

Weir Diaphragm Valve SWD-T Series



Produced with Craftsmanship

Contributes to the automation of flow rate adjustment that has traditionally been done with a manual valve.



Electro pneumatic regulator
SWD-EVD

+

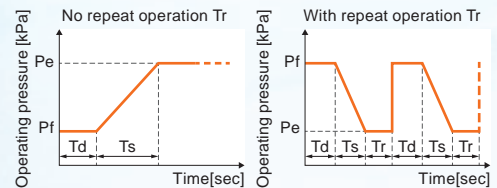
Weir diaphragm valve
SWD-C Series

Preset function

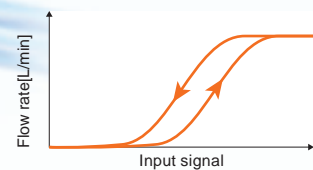
Register any parameters in the preset memory.
(Max. 6 patterns)
Can be called up using an external signal.

[Parameters that can be input]

- Pressure: Pf (initial pressure), Pe (ultimate pressure)
- Time parameter:
Td (delay time), Ts (sweep time), Tr (repeat time)

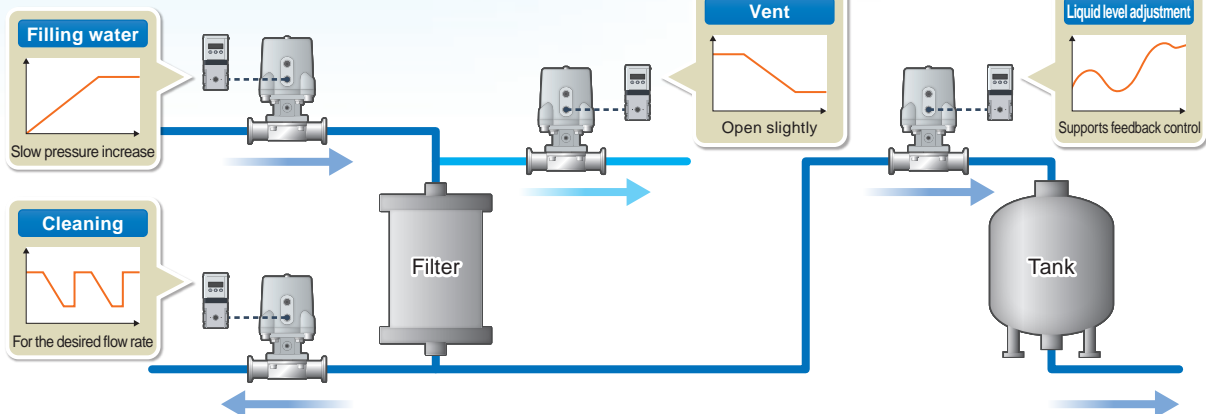


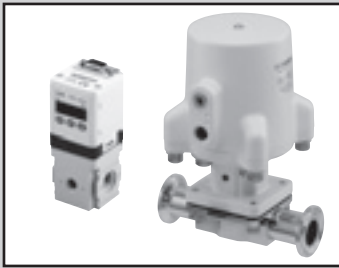
Supports flow rate proportional control with analog input signal



Examples of applications

● Various flow rate control





Weir diaphragm valve Flow rate control type

SWD-T Series

● Connection: ISO ferrule



Specifications

* Refer to pages 2 to 4 for the Discrete valve (SWD-C) specifications.

* Refer to pages 5 to 7 for specifications of the Discrete electro-pneumatic regulator (SWD-EVD).

How to order

SWD 1 1 - 8 - F T - 0 AN - C1B1

Model No.

