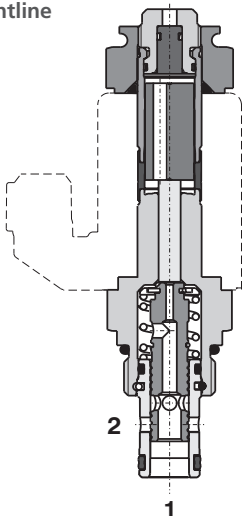


2/2 Directional Valve, Solenoid Operated, Spool Type, Direct Acting

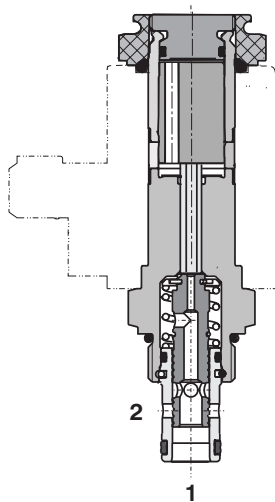
SD2E-A2

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 350 bar (5100 PSI)

Lightline



High performance



Technical Features

- › Hardened precision parts
- › High flow capacity
- › High transmitted hydraulic power
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Variety of optional spools available
- › Coil interchangeability among SD*-A* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

2-way, 2-position high pressure, bi-directional spool valve in the form of a screw-in cartridge. The valve is used mainly to direct flow to actuators.

Model Code	2111	2112
Symbol		

Technical Data

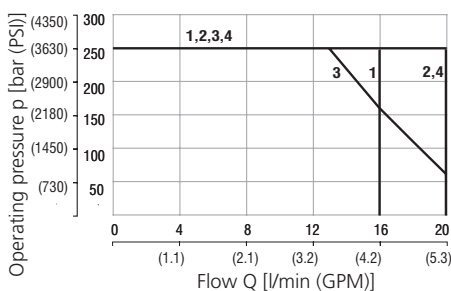
Valve size / Cartridge cavity	3/4-16 UNF-2A / A2 (C-8-2)	
	Lightline	High performance
Max. flow	l/min (GPM)	20 (5.3) / 30 (8)
Max. operating pressure	bar (PSI)	250 (3600) / 350 (5100)
Max. internal leakage in the direction 2→1 ($v=32 \text{ mm}^2/\text{s}$)	cm^3/min	≤ 35 at 250 bar
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140) / -30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140) / -20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122) / -30...80 (-22...176)
Fluid viscosity range	mm^2s^{-1}	10 ... 500
Weight without coil	kg (lbs)	0.14 (0.31) / 0.20 (0.44)

	Datasheet	Type
General information	HA 0060	Products and operating conditions
Coil types	HA 8007	C14B* / C19B*
Valve bodies	In-line mounted	HA 0018 / SB-A2*
	Sandwich mounted	HA 0028 / SB-*A2*
Cavity details / Form tools	HA 0019	SMT-A2*
Spare parts	HA 8010	

Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Operating limits - Lightline

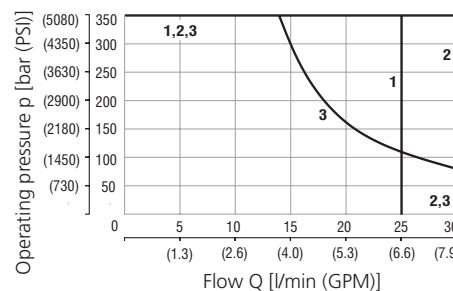
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)



	Model	Connection
1	2112	2→1
2	2112	1→2
3	2111	1→2
4	2111	2→1

Operating limits - High performance

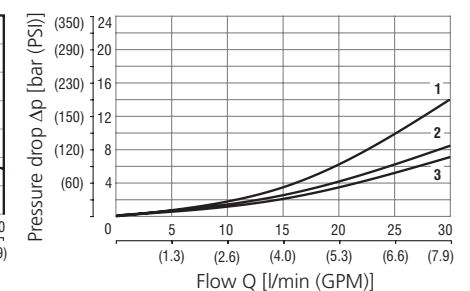
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)



	Model	Connection
1	2112	2→1
2	2112	1→2
2	2111	2→1
3	2111	1→2

Pressure drop related to flow rate

- Lightline, High performance

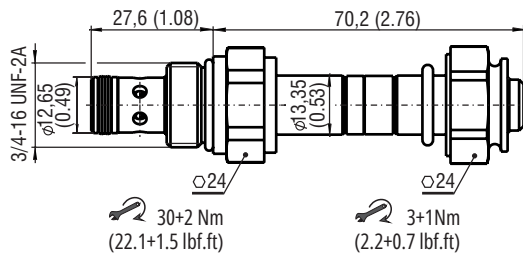


	Model	Connection
1	2112	1→2
1	2112	2→1
2	2111	1→2
3	2111	2→1

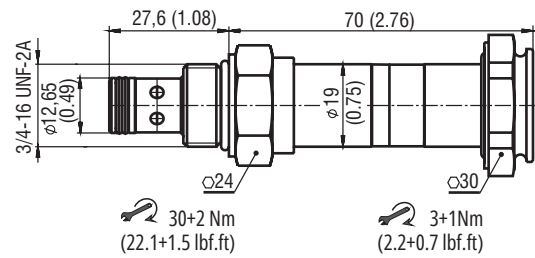
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

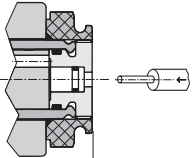
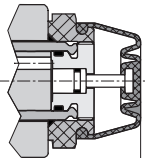
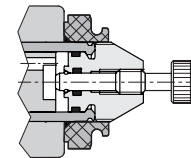
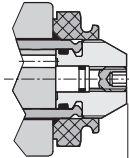
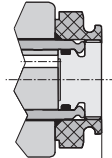
Lightline



High performance



Manual Override in millimeters (inches)

No Designation - standard	Designation M2 - rubber boot protected	Designation M4 - hand screw (only for High performance)	Designation M5 - socket head screw, size 2.5	Designation M9 - without manual override
 L ~ 70,2 (2.63) H ~ 70,0 (2.76)	 L ~ 81,7 (3.22) H ~ 81,5 (3.21)	 H ~ 89,6 (3.53)	 L ~ 77,2 (3.04) H ~ 77,6 (3.06)	 L ~ 67,2 (2.65) H ~ 70,0 (2.76)

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

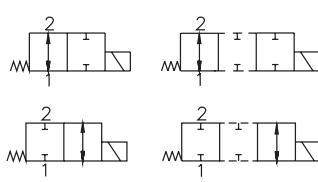
SD2E-A2 / -

2/2 directional valve, solenoid operated, spool type, direct acting

Valve cavity
3/4-16 UNF (C-8-2)

Model
Lightline **L**
High performance **H**

Functional symbol



2I11

2I12

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

No designation
V

Seals
NBR
FPM (Viton)

Manual override
standard
rubber boot protected
hand screw (only for High performance)
socket head screw
without manual override

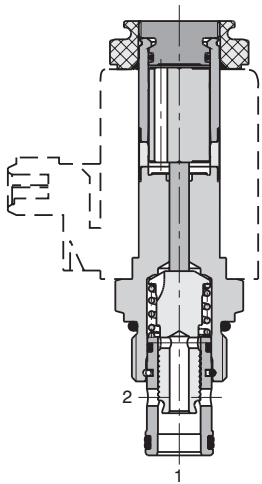
No designation
M2
M4
M5
M9

2/2 Directional Valve, Solenoid Operated, Spool Type, Direct Acting

SD2E-B2

7/8-14 UNF • Q_{max} 55 l/min (15 GPM) • p_{max} 350 bar (5100 PSI)

Lightline



Technical Features

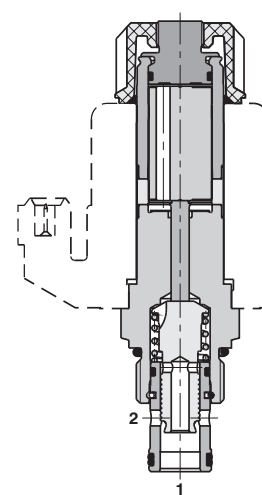
- › Hardened precision parts
- › High flow capacity
- › High transmitted hydraulic power
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Variety of optional spools available
- › Coil interchangeability among SD*-B* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

2-way, 2-position high pressure directional spool valve in form of a screw-in cartridge. The valve is used mainly to direct flow to actuators.

Model Code	2111	2112
Symbol		

High performance



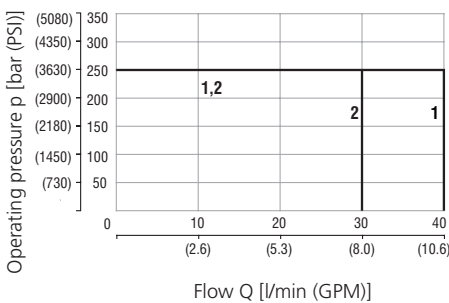
Technical Data

Valve size / Cartridge cavity		7/8-14 UNF-2A / B2 (C-10-2)	
		Lightline	High performance
Max. flow	l/min (GPM)	40 (10.6)	55 (14.5)
Max. operating pressure	bar (PSI)	250 (3600)	350 (5100)
Max. internal leakage in the direction 2→1 (v=32 mm ² /s)	cm ³ /min	≤ 45 at 250 bar	
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Weight without coil	kg (lbs)	0.22 (0.49)	0.29 (0.64)
General information		Datasheet	Type
		HA 0060	Products and operating conditions
Coil types		HA 8007	C19B* C22B*
Valve bodies	In-line mounted	HA 0018	SB-B2*
	Sandwich mounted	HA 0028	SB-*B2*
Cavity details / Form tools		HA 0019	SMT-B2*
Spare parts		HA 8010	

Characteristics measured at v = 32 mm²/s (156 SUS)

Operating limits - Lightline

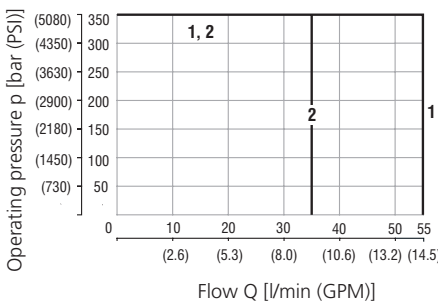
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N-10% (21.6 V DC)



