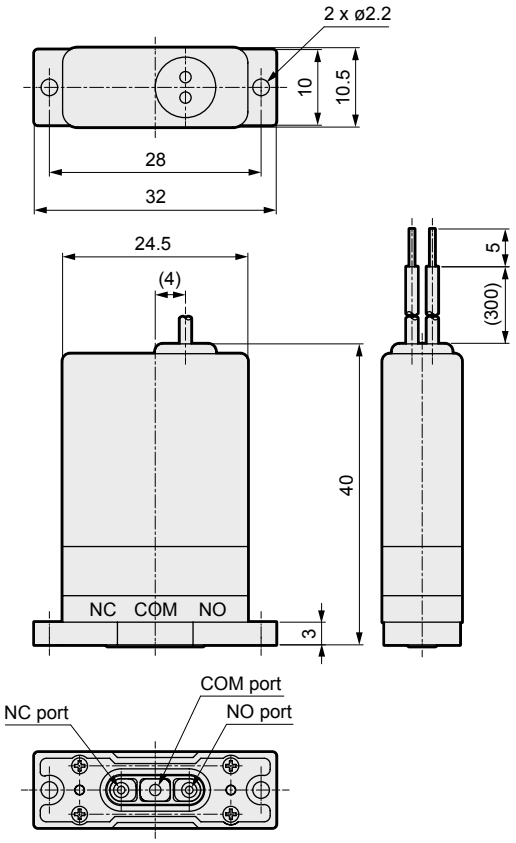


Cannot be disassembled

No.	Part name	Material	
1	Body	PEEK	Polyether ether ketone
2	Diaphragm	FKM	Fluoro rubber
3	Packing	FKM	Fluoro rubber
4	Connection adaptor	PEEK	Polyether ether ketone

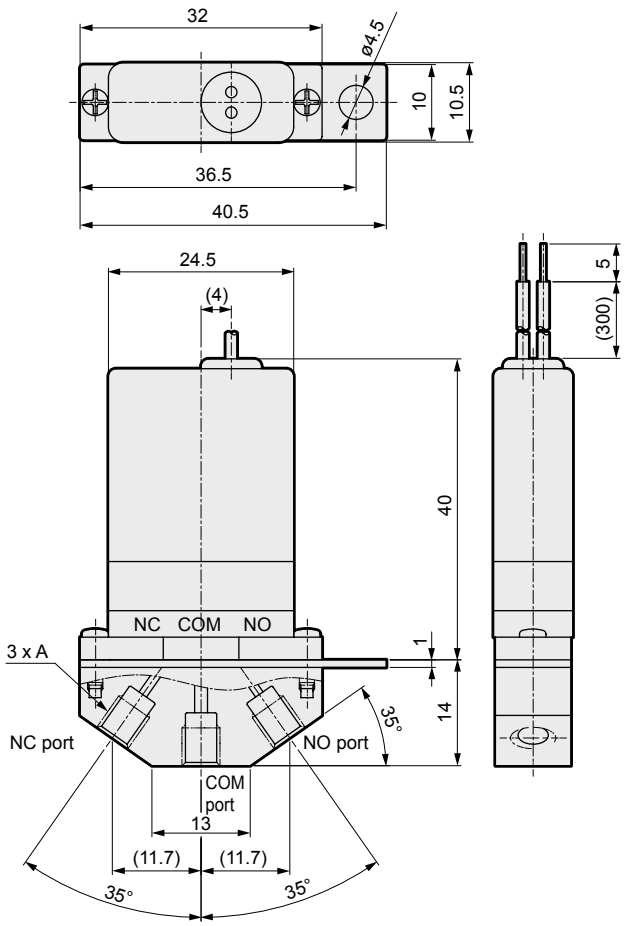
Dimensions

● Actuator



Note: MR10R-2NC has no hole machined for the NO port.
MR10R-2NO has no hole machined for the NC port.

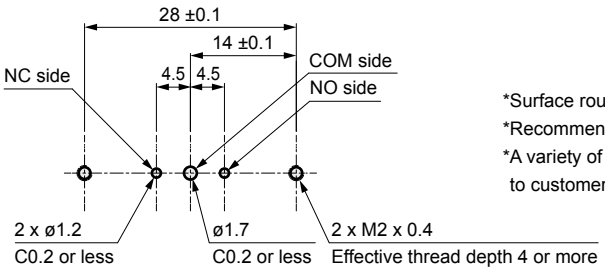
● Direct piping



Note: MR10R-2NC has a blocked NO port.
MR10R-2NO has a blocked NC port

Model No.	A
MR10R-*-M5	M5
MR10R-*-M6	M6
MR10R-*-4U	1/4-28UNF

● Actuator installation dimensions



*Surface roughness: Rz6.3 or less
*Recommended thread size: M2 depth 6 mm
*A variety of connection adaptors and manifolds are available in response to customer demand. Contact CKD for details.

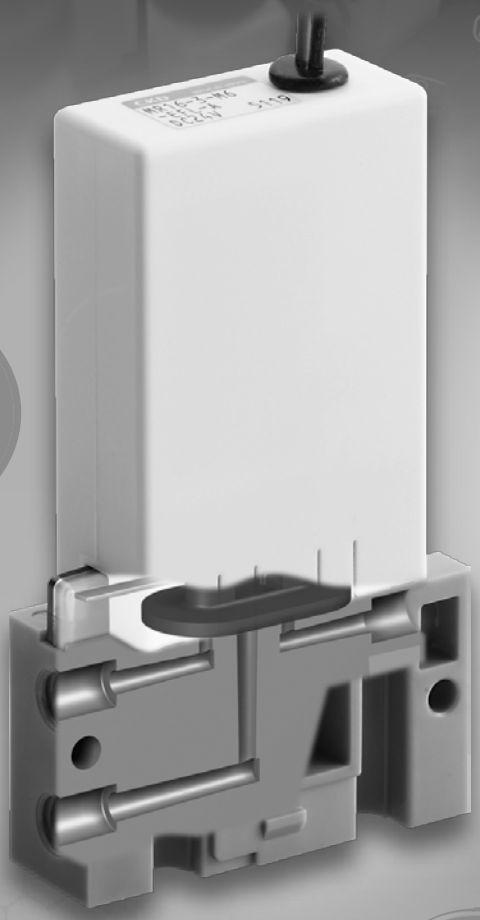
First in the industry!

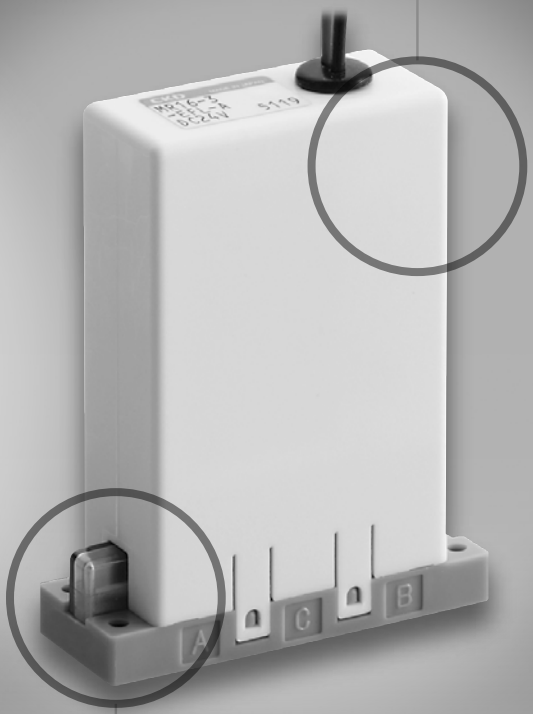
New rocker valve with indicator!

Visible.

LED lamp equipped as standard

LED lights when energized for visual inspection.

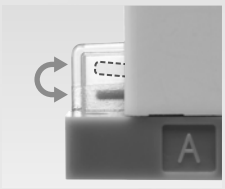




Volumetric capacity 50μℓ

First in the industry

Built-in mechanical indicator makes valve open/closed status directly visible!



Compact metal-free 2, 3-port solenoid valve

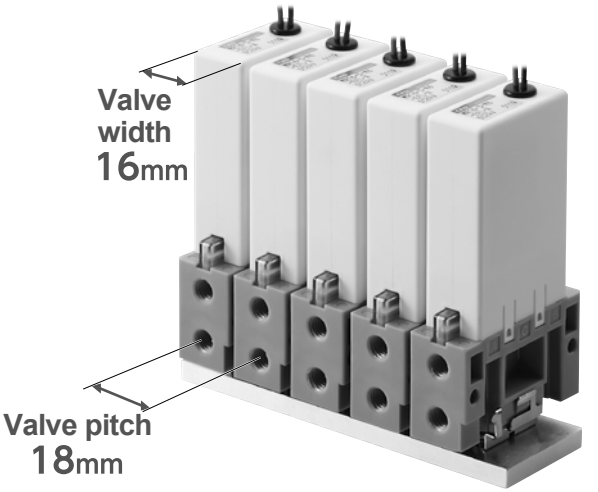
MR16 Series

CKD

Space saving

Width: 16 mm, valve pitch: 18 mm

Actuator can be installed at a valve pitch of 17 mm.



[Unit: mm]

Body	Product width	Valve pitch
Actuator	16	17
Direct piping	16.4	17*
Direct piping (with mounting plate)	16.5	18

* 16.4 mm if direct pipings are linked together.

Highly corrosion-resistant metal-free structure

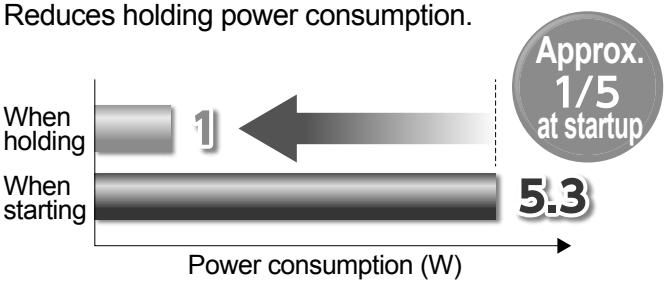
Adopts PEEK resin for the body

Features a highly corrosion-resistant resin/rubber material for wetted parts to enable use with various fluids.

Body material	**PEEK**
Sealant	**FKM, EPDM**

Energy saving circuit equipped as standard

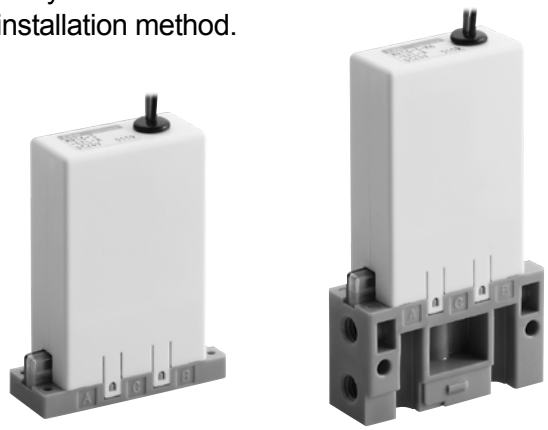
Reduces heat generated by the coil and prevents thermal effects on fluids.
Reduces holding power consumption.



Selectable body

Actuator and direct piping are available

Body can be selected to suit the installation method.



Actuator　　Direct piping

Wide pressure range

Can be used with max. pressure of 0.3 MPa and with negative pressure

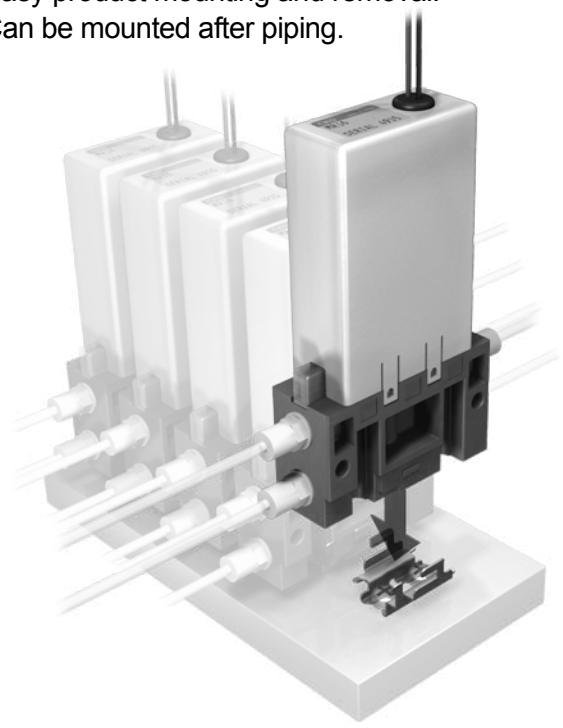
Internal volume is reduced to 50 µℓ to achieve high pressure. Supports negative pressure when syringes or discharged liquids are replaced.

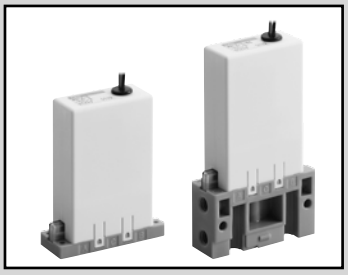
Working pressure (MPa)	**−0.08 to 0.3**

Easy maintenance

One-touch attachment structure

Easy product mounting and removal.
Can be mounted after piping.





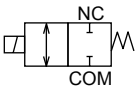
Metal-free 2, 3-port solenoid valve

MR16 Series

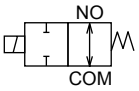
- NC (open when energized), NO (closed when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Port size: M6, 1/4-28UNF

JIS symbol

- 2-port: NC (open when energized)



- 2-port: NO (closed when energized)



- 3-port: Universal

Specifications

Item		2-port		3-port
		MR16-2NC	MR16-2NO	MR16-3
Actuation		NC (open when energized)	NO (closed when energized)	Universal
Working fluid		Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)		
Proof pressure	MPa	0.45 (≈65 psi, 4.5 bar) (water pressure)		
Working pressure	MPa	-0.08 (≈-12 psi, -0.8 bar) to 0.3 (≈44 psi, 3 bar)		
Fluid temperature	°C	5 (41°F) to 40 (104°F)		
Ambient temperature	°C	5 (41°F) to 45 (113°F)		
Atmosphere		No explosive or corrosive atmospheres		
Valve seat leakage	cm^3/min	0 (water pressure)		
Port size		M6, 1/4-28UNF		
Orifice size	mm	1.6		
Cv		0.05		
Volumetric capacity	μℓ	50 (*1)		
Valve structure		Diaphragm direct acting (rocker)		
Mounting orientation		Unrestricted (*2)		
Weight	g	75 (actuator), 85 (direct piping)		
Electrical specifications				
Rated voltage		24 VDC/12 VDC		
Voltage fluctuation range		±10%		
Power consumption W	When starting	5.3 (*3)		
	When holding	1		
Leakage current	mA	1.0 or less (24 VDC), 2.0 or less (12 VDC) (*4)		
Thermal class		Class 130 (B)		

*1 : Volume of wetted parts formed by the body and diaphragm. Note that piping volume is excluded.
*2 : Install vertically so that the coil where little fluid accumulates is at the top.
*3 : Time from energizing to 100 ms.
*4 : The leakage current from the control circuit must be equal to or less than the values shown in the table.
*5 : When using sodium hypochlorite (soda), select FKM for the diaphragm material.
(EPDM will deteriorate over long-term use even with tap water levels of residual chlorine)
For 0.1% or less effective concentration, perform functional testing according to your application before use.
Do not attempt to use effective chlorine concentration exceeding 0.1%.
*6 : As this product has an integrated electronic circuit board, do not use it in very humid atmospheres.
*7 : As this product generates noise from incorporating electronic oscillator circuits, use noise countermeasures on the same power line.
*8 : Solenoid valve has polarity. Connect the red lead wire to the plus (+) side.
*9 : After the solenoid valve is completely switched OFF, set an interval of one second or more before switching it ON the next time.
*10: For the mounting plate option, slide the product in the piping direction by pulling the lever to remove from the mounting plate.

How to order

MR16 - 2NC - M6 - EF L B - A - DC24V

Model No.

Ⓐ Number of ports/type

Code	Description
Ⓐ Number of ports/type	
2NC	2-port/NC (open when energized)
2NO	2-port/NO (closed when energized)
3	3-port/universal

Ⓑ Port size

Ⓑ Port size	
Blank	Actuator
M6	M6 (direct piping)
4U	1/4-28UNF (direct piping)

Ⓒ Material combination

	Body material	Sealant
Ⓒ Material combination		
EF	PEEK	FKM
EE	PEEK	EPDM

Ⓓ With circuit board option

Ⓓ With circuit board option	
L	With lamp/energy saving board

Ⓔ With mounting plate option *1

Ⓔ With mounting plate option	
Blank	Without mounting plate
B	With mounting plate

Ⓕ Indicator direction *2

Ⓕ Indicator direction	
A	Port A side
B	Port B side

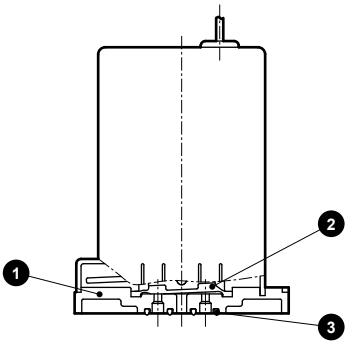
Ⓖ Voltage

Ⓖ Voltage	
DC24V	24 VDC
DC12V	12 VDC

*1 : "B" can be selected only for port size "M6"/"4U".
*2 : If Number of ports/type is "2NC", only "A" can be selected, and if "2NO", only "B" can be selected. If it is "3", either A or B can be selected.

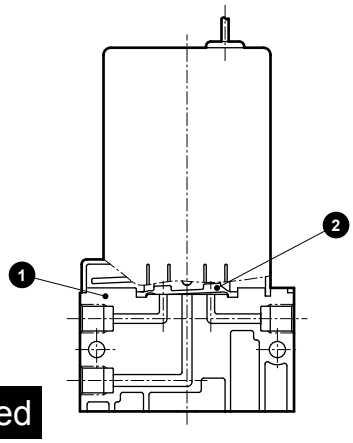
Internal structure and main part material

● Actuator



Cannot be disassembled

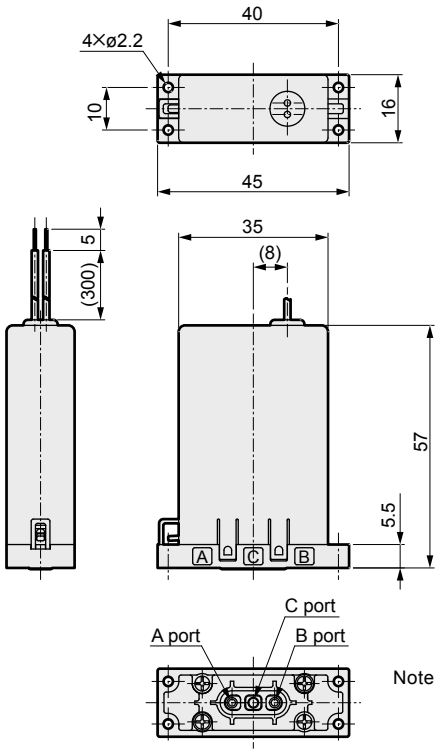
● Direct piping



No.	Part name	Material	
1	Body	PEEK	Polyether ether ketone
2	Diaphragm	FKM, EPDM	Fluoro rubber, ethylene propylene rubber
3	Gasket	FKM, EPDM	Fluoro rubber, ethylene propylene rubber

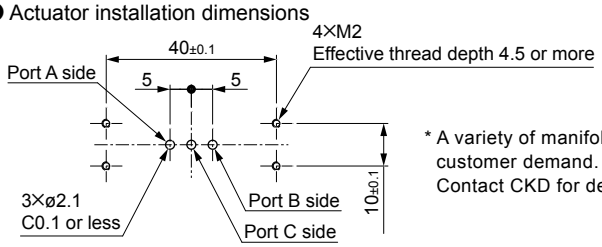
Dimensions

● Actuator



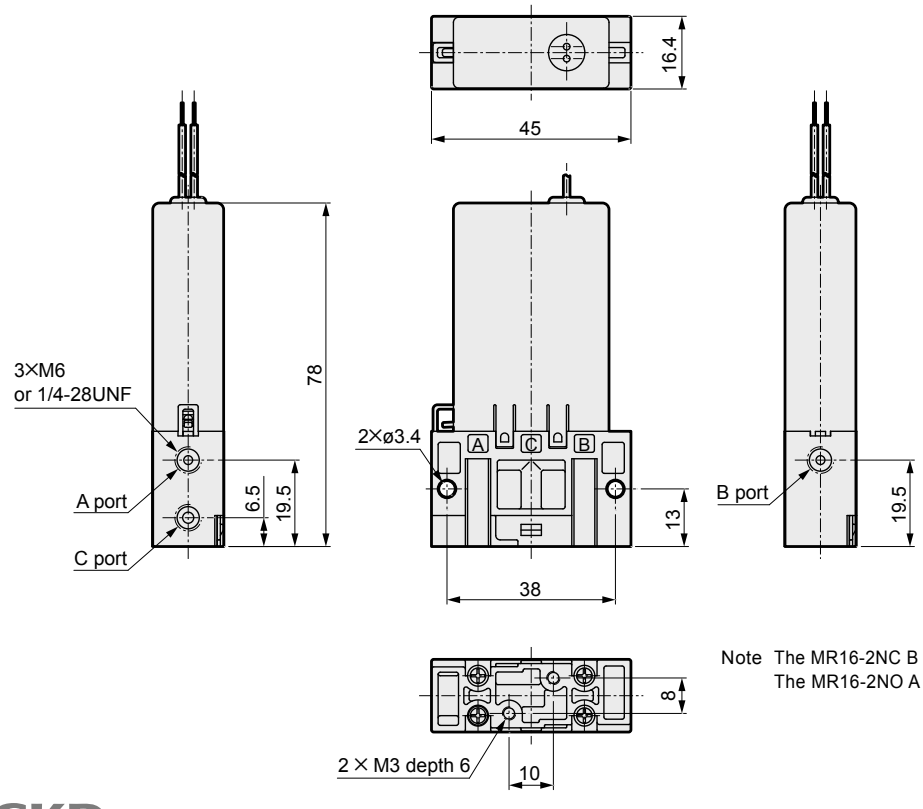
Note MR16-2NC has no hole machined for B port and "B" is not indicated.
MR16-2NO has no hole machined for A port and "A" is not indicated.

● Actuator installation dimensions



* A variety of manifolds are available in response to customer demand.
Contact CKD for details.

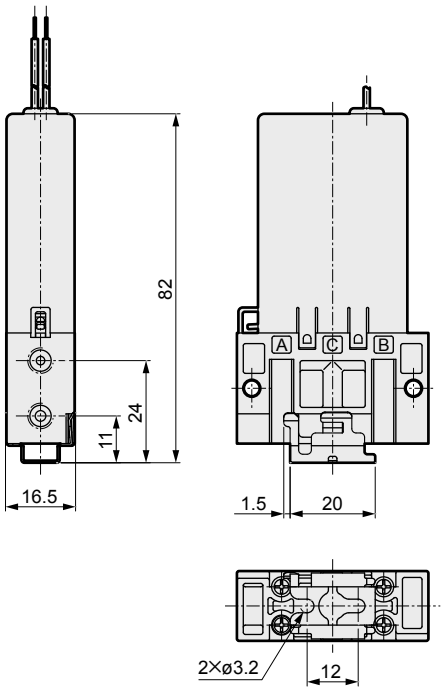
● Direct piping



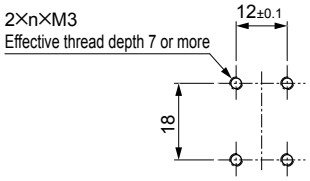
Note The MR16-2NC B port is plugged and "B" is not indicated.
The MR16-2NO A port is plugged and "A" is not indicated.

Dimensions

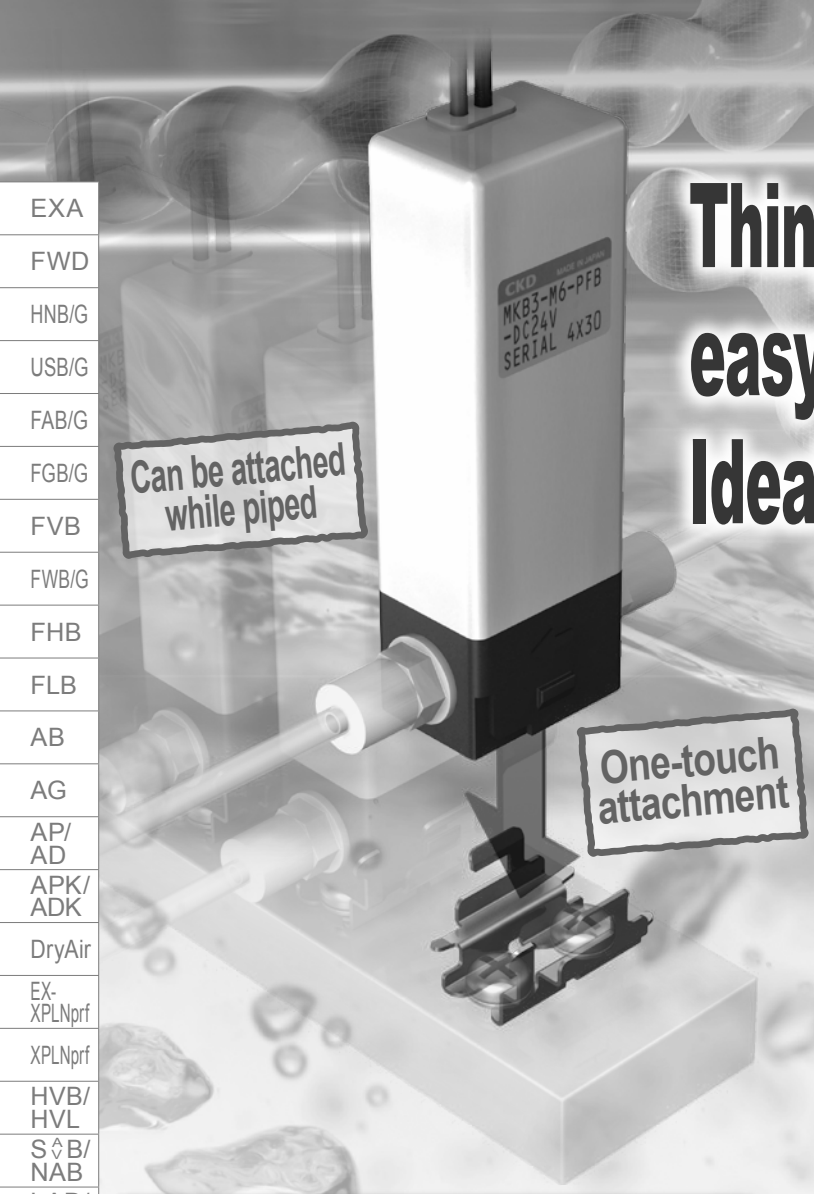
● Direct piping (with mounting plate)



● Direct piping (with mounting plate) installation dimensions



● Machining drawing when installing MR16 in parallel. (n: Station No.)



Thin, space-saving, easy maintenance. Ideal for medical devices.

Easy maintenance

One-touch attachment structure

Easy product mounting and removal.
Can be mounted after piping.

Patent pending

Wide pressure range

Can be used with negative pressures

Supports negative pressure when syringes or discharged liquids are replaced.

Working pressure (MPa)	**−0.08 to 0.25**
Back pressure (MPa)	**0 to 0.25**

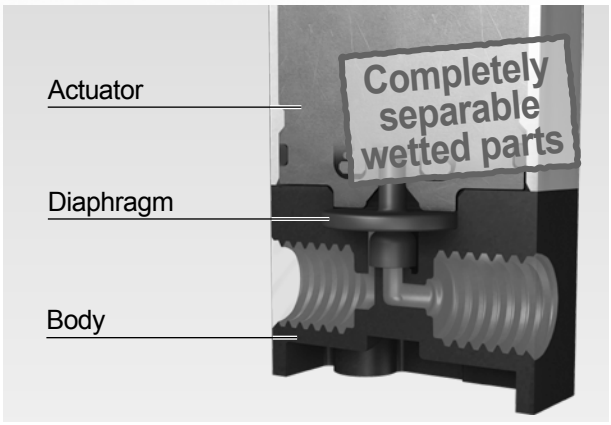
Energy saving board (with lamp) can be selected

Built-in energy saving board reduces heat generated by the coil and prevents thermal effects on fluids.
Reduces power consumption when energized.
The lamp allows the energizing status to be checked.

Metal-free diaphragm structure

Completely separable actuator and wetted parts.
Uses a highly corrosion-resistant resin/rubber material for wetted parts.
Our unique diaphragm structure achieves high durability.

Body material	**PPS**
Diaphragm material	**FKM, EPDM**

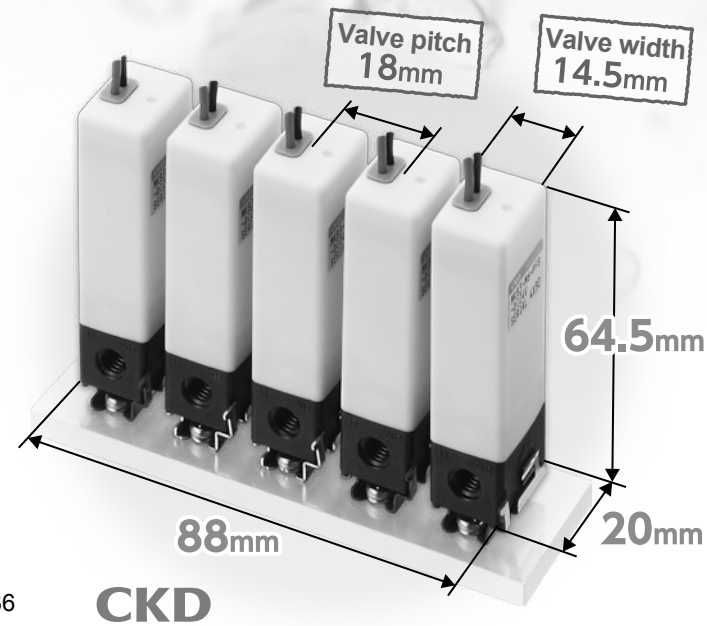


Metal-free 2-port solenoid valve

MKB3 Series

Thin and compact design makes high density installation possible

Achieves 14.5 mm thinness.
Our unique mounting method makes parallel installation at a fine pitch possible.



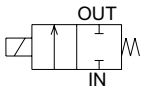
Metal-free 2-port solenoid valve

MKB3 Series

- NC (open when energized)
- Working fluid: Water/pure water/chemical liquids
- Port size: M6/1/4-28UNF

CE RoHS CAD

JIS symbol



Specifications

Item			MKB3
Actuation			NC (open when energized)
Working fluid			Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)
Proof pressure	MPa		0.5 (≈73 psi, 5 bar) (water pressure)
Working pressure	MPa		-0.08 (≈-12 psi, -0.8 bar) to 0.25 (≈36 psi, 2.5 bar)
Back pressure	MPa		0 (≈0 psi, 0 bar) to 0.25 (≈36 psi, 2.5 bar)
Fluid temperature	°C		5 (41°F) to 50 (122°F)
Ambient temperature	°C		5 (41°F) to 50 (122°F)
Atmosphere			No explosive or corrosive atmospheres
Valve seat leakage	cm^3/min		0 (water pressure)
Port size			M6, 1/4-28UNF
Orifice size	mm		1.5
Cv			0.04
Valve structure			Diaphragm direct acting valve
Mounting orientation			Unrestricted
Weight	g		50
Electrical specifications			
Rated voltage			24 VDC/12 VDC
Voltage fluctuation range			±5%
Power consumption	W	Standard	2.5
		Energy saving With circuit: Starting	2.5 (*2)
		Energy saving With circuit: Holding	1
Leakage current	mA		1.0 or less (24 VDC)/2.0 or less (12 VDC) (*3)
Thermal class			Class 130 (B)

*1: When using sodium hypochlorite (soda), select FKM for the diaphragm material.
(EPDM will deteriorate over long-term use even with tap water levels of residual chlorine)
For 0.1% or less effective concentration, perform functional testing according to your application before use.
Do not attempt to use effective chlorine concentration exceeding 0.1%.
*2: Time from energizing to 200 ms.
*3: The leakage current from the control circuit must be equal to or less than the values shown in the table.
*4: As this product has an integrated electronic circuit board, do not use it in very humid atmospheres.
*5: Solenoid valve has polarity. Connect the red lead wire to the plus (+) side. (With circuit board option: for L)
*6: After the solenoid valve is completely switched OFF, set an interval of one second or more before switching it ON the next time. (With circuit board option: for L)
*7: For the mounting plate option, slide the product in the piping direction by pulling the lever to remove from the mounting plate.

How to order

MKB3 - M6 - PF L B - DC24V

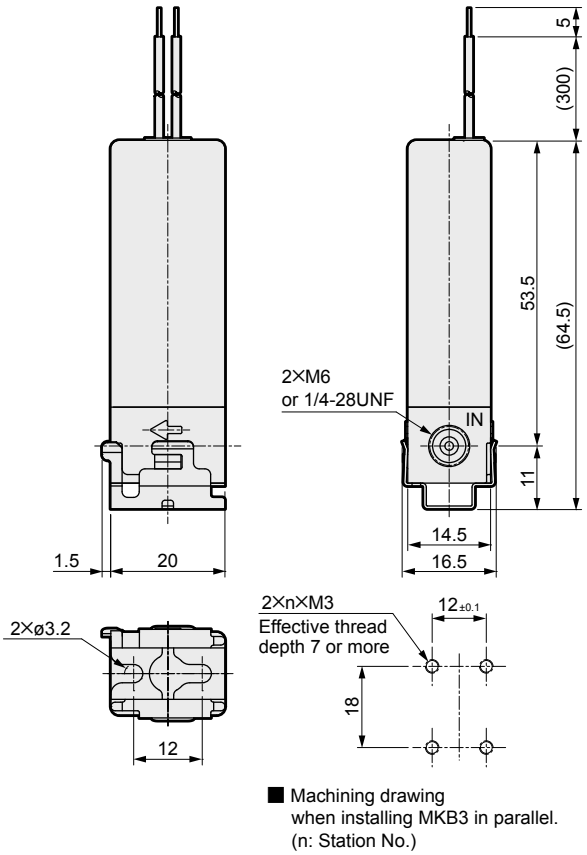
- MKB3: Model No.
- M6: Ⓐ Port size
- PF: Ⓑ Material combination
- L: Ⓒ With circuit board option
- B: Ⓓ With mounting plate option
- DC24V: Ⓔ Voltage

Code	Description	
Ⓐ Port size		
M6	M6	
4U	1/4-28UNF	
Ⓑ Material combination		
	Body material	Diaphragm material
PF	PPS	FKM
PE	PPS	EPDM
Ⓒ With circuit board option		
Blank	No option	
L	With lamp/energy saving board	
Ⓓ With mounting plate option		
B	With mounting plate (standard) *1	
N	Without mounting plate *2	
Ⓔ Voltage		
DC24V	24 VDC	
DC12V	12 VDC	

*1 : Mounting plate is attached.
*2 : Cannot be installed with discrete solenoid valve without mounting plate.

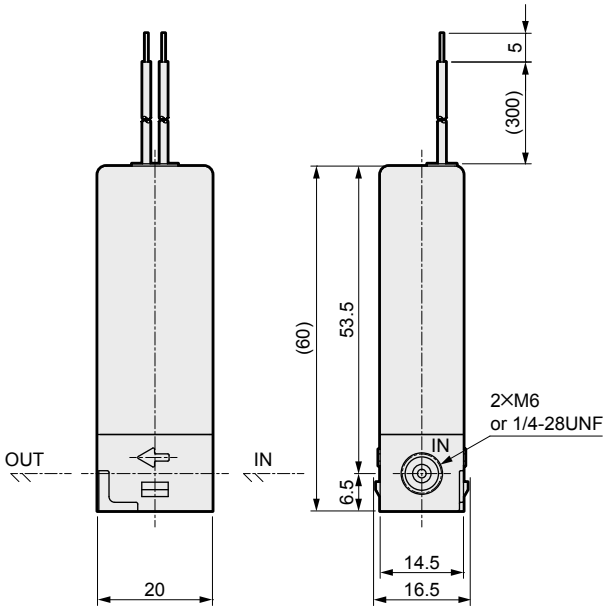
Dimensions

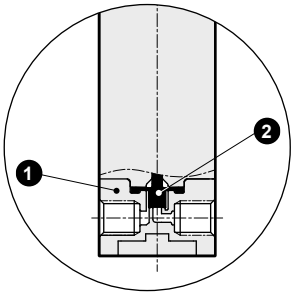
● With mounting plate (standard)



■ Machining drawing
when installing MKB3 in parallel.
(n: Station No.)

● Without mounting plate





Cannot be disassembled

Main part material

No.	Part name	Material	
❶	Body	PPS	Polyphenylene sulfide
❷	Diaphragm	FKM, EPDM	Fluoro rubber, ethylene propylene rubber

MEMO

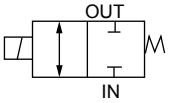
Metal-free 2, 3-port solenoid valve

MAB1/MAG1 Series

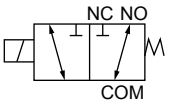
- NC (open when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Port size: M6

JIS symbol

- MAB1 (2-port)
  : NC (open when energized)



- MAG1 (3-port)
  : Universal



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	MAB1-M6-DC24V	MAG1-M6-DC24V
Working fluid	Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)	
Proof pressure MPa	0.45 (≈65 psi, 4.5 bar) (water pressure)	
Working pressure MPa	See table below	See table below
Fluid temperature °C	5 (41°F) to 60 (140°F)	
Ambient temperature °C	0 (32°F) to 50 (122°F)	
Atmosphere	No explosive or corrosive atmospheres	
Valve seat leakage cm^3/min	0 (water pressure)	
Port size	M6	
Orifice size mm	1.6 or equiv.	
Cv	0.045	
Mounting orientation	Unrestricted	
Weight kg	0.13	
Electrical specifications		
Rated voltage	24 VDC	
Voltage fluctuation range	±10%	
Power consumption W	2.3	
Leakage current mA	2.4 or less (*1)	
Thermal class	Class 130 (B)	

Working pressure MPa

Conditions	Fluid flow direction	Working pressure range of each port IN	Working pressure range of each port OUT
IN (+) press	IN→OUT	0 to 0.3	0 to 0.1
OUT (+) press	OUT→IN	0 to 0.1	0 to 0.1
IN (-) press	OUT→IN	-0.05 to 0	-0.05 to 0

Conditions	Fluid flow direction	Working pressure range of each port COM	NC	NO
COM (+) press	COM → NO or NC	0 to 0.3	0 to 0.1	0 to 0.1
NC (+) press	NC→COM	0 to 0.1	0 to 0.1	0 to 0.1
NO (+) press	NO→COM	0 to 0.1	0 to 0.1	0 to 0.1
COM (-) press	NO or NC → COM	-0.05 to 0	-0.05 to 0	-0.05 to 0

*1: The leakage current from the control circuit must be equal to or less than the values shown in the table.

How to order

MA Ⓑ 1 - M6 - DC24V

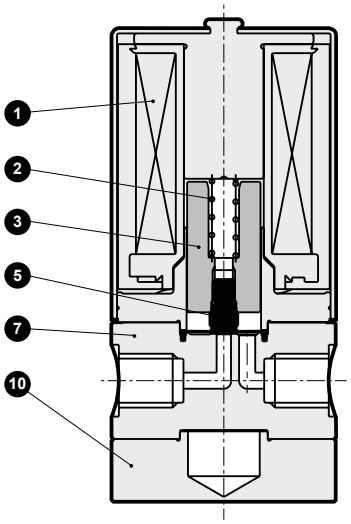
Ⓐ Number of ports

Model No.

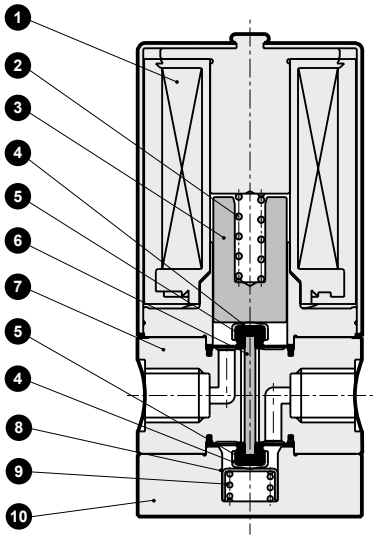
Code	Description
Ⓐ Number of ports	
B	2-port valve
G	3-port valve

Internal structure and parts list

● MAB1-M6-DC24V



● MAG1-M6-DC24V

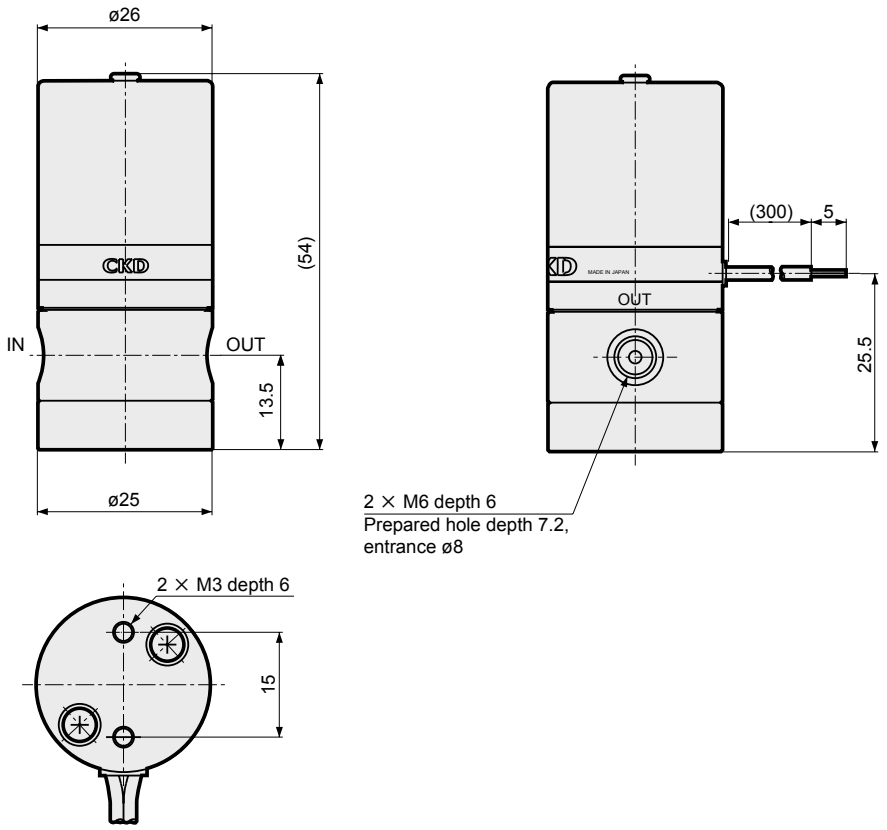


Cannot be disassembled

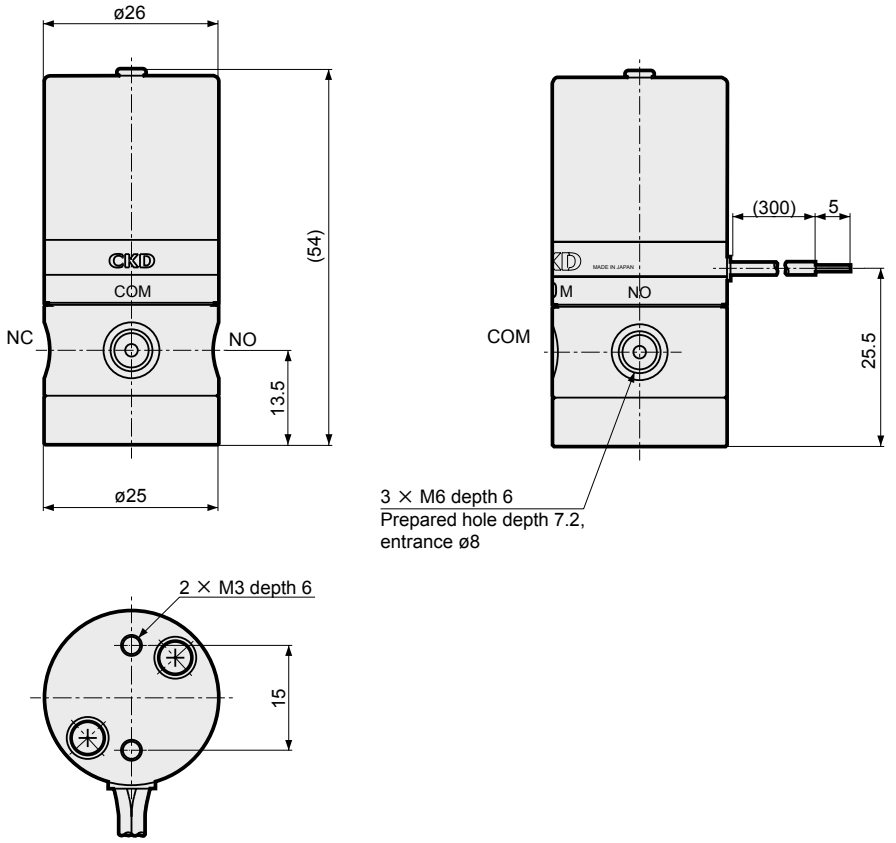
No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	---	---	6	Rod	---	Ceramic
2	Spring	SUS304	Stainless steel	7	Body	PTFE	Tetrafluoroethylene resin
3	Plunger	SUY	Iron	8	Spring holder	SUS304	Stainless steel
4	Cap	SUS304	Stainless steel	9	Spring	SUS304	Stainless steel
5	Diaphragm	PTFE	Tetrafluoroethylene resin	10	Mounting plate	SUS303	Stainless steel

Dimensions CAD

● MAB1-M6-DC24V



● MAG1-M6-DC24V



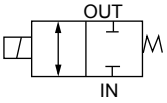
Metal-free 2, 3-port solenoid valve

MYB1/MYG1 Series

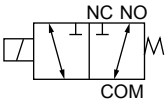
- NC (open when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Port size: M6

JIS symbol

- MYB1 (2-port)
  : NC (open when energized)



- MYG1 (3-port)
  : Universal



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	MYB1-M6	MYG1-M6
Working fluid	Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)	
Proof pressure MPa	0.3 (≈44 psi, 3 bar) (water pressure)	
Working pressure MPa	See table below	See table below
Fluid temperature °C	5 (41°F) to 60 (140°F)	
Ambient temperature °C	0 (32°F) to 50 (122°F)	
Atmosphere	No explosive or corrosive atmospheres	
Valve seat leakage cm^3/min	0 (water pressure)	
Port size	M6	
Orifice size mm	2.0 or equiv.	
Cv	0.1	
Mounting orientation	Unrestricted	
Weight kg	0.14	
Electrical specifications		
Rated voltage	12 VDC/24 VDC/100 VAC(50/60 Hz)	
Voltage fluctuation range	±10%	
Power consumption W AC	3.8	
Power consumption W DC	3.0	
Leakage current mA	2 or less (12 VDC)/1 or less (24 VDC)/1.5 or less (100 VAC) (*1)	
Thermal class	Class 130 (B)	

Working pressure MPa

Conditions	Fluid flow direction	Working pressure range of each port IN	Working pressure range of each port OUT
IN (+) press	IN→OUT	0 to 0.2	0 to 0.1
OUT (+) press	OUT→IN	0 to 0.1	0 to 0.1
IN (-) press	OUT→IN	-0.05 to 0	-0.05 to 0

Conditions	Fluid flow direction	Working pressure range of each port COM	NC	NO
COM (+) press	COM → NO or NC	0 to 0.2	0 to 0.1	0 to 0.1
NC (+) press	NC→COM	0 to 0.1	0 to 0.1	0 to 0.1
NO (+) press	NO→COM	0 to 0.1	0 to 0.1	0 to 0.1
COM (-) press	NO or NC → COM	-0.05 to 0	-0.05 to 0	-0.05 to 0

*1: The leakage current from the control circuit must be equal to or less than the values shown in the table.

How to order

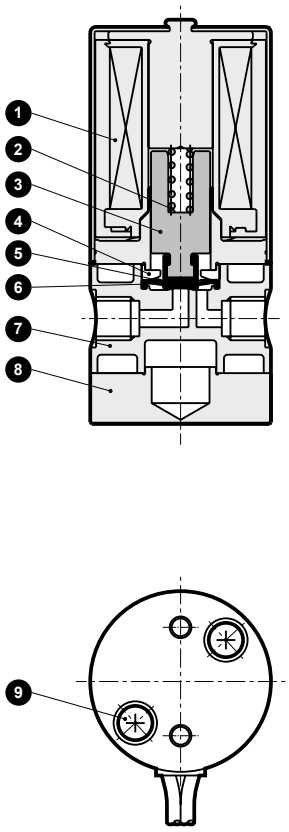
MY B 1 - M6 - DC12V

- A Number of ports
- B Orifice size
- C Port size
- D Rated voltage

Code	Description
A Number of ports	
B	2-port
G	3-port
B Orifice size	
1	ø2
C Port size	
M6	M6
D Rated voltage	
DC12V	12 VDC
DC24V	24 VDC
AC100V	100 VAC(50/60 Hz)

Internal structure and parts list

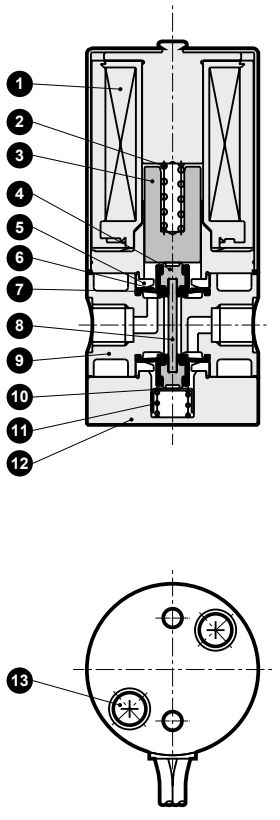
● MYB1-M6



Cannot be disassembled

No.	Part name	Material	
1	Coil assembly	Class B molded coil	
2	Spring	SUS304	Stainless steel
3	Plunger	SUS405 or equiv.	Stainless steel
4	Diaphragm adaptor	PPS	Polyphenylene sulfide
5	Protective sheet	PTFE	Tetrafluoroethylene resin
6	Diaphragm	FKM	Fluoro rubber
7	Body	PPS	Polyphenylene sulfide
8	Mounting plate	SUS303	Stainless steel
9	Phillips pan head machine screw, captive spring washer	SUSXM7	Stainless steel

● MYG1-M6

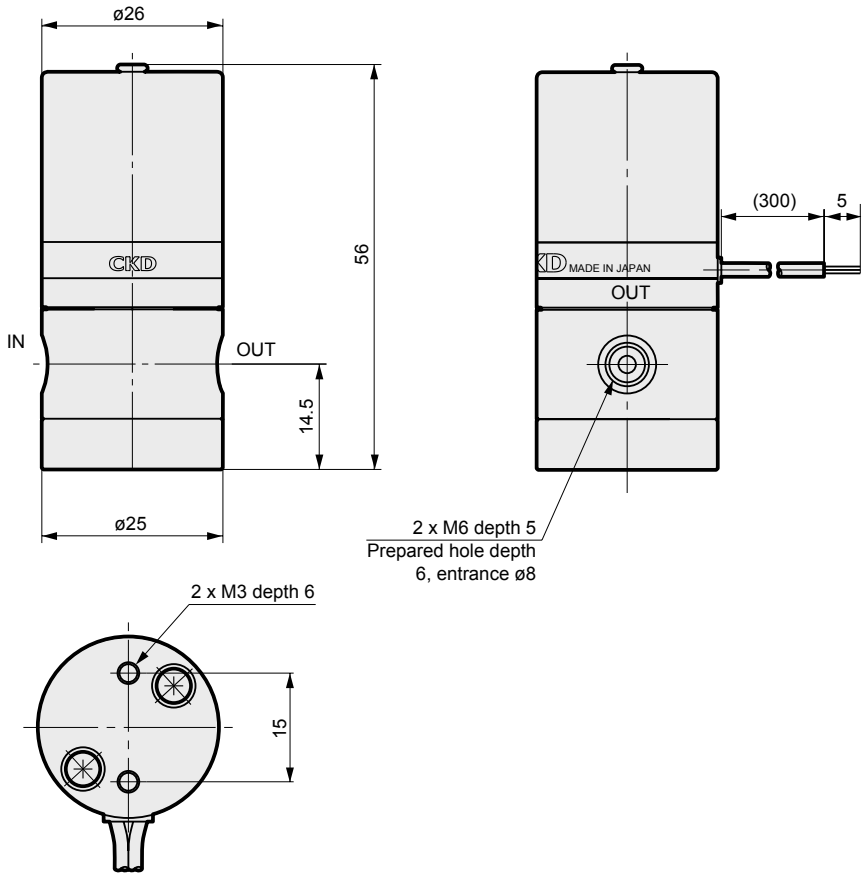


Cannot be disassembled

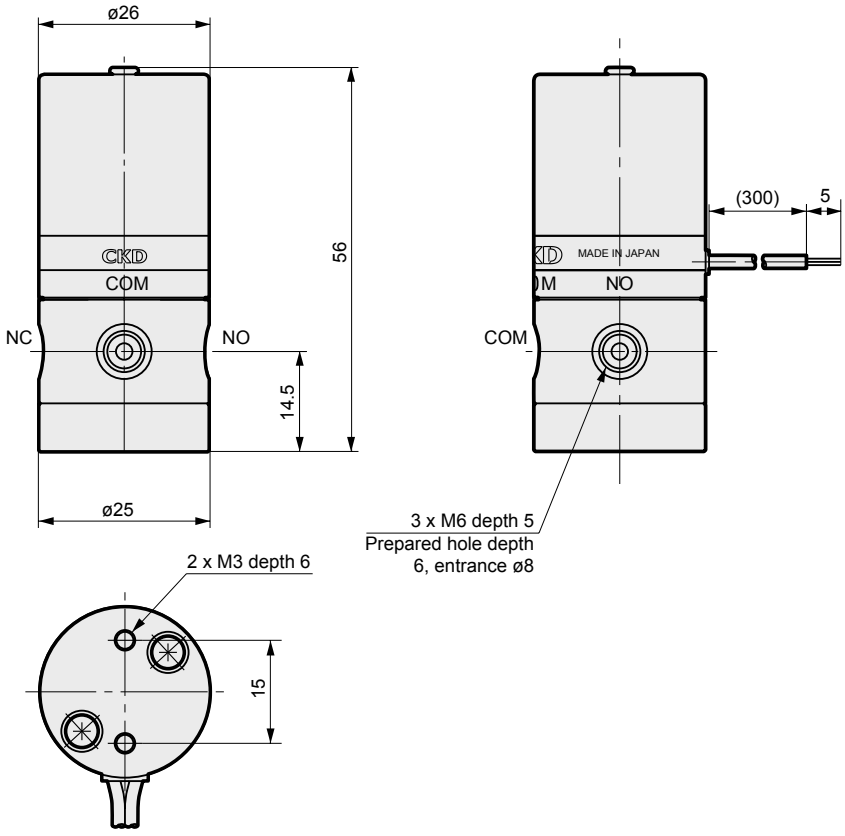
No.	Part name	Material	
1	Coil assembly	Class B molded coil	
2	Spring	SUS304	Stainless steel
3	Plunger	SUY	Iron
4	Spacer	PPS	Polyphenylene sulfide
5	Diaphragm adaptor	PPS	Polyphenylene sulfide
6	Protective sheet	PTFE	Tetrafluoroethylene resin
7	Diaphragm	FKM	Fluoro rubber
8	Rod	Ceramic	
9	Body	PPS	Polyphenylene sulfide
10	Spring holder	SUS304	Stainless steel
11	Spring	SUS304	Stainless steel
12	Mounting plate	SUS303	Stainless steel
13	Phillips pan head machine screw, captive spring washer	SUSXM7	Stainless steel

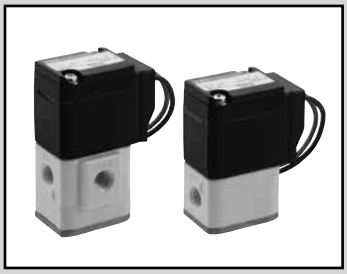
Dimensions CAD

● MYB1-M6



● MYG1-M6





Metal-free 2, 3-port solenoid valve

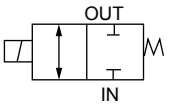
MYB2/MYG2 Series

- NC (open when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Port size: Rc1/8

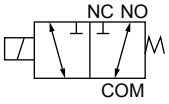
RoHS CAD

JIS symbol

- MYB2 (2-port)
  : NC (open when energized)



- MYG2 (3-port)
  : Universal



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	MYB2-6	MYG2-6
Working fluid	Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)	
Proof pressure MPa	0.3 (≈44 psi, 3 bar) (water pressure)	
Working pressure MPa	Conditions: IN (+) press; Fluid flow direction: IN→OUT; Working pressure of each port (MPa) IN: 0 to 0.2, OUT: 0 to 0.1 Conditions: OUT (+) press; Fluid flow direction: OUT→IN; IN: 0 to 0.1, OUT: 0 to 0.1 Conditions: IN (-) press; Fluid flow direction: OUT→IN; IN: -0.05 to 0, OUT: -0.05 to 0	Conditions: COM (+) press; Fluid flow direction: COM→NO or NC; Working pressure of each port (MPa) COM: 0 to 0.2, NC: 0 to 0.1, NO: 0 to 0.1 Conditions: NC (+) press; Fluid flow direction: NC→COM; COM: 0 to 0.1, NC: 0 to 0.1, NO: 0 to 0.1 Conditions: NO (+) press; Fluid flow direction: NO→COM; COM: 0 to 0.1, NC: 0 to 0.1, NO: 0 to 0.1 Conditions: COM (-) press; Fluid flow direction: NO or NC→COM; COM: -0.05 to 0, NC: -0.05 to 0, NO: -0.05 to 0
Fluid temperature °C	5 (41°F) to 60 (140°F)	
Ambient temperature °C	0 (32°F) to 50 (122°F)	
Atmosphere	No explosive or corrosive atmospheres	
Valve seat leakage cm^3/min	0 (water pressure)	
Port size	Rc1/8	
Orifice size mm	3.0 or equiv.	
Cv	0.18	
Mounting orientation	Unrestricted	
Weight kg	0.22	0.24
Electrical specifications		
Rated voltage	24 VDC, 100 VAC(50/60 Hz)	
Voltage fluctuation range	±10%	
Power consumption W	5.5	
Starting current A	1 or less	
Leakage current mA	24 VDC: 1 or less, 100 VAC: 6 or less (*1)	
Thermal class	Class 130 (B)	

*1 : The leakage current from the control circuit must be equal to or less than the values shown in the table.
*2 : As this product generates noise from incorporating electronic oscillator circuits, use noise countermeasures on the same power line.
*3 : After the solenoid valve is completely switched OFF, set an interval of 0.5 seconds or more before switching it ON the next time.

How to order

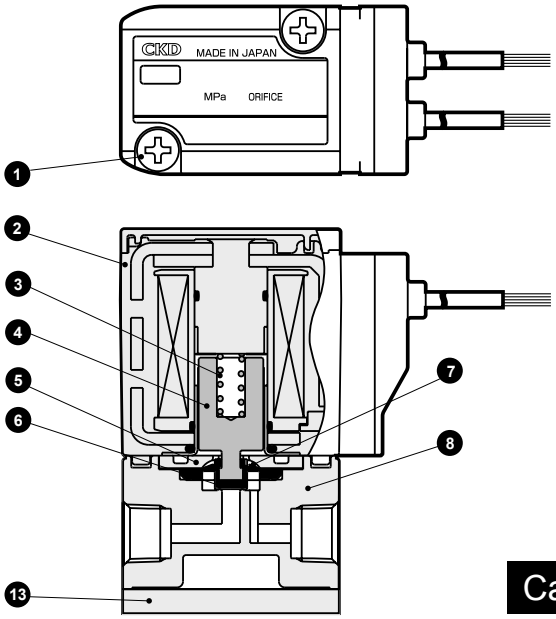
MY B 2 – 6 – DC24V

Ⓐ Number of ports
Ⓑ Orifice size
Ⓒ Port size
Ⓓ Rated voltage

Code	Description
Ⓐ Number of ports	
B	2-port
G	3-port
Ⓑ Orifice size	
2	ø3
Ⓒ Port size	
6	Rc1/8
Ⓓ Rated voltage	
DC24V	24 VDC
AC100V	100 VAC(50/60 Hz)

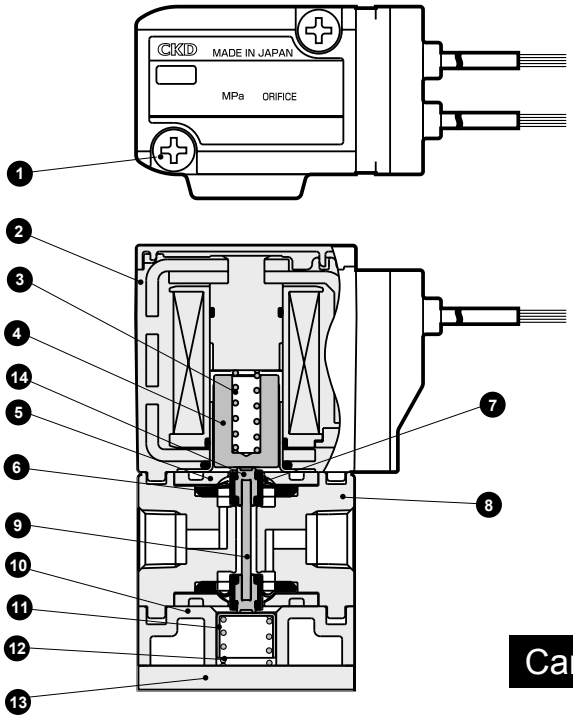
Internal structure and parts list

● MYB2 (2-port valve)



Cannot be disassembled

● MYG2 (3-port valve)

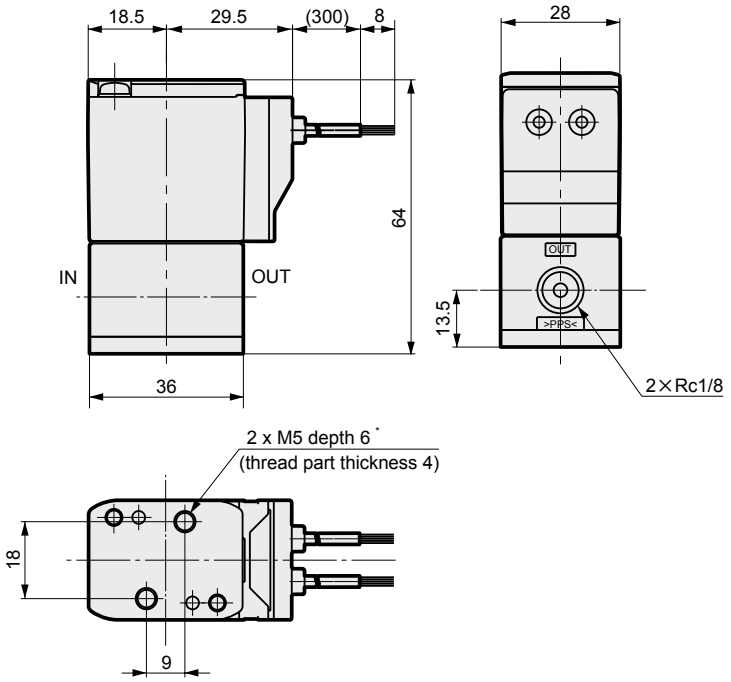


Cannot be disassembled

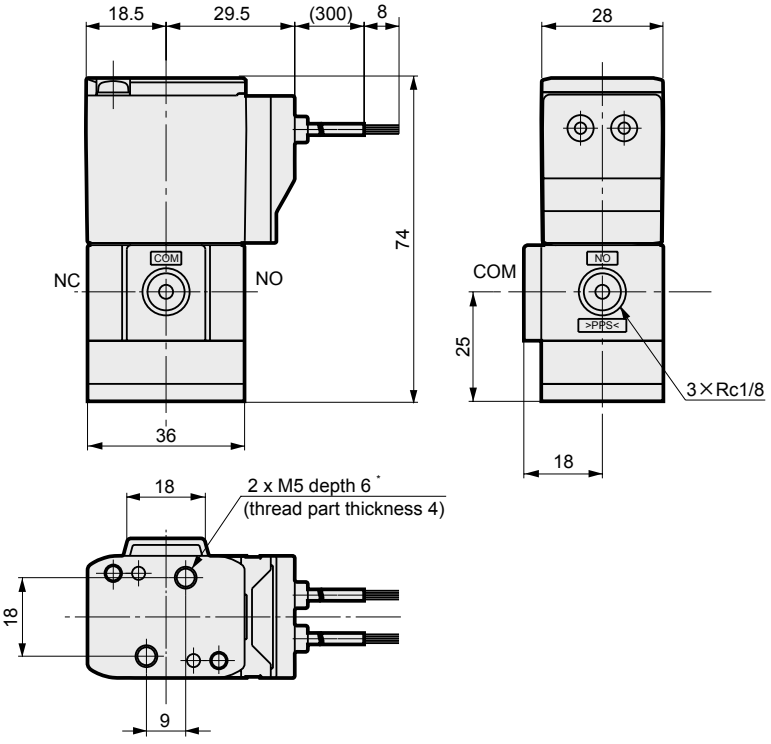
No.	Part name	Material		No.	Part name	Material	
1	Cross-recessed pan head machine screw	SUSXM7	Stainless steel	8	Body	PPS	Polyphenylene sulfide
2	Coil assembly	Class B molded coil		9	Rod	Ceramic	
3	Spring	SUS304	Stainless steel	10	Base	PPS	Polyphenylene sulfide
4	Plunger	SUS405 or equiv.	Stainless steel	11	Spring holder	SUS304	Stainless steel
5	Diaphragm adaptor	PPS	Polyphenylene sulfide	12	Spring	SUS304	Stainless steel
6	Diaphragm	FKM	Fluoro rubber	13	Mounting plate	SUS304	Stainless steel
7	Protective sheet	PTFE	Tetrafluoroethylene resin	14	Cap	PPS	Polyphenylene sulfide

Dimensions CAD

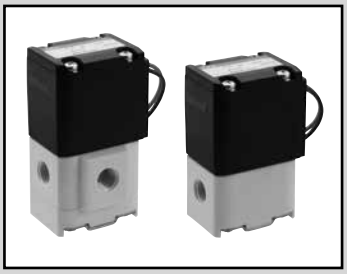
● MYB2 (2-port valve)



● MYG2 (3-port valve)



* When 2 x M5 for mounting is 6 mm or more from the bottom of the mounting plate, the screw cuts into the body or base, leading to cracking. The screw end must be 6 mm or less from the bottom of the mounting plate.



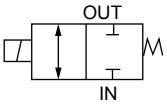
Metal-free 2, 3-port solenoid valve

MYB3/MYG3 Series

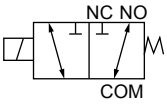
- NC (open when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Port size: Rc1/8, Rc1/4, Rc3/8

JIS symbol

● MYB3 (2-port)
: NC (open when energized)



● MYG3 (3-port)
: Universal



Specifications

Item		MYB3	MYG3
Working fluid		Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)	
Proof pressure	MPa	0.3 (≈44 psi, 3 bar) (water pressure)	
Working pressure	MPa	See table below	See table below
Fluid temperature	°C	5 (41°F) to 60 (140°F)	
Ambient temperature	°C	0 (32°F) to 50 (122°F)	
Atmosphere		No explosive or corrosive atmospheres	
Valve seat leakage	cm^3/min	0 (water pressure)	
Port size		Rc1/8, Rc1/4, Rc3/8	
Orifice size	mm	5.0 or equiv.	
Cv		0.5	
Mounting orientation		Unrestricted	
Weight	kg	0.55	0.6
Electrical specifications			
Rated voltage		12 VDC/24 VDC/100 VAC(50/60 Hz)	
Voltage fluctuation range		±10%	
Power consumption	W AC	11	
	W DC	11.5	
Leakage current	mA	2 or less (12 VDC)/1 or less (24 VDC)/2 or less (100 VAC) (*1)	
Thermal class		Class 130 (B)	

Working pressure MPa

Conditions	Fluid flow direction	Working pressure range of each port IN	OUT
IN (+) press	IN→OUT	0 to 0.2	0 to 0.1
OUT (+) press	OUT→IN	0 to 0.1	0 to 0.1
IN (-) press	OUT→IN	-0.05 to 0	-0.05 to 0

Conditions	Fluid flow direction	Working pressure range of each port COM	NC	NO
COM (+) press	COM→NO or NC	0 to 0.2	0 to 0.1	0 to 0.1
NC (+) press	NC→COM	0 to 0.1	0 to 0.1	0 to 0.1
NO (+) press	NO→COM	0 to 0.1	0 to 0.1	0 to 0.1
COM (-) press	NO or NC→COM	-0.05 to 0	-0.05 to 0	-0.05 to 0

*1 : The leakage current from the control circuit must be equal to or less than the values shown in the table.

How to order

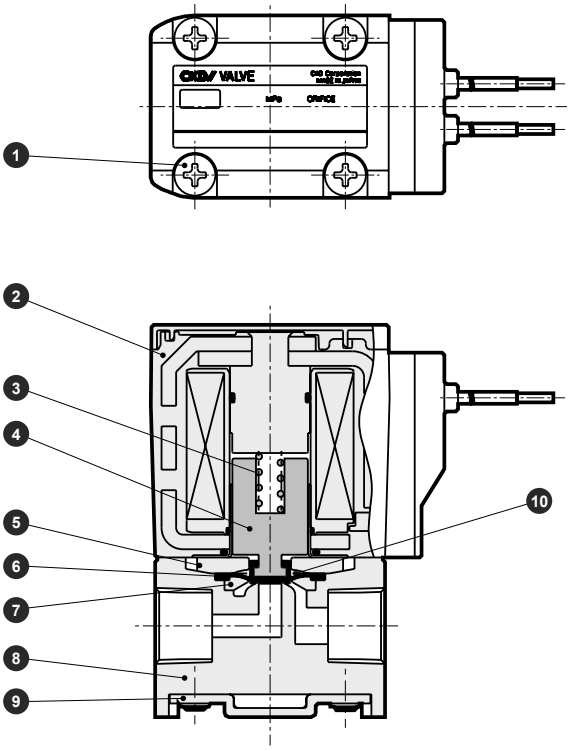
MY B 3 - 6 - DC12V

Ⓐ Number of ports
Ⓑ Orifice size
Ⓒ Port size
Ⓓ Rated voltage

	Code	Description
Ⓐ	**B**	2-port
	G	3-port
Ⓑ	**3**	ø5
Ⓒ	**6**	Rc1/8
	8	Rc1/4
	10	Rc3/8
Ⓓ	**DC12V**	12 VDC
	DC24V	24 VDC
	AC100V	100 VAC(50/60 Hz)

Internal structure and parts list

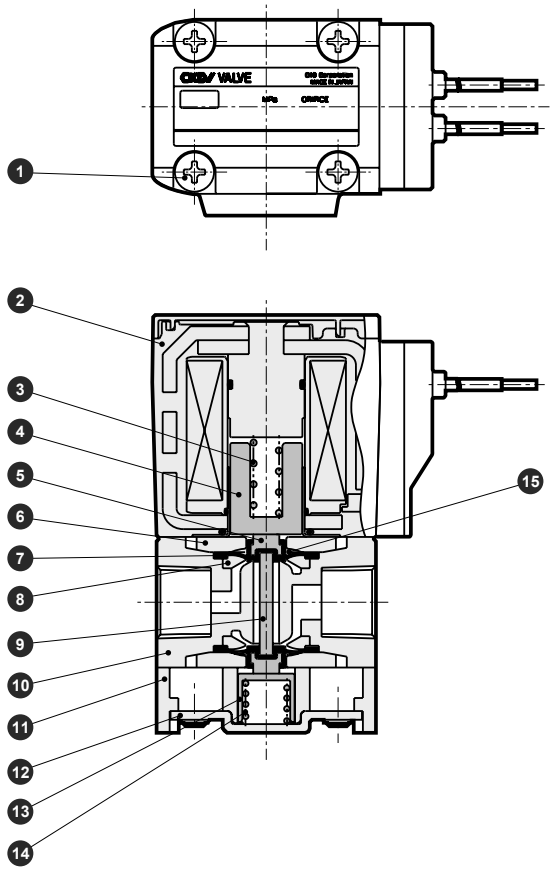
● MYB3



Cannot be disassembled

No.	Part name	Material	
1	Cross-recessed pan head machine screw	SUSXM7	Stainless steel
2	Coil assembly	Class B molded coil	
3	Spring	SUS304	Stainless steel
4	Plunger	SUS405 or equiv.	Stainless steel
5	Diaphragm adaptor	PPS	Polyphenylene sulfide
6	Diaphragm	FKM	Fluoro rubber
7	Diaphragm adaptor	PPS	Polyphenylene sulfide
8	Body	PPS	Polyphenylene sulfide
9	Mounting plate	SUS304	Stainless steel
10	Protective sheet	PTFE	Tetrafluoroethylene resin

● MYG3



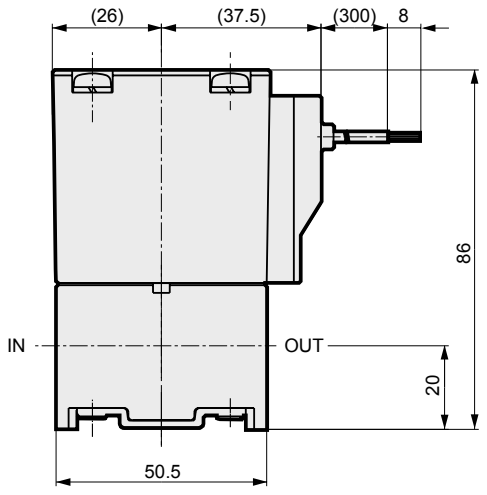
Cannot be disassembled

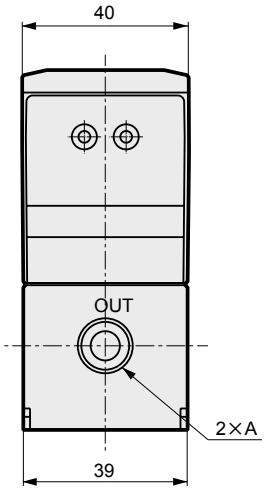
No.	Part name	Material	
1	Cross-recessed pan head machine screw	SUSXM7	Stainless steel
2	Coil assembly	Class B molded coil	
3	Spring	SUS304	Stainless steel
4	Plunger	SUS405 or equiv.	Stainless steel
5	Spacer	PPS	Polyphenylene sulfide
6	Diaphragm adaptor	PPS	Polyphenylene sulfide
7	Diaphragm	FKM	Fluoro rubber
8	Diaphragm adaptor	PPS	Polyphenylene sulfide
9	Rod	Ceramic	
10	Body	PPS	Polyphenylene sulfide
11	Base	PPS	Polyphenylene sulfide
12	Mounting plate	SUS304	Stainless steel
13	Spring holder	SUS304	Stainless steel
14	Spring	SUS304	Stainless steel
15	Protective sheet	PTFE	Tetrafluoroethylene resin

Dimensions CAD

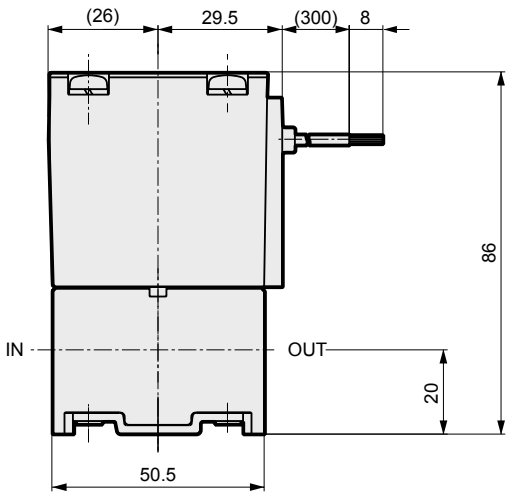
● MYB3

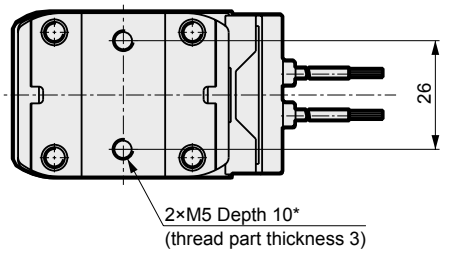
[For AC]



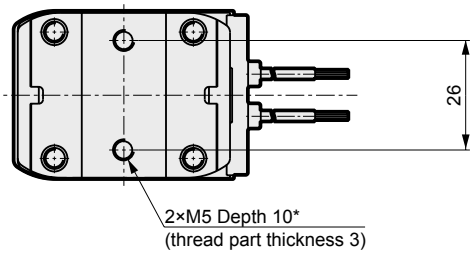


[For DC]



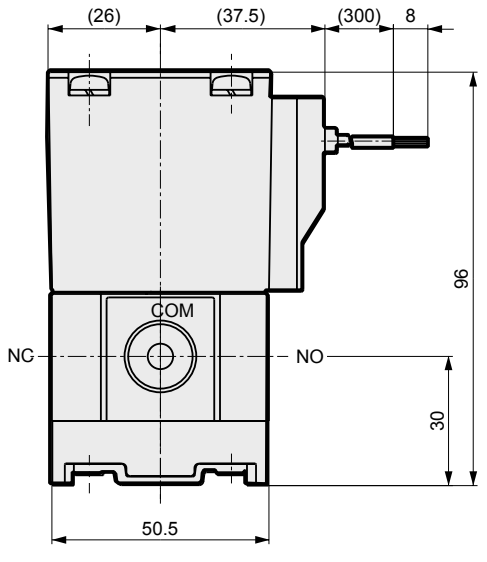


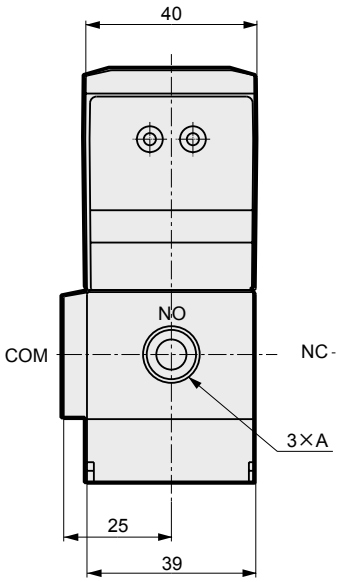
Model No.	A
MYB3-6	Rc1/8
MYB3-8	Rc1/4
MYB3-10	Rc3/8



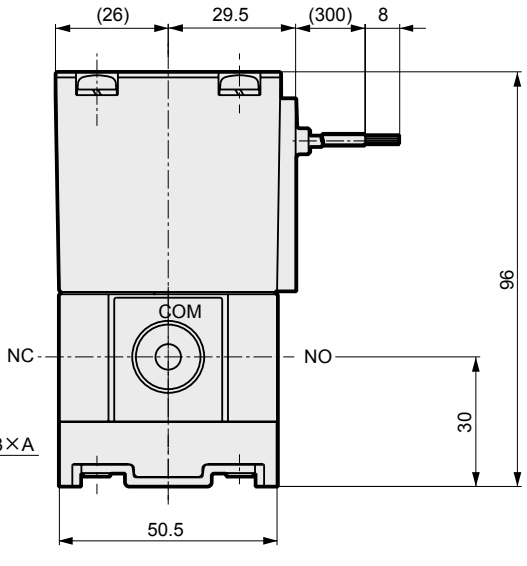
● MYG3

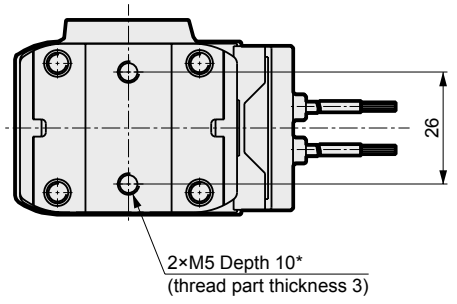
[For AC]



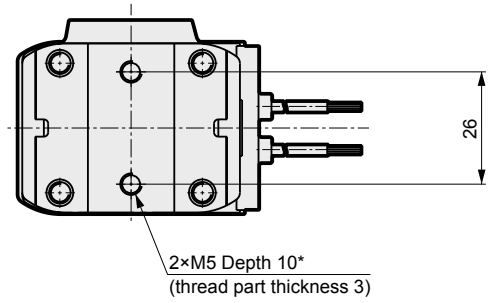


[For DC]

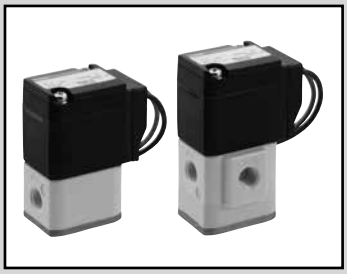




Model No.	A
MYG3-6	Rc1/8
MYG3-8	Rc1/4
MYG3-10	Rc3/8



* When M5 for mounting is 10 mm or more from the bottom of the mounting plate, the screw cuts into the body or base, leading to cracking. The screw end must be 10 mm or less from the bottom of the mounting plate.



Metal-free 2, 3-port solenoid valve

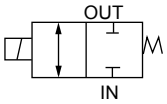
MEB2/MEG2 Series

- NC (open when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Port size: Rc1/8

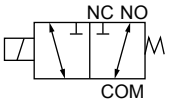
RoHS CAD

JIS symbol

● MEB2 (2-port)
: NC (open when energized)



● MEG2 (3-port)
: Universal



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	MEB2-6	MEG2-6
Working fluid	Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)	
Proof pressure MPa	0.3 (≈44 psi, 3 bar) (water pressure)	
Working pressure MPa	See table below	See table below
Fluid temperature °C	0 (32°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	0 (32°F) to 50 (122°F)	
Atmosphere	No explosive or corrosive atmospheres	
Valve seat leakage cm^3/min	0 (water pressure)	
Port size	Rc1/8	
Orifice size mm	3.0 or equiv.	
Cv	0.18	
Mounting orientation	Unrestricted	
Weight kg	0.22	0.24

Working pressure MPa — MEB2-6

Conditions	Fluid flow direction	Working pressure range of each port IN	OUT
IN (+) press	IN→OUT	0 to 0.2	0 to 0.1
OUT (+) press	OUT→IN	0 to 0.1	0 to 0.1
IN (-) press	OUT→IN	-0.05 to 0	-0.05 to 0

Working pressure MPa — MEG2-6

Conditions	Fluid flow direction	Working pressure range of each port COM	NC	NO
COM (+) press	COM→NO or NC	0 to 0.2	0 to 0.1	0 to 0.1
NC (+) press	NC→COM	0 to 0.1	0 to 0.1	0 to 0.1
NO (+) press	NO→COM	0 to 0.1	0 to 0.1	0 to 0.1
COM (-) press	NO or NC→COM	-0.05 to 0	-0.05 to 0	-0.05 to 0

Electrical specifications	
Rated voltage	24 VDC/100 VAC(50/60 Hz)
Voltage fluctuation range	±10%
Power consumption W	5.5
Starting current A	1 or less
Leakage current mA	24 VDC: 1 or less, 100 VAC: 6 or less (*1)
Thermal class	Class 130 (B)

*1 : The leakage current from the control circuit must be equal to or less than the values shown in the table.
*2 : As this product generates noise from incorporating electronic oscillator circuits, use noise countermeasures on the same power line.
*3 : After the solenoid valve is completely switched OFF, set an interval of 0.5 seconds or more before switching it ON the next time.

How to order

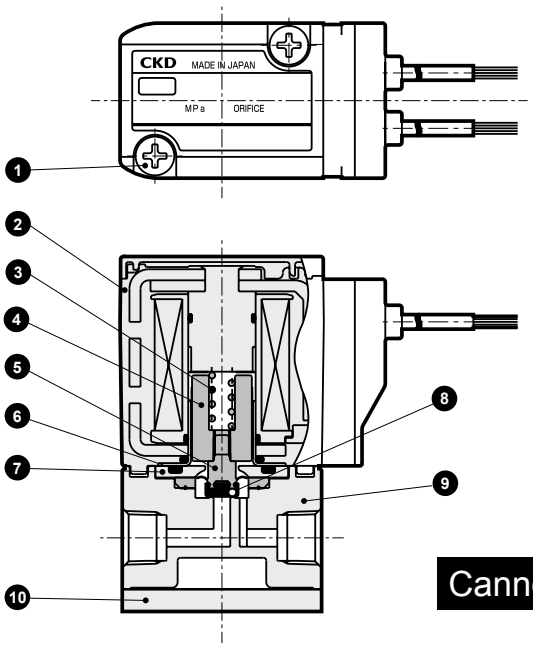
ME B 2 – 6 – DC24V

- A Number of ports
- B Orifice size
- C Port size
- D Rated voltage

Code	Description
A Number of ports	
B	2-port
G	3-port
B Orifice size	
2	ø3
C Port size	
6	Rc1/8
D Rated voltage	
DC24V	24 VDC
AC100V	100 VAC(50/60 Hz)

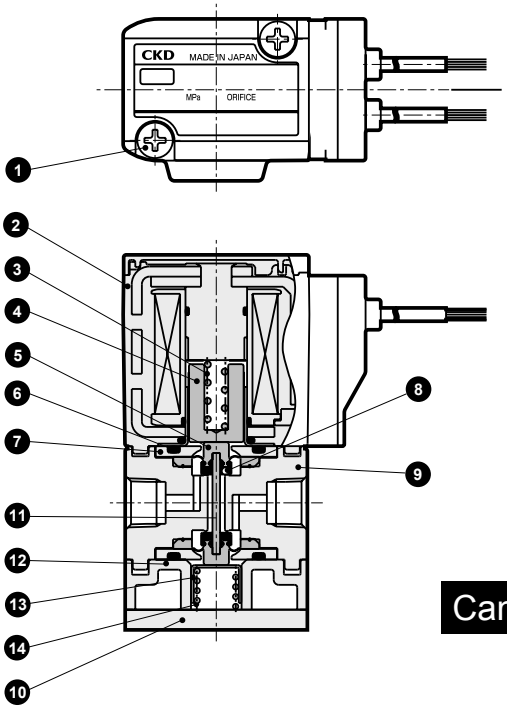
Internal structure and parts list

● MEB2 (2-port valve)



Cannot be disassembled

● MEG2 (3-port valve)

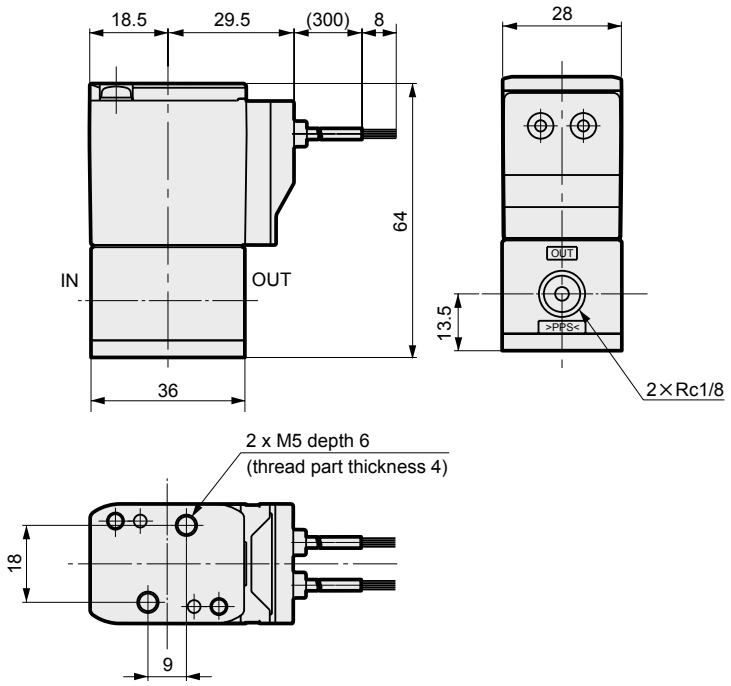


Cannot be disassembled

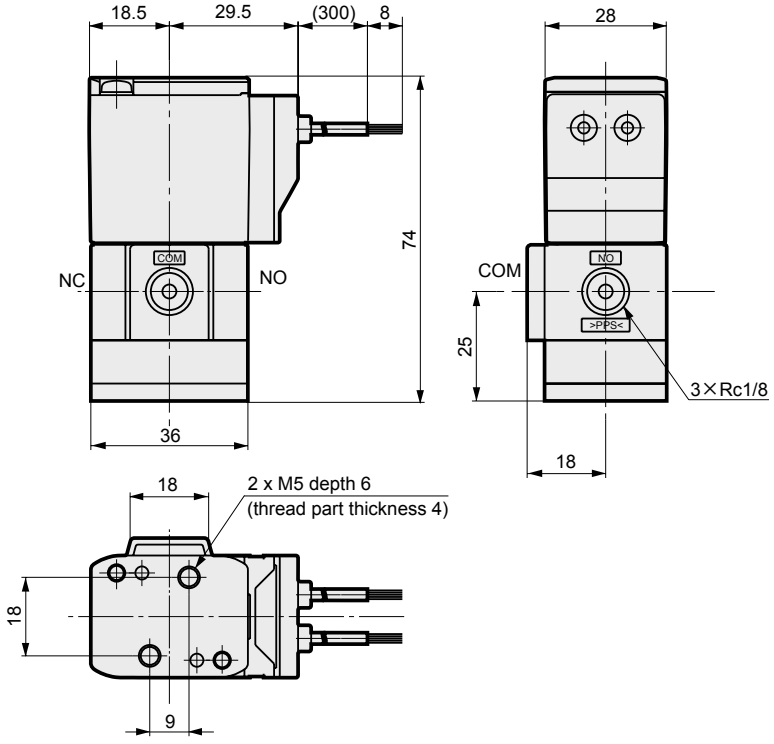
No.	Part name	Material		No.	Part name	Material	
1	Cross-recessed pan head machine screw	SUSXM7	Stainless steel	8	Valve seat	FFKM	Perfluoroelastomer
2	Coil assembly	Class B molded coil		9	Body	PPS	Polyphenylene sulfide
3	Spring	SUS304	Stainless steel	10	Mounting plate	SUS304	Stainless steel
4	Plunger	SUS405 or equiv.	Stainless steel	11	Rod	Ceramic	
5	Diaphragm	PTFE	Tetrafluoroethylene resin	12	Base	PPS	Polyphenylene sulfide
6	O-ring	FKM	Fluoro rubber	13	Spring holder	SUS304	Stainless steel
7	Diaphragm adaptor	PPS	Polyphenylene sulfide	14	Spring	SUS304	Stainless steel

Dimensions CAD

● MEB2 (2-port valve)



● MEG2 (3-port valve)



* When 2 x M5 for mounting is 6 mm or more from the bottom of the mounting plate, the screw cuts into the body or base, leading to cracking. The screw end must be 6 mm or less from the bottom of the mounting plate.

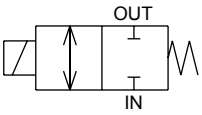
Metal-free 2-port solenoid valve

MJB3 Series

- NC (open when energized)
- Working fluid: Water/pure water/chemical liquids
- Port size: Tube connection porting O.D. x I.D. = ø8 x ø4

CE RoHS CAD

JIS symbol



Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	MJB3-4TN
Working fluid	Water, pure water, chemical liquids (fluids that do not corrode wetted part materials)
Proof pressure MPa	0.23 (≈33 psi, 2.3 bar) (water pressure)
Working pressure MPa	IN→OUT -0.06 to 0.15 When OUT port has negative pressure, the IN port is open to the atmosphere. OUT→IN -0.06 to 0.15 When IN port has negative pressure, the OUT port is open to the atmosphere.
Fluid temperature °C	0 (32°F) to 90 (194°F) (no freezing)
Ambient temperature °C	0 (32°F) to 40 (104°F)
Atmosphere	No explosive or corrosive atmospheres
Valve seat leakage cm^3/min	0 (water pressure)
Port size	Tube connection porting O.D. x I.D. = ø8 x ø4
Orifice size mm	3
Cv	0.2
Mounting orientation	Unrestricted
Weight kg	0.15
Electrical specifications	
Rated voltage	24 VDC
Voltage fluctuation range	±10%
Power consumption W	5.1
Leakage current mA	1 or less (*1)
Thermal class	Class 130 (B)

*1 : The leakage current from the control circuit must be equal to or less than the values shown in the table.
*2 : For 0.1% or less effective concentration of sodium hypochlorite (soda), perform functional testing according to your application before use. Do not attempt to use effective chlorine concentration exceeding 0.1%.
*3 : Do not apply excessive force on the fitting when connecting or disconnecting the tube.
*4 : Recommended tube
Material: Silicone rubber, size: O.D x I.D = ø11 x ø5

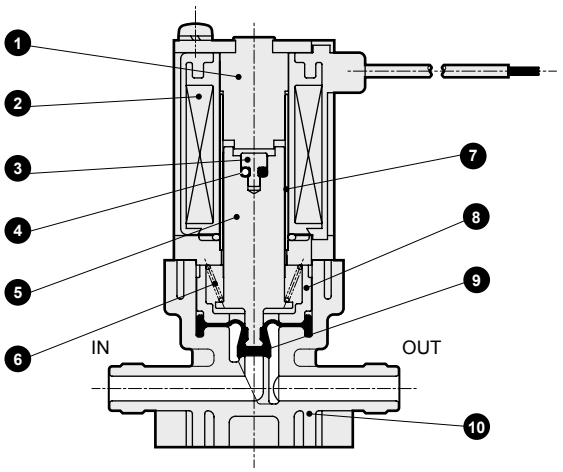
How to order

MJB3 - 4TN - P F - DC24V

- MJB3 — Model No.
- 4TN — Ⓐ Port size
- P — Ⓑ Body material
- F — Ⓒ Sealant
- DC24V — Ⓓ Voltage

Code	Description
Ⓐ Port size	
4TN	Port I.D. ø4
Ⓑ Body material	
P	PPS
S	PSU
Ⓒ Sealant	
F	FKM
Ⓓ Voltage	
DC24V	24 VDC

Internal structure and parts list

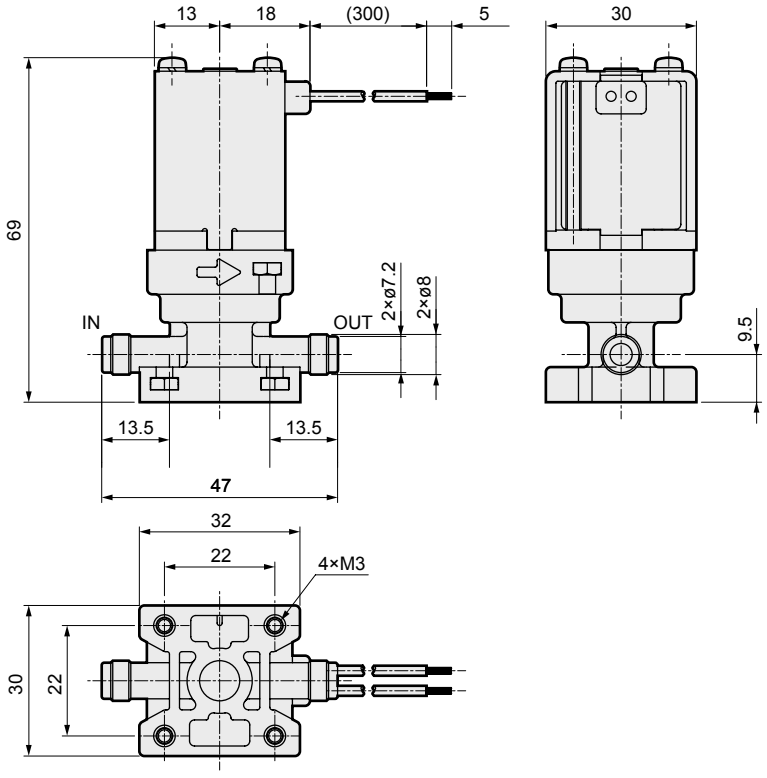


Cannot be disassembled

No.	Part name	Material	
1	Core A	SUM	Steel
2	Coil assembly	Class B molded coil	
3	Rod	PPS	Polyphenylene sulfide
4	O-ring	FKM	Fluoro rubber
5	Plunger	SUS405 or equiv.	Stainless steel
6	Spring	SUS304	Stainless steel
7	Guide pipe	SUS304	Stainless steel
8	Diaphragm holder	PPS	Polyphenylene sulfide
9	Diaphragm	FKM	Fluoro rubber
10	Body	PPS (PSU)	Polyphenylene sulfide (Polysulfone)

( ) shows options.

Dimensions



Metal-free 2-port solenoid valve

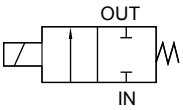
EMB21 Series

- NC (open when energized)
- Working fluid: Water/pure water/chemical liquids
- Port size: Rc1/4

RoHS

JIS symbol

● NC (open when energized)



Specifications

Item		EMB21
Working fluid		Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)
Working pressure MPa		-0.05 (≈-7.3 psi, -0.5 bar) to 0.3 (≈44 psi, 3 bar)
Back pressure MPa		0 (≈0 psi, 0 bar) to 0.1 (≈15 psi, 1 bar)
Proof pressure MPa		0.6 (≈87 psi, 6 bar) (water pressure)
Fluid temperature °C		5 (41°F) to 80 (176°F)
Ambient temperature °C		0 (32°F) to 60 (140°F) (no freezing)
Valve seat leakage cm^3/min		0 (water pressure)
Port size		Rc1/4(*2)
Orifice size mm		3
Cv		0.18
Mounting orientation		Unrestricted
Weight kg		0.32 (0.43 for SUS316 body)
Frequency Cycle/min.		60 or less
Electrical specifications		
Rated voltage		100 VAC(50/60 Hz), 200 VAC(50/60 Hz), 24 VDC
Voltage fluctuation range		-10 to +10% of rated voltage
Power consumption	100 VAC	4.6
	200 VAC	5.4
	24 VDC	4.5
Leakage current mA		2 or less
Thermal class		Class 130 (B)

*1 : Read the safety precautions for EMB21 (page 975).
*2 : Do not use metal fittings on the PTFE body because they could damage the port.
Wrap PTFE sealing tape two or three times around a fitting which is compatible with the JIS B 0203 pipe taper screw.
For tightening fluoro resin fittings, refer to the recommended tightening torque below.
Recommended tightening torque: 0.7 to 1.0 N·m (PTFE), 1.0 to 1.5 N·m (SUS316)

How to order

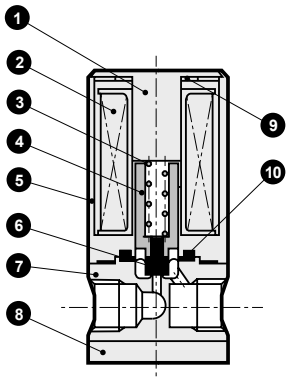
EMB21 - 8 - 5 - D - AC100V

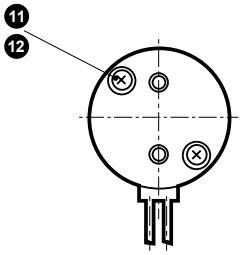
- EMB21 — Model No.
- 8 — Port size Rc1/4
- 5 — (fixed)
- D — Ⓐ Body material
- AC100V — Ⓑ Rated voltage

Code	Description
Ⓐ Body material	
Blank	PTFE
D	SUS316
Ⓑ Rated voltage	
AC100V	100 VAC(50/60 Hz)
AC200V	200 VAC(50/60 Hz)
DC24V	24 VDC

Internal structure and parts list

● EMB21 Series



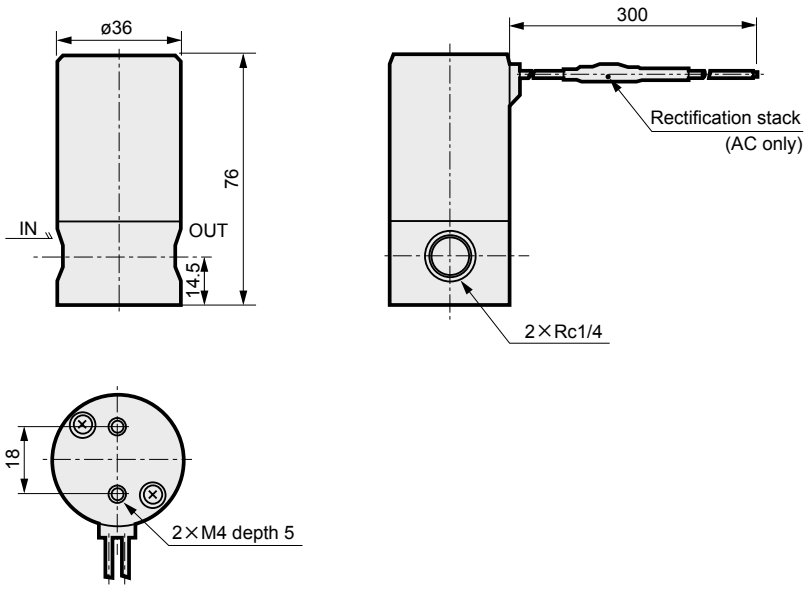


Cannot be disassembled

No.	Part name	Material	
1	Core A	SUM22	Steel
2	Coil assembly	-	
3	Cylindrical spring	SUS304	Stainless steel
4	Plunger	SUS405 or equiv.	Stainless steel
5	Core B	SUM22	Steel
6	Diaphragm	PTFE	Tetrafluoroethylene resin
7	Body	PTFE	Tetrafluoroethylene resin
8	Mounting plate	SUS303	Stainless steel
9	Gasket	FKM	Fluoro rubber
10	Gasket	FKM	Fluoro rubber
11	Phillips pan head machine	SUS304	Stainless steel
12	Spring washer	SUS304	Stainless steel

Dimensions

● EMB21-8-5-*



Metal-free 2-port solenoid valve

EMB41/51 Series

- NC (open when energized)
- Working fluid: Water/pure water/chemical liquids
- Port size: Rc3/8, Rc1/2

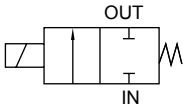
Export controlled items

* Subject: Port size 15

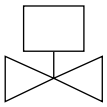
RoHS

JIS symbol

- NC (open when energized)



Mounting orientation



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	EMB41/51
Working fluid	Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)
Working pressure MPa	0 to 0.25 (refer to the working pressure in the individual specifications.) (*1)
Proof pressure MPa	0.4 (≈58 psi, 4 bar) (water pressure)
Fluid temperature °C	5 (41°F) to 60 (140°F)
Valve seat leakage cm^3/min	0 (water pressure)
Mounting orientation	Vertical direction with the coil on top
Frequency Cycle/min.	60 or less
Electrical specifications	
Rated voltage	100 VAC(50/60 Hz), 200 VAC(50/60 Hz), 24 VDC
Voltage fluctuation range	-10 to +10% of rated voltage
Leakage current mA	2 or less
Mounting wire	VCTF-0.75 (2-conductor)

*1 : Read the safety precautions for EMB41/51 (page 975).
*2 : Do not use metal fittings because they could damage the port.
Wrap PTFE sealing tape two or three times around a fitting which is compatible with the JIS B 0203 pipe taper screw.
For tightening fluoro resin fittings, refer to the recommended tightening torque below.
Recommended tightening torque: Rc 3/8: 1.0 to 1.5 N·m, Rc 1/2: 1.5 to 2.0 N·m

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size (*2)	Orifice size (mm)	Cv	Working pressure (MPa)	Back pressure (MPa)	Ambient temperature (°C)	Power consumption (W)	Weight (kg)
EMB41-10-3	Rc3/8	6	0.68	0 to 0.25	0.1	0 (32°F) to 50 (122°F)	11	0.86
EMB41-10-5		8	0.83	0 to 0.2	0.07			
EMB51-10-3	Rc3/8	10	2.05	0 to 0.15	0.06	0 (32°F) to 55 (131°F)	16	2.05
EMB51-15-4	Rc1/2	12	2.7	0 to 0.12				
EMB51-15-5		15	3.6	0 to 0.05	0.03			

How to order

EMB41 - 10 - 3 - AC100V

- EMB41 — Model No.
- 10 — Ⓐ Port size
- 3 — Ⓑ Orifice size
- AC100V — Ⓒ Rated voltage

Code	Description	Model No. EMB41	Model No. EMB51	Model No. EMB51
Ⓐ Port size				
10	Rc 3/8	●	●	
15	Rc 1/2			●
Ⓑ Orifice size				
	EMB41 / **EMB51**			
3	ø6 / ø10	●	●	
4	– / ø12			●
5	ø8 / ø15	●		●
Ⓒ Rated voltage				
AC100V	100 VAC (50/60 Hz)	●	●	●
AC200V	200 VAC (50/60 Hz)	●	●	●
DC24V	24 VDC	●	●	●

[Example of model No.]

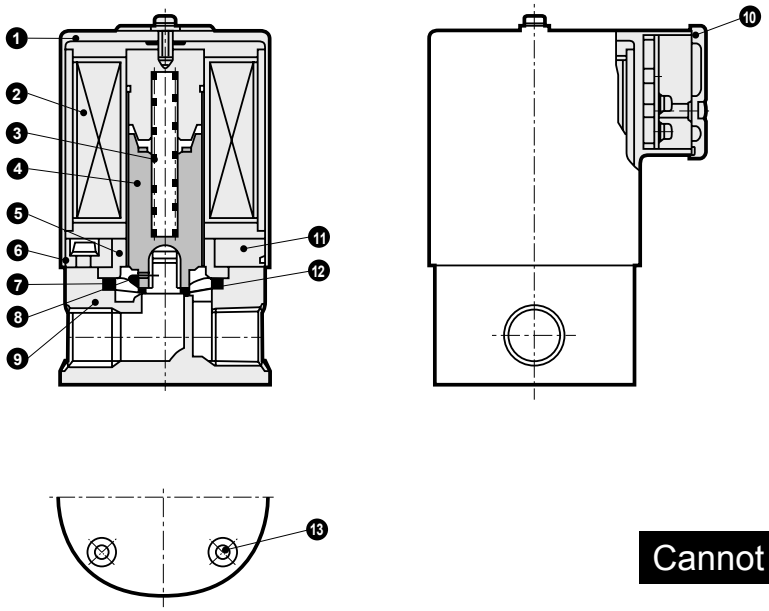
EMB51-15-5-AC200V

Model: EMB51

Ⓐ Port size : Rc1/2
Ⓑ Orifice size : ø15
Ⓒ Rated voltage : 200 VAC (50/60 Hz)

Internal structure and parts list

● EMB41/51 Series

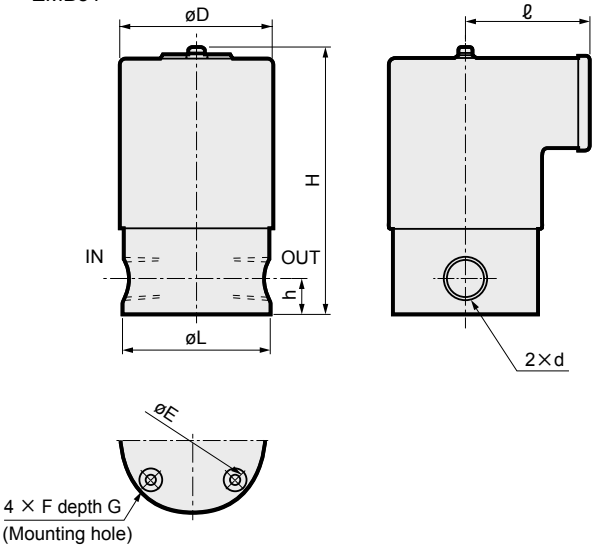


Cannot be disassembled

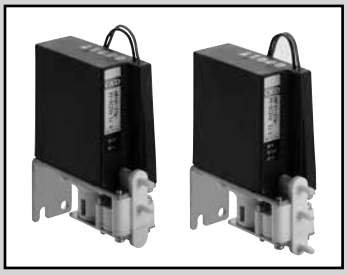
No.	Part name	Material		No.	Part name	Material	
1	Cover	PP	Polypropylene	9	Body	PTFE	Tetrafluoroethylene resin
2	Coil assembly	-		10	Gasket	FKM	Fluoro rubber
3	Spring	SUS304	Stainless steel	11	Body	A5056	Aluminum
4	Plunger	SUS405 or equiv.	Stainless steel	12	Rubber spacer	FKM	Fluoro rubber
5	Core assembly	SUS403/SUS316	Stainless steel	13	Embedded nut	SUS303	Stainless steel
6	O-ring	FKM	Fluoro rubber				
7	Diaphragm	PTFE	Tetrafluoroethylene resin				
8	Double diaphragm	PTFE	Tetrafluoroethylene resin				

Dimensions

● EMB41-**-*
EMB51-**-*



Model No.	D	d	E	F-G	H	h	L	ℓ
EMB41-10-3	54	Rc3/8	41	M4-8	110	14	54	50
EMB41-10-5	54	Rc3/8	41	M4-8	110	14	54	50
EMB51-10-3	74	Rc3/8	56	M5-12	136	22	70	60
EMB51-15-4	74	Rc1/2	56	M5-12	136	22	70	60
EMB51-15-5	74	Rc1/2	56	M5-12	136	22	70	60



Compact metal-free lever 2, 3-port solenoid valve for medical equipment

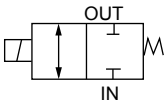
HMTB1/HMTG1 Series

- NC (open when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Port size: ø2 barbed fitting

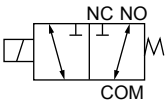
RoHS CAD

JIS symbol

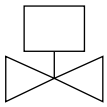
● HMTB1 (2-port)
: NC (open when energized)



● HMTG1 (3-port)
: Universal



Mounting orientation



Specifications

1 MPa = 10 bar

Item		HMTB1	HMTG1
Working fluid		Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)	
Proof pressure MPa		0.6 (≈87 psi, 6 bar) (water pressure)	
Working pressure MPa		IN→OUT:-0.05 (≈-7.3 psi) to 0.3 (≈44 psi) OUT→IN:-0.05 (≈-7.3 psi) to 0.15 (≈22 psi)	COM→NC/NO: -0.05 (≈-7.3 psi) to 0.3 (≈44 psi) NC/NO→COM: -0.05 (≈-7.3 psi) to 0.15 (≈22 psi)
Fluid temperature °C		5 (41°F) to 40 (104°F)	
Ambient temperature °C		0 (32°F) to 55 (131°F)	
Port size		ø2 barbed fitting	
Orifice size mm		1.6	
Cv		0.05	
Mounting orientation		Vertical position with coil on top	
Weight kg		0.21	
Frequency Cycle/min.		60 or less	
Operation sound dB		50	
Electrical specifications			
Rated voltage		24 VDC/12 VDC	
Voltage fluctuation range		±10%	
Temperature rise K		30	
Power consumption	When starting	9.6 (*1)	
	When holding	2.4	
Leakage current mA		5 or less (*2)	
Thermal class		Class 120 (E)	

*1 : Time from energizing to 200 ms.
*2 : The leakage current from the control circuit must be equal to or less than the values shown in the table.
*3 : Use direct current (excluding rectified alternating current).
*4 : When starting and switching retention, noise is generated temporarily. Check the compatibility of the control circuit.
*5 : Do not apply excessive force on the fitting when connecting or disconnecting the tube.
*6 : Solenoid valve has polarity. Connect the red lead wire to the plus (+) side.
*7 : After the solenoid valve is completely switched ON or OFF, set an interval of 0.5 seconds or more before switching it the next time.