● Electro-pneumatic regulator option

A Valve series

B Valve actuation

C Valve port size

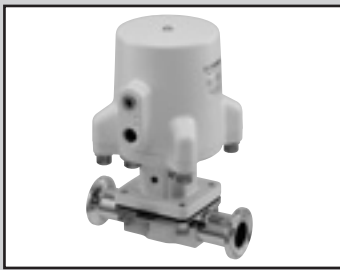
D Valve material combination

E Valve option

F Electro-pneumatic regulator input specifications

G Electro-pneumatic regulator output specifications

| Code | Item | SWD1 | SWD2 | SWD3 | SWD4 |
|--|---|------|------|------|------|
| A Valve series | | | | | |
| 1 | Size 1 | ● | | | |
| 2 | Size 2 | | ● | | |
| 3 | Size 3 | | | ● | |
| 4 | Size 4 | | | | ● |
| B Valve actuation | | | | | |
| 1 | NC (normally closed) | ● | ● | ● | ● |
| 2 | NO (normally open) | ● | ● | ● | ● |
| C Valve 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) | | | | ● |
| D Valve material combination | | | | | |
| F | Actuator | | | | |
| | ADC12 | ● | ● | ● | ● |
| | Diaphragm | | | | |
| | PTFE/EPDM | ● | ● | ● | ● |
| | Body | | | | |
| | SUS316L | ● | ● | ● | ● |
| E Valve option | | | | | |
| T | Valve: Flow rate control type (SWD-C) | ● | ● | ● | ● |
| | Electro-pneumatic regulator set for control | ● | ● | ● | ● |
| F Electro-pneumatic regulator Input specification | | | | | |
| 0 | 0-10 VDC | ● | ● | ● | ● |
| 1 | 0-5 VDC | ● | ● | ● | ● |
| 2 | 4-20 mA DC | ● | ● | ● | ● |
| G Electro-pneumatic regulator output specifications | | | | | |
| AN | 1 to 5 V analog, error (NPN) | ● | ● | ● | ● |
| AP | 1 to 5 V analog, error (PNP) | ● | ● | ● | ● |
| H Electro-pneumatic regulator option | | | | | |
| Cable option | | | | | |
| Blank | None | ● | ● | ● | ● |
| C1 | Cable 1 m | ● | ● | ● | ● |
| C3 | Cable 3 m | ● | ● | ● | ● |
| Bracket option | | | | | |
| Blank | None | ● | ● | ● | ● |
| B1 | B-bracket, floor mounted | ● | ● | ● | ● |
| L11 | L-bracket, wall mounted | ● | ● | ● | ● |



Weir diaphragm valve Flow rate control type

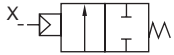
SWD-C Series

● Connection: ISO ferrule

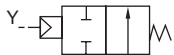


JIS symbol

● NC (normally closed)



● NO (normally open)



Specifications

| Item | | SWD*1 | SWD*2 | | |
|---------------------------------|----------------------|--|--------------|------------|-------------|
| Actuation | | NC | NO | | |
| Working fluid | | Water, pure water, chemical liquids (fluids that do not corrode wetted part materials) | | | |
| Working pressure | MPa | 0 to 0.6 | | | |
| Proof pressure (water pressure) | MPa | 2.0 | | | |
| Fluid temperature | °C | 5 to 90 (during steam sterilization 130°C, allowable for 20 minutes or less) | | | |
| Ambient temperature | °C | 0 to 60 | | | |
| Frequency | cycles/min. | 20 | | | |
| Valve seat leakage | cm ³ /min | 0 (water pressure) | | | |
| Mounting orientation | | Unrestricted (*2) | | | |
| Operating port | | Rc1/8 | | | |
| Operating fluid | | Air | | | |
| Operating pressure (*1) | MPa | 0.35 to 0.7 | 0.25 to 0.35 | | |
| | | | | 0.4 to 0.7 | 0.3 to 0.35 |
| | | 0.35 to 0.4 | | | |
| | | | Cv | | |
| | | 2.6 | | | |
| 4.5 | | | | | |
| 13 | | | | | |
| 27 | | | | | |

*1: The above values are the pressure range for fully open or fully closed. The pressure range for flow rate control is less than the min. pressure. For details, refer to the technical data (flow rate characteristics) on our website.

*2: When using horizontal piping, liquid accumulation in the valve can be minimized by piping at the angles described on page 10.