	Model	Connection
1	2111	2→1
2	2112	2→1

Operating limits - High performance

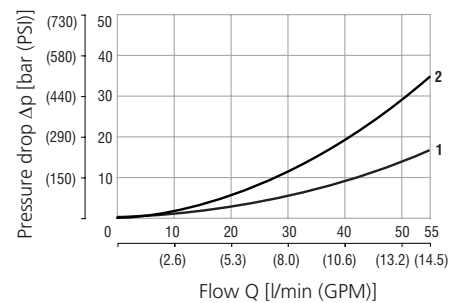
Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N-10% (21.6 V DC)



	Model	Connection
1	2111	2→1
2	2112	2→1

Pressure drop related to flow rate

- Lightline, High performance

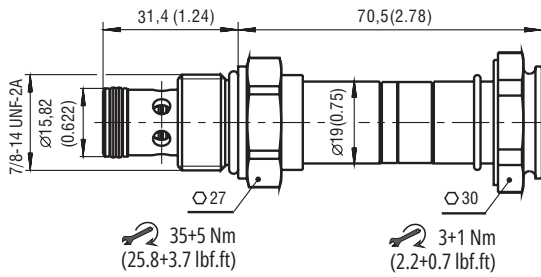


	Model	Connection
1	2111	2→1
2	2112	2→1

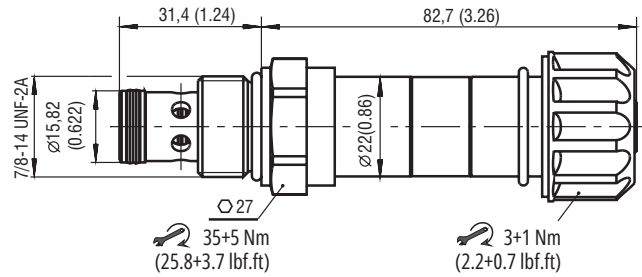
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

Lightline



High performance



Manual Override in millimeters (inches)

No designation - standard	Designation M2 - rubber boot protected	Designation M5 - socket head screw, size 2.5	Designation M9 - without manual override
<p>L ~ 70,5 (2.78) H ~ 82,7 (3.26)</p>	<p>L ~ 82,0 (3.23) H ~ 100,0 (3.94)</p>	<p>L ~ 78,1 (3.07) H ~ 84,8 (3.34)</p>	<p>L ~ 70,5 (2.78) H ~ 82,7 (3.26)</p>

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD2E - B2 / -

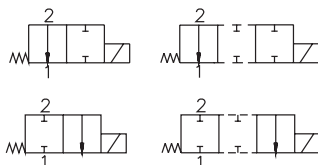
2/2 directional valve,
solenoid operated,
spool type, direct acting

Valve cavity
7/8-14 UNF (C-10-2)

Model
Lightline
High performance

L
H

Functional symbol



2I11

2I12

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

No designation
V

Seals
NBR
FPM (Viton)

No designation
M2
M5
M9

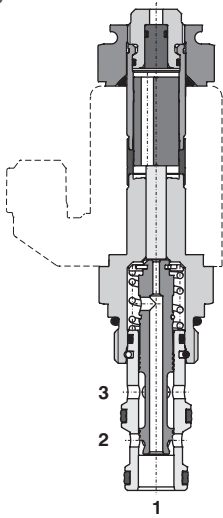
Manual override
standard
rubber boot protected
socket head screw
without manual override

3/2 Directional Valve, Solenoid Operated, Spool Type, Direct Acting

SD2E-A3

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 350 bar (5100 PSI)

Lightline



Technical Features

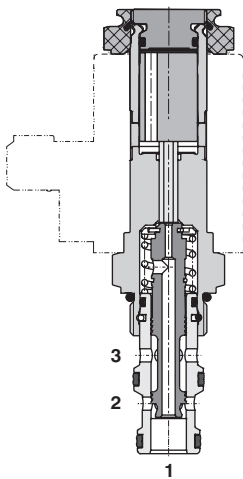
- › Hardened precision parts
- › High flow capacity
- › High transmitted hydraulic power
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Variety of optional spools available
- › Coil interchangeability among SD*-A* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

3-way, 2-position high pressure, bi-directional spool valve in the form of a screw-in cartridge. The valve is used mainly to direct flow to actuators.

Model Code	2D21, 2D25	2D26	2D27, 2D31
Symbol			

High performance



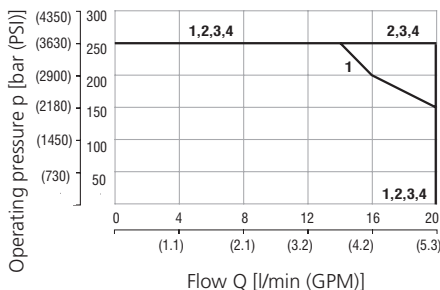
Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / A3 (C-8-3)	
		Lightline	High performance
Max. flow	l/min (GPM)	20 (5.3)	30 (8)
Max. operating pressure	bar (PSI)	250 (3600)	350 (5100)
Max. internal leakage in the direction 3→1 (v=32 mm ² /s)	cm ³ /min	≤ 35 at 250 bar	
Fluid temperature range (NBR)	°C	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C	-30...50 (-22...122)	-30...80 (-22...176)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Weight without coil	kg (lbs)	0.14 (0.31)	0.20 (0.44)
Datasheet		Type	
General information		HA 0060	
Coil types		Products and operating conditions	
		HA 8007	C 14B* C 19B*
Valve bodies		In-line mounted	HA 0018
		Sandwich mounted	HA 0028
Cavity details / Form tools		HA 0019	SMT-A3*
Spare parts		HA 8010	

Characteristics measured at v = 32 mm²/s (156 SUS)

Operating limits - Lightline

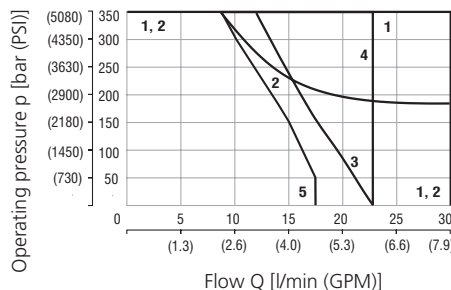
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N -10% (21.6 VDC)



	Model	Connection
1	2D26	3→2
2	2D26	2→1
3	2D25	3→2, 2→1
4	2D21	3→2, 2→1

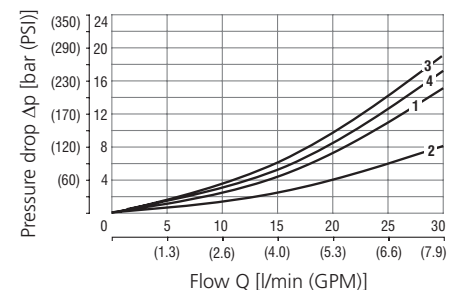
Operating limits - High performance

Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N -10% (21.6 VDC)



	Model	Connection
1	2D21	3→2, 2→1
1	2D25	3→2, 2→1
1	2D31	3→1
2	2D26	3→2, 2→1
3	2D31	2→1
4	2D27	3→1
5	2D27	2→1

Pressure drop related to flow rate
- Lightline, High performance

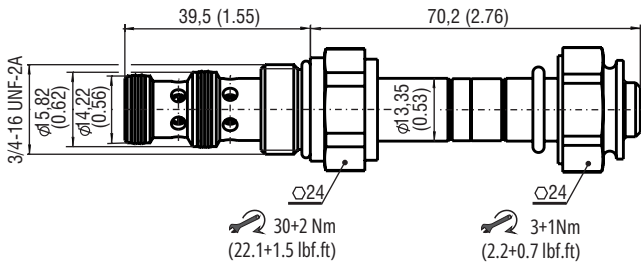


	Model	Connection
1	2D21	3→2
1	2D25	3→2
1	2D31	2→1
1	2D27	2→1
2	2D21	2→1
3	2D26	3→2
3	2D27	3→1
4	2D25	2→1
4	2D26	2→1
4	2D31	3→1

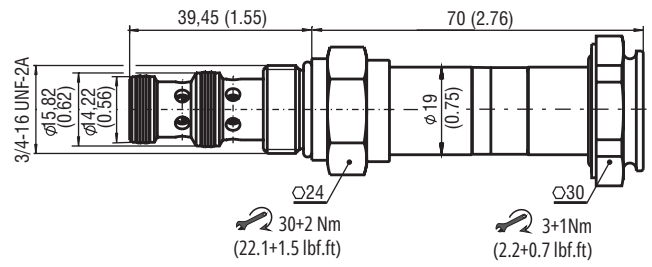
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

Lightline



High performance



Manual Override in millimeters (inches)

No Designation - standard	Designation M2 - rubber boot protected	Designation M4 - hand screw (only for High performance)	Designation M5 - socket head screw, size 2.5	Designation M9 - without manual override
 L ~ 70,2 (2.63) H ~ 70,0 (2.76)	 L ~ 81,7 (3.22) H ~ 81,5 (3.21)	 H ~ 89,6 (3.53)	 L ~ 77,2 (3.04) H ~ 77,6 (3.06)	 L ~ 67,2 (2.65) H ~ 70,0 (2.76)

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD2E-A3 / -

3/2 directional valve, solenoid operated, spool type, direct acting

Valve cavity
3/4-16 UNF (C-8-3)

Model
Lightline **L**
High performance **H**

Functional symbol

		2D21
		2D25
		2D26
		only for H 2D27
		only for H 2D31

Surface treatment

A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

No designation V

Seals
NBR
FPM (Viton)

Manual override
standard
rubber boot protected
hand screw (only for High performance)
socket head screw
without manual override

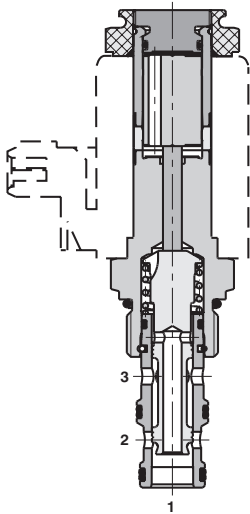
No designation
M2
M4
M5
M9

3/2 Directional Valve, Solenoid Operated, Spool Type, Direct Acting

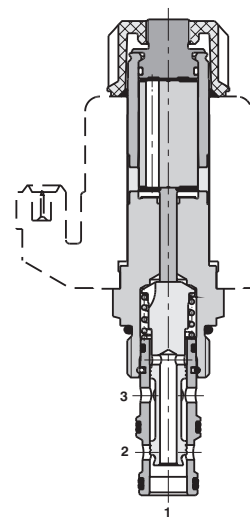
SD2E-B3

7/8-14 UNF • Q_{max} 60 l/min (16 GPM) • p_{max} 350 bar (5100 PSI)

Lightline



High performance



Technical Features

- › Hardened precision parts
- › High flow capacity
- › High transmitted hydraulic power
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Variety of optional spools available
- › Coil interchangeability among SD*-B* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

3-way, 2-position high pressure directional spool valve in form of a screw-in cartridge. The valve is used mainly to direct flow to actuators.