How to order

HMT B 1 - 2TN - PN - DC12V

Model No. | Ⓐ Number of ports | Ⓑ Material | Ⓒ Rated voltage

Code	Description
Ⓐ Number of ports	
B	2-port valve
G	3-port valve

Ⓑ Material		
	Body	**Seal**
PN	PPS	NBR
PF	PPS	FKM
PE	PPS	EPDM

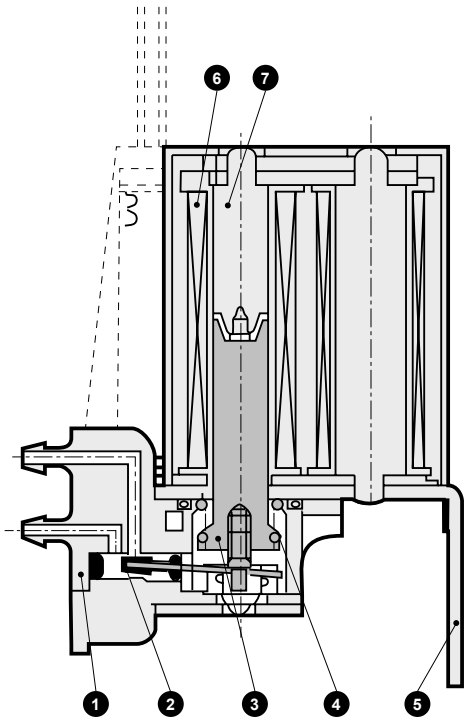
Ⓒ Rated voltage	
DC12V	12 VDC
DC24V	24 VDC

[Example of model No. 1]
HMTB1-2TN-PF-DC24V
Model : HMTB1

Ⓐ Number of ports : 2-port valve
Ⓑ Material : Body - PPS, sealant - FKM
Ⓒ Rated voltage : 24 VDC

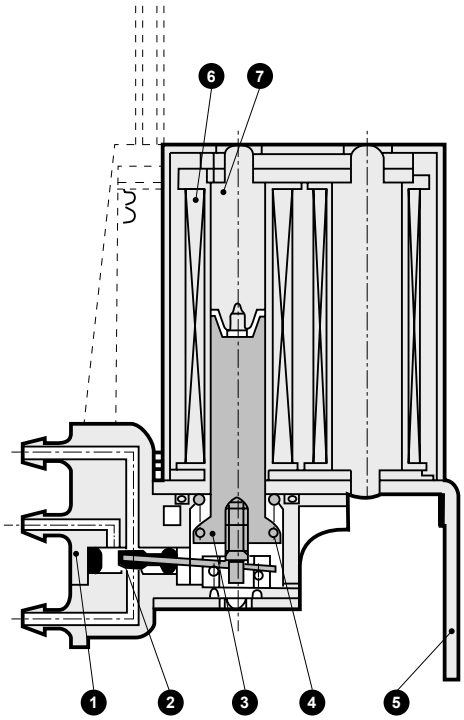
Internal structure and parts list

● HMTB1 (2-port)



Cannot be disassembled

● HMTG1 (3-port)

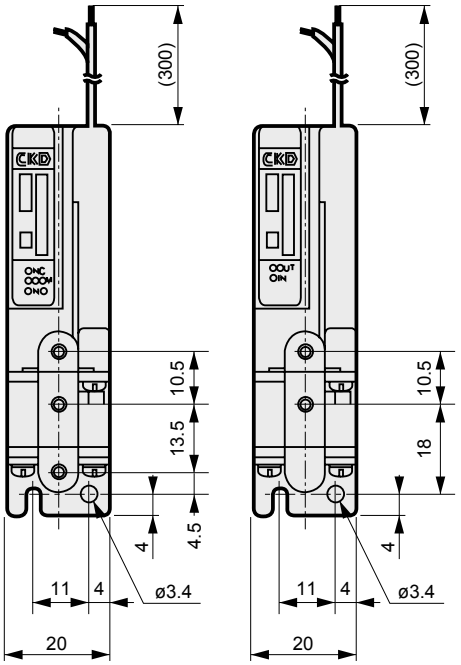


Cannot be disassembled

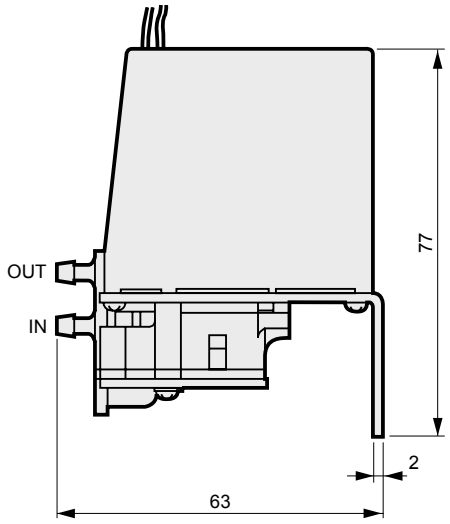
No.	Part name	Material		No.	Part name	Material	
1	Body	PPS	Polyphenylene sulfide	5	Frame	SUS430	Stainless steel
2	Valve seat packing	NBR, FKM, EPDM	Nitrile rubber, fluoro rubber, ethylene propylene rubber	6	Coil assembly	—	
3	Plunger assembly	SUS430/SUS304	Stainless steel	7	Core assembly	SUM22, SPC	Steel
4	Spring	SUS304	Stainless steel				

Dimensions

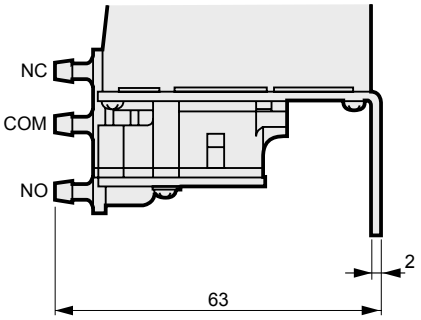
● HMTG1 (3-port)



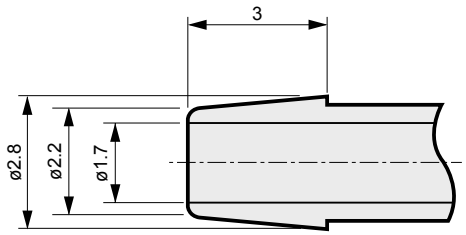
● HMTB1 (2-port)



● HMTG1 Series
(3-port)



Barbed fitting dimensions



Note: Do not apply extreme lateral load to the barbed fitting.
(Allowable lateral load) 0.2 N·m or less

Miniature direct acting 2, 3-port solenoid valve

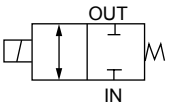
UMB1/UMG1 Series

- NC (open when energized), universal
- Working fluid: Water/pure water
- Port size: Stainless steel pipe with O.D. ø1.26 x I.D. ø0.9

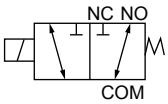
RoHS CAD

JIS symbol

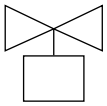
● UMB1 (2-port)
: NC (open when energized)



● UMG1 (3-port)
: Universal



Mounting orientation



Specifications

Item	UMB1	UMG1
Working fluid	Water/pure water	
Proof pressure MPa	0.6 (≈87 psi, 6 bar) (water pressure)	
Working pressure MPa	0 (≈0 psi, 0 bar) to 0.2 (≈29 psi, 2 bar)	
Fluid temperature °C	5 (41°F) to 55 (131°F)	
Ambient temperature °C	0 (32°F) to 55 (131°F)	
Valve seat leakage cm^3/min	0 (water pressure)	
Port size	Stainless steel pipe with O.D. ø1.26 x I.D. ø0.9	
Orifice size mm	0.9	
Cv	0.01	
Mounting orientation	Vertical direction with the coil down	
Weight kg	0.03	
Volumetric capacity µℓ	80 (*1)	
Response time ms	8 or less	
Electrical specifications		
Rated voltage	24 VDC/12 VDC	
Voltage fluctuation range	±10%	
Power consumption W	1.5	
Leakage current mA	0.4 or less (24 VDC)/0.7 or less (12 VDC) (*2)	
Thermal class	Class 130 (B)	

*1 : Volume of wetted parts formed by the body and main valving element. Note that piping volume is excluded.
*2 : The leakage current from the control circuit must be equal to or less than the values shown in the table.
*3 : Do not apply torque exceeding 0.3 N·m on the mounting bolt (M3).

How to order

UM Ⓑ 1 – T1 – DC12V

Model No.

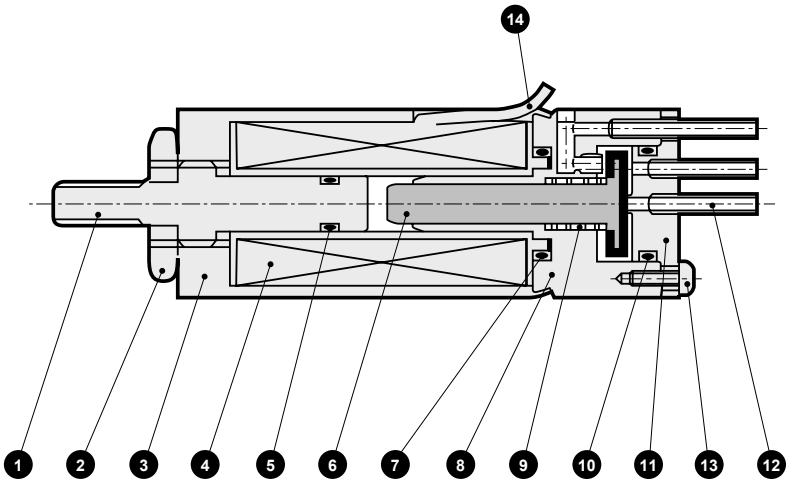
Ⓐ Number of ports

Ⓑ Rated voltage

Code	Description
Ⓐ Number of ports	
B	2-port valve
G	3-port valve
Ⓑ Rated voltage	
DC12V	12 VDC
DC24V	24 VDC

Internal structure and parts list

● UMG1-T1

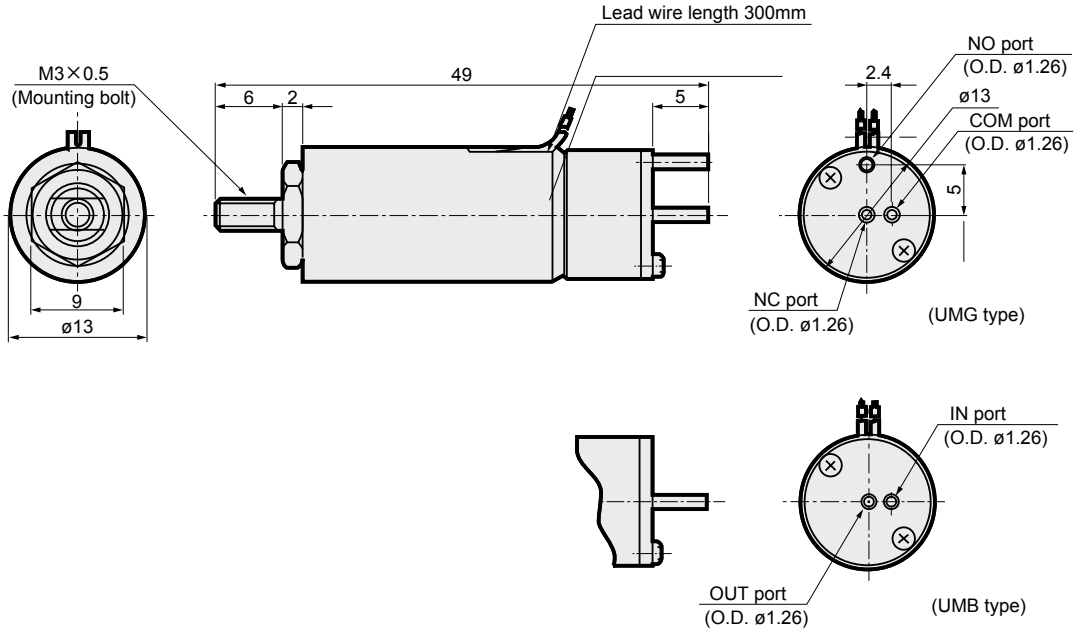


Cannot be disassembled

No.	Part name	Material		No.	Part name	Material	
1	Core A	SUS304 or equiv.	Stainless steel	8	Body	SUS304 or equiv.	Stainless steel
2	Hexagon nut	SWRM3	Steel	9	Spring	SUS304	Stainless steel
3	Bonnet	SUYB	Iron	10	O-ring	FKM	Fluoro rubber
4	Coil	—— (Wetted parts: PBT)	(Polybutylene terephthalate)	11	Cap	SUS304 or equiv.	Stainless steel
5	O-ring	FKM	Fluoro rubber	12	Connection pipe	SUS304	Stainless steel
6	Plunger	SUS304 or equiv., FKM	Stainless steel, fluoro rubber	13	Cross-recessed pan head machine screw	SUS304	Stainless steel
7	O-ring	FKM	Fluoro rubber	14	Lead wire	——	

Dimensions CAD

● UMB1-T1
● UMG1-T1



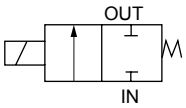
High corrosion resistant direct acting 2-port solenoid valve

HB Series

- NC (open when energized)
- Working fluid: Water/pure water/chemical liquids
- Port size: M5, Rc1/8, Rc1/4, Rc3/8

JIS symbol

● NC (open when energized)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	HB11/21/31/41
Working fluid	Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)
Proof pressure MPa	1.5 (≈220 psi, 15 bar) (HB11), 2 (≈290 psi, 20 bar) (HB21/31/41) (water pressure)
Working pressure MPa	0 to 0.7 (refer to the working pressure in the individual specifications.)
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)
Valve seat leakage cm^3/min	0 (water pressure), PTFE sealant: 300 or less (air)
Mounting orientation	Unrestricted
Treatment	Oil-prohibited
Electrical specifications	
Rated voltage	100 VAC(50/60 Hz), 200 VAC(50/60 Hz), 12 VDC, 24 VDC

*1 : The AC rated voltage will be converted to DC by the diode integrated into the coil.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Cv	Working pressure (MPa)	Ambient temperature (°C)	Power consumption (w)	Weight (kg)
HB11-M5-1	M5	1.0	0.03	0 to 0.7	-20 (-4°F) to 50 (122°F)	AC:4 DC:3	0.10
HB11-M5-2		1.5	0.06	0 to 0.3			
HB21-6-1	Rc1/8	1.6	0.09	0 to 0.7		4	0.16
HB21-6-2		2.3	0.18	0 to 0.3			
HB21-6-3		3.2	0.3	0 to 0.08			
HB31-6-3	Rc1/8	3.0	0.31	0 to 0.4	-20 (-4°F) to 60 (140°F)	11	0.52
HB31-8-3	Rc1/4						
HB41-8-5		4.0	0.48				0.69
HB41-10-5	Rc3/8						
HB41-8-7	Rc1/4	7.0	0.82	0 to 0.08			
HB41-10-7	Rc3/8						

How to order

HB11
HB21
HB31
HB41 - **6** - **3** - **L** - **5A** - **AC100V**

Model No.

Ⓐ Port size

Ⓑ Orifice size

Ⓒ Seal

Ⓓ Coil system

Ⓔ Rated voltage *2

Code	Description	Model No. HB11	HB21	HB31	HB41
Ⓐ Port size					
M5	M5	●			
6	Rc1/8		●	●	
8	Rc1/4			●	●
10	Rc3/8				●
Ⓑ Orifice size					
	HB11 / HB21 / HB31 / HB41				
1	ø1 / ø1.6 / - / -	●	●		
2	ø1.5 / ø2.3 / - / -	●	●		
3	- / ø3.2 / ø3 / -		●	●	
5	- / - / - / ø4				●
7	- / - / - / ø7				●
Ⓒ Seal					
L	NBR	●	●	●	●
M	FKM	●	●	●	●
N	PTFE		●	●	●
Ⓓ Coil system					
Blank	Compact	●	●		
5A	Open frame lead wire (diode integrated) for AC voltage			●	●
3A	Open frame lead wire for DC voltage			●	●
Ⓔ Rated voltage					
AC100V	100 VAC(50/60 Hz)	●	●	●	●
AC200V	200 VAC(50/60 Hz)	●	●	●	●
DC12V	12 VDC	●	●	●	●
DC24V	24 VDC	●	●	●	●

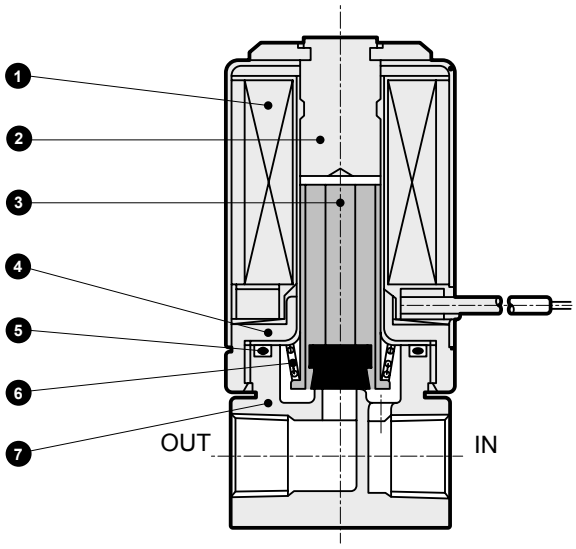
*1 : The combinations indicated with ● above are available.
*2 : 100 VAC or 200 VAC for 5A of Item Ⓓ and 12 VDC or 24 VDC for 3A.

[Example of model No.]
HB41-8-5-L-3A-DC24V
Model : HB41

Ⓐ Port size : Rc 1/4
Ⓑ Orifice size : ø4
Ⓒ Seal : NBR
Ⓓ Coil variation : Open frame lead wire
Ⓔ Rated voltage : 24 VDC

Internal structure and parts list

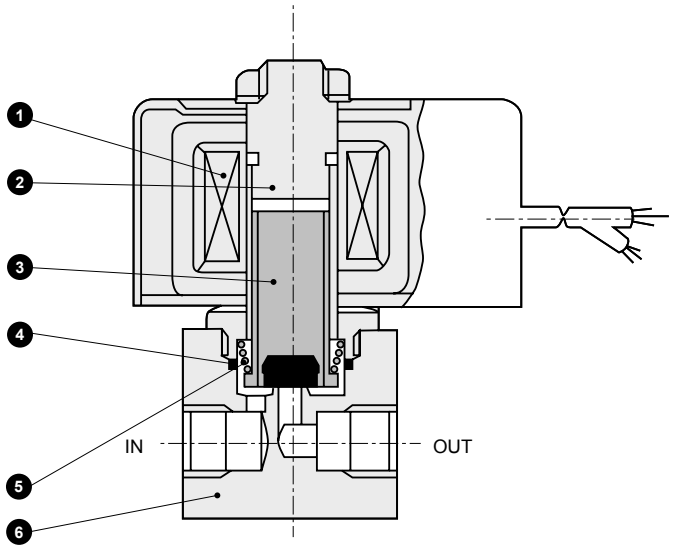
● HB11
● HB21



Cannot be disassembled

No.	Part name	Material	
1	Coil assembly	————	————
2	Core assembly	SUS316 or equiv.	Stainless steel
3	Plunger assembly	SUS316 or equivalent/NBR (FKM/PTFE)	Stainless steel, nitrile rubber (fluoro rubber/tetrafluoroethylene resin)
4	Core B	SUM22	Steel
5	O-ring	NBR (FKM/PTFE)	Nitrile rubber (fluoro rubber/tetrafluoroethylene resin)
6	Spring	SUS316	Stainless steel
7	Body	SUS316	Stainless steel

● HB31
● HB41

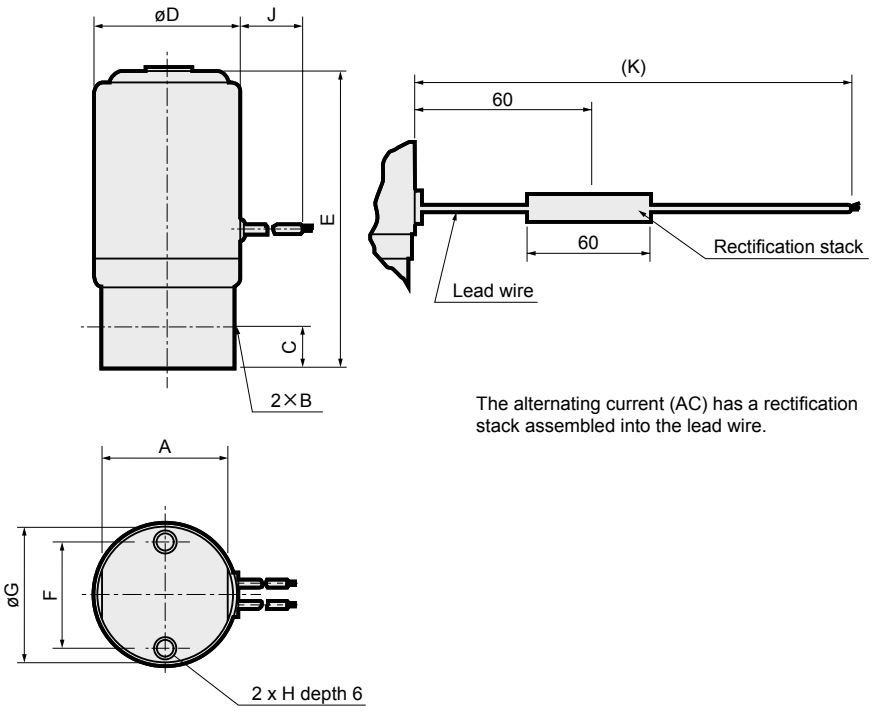


Cannot be disassembled

No.	Part name	Material	
1	Coil assembly	————	————
2	Core assembly	SUS316 or equiv.	Stainless steel
3	Plunger assembly	SUS316 or equivalent/NBR (FKM/PTFE)	Stainless steel, nitrile rubber (fluoro rubber/tetrafluoroethylene resin)
4	O-ring	NBR (FKM/PTFE)	Nitrile rubber (fluoro rubber/tetrafluoroethylene resin)
5	Spring	SUS316	Stainless steel
6	Body	SUS316	Stainless steel

Dimensions CAD

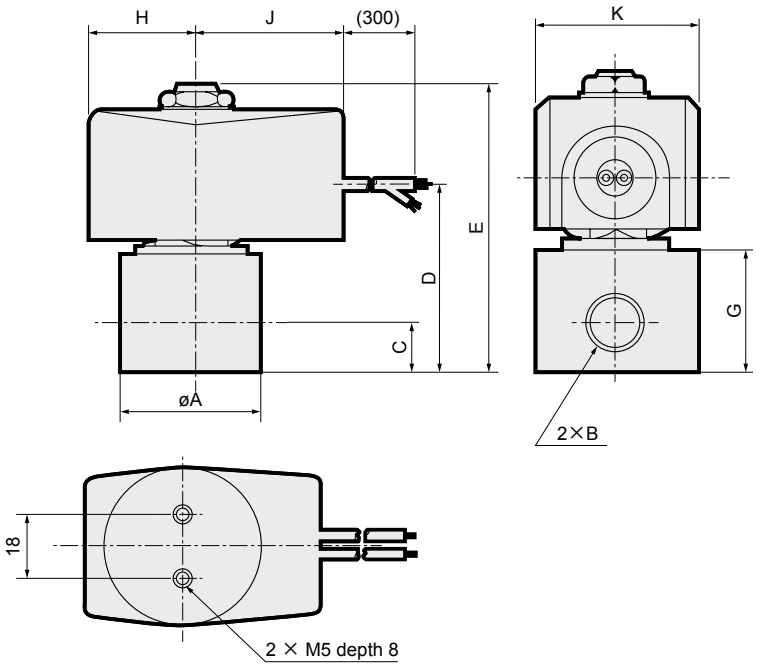
● HB11
● HB21



The alternating current (AC) has a rectification stack assembled into the lead wire.

Model No.	A	B	C	D	E	F	G	H	J	K
HB11	18	M5×0.8	5	20.4	47	15	20	M3×0.5	200	250
HB21	23	Rc1/8	8	25	55	18	25	M4×0.7	300	300

● HB31
● HB41



Model No.	A	B	C	D	E	G	H	J	K
HB31-$\frac{6}{8}$	37.5	RC1/8 RC1/4	11	50.5	75	31	24	38	38
HB41-8-5	37.5	Rc1/4	11	52	80.5	31	28	42	46
HB41-$^{8-7}_{10-5/7}$	45	RC1/4 RC3/8	12	55	83.5	34	28	42	46

Direct acting 2, 3-port valve
(pinch valve for high purity fluids)

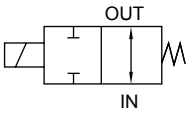
HYN Series

- NO (closed when energized), NC (open when energized), universal
- Working fluid: Water/pure water/chemical liquids
- Removable tube, compatible tube: ø3 x ø1, ø5 x ø3, ø8 x ø6

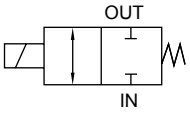
RoHS CAD

JIS symbol

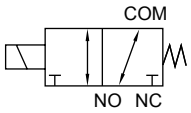
● 2-port valve
: NO (closed when energized)



● 2-port valve
: NC (open when energized)



● 3-port
: Universal



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	HYN-3		HYN-5		HYN-8	
	AC	DC	AC	DC	AC	DC
Working fluid	Water/pure water/chemical liquids (fluids that do not corrode wetted part materials)					
Working pressure MPa	0 to 0.05 (refer to the working pressure in the individual specifications.)					
Fluid temperature °C	5 (41°F) to 50 (122°F)					
Ambient temperature °C	0 (32°F) to 40 (104°F) (no freezing)					
Frequency Cycle/min.	60 or less					
Mounting orientation	Unrestricted (*1)					
Electrical specifications						
Rating	Continuous	Continuous	Intermittent (*2)	Continuous	Intermittent (*2)	Continuous
Rated voltage	100 V (50/60 Hz)	12 V 24 V	100 (50/60 Hz)	12 V 24 V	100 (50/60 Hz)	12 V 24 V
Voltage fluctuation range	±10%					
Leakage current mA	2 or less (*3)					

*1 : Avoid vertical mounting with the coil down to prevent fluid intrusion into the coil during abnormalities such as tube rupture.
*2 : When using intermittent rating, keep the max. continuous power ON time within 10 minutes and the DUTY ratio one half or less.
*3 : The leakage current from the control circuit must be equal to or less than the values shown in the table.
*4 : For tightening torque of the set screw, refer to the recommended tightening torque below.
Recommended tightening torque: HYN-3: 0.2 to 0.4 N·m, HYN-5, 8: 0.5 to 0.7 N·m
*5 : The performance may not be satisfied if a tube other than the recommended ones is used.
*6 : When starting and switching retention, noise is generated temporarily. Check the compatibility of the control circuit.
*7 : Solenoid valve has polarity. Connect the red lead wire to the plus (+) side.
*8 : After the solenoid valve is completely switched ON or OFF, set an interval of 0.5 seconds or more before switching it the next time.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Compatible tube (*1) (silicone tube)	Working pressure (MPa)	Power consumption 12/24 VDC (w)		Max. current 100 VAC (A)		Thermal class	Weight (kg)
			Starting (*2)	Holding	Starting (*2)	Holding		
HYN-3	ø3×ø1	0 to 0.05	15	4	0.26	0.06	Class 120 (E)	0.18
HYN-5	ø5×ø3		30	8	0.55	0.14	Class 130 (B)	0.36
HYN-8	ø8×ø6	0 to 0.02	30	8				0.37

*1 : Use the recommended tubes below.
*2 : Time from energizing to 200 ms.

Tube model No.	Tube size (O.D.) x (I.D.) x (length)
HYN-3-1-1000	ø3×ø1×1 m
HYN-3-1-5000	ø3×ø1×5 m
HYN-5-3-1000	ø5×ø3×1 m
HYN-5-3-5000	ø5×ø3×5 m
HYN-8-6-1000	ø8×ø6×1 m
HYN-8-6-5000	ø8×ø6×5 m

How to order

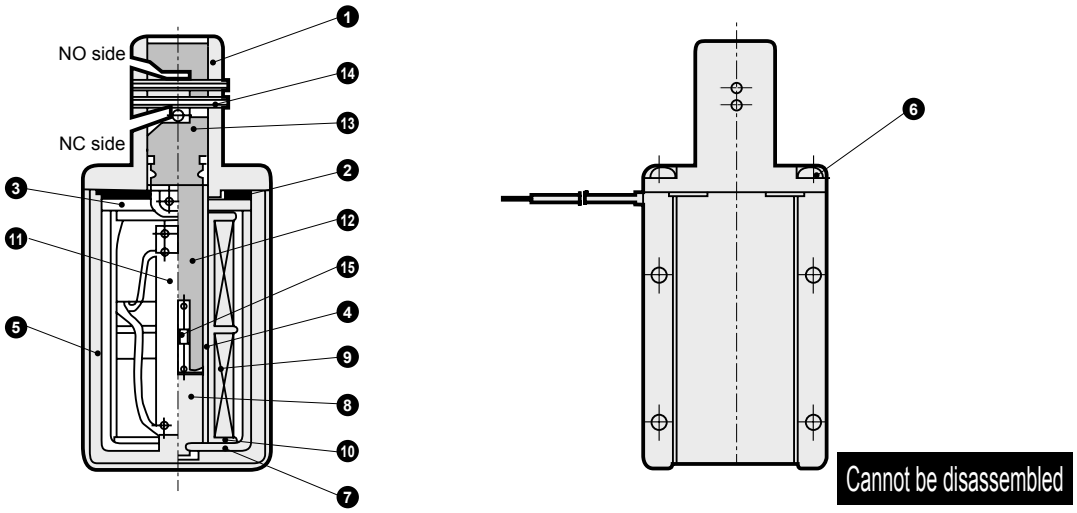
HYN – 3 – DC12V

- HYN: Model No.
- 3: Ⓐ Tube used
- DC12V: Ⓑ Rated voltage

Code	Description
Ⓐ Tube used	
3	ø3×ø1
5	ø5×ø3
8	ø8×ø6
Ⓑ Rated voltage	
AC100V	100 VAC(50/60 Hz)
DC12V	12 VDC
DC24V	24 VDC

Internal structure and parts list

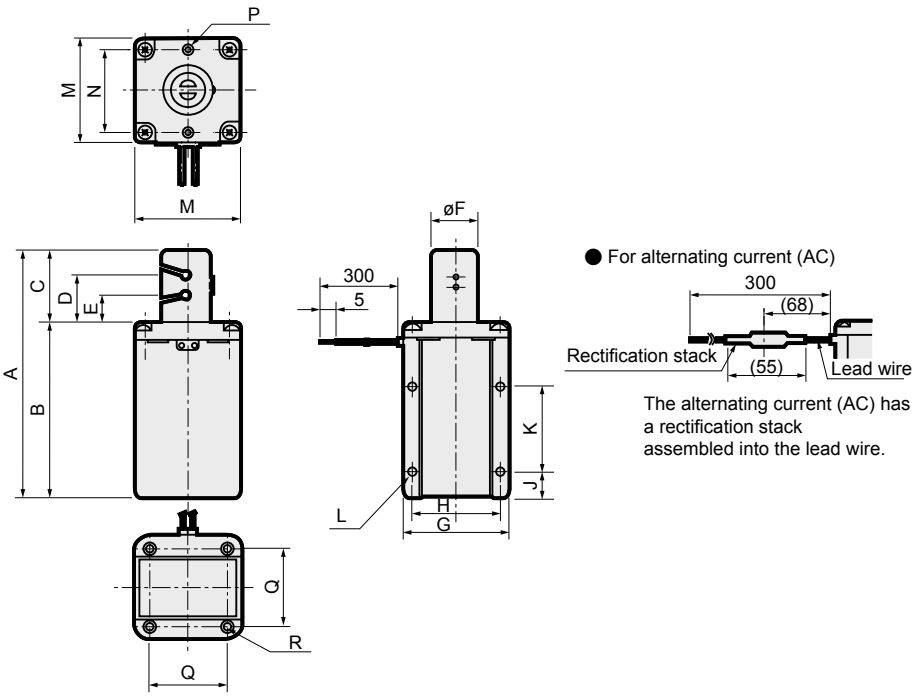
● HYN



No.	Part name	Material		No.	Part name	Material	
1	Valve A	POM	Acetal resin	9	Coil	-	-
2	Packing	NBR	Nitrile rubber	10	Bobbin	PET	Polyethylene
3	Frame B	SPC	Steel	11	Wiring section assembly	-	-
4	Plunger guide	C2700	Copper	12	Plunger	SUS405	Stainless steel
5	Cover	PA	Polyamide	13	Valve B	POM	Polyacetal resin
6	Tapping screw	SUS304	Stainless steel	14	Spring pin	SUS420	Stainless steel
7	Frame A	SPC	Steel	15	Return spring	SUS304	Stainless steel
8	Stopper	SUS405	Stainless steel				

Dimensions CAD

● HYN



● For alternating current (AC)

The alternating current (AC) has a rectification stack assembled into the lead wire.

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
HYN-3	81.5	57.5	24	17	10	16	34	28	9	28	4 x M3 depth 7	34	28	2 x M3 depth 5	-	-
HYN-5	98	65	33	23	13	25	43	36.5	11	36.5	4 x M4 depth 7	43	-	-	36.5	4 x M4 depth 7
HYN-8	103	65	38	27	14	30	43	36.5	11	36.5	4 x M4 depth 7	43	-	-	36.5	4 x M4 depth 7

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

Components for Life Science

Design/selection

⚠WARNING

1 Ambient environment

Take appropriate safeguards when using this product in places where it may be exposed to water drops.

2 Do not disassemble the product.

Once disassembled, the product may not satisfy the required performance any longer even if reassembled.

⚠CAUTION

(1) Check the compatibility of product component materials and working fluids. Also, do not allow fluid to come into contact with the product body.
(2) Do not use for strong acids such as hydrochloric acid, hydrofluoric acid or nitric acid.
(3) Do not use for sodium hypochlorite (soda). (Compatible models only)
(4) Carefully select the solenoid valve, taking the chemical liquid characteristics into consideration. (Presence of crystal deposits when chemical liquids dry, effect on solenoid valve component materials if chemical liquids evaporate, etc.)
(5) When using these components for a chemical liquid having a low boiling point, such as hexane, the chemical liquid in the solenoid valve could evaporate due to heating of the coils, and cause bubbles, etc., in the solenoid valve and pipe. Use an AMD type air operated valve for chemical liquids if formation of bubbles, etc., poses a problem.
(6) When using the solenoid valve with negative pressure, such as for dispensing control, air may be drawn into the solenoid valve depending on the type of chemical liquid, type of connection fitting, and type of tube, etc. Check carefully before starting use.
(7) Use a smoothed power source with sufficient margin against power consumption for the power supply.

■ Working pressure and proof pressure

Working pressure and proof pressure are as listed below. Carefully select the model with full understanding.
Working pressure: Pressure at which the valve opens and closes normally.
Proof pressure: Pressure which the valve withstands without any decrease in its functions or performance.
The catalog specifications are satisfied, even when pressure exceeding the working pressure is temporarily applied, upon return to the working pressure.

Mounting, piping and wiring

⚠WARNING

1 Always flush the piping before installing the solenoid valve.

Debris or foreign matter in the fluid may prevent the solenoid valve from functioning correctly.
When there is contamination, install a filter on the primary side of the solenoid valve according to the circuit used.

2 For products that have an arrow displayed, ensure that the piping is performed so that the flow of the fluid is consistent with the direction of the arrow.

⚠CAUTION

1 Refer to the table below for the piping tightening torque.

Note that if the solenoid valve body is made of resin, a PP or fluororesin fitting must be used. The port could be damaged if a metal fitting is used.

[Stainless steel solenoid valve]

Piping nominal diameter	Recommended tightening torque [N·m]
M5	2.1 to 3
Rc1/8	18 to 20
Rc1/4	23 to 25
Rc3/8	31 to 33

[PPS/PEEK solenoid valve]

Piping nominal diameter	Recommended tightening torque [N·m]
M5, M6 1/4-28UNF	0.10 to 0.15
Rc1/8	0.5 to 0.8
Rc1/4	1.0 to 1.5
Rc3/8	1.0 to 1.5

[Fluorine resin solenoid valve]

Piping nominal diameter	Recommended tightening torque [N·m]
M6	0.05 to 0.08
Rc1/4	0.7 to 1.0
Rc3/8, R3/8	1.0 to 1.5
Rc1/2, R1/2	1.5 to 2.0
R3/4	2.0 to 2.5

2 When using vertical piping on the secondary side, keep it within 2 m in height. Use tubing or piping with the same or larger bore size as the orifice size to fix the pipe.

3 Do not hold the lead wire while handling.
Also, do not pull the lead wires.

[Precautions for each model]

MR10R/MR16 Safety precautions

⚠CAUTION

(1) Check the compatibility of product component materials and working fluids.
(2) Do not use for hydrochloric acid, hydrofluoric acid or nitric acid. Contact CKD when the effective chlorine concentration of sodium hypochlorite (soda) is more than 0.1%. For 0.1% or less effective chlorine concentration, perform functional testing according to your application before use.
(3) Foreign matter, etc., inside the piping may cause malfunction and valve seat leakage. Make sure to flush the piping.
(4) When using vertical piping on the secondary side, keep it within 2 m in height. Use tubing or piping with the same or larger bore size as the orifice size to fix the pipe.
(5) Do not disassemble.
Once disassembled, the product may not satisfy the required performance any longer even if reassembled.

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Precautions for each model series and for individual products

MKB3 Safety precautions

CAUTION

(1) Slide the product in the piping direction by pulling the lever to remove from the mounting plate.

(2) Do not use metal fittings because they could damage the port. Use a PP or fluorine resin fitting.
When tightening the fitting, use the recommended tightening torque in the torque table.

(3) Do not disassemble the product.

(4) Foreign matter, etc., inside the piping may cause malfunction and valve seat leakage. Always flush the piping before installing the valve.

(5) When using vertical piping on the secondary side, keep it within 2 m in height. Use tubing or piping with the same or larger bore size as the orifice size to fix the pipe.

(6) Do not hold the lead wire while handling.

[Precautions for each model]

MAB1/MAG1 Safety precautions

CAUTION

(1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks. Always flush the piping before installing the valve.

(2) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquids.

(3) Consult with CKD if the secondary piping is laid at a high level or extremely restricted.

(4) Do not disassemble the product.
Once disassembled, the product may not satisfy the required performance any longer even if reassembled.

MYB$^{1}_{3}$/MYG$^{1}_{3}$/MEB2/MEG2 Safety precautions

CAUTION

(1) Check the compatibility of product component materials and working fluids. Do not allow fluid to come into contact with the product body.

(2) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks.
Always flush the piping before installing the valve.

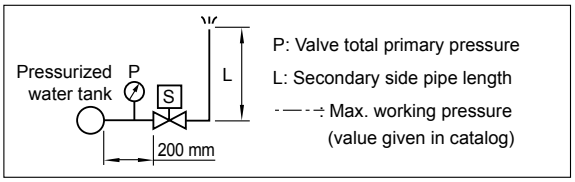
(3) Do not use metal fittings because they could damage the port. Use a PP or fluorine resin fitting.
When tightening the fitting, use the recommended tightening torque in the torque table.

(4) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda) or solvents, use an AMD type air operated valve for chemical liquids.

(5) Leakage current from the control circuit must be less than that specified for each voltage.

(6) Contact CKD if the secondary piping is vertical and long (2 m or higher) or extremely restricted.

(7) Do not disassemble the product.
Once disassembled, the product may not satisfy the required performance any longer even if reassembled.



MJB3 Safety precautions

⚠ CAUTION

(1) Check the compatibility of product component materials and working fluids.
(2) Foreign matter, etc., inside the piping may cause malfunction and valve seat leakage. Always flush the piping before installing the valve.
(3) Do not use for hydrochloric acid, hydrofluoric acid or nitric acid. Contact CKD when the effective chlorine concentration of sodium hypochlorite (soda) is more than 0.1%. For 0.1% or less effective chlorine concentration, perform functional testing according to your application before use.
(4) Do not apply excessive force on the fitting when connecting or disconnecting the tube.
(5) Recommended tube
Material: silicone rubber, size: I.D. x O.D. = ø5 x ø11
(6) Do not disassemble the product.
Once disassembled, the product may not satisfy the required performance any longer even if reassembled.

EMB21 Safety precautions

⚠ CAUTION

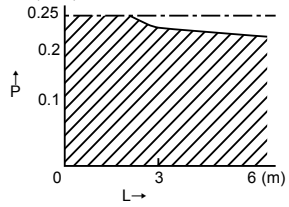
(1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks.
Always flush the piping before installing the valve.
(2) Consult with CKD if the secondary piping is laid at a high level.
(3) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda), use an AMD type air operated valve for chemical liquids.
(4) Do not disassemble the product.
Once disassembled, the product may not satisfy the required performance any longer even if reassembled.

EMB41/EMB51 Safety precautions

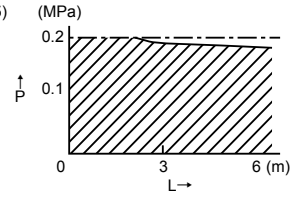
⚠ CAUTION

(1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks. Always flush the piping before installing the valve.
(2) Use VCTF-0.75 vinyl cable for equipment (JISC3306) for the lead-out wires (2-conductor: O.D. 6.6).
(3) Consult with CKD if the secondary piping is laid at a high level.
(4) When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda) or solvents, use an AMD type air operated valve for chemical liquids.
(5) In particular, the working pressure changes according to the OUT side piping conditions, so refer to the characteristics in the graph at right before use (note that the fluid is water).

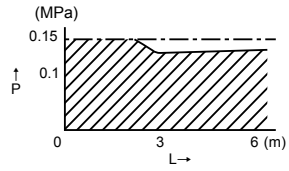
(EMB41-10-3) (MPa)



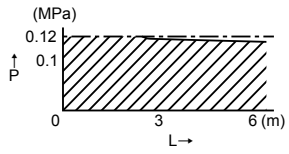
(EMB41-$^{10}_{10U}$-5) (MPa)



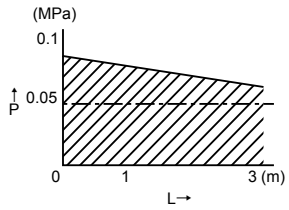
(EMB51-10-3) (MPa)



(EMB51-15-4) (MPa)



(EMB51-15-5) (MPa)



Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

[Precautions for each model]

HMTB/HMTG Safety precautions

⚠ CAUTION

(1)Use direct current (excluding rectified alternating current).

(2)Do not apply excessive force on the fitting when connecting or disconnecting the tube.

(3)Do not disassemble the product.
Once disassembled, the product may not satisfy the required performance any longer even if reassembled.

(4)Do not use for hydrochloric acid, hydrofluoric acid or nitric acid.
When using sodium hypochlorite (soda), select FKM for the sealant material.
(EPDM will deteriorate over long-term use even with tap water levels of residual chlorine)
Contact CKD when the effective chlorine concentration of sodium hypochlorite (soda) is more than 0.1%.
For 0.1% or less effective chlorine concentration, perform functional testing according to your application before use.

UMB/UMG Safety precautions

⚠ CAUTION

(1)Do not disassemble the product.
Once disassembled, the product may not satisfy the required performance any longer even if reassembled.

(2)Do not apply torque exceeding 0.3 N·m on the mounting bolt (M3).

(3)Protect the product against contact with water. Water could cause insulation or operation faults.

(4)When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda) or solvents, use an AMD type air operated valve for chemical liquids.

HB Safety precautions

⚠ CAUTION

(1)Foreign matter, etc., inside the piping may cause malfunction and valve seat leakage. Always flush the piping before installing the valve.

(2)Do not disassemble the product.
Once disassembled, the product may not satisfy the required performance any longer even if reassembled.

(3)When using strong acids, such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda) or solvents, use an AMD type air operated valve for chemical liquids.

HYN Safety precautions

⚠ CAUTION

(1)The power supply voltage must be 24 VDC (average) with a ripple of 4.8 VP-P or less. (When using an average of 12 VDC, the ripple must be 2.4 VP-P or less.)

(2)When using a DC-specification product with a full wave rectified AC power supply, the power must be smoothed to attain the aforementioned ripple voltage range. Contact CKD for details.

(2)Securely insert the tube to the prescribed position.

(3)Depending on the working fluid, the silicone tube may not be resistant to chemical liquids, or chemical liquids may adhere to it. Check this before use.

(4)Do not expose the coil to water.

(5)If a silicone tube is left attached for a long time, it could stick and prevent the tube from opening. If the tube sticks, replace the tube or un-stick the tube by applying pressure or by hand.

(6)Do not apply higher pressure than the working pressure. Otherwise the tube may dislocate.

Gas combustion systems

Direct acting valve for gas, combination valve

Overview

Enables safer and more optimized gas utilization system.

Features

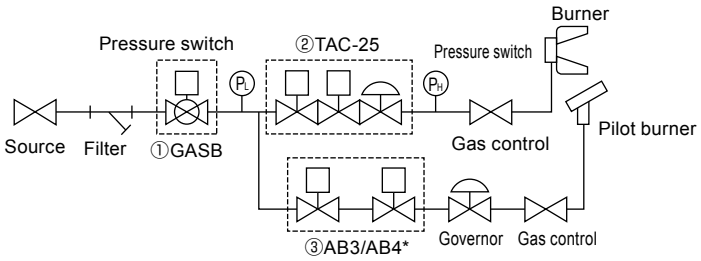
Wide variation
Made in Japan
High performance/long service life
V Series is ideal for the heavy-use and high durability requirements of industrial furnaces.

CONTENTS

⚠ Always read the precautions in the Introduction and on page 1032 before use.

In pursuit of system safety from every angle, CKD offers the components required for gas combustion systems.

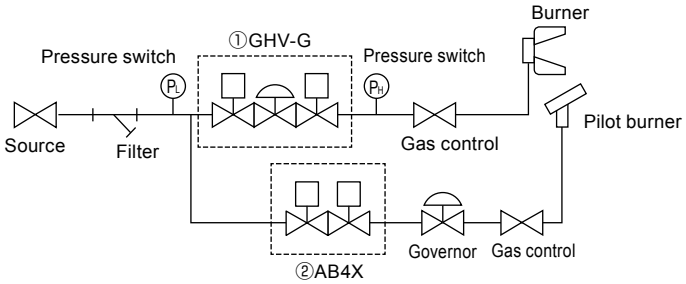
Example of system circuit



* Contact CKD for details on using LP gas.

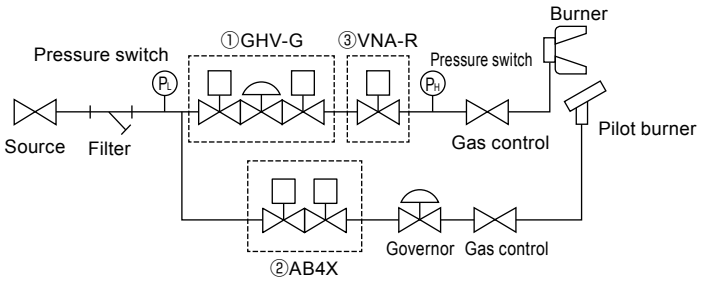
Medium pressure circuit

(1) GASB
(2) TAC-25
(3) AB3
AB4



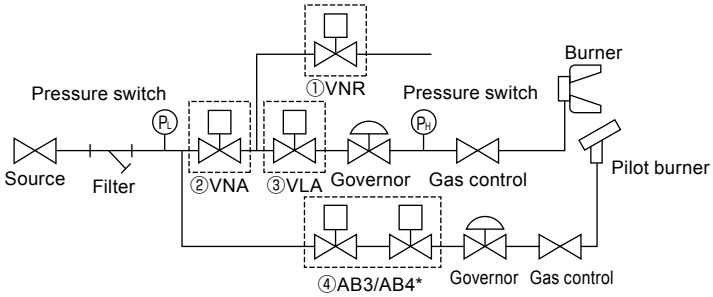
Intermediate pressure circuit (combination valve used)

(1) GHV-G
(2) AB4X



Intermediate pressure circuit
(combination valve used: Hi-Lo-Off control)

(1) GHV-G
(2) AB4X
(3) VNA-R



* Contact CKD for details on using LP gas.

Intermediate pressure circuit (conventional circuit)

(1) VNR
(2) VNA
(3) VLA
(4) AB3
AB4

Select an appropriate model for your application

Solenoid valve

- With flow rate controller.
- A strainer is incorporated.
  Option (with pressure detection port.)
- Slow opening operation is possible.
- Ideal for natural gas conversion.
- With terminal box.
- Built-in rectifier so noise does not occur.

Medium pressure gas safety shutoff control system

- Combined product of solenoid valve and governor that supports medium pressure of 0.1 to 0.3 MPa.
- Shut off valve using solenoid valve structure is adopted.

Selection guide

Series name		Working pressure			Opening operation		Port size													Page
		Low pressure	Intermediate pressure	Medium pressure	Quick	Slow	8A	15A	20A	25A	32A	40A	50A	65A	80A	100A	125A	150A	200A	250A	
							1/4	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	
Gas combination valve	**GHV**	○	○		○	○				◎	◎	◎	◎								**980**
	GAV	○			○				◎	◎	◎	◎									**984**
Solenoid valve	**DSG**	○			○			◎	◎	◎											**986**
	DSG-W	○			○				◎	◎											**990**
	VNA	○	○		○			◎	◎	◎	◎	◎	◎	◎							**992**
	VLA	○	○			○		◎	◎	◎	◎	◎	◎	◎							**998**
	VNA-R/RH	○	○	○	○				◎	◎	◎	◎									**1002**
	VNR	○	○		○			◎	◎	◎	◎	◎									**1006**
Medium pressure gas safety shutoff control system	**TAC-25**			○	○	○				IN side ●		OUT side ●									**1008**
	VNM	○	○	○	○					●											**1012**
	VLM	○	○	○		○				●											**1014**
	C25N-B			○						IN side ●		OUT side ●									**1016**
Safety shut off valve	**VNM-25-K**	○	○	○	○					●											**1018**
Motorized valve	**HK1**	○	○	○		○						◉	◉	◉	●	▲	▲	▲	▲		**1020**
	HS	○	○	○		○							●		●						**1024**
Ball valve	**GASB**	○	○	○		○							●		●	●					**1028**

Port size column: ◎: Rp ●: JIS flange ▲: DIN flange ◉: Rp and JIS flange ◬: Rp and DIN flange

Motorized valve

- There is no contamination in the oil and no oil leakage.
- With flow rate controller.
- With pressure detection port.

Ball valve

- Enables unmanned operation of valve open/close by remote control.
- Gas can be cut off reliably during power failures by a fail-safe mechanism.
- With valve operation confirmation switch and display needle (visual inspection).

Intermediate pressure gas combination valve

GHV Series

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: Rp1, Rp1¹/₄, Rp1¹/₂, Rp2

RoHS

Features

■ Integrated structure/space-saving
Compactly integrated two solenoid valves with governor function
Interface 1/3 (50A, compared to CKD conventional products)
Supports JIS B 8415 double shut off with a single unit, realizing space saving of equipment/systems.

■ Wiring and piping work-hour reduction (solenoid valve is simultaneous energizing)
By integrating double shut off, wiring and piping hours can be reduced by one machine worth.

■ Up to intermediate pressure (up to 50 kPa) allowed

■ Selectable variations
- Solenoid valve with built-in governor + solenoid valve
- Solenoid valve + solenoid valve
- Solenoid valve + solenoid valve (slow open)

■ Option
With closing confirmation switch (Mounted to secondary side solenoid valve)

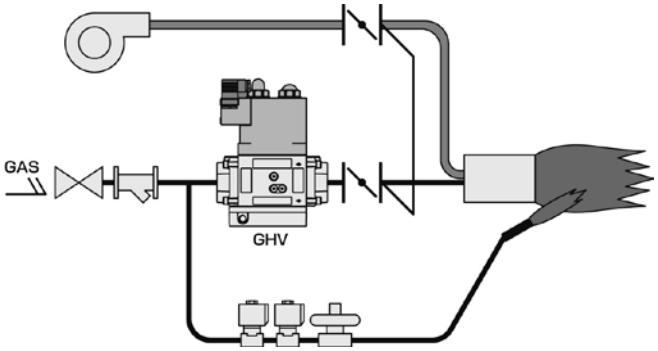
■ Port size change is easy
Port size can be changed by replacing the flange from 25A to 50A

■ ISO23551-1, ISO23551-2 compliant

Main applications

- Gas boilers
- Industrial furnaces
- Gas absorption water coolers/heaters
- Drying furnaces

System example



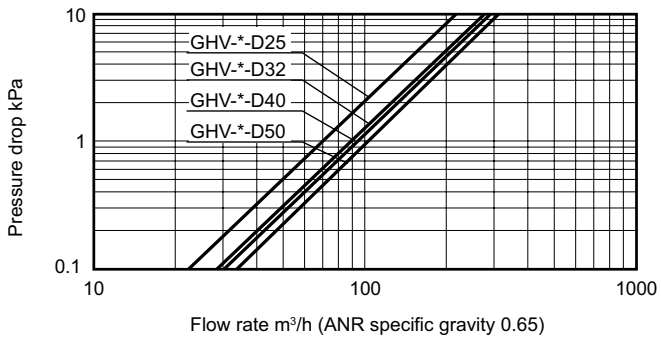
Specifications

1 MPa = 10 bar

Item		GHV-G				GHV-N				GHV-L			
		-D25	-D32	-D40	-D50	-D25	-D32	-D40	-D50	-D25	-D32	-D40	-D50
Working fluid		City gas/natural gas/LPG											
Working pressure	kPa	0 (≈0 psi, 0 bar) to 50 (≈7.2 psi, 0.5 bar)											
Secondary pressure	kPa	0.4 (≈0.06 psi) to 2.0 (≈0.29 psi)				-							
Flow rate Specific gravity of natural gas 0.65 ΔP = 0.25 kPa	m³/h(ANR)	35	43.7	47.5	51	35	43.7	47.5	51	35	43.7	47.5	51
Rated voltage	V	100 AC +10% -15% 200 AC +10% -15%											
Frequency	Hz	Common in 50 and 60											
Power consumption (apparent power)	VA	80											
Ambient temperature	°C	-15 (5°F) to 70 (158°F) (no freezing) (*1)								-15 (5°F) to 60 (140°F) (no freezing)			
Closing time	s	1.0 or less											
Frequency	Cycle/min.	10 or less								1 or less			
Mounting orientation		Range of vertical direction with the coil on top to horizontal direction with the coil horizontal. (vertical piping installation available)											
Connection		Screw-in (Rp)											
Port size		1	1¹/₄	1¹/₂	2	1	1¹/₄	1¹/₂	2	1	1¹/₄	1¹/₂	2
Weight	kg	6.1				5.5				5.8			
Proof pressure	kPa	75 (≈11 psi, 0.75 bar)											
Opening time	s	-				1 or less				Approx. 10			
Start gas adjustment	%	-								0 to 70			
Re-energizing intermission time	s	-								5 or more			
Degree of protection		IP54											

*1 : When type with closing confirmation switch is selected, -15 to 60 (no freezing)

Flow characteristics

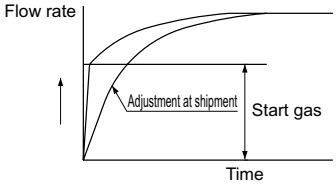


Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane
Specific gravity (air = 1)	0.65	0.54	1.6	2.0
Coefficient	1.0	1.09	0.63	0.57

Opening characteristics (GHV-L)



How to order

GHV - **G** - **D40** - **E** - **AC100V**

- GHV: Model No.
- G: Ⓐ Variation
- D40: Ⓑ Port size
- E: Ⓒ Option
- AC100V: Ⓓ Voltage

Code	Description
Ⓐ Variation	
G	Solenoid valve with built-in governor + solenoid valve
N	Solenoid valve + solenoid valve
L	Solenoid valve + solenoid valve (slow open)
Ⓑ Port size	
D00	Without flange
D25	Rp1
D32	Rp1 1/4
D40	Rp1 1/2
D50	Rp2
Ⓒ Option	
Blank	None
E	With closing confirmation switch
Ⓓ Voltage	
AC100V	100 VAC 50 Hz/60 Hz
AC200V	200 VAC 50 Hz/60 Hz

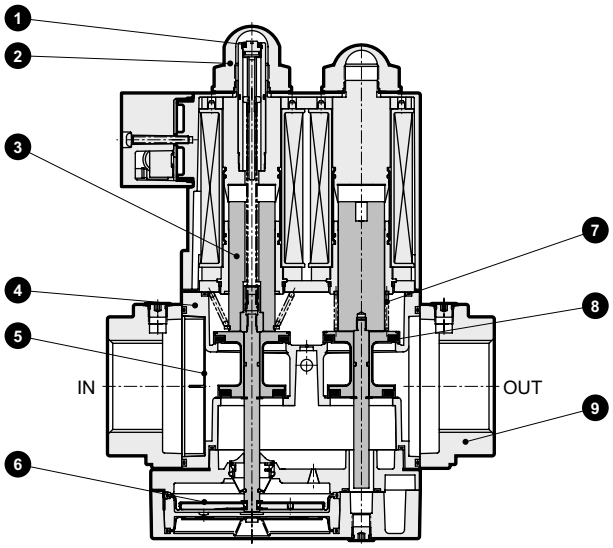
● Flange set

GHV - **FLANGE** - **D40**

- GHV: Model No.
- D40: Ⓐ Port size

Code	Description
Ⓐ Port size	
D25	Rp1
D32	Rp1 1/4
D40	Rp1 1/2
D50	Rp2

Internal structure and parts list



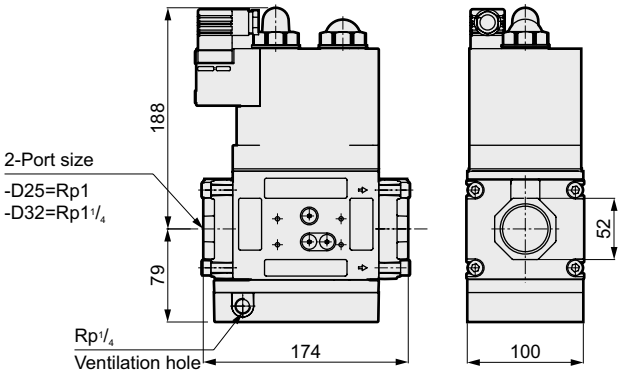
Cannot be disassembled

No.	Part name	Material
1	Pressure adjustment screw	Stainless steel
2	Governor cap	Resin
3	Plunger	Steel
4	Body	Aluminum die-casting
5	Strainer	Resin
6	Diaphragm	Nitrile rubber
7	Spring	Stainless steel, spring steel
8	Valve	Nitrile rubber/aluminum die-casting
9	Flange	Aluminum die-casting

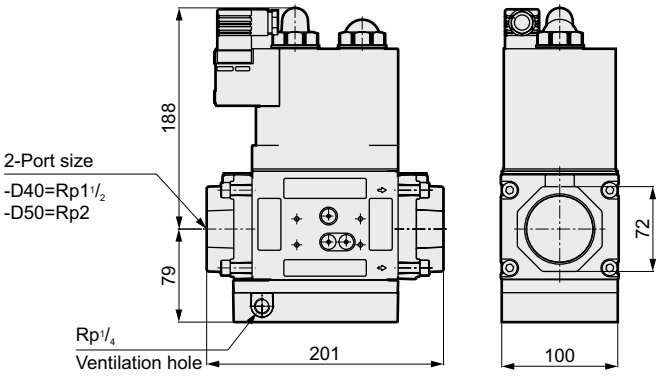
Dimensions

● Solenoid valve with built-in governor + solenoid valve

● GHV-G-D25/D32

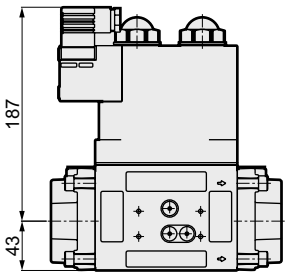


● GHV-G-D40/D50



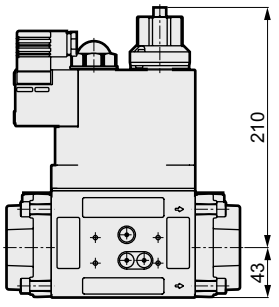
● Solenoid valve + solenoid valve

● GHV-N-D25 to D50



● Solenoid valve + solenoid valve (Slow open)

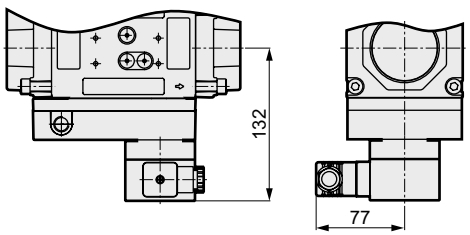
● GHV-L-D25 to D50



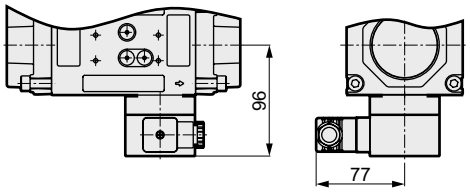
Optional dimensions

● Closing confirmation switch

● GHV-G-D25 to D50-E

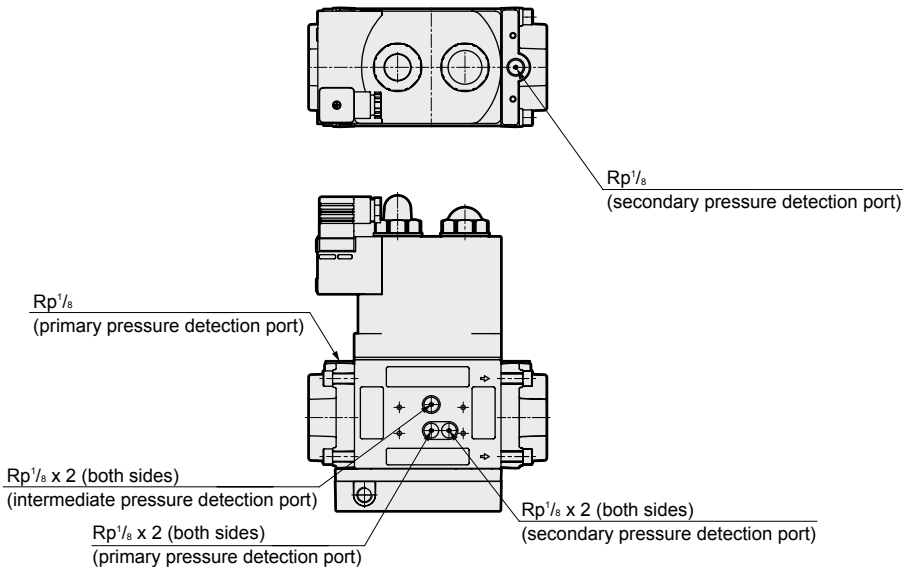


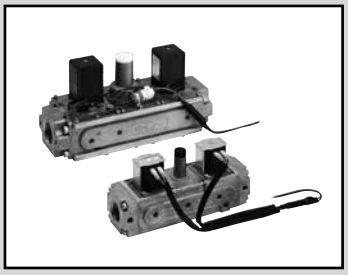
● GHV-$^{N}_{L}$-D25 to D50-E



CKD

Pressure detection port layout drawing





Compact/space saving type that aggregates multiple functions

Low pressure gas combination valve GAV Series

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: Rp3/4, Rp1, Rp1 1/4, Rp1 1/2

Features

- Double solenoid valve and governor integrated
  Improved safety and reliability due to double shut off with a combination of solenoid valves and governor.
- Reduction of piping work-hours
  Significant reduction in piping work-hours is realized compared to the conventional combination of discrete solenoid valve and governor.

Main applications

- Gas boilers
- Industrial furnaces
- Gas absorption water coolers/heaters
- Drying furnaces
- Others

Specifications

Item	GAV-20-A	GAV-25-A	GAV-32-A	GAV-40-A
Working fluid	City gas/natural gas/LPG			
Working pressure kPa	0 (≈0 psi, 0 bar) to 5 (≈0.7 psi, 0.05 bar)			
Secondary pressure kPa	0.5 (≈0.08 psi, 0.005 bar) to 1.5 (≈0.21 psi, 0.015 bar)			
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa) m^3/h(ANR)	10.0		28.0	
Rated voltage V	100 AC +10% -15%		200 AC +10% -15%	
Frequency Hz	Common to 50 and 60			
Power consumption (apparent power) VA	10×2		27×2	
Ambient temperature °C	-20 (-4°F) to +60 (140°F) (no freezing)			
Opening time s	0.5 or less			
Closing time s	1.0 or less			
Frequency Cycle/min.	30 or less			
Mounting orientation	Vertical direction with the coil up or horizontal direction with the coil horizontal			
Connection	Screw-in (Rp)			
Port size	3/4	1	1 1/4	1 1/2
Weight kg	2.4		5.4	
Proof pressure kPa	10 (≈1.4 psi, 0.1 bar)			
Combination	V+G+V		V+G+V	

* Flow rate is the maximum flow rate value. * V: Solenoid valve
G: Governor

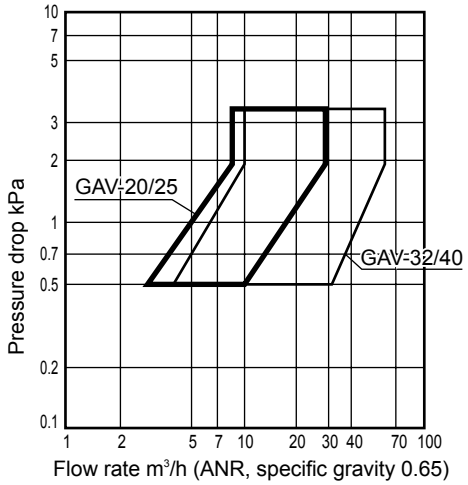
How to order

GAV - 20 - A - AC100V

- GAV: Model No.
- 20: Ⓐ Port size
- A: Ⓑ Governor layout position
- AC100V: Ⓒ Voltage

Code	Description
Ⓐ Port size	
20	Rp3/4
25	Rp1
32	Rp1 1/4
40	Rp1 1/2
Ⓑ Governor layout position	
A	Soln valve + govn + soln valve
Ⓒ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

Flow characteristics (flow rate control range)

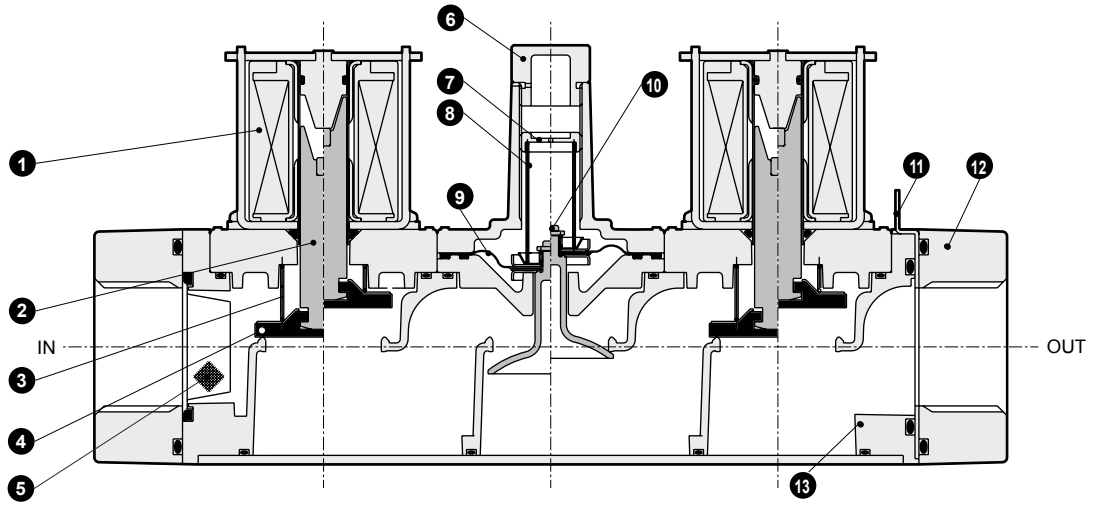


Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

Internal structure and parts list

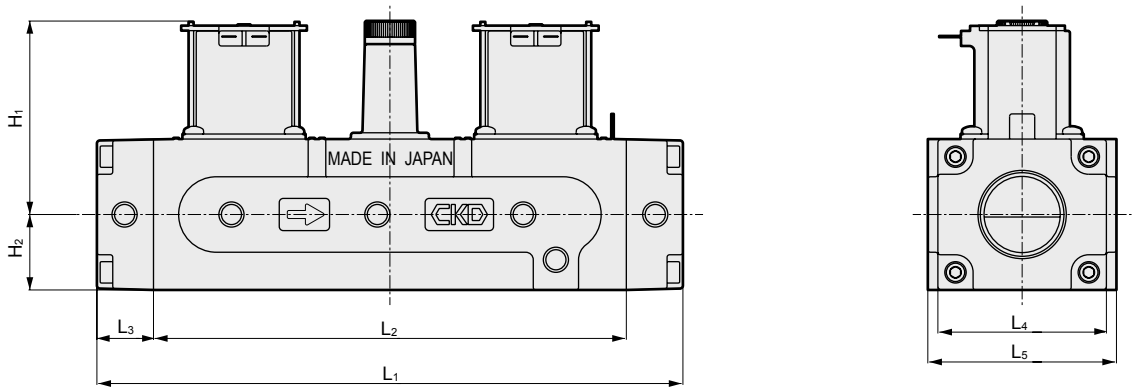


Cannot be disassembled

No.	Part name	Material	No.	Part name	Material
1	Coil winding	Polyester copper wire	8	Pressure adjustment spring	Stainless steel wire
2	Plunger	Steel	9	Diaphragm	Nitrile rubber
3	Spring	Stainless steel wire	10	Governor valving element	Resin
4	Valve disc	Nitrile rubber	11	Orifice plate	Copper alloy plate
5	Strainer	Stainless steel	12	Flange	Aluminum die-casting
6	Cap	Resin	13	Body	Aluminum die-casting
7	Pressure adjustment screw	Resin			

Dimensions

● GAV-20 to 40



Code / Model No.	Port size	H1	H2	L1	L2	L3	L4	L5
GAV-20-A	3/4	77	30	233	188	22.5	67	75
GAV-25-A	1	77	30	233	188	22.5	67	75
GAV-32-A	1¼	124	40	316	262	27	104	120
GAV-40-A	1½	124	40	316	262	27	104	120

Equivalent to "DIN3394" group B For double shut off compliant with low pressure (5 kPa) specifications

Gas shut off valve (quick open) DSG Series

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: Rp1/2, Rp3/4, Rp1

RoHS CAD

Features

- Japan Gas Appliances Inspection Association (JIA) certified product (relevant model No.: DSG-15-AC100V, AC200V, DSG-20-AC100V, AC200V, DSG-25-AC100V, AC200V. * Option products are not compliant.)
- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.
- Built-in strainer for a structure that stops foreign matter such as dust in front of the valve during piping.
- Equipped with JIS standard conduit thread, making electrical wiring easy.

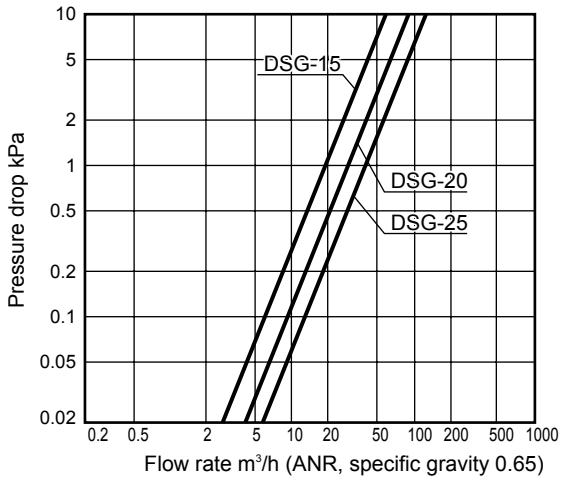
Main applications

- Gas boilers
- Industrial furnaces
- Gas absorption water coolers/heaters
- Drying furnaces
- Others

Specifications

Item		DSG-15	DSG-20	DSG-25
Working fluid		City gas/natural gas/LPG		
Working pressure	kPa	0 (≈0 psi, 0 bar) to 5 (≈0.7 psi, 0.05 bar)		
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa)	m^3/h(ANR)	9.8	15.0	20.0
Cv		6.6	10.1	13.4
Rated voltage	V	100 AC $^{+10\%}_{-15\%}$ 200 AC $^{+10\%}_{-15\%}$		
Frequency	Hz	Common to 50 and 60		
Power consumption (apparent power)	VA	16		
Ambient temperature	°C	-20 (-4°F) to +60 (140°F) (no freezing)		
Opening time	s	0.5 or less		
Closing time	s	1.0 or less		
Frequency	Cycle/min.	30 or less		
Mounting orientation		Vertical direction with the coil up or horizontal direction with the coil horizontal		
Connection		Screw-in (Rp)		
Port size		1/2	3/4	1
Weight	kg	1.0	1.2	1.2
Proof pressure	MPa	0.1 (≈15 psi, 1 bar)		
Degree of protection		IP51 equivalent (IP21 equivalent with HP terminal box)		

Flow characteristics



Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

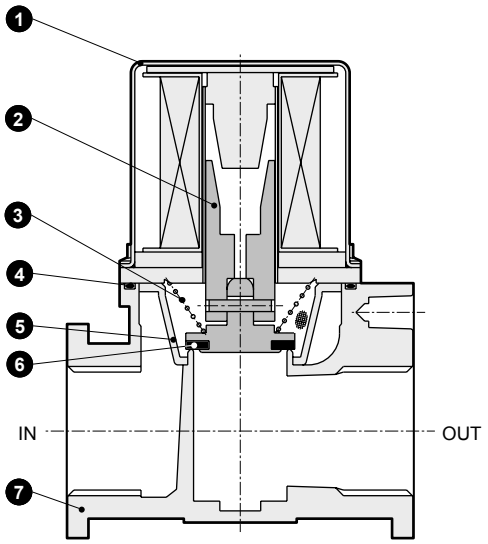
How to order

DSG - **15** - **Y** - **AC100V**

Model No. Ⓐ Port size Ⓑ Option Ⓒ Voltage

Code	Description
Ⓐ Port size	
15	Rp1/2
20	Rp3/4
25	Rp1
Ⓑ Option	
Blank	Standard
Y	With flow rate adjustment
3M	HP terminal box (G1/2)
P	With pressure detection port
Ⓒ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 HZ

Internal structure and parts list

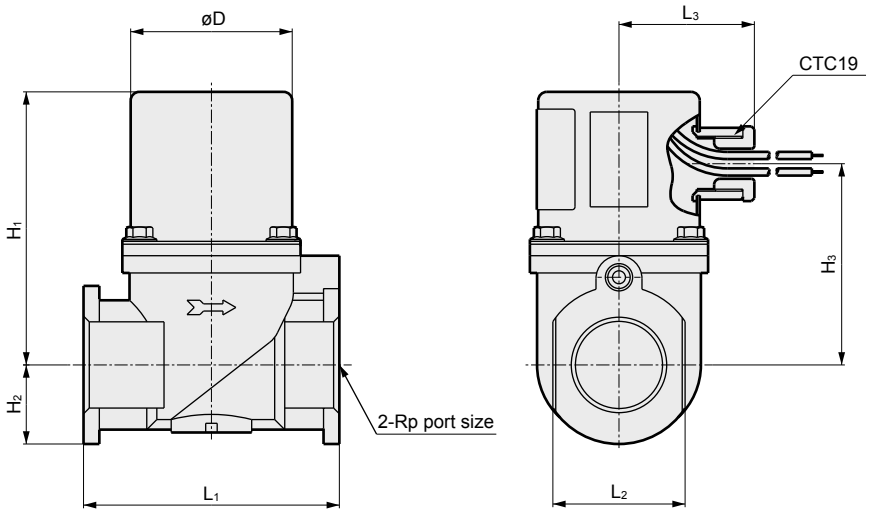


Cannot be disassembled

No.	Part name	Material
1	Bonnet	Steel
2	Plunger	Stainless steel
3	Spring	Stainless steel wire
4	O-ring	Nitrile rubber
5	Strainer	Resin
6	Valve disc	Nitrile rubber
7	Body	Aluminum die-casting

Dimensions CAD

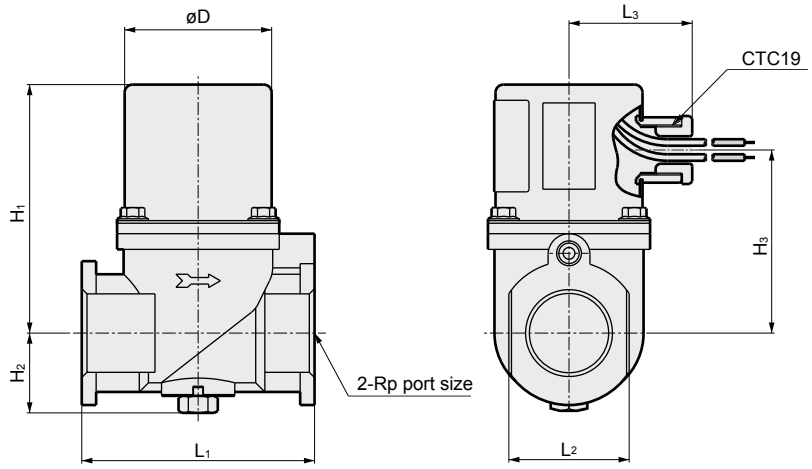
● Standard
DSG-15 to 25



Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
DSG-15	1/2	91	17.5	67	69	32	47	56
DSG-20	3/4	95	27.5	71	89	46	47	56
DSG-25	1	95	27.5	71	89	46	47	56

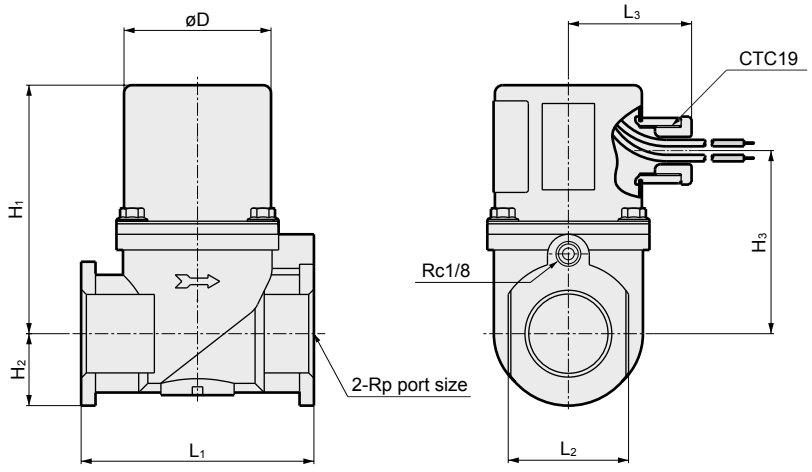
Optional dimensions

● With flow rate adjustment
DSG-15 to 25-Y



Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
DSG-15-Y	1/2	91	24	67	69	32	47	56
DSG-20-Y	3/4	95	30.5	71	89	46	47	56
DSG-25-Y	1	95	30.5	71	89	46	47	56

● With pressure detection port
DSG-15 to 25-P



Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
DSG-15-P	1/2	91	17.5	67	69	32	47	56
DSG-20-P	3/4	95	27.5	71	89	46	47	56
DSG-25-P	1	95	27.5	71	89	46	47	56

Equivalent to "DIN3394" group B For double shut off valve compliant with low pressure (5 kPa) specifications

Gas double shut off valve (quick open) DSG-W Series

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: Rp3/4, Rp1

RoHS

Features

- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.
- Built-in strainer for a structure that stops foreign matter such as dust in front of the valve during piping.

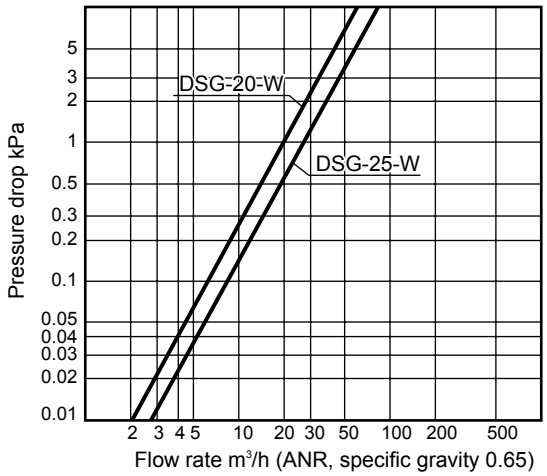
Main applications

- Gas boilers
- Industrial furnaces
- Gas absorption water coolers/ heaters
- Drying furnaces
- Others

Specifications

Item		DSG-20-W	DSG-25-W
Working fluid		City gas/natural gas/LPG	
Working pressure	kPa	0 (≈0 psi, 0 bar) to 5 (≈0.7 psi, 0.05 bar)	
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa)	m³/h(ANR)	10.5	14.0
Cv		7.0	9.4
Rated voltage	V	100 AC +10% -15%	200 AC +10% -15%
Frequency	Hz	Common to 50 and 60	
Power consumption (apparent power)	VA	16×2	
Ambient temperature	°C	-20 (-4°F) to +60 (140°F) (no freezing)	
Opening time	s	0.5 or less	
Closing time	s	1.0 or less	
Frequency	Cycle/min.	30 or less	
Mounting orientation		Vertical direction with the coil up or horizontal direction with the coil horizontal	
Connection		Screw-in (Rp)	
Port size		3/4	1
Weight	kg	2.0	2.0
Proof pressure	MPa	0.1 (≈15 psi, 1 bar)	
Degree of protection		IP21 equivalent	

Flow characteristics



Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

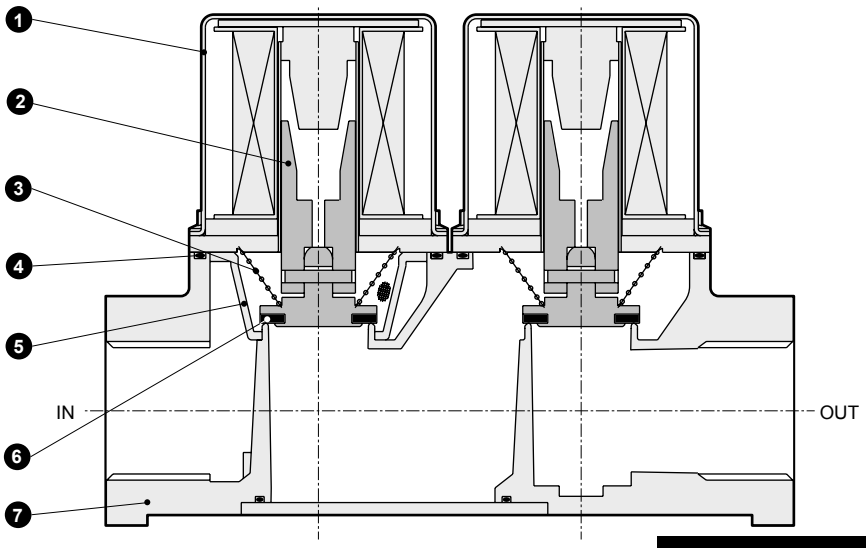
How to order

DSG - 20 - W - AC100V

- DSG: Model No.
- 20: Ⓐ Port size
- W
- AC100V: Ⓑ Voltage

Code	Description
Ⓐ Port size	
20	Rp3/4
25	Rp1
Ⓑ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

Internal structure and parts list

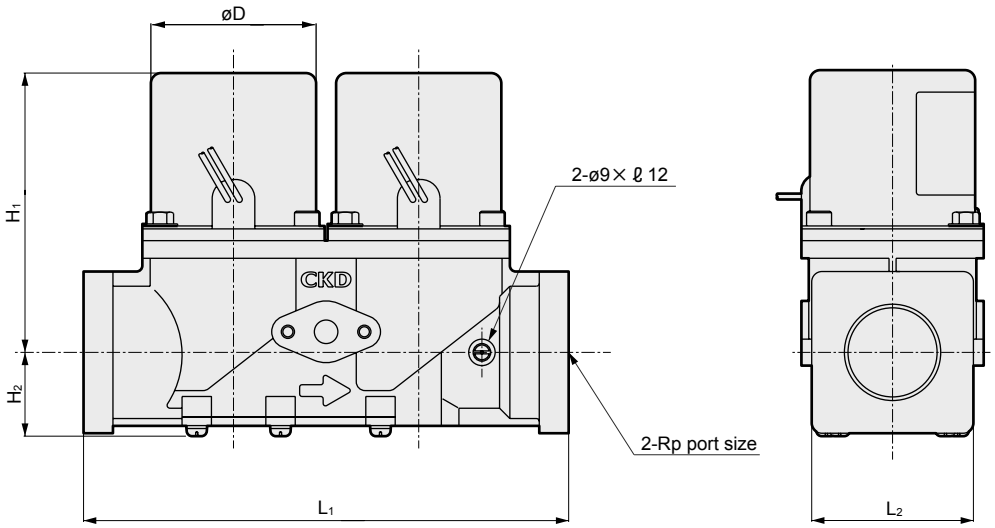


Cannot be disassembled

No.	Part name	Material
1	Bonnet	Steel
2	Plunger	Stainless steel
3	Spring	Stainless steel wire
4	O-ring	Nitrile rubber
5	Strainer	Resin
6	Valve disc	Nitrile rubber
7	Body	Aluminum die-casting

Dimensions

● DSG-20/25-W



Code / Model No.	Port size	H1	H2	L1	L2	øD
DSG-20-W	3/4	95	28.5	165	55	56
DSG-25-W	1	95	28.5	165	55	56

For double shut off compliant with low pressure (5 kPa) to intermediate pressure (45 kPa) specifications.
Equivalent to "DIN3394" groups A and B

Gas shut off valve (quick open) VNA Series

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2

RoHS CAD

Features

- Japan Gas Appliances Inspection Association (JIA) certified product (relevant model No.: VNA-32-AC100V, AC200V, VNA-40-AC100V, AC200V, VNA-50-AC100V, AC200V. * Option products, other bore sizes are not compliant.)
- For a wide range of gas pressures ranging from low pressure to intermediate pressure.
- Flow rate adjustment (calorie change) is easy, adjustable even after installation.
- Equipped with a robust dedicated terminal box with JIS standard conduit thread, making electrical wiring easy too.
- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.

Main applications

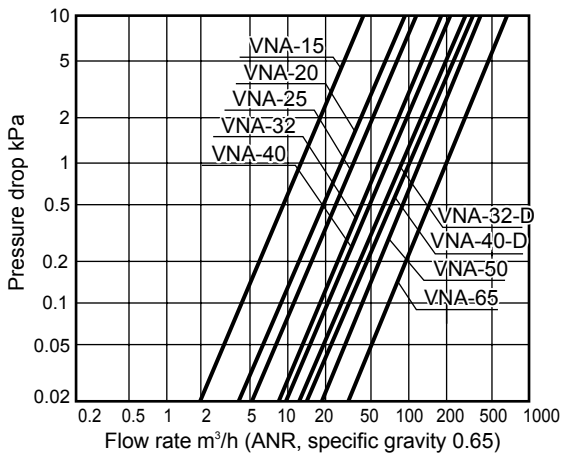
- Gas boilers
- Industrial furnaces
- Gas absorption water coolers/ heaters
- Drying furnaces
- Others

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	VNA-15	VNA-20	VNA-25	VNA-32	VNA-40	VNA-50	VNA-65	VNA-32-D	VNA-40-D
Working fluid	City gas/natural gas/LPG								
Working pressure kPa	0 to 45	0 (≈0 psi, 0 bar) to 30 (≈4.3 psi, 0.3 bar)				0 (≈0 psi) to 20 (≈2.9 psi)		0 (≈0 psi) to 5 (≈0.7 psi)	
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa) m³/h(ANR)	6.9	14.8	18.7	30.3	34.5	70.0	112.6	45.0	49.0
Cv	4.6	9.9	12.5	20.4	23.2	47.1	75.8	30.3	33.0
Rated voltage V	100 AC +10% -15% 200 AC +10% -15%								
Frequency Hz	Common to 50 and 60								
Power consumption (apparent power) VA	31			50		73	74	50	
Ambient temperature °C	-20 (-4°F) to +60 (140°F) (no freezing)								
Opening time s	0.5 or less								
Closing time s	1.0 or less								
Frequency Cycle/min.	30 or less								
Flow rate adjustment %	20 to 100							-	
Mounting orientation	Vertical direction with the coil on top or horizontal direction with the coil horizontal								
Connection	Screw-in (Rp)								
Port size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	1 1/4	1 1/2
Weight kg	1.7	2.5	2.4	4.0	3.9	8.3	14.6	3.7	3.7
Proof pressure MPa	0.1 (≈15 psi, 1 bar)								
Degree of protection	IPX4								

Flow characteristics



Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

How to order

VNA - 40 - D PY - AC100V

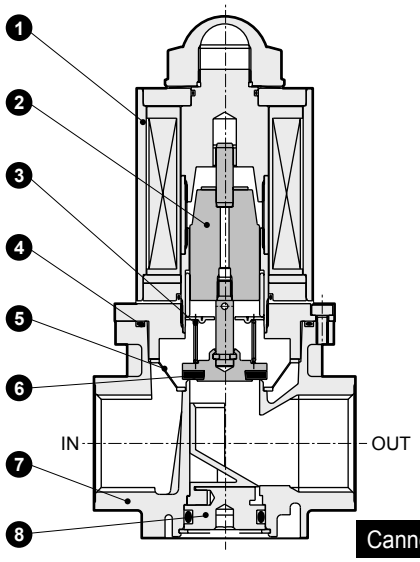
- VNA — Model No.
- 40 — Ⓐ Port size
- D — Ⓑ Capacity *2
- PY — Ⓒ Other options *3 *4 *5 *6 *7 *8 *10
- AC100V — Ⓓ Voltage *9

Code		Description	Model No. VNA-15	VNA-20	VNA-25	VNA-32	VNA-40	VNA-50	VNA-65
Ⓐ Port size									
15		Rp1/2	●						
20		Rp3/4		●					
25		Rp1			●				
32		Rp1¼				●			
40		Rp1½					●		
50		Rp2						●	
65		Rp2½							●
Ⓑ Capacity									
Blank		Standard	●	●	●	●	●	●	●
D		Large flow rate specifications				●	●		
Ⓒ Other options									
Blank	Standard	No	●	●	●	●	●	●	●
E	Option	Operation confirmation micro switchwith	●	●	●	●	●	●	●
H	Option	0.1 MPa specifications	●	●	●	●	●		
L	Option	With power indicator lamp	●	●	●	●	●	●	●
P	Option	With pressure detection port	●	●	●	●	●	●	●
V	Option	Vacuum specifications	●	●	●				
Y	Option	With flow rate adjustment				●	●		
ZZ	Option	Outdoors	●	●	●	●	●	●	●
H2	Option	Working fluid: Hydrogen gas	●	●	●	●	●	●	●
Ⓓ Voltage									
AC100V	Standard	100 VAC 50/60Hz	●	●	●	●	●	●	●
AC200V	Standard	200 VAC 50/60Hz	●	●	●	●	●	●	●
AC110V	Option	110 VAC 50/60Hz	●	●	●	●	●	●	●
AC220V	Option	220 VAC 50/60Hz	●	●	●	●	●	●	●
DC24V	Option	24 VDC	●	●	●	●	●	●	●
DC100V	Option	100 VDC	●	●	●	●	●	●	●

*1: The combinations indicated with ● above are available.
*2: For large flow rate specifications (B Item D), flow rate adjustment is not available. Combinations with flow rate adjustment (C Item Y) are available. In addition, combinations with the 0.1MPa specification (C Item H) or vacuum specification (C Item V) are not available for large flow rate specifications (B Item D).
*3: For models with micro switch for operation confirmation (C Item E), a pressure detection port is provided as standard. Flow rate adjustment is not available. Combinations with the 0.1MPa specification (C Item H), vacuum specification (C Item V), or outdoor specification (C Item ZZ) are not available.
*4: For port sizes 32 and 40 with 0.1MPa specification (C Item H), a power indicator lamp is provided as standard.
*5: For models with power indicator lamp (C Item L), combination with the outdoor specification (C Item ZZ) is not available.
*6: Models with flow rate adjustment (C Item Y) are dedicated large flow rate specification options (B Item D). Standard products all have flow rate adjustment equipped as standard.
*7: Combinations of the outdoor specification (C Item ZZ) with micro switch for operation check (C Item E) or with power indicator lamp (C Item L) are not available.
*8: For combinations of the Item C option specifications other than the above, contact CKD.
*9: For voltages other than above, contact CKD.
*10: Working gas: The hydrogen gas option cannot be combined with the 0.1MPa specification (C Item H) or vacuum specification (C Item V).

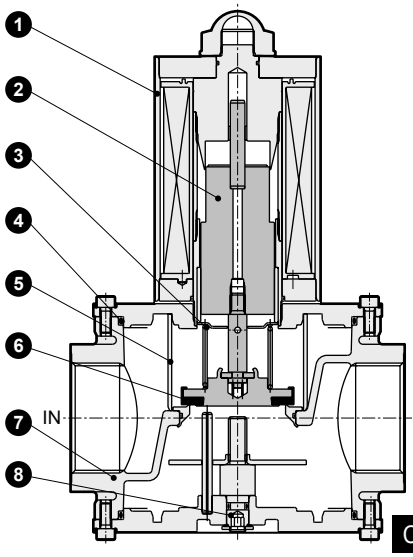
Internal structure and parts list

● VNA-15 to 40



Cannot be disassembled

● VNA-50 to 65



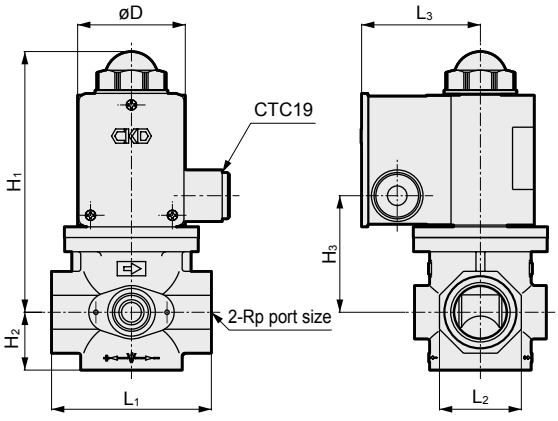
Cannot be disassembled

No.	Part name	Material	No.	Part name	Material
1	Bonnet	Steel	5	Strainer	Resin (15 to 50)/stainless steel wire (65)
2	Plunger	Stainless steel	6	Valve disc	Nitrile rubber
3	Spring	Stainless steel wire	7	Body	Aluminum
4	O-ring	Nitrile rubber	8	Flow rate adjustment screw	Aluminum (15 to 40)/steel (50 to 65)

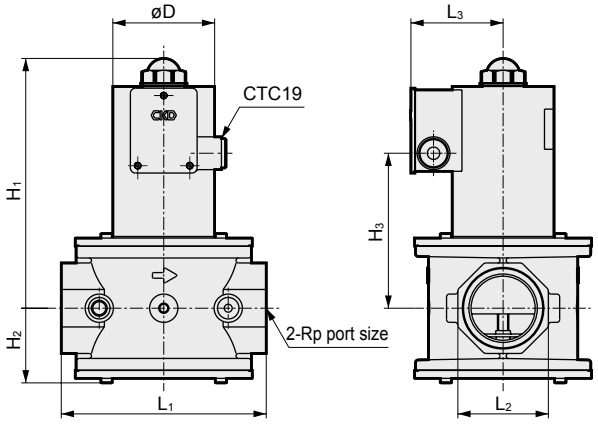
Dimensions

CAD

● VNA-15 to 40



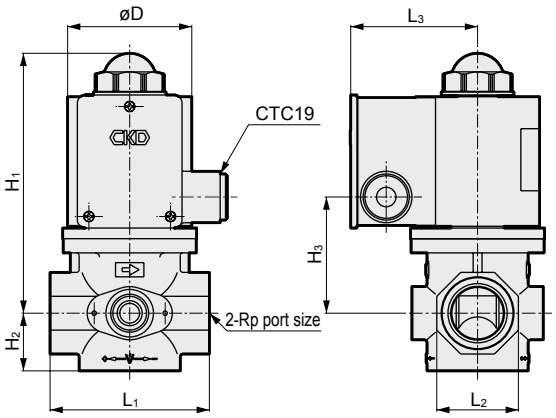
● VNA-50 to 65



Code / Model No.	Port size	H_1	H_2	H_3	L_1	L_2	L_3	øD
VNA-15	1/2	132.5	24.5	51	69	32	63	50
VNA-20	3/4	147	33	65.5	89	46	68	60.5
VNA-25	1	147	33	65.5	89	46	68	60.5
VNA-32	1¼	166	39.5	84.5	128	65	73	70
VNA-40	1½	166	39.5	84.5	128	65	73	70
VNA-50	2	221	66.5	137	180	80	83	90
VNA-65	2½	232	77.5	148	218	95	101	127
VNA-32-D	1¼	174.5	35	93	128	70	73	70
VNA-40-D	1½	174.5	35	93	128	70	73	70

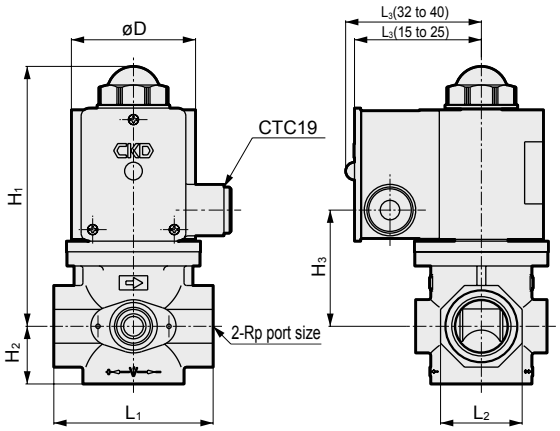
Optional dimensions

● Vacuum specifications: 1.33 x 10^{-5} to 101 kPa
(reverse vacuum is not possible)
VNA-15/20/25-V



Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VNA-15-V	1/2	136.5	24.5	55	69	32	68	60.5
VNA-20-V	3/4	147	33	65.5	89	46	73	70
VNA-25-V	1	147	33	65.5	89	46	73	70

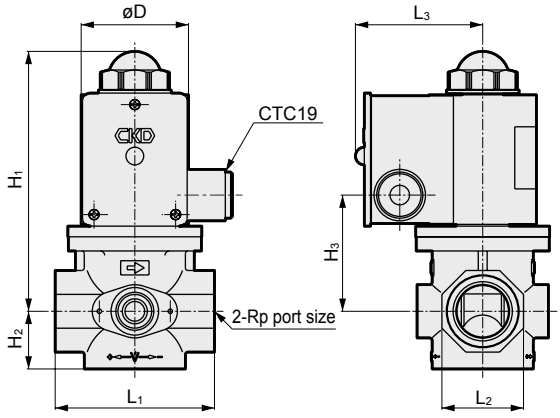
● 0.1 MPa specifications
VNA-15 to 40-H



*For port sizes 32 and 40, power indicator lamp is provided as standard.

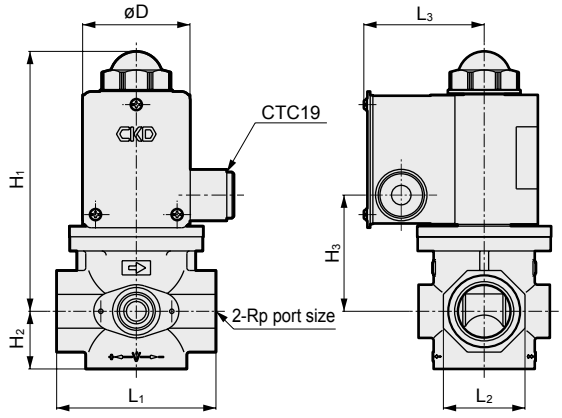
Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VNA-15-H	1/2	136.5	24.5	55	69	32	68	60.5
VNA-20-H	3/4	147	33	65.5	89	46	73	70
VNA-25-H	1	147	33	65.5	89	46	73	70
VNA-32-H	1 1/4	193	39.5	111.5	128	65	88	90
VNA-40-H	1 1/2	193	39.5	111.5	128	65	88	90

● With power indicator lamp
VNA-15 to 65-L



Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VNA-15-L	1/2	132.5	24.5	51	69	32	68	50
VNA-20-L	3/4	147	33	65.5	89	46	73	60.5
VNA-25-L	1	147	33	65.5	89	46	73	60.5
VNA-32-L	1 1/4	166	39.5	84.5	128	65	78	70
VNA-40-L	1 1/2	166	39.5	84.5	128	65	78	70
VNA-50-L	2	221	66.5	137	180	80	88	90
VNA-65-L	2 1/2	232	77.5	148	218	95	106	127

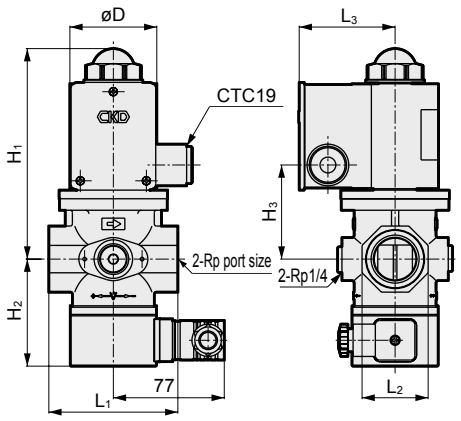
● Outdoor
VNA-15 to 65-ZZ



Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VNA-15-ZZ	1/2	132.5	24.5	51	69	32	63	50
VNA-20-ZZ	3/4	147	33	65.5	89	46	68	60.5
VNA-25-ZZ	1	147	33	65.5	89	46	68	60.5
VNA-32-ZZ	1 1/4	166	39.5	84.5	128	65	73	70
VNA-40-ZZ	1 1/2	166	39.5	84.5	128	65	73	70
VNA-50-ZZ	2	221	66.5	137	180	80	83	90
VNA-65-ZZ	2 1/2	232	77.5	148	218	95	101	127

Optional dimensions

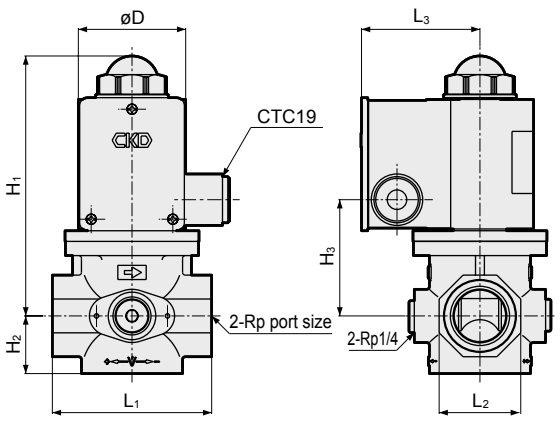
● With operation confirmation micro switch
VNA-15 to 65-E



* Pressure detection port is provided as standard. Flow rate adjustment is not available.

Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VNA-15-E	1/2	132.5	69.5	51	69	32	63	50
VNA-20-E	3/4	147	75	65.5	89	46	68	60.5
VNA-25-E	1	147	75	65.5	89	46	68	60.5
VNA-32-E	1¼	166	81.5	84.5	128	65	73	70
VNA-40-E	1½	166	81.5	84.5	128	65	73	70
VNA-50-E	2	221	104.5	137	180	80	83	90
VNA-65-E	2½	232	115.5	148	218	95	101	127

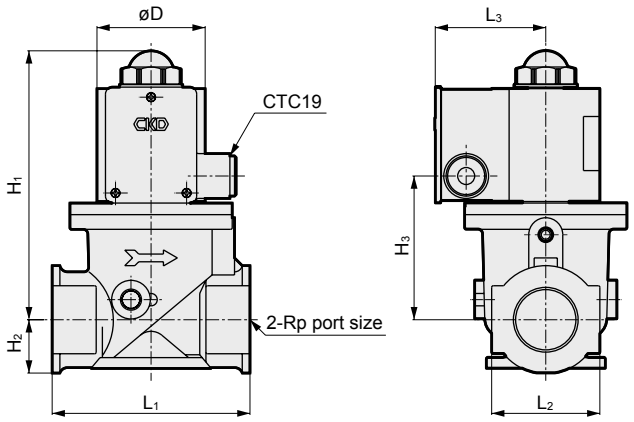
● With pressure detection port
VNA-15 to 65-P



* Pressure detection port connects on the IN side.

Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VNA-15-P	1/2	132.5	24.5	51	69	32	63	50
VNA-20-P	3/4	147	33	65.5	89	46	68	60.5
VNA-25-P	1	147	33	65.5	89	46	68	60.5
VNA-32-P	1¼	166	39.5	84.5	128	65	73	70
VNA-40-P	1½	166	39.5	84.5	128	65	73	70
VNA-50-P	2	221	66.5	137	180	80	83	90
VNA-65-P	2½	232	77.5	148	218	95	101	127

● Large flow rate specifications
VNA-32/40-D



* Flow rate adjustment is not available.

Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VNA-32-D	1¼	174.5	35	93	128	70	73	70
VNA-40-D	1½	174.5	35	93	128	70	73	70

MEMO

For double shut off compliant with low pressure (5 kPa) to intermediate pressure (25 kPa) specifications.
Equivalent to "DIN3394" groups A and B

Gas shut off valve (slow open) VLA Series

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2 RoHS

Features

- For a wide range of gas pressures ranging from low pressure to intermediate pressure.
- Flow rate adjustment (calorie change) is easy, adjustable even after installation.
- Equipped with a robust dedicated terminal box with JIS standard conduit thread, making electrical wiring easy too.
- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.