How to order

SWD 1 1 - 8 - F C

Model No. A Series

B Actuation

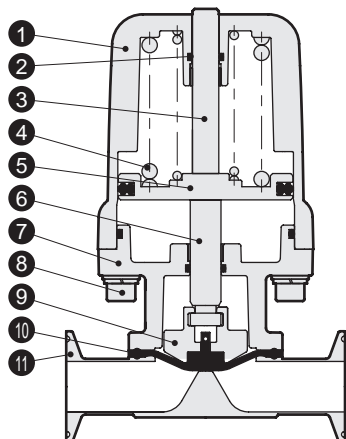
C Port size

D Material combination

E Valve option

| Code | Item | SWD1 | SWD2 | SWD3 | SWD4 |
|-------------------------------|--------------------------|------|------|------|------|
| A Series | | | | | |
| 1 | Size 1 | ● | | | |
| 2 | Size 2 | | ● | | |
| 3 | Size 3 | | | ● | |
| 4 | Size 4 | | | | ● |
| B Actuation | | | | | |
| 1 | NC (normally closed) | ● | ● | ● | ● |
| 2 | NO (normally open) | ● | ● | ● | ● |
| C 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) | | | | ● |
| D Material combination | | | | | |
| F | Actuator | | | | |
| | ADC12 | | | | |
| | Diaphragm | | | | |
| | PTFE/EPDM | | | | |
| | Body | | | | |
| | SUS316L | ● | ● | ● | ● |
| E Valve option | | | | | |
| C | Flow rate control type | ● | ● | ● | ● |

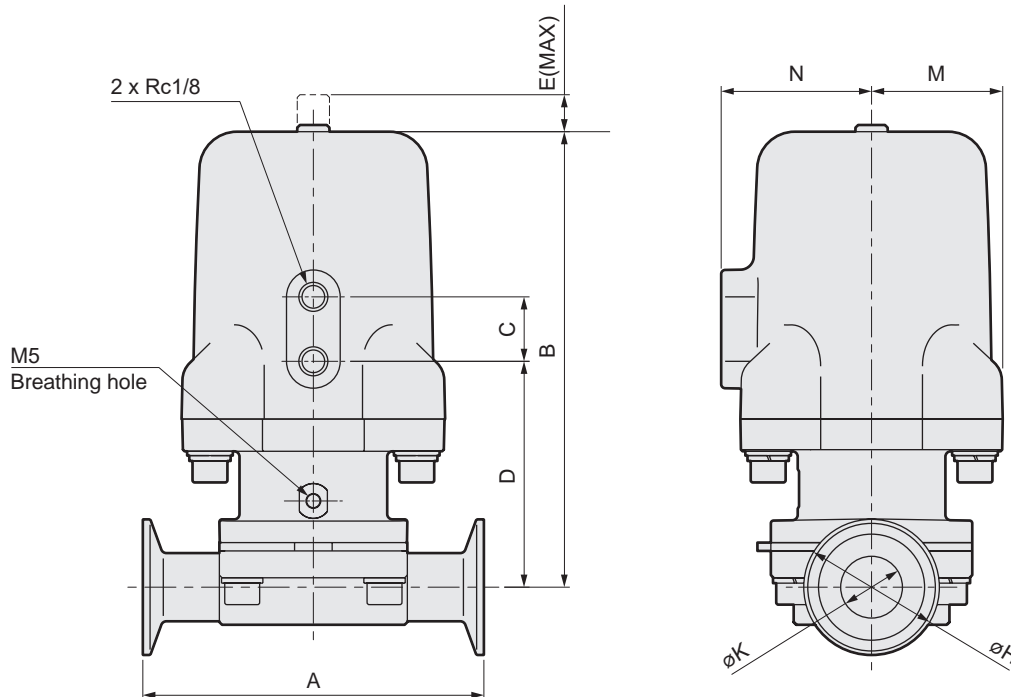
Internal structure and parts list



| 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 |

*Refer to page 4 for consumable parts. Wetted parts material is PTFE (diaphragm) and SUS316L (body).