Model Code	2D21	2D25	2D26	2D34
Symbol				

Technical Data

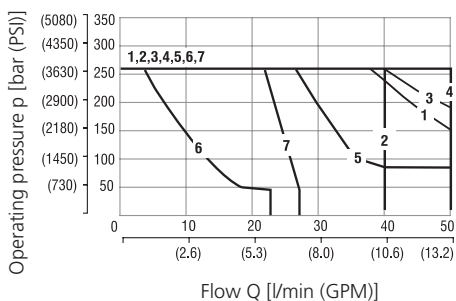
Valve size / Cartridge cavity	7/8-14 UNF-2A / B3 (C-10-3)	
	Lightline	High performance
Max. flow	l/min (GPM)	50 (13.2) / 60 (15.9)
Max. operating pressure	bar (PSI)	250 (3600) / 350 (5100)
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140) / -30...80 (-22...176)
Max. internal leakage in the direction 3→1 (v=32 mm ² /s)	cm ³ /min	≤ 45 at 250 bar
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140) / -20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122) / -30...80 (-22...176)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500
Weight without coil	kg (lbs)	0.24 (0.53) / 0.31 (0.68)

General information	Datasheet	Type
	HA 0060	Products and operating conditions
Coil types	HA 8007	C19B* / C22B*
Valve bodies	In-line mounted	SB-B3*
	Sandwich mounted	SB-*B3*
Cavity details / Form tools	HA 0019	SMT-B3*
Spare parts	HA 8010	

Characteristics measured at v = 32 mm²/s (156 SUS)

Operating limits - Lightline

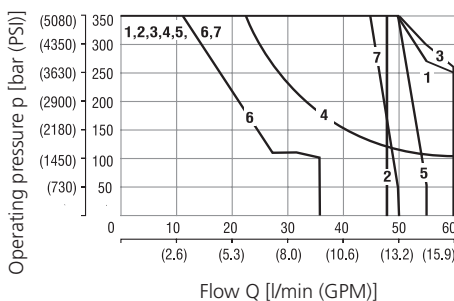
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N-10% (21.6 VDC)



	Model	Connection
1	2D21	3→2
2	2D21, 2D26	2→1
3	2D25	3→2
4	2D25	2→1
5	2D26	3→2
6	2D34	3→1
7	2D34	2→1

Operating limits - High performance

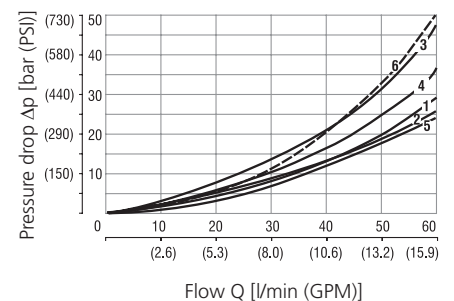
Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N-10% (21.6 VDC)



	Model	Connection
1	2D21	3→2
2	2D21	2→1
3	2D25	3→2
5	2D25, 2D26	2→1
4	2D26	3→2
6	2D34	3→1
7	2D34	2→1

Pressure drop related to flow rate

- Lightline, High performance

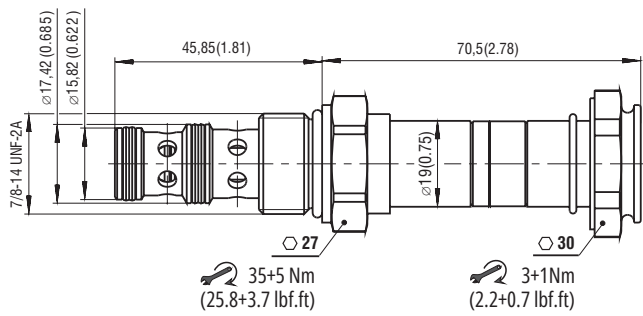


	Model	Connection
1	2D21, 2D26	2→1
2	2D21	3→2
3	2D25	3→2
4	2D25, 2D34	2→1
1	2D26	3→2
5	2D34	3→1
6	2D34	2→1

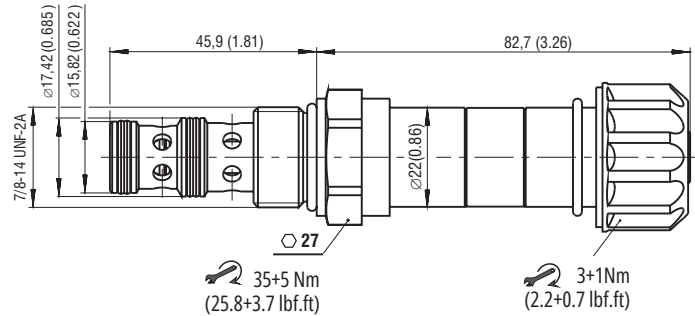
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

Lightline



High performance



Manual Override in millimeters (inches)

No designation - standard	Designation M2 - rubber boot protected	Designation M5 - socket head screw, size 2.5	Designation M9 - without manual override
<p>L ~ 70,5 (2.78) H ~ 82,7 (3.26)</p>	<p>L ~ 82,0 (3.23) H ~ 100,0 (3.94)</p>	<p>L ~ 78,1 (3.07) H ~ 84,8 (3.34)</p>	<p>L ~ 70,5 (2.78) H ~ 82,7 (3.26)</p>

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD2E-B3 / -

3/2 directional valve, solenoid operated, spool type, direct acting

Valve cavity
7/8-14 UNF (C-10-3)

Provedení
Lightline
High performance

Functional symbol

	2D21
	2D25
	2D26
	2D34

Surface treatment

A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

Seals
No designation
V

NBR
FPM (Viton)

Manual override
No designation
M2
M5
M9

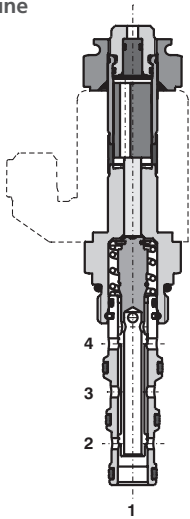
standard
rubber boot protected
socket head screw
without manual override

4/2 Directional Valve, Solenoid Operated, Spool Type, Direct Acting

SD2E-A4

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 350 bar (5100 PSI)

Lightline



Technical Features

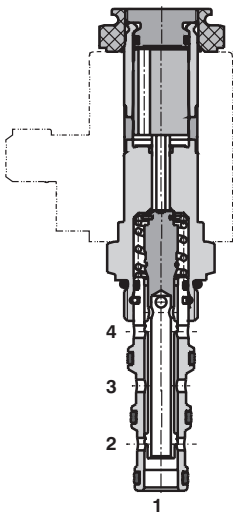
- › Hardened precision parts
- › High flow capacity
- › High transmitted hydraulic power
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Variety of optional spools available
- › Coil interchangeability among SD*-A* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

4-way, 2-position high pressure bi-directional spool valve in the form of a screw-in cartridge. The valve is used mainly to direct flow to actuators.

2Z11	2Z51	2X21	2R21	2P51	2Y11	2C51	2Y61

High performance



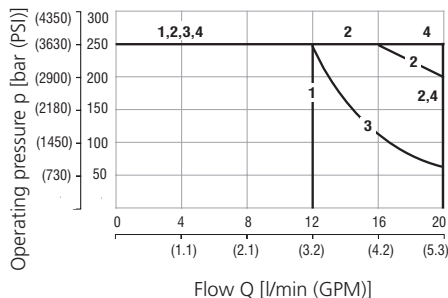
Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / A4 (C-8-4)	
		Lightline	High performance
Max. flow	l/min (GPM)	20 (5.3)	30 (8)
Max. operating pressure	bar (PSI)	250 (3600)	350 (5100)
Max. internal leakage in the direction 4→1 ($v=32$ mm ² /s)	cm ³ /min	≤ 35 at 250 bar	
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Weight without coil	kg (lbs)	0.15 (0.33)	0.23 (0.51)
General information		Type	
Coil types		Products and operating conditions	
Valve bodies		Datasheet	
Cavity details / Form tools		Type	
Spare parts		Type	
General information		HA 0060	
Coil types		HA 8007	
Valve bodies		HA 0018	
Cavity details / Form tools		HA 0028	
Spare parts		HA 0019	
		HA 8010	

Characteristics measured at $v = 32$ mm²/s (156 SUS)

Operating limits - Lightline

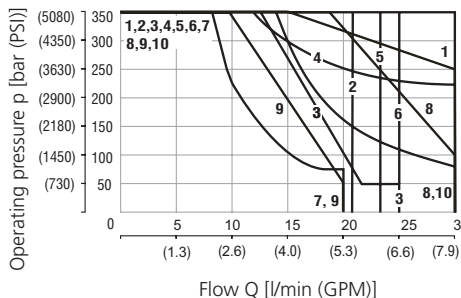
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)



Model	Connection
1	2Z11 3→2, 4→1
2	2Z51 3→4, 2→1
3	2R21 3→2, 4→1
4	2R21 3→4, 2→1
4	2P51 3→4, 2→1
4	2X21 3→4, 2→1 3→2, 4→1

Operating limits - High performance

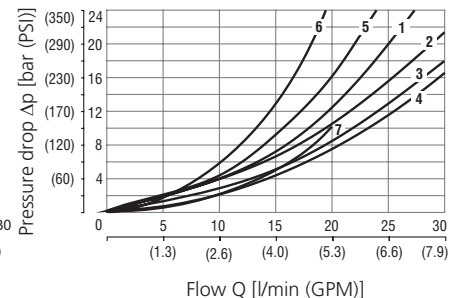
Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)



Model	Connection
1	2Z51 3→4, 2→1
2	2Z11 3→2, 4→1
3	2R21 3→2, 4→1
4	2X21 3→4, 2→1
5	2X21 3→2, 4→1
6	2Y11 3→2, 4→1
7	2C51 3→1
8	2Y61 3→2
9	2Y61 4→1
10	2Y61 1→4