Main applications

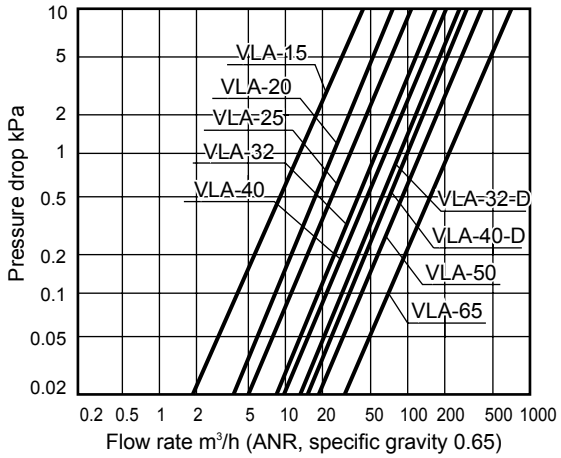
- Gas boilers
- Industrial furnaces
- Gas absorption water coolers/ heaters
- Drying furnaces
- Others

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	VLA-15	VLA-20	VLA-25	VLA-32	VLA-40	VLA-50	VLA-65	VLA-32-D	VLA-40-D
Working fluid	City gas/natural gas/LPG								
Working pressure kPa	0 to 25	0 (≈0 psi, 0 bar) to 20 (≈2.9 psi, 0.2 bar)						0 (≈0 psi) to 5 (≈0.7 psi)	
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa) m³/h(ANR)	6.9	14.8	18.7	30.3	34.5	70.0	112.6	45.0	49.0
Cv	4.6	9.9	12.5	20.4	23.2	47.1	75.8	30.3	33.0
Rated voltage V	100 AC +10% -15% 200 AC +10% -15%								
Frequency Hz	Common to 50 and 60								
Power consumption (apparent power) VA	31			50		73	74	50	
Ambient temperature °C	-20 (-4°F) to +60 (140°F) (no freezing)								
Opening time s	Approx. 10								
Closing time s	1.0 or less								
Frequency Cycle/min.	1 or less								
Flow rate adjustment %	20 to 100							-	
Start gas adjustment %	0 to 70								
Re-energizing intermission time s	5.0 or more								
Mounting orientation	Vertical direction with the coil on top or horizontal direction with the coil horizontal								
Connection	Screw-in (Rp)								
Port size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	1 1/4	1 1/2
Weight kg	1.9	2.7	2.6	4.2	4.1	8.9	15.2	4.0	4.0
Proof pressure MPa	0.1 (≈15 psi, 1 bar)								
Degree of protection	IPX4								

Flow characteristics

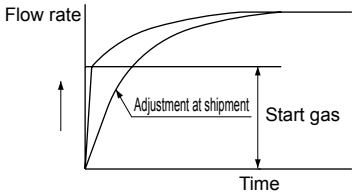


Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

Opening operation characteristics



How to order

VLA - 40 - D P - AC100V

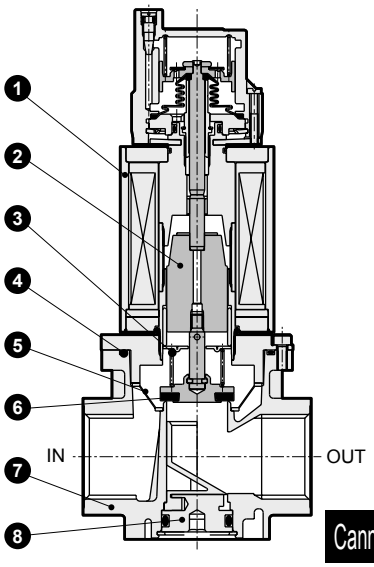
Model No. / Ⓐ Port size / Ⓑ Capacity *2 / Ⓒ Other options *3 *4 *5 *6 / Ⓓ Voltage *7

Code		Description	Model No. VLA-15	VLA-20	VLA-25	VLA-32	VLA-40	VLA-50	VLA-65
Ⓐ Port size									
15		Rp1/2	●						
20		Rp3/4		●					
25		Rp1			●				
32		Rp1 1/4				●			
40		Rp1 1/2					●		
50		Rp2						●	
65		Rp2 1/2							●
Ⓑ Capacity									
Blank		Standard	●	●	●	●	●	●	●
D		Large flow rate specifications				●	●		
Ⓒ Other options									
Blank	**Std.**	None	●	●	●	●	●	●	●
E	**Option**	With operation confirming μ switch	●	●	●	●	●	●	●
L		With power indicator lamp	●	●	●	●	●	●	●
P		With pressure detection port	●	●	●	●	●	●	●
ZZ		Outdoor	●	●	●	●	●	●	●
Ⓓ Voltage									
AC100V	**Std.**	100 VAC 50/60 Hz	●	●	●	●	●	●	●
AC200V		200 VAC 50/60 Hz	●	●	●	●	●	●	●
AC110V	**Option**	110 VAC 50/60 Hz	●	●	●	●	●	●	●
AC220V		220 VAC 50/60 Hz	●	●	●	●	●	●	●
DC24V		24 VDC	●	●	●	●	●	●	●
DC100V		100 VDC	●	●	●	●	●	●	●

*1 : The combinations indicated with ● above are available.
*2 : For large flow rate specifications (B Item D), flow rate adjustment is not available.
*3 : For models with micro switch for operation confirmation (C Item E), a pressure detection port is provided as standard.
Flow rate adjustment is not available.
Combination with the outdoor specification (C Item ZZ) is not available.
*4 : For models with power indicator lamp (C Item L), combination with the outdoor specification (C Item ZZ) is not available.
*5 : Combinations of the outdoor specification (C Item ZZ) with models with micro switch for operation confirmation (C Item E) or with power indicator lamp (C Item L) are not available.
*6 : For combinations of the Item C option specifications other than listed above, contact CKD.
*7 : For voltages other than above, contact CKD.

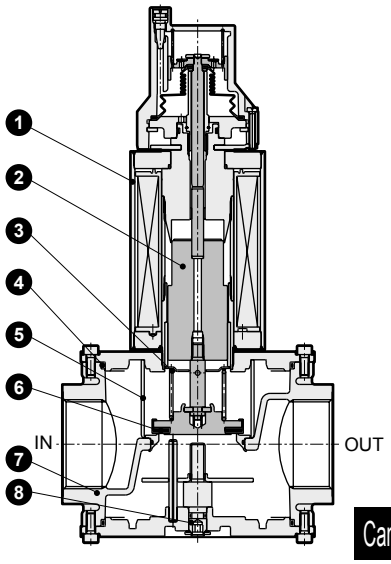
Internal structure and parts list

● VLA-15 to 40



Cannot be disassembled

● VLA-50 to 65

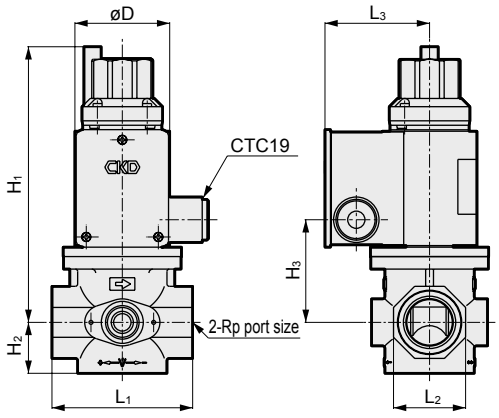


Cannot be disassembled

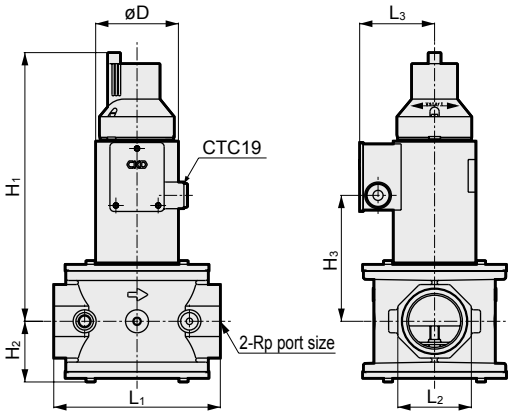
No.	Part name	Material	No.	Part name	Material
1	Bonnet	Steel	5	Strainer	Resin (15 to 50)/stainless steel wire (65)
2	Plunger	Stainless steel	6	Valve disc	Nitrile rubber
3	Spring	Stainless steel wire	7	Body	Aluminum
4	O-ring	Nitrile rubber	8	Flow rate adjustment screw	Aluminum (15 to 40)/steel (50 to 65)

Dimensions

● VLA-15 to 40



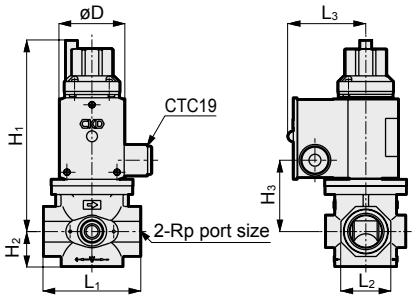
● VLA-50 to 65



Code / Model No.	Port size	H_1	H_2	H_3	L_1	L_2	L_3	øD
VLA-15	1/2	161.5	24.5	51	69	32	63	50
VLA-20	3/4	176	33	65.5	89	46	68	60.5
VLA-25	1	176	33	65.5	89	46	68	60.5
VLA-32	1 1/4	195	39.5	84.5	128	65	73	70
VLA-40	1 1/2	195	39.5	84.5	128	65	73	70
VLA-50	2	292.5	66.5	137	180	80	83	90
VLA-65	2 1/2	303.5	77.5	148	218	95	101	127
VLA-32-D	1 1/4	203.5	35	93	128	70	73	70
VLA-40-D	1 1/2	203.5	35	93	128	70	73	70

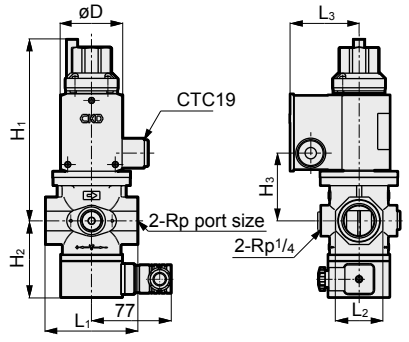
Optional dimensions

● With power indicator lamp
VLA-15 to 65-L



Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VLA-15-L	1/2	161.5	24.5	51	69	32	68	50
VLA-20-L	3/4	176	33	65.5	89	46	73	60.5
VLA-25-L	1	176	33	65.5	89	46	73	60.5
VLA-32-L	1 1/4	195	39.5	84.5	128	65	78	70
VLA-40-L	1 1/2	195	39.5	84.5	128	65	78	70
VLA-50-L	2	292.5	66.5	137	180	80	88	90
VLA-65-L	2 1/2	303.5	77.5	148	218	95	106	127

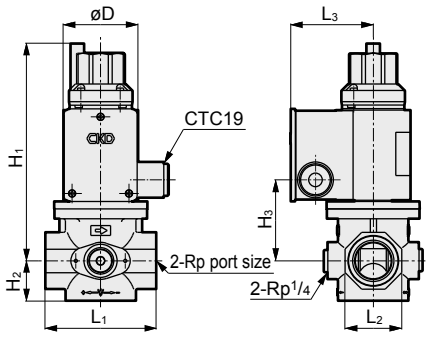
● With for operation confirmation micro switch
VLA-15 to 65-E



* Pressure detection port is provided as standard. Flow rate adjustment is not available.

Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VLA-15-E	1/2	161.5	69.5	51	69	32	63	50
VLA-20-E	3/4	176	75	65.5	89	46	68	60.5
VLA-25-E	1	176	75	65.5	89	46	68	60.5
VLA-32-E	1 1/4	195	81.5	84.5	128	65	73	70
VLA-40-E	1 1/2	195	81.5	84.5	128	65	73	70
VLA-50-E	2	292.5	104.5	137	180	80	83	90
VLA-65-E	2 1/2	303.5	115.5	148	218	95	101	127

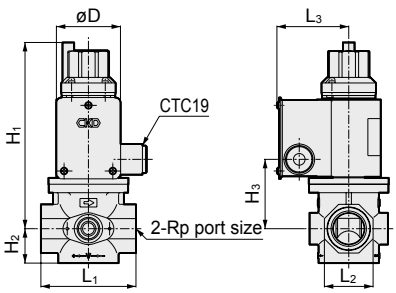
● With pressure detection port
VLA-15 to 65-P



* Pressure detection port connects on the IN side.

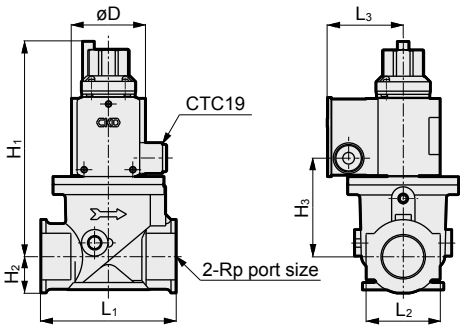
Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VLA-15-P	1/2	161.5	24.5	51	69	32	63	50
VLA-20-P	3/4	176	33	65.5	89	46	68	60.5
VLA-25-P	1	176	33	65.5	89	46	68	60.5
VLA-32-P	1 1/4	195	39.5	84.5	128	65	73	70
VLA-40-P	1 1/2	195	39.5	84.5	128	65	73	70
VLA-50-P	2	292.5	66.5	137	180	80	83	90
VLA-65-P	2 1/2	303.5	77.5	148	218	95	101	127

● Outdoor
VLA-15 to 65-ZZ



Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VLA-15-ZZ	1/2	161.5	24.5	51	69	32	63	50
VLA-20-ZZ	3/4	176	33	65.5	89	46	68	60.5
VLA-25-ZZ	1	176	33	65.5	89	46	68	60.5
VLA-32-ZZ	1 1/4	195	39.5	84.5	128	65	73	70
VLA-40-ZZ	1 1/2	195	39.5	84.5	128	65	73	70
VLA-50-ZZ	2	292.5	66.5	137	180	80	83	90
VLA-65-ZZ	2 1/2	303.5	77.5	148	218	95	101	127

● Large flow rate specifications
VLA-32/40-D



* Flow rate adjustment is not available.

Code / Model No.	Port size	H1	H2	H3	L1	L2	L3	øD
VLA-32-D	1 1/4	203.5	35	93	128	70	73	70
VLA-40-D	1 1/2	203.5	35	93	128	70	73	70

Gas solenoid valve equipped with main & bypass flow rate adjustment mechanism, switchable between low and high gas combustion.

Flow rate switching solenoid valve (quick open)

VNA-R/RH Series

- City gas/natural gas/LPG
- Port size: Rp3/4, Rp1, Rp1 1/4, Rp1 1/2

RoHS

Features

- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.
- Equipped with main and bypass flow rate adjustment mechanism as well as locking mechanism
- High combustion gas rate supplied when energized and low combustion gas rate supplied when not energized (there is no shut-off function)
- Amount of gas can be arbitrarily adjusted with flow rate adjustment mechanism
- Switching among three levels (low/medium/high combustion) can be done by using two units
- Conventional bypass circuit (orifice plate) unnecessary, piping work-hours, cost, installation space and maintenance cost reduced
- With power indicator lamp

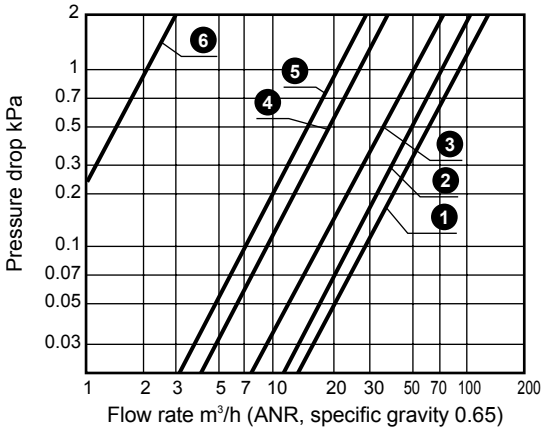
Specifications

1 MPa = 10 bar

Item			VNA-20-R	VNA-25-R	VNA-32-R	VNA-40-R	VNA-20-RH	VNA-25-RH	VNA-32-RH	VNA-40-RH
Working fluid			City gas/natural gas/LPG							
Working pressure		MPa	0 (≈0 psi) to 0.055 (≈8 psi) when △P = 0.035 (≈5.1 psi) or less				0 (≈0 psi, 0 bar) to 0.1 (≈15 psi, 1 bar)			
Flow rate	m^3/h(ANR)	Main + Bypass	19	23	42	45	19	23	42	45
Specific gravity of natural gas 0.65 △P = 0.25 kPa		Bypass only	7.4	6.4	9.3	9.1	7.4	6.4	9.3	9.1
Cv			12.8	15.5	28.3	30.3	12.8	15.5	28.3	30.3
Rated voltage		V	100 AC +10% -15%				200 AC +10% -15%			
Frequency		Hz	Common to 50 and 60							
Power consumption (apparent power)		VA	31		50				82	
Ambient temperature		°C	-20 (-4°F) to +60 (140°F) (no freezing)							
Opening time		s	0.5 or less							
Closing time		s	1.0 or less							
Frequency		Cycle/min.	30 or less							
Flow rate adjustment	Main flow rate	%	50 to 100							
	Bypass flow rate	%	10 to 100							
Mounting orientation			Vertical direction with the coil on top or horizontal direction with the coil horizontal							
Connection			Screw-in (Rp)							
Port size			3/4	1	1 1/4	1 1/2	3/4	1	1 1/4	1 1/2
Weight		kg	2.6	2.5	4.1	4.0	3.0	2.9	5.1	5.0
Proof pressure		MPa	0.1 (≈15 psi, 1 bar)				0.3 (≈44 psi, 3 bar)			
Degree of protection			IPX4							

* Cv value is the value at main fully open (+), bypass fully open (H).

Flow characteristics (typical: VNA-40-R, VNA-40-RH)



No.	Main	Bypass
1	Fully open (+)	Fully open (H)
2	Fully open (+)	Fully open (L)
3	Fully open (-)	Fully open (H)
4	Fully open (-)	Fully open (L)
5	Solenoid valve OFF	Fully open (H)
6	Solenoid valve OFF	Fully open (L)

Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

How to order

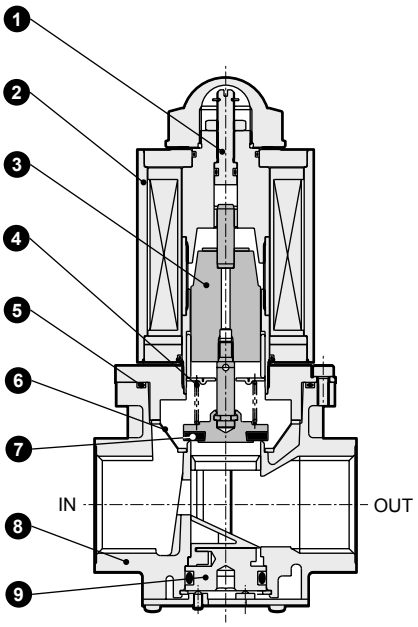
VNA - **20** - **R** **H** - **AC100V**

Model No. Ⓐ Port size Ⓑ Working pressure Ⓒ Voltage

Code		Description
Ⓐ Port size		
20		Rp3/4
25		Rp1
32		Rp1 1/4
40		Rp1 1/2
Ⓑ Working pressure		
Blank		0 to 0.055 MPa
H		0 to 0.1 MPa
Ⓒ Voltage		
AC100V	**Std.**	100 VAC 50/60 Hz
AC200V		200 VAC 50/60 Hz
AC110V	**Option**	110 VAC 50/60 Hz
AC220V		220 VAC 50/60 Hz
DC24V		24 VDC
DC100V		100 VDC

*1 : For voltages other than above, contact CKD.

Internal structure and parts list

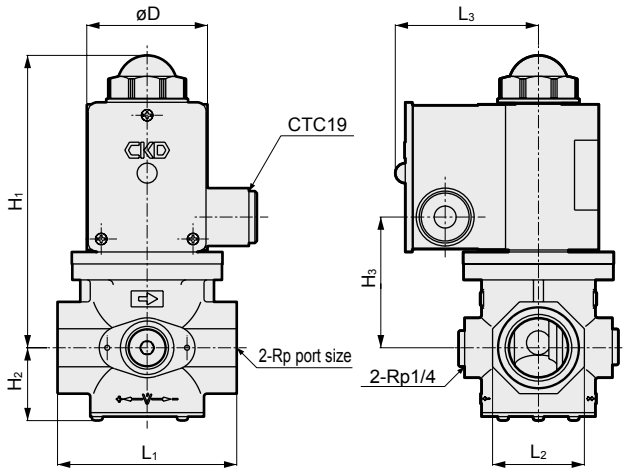


Cannot be disassembled

No.	Part name	Material
1	Adjustment screw	Stainless steel
2	Bonnet	Steel
3	Plunger	Stainless steel
4	Spring	Stainless steel wire
5	O-ring	Nitrile rubber
6	Strainer	Resin
7	Valve disc	Nitrile rubber (R), urethane rubber (RH)
8	Body	Aluminum die-casting
9	Flow rate adjustment screw	Aluminum

Dimensions

● VNA-20 to 40-R/RH



Code / Model No.	Port size	H_1	H_2	H_3	L_1	L_2	L_3	øD
VNA-20-R	3/4	147	37	65.5	89	46	73	60.5
VNA-25-R	1	147	37	65.5	89	46	73	60.5
VNA-32-R	1¼	166	45	84.5	128	65	78	70
VNA-40-R	1½	166	45	84.5	128	65	78	70
VNA-20-RH	3/4	147	37	65.5	89	46	78	70
VNA-25-RH	1	147	37	65.5	89	46	78	70
VNA-32-RH	1¼	193	45	111.5	128	65	88	90
VNA-40-RH	1½	193	45	111.5	128	65	88	90

MEMO

NO ideal for gas relief line of industrial combustion equipment

Solenoid relief valve **VNR Series**

- NO (closed when energized)
- City gas/natural gas/LPG
- Port size: Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2

RoHS

Features

- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.
- Equipped with a robust dedicated terminal box with JIS standard conduit thread, making electrical wiring easy too.

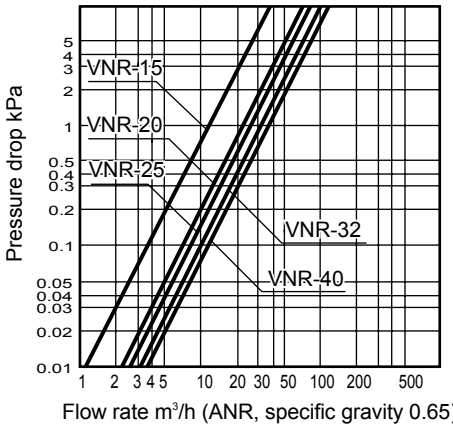
Main applications

- Industrial furnaces
- Drying furnaces

Specifications

Item		VNR-15	VNR-20	VNR-25	VNR-32	VNR-40
Working fluid		City gas/natural gas/LPG				
Working pressure	kPa	0 (≈0 psi, 0 bar) to 20 (≈2.9 psi, 0.2 bar)				
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa)	m^3/h(ANR)	5.8	11.7	12.7	16.6	17.2
Cv		3.8	7.8	8.4	11.0	11.4
Rated voltage	V	100 AC +10% -15% 200 AC +10% -15%				
Frequency	Hz	Common to 50 and 60				
Power consumption (apparent power)	VA	31			50	
Ambient temperature	°C	-20 (-4°F) to +60 (140°F) (no freezing)				
Closing time	s	1.0 or less				
Opening time	s	Approx. 0.5				
Frequency	Cycle/min.	30 or less				
Mounting orientation		Vertical direction with the coil up or horizontal direction with the coil horizontal				
Connection		Screw-in (Rp)				
Port size		1/2	3/4	1	1 1/4	1 1/2
Weight	kg	1.6	2.3	2.2	3.4	3.3
Proof pressure	MPa	0.1 (≈15 psi, 1 bar)				
Degree of protection		IPX4				

Flow characteristics



How to order

VNR - 15 - AC100V

- VNR: Model No.
- 15: Ⓐ Port size
- AC100V: Ⓑ Voltage

Code	Description
Ⓐ Port size	
15	Rp1/2
20	Rp3/4
25	Rp1
32	Rp1 1/4
40	Rp1 1/2
Ⓑ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

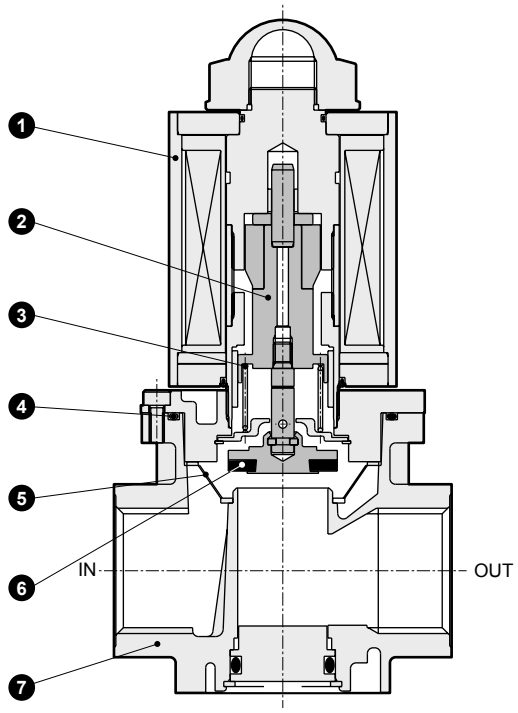
For voltages other than above, contact CKD.

Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

Internal structure and parts list

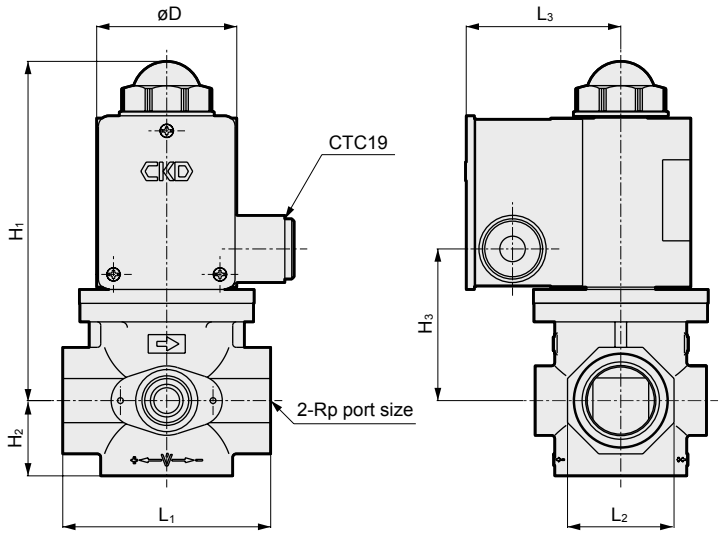


Cannot be disassembled

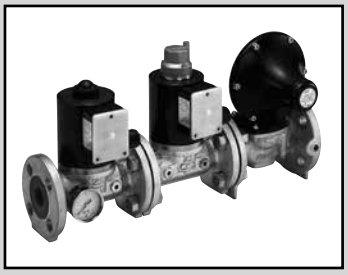
No.	Part name	Material
1	Bonnet	Steel
2	Plunger	Stainless steel
3	Spring	Stainless steel wire
4	O-ring	Nitrile rubber
5	Strainer	Resin
6	Valve disc	Fluoro rubber
7	Body	Aluminum die-casting

Dimensions

● VNR-15 to 40



Code / Model No.	Port size	H_1	H_2	H_3	L_1	L_2	L_3	øD
VNR-15	1/2	132.5	24.5	51	69	32	63	50
VNR-20	3/4	147	33	65.5	89	46	68	60.5
VNR-25	1	147	33	65.5	89	46	68	60.5
VNR-32	1¼	166	39.5	84.5	128	65	73	70
VNR-40	1½	166	39.5	84.5	128	65	73	70



Complex integration of shut off valve/governor/pressure gauge. Highly reliable and economical, ideal for medium pressure gas combustion equipment.

Medium pressure gas safety shut off control system
TAC-25 Series

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: Inlet side 25A (JIS flange), outlet side 40A (JIS flange)

RoHS

Features

- Multifunctional systematization
  Double shut off function, governor function, pressure gauge and pressure detection port, as required for medium pressure gas specification combustion equipment, are efficiently combined and systematized.
- Solenoid valve drive method
  Solenoid valve structure is adopted for the gas shut off valve. The DC driven actuator with rectifier has eliminated noise and coil burnout for safety, improving maintainability as well.
- Highly economical
  All system components have a compact, space-saving design. No more complicated piping work as shut off valve is delivered connected.

Main applications

- Gas boilers (up to 2 t/h)
- Gas engines
- Gas absorption water coolers/heaters (up to 1,400 kW)
- Industrial furnaces

When placing an order

The medium pressure gas safety shutoff control system is adjusted and shipped with a selection of parts used according to the primary pressure/secondary pressure/flow rate.
When ordering, fill in a separate medium pressure gas safety shut off control system specifications check sheet (page 1010).
How to order differs depending on the specifications.

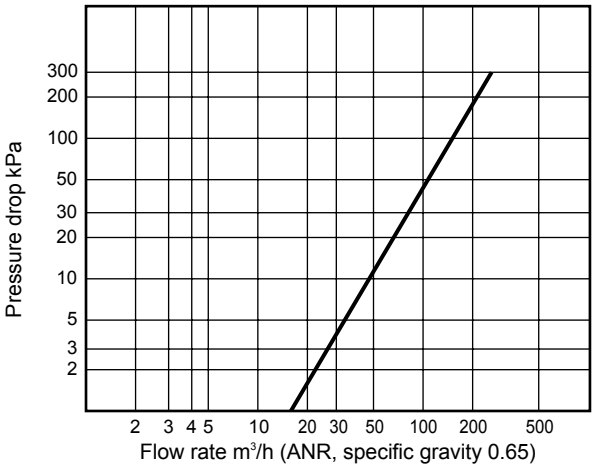
Specifications

1 MPa = 10 bar

Item		TAC-25	
Working fluid		City gas/natural gas/LPG	
Working pressure MPa		0.1 (≈15 psi) to 0.2 (≈29 psi)	0.1 (≈15 psi) to 0.3 (≈44 psi)
Secondary pressure kPa		1.5 (≈0.22 psi) to 5 (≈0.7 psi)	5 (≈0.8 psi) to 60 (≈8.7 psi)
Flow rate (Specific gravity of natural gas 0.65) m^3/h(ANR)		2 to 40	10 to 120
Rated voltage V		100 AC ±10%	200 AC ±10%
Frequency Hz		Common to 50 and 60	
Power consumption (apparent power) VA		82×2	
Ambient temperature °C		-20 (-4°F) to +60 (140°F) (no freezing)	
Opening time s		Approx. 10.0 (adjustable)	
Closing time s		1.0 or less	
Frequency Cycle/min.		1 or less	
Start gas adjustment %		0 to 50	
Re-energizing intermission time s		5.0 or more	
Mounting orientation		Vertical direction with the coil up or horizontal direction with the coil horizontal	
Connection		Flange (JIS10KRF)	
Port size	Inlet side	25A	
	Outlet side	40A	
Weight kg		23.0	
Degree of protection		IPX4	

* The above specifications are a combination of VNM⊕VLM⊕C25N-B.
* The secondary pressure range shows the range that can be set by changing the control spring or other parts.
* If considering use at primary pressure less than 0.1 MPa, or at flow rate exceeding 120 m^3/h, contact CKD.

Flow characteristics



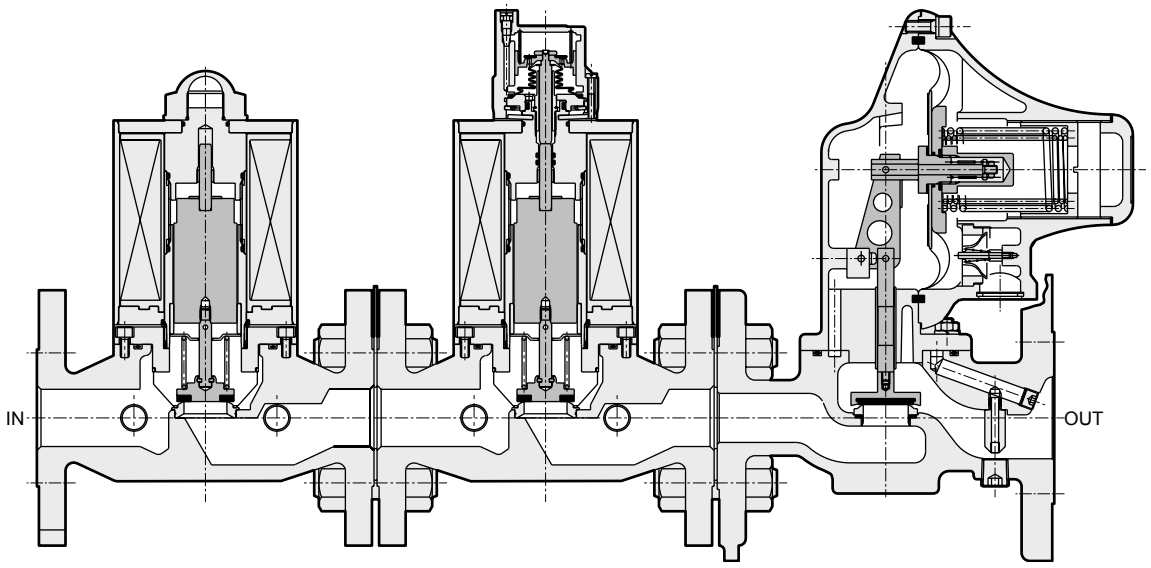
Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

⚠ When opening and closing the TAC-25 downstream shut off valve, be sure to interlink it with the TAC-25 medium pressure gas shut off valve. (If the downstream valve is the flow rate switching solenoid valve, interlinking with the medium pressure gas shut off valve is not required.)

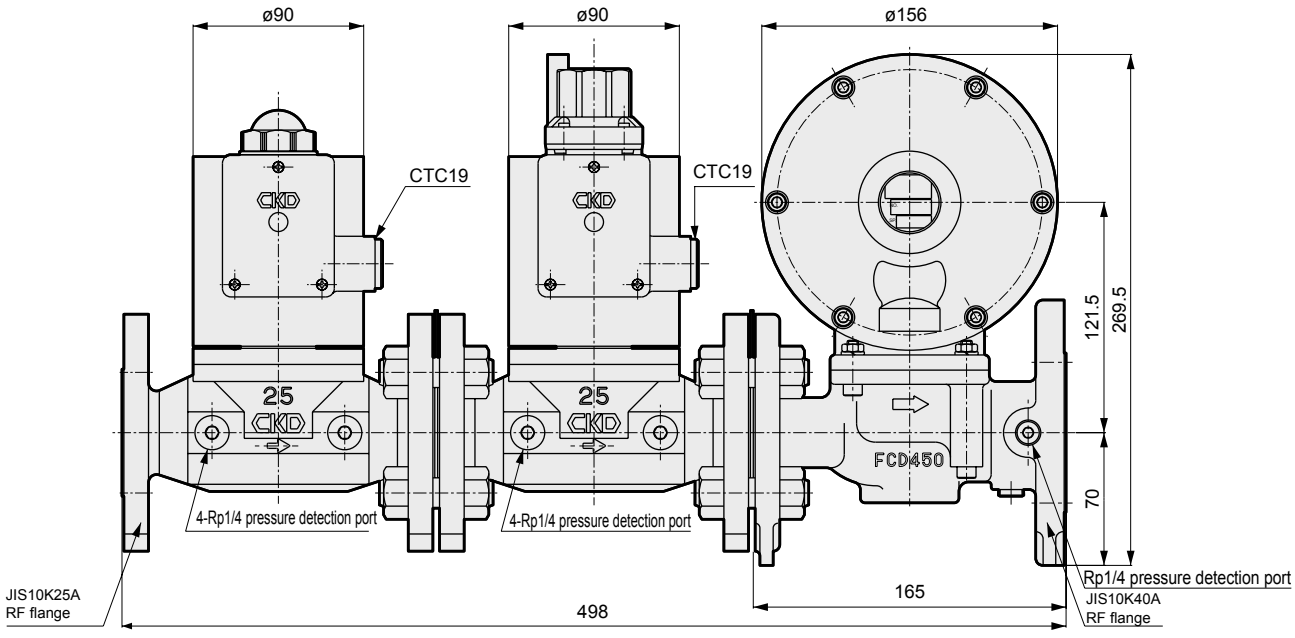
Internal structure



● Parts are the same as the single unit.
Refer to pages 1012 to 1017.

Dimensions

● TAC-25



Medium pressure gas safety shut off control system specifications check sheet

/ /

■ Your company name

■ User name

■ Quantity

■ Delivery date

■ Contact

■ Master unit used

● Common descriptions

Fluid name	
Specific gravity	

● Shut off valve descriptions

Voltage	

● Governor descriptions

Primary pressure MPa	Min.	Regular use	Max.
Secondary pressure kPa	*1 (setting flow rate: m^3/h (ANR))		
Flow rate m^3/h (ANR)	Min.		Max.
Mounting orientation	Position of the upper cap viewed from the IN side flange		
	1 right side	2	left side
	3 OUT side	4	IN side

● Pressure gauge descriptions

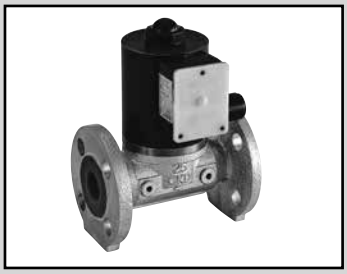
Pressure display	0.4 MPa

● Remarks

*1 : If setting flow rate is not designated due to secondary pressure adjustment, it is adjusted at the maximum flow rate.

Issuer → Dealer → Plant

MEMO



Lightweight, compact and reliable safety shut off valve that uses a solenoid valve drive method.

Medium pressure gas shut off valve (quick open)

VNM Series

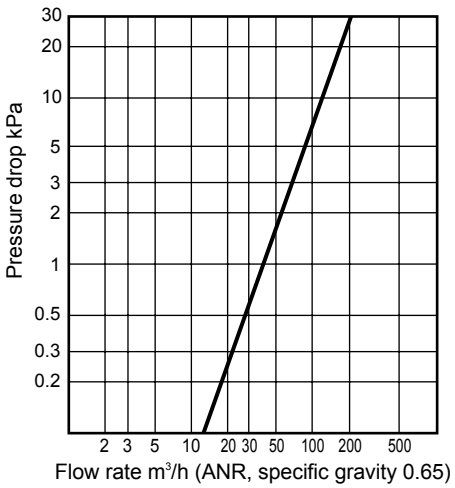
- NC (open when energized)
- City gas/natural gas/LPG
- Port size: 25A (JIS flange)

RoHS

Features

- Equipped with a robust dedicated terminal box with JIS standard conduit thread, making electrical wiring easy too.
- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.
- Equipped with a pressure switch/ pressure gauge mountable connection port on the body
- With power indicator lamp

Flow characteristics



Specifications

Item		VNM-25
Working fluid		City gas/natural gas/LPG
Working pressure	MPa	0 (≈0 psi, 0 bar) to 0.3 (≈44 psi, 3 bar)
Flow rate (Specific gravity of natural gas, △P = 0.25 kPa)	m³/h(ANR)	19
Cv		12.8
Rated voltage	V	100 AC ±10% 200 AC ±10%
Frequency	Hz	Common to 50 and 60
Power consumption (apparent power)	VA	82
Ambient temperature	°C	-20 (-4°F) to +60 (140°F) (no freezing)
Opening time	s	0.5 or less
Closing time	s	1.0 or less
Frequency	Cycle/min.	30 or less
Mounting orientation		Vertical direction with the coil up or horizontal direction with the coil horizontal
Connection		Flange (JIS10KRF)
Port size		25A
Weight	kg	7.7
Proof pressure	MPa	0.5 (≈73 psi, 5 bar)
Degree of protection		IPX4

Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

How to order

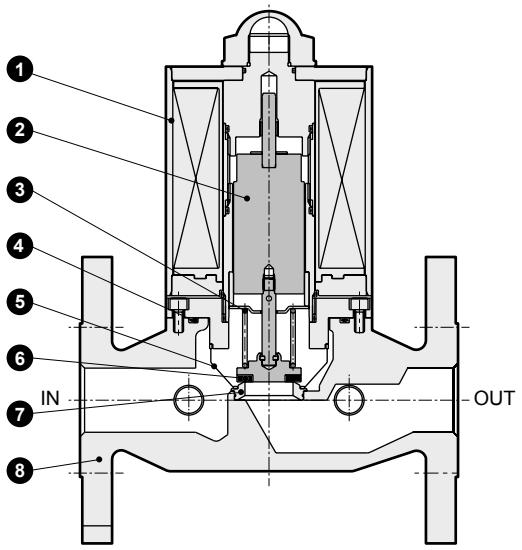
VNM - 25 - E - AC100V

- VNM: Model No.
- 25: Ⓐ Port size
- E: Ⓑ Option
- AC100V: Ⓒ Voltage

Code		Description
Ⓐ Port size		
25		JIS flange 25A
Ⓑ Option		
Blank		None
E		With operation confirmation micro switch
Ⓒ Voltage		
AC100V	Std.	100 VAC 50/60 Hz
AC200V	Std.	200 VAC 50/60 Hz
AC110V	Option	110 VAC 50/60 Hz
AC220V	Option	220 VAC 50/60 Hz
DC24V	Option	24 VDC

*1 : For voltages other than above, contact CKD.

Internal structure and parts list

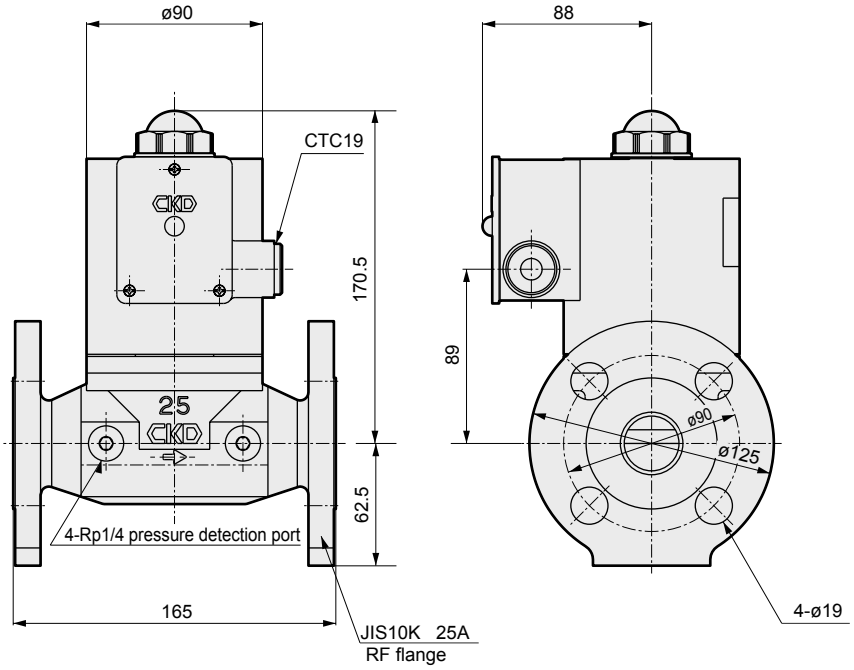


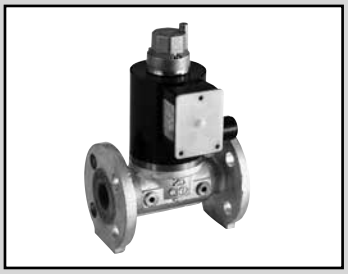
Cannot be disassembled

No.	Part name	Material
1	Bonnet	Steel
2	Plunger	Stainless steel
3	Spring	Stainless steel wire
4	O-ring	Fluoro rubber
5	Filter	Stainless steel wire
6	Valve disc	Urethane rubber
7	Valve seat	Stainless steel
8	Body	Ductile cast iron

Dimensions

● VNM-25





Lightweight and compact reliable safety shut off valve that uses a solenoid valve drive method.

Medium pressure gas shut off valve (slow open)

VLM Series

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: 25A (JIS flange)

RoHS

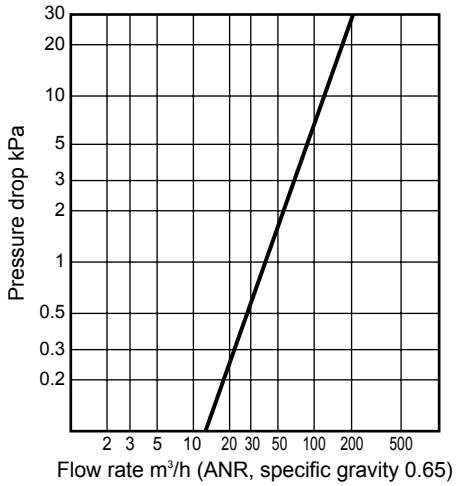
Features

- Equipped with a robust dedicated terminal box with JIS standard conduit thread, making electrical wiring easy too.
- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.
- Equipped with a pressure switch/ pressure gauge mountable connection port on the body
- With power indicator lamp

Specifications

Item	VLM-25
Working fluid	City gas/natural gas/LPG
Working pressure MPa	0 (≈0 psi, 0 bar) to 0.3 (≈44 psi, 3 bar)
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa) m^3/h(ANR)	19
Cv	12.8
Rated voltage V	100 AC ±10% 200 AC ±10%
Frequency Hz	Common to 50 and 60
Power consumption (apparent power) VA	82
Ambient temperature °C	-20 (-4°F) to +60 (140°F) (no freezing)
Opening time s	Approx. 10
Closing time s	1.0 or less
Frequency Cycle/min.	1 or less
Start gas adjustment %	0 to 50
Re-energizing intermission time s	5.0 or more
Mounting orientation	Vertical direction with the coil up or horizontal direction with the coil horizontal
Connection	Flange (JIS10KRF)
Port size	25A
Weight kg	7.8
Proof pressure MPa	0.5 (≈73 psi, 5 bar)
Degree of protection	IPX4

Flow characteristics

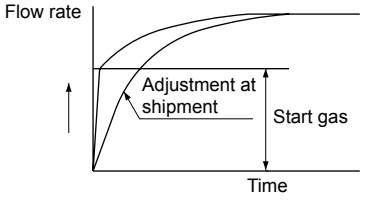


Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

Opening operation characteristics



How to order

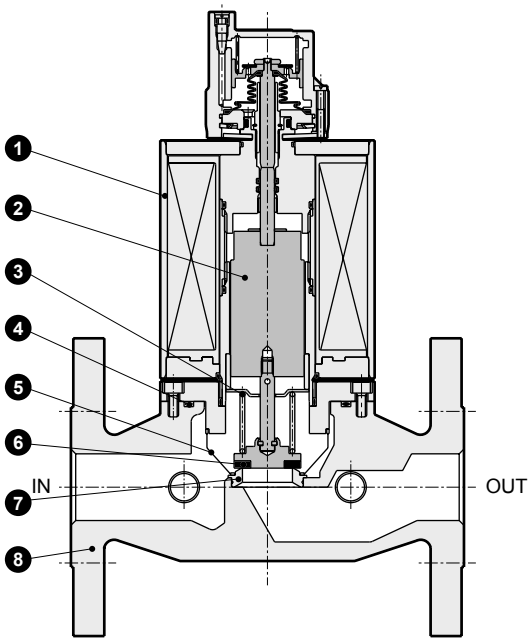
VLM - 25 - AC100V

- VLM: Model No.
- 25: Ⓐ Port size
- AC100V: Ⓑ Voltage

Code		Description
Ⓐ Port size		
25		JIS flange 25A
Ⓑ Voltage		
AC100V	Std.	100 VAC 50/60 Hz
AC200V	Std.	200 VAC 50/60 Hz
AC110V	Option	110 VAC 50/60 Hz
AC220V	Option	220 VAC 50/60 Hz
DC24V	Option	24 VDC

* For voltages other than above, contact CKD.

Internal structure and parts list

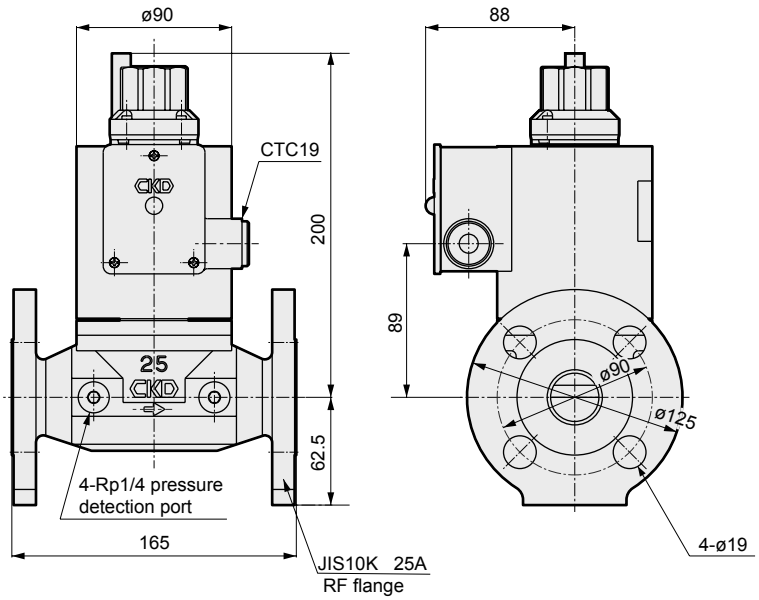


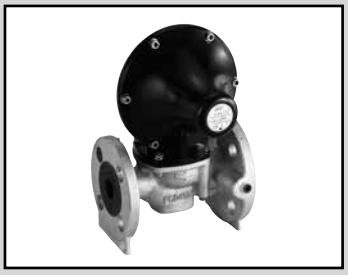
Cannot be disassembled

No.	Part name	Material
1	Bonnet	Steel
2	Plunger	Stainless steel
3	Spring	Stainless steel wire
4	O-ring	Fluoro rubber
5	Filter	Stainless steel wire
6	Valve disc	Urethane rubber
7	Valve seat	Stainless steel
8	Body	Ductile cast iron

Dimensions

● VLM-25





Medium pressure governor realizing compactness/large flow rate with a unique structural design.

Medium pressure governor C25N-B Series

- City gas/natural gas/LPG
- Port size: Inlet side 25A (JIS flange), outlet side 40A (JIS flange) RoHS

Features

- Compact and provides stable secondary pressure over a wide flow rate range
- Adopts a double diaphragm structure with an eye to safety
- Innovative design

When placing an order

The medium pressure governor is adjusted and shipped with a selection of parts used according to the primary pressure/ secondary pressure/flow rate. When ordering, fill in a separate medium pressure gas safety shut off control system specifications check sheet (page 1010). How to order differs depending on the specifications.

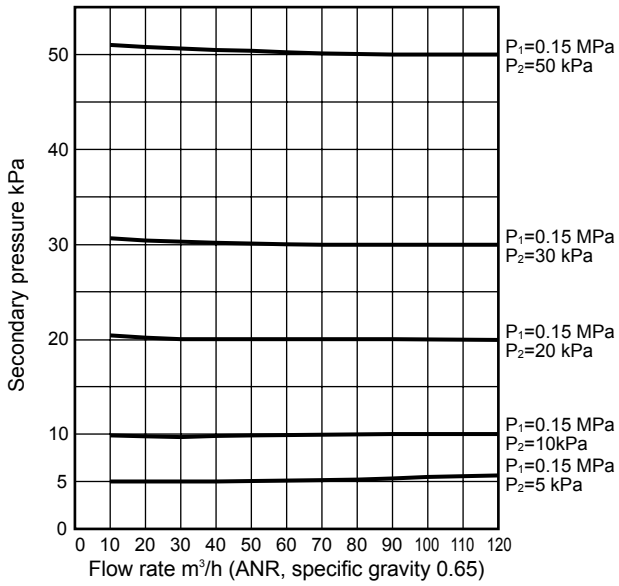
Specifications

1 MPa = 10 bar

Item		C25N-B	
Working fluid		City gas/natural gas/LPG	
Working pressure MPa		0.1 (≈15 psi) to 0.2 (≈29 psi)	0.1 (≈15 psi) to 0.3 (≈44 psi)
Secondary pressure kPa		1.5 (≈0.22 psi) to 5 (≈0.7 psi)	5 (≈0.8 psi) to 60 (≈8.7 psi)
Secondary pressure fluctuation range %		Within 20	
Flow rate (Specific gravity of natural gas 0.65) m^3/h(ANR)		2 to 40	10 to 120
Ambient temperature °C		-20 (-4°F) to +60 (140°F) (no freezing)	
Mounting orientation		Unrestricted	
Connection		Flange (JIS10KRF)	
Port size	Inlet side	25A	
	Outlet side	40A	
Weight kg		7.5	

* The secondary pressure range shows the range that can be set by changing the control spring or other parts.
* If considering use at primary pressure less than 0.1 MPa, or at flow rate exceeding 120 m^3/h, contact CKD.

Governor characteristics (representative characteristics)



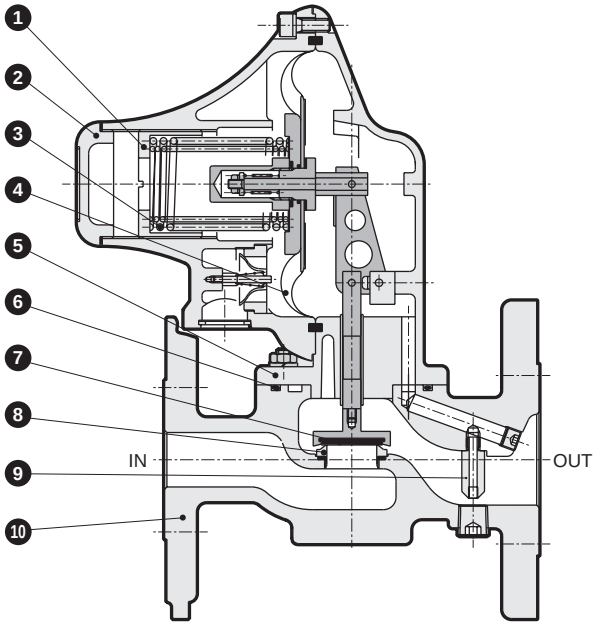
Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

⚠ Do not open and close the shut off valve on the downstream side of C25N-B.

Internal structure and parts list

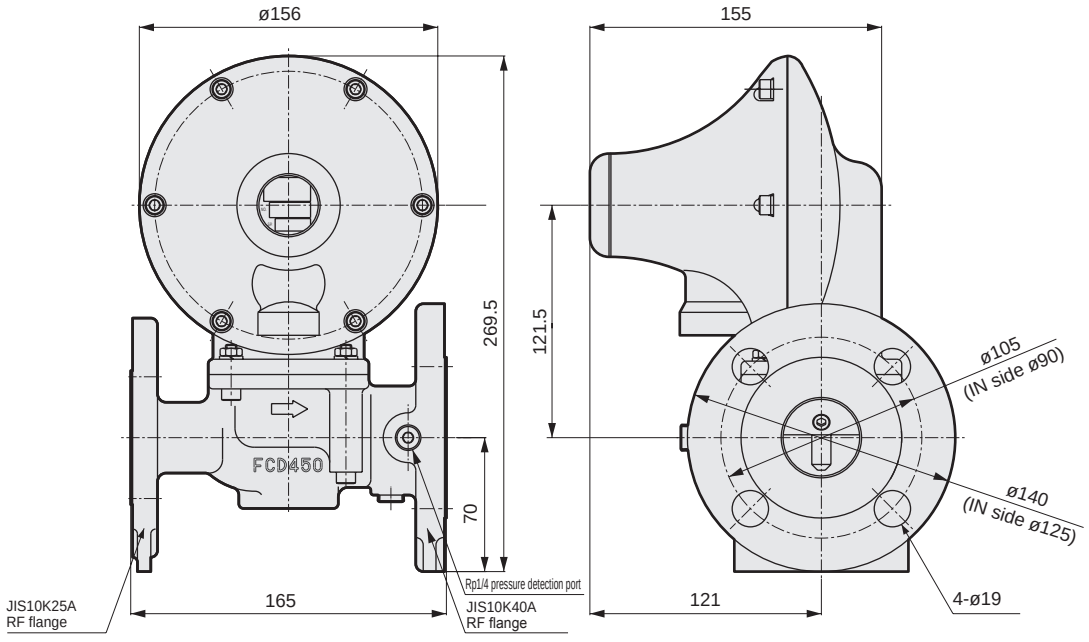


Cannot be disassembled

No.	Part name	Material
1	Adjusting nut	Copper alloy
2	Upper cap	Zinc die-casting
3	Pressure control spring	Piano wire (stainless steel wire)
4	Diaphragm	Nitrile rubber containing ground fabric
5	Case	Aluminum die-casting
6	O-ring	Nitrile rubber
7	Valve	Fluoro rubber
8	Orifice	Copper alloy
9	Booster pipe	Copper alloy
10	Body	Ductile cast iron

Dimensions

● C25N-B



(Aichi Tokei Denki)

* In order to prevent confusion with the standard product VNM-25, a label stating "Increased fire safety specifications" is affixed to this product.

Fire-resistant to shut off the gas without fail in case of fire accidents

Safety shut off valve VNM-25-K Series

(increased fire safety specifications)

- NC (open when energized)
- City gas/natural gas
- Port size: 25A (JIS flange)

RoHS

Overview

Increased fire safety specifications have been jointly developed by three gas companies to ensure resistance to fire heat so that the product can endure for the time (about 30 minutes) necessary to start initial firefighting in case of fire due to an unpredictable cause. This product normally functions as a safety shut off valve for a gas circuit double shut off system to increase safety of automatic startup and operation. In a fire-related emergency, it endures high heat, keeping the gas cut off, and thus prevents fire from spreading.

Features

- Heat resistant structure and materials have enabled higher fire safety levels compared with conventional safety shut off valves.
- The DC driven actuator with rectifier has eliminated noise and coil burnout for safety.
- Checking valve open/close state is easy with the valve closing confirmation switch and power indicator.

Main applications

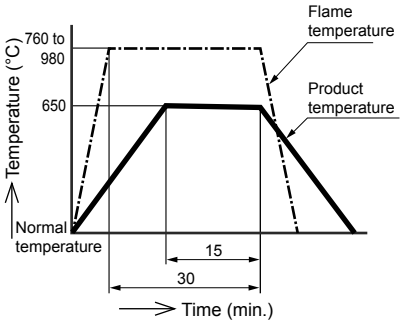
Gas combustion systems to which the "Safety Guidelines for automatic startup and operation of industrial gas combustion systems" (issued by Tokyo Gas, Osaka Gas and Toho Gas) are applied

Specifications

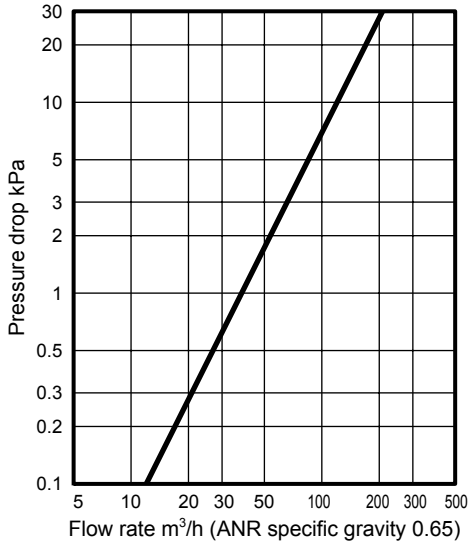
Item		VNM-25-K	
Working gas		City gas/natural gas	
Working pressure	MPa	0 (≈0 psi, 0 bar) to 0.3 (≈44 psi, 3 bar)	
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa)	m³/h(ANR)	19	
Cv		12.8	
Rated voltage	V	100 AC ±10%, 200 AC ±10%	
Frequency	Hz	Common in 50 and 60	
Power consumption (apparent power)	VA	82	
Ambient temperature	°C	-10 (14°F) to +60 (140°F) (no freezing)	
Opening time	s	0.5 or less	
Closing time	s	1.0 or less	
Frequency	Cycle/min.	30 or less	
Fire-resistance*		Refer to the descriptions below.	
Mounting orientation		Vertical direction with the coil up or horizontal direction with the coil horizontal	
Connection		Flange (JIS 10K RF)	
Port size		25A	
Weight	kg	10	
Proof pressure	MPa	0.5 (≈73 psi, 5 bar)	
Valve closing confirmation switch	Load voltage V	12, 24 DC	100 AC
	Load current mA	50 or less	20 or less
Degree of protection		IPX4	

* Fire safety performance

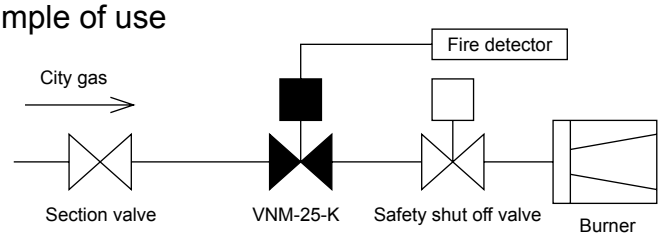
Fire safety performance of this product is based on the API607 standard (American Petroleum Institute).
The product is exposed to a fire atmosphere of 760 to 980°C for 30 minutes within which the product temperature is kept at 650°C for 15 minutes.
When the product is naturally cooled and 0.2 MPa water pressure is applied, the internal leakage is 1.2 ℓ /h or less and external leakage is 1.5 ℓ /h or less.



Flow characteristics



Example of use



Install this product as an upstream safety shut off valve for a double shut off system and connect it to the fire detector so that the valve can be triggered by the fire detector to shut off the gas in case of fire, thus preventing fire spreading due to gas leakage.

Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B, 6C)
Specific gravity (air = 1)	0.65	0.54
Coefficient	1.0	1.09

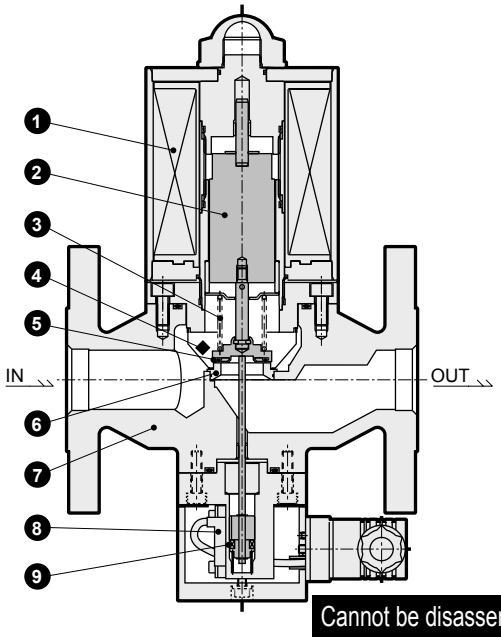
How to order

VNM - 25 - K - AC100V (A)

Model No.

Ⓐ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 Hz

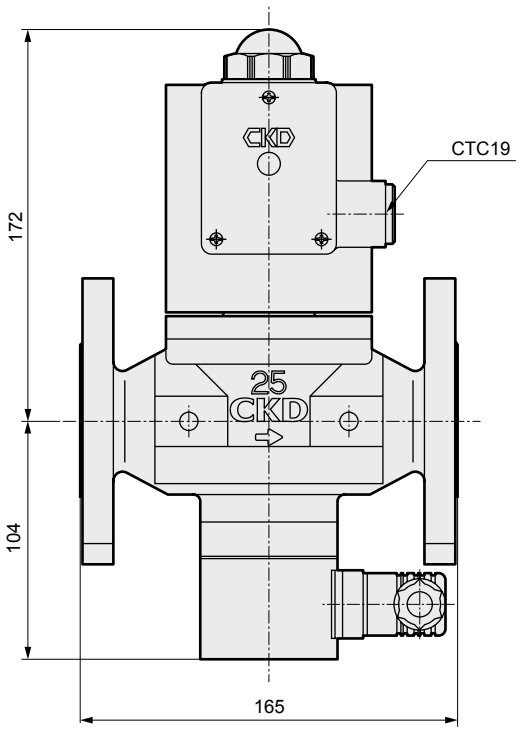
Internal structure and parts list

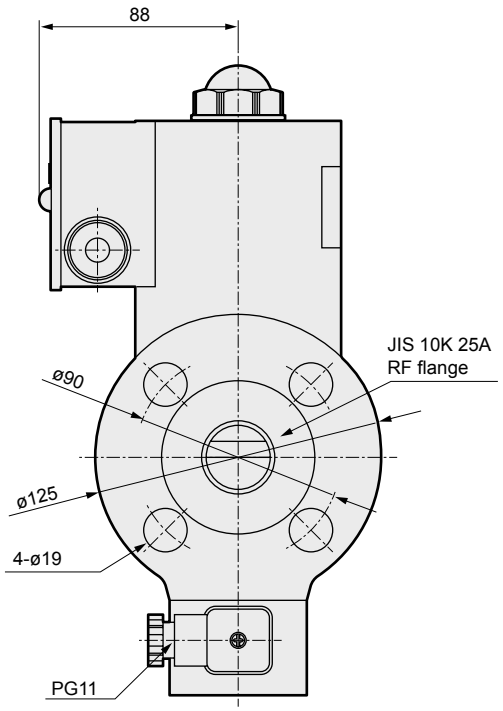


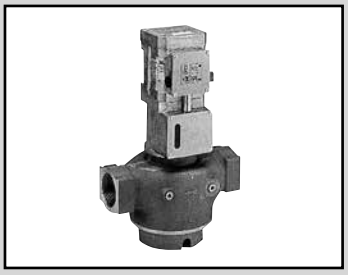
Cannot be disassembled

No.	Part name	Material
1	Coil winding	EIW
2	Plunger	SUS403
3	Spring	Inconel
4	Strainer	SUS304
5	O-ring	U
6	Valve seat	S45C
7	Body	FCD450
8	Reed switch	-
9	Magnet	Plastic magnet

Dimensions







Highly reliable shut off valve ideal for main gas lines, with integrated motor/hydraulic pump.

Fluid operated 2-position shut off valve **HK1 Series**

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: Rp1 1/2, Rp2, Rp2 1/2 40 A to 80 A (JIS flange)/100 A to 200 A (DIN flange) CAD

Features

- 2-position shut off valve with integrated motor and hydraulic pump
- Excellent performance in safe gas shut off
- Reliable and long service-life actuator
- Indicator for checking valve open/close state
- Integrated strainer prevents foreign matter from being caught in pipes.
- With flow rate controller. For easy adjustment of calorie of gas (excluding bore sizes 125 A to 200 A)
- Pressure detection port on the body enables easy installation of the pressure switch and reduces cost for piping.
- Supplied terminal box makes wiring easier.

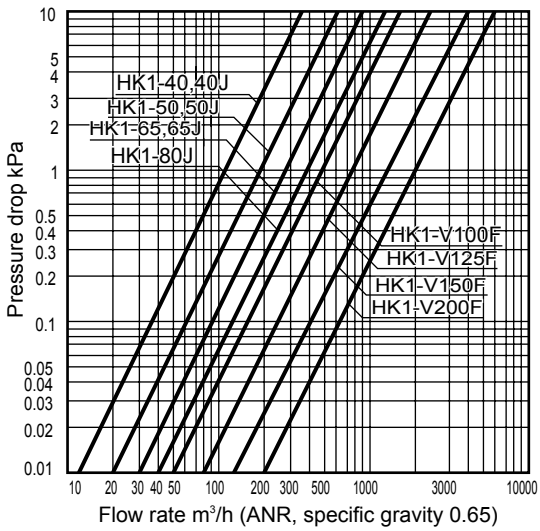
Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

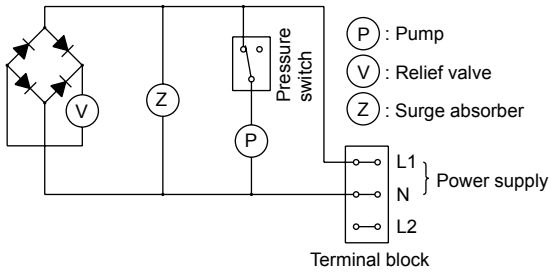
Item	HK1-40	HK1-40J	HK1-50	HK1-50J	HK1-65	HK1-65J	HK1-80J	HK1-V100F	HK1-V125F	HK1-V150F	HK1-V200F
Working fluid	City gas/natural gas/LPG										
Working pressure MPa	0 (≈0 psi) to 0.4 (≈58 psi)		0 (≈0 psi) to 0.25 (≈36 psi)		0 (≈0 psi) to 0.2 (≈29 psi)		0 to 0.14	0 to 0.1	0 to 0.06	0 to 0.04	0 to 0.023
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa) m³/h(ANR)	59		96		145		196	287	399	601	950
Cv	39		64		97		132	191	265	399	631
Rated voltage V	100 AC ±10% 200 AC ±10%										
Frequency Hz	Common in 50 and 60										
Power consumption (apparent power) VA — When opening	120 (100 VAC), 115 (200 VAC)										
Power consumption (apparent power) VA — When held open	12										
Ambient temperature °C	-15 (5°F) to +60 (140°F) (no freezing)										
Opening time s	30 or less (ambient temperature 0 to 60°C with rated voltage)										
Closing time s	1.0 or less										
Frequency Cycle/min.	4 or less										
Flow rate adjustment %	0 to 100								Without flow rate controller		
Mounting orientation	Vertical direction with the actuator up or horizontal direction with the terminal box side of actuator up										
Connection	Screw-in (Rp)	Flange (JIS10KRF)	Screw-in (Rp)	Flange (JIS10KRF)	Screw-in (Rp)	Flange (JIS10KRF)		Flange (DINPN16)			
Port size	1 1/2	40A	2	50A	2 1/2	65A	80A	100A	125A	150A	200A
Weight kg	9	21.5	9.2	10.7	12.7	14.3	15.3	19	24	32	52
Proof pressure MPa	0.6 (≈87 psi, 6 bar)							0.2	0.12	0.08	0.05
Degree of protection	IP54 (IP21 equivalent with HP terminal box)										

* Companion flange and gasket are supplied with DIN flange connection.

Flow characteristics



Electric circuit Fig.



* The contact of pressure switch indicates that the valve is closed.

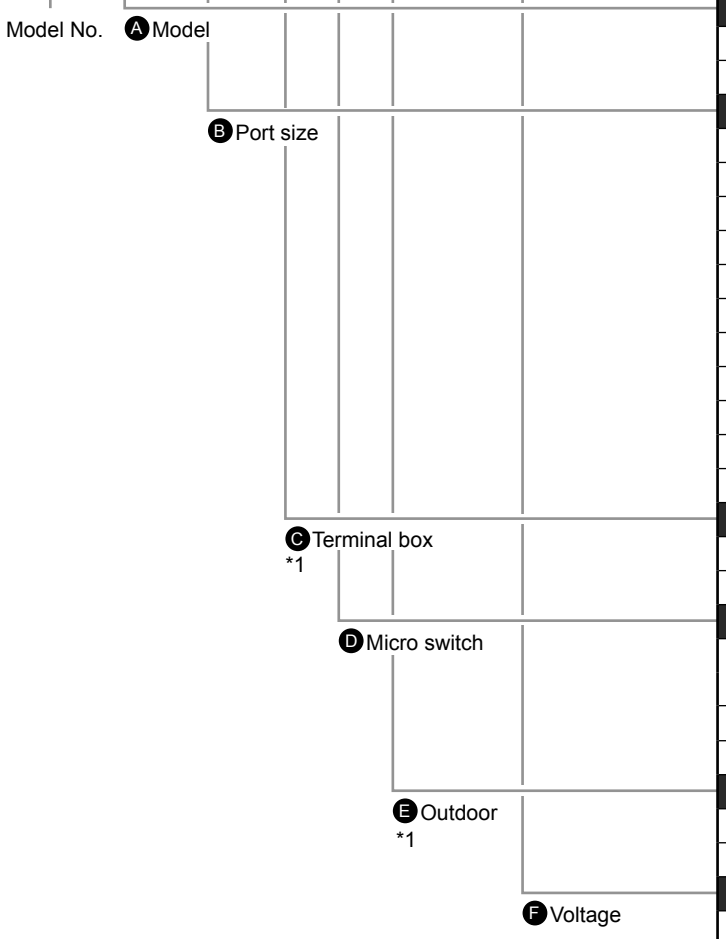
Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

How to order

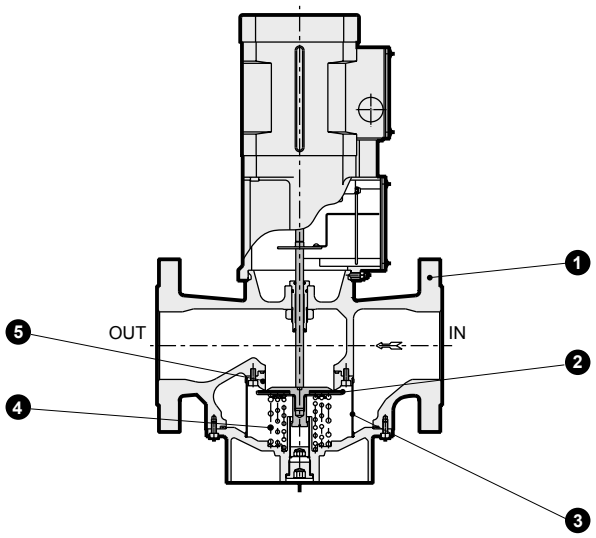
HK 1 - 40 - 3M S ZZ - AC100V



Code	Description	
Ⓐ Model		
1	ON-OFF 2-position control	
1E	ON-OFF 2-position control with micro switch	
Ⓑ Port size		
40	Screw-in Rp1 1/2	
50	Screw-in Rp2	
65	Screw-in Rp2 1/2	
40J	JIS Flange 40A	
50J	JIS Flange 50A	
65J	JIS Flange 65A	
80J	JIS Flange 80A	
V100F	DIN Flange 100A	
V125F	DIN Flange 125A	
V150F	DIN Flange 150A	
V200F	DIN Flange 200A	
Ⓒ Terminal box		
Blank	None	
3M	HP terminal box (G1/2)	
Ⓓ Micro switch		
Blank	For Ⓐ 1	Without micro switch
	For Ⓐ 1E	With valve opening confirmation micro switch
S	For Ⓐ 1E only	With valve closing confirmation micro switch
ES		With valve opening/closing confirmation micro switch
Ⓔ Outdoor		
Blank	Standard	
ZZ	Outdoor	
Ⓕ Voltage		
AC100V	100 VAC 50/60 Hz	
AC200V	200 VAC 50/60 HZ	

*1 : For ZZ of Ⓔ (outdoor), a round terminal box is automatically attached and 3M of Ⓒ (terminal box) cannot be selected.

Internal structure and parts list



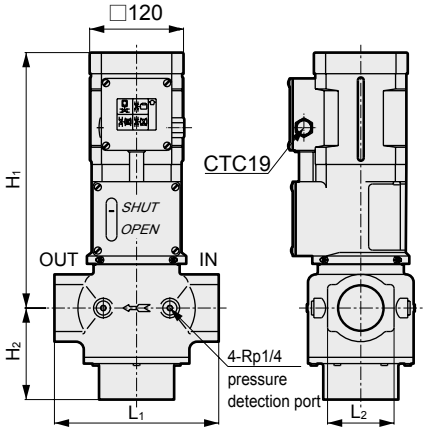
* The actuator part is rotated 90° in the figure.

Cannot be disassembled

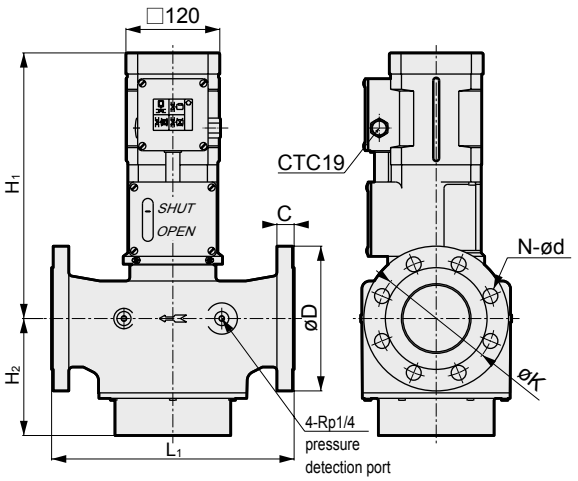
No.	Part name	Material
1	Body	Aluminum (except for 40J)
		Cast iron (40J)
2	Valve disc	Urethane rubber (40 to 80J)
		Nitrile rubber (V100F to V200F)
3	Filter	Stainless steel wire
4	Spring	Stainless steel wire
5	Valve seat	Aluminum

Dimensions

● HK1-40/50/65



● HK1-40J to 80J/V100F to V200F



Code / Model No.	Connection	H_1	H_2	L_1	L_2	C	øD	øK	N-ød
HK1-40	Thread connection	324	114	210	70	-	-	-	-
HK1-50		327	117	210	85	-	-	-	-
HK1-65		337	140	310	100	-	-	-	-
HK1-40J	JIS flange connection	324	114	230	-	20	140	105	4-19
HK1-50J		327	117	230	-	20	155	120	4-19
HK1-65J		337	140	290	-	22	175	140	4-19
HK1-80J		340	150	310	-	22	185	150	8-19
HK1-V100F	DIN flange connection	400	163	350	-	24	229	180	8-18
HK1-V125F		450	158	400	-	26	250	210	8-18
HK1-V150F		445	173	480	-	26	285	240	8-23
HK1-V200F		475	218	600	-	30	340	295	12-23

MEMO

Highly reliable shut off valve with integrated motor/hydraulic pump and large flow rate at low pressure (202 to 449 m^3/h (ANR))

Fluid operated 2-position shut off valve **HS Series**

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: 50A (JIS flange)/80A (JIS flange)

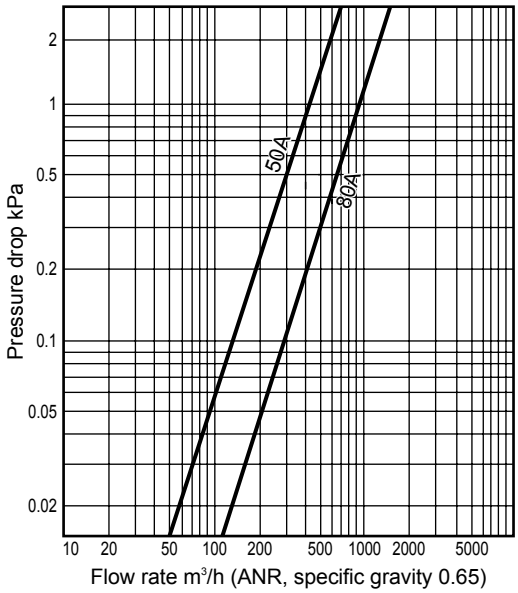
Features

- Reliable and long service-life actuator with integrated motor and hydraulic pump
- Excellent performance in safe gas shut off
- Indicator for checking valve open/close state
- Lightweight aluminum body
- Supplied terminal box makes wiring easier.

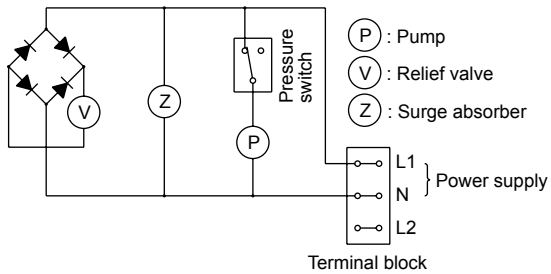
Specifications

Item		HS-50J	HS-80J
Working fluid		City gas/natural gas/LPG	
Working pressure	MPa	0 (≈0 psi, 0 bar) to 0.18 (≈26 psi, 1.8 bar)	0 (≈0 psi, 0 bar) to 0.06 (≈8.7 psi, 0.6 bar)
Flow rate Specific gravity of natural gas 0.65 △P = 0.25 kPa	m^3/h(ANR)	202	449
Cv		135	300
Rated voltage	V	100 AC ±10% 200 AC ±10%	
Frequency	Hz	Common in 50 and 60	
Power consumption (apparent power) VA	When opening	120 (100 VAC), 115 (200 VAC)	
	When held open	12	
Ambient temperature	°C	-15 (5°F) to +60 (140°F) (no freezing)	
Opening time	s	30 or less (ambient temperature 0 (32°F) to 60°C (140°F) with rated voltage)	
Closing time	s	1.0 or less	
Frequency	Cycle/min.	4 or less	
Mounting orientation		Vertical direction with the actuator up or horizontal direction with the terminal box side of actuator up	
Connection		Flange (JIS10KRF)	
Port size		50A	80A
Weight	kg	13	17
Proof pressure	MPa	0.6 (≈87 psi, 6 bar)	
Degree of protection		IP54 (IP21 equivalent with HP terminal box)	

Flow characteristics



Electric circuit Fig.



* The contact of pressure switch indicates that the valve is closed.

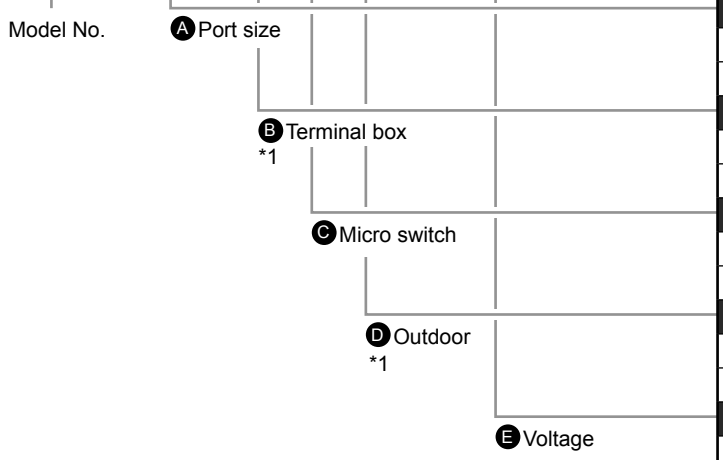
Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

How to order

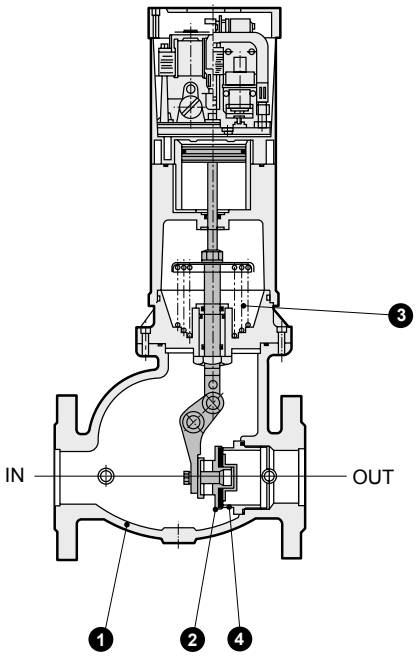
HS - **50J** - **3M** **E** **ZZ** - **AC100V**



Code	Description
Ⓐ Port size	
50J	JIS Flange 50A
80J	JIS Flange 80A
Ⓑ Terminal box	
Blank	None
3M	HP terminal box (G1/2)
Ⓒ Micro switch	
Blank	Without micro switch
E	With valve closing confirmation micro switch
Ⓓ Outdoor	
Blank	Standard
ZZ	Outdoor
Ⓔ Voltage	
AC100V	100 VAC 50/60 Hz
AC200V	200 VAC 50/60 HZ

*1 : For ZZ of Ⓓ (outdoor), a round terminal box is automatically attached and 3M of Ⓑ (terminal box) cannot be selected.

Internal structure and parts list

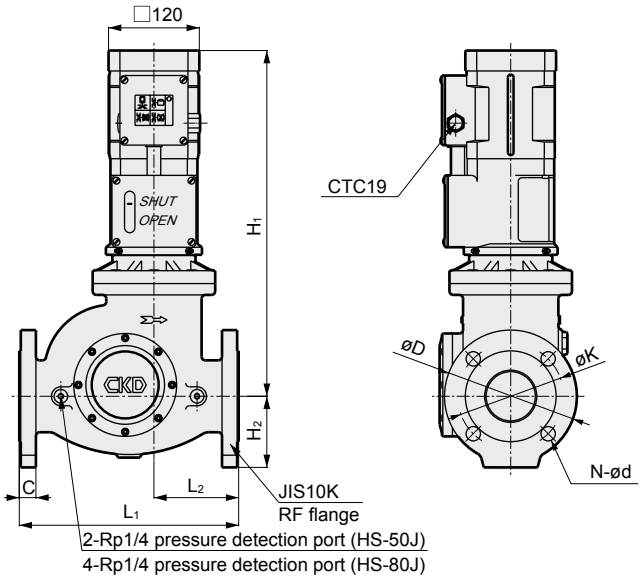


Cannot be disassembled

No.	Part name	Material
1	Body	Aluminum
2	Valve disc	Nitrile rubber
3	Spring	Piano wire
4	Valve seat	Aluminum

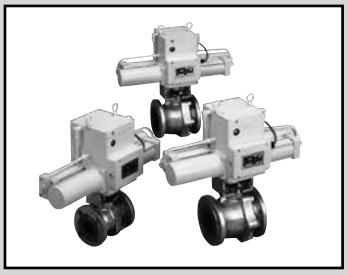
Dimensions

● HS-50J/80J



Code / Model No.	H_1	H_2	L_1	L_2	C	øD	øK	N-ød
HS-50J	434	82	230	83	20	155	120	4-19
HS-80J	465	100	310	112	22	185	150	8-19

MEMO



Ball valve actuation leveraging spring force and fail-safe mechanism for secure shut off.

Ball valve for automatic shut off **GASB Series**

- NC (open when energized)
- City gas/natural gas/LPG
- Port size: 50A (JIS flange)/80A (JIS flange)/100A (JIS flange)

Features

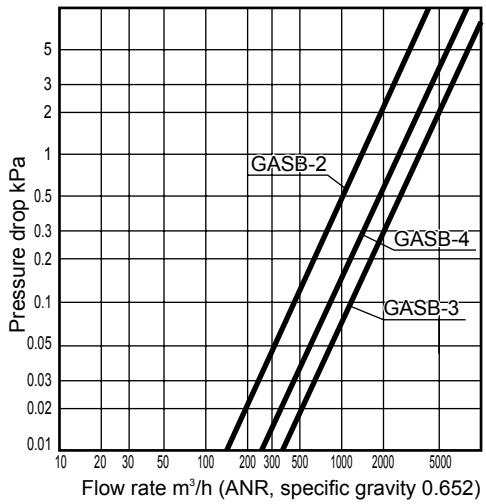
- Fail-safe mechanism to ensure the highest safety
- Supporting up to 1.0 MPa
- Energy-saving low watt
- Valve open/close indicator
  With operation confirmation switch
- Ductile cast iron body and stainless steel ball

Specifications

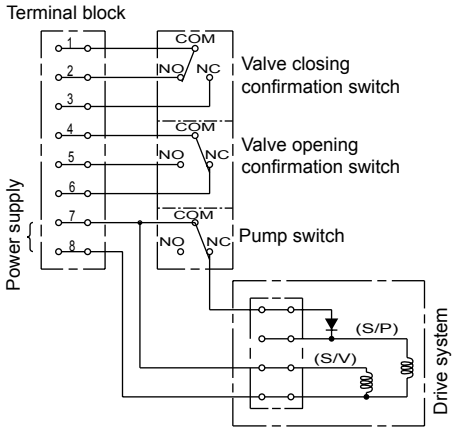
°F = 9/5°C + 32

Item		GASB-2	GASB-3	GASB-4
Working fluid		City gas/natural gas/LPG		
Working pressure	MPa	0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)		
Flow rate (Specific gravity of natural gas 0.65, △P = 0.25 kPa)	m³/h(ANR)	680	1780	1270
Cv		460	1200	860
Rated voltage	V	100 AC ±10% 200 AC ±10%		
Frequency	Hz	Common to 50 and 60		
Apparent power	When valve is opening	460		
VA	When valve is held open	44		
Power consumption	When valve is opening	150		
W	When valve is held open	15		
Ambient temperature	°C	-10 (14°F) to +60 (140°F) (no freezing)		
Opening time	s	20 or less (at 20°C, rated voltage), 60 or less (at -10°C, rated voltage)		
Closing time	s	2 or less (at 20°C (68°F))		
Frequency	Cycle/min.	1 or less		
Mounting orientation		Vertical with actuator up / horizontal with actuator horizontal (Note: when horizontal, SHUT side of valve open/close indicator should be on top when actuator is viewed from front.)		
Connection		Flange (JIS 10K RF)		
Port size		50A	80A	100A (reduced port)
Weight	kg	46	56	59
Proof pressure	MPa	1.5 (≈220 psi, 15 bar)		

Flow characteristics



Electric circuit Fig.



* The contact indicates that the valve is closed. The contact capacity of valve open/close confirmation limit switch is 250 VAC, 10 A.

Reference: conversion coefficient

Converted flow rate = (flow rate in table) x (coefficient)

Gas type	Natural gas (13A)	City gas (6B.6C)	Propane	Butane	Butane-air (6A)
Specific gravity (air = 1)	0.65	0.54	1.6	2.0	1.25
Coefficient	1.0	1.09	0.63	0.57	0.72

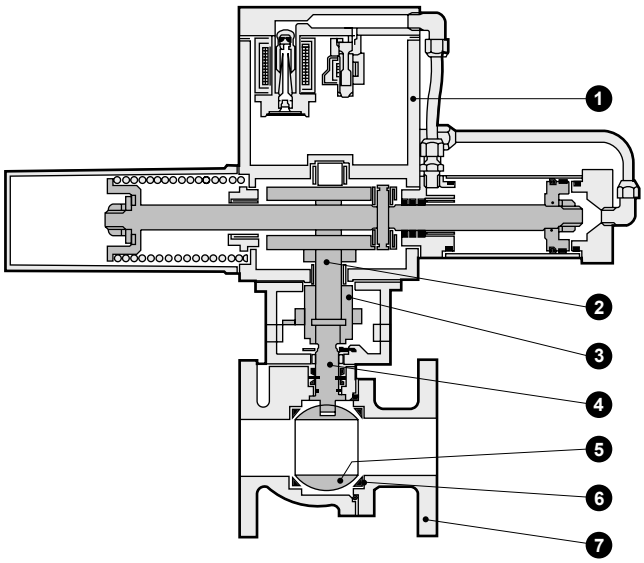
How to order

GASB - 2 - 1

- GASB: Model No.
- 2: Ⓐ Port size
- 1: Ⓑ Voltage

Code	Description
Ⓐ Port size	
2	JIS Flange 50A
3	JIS Flange 80A
4	JIS Flange 100A
Ⓑ Voltage	
1	100 VAC 50/60 Hz
2	200 VAC 50/60 Hz

Internal structure and parts list



● Opening operation
Hydraulic pressure generated by the solenoid pump drives the piston in the cylinder. Then a rotation torque is applied to the drive shaft to change the ball valve from the fully closed to fully open state.

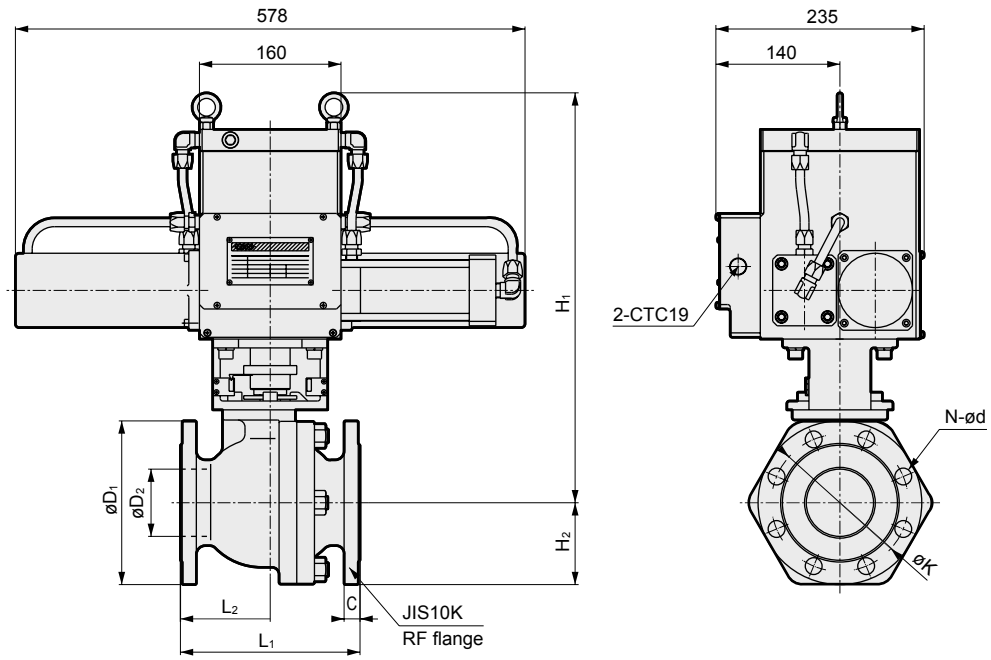
● Closing operation
When power is turned OFF, the spring force accumulated by the return spring automatically returns the valve from the fully open to fully closed state.

Cannot be disassembled

No.	Part name	Material
1	Housing	Cast iron
2	Drive shaft	Steel
3	Coupling	Steel
4	Stem	Stainless steel
5	Ball	Stainless steel
6	Ball seat	Tetrafluoroethylene resin
7	Body	Ductile cast iron

Dimensions

● GASB-2/3/4



Code / Model No.	H_1	H_2	L_1	L_2	C	$øD_1$	$øD_2$	øK	N-ød
GASB-2	425	78	178	79	16	155	50	120	4-19
GASB-3	462	93	203	102	18	185	76	150	8-19
GASB-4	462	105	229	114	18	210	102	175	8-19

DIN standards

DIN Standard

1 Safety

DIN standards have been developed to achieve the overall safety of combustion systems by implementing regulations to obtain the highest level of system safety and reliability.
They also apply to individual system components in terms of the safety and reliability of their characteristics and structure.

● Solenoid valve/shut off valve (applicable standards: DIN3394 and DIN3391)

1. Leakage..... Internal leakage and external leakage measured after the specified number of ON-OFF operations (25A or less: 200,000 times, up to 50A: 150,000 times, up to 80A: 100,000 times, up to 150A: 50,000 times, and larger: 20,000 times) are strictly specified in the table below.
2. Leakage test..... Leakage test is performed with pressure applied from the direction in which the valve easily opens.
3. Valve shut off force.. The spring must endure 10 million times of ON/OFF operations to ensure reliability of valve closing operation.
4. Integrated strainer... The strainer must be integrated to prevent dust and foreign matter from adhering to the valve seat.

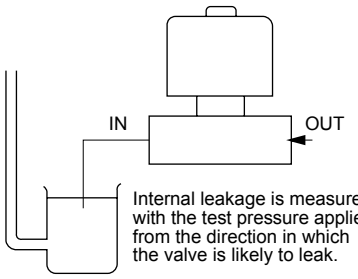
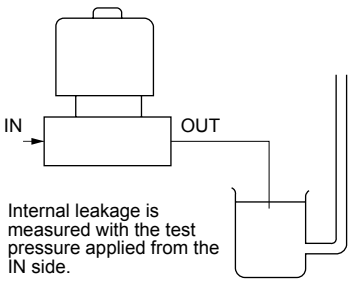
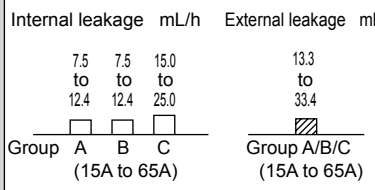
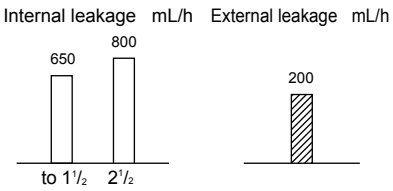
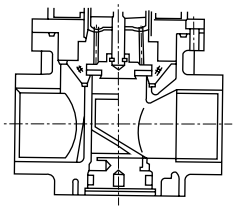
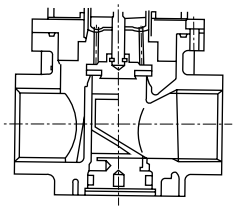
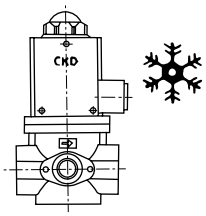
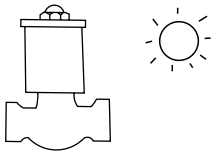
Allowable leakage (internal and external, sourced from DIN3394)

Group	Max. working pressure Pe, zul kPa	Internal leakage		External leakage	
		Test pressure kPa	* Max. allowable pressure rise kPa	Test pressure kPa	* Max. allowable pressure drop kPa
A	From 5 to 15 or less	15	0.03	1.5×Pe,zul at least 15	0.06
	>15	$\frac{1.1Pe,zul \times d-0.4}{8.12\sqrt{Pe,zul}}$ at least and ≥ 15 and max. 500			
B	≥ 5	5			
C	≥ 5	1	0.06		

* Fluctuations in pressure during pressure rise and pressure drop are tested for 5 minutes.

* d = valve seat size (mm)

Comparison of standards of solenoid valves for gas

	DIN3391/DIN3394	Other standards
Internal leakage measuring method	 Internal leakage is measured with the test pressure applied from the direction in which the valve is likely to leak.	 Internal leakage is measured with the test pressure applied from the IN side.
Allowable leakage		
Installation of strainer	 Integration of strainer is specified.	 Integration of strainer is not specified.
Allowable min. temperature of solenoid valve	 Operation at -15°C must be guaranteed.	 Operation at 0°C must be guaranteed.

Gas combustion systems: Warnings and Precautions

Be sure to read this section before use.

Gas combustion systems

When designing and manufacturing equipment using CKD products, the manufacturer is obligated to ensure that the safety of the mechanism, gas/pneumatic control circuit and/or water control circuit and the system that runs the electrical controls are secured.
It is important to select, use, handle and maintain CKD products appropriately to ensure their safe usage.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠ WARNING

1. This product is designed and manufactured as a general gas combustion system control component. It must be handled by an operator having sufficient knowledge and experience.
2. Observe organization standards and regulations, etc., related to the safety of the device design and control, etc.
   JIS B 8415 (General safety code for industrial combustion furnaces)
   The Japan Gas Association (Technical Safety Guidelines for Industrial Gas Combustion Systems)
   The Japan Gas Association (Technical Safety Guidelines for Gas Boiler Combustion Systems)
   Including the High Pressure Gas Safety Act, Industrial Safety and Health Act, other safety rules, organization standards and regulations, etc.
3. Do not handle, pipe, or remove devices before confirming safety.
   ❶ Inspect and service the machine and devices after confirming safety of all systems related to this product.
   ❷ Note that there may be hot or charged sections even after operation is stopped.
   ❸ When inspecting or maintaining equipment, be sure to shut off gas supply and the relevant power supply, using caution to avoid leakage and ground fault.

Design/selection

1. Safety design

⚠ WARNING

■ Take measures to prevent physical harm or property damage in the event of failure of this product.

⚠ CAUTION

■ Vibration
Install this product in a place not subject to vibration.

2. Working fluid

⚠ WARNING

■ Working fluids
(1) Do not use any fluid other than the working fluids specified in the catalog.
(2) If used with compressed air or blown air, foreign matter, moisture, oil, etc., in the air will lead to operation faults or leaks.
(3) If used for fluids other than city gas, natural gas, or LPG, foreign matter, moisture, oil, corrosive elements, etc., in the fluid will lead to operation faults or leaks.
(4) Depending on the model, internal parts may wear when the valve operates. Caution is required because wear chips could enter the secondary side of the valve.

■ Quality of fluid
Iron rust and debris in the fluid can cause operation faults or leaks, and deteriorate product performance. Provide measures to remove foreign matter.

■ When using this product with LPG (propane gas or butane gas), depending on the gas quality, a viscous substance may be generated that can cause operation failure or deterioration of rubber sealing material thanks to its oil, which can further result in internal or external leakage. Conduct a periodic inspection at least once a year to ensure correct operation and that there are no leaks.

3. Working environment

⚠ WARNING

■ Do not use this product near a heat generating source or in a location where it may be exposed to radiant heat.

■ Use this product within the specified ambient temperature range.

■ Take appropriate safeguards according to the degree of protection listed in the catalog specifications. Consult with CKD when using outdoors.

■ This product should not be used in any conditions where exposure to corrosive gas, solvents, water, or vapor may occur, or in any other atmospheric conditions that may deteriorate or damage the component materials.
Ensure that the product is free of water droplets, oil, and metal chips.

■ Dust-proofing and drip-proofing
The performance of the dust- and drip-proof structure of this product is subject to change with working environments and aging, and therefore is not guaranteed. Install in a place where the product is not exposed to rain, water, direct sunlight, or dust.

4. Securing of space

⚠ CAUTION

■ Securing maintenance space
Secure sufficient space for maintenance and inspection.

1. Installation

CAUTION

- Be sure to read the instruction manual thoroughly before installing the product.
- In the case of models with solenoid valves, do not apply external force to the coil during installation.
- After installation, check for leaks from pipes, for proper wire connections and that the product is installed correctly.
- While some shutoff valves are equipped with a simple filter or a strainer, always install a filter or strainer that enables element cleaning and replacement in front of the shut off valve for the removal of dirt and foreign matter.

2. Piping

CAUTION

- Observe the effective thread length for the piping threads. Chamfer the end of the thread section by approx. a half-pitch.
- If excessive sealant (sealing tape, gel-type sealant) is applied when piping, it could enter the product and cause malfunctions.
- When applying or wrapping sealant on the piping material, apply or wind it from the pipe end along the thread section, and leave 1.5 to 2 threads uncovered.

3. Wiring

WARNING

- Ensure that the operation power supply for the safety shut off valve is correctly connected.

● Example of faulty operation power supply connection

This is an informative actual case where an explosion occurred in the combustion system.
The cause is the incorrect connection of the operation power supply as shown in Fig.1. (When the high potential side H and ground side G connections were reversed, the line between the monitoring relay and the shutoff valve happened to be grounded.)
As a result, ground current flowed into the safety shut off valve the moment the power was supplied, which opened the valve, allowing a massive amount of unburned gas to flow out from the burner.
This mixed with pre-purge air, creating an explosive mixture, which exploded when ignited.

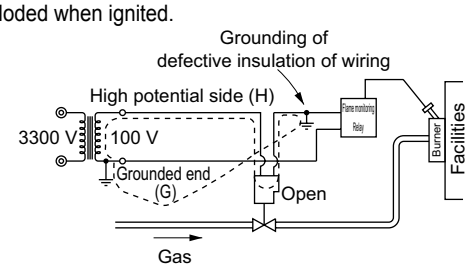


Fig.1 Example of faulty operation power supply connection

● Correct connection of operation power supply

Connecting the operation power supply's high potential side H and ground side G correctly as shown in Fig.2 can prevent ground current from flowing into the safety shut off valve even when there is an insulation failure. This prevents the valve from opening, and therefore there is no risk of gas outflow.

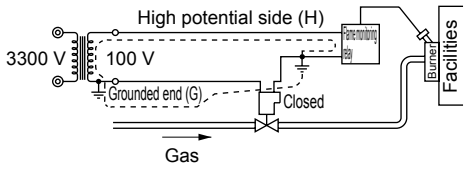
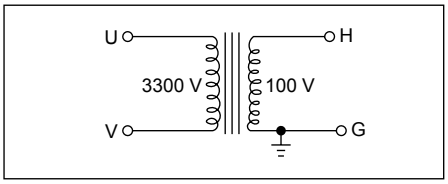


Fig.2 Correct connection of operation power supply

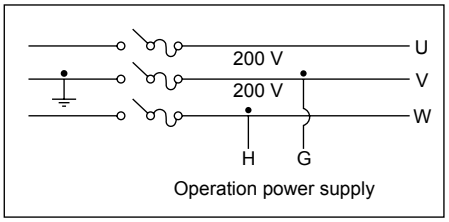
Excerpt from Volume 27 of the Journal of the Society of High Pressure Gas Industry

● Single-phase 100 V



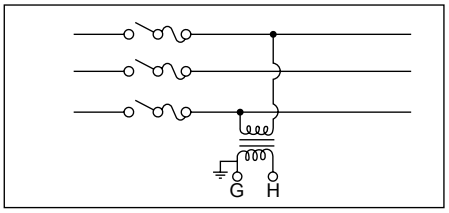
The secondary side of the transformer is always grounded on one side, and the high potential side (H) and ground side (G) are identified.
In this case, correctly connect both the (H) and (G) sides.

● Three-phase 200 V



(1)When one of the three lines on the secondary side is grounded

To select this kind of three-phase power cable as the operation power supply, be sure to select the ground line (V), that is, (G) side, and either of the remaining lines as the (H) side.



(2)When none of the three lines on the secondary side are grounded

For the operation power supply, install a transformer dedicated for safety operation circuits and ground one side of the lines.

- The wiring of the operation power supply should be in accordance with JIS B 9960-1 Safety of Machinery - Electrical Equipment of Machines - Part 1: General Requirements. Install an overcurrent protector (a circuit protector or a shutoff mechanism for wiring) for the operation power supply.

CAUTION

- Use within the working pressure range. The equipment may be damaged if a pressure that exceeds the proof pressure range is applied.
- Provide a circuit breaker, such as a fuse, on the control circuit to protect electrical equipment.
- Use of a switching circuit which does not generate contact chattering will increase the durability of the solenoid valves and motor driven valves.

Gas combustion systems: Warnings and Precautions

Be sure to read this section before use.

Use/maintenance

1. Maintenance and inspection

WARNING

■ Conduct periodic inspections to check for any gas leakage from the safety shut off valve.
Even a safety shut off valve with the most powerful spring cannot close completely if there is any foreign matter left in the valve seat; such a condition can cause gas leaks into the furnace. Considering that such gas leaks do actually occur frequently, be sure to conduct periodic inspections.

● Periodic inspection
Close valve (1) and connect a rubber hose to the tip of test valve (3). Immerse the tip of the rubber hose in a container filled with water about 10 mm deep. Check for any bubbles when the test valve (3) is opened.
If the bubbles continue and do not stop, it indicates a leak in the safety shut off valve. Repair or replace the safety shut off valve.
For an accurate measurement of leakage, collect the gas in a measuring cylinder filled with water. (Refer to Fig. 3)
(Follow the periodic inspection guide provided in the equipment's technical safety guidelines.)

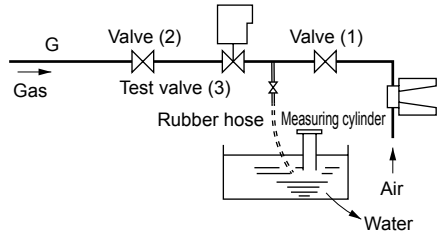


Fig.3 Test method for the safety shut off valve

CAUTION

■ Do not use valves as footing or place any heavy objects on top of the valves.

■ If the product has been out of use for one month or more, perform a test run before starting the actual operation.

■ Read the instruction manual thoroughly and make sure you understand the content before performing maintenance.

■ Always turn the power OFF and release any fluids or pressure before starting maintenance.

■ Pay attention to clogging of the strainer and filter.

2. Disassembly/assembly

WARNING

■ Do not disassemble the inside of the valve or the automatic burner controller.

Product-specific cautions

Design/selection

WARNING

■ Solenoid valve

- Solenoid valves are not designed to function as a safety valve, such as an emergency shut off valve. When using in such a system, always take separate measures that will ensure safety.

■ Motorized valves and ball valves

- Motorized valves and ball valves are not designed to function as a safety valve, such as an emergency shut off valve. When using in such a system, always take separate measures that will ensure safety.

CAUTION

■ Solenoid valve

- Make sure that the secondary pressure does not exceed the primary pressure of the solenoid valve.

■ Motorized valves and ball valves

- The inside of the actuator of a motorized valve or a ball valve is filled with operating fluid. The viscosity of this fluid changes with temperature, which means that the valve opening operation time is dependent on ambient temperature.
  The operating fluid is more viscous particularly in lower temperatures. Note that in lower temperatures, the valve opening operation time can be longer compared to that in normal temperatures.

■ Ball valves

- A half-wave rectification circuit is built into the ball valve actuator, which cannot be used with an uninterrupted power supply (UPS).

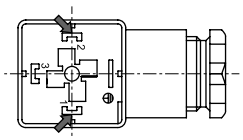
Mounting, installation, and adjustment

CAUTION

GHV

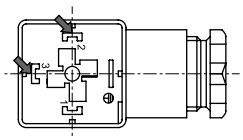
- When carrying this product, hold the body of the product.
- After connecting the pipes, always check for any leakage in all connected parts.
- Wire the power supply as follows by removing the terminal box. There is no polarity.

Using 100 VAC



Wire terminals 1 and 2

Using 200 VAC



Wire terminals 2 and 3

Use/maintenance

WARNING

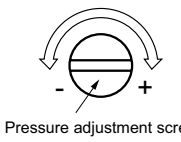
■ Solenoid valve

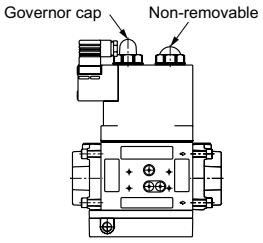
- Note that the surface of the solenoid valve can be hot thanks to the temperature increase in the coil. (Approx. 90°C) (Performance is not affected by higher surface temperatures.)
- There is a risk of electric shock by touching the electrical wiring connections (bare, live parts). Always turn the power OFF before inspection. Never touch the live parts with wet hands.

CAUTION

GHV

- To adjust the pressure, loosen the governor cap to remove it, and turn the pressure adjustment screw using a flathead screwdriver. Install a pressure gauge on the secondary side and adjust the pressure while checking the actual pressure. A stopper is triggered when the upper or lower limit of the adjustable pressure range is reached, preventing further turning. Forcibly turning the screw can damage the adjustment screw, creating a risk of gas leakage.
  Pressure rises when the screw is turned clockwise and drops when the screw is turned counterclockwise.





Automatic watering control systems

For watering of urban greenery, golf courses, grounds, protected horticulture, and farmlands, etc.

Overview

Watering system equipment by CKD widely in use for watering of urban greenery/greenery on rooftops and within buildings/ grounds/parks/greenbelts.

Features

Automatic watering controller for urban greenery, golf courses, grounds, protected horticulture, and farmlands, etc.

Supports a variety of usage programs

Capable of supporting watering on specific days of the week, intermittent watering, and sensor detected watering, etc.

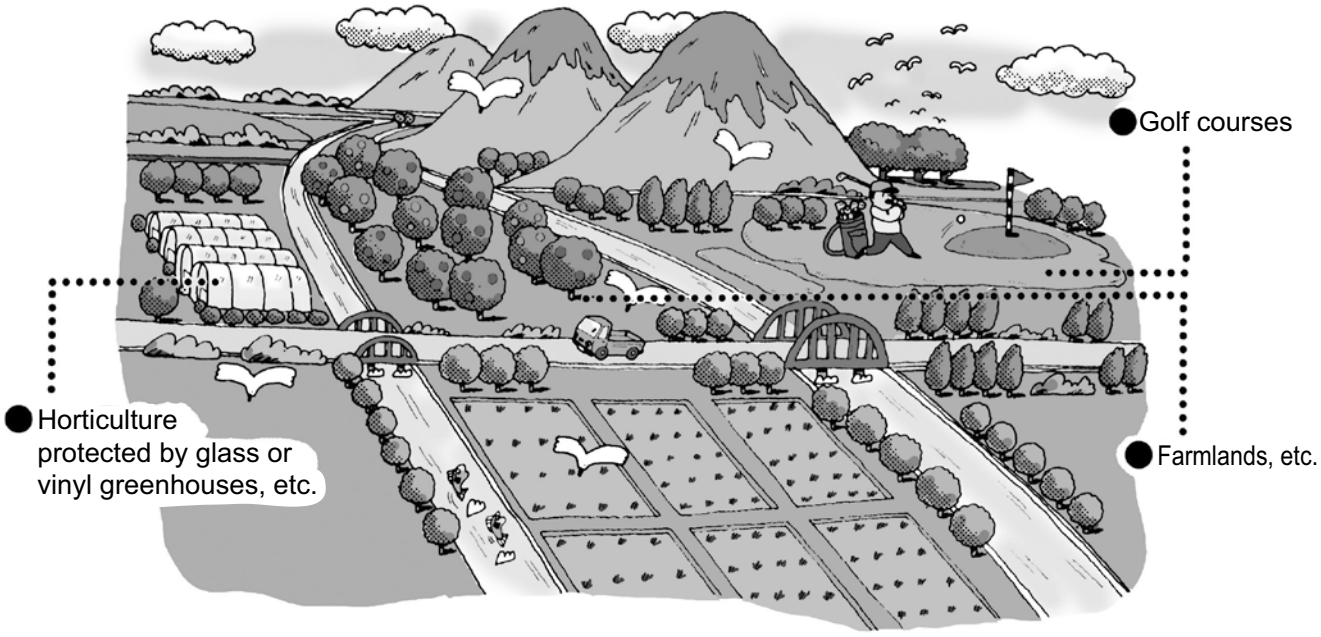
Wide variation

Available selections of solar powered systems, commercial power supply powered systems, and alkaline battery powered systems.