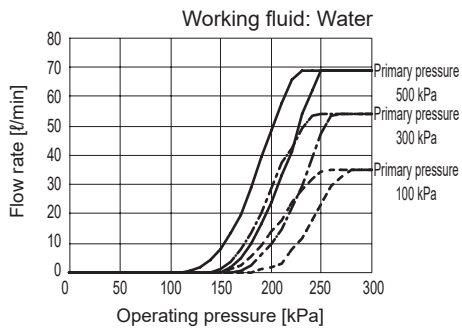
Dimensions



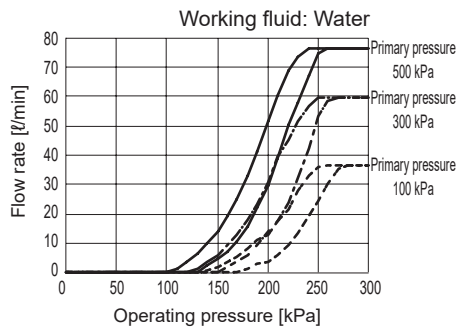
| Model No. | A | B | C | D | E | H | K | M | N | Weight [kg] | |
|------------|-----|------|----|------|------|------|------|----|------|-------------|-----|
| | | | | | | | | | | NC | NO |
| SWD1*8-FC | 90 | 99.5 | 22 | 60 | 7 | 34 | 10.5 | 32 | 40 | 0.6 | |
| SWD1*10-FC | 90 | 101 | 22 | 61.5 | 7 | 34 | 14 | 32 | 40 | 0.6 | |
| SWD2*15-FC | 108 | 130 | 22 | 73 | 8.5 | 34 | 17.5 | 38 | 46.5 | 1.2 | |
| SWD3*25-FC | 127 | 170 | 24 | 84 | 12.5 | 50.5 | 23 | 49 | 56 | 2.7 | 2.3 |
| SWD4*40-FC | 159 | 212 | 28 | 97 | 16.5 | 50.5 | 35.7 | 57 | 66 | 5.1 | 4.1 |

Flow characteristics

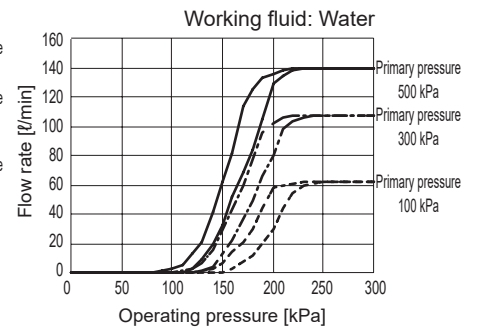
●SWD11-8-FC



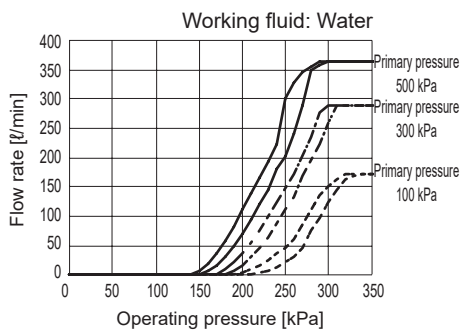
●SWD11-10-FC



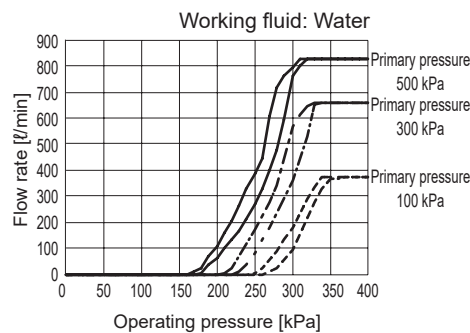
●SWD21-15-FC



●SWD31-25-FC



●SWD41-40-FC



Nonete: The product performance varies and may fluctuate due to the working fluid, temperature, etc., and so consider this as being a reference value. Detailed characteristics data will be posted in the technical data on our website.

How to order repair parts

SWD - 1 PE C

Series

Option

| Code | Item |
|-----------------|------------------------|
| A Series | |
| 1 | Size 1 |
| 2 | Size 2 |
| 3 | Size 3 |
| 4 | Size 4 |
| B Option | |
| Blank | Standard |
| C | Flow rate control type |