Pressure drop related to flow rate

- Lightline, High performance

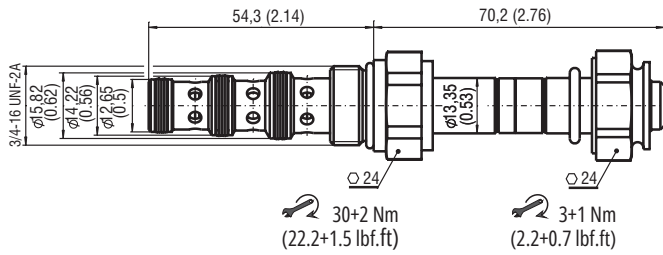


Model	Connection	Model	Connection
1	2Z11 4→1	2R21	2→1
1	2Y61 3→2		
2	2Z11 3→2	2Z51	2→1
2	2X21 3→4, 4→1	2R21	3→2
3	2Z51 3→4	2R21	3→4
3	2Y11 3→2, 4→1		
4	2X21 3→2, 2→1	2C51	3→2, 4→1
5	2R21 4→1		
6	2C51 3→1		
7	2Y61 4→1		

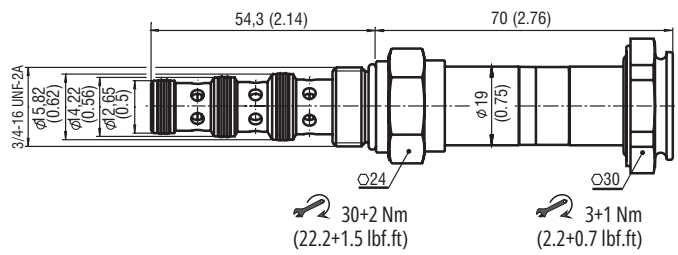
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

Lightline



High performance



Manual Override in millimeters (inches)

No Designation - standard	Designation M2 - rubber boot protected	Designation M4 - hand screw (only for High performance)	Designation M5 - socket head screw, size 2.5	Designation M9 - without manual override
 L ~ 70,2 (2.63) H ~ 70,0 (2.76)	 L ~ 81,7 (3.22) H ~ 81,5 (3.21)	 H ~ 89,6 (3.53)	 L ~ 77,2 (3.04) H ~ 77,6 (3.06)	 L ~ 67,2 (2.65) H ~ 70,0 (2.76)

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD2E-A4 / -

**4/2 directional valve,
solenoid operated,
spool type, direct acting,**

Valve cavity
3/4-16 UNF (C-8-4)

Model
Lightline
High performance

L
H

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

No designation
V

Seals
NBR
FPM (Viton)

Functional symbol

		2Z11
		2Z51
		2X21
		2R21
		only for L 2P51
		only for H 2Y11
		only for H 2Y61
		only for H 2C51

No designation
M2
M4
M5
M9

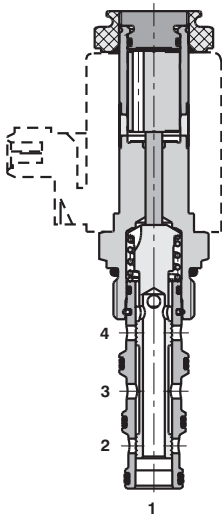
Manual override
standard
rubber boot protected
hand screw (only for High performance)
socket head screw
without manual override

4/2 Directional Valve, Solenoid Operated, Spool Type, Direct Acting

SD2E-B4

7/8-14 UNF • Q_{max} 50 l/min (13 GPM) • p_{max} 350 bar (5100 PSI)

Lightline



Technical Features

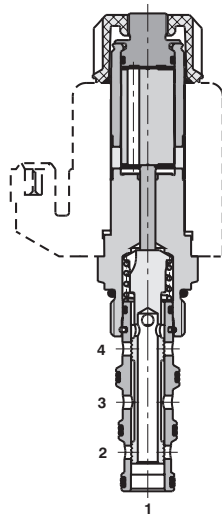
- › Hardened precision parts
- › High flow capacity
- › High transmitted hydraulic power
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Variety of optional spools available
- › Coil interchangeability among SD*-B* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

4-way, 2-position high pressure directional spool valve in form of a screw-in cartridge. The valve is used mainly to direct flow to actuators.

Model Code	2Z11	2Z51	2X11	2X21
Symbol				

High performance



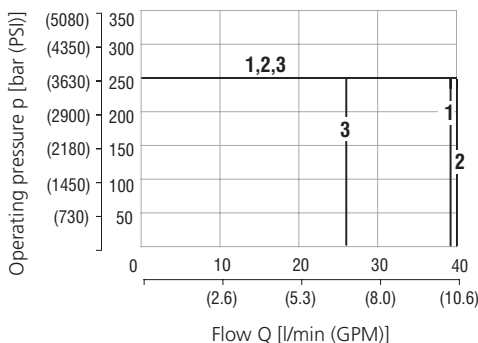
Technical Data

Valve size / Cartridge cavity		7/8-14 UNF-2A / B4 (C-10-4)	
		Lightline	High performance
Max. flow	l/min (GPM)	40 (10.6)	50 (13)
Max. operating pressure	bar (PSI)	250 (3600)	350 (5100)
Max. internal leakage in the direction 4→1 ($v=32$ mm ² /s)	cm ³ /min	≤ 45 at 250 bar	
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Weight without coil	kg (lbs)	0.25 (0.55)	0.32 (0.71)
		Datasheet Type	
General information		HA 0060	Products and operating conditions
Coil types		HA 8007	C19B* C22B*
Valve bodies		In-line mounted: HA 0018 Sandwich mounted: HA 0028	SB-B4* SB-*B4*
Cavity details / Form tools		HA 0019	SMT-B4*
Spare parts		HA 8010	

Characteristics measured at $v = 32$ mm²/s (156 SUS)

Operating limits - Lightline

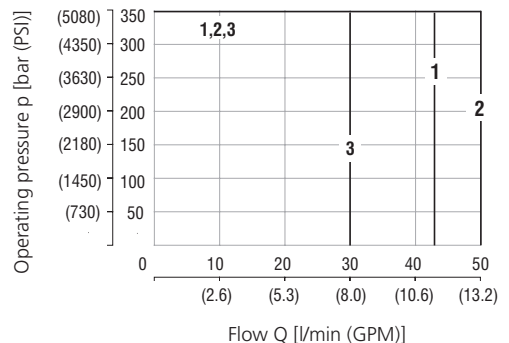
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)



	Model	Connection
1	2Z11	3→2, 4→1
2	2Z51	3→4, 2→1
2	2X21	3→4, 2→1
3	2X21	3→2, 4→1

Operating limits - High performance

Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)

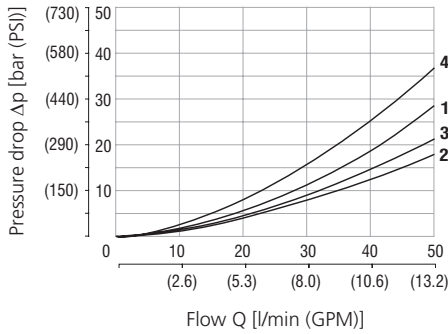


	Model	Connection
1	2Z11	3→2, 4→1
2	2Z51	3→4, 2→1
1	2X11	3→4, 2→1
1	2X11	3→2, 4→1
2	2X21	3→4, 2→1
3	2X21	3→2, 4→1

For operating limits under conditions and flow directions other than shown contact our technical support.

Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

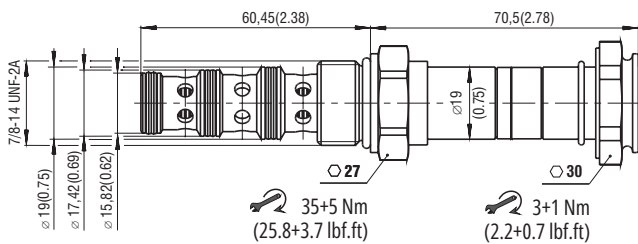
Pressure drop related to flow rate
- Lightline, High performance



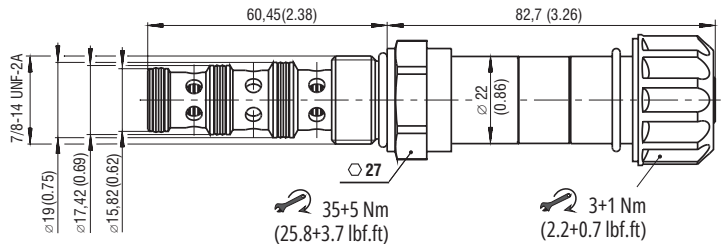
	Model	Connection	Model	Connection	
1	Z211	3→2	4	2X11 only for H	3→2
1	Z211	4→1	1	2X11 only for H, $Q_{\max} 50 \text{ l/min}$	3→4
3	Z251 only for L	3→4	4	2X11 only for H, $Q_{\max} 35 \text{ l/min}$	4→1
3	Z251 only for L	2→1	3	2X21	3→2
2	Z251 only for H	3→4	4	2X21	4→1
3	Z251 only for H	2→1	3	2X21 $Q_{\max} 50 \text{ l/min}$	3→4
4	2X11 only for H	2→1	2	2X21 $Q_{\max} 40 \text{ l/min}$	2→1

Dimensions in millimeters (inches)

Lightline



High performance



Manual Override in millimeters (inches)

No designation - standard	Designation M2 - rubber boot protected	Designation M5 - socket head screw, size 2.5	Designation M9 - without manual override
<p>L ~ 70,5 (2.78) H ~ 82,7 (3.26)</p>	<p>L ~ 82,0 (3.23) H ~ 100,0 (3.94)</p>	<p>L ~ 78,1 (3.07) H ~ 84,8 (3.34)</p>	<p>L ~ 70,5 (2.78) H ~ 82,7 (3.26)</p>

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD2E-B4 / -

4/2 directional valve, solenoid operated, spool type, direct acting

Valve cavity
7/8-14 UNF (C-10-4)

Model
Lightline
High performance

Functional symbol

		Z211
		Z251
		2X11
		2X21

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

No designation
V

Seals
NBR
FPM (Viton)

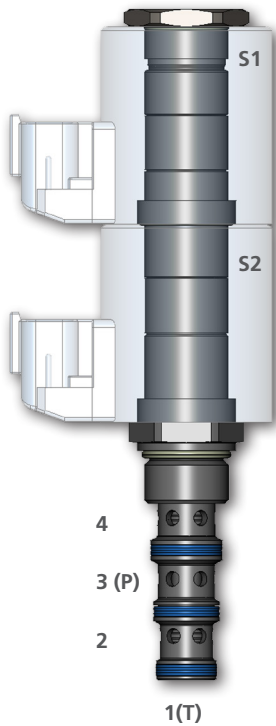
No designation
M2
M5
M9

Manual override
standard
rubber boot protected
socket head screw
without manual override

4/3 Directional Valve, Solenoid Operated, Spool Type, Direct Acting

SD2E-A4/H3

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- › Hardened precision parts
- › High flow capacity relative to size and valve type
- › High transmitted hydraulic power
- › Ports 2,3,4 may be fully pressurized
- › Four optional spools available
- › Interchangeable coil C19B* among SD*-A*/H* product line
- › Surface of the valve is zinc coated with corrosion protection 520 h in NSS acc. to ISO 9227

Functional Description

4-way, 3-position spool type directional valve with 3/4-16 UNF connection thread, operated by dual solenoids, designed for installation into A4 (C-8-4) chambers of the block. The valve controls the flow direction of the fluid, changes the direction of the hydraulic cylinder piston rod or stops it.