Measures against lightning-induced failures

Use in combination with an automatic watering valve supplied by CKD.

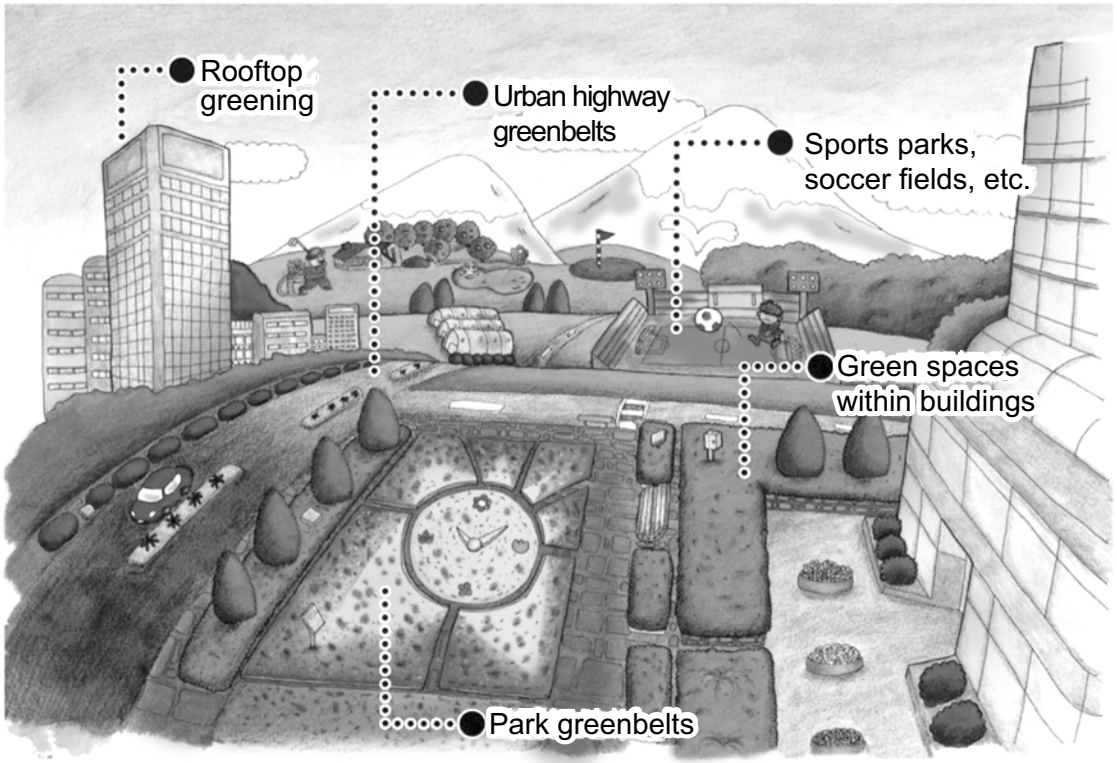
CONTENTS



For economic watering of parks and greenbelts, etc.

Watering system equipment by CKD ideal for automation of water supplies, watering, and irrigation.

Watering system equipment by CKD widely in use for watering of urban greenery/greenery on rooftops and within buildings/grounds/parks/greenbelts. Realizes economic watering of greenery in tune with the era of power and energy conservation to protect the environment.



Automatic watering control systems - list of series

Watering controller, solenoid valve selection guide

* Series column: ●: Standard product
○: Made-to-order product

	Applications	Model No.	Classification, method			Series									Page
Controller	Watering of urban parks, building greenery, golf courses, soccer fields, farmlands, gardens	RSC-S5 · Solar power generation · Pulse output · Pole mounted 	Solar battery method			Channel									1040
						1	2	4	6	8	12	16			
				· Watering on specific days of the week (WP)					●						
		RSC-G · Commercial power supply · Pulse output · Wall mounted 	Commercial power supply method			1	2	4	6	8	12	16			1042
				· Watering on specific days of the week (WP)					●						
		RSC-$\frac{1}{2}$WP · Dry cell battery · Pulse output · Pole mounted 	Alkaline battery method			1	2	4	6	8	12	16			RSC-1WP: 1044 RSC-2WP: 1048
				· Watering on specific days of the week		●	●								
Rain sensor	Golf course greenery	RS-6 	Power supply not required			Operating rain volume (mm)									1050
						6									
				No-voltage a-contact output		●									
Solenoid valve	Agricultural and industrial water/river water watering/irrigation/fertilizer spraying	RSV-K · Metal · Thread connection (A) · Flange connection (F) 			Connection	Bore size									1052
						15	20	25	32	40	50	65	80	100	
			· Continuous energizing		Screw-in		●	●	●	●	●	●	●		
					Flange					●	●	●	●	○	
			· Pulse energizing (P)		Screw-in		●	●	●	●	●	●	●		
					Flange					●	●	●	●	○	
		GSV2 · Union connection 				15	20	25	32	40	50	60	80	100	
			· Continuous energizing		Union		●	●		●	●				1056
			· Pulse energizing (P)												
		GSV · Resin · Thread connection (A) 				15	20	25	32	40	50	65	80	100	1058
			· Continuous energizing		Screw-in			●			●				
			· Pulse energizing (P)												
	Tap water supply/watering	RSV-W · Metal · Thread connection (A) 				15	20	25	32	40	50	65	80	100	1062
			· Continuous energizing		Screw-in	●	●	●	●	●	●				
			· Pulse energizing (7L)				●	●	●	●	●				

Automatic watering controller for golf courses, greenbelts, farmlands, etc.

RSC-S5 solar controller

- Commercial power supply not required (solar battery)
- Day of the week configuration

Main applications

- Watering of golf courses and soccer fields
- Watering of farmlands and orchards
- Watering of parks and urban greenbelts
- Watering of greenery within buildings and on rooftops
- Watering for prevention of dust pollution
- Other watering in places where a commercial power supply is not available

Applicable solenoid valve series

Latch (pulse voltage)

- RSV-20A-210K-P to 100F-210-P
- RSV-20A-210W-7L011-DC6V to 50A
- GSV2-20* to 50*
- GSV-25A-25-P / 50A

Overview

- Commercial power supply not required
- Can be freely installed in any direction
- Rust-free with a stainless steel box
- Low cost of facilities and construction
- Capable of configuring programs max. 9 times per day
- Capable of sequentially or arbitrarily configuring the watering order
- Capable of temporary and manual watering
- Measures against lightning-induced failures
- Battery protection circuit equipped
- Capable of control up to 500 m with 1.25 mm^2 2-conductor wires

Specifications

Item	RSC-S5-6WP
Watering setting method	Arbitrary configuration of days of the week
Watering order	Sequentially (arbitrarily also available)
Configuration and No. of times to water	Max. 9 times/day
Watering time	Arbitrary for every channel
Upper limit of watering time	Up to 23 hours 59 minutes/day for each time
Temporarily programmed watering	Available
Skip watering function	Available
Simultaneous watering	Available
Manual watering	Available
External stop	Available
Control output voltage	Polarity inverted pulse energizing (6 to 12 VDC)
Control No. (CH No.)	6CH
Connected solenoid valve No.	1/CH
Lightning-induced failure prevention	Anti-surge 2500 A (8/20 μs) varistor integrated
Control distance (2-conductor)	500 m/1.25 mm^2, 800 m/2 mm^2
Solar cell (solar battery)	6 VDC 1.3 W
Lead storage battery	6 VDC 5,000 mAh
Ambient temperature	-5 (23°F) to 40°C (104°F)
Storage ambient temperature	-25 (-13°F) to 60°C (140°F)
Option	Pole (RSC-S-POLE), rain sensor (RS-6)
Material/paint color/weight	SUS304 t1.5, 7.5BG6/1.5 glossy (gray-based), 9.5kg
Installation	Outdoors
Stopping watering with rain sensor (RS-6)	Available (rain sensor can be mounted on the body of the controller)

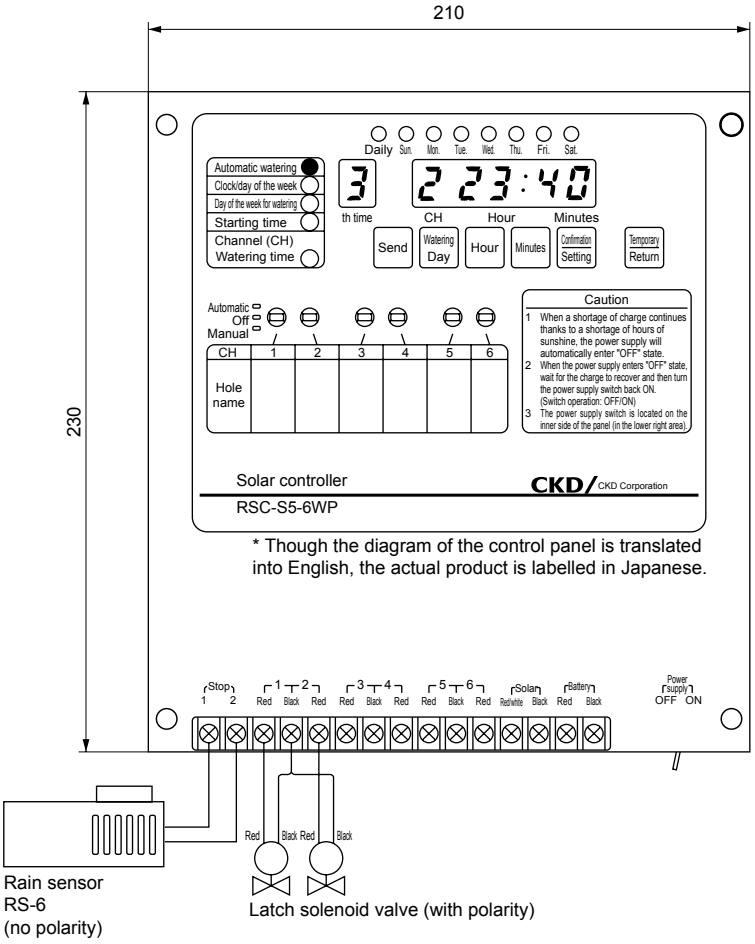
How to order

RSC-S5- 6 W P

- 6: Channel No.: 6CH
- W: Watering method: Day of the week
- P: Control method: Pulse voltage

Control unit operating section/wiring

● Example of the RSC-S5-6WP



* Though the diagram of the control panel is translated into English, the actual product is labelled in Japanese.

Caution

● Always read the precautions in the attached instruction manual before starting use.

● In order to maintain power generating efficiency, perform daily inspections to always keep the solar panel surface clean and make sure the unit is installed in a location that is exposed to sunlight.
The power generating efficiency of the solar cells will decrease due to adhesion of bird droppings or dead leaves and will void the ability to control watering.

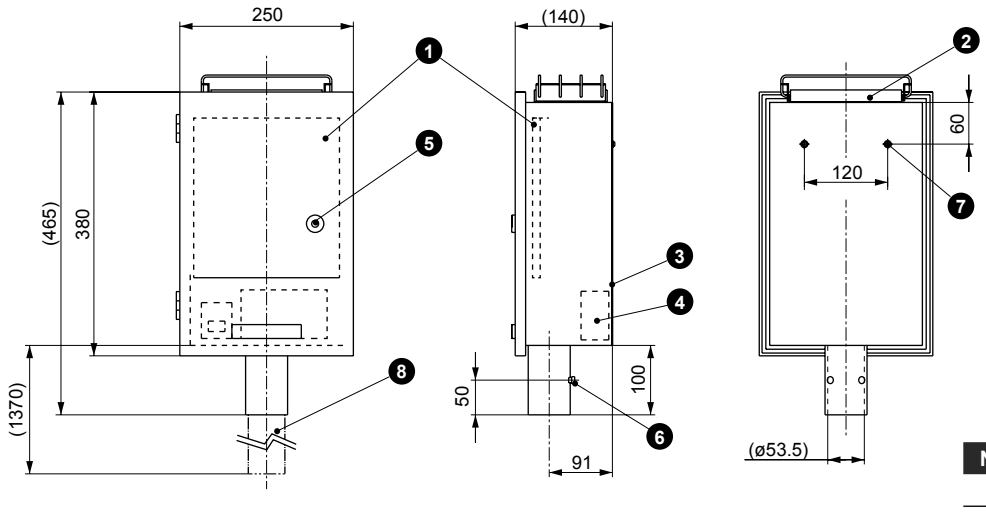
● When the battery voltage decreases, the battery protection circuit will operate and the display will be ineffective even when the confirmation button is pressed.
After recovery of the battery voltage, turn the power supply back ON and re-configure the unit.

● Manual operation will be given the highest priority.
Manual Operation > Stop > Temporary Operation > Automatic Operation

● Make sure the unit is installed in a location that is exposed to sunlight (for 4 hours and over/day).

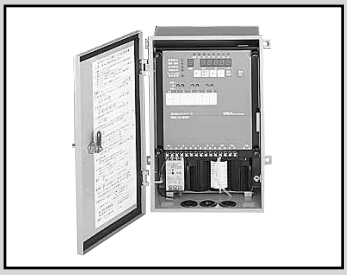
● When the rain sensor (RS-6) is connected to the stop terminal, watering will be stopped when the cumulative rain volume has reached 6 mm. Recovery will be performed automatically depending on the situation of the weather.

Internal structure and dimensions



No.	Part name
1	Control unit
2	Solar cell (solar battery)
3	Box (stainless steel)
4	Lead storage battery (battery)
5	Coin lock with cap
6	Hexagon head bolt
7	⊕ pan head screw
8	Pole (separately sold option)
9	Cable bushing (included)
10	Key (included)

Paint color: 7.5BG6/1.5 glossy (gray-based)



Automatic watering controller for greenery, parks, grounds, etc.

RSC-G watering controller

- Free power supply 100/200 VAC shared (commercial power supply)
- Day of the week configuration

Main applications

- Watering of parks and urban greenbelts
- Watering of greenery within buildings and on rooftops
- Watering of various grounds such as soccer fields
- Watering of farmlands and orchards
- Watering for prevention of dust pollution
- Others

Applicable solenoid valve series

Latch (pulse voltage)

- RSV-20A-210K-P to 100F-210-P
- RSV-20A-210W-7L011-DC6V to 50A
- GSV2-20* to 50*
- GSV-25A-25-P / 50A

Overview

- Commercial power supply free input (85 VAC to 264 VAC, 50/60Hz)
- Capable of control up to 500 m with 1.25 mm^2 2-conductor wires
- Rust-free with a stainless steel box
- Power failure memory protection for a max. of 40 days
- Capable of configuring programs max. 9 times per day
- Capable of sequentially or arbitrarily configuring the watering order
- Capable of temporary and manual watering
- Measures against lightning-induced failures

Specifications

Item	RSC-G-6WP
Watering setting method	Arbitrary configuration of days of the week
Watering order	Sequentially (arbitrarily also available)
Configuration and No. of times to water	Max. 9 times/day
Watering time	Arbitrary for every channel
Upper limit of watering time	Up to 23 hours 59 minutes/day for each time
Temporarily programmed watering	Available
Skip watering function	Available
Simultaneous watering	Available
Manual watering	Available
External stop	Available
Control output voltage	Polarity inverted pulse energizing (6 to 12 VDC)
Power consumption	20 W/30 W or less (100 V/200 V)
Control No. (CH No.)	6CH
Connected solenoid valve No.	1/CH
Lightning-induced failure prevention	Anti-surge 2500 A (8/20 μs) varistor integrated
Control distance (2-conductor)	500 m/1.25 mm^2, 800 m/2 mm^2
Rated voltage	85 to 264 VAC, 50/60 Hz
Power failure protection	40 days or more (only after the unit has been energized for 48 hours or more)
Ambient temperature	-5 (23°F) to 40°C (104°F)
Storage ambient temperature	-25 (-13°F) to 60°C (140°F)
Option	Rain sensor (RS-6)
Box material/paint color/weight	SUS304 t1.5, 7.5BG6/1.5 glossy (gray-based), 9.5kg
Installation	Indoors, outdoors
Stopping watering with rain sensor (RS-6) *1	Available

*1 As the rain sensor cannot be mounted on the body of the controller, be sure to separately install and fix the sensor in a location within 5 m from the unit.

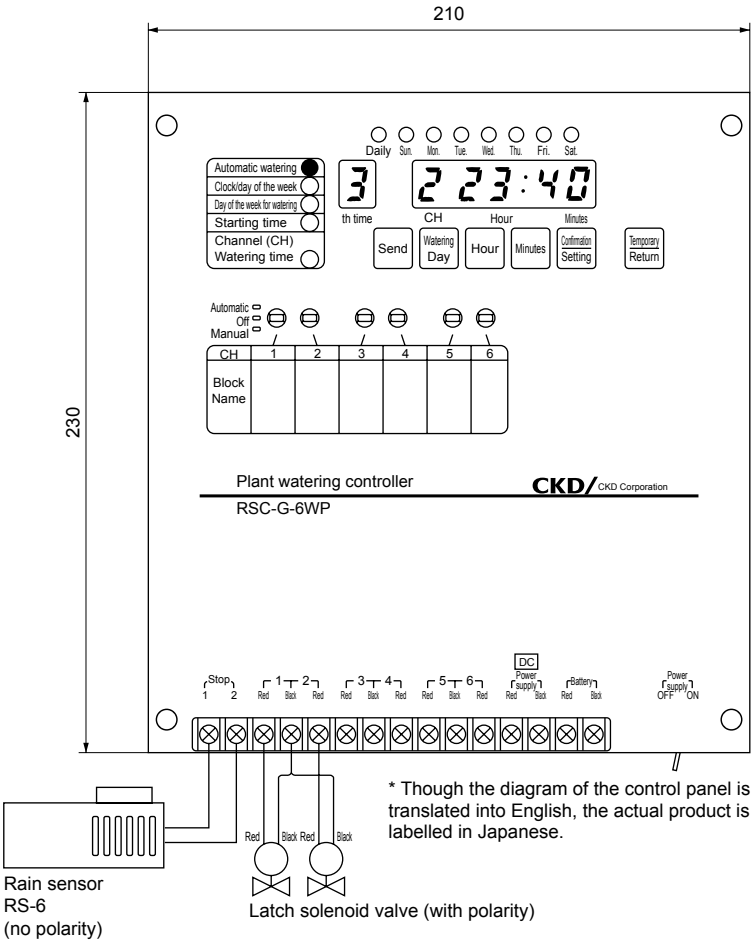
How to order

RSC-G- 6 W P

- 6 — Channel No.: 6CH
- W — Watering method: Day of the week
- P — Control method: Pulse voltage

Control unit operating section/wiring

● Example of the RSC-G-6WP

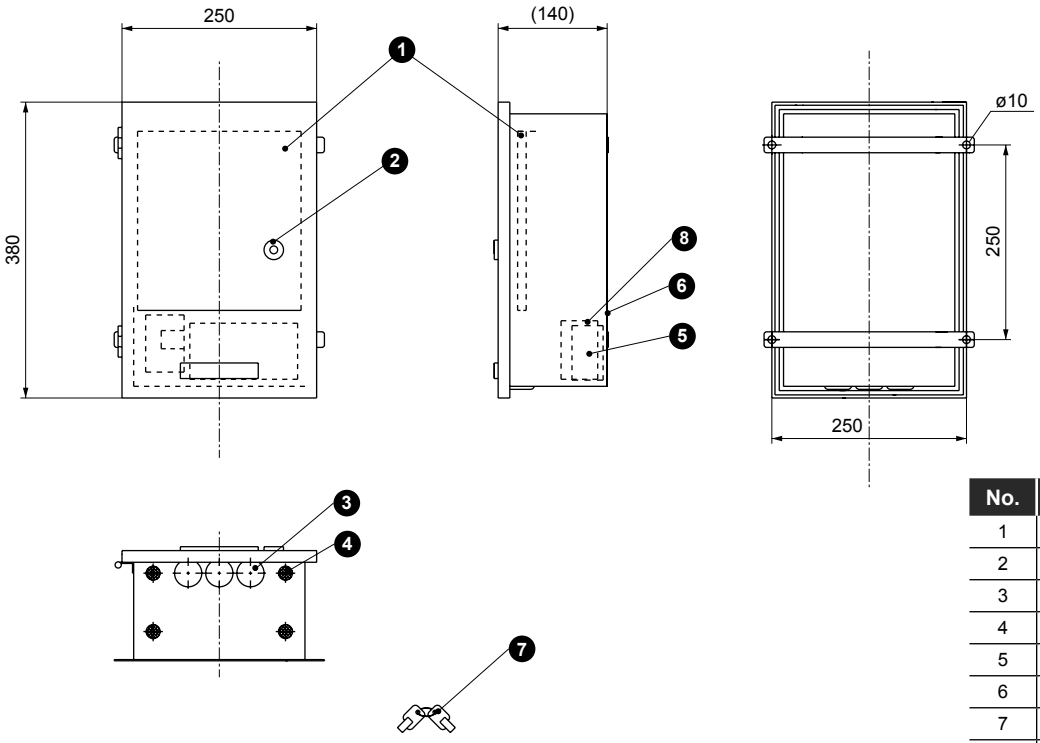


* Though the diagram of the control panel is translated into English, the actual product is labelled in Japanese.

Caution

- Always read the precautions in the instruction manual before starting use.
- When fixing the box onto a pole, be sure to use the mounting brackets (PM-317, PM-323, PM-330, PM-340) manufactured by Nitto Kogyo.
- When the storage battery voltage decreases thanks to power failure (40 days and over), etc., the battery protection circuit will automatically operate and the power supply will enter a state of being "OFF". In this case, wait for the charge to recover with a commercial power supply, turn the power supply switch back ON, and configure the program.
- Manual operation will be given the highest priority. Manual Operation > Stop > Temporary Operation > Automatic Operation
- When the rain sensor (RS-6) is connected to the stop terminal, watering will be stopped when the cumulative rain volume has reached 6 mm. Recovery will be performed automatically depending on the situation of the weather.

Internal structure and dimensions



No.	Part name
1	Control unit
2	Coin lock with cap
3	Grommet with membrane
4	Ventilation hole
5	Lead storage battery
6	Box (stainless steel)
7	Key (included)
8	Switching power supply

Paint color: 7.5BG6/1.5 glossy (gray-based)

Automatic watering controller for greenery, parks, and farmlands, etc.

RSC-1WP battery operated watering controller

- Outdoor to match greenery
- Day of the week configuration

Main applications

- Watering of parks and urban greenbelts
- Watering of greenery within buildings and on rooftops
- Watering of indoor plantings
- Watering of gardens
- Watering for amusement
- Watering of protected horticulture and outdoor cultured vegetables
- Watering in places where a commercial power supply is not available, etc.

Applicable solenoid valve series

Latch (pulse voltage)

- RSV-20A-210K-P to 80F-210K-P
- RSV-20A-210W-7L011-DC6V to 50A
- GSV2-20*-P to 50*
- GSV-25A-25-P / 50A

Overview

- It is possible to perform automatic watering of greenery and within greenhouses where a commercial power supply is not available.
- It is possible to configure a watering time for up to 12 times per day.
- It is possible to configure the watering time from 1 minute up to 9 hours and 59 minutes.
- It is possible to configure the watering time for 1 day to be 1 minute up to 9 hours and 59 minutes.
- A lockable wall mounted structure which can be mounted outside as is. (Locks not included) (Optional pole holders are available as well.)
- Used to control 1 solenoid valve manufactured by CKD (port size of 20A to 80F).
- Configured with a relay output to prevent lightning-induced failure.

Specifications

Item	RSC-1WP
Watering setting method	Arbitrary configuration of days of the week
Configuration and No. of times to water	12 times (First and second times for each of 6 periods can be configured)
Watering time	1 minute to 9 hours and 59 minutes per 1 time
Watering method	Automatic, manual (semi-automatic)
External stop	Available
Control output voltage	Polarity inverted pulse energizing (6 to 9 VDC)
Control No. (CH No.)	1CH
Connected solenoid valve No.	1/CH
Control distance (2-conductor)	Within 60 m (0.75mm^2 cable used) Within 100m (1.25mm^2 cable used)
Operating ambient temperature	-5 (23°F) to 40°C (104°F)
Storage ambient temperature	-20 (-4°F) to 55°C (131°F)
Power supply voltage	One 9 V alkaline battery (6LR61)
Lightning-induced failure prevention	Anti-surge 2500 A (8/20 μs) varistor integrated
Installation	Indoors/outdoors
Stopping watering with rain sensor (RS-6)	Mountable on a pole holder sold separately *1

Note) The clock error is a monthly difference of a max. of approximately ±1 minute. (This varies depending on the usage environment)

*1 Pole holder model No. (sold separately) RSC-1WP-PH (common to 1WP, 2WP)

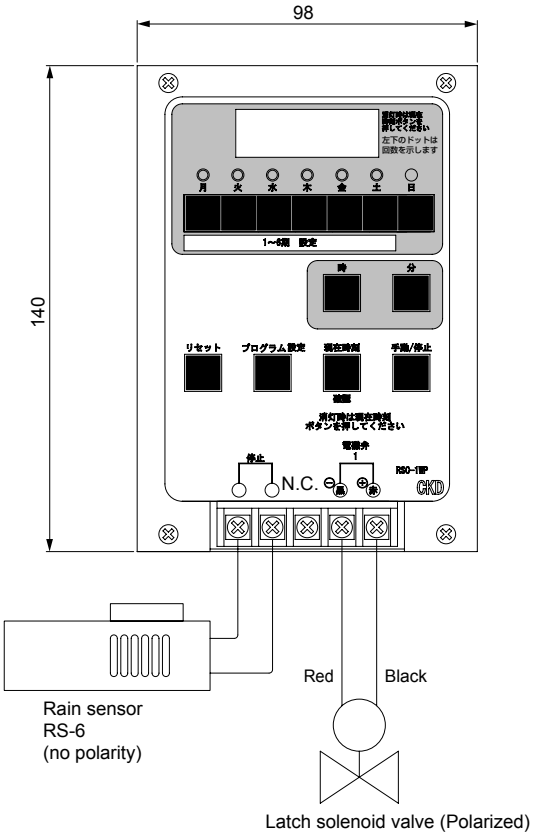
How to order

RSC- 1 W P

- 1: Channel No.: 1 CH
- W: Watering method: Day of the week
- P: Control method: Pulse voltage

Control unit operating section/wiring

● RSC-1WP

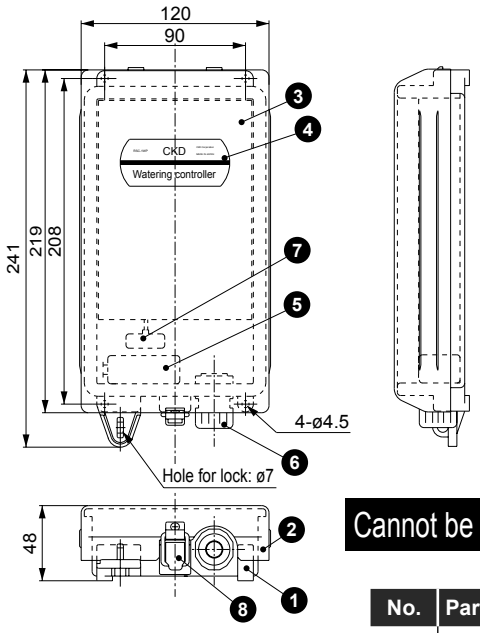


Caution

- Always read the precautions in the instruction manual before starting use.
- As the batteries attached with the product are for tests upon shipping, it is recommended that new batteries be purchased upon installation of the unit.
- Be sure to replace the batteries every year.
- Be sure to use a 2-conductor cable and seal the unit with an SC lock ❻. (Cable outer diameter of ø8.5 to 10.5)
- In order to maintain water resistance, be sure to securely close the cover when not operating the unit.
- Be sure to use a plastic or stainless pipe having a diameter of approximately ø35 for the pole.
- Manual operation will be given the highest priority. Manual Operation > Stop > Automatic Operation
- When the rain sensor (RS-6) is connected to the stop terminal, watering will be stopped when the cumulative rain volume has reached 6 mm. Recovery will be performed automatically depending on the situation of the weather.

Internal structure and dimensions

● RSC-1WP



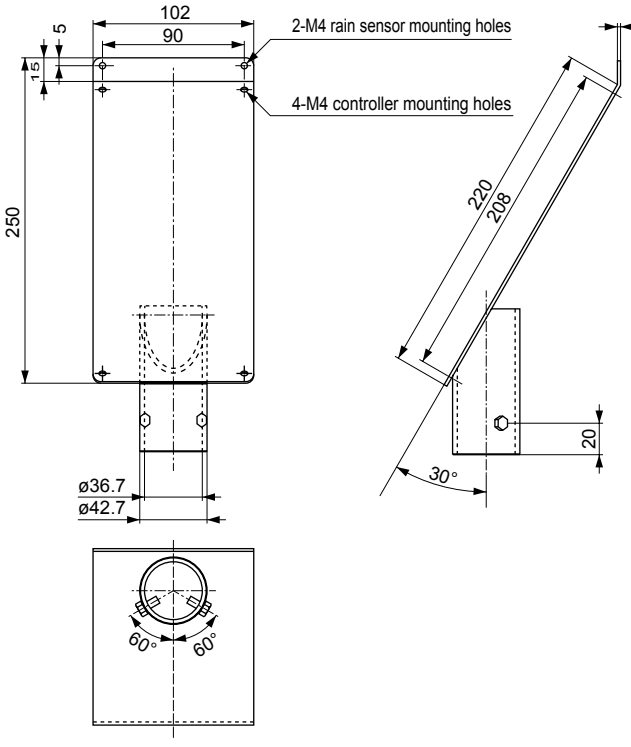
* Though the diagram of the control panel is translated into English, the actual product is labelled in Japanese.

Cannot be disassembled

No.	Part name
1	Case (AAS resin)
2	Cover (stainless steel)
3	Operating section
4	Product name plate
5	Alkaline battery
6	SC lock
7	Battery hook
8	Hook snap lock

Cover finishing: Powder paint
Suede stone
(light gray)

● RSC-1WP-PH



All stainless steel bolts for mounting the controller are included.

Annual calendar system

Specifications

Item	RSC-1WP-C
Watering setting method	Annual/day-of-week setting and pulse output watering method
Config and No. of times to water	12 times (First and second times for each of 6 periods)
Watering time	1 minute to 9 hours and 59 minutes per 1 time
Watering method	Automatic/manual (semi-automatic)
External stop	Available
Control output voltage	Polarity inverted pulse energizing (6 to 9 VDC)
Control No. (CH No.)	1CH
Connected solenoid valve No.	1/CH
Control distance (2-conductor)	Within 60 m (when 0.75 mm² cable is used)
	Within 100 m (when 1.25 mm² cable is used)
Operating ambient temperature	-5 (23°F) to 40°C (104°F)
Storage ambient temperature	-20 (-4°F) to 55°C (131°F)
Power supply voltage	One 9 V alkaline battery (6LR61)
Lightning-induced failure prevention	Anti-surge 2500 A (8/20 μs) varistor integrated
Installation	Indoors/outdoors
Stopping watering with rain sensor (RS-6)	Mountable on a pole holder sold separately *

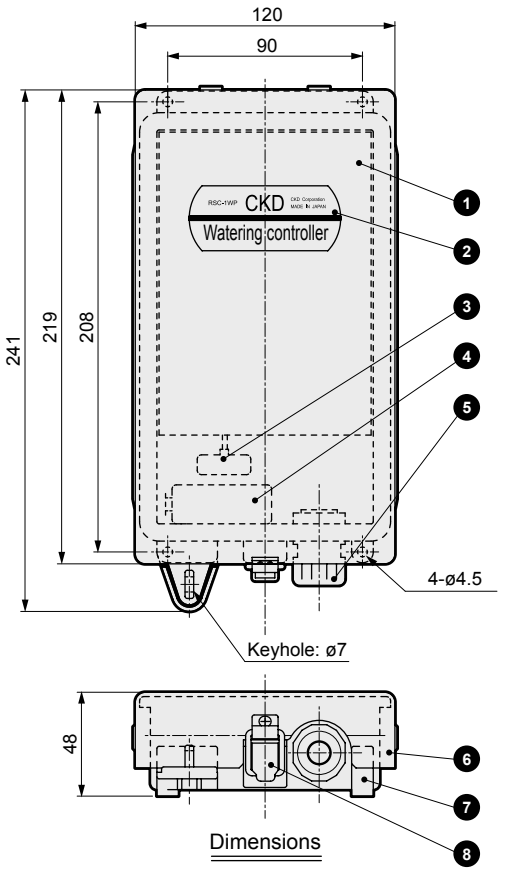
* Pole holder (optional) model No: RSC-1WP-PH

How to order

RSC- 1 W P -C

- 1: Channel No.: 1 CH
- W: Watering method: Day of the week
- P: Control method: Pulse voltage
- C: Function: Annual calendar function

Dimensions

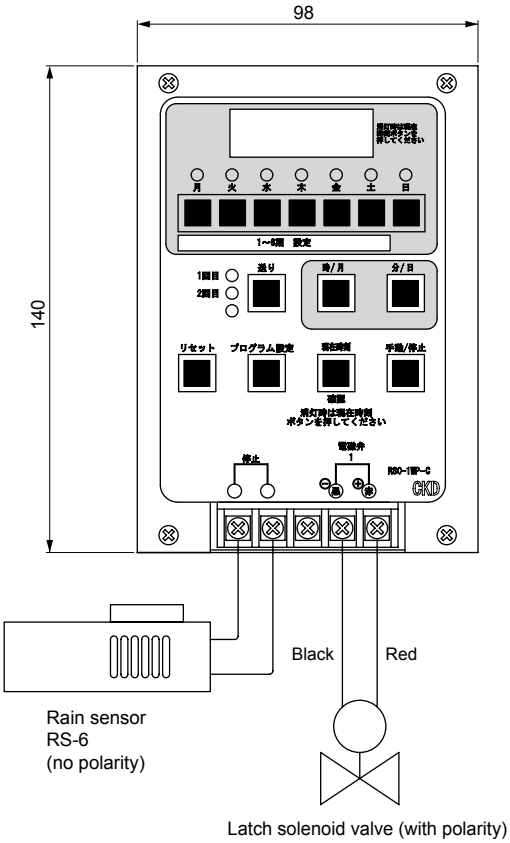


Dimensions

No.	Part name	Material
1	Operating section	
2	Product name plate	
3	Battery hook	
4	Alkaline battery	
5	SC lock	
6	Cover	Stainless steel
7	Case	AAS resin
8	Hook snap lock	

Control unit operating section/wiring

● RSC-1WP-C



Safety precautions

Always read the precautions in the instruction manual before starting use.

- As the batteries attached with the product are for tests upon shipping, it is recommended that new batteries be purchased upon installation of the unit.
- Be sure to replace the batteries every year.
- Be sure to use a 2-conductor cable and seal the unit with an SC lock. (Cable outer diameter of ø8.5 to ø10.5)
- In order to maintain water resistance, be sure to securely close the cover when not operating the unit.
- Be sure to use a plastic or stainless pipe having a diameter of approximately ø35 for the pole. (When using an optional pole holder)
- Manual operation will be given the highest priority. Manual Operation > Stop > Automatic Operation
- When the rain sensor (RS-6) is connected to the stop terminal, watering will be stopped when the cumulative rain volume has reached 6 mm. Recovery will be performed automatically depending on the situation of the weather.
- Be careful when operating the "Reset" button as this will clear all details.
- Check the watering status regularly to avoid affecting crop growth due to trouble.

Soil water check method

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	RSC-1WP-H
Watering setting method	Soil water check type (threshold can be set.)
Configuration and No. of times to water	Six terms (2 cycles/term)
Watering time	1 minute to 9 hours and 59 minutes per 1 time
Watering method	Automatic/manual (semi-automatic)
Watering/non-watering	Watering/non-watering setting based on the water setting value
Control output voltage	Polarity inverted pulse energizing (6 to 9 VDC)
Control No. (CH No.)	1CH
Connected solenoid valve No.	1/CH
Solenoid valve control distance	Within 60 m (when 0.75 mm^2 cable (O.D. ø8.5 to 10) is used) *1
Operating ambient temperature	-5 (23°F) to 40°C (104°F)
Storage temperature	-20 (-4°F) to 55°C (131°F)
Power supply	One 9 V alkaline battery (6LR61)
Lightning-induced electric failure prevention	Anti-surge 2500 A (8/20 µs) varistor integrated
Installation	Indoors/outdoors (except atmospheres affecting component materials)

* Pole holder (optional) model No: RSC-1WP-PH

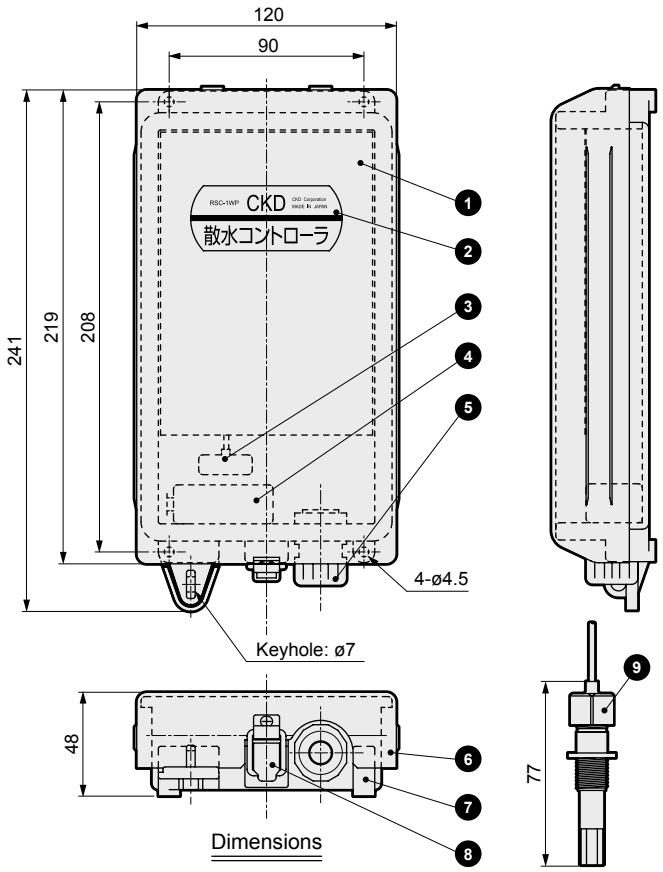
*1 Extension of the checker is to be 10 m or less for 0.3 mm^2. (includes cable 2 m)

How to order

RSC- 1 W P -H

- Channel No.: 1 CH
- Watering method: Day of the week
- Control method: Pulse voltage
- Function: Soil water check function

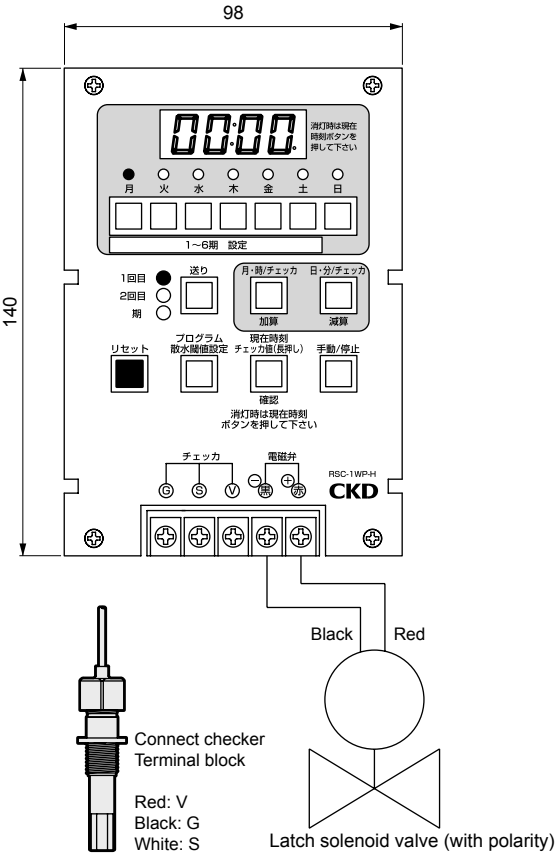
Dimensions



Dimensions

Control unit operating section/wiring

● RSC-1WP-H



No.	Part name	Material
1	Operating section	
2	Product name plate	
3	Battery hook	
4	Alkaline battery	
5	SC lock	
6	Cover	Stainless steel
7	Case	AAS resin
8	Hook snap lock	
9	Water checker	

⚠ Safety precautions

Always read the precautions in the instruction manual before starting use.

- As the batteries included with the product are for tests upon shipping, it is recommended that new batteries be purchased upon installation of the unit.
- Be sure to replace the batteries every year.
- Be sure to seal the cable port with an SC lock.(Cable outer diameter of ø8.5 to ø10.5)
- In order to maintain water resistance, be sure to securely close the cover when not operating the unit.
- Be sure to use a plastic or stainless pipe having a diameter of approximately ø35 for the pole. (When using an optional pole holder)
- Be careful when operating the “Reset” button as this will clear all details.
- Check the watering status regularly to avoid affecting crop growth due to trouble.
- Use the water checker buried in soil.
- Water checker values are values unique to CKD. As an example, the value will be around 970 when dry, but will fall to 400 or below when water is sufficiently replenished. However, values may change greatly depending on the soil and burying method, so be sure to individually check them and then set the threshold. Even when burying again, perform checks and settings again.

Automatic watering controller for golf courses, greenbelts, parks, farmlands, etc.

RSC-2WP battery operated watering controller

- Completely independent control of 2CH watering
- Day of the week configuration

Main applications

- Watering of golf courses
- Watering of parks and urban greenbelts
- Watering of greenery within buildings and on rooftops
- Watering of indoor plantings
- Watering of gardens
- Watering for amusement
- Watering of protected horticulture and outdoor cultured vegetables
- Watering in places where a commercial power supply is not available, etc.

Applicable solenoid valve series

Latch (pulse voltage)

- RSV-20A-210K-P to 80F-210K-P
- RSV-20A-210W-7L011-DC6V to 50A
- GSV2-20*-P to 50*
- GSV-25A-25-P / 50A

Overview

- It is possible to perform automatic watering of greenery and within greenhouses where a commercial power supply is not available.
- The unit will operate for approximately 1 year with 1 alkaline battery (9 V).
- It is possible to configure a watering time for up to 6 times per day.
- It is possible to configure the watering time for 1 day to be 1 minute up to 9 hours and 59 minutes.
- A lockable wall mounted structure which can be mounted outside as is. (Locks not included) (Optional pole holders are available as well.)
- Used to control 2 solenoid valve manufactured by CKD (port size of 20A to 80F).
- Configured with a relay output to prevent lightning-induced failure.

Specifications

Item	RSC-2WP
Watering setting method	Arbitrary configuration of days of the week
Configuration and No. of times to water	Two independent channels 6 cycles/day
Watering time	1 minute to 9 hours and 59 minutes per 1 time
Watering method	Automatic, manual (semi-automatic)
External stop	Available
Control output voltage	Polarity inverted pulse energizing (6 to 9 VDC)
Control No. (CH No.)	2CH
Connected solenoid valve No.	1/CH
Control distance (2-conductor)	Within 60 m (when 0.75mm^2 cable is used)
	Within 100 m (when 1.25mm^2 cable is used)
Operating ambient temperature	-5 (23°F) to 40°C (104°F)
Storage ambient temperature	-20 (-4°F) to 55°C (131°F)
Power supply voltage	One 9 V alkaline battery (6LR61)
Lightning-induced failure prevention	Anti-surge 2500 A (8/20 μs) varistor integrated
Installation	Indoors/outdoors
Stopping watering with rain sensor (RS-6)	Mountable on a pole holder sold separately *1

Note) The clock error is a monthly difference of a max. of approximately ±1 minute. (This varies depending on the usage environment)

*1 Pole holder model No. (sold separately) RSC-1WP-PH (common to 1WP, 2WP)

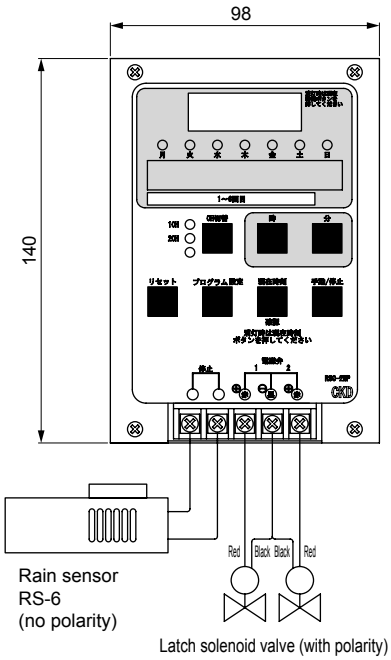
How to order

RSC- 2 W P

- P: Control method: pulse voltage
- W: Watering method: day of the week
- 2: Channel No.: 2 CH

Control unit operating section/wiring

- RSC-2WP

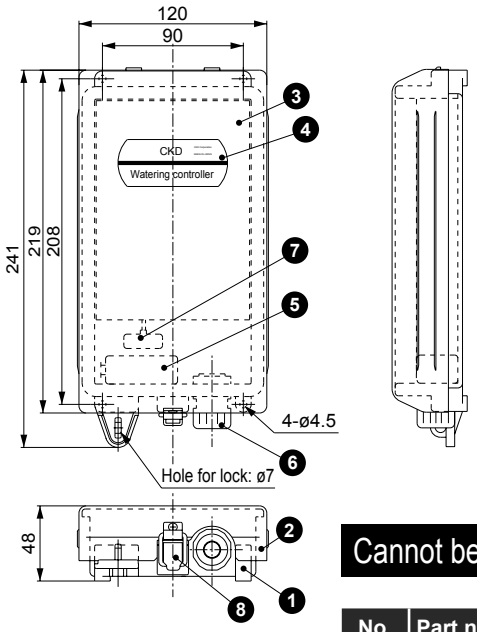


Caution

- Always read the precautions in the instruction manual before starting use.
- As the batteries attached with the product are for tests upon shipping, it is recommended that new batteries be purchased upon installation of the unit.
- Be sure to replace the batteries every year.
- Be sure to use 3-conductor cabtyre cables (cable outer diameter of ø8.5 to 10.5) for the wiring of the solenoid valves and arrange the wiring so that the common line is shared before entry into the controller. In addition, be sure to securely seal the cable outlet with silicone, etc., when using rain sensors.
- In order to maintain water resistance, be sure to securely close the cover when not operating the unit.
- Be sure to use a plastic or stainless pipe having a diameter of approximately ø35 for the pole.
- Manual operation will be given the highest priority. Manual Operation > Stop > Automatic Operation
- When the rain sensor (RS-6) is connected to the stop terminal, watering will be stopped when the cumulative rain volume has reached 6 mm. Recovery will be performed automatically depending on the situation of the weather.
- Be careful when operating the "All Reset" button as this will clear all details other than the present time.

Internal structure and dimensions

● RSC-2WP

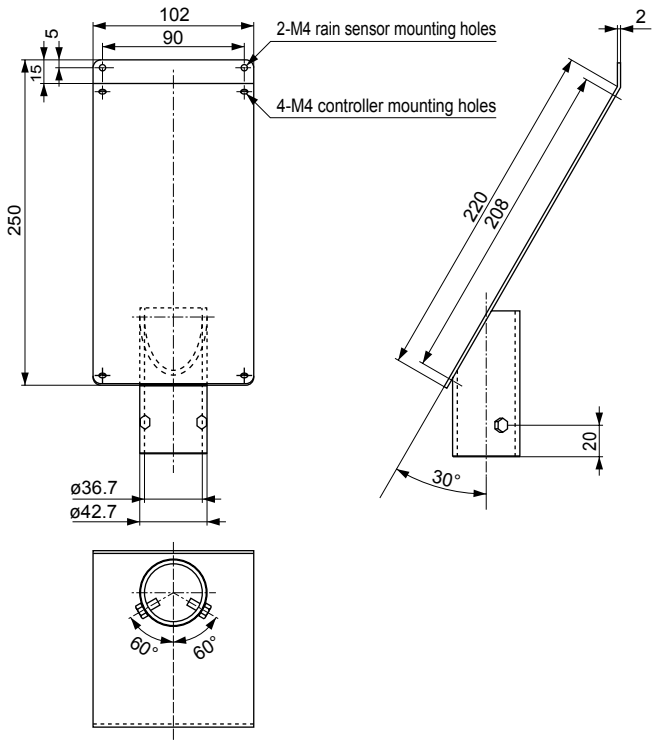


Cannot be disassembled

No.	Part name
1	Case (AAS resin)
2	Cover (stainless steel)
3	Operating section
4	Product name plate
5	Alkaline battery
6	SC lock
7	Battery hook
8	Hook snap lock

Cover finishing: Powder paint
Suede stone
(light gray)

● RSC-1WP-PH
(Common to RSC-1WP, 2WP)



Stainless steel bolts for mounting the controller are included.

* Though the diagram of the control panel is translated into English, the actual product is labelled in Japanese.

Rain sensor

RS-6 rain sensor

- Automatically detects rain volumes of 6 mm or more
- Power supply/amplifier not required

Main applications

- Watering of parks and urban greenbelts
- Watering of greenery within buildings and on rooftops
- Watering of soccer fields and various grounds
- Watering of golf courses
- Watering for prevention of dust pollution
- Others

Applicable controller series

- RSC-S5
- RSC-G
- RSC-1WP
- RSC-2WP
- RSC-W-2WP

Overview

- Power supply unit not required
- Automatic recovery depending on the weather situation
- Operating accuracy ±1 mm (rain volume)
- Water saving effect

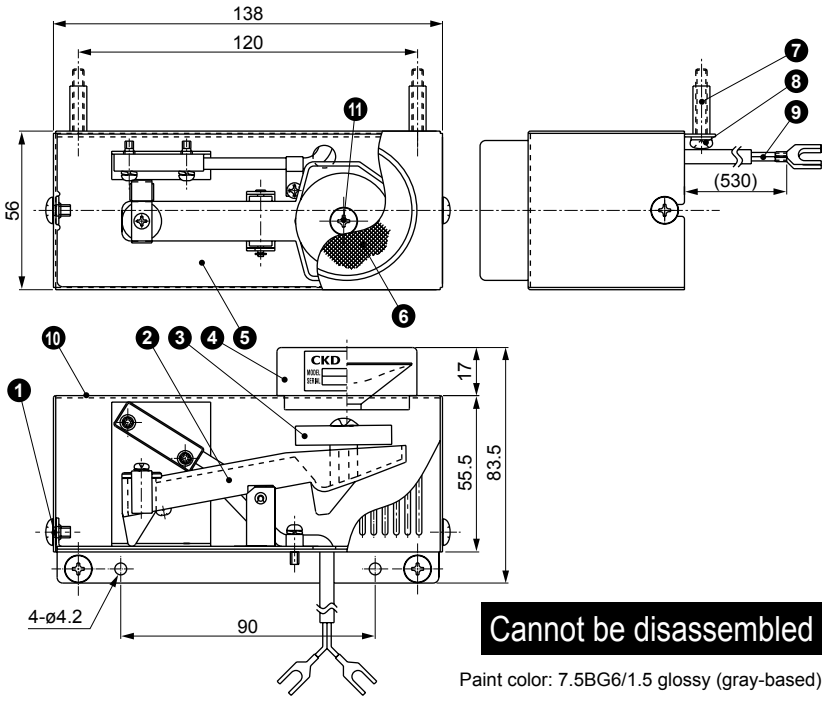
Caution

*1 : The felt of No. ❸ is a repair part.
*2 : Make sure that the lead wire is no longer than max. 5 m when extending the lead wire.

Specifications

Item	RS-6
Operating rain volume	6 mm
Return time	6 to 20 hours (will vary depending on the weather)
Angle of installation	±2° or less both lengthwise and widthwise

Internal structure and dimensions



Cannot be disassembled

Paint color: 7.5BG6/1.5 glossy (gray-based)

No.	Part	Material	Qty.	Remarks	No.	Part name	Material	Qty.	Remarks
1	(+) truss head screws	SUS304	2		7	Stud	SUS304TP	2	Included
2	See-saw body	PBT	1		8	(+) pan head screws with spring seat		2	Included
3	Felt	Ester, acrylic, Bell Oasis	1	4 included	9	Lead wire	UL1007 product	2	
4	Funnel	A5056BD	1		10	Cover	SECC-P	1	
5	Chassis	SUS304	1		11	Tapping screw	SUS304TP	1	
6	Wire mesh	SUS304	1						

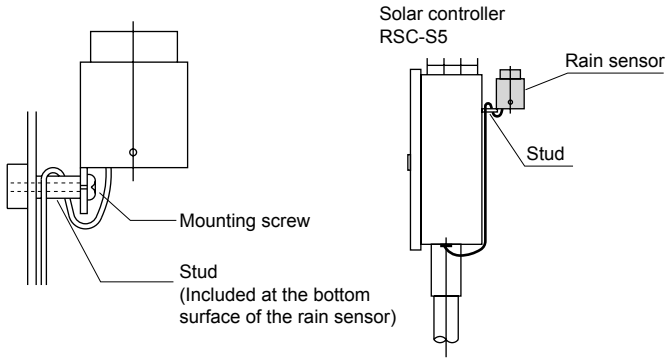
Rain sensor mounting procedures

When mounting this product on the RSC-S5 solar controller, follow the procedures outlined below.

Rain sensor mounting procedures

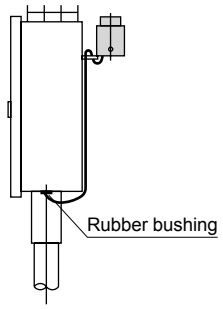
1 Mounting

As the control box is provided with mounting holes, mount the rain sensor using the included studs.



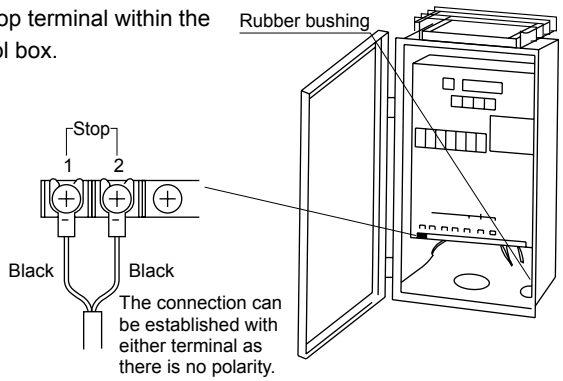
2 Lead wire wiring

Arrange the lead wire of the rain sensor along the stud and further guide the wire along the control box from the hole of the rubber bushing in the bottom surface.
Insert the lead wire as far inside the box as possible.



3 Wiring

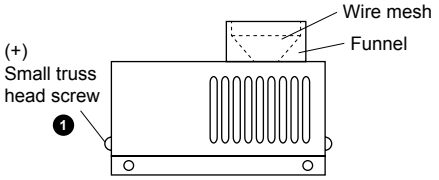
Connect the lead wire to the stop terminal within the control box.



Rain sensor inspection outline

Rain sensor inspection outline

1. Periodically inspect the rain receiving (funnel) section to make sure that there is no foreign matter such as dried leaves.



2. Replace the felt every six months, such as before the start of a season.
   (Since dust on the felt will suppress the efficiency of absorption and evapotranspiration of rain water and lower performance)

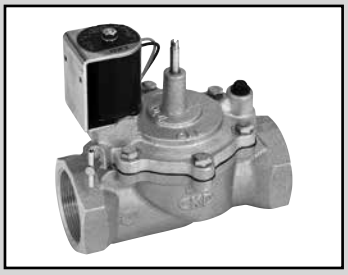
[How to perform inspections]
By loosening the small (+) truss head screws ❶ (x 2) as shown in the internal structure diagram, the cover ❿ can be removed upwards.

If the surface of the felt has become discolored and is black, remove the tapping screw ⓫ and replace the felt with a spare product.

3. If there are no more included felts available, place an order for "felts for the rain sensor". 5 pieces are included in a set.

4. When the rain sensor (RS-6) is connected to the RSC controller, the sensor will function according to automatic and temporary programs, regardless of manual operation.

5. Be sure to use a lead wire length of max. 5 m.



Solenoid valve for automatic watering

RSV solenoid valve

- For watering of protected horticulture, urban greenery, greenbelts, parks, golf courses, soccer fields, farmlands, etc.
- Pilot operated diaphragm
- Continuously energized, latch

Overview

- Low water hammer
- Molded coil with excellent water resistance
- Equipped with a self-cleaning filter for pilot flow path protection
- Equipped with flow rate adjusting and manual operation mechanisms
- Capable of battery control with a latch coil
- IP67 or equivalent (excluding the terminal box equipped coil)

Caution

(1) Before inspecting the filter, close the IN-side water control valve and loosen the manual operation needle by 1/2 rotation to lower the pressure. Lightly tighten the needle by hand upon reassembly. The tightening torque is 0.8 to 1.2 Nm. Tightening the needle excessively will cause damage.
(2) Although the unit can be used if the solenoid valve coil will only be submerged in water temporarily, consider drainage of the water if there is the risk of the unit being submerged in water or buried under dirt for longer periods of time. (coil with terminal box cannot be submerged in water)
(3) In cases when vertical piping cannot be avoided, arrange the piping so that the IN-side is at the bottom.
(4) The 24 VDC type is equipped with a surge suppressor device.
(5) The AC coils are all equipped with rectifying surge suppressors. (Half-wave)
(6) Avoid direct exposure to sunlight.

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	RSV-20A-210K	RSV-25A-210K	RSV-32A-210K	RSV-40A-210K	RSV-40F-210	RSV-50A-210K	RSV-50F-210	RSV-65A-210K	RSV-65F-210K	RSV-80A-210K	RSV-80F-210K	RSV-100F-210 (Made-to-order product)
Working fluid	Agricultural water											
Max. working pressure MPa	1 (≈150 psi, 10 bar)											
Working pressure differential MPa	0.03 (≈4.4 psi) to 1 (≈150 psi)						0.05 to 1					0.1 to 1
Proof pressure (water pressure) MPa	3 (≈440 psi, 30 bar)											2
Fluid temperature °C	5 (41°F) to 60 (140°F) (no freezing)											
Ambient temperature °C	0 (32°F) to 60 (140°F)											
Valve seat leakage cm^3/min	0.1 or less (water)											
Orifice size mm	25		50					80				98
Cv	13	14	29	35		46.5		82	97			180
Max. operating frequency times/min.	1											0.3
Mounting orientation	Mount with coil on top.											
Connection	Screw-in (Rc)				Flange JIS 10K	Screw-in (Rc)	Flange JIS 10K	Screw-in (Rc)	Flange JIS 10K	Screw-in (Rc)	Flange JIS 10K	
Port size (Piping port size)	3/4	1	1 1/4	1 1/2	40	2	50	2 1/2	65	3	80	100
Weight kg	2.1	2.2	3.9	4.1	8.6	4.7	9.6	10.9	17.4	11.4	18.4	42
Drive method/voltage	Continuously energized: 24 VDC, 24/100/200 VAC (50/60 Hz) Latch pulse signal: P (voltage selection unnecessary) *2											
Rated voltage	24 VDC, 24/100/200 VAC (50/60 Hz), P type *2											
Power consumption W	AC/2.5, DC type/3											
Thermal class	Class 130 (B) (JIS C 4003)											
Coil temperature rise deg(K)	30											
Leakage current mA	6 or less/24 VAC, 1.9 or less/100 VAC, 0.7 or less/200 VAC, 4 or less/24 VDC											

How to order

RSV- **20A** - 210 **K** - [ ] - **AC100V**

- **20A** → Ⓐ Port size
- **K** → Ⓑ Body material*1
- [ ] → Ⓒ Drive method
- **AC100V** → Ⓓ Voltage *3

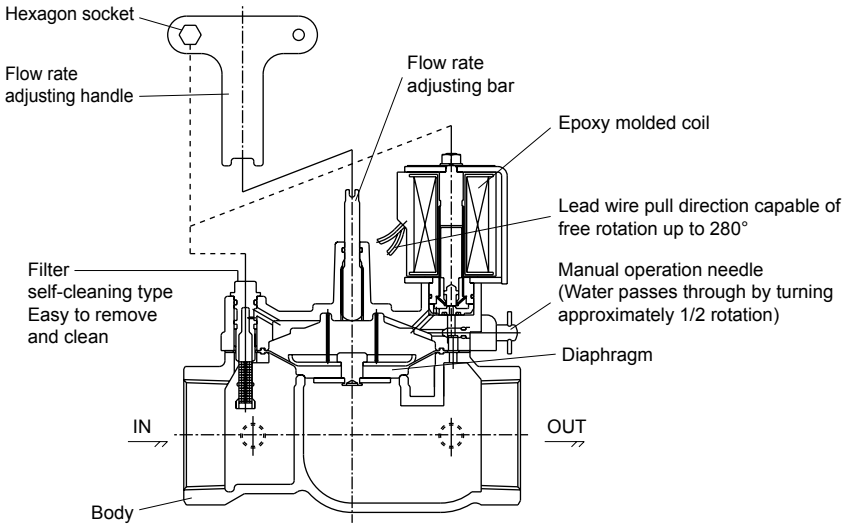
Code	Description	Body material	
	Ⓐ Port size	Bronze	Cast iron
20A	Rc3/4	●	
25A	Rc1	●	
32A	Rc1 1/4	●	
40A	Rc1 1/2	●	
50A	Rc2	●	
65A	Rc2 1/2	●	
80A	Rc3	●	
40F	Flange 40		●
50F	Flange 50		●
65F	Flange 65		●
80F	Flange 80		●
100F	Flange 100 (made-to-order product)		●
	Ⓑ Body material		
K	Bronze		
Blank	Cast iron		
	Ⓒ Drive method		
Blank	Continuously energized		
3M	Continuously energized (with HP terminal box) *2		
P	Latch pulse signal *3		
	Ⓓ Voltage		
DC24V	24 VDC		
AC24V	24 VAC 50/60 Hz		
AC100V	100 VAC 50/60 Hz		
AC200V	200 VAC 50/60 Hz		

Precautions for model No. selection

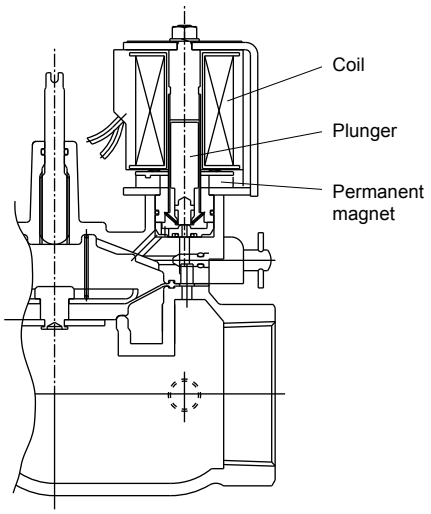
*1 For Item Ⓑ Body material, select combinations with the ● mark in the Ⓐ Port size table.
*2 Do not use products equipped with terminal boxes outdoors or within manholes.
*3 The Ⓒ Item P type is dedicated for use with controllers manufactured by CKD.
The voltage of the model No. is not required when placing an order.
Applicable controller
· RSC-S5, RSC-G series
· RSC-1WP, RSC-2WP

Internal structure and parts list

● Continuously energized (NC)



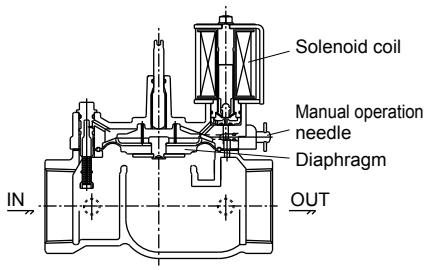
● Pulse energizing (latch)



Part name	Material	Part name	Material
Flow rate adjusting handle	Steel plate (chrome finished) included	Solenoid valve coil section	Epoxy resin molded
Manual operation needle	Stainless steel	Plunger	Stainless steel
Pilot valve body	Bronze casting (80 or less) cast iron (100F)	Pilot valve seat	POM (80 or less)
Body	Bronze casting (with K code) cast iron (without K code)	Filter	Stainless steel, PBT
Diaphragm	Nitrile rubber		

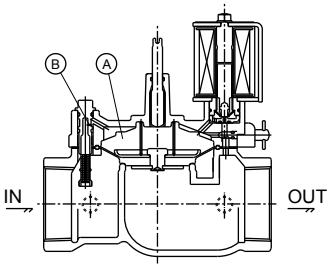
Operational explanation

● Opening operation



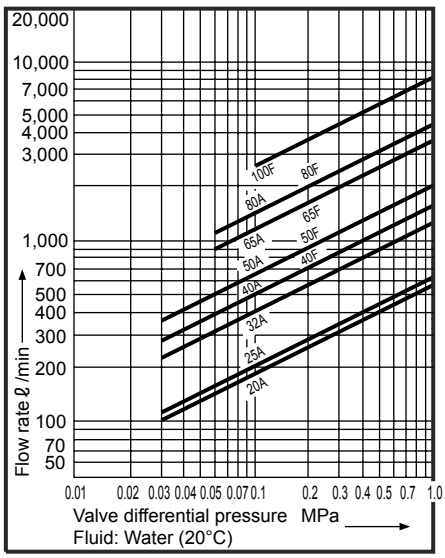
When the solenoid valve coil section is energized or the manual operation needle is opened, the diaphragm will be pushed up due to the IN-side inflow pressure and allow the passage of water, as the fluid within the pilot chamber Ⓐ flows out to the OUT-side and lowers the pressure within the pilot chamber.

● Closing operation



When the solenoid valve coil section is OFF or the manual operation needle is closed, as the IN-side fluid will pass through pilot hole Ⓑand the fluid pressure acts on the upper surface of the diaphragm, the pressure difference between the top and bottom of the diaphragm along with the spring force pushes the diaphragm down and maintains a state where the passage of water is blocked.

Flow characteristics



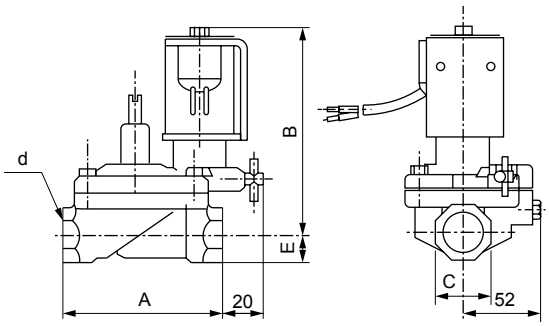
● With the latch solenoid valve

By applying a pulse voltage of red ⊕and black ⊖to the coil lead wires, the plunger will rise and latch (hold) with the permanent magnet to create a state where water is allowed to pass.
Conversely, by applying pulse voltage of red ⊖and black ⊕, the plunger will recover and create a state where the passage of water is blocked.

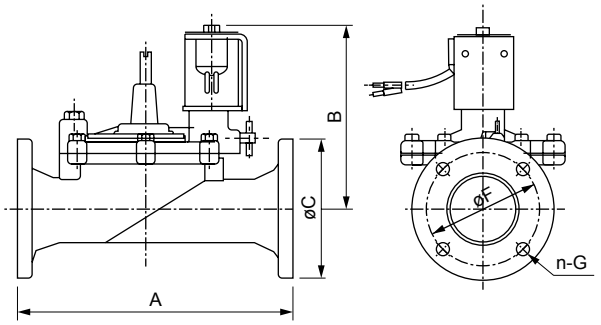
Dimensions

◎ Lead wire color coding: DC coil - red black, less than 200 VAC - blue, 200 VAC or more - red
◎ Lead wire length: 700 mm

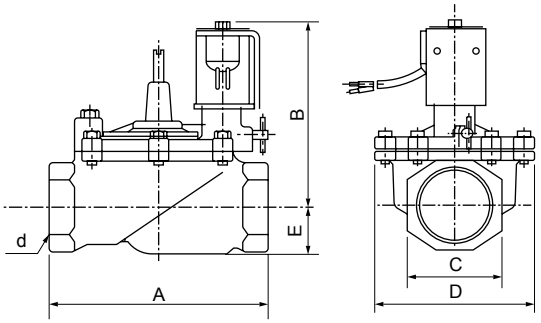
● RSV-20A-210K
25



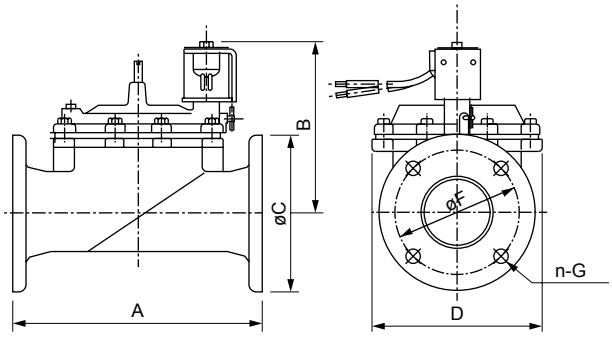
● RSV-40F-210
50



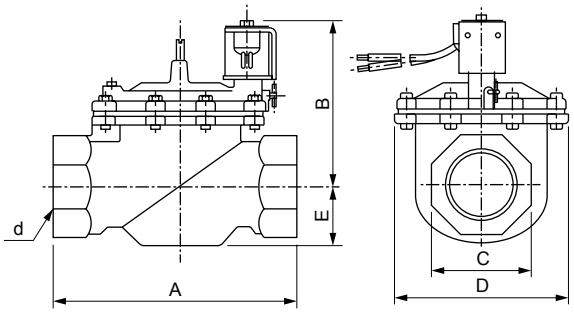
● RSV-32A-210K
40
50



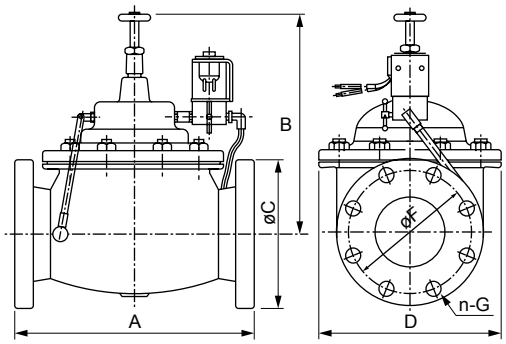
● RSV-65F-210K
80



● RSV-65A-210K
80



● RSV-100F-210



Model No.	A	B	C	D	E	F	n-G	d
RSV-20A-210K	100	129	35	-	18	-	-	Rc3/4
RSV-25A-210K	105	131	44	-	22	-	-	Rc1
RSV-32A-210K	168	141	54	130	29	-	-	Rc1 1/4
RSV-40A-210K	176	146	60	130	34	-	-	Rc1 1/2
RSV-40F-210	225	161	140	-	-	105	4-ø19	-
RSV-50A-210K	180	151	74	130	39	-	-	Rc2
RSV-50F-210	225	164	155	-	-	120	4-ø19	-
RSV-65A-210K	246	179	90	200	48	-	-	Rc2 1/2
RSV-65F-210K	290	191	175	200	-	140	4-ø19	-
RSV-80A-210K	250	187	105	200	58	-	-	Rc3
RSV-80F-210K	300	201	185	200	-	150	8-ø19	-
RSV-100F-210	332	315	210	256	-	175	8-ø19	-

MEMO

Resin solenoid valve for automatic watering

GSV2 Resin solenoid valve

- Union connection
- For watering of greenbelts, protected horticulture, parks, and urban greenery
- Continuously energized, latch
- Pilot operated diaphragm

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		GSV2-20*	GSV2-25*	GSV2-40*	GSV2-50*
Working fluid		Water/agricultural water/diluted agricultural chemicals/liquid fertilizers, etc. * Limited to fluids that will not cause corrosion of the wetted part materials.			
Max. working pressure	MPa	0.75(≈108 psi, 7 bar)			
Working pressure differential range	MPa	0.03 (≈5 psi, 1 bar) to 0.75 (≈108 psi, 7 bar)			
Proof pressure	MPa	1.5 (≈217 psi, 15 bar)			
Fluid temperature	°C	4 (39°F) to 40 (104°F)			
Ambient temperature	°C	0 (32°F) to 50 (122°F)			
Valve seat leakage	cm^3/min	0.1 or less (water)			
Orifice size	mm	25		52	
Cv		11	13	42	45
Mounting orientation		Use in horizontal piping with the coil portion facing upward or in vertical piping with the OUT port facing upward			
Nominal port size		20	25	40	50
Body material		PP			
Weight kg	Connection: U	1	1	1.8	1.9
	Connection: A	1.5	1.5	3.3	2.9
Drive method/voltage		Continuously energized: 24 VDC, 24/100/200 VAC (50/60 Hz), Latch pulse signal: P (voltage selection unnecessary) *1			
Power consumption	W	AC/2.5, DC/3			
Thermal class		B (JIS C 4003)			
Leakage current	mA	6 or less/24 VAC, 1.9 or less/100 VAC, 0.7 or less/200 VAC, 4 or less/24 VDC			

How to order

GSV2 - 50 U - P - AC100V

- 50: Ⓐ Nominal port size
- U: Ⓑ Connection
- P: Ⓒ Drive method
- AC100V: Ⓓ Voltage

*1 : The P type is dedicated for use with controllers manufactured by CKD.
The voltage of the model No. is not required when placing an order.
Dedicated controller
· RSC-S5, RSC-G Series
· RSC-1WP, RSC-2WP

*2 : If Connection is Blank, prepare a union end and union nut separately.
Note that the O-ring is included.

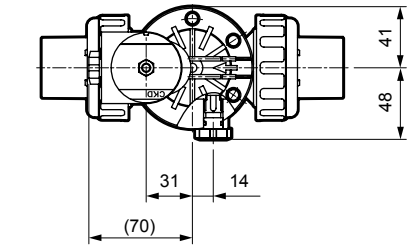
*3 : The AC coils are all equipped with rectifying surge suppressors. (Half-wave)

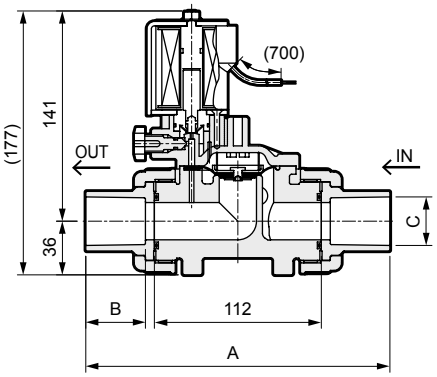
*4 : The 24 VDC type is equipped with a surge suppressor device.

Code	Description
Ⓐ Nominal port size	
20	20A
25	25A
40	40A
50	50A
Ⓑ Connection	
U	Polyvinyl chloride fitting (socket)
Blank	Body only (no union end/union nut) *2
A	Taper pipe thread (Rc) (made-to-order product)
Ⓒ Drive method	
Blank	Continuously energized
P	Latch pulse signal *1
Ⓓ Voltage	
AC24V	24 VAC 50/60 Hz *3
AC100V	100 VAC 50/60 Hz *3
AC200V	200 VAC 50/60 Hz *3
DC24V	24 VDC *4

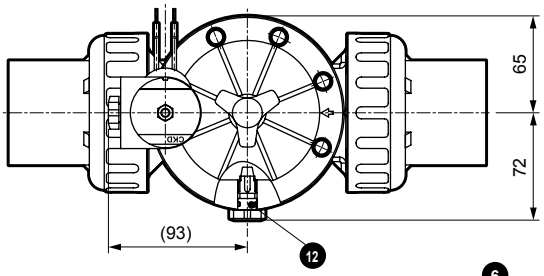
Internal structure and dimensions

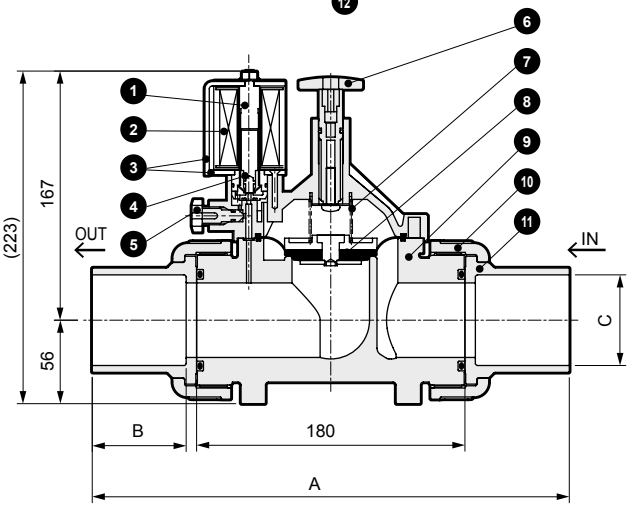
● GSV2-25U



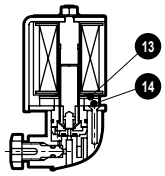


● GSV2-50U





●P: Latch



Dimensions		GSV2-20*	GSV2-25*	GSV2-40*	GSV2-50*
Connection: U	A	190	204	304	320
	B	35	40	55	63
	C	ø26.5	ø32.6	ø48.7	ø60.8
Connection: A	A	174	174	266	266
	C	Rc3/4	Rc1	Rc1 1/2	Rc2

No.	Part name	Material
1	Core assembly	SUS
2	Coil assembly	-
3	Core A/B	SUS
4	Plunger	SUS, NBR
5	Manual operation needle	PP
6	Flow rate adjusting handle	PP
7	Spring	SUS
8	Diaphragm assembly	NBR, PP, SUS
9	Body	PP
10	Union nut	PP
11	Union end	PVC (HITS), SUS
12	Pilot filter	PP, SUS
13	Ring plate	SUS (latch only)
14	Magnet	DPM-2 (latch only)

Resin solenoid valve for automatic watering

GSV resin solenoid valve

- For watering of greenbelts, protected horticulture, parks, and urban greenery
- Continuously energized, latch
- Pilot operated diaphragm

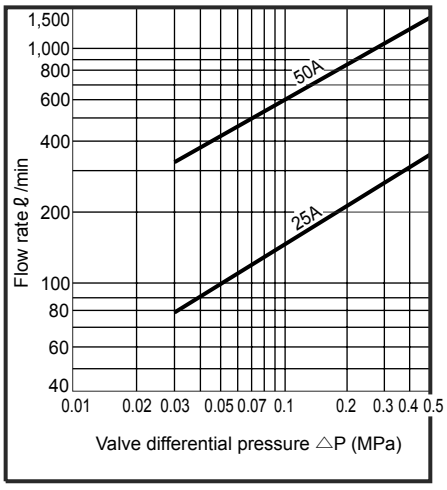
Main applications

- Irrigation and watering for protected horticulture
- Watering of parks and urban greenery
- Watering of gardens and indoor and outdoor plantings

Overview

- Lightweight and low cost with a resin body
- Molded coil with excellent water resistance
- Diluted agricultural chemicals and liquid fertilizers can also be used *
- Equipped with a self-cleaning filter for pilot flow path protection
- Low water hammer
- Capable of battery control with a latch coil

Flow characteristics



Specifications

Item	GSV-25A-25	GSV-50A-25
Working fluid	Water/agricultural water/diluted agricultural chemicals/liquid fertilizers, etc. * Limited to fluids that will not cause corrosion of the wetted part materials.	
Max. working pressure MPa	0.5 (≈73 psi, 5 bar)	
Working pressure differential MPa	0.03 (≈4.4 psi, 0.3 bar) to 0.5 (≈73 psi, 5 bar)	
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)	
Fluid temperature °C	4 (39.2°F) to 40 (104°F) (no freezing)	
Ambient temperature °C	0 (32°F) to 50 (122°F)	
Valve seat leakage cm^3/min	0.1 or less (water)	
Orifice size mm	25	50
Cv	10.4	42
Mounting orientation	Mount with coil on top.	
Port size	Rc1 or equiv.	Rc2 or equiv.
Drive method/voltage	Continuously energized: 24 VDC, 24/100/200 VAC (50/60 Hz) Latch pulse signal: P (voltage selection unnecessary) *1	
Weight kg	1	1.6
Rated voltage	24 VDC, 24/100/200 VAC (50/60 Hz), P type *1	
Power consumption W	AC/2.5, DC type/3	
Thermal class	Class 130 (B) (JIS C 4003)	
Leakage current mA	6 or less/24 VAC, 1.9 or less/100 VAC, 0.7 or less/200 VAC, 4 or less/24 VDC	

How to order

GSV - 50 A - 25 - ○ - DC24V

Ⓐ Port size

Ⓑ Drive method

Ⓒ Voltage *1

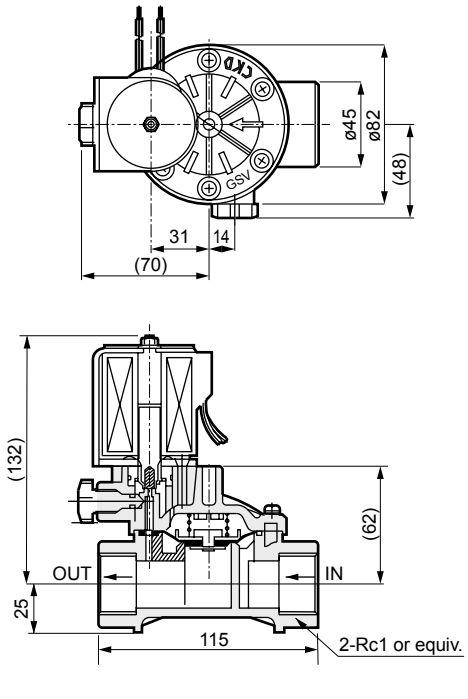
Code	Description
Ⓐ Port size	
25	Rc1 or equiv.
50	Rc2 or equiv.
Ⓑ Drive method	
Blank	Continuously energized
P	Latch pulse signal *1
Ⓒ Voltage	
AC24V	24 VAC 50/60 Hz *2
AC100V	100 VAC 50/60 Hz *2
AC200V	200 VAC 50/60 Hz *2
DC24V	24 VDC *3

*1 P type is dedicated for use with controllers manufactured by CKD.
The voltage of the model No. is not required when placing an order.
Applicable controller
· RSC-S5, RSC-G series
· RSC-1WP, RSC-2WP
*2 The AC coils are all equipped with rectifying surge suppressors. (Half-wave)
*3 The 24 VDC type is equipped with a surge suppressor device.

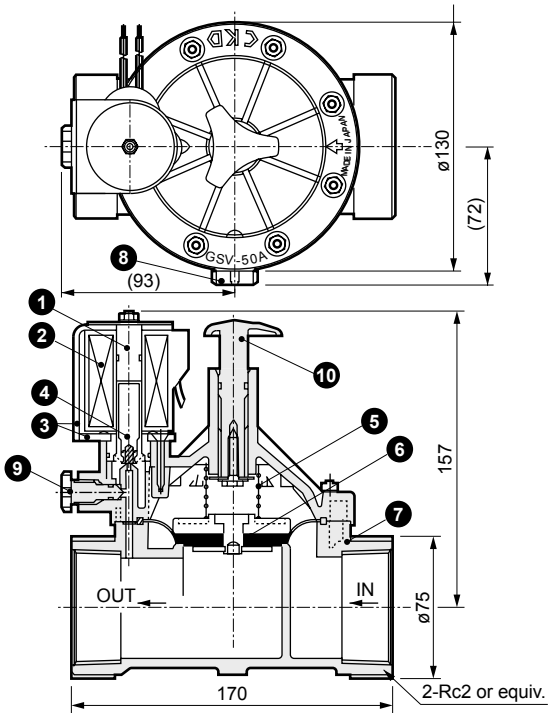
Internal structure and dimensions

◎ Lead wire color coding: DC coil - red black, less than 200 VAC - blue, 200 VAC or more - red
◎ Lead wire length: 700 mm

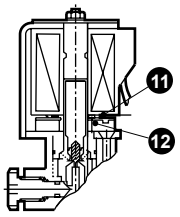
● GSV-25A-25



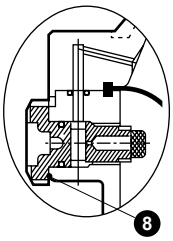
● GSV-50A-25



● P: Latch



Pilot filter section



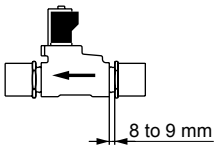
No.	Part name	Material	No.	Part name	Material
1	Core assembly	SUS430	7	Body	PP
2	Coil	-	8	Pilot filter	PP, SUS
3	Core A/B	SUS430	9	Manual operation needle	PP
4	Plunger	K-M31	10	Flow rate adjusting handle	PP
5	Spring	SUS304	11	Ring plate	SUS430 (latch only)
6	Diaphragm assembly	NBR, PP, SUS	12	Magnet	DPM-2 (latch only)

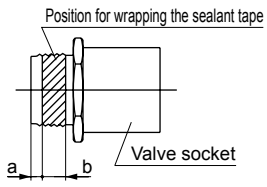
(Note) Components of No. ❶, ❹ to ❿ are the wetted parts.

⚠ Precautions for valve socket piping

* Always read the precautions in the instruction manual before starting use.
* GSV, GSV2 types : Observe the common precautions.

Securely wrap sealant tape around the threaded part of the valve socket 5 times (50 A) or 3 times (25 A) and screw the socket in until the dimension of the part below the screw head is 8 to 9 mm, as shown below. Screwing the bolt too far in will cause damage. Do not use metal nipples.





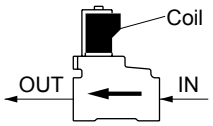
Bore size	Dimensions		Tightening torque N·m
	a	b	
25A	5	15	5.9
50A	7	17	9.3

* When the piping is long (100 m or more), set the working pressure lower by approximately 20% to prevent water hammer from occurring.

GSV and GSV2 Precautions

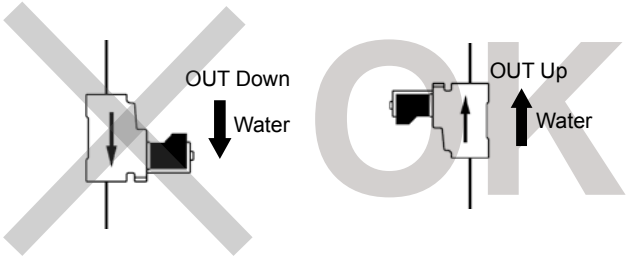
Precautions for solenoid valve piping

(1) Ensure that the piping is performed so that the flow of the fluid is consistent with the arrow direction of the body.

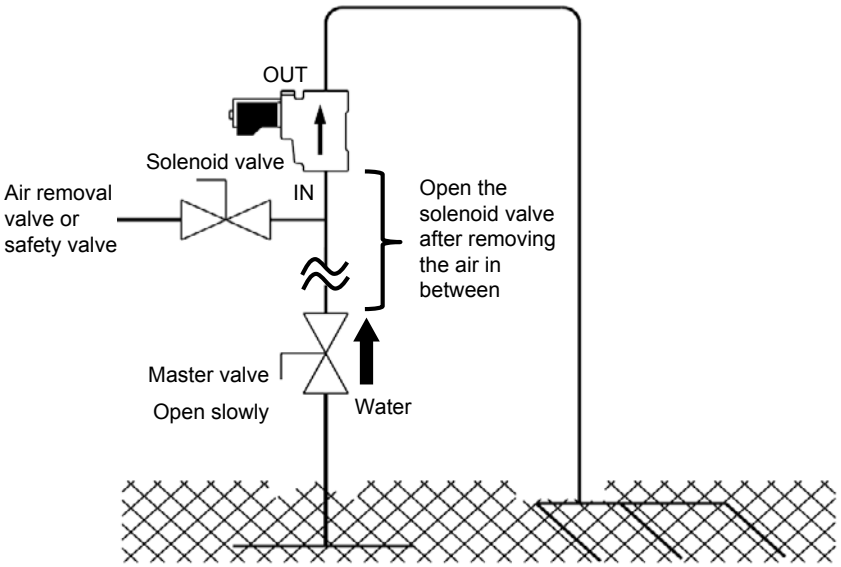


When piping the solenoid valve horizontally as seen in the figure at left, be sure to set the coil part facing upward.

(2) Take note of the following points when piping the solenoid valve vertically.
When the solenoid valve OUT port is facing downward, the air in the valve cannot be drawn out, and may cause faulty operation and vibrations.
To stabilize solenoid valve operations, be sure to set the piping with the OUT port facing upward when performing vertical piping as seen in the below diagram.



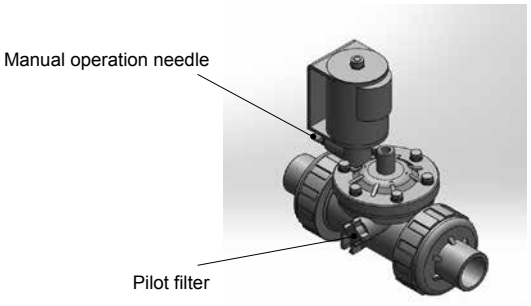
(3) Take note of the following points when starting to use the solenoid valve.
If there is air accumulated in the piping of the solenoid valve IN side and the master valve of the upper flow side of the solenoid valve is opened, the solenoid valve may be damaged by water hammer.
· When opening the main valve, open slowly so that excessive pressure is not applied to the solenoid valve.
· Install an air vent valve in front of the solenoid valve IN side. Before starting, open the air vent valve and then the main valve to release air between the solenoid valve and the main valve. Or, place a safety valve (relief valve) between the master valve and solenoid valve.

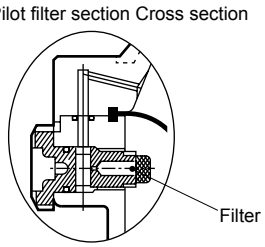


(4) Perform piping so that stress is not applied to the solenoid valve port.

Precautions for filter inspection

A filter is integrated to the pilot filter section to prevent malfunctions of the solenoid valve due to foreign materials. Perform filter inspection after closing the IN side of the water control valve, loosening the manual operation needle, and lowering the pressure. Lightly tighten the needle by hand upon reassembly. The guideline of the tightening torque is 0.8 to 1.2 Nm. Note that damage may occur if tightened excessively.





Safety precautions

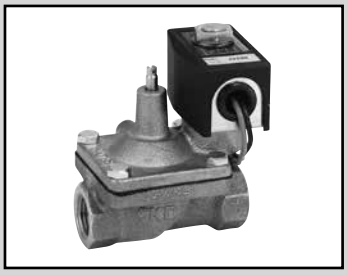
(1) Use the product within the working pressure differential ranges.
- GSV : 0.03 to 0.5 MPa
- GSV2 : 0.03 to 0.75 MPa

(2) Avoid direct sunlight.

(3) Use the following formula to calculate the flow rate.

$$Q \approx 45.16\ Cv \sqrt{\frac{\Delta P}{G}}$$

Q : Flow ℓ/min
ΔP : Primary-side pressure - Secondary side pressure (MPa)
G : Specific gravity (water = 1)
Cv : Flow coefficient



Tap water control valve (approved by JWWA)

RSV-W solenoid valve

- For watering with tap water of greenery on urban highways, in parks and factories, and on building rooftops, etc.
- For water supply control of tap water
- Continuously energized, latch
- Pilot operated diaphragm

Main applications

Applications of attaching a solenoid valve on a tap water pipe

- Controlling the water supply of a pool, bath, shower, toilet, etc.
- Controlling the water supply of cleaning equipment
- Watering of rooftops and gardens

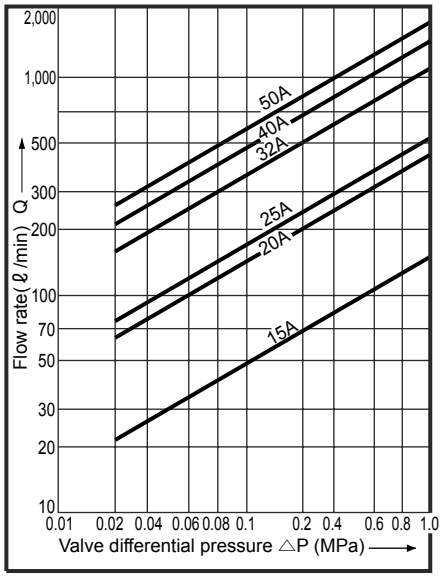
Overview

- Low water hammer
- A type equipped with a strainer for the main flow path to prevent the entry of trash can also be made. (15A to 25A)
- An outdoor type is also available (3A, 7A, 7L)

Specifications

Item	RSV-15A-210W-3A011	RSV-20A-210W-3A011	RSV-25A-210W-3A011	RSV-32A-210W-3A011	RSV-40A-210W-3A011	RSV-50A-210W-3A011
Working fluid	Tap water					
Max. working pressure MPa	1 (≈150 psi, 10 bar)					
Working pressure differential MPa	0.02 (≈2.9 psi, 0.2 bar) to 1 (≈150 psi, 10 bar)					
Structural proof pressure MPa	1.75 (≈250 psi, 17.5 bar)					
Fluid temperature °C	0 (32°F) to 60 (140°F) (no freezing)					
Ambient temperature °C	0 (32°F) to 60 (140°F)					
Ambient humidity %	95 or less					
Orifice size mm	15.5	25.5		50.5		
Cv	3.4	10.1	12.0	25.0	34.0	41.0
Frequency times/min.	1 or less					
Mounting orientation	Horizontal position with coil on top					
Port size	$RC^1/_2$	$RC^3/_4$	RC1	$RC1^1/_4$	$RC1^1/_2$	RC2
Weight kg	1.5	2.0		4.2		
Electrical specifications						
Drive method/voltage	Continuously energized: 24 VDC, 100:200V AC (50/60 Hz) *1 Latch pulse signal: 7L *2					
Power consumption W	100 VAC/200 VAC: 5.2/3.8 (50/60 Hz) 24 VDC: 11					
Thermal class	Class 130 (B) (JIS C 4003)					
Apparent power VA	When holding: 12/10 (50/60Hz), When starting: 17/14 (50/60Hz)					
Leakage current mA	6 or less/100 VAC, 3 or less/200 VAC, 1 or less/24 VDC					

Flow characteristics (Fluid: water)

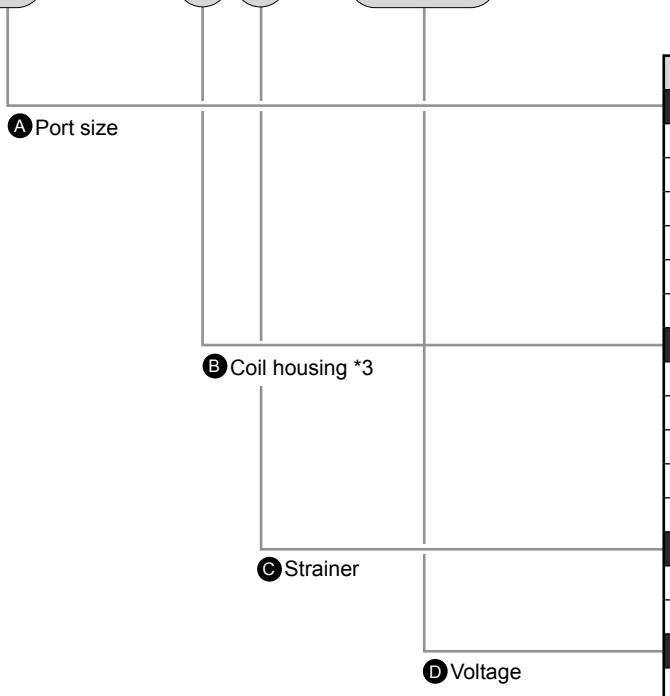


Application based coil shape selection examples

- ○ For indoor housing facilities (drainage).....2G
- ○ For installation within manholes for urban greenery, etc.....7A
- ○ Battery controller for controlling solar controllers for urban greenery, etc...7L
- ○ For outdoor drainage 3A

How to order

RSV- 25A -210W- 3A 0 11 - AC100V

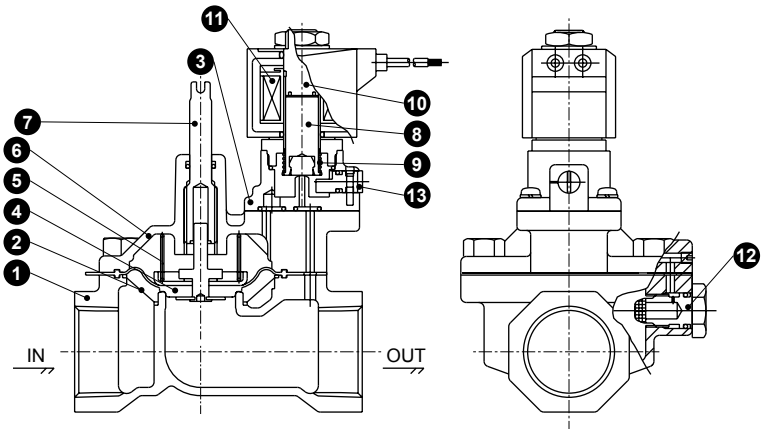


Code	Description	
Ⓐ Port size		
15A	Rc1/2	
20A	Rc3/4	
25A	Rc1	
32A	Rc1 1/4	
40A	Rc1 1/2	
50A	Rc2	
Ⓑ Coil housing		
2G	Coil with DIN terminal box (for housing facilities)	
3A	Coil with open frame (for greenery)	
00	Grommet lead (for housing facilities) *1	
7A	Low-watt coil - 3W (for greenery)	
7L	Latch coil (for greenery) *2	
Ⓒ Strainer		
0	None	Standard
2	With	*4
Ⓓ Voltage		
AC100V	100 VAC 50/60 Hz	
AC200V	200 VAC 50/60 Hz	
DC24V	24 VDC	

⚠ Precautions on model No. selection

*1 When the coil housing is "00", it is only possible to select AC for the voltage.
*2 The latch coil shape 7L is dedicated for the controller manufactured by CKD.
The voltage of the model No. when placing an order is 6 VDC.
Applicable controller
· RSC-S5, RSC-G series
· RSC-1WP, RSC-2WP
*3 Coil options 7A and 7L with bore size of 20A or more are available.
*4 Strainers integrated with bore size of 15 to 25A are available.

Internal structure and parts list

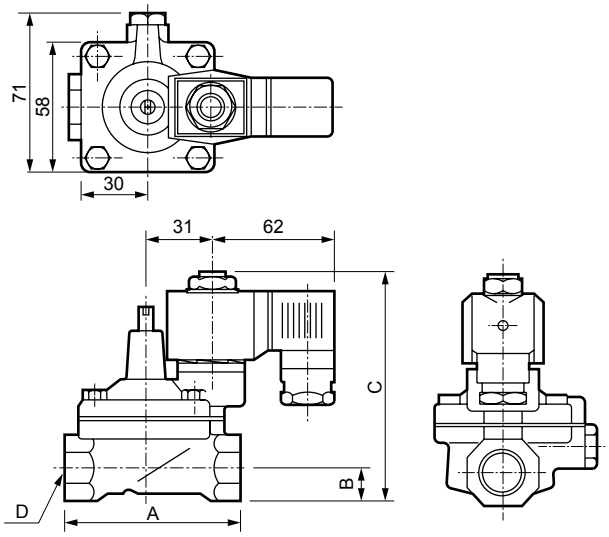


Cannot be disassembled

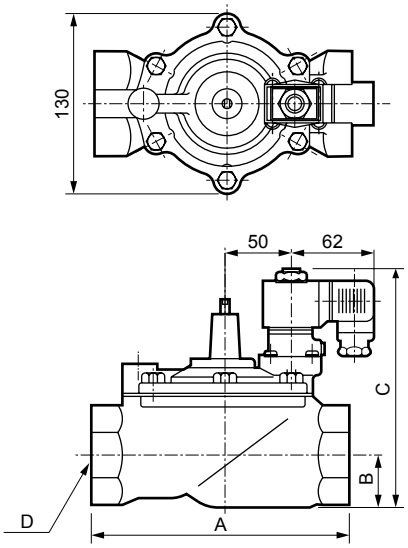
No.	Part name	Material
1	Valve body	Bronze casting
2	Strainer	Stainless copper wire (available up to 25A)
3	Pilot valve seat	Bronze casting
4	Diaphragm	Ethylene propylene rubber
	Diaphragm assembly	Cold-rolled stainless steel plates
5	Spring	Stainless steel wire for springs
6	Pilot valve body	Bronze casting
7	Flow rate adjusting	Stainless copper bar
8	Plunger	Stainless copper bar
	Valve seat	Nitrile rubber
9	Spring	Stainless steel wire for springs
10	Core assembly	Stainless steel bar
11	Coil	-
12	Bleed orifice	Free machining copper alloy bar
13	Manual cock	Stainless steel bar

Dimensions

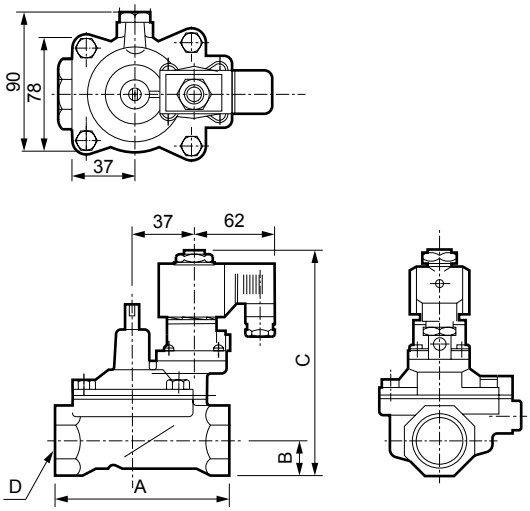
● RSV-15A-210W



● RSV-$\begin{matrix}32\\40\\50\end{matrix}$A-210W



● RSV-$\begin{matrix}20\\25\end{matrix}$A-210W



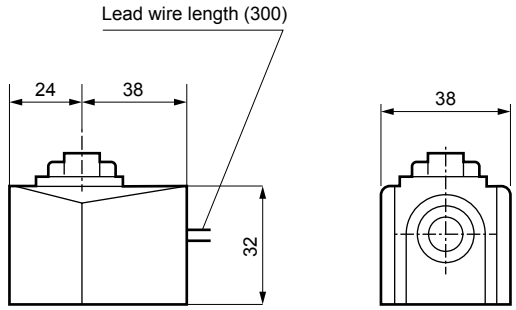
Model No.	A	B	C	7A, 7L	D
RSV-15A-210W	80	15	102	-	$Rc^1/_2$
RSV-20A-210W	100	18	135	163	$Rc^3/_4$
RSV-25A-210W	105	22	141	169	Rc1
RSV-32A-210W	168	29	154	182	$Rc1^1/_4$
RSV-40A-210W	176	34	164	192	$Rc1^1/_2$
RSV-50A-210W	180	39	174	202	Rc2

⚠ Always read the precautions in the instruction manual before starting use.

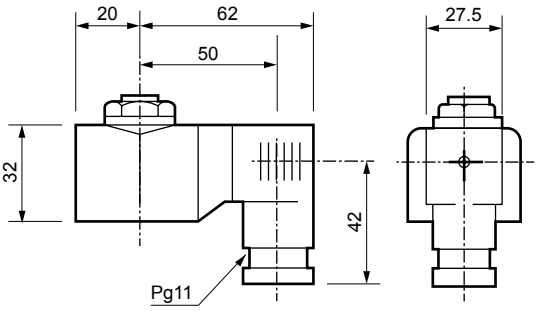
Coil housing shape

Standard

● Open frame (3A) greenery

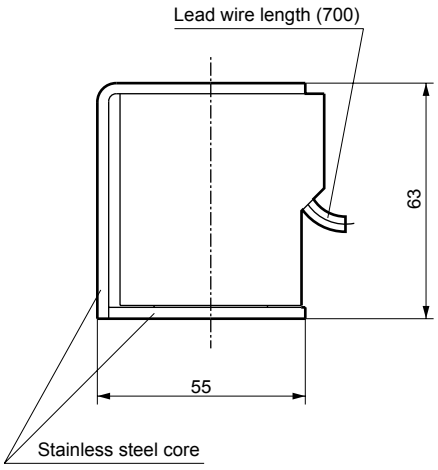


● Type with DIN terminal (2G) housing facilities

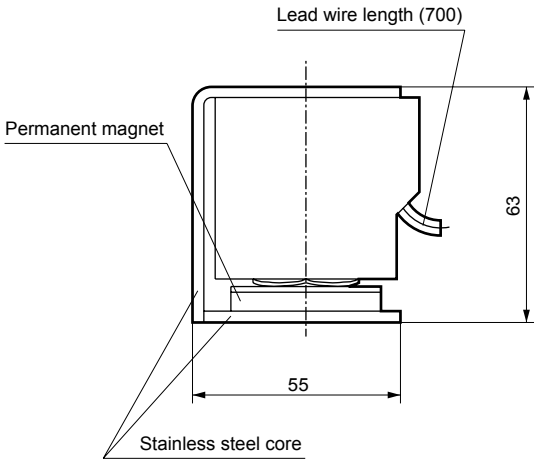


Option

● Low-watt (7A) greening
Continuous energizing



● Latch (7L) greenery



Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Cautions regarding solenoid valve for automatic watering

Design/selection

CAUTION

■ This product cannot be used as an emergency shut off valve.
The solenoid valves listed in this catalog are not designed as valves to ensure safety such as emergency shut off valves. When using in such a system, always take separate measures that will ensure safety.

■ This product cannot be used in an explosion-proof atmosphere.
Select products from the explosion-proof solenoid valve series for use within an explosion-proof atmosphere.

■ Working fluids
Do not use any fluid other than the working fluids specified in the catalog.

■ Fluid temperature
Be sure to use the coolant check valve within the specified fluid temperature range.

■ Ambient environment
(1) Do not use this product in a corrosive gas atmosphere or an atmosphere that could affect the component materials.
(2) Do not use this product near a heat generating source or in a location where it may be exposed to radiant heat.
(3) Use this product within the operating ambient temperature.
(4) When using this product in a cold climate, take necessary measures to prevent freezing by wrapping the product with insulation or heating tape. However, refrain from wrapping insulation, etc., around the coil.
(5) Although solenoid valves with a protection grade of IP67 have a structure capable of withstanding temporary submersion in water, be sure to ensure proper drainage of water to prevent deterioration of insulation. In addition, avoid direct exposure to sunlight.

■ Securing maintenance space
Secure sufficient space for maintenance and inspection.

■ Leakage current
When using a PLC with a CR circuit to absorb the surge voltage generated from switching elements, etc., the leakage current could adversely affect the operation of the solenoid valve. Use the products with a leakage current which is less than the values listed in this catalog for each product.

■ Min. working pressure differential
Use the products at a pressure higher than the min. working pressure differentials within the specifications listed in the catalog.

Mounting, installation and adjustment

CAUTION

1. Installation

■ Be sure to read the instruction manual thoroughly before installing the product.
■ Do not apply external force to the coil during installation.
■ After installation, check for leaks from pipes, for proper wire connections and that the product is installed correctly.

2. Piping

■ Observe the effective thread length for the piping threads. Chamfer the end of the thread section by approx. a half-pitch.
■ Before piping, flush the inside of the pipe with 0.3 MPa of air, and remove foreign matter such as dirt, metal chips, rust and sealing tape.
■ If excessive sealant (sealing tape, gel-type sealant) is applied when piping, it could enter the product and cause malfunctions.
■ When wrapping sealant on the piping material, wind it from the pipe end along the thread section, and leave 1.5 to 2 threads uncovered.
■ Dirt or foreign matter in fluid could prevent the product from functioning correctly.
Install a strainer of 40 to 80 mesh on the primary side of the solenoid valve depending on the quality of the water.
■ Make sure not to use the wrong port when connecting the pipes to the product.
■ Refer to the table on the top right for the tightening torque when piping. (Refer to page 1059 for GSV Series.)
■ When installing piping, be sure to prepare a bypass circuit for performing maintenance in the event of a failure.
■ Be sure to sufficiently implement removal of air within the piping and install an automatic air removal valve in areas where air is easily accumulated.
■ Do not use a solenoid valve with terminal box outdoors or within manholes. Moisture may cause accidents due to electrical leakage.
■ After piping, open the escape valve (sludge valve) on the end to drain the pipes of foreign objects and ensure that the space within the pipes is replaced with water.
■ Accumulation of air inside the valve may cause operation defects such as vibrations. Be sure to release the air and ensure that the space within the pipes is replaced with water.

Recommended tightening torque when piping

Piping nominal diameter	Recommended tightening torque when piping [N·m]
Rc1/2	41 to 43
Rc3/4	62 to 65
Rc1	83 to 86
Rc1 1/4	97 to 100
Rc1 1/2	104 to 108
Rc2	132 to 136
Rc2 1/2	146 to 150
Rc3	148 to 152

3. Wiring

■ Use with the allowable voltage range. Usage outside the allowable voltage range may lead to malfunction or coil damage.
■ Provide a circuit breaker, such as a fuse, on the control circuit to protect electrical equipment.
■ If the electric circuit system is vulnerable to solenoid surge, use a solenoid with surge suppressor, or insert a surge absorber, etc., in parallel to the solenoid.
■ As a guide, use a wire with a nominal cross section of 0.75mm^2 or more. Make sure that excessive force is not applied to the lead wire.
■ Use crimping sleeves for the lead wire joints and ensure water-proof insulation with water-proof insulation pads, etc.
■ Use of a switching circuit which does not generate contact chatter extends the service life of solenoid valves.