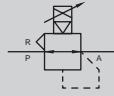




Electro-pneumatic regulator for SWD-C

SWD-EVD Series

JIS symbol



| Item | SWD-EVD□ | |
|-----------------------------------|--|-----------------------|
| Actuation *1 | NO | |
| Working fluid | Clean compressed air (JIS B 8392-1: 2012(ISO 8573-1: 2010)[1:3:2]or equiv.) | |
| Max. working pressure | 700 kPa | |
| Min. working pressure | Set pressure +100kPa | |
| Proof pressure | Inlet | 1050 kPa |
| | Output side | 750 kPa |
| Pressure control range *2 | 0 to 500 kPa | |
| Power supply voltage | 24 VDC±10% (power supply with ripple rate 1% or less) | |
| Current consumption | 0.18 A or less (0.6 A or less rush current when the power is turned ON) | |
| Input signal (input impedance) | 0 to 10 VDC (6.7kΩ) | |
| | 0 to 5 VDC (10 kΩ) | |
| | 4 to 20 mADC (250 Ω) | |
| Preset input | 8 points | |
| Output signal | Output accuracy: ±6%F.S. or less, Analog output: 1-5 VDC (connecting load impedance 500kΩ and over) | |
| Error output signal | NPN, or PNP open collector output, 30 V or less and 50mA or less, voltage drop 2.4V or less, PLC/relay compatible | |
| Direct memory setting | 5 to 500kPa (min. setting width 1kPa/setting resolution 1kPa) | |
| Hysteresis *3 | 0.5% F.S. or less | |
| Linearity *3 | ± 0.3% F.S. or less | |
| Resolution *3 | 0.2% F.S. or less | |
| Repeatability *3 | 0.3% F.S. or less | |
| Temperature characteristics | Zero point fluctuation | 0.15% F.S./°C or less |
| | Span point fluctuation | 0.07% F.S./°C or less |
| Max. flow rate (ANR) *4 | 400l/min | |
| Step response *5 | None load | 0.2 sec or less |
| Vibration resistance | 98m/s ² or less | |
| Ambient temperature | 5 to 45°C | |
| Fluid temperature | 5 to 45°C | |
| Port size | Rc1/4 | |
| Mounting orientation | Unrestricted | |
| Weight | 270 g (body only) | |
| Protection circuit | Power reverse connection protection | |

*1: The pilot operating pressure of this product is released (NO) when the power is OFF, which causes the secondary pressure to drop to atmospheric pressure.

*2: There is 1% F.S. or less residual pressure when the input signal is 0%. (5 kPa)

*3: The conditions for the values above are: 24±0.1 VDC power supply voltage, 25±3°C ambient temperature, no load, working pressure of +100kPa max. control pressure, and 10 to 90% control pressure. In addition, when the secondary side is a closed circuit, pressure fluctuations will occur if the product is used for blowing or for similar applications.

*4: The characteristics where working pressure is maximum and control pressure is maximum are shown.

*5: The above characteristics are those when the max. working pressure is set and the step amount is set

from

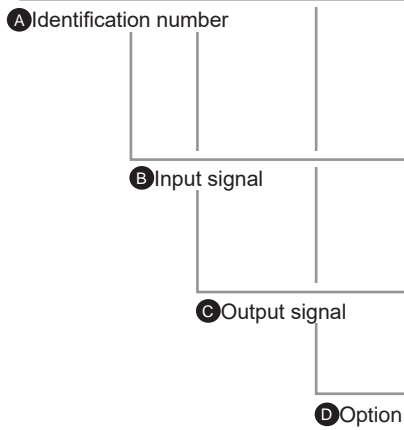
| |
|----------------------|
| 50% F.S. → 100% F.S. |
| 50% F.S. → 60% F.S. |
| 50% F.S. → 40% F.S. |

* Refer to the SM-50829 instruction manual for safety precautions, wiring method and operation method.

* For input/output characteristics, analog output, flow characteristics, and relief characteristics, refer to EVD-1500 in Pneumatic, Vacuum, and Auxiliary Components (CB-024SA).

How to order

SWD - EVD1 - 0 AN - C1B1



| Code | Item |
|--------------------------------|------------------------------|
| A Identification number | |
| EVD1 | For SWD12, 22 |
| EVD2 | For SWD32 |
| EVD3 | For SWD11, 21, 42 |
| EVD4 | For SWD31, 41 |
| B Input signal | |
| 0 | 0-10 VDC |
| 1 | 0-5 VDC |
| 2 | 4-20 mA DC |
| C Output signal | |
| AN | 1 to 5 V analog, error (NPN) |
| AP | 1 to 5 V analog, error (PNP) |
| D Option | |
| Cable option | |
| Blank | None |
| C1 | Cable 1 m |
| C3 | Cable 3 m |
| Bracket option | |
| Blank | None |
| B1 | B-bracket, floor mounted |
| L11 | L-bracket, wall mounted |

*1: There is 1% F.S. or less residual pressure when the input signal is 0%.

[Example of model No.]

SWD-EVD1-0AN-C1B1

- A** (Identification number) : For SWD12, 22
- B** Input signal : 0-10 V
- C** Output signal : 1 to 5 V analog, error (NPN)
- D** Option : Cable 1 m, B-bracket

● Option (cable, B-bracket) Discrete model No.