Model Code	3Z11	3Y11	3H11	3C11
Symbol				

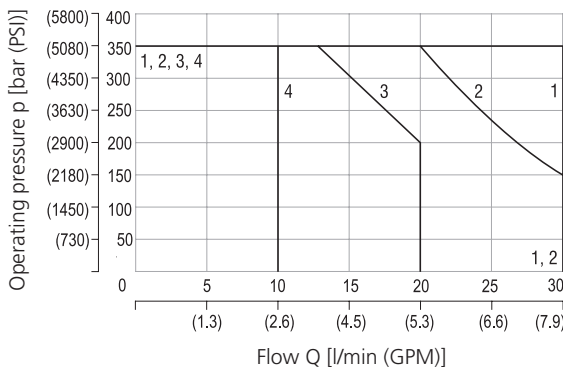
Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / A4 (C-8-4)
Max. flow	l/min (GPM)	30 (8)
Max. operating pressure in Ports 2, 3, 4	bar (PSI)	350 (5100)
Max. operating pressure in Port 1	bar (PSI)	250 (3600)
Max. internal leakage in the direction 4→1 (v=32 mm ² /s)	cm ³ /min	≤ 35 at 250 bar
Fluid temperature range (HNBR)	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature range	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500
Weight without coil	kg (lbs)	0.30 (0.66)
Datasheet		Type
General information	HA 0060	Products and operating conditions
Coil types	HA 8007	C19B*
Valve bodies In-line mounted	HA 0018	SB-A4*
Cavity details / Form tools	HA 0019	SMT-A4*
Spare parts	HA 8010	

Characteristics measured at v = 32 mm²/s (156 SUS)

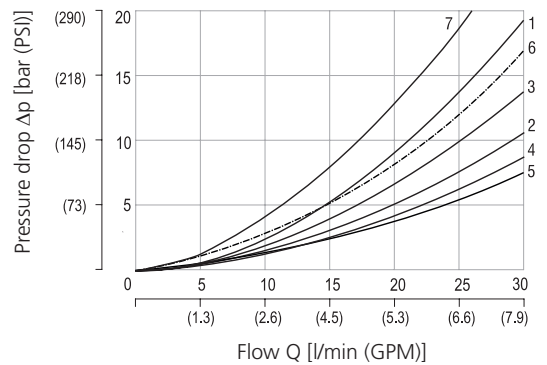
Operating limits

Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage U_N -10% (21.6 V DC)



	Model	Connection
1	3Z11	3→4, 2→1, 3→2, 4→1
1	3C11	3→2, 4→1
2	3Y11	3→4, 2→1, 3→2, 4→1
3	3H11	3→4, 2→1, 3→2, 4→1
4	3C11	3→4, 2→1

Pressure drop related to flow rate

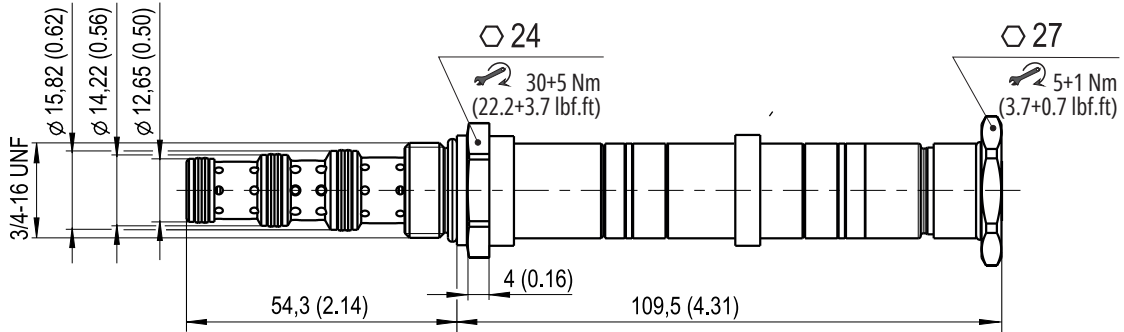
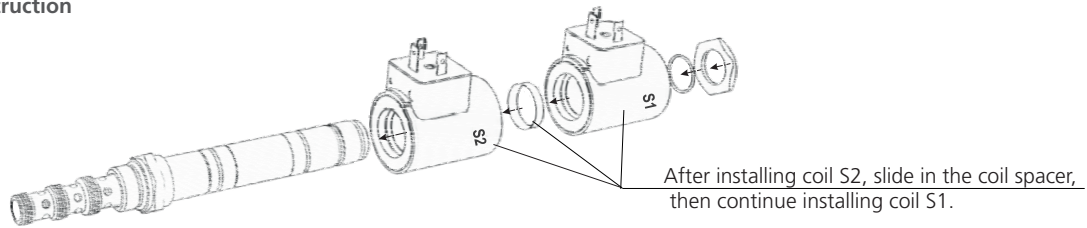


	Model	Connection	Model	Connection	
1	3Z11	3→2, 3→4	3	3Z11	4→1
1	3Y11	3→2, 3→4, 4→1	4	3Y11	2→1
1	3C11	2→1	5	3H11	2→1
2	3Z11	2→1	6	3H11	3→2, 3→4
2	3H11	4→1	6	3C11	4→1
2	3C11	3→1	7	3C11	3→2

For operating limits under conditions and flow directions other than shown contact our technical support.

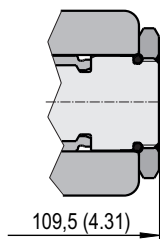
Dimensions in millimeters (inches)

Coils assembly instruction

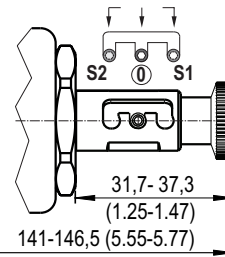


Manual Override in millimeters (inches)

Designation M9
- standard - without manual override



Designation M7
- handwheel with locking for both end positions



In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port 1(T) does not exceed 25 bar (363 PSI).

Ordering Code

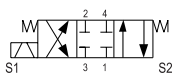
SD2E-A4 / H3 - **B**

4/3 directional valve, solenoid operated, spool type, direct acting

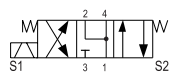
Valve cavity
3/4-16 UNF (C-8-4)

High performance, 3-position valve

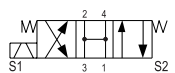
Functional symbol



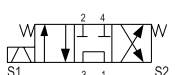
Z11



Y11



H11



C11

Surface treatment
zinc-coated (ZnNi), ISO 9227 (520 h)

No designation
V

Seals
HNBR
FPM (Viton)

Manual override
standard - without manual override
handwheel with locking

M9
M7

Coils are not included!
Order separately, see Coil datasheet C_8007.

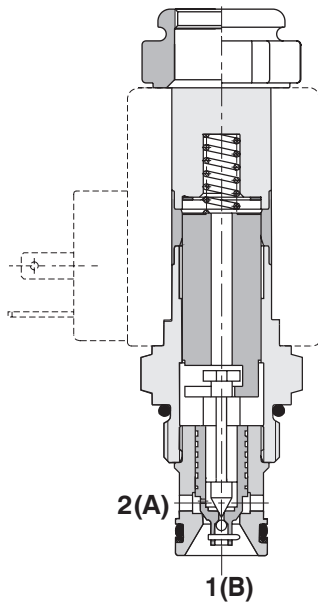
Valve	Coil	Page
SD2E-A4/H*	C19	7

2/2 Solenoid Operated Poppet Valve, Pilot Operated

ROE3-062S2

M22x1.5 • Q_{max} 63 l/min (17 GPM) • p_{max} 250 bar (3600 PSI)

Normally closed



Technical Features

- › Screw-in cartridge valve with connecting thread M22x1.5
- › All ports may be fully pressurized with maximum pressure 250 bar
- › Valve closes leak-free in specified flow direction
- › Precisely manufactured parts and hardened poppet
- › Normally closed version
- › Optional type of manual override
- › Coil interchangeability among ROE / RPE3-04 product line
- › The valve in standard version is zinc-coated with surface protection 240 h in NSS acc. to ISO 9227

Functional Description

2/2 screw-in cartridge poppet valve with connecting thread M22x1.5, solenoid operated, piloted. The one-directional valve is used for leak-free closing in specified flow direction (2 → 1).

Model Code	S2
Symbol	

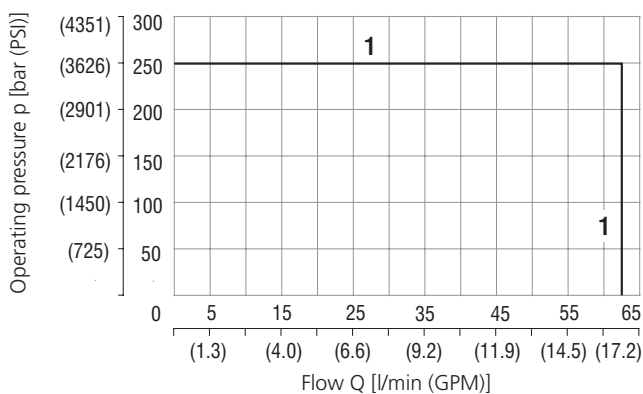
Technical Data

Valve size / Cartridge cavity	M22x1.5 / QG2		
Max. flow	l/min (GPM)	63 (16.6)	
Max. operating pressure	bar (PSI)	250 (3600)	
Max. internal leakage in the direction 2→1 ($v=32 \text{ mm}^2/\text{s}$)	cm^3/min	≤ 0.25 at 250 bar	
Fluid temperature range (NBR)	$^{\circ}\text{C}$ ($^{\circ}\text{F}$)	-30 ... +80 (-22 ... +176)	
Fluid temperature range (FPM)	$^{\circ}\text{C}$ ($^{\circ}\text{F}$)	-20 ... +80 (-4 ... +176)	
Ambient temperature	$^{\circ}\text{C}$ ($^{\circ}\text{F}$)	-20 ... 50 (-4 ... 122)	
Fluid viscosity range	mm^2s^{-1}	10 ... 500	
Weight without coil	kg (lbs)	0.20 (0.44)	
	Datasheet	Type	
General information	HA 0060	Products and operating conditions	
Coil types	HA 8007	C19B*	
Valve bodies	In line mounted	HA 0018	SB-QG2*
	Sandwich mounted	HA 0028	SB-06-QG2*
Cavity details	HA 0019	SMT-QG2*	
Spare parts	HA 8010		

Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

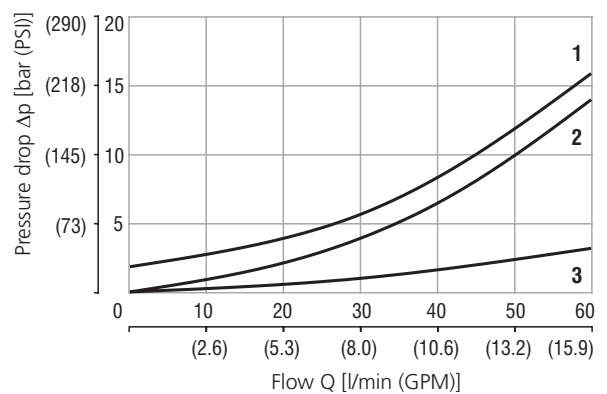
Operating limits

Operating limits for maximum hydraulic power at rated temperature and supply voltage equal to 90% of the nominal value.