Use/maintenance

⚠ WARNING

- Use the product within the max. working pressure and max. working pressure differential ranges.
- Do not touch coils with hands or body while the power is ON or immediately after it is turned OFF.
  The coil section of the solenoid valve will heat up when energized.
  Depending on the product, direct contact could cause burns and so use caution.
- Do not touch the electrical wiring connections (bare, live parts) with hands or body when they are energized. There is a risk of electric shock.

⚠ CAUTION

- Do not use valves as footing or place any heavy objects on top of the valves.
- If the product has been out of use for a period, perform a test run before starting the actual operation.
- Read the instruction manual thoroughly and make sure you understand the content prior to use and before performing maintenance.
- Before performing maintenance, be sure to turn the power supply OFF, close the water control valves, and open the manual operation needle to release the fluid pressure.
- To ensure optimum use, inspect the product every six months. When using water of especially poor quality (when there are large amounts of debris or foreign matter, or when the water contains organic matter), clean the filter for the pilot and check the pilot hole (the approx. ø0.8 hole on the inner groove portion of the O-ring) for clogging once every 2 to 3 months. Clogging of this hole may delay operation or cause defective closing.
- When cleaning the product, use a low-polluting cleaning agent such as a neutral detergent. (Note that the rubber parts must be replaced. There is a risk of expansion.)
- For manual operation, the manual operation needle can be opened by turning the needle 1/2 to 1 turns in the counter-clockwise direction.
  Securely tighten the needle when closing the unit.

⚠ Cautions regarding controller for automatic watering

Mounting, installation and adjustment

⚠ CAUTION

1. Mounting and installation

- Always read the operation procedures in each of the instruction manuals thoroughly before installation.
- With the commercial power supply, be sure to use a circuit breaker such as an electrical leakage breaker to protect the controller.

2. Wiring

- With the commercial power supply, be sure to establish a ground (earth) connection in order to prevent electrical shock and lightning-induced failures. D class grounding (with the ground resistance of 100 Ω or less)
- With the commercial power supply, make sure that there are no mistakes with the power supply voltage when connecting the product.
- There are specific polarities with the output of the pulse voltage. Reverse operation if (red) and (black) are connected in reverse. Do not short-circuit (contact) (red) and (black).
- After wiring the product, make sure that the screws of the terminal block are not loose.

Use/maintenance

⚠ CAUTION

- With the pulse voltage controlled types (RSC-S5, RSC-G, and RSC-1WP types), all the configurations are deleted when the power supply is turned "OFF" or the batteries are removed.
  However, the RSC-2WP retains configurations for 30 seconds even after the batteries are removed.
  Also, note that even if the power supply is turned OFF during watering, the watering state will not be cancelled.
- Be sure to close the door to prevent the panel surface from being exposed to water. Exposure to water may cause failure.
- Do not touch the wiring connections (bare, live parts) of the commercial power supply.
- Do not operate the unit with wet hands.
- Do not use solenoid valves which are not applicable.
- Be sure to turn the power supply OFF before inspecting or replacing a fuse.
- When touching the rear surface (substrate) of the control unit, static electricity may cause damage.
- Check the watering situation approximately once a week.
- Do not disassemble or modify the product.
- When using the rain sensor, be sure to regularly (approximately twice a year) inspect and replace the felt.
  Refer to page 1051 for an outline of the inspection.

MEMO

Outdoor Products W Series

Overview

The Outdoor Products W Series can withstand long-term use even in harsh outdoor environments.

Features

Proven durability for outdoor use

- Combined cycle test
  (JIS H8502:1999)
  960 hours cleared
- Accelerated weathering test
  (Sunshine weather meter test)
  1,000 hours cleared
- Ozone exposure test
  (JIS D0205:1987)
  400 hours cleared

WEATHER PROOF

This logo represents CKD's guarantee of its products for outdoor use.

CONTENTS

⚠ Always read the precautions in the Introduction and on page 1095 before use.

CKD's outdoor series can withstand long-term use even in harsh outdoor environments.

Proven durability for outdoor use

· Cleared a 960 hour combined cycle test (JIS H8502: 1999) to test durability of coating on metal parts
· Accelerated weathering (sunshine weather meter) test: 1000 hours cleared to test durability of resin parts
· Cleared a 400 hour ozone exposure test (JIS D0205: 1987) to test durability of rubber/gaskets

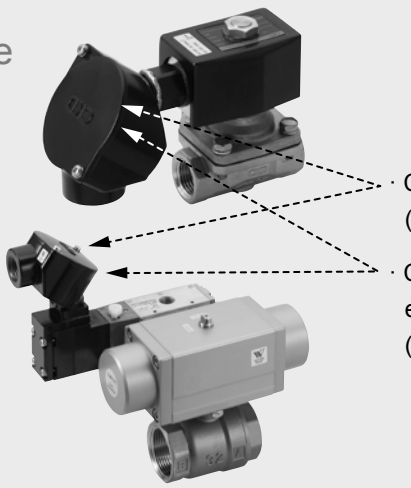
Combined cycle test	Accelerated weathering test	Ozone exposure test
Equivalent to 7-year acceleration	**Equivalent to 3-year acceleration**	**400 hours**

General purpose valve

Weather resistance improved with the highly reliable general purpose valves that have 30 years of market performance.

Air operated ball valve

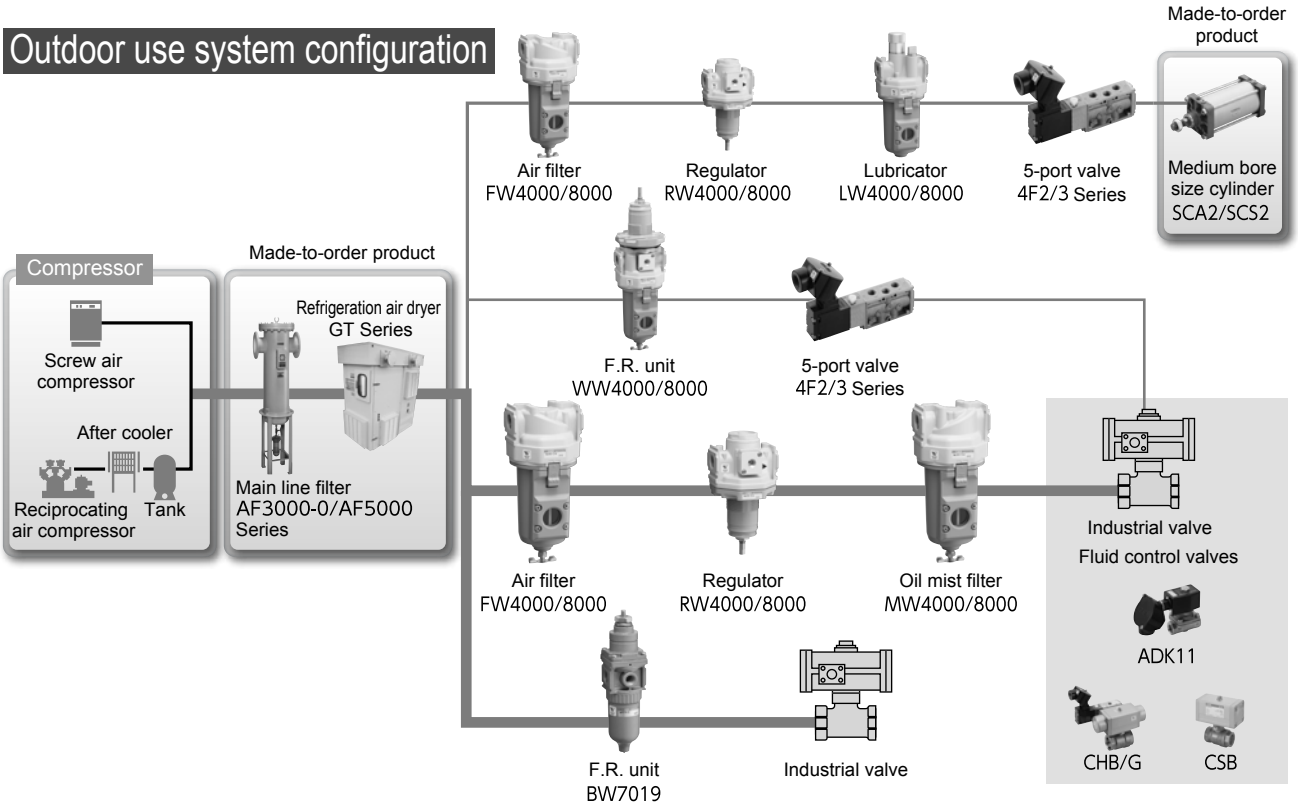
Also has a mounted solenoid valve option.



· Changed to metal terminal box (round terminal box)

· Completely prevents water, etc., from entering due to the sealant coating. (IP65 compliant)

Outdoor use system configuration



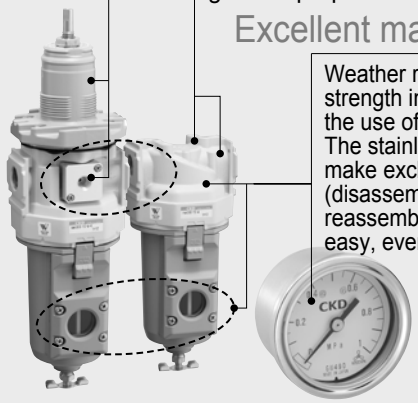
F.R.L.

All-metal cover and gauge plug

Weather resistance is improved by using metal for the resin parts of general-purpose items.

Excellent maintainability

Weather resistance and strength improved through the use of tempered glass. The stainless steel screws make exchange (disassembly and reassembly) of repair parts easy, even when outdoors.

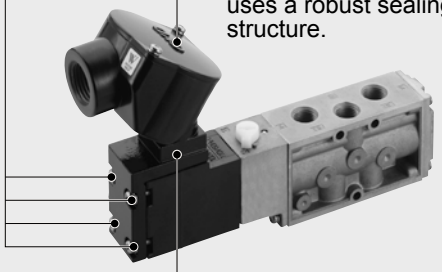


4F Series

Stainless steel screws used

Uses a sealing structure

The terminal box cover uses a robust sealing structure.



IP65 certified

Completely prevents water, etc., from entering due to the sealant coating.

Refer to catalog No. CC-1276A for details.

WEATHER PROOF This logo represents CKD's guarantee of its products for outdoor use.

Pilot kick 2-port solenoid valve
(General purpose valve)

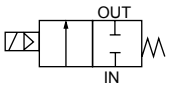
ADK11-W Series

- NC (open when energized)
- Port size: Rc1/2 to Rc1
- Diaphragm drive

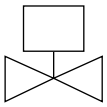
RoHS

JIS symbol

● ADK11: NC (open when energized)



Mounting orientation



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	Standard specifications
Working fluid	Air/low vacuum (1.33 x 10^3 Pa (abs))/water/kerosene/oil (50 mm^2/s or less)
Working pressure differential MPa	0 (≈0 psi, 0 bar) to 1.0 (≈145 psi, 10 bar) (refer to max. working pressure differential in individual specifications.)
Max. working pressure MPa	2 (≈290 psi, 20 bar)
Proof pressure (water pressure) MPa	4 (≈580 psi, 40 bar)
Fluid temperature °C	5 (41°F) to 60 (140°F)
Ambient temperature °C	-10 (14°F) to 60 (140°F)
Thermal class	Class 130 (B)
Working environment	Indoors/outdoors
Atmosphere	A place free of corrosive gases, liquids, chemicals, and explosive gases
Valve structure	Pilot kick poppet, diaphragm drive
Valve seat leakage (*1) cm^3/min (ANR)	1 or less (air)
Mounting orientation	Limited to vertical orientation with the coil on top
Body/sealant	Stainless steel/fluoro rubber
Degree of protection	IP65

*1 : Value at pneumatic pressure of 0.02 to 1.0 MPa.
When used at a pressure less than 0.02 MPa, the sealant may be unstable. Contact CKD in this case.

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Min. working pressure differential (MPa)	Max. working pressure differential (MPa)			Rated voltage	Apparent power (VA)				Power consumption (W)	Weight (kg)
				Air	Water/kerosene	Oil (50 mm^2/s)		When holding		When starting		AC	
				AC	AC	AC		50 Hz	60 Hz	50 Hz	60 Hz	50/60 Hz	
NC (open when energized)													
ADK11-15A	Rc1/2	16	0	1	1	0.6	100 VAC 50/60 Hz 200 VAC 50/60 Hz	25	21	84	75	10/8.5	1.2
ADK11-20A	Rc3/4	23											1.3
ADK11-25A	Rc1	28											1.7

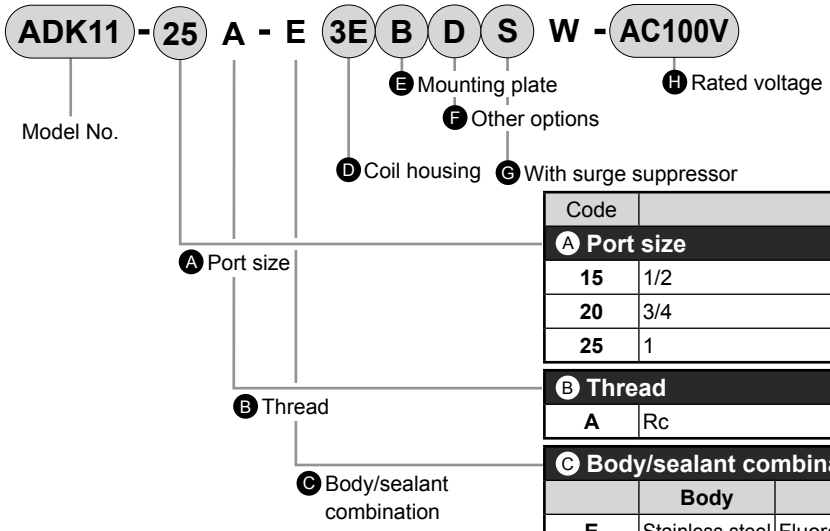
*1 : The model numbers above show the basic port size (Rc). Refer to How to order for other combinations.
*2 : The voltage fluctuation range must be within ±10% of the rated voltage.

Flow characteristics

Model No.	Port size	Orifice size (mm)	Flow characteristics			
			C[dm^3/(s·bar)]	b	Cv	S (mm^2)
NC (open when energized)						
ADK11-15A	Rc1/2	16	20	0.31	4.5	-
ADK11-20A	Rc3/4	23	-	-	8.6	162
ADK11-25A	Rc1	28	-	-	12.0	231

*1 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

How to order



Code	Description
A Port size	
15	1/2
20	3/4
25	1
B Thread	
A	Rc

C Body/sealant combination

	Body	Seal	Remarks
E	Stainless steel	Fluoro rubber	air/water/low vacuum/kerosene/oil

D to H

For details on the coil housing, other options and voltage, etc., refer to the following table.

[Example of model No. 1]
ADK11-15A-E3EW-AC100V
A Port size : 1/2
B Thread : Rc
C Body/sealant combination
: Body - stainless steel, sealant - fluoro rubber
D Coil housing: Open frame with round terminal box
E to F : None
H Rated voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

For Items Ⓓ to Ⓗ, the combinations indicated with codes are available.
Note that if options for Items Ⓔ to Ⓖ are not required, they should be left blank.

D Coil housing			E	F Other options			G	H Rated voltage
Description			Mounting plate	Cable gland (marine cable gland)			With surge suppressor	Description
				A-15a	A-15b	A-15c		
3E	Open Frame	With round terminal box (G1/2)	**B**	**D**	**E**	**F**	**S**	100 VAC, 200 VAC
3L		Round terminal box with lamp (G1/2)						

⚠ Refer to the following cautions for Items Ⓔ to Ⓗ.

⚠ Precautions for model No. selection

Notes for Items E to G

*1 : For Item Ⓕ, select an option from D, E, and F.
*2 : The surge suppressor is mounted in the terminal box when the coil includes a terminal box.

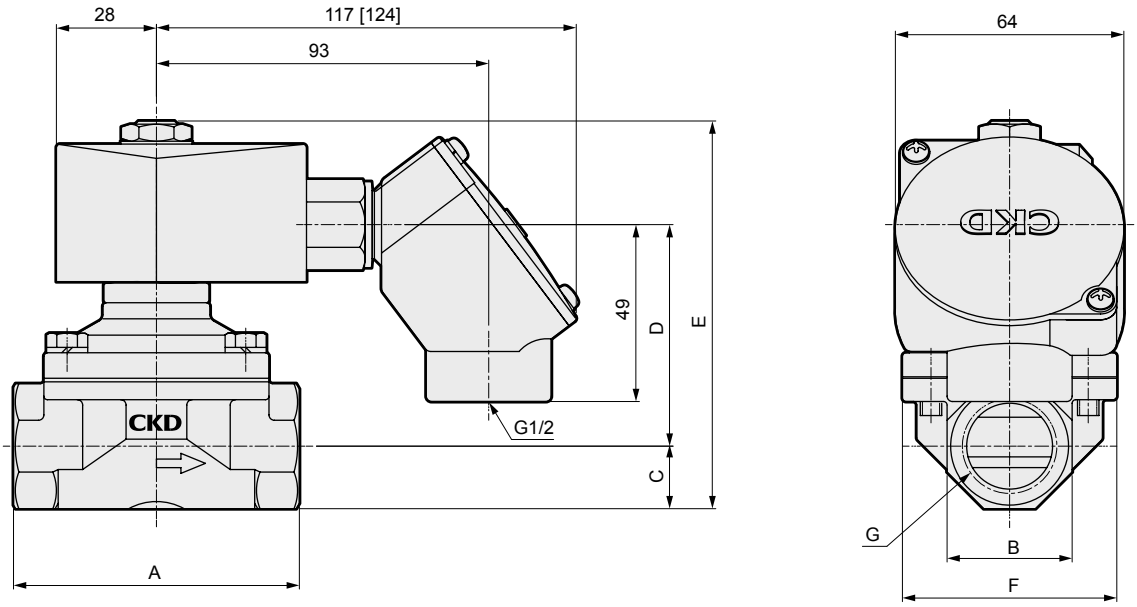
Notes for Items H

*3 : 100 VAC coil is compatible with 100 VAC 50/60 Hz and 110 VAC 60 Hz, and
200 VAC coil is compatible with 200 VAC 50/60 Hz and 220 VAC 60 Hz.

Dimensions: ADK11-W Series

● Open frame + round terminal box
ADK11-15A/20A/25A-E 3E
3L

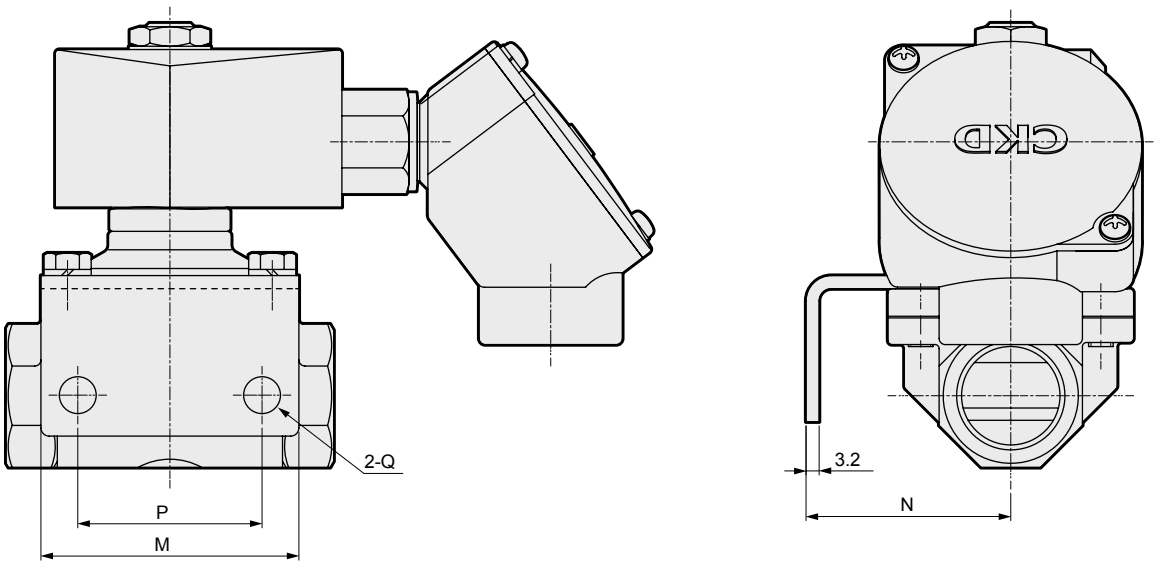
[ ] shows ADK11-15A/20A/25A-E 3L



Model No.	A	B	C	D	E	F	G
ADK11-15A-E3E/3L	71	29	14.5	58.5	102	50	Rc1/2
ADK11-20A-E3E/3L	80	35	17.5	62	108.5	60	Rc3/4
ADK11-25A-E3E/3L	90	45	22.5	67.5	119	71	Rc1

Dimensions: ADK11-W Series

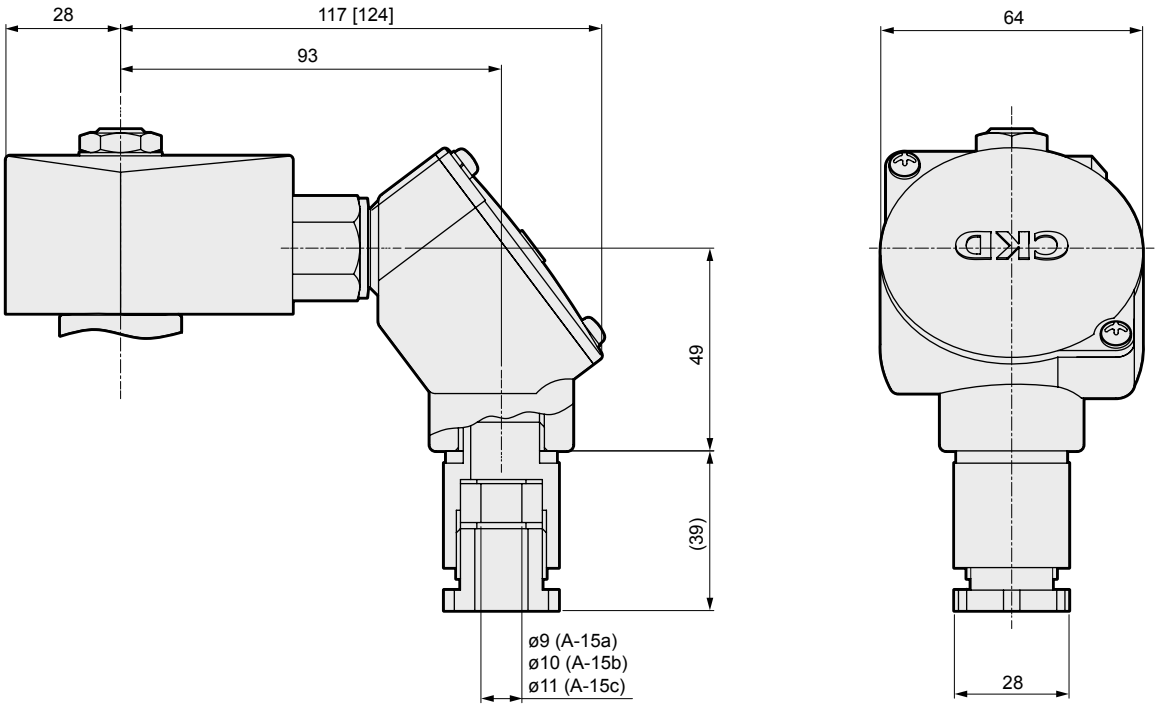
● Mounting plate
ADK11-15A/20A/25A-E*B



Model No.	M	N	P	Q
ADK11-15A-E3E/3LB	56	45	40	ø9
ADK11-20A-E3E/3LB	63	50	45	ø9
ADK11-25A-E3E/3LB	75	56	50	ø11

● Open frame + round terminal box + cable gland
ADK11-15A/20A/25A-E [3E / 3L] [D / E / F]

[ ] shows ADK11-15A/20A/25A-E [3L]



Air operated 2-port ball valve
(compact rotary valve)

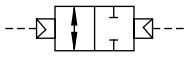
CHB-W/CHB-WR* Series

● Port size: Rc3/8 to Rc2

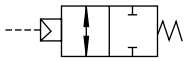
RoHS

JIS symbol

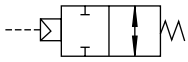
● CHB-W
(double acting)



● CHB-WR1
(single acting-NC)



● CHB-WR2
(single acting-NO)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		CHB-W	CHB-WR*
Actuation		Air operated: Double acting	Air operated: Single acting
Working fluid		Water/air/oil (500 mm^2/s or less)	
Working pressure MPa		0 ((≈0 psi, 0 bar)) to 1.0 ((≈145 psi, 10 bar))	
Proof pressure (water pressure) MPa		2.0 (≈290 psi, 20 bar)	
Fluid temperature °C		0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C		-10 (14°F) to 60 (140°F) (no freezing)	
Working environment		Indoors/outdoors	
Valve seat leakage cm^3/min		0 (at initial water pressure 1 MPa)	
Mounting orientation		Unrestricted	
Frequency cycles/min		1 or less	
Rotary actuator	Pilot fluid	Compressed air	
	Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water pressure) MPa	1.5 (≈217 psi, 15 bar)	
	Working pressure MPa	0.35 (≈51 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)	0.4 (≈58 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)
	Fluid temperature °C	5 (41°F) to 60 (140°F)	
	Port size	Rc1/8	Rc1/8

Individual specifications

Item / Model No.		Port size	Orifice size (mm)	Cv	Weight (kg)	
					Double acting	Single acting
Standard bore	CHB-W(R*)-10	Rc3/8	10	10	1.0	1.1
	CHB-W(R*)-15	Rc1/2	10	6	1.0	1.1
	CHB-W(R*)-20	Rc3/4	15	16	1.2	1.3
	CHB-W(R*)-25	Rc1	20	29	1.3	2.2
	CHB-W(R*)-32	Rc1 1/4	25	50	2.3	2.8
	CHB-W(R*)-40	Rc1 1/2	32	98	2.7	4.9
	CHB-W(R*)-50	Rc2	40	125	3.5	5.7

1 : CHB-W (R)-10 is full bore.

How to order

CHB - WR1 - 15 - E

Model No.

Ⓐ Actuator

Ⓑ Port size

Ⓒ Body material

Code	Description	Model No. CHB (Standard bore)
Ⓐ Actuator		
W	Double acting	●
WR1	Single acting NC (normally closed)	●
WR2	Single acting NO (normally open)	●
Ⓑ Port size		
10	Rc3/8	●
15	Rc1/2	●
20	Rc3/4	●
25	Rc1	●
32	Rc1 1/4	●
40	Rc1 1/2	●
50	Rc2	●
Ⓒ Body material		
E	Stainless steel	●

[Example of model No.]

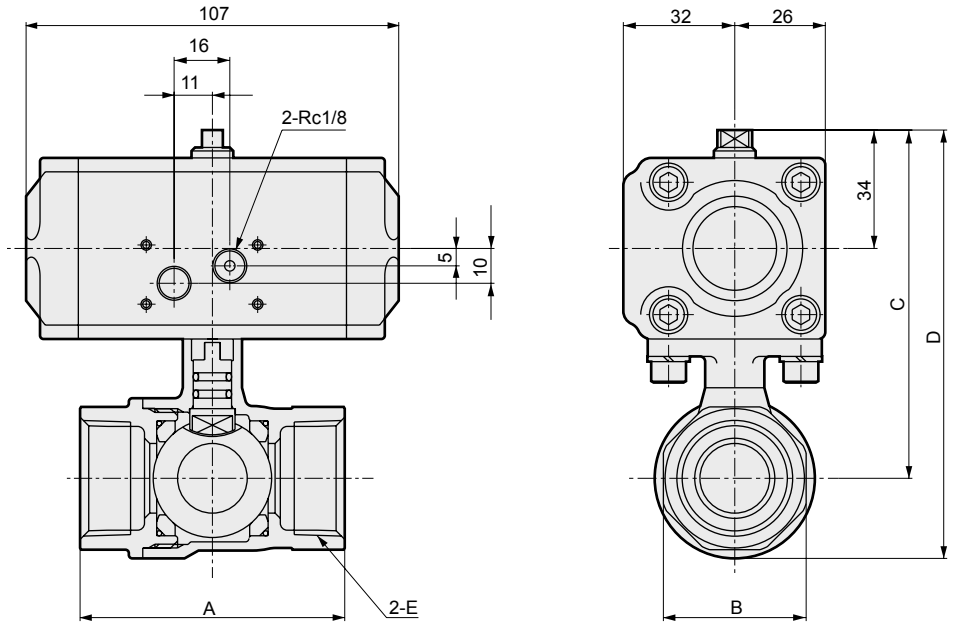
CHB-WR1-15-E

Model No.: CHB (standard bore)

Ⓐ Actuator : Direct acting NC (normally closed)
Ⓑ Port size : Rc1/2
Ⓒ Body material : Stainless steel

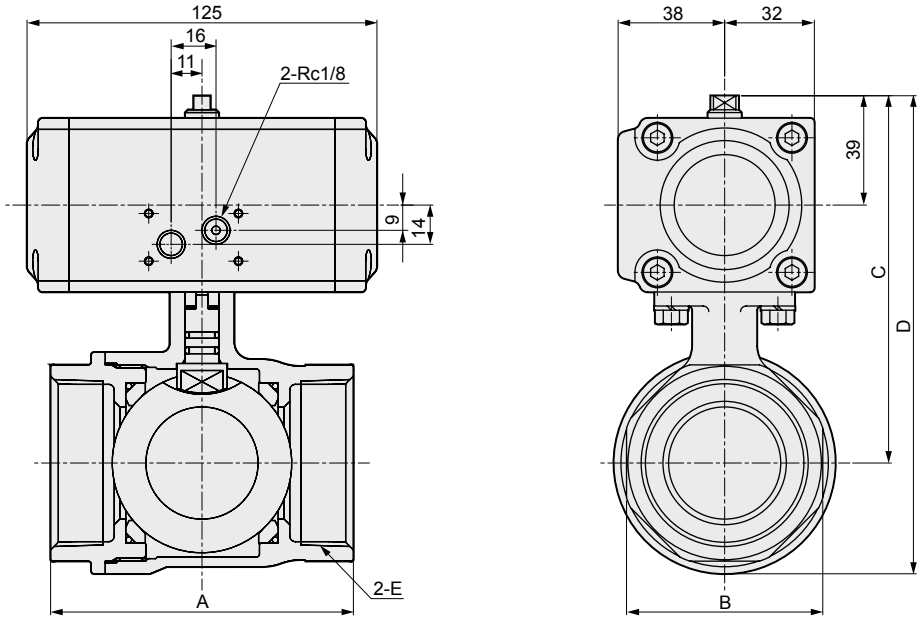
Dimensions: CHB-W Series

● CHB-W-10/15/20/25



Model No.	A	B	C	D	E
CHB-W-10	56	28	91	107	Rc3/8
CHB-W-15	56	28	91	107	Rc1/2
CHB-W-20	65	34	97	117.5	Rc3/4
CHB-W-25	76	41	100	124	Rc1

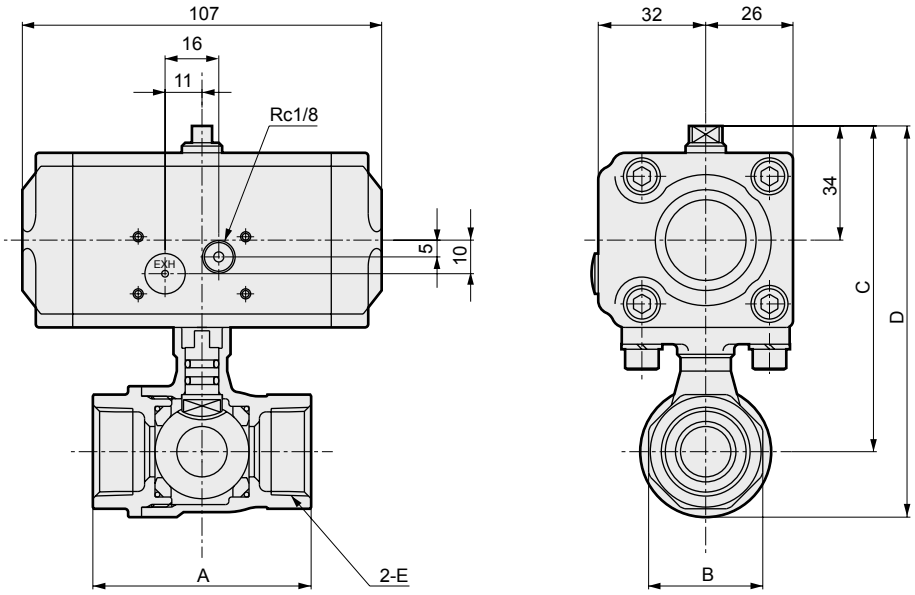
● CHB-W-32/40/50



Model No.	A	B	C	D	E
CHB-W-32	84	50	116	145.5	Rc1 1/4
CHB-W-40	94	57	122	157.5	Rc1 1/2
CHB-W-50	108	70	131	171.5	Rc2

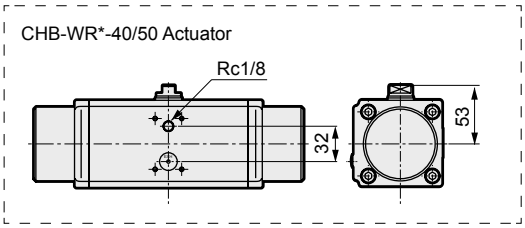
Dimensions: CHB-WR* Series

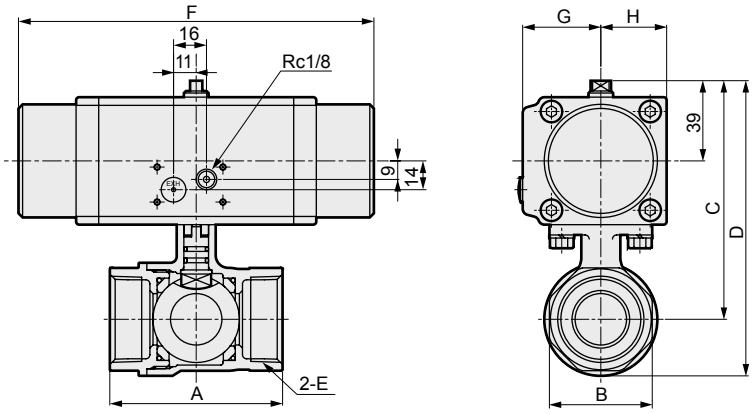
● CHB-WR*-10/15/20



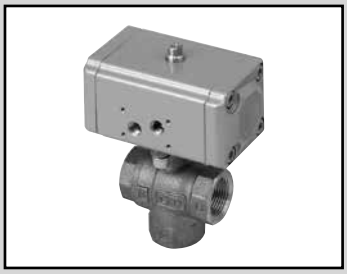
Model No.	A	B	C	D	E
CHB-WR*-10	56	28	91	107	Rc3/8
CHB-WR*-15	56	28	91	107	Rc1/2
CHB-WR*-20	65	34	97	117.5	Rc3/4

● CHB-WR*-25/32/40/50





Model No.	A	B	C	D	E	F	G	H
CHB-WR*-25	76	41	110	134	Rc1	173	38	32
CHB-WR*-32	84	50	116	145.5	Rc1 1/4	173	38	32
CHB-WR*-40	94	57	156.5	192	Rc1 1/2	244	43	38
CHB-WR*-50	108	70	165.5	206	Rc2	244	43	38



Air operated 3-port ball valve
(compact rotary valve)

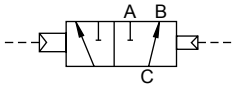
CHG-W/CHG-WR* Series

● Port size: Rc1/2 to Rc2

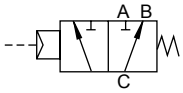
RoHS

JIS symbol

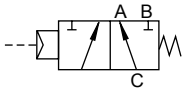
● CHG-W (double acting)



● CHG-WR1
(single acting - normally B-C path)



● CHG-WR2
(single acting - normally A-C path)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		CHG-W	CHG-WR*
Actuation		Air operated: Double acting	Air operated: Single acting
Working fluid		Water/air/oil (500 mm²/s or less)	
Working pressure MPa		0 (≈0 psi, 0 bar) to 1.0 (≈145 psi, 10 bar)	
Proof pressure (water pressure) MPa		2.0 (≈290 psi, 20 bar)	
Fluid temperature °C		0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C		-10 (14°F) to 60 (140°F) (no freezing)	
Working environment		Indoors/outdoors	
Valve seat leakage cm³/min		0 (at initial water pressure 1 MPa)	
Mounting orientation		Unrestricted	
Frequency cycles/min		1 or less	
Pressurization direction		Port C pressurization only	
Flow path shape		Multi-fluid (90° rotation switching)	
Rotary actuator	Pilot fluid	Compressed air	
	Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water pressure) MPa	1.5 (≈217 psi, 15 bar)	
	Working pressure MPa	0.35 (≈51 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)	0.4 (≈58 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)
	Fluid temperature °C	5 (41°F) to 60 (140°F)	
	Port size	Rc1/8	Rc1/8

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Cv	Weight (kg)	
				Double acting	Single acting
CHG-W(R*)-15	Rc1/2	10	3	1.1	1.2
CHG-W(R*)-20	Rc3/4	14	6	1.3	1.4
CHG-W(R*)-25	Rc1	19	11	1.5	2.4
CHG-W(R*)-32	Rc1 1/4	23	16	2.3	2.8
CHG-W(R*)-40	Rc1 1/2	30	28	2.8	5.0
CHG-W(R*)-50	Rc2	38	47	3.7	5.9

How to order

CHG - WR1 - 20 - E

Model No.

Ⓐ Actuator

Ⓑ Port size

Ⓒ Body material

Code	Description
Ⓐ Actuator	
W	Double acting
WR1	Single acting, normally B-C path
WR2	Single acting, normally A-C path
Ⓑ Port size	
15	Rc1/2
20	Rc3/4
25	Rc1
32	Rc1 1/4
40	Rc1 1/2
50	Rc2
Ⓒ Body material	
E	Stainless steel

[Example of model No.]

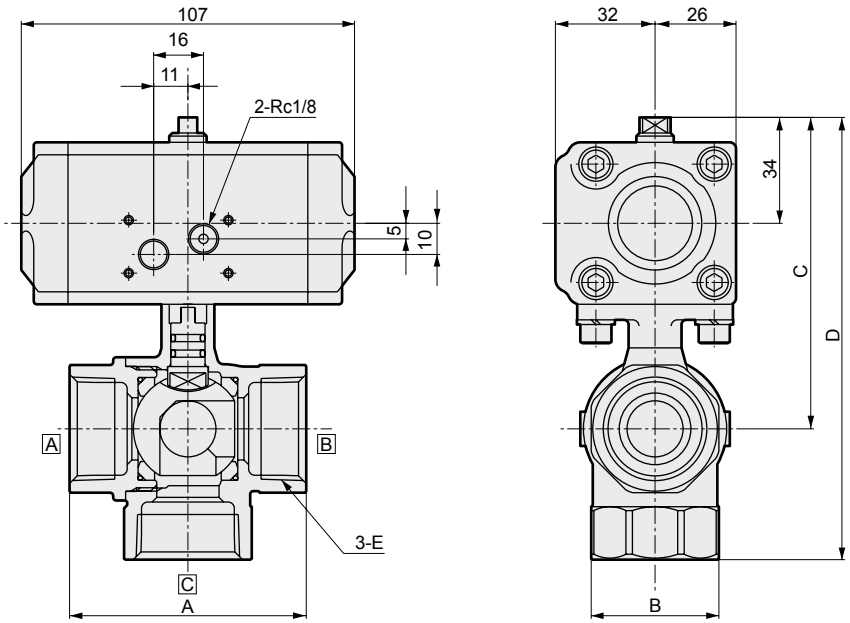
CHG-WR1-20-E

Model: CHG

Ⓐ Actuator : Direct acting, normally B-C path
Ⓑ Port size : Rc3/4
Ⓒ Body material : Stainless steel

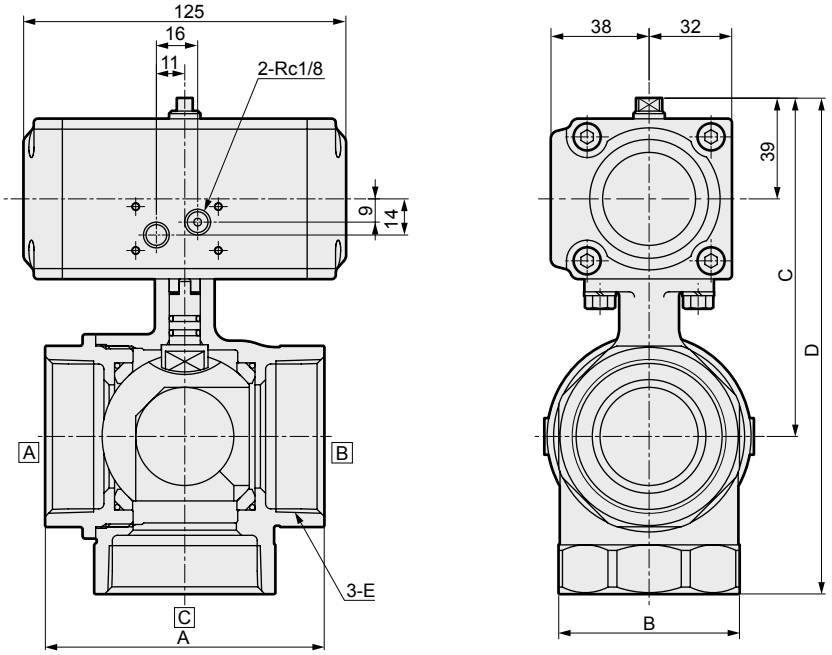
Dimensions: CHG-W Series

● CHG-W-15/20/25



Model No.	A	B	C	D	E
CHG-W-15	56	28	91	121	Rc1/2
CHG-W-20	65	34	97	133	Rc3/4
CHG-W-25	76	41	100	142	Rc1

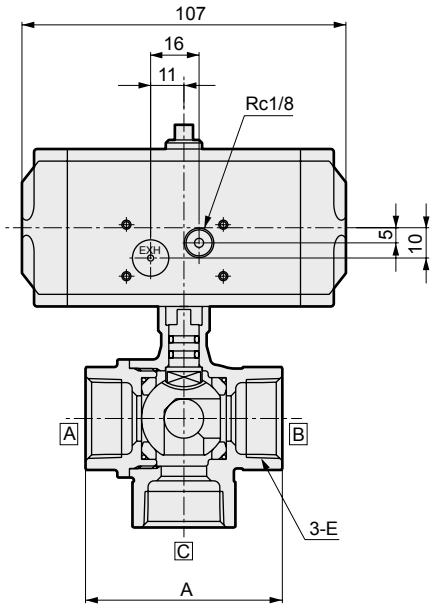
● CHG-W-32/40/50

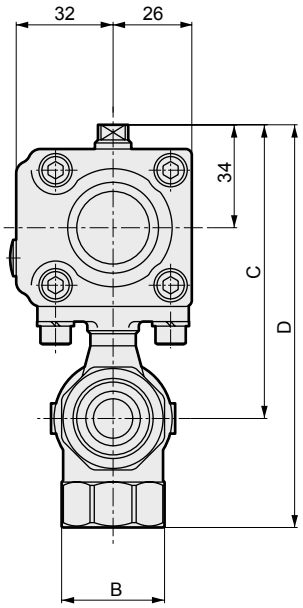


Model No.	A	B	C	D	E
CHG-W-32	84	50	116	163	Rc1 1/4
CHG-W-40	94	57	122	175	Rc1 1/2
CHG-W-50	108	70	131	192	Rc2

Dimensions: CHG-WR* Series

● CHG-WR*-15/20

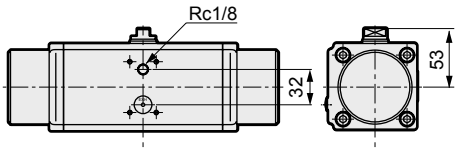


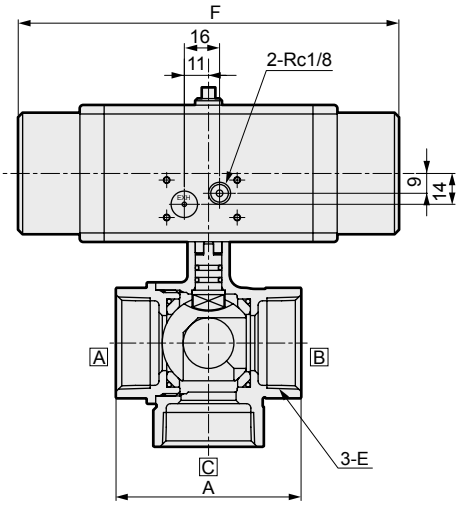


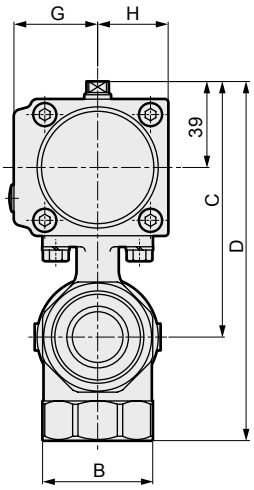
Model No.	A	B	C	D	E
CHG-WR*-15	56	28	91	121	Rc1/2
CHG-WR*-20	65	34	97	133	Rc3/4

● CHG-WR*-25/32/40/50

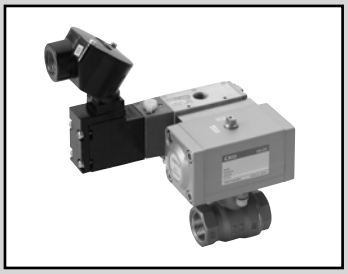
● CHG-WR*-40/50 Actuator







Model No.	A	B	C	D	E	F	G	H
CHG-WR*-25	76	41	110	152	Rc1	173	38	32
CHG-WR*-32	84	50	116	163	Rc1 1/4	173	38	32
CHG-WR*-40	94	57	156.5	209.5	Rc1 1/2	244	43	38
CHG-WR*-50	108	70	165.5	226.5	Rc2	244	43	38



Air operated 2-port ball valve with solenoid valve
(compact rotary valve)

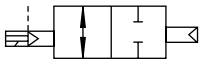
CHB-WV1/CHB-WX1 Series

● Port size: Rc3/8 to Rc2

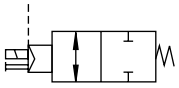
RoHS

JIS symbol

● CHB-WV1
(Double acting-NC)



● CHB-WX1
(Single acting-NC)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			CHB-WV1	CHB-WX1
Actuation			With solenoid valve: Double acting	With solenoid valve: Single acting
Working fluid			Water/air/oil (500 mm²/s or less)	
Working pressure MPa			0 (≈0 psi, 0 bar) to 1.0 (≈145 psi, 10 bar)	
Proof pressure (water pressure) MPa			2.0 (≈290 psi, 20 bar)	
Fluid temperature °C			0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C			-10 (14°F) to 60 (140°F) (no freezing)	
Working environment			Indoors/outdoors	
Valve seat leakage cm³/min			0 (at initial water pressure 1 MPa)	
Mounting orientation			Vertical direction with the actuator on the top	
Frequency cycles/min			1 or less	
Rotary actuator	Pilot fluid		Compressed air	
	Lubrication		Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water pressure) MPa		1.5 (≈217 psi, 15 bar)	
	Working pressure MPa		0.35 (≈51 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)	0.4 (≈58 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)
	Fluid temperature °C		5 (41°F) to 60 (140°F)	
	Port size	Ports S, E1, E2	Rc1/4	
		EXH port		Rc1/8
Electrical specifications				
Rated voltage			100 VAC (50/60 Hz), 200 VAC (50/60 Hz), 24 VDC	
Starting current (A)		100 VAC	0.170/0.140 (50/60 Hz)	
		200 VAC	0.090/0.070 (50/60 Hz)	
		24 VDC	0.250	
Holding current (A)		100 VAC	0.100/0.080 (50/60 Hz)	
		200 VAC	0.050/0.040 (50/60 Hz)	
		24 VDC	0.250	
Power consumption (W)		100 VAC	5.0/4.0 (50/60 Hz)	
		200 VAC	5.0/4.0 (50/60 Hz)	
		24 VDC	6.0	
Thermal class			Class 130 (B)	
Degree of protection			IP65	
Voltage fluctuation range			±10%	

Individual specifications

Item / Model No.		Port size	Orifice size (mm)	Cv	Weight (kg)	
					Double acting	Single acting
Standard bore	CHB-WV1/WX1-10-	Rc3/8	10	10	2.1	2.2
	CHB-WV1/WX1-15-	Rc1/2	10	6	2.1	2.2
	CHB-WV1/WX1-20-	Rc3/4	15	16	2.3	2.4
	CHB-WV1/WX1-25-	Rc1	20	29	2.4	3.3
	CHB-WV1/WX1-32-	Rc1 1/4	25	50	3.4	3.9
	CHB-WV1/WX1-40-	Rc1 1/2	32	98	3.8	6.0
	CHB-WV1/WX1-50-	Rc2	40	125	4.6	6.8

How to order

CHB - WV1 - 25 - E B - S - AC100V

Model No.
Ⓐ Actuator
Ⓑ Port size
Ⓒ Body material
Ⓓ Coil option
Ⓔ Other options
Ⓕ Voltage

Code	Description	Model No. CHB (Standard bore)
Ⓐ Actuator		
WV1	Double acting NC (open when energized)	●
WX1	Single acting NC (open when energized)	●
Ⓑ Port size		
10	Rc3/8	●
15	Rc1/2	●
20	Rc3/4	●
25	Rc1	●
32	Rc1 1/4	●
40	Rc1 1/2	●
50	Rc2	●
Ⓒ Body material		
E	Stainless steel	●
Ⓓ Coil option		
B	Round terminal box	●
BL	Round terminal box with lamp	●
Ⓔ Other options		
Blank	None	●
S	Silencer *1	●
Ⓕ Voltage		
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz	●
AC200V	200 VAC 50/60 Hz and 220 VAC 60 Hz	●
DC24V	24 VDC	●

*1 : For Ⓐ WV1, CKD SL-8A-W x 2 pcs, for Ⓐ WX1 x 1 pc included with the product.

[Example of model No.]

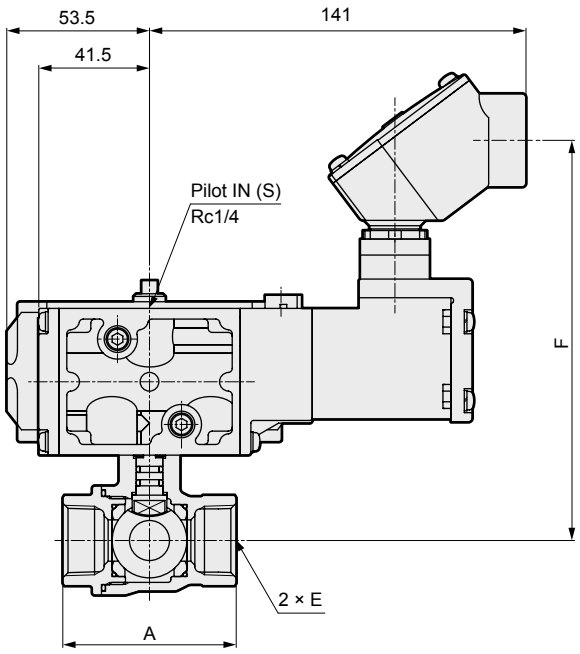
CHB-WV1-25-EB-S-AC100V

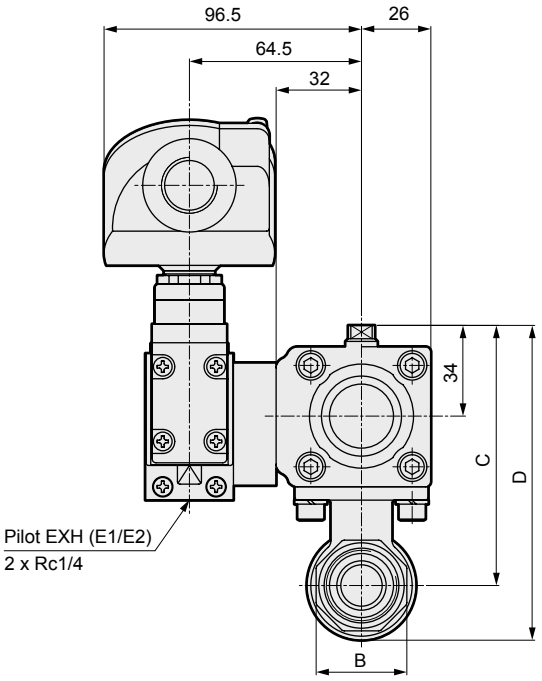
Model No.: CHB (standard bore)

Ⓐ Actuator : Double acting NC (open when energized)
Ⓑ Port size : Rc1
Ⓒ Body material : Stainless steel
Ⓓ Coil option : With round terminal box
Ⓔ Other options : 2 silencers included
Ⓕ Voltage : 100 VAC 50/60 Hz, 110 VAC 60 Hz

Dimensions CHB-WV1 Series

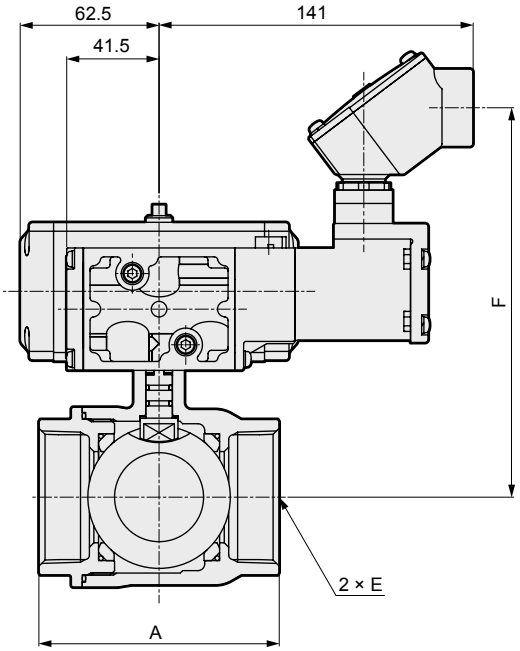
● CHB-WV1-10/15/20/25

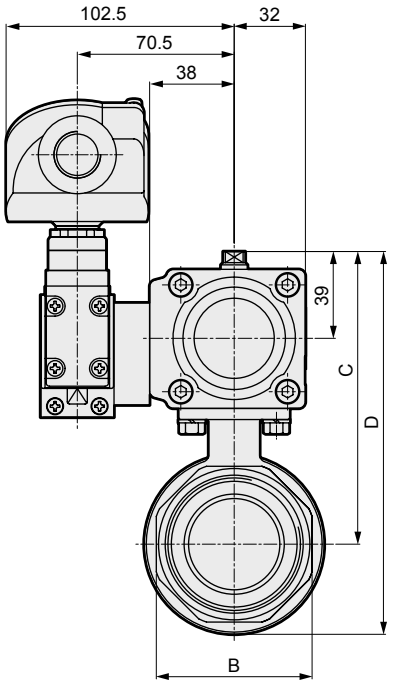




Model No.	A	B	C	D	E	F
CHB-WV1-10	56	28	91	107	Rc3/8	144
CHB-WV1-15	56	28	91	107	Rc1/2	144
CHB-WV1-20	65	34	97	117.5	Rc3/4	150
CHB-WV1-25	76	41	100	124	Rc1	153

● CHB-WV1-32/40/50

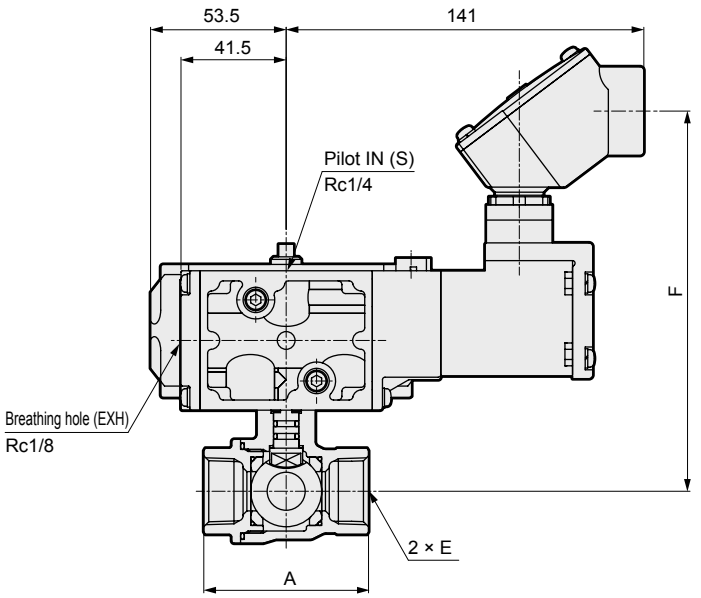


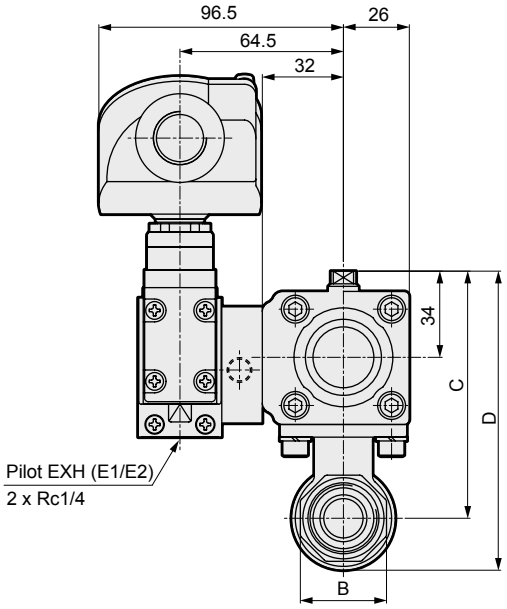


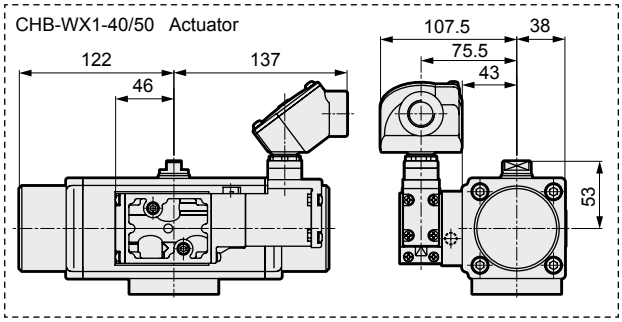
Model No.	A	B	C	D	E	F
CHB-WV1-32	84	50	116	145.5	Rc11/4	160
CHB-WV1-40	94	57	122	157.5	Rc11/2	166
CHB-WV1-50	108	70	131	171.5	Rc2	175

Dimensions CHB-WX1 Series

● CHB-WX1-10/15/20

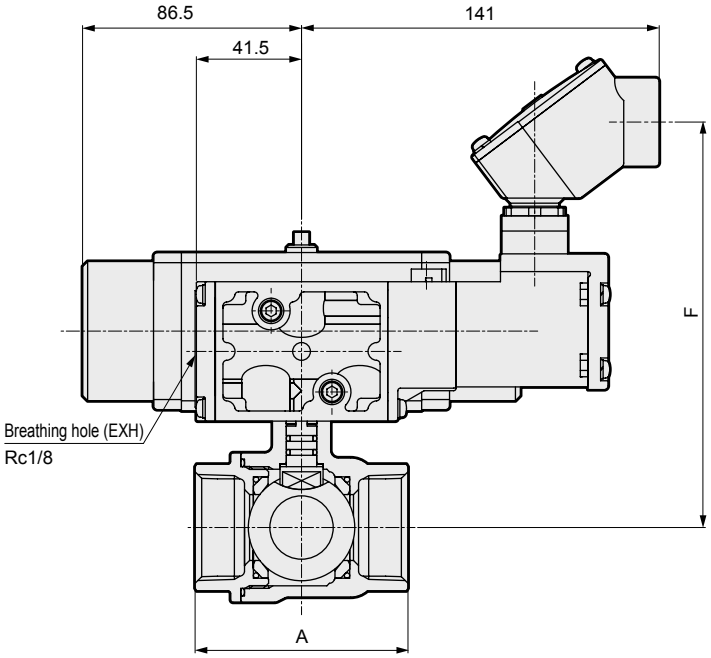


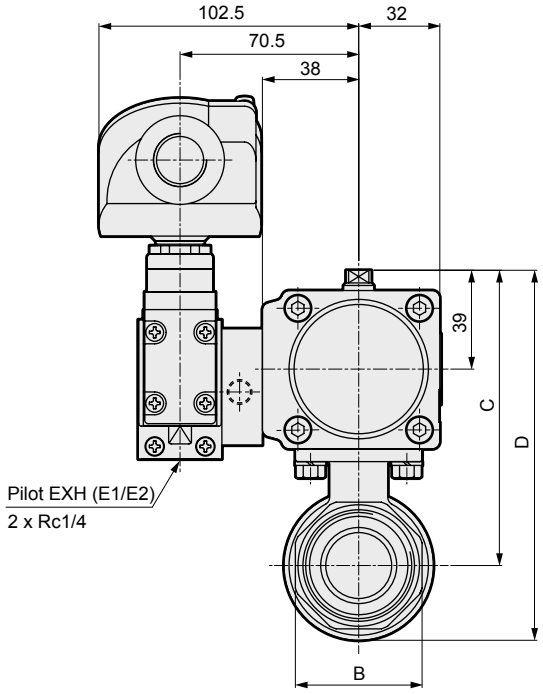




Model No.	A	B	C	D	E	F
CHB-WX1-10	56	28	91	107	Rc3/8	144
CHB-WX1-15	56	28	91	107	Rc1/2	144
CHB-WX1-20	65	34	97	117.5	Rc3/4	150

● CHB-WX1-25/32/40/50





Model No.	A	B	C	D	E	F
CHB-WX1-25	76	41	110	134	Rc1	153
CHB-WX1-32	84	50	116	145.5	Rc11/4	160
CHB-WX1-40	94	57	156.5	192	Rc11/2	194
CHB-WX1-50	108	70	165.5	206	Rc2	203

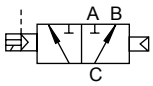
CHG-WV1/CHG-WX1 Series

● Port size: Rc1/2 to Rc2

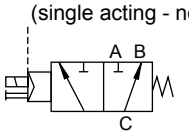
RoHS

JIS symbol

● CHG-WV1
(double acting - normally B-C path)



● CHG-WX1
(single acting - normally B-C path)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item			CHG-WV1	CHG-WX1
Actuation			With solenoid valve: Double acting	With solenoid valve: Direct acting
Working fluid			Water/air/oil (500 mm²/s or less)	
Working pressure MPa			0 (≈0 psi, 0 bar) to 1.0 (≈145 psi, 10 bar)	
Proof pressure (water pressure) MPa			2.0 (≈290 psi, 20 bar)	
Fluid temperature °C			0 (32°F) to 80 (176°F) (no freezing)	
Ambient temperature °C			-10 (14°F) to 60 (140°F) (no freezing)	
Working environment			Indoors/outdoors	
Valve seat leakage cm³/min			0 (at initial water pressure 1 MPa)	
Mounting orientation			Vertical direction with the actuator on the top	
Frequency cycles/min			1 or less	
Pressurization direction			Port C pressurization only	
Flow path shape			Multi-fluid (90° rotation switching)	
Rotary actuator	Pilot fluid		Compressed air	
	Lubrication		Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water pressure) MPa		1.5 (≈217 psi, 15 bar)	
	Working pressure MPa		0.35 (≈51 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)	0.4 (≈58 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)
	Fluid temperature °C		5 (41°F) to 60 (140°F)	
	Port size	Ports S, E1, E2	Rc1/4	
		EXH port		Rc1/8
Electrical specifications				
Rated voltage			100 VAC (50/60 Hz), 200 VAC (50/60 Hz), 24 VDC	
Starting current (A)		100 VAC	0.170/0.140 (50/60 Hz)	
		200 VAC	0.090/0.070 (50/60 Hz)	
		24 VDC	0.250	
Holding current (A)		100 VAC	0.100/0.080 (50/60 Hz)	
		200 VAC	0.050/0.040 (50/60 Hz)	
		24 VDC	0.250	
Power consumption (W)		100 VAC	5.0/4.0 (50/60 Hz)	
		200 VAC	5.0/4.0 (50/60 Hz)	
		24 VDC	6.0	
Thermal class			Class 130 (B)	
Degree of protection			IP65	
Voltage fluctuation range			±10%	

Individual specifications

Item / Model No.	Port size	Orifice size (mm)	Cv	Weight (kg)	
				Double acting	Single acting
CHG-WV1/WX1-15-	Rc1/2	10	3	2.2	2.3
CHG-WV1/WX1-20-	Rc3/4	14	6	2.4	2.5
CHG-WV1/WX1-25-	Rc1	19	11	2.6	3.5
CHG-WV1/WX1-32-	Rc1 1/4	23	16	3.4	3.9
CHG-WV1/WX1-40-	Rc1 1/2	30	28	3.9	6.1
CHG-WV1/WX1-50-	Rc2	38	47	4.8	7.0

How to order

CHG - WX1 - 15 - E B - S - AC200V

Model No.

Ⓐ Actuator
Ⓑ Port size
Ⓒ Body material
Ⓓ Coil option
Ⓔ Other options
Ⓕ Voltage

Code	Description
Ⓐ Actuator	
WV1	Double acting, normally B-C path
WX1	Single acting, normally B-C path
Ⓑ Port size	
15	Rc1/2
20	Rc3/4
25	Rc1
32	Rc1 1/4
40	Rc1 1/2
50	Rc2
Ⓒ Body material	
E	Stainless steel
Ⓓ Coil option	
B	Round terminal box
BL	Round terminal box with lamp
Ⓔ Other options	
Blank	None
S	Silencer *1
Ⓕ Voltage	
AC100V	100 VAC 50/60 Hz, 110 VAC 60 Hz
AC200V	200 VAC 50/60 Hz and 220 VAC 60 Hz
DC24V	24 VDC

*1 : For Ⓐ WV1, CKD SL-8A-W x 2 pcs, for Ⓐ WX1 x 1 pc included with the product.

[Example of model No.]

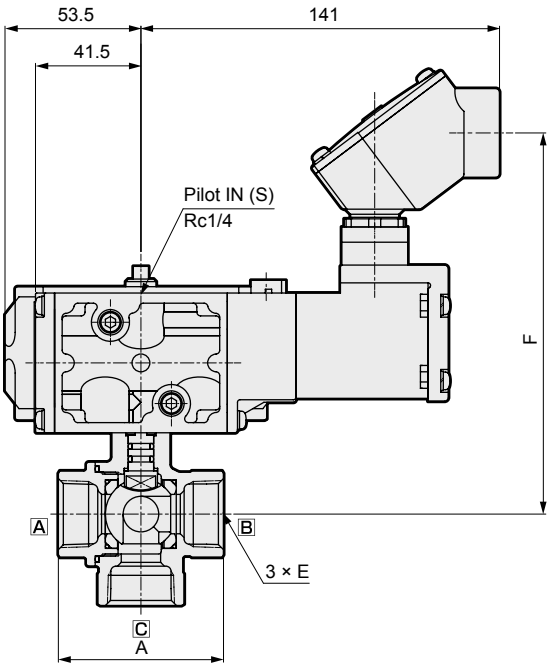
CHG-WX1-15-EB-S-AC200V

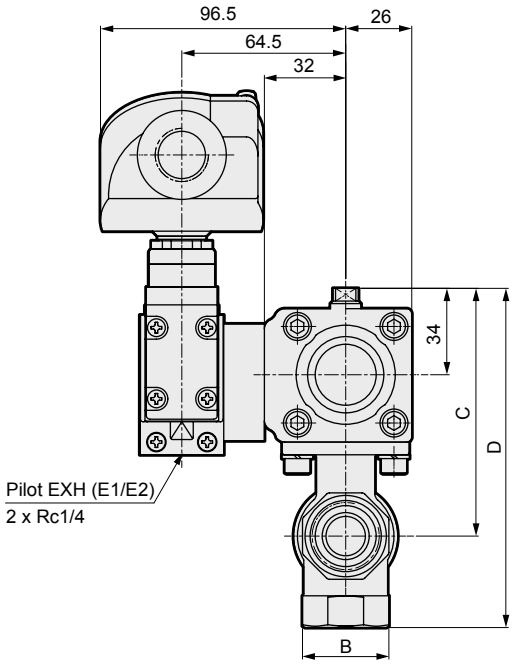
Model: CHG

Ⓐ Actuator : Direct acting, normally B-C path
Ⓑ Port size : Rc1/2
Ⓒ Body material : Stainless steel
Ⓓ Coil option : With round terminal box
Ⓔ Other options : 1 silencer included
Ⓕ Voltage : 200 VAC 50/60 Hz, 220 VAC 60 Hz

Dimensions CHG-WV1 Series

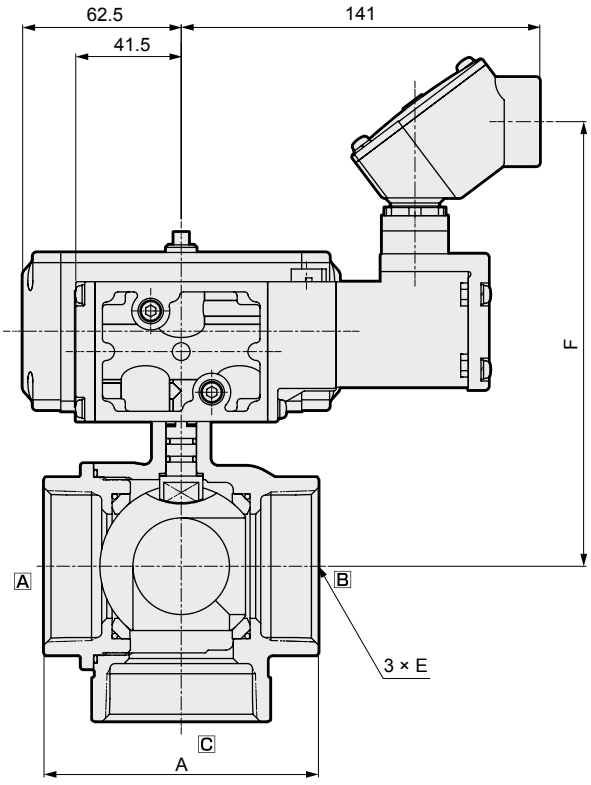
● CHG-WV1-15/20/25

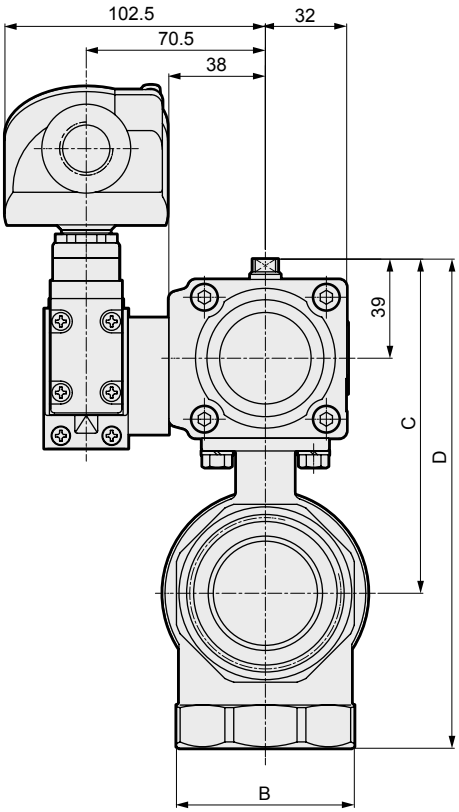




Model No.	A	B	C	D	E	F
CHG-WV1-15	56	28	91	121	Rc1/2	144
CHG-WV1-20	65	34	97	133	Rc3/4	150
CHG-WV1-25	76	41	100	142	Rc1	153

● CHG-WV1-32/40/50

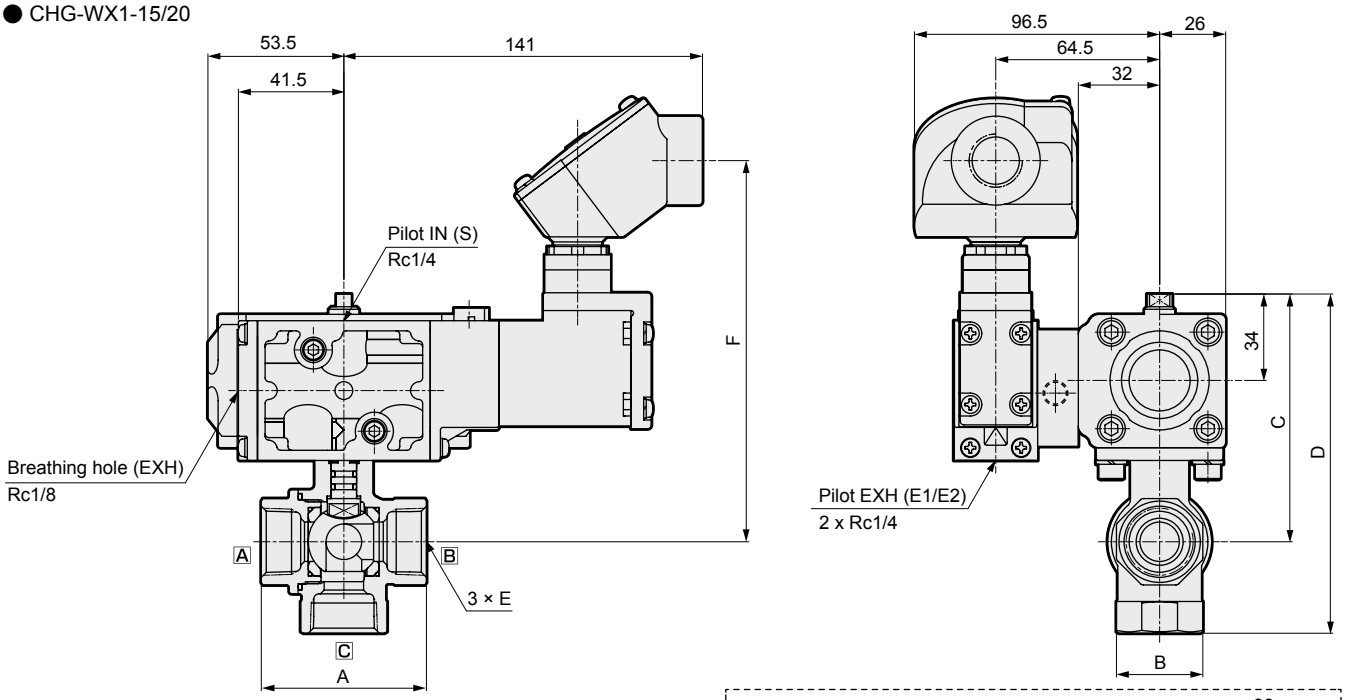




Model No.	A	B	C	D	E	F
CHG-WV1-32	84	50	116	163	Rc11/4	160
CHG-WV1-40	94	57	122	175	Rc11/2	166
CHG-WV1-50	108	70	131	192	Rc2	175

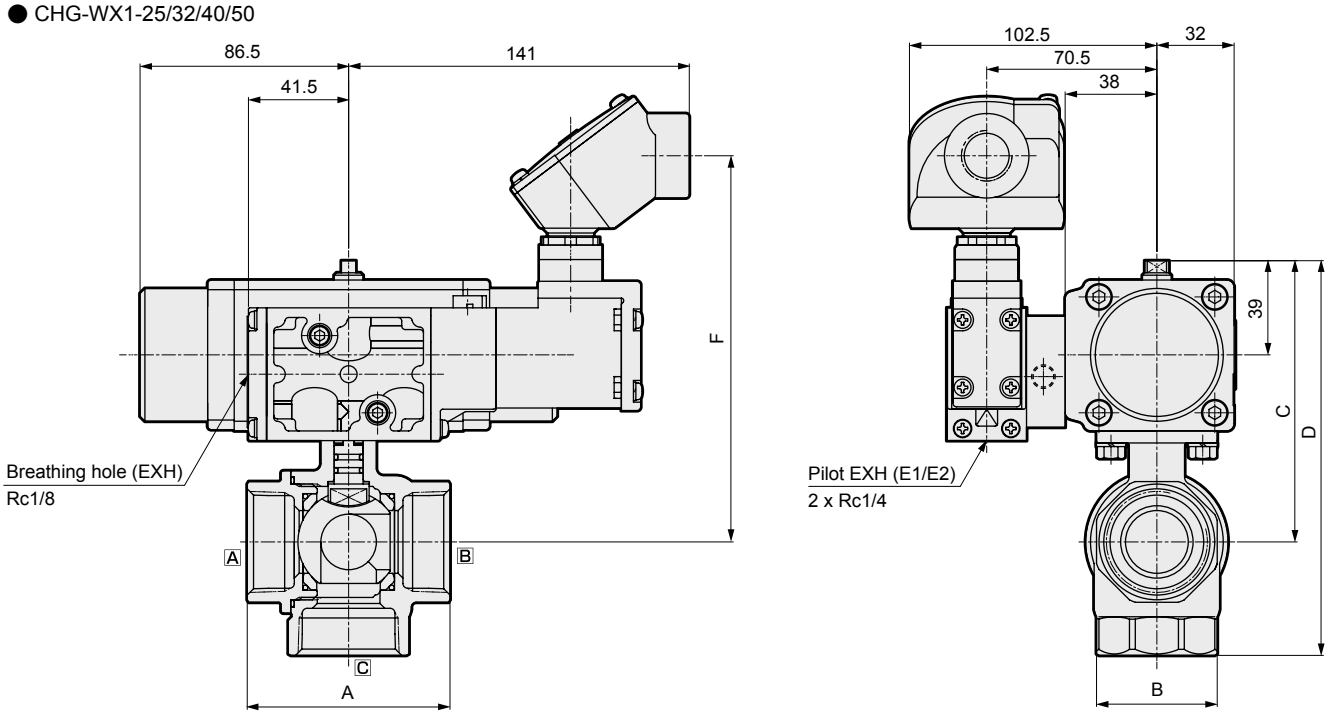
Dimensions CHG-WX1 Series

● CHG-WX1-15/20

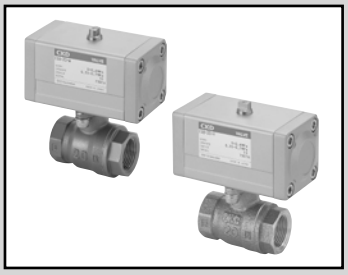


Model No.	A	B	C	D	E	F
CHG-WX1-15	56	28	91	121	Rc1/2	144
CHG-WX1-20	65	34	97	133	Rc3/4	150

● CHG-WX1-25/32/40/50



Model No.	A	B	C	D	E	F
CHG-WX1-25	76	41	110	152	Rc1	153
CHG-WX1-32	84	50	116	163	Rc11/4	160
CHG-WX1-40	94	57	156.5	209.5	Rc11/2	194
CHG-WX1-50	108	70	165.5	226.5	Rc2	203



Air operated 2-port ball valve
(compact rotary valve)

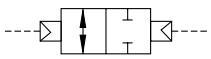
CSB-W/CSB-WR* Series

● Port size: Rc3/8 to Rc2

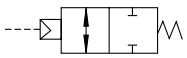
RoHS

JIS symbol

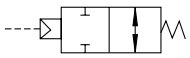
● CSB-W
(double acting)



● CSB-WR1
(single acting-NC)



● CSB-WR2
(single acting-NO)



Common specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		CSB-W	CSB-WR*
Actuation		Air operated: Double acting	Air operated: Single acting
Working fluid		Steam/hot water	
Working pressure MPa		0 (≈0 psi, 0 bar) to 0.6 (≈87 psi, 6 bar)	
Proof pressure (water pressure) MPa		2.0 (≈290 psi, 20 bar)	
Fluid temperature °C		0 (32°F) to 164 (327°F) (no freezing)	
Ambient temperature °C		-10 (14°F) to 60 (140°F) (no freezing)	
Working environment		Indoors/outdoors	
Valve seat leakage cm^3/min		1 or less (at initial water pressure 0.6 MPa)	
Mounting orientation		Unrestricted	
Frequency cycles/min		1 or less	
Rotary actuator	Pilot fluid	Compressed air	
	Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)	
	Proof pressure (water pressure) MPa	1.5 (≈217 psi, 15 bar)	
	Working pressure MPa	0.35 (≈51 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)	0.4 (≈58 psi, 4 bar) to 0.7 (≈101 psi, 7 bar)
	Fluid temperature °C	5 (41°F) to 60 (140°F)	
	Port size	Rc1/8	

Individual specifications

Item / Model No.		Port size	Orifice size (mm)	Cv	Weight (kg)	
					Double acting	Single acting
Standard bore	CSB-W(R*)-10	Rc3/8	10	10	1.0	1.1
	CSB-W(R*)-15	Rc1/2	10	6	1.0	1.1
	CSB-W(R*)-20	Rc3/4	15	16	1.2	1.3
	CSB-W(R*)-25	Rc1	20	29	1.3	2.2
	CSB-W(R*)-32	Rc1 1/4	25	50	2.3	2.8
	CSB-W-40	Rc1 1/2	32	98	2.7	-
	CSB-W-50	Rc 2	40	125	3.5	-

1 : CSB-(WR)-10 is full bore.
2 : CSB-(WR)-40/50 is not provided.

How to order

CSB - WR1 - 15 - W

Model No.

Ⓐ Actuator

Ⓑ Port size *1

Ⓒ Body/seat material

Code	Description	Model No. CSB (Standard bore)
Ⓐ Actuator		
W	Double acting	●
WR1	Single acting NC (normally closed)	●
WR2	Single acting NO (normally open)	●
Ⓑ Port size		
10	Rc 3/8	●
15	Rc 1/2	●
20	Rc 3/4	●
25	Rc 1	●
32	Rc 1 1/4	●
40	Rc 1 1/2	●
50	Rc 2	●
Ⓒ Body/seat material		
W	Stainless steel - reinforced PTFE	●

1 : CSB-WR-40/50 is not provided.

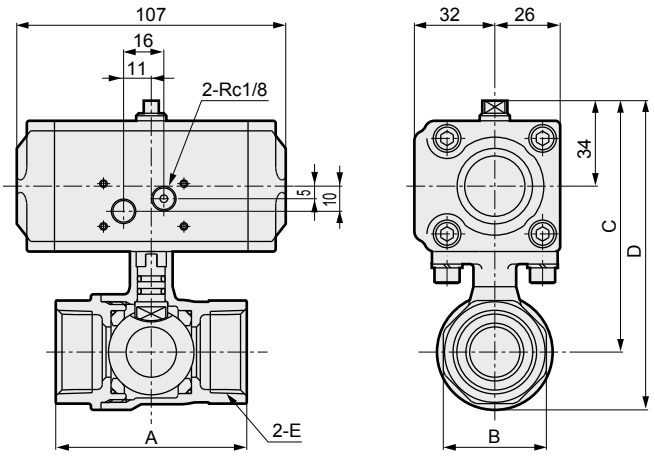
[Example of model No.]

CSB-WR1-15-W

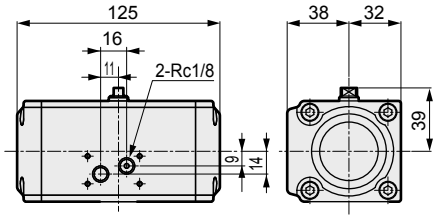
Model: CSB (standard bore)
Ⓐ Actuator : Single acting NC (normally closed)
Ⓑ Port size : Rc1/2
Ⓒ Body/seat material : Stainless steel reinforced PTFE

Dimensions: CSB-W Series

● CSB-W-10/15/20/25/32/40/50



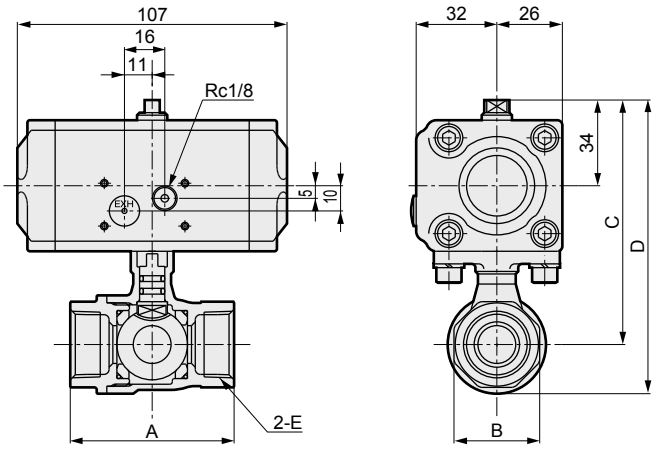
CSB-W-32/40/50 Actuator



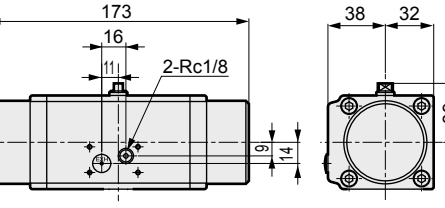
Model No.	A	B	C	D	E
CSB-W-10	56	28	91	107	Rc3/8
CSB-W-15	56	28	91	107	Rc1/2
CSB-W-20	65	34	97	117.5	Rc3/4
CSB-W-25	76	41	100	124	Rc 1
CSB-W-32	84	50	116	145.5	Rc1¼
CSB-W-40	94	57	122	157.5	Rc1½
CSB-W-50	108	70	131	171.5	Rc 2

Dimensions: CSB-WR* Series

● CSB-WR*-10/15/20/25/32



CSB-WR*-25/32 Actuator



Model No.	A	B	C	D	E
CSB-WR*-10	56	28	91	107	Rc3/8
CSB-WR*-15	56	28	91	107	Rc1/2
CSB-WR*-20	65	34	97	117.5	Rc3/4
CSB-WR*-25	76	41	110	134	Rc1
CSB-WR*-32	84	50	116	145.5	Rc1¼

Safety precautions

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Product-specific cautions: Fluid control valves ADK11-W and CHB/G-W (Outdoor Series)

* For precautions other than those below, refer to the product-specific cautions for ADK (page 324) and CHB/G (page 736).

WARNING

■ Design/consideration

- This product is for industrial use. Do not use for medical purposes, or in any equipment or circuit that concerns human life.
- The W Series does not have explosion-proof certification, so it cannot be used in atmospheres requiring explosions.

■ Working environment

- This product has outdoor specifications, but should not be used in the following environments.
  - · When ambient temperature exceeds the specifications. (The product temperature is at risk of exceeding the ambient temperature when exposed to direct sunlight.)
  - · Where fluid freezes.
  - · In atmospheres containing corrosive gases, liquids, chemicals, and explosive gases.
  - · Locations with vibration or impact.

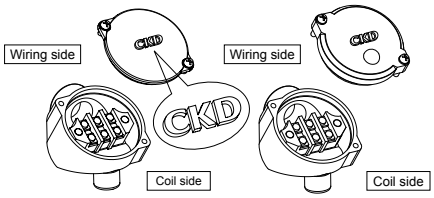
CAUTION

■ When wiring (ADK-W Series or CHB/G-W Series)

1) Precautions for disassembly and assembly

- Precautions for assembly of cap

The cap must be assembled in a certain direction. When the cap is to be assembled after performing wiring work, etc., make sure to assemble the cap with attention to the assembly direction. (In the figure to the right, align with the direction of the CKD logo mark)
When placed in the opposite direction, the cap cannot be assembled.



2) Wiring

(1) Fasten crimp terminals to the electrical wiring and process the ends of the wires before installing them.

* Use terminal thread of size M3 and a crimp terminal with an outer diameter of 7 mm or less.
* The crimp terminals used should be sheathed terminals.

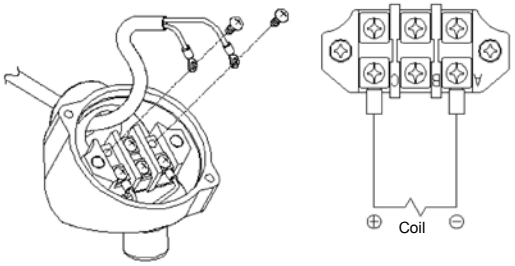
(2) Tighten the screws with the following tightening torque.

* Gap mounting screw tightening torque: 0.5 N·m.
* Terminal screw tightening torque: 0.5 N·m.

(3) Two lead wires should be wired from the terminal block of the coil.

*For terminal box without lamp 3E (ADK11-W Series) and B (CHB/G-W Series), and terminal box with lamp 3L (ADK11-W Series)
There is no polarity. Wire to the A terminal and C terminal on the terminal block.

*For terminal box with lamp, BL (CHB/G-W Series)/DC voltage
Because there is polarity, be careful while wiring.
Wire the ⊖ pole to the A terminal and the ⊕ pole to the C terminal on the terminal block.
(The solenoid valve will operate even if the polarity is incorrect, but the lamp will not turn ON.)



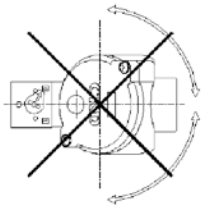
Note: It is recommended that you insert a fuse to the electrical circuit for safety and unit protection.

■ When using the product

● The male thread section of the round terminal box main body is fixed to the coil section of the solenoid valve using an adhesive.
Do not remove the round terminal box main body or change the direction of the wiring port. Doing so may cause rainwater to enter the round terminal box through the male thread section.
With the CHB-W Series, follow the table below and do not configure the exhaust ports for atmosphere release, and be sure to implement measures to prevent foreign matter, dust, and rainwater from entering the body.
In addition, implement waterproof measures for the electrical wires and piping with the use of cable glands, etc.

Actuator (actuation)	Applicable port
W (double acting)	-
WR* (direct acting)	EXH
V1 (with solenoid valve/double acting)	E1, E2
X1 (with solenoid valve/single acting)	E1/E2/EXH

*When using a silencer, mount E1 or E2 to the silencer for a V1, and an E1 for an X1.

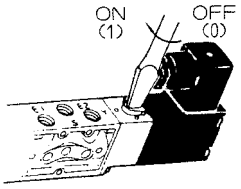


■ Manual operation (CHB-W Series)

● Use the manual button for confirmation of operation during test operation. When used for long periods in the locked state, the locking mechanism may fail and switch the unit from ON to OFF.

● Manual override
As this is a pilot solenoid valve, the main valve will not be switched even if the manual override is operated unless air is supplied to the S port.

● Locking manual override
Turning the locking manual override by approximately 45° with a screwdriver will create a state that is the same as when energized, where the valve is locked. Rotation is only in the clockwise direction. Do not force the rotation, as rotating the device further after the valve has been locked will cause damage. Be sure to release the lock (0 position) of the locking manual override prior to starting normal operation.



■ Others

● This product is guaranteed for outdoor use, but not corrosion resistance (no rust or discoloration).

● This product is provided with performance which enables outdoor use in standard environmental conditions. This product satisfies certain performance requirements after implementation of an accelerated weathering test (sunshine weathering meter) for 1000 hours and a (salt, dry, moisture) compound cycle test for 960 hours. However, the risk of defects such as rust occurring in a short amount of time may increase when using the unit in a special environment. Consult with CKD when using this device in a special environment.

Special fluid control valve

Overview

AMD-Part3R

Standard of air operated valve for chemical liquids. Body structure revised, PVDF adopted in the actuator, all-in-one model that supports various specifications. (Connection method: 1/8" to 1" compatible)

LGD

Series of valves for process gas using forged bodies. Air operated valve and 180° rotation manual valve are available.

Features

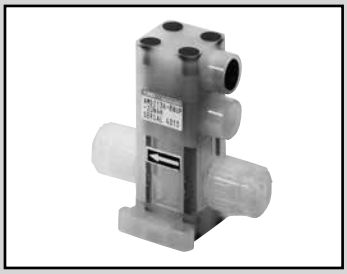
AMD-Part3R

- Specification pressure range expanded
  A⇔B: 0.5 MPa
- Supports a variety of chemical liquids as standard
  Acid/alkali alike widely compatible
- Improved ease of use
  Operating pressure (0.35 MPa to 0.5 MPa),
  Fluid temperature (120°C)
- 3 types of mounting methods
  2 types of flange Bottom mounting available

LGD

- Excellent leakage performance
  Valve seat leakage: 1.0 x 10^{-10} or less
  External leakage: 1.0 x 10^{-10} or less
- Compatible fittings
  Male fitting, female fitting (JXR or equiv.)
  Double barbed fitting (Swagelok or equiv.)
- Connection variations
  Male fitting, female fitting
  1/4" 1/2" (3/8" compatible)
  Double barbed fitting
  1/4" 3/8" 1/2"

CONTENTS



Air operated valve for chemical liquids

AMDZ*3R Series

RoHS CAD

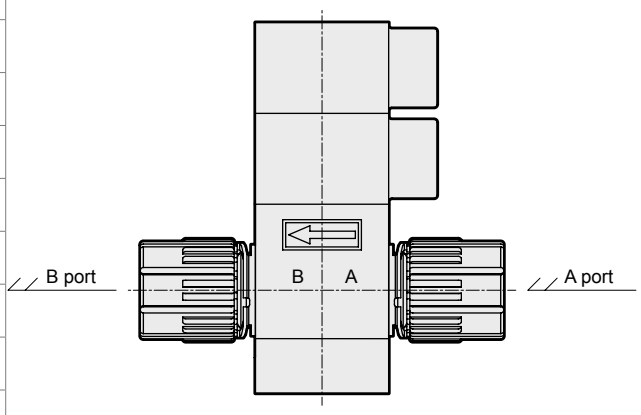
Specifications

1 MPa = 10 bar

Item			AMDZ*3R		
Working fluid			Pure water, chemical liquids, air, N_2 gas (*1)		
Fluid temperature		°C	5 (41°F) to 120 (248°F) (*2, *3)		
Proof pressure		MPa	1.0 (≈150 psi, 10 bar)		
Working pressure (A→B)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Working pressure (B→A)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Valve seat leakage		cm^3/min	0 (water pressure)		
Back pressure		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Ambient temperature		°C	0 (32°F) to 60 (140°F)		
Frequency			30 times/min. or less		
Mounting orientation			Unrestricted		
Connection			O.D. 1/8" tube connection (fitting integrated) O.D. ø6 tube connection (fitting integrated) O.D. 1/4" tube connection (fitting integrated)		
Orifice size			ø2	ø3.5	ø4
Cv			0.07	0.22	0.25
Operating section	Operating pressure	MPa	NC/NO: 0.4 (≈58 psi) to 0.5 (≈73 psi), double acting: 0.3 (≈44 psi) to 0.4 (≈58 psi)		
	Operating port		Rc1/8 (operation ports used NC: port Y NO: port X Double acting: ports X, Y)		
Weight		kg	0.07		

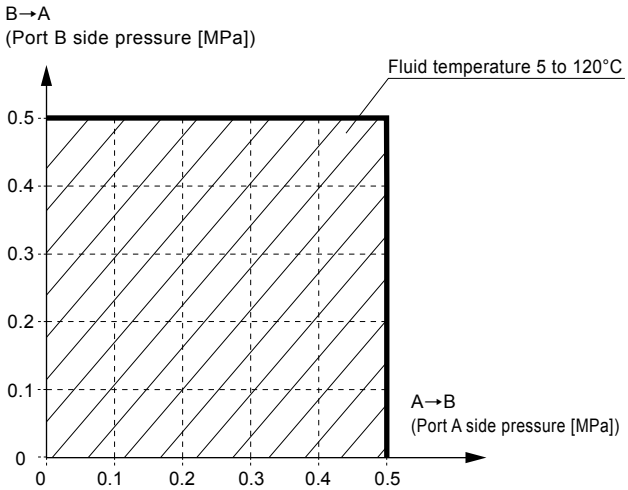
*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility check list on page 1148.)
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : 5 to 100°C if the connection is F-LOCK60 series fitting.

Structure and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PFA, PTFE
Mounting plate	PVDF

Working pressure



How to order

AMDZ (1) **3R -** (6UP) **-** (Z0) (N) (4) (X)

- Model No.
- (A) Actuation
- (B) Connection
- (C) Actuator option
- (D) Body option
- (E) Operating port direction
- (F) Mounting method

(A) Actuation	
1	NC
2	NO
3	Double acting

(B) Connection (Note)				
6BUP	**6UP**	**8BUP**	**6UR**	**8BUR**
Super 300 Pillar fitting P Series integrated			F-LOCK 60 Series fitting integrated	
1.8" x 0.086" tube connection	ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø6 x ø4 tube connection	1/4" x 5/32" tube connection

Code	Description \ Orifice size	ø2	ø4		ø3.5	
(C) Actuator option						
Z0	ON/OFF only	●	●	●	●	●

(D) Body option		Body material				
N	Normal body	PFA			PTFE	

(E) Operating port direction						
4	With valve viewed from above, ← indicates fluid flow direction and ⇦ operating port direction.	●	●	●	●	●
1		●	●	●	●	●
2		●	●	●	●	●
3		●	●	●	●	●

(F) Mounting method						
X	Bottom mount	●	●	●	●	●
H	4-point flange mounting	●	●	●	●	●

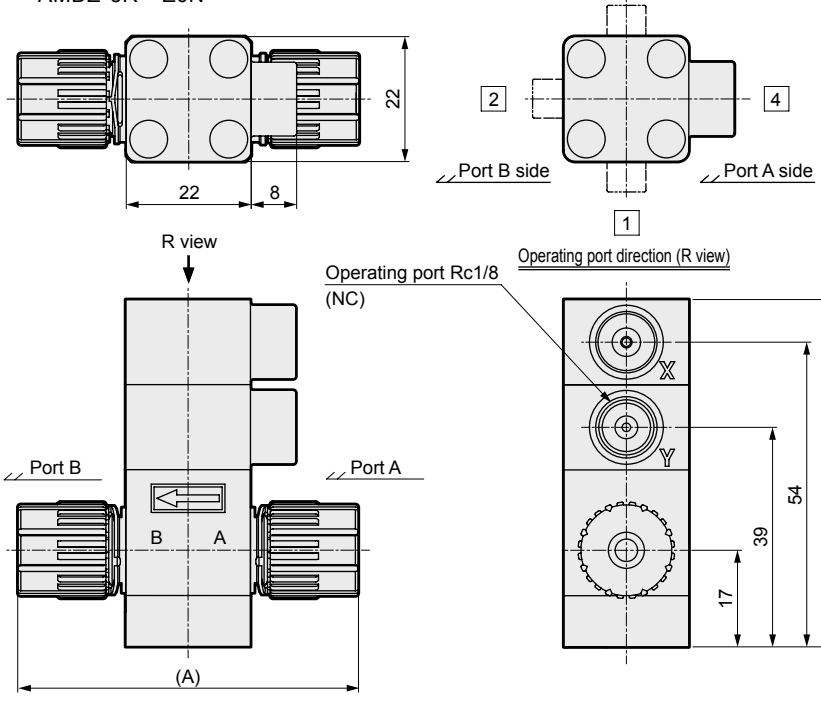
Precautions for model No. selection

Note: Made-to-order product if the body material is PTFE.

Dimensions

● Z0 ON/OFF only + N normal body

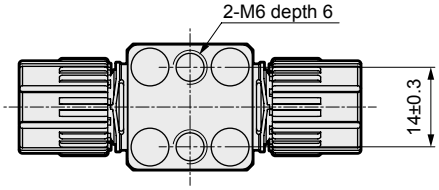
·AMDZ*3R-*-Z0N**



Connection	A
6BUP	50
6UP	60
8BUP	60
6UR	82
8BUR	84

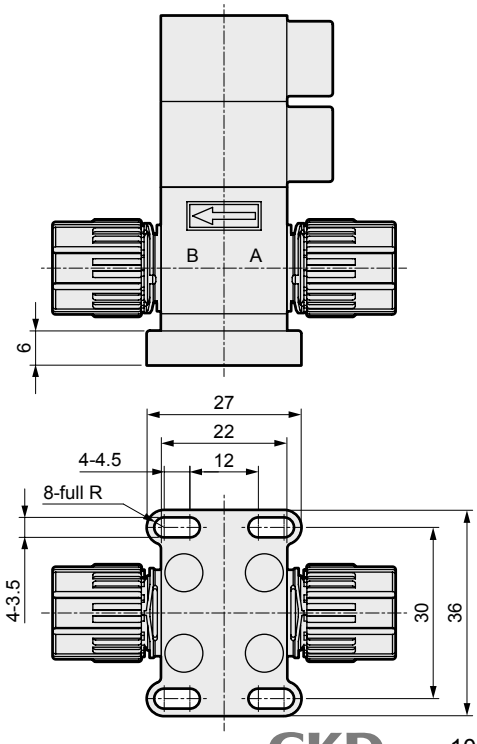
● X Bottom mounting

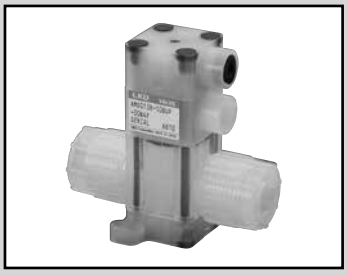
·AMDZ*3R-*-***X



● H 4-point flange mounting

·AMDZ*3R-*-***H





Air operated valve for chemical liquids

AMD0*3R Series

RoHS CAD

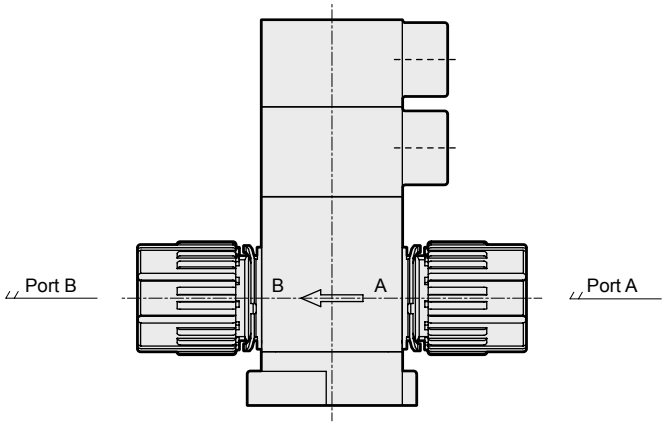
Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		AMD0*3R				
Working fluid		Chemical liquids, pure water, air, N_2 gas (*1)				
Fluid temperature °C		5 (41°F) to 120 (248°F) (*3, *4)				
Proof pressure MPa		1.0 (≈145 psi, 10 bar)				
Working pressure (A→B) MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)				
Working pressure (B→A) MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)				
Valve seat leakage cm^3/min		0 (water pressure)				
Back pressure MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)				
Ambient temperature °C		0 (32°F) to 60 (140°F)				
Frequency		30 cycles/min. or less				
Mounting orientation		Unrestricted				
Connection		O.D. ø6/ø8/ø10 tube connection (integrated fitting) O.D. 1/4" / 3/8" tube connection (integrated fitting)				
Orifice size		ø3.5	ø4	ø6	ø7	ø8
Cv		0.28	0.34	0.64	0.7	0.8
Operating section	Operating pressure MPa	NC/NO: 0.35 to 0.5 Double acting: 0.3 to 0.4				
	Operating port	Rc1/8 (operation ports used NC: port Y NO: port X Double acting: ports X, Y)				
Weight kg		0.10				

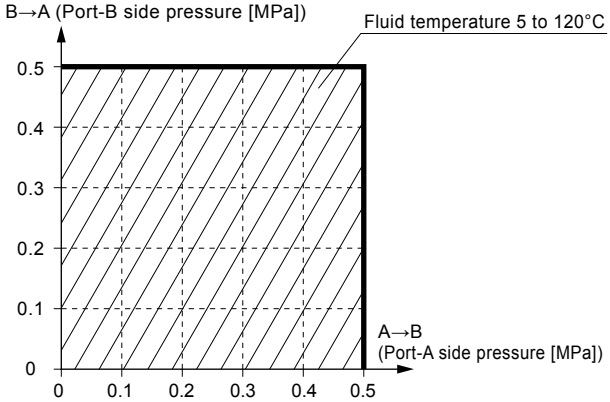
*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility checklist on page 1148.)
*2 : Refer to pages 1142 to 1143 for flow characteristics.
*3 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*4 : 5 to 100°C if the connection is F-LOCK60 Series fitting.

Structure diagram and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PFA, PTFE
Mounting plate	PVDF

Working pressure



How to order

AMD0 (1) 3R - (10UP) - (00) (N) (4) (F)

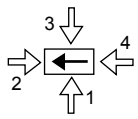
- Model No.
- (A) Actuation
- (B) Connection
- (C) Actuator option
- (D) Body option
- (E) Operating port direction
- (F) Mounting method

(A) Actuation	
1	NC (normally closed)
2	NO (normally open)
3	Double acting

(B) Connection (*1)	6UP	8BUP	8UP	10UP	10BUP	6UR	8BUR	8UR	10UR	10BUR
	Super 300 Pillar fitting P series integrated					F-LOCK 60 Series Integrated fitting				
	ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø8 x ø6 tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø8 x ø6 tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection
Code / Description \ Orifice size	ø4		ø6	ø8		ø3.5		ø6	ø7	ø6
(C) Actuator option										
00 ON/OFF only (with indicator)	●	●	●	●	●	●	●	●	●	●
10 With flow rate adjustment	●	●	●	●	●	●	●	●	●	●

(D) Body option		Body material	
N	Normal body	PFA	PTFE

(E) Operating port direction (*2)



With valve viewed from above, ← indicates fluid flow direction and ⇦ operating port direction.

4		●	●	●	●	●	●	●	●	●	●
1		●	●	●	●	●	●	●	●	●	●
2		●	●	●	●	●	●	●	●	●	●
3		●	●	●	●	●	●	●	●	●	●

(F) Mounting method (*2)											
F	Flange mounting	●	●	●	●	●	●	●	●	●	●
H	4-point flange mounting	●	●	●	●	●	●	●	●	●	●
X	Bottom mounting	●	●	●	●	●	●	●	●	●	●

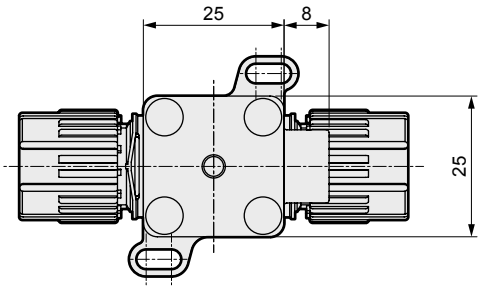
Precautions for model No. selection

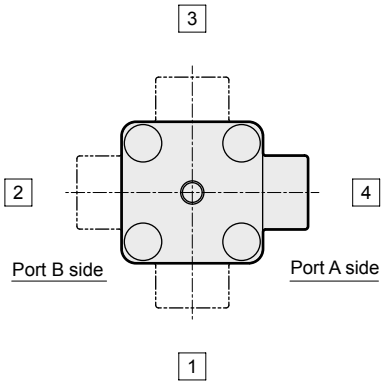
*1 : Made-to-order product if the body material is PTFE.
*2: Refer to dimensions for operating port direction and mounting plate.