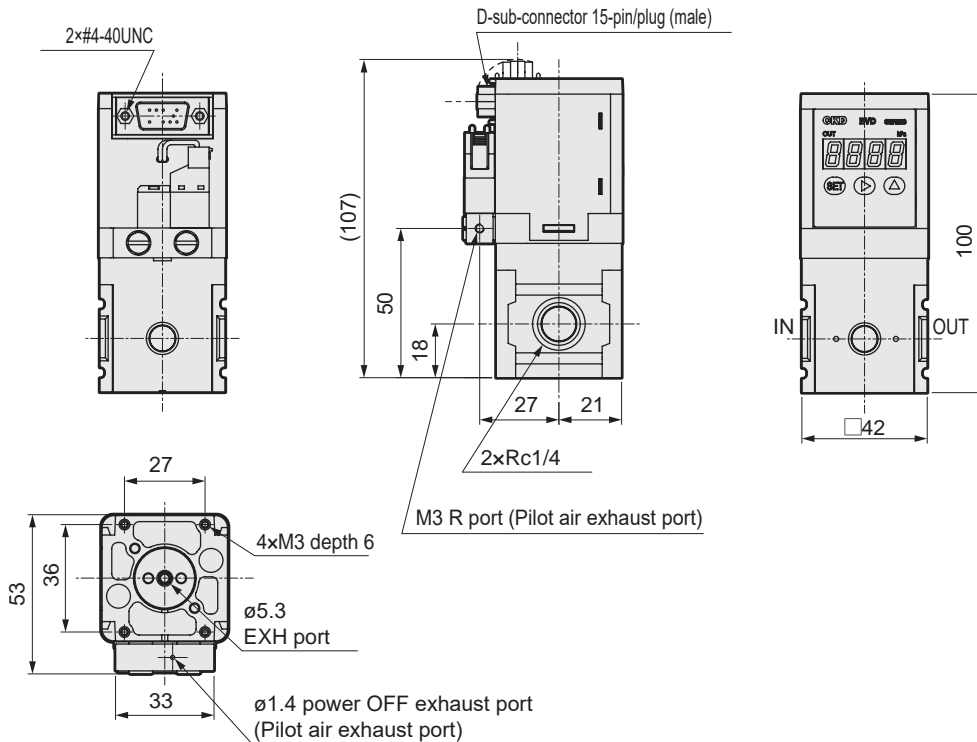
EVD - C1
D Option

● Option (L-bracket) Discrete model No.

EVL - L11
D Option

SWD-EVD Series

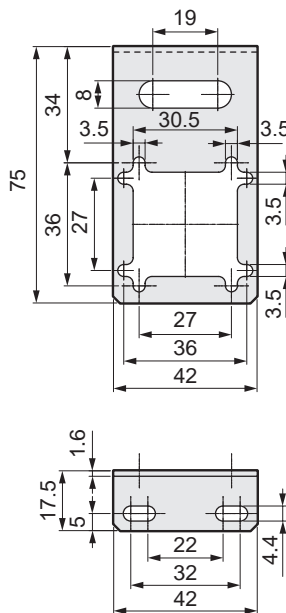
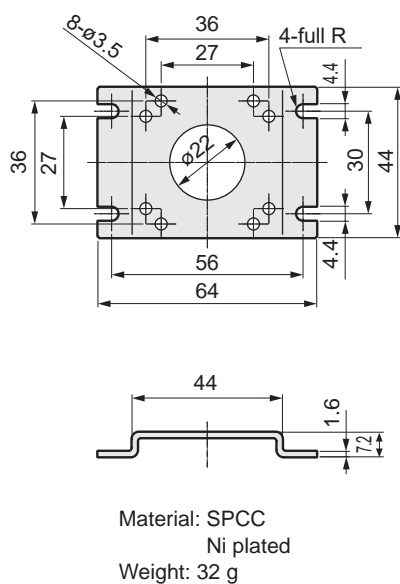
Dimensions