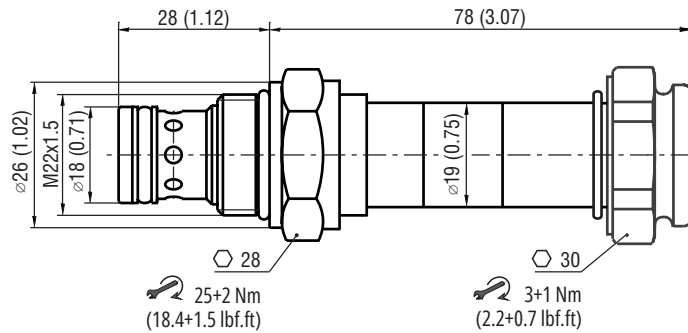
Model	Connection
1	S2
	2→1, 1→2

Pressure drop related to flow rate



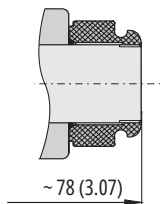
Model	Connection	Solenoid	
1	S2	1→2	OFF
2	S2	2→1	ON
3	S2	1→2	ON

Dimensions in millimeters (inches)

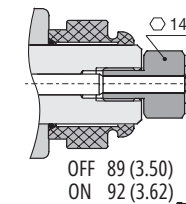


Manual Override in millimeters (inches)

Standard
- without manual override



Designation N5
- with external hexagon A/F 14



In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

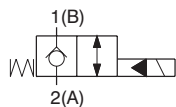
Ordering Code

ROE3 - 062 S2 -

2/2 Solenoid Operated Poppet Valve,
Pilot Operated M22x1.5

Valve size

Functional symbol



Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

No designation
V

Seals
NBR
FPM (Viton)

No designation
N5

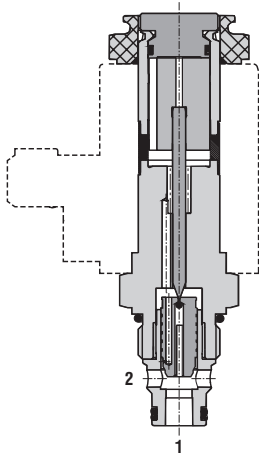
Manual override
standard - without manual override
with external hexagon A/F 14

2/2 Directional Valve, Solenoid Operated, Poppet Type, Piloted

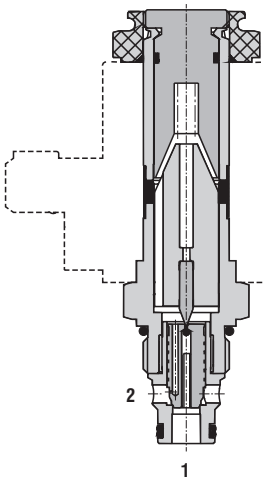
SD3E-A2

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 420 bar (6100 PSI)

Normally Open



Normally Closed



Technical Features

- › Hardened precision parts
- › High flow capacity and leak-free closing
- › High transmitted hydraulic power up to 420 bar
- › Lightline design 250 bar with reduced solenoid power for production cost saving
- › Normally open and normally closed version
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Coil interchangeability among SD*- A* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

2/2 screw-in cartridge poppet valve, pilot operated. The one-directional valve with 3/4-16 UNF connection thread is designed for on-off flow control with leak-free closing in 2→1 flow direction. In the opposite flow direction the valve is opened by fluid pressure.

Model Code	202	2L2
Symbol		

Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / A2 (C-8-2)	
		Lightline	High performance
Max. flow	l/min (GPM)	30 (7.9)	30 (7.9)
Max. operating pressure	bar (PSI)	250 (3600)	420 (6100)
Max. internal leakage in the direction 2→1 ($v=32$ mm ² /s)	cm ³ /min	≤ 0.25 at 250 bar	
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Weight without coil	kg (lbs)	0.12 (0.26)	0.20 (0.44)
General information		Type	
Datasheet		Products and operating conditions	
HA 0060		C 14B* C 19B*	
Coil types		Type	
HA 8007		SB-A2* SB-*A2*	
Valve bodies		Type	
In-line mounted		SMT-A2*	
Sandwich mounted		HA 0018 HA 0028	
Cavity details / Form tools		HA 0019	
Spare parts		HA 8010	

Characteristics measured at $v = 32$ mm²/s (156 SUS)

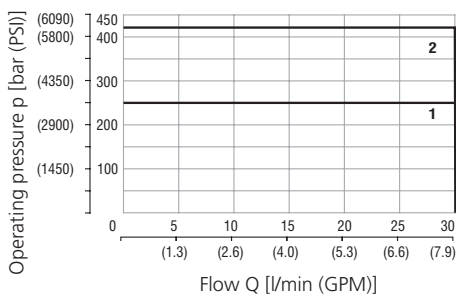
Operating limits - Lightline + High performance

- L - Oil 60 °C (140 °F) / Ambient temperature / 50 °C (122 °F) / Voltage U_N -10% (21.6 VDC)
- HP - Oil 80 °C (176 °F) / Ambient temperature / 50 °C (122 °F) / Voltage U_N -10% (21.6 VDC)

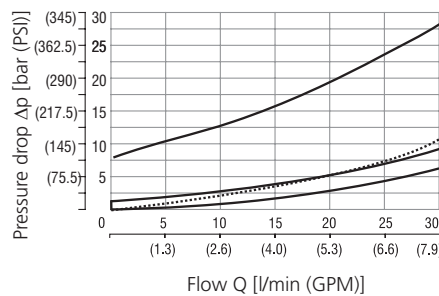
Pressure drop related to flow rate

- Lightline

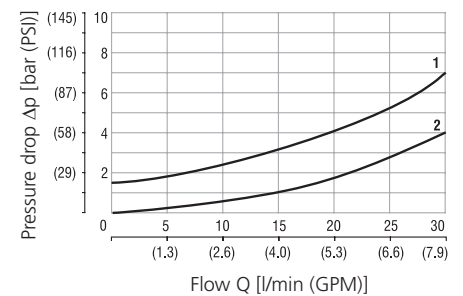
- High performance



	Model	Connection
1	L2L2	1→2, 2→1
1	L2O2	1→2, 2→1
2	H2L2	1→2, 2→1
2	H2O2	1→2, 2→1



	Model	Connection	Solenoid
1	L2L2	1→2	on
1	L2L2	2→1	on
1	L2O2	2→1	off
2	L2L2	1→2	off
3	L2O2	1→2	on
4	L2O2	1→2	off

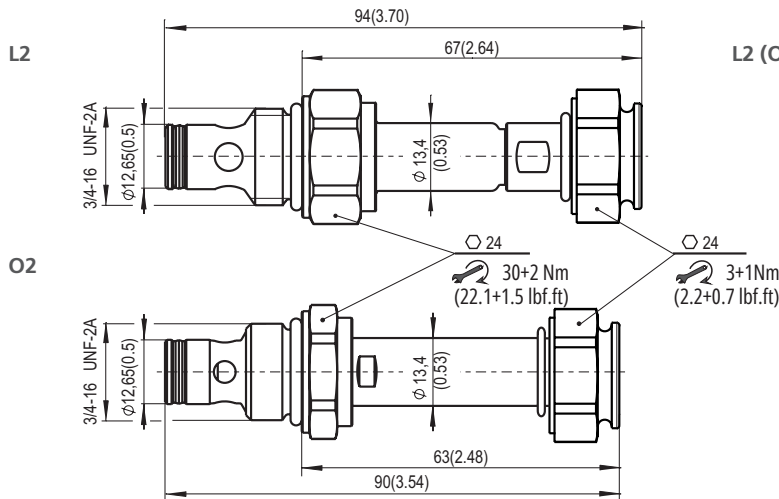


	Model	Connection	Solenoid
1	H2L2	1→2	off
2	H2L2	1→2	on
2	H2L2	2→1	on
2	H2O2	1→2	off
2	H2O2	2→1	off

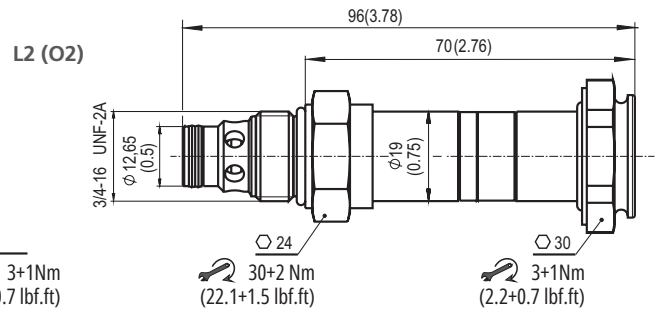
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

Lightline



High performance



Manual Override in millimeters (inches)

*Only for High performance version

No designation* - standard for 2O2	Designation M2 for 2O2* - rubber boot protected	Designation M5 for 2O2* - socket head screw, size 2.5	Designation M9 for 2O2 - without manual override
 ~70.0 (2.76)	 ~81.5 (3.21)	 ~77.6 (3.06)	 H ~70.0 (2.76) L ~90.0 (3.54)
Designation M7 for 2L2* - removable handwheel with locking**	Designation M4 for 2L2* - hand screw	Designation M5 for 2L2* - socket head screw, size 2.5	Designation M9 for 2L2 - without manual override
 H ~96(3.78)	 ~88.8 (3.50)	 ~88.8 (3.50)	 H ~70.0 (2.76) L ~94.0 (3.70)
**Basic position 1 of the M7 manual override Spool of valve is operated by solenoid.	**Position 2 of the M7 manual override Spool of the valve is shifted by handwheel and locked in this position.		