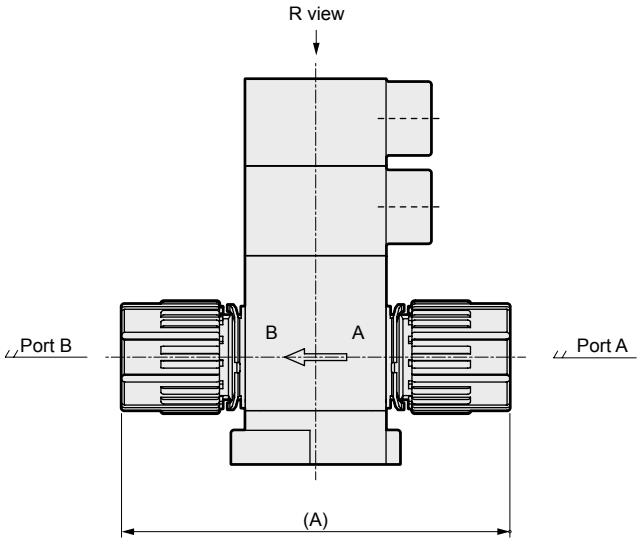
Dimensions

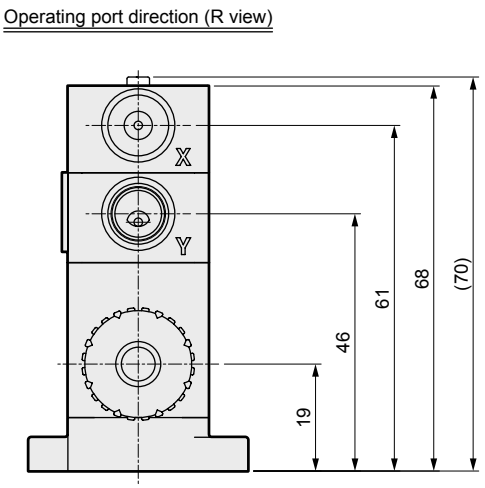
● 00 ON/OFF only (with indicator)

· AMD0*3R- *1 -00N**







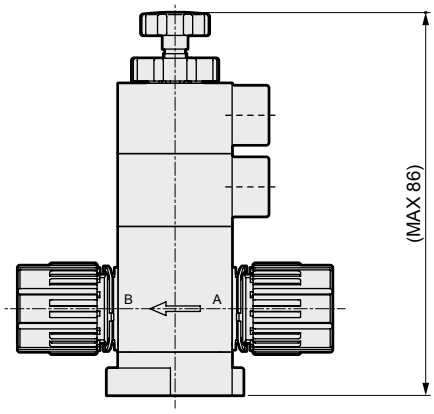


*1 (Connection)	A
6UP	63
8BUP	63
8UP	69
10UP	75
10BUP	75
6UR	85
8BUR	87
8UR	87
10UR	99
10BUR	103

Dimensions

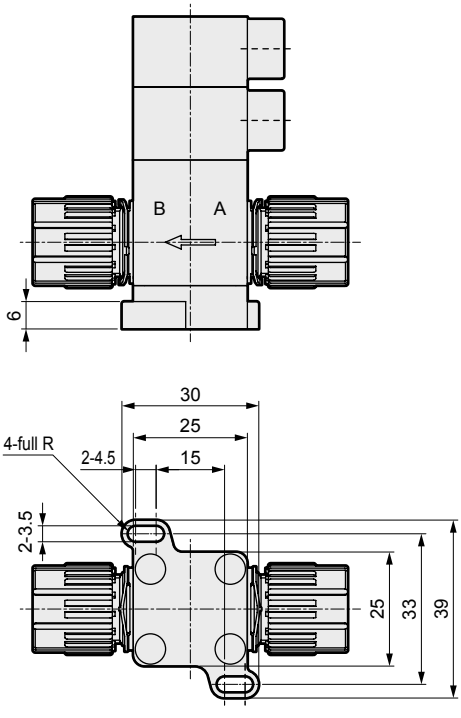
● 10 With flow rate adjustment

· AMD0*3R-*-10N**



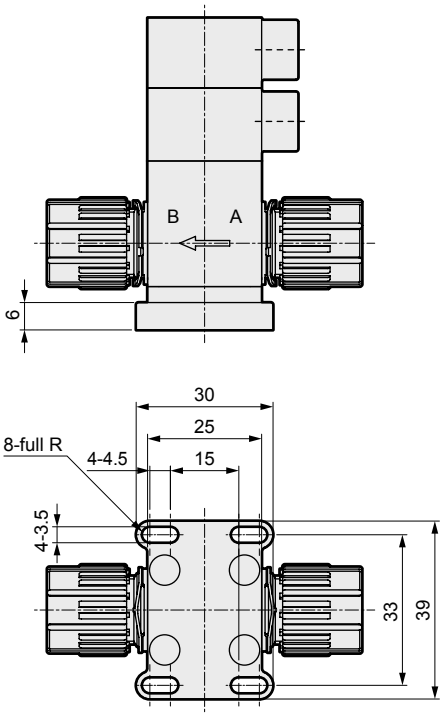
● F Flange mounting

· AMD0*3R-*-***F



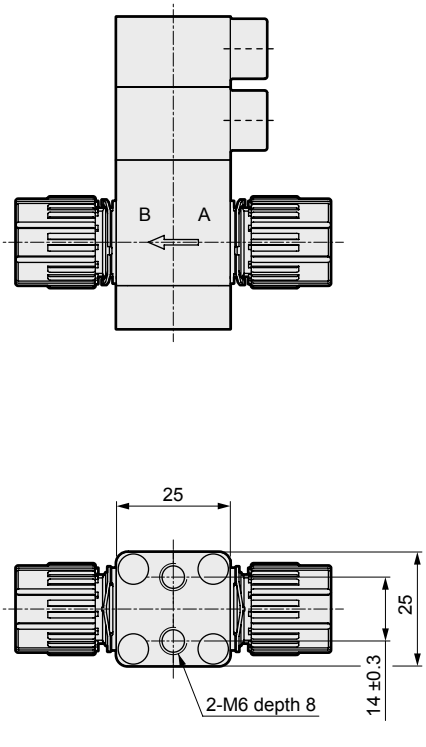
● H 4-point flange mounting

· AMD0*3R-*-***H



● X Bottom mounting

· AMD0*3R-*-***X



Air operated valve for chemical liquids

AMD3*3R Series

RoHS CAD

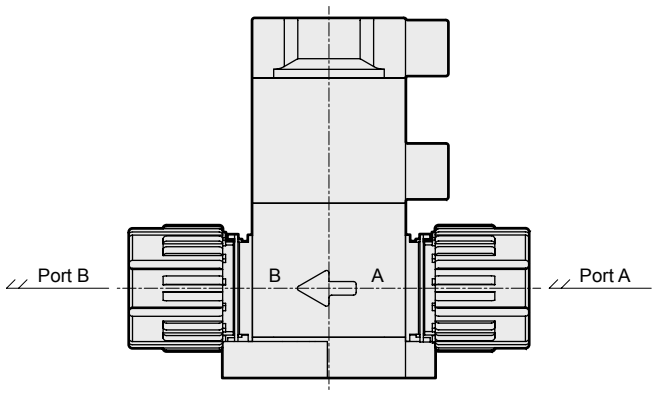
Specifications

1 MPa = 10 bar

Item		AMD3*3R				
Body option		N (normal body)			B (body with bypass)	
Working fluid		Chemical liquids, pure water, air, N_2 gas (*1)				
Fluid temperature	°C	5 (41°F) to 120 (248°F) (*2, *3)			5 (41°F) to 90 (194°F)	
Proof pressure	MPa	1.0 (≈150 psi, 10 bar)				
Working pressure (A→B)	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)			Refer to figure below for “Working pressure”	
Working pressure (B→A)	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)			Refer to figure below for “Working pressure”	
Valve seat leakage	cm^3/min	0 (water pressure)				
Back pressure	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)			Refer to figure below for “Working pressure”	
Ambient temperature	°C	0 (32°F) to 60 (140°F) (0 (32°F) to 50 (122°F) when sensor attached)				
Frequency		30 times/min. or less				
Mounting orientation		Unrestricted				
Connection		O.D. ø10/ø12 tube connection (fitting integrated) O.D. 3/8” / 1/2” tube connection (fitting integrated)				
Orifice size		ø6	ø7	ø8	ø9	ø10
Cv		0.7	1	1.25	1.6	1.8
Bypass orifice size		-			ø2.3	
Operating section	Operating pressure MPa	NC/NO: 0.35 (≈51 psi) to 0.5 (≈73 psi) Double acting: 0.3 (≈44 psi) to 0.4 (≈58 psi)				
	Operating port	Rc1/8 (operation ports used NC: port Y NO: port X Double acting: ports X, Y)				
Sensor		Refer to pages 1140 to 1141.				
Weight	kg	0.21			0.23	

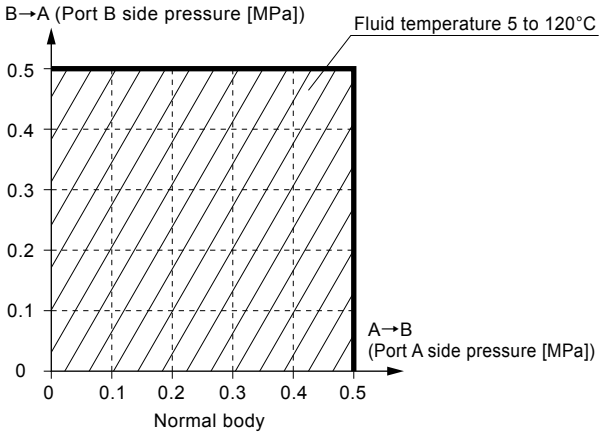
*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility check list on page 1148.)
Body with bypass cannot be used for hydrofluoric acid or chemical liquids containing hydrofluoric acid.
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : 5 to 100°C if the connection is F-LOCK60 series fitting.
*4 : Refer to pages 1142 to 1143 for flow characteristics.

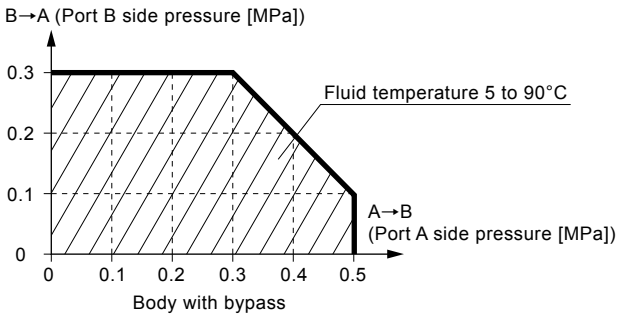
Structure and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PFA, PTFE
Mounting plate	PVDF

Working pressure





How to order

AMD3 (1) 3R - (10UP) - (00) (N) (4) (F)

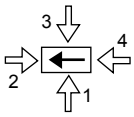
- Model No.
- Ⓐ Actuation
- Ⓑ Connection
- Ⓒ Actuator option
- Ⓓ Body option
- Ⓔ Operating port direction
- Ⓕ Mounting method

Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Code	Description \ Orifice size	Ⓑ Connection (*1)							
		10UP	10BUP	12UP	15BUP	10UR	10BUR	12UR	15BUR
		Super 300 Pillar fitting P Series integrated				F-LOCK 60 Series fitting integrated			
		ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø12 x ø10 tube connection	1/2" x 3/8" tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø12 x ø10 tube connection	1/2" x 3/8" tube connection
		ø8		ø10		ø7	ø6	ø9	
Ⓒ Actuator option									
00	ON/OFF only (with indicator)	●	●	●	●	●	●	●	●
10	With flow rate adjustment	●	●	●	●	●	●	●	●
With sensor	Transistor / Cable direction (*2) / Cable length								
A1	NPN, Operating port side, 1 m	●	●	●	●	●	●	●	●
A3	NPN, Operating port side, 3 m	●	●	●	●	●	●	●	●
B1	NPN, Opposite side to operating port, 1 m	●	●	●	●	●	●	●	●
B3	NPN, Opposite side to operating port, 3 m	●	●	●	●	●	●	●	●
C1	PNP, Operating port side, 1 m	●	●	●	●	●	●	●	●
D1	PNP, Opposite side to operating port, 1 m	●	●	●	●	●	●	●	●

Ⓓ Body option		Body material			
N	Normal body	PFA	PFA	PTFE	PTFE
B	Body with bypass	PTFE	PFA	PTFE	PTFE

Ⓔ Operating port direction (*2)



With valve viewed from above, ← indicates fluid flow direction and ⇦ operating port direction.

4		●	●	●	●	●	●	●	●
1		●	●	●	●	●	●	●	●
2		●	●	●	●	●	●	●	●
3		●	●	●	●	●	●	●	●

Ⓕ Mounting method (*2)									
F	Flange mounting	●	●	●	●	●	●	●	●
H	4-point flange mounting	●	●	●	●	●	●	●	●
X	Bottom mount	●	●	●	●	●	●	●	●

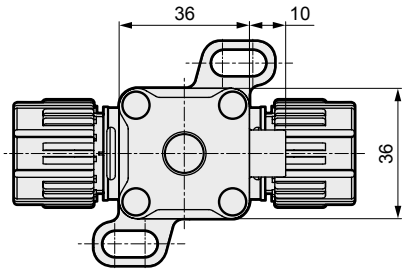
Precautions for model No. selection

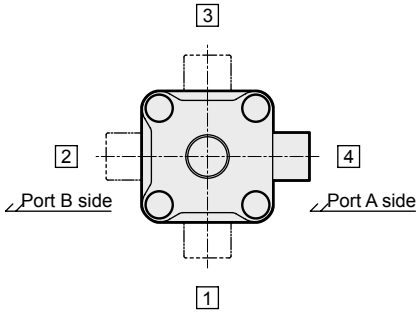
*1 : Made-to-order product if the body material is PTFE.
*2 : Refer to dimensions for operating port direction, sensor cable direction, and mounting plate.

Dimensions

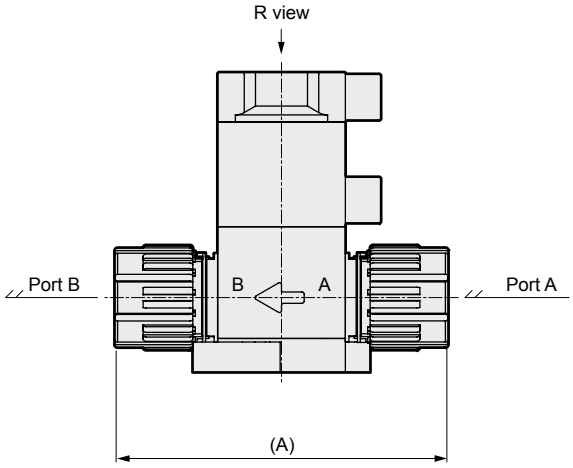
● 00 ON/OFF only (with indicator) + N normal body

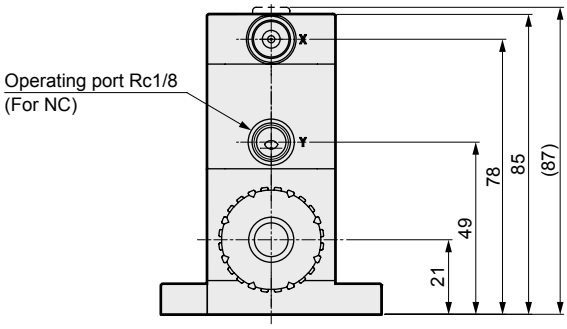
·AMD3*3R- *1 -00N**





Operating port direction (R view)

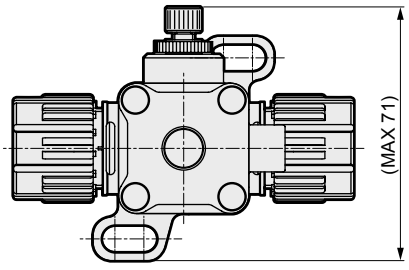


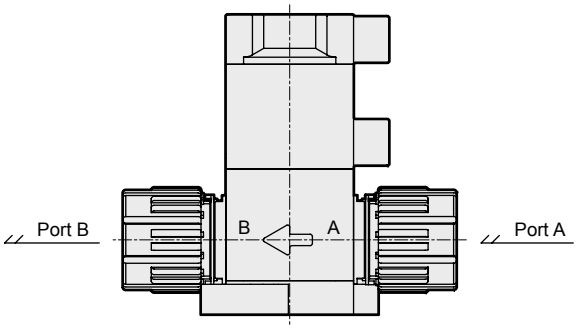


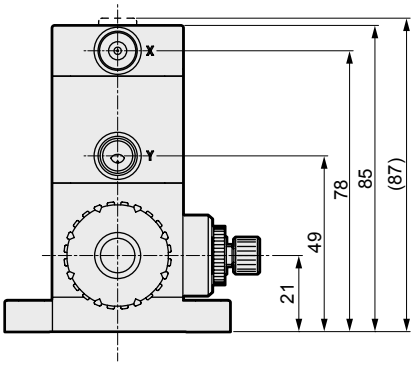
*1 (connection method)	A
10UP	86
10BUP	86
12UP	94
15BUP	94
10UR	110
10BUR	114
12UR	110
15BUR	114

● 00 ON/OFF only (with indicator) + B body with bypass

·AMD3*3R-*-00B**



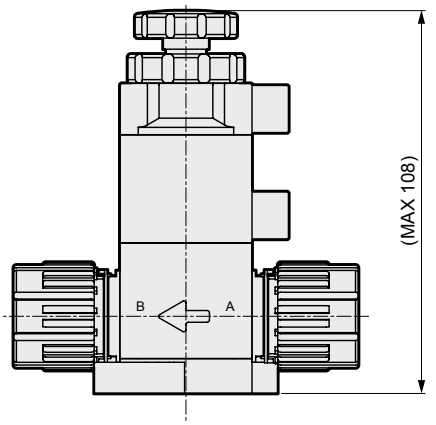




Dimensions

● 10 With flow rate adjustment

·AMD3*3R-*-10***

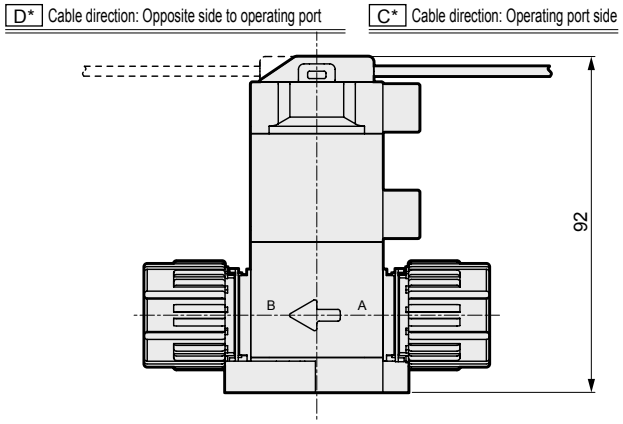


● A* B* C* D* With sensor

·AMD3*3R-*-(A B C D)****

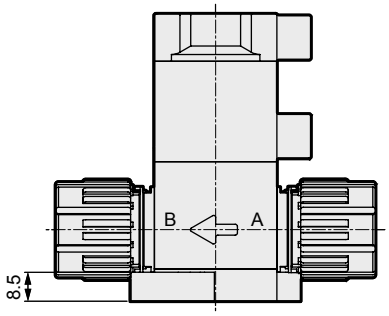
B* D* Cable direction: Opposite side to operating port

A* C* Cable direction: Operating port side



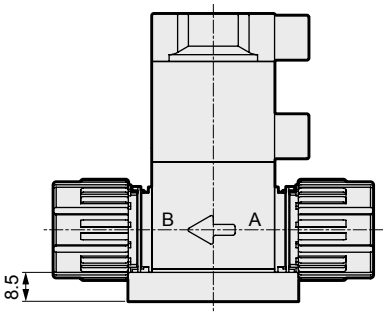
● F Flange mounting

·AMD3*3R-*-***F



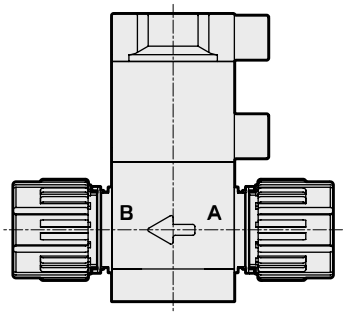
● H 4-point flange mounting

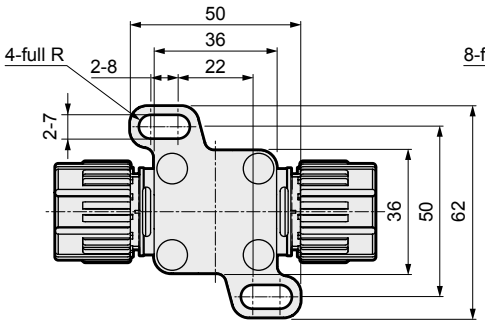
·AMD3*3R-*-***H

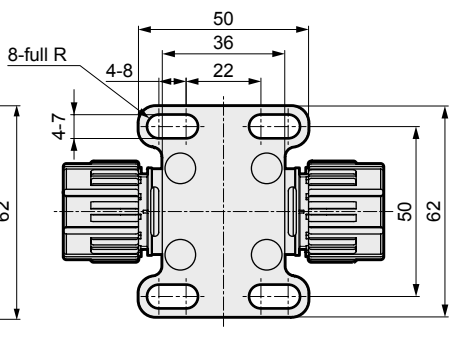


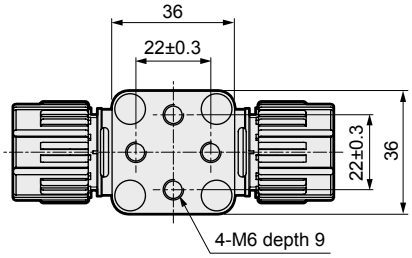
● X Bottom mounting

·AMD3*3R-*-***X









Air operated valve for chemical liquids

AMD4*3R Series

RoHS CAD

Export controlled items

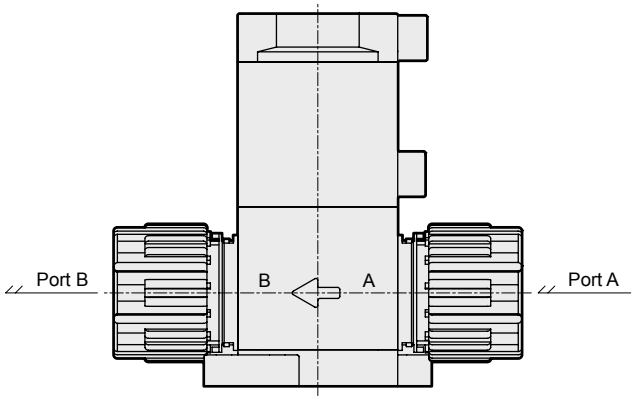
Specifications

1 MPa = 10 bar

Item		AMD4*3R	
Body option		**N (normal body)**	**B (body with bypass)**
Working fluid		Chemical liquids, pure water, air, N_2 gas (*1)	
Fluid temperature	°C	5 (41°F) to 120 (248°F) (*2, *3)	5 (41°F) to 90 (194°F)
Proof pressure	MPa	1.0 (≈150 psi, 10 bar)	
Working pressure (A→B)	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)	Refer to figure below for "Working pressure"
Working pressure (B→A)	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)	Refer to figure below for "Working pressure"
Valve seat leakage	cm^3/min	0 (water pressure)	
Back pressure	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)	Refer to figure below for "Working pressure"
Ambient temperature	°C	0 (32°F) to 60 (140°F) (0 (32°F) to 50 (122°F) when sensor attached)	
Frequency		20 times/min. or less	
Mounting orientation		Unrestricted	
Connection		O.D. 3/4" tube connection (fitting integrated)	
Orifice size		ø15	ø16
Cv		4.5	5
Bypass orifice size		-	ø6
Operating section	Operating pressure MPa	NC/NO: 0.35 (≈51 psi) to 0.5 (≈73 psi) Double acting: 0.3 (≈44 psi) to 0.4 (≈58 psi)	
	Operating port	Rc1/8 (operation ports used NC: port Y NO: port X Double acting: ports X, Y)	
Sensor		Refer to pages 1140 to 1141.	
Weight	kg	0.48	0.49

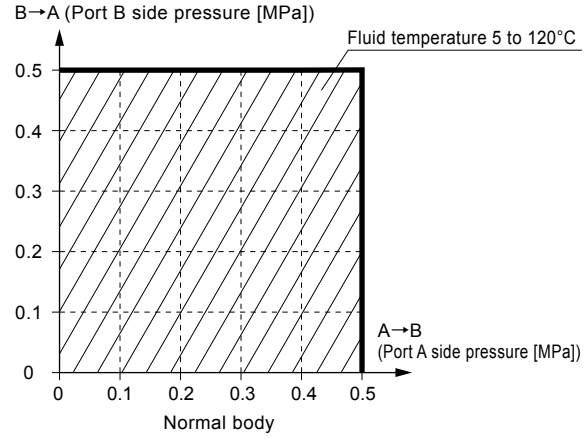
*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility check list on page 1148.)
Body with bypass cannot be used for hydrofluoric acid or chemical liquids containing hydrofluoric acid.
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : 5 to 100°C if the connection is F-LOCK60 series fitting.
*4 : Refer to pages 1142 to 1143 for flow characteristics.

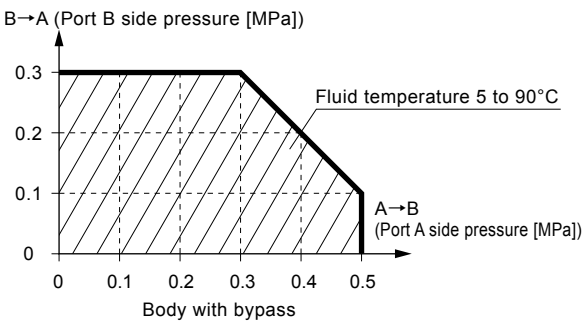
Structure and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PFA, PTFE
Mounting plate	PVDF

Working pressure





How to order

AMD4 (1) 3R - (20BUP) - (00) (N) (4) (F)

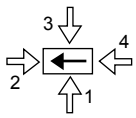
- Model No.
- Ⓐ Actuation
- Ⓑ Connection
- Ⓒ Actuator option
- Ⓓ Body option
- Ⓔ Operating port direction
- Ⓕ Mounting method

Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Ⓑ Connection (*1)		
	20BUP	20BUR
	Super 300 Pillar fitting P Series integrated	F-LOCK 60 Series fitting integrated
	3/4" x 5/8" tube connection	3/4" x 5/8" tube connection
Code / Description \ Orifice size	ø16	ø15
Ⓒ Actuator option		
00 ON/OFF only (with indicator)	●	●
10 With flow rate adjustment	●	●

With sensor	Transistor	Cable direction (*2)	Cable length		
A1	NPN	Operating port side	1 m	●	●
A3			3 m	●	●
B1		Opposite side to operating port	1 m	●	●
B3			3 m	●	●
C1	PNP	Operating port side	1 m	●	●
D1		Opposite side to operating port	1 m	●	●

Ⓓ Body option		Body material	
N	Normal body	PFA	PTFE
B	Body with bypass	PFA	PTFE

Ⓔ Operating port direction (*2)				
4		With valve viewed from above, ← indicates fluid flow direction and ⇦ operating port direction.	●	●
1			●	●
2			●	●
3			●	●

Ⓕ Mounting method (*2)			
F	Flange mounting	●	●
H	4-point flange mounting	●	●
X	Bottom mount	●	●

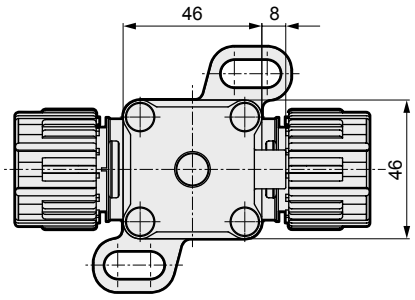
Precautions for model No. selection

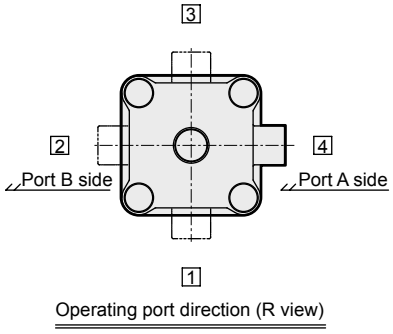
*1 : Made-to-order product if the body material is PTFE.
*2 : Refer to dimensions for operating port direction, sensor cable direction, and mounting plate.

Dimensions

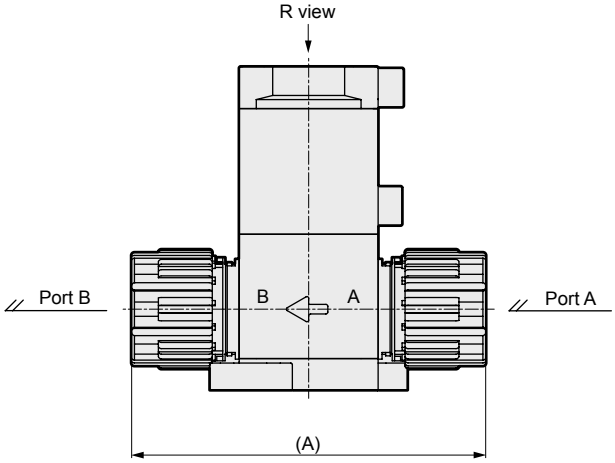
● 00 ON/OFF only (with indicator) + N normal body

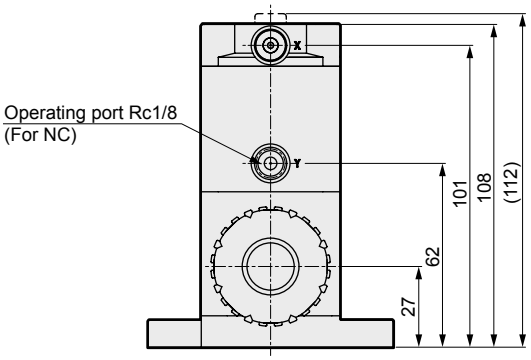
·AMD4*3R- *1 -00N**





Operating port direction (R view)

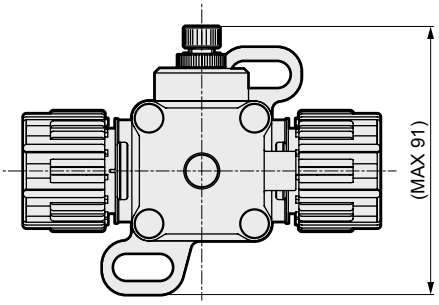


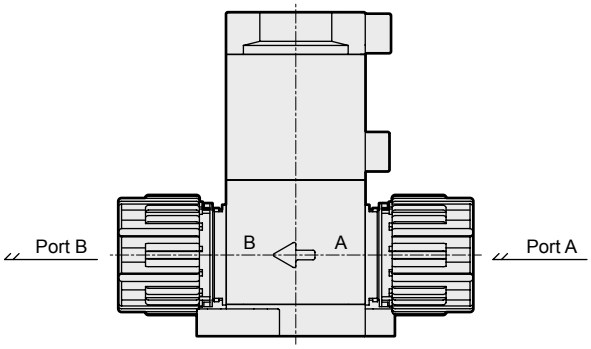


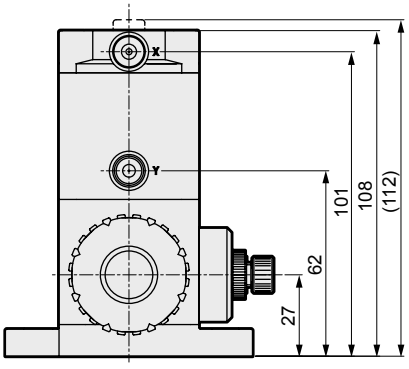
*1 (connection method)	A
20BUP	118
20BUR	134

● 00 ON/OFF only (with indicator) + B body with bypass

·AMD4*3R-*-00B**







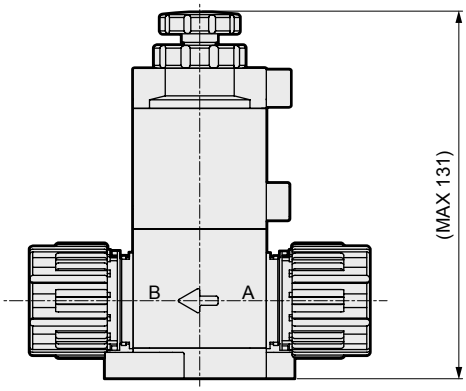
Dimensions

● 10 With flow rate adjustment

·AMD4*3R-*-10***

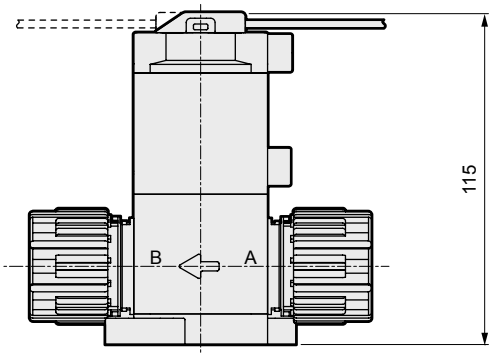
● A* B* C* D* With sensor

·AMD4*3R-*-[A B C D]****



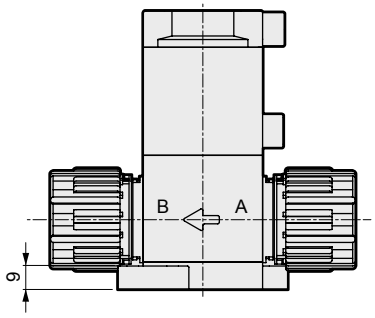
B* D* Cable direction: Opposite side to operating port

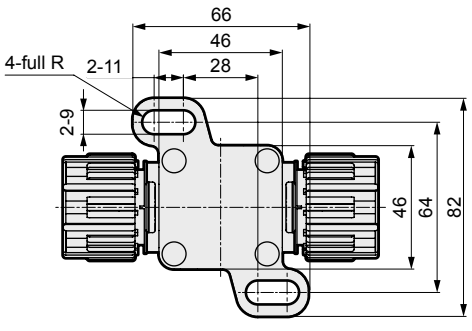
A* C* Cable direction: Operating port side



● F Flange mounting

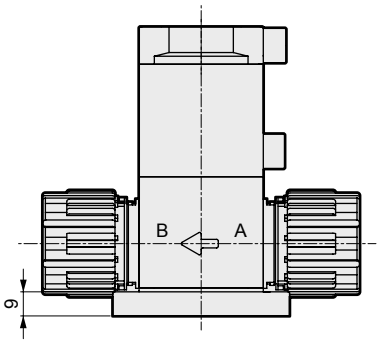
·AMD4*3R-*-***F

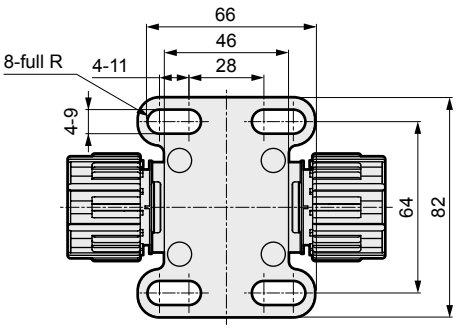




● H 4-point flange mounting

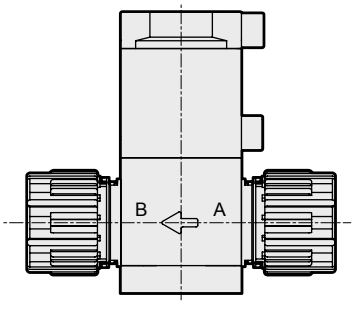
·AMD4*3R-*-***H

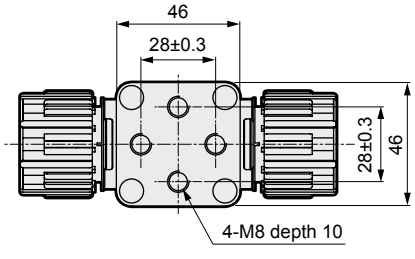


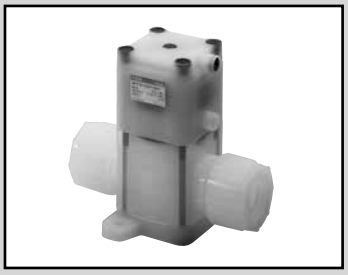


● X Bottom mounting

·AMD4*3R-*-***X







Air operated valve for chemical liquids

AMD5*3R Series

RoHS CAD

Export controlled items

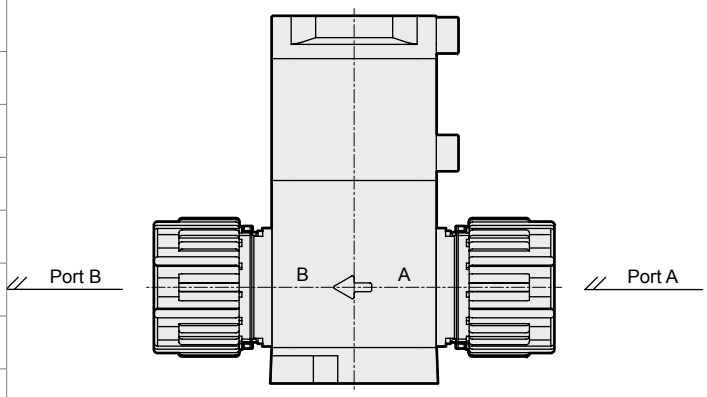
Specifications

1 MPa = 10 bar

Item		AMD5*3R	
Body option		**N (normal body)**	**B (body with bypass)**
Working fluid		Chemical liquids, pure water, air, N_2 gas (*1)	
Fluid temperature	°C	5 (41°F) to 120 (248°F) (*2, *3)	5 (41°F) to 90 (194°F)
Proof pressure	MPa	1.0 (≈150 psi, 10 bar)	
Working pressure (A→B)	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)	Refer to figure below for "Working pressure"
Working pressure (B→A)	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)	Refer to figure below for "Working pressure"
Valve seat leakage	cm^3/min	0 (water pressure)	
Back pressure	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)	Refer to figure below for "Working pressure"
Ambient temperature	°C	0 (32°F) to 60 (140°F) (0 (32°F) to 50 (122°F) when sensor attached)	
Frequency		20 times/min. or less	
Mounting orientation		Unrestricted	
Connection		O.D. ø25 tube connection (fitting integrated) O.D. 1" tube connection (fitting integrated)	
Orifice size		ø20	
Cv		8	
Bypass orifice size		-	ø6
Operating section	Operating pressure MPa	NC/NO: 0.35 (≈51 psi) to 0.5 (≈73 psi) Double acting: 0.3 (≈44 psi) to 0.4 (≈58 psi)	
	Operating port	Rc1/8 (operation ports used NC: port Y NO: port X double acting: ports X, Y)	
Sensor		Refer to pages 1140 to 1141.	
Weight	kg	0.91	1.0

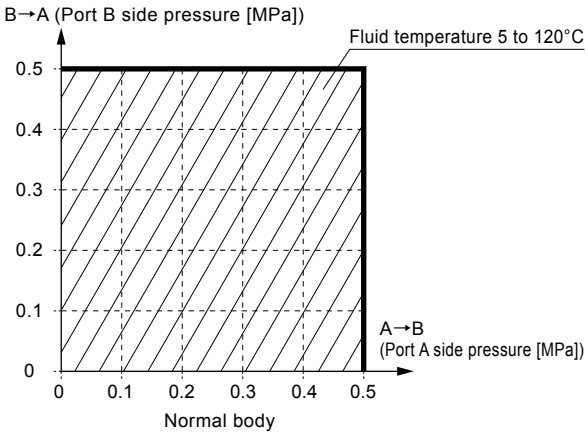
*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility check list on page 1148.)
Body with bypass cannot be used for hydrofluoric acid or chemical liquids containing hydrofluoric acid.
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : 5 to 100°C if the connection is F-LOCK60 series fitting.
*4 : Refer to pages 1142 to 1143 for flow characteristics.

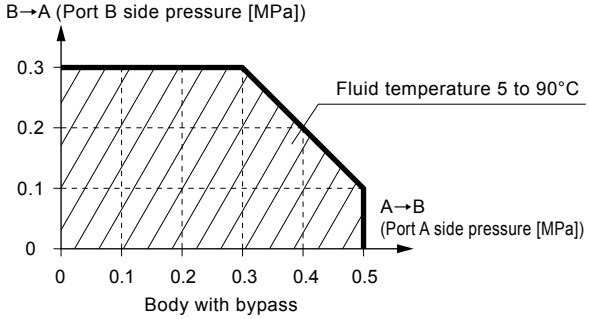
Structure and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PFA, PTFE
Mounting plate	PVDF

Working pressure





How to order

AMD5 (1) 3R - (25BUP) - (00) (N) (4) (F)

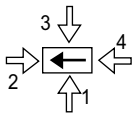
- Model No.
- Ⓐ Actuation
- Ⓑ Connection
- Ⓒ Actuator option
- Ⓓ Body option
- Ⓔ Operating port direction
- Ⓕ Mounting method

Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Ⓑ Connection (*1)			
25UP	25BUP	25UR	25BUR
Super 300 Pillar fitting P Series integrated		F-LOCK 60 Series fitting integrated	
ø25 x ø22 tube connection	1" x 7/8" tube connection	ø25 x ø22 tube connection	1" x 7/8" tube connection

Code	Description	Orifice size				
			ø20			
Ⓒ Actuator option						
00	ON/OFF only (with indicator)		●	●	●	●
10	With flow rate adjustment		●	●	●	●
With sensor	Transistor	Cable direction (*2)	Cable length			
A1	NPN	Operating port side	1 m	●	●	●	●
A3			3 m	●	●	●	●
B1		Opposite side to operating port	1 m	●	●	●	●
B3			3 m	●	●	●	●
C1	PNP	Operating port side	1 m	●	●	●	●
D1		Opposite side to operating port	1 m	●	●	●	●

Ⓓ Body option		Body material	
N	Normal body	PFA	PTFE
B	Body with bypass	PTFE	PTFE

Ⓔ Operating port direction (*2)					
4	 With valve viewed from above, ← indicates fluid flow direction and ⇦ operating port direction.	●	●	●	●
1		●	●	●	●
2		●	●	●	●
3		●	●	●	●

Ⓕ Mounting method (*2)					
F	Flange mounting	●	●	●	●
H	4-point flange mounting	●	●	●	●
X	Bottom mount	●	●	●	●

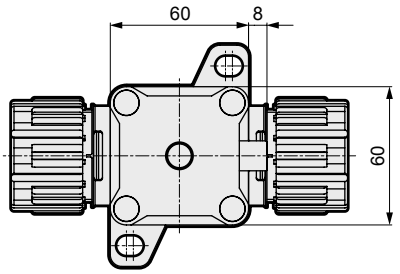
Precautions for model No. selection

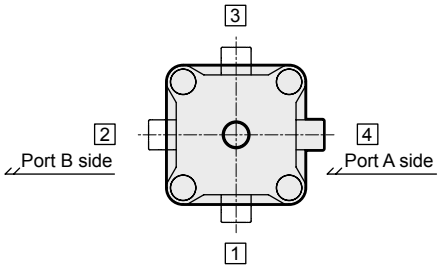
*1 : Made-to-order product if the body material is PTFE.
*2 : Refer to dimensions for operating port direction, sensor cable direction, and mounting plate.

Dimensions

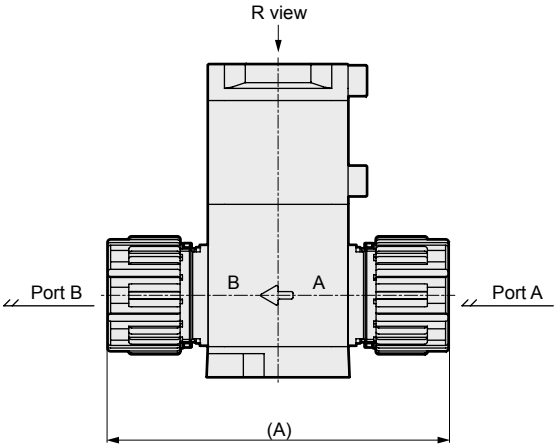
● 00 ON/OFF only (with indicator) + N normal body

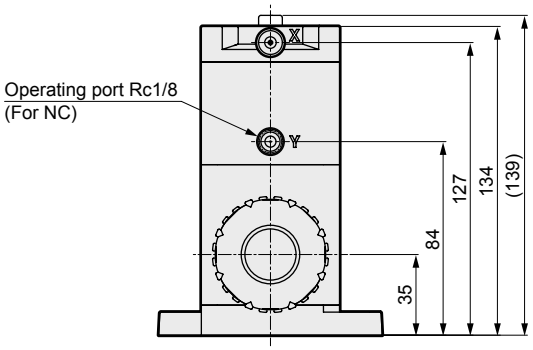
·AMD5*3R- *1 -00N**





Operating port direction (R view)

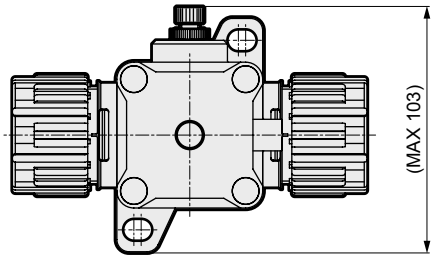


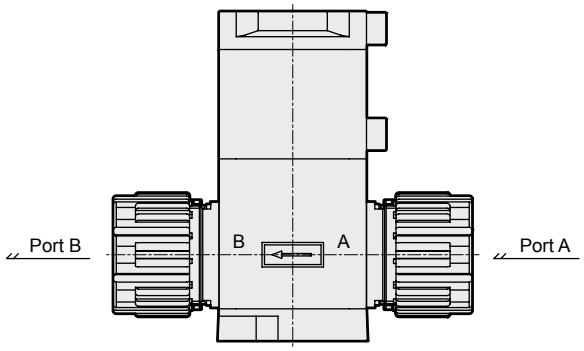


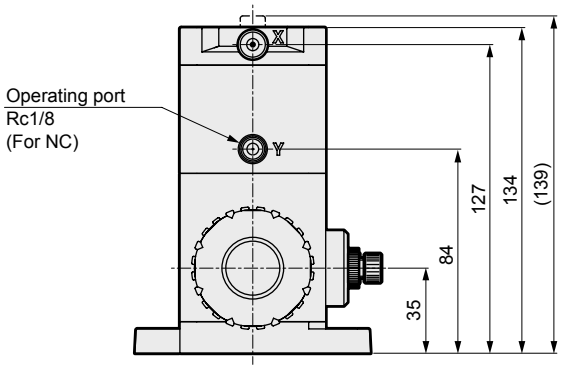
*1 (connection method)	A
25UP	146
25BUP	146
25UR	159
25BUR	162

● 00 ON/OFF only (with indicator) + B body with bypass

·AMD5*3R-*-00B**



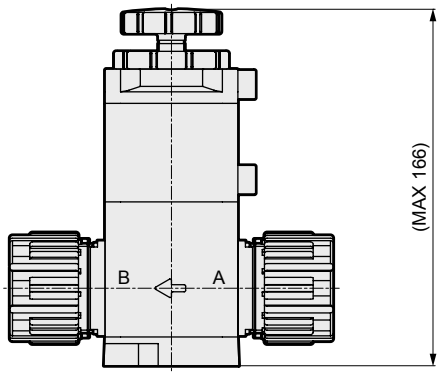




Dimensions

● 10 With flow rate adjustment

·AMD5*3R-*-10***

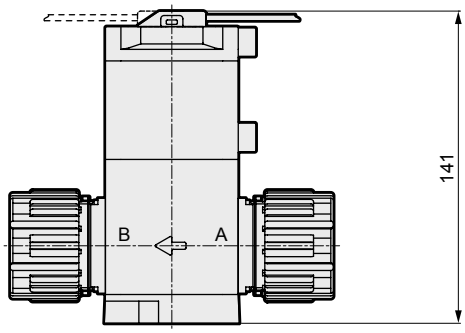


● A* B* C* D* With sensor

·AMD5*3R-*- (A B C D) ****

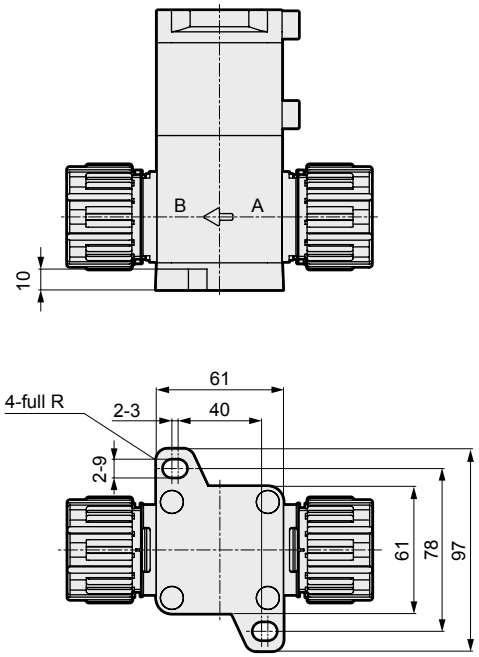
B* D* Cable direction: Opposite side to operating port

A* C* Cable direction: Operating port side



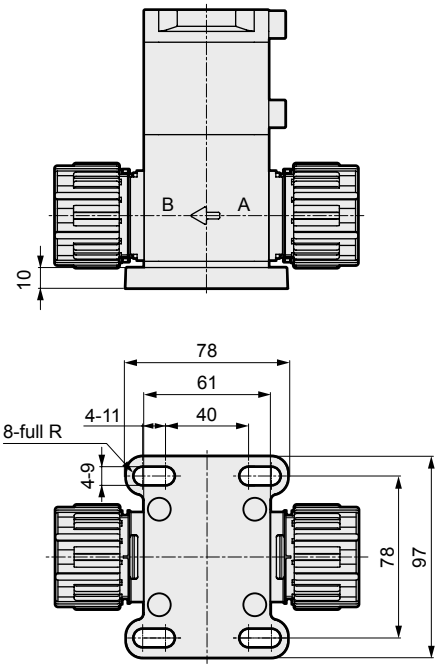
● F Flange mounting

·AMD5*3R-*-***F



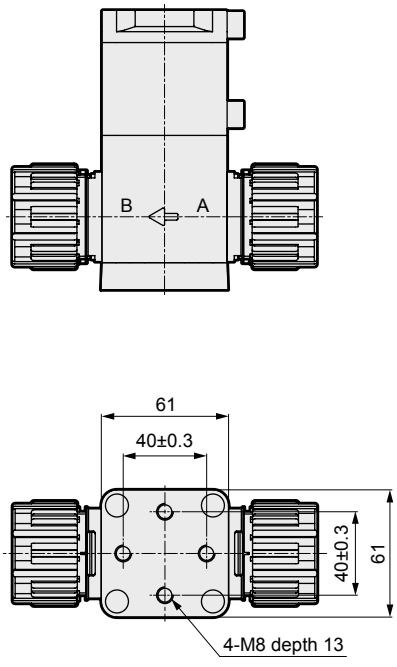
● H 4-point flange mounting

·AMD5*3R-*-***H



● X Bottom mounting

·AMD5*3R-*-***X



Air operated valve for chemical liquids (3-port valve)

AMGZ03R Series

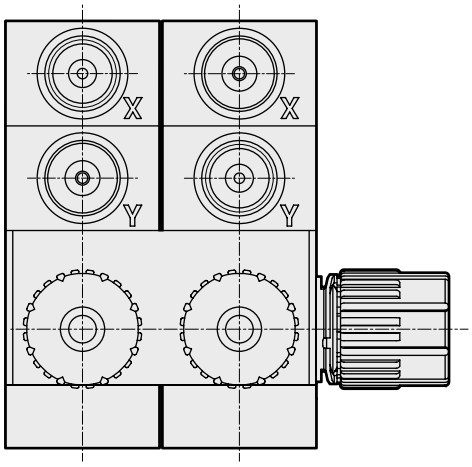
RoHS CAD **Made-to-order product**

Specifications

Item			AMGZ03R
Working fluid			Pure water, chemical liquids, air, N_2 gas (*1)
Fluid temperature		°C	5 (41°F) to 120 (248°F) (*2, *3)
Proof pressure		MPa	1.0 (≈150 psi, 10 bar)
Working pressure (A→B)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)
Working pressure (B→A)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)
Valve seat leakage		cm^3/min	0 (water pressure)
Back pressure		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)
Ambient temperature		°C	0 (32°F) to 60 (140°F)
Frequency			30 times/min. or less
Mounting orientation			Unrestricted
Connection			O.D. ø6 tube connection (fitting integrated) O.D. 1/4" tube connection (fitting integrated)
Orifice size			ø3.5, ø4
Operating section	Operating pressure	MPa	NC/NO: 0.4 (≈58 psi, 4 bar) to 0.5 (≈73 psi, 5 bar)
	Operating port		Rc1/8
Weight		kg	0.13

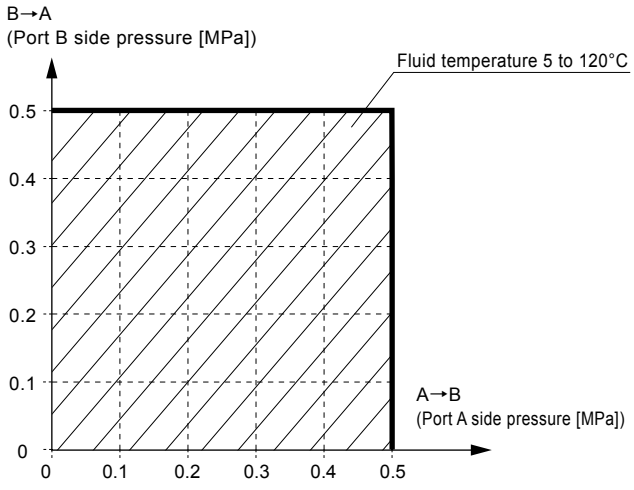
*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility check list on page 1148.)
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : 5 to 100°C if the connection is F-LOCK60 series fitting.

Structure and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PTFE
Mounting plate	PVDF

Working pressure



How to order

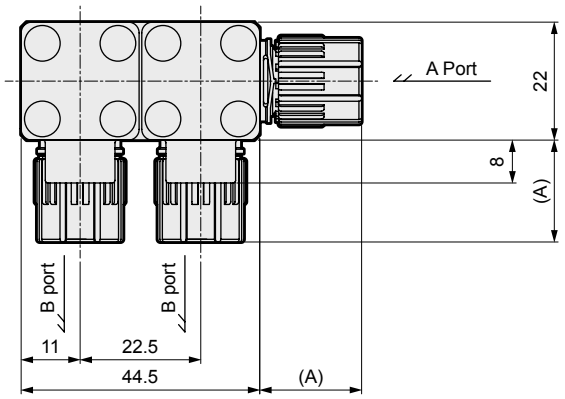
AMGZ03R - 6UP - Z0 L

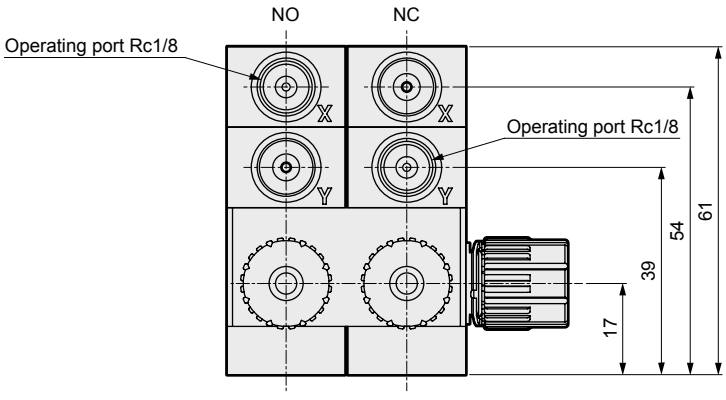
- AMGZ03R: Model No.
- 6UP: Ⓐ Connection
- Z0: Ⓑ Actuator option
- L: Ⓒ A Port position

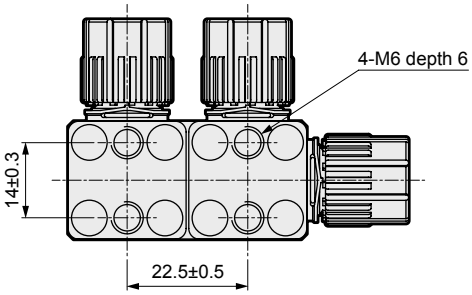
Ⓐ Connection (Note)	6UP	8BUP	6UR	8BUR
	Super 300 Pillar fitting P Series integrated		F-LOCK 60 Series fitting integrated	
	ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø6 x ø4 tube connection	1/4" x 5/32" tube connection
Orifice size	ø4		ø3.5	
Body material	PTFE			
Ⓑ Actuator option				
Z0 ON/OFF only	●	●	●	●
Ⓒ A Port position				
L Left	●	●	●	●
R Right	●	●	●	●

Dimensions

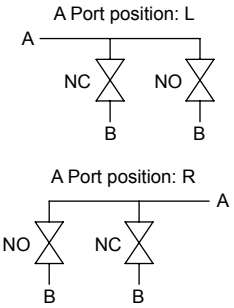
●AMGZ03R- *1 -Z0R

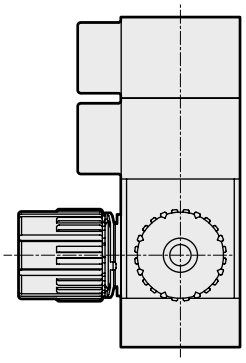




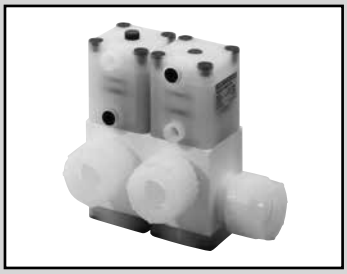


*: Note that NC and NO arrangements differ by A Port position.
The valve close to the A Port side is NC, while the other is NO.





Connection *1	A
6UP	19
8BUP	19
6UR	30
8BUR	31



Air operated valve for chemical liquids (3-port valve)

AMG003R Series

Made-to-order product

RoHS CAD

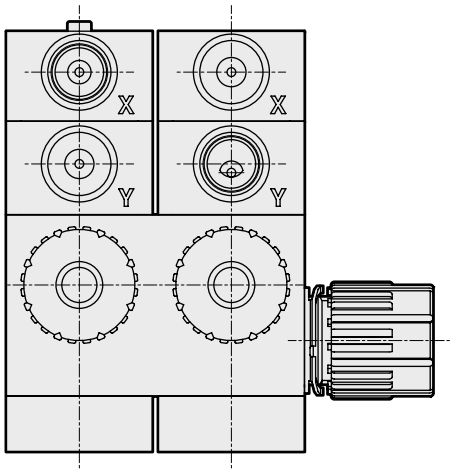
Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		AMG003R
Working fluid		Chemical liquids, pure water, air, N_2 gas (*1)
Fluid temperature °C		5 (41°F) to 120 (248°F) (*2, *3)
Proof pressure MPa		1.0 (≈145 psi, 10 bar)
Working pressure (A→B) MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)
Working pressure (B→A) MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)
Valve seat leakage cm^3/min		0 (water pressure)
Back pressure MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)
Ambient temperature °C		0 (32°F) to 60 (140°F)
Frequency		30 cycles/min. or less
Mounting orientation		Unrestricted
Connection		O.D. ø6/ø8/ø10 tube connection (integrated fitting) O.D. 1/4" / 3/8" tube connection (integrated fitting)
Orifice size		ø3.5 to ø8
Operating section	Operating pressure MPa	NC/NO: 0.35 to 0.5
	Operating port	Rc1/8
Weight kg		0.22

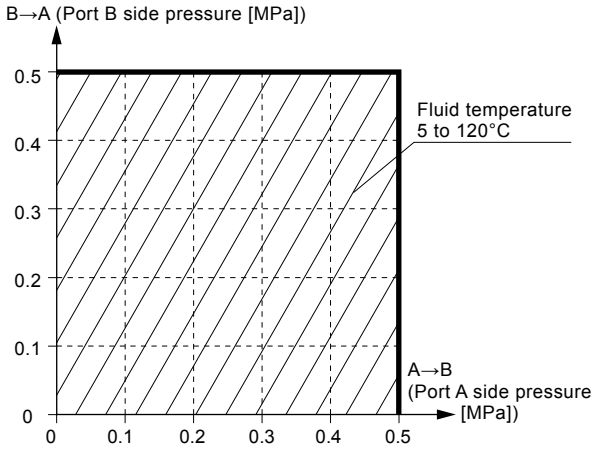
*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility checklist on page 1148.)
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : 5 to 100°C when the connecting fitting is an F-LOCK60 Series fitting.

Structure diagram and parts list

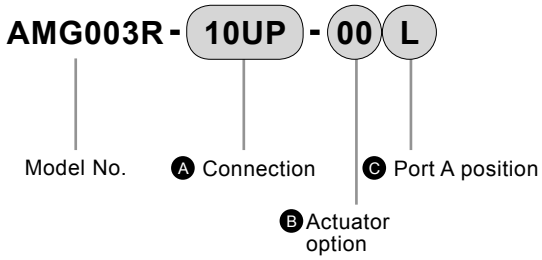


Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PTFE
Mounting plate	PVDF

Working pressure



How to order



Code	Description \ Orifice size	A Connection									
		6UP	8BUP	8UP	10UP	10BUP	6UR	8BUR	8UR	10UR	10BUR
		Super 300 Pillar fitting P series integrated					F-LOCK 60 Series Integrated fitting				
		ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø8 x ø6 tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø8 x ø6 tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection
		ø4		ø6	ø8		ø3.5		ø6	ø7	ø6
	Body material	PTFE									
B Actuator option											
00	ON/OFF only (with indicator)	●	●	●	●	●	●	●	●	●	●
10	With flow rate adjustment	●	●	●	●	●	●	●	●	●	●
C Port A position (*1)											
L	Left	●	●	●	●	●	●	●	●	●	●
R	Right	●	●	●	●	●	●	●	●	●	●

Precautions for model No. selection

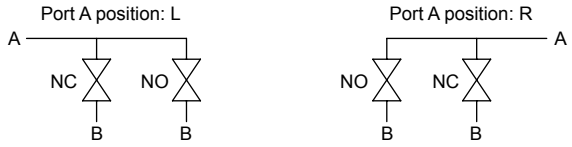
*1: Refer to dimensions for port A position.

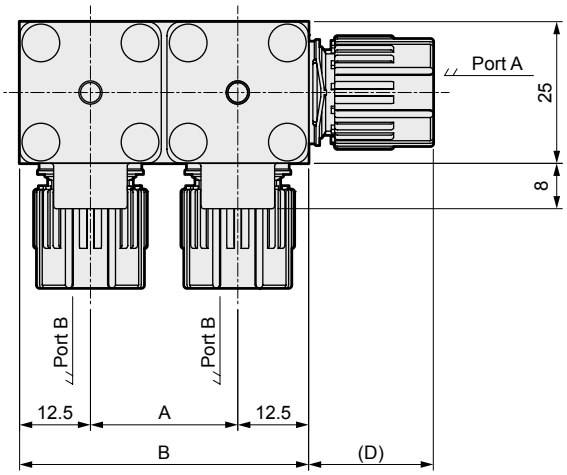
Dimensions

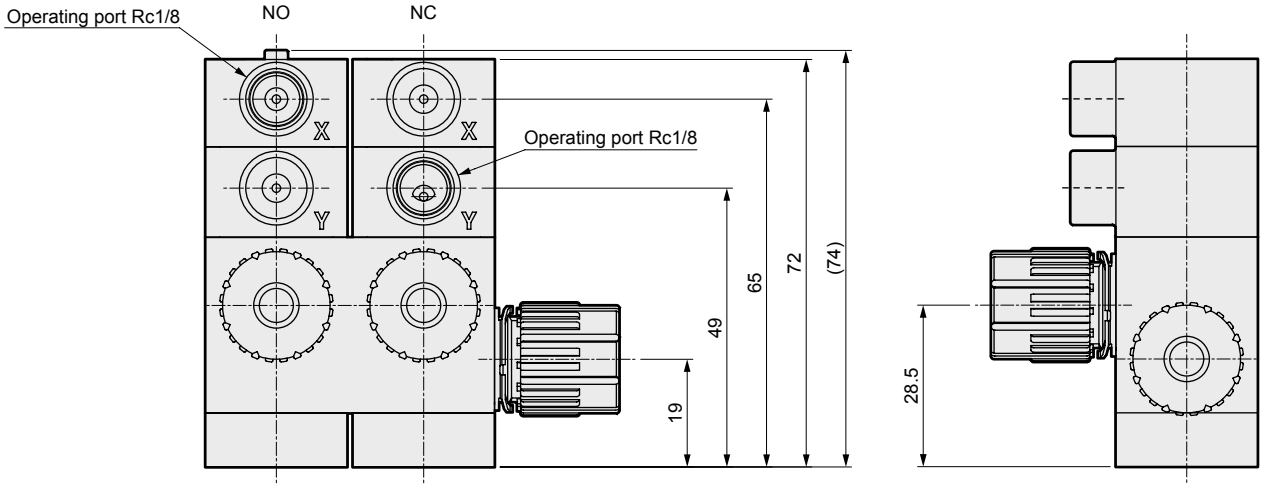
● 00 ON/OFF only (with indicator)

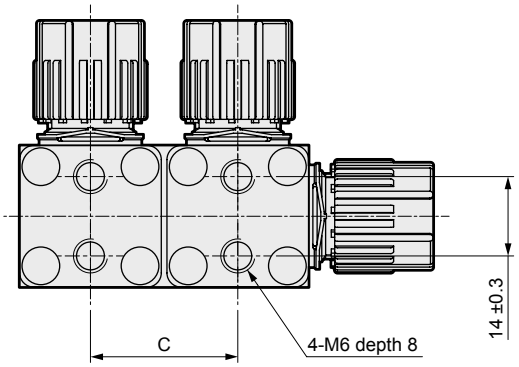
· AMG003R-

* Note that NC and NO arrangements differ by port A position.
The valve close to the port A side is NC, while the other is NO.









Dimensions

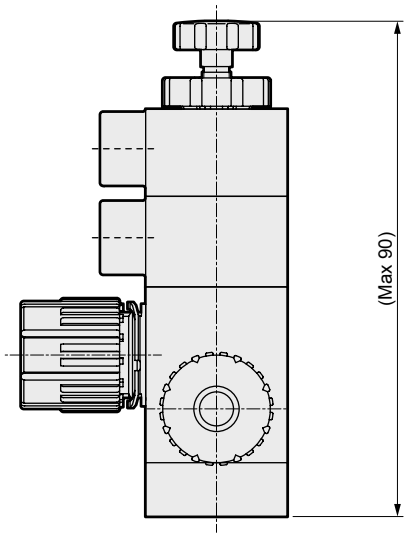
AMG003R

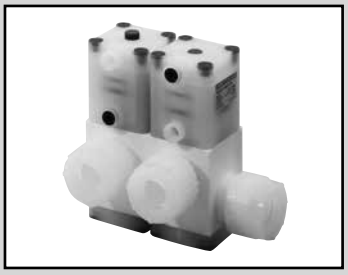
*1 (connection method)	A	B	C
6UP 8BUP 8UP 6UR 8BUR 8UR	26	51	26 ±0.3
10UP 10BUP 10UR 10BUR	31	56	31 ±0.3

AMG003R, GAMD0*3R

*1 (connection method)	D
6UP	19
8BUP	19
8UP	22
10UP	25
10BUP	25
6UR	30
8BUR	31
8UR	31
10UR	37
10BUR	39

● 10 With flow rate adjustment
· AMG*03R-*-10*





Air operated valve for chemical liquids (3-port valve)

AMG$^{3}_{5}$03R Series

- Orifice : AMG303R ø6 to ø10
  Orifice : AMG403R ø15 to ø16
  Orifice : AMG503R ø20

Made-to-order product

Export controlled items

* Applicable AMG403R, 503R

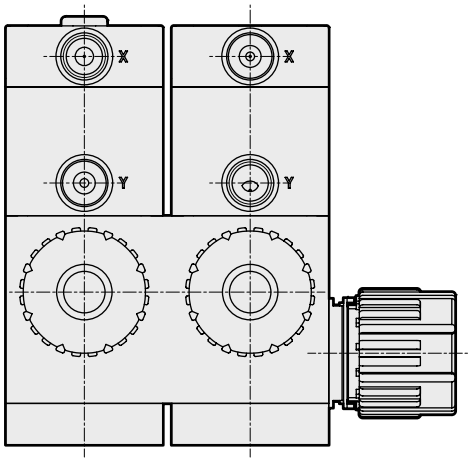
RoHS CAD

Specifications

Item		AMG303R	AMG403R	AMG503R
Working fluid		Chemical liquids, pure water, air, N_2 gas (*1)		
Fluid temperature	°C	5 (41°F) to 120 (248°F) (*2, *3)		
Proof pressure	MPa	1.0 (≈150 psi, 10 bar)		
Working pressure (A→B)	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Working pressure (B→A)	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Valve seat leakage	cm^3/min	0 (water pressure)		
Back pressure	MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Ambient temperature	°C	0 (32°F) to 60 (140°F) (0 (32°F) to 50 (122°F) when sensor attached)		
Frequency		30 times/min. or less	20 times/min. or less	
Mounting orientation		Unrestricted		
Connection		O.D. ø10/ø12 tube connection (Fitting integrated) O.D. 3/8" / 1/2" tube connection (fitting integrated)	O.D. 3/4" tube connection (Fitting integrated)	O.D. ø25 tube connection (Fitting integrated) O.D. 1" tube connection (Fitting integrated)
Orifice size		ø6 to ø10	ø15 to ø16	ø20
Operating section	Operating pressure MPa	NC/NO: 0.35 (≈51 psi, 3.5 bar) to 0.5 (≈73 psi, 5 bar)		
	Operating port	Rc1/8		
Sensor		Refer to pages 1140 to 1141.		
Weight	kg	0.50	1.0	2.1

*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility check list on page 1148.)
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : When connection fitting is F-LOCK60 series fitting, 5 to 100°C.

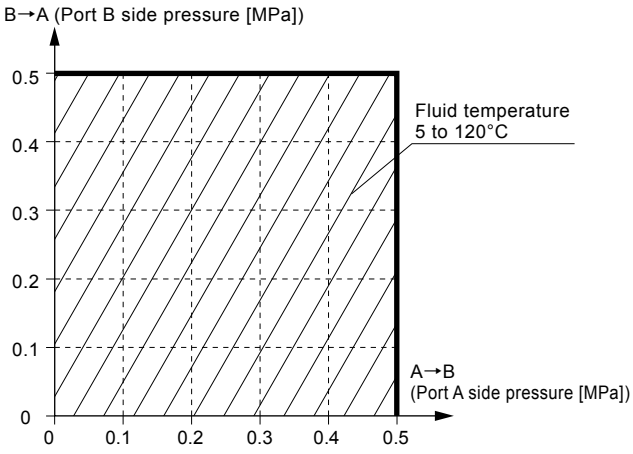
Structure and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PTFE
Mounting plate	PVDF

Working pressure

●AMG303R, AMG403R, AMG503R



How to order

AMG303R - 10UP - 00 L

- AMG303R: Model No.
- 10UP: Ⓐ Connection
- 00: Ⓑ Actuator Option
- L: Ⓒ Port A position

Code	Description / Orifice size			Cable length	Ⓐ Connection							
					10UP	10BUP	12UP	15BUP	10UR	10BUR	12UR	15BUR
					Super 300 type Pillar fitting P Series integrated				F-LOCK 60 Series fitting integrated			
					ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø12 x ø10 tube connection	1/2" x 3/8" tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø12 x ø10 tube connection	1/2" x 3/8" tube connection
	Orifice size				ø8		ø10		ø7	ø6	ø9	
	Body material				PTFE							
Ⓑ Actuator option												
00	ON/OFF only (with indicator)				●	●	●	●	●	●	●	●
10	With flow rate adjustment				●	●	●	●	●	●	●	●
With sensor	Transistor	Cable direction (*)		Cable length								
A1	NPN	Operating port side		1 m	●	●	●	●	●	●	●	●
A3				3 m	●	●	●	●	●	●	●	●
B1		Opposite side to operating port		1 m	●	●	●	●	●	●	●	●
B3				3 m	●	●	●	●	●	●	●	●
C1	PNP	Operating port side		1 m	●	●	●	●	●	●	●	●
D1		Opposite side to operating port		1 m	●	●	●	●	●	●	●	●
Ⓒ Port A position (*)												
L	Left				●	●	●	●	●	●	●	●
R	Right				●	●	●	●	●	●	●	●

Precautions for model No. selection

*: Refer to dimensions for sensor cable direction and port A position.

AMG403R Series

How to order

AMG403R- **20BUP** **-** **00** **L**

- Model No.
- Ⓐ Connection
- Ⓑ Actuator option
- Ⓒ Port A position

Code	Description \ Orifice size				Ⓐ Connection: 20BUP Super 300 Pillar fitting P Series integrated 3/4" x 5/8" tube connection	Ⓐ Connection: 20BUR F-LOCK 60 Series fitting integrated 3/4" x 5/8" tube connection
	Body material				PTFE	
Ⓑ Actuator option						
00	ON/OFF only (with indicator)				●	●
10	With flow rate adjustment				●	●
With sensor	Transistor	Cable direction (*)		Cable length		
A1	NPN	Operating port side		1 m	●	●
A3				3 m	●	●
B1		Opposite side to operating port		1 m	●	●
B3				3 m	●	●
C1	PNP	Operating port side		1 m	●	●
D1		Opposite side to operating port		1 m	●	●
Ⓒ Port A position (*)						
L	Left				●	●
R	Right				●	●

Precautions for model No. selection

*: Refer to dimensions for sensor cable direction and port A position.

How to order

AMG503R - 25UP - 00 L

- AMG503R: Model No.
- 25UP: Ⓐ Connection
- 00: Ⓑ Actuator option
- L: Ⓒ Port A position

Code / Description / Orifice size				Ⓐ Connection			
				25UP	25BUP	25UR	25BUR
				Super 300 Pillar fitting P Series integrated		F-LOCK 60 Series Fitting integrated	
				ø25 x ø22 tube connection	1" x 7/8" tube connection	ø25 x ø22 tube connection	1" x 7/8" tube connection
Body material				PTFE			
Ⓑ Actuator option							
00	ON/OFF only (with indicator)			●	●	●	●
10	With flow rate adjustment			●	●	●	●
With sensor	Transistor	Cable direction (*)	Cable length				
A1	NPN	Operating port side	1 m	●	●	●	●
A3			3 m	●	●	●	●
B1		Opposite side to operating port	1 m	●	●	●	●
B3			3 m	●	●	●	●
C1	PNP	Operating port side	1 m	●	●	●	●
D1		Opposite side to operating port	1 m	●	●	●	●
Ⓒ Port A position (*)							
L	Left			●	●	●	●
R	Right			●	●	●	●

Precautions for model No. selection

*: Refer to dimensions for sensor cable direction and port A position.

Dimensions

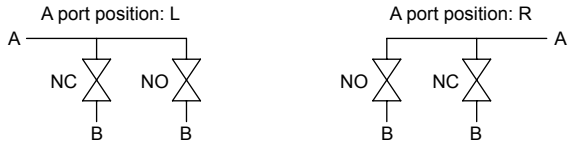
● 00 ON/OFF only (with indicator)

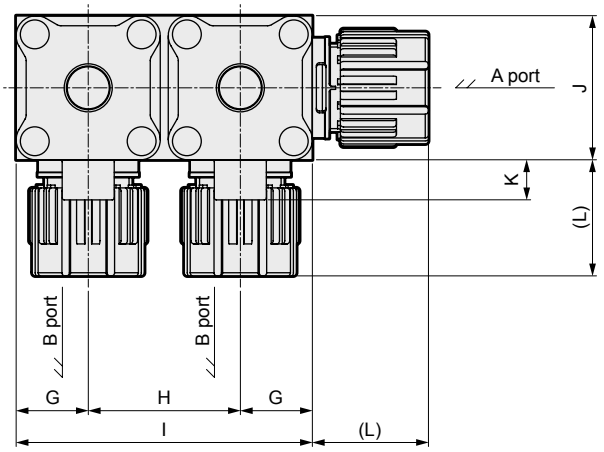
·AMG303R- *1

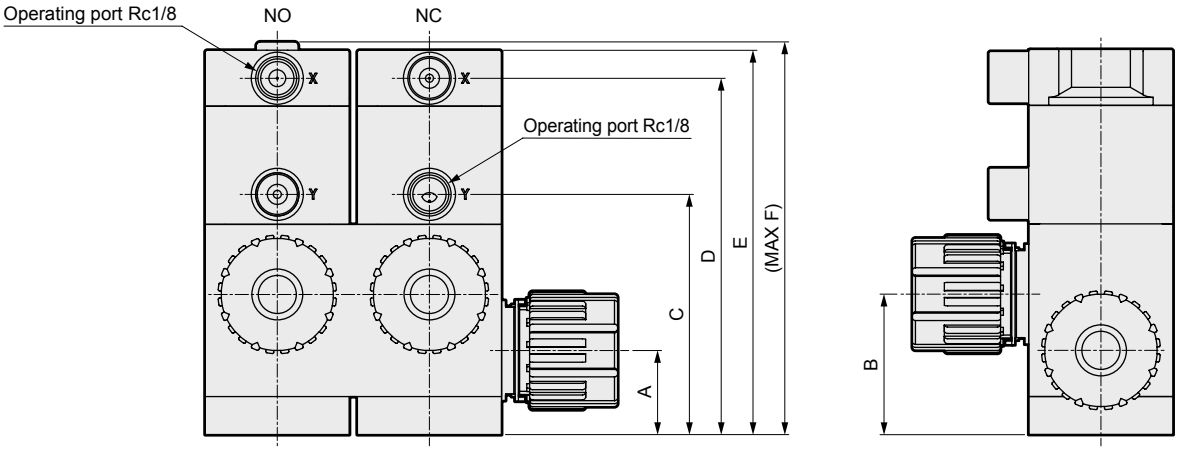
·AMG403R- *1

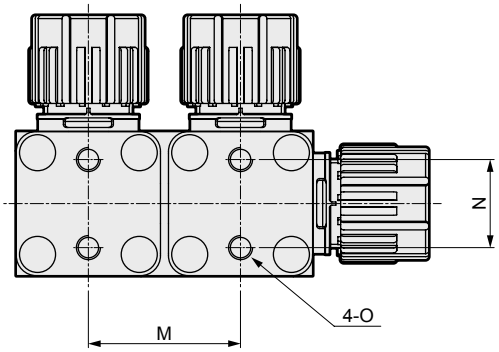
·AMG503R- *1

*: Note that NC and NO arrangements differ by A port position.
The valve close to the A port side is NC, while the other is NO.









Dimensions

Model No.	A	B	C	D	E	F	G	H	I	J	K	Q	R
AMG303R	21	35	60	89	96	98	18	38	74	36	10	119	103
AMG403R	27	46	78	118	125	128	23	48	94	46	8	148	132
AMG503R	35	60	99	142	149	154	30	62	122	60	8	181	156

Model No.	M	N	O
AMG303R	38±0.3	22±0.3	M6 depth 9
AMG403R	48±0.4	28±0.3	M8 depth 10
AMG503R	62±0.4	40±0.3	M8 depth 13

AMG303R (10 mm / 3/8")

*1 (connection method)	L
10UP	25
10BUP	25
10UR	37
10BUR	39

AMG303R (12 mm / 1/2")

*1 (connection method)	L
12UP	29
15BUP	29
12UR	37
15BUR	39

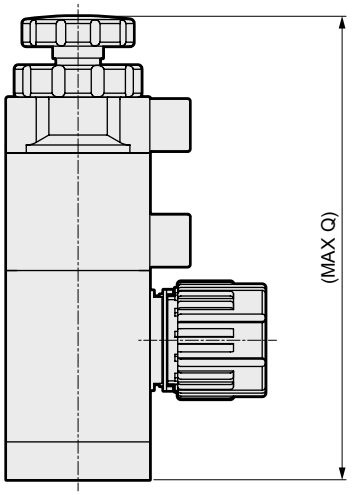
AMG403R

*1 (connection method)	L
20BUP	36
20BUR	44

AMG503R

*1 (connection method)	L
25UP	43
25BUP	43
25UR	49.5
25BUR	51

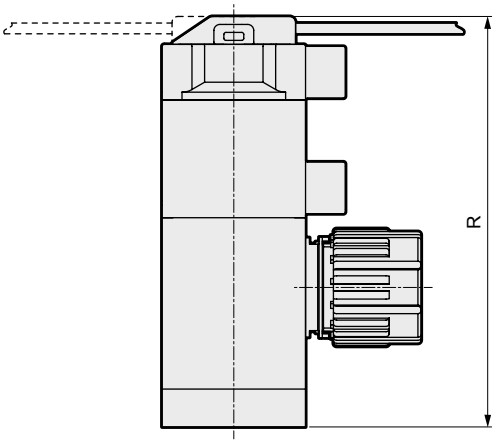
● 10 With flow rate adjustment
·AMG*03R-*-10*

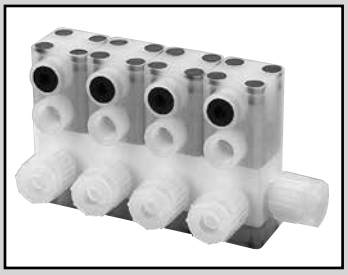


● A* B* C* D* With sensor
·AMG*03R-*- A B C D **

B* D* Cable direction: Opposite side to operating port

A* C* Cable direction: Operating port side





Air operated valve for chemical liquids (manifold/branch valve)

GAMDZ*3R Series

RoHS CAD **Made-to-order product**

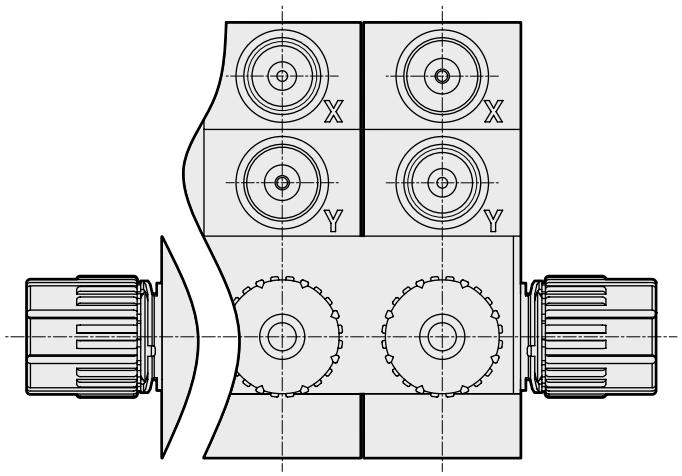
Specifications

1 MPa = 10 bar

Item			GAMDZ*3R
Working fluid			Pure water, chemical liquids, air, N_2 gas (*1)
Fluid temperature		°C	5 (41°F) to 120 (248°F) (*2, *3)
Proof pressure		MPa	1.0 (≈150 psi, 10 bar)
Working pressure (A→B)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)
Working pressure (B→A)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)
Valve seat leakage		cm^3/min	0 (water pressure)
Back pressure		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)
Ambient temperature		°C	0 (32°F) to 60 (140°F)
Frequency			30 times/min. or less
Mounting orientation			Unrestricted
Connection			O.D. ø6 tube connection (fitting integrated) O.D. 1/4" tube connection (fitting integrated)
Orifice size			ø3.5, ø4
Operating section	Operating pressure	MPa	NC/NO: 0.4 (≈58 psi) to 0.5 (≈73 psi), double acting: 0.3 (≈44 psi) to 0.4 (≈58 psi)
	Operating port		Rc1/8 (operation ports used NC: port Y NO: port X Double acting: ports X, Y)
Weight		kg	0.08 (1 station), 0.14 (2 stations), 0.21 (3 stations), 0.27 (4 stations), 0.33 (5 stations)

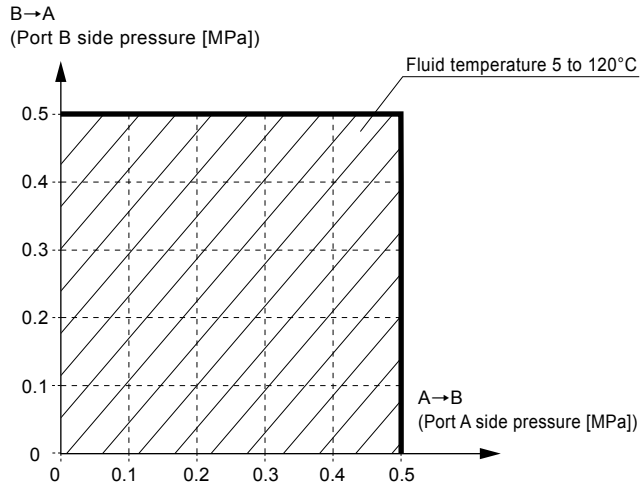
*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility check list on page 1148.)
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : 5 to 100°C if the connection is F-LOCK60 series fitting.

Structure and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PTFE
Mounting plate	PVDF

Working pressure



How to order

GAMDZ **1** 3R - **6UP** - **Z0** **3** **W**

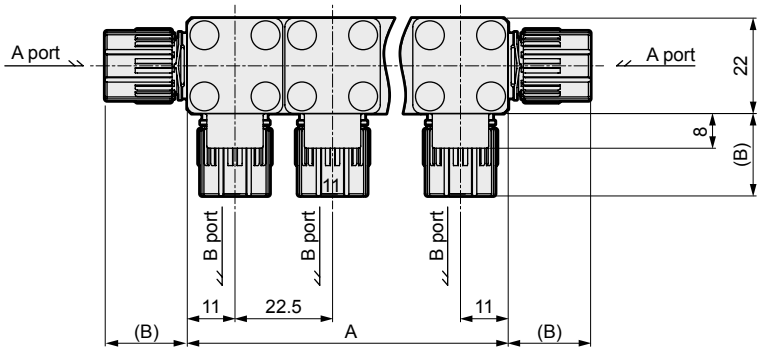
- 1: Model No.
- 6UP: Ⓑ Connection
- Z0: Ⓒ Actuator option
- 3: Ⓓ Station No.
- W: Ⓔ A Port position

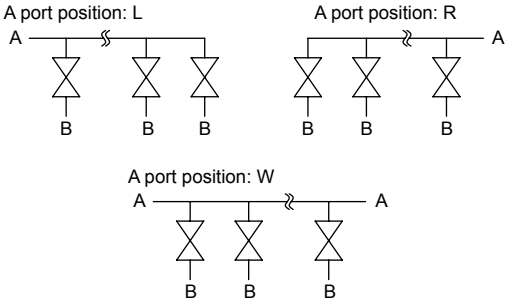
Ⓐ Actuation	
1	NC
2	NO
3	Double acting

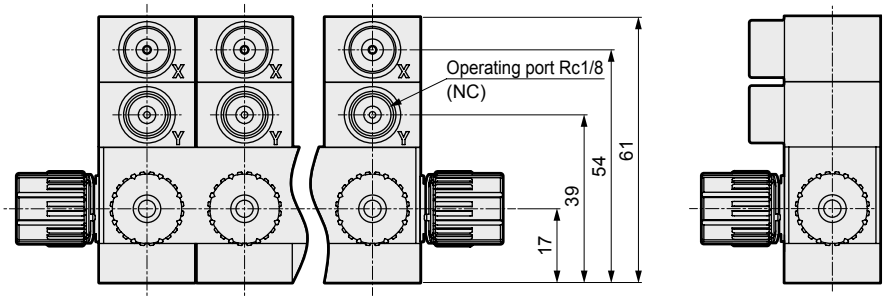
Code	Description / Orifice size	Ⓑ Connection (Note)			
		6UP	**8BUP**	**6UR**	**8BUR**
		Super 300 Pillar fitting P Series integrated		F-LOCK 60 Series fitting integrated	
		ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø6 x ø4 tube connection	1/4" x 5/32" tube connection
	Orifice size	ø4		ø3.5	
	Body material	PTFE			
Ⓒ Actuator option					
Z0	ON/OFF only	●	●	●	●
Ⓓ Station No.					
1	1 station	●	●	●	●
to	to				
5	5 stations				
Ⓔ A Port position					
L	Left	●	●	●	●
R	Right	●	●	●	●
W	Both sides	●	●	●	●

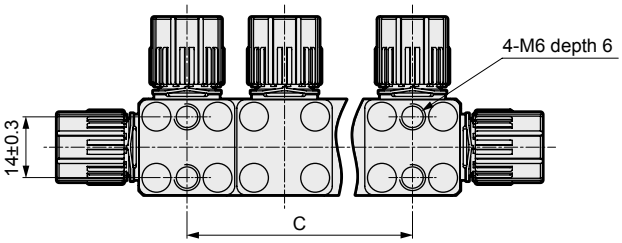
Dimensions

● ON-OFF only
·GAMDZ*3R- *1



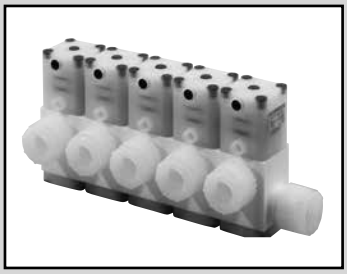






Station No.	A	C
1 station	22	-
2 stations	44.5	22.5±0.5
3 stations	67	45±0.7
4 stations	89.5	67.5±1.0
5 stations	112	90±1.0

Connection *1	B
6UP	19
8BUP	19
6UR	30
8BUR	31



Air operated valve for chemical liquids (manifold/branch valve)

GAMD0*3R Series

Made-to-order product

RoHS CAD

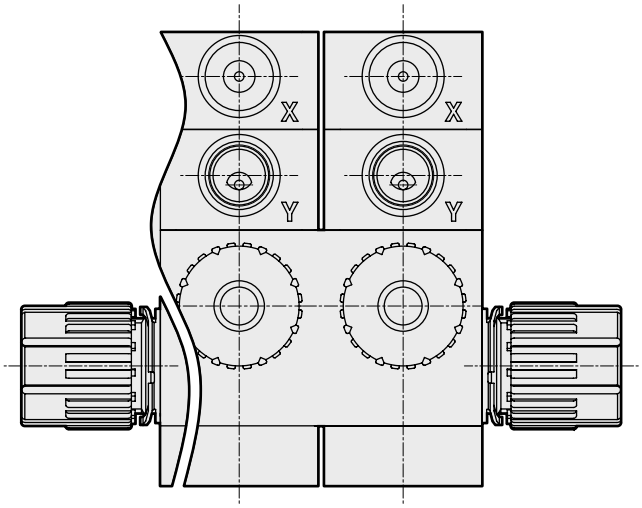
Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		GAMD0*3R
Working fluid		Chemical liquids, pure water, air, N_2 gas (*1)
Fluid temperature °C		5 (41°F) to 120 (248°F) (*2, *3)
Proof pressure MPa		1.0 (≈145 psi, 10 bar)
Working pressure (A→B) MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)
Working pressure (B→A) MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)
Valve seat leakage cm^3/min		0 (water pressure)
Back pressure MPa		0 (≈0 psi, 0 bar) to 0.5 (≈72 psi, 5 bar)
Ambient temperature °C		0 (32°F) to 60 (140°F)
Frequency		30 cycles/min. or less
Mounting orientation		Unrestricted
Connection		O.D. ø6/ø8/ø10 tube connection (integrated fitting) O.D. 1/4" / 3/8" tube connection (integrated fitting)
Orifice size		ø3.5 to ø8
Operating section	Operating pressure MPa	NC/NO: 0.35 to 0.5 Double acting: 0.3 to 0.4
	Operating port	Rc1/8 (operation ports used NC: port Y NO: port X Double acting: ports X, Y)
Weight kg		0.12 (1 station), 0.23 (2 stations), 0.34 (3 stations), 0.45 (4 stations), 0.56 (5 stations)

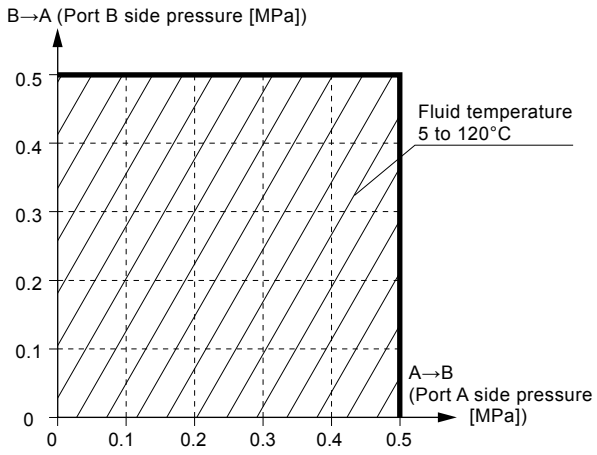
*1: Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility checklist on page 1148.)
*2: For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3: 5 to 100°C if the connection is F-LOCK60 Series fitting.

Structure diagram and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PTFE
Mounting plate	PVDF

Working pressure



How to order

GAMD0 (1) 3R - (10UP) - (00) (5) (W)

- 1: Model No.
- Ⓐ Actuation
- 10UP: Ⓑ Connection
- 00: Ⓒ Actuator option
- 5: Ⓓ Station No.
- W: Ⓔ Port A position

Ⓐ Actuation	
1	NC (normally closed)
2	NO (normally open)
3	Double acting

Ⓑ Connection	6UP	8BUP	8UP	10UP	10BUP	6UR	8BUR	8UR	10UR	10BUR
	Super 300 Pillar fitting P series integrated					F-LOCK 60 Series Integrated fitting				
	ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø8 x ø6 tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø6 x ø4 tube connection	1/4" x 5/32" tube connection	ø8 x ø6 tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection
Code / Description: Orifice size	ø4		ø6	ø8		ø3.5		ø6	ø7	ø6
Body material	PTFE									
Ⓒ Actuator option										
00 ON/OFF only (with indicator)	●	●	●	●	●	●	●	●	●	●
10 With flow rate adjustment	●	●	●	●	●	●	●	●	●	●
Ⓓ Station No. (*1)										
1 1 station / to / 5 5 stations	●	●	●	●	●	●	●	●	●	●
Ⓔ Port A position (*1)										
L Left	●	●	●	●	●	●	●	●	●	●
R Right	●	●	●	●	●	●	●	●	●	●
W Both sides	●	●	●	●	●	●	●	●	●	●

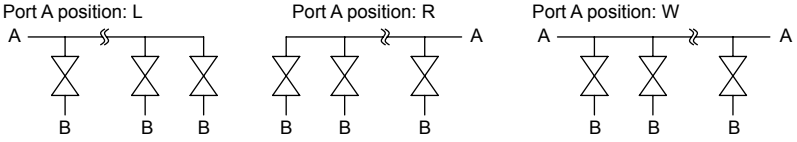
⚠ Precautions for model No. selection

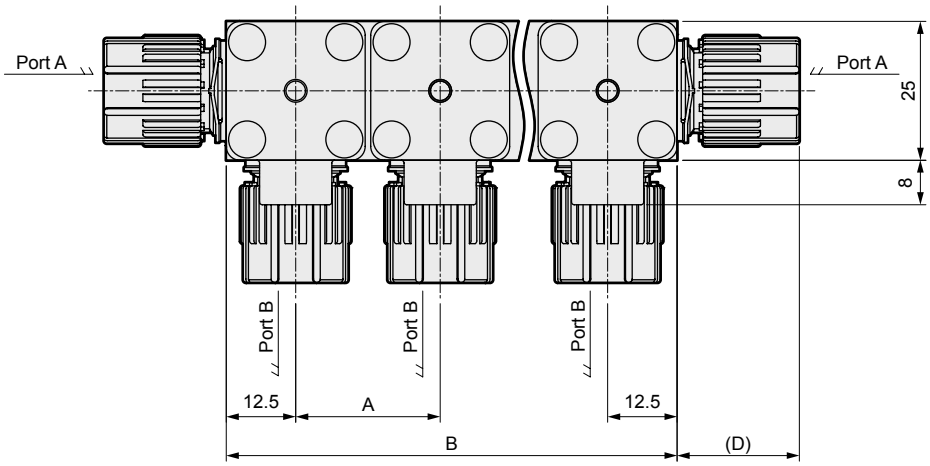
*1: Refer to dimensions for station No. and port A position.

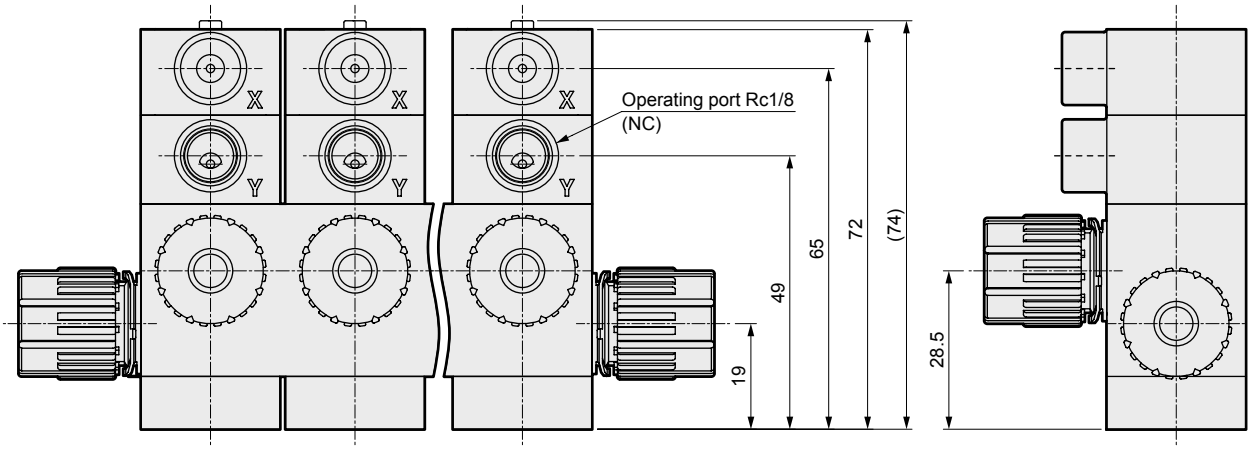
Dimensions

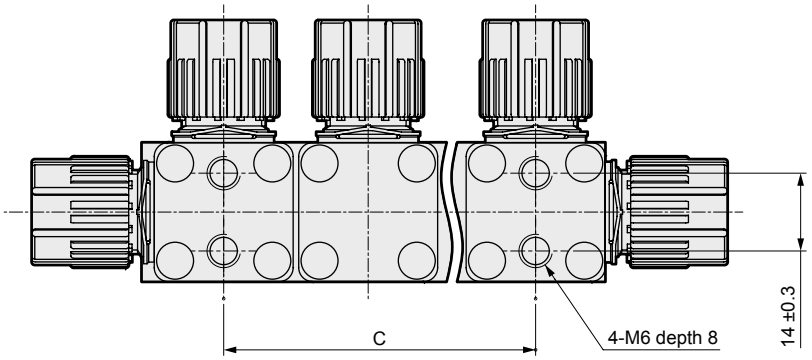
● 00 ON/OFF only type (with indicator)

· GAMD0*3R- *1









Dimensions

GAMD0*3R

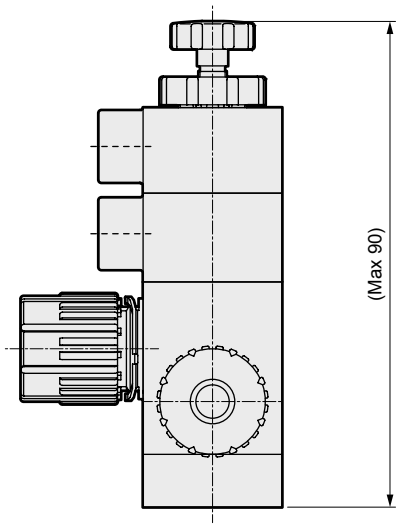
*1 (connection method)	D
6UP	19
8BUP	19
8UP	22
10UP	25
10BUP	25
6UR	30
8BUR	31
8UR	31
10UR	37
10BUR	39

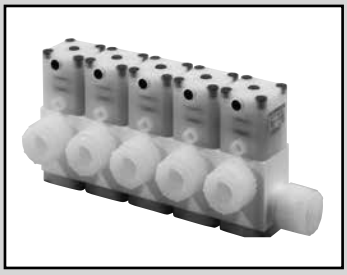
GAMD0*3R

*1 (connection method)	Station No.	A	B	C
6UP 8BUP 8UP 6UR 8BUR 8UR	1	-	26	-
	2	26	51	26 ±0.3
	3	26	77	52 ±0.4
	4	26	103	78 ±0.4
	5	26	129	104 ±0.5
10UP 10BUP 10UR 10BUR	1	-	31	-
	2	31	56	31 ±0.3
	3	31	87	62 ±0.4
	4	31	118	93 ±0.5
	5	31	149	124 ±0.5

● 10 With flow rate adjustment

· GAMD**3R-*-10**





Air operated valve for chemical liquids (manifold/branch valve)

GAMD$^{3}_{4}_{5}$*3R Series

Made-to-order product

Export controlled items

* Applicable GAMD4*3R, 5*3R

- Orifice : GAMD3*3R ø6 to ø10
  Orifice : GAMD4*3R ø15 to ø16
  Orifice : GAMD5*3R ø20
- Station No. : 1 to 5 stations

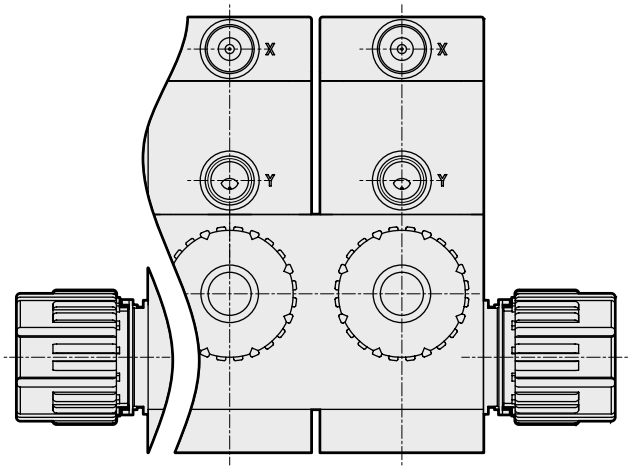
Specifications

1 MPa = 10 bar

Item			GAMD3*3R	GAMD4*3R	GAMD5*3R
Working fluid			Chemical liquids, pure water, air, N_2 gas (*1)		
Fluid temperature		°C	5 (41°F) to 120 (248°F) (*2, *3)		
Proof pressure		MPa	1.0 (≈150 psi, 10 bar)		
Working pressure (A→B)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Working pressure (B→A)		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Valve seat leakage		cm^3/min	0 (water pressure)		
Back pressure		MPa	0 (≈0 psi, 0 bar) to 0.5 (≈73 psi, 5 bar)		
Ambient temperature		°C	0 (32°F) to 60 (140°F) (0 (32°F) to 50 (122°F) when sensor attached)		
Frequency			30 times/min. or less	20 times/min. or less	
Mounting orientation			Unrestricted		
Connection			O.D. ø10/ø12 tube connection (Fitting integrated) O.D. 3/8" / 1/2" tube connection (fitting integrated)	O.D. 3/4" tube connection (Fitting integrated)	O.D. ø25 tube connection (Fitting integrated) O.D. 1" tube connection (Fitting integrated)
Orifice size			ø6 to ø10	ø15 to ø16	ø20
Operating section	Operating pressure	MPa	NC/NO: 0.35 (≈51 psi) to 0.5 (≈73 psi) Double acting: 0.3 (≈44 psi) to 0.4 (≈58 psi)		
	Operating port		Rc1/8 (operation ports used NC: port Y NO: port X Double acting: ports X, Y)		
Sensor			Refer to pages 1140 to 1141.		
Weight	1 station	kg	0.26	0.54	1.2
	2 stations		0.52	1.1	2.5
	3 stations		0.78	1.6	3.9
	4 stations		1.0	2.1	5.2
	5 stations		1.3	2.6	-

*1 : Check the compatibility of product structural materials, working fluids and atmosphere. (Refer to the compatibility check list on page 1148.)
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, use within the range of 5 to 80°C.
*3 : 5 to 100°C if the connection is F-LOCK60 series fitting.

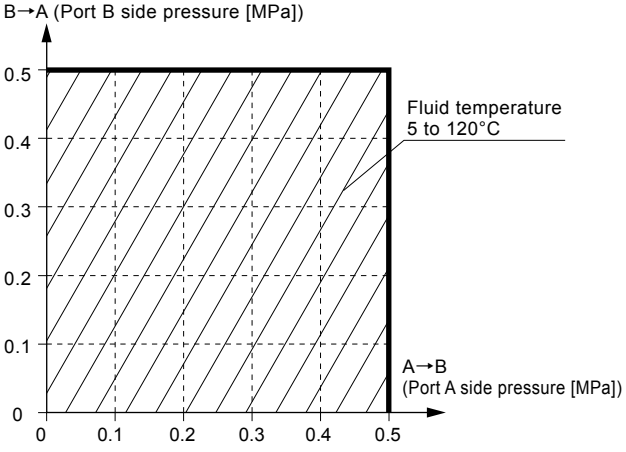
Structure and parts list



Part name	Material
Actuator	PVDF and others
Diaphragm	PTFE
Body	PTFE
Mounting plate	PVDF

Working pressure

●GAMD3*3R, GAMD4*3R, GAMD5*3R



How to order

GAMD3 (1) 3R - (10UP) - (00) (5) (W)

- 1: Model No.
- Ⓐ Actuation
- Ⓑ Connection (10UP)
- Ⓒ Actuator option (00)
- Ⓓ Station No. (5)
- Ⓔ Port A position (W)

Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Code	Description \ Orifice size			Ⓑ Connection							
				10UP	10BUP	12UP	15BUP	10UR	10BUR	12UR	15BUR
				Super 300 type Pillar fitting P Series integrated				F-LOCK 60 Series fitting integrated			
				ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø12 x ø10 tube connection	1/2" x 3/8" tube connection	ø10 x ø8 tube connection	3/8" x 1/4" tube connection	ø12 x ø10 tube connection	1/2" x 3/8" tube connection
				ø8		ø10		ø7	ø6	ø9	
Body material				PTFE							
Ⓓ Actuator option											
00	ON/OFF only (with indicator)			●	●	●	●	●	●	●	●
10	With flow rate adjustment			●	●	●	●	●	●	●	●
With sensor	Transistor	Cable direction (*)	Cable length								
A1	NPN	Operating port side	1 m	●	●	●	●	●	●	●	●
A3			3 m	●	●	●	●	●	●	●	●
B1		Opposite side to operating port	1 m	●	●	●	●	●	●	●	●
B3			3 m	●	●	●	●	●	●	●	●
C1	PNP	Operating port side	1 m	●	●	●	●	●	●	●	●
D1		Opposite side to operating port	1 m	●	●	●	●	●	●	●	●
Ⓓ Station No. (*)											
1	1 station			●	●	●	●	●	●	●	●
to	to										
5	5 stations										
Ⓔ Port A position (*)											
L	Left			●	●	●	●	●	●	●	●
R	Right			●	●	●	●	●	●	●	●
W	Both sides			●	●	●	●	●	●	●	●

⚠ Precautions for model No. selection

*: Refer to dimensions for sensor cable direction, station No. and port A position.

How to order

GAMD4 (1) 3R - (20BUP) - (00) (5) (W)

- 1 — Model No.
- 20BUP — Ⓑ Connection
- 00 — Ⓒ Actuator option
- 5 — Ⓓ Station No.
- W — Ⓔ Port A position

Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Ⓑ Connection		
	20BUP	20BUR
	Super 300 Pillar fitting P series integrated	F-LOCK 60 Series Fitting integrated
	3/4" x 5/8" tube connection	3/4" x 5/8" tube connection
Code / Description \ Orifice size	ø16	ø15
Body material	PTFE	

Ⓒ Actuator option						
00	ON/OFF only (with indicator)				●	●
10	With flow rate adjustment				●	●
With sensor	Transistor	Cable direction (*)		Cable length		
A1	NPN	Operating port side		1 m	●	●
A3				3 m	●	●
B1		Opposite side to operating port		1 m	●	●
B3				3 m	●	●
C1	PNP	Operating port side		1 m	●	●
D1		Opposite side to operating port		1 m	●	●

Ⓓ Station No. (*)			
1	1 station	●	●
to	to		
5	5 stations		

Ⓔ Port A position (*)			
L	Left	●	●
R	Right	●	●
W	Both sides	●	●

⚠ Precautions for model No. selection

*: Refer to dimensions for sensor cable direction, station No. and Port A position.

How to order

GAMD5 (1) 3R - (25UP) - (00) (4) (W)

- 1 — Model No.
- Ⓐ Actuation
- Ⓑ Connection
- Ⓒ Actuator option
- Ⓓ Station No.
- Ⓔ Port A position

Ⓐ Actuation	
1	NC
2	NO
3	Double acting

Ⓑ Connection			
25UP	25BUP	25UR	25BUR
Super 300 Pillar fitting P Series integrated		F-LOCK 60 Series fitting integrated	
ø25 x ø22 tube connection	1" x 7/8" tube connection	ø25 x ø22 tube connection	1" x 7/8" tube connection

Code	Description \ Orifice size			ø20			
Body material				PTFE			
Ⓒ Actuator option							
00	ON/OFF only (with indicator)			●	●	●	●
10	With flow rate adjustment			●	●	●	●
With sensor	Transistor	Cable direction (*)	Cable length				
A1	NPN	Operating port side	1 m	●	●	●	●
A3			3 m	●	●	●	●
B1		Opposite side to operating port	1 m	●	●	●	●
B3			3 m	●	●	●	●
C1	PNP	Operating port side	1 m	●	●	●	●
D1		Opposite side to operating port	1 m	●	●	●	●
Ⓓ Station No. (*)							
1	1 station			●	●	●	●
to	to						
4	4 stations						
Ⓔ Port A position (*)							
L	Left			●	●	●	●
R	Right			●	●	●	●
W	Both sides			●	●	●	●

Precautions for model No. selection

*: Refer to dimensions for sensor cable direction, station No. and Port A position.