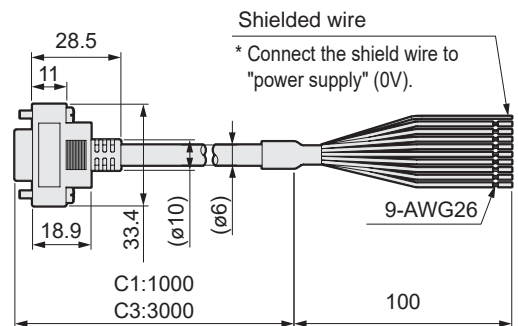
Cable, bracket optional dimensions

●B-bracket (-B1): floor mounted

●L-bracket (-L11): Wall mounted



●Cable dimensions (-C1, C3)



| | |
|-----------------------------|-----------------------------|
| Wire material | Tinned annealed copper wire |
| Conductor O. D. | Approx. 0.48 |
| Outer diameter of insulator | 0.88 |

Material: SPCC
Ni plated
Weight: 31 g

| D sub-socket pin No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | Weight g | | |
|----------------------|---------------------|--------|--------|--------|----------------|--------|--------|--------|--------|--------|--------------|---------|------------|--------|----------------|------------------|-------------------|---------------------|
| Insulator color | Brown | Orange | Yellow | - | Red | - | - | - | - | Gray | White | - | Green | Blue | Black | C1: 67 C3:166 | | |
| Name | Preset input signal | | | Vacant | Power supply + | Vacant | Vacant | Vacant | Vacant | Common | Input signal | | | Vacant | Analog Output | | Error output | Power supply - (0V) |
| Input | Bit 1 | Bit 2 | Bit 3 | | +24 VDC | | | | | | 0-10 VDC | 0-5 VDC | 4-20 mA DC | | Output 1-5 VDC | | NPN or PNP output | |

Nonote: The No. 10 pin common is the common for the preset input (pin No. 1 to 3).

Made-to-order product

With opening adjustment mechanism



With open/close switch



Specially shaped body



With photo sensor for detecting valve opening



With proximity sensor for detecting valve opening



Stroke detection potentiometer



* Contact CKD Sales for details.



Safety precautions

Fluid Control Components: Warnings and Cautions

Be sure to read this section before use.

Refer to the "General Purpose Valves (CB-03-1SA)" catalog for general precautions. Although the above general catalog states that products are not applicable for medical equipment or direct contact with beverages/foodstuffs, the SWD-T Series products can be used in such applications as long as they are within the range of the product specifications.

Product-specific cautions: Flow rate control valve SWD-T 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.
- Iron rust and foreign materials in the fluid can cause operation faults or leaks and deteriorate 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 hands 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 type 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 Degree of filtration of 5 µm or more.
- The valve operation may be unable to track if the operating air supply time or exhaust time is short.
- 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.
- 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 foreign materials, 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 |

⚠ CAUTION

- This product may become heavy depending on the port size. When mounting, piping or removing, take measures to prevent injury due to falling, etc.
- For horizontal piping, liquid accumulation in the valve can be minimized by tilting the valve and piping. Pipe so that the "-CKD-" mark stamped on the body piping section is directly above. (Refer to Table 1, Fig. 1)

Table 1. Port size and valve tilt angle

| Model No. | Port size | Valve tilt angle (θ°) |
|-----------|------------|-----------------------|
| SWD1*-8 | 8 A | 23 |
| SWD1*-10 | 10 A | 11 |
| SWD2*-15 | 15 A | 14 |
| SWD3*-25 | 25A (1S) | 25 |
| SWD4*-40 | 40A (1.5S) | 24 |

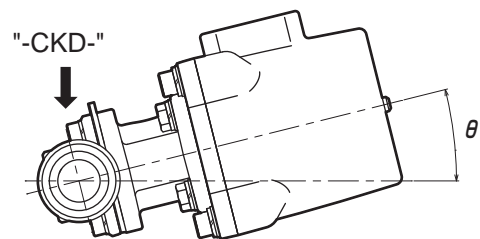


Fig. 1 Valve tilt angle

- Piping of body
 - The dimensions of the ferrule part are ISO compliant. Assemble using gaskets and clamps of appropriate size.