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD3E-A2 / -

2/2 directional valve, solenoid operated, poppet type, piloted

Valve cavity
3/4-16 UNF (C-8-2)

Model
Lightline L
High performance H

Functional symbol

 2O2
 2L2

Surface treatment
 A zinc-coated (ZnCr-3), ISO 9227 (240 h)
 B zinc-coated (ZnNi), ISO 9227 (520 h)*

Seals
 NBR
 V FPM (Viton)*

Manual override
 No designation standard for 2O2*
 M2 rubber boot protected*
 M4 hand screw*
 M5 socket head screw*
 M7 removable handwheel with locking*
 M9 without manual override

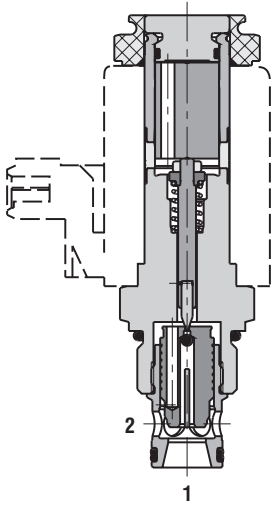
*Only for High performance version

2/2 Directional Valve, Solenoid Operated, Poppet Type, Piloted

SD3E-B2

7/8-14 UNF • Q_{max} 75 l/min (20 GPM) • p_{max} 420 bar (6100 PSI)

Normally Open



Technical Features

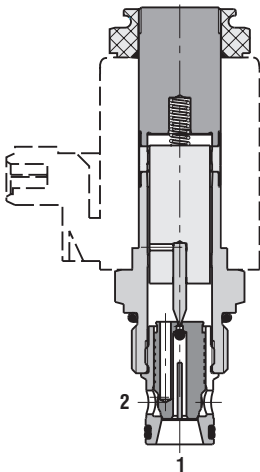
- › Hardened precision parts
- › High flow capacity and leak-free closing
- › High transmitted hydraulic power up to 420 bar
- › Normally open and normally closed version
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Coil interchangeability among SD*- B* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

2/2 screw-in cartridge poppet valve, pilot operated. The one-directional valve with 7/8-14 UNF connection thread is designed for on-off flow control with leak-free closing in 2 → 1 flow direction. In the opposite flow direction the valve is opened by fluid pressure.

Model Code	2O2	2L2
Symbol		

Normally Closed



Technical Data

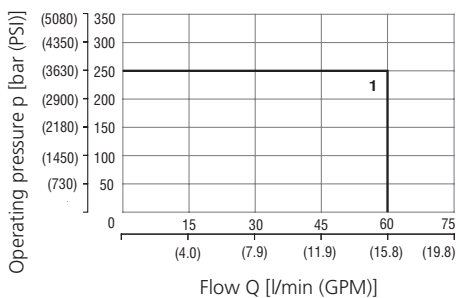
Valve size / Cartridge cavity	7/8-14 UNF-2A / B2 (C-10-2)	
	Lightline	High performance
Max. flow	60 (15.9) l/min (GPM)	75 (19.8)
Max. operating pressure	250 (3600) bar (PSI)	420 (6100)
Max. internal leakage in the direction 2→1 ($v=32$ mm ² /s)	cm ³ /min ≤ 0.25 at 250 bar	
Fluid temperature range (NBR)	°C (°F) -30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F) -20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F) -30...50 (-22...122)	-30...80 (-22...176)
Fluid viscosity range	mm ² s ⁻¹ 10 ... 500	
Weight without coil	kg (lbs) 0.23 (0.51)	0.30 (0.66)

	Datasheet	Type
General information	HA 0060	Products and operating conditions
Coil types	HA 8007	C 19B* C 22B*
Valve bodies	In-line mounted	SB-B2*
	Sandwich mounted	SB-*B2*
Cavity details / Form tools	HA 0019	SMT-B2*
Spare parts	HA 8010	

Characteristics measured at $v = 32$ mm²/s (156 SUS)

Operating limits - Lightline

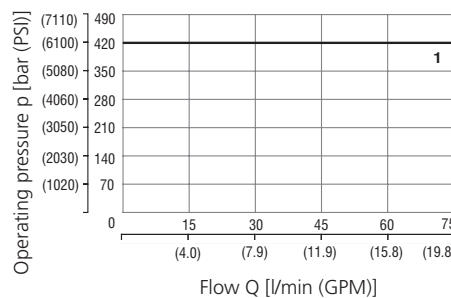
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)



	Model	Connection
1	2L2	1→2, 2→1
1	2O2	1→2, 2→1

Operating limits - High performance

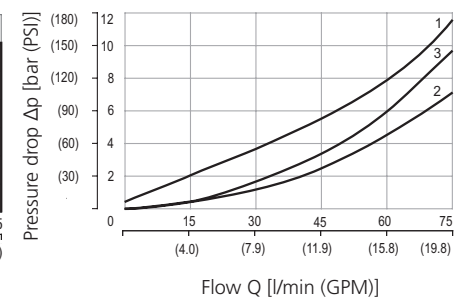
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)



	Model	Connection
1	2L2	1→2, 2→1
1	2O2	1→2, 2→1

Pressure drop related to flow rate

- Lightline, High performance

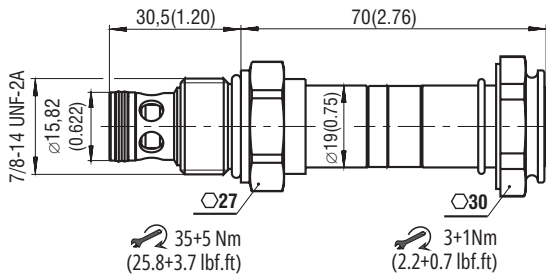


	Model	Connection	Solenoid
1	2L2	1→2	off
2	2L2	2→1	on
2	2L2	1→2	on
2	2O2	1→2	off
3	2O2	2→1	off

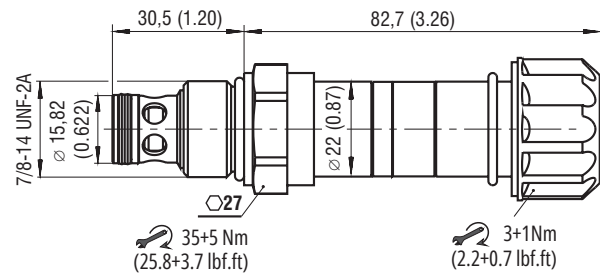
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

Lightline



High performance



Manual Override in millimeters (inches)

No designation - for 2O2 - standard	Designation M2 for 2O2 - rubber boot protected	Designation M5 - for 2O2 - socket head screw, size 2.5 (normally opened, screw in by allen key)	Designation M9 - for 2O2 - without manual override
 L ~ 70.0 (2.76) H ~ 82.7 (3.26)	 L ~ 82.0 (3.23) H ~ 100.0 (3.94)	 L ~ 77.6 (3.06) H ~ 84.8 (3.34)	 L ~ 70.0 (2.76) H ~ 82.7 (3.26)
		Designation M5 - for 2L2 - socket head screw, size 2.5 (normally closed, unscrew by allen key or by hand)	Designation M9 - for 2L2 - without manual override
		 L ~ 81.8 (3.22) H ~ 93.6 (3.69)	 L ~ 70.0 (2.76) H ~ 82.7 (3.26)

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

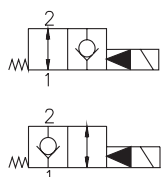
SD3E-B2 / -

2/2 directional valve, solenoid operated, poppet type, piloted

Valve cavity
7/8-14 UNF (C-10-2)

Model
Lightline L
High performance H

Functional symbol



2O2

2L2

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

No designation V

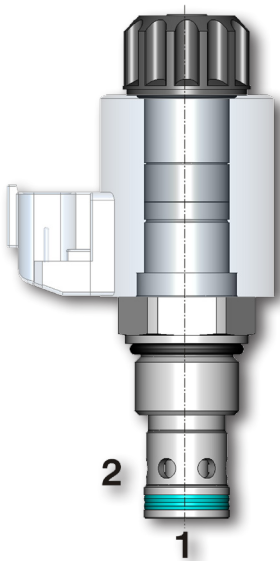
Seals
NBR
FPM (Viton)

No designation
M2
M5
M9

Manual override
standard for 2O2
rubber boot protected
socket head screw
without manual override

2/2 Directional Valve, Solenoid Operated, Poppet Type, Piloted

SD3E-C2*2O2(2L2) 1-1/16-12 UN • Q_{max} 150 l/min (40 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- › Hardened precision parts
- › High flow capacity and leak-free closing
- › High transmitted hydraulic power, max. pressure 350 bar
- › Normally open and normally closed version
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Coil interchangeability among SD*- C/H* product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (520 h salt spray)

Functional Description

2/2 screw-in cartridge poppet valve, pilot operated. The one-directional valve with 1-1/16-12 UN connection thread is designed for on-off flow control with leak-free closing in 2 → 1 flow direction. In the opposite flow direction the valve is opened by fluid pressure.