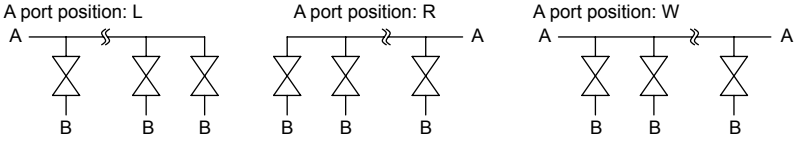
Dimensions

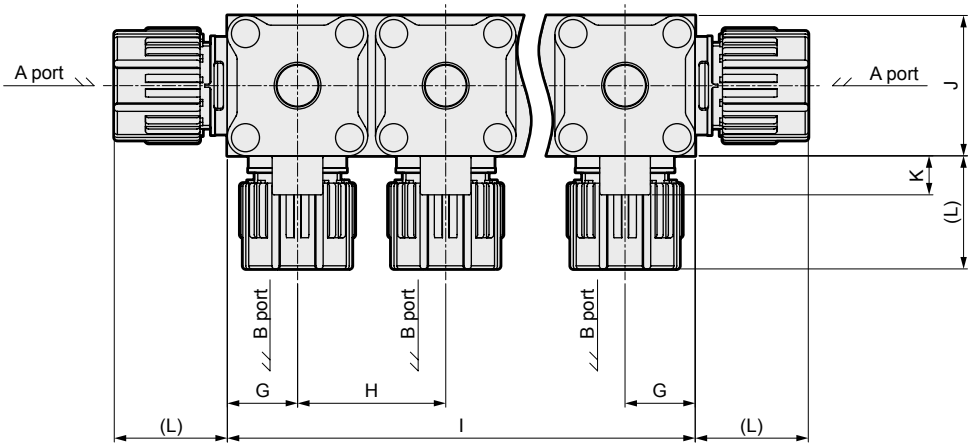
● 00 ON/OFF only (with indicator)

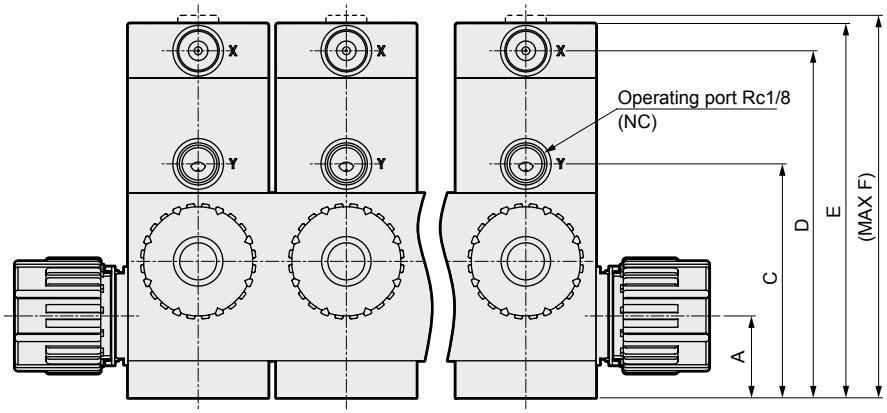
·GAMD3*3R- *1

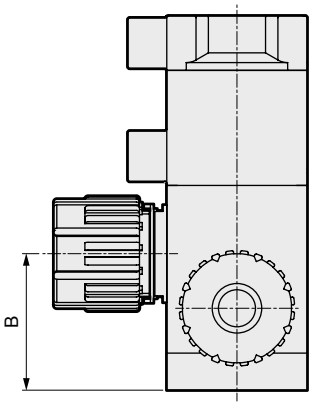
·GAMD4*3R- *1

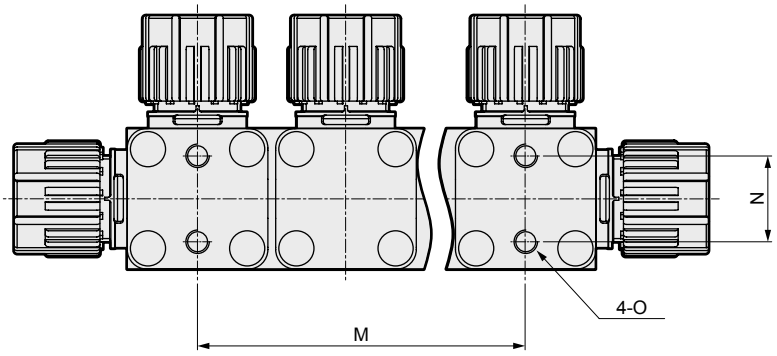
·GAMD5*3R- *1











Dimensions

Model No.	A	B	C	D	E	F	G	H	J	K	Q	R
GAMD3*3R	21	35	60	89	96	98	18	38	36	10	119	103
GAMD4*3R	27	46	78	118	125	128	23	48	46	8	148	132
GAMD5*3R	35	60	99	142	149	154	30	62	60	8	181	156

Station No.	Model No.	I	M	N	O
1	GAMD3*3R	36	-	22±0.3	M6 depth 9
	GAMD4*3R	46	-	28±0.3	M8 depth 10
	GAMD5*3R	60	-	40±0.3	M8 depth 13
2	GAMD3*3R	74	38±0.3	22±0.3	M6 depth 9
	GAMD4*3R	94	48±0.4	28±0.3	M8 depth 10
	GAMD5*3R	122	62±0.4	40±0.3	M8 depth 13
3	GAMD3*3R	112	76±0.4	22±0.3	M6 depth 9
	GAMD4*3R	142	96±0.5	28±0.3	M8 depth 10
	GAMD5*3R	184	124±0.5	40±0.3	M8 depth 13
4	GAMD3*3R	150	114±0.5	22±0.3	M6 depth 9
	GAMD4*3R	190	144±0.5	28±0.3	M8 depth 10
	GAMD5*3R	246	186±0.7	40±0.3	M8 depth 13
5	GAMD3*3R	188	152±0.7	22±0.3	M6 depth 9
	GAMD4*3R	238	192±0.7	28±0.3	M8 depth 10

GAMD3*3R (10 mm / 3/8")

*1 (connection method)	L
10UP	25
10BUP	25
10UR	37
10BUR	39

GAMD3*3R (12 mm / 1/2")

*1 (connection method)	L
12UP	29
15BUP	29
12UR	37
15BUR	39

GAMD4*3R

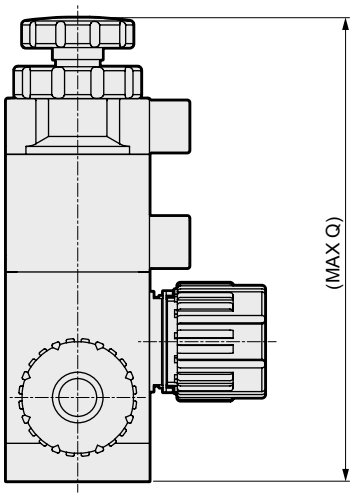
*1 (connection method)	L
20BUP	36
20BUR	44

GAMD5*3R

*1 (connection method)	L
25UP	43
25BUP	43
25UR	49.5
25BUR	51

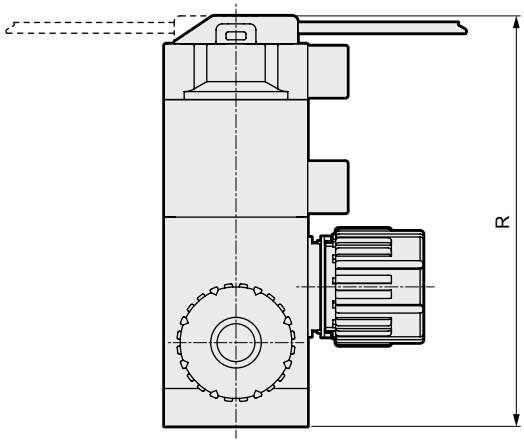
● 10 With flow rate adjustment
·GAMD**3R-*-10**

● A* B* C* D* With sensor
·GAMD**3R-*-A/B/C/D ***



B* D* Cable direction: Opposite side to operating port

A* C* Cable direction: Operating port side

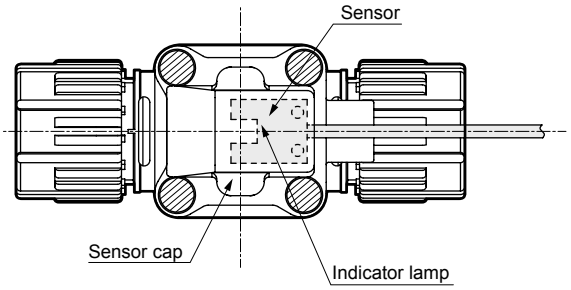


[Sensor specifications]

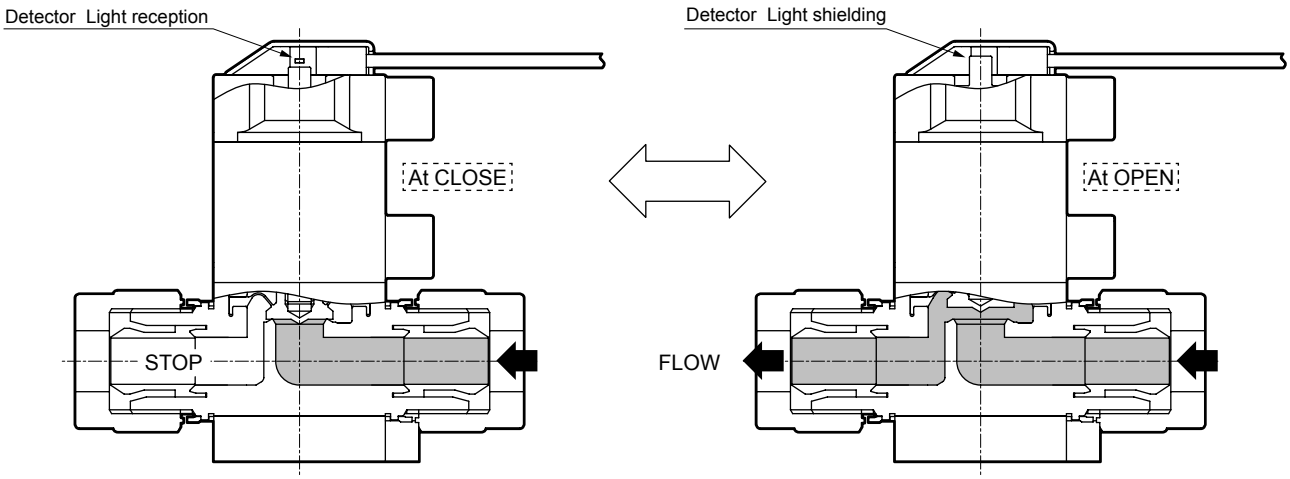
Actuator option code	A1, B1	A3, B3	C1, D1
Sensor	Micro photo sensor PM-25 Series (Panasonic Industrial Devices SUNX Co., Ltd.)		
Switch output	NPN transistor/open collector · Max. inrush current 50 mA · Applied voltage 30 VDC or less (between output and 0 V) · Residual voltage: 2 V or less		PNP transistor/open collector · Max. outflow current 50 mA · Applied voltage 30 VDC or less (between output and +V) · Residual voltage: 2 V or less
Indicator lamp	Orange LED		
Power supply voltage	5 to 24 VDC ±10% ripple P-P 10% or less		
Current consumption	15 mA or less		
Operating ambient temperature	0 to 50°C (no condensation or freezing)		
Operating ambient humidity	5% to 85% RH, when stored: 5% to 95% RH		
Operating ambient illumination	Fluorescent light: light-receiving surface luminance 1000 Lx or less		
Withstand voltage	1000 VAC for 1 minute applied to all charged sections/between cases		
Insulation resistance	20 MΩ and over with 250 VDC megger overall charging section/between cases		
Material	Case: PBT, Display: polycarbonate		
Cable	0.09 mm^2 4-conductor cabtyre cable (*3, *4)		
Cable length (*12)	1 m	3 m	1 m

*1 : Since the output is not equipped with a short circuit protection circuit, perform connections carefully.
Do not directly connect power or capacity loads. Incorrect wiring could result in damage.
*2 : Insulate unused output lines.
*3 : It cannot be used in movable parts.
*4 : Cable extension is possible, but extending the cable will cause voltage drop. Ensure that the supply voltage of the supplied sensor cable end is within the specified rating.
*5 : Never use this product in an explosive gas atmosphere. The sensor does not have an explosive-proof structure.
Never use in an explosive gas atmosphere as explosions or fires could result.
*6 : The sensor does not have a dust-proof or drip-proof structure.
It cannot be used in high steam and dusty environments or in direct contact with water, chemicals, etc. or in an atmosphere such as corrosive gas.
*7 : No special ambient light countermeasures have been taken. Take care that light does not contact the sensor light-receiving unit.
*8 : Avoid using in a transient state (50 ms) after power is turned ON.
*9 : Contact CKD if the sensor needs to be replaced.
*10 : Do not apply tensile strength to the cable. Failure to observe this could result in disconnection, damage, or malfunction.
*11 : Do not remove the sensor or sensor cap.
*12 : Contact CKD for cables longer than 1 m or 3 m.
*13 : Refer to the most recent manufacturer's catalog upon use.

Valve operation and sensor operation



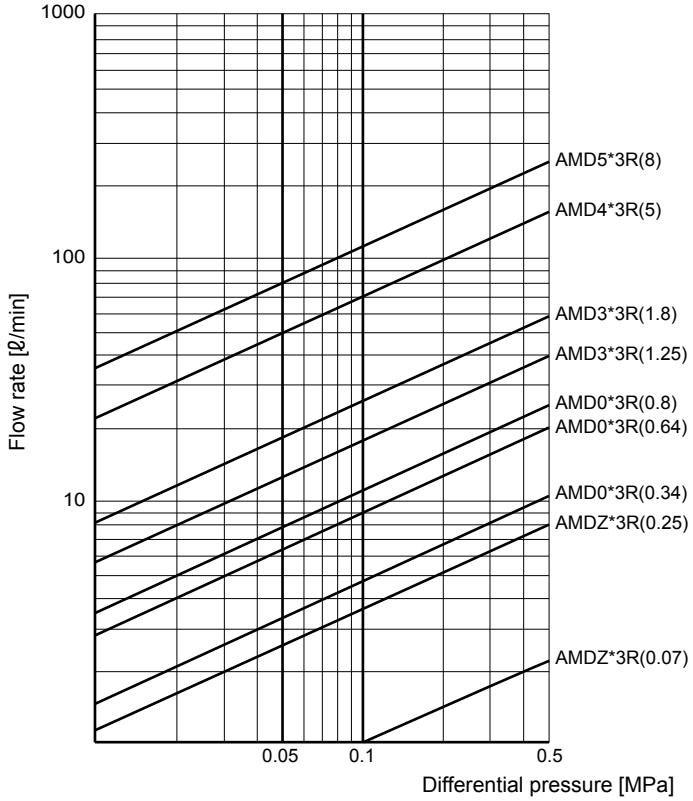
Valve operation			At CLOSE	At OPEN
Sensor	Detector		Light reception	Light shielding
	Indicator lamp		ON	OFF
	Output 1	Lead wire color: Black	Output ON	Output OFF
	Output 2	Lead wire color: White	Output OFF	Output ON



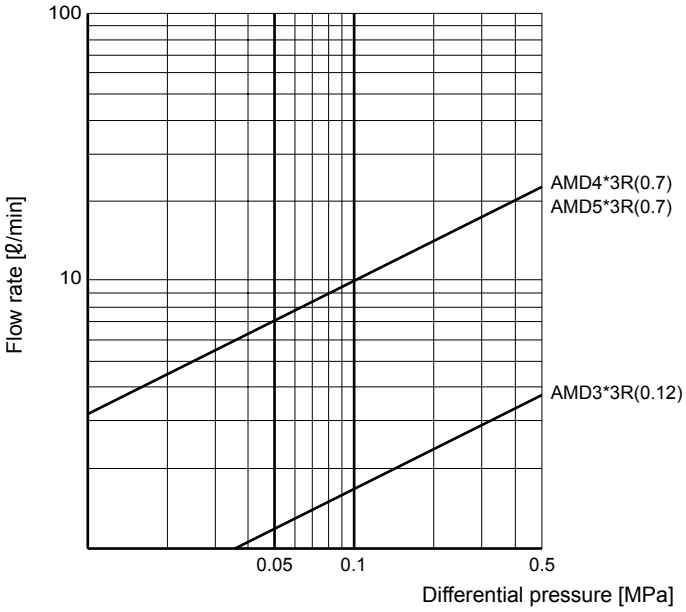
Flow characteristics

AMDZ*3R to AMD5*3R

● Flow characteristics (water)
Differential pressure - flow rate in ( ): Cv value

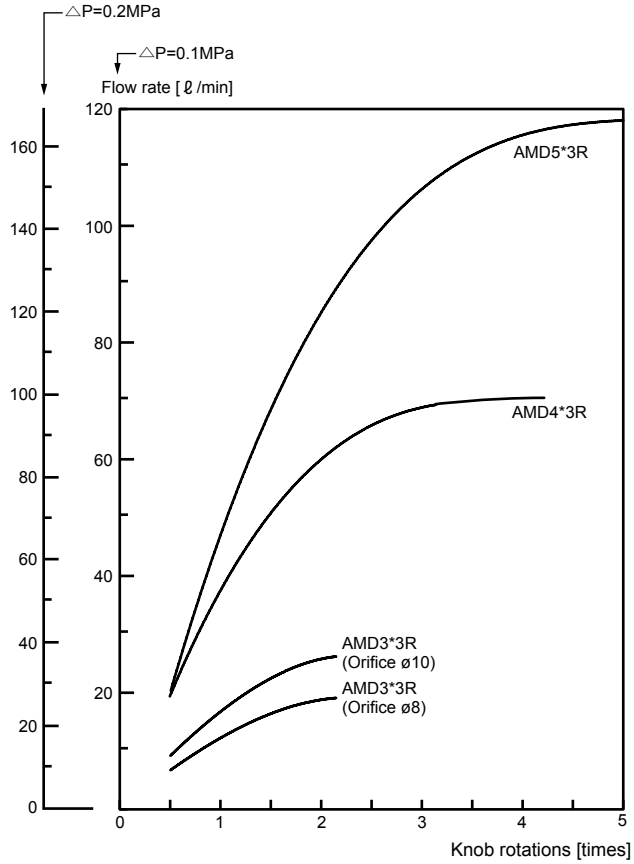


● Bypass Flow characteristics (water)
Differential pressure - flow rate in ( ): Cv value

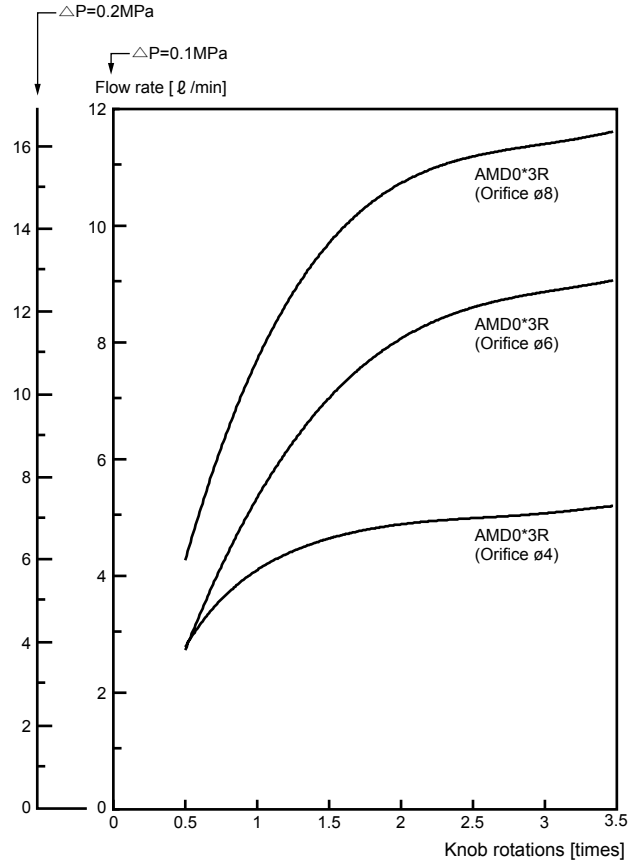


Flow characteristics

● With flow rate adjustment (water)
Rotations - flow rate

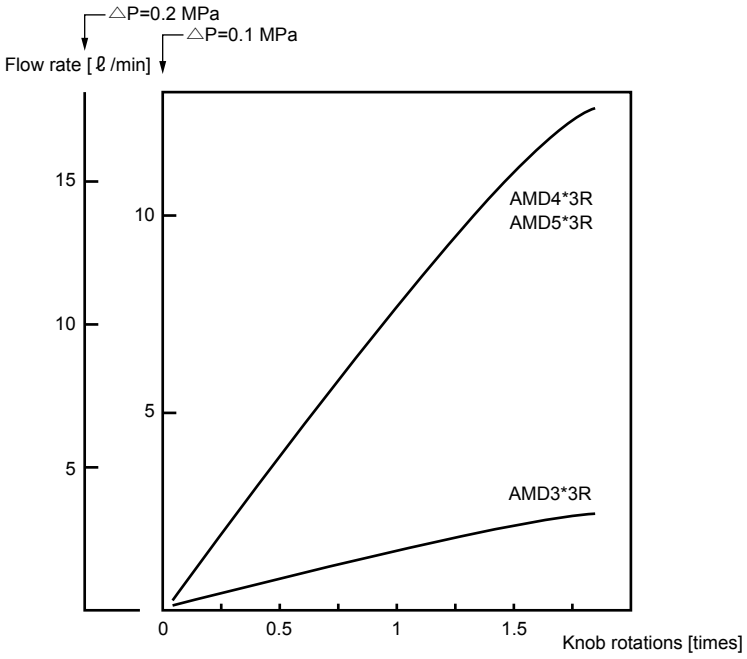


● With flow rate adjustment (water)
Rotations - flow rate



*1 : Make sure to turn the adjusting knob more than 1/2 from the closed state to ensure appropriate setting. If used below this level, vibration or flow rate fluctuation may occur depending on the working conditions.

● With bypass (water)
Rotations - flow rate



Safety Precautions

Be sure to read this section before use.

Design/selection

1. Checking the specifications

⚠ WARNING

■ This product cannot be used as an emergency shut off valve.
The valves listed in this catalog are not designed as valves to ensure safety such as emergency shut off valves. When using in such a system, always take separate measures that will ensure safety.

■ Incorrect equipment selection and handling can cause problems not only in this product, but also to your system. For equipment selection and handling, it is the customer's responsibility to check the specifications of this product and the compatibility with your system before use.

■ Working fluids
For information on the compatibility of product materials, working fluids, and ambient atmospheres, refer to the compatibility checklist on page 1148 as a basic reference. For fluids not listed in the checklist or new fluids (including different concentration levels), contact and inquire with CKD beforehand.

■ Fluid temperature
Use within the specified fluid temperature range.

■ Working pressure
Use the products within the working pressure given in the specifications listed in this catalog.

■ Ambient environment
(1) Check the compatibility of product component materials and ambient atmosphere. (Do not use this product in a corrosive or explosive atmosphere.)
(2) Do not allow fluid to come into contact with the product body.
(3) Use this product within the ambient temperature range.
(4) Do not use this product outdoors or in a place where it may be subjected to vibration or impact, or near a heat source.

2. Design

⚠ WARNING

When using a working fluid that may be hazardous to the human body, isolate the valve so that no one can approach it.

■ Liquid ring
When the valve opens and closes, the diaphragm moves up and down, which accordingly causes the flow path capacity to change inside the valve. For this reason, as the fluid is an incompressible fluid (liquid), extreme pressures will be created in the valve when operating under conditions that seal the fluid in the valve (liquid ring). In this case, install a release valve on the primary or secondary side of the valve, preventing a liquid ring circuit from forming.

■ Securing maintenance space
Secure sufficient space for maintenance and inspection.

3. With sensor option

⚠ WARNING

■ Application, load current, voltage, temperature, impact, environment, etc., exceeding the specifications will result in damage or operation faults. Use the device as instructed in specifications.

■ Never use this product in an explosive gas atmosphere. Option with sensor does not have an explosive-proof structure. Never use in an explosive gas atmosphere as explosions or fires could result.

■ Option with sensor does not have a dust-proof or drip-proof structure. It cannot be used in high steam and dusty environments or in direct contact with water, chemicals, etc. or in an atmosphere such as corrosive gas.

■ Take care when using this product for an interlock circuit.
When using the option with sensor for an interlock signal requiring high reliability, provide a double interlock by installing a mechanical protective function or other sensor as a guard if problems occur.
Regularly inspect and confirm that the interlock activates correctly.

■ Pay attention to the contact capacity.
Do not use a load that exceeds the sensor's max. contact capacity. This may lead to failure.

■ Pay attention to the protection circuit.
- When an inductive load (relay or solenoid valve) is connected, a surge voltage is generated when the sensor is turned OFF. Provide a protection circuit.
- When a capacious load (capacitor) is connected, starting current is generated when the sensor is turned ON. Provide a protection circuit.
- If the wiring length increases, the wiring capacity will be reached and a rush current will occur, damaging the sensor or shortening the service life. Provide a protection circuit.

■ Do not use this product in surge generating areas.
If there are devices and components (solenoid lifters, high frequency induction furnace, motors, etc.) around the sensor that generate a large surge, consider surge protection of the source as it may lead to deterioration or damage of the sensor internal circuit element.

⚠ CAUTION

■ Be careful of the internal voltage drop caused by serial connection.
- When serially connecting several sensors, the sensor voltage drop is the total voltage drop of all connected sensors. Check load specifications and determine the number of connections so as not to exceed the maximum load current of the sensor.

Mounting, installation and adjustment

1. Installation

⚠ WARNING

■ Incorrect mounting or piping will result in product trouble, may cause trouble in the user's system, and may result in death or serious injury. The user is responsible for making sure that the operator has read the instruction manual and fully comprehends the system, fluid characteristics, compatibility between the fluid and related products, and other safety-related information.

⚠ CAUTION

■ After installation, check for leaks from pipes and that the product is installed correctly.

2. Piping

⚠ WARNING

■ Always flush the piping before installing the valve. Debris or foreign matter in the fluid may prevent the valve from functioning correctly. When there is contamination, install a filter on the primary side of the valve according to the circuit used.

■ For products that have an arrow displayed, ensure that the piping is performed so that the flow of the fluid is consistent with the direction of the arrow.

■ When piping, do not apply tension, compression, bending or other forces to the valve body from the piping.

■ For NC and NO, that are not pressurized with operating pressure should be open to the atmosphere. If direct intake and exhaust from the valve should be avoided due to reasons such as ambient atmospheric conditions or airborne dirt, remove the set screw and install piping in order to allow intake and exhaust elsewhere as preferable.

■ Use the driving solenoid valve connected to the drive unit according to the specifications or applications.

⚠ CAUTION

■ For information on PFA fitting tubes, refer to the latest instruction manuals issued by fitting manufacturers and install accordingly.
Since fitting installation requires dedicated installation jigs, contact fitting manufacturers separately.
Distance to adjacent fitting is short for AMG and GAMD. Note that installation may be difficult with ordinary tools. Contact CKD as fitting manufacturers' dedicated installation tools may not be usable. (Super 300 pillar fitting)

■ When installing piping, avoid any application of stress on the valve body, such as bending, tension, or compression. Also, make sure that the pipes' support position and method do not produce piping load on the valve.

■ Fix the equipment to the mounting plate in addition to using fittings as support when installing a valve.

■ When carrying out piping in the operation port, there may be port cracking and screw damage, so tighten with 0.4 to 0.6 N·m.

3. With sensor option

⚠ CAUTION

■ Do not drop or apply impact.
Do not drop, bump or apply excessive impact when handling. Even if the body is not damaged, sensor components could break or malfunction.

■ Do not carry the valve body by the sensor's lead wire.
Never do this: it not only causes disconnection of lead wires, but since stress is applied to the internal sensor, it may also damage the sensor internal element.

■ Do not wire together with power lines or high voltage lines.
Avoid the use of parallel wiring or wiring in the same conduit as that of power lines or high voltage lines. The control circuit containing the sensor could malfunction due to noise.

■ Do not short-circuit the load.
If turned ON in a state of load short-circuit, excess current will flow and the sensor will be damaged.

■ Pay attention to the lead wire connection.
Turn OFF power to the device in the electric circuit to be connected before starting wiring. If operated while the power is turned ON, it may cause accidents due to electric shock or unpredicted operation.

■ Check the power supply fluctuations so that the power supply input does not exceed the rating.

■ When using a commercially available switching regulator on the power supply, be sure to ground the power supply frame ground (F.G.) terminal.

■ When using a device (such as a switching regulator or inverter motor) that could generate noise near the sensor, be sure to ground the device frame ground (F.G.) terminal.

Safety Precautions

Be sure to read this section before use.

Use/maintenance

1. Before use

⚠ WARNING

■ Use this product at max. working pressure and max. operating pressure or less.

⚠ CAUTION

■ For information on the compatibility of product materials, working fluids, and ambient atmospheres, refer to the compatibility checklist on page 1148 as a basic reference. For fluids not listed in the checklist or new fluids (including different concentration levels), contact and inquire with CKD beforehand.

- Fluids that contain particles, such as slurry and UV curing agent, or could solidify or jell may affect performance.
- If the fluid is highly absorbable, such as liquid containing a surfactant or stripping solution, the fluid may permeate through the parts.

Conduct periodic inspections, and if there is any abnormality, take necessary measures such as replacing the parts.

■ When using gases such as N_2 gas or air, valve seat leakage up to 1 cm^3/min (at pneumatic pressure) may occur.

■ Rapid changes in fluid temperature may cause the valve seat to warp unevenly, leading to valve seat leakage.

■ As for operating air, use air or inert gas passed through a filter with a filtration rating of 5 μm or more.

■ Since it is precision cleaned, clean packed and delivered assuming installation in a clean room, handle with care.

■ Do not overly turn the flow rate/bypass adjustment knob.

■ Do not use valves as footing or place any heavy objects on top of the valves.

■ If the product has been out of use for a long period, perform a test run before starting the actual operation.

■ Turbulent flow occurs on the secondary side of the valve. When installing a device that requires laminar flow, e.g. a flow rate meter, on the secondary side of the valve, make sure to keep enough distance between the valve and the device so that the device is not affected by turbulent flow.

■ Never attempt to disassemble the product. It is very dangerous, as some products include high-load springs.

■ Do not allow fluid to come into contact with the product body.

■ Static electricity
Fluororesin is easily charged and becomes further charged by flowing gas or liquids. As static electricity may cause external leakage or ignition, be sure to take measures to remove static electricity to the extent possible.

■ When using a model with flow rate adjustment, make sure to turn the adjusting dial at least the specified number of times from the closed state to ensure appropriate setting. If used below this level, vibration or flow rate fluctuation may occur depending on the working conditions. Changes in fluid temperature may also affect flow rate depending on the working conditions.

■ Water hammer and vibration may occur in certain fluid pressure conditions. In most cases, this can be resolved by adjusting the open-close speed using a speed controller, etc. If a problem persists, review and revise the fluid pressure and piping conditions.

2. Maintenance and inspection

⚠ DANGER

■ When replacing the valve, thoroughly replace the remaining chemical liquid with pure water or air so that it does not affect the surrounding devices and humans.
While the upper side of the diaphragm (cylinder side) does not come into contact with the fluid, it may be exposed to chemical atmosphere due to gas permeation from the thin film part. For your safety, follow the precautions below:

(1) Since a small amount of transmitted gas is released from the breathing hole on the cylinder side by the operation of the valve, do not let anyone near the breathing hole during valve operation.
(2) In addition, crystals may adhere to the breathing hole and its vicinity.
(3) When touching the valve, use corrosion-resistant gloves and do not touch with bare hands.

■ Valves used with chemical liquids may have chemical atmosphere remaining between the actuator and the diaphragm. Never attempt to disassemble the product.
If disassembly is necessary, contact CKD or a dealership.

■ Perform the following periodic inspection once or twice a year to ensure that the valve is achieving optimal functionality.

(1) Inspection for leakage to the valve exterior
(2) Inspection for leakage from fitting
(3) Check for abnormalities such as discoloration, deformation, corrosion of the components

⚠ WARNING

■ Read the instruction manual thoroughly and make sure you understand the content before performing maintenance.

■ Always drain the operating air and fluid before performing maintenance.

■ Before starting maintenance or inspection, read the material safety data sheet (SDS) for the chemical liquid and wear the necessary protective gear.

■ When using chemical liquids such as high permeability hydrochloric acid, hydrofluoric acid, or nitric acid for a long period of time, it can lead to deterioration of parts other than the wetted parts and accidents such as external leakage due to transmission gas. Check for abnormalities such as discoloration, deformation, or corrosion of the components once or twice a year as periodic inspection for safety.

⚠ CAUTION

■ When replacing a product, always replace it with a product with the same model No. Specifications may differ even when the appearance is the same.

■ Store unused products in a location where they are not exposed to direct sunlight or high temperatures. When handling the product, do not apply impact or damage it by throwing, dropping, or allowing it to catch on something.

3. With sensor option

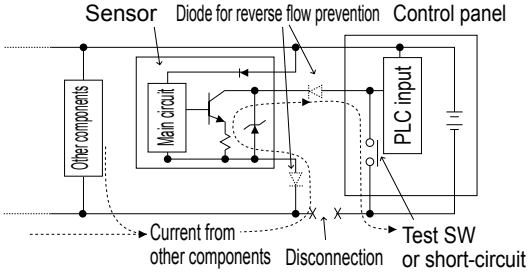
⚠ WARNING

■ Do not apply overcurrent.
If overcurrent flows to the sensor due to a load short-circuit, etc., the sensor will be damaged with a risk of ignition. Provide an overcurrent protection circuit, such as a fuse, for the output wire and power cable as needed.

⚠ CAUTION

■ Pay attention to the reverse current caused by disconnected wires/wiring resistance.

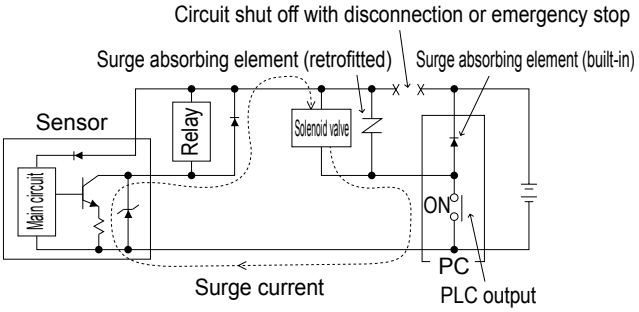
● If other devices, including a sensor, are connected to the same power supply as the sensor, and the output wire and power cable negative (-) side are short-circuited to check the operation of the control panel input unit, or if the power cable negative (-) side is disconnected, reverse current could flow to the sensor's output circuit and cause damage.



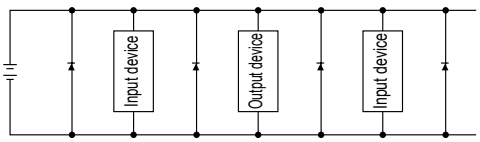
● Take the following measures to prevent damage caused by reverse current.
(1) Avoid centralizing current at the power cable, especially a negative power cable, and use as thick a cable as possible.
(2) Limit the number of devices connected to the same power source as the sensor.
(3) Insert a diode parallel to the sensor's output line to prevent reverse current.
(4) Insert a diode parallel to the sensor power wire's negative (-) side to prevent reverse current.

■ Pay attention to surge current leading.

● When sensor power is shared with an inductive load that generates surges, such as a solenoid valve or relay, if the circuit is cut off while the inductive load is functioning, surge current could enter the output circuit and cause damage depending on where the surge absorbing element is installed.



● Take the measures below to prevent damage from sneak surge current.
(1) Separate the power supply for output including the inductive load, such as the solenoid valve and relay, and input, such as the sensor.
(2) If a separate power supply cannot be used, directly install a surge absorption element for all inductive loads. Consider that the surge absorption element connected to the PLC, etc., protects only the individual device.
(3) Insert a diode parallel to the sensor's output line to prevent reverse current.
(4) Connect a surge absorption element to places on the power wiring shown in the figure below, as a measure against disconnections in unspecified areas.



When devices are connected to a connector, the output circuit could be damaged by the above if the connector is disconnected while power is ON. Turn power OFF before connecting or disconnecting the connector.

Safety Precautions

Be sure to read this section before use.

Product and working fluid compatibility checklist

* This checklist is created based on previous evaluations and experience, and does not guarantee performance.
* When the working fluid is other than pure water, check with a chemical expert regarding the compatibility between the working fluid and the product material in order to determine usability.

Fluid name		Compatibility
Pure water		●
Oxidizing fluids	Sulfuric acid	●
	Hydrochloric acid	●
	Nitric acid	●
	Hydrofluoric acid	● (*2)
	Phosphoric acid	●
	Ammonium fluoride	● (*2)
	Hydrogen peroxide solution	●
	Ozone water	△
	Sulfuric acid + hydrogen peroxide solution	● (*3)
	Sulfuric acid + ozone	△
Basic fluids	Sodium hydroxide	●
	Potassium hydroxide	●
	Aqueous ammonia	●
Organic fluids	Acetone	×
	Butyl acetate	×
	Isopropyl alcohol	●
Others/mixtures	Paint thinner	×
	Resist	● (*1)
	Developing solution	● (*1)
	Slurry	● (*1)
	Plating solution	● (*1)
	Stripping solution	● (*1, *4)
Gas	Air/nitrogen gas	● (*5)

Judgment	●	Usable. (For details, refer to the product pages.)
	△	Contact CKD for details. (May be available depending on conditions.)
	×	Unusable.

*1 : Since this is often a mixture of various chemical liquids, the total effects cannot be grasped.
Check adequately the compatibility of product component materials and working fluids in order to determine usability.
*2 : For hydrofluoric acid or chemical liquids containing hydrofluoric acid, fluid temperature is 5 to 80°C.
Body with bypass cannot be used for hydrofluoric acid or chemical liquids containing hydrofluoric acid.
*3 : Contact CKD when using sulfuric acid + hydrogen peroxide solution at 100°C or more.
*4 : Replace periodically when using amine-based stripping solution at fluid temperature 80°C or more.
Consider min. once a year as a guideline.
*5 : When using gases, valve seat leakage up to 1 cm^3/min (at pneumatic pressure) may occur.

■ Safety and performance related precautions

- Contact CKD to consider the impact on the product component materials when using with ozone or organic solvent-based fluids.
- Fluororesin is easily charged and becomes further charged by flowing gas or fluids. As static electricity may cause external leakage or ignition, be sure to take measures to remove static electricity to the extent possible.
- Fluids that contain particles, such as slurry and UV curing agent, or could solidify or jell may affect performance.
- If the fluid is highly absorbable, such as liquid containing a surfactant or stripping solution, the fluid may permeate through the parts.
- When using chemical liquids such as high permeability hydrochloric acid, hydrofluoric acid, or nitric acid for a long period of time, it can lead to deterioration of parts other than the wetted parts due to transmission gas.
- Check for abnormalities such as discoloration, deformation, or corrosion of the components once or twice a year as periodic inspection for safety.
- The sensor does not have a dust-proof or explosive-proof structure. It cannot be used in high steam and dusty environments or in direct contact with water, chemicals, etc. or in an atmosphere of corrosive gas.

MEMO

Air operated valve for process gas

LGD** Series

● Metal diaphragm

RoHS

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item	LGD1*	LGD2*
Working fluid	Inert gas/process gas	
Working pressure Pa(abs)-MPa(G)	1.3×10^{-6} to 0.99	
Fluid temperature °C	5 (41°F) to 80 (176°F)	
Ambient temperature °C	5 (41°F) to 80 (176°F)	
Valve seat leakage Pa·m³/sec.He	1.0×10^{-10} or less	
External leakage Pa·m³/sec.He	1.0×10^{-10} or less	
Cv (23°C under pressurization)	0.3	3/8" : 0.65 1/2" : 0.7
Connection *1	1/4″ JXR male fitting or equiv. 1/4″ JXR female fitting or equiv. 1/4" double barbed fitting	1/2″ JXR male fitting or equiv. (3/8" compatible) 1/2″ JXR female fitting or equiv. (3/8" compatible) 3/8" double barbed fitting 1/2" double barbed fitting
Actuation	NC	
	NO	
Operating pressure MPa	NC : 0.4 (≈58 psi, 4 bar) to 0.6 (≈87 psi, 6 bar)	
	NO : 0.4 (≈58 psi, 4 bar) to 0.5 (≈73 psi, 5 bar)	
Operating port	M5	
Weight *2 kg	0.23	0.57

*1: JXR fitting can be connected to VCR fitting.
*2: Weight is the value with JXR male fitting or equiv.

How to order

LGD1 1 - 4RM

Ⓐ Actuation
Ⓑ Connection

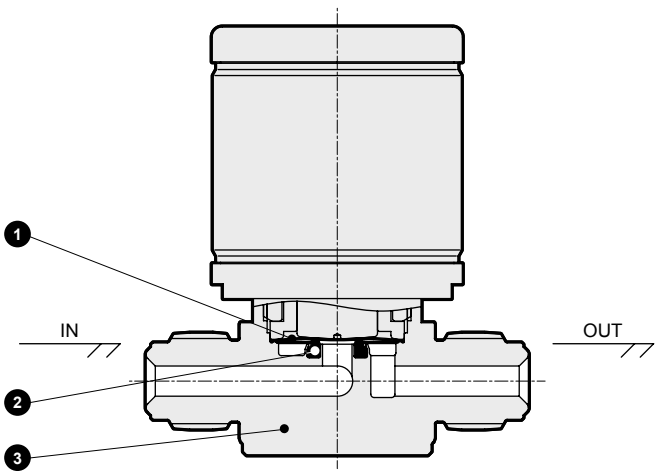
Code	Description
Ⓐ Actuation	
1	NC
2	NO
Ⓑ Connection	
4RM	1/4" male fitting (JXR or equiv.)
4R	1/4" female fitting (JXR or equiv.)
4S	1/4" double barbed fitting

LGD2 1 - 8RM

Ⓐ Actuation
Ⓑ Connection

Code	Description
Ⓐ Actuation	
1	NC
2	NO
Ⓑ Connection	
8RM	1/2" male fitting (JXR or equiv.)
8R	1/2" female fitting (JXR or equiv.)
6S	3/8" double barbed fitting
8S	1/2" double barbed fitting

Internal structure and parts list



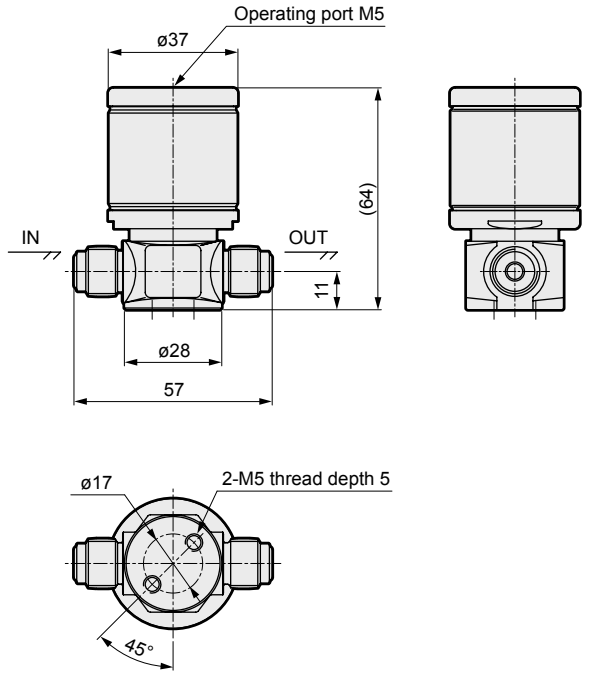
Gas contact part materials

No.	Part name	Material
1	Diaphragm	Ni-Co Alloy
2	Valve seat	PCTFE
3	Body	SUS316L

Dimensions

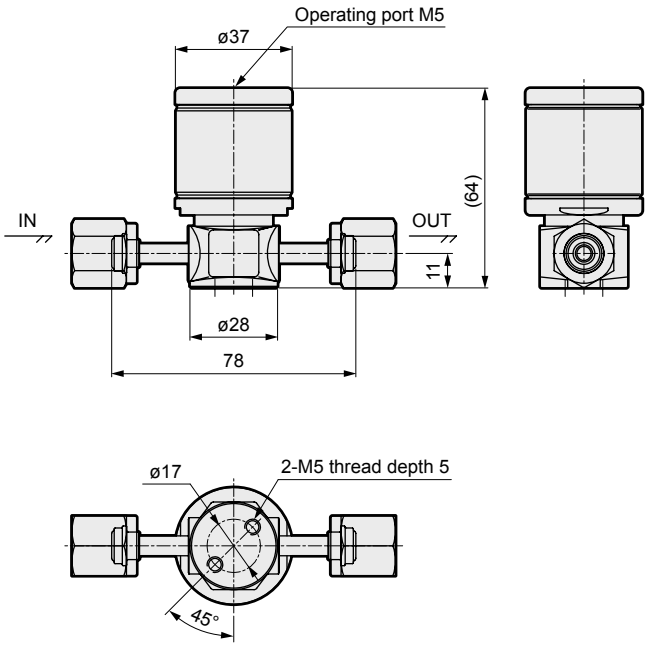
LGD1*-4RM

● JXR male fitting or equiv.



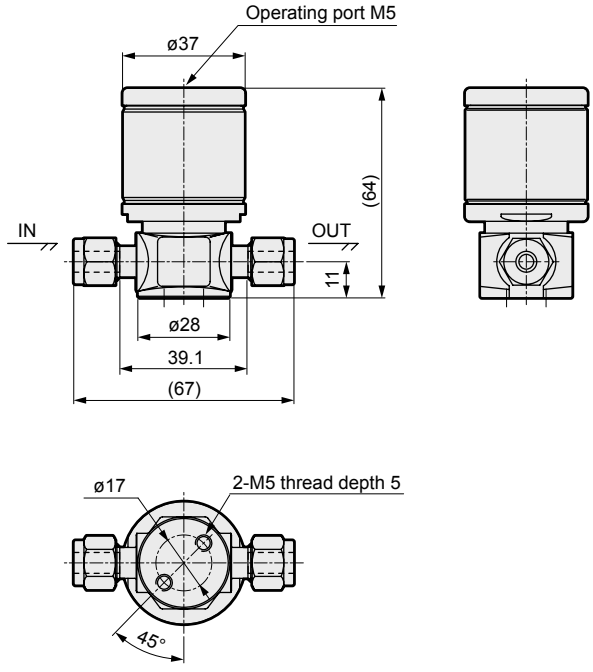
LGD1*-4R

● JXR female fitting or equiv.



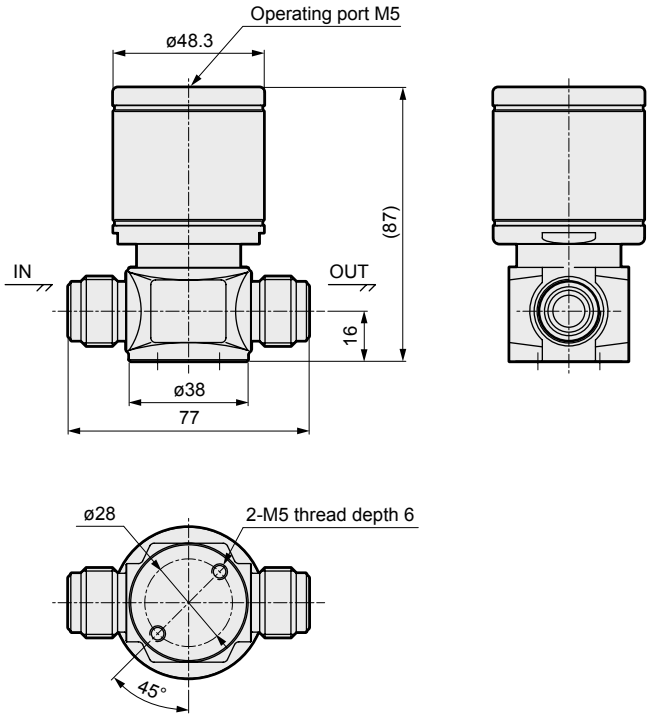
LGD1*-4S

● Double barbed fitting



LGD2*-8RM

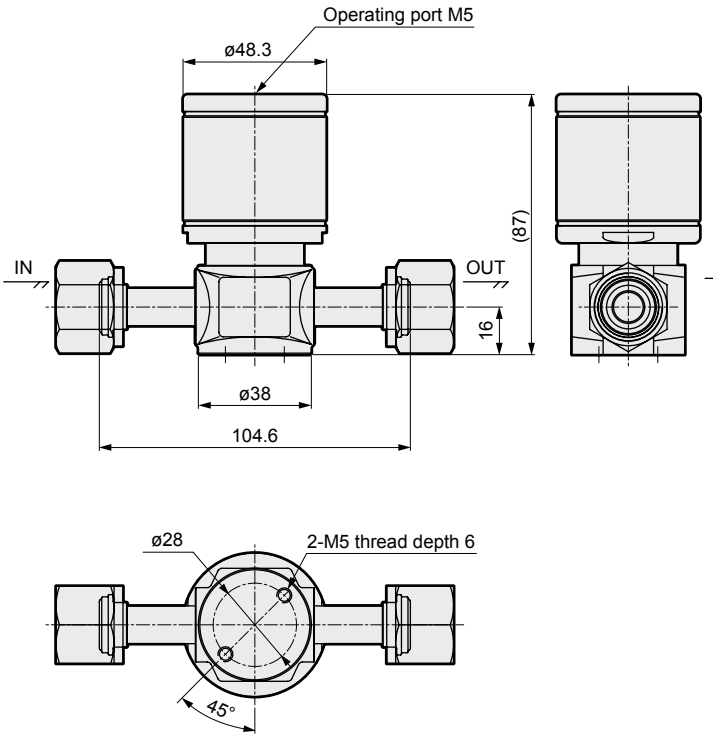
● JXR male fitting or equiv.



Dimensions

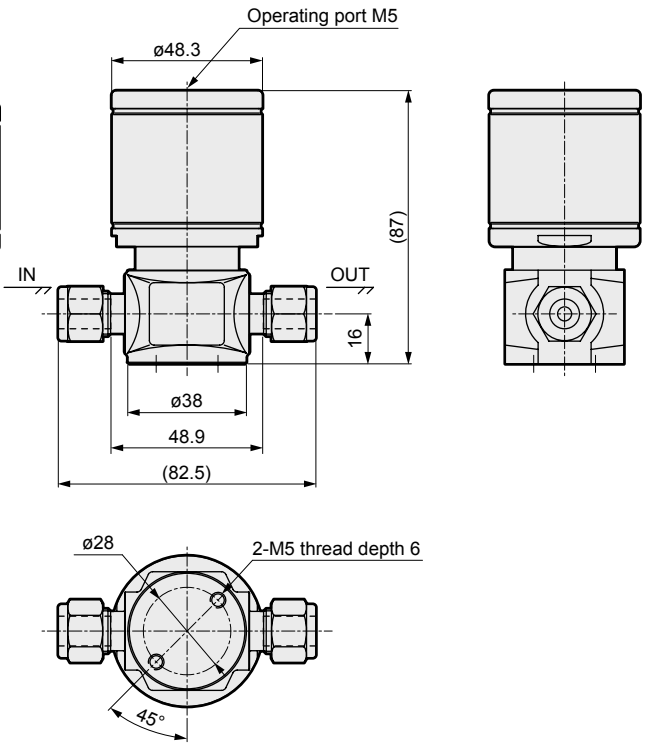
LGD2*-8R

● JXR female fitting or equiv.



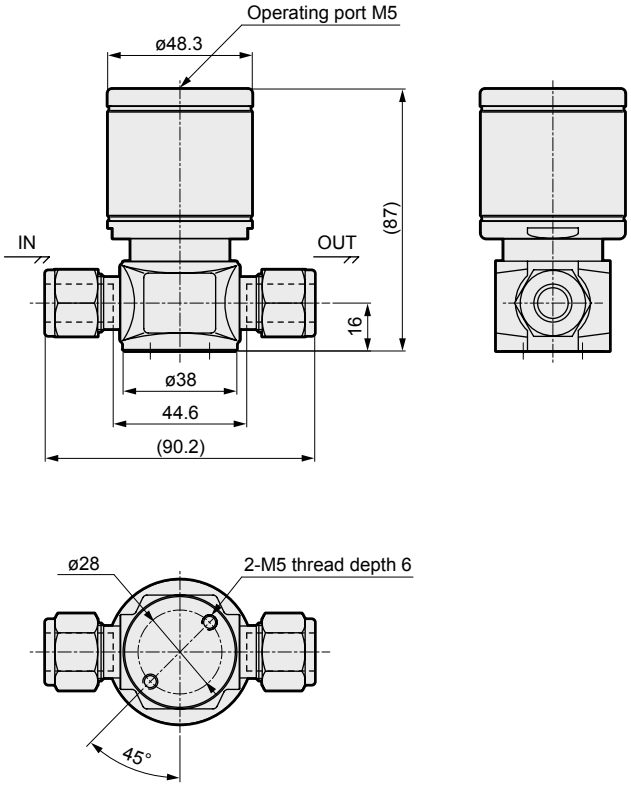
LGD2*-6S

● Double barbed fitting



LGD2*-8S

● Double barbed fitting



Manual valve for process gas

LGD*0 Series

- Metal diaphragm
- 180° rotation

RoHS

Specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item		LGD10	LGD20
Working fluid		Inert gas/process gas	
Working pressure	Pa(abs)-MPa(G)	1.3×10^{-6} to 0.99	
Fluid temperature	°C	5 (41°F) to 80 (176°F)	
Ambient temperature	°C	5 (41°F) to 60 (140°F)	
Valve seat leakage	$Pa\cdot m^3/sec.He$	1.0×10^{-10} or less	
External leakage	$Pa\cdot m^3/sec.He$	1.0×10^{-10} or less	
Cv	(23°C under pressurization)	0.3	0.7
Connection *1		1/4" JXR male fitting or equiv. 1/4" JXR female fitting or equiv. 1/4" double barbed fitting	1/2" JXR male fitting or equiv. (3/8" compatible) 1/2" JXR female fitting or equiv. (3/8" compatible) 3/8" double barbed fitting 1/2" double barbed fitting
Weight *2	kg	0.26	0.57

*1: JXR fitting can be connected to VCR fitting.
*2: Weight is the value with JXR male fitting or equiv.

How to order

LGD10 - 4RM

Ⓐ Connection

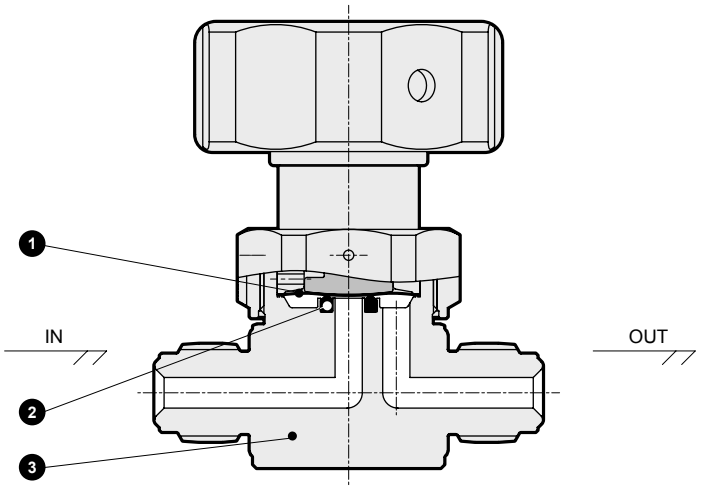
Code	Description
Ⓐ **Connection**	
4RM	1/4" male fitting (JXR or equiv.)
4R	1/4" female fitting (JXR or equiv.)
4S	1/4" double barbed fitting

LGD20 - 8RM

Ⓐ Connection

Code	Description
Ⓐ **Connection**	
8RM	1/2" male fitting (JXR or equiv.)
8R	1/2" female fitting (JXR or equiv.)
6S	3/8" double barbed fitting
8S	1/2" double barbed fitting

Internal structure and parts list



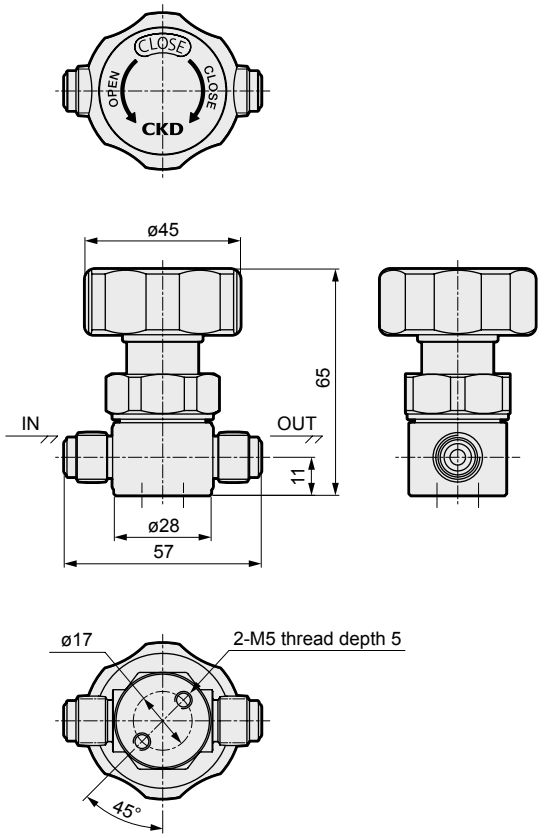
Gas contact part materials

No.	Part name	Material
1	Diaphragm	Ni-Co alloy
2	Valve seat	PCTFE
3	Body	SUS316L

Dimensions

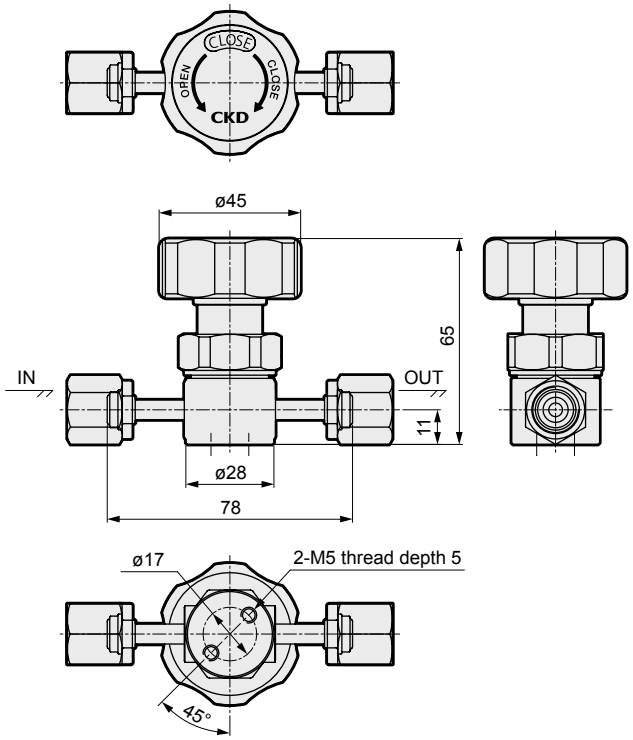
LGD10-4RM

● JXR male fitting or equiv.



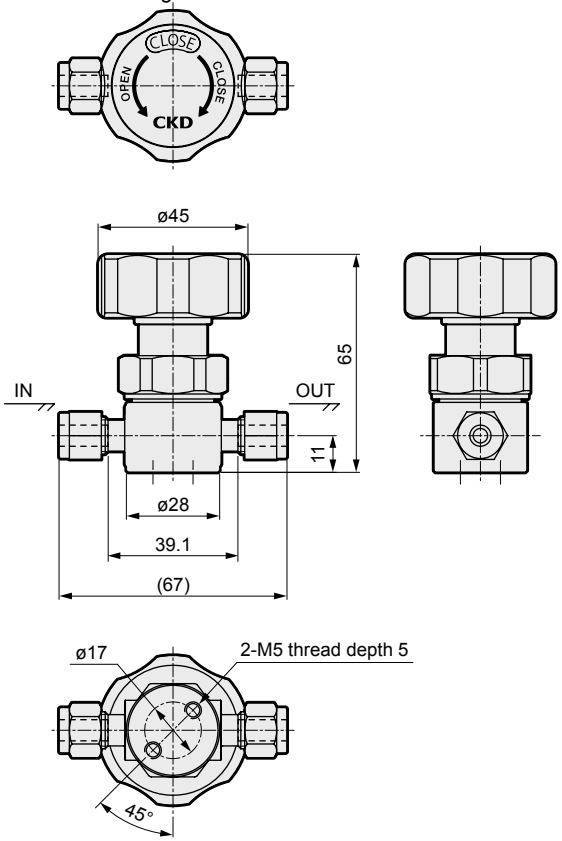
LGD10-4R

● JXR female fitting or equiv.



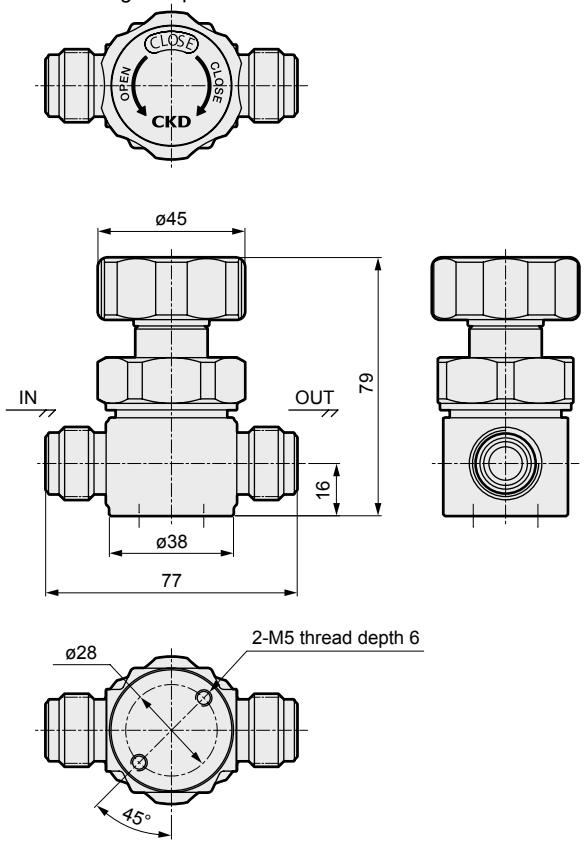
LGD10-4S

● Double barbed fitting



LGD20-8RM

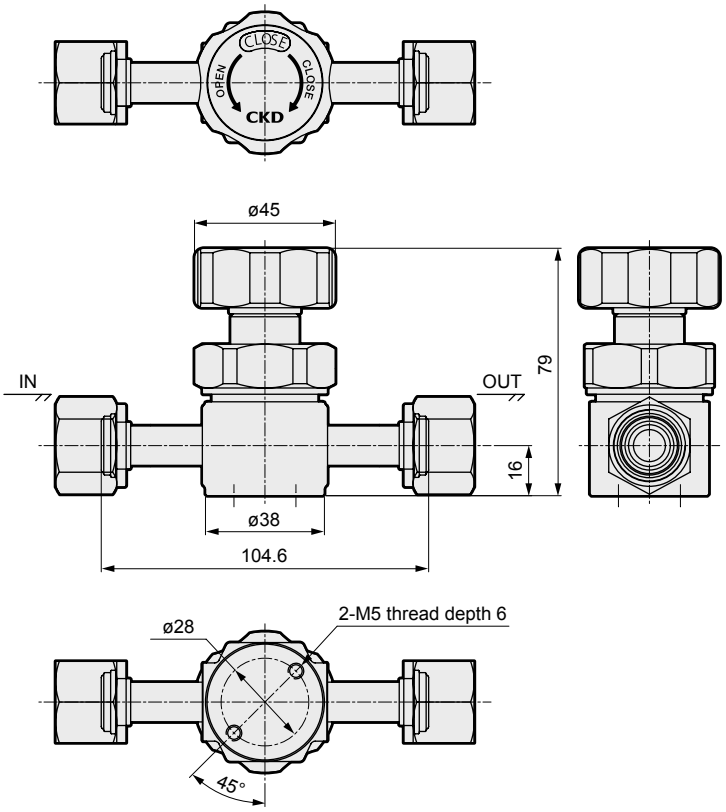
● JXR male fitting or equiv.



Dimensions

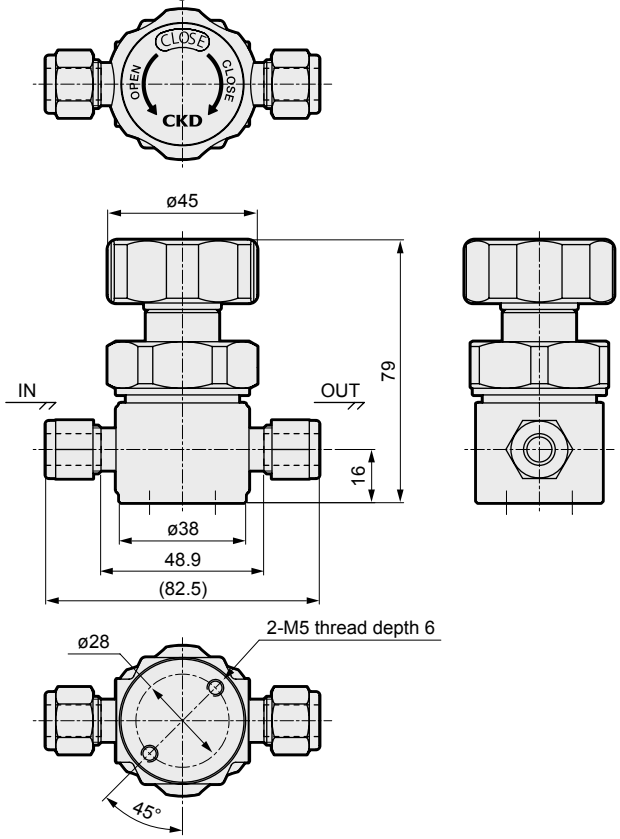
LGD20-8R

● JXR female fitting or equiv.



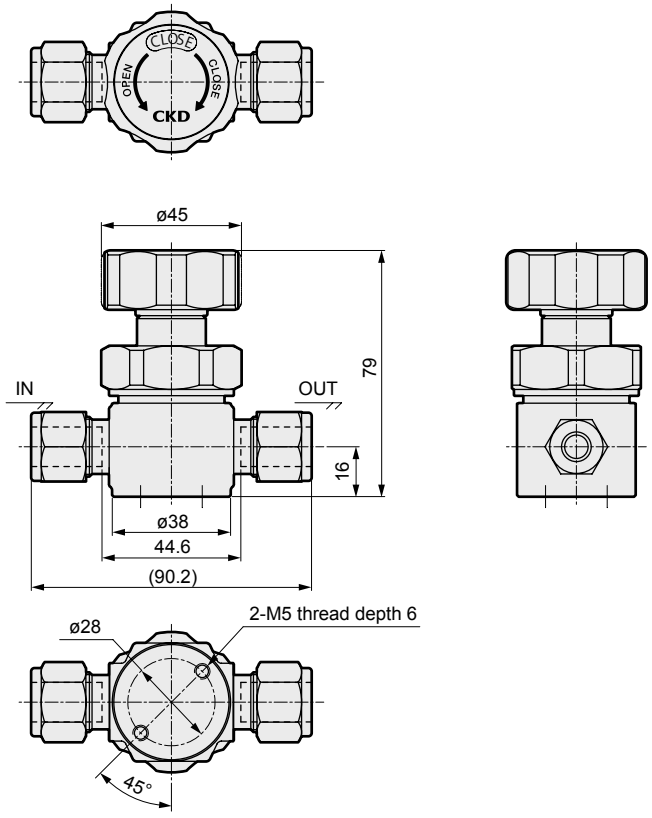
LGD20-6S

● Double barbed fitting



LGD20-8S

● Double barbed fitting



Safety precautions

Read the instruction manual and precautions described in the latest “Dry Fine system/high purity gas control system components” (Catalog No. CB-035A) before use.

⚠ WARNING

■ Design/selection

● This product has been designed to satisfy performance at fluid temperatures of 5 to 80°C.
Never use this product outside the specified temperature range.

Introduction of made-to-order products

CONTENTS

Noise reduction special purpose valve
(direct acting 2-port solenoid valve for compressed air/dry air)

FGB31/FGB41 Series

- NC (open when energized)
- Working fluids: Compressed air, dry air
- Port size: Rc1/4

Made-to-order product

For quiet environments

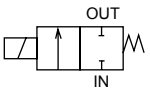
The metallic noise unique to valves has been greatly reduced by incorporating a special structure. The FGB Series of 2-port valves for air is ideal for quiet environments.

Applications

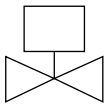
- Medical field - Oxygen generators, artificial dialysis equipment, analysis equipment for research
- Food product field - Food product warming systems, vending machines
- Public facilities - Automatic flushing sensors for toilets

JIS symbol

- NC (open when energized)



Mounting orientation



Specifications

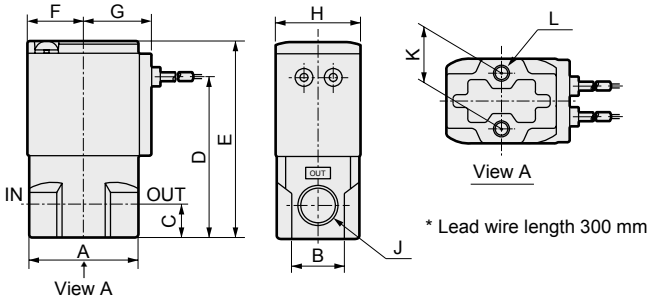
1 MPa = 10 bar

Model No.		NC (open when energized)	
Item		FGB31-X2077	FGB41-X2078
Working fluid		Compressed air, dry air, inert gas	
Working pressure	MPa	0 (≈0 psi) to 0.4 (≈58 psi)	0 (≈0 psi) to 0.45 (≈65 psi)
Proof pressure (water pressure)	MPa	2.1 (≈300 psi, 21 bar)	
Fluid temperature	°C	0 (32°F) to 40 (104°F) (no freezing)	
Ambient temperature	°C	0 (32°F) to 40 (104°F)	
Port size		Rc1/4	
Orifice size	mm	3	4
C[dm^3/(s·bar)]		1.2	2.1
b		0.56	0.54
Valve seat leakage	cm^3/min	0.2 or less	
Atmosphere		Place free of corrosive gas and explosive gas	
Mounting orientation		Vertical position with coil on top	
Thermal class		Class 130 (B) (JIS C 4003)	
Rated voltage		24 VDC, 12 VDC	
Coil		Grommet lead wire	
Power consumption	W	6.5	8

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Dimensions and parts list

- FGB31-X2077
  FGB41-X2078



* Lead wire length 300 mm

Part name	Material	
Coil assembly	-	-
Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber
O-ring	NBR	Nitrile rubber
Spring	SUS	Stainless steel
Body	ADC	Aluminum die-casting

Model No.	A	B	C	D	E	F	G	H	J	K	L
FGB31-X2077	36	18	11	53.5	65.5	18.5	22.5	28	Rc1/4	18	M5 depth 6
FGB41-X2078	40	25	12	62	76	22.5	26	34	Rc1/4	18	M5 depth 7

Noise reduction special purpose valve
(direct acting 2-port solenoid valve for water)

FWB31/FWB41 Series

- NC (open when energized)
- Working fluid: Water
- Port size: Rc1/4

Made-to-order product

For quiet environments

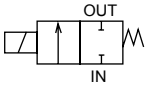
The metallic noise unique to valves has been greatly reduced by incorporating a special structure. The FWB Series of 2-port valves for water is ideal for quiet environments.

Applications

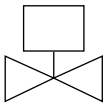
- Medical field - Oxygen generators, artificial dialysis equipment, analysis equipment for research
- Food product field - Food product warming systems, vending machines
- Public facilities - Automatic flushing sensors for toilets

JIS symbol

- NC (open when energized)



Mounting orientation

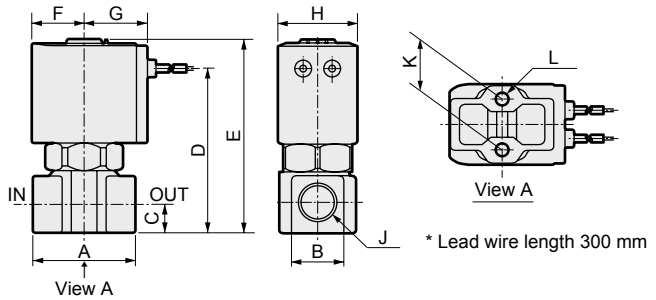


Specifications

Model No.		NC (open when energized)	
Item		FWB31-X2079	FWB41-X2080
Working fluid		Water (excluding sewage, agricultural water and liquid manure)	
Working pressure	MPa	0 (≈0 psi, 0 bar) to 0.3 (≈44 psi, 3 bar)	0 (≈0 psi, 0 bar) to 0.35 (≈51 psi, 3.5 bar)
Proof pressure (water pressure)	MPa	5.0 (≈730 psi, 50 bar)	
Fluid temperature	°C	1 (33.8°F) to 40 (104°F) (no freezing)	
Ambient temperature	°C	0 (32°F) to 40 (104°F)	
Port size		Rc1/4	
Orifice size	mm	3	4
Cv		0.3	0.54
Valve seat leakage	cm^3/min	0 (water pressure)	
Atmosphere		Place free of corrosive gas and explosive gas	
Mounting orientation		Vertical position with coil on top	
Thermal class		Class 130 (B) (JIS C 4003)	
Rated voltage		24 VDC, 12 VDC	
Coil		Grommet lead wire	
Power consumption	W	6	8

Dimensions and parts list

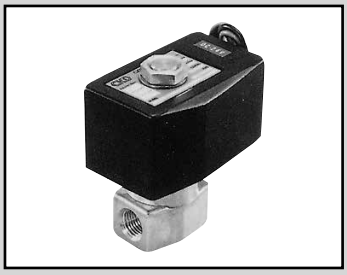
- FWB31-X2079
  FWB41-X2080



* Lead wire length 300 mm

Part name	Material	
Coil assembly	-	-
Core assembly	SUS	Stainless steel
Plunger assembly	SUS, NBR	Stainless steel, nitrile rubber
O-ring	NBR	Nitrile rubber
Spring	SUS	Stainless steel
Body	C3771	Copper alloy

Model No.	A	B	C	D	E	F	G	H	J	K	L
FWB31-X2079	36	18	11	57.5	68.5	18.5	22.5	28	Rc1/4	18	M5 depth 6
FWB41-X2080	40	21	12	67	81	22.5	26	34	Rc1/4	18	M5 depth 8



Frequent operation direct acting 2-port solenoid valve

A2-5201

- NC (open when energized)
- Working fluid: Compressed air, dry gas, inert gas
- Port size: Rc1/8, Rc1/4

Made-to-order product

RoHS

The air pressure open/close state can be controlled at high frequency.

- Excellent response and response stability.
- Durability: 10 or more times higher than conventional products.

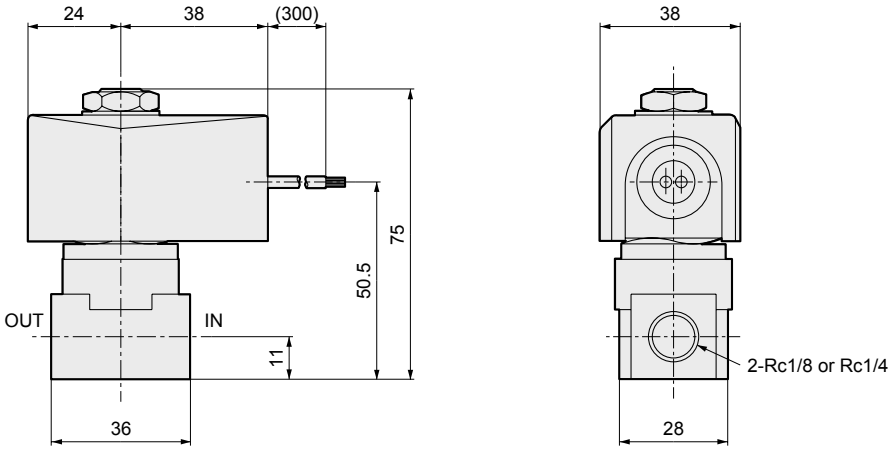
Specifications

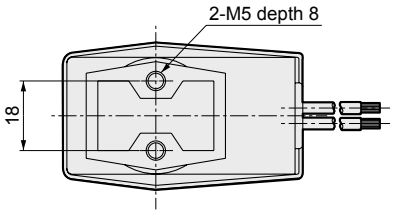
1 MPa = 10 bar

Item	A2-5201-01-3	A2-5201-01-4	A2-5201-02-3	A2-5201-02-4
Working fluid	Compressed air, dry gas, inert gas			
Working pressure MPa	0 (≈0 psi) to 0.7 (≈100 psi)	0 (≈0 psi) to 0.5 (≈73 psi)	0 (≈0 psi) to 0.7 (≈100 psi)	0 (≈0 psi) to 0.5 (≈73 psi)
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)			
Fluid temperature °C	0 (32°F) to 50 (122°F)			
Ambient temperature °C	0 (32°F) to 50 (122°F)			
Valve seat leakage cm^3/min	0.2 or less			
Port size	Rc1/8		Rc1/4	
Orifice size mm	3	4	3	4
C[$dm^3/(s \cdot bar)$]	1.2	2.1	1.2	2.1
b	0.53	0.50	0.53	0.50
Weight kg	0.46		0.45	
Mounting orientation	Unrestricted			
Electrical specifications				
Rated voltage	24 VDC intermittent rating (energizing time ratio: ON ≤ OFF, max. continuous energizing time: 10 sec)			
Power consumption W	20			
Thermal class	Class 130 (B)			

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Dimensions and parts list





Parts list

Part name	Material	
Coil assembly	Thermal class B	(Mold)
Core assembly	SUS	Stainless steel
Plunger	SUS/NBR	Stainless steel/nitrile rubber
Spring	SUS	Stainless steel
O-ring	NBR	Nitrile rubber
Body	C3771	Copper alloy

Frequent operation pilot operated 2-port solenoid valve

A2-5202

- NC (open when energized)
- Working fluid: Compressed air, dry gas, inert gas
- Port size: Rc1/4, Rc3/8

Made-to-order product

RoHS

The air pressure open/close state can be controlled at high frequency.

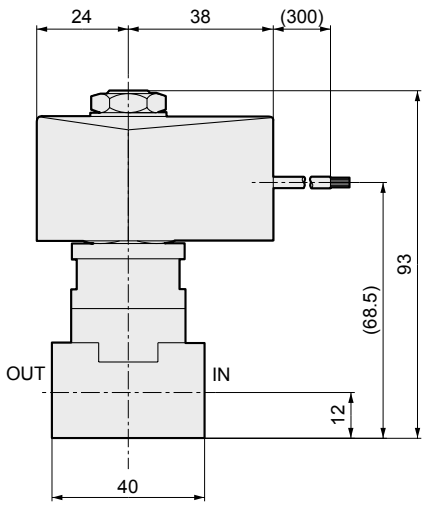
- Excellent response and response stability.
- Durability: 10 or more times higher than conventional products.

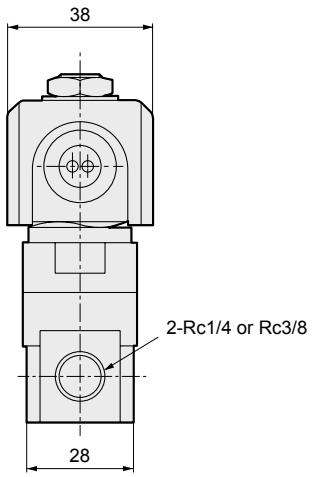
Specifications

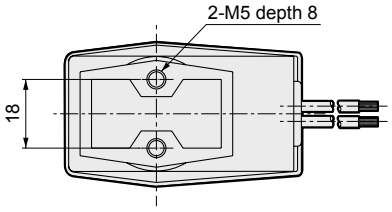
Item		A2-5202-02-7	A2-5202-03-7
Working fluid		Compressed air, dry gas, inert gas	
Working pressure	MPa	0.02 (≈2.9 psi, 0.2 bar) to 0.7 (≈100 psi, 7 bar)	
Proof pressure (water pressure)	MPa	1.5 (≈220 psi, 15 bar)	
Fluid temperature	°C	0 (32°F) to 50 (122°F)	
Ambient temperature	°C	0 (32°F) to 50 (122°F)	
Valve seat leakage	cm^3/min	10 or less	
Port size		Rc1/4	Rc3/8
Orifice size	mm	7	
C[$dm^3/(s \cdot bar)$]		5.6	5.6
b		0.29	0.29
Weight	kg	0.52	
Mounting orientation		Unrestricted	
Electrical specifications			
Rated voltage		24 VDC intermittent rating (energizing time ratio: ON ≤ OFF, max. continuous energizing time: 10 sec)	
Power consumption	W	20	
Thermal class		Class 130 (B)	

*1: Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

Dimensions and parts list







Parts list

Part name	Material	
Coil assembly	Thermal class B	(Mold)
Core assembly	SUS	Stainless steel
Plunger	SUS/NBR	Stainless steel/nitrile rubber
O-ring	NBR	Nitrile rubber
Spring	SUS	Stainless steel
Body	C3604	Copper alloy
O-ring	NBR	Nitrile rubber
Body	C3771	Copper alloy

Ultra-low temperature 2-port solenoid valve

A2-5800/A2-3400 Series

- NC (open when energized)
- Working fluid: Liquid nitrogen, inert liquids
- Port size: Rc1/4, Rc3/8

Made-to-order product

RoHS

- Usable even with ultra-low temperature fluids such as liquid nitrogen (-196°C).
- The coil is a molded coil which is resistant to condensation.
- 3 types are available based on flow rates.

Applications

- Refrigerant control of the thermo-chiller
- Testers and inspection equipment for semiconductors
- Fluorescent X-ray spectrometers
- Biotechnology (containers for cryo-preservation of cells)
- Industrial freezing and refrigerating equipment

Specifications

1 MPa = 10 bar

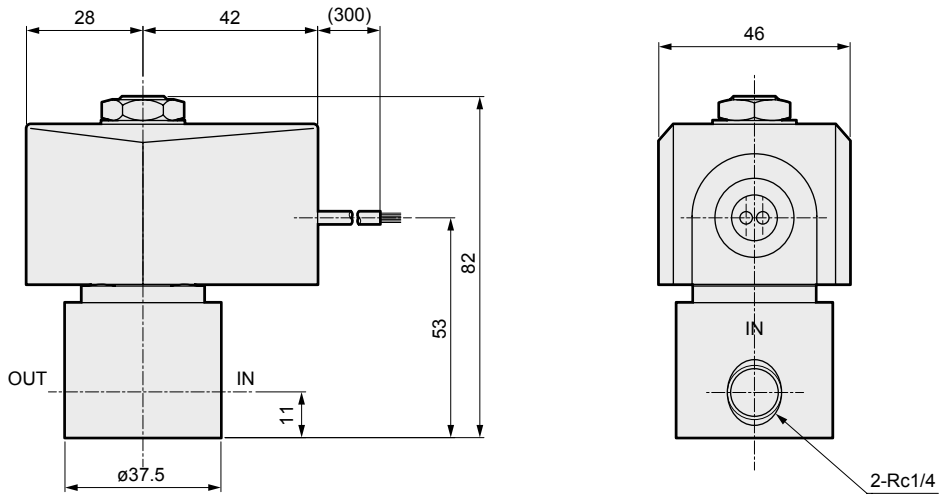
Item	A2-5800-02-3	A2-5800-02-5	A2-3400-03-12
Working fluid	LN2, inert liquid		
Valve structure	Direct acting poppet structure		Pilot kick poppet structure
Working pressure MPa	0 (≈0 psi) to 1.0 (≈150 psi)	0 (≈0 psi) to 0.4 (≈58 psi)	0 (≈0 psi, 0 bar) to 0.8 (≈120 psi, 8 bar)
Orifice size mm	ø3	ø5	ø12
Cv	0.22	0.6	2.7
Port size	Rc1/4		Rc3/8
Fluid temperature °C	-196 (-320.8°F) to 50 (122°F) (no freezing)		
Ambient temperature °C	-20 (-4°F) to 40 (104°F)		
Valve seat leakage cm^3/min	100 or less (pneumatic pressure)		400 or less (pneumatic pressure)
Weight kg	0.65		0.77
Mounting orientation	Vertical position with coil on top		
Rated voltage	100 VAC, 200 VAC (full-wave rectification coil), 12 VDC, 24 VDC		
Power consumption	17 W		AC:17 W, DC:15 W

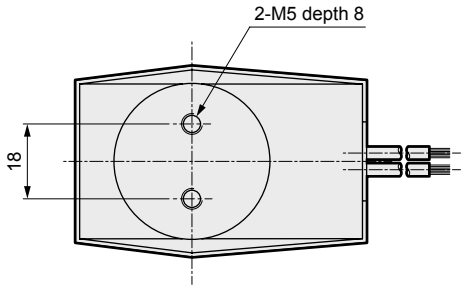
Caution

(1) Be careful when piping as malfunctions may occur when the moisture in air condenses and freezes.

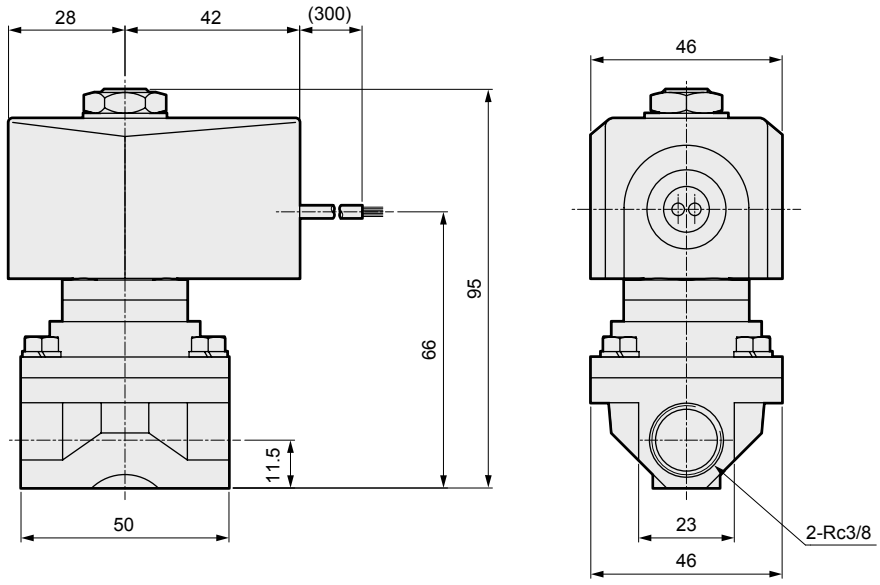
Dimensions

● A2-5800





● A2-3400



Air operated 2-port valve, cylinder valve for high pressure air

NAB-4SX1450/NAB-4SX1451

- NC, NO
- Working fluid: High pressure air (20 MPa)
- Port size: 1/4 inch double barbed fitting

Made-to-order product

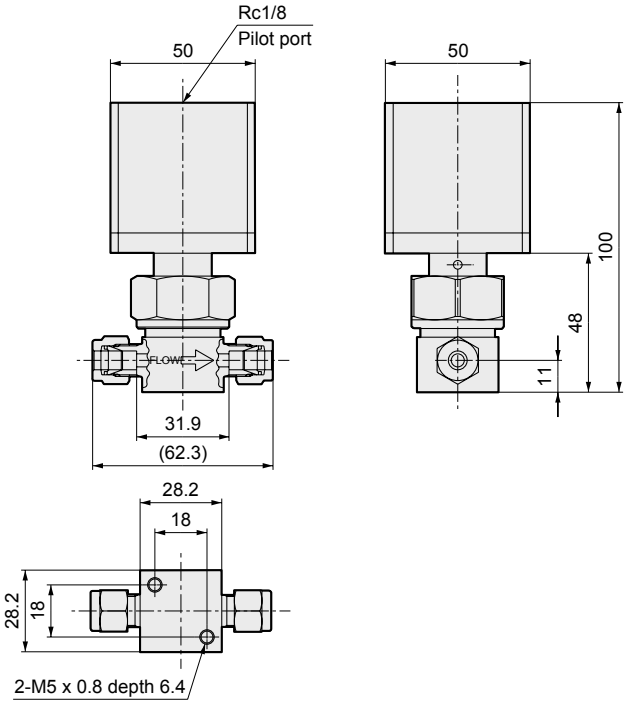
High pressure air (20 MPa) control is possible.
Ideal for sealing hydraulic devices and aerating pressure-resistant inspection media.

- It is possible to apply pressure from both the normal and reverse directions.
- The exterior seal is ensured with a special rod sealant structure.
- NC/NO can be selected depending on the application.
- This valve is suitable for inspection equipment for automobile antilock brake systems (ABS).

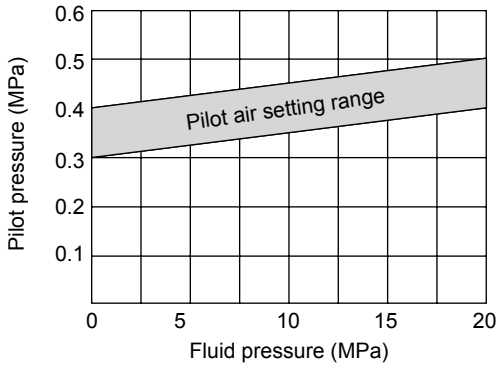
Specifications

Item	NAB-4SX1450	NAB-4SX1451
Actuation	NC	NO
Working fluid	Compressed air	
Working pressure MPa	0 (≈0 psi, 0 bar) to 20 (≈2900 psi, 200 bar)	
Proof pressure (water pressure) MPa	35 (≈5100 psi, 350 bar)	
Fluid temperature °C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm^3/min(ANR)	0.1 or less	
Connection	1/4” double barbed fitting	
Orifice size mm	3	
Effective cross-sectional area mm^2	4.6	
Weight kg	0.6	0.58
Mounting orientation	Unrestricted	
Pilot fluid	Air	
Pilot pressure MPa	0.4 (≈58 psi, 4 bar) to 0.7 (≈100 psi, 7 bar)	Refer to the figure below.
Pilot port size	Rc1/8	
Frequency	30 times/min. or less	
Fluid pressure supply port	Arbitrary	

Dimensions



- Pilot pressure inlet (NAB-4SX1451)

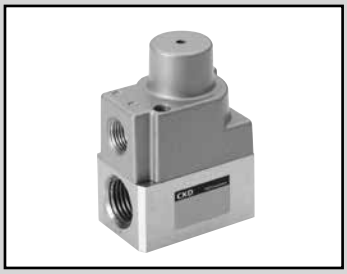


Parts list

Part		Material
Gas contact parts	Body	SUS316L
	Seal	PI, FKM
	Holder	SUS304
	Stem	SUS304
Others	Cylinder	A5056
	Piston assembly	A2017, SUS303

*1 : This product is not approved for use with high pressure gas. The entire system, including the valve, must be approved.
*2 : Other ancillary materials are available. Contact CKD for details.

MEMO



Color changing valve

NAB-X2267/NAB-X2268

● Working fluids: Paint/thinner/air

Made-to-order product

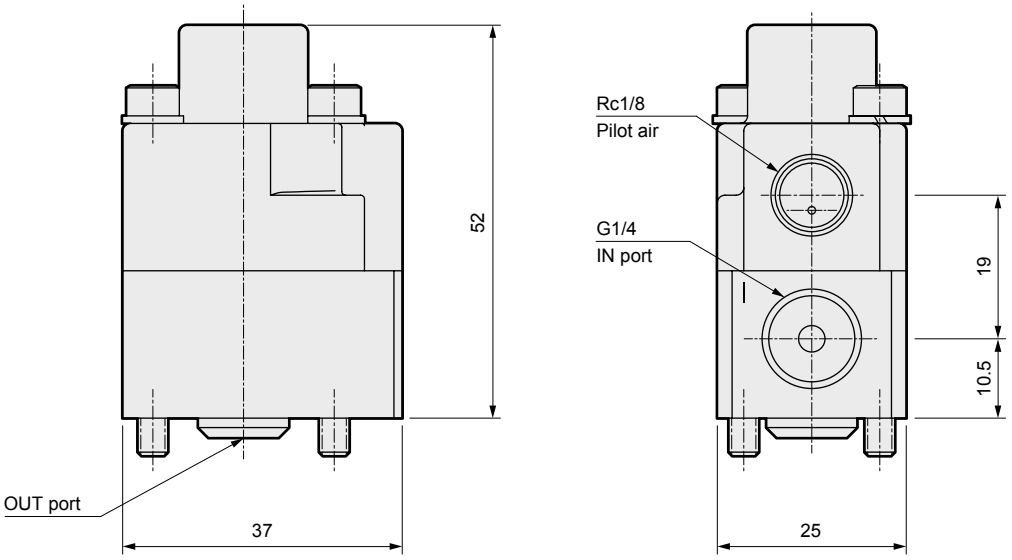
Specifications

Item	NAB-X2267 (2-port valve)	NAB-X2268 (3-port valve)
Actuation	Air operated/single acting	
Working fluid	Paint/thinner/air	
Working pressure MPa	0 (≈0 psi, 0 bar) to 1.0 (≈150 psi, 10 bar)	
Proof pressure (water pressure) MPa	1.5 (≈220 psi, 15 bar)	
Fluid temperature °C	5 (41°F) to 50 (122°F)	
Ambient temperature °C	-10 (14°F) to 60 (140°F)	
Valve seat leakage cm^2/min	0 (water pressure 0 to 1 MPa) *1	
Mounting orientation	Unrestricted	
Operating frequency Cycle/min.	30 or less	
Main side port size	G1/4	
Orifice size mm	3 or equiv.	
Cv	0.3	
Weight g	180	210
Material of wetted parts	SUS303, FKM, PTFE	
Pilot fluid	Air	
Pilot pressure MPa	0.35 (≈51 psi, 3.5 bar) to 0.7 (≈100 psi, 7 bar)	
Pilot port size	Rc1/8	

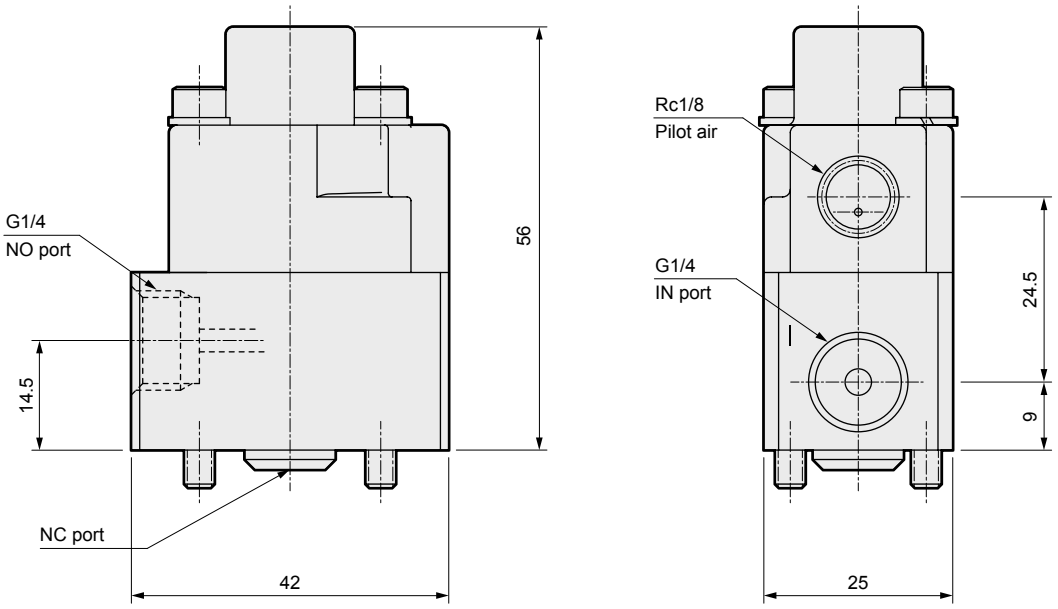
*1: As the NO port of NAB-X2268 (3-port valve) is on the circulating side, valve seat leakage is not guaranteed.

Dimensions

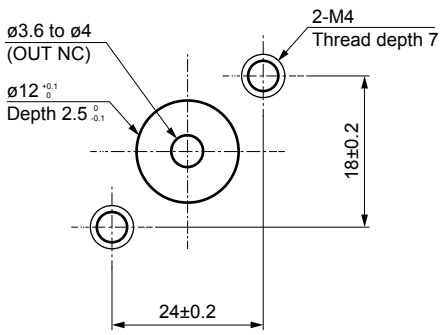
● NAB-X2267



● NAB-X2268



● Mounting dimensions



● Parts list

Part name	Material	
Cylinder guard	ADC12	Aluminum die-casting
Spring	SUS304	Aluminum die-casting
Piston	A2011	Aluminum
Adaptor	C3604	Copper alloy
Diaphragm	PTFE	Tetrafluoroethylene resin
Body	SUS303	Stainless steel
Valve seat	PTFE	Tetrafluoroethylene resin
Rod packing	FKM	Fluoro rubber
Valve stem	SUS303	Stainless steel
O-ring	FKM	Fluoro rubber
O-ring	FKM	Fluoro rubber

Medium pressure cylinder valve

NAB-6X2191/NAB-6X2192

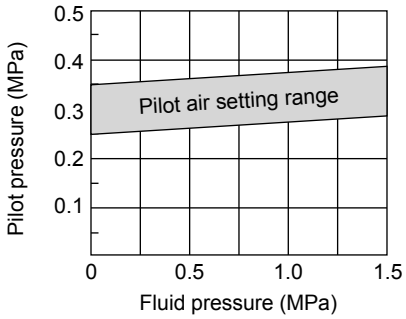
- NC, NO
- Working fluid: Compressed air
- Port size: Rc1/8

Made-to-order product

Specifications

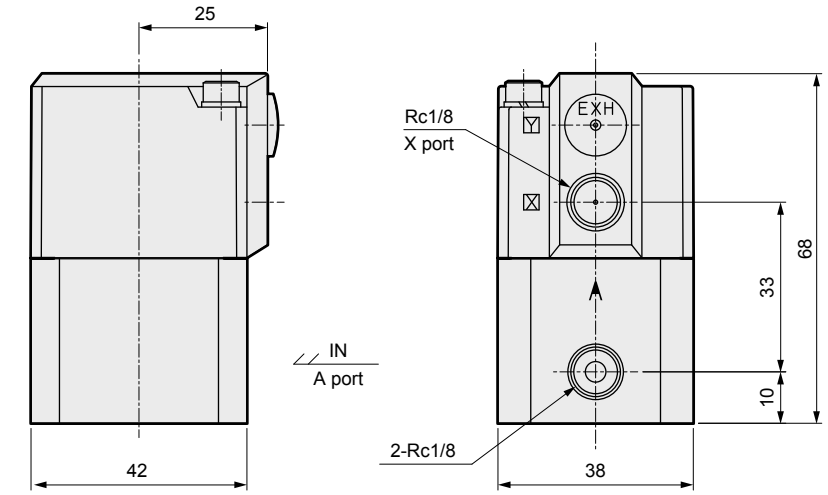
Item		NAB-6X2191	NAB-6X2192
Actuation		NC	NO
Working fluid		Compressed air	
Working pressure	MPa	0 (≈0 psi, 0 bar) to 1.5 (≈220 psi, 15 bar)	
Proof pressure (water pressure)	MPa	3.0 (≈440 psi, 30 bar)	
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)	
Ambient temperature	°C	-10 (14°F) to 60 (140°F)	
Valve seat leakage	cm^2/min	0.12 or less	
Port size		Rc1/8	
Orifice size	mm	3	
Mounting orientation		Unrestricted	
Pilot fluid		Air	
Pilot pressure	MPa	0.35 (≈51 psi, 3.5 bar) to 0.7 (≈100 psi, 7 bar)	Refer to the figure below.
Pilot port size		Rc1/8	
Frequency		30 times/min. or less	

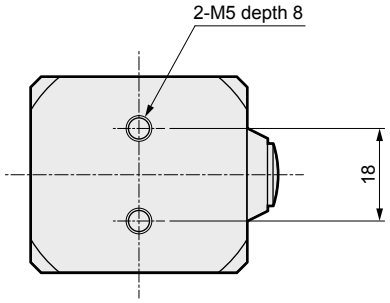
- Pilot pressure (NAB-6X2192)



Dimensions

● NAB-6X2191

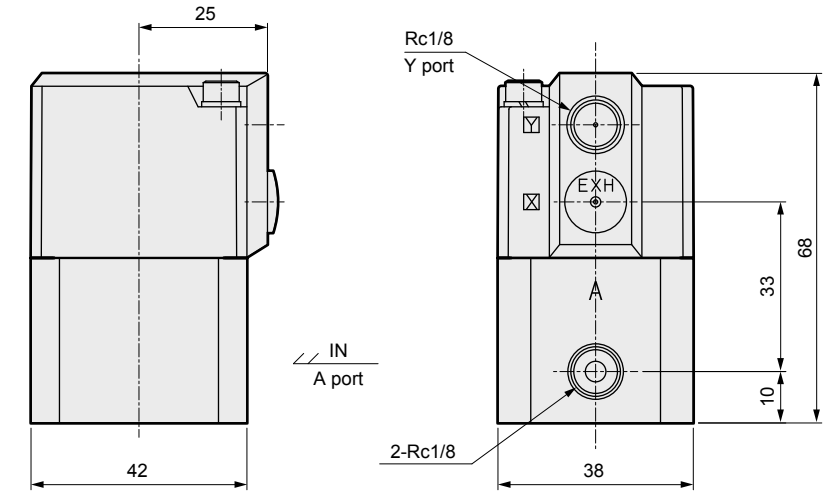


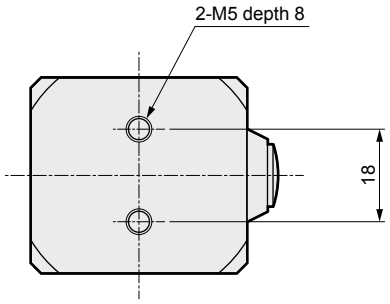


● Parts list

Part name	Material	
Cylinder guard	ADC12	Aluminum die-casting
Spring	SWP	Piano wire
Piston	A2017	Aluminum
Adaptor	SUS303	Stainless steel
Body	SUS304	Stainless steel
Rod packing	NBR	Nitrile rubber
Piston rod	SUS304	Stainless steel
Valving element	FKM	Fluoro rubber

● NAB-6X2192





● Parts list

Part name	Material	
Cylinder guard	ADC12	Aluminum die-casting
Piston	A2017	Aluminum
Spring	SWP	Piano wire
Adaptor	SUS303	Stainless steel
Body	SUS304	Stainless steel
Rod packing	NBR	Nitrile rubber
Piston rod	SUS304	Stainless steel
Valving element	FKM	Fluoro rubber

Proportional solenoid valve

A2-6500 Series

- NC (open when energized)
- Working fluid: Compressed air
- Port size: Rc1/8

Made-to-order product

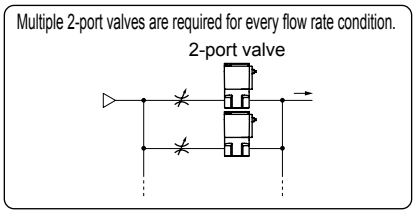
RoHS

Step-less control of the flow rate in proportion to the current.

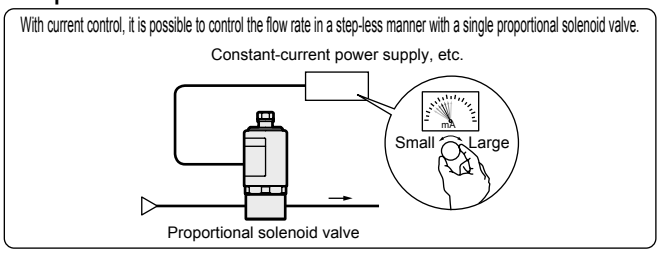
Thanks to step-less control of the flow rate with current control, fine flow rate control, such as “multiple-step flow rate control” and “optimal flow rate control”, which was difficult with conventional solenoid valves has been made possible. Proportional control contributes to “energy conservation of devices” and “elimination of waste”.

Applications

Conventional (2-port valve)



Proportional solenoid valve



Specifications

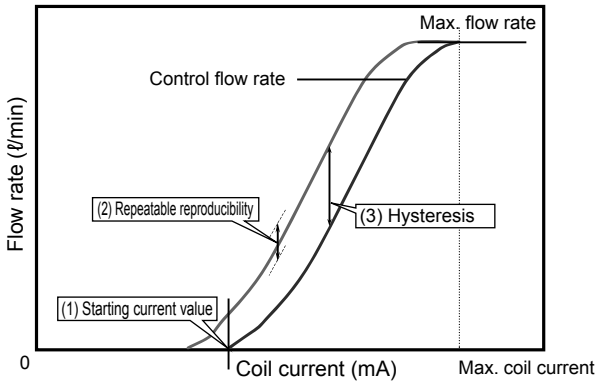
1 MPa = 10 bar

Standard specifications	Working fluid	Compressed air		
	Fluid temperature °C	0 (32°F) to 50 (122°F)		
	Ambient temperature °C	0 (32°F) to 50 (122°F)		
	Actuation	NC		
	Mounting orientation	Limited to vertical mounting with the coil on top.		
	When valve is closed (current value: 0) Valve seat leakage cm^3/min	1 or less		
	Port size	Rc1/8		
Characteristic specifications	**Model No.**	**A2-6501**	**A2-6502**	**A2-6503**
	Orifice size mm	1.6	2.3	3.2
	Max. working pressure differential MPa	0.7 (≈100 psi)	0.35 (≈51 psi)	0.15 (≈22 psi, 1.5 bar)
	Min. working pressure differential MPa	0.2 (≈29 psi)	0.1 (≈15 psi)	0.05 (≈7.3 psi, 0.5 bar)
	Max. working pressure MPa	0.7 (≈100 psi)	0.35 (≈51 psi)	0.15 (≈22 psi, 1.5 bar)
	Control flow rate ℓ/min (under max. working pressure differential)	0 to 100		0 to 80
	Hysteresis (under max. working pressure differential)	10% F.S. or less		13% F.S. or less
	Starting current value (under max. working pressure differential)	50% or less (12 VDC: 165 mA or less, 24 VDC: 82.5 mA or less)		65% or less (12 VDC: 214 mA or less, 24 VDC: 107 mA or less)
	Repeatable reproducibility	3% F.S. or less		
Coil specs	Used power supply voltage	12 VDC, 24 VDC		
	Coil current mA	0 to 330(12 VDC), 0 to 165(24 VDC)		
	Power consumption W	0 to 4		

- Body material: Copper alloy
- Sealant material: FKM
- Valve closed with power supply OFF (current value: 0)
- Valve seat leakage when valve is closed: 1 cm^3/min or less

Details of the various values of the specifications

Flow characteristics



(1) Starting current value
Upon increasing the coil current from a state where the flow rate is 0, the current value of when the fluid starts to flow.
(Indicated as a percentage of the max. coil current.)

(2) Repeatable reproducibility
The variance of flow rates which are output when applying identical currents.
(Indicated as a percentage of the max. flow rate.)

(3) Hysteresis
The max. flow rate difference with an identical current value when increasing and decreasing the current.
(Indicated as a percentage of the max. flow rate.)

Air operated 2-port valve with solenoid valve (coolant control)
High pressure coolant valve

CVSE2-15AX039/20AX040/25AX041

- Working fluid: High pressure coolant (10 MPa)
- Port size: Rc1/2, Rc3/4, Rc1

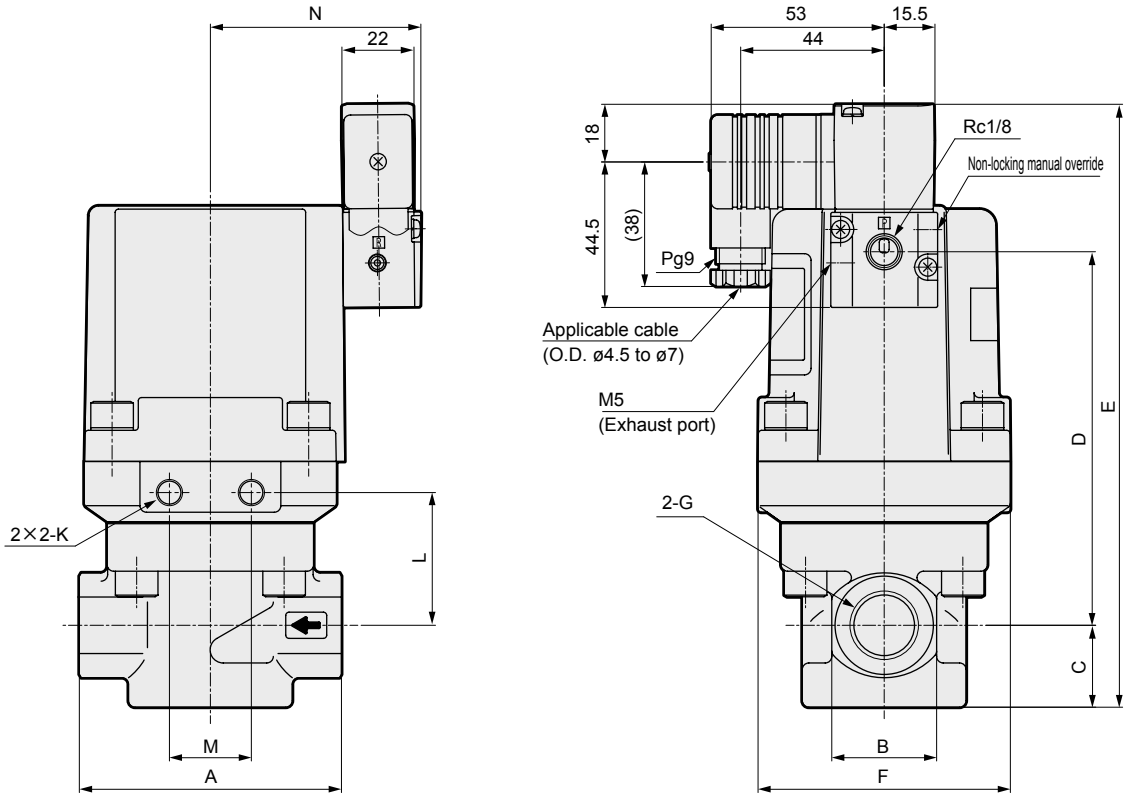
Made-to-order product

High pressure coolant (10 MPa) control is possible.