Use/maintenance

⚠ DANGER

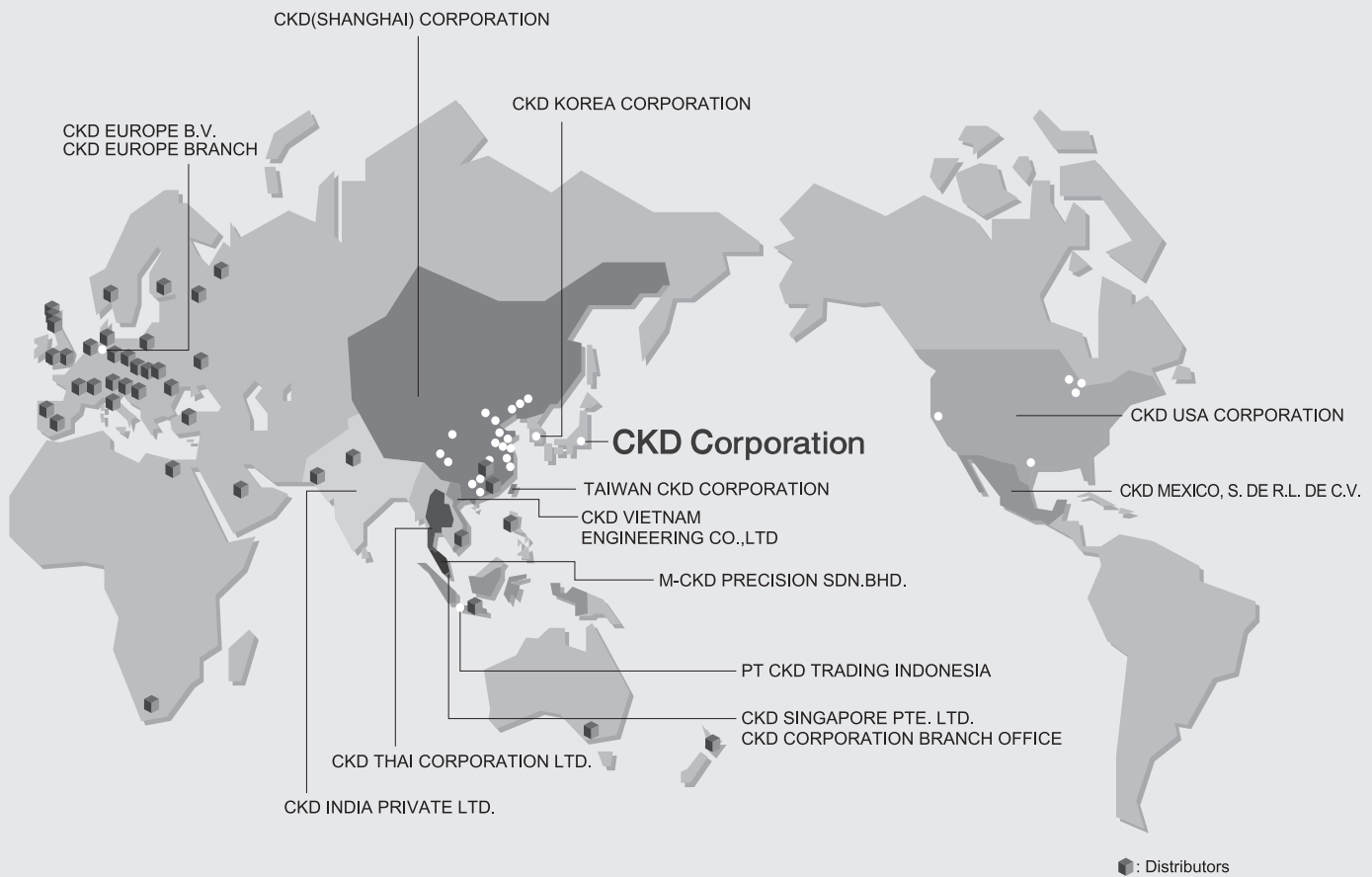
- Handling the actuator
 - Never attempt to disassemble the actuator. It is very dangerous, as a high-load spring is incorporated. If disassembly is necessary, contact CKD or a distributor.

⚠ WARNING

- Before disassembling, be sure to release the operating air and 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 Component 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.

⚠ CAUTION

- Before replacing the valve, thoroughly replace the remaining fluid with pure water so that it does not affect the surrounding Components and humans, and purge with dry air or inert gas. When touching the valve, read the safety data sheet (SDS) for the working fluid and wear the necessary protective gear.
- If the product has been out of use for 1 month or more, perform a test run before starting the 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.
- Do not use valves as a footing or place any heavy objects on top of the valves.
- Defects occurring in disassembled or replaced products and parts are excluded from the warranty scope.



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