Specifications

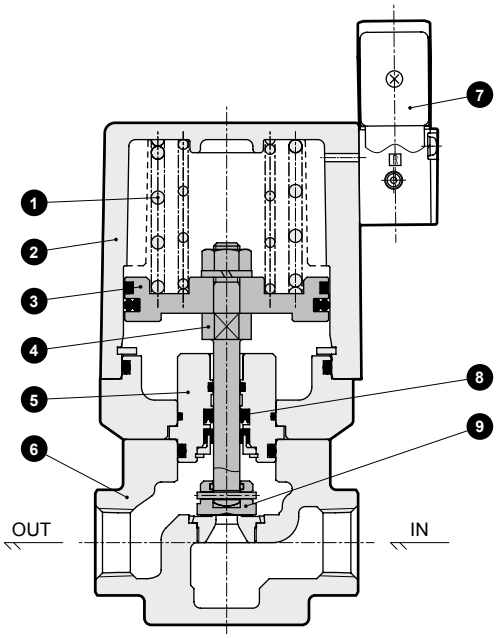
Item		CVSE2-15AX039	CVSE2-20AX040	CVSE2-25AX041
Actuation		NC		
Working fluid		Coolant		
Fluid viscosity	mm^2/s	500 or less		
Working pressure	MPa	0 (≈0 psi, 0 bar) to 10 (≈1500 psi, 100 bar)		
Proof pressure (water pressure)	MPa	14 (≈2000 psi, 140 bar)		
Fluid temperature	°C	-10 (14°F) to 60 (140°F) (no freezing)		
Ambient temperature	°C	-10 (14°F) to 60 (140°F)		
Valve seat leakage	cm^2/min	20 or less (water pressure)		
Port size		Rc1/2	Rc3/4	Rc1
Orifice size	mm	6.5	8	10
Mounting orientation		Unrestricted		
Pilot fluid		Air		
Pilot pressure	MPa	0.25 (≈36 psi, 2.5 bar) to 0.7 (≈100 psi, 7 bar)		
Pilot port size		Rc1/8		
Electrical specifications				
Rated voltage		100 VAC (50/60 Hz) / 110 V (60 Hz), 200 VAC (50/60 Hz) / 220 V (60 Hz), 24 VDC		
Apparent power (VA)	When holding	3.6(50 Hz), 2.8(60 Hz)		
	When starting	11(50 Hz), 9(60 Hz)		
Power consumption (W)	AC	1.9(50 Hz), 1.5(60 Hz)		
	DC	2.0		
Thermal class		Class 130 (B)		
Coil		With surge suppressor integrated DIN terminal box with lamp (Pg9)		

Dimensions



Model No.	A	B	C	D	E	F	G	K	L	M	N
CVSE2-15AX039	80	32	25	114	184	77	Rc1/2	M8 thread depth 10	40.5	25	64.5
CVSE2-20AX040	90	40	29	136.5	210.5	95	Rc3/4	M8 thread depth 10	45.5	25	72.5
CVSE2-25AX041	110	48	33.5	149.5	228	113	Rc1	M12 thread depth 14	49	45	82.5

Internal structure and parts list



No.	Part name	Material	
1	Spring	SWP	Piano wire
2	Cylinder guard	ADC12	Aluminum die-casting
3	Piston	A2017	Aluminum
4	Piston rod	SUS304	Stainless steel
5	Adaptor	SUS303	Stainless steel
6	Body	FCD450	Cast iron
7	Pilot solenoid valve	-	-
8	Rod packing	NBR	Nitrile rubber
9	Main valving element	SUS420	Stainless steel

Terminal box

● Terminal box
This terminal box is available as a solenoid valve accessory for easy coil wiring of the solenoid valve.

Features

- Due to its design specific to solenoid valve coil connections, this terminal box is ideal for power supply connections.
- A model equipped with an indicator lamp to enable checking of the ON-OFF of the power supply from the outside is also available.
- The marine cable gland can be connected as is.

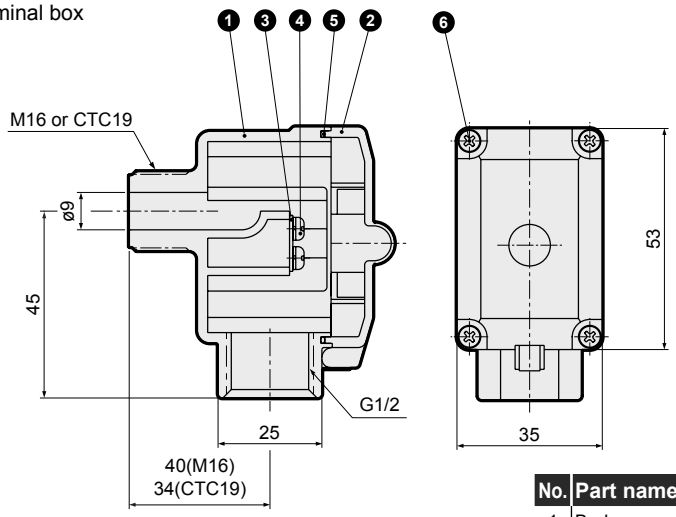
Type and specifications of terminal box

Item / Type	Terminal count	Existence of indicator lamp	Power supply	Screw size A	Screw size B
HP terminal box	3P	Without indicator lamp	AC/DC power supply shared	M16	G1/2
			Rating of 400 V, 10 A or less	CTC19	G1/2
		With indicator lamp	For AC/DC power supply (with neon light)	M16	G1/2
			Rating 100/200 VAC 100/200 VDC / 1A	CTC19	G1/2
			For DC power supply (with LED)	M16	G1/2
			Rating 24 VDC 6.3 mA	CTC19	G1/2

* Contact a CKD sales representative for details regarding models

Dimensions and internal structure

● HP terminal box

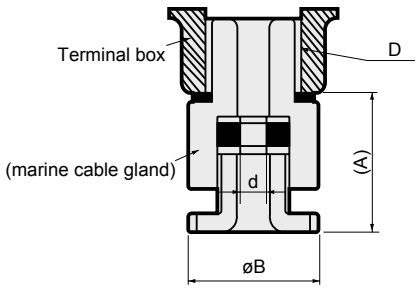


No.	Part name	Material
1	Body	PA
2	Cover	PA
3	Terminal	C2680
4	Wiring thread	SS
5	Gasket	NBR
6	Fixing screw	SS

Marine cable gland

When water proof wiring port is required for solenoid valve with terminal box, marine cable gland should be used.

Dimensions



*1 : Dimensions with * are provided for reference.
*2 : Select the model based on dimension D (selection based on terminal box screw size) and dimension d (selection based on wiring cable size).

Model No.	A *	B	D	d
A-15a	39	28	G1/2	9
A-15b	39	28	G1/2	10
A-15c	39	28	G1/2	11
A-20a	43	34	G3/4	12
A-20b	43	34	G3/4	13
A-20c	43	34	G3/4	15

Systems

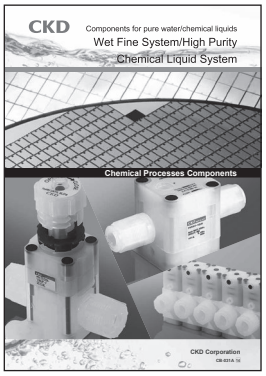
Responding to the needs of users in specialized markets

● Refer to the separate catalogs for details.

CKD can offer various products for specific markets.

Refer to the separate specialized catalogs for details.

CONTENTS



Responding to high-level needs for semiconductor manufacturing process control

Wet Fine System/high purity chemical liquid system

- Port size: Rc1/8 to 1, fitting integrated
- Working fluid: Pure water, chemical liquid, N2 gas, air

Catalog No.
CB-031A

Suitable for wet processes, etc., of semiconductor manufacturing lines.

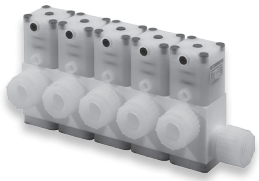
- Designed based on our industry-leading advanced production technology
- A wide range of products and fittings
- Clean production system throughout the company

Wet Fine system

● Air operated valve for chemical liquids

AMD3R**

● Air operated valve for chemical liquids (manifold)



GAMD3R**

● Air operated valve for chemical liquids (metal-free)

AMD*1M

● Air operated valve for chemical liquids (for liquid supply)

AMD*1H

● Manual valve for chemical liquids

MMD*03RN

● Air operated valve for chemical liquids

Drip valve integrated

AMDS

● Pilot operated regulator

PMP

● Manually operated regulator

PYM/PMM

● Fine level switch

FMD

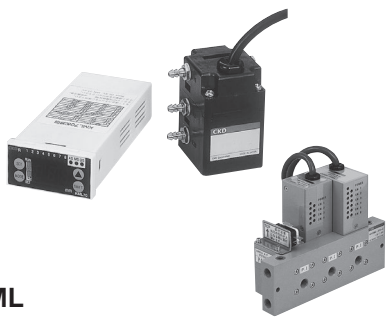
● Electric flow rate adjusting valve

MNV

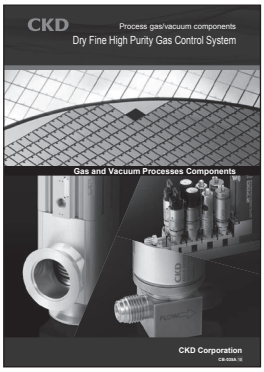
● Manual fine flow rate adjusting valve

LYX

● Fine level switch



KML



Process gas/vacuum components

Dry Fine System/high purity gas control system components

● Working fluid and port size: Process gas: 1/4” / 3/8” JXR fittings
For vacuum: NW25 to NW80 and other types

Catalog No.
CB-035A

Suitable for dry processes, etc., of semiconductor manufacturing lines.

- Ultra-fine valve compatible with high megabit
- Clean environment production from designing to packaging
- Various models are available for process gas and vacuum

Equipment for process gas

● Air operated valve for process gas

AGD

● Air operated valve for process gas

AGD (high temperature/high durability)

● Manual valve for process gas

OGD

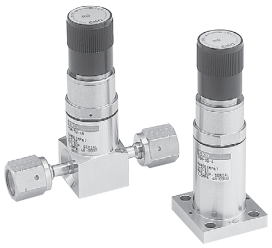
● Manual valve for process gas

MGD

● Manual valve for process gas

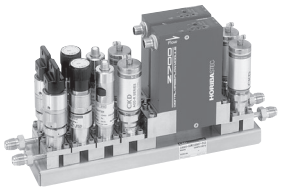
LGD

● Regulator for process gas



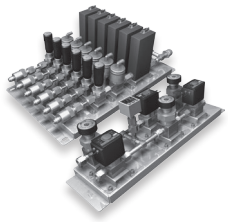
PGM

● Integrated gas supply system



IAGD5

● Clean panel



FICS

Valve for high vacuum

● Air operated valve

AVB

● Manual valve

MVB

System components

● Pressure control system

IAVB

● Proportional control system

VEC-R

Troubleshooting — 1

Periodic inspection

- Periodic inspections, once or twice a year, are the best method to ensure that the solenoid valve can be used for a long time. If items 1 to 4 below adhere in the solenoid valve, smooth and correct operation could be obstructed and the solenoid valve durability could be shortened.

1 Change in quality of fluid in use

2 Rust inside pipes

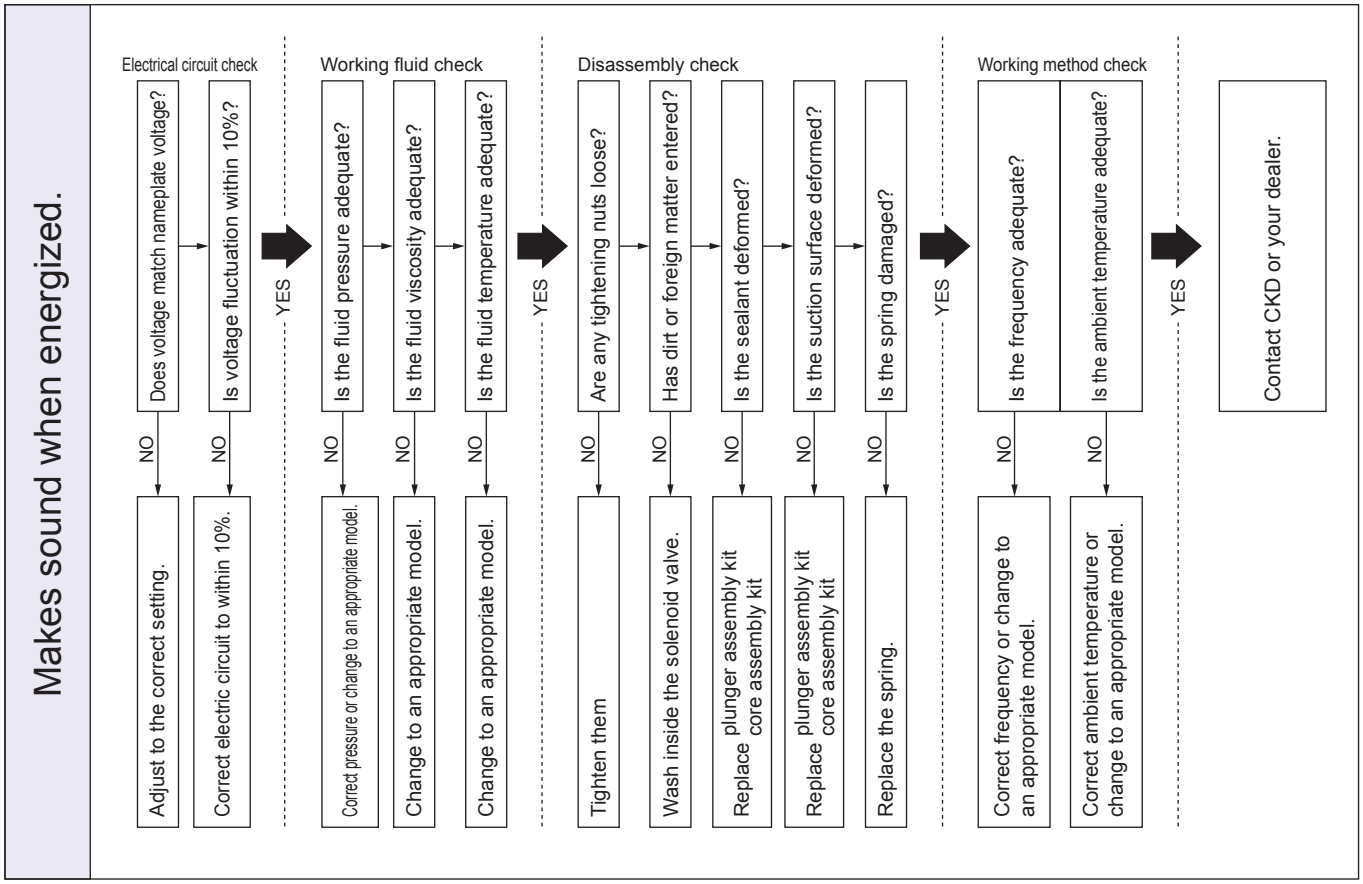
3 Oil oxides, carbon or tar from compressors

4 Trash/foreign matter

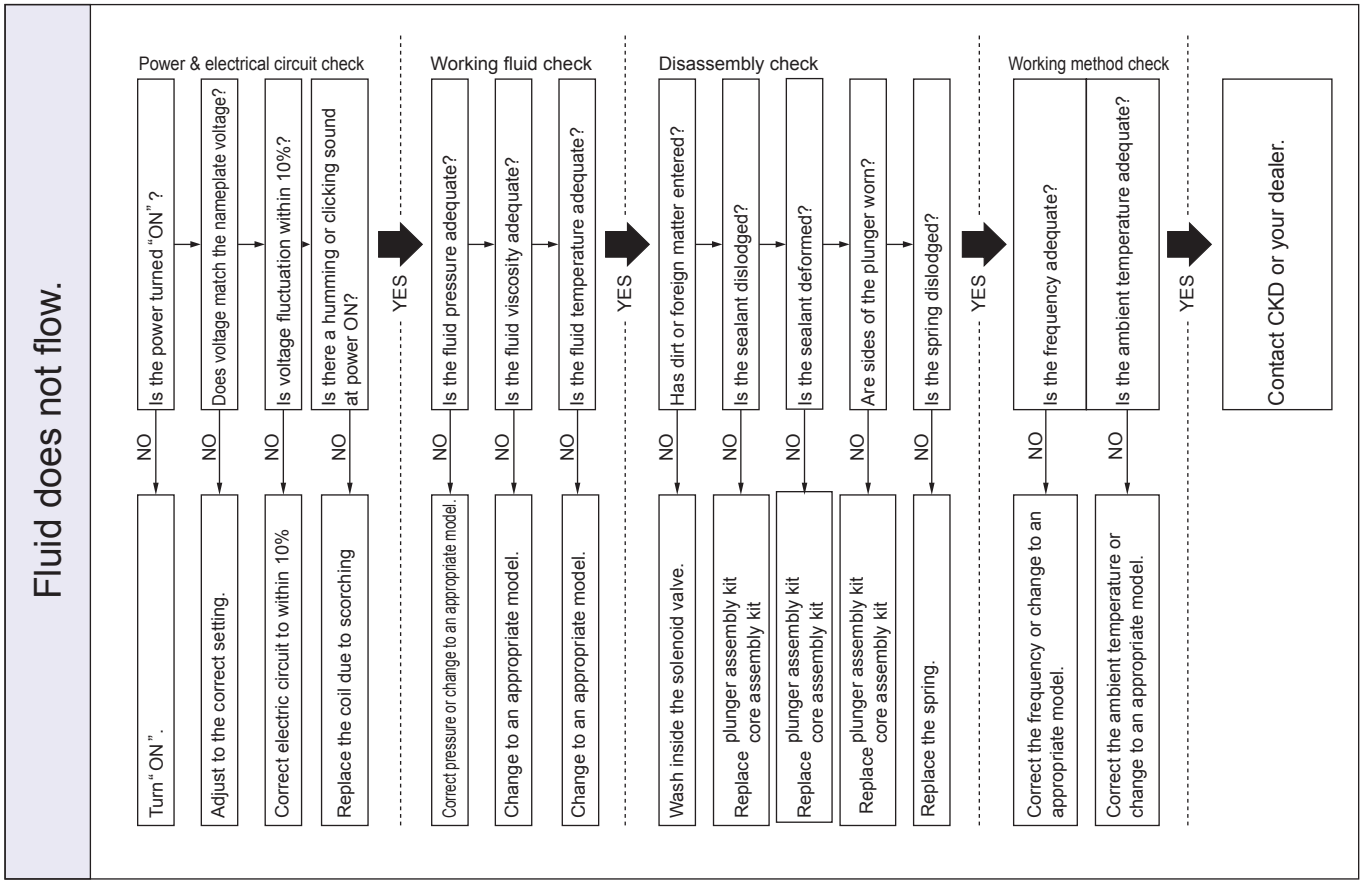
Precautions for maintenance and inspections

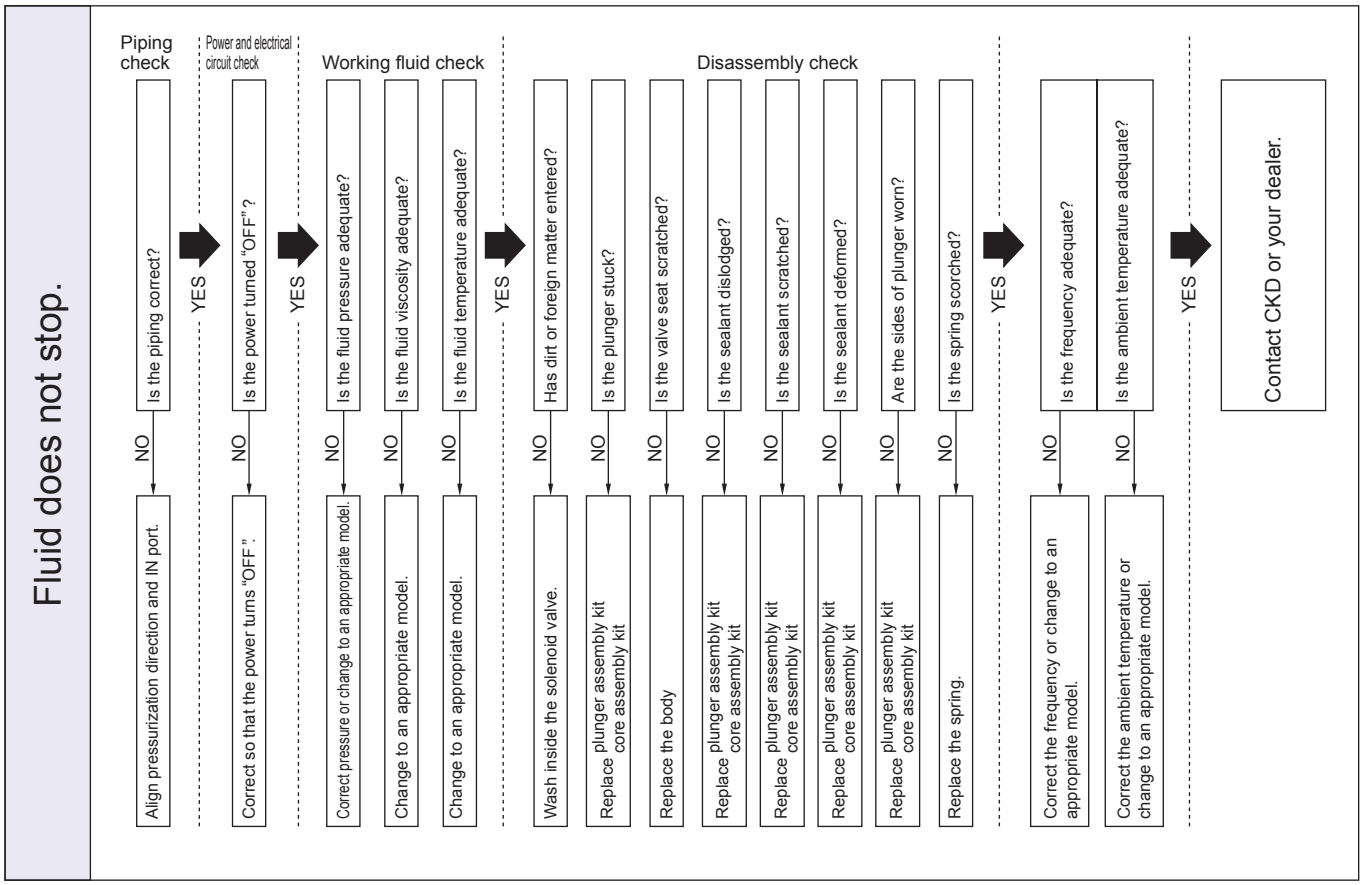
- Always turn the power OFF and release any fluids or pressure before starting inspection.
- When washing the product, use a neutral detergent or kerosene, etc. (If the sealant material is EPDM, it could expand, so kerosene cannot be used.)
- Contact CKD sales personnel if you have any questions regarding the disassembly procedures or repair parts, etc.

[Solenoid valve]

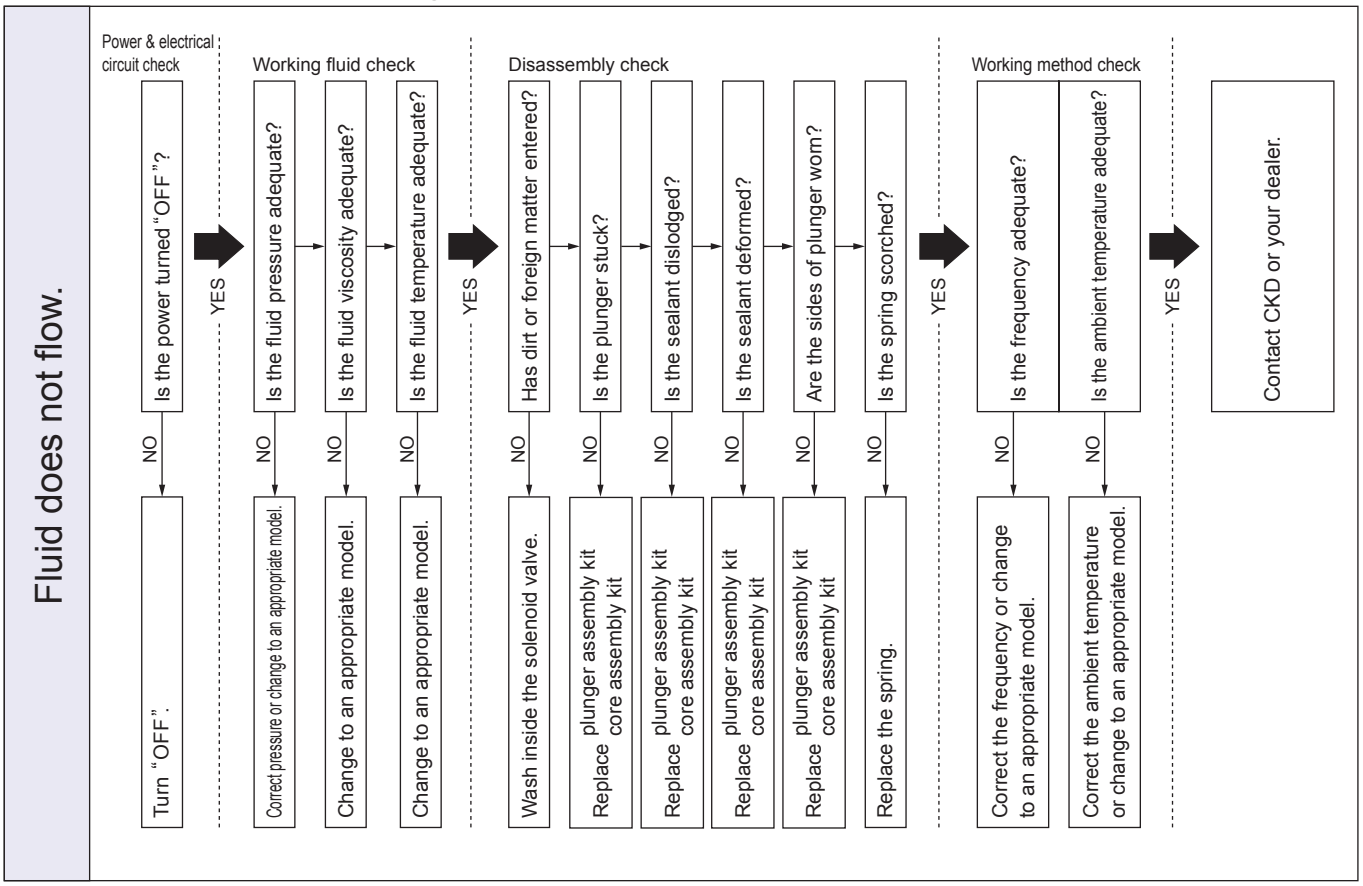


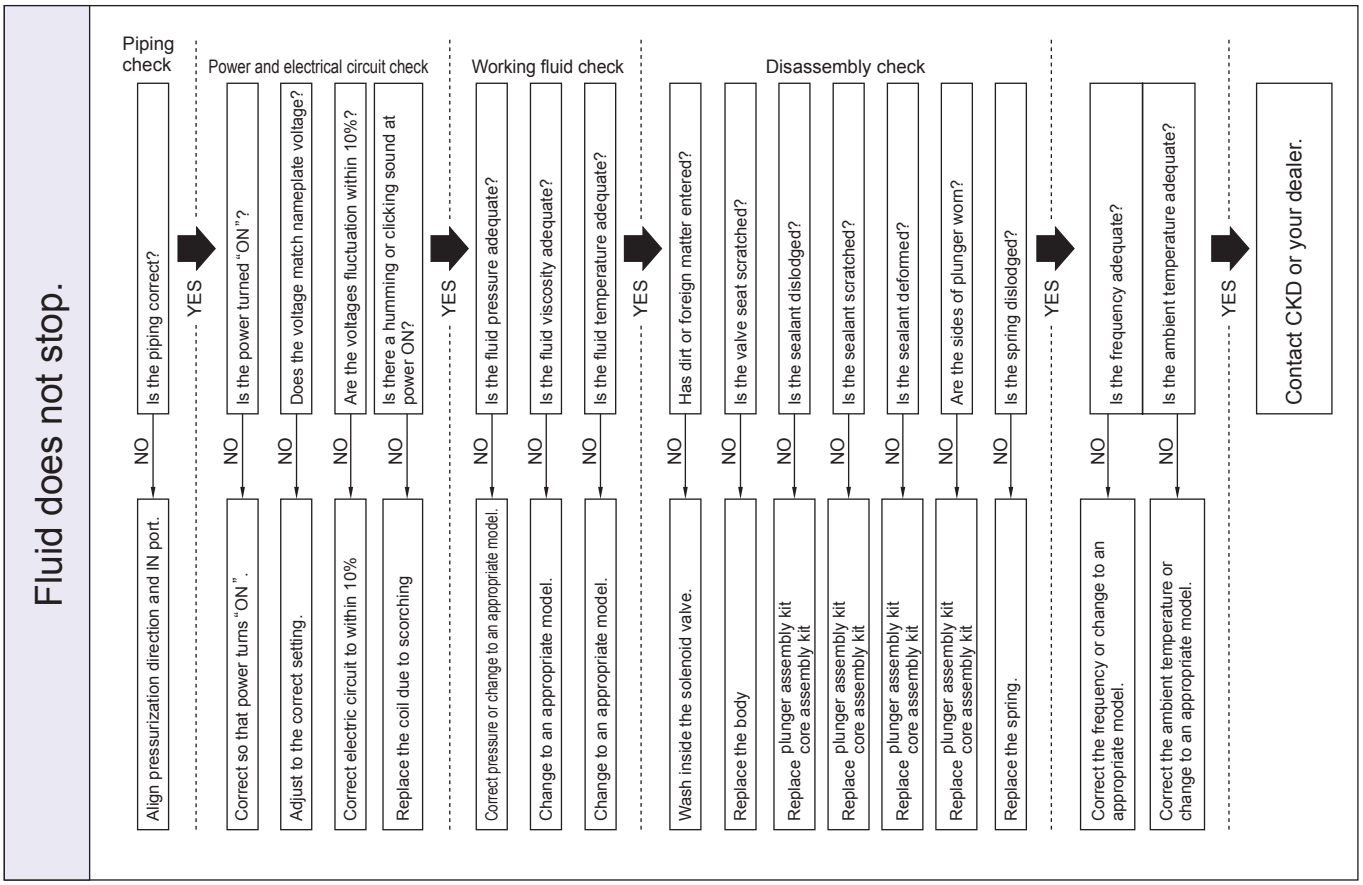
● NC (open when energized)





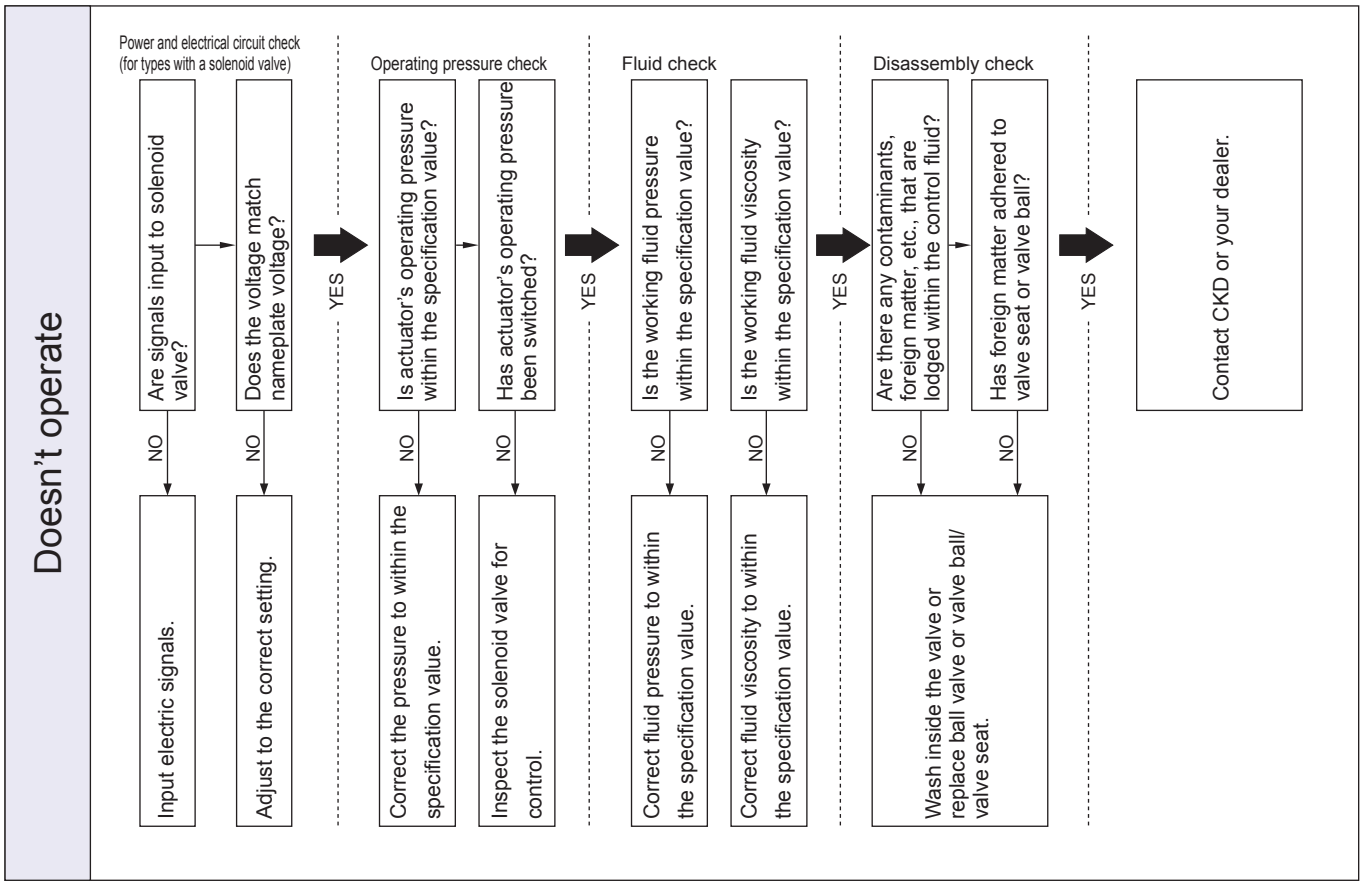
● NO (closed when energized)

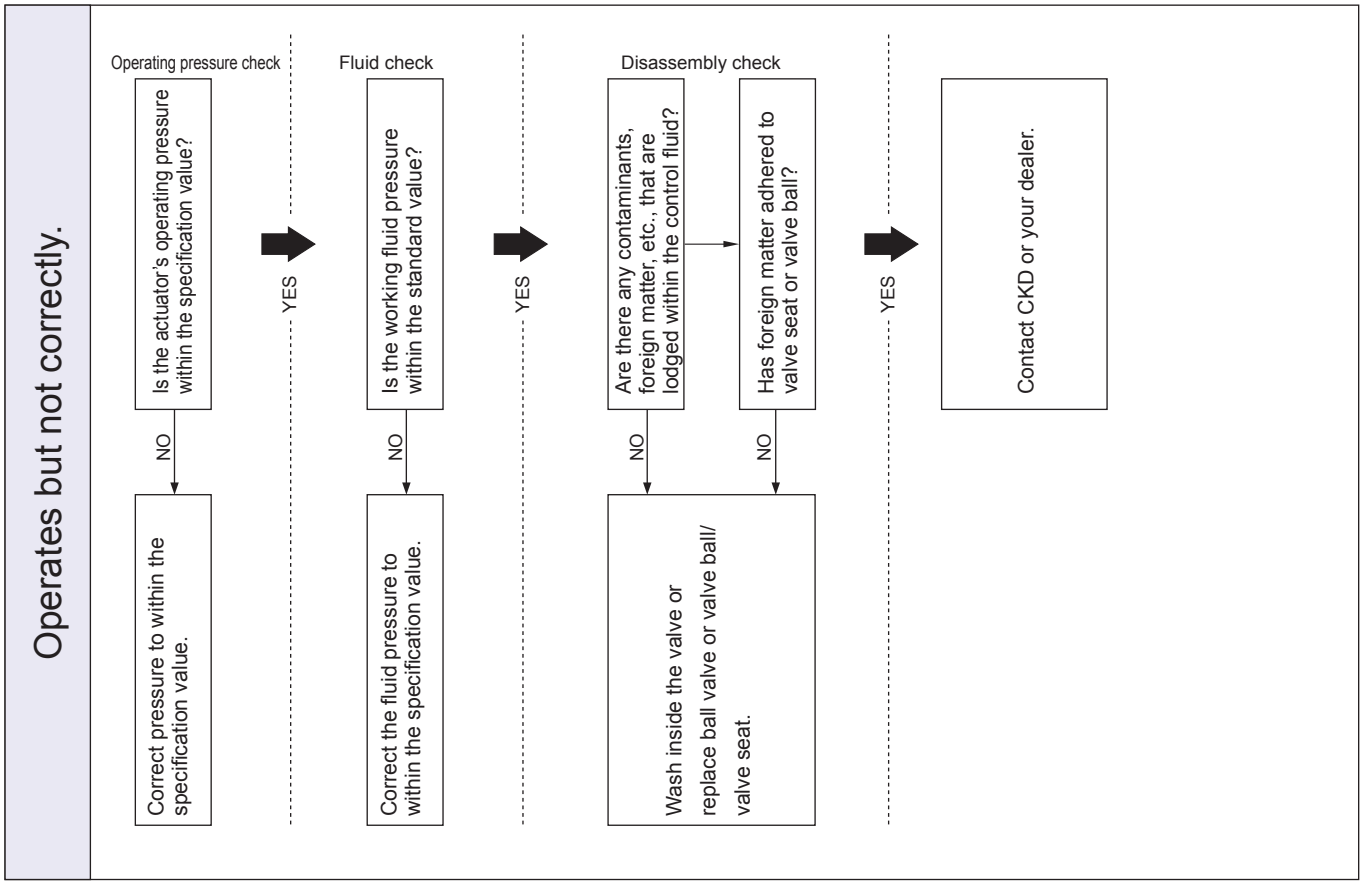


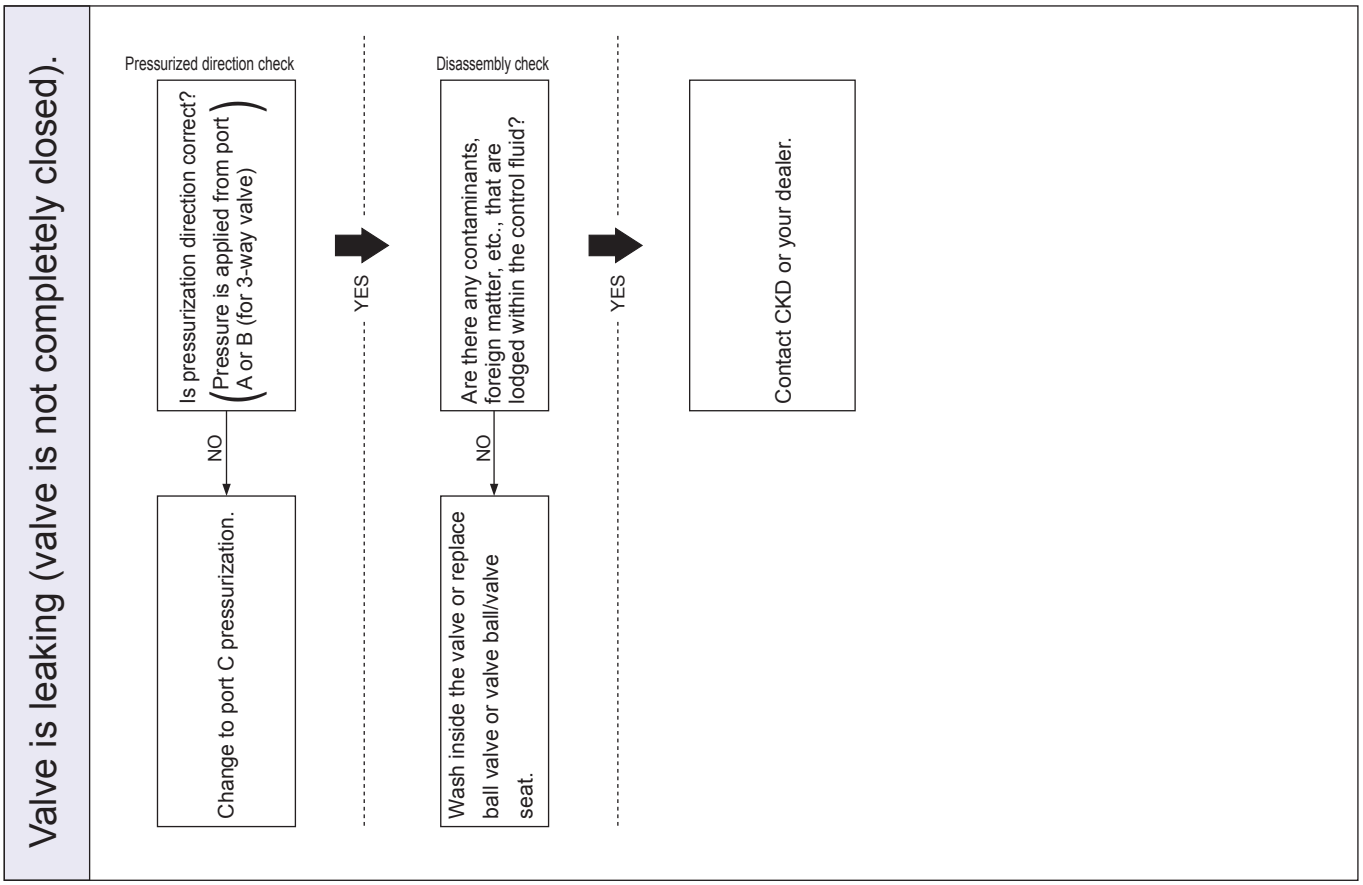


Troubleshooting — ❷

[Air operated 2, 3-port ball valve (compact rotary valve)]



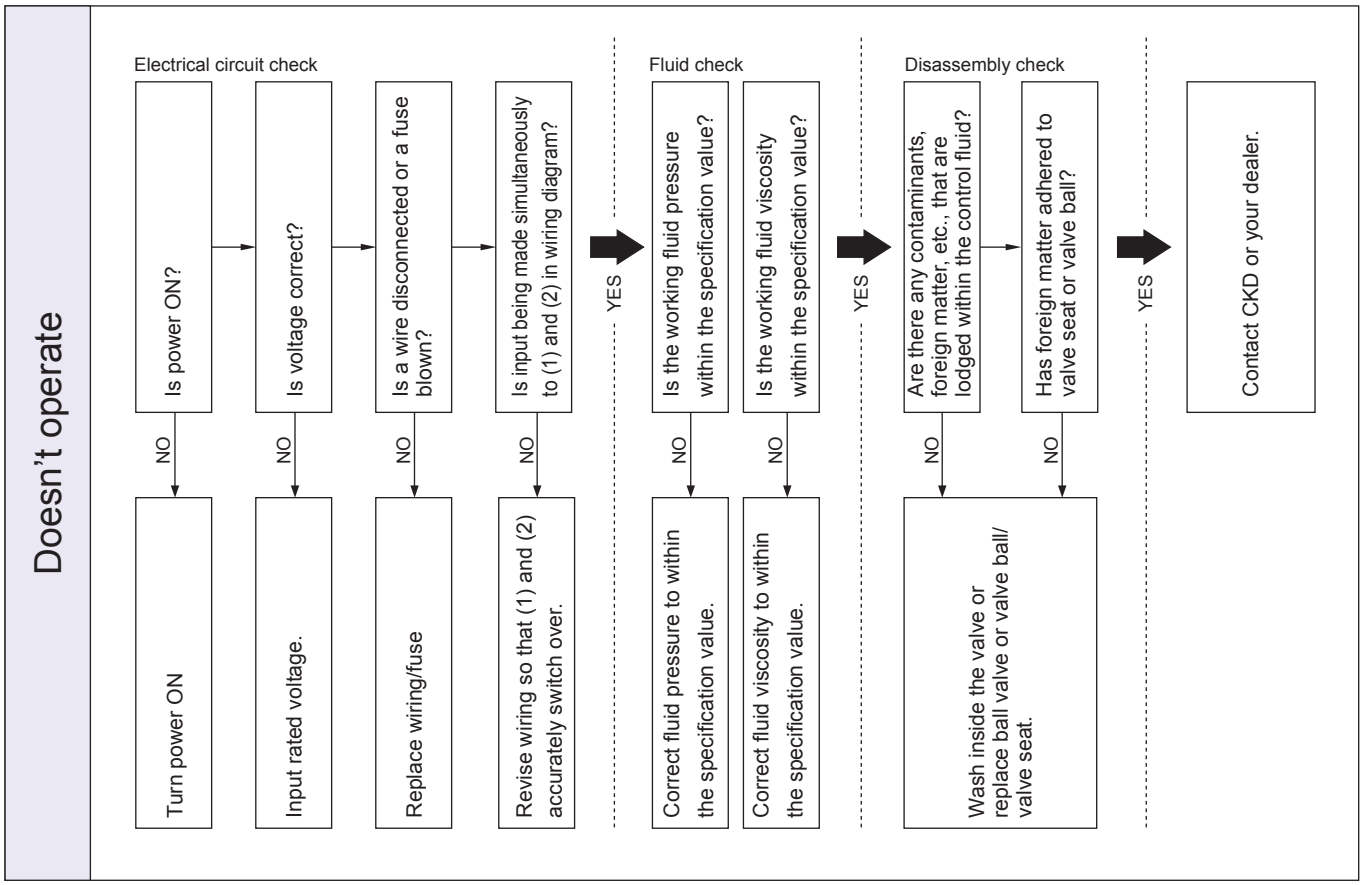


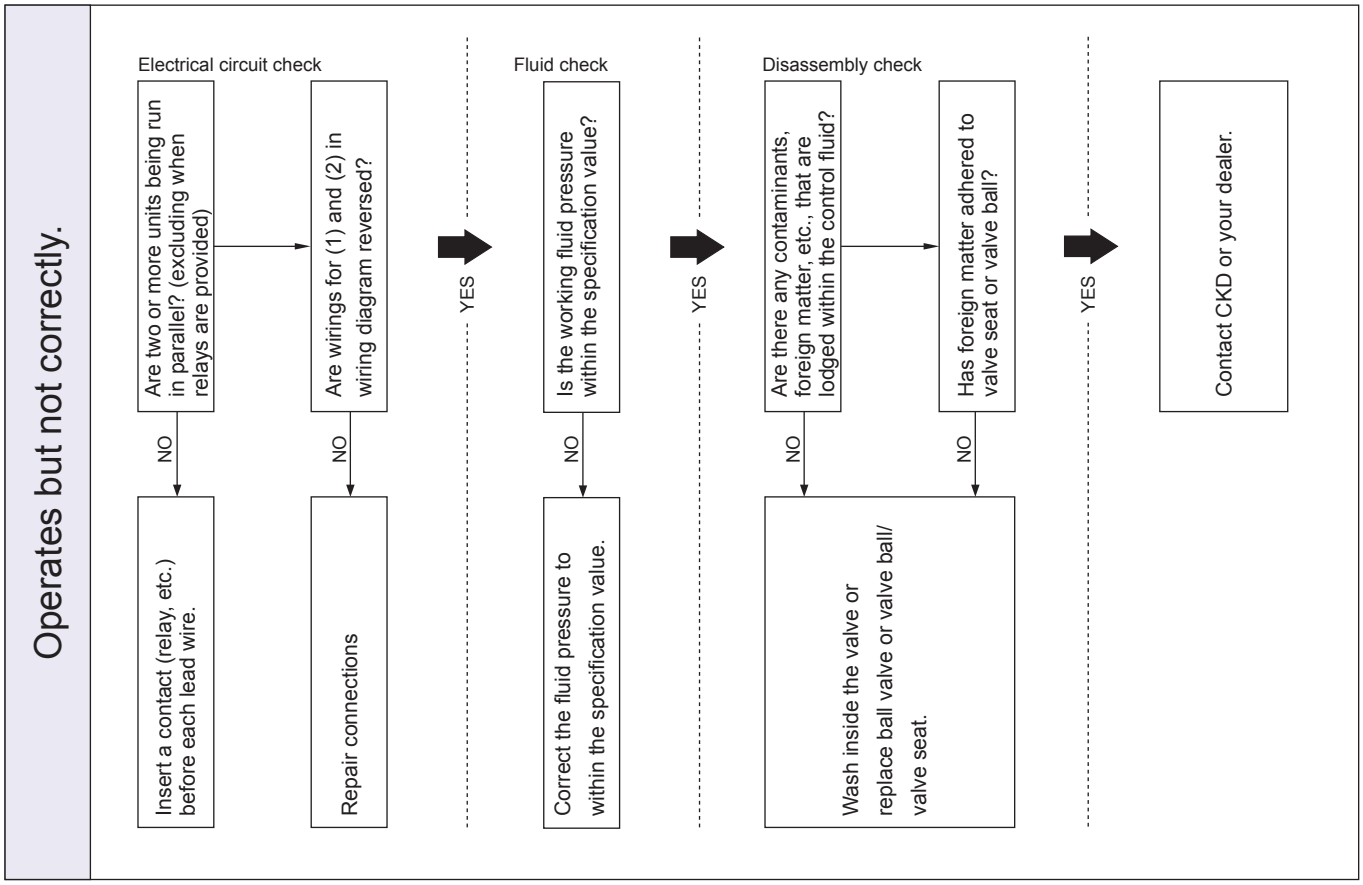


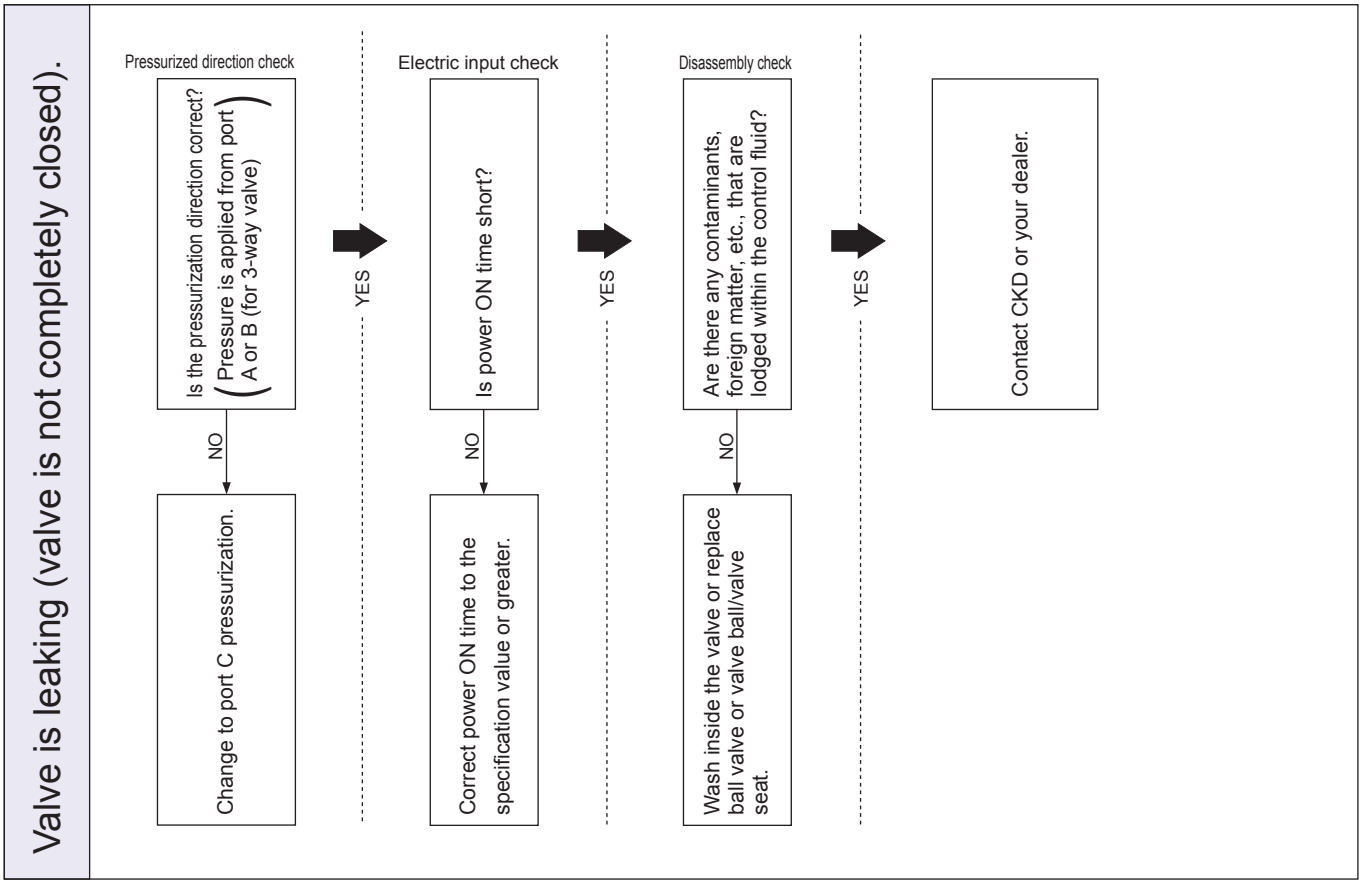
Note: The ball valve for the bronze body cannot be disassembled, so replace the ball valve.

Troubleshooting — 3

[Motor driven 2, 3-port ball valve (Motor valve)]





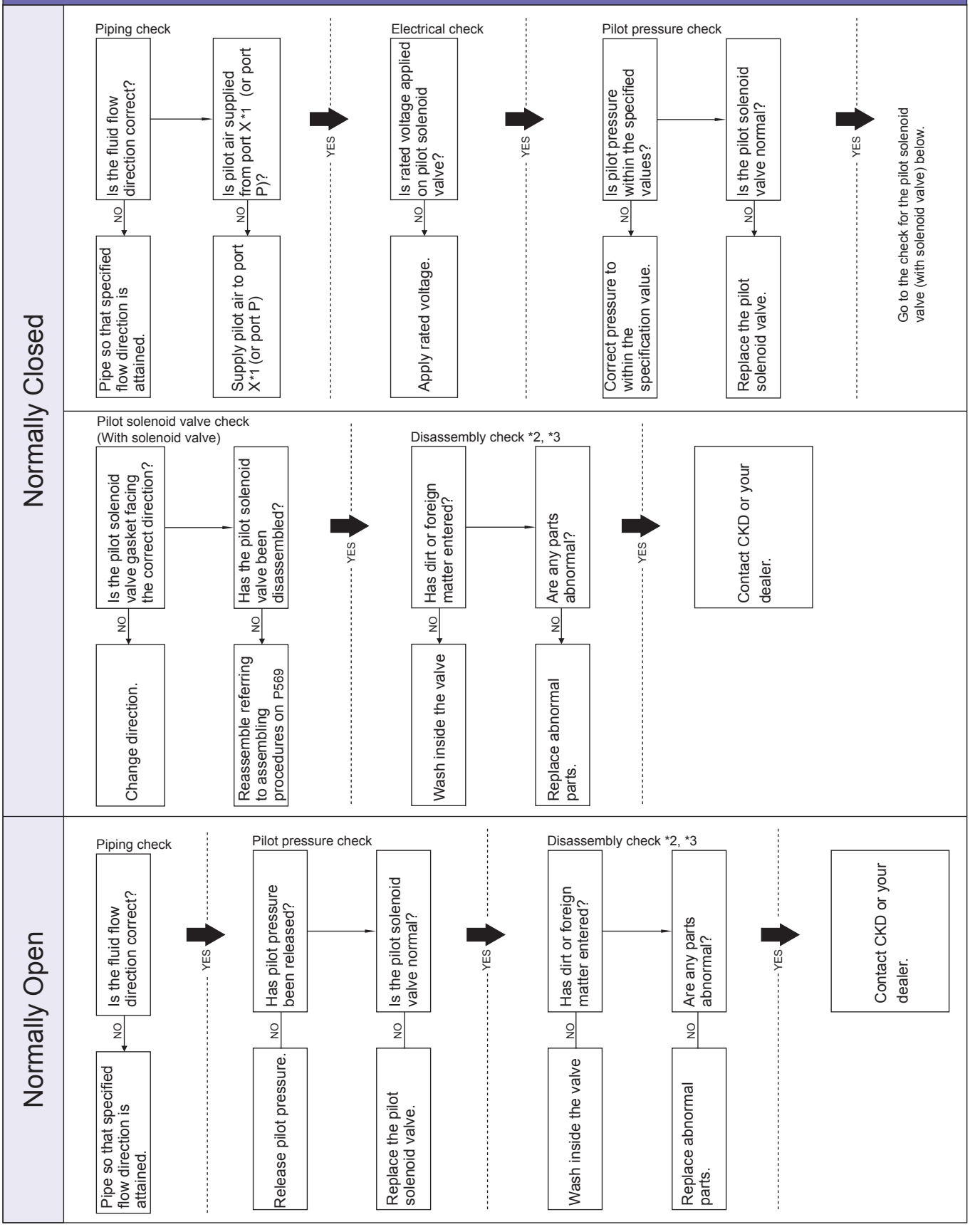


Note: The ball valve for the bronze body cannot be disassembled, so replace the ball valve.
[MXB1/MXB1F/MXG1/MXB1D/MXB1DF/MXG1D/MSB1/MSB1F/MSB1D/MSB1F/MXBC/MXGC]

Troubleshooting — 4

[Air operated 2-port valve (cylinder valve)]

Valve does not open or specified flow rate is not attained

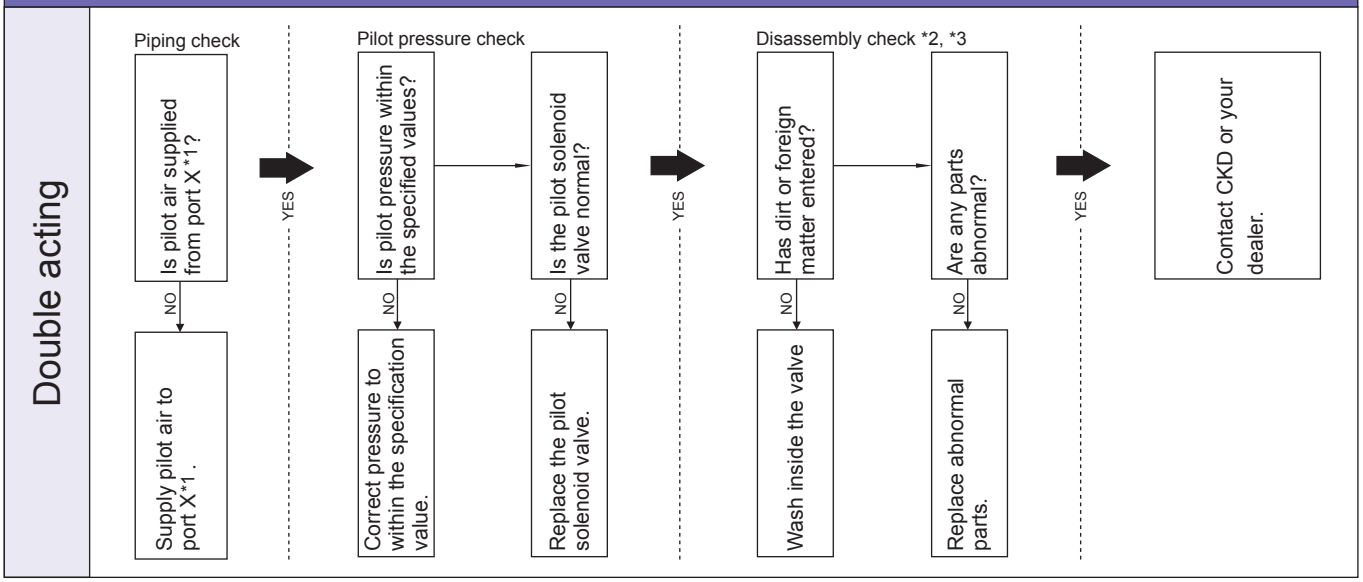


*1. Port Y for LAD
*2. It is prohibited to disassemble LAD or NAD.
*3. Refer to “Cautions for disassembling” in the instruction manual.

Air operated 2-port valve

Troubleshooting

Valve does not open or specified flow rate is not attained

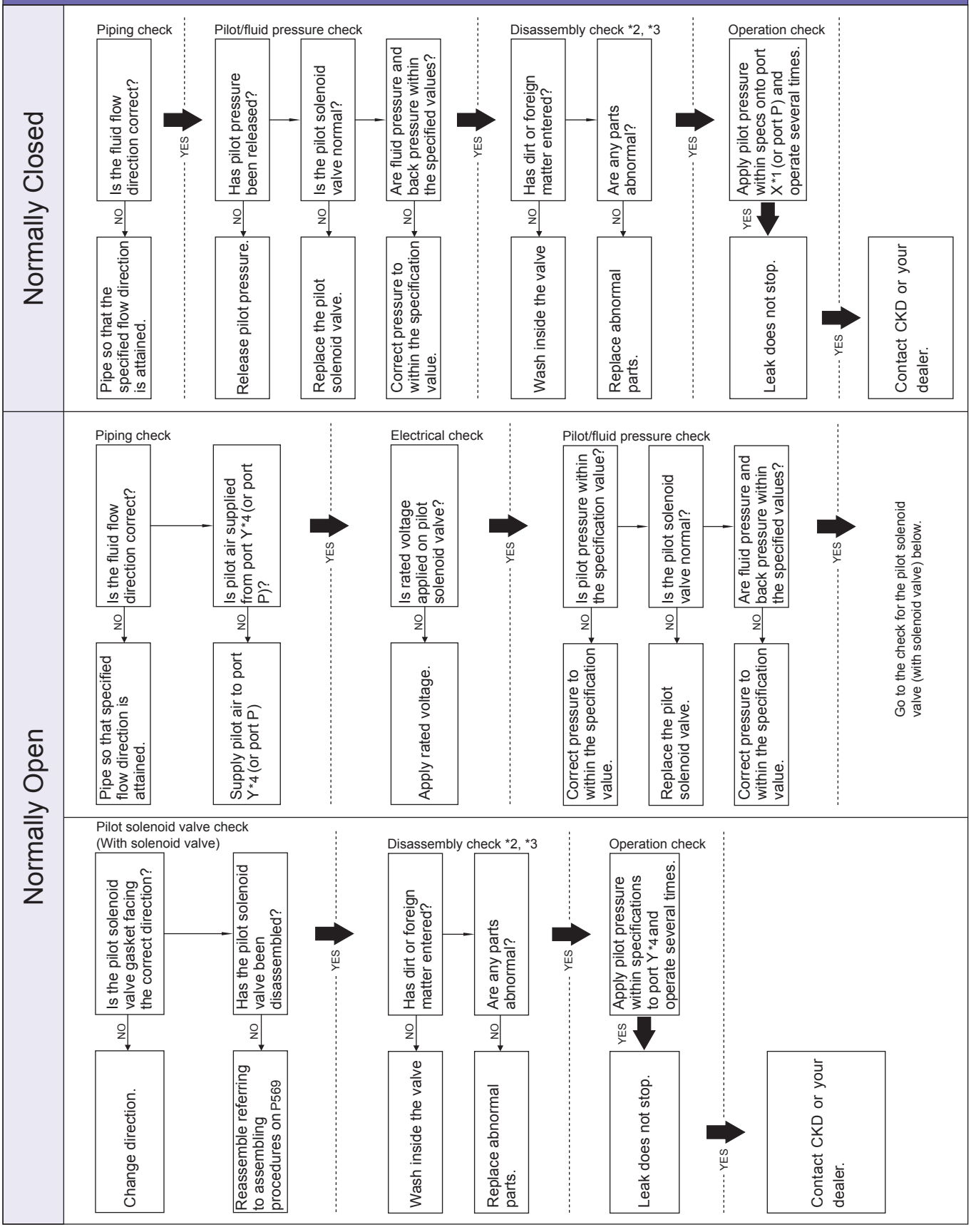


*1. Port Y for LAD
*2. It is prohibited to disassemble LAD or NAD.
*3. Refer to “Cautions for disassembling” in the instruction manual.

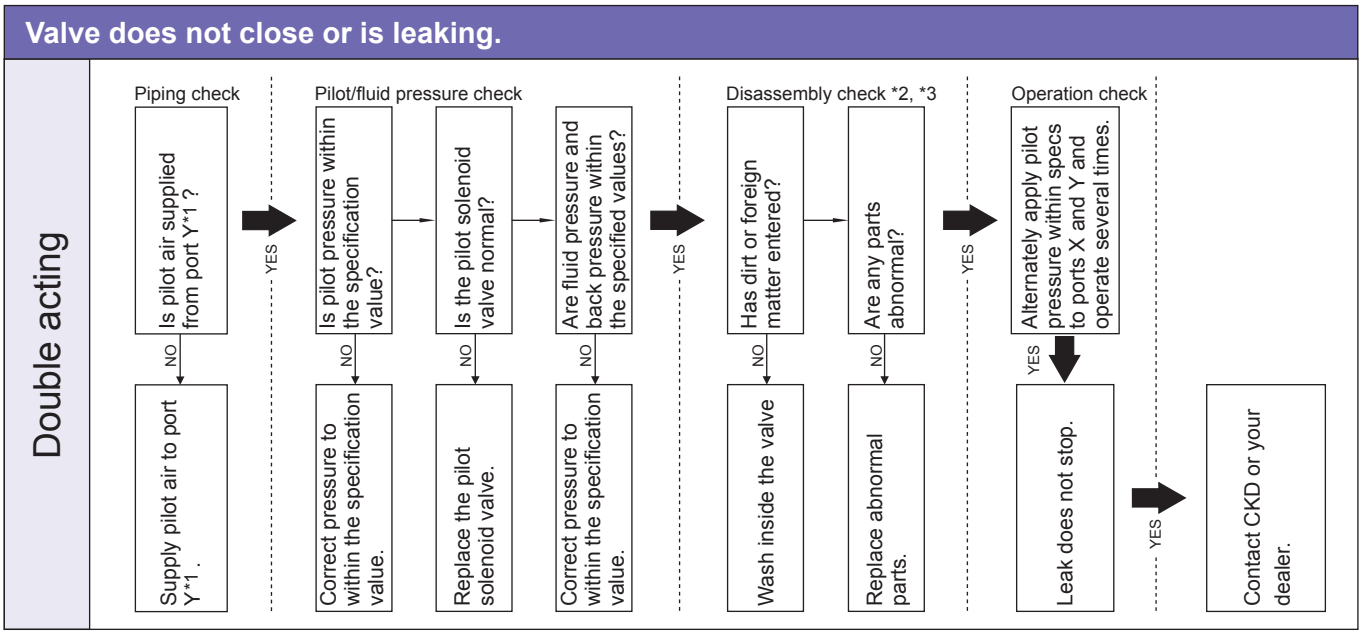
Troubleshooting — 4

[Air operated 2-port valve (cylinder valve)]

Valve does not close or is leaking.



*1. Port Y for LAD
*2. It is prohibited to disassemble LAD or NAD.
*3. Refer to “Cautions for disassembling” in the instruction manual.
*4. Port X for LAD



*1. Port X for LAD
*2. It is prohibited to disassemble LAD or NAD.
*3. Refer to “Cautions for disassembling” in the instruction manual.

MEMO

Unit conversion table

1. Length

m	cm	in	ft
1	1×10^{2}	3.937×10	3.281
1×10^{-2}	1	3.937×10^{-1}	3.281×10^{-2}
2.54×10^{-2}	2.540	1	8.333×10^{-2}
3.048×10^{-1}	3.048×10	12	1

2. Area

m^2	cm^2	in^2	ft^2
1	1×10^{4}	1.550×10^{3}	1.076×10
1×10^{-4}	1	1.55×10^{-1}	1.076×10^{-3}
6.45×10^{-4}	6.452	1	6.944×10^{-3}
9.290×10^{-2}	9.290×10^{2}	1.44×10^{2}	1

3. Volume

m^3	cm^3	in^3	ft^3
1	1×10^{6}	6.1023×10^{4}	3.531×10
1×10^{-6}	1	6.1023×10^{-2}	3.531×10^{-5}
1.639×10^{-5}	1.639×10	1	5.787×10^{-4}
2.832×10^{-2}	2.8320×10^{4}	1.728×10^{3}	1

4. Capacity

m^3	l	gal(UK)	gal(US)
1	1.000×10^{3}	2.200×10^{2}	2.642×10^{2}
1×10^{-3}	1	2.200×10^{-1}	2.642×10^{-1}
4.546×10^{-3}	4.546	1	1.201
3.785×10^{-3}	3.785	8.327×10^{-1}	1

5. Weight

kg	t	lb	ton(UK)	sh tn(US)
1	1×10^{-3}	2.20462	9.842×10^{-4}	1.1023×10^{-3}
1×10^{3}	1	2.20462×10^{3}	9.842×10^{-1}	1.1023
4.5359×10^{-1}	4.5359×10^{-4}	1	4.464×10^{-4}	5×10^{-4}
1.01605×10^{3}	1.01605	2.204×10^{3}	1	1.12
9.07185×10^{2}	9.07185×10^{-1}	2.000×10^{3}	8.9286×10^{-1}	1

6. Density

kg/m^3	g/cm^3	lb/in^3	lb/ft^3
1	1×10^{-3}	3.613×10^{-5}	6.243×10^{-2}
1.000×10^{3}	1	3.613×10^{-2}	6.243×10
2.7680×10^{4}	2.768×10	1	1.728×10^{3}
1.602×10	1.602×10^{-2}	5.787×10^{-4}	1

7. Power

N	dyn	kgf	lbf	pdl (poundal)
1	1×10^{5}	1.01972×10^{-1}	2.248×10^{-1}	7.233
1×10^{-5}	1	1.01972×10^{-6}	2.248×10^{-6}	7.233×10^{-5}
9.80665	9.80665×10^{5}	1	2.205	7.093×10
4.44822	4.44822×10^{5}	4.536×10^{-1}	1	3.217×10
1.38255×10^{-1}	1.38255×10^{4}	1.410×10^{-2}	3.108×10^{-2}	1

8. Pressure

MPa	Pa	bar	kgf/cm^2	atm	mH_2O	mHg	$lbf/in^2(psi)$
1×10^{-6}	1	1×10^{-5}	1.0197×10^{-5}	9.869×10^{-6}	1.0197×10^{-4}	7.501×10^{-6}	1.450×10^{-4}
1×10^{-1}	1×10^{5}	1	1.0197	9.869×10^{-1}	1.0197×10	7.501×10^{-1}	1.450×10
9.80665×10^{-2}	9.80665×10^{4}	9.80665×10^{-1}	1	9.678×10^{-1}	1.0000×10	7.356×10^{-1}	1.422×10
1.01325×10^{-1}	1.01325×10^{5}	1.01325	1.0332	1	1.033×10	7.60×10^{-1}	1.470×10
9.80665×10^{-3}	9.80665×10^{3}	9.80665×10^{-2}	1.0000×10^{-1}	9.678×10^{-2}	1	7.355×10^{-2}	1.4222×10^{-1}
1.3332×10^{-1}	1.3332×10^{5}	1.3332	1.3595	1.3158	1.360×10	1	1.934×10
6.895×10^{-3}	6.895×10^{3}	6.895×10^{-2}	7.031×10^{-2}	6.805×10^{-2}	7.031×10^{-1}	5.171×10^{-2}	1

9. Stress

Pa	N/mm^2	kgf/mm^2	kgf/cm^2	lbf/ft^2
1	1×10^{-6}	1.0197×10^{-7}	1.0197×10^{-5}	2.089×10^{-2}
1×10^{6}	1	1.01972×10^{-1}	1.01972×10	2.089×10^{4}
9.80665×10^{6}	9.80665	1	1×10^{2}	2.048×10^{5}
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1	2.048×10^{3}
4.786×10	4.786×10^{-5}	4.882×10^{-6}	4.882×10^{-4}	1

10. Speed

m/s	km/h	kn (knot)	ft/s	mile/h
1	3.6	1.944	3.281	2.237
2.778×10^{-1}	1	5.400×10^{-1}	9.113×10^{-1}	6.214×10^{-1}
5.144×10^{-1}	1.852	1	1.688	1.151
3.048×10^{-1}	1.097	5.925×10^{-1}	1	6.818×10^{-1}
4.470×10^{-1}	1.609	8.690×10^{-1}	1.467	1

11. Angular speed

rad/s	°/s	rpm
1	5.730×10	9.549
1.745×10^{-2}	1	1.667×10^{-1}
1.047×10^{-1}	6	1

12. Viscosity

Pa s	cP	P	kgf·s/m²	lbf·s/in²
1	1.000×10^{3}	1.0×10	1.01973×10^{-1}	1.449×10^{-4}
1×10^{-3}	1	1.0×10^{-2}	1.01973×10^{-4}	1.449×10^{-7}
1×10^{-1}	1.00×10^{2}	1	1.01973×10^{-2}	1.449×10^{-5}
9.80665	9.80665×10^{3}	9.80665×10	1	1.422×10^{-3}
6.9×10^{3}	6.9×10^{6}	6.9×10^{4}	7.03×10^{2}	1

13. Dynamic viscosity

m²/s	cSt	St	ft²/s
1	1×10^{6}	1×10^{4}	1.076×10
1×10^{-6}	1	1×10^{-2}	1.076×10^{-5}
1×10^{-4}	1.00×10^{2}	1	1.076×10^{-3}
9.290×10^{-2}	9.2900×10^{4}	9.290×10^{2}	1

14. Volumetric flow

m³/s	ℓ/s	ℓ/min	m³/min	m³/h	ft³/s
1	1×10^{3}	6×10^{4}	6×10	3.600×10^{3}	3.531×10
1×10^{-3}	1	6×10	6×10^{-2}	3.600	3.531×10^{-2}
1.66666×10^{-5}	1.666×10^{-2}	1	1×10^{-3}	6×10^{-2}	5.9×10^{-4}
1.66666×10^{-2}	1.66666×10	1×10^{3}	1	6×10	5.885×10^{-1}
2.77777×10^{-4}	2.77777×10^{-1}	1.66666×10	1.66666×10^{-2}	1	9.810×10^{-3}
2.832×10^{-2}	2.832×10	1.69833×10^{3}	1.69833	1.019×10^{2}	1

15. Work, energy and calories

J	kW·h	kgf·m	kcal	ft·lbf	BTU
1	2.778×10^{-7}	1.0197×10^{-1}	2.389×10^{-4}	7.376×10^{-1}	9.480×10^{-4}
3.6×10^{6}	1	3.671×10^{5}	8.600×10^{2}	2.655×10^{6}	3.413×10^{3}
4.1896×10^{3}	1.163×10^{-3}	4.269×10^{2}	1	3.087×10^{3}	3.968
1.356	3.766×10^{-7}	1.383×10^{-1}	3.239×10^{-4}	1	1.285×10^{-3}
1.055×10^{3}	2.930×10^{-4}	1.076×10^{2}	2.520×10^{-1}	7.780×10^{2}	1

16. Power (power/motivity)

kW	kgf·m/s	PS(FR)	HP(UK)	kcal/s	ft·lbf/s	BTU/s
1	1.0197×10^{2}	1.3596	1.3405	2.389×10^{-1}	7.376×10^{2}	9.480×10^{-1}
9.807×10^{-3}	1	1.333×10^{-2}	1.315×10^{-2}	2.343×10^{-3}	7.233	9.297×10^{-3}
7.355×10^{-1}	7.5×10	1	9.859×10^{-1}	1.757×10^{-1}	5.425×10^{2}	6.973×10^{-1}
7.46×10^{-1}	7.607×10	1.0143	1	1.782×10^{-1}	5.502×10^{2}	7.072×10^{-1}
4.186	4.269×10^{2}	5.691	5.611	1	3.087×10^{3}	3.968
1.356×10^{-3}	1.383×10^{-1}	1.843×10^{-3}	1.817×10^{-3}	3.239×10^{-4}	1	1.285×10^{-3}
1.055	1.076×10^{2}	1.434	1.414	2.520×10^{-1}	7.780×10^{2}	1

17. Thermal conduction ratio

W/(m·K)	kcal/m·h·°C	BTU/ft·h·°F
1	8.600×10^{-1}	5.779×10^{-1}
1.163	1	6.720×10^{-1}
1.731	1.488	1

18. Thermal conduction coefficient

W/(m²·K)	kcal/m²·h·°C	J/m²·h·°C	BTU/ft²·h·°F
1	8.598×10^{-1}	3.599×10^{3}	1.761×10^{-1}
1.163	1	4.187×10^{3}	2.048×10^{-1}
2.778×10^{-4}	2.389×10^{-4}	1	4.893×10^{-5}
5.678	4.882	2.044×10^{4}	1

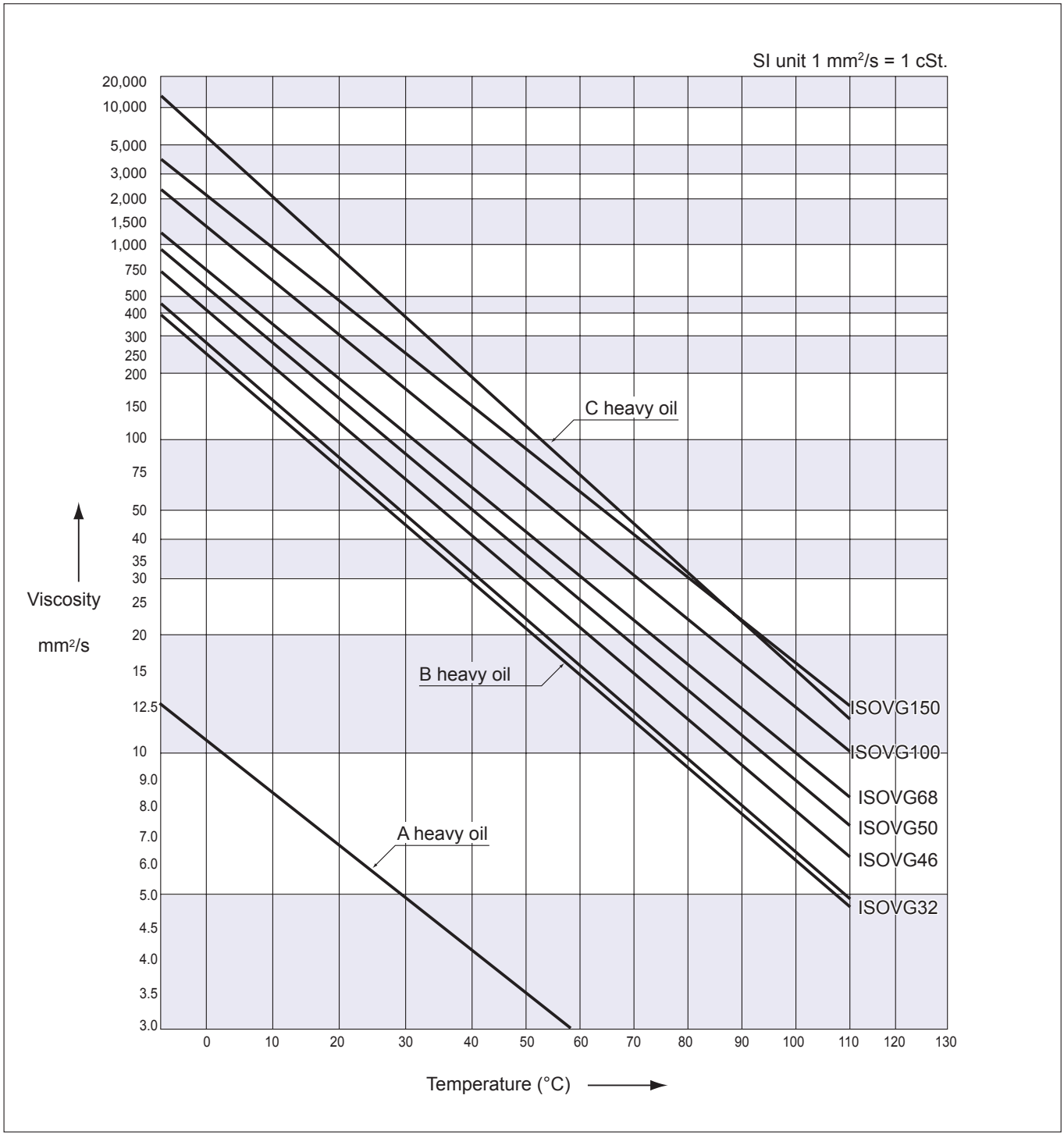
19. Charpy impact value

J/cm²	kgf·m/cm²
1	1.0197×10^{-1}
9.80665	1

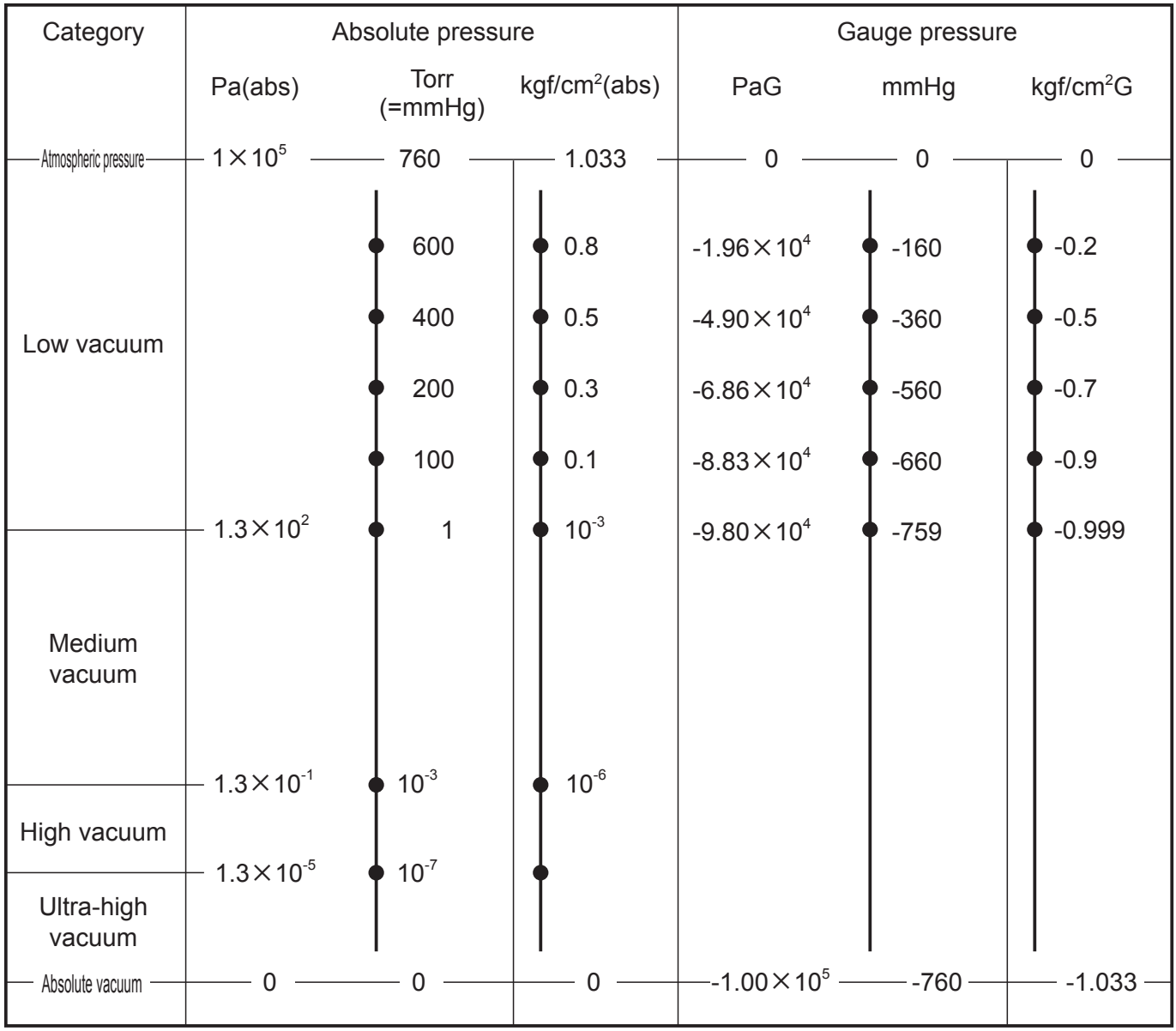
20. Izot impact value

J	kgf·m
1	1.0197×10^{-1}
9.80665	1

Heavy oil and turbine oil viscosity characteristics



Vacuum unit and class



CE Marking

CKD, with a wide range of EU Standards compliant components, supports customers' machine products to attain CE marking.

CE : Shown on EU Standards compliant products

What is CE Marking?

- CE Marking certifies that the product satisfies all EC Directive requirements to which it is applicable.
- CE Marking serves as a product passport that allows products with CE Marking to be freely distributed in EU countries.
- Machines exported to the EU must comply with Machinery Directives, EMC Directives and Low-Voltage Directives, etc. In principle, CE Marking must be indicated on the final product marketed; therefore, as a rule, built-in components do not require CE Markings. If compliance of built-in parts (CKD products) with EU Standards can be verified, CE Marking of the final product (customer's machine product) can be easily obtained.

Applicable EC Directives

CKD's main components, such as solenoid valves, sensors, and direct drive actuator, are called on to comply with the Directives below. Many models already comply with EU Standards.

Directive	Requirement	Application
Machinery Directive (2006/42/EC)	Requirements on safety for machinery	■ Machines with drive sections Components such as solenoid valves are not subject to this compliance, but the user can obtain CE Marking certification more easily by complying with Standards.
EMC Directive (2014/30/ EU)	Electromagnetic interference generation (EMI emission) and electromagnetic interference elimination performance countermeasures (EMS immunity)	■ Devices generating electromagnetic interference or affected by electromagnetic interference Solenoid valves composed of a simple solenoid are not affected by electromagnetic interference, but the user can obtain CE Marking certification more easily by complying with Standards.
Low-Voltage Directive (2014/35/EU)	Electrical safety with regard to electric shock, etc.	■ Devices operating at 50 VAC to 1000 VAC and 75 VDC to 1500 VDC
Pressure Equipment Directive (2014/68/EU)	Safety regarding the dangers of fluid energy found in pressure equipment	■ When specific criteria are exceeded within pressure equipment
Simple Pressure Vessels Directive (2014/29/ EU)	Safety with regard to vessel leakage and explosion	■ Containers welded and for which total max. working pressure and volume (PV/S) exceeds 50 bar/liter The CKD air tank (AT) does not comply with this directive, and cannot be exported to the EU.
RoHS Directive (2011/65/ EU)	Environmentally active 6 restricted substances	■ Electrical and electronics devices
2011/65/EU and (EU)2015/863	Environmentally active 10 restricted substances	■ Electrical and electronics devices

CE marking is applicable for the European Union (EU) countries and European Free Trade Association (EFTA) countries, in addition to Turkey.

CKD product conformity to EU standards

⚠ Depending on specifications and detailed model No. combinations, compatible parts may not be available. Contact your CKD Sales Representative for details.
Visit our website for the latest information.
Website address https://www.ckd.co.jp/support/eu/

CKD RoHS Compliance

CKD's target is to develop environmentally friendly products.

RoHS

RoHS is the abbreviation for Restriction Of the use of certain Hazardous Substances in electrical and electronic equipment.
This is the directive prohibiting use of certain hazardous substances issued by the EU.

- CKD products are approved as in conformity to RoHS directive in order of priority from July 1, 2006.
- RoHS-compliant products are designed to reduce environmental load and can be distributed in the EU countries.

CKD Environment Policy

Based on the CKD Environment Policy enacted in 2001, CKD has been promoting company-wide environment management activities to protect the global environment.

CKD Environment Policy

1. Development and sales of low-environmental load products
2. Reduction of environmental pollutants
3. Promotion of energy and resource saving
4. Reduction of waste

CKD's Compliance with RoHS

From July 2006, we have sequentially enforced RoHS compliance of our key products. These products are indicated with the "RoHS-compliant" mark in this manual. Contact CKD sales for models compatible with the 10 RoHS prohibited substances.

(Note) Stock in distribution is being sequentially changed to RoHS compliance.

Technical data

RoHS Directive

(Directive 2011/65/EU of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment)

This directive assimilates laws related to limiting the use of hazardous substances in electrical and electronics components set forth by each EU member state, contributes to the protection of human health, and provides sufficient means for processing and recycling waste electrical and electric products.

1 Scope of application

1. Large appliances
2. Small appliances
3. IT equipment and telecommunications equipment
4. Consumer equipment
5. Lighting equipment
6. Electric tools
7. Toys, leisure goods and sporting equipment
8. Medical equipment and in-vitro diagnostic medical equipment
9. Monitoring and control equipment, industrial monitoring and control equipment
10. Vending machines
11. Other electrical and electronic equipment not in the above categories

Our equipment products mainly correspond to category 9: Industrial monitoring and control equipment.
(Some category 8 medical devices and non-applicable products are available)

2 Objective

Restricted substances 2011/65/EU

- Lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs)
- Polybrominated diphenyl ethers (PBDEs)

Substances subject to additional regulation ((EU)2015/863)

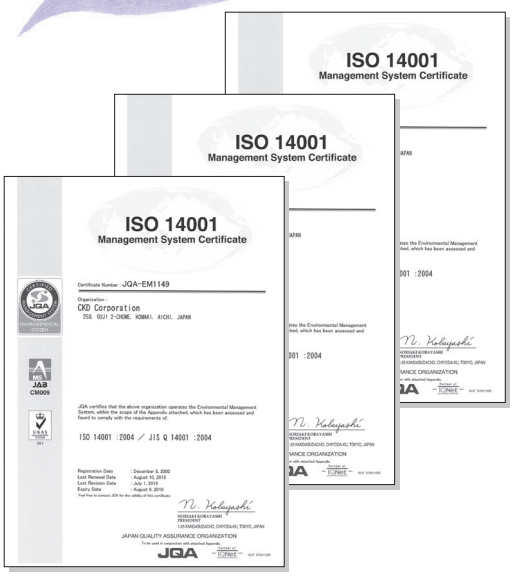
- Specified phthalates (DEHP,DBP,BBP,DIBP)

As a general rule, categories 8 and 9 electrical and electronic equipment containing any of the above may not be brought into the EU from July 22, 2021 on, and those in other categories likewise from July 22, 2019 on.

ISO9001/ISO14001 Certification

Providing safe quality, friendly to users, machines and environment.

CKD has acquired International Standard ISO9001 and ISO14001 certification and structured a quality and environment management system.
With safety, environment and energy conservation as our most important priorities, we are working company-wide to promote safe product and quality creation friendly to users, machines, society and the global environment.



International Standard ISO9001 Certification

International Standard on quality management system

CKD's production division acquired certification in 1994, and all CKD divisions, including the sales division, acquired certification in 2007.

Approach to quality system

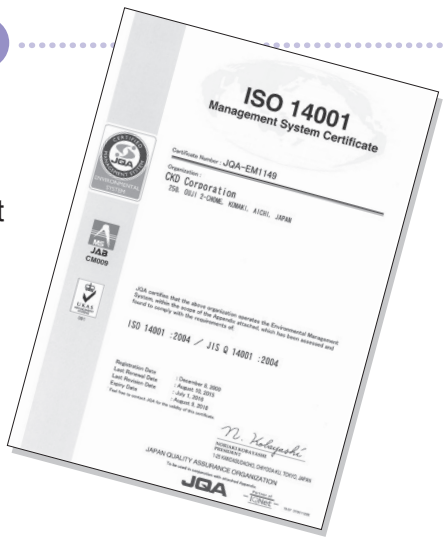
To respond to diverse product needs, CKD develops user-friendly products individualized for each industry. We conduct quality management activities to increase customer satisfaction.

International Standard ISO14001 Certification

International Standard for environment management systems. CKD's production division acquired certification in 2000, and all CKD divisions, including the sales division, acquired certification in 2003.

Approach to environment and energy conservation

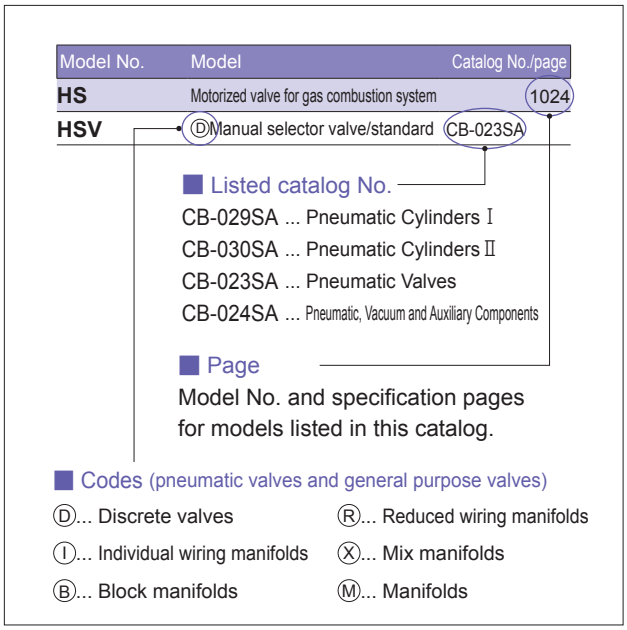
CKD is aware that preserving the global environment is an utmost priority. We conduct environmental management activities based on the CKD Environment Policy.



MEMO

MEMO

Model No. [index in alphabetical order]



Model No. [index in alphabetical order]

■ Listed catalog No.

CB-029SA ...Pneumatic Cylinders Ⅰ
CB-030SA ...Pneumatic Cylinders Ⅱ
CB-023SA ...Pneumatic Valves
CB-024SA ...Pneumatic, Vacuum and Auxiliary Components
CB-03-1SA...General Purpose Valves

■ Codes (pneumatic valves and general purpose valves)

Ⓓ...Discrete valves
Ⓡ...Reduced wiring manifolds
ⓘ...Individual wiring manifolds
Ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

Model No. [index in alphabetical order]

■ Listed catalog No.

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■ Codes (pneumatic valves and general purpose valves)

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Ⓡ...Reduced wiring manifolds
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Ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

Model No. [index in alphabetical order]

G

■ Listed catalog No.

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CB-023SA ...Pneumatic Valves
CB-024SA ...Pneumatic, Vacuum and Auxiliary Components
CB-03-1SA...General Purpose Valves

■ Codes (pneumatic valves and general purpose valves)

Ⓓ...Discrete valves
Ⓡ...Reduced wiring manifolds
Ⓘ...Individual wiring manifolds
Ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

Model No. [index in alphabetical order]

H

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CB-03-1SA...General Purpose Valves

■ Codes (pneumatic valves and general purpose valves)

Ⓓ...Discrete valves
Ⓡ...Reduced wiring manifolds
ⓘ...Individual wiring manifolds
ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

Model No. [index in alphabetical order]

L

M

■ Listed catalog No.

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CB-023SA ...Pneumatic Valves
CB-024SA ...Pneumatic, Vacuum and Auxiliary Components
CB-03-1SA...General Purpose Valves

■ Codes (pneumatic valves and general purpose valves)

Ⓓ...Discrete valves
Ⓡ...Reduced wiring manifolds
Ⓘ...Individual wiring manifolds
Ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

Model No. [index in alphabetical order]

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CB-024SA ...Pneumatic, Vacuum and Auxiliary Components
CB-03-1SA...General Purpose Valves

■ Codes (pneumatic valves and general purpose valves)

Ⓓ...Discrete valves
Ⓡ...Reduced wiring manifolds
ⓘ...Individual wiring manifolds
Ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

Model No. [index in alphabetical order]

N

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CB-023SA ...Pneumatic Valves
CB-024SA ...Pneumatic, Vacuum and Auxiliary Components
CB-03-1SA...General Purpose Valves

■ Codes (pneumatic valves and general purpose valves)

Ⓓ...Discrete valves
ⓘ...Individual wiring manifolds
Ⓑ...Block manifolds
Ⓡ...Reduced wiring manifolds
Ⓧ...Mix manifolds
Ⓜ...Manifolds

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Ⓘ...Individual wiring manifolds
Ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

Model No. [index in alphabetical order]

SCA2-K	Medium bore size cylinder (medium bore size ø40 to 100)/double acting/steel tube	CB-029SA
SCA2-O	Medium bore size cylinder (medium bore size ø40 to 100)/double acting/low speed	CB-029SA
SCA2-P	Medium bore size cylinder (medium bore size ø40 to 100)/double acting/stroke adjustable/push	CB-029SA
SCA2-P12	Medium bore size cylinder (oil-prohibited)	CB-029SA
SCA2-Q2	Medium bore size cylinder (medium bore size ø40 to 100)/double acting/position locking	CB-029SA
SCA2-R	Medium bore size cylinder (medium bore size ø40 to 100)/double acting/adjustable stroke/pull	CB-029SA
SCA2-T	Medium bore size cylinder (medium bore size ø40 to 100)/double acting/heat resistance	CB-029SA
SCA2-U	Medium bore size cylinder (medium bore size ø40 to 100)/double acting/low friction	CB-029SA
SCA2-V	Medium bore size cylinder (medium bore size ø40 to 100)/with valve/double acting	CB-029SA
SCA2-W	Medium bore size cylinder (medium bore size ø40 to 100)/double acting/two-stage	CB-029SA
SCD	Speed controller/ Miniature in/out	CB-024SA
SCD2	Speed controller/In/out line type/with push-in fitting	CB-024SA
SCG	Tie rod cylinder/ Double acting/single rod	CB-029SA
SCG-D	Tie rod cylinder/ Double acting/double rod	CB-029SA
SCG-G	Tie rod cylinder/ Double acting/rubber scraper	CB-029SA
SCG-G2/3	Tie rod cylinder/ Double acting/coolant proof	CB-029SA
SCG-G4	Tie rod cylinder/Double acting/anti-spatter adherence	CB-029SA
SCG-M	Tie rod cylinder/ Double acting/rotation-stop	CB-029SA
SCG-O	Tie rod cylinder/ Double acting/low speed	CB-029SA
SCG-Q	Tie rod cylinder/ Double acting/position locking	CB-029SA
SCG-U	Tie rod cylinder/ Double acting/low friction	CB-029SA
SCK	Shock absorber/adjustable	CB-030SA
SCL2	Speed controller/ Line type/with push-in fitting	CB-024SA
SCL2-N	Needle valve/ Line type/with push-in fitting	CB-024SA
SCM	Round shaped cylinder/ double acting/single rod	CB-029SA
SC-M3/M5 (-F)	Speed controller/miniature	CB-024SA
SCM-B	Round shaped cylinder/ double acting/back to back	CB-029SA
SCM-D	Round shaped cylinder/ double acting/double rod	CB-029SA
SCM-F	Round shaped cylinder/ double acting/fine speed	CB-029SA
SCM-LD	Round shaped cylinder/double acting/direct mounting foot	CB-029SA
SCM-M	Round shaped cylinder/ double acting/rotation-stop	CB-029SA
SCM-O	Round shaped cylinder/ double acting/low speed	CB-029SA
SCM-P	Round shaped cylinder/double acting/adjustable stroke/push	CB-029SA
SCM-Q	Round shaped cylinder/ double acting/position locking	CB-029SA
SCM-R	Round shaped cylinder/double acting/adjustable stroke/pull	CB-029SA
SCM-T	Round shaped cylinder/ double acting/heat resistance	CB-029SA
SCM-U	Round shaped cylinder/ double acting/low friction	CB-029SA
SCM-W	Round shaped cylinder/ double acting/two-stage	CB-029SA
SCM-W4	Round shaped cylinder/ double acting/tandem	CB-029SA
SCM-X	Round shaped cylinder/ single acting/push	CB-029SA
SCM-Y	Round shaped cylinder/ single acting/pull	CB-029SA
SCPD3	Pencil shaped cylinder/ Double acting/single rod	CB-029SA

■ Listed catalog No.

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CB-03-1SA...General Purpose Valves

■ Codes (pneumatic valves and general purpose valves)

Ⓓ...Discrete valves
Ⓡ...Reduced wiring manifolds
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Ⓜ...Manifolds

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Model No. [index in alphabetical order]

Model No.	Model	Catalog No./page
S		
SSD2-KU	Compact cylinder/double acting/high load/low friction	CB-029SA
SSD2-L	Compact cylinder/double acting/single rod/long stroke	CB-029SA
SSD2-L4	Compact cylinder/double acting/with strong magnetic field proof switch	CB-029SA
SSD2-M	Compact cylinder/double acting/rotation-stop	CB-029SA
SSD2-O	Compact cylinder/double acting/low speed	CB-029SA
SSD2-P7*	Compact cylinder/double acting/clean-room specifications	CB-029SA
SSD2-Q	Compact cylinder/double acting/with position locking	CB-029SA
SSD2-T1	Compact cylinder/double acting/heat resistance	CB-029SA
SSD2-T1L	Compact cylinder/double acting/with heat resistant cylinder switch	CB-029SA
SSD2-W	Compact cylinder/double acting/two-stage	CB-029SA
SSD2-X	Compact cylinder/single acting/push	CB-029SA
SSD2-Y	Compact cylinder/single acting/pull	CB-029SA
SSD-B	Compact cylinder/double acting/back to back	CB-029SA
SSD-D	Compact cylinder/double acting/double rod	CB-029SA
SSD-DG1	Compact cylinder/double acting/double rod/coil scraper	CB-029SA
SSD-DG4	Compact cylinder/double acting/double rod/anti-spatter adherence	CB-029SA
SSD-F	Compact cylinder/double acting/fine speed	CB-029SA
SSD-G1	Compact cylinder/double acting/coil scraper	CB-029SA
SSD-G1L4	Compact cylinder/double acting/with strong magnetic field proof for switch/with coil scraper	CB-029SA
SSD-G2/G3	Compact cylinder/double acting/coolant proof	CB-029SA
SSD-G4	Compact cylinder/double acting/anti-spatter adherence	CB-029SA
SSD-G5	Compact cylinder/double acting/single rod/environment-resistant scraper	CB-029SA
SSD-K	Compact cylinder/double acting/single rod/high load	CB-029SA
SSD-K-*C	Compact cylinder/double acting/high load/rubber-air cushioned	CB-029SA
SSD-KF	Compact cylinder/double acting/high load/fine speed	CB-029SA
SSD-KG1	Compact cylinder/double acting/high load/coil scraper	CB-029SA
SSD-KG1L4	Compact cylinder/double acting/high load/with strong magnetic field proof switch/with coil scraper	CB-029SA
SSD-KG2/KG3	Compact cylinder/double acting/high load/coolant proof	CB-029SA
SSD-KG4	Compact cylinder/double acting/high load/anti-spatter adherence	CB-029SA
SSD-KG5	Compact cylinder/double acting/high load/environment-resistant scraper	CB-029SA
SSD-KL4	Compact cylinder/double acting/high load/with strong magnetic field proof switch	CB-029SA
SSD-K-P12	Compact cylinder/oil-prohibited	CB-029SA
SSD-KU	Compact cylinder/double acting/low friction	CB-029SA
SSD-L4	Compact cylinder/double acting/with strong magnetic field proof switch	CB-029SA
SSD-LN	With length measuring sensor	CB-030SA
SSD-M	Compact cylinder/double acting/rotation-stop	CB-029SA
SSD-O	Compact cylinder/double acting/low speed	CB-029SA
SSD-Q	Compact cylinder/double acting/position locking	CB-029SA
SSD-T	Compact cylinder/double acting/heat resistance	CB-029SA
SSD-T1L	Compact cylinder/double acting/with heat resistant cylinder switch	CB-029SA
SSD-W	Compact cylinder/double acting/two-stage	CB-029SA
SSD-X	Compact cylinder/single acting/push	CB-029SA
SSD-Y	Compact cylinder/single acting/pull	CB-029SA
SSG	Guided super compact cylinder/double acting/single rod	CB-029SA
STA2	Stopper cylinder	CB-029SA
STG	Guided cylinder/Double acting/single rod	CB-030SA

STG-*-*C	Guided cylinder/Double acting/rubber-air cushioned	CB-030SA
STG-*C	Guided cylinder/Double acting/air cushioned	CB-030SA
STG-*G	Guided cylinder/ Double acting/rubber scraper	CB-030SA
STG-*G1	Guided cylinder/ Double acting/coil scraper	CB-030SA
STG-*G2/G3	Guided cylinder/ Double acting/coolant proof	CB-030SA
STG-*G4	Guided cylinder/Double acting/anti-spatter adherence	CB-030SA
STG-*Q	Guided cylinder/ Double acting/position locking	CB-030SA
STG-B-P7*	Guided cylinder/Double acting/ clean-room specifications	CB-030SA
STG-K	Guided cylinder/Double acting/heavy duty guide rod	CB-030SA
STG-MG5	Guided cylinder/Double acting/ environment-resistant scraper	CB-030SA
STK	Stopper cylinder/Double acting/round rod end form	CB-029SA
STK-JY	Stopper cylinder/Single acting/pull/rod end form roller	CB-029SA
STK-JY1	Stopper cylinder/Double acting/ spring integrated/rod end form roller	CB-029SA
STK-M	Stopper cylinder/Double acting/ rod end form chamfered	CB-029SA
STK-MY	Stopper cylinder/Single acting/ pull/rod end form chamfered	CB-029SA
STK-MY1	Stopper cylinder/Double acting/spring integrated/rod end form chamfered	CB-029SA
STK-Y	Stopper cylinder/Single acting/ pull/round rod end form	CB-029SA
STK-Y1	Stopper cylinder/Double acting/ spring integrated/round rod end form	CB-029SA
STL-*	Guided cylinder (long stroke)/ double acting/single rod	CB-030SA
STL-*-*C	Guided cylinder (long stroke)/ double acting/rubber-air cushioned	CB-030SA
STL-*C	Guided cylinder (long stroke)/ double acting/air cushioned	CB-030SA
STL-*F	Guided cylinder (long stroke)/ double acting/fine speed	CB-030SA
STL-*G/G1	Guided cylinder (long stroke)/ double acting/scraper	CB-030SA
STL-*G2/G3	Guided cylinder (long stroke)/ double acting/coolant proof	CB-030SA
STL-*G4	Guided cylinder (long stroke)/double acting/anti-spatter adherence	CB-030SA
STL-*O	Guided cylinder (long stroke)/ double acting/low speed	CB-030SA
STL-*P	Guided cylinder (long stroke)/double acting/stroke adjustable/push	CB-030SA
STL-*Q	Guided cylinder (long stroke)/ double acting/position locking	CB-030SA
STL-*T	Guided cylinder (long stroke)/ double acting/heat resistance	CB-030SA
STL-*T2	Guided cylinder (long stroke)/double acting/packing material fluoro rubber	CB-030SA
STL-*V	Guided cylinder (long stroke)/ with valve/double acting	CB-030SA
STM-B-P7*	Guided cylinder/Double acting/ single rod/clean-room specifications	CB-030SA
STM-M/B	Guided cylinder/ Double acting/single rod	CB-030SA
STR2-*	Twin rod cylinder/double acting/single rod	CB-030SA
STR2-*D	Twin rod cylinder/double acting/double rod	CB-030SA
STR2-*F	Twin rod cylinder/double acting/fine speed	CB-030SA
STR2-*O	Twin rod cylinder/double acting/low speed	CB-030SA
STR2-*Q	Twin rod cylinder/double acting/position locking	CB-030SA
STS-*	Guided cylinder (short stroke)/ double acting/single rod	CB-030SA
STS-*-*C	Guided cylinder (short stroke)/ double acting/rubber-air cushioned	CB-030SA

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CB-030SA ...Pneumatic Cylinders Ⅱ
CB-023SA ...Pneumatic Valves
CB-024SA ...Pneumatic, Vacuum and Auxiliary Components
CB-03-1SA...General Purpose Valves

■ Codes (pneumatic valves and general purpose valves)

Ⓓ...Discrete valves
Ⓡ...Reduced wiring manifolds
Ⓘ...Individual wiring manifolds
Ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

Model No. [index in alphabetical order]

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Ⓧ...Mix manifolds
Ⓑ...Block manifolds
Ⓜ...Manifolds

General Purpose Valves

Catalog No. CB-03-1SA 9

Date of issue January 31, 2017 9th edition
November 30, 2020 9th edition Ver. 2

Place of issue **CKD Corporation**
2-250 Ouji, Komaki City, Aichi 485-8551, Japan
https://www.ckd.co.jp/english/

Fixed price 1,000 yen (tax not included)

CKD WARRANTY

Subject to the conditions below, CKD Corporation ("CKD") warrants the first end user (the "Buyer") that CKD's products are free from defects in material and workmanship.

"Warranty Period" is one (1) year from the first delivery to the customer.

CKD will, at CKD's option, either repair or replace a defective product, including lowest transportation costs but not including installation or any other similar charges, provided that the buyer (1) notifies CKD in writing of the claimed defect within one year from the date Buyer received the product, (2) provides a complete explanation of the defect, the application of the product, and such other information concerning use of the product as CKD may request, and (3) returns the product to CKD in accordance with CKD's specific written instructions and authorization obtained from CKD prior to return of the product, and CKD's inspection confirms that the product was defective.

This warranty applies only if the product was used and applied correctly under normal operating conditions and good engineering practice; was installed, operated and maintained in accordance with all instructions issued or published by CKD; was used within stated pressure, media and operating limitations published by CKD and in effect on the date of shipment; and was not subject to abuse, misuse or unauthorized modification.

THIS WARRANTY IS THE ONLY AUTHORIZED CKD WARRANTY AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, notwithstanding any disclosure to CKD of the use to which the product is to be put. The Buyer's **SOLE AND EXCLUSIVE REMEDY** on any claim of any kind for any loss or damage arising out of the manufacture, sale, delivery or use of CKD's products shall be for the repair or replacement of any defective products as provided herein.

IN NO EVENT SHALL CKD BE LIABLE FOR BUSINESS INTERRUPTIONS, LOSS OF PROFITS, PERSONAL INJURY, COSTS OF DELAY OR FOR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSSES, COSTS OR DAMAGES. There are no warranties, expressed or implied, made by CKD other than the warranty against defects in material and workmanship set forth above, and CKD neither assumes nor authorizes any other person or firm to assume for it any other obligations or liability.

CKD shall not be liable for any trouble, malfunction and damages of CKD products caused, directly or indirectly, by disaster or any other causes not attributable to CKD’s responsibility. CKD also shall not be responsible for any trouble, malfunction and damages of CKD products caused by the lack or malfunction of safety circuit or structure or function that should be commonly equipped in the Buyer's equipment in which the CKD products were used.

CKD MAINTAINS A POLICY OF ONGOING PRODUCT DEVELOPMENT AND IMPROVEMENT. WE THEREFORE RESERVE THE RIGHT TO CHANGE DIMENSIONS, SPECIFICATIONS AND DESIGN WITHOUT NOTICE.

WORLD-NETWORK

CKD Corporation

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ASIA

喜開理(上海)機器有限公司
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2020.12

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