Model Code	2O2	2L2
Symbol		

Technical Data

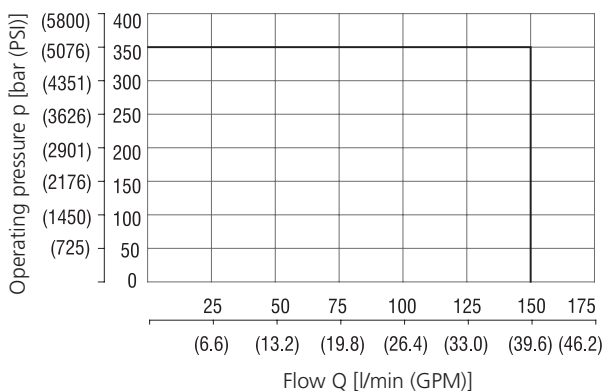
Valve size / Cartridge cavity		1-1/16-12 UN / C2 (VC12-2)
		High performance
Max. flow	l/min (GPM)	150 (39.6)
Max. operating pressure	bar (PSI)	350 (5100)
Max. internal leakage in the direction 2→1 ($v=32 \text{ mm}^2/\text{s}$)	cm^3/min	≤ 0.25 at 250 bar
Fluid temperature range (NBR)	°C (°F)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...80 (-22...176)
Fluid viscosity range	mm^2/s	10 ... 500
Weight without coil	kg (lbs)	0.40 (0.88)

		Datasheet	Type
General information		HD 0060	Products and operating conditions
Coil types		HD 8007	C22B*
Valve bodies	In-line mounted	HD 0018	SB-C2*
	Sandwich mounted	HD 0028	on request
Cavity details / Form tools		HD 0019	SMT-C2*
Spare parts		HD 8010	

Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Operating limits - High performance

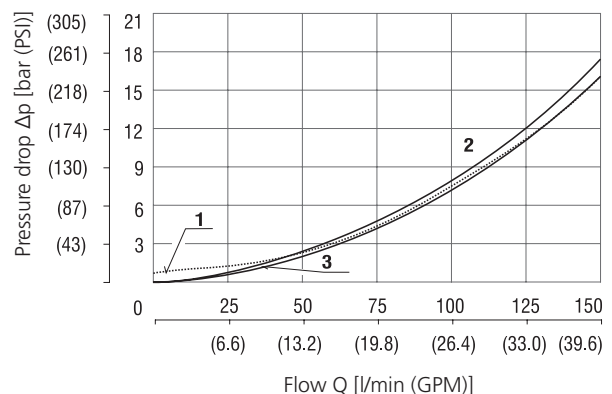
Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)



	Model	Connection
1	2L2	1→2, 2→1
1	2O2	1→2, 2→1

Pressure drop related to flow rate

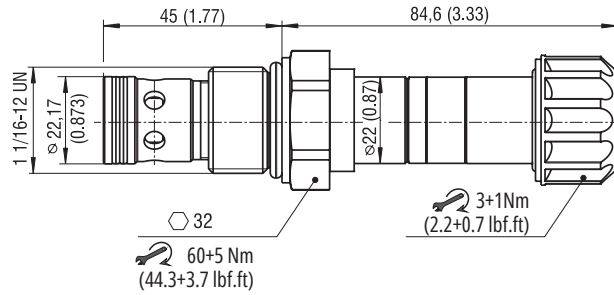
- High performance



	Model	Connection	Solenoid
1	2L2	1→2	off
2	2L2	2→1	on
3	2L2	1→2	on
2	2O2	1→2	off
3	2O2	2→1	off

Dimensions in millimeters (inches)

High performance

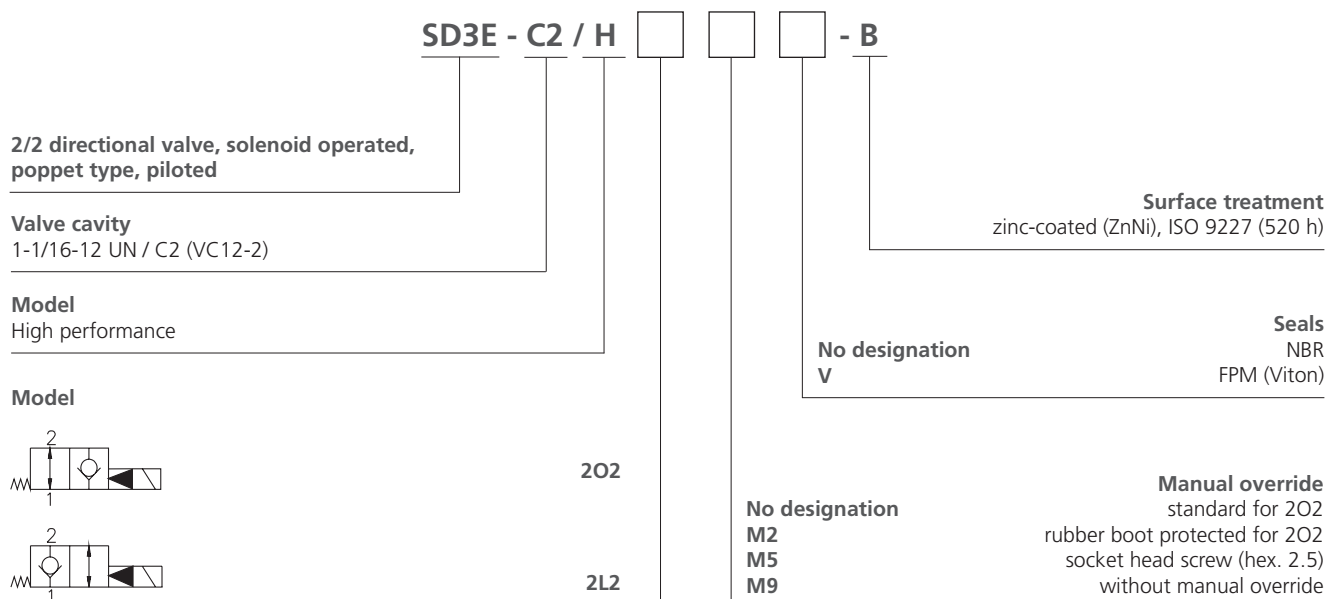


Manual Override in millimeters (inches)

No designation - for 2O2 - standard	Designation M2 for 2O2 - rubber boot protected	Designation M5 - for 2O2 - socket head screw, hex. 2.5	Designation M9 - for 2O2 - without manual override
84,6 (3.33)	101,8 (4.01)	86,8 (3.42)	84,7 (3.33)
		Designation M5 - for 2L2 - socket head screw, hex. 2.5	Designation M9 - for 2L2 - without manual override
		95,6 (3.76)	84,6 (3.33)

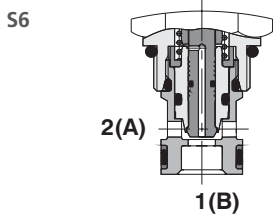
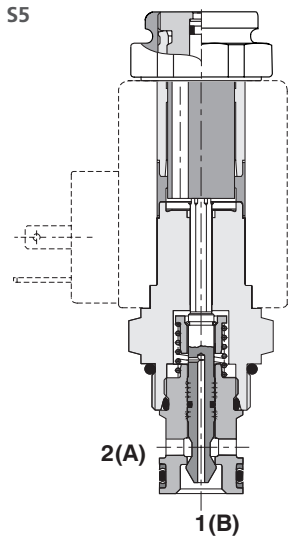
In case of solenoid malfunction or power failure, the valve poppet can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code



2/2 Solenoid Operated Poppet Valve, Direct Acting

ROE3-042S5(S6) M22x1.5 • Q_{max} 25 l/min (7 GPM) • p_{max} 250 bar (3600 PSI)



Technical Features

- › Screw-in cartridge valve with connecting thread M22x1.5
- › All ports may be fully pressurized with maximum pressure 250 bar
- › Valve closes leak-free in both flow directions
- › Precisely manufactured parts and hardened poppet
- › Normally open or normally closed version
- › Optional type of manual override
- › Coil interchangeability among ROE / RPE3-04 product line
- › The valve in standard version is zinc-coated with surface protection 240 h in NSS acc. to ISO 9227

Functional Description

2/2 screw-in cartridge poppet valve with connecting thread M22x1.5, solenoid operated, direct acting. The bi-directional valve is used for leak-free closing in both flow directions.

Model Code	S5	S6
Symbol		

Technical Data

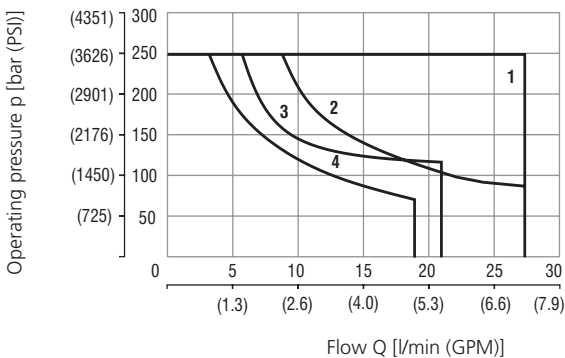
Valve size / Cartridge cavity		M22x1.5 / QG2
Max. flow	l/min (GPM)	25 (6.6)
Max. operating pressure	bar (PSI)	250 (3600)
Max. internal leakage in the direction 2→1 ($v=32$ mm ² /s)	cm ³ /min	≤ 0.25 at 250 bar
Fluid temperature range (NBR)	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature	°C (°F)	-20 ... 50 (-4 ... 122)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500
Weight without coil	kg (lbs)	0.2 (0.44)

		Datasheet	Type
General information		HA 0060	Products and operating conditions
Coil types		HA 8007	C19B*
Valve bodies	In-line mounted	HA 0018	SB-QG2*
	Sandwich mounted	HA 0028	SB-04-QG2*
Cavity details		HA 0019	SMT-QG2*
Spare parts		HA 8010	

Characteristics measured at $v = 32$ mm²/s (156 SUS)

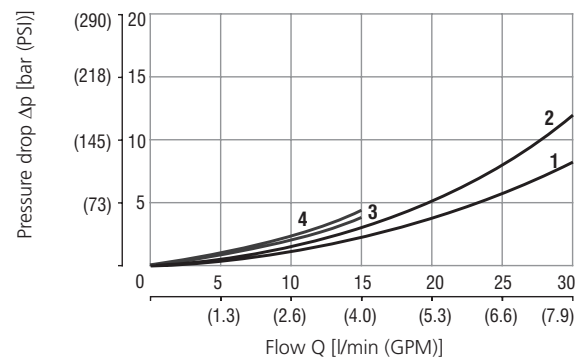
Operating limits

Operating limits for maximum hydraulic power at rated temperature and supply voltage equal to 90% of the nominal value.



	Model	Connection
1	S5	2→1
2	S5	1→2
3	S6	2→1*
4	S6	1→2*

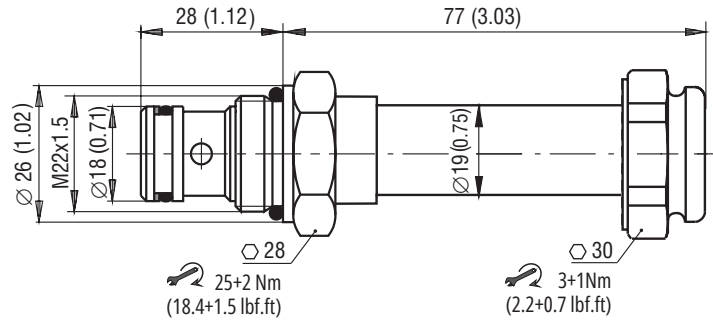
Pressure drop related to flow rate



	Model	Connection
1	S5	2→1
2	S5	1→2
3	S6	2→1*
4	S6	1→2*

*flow up to 15 l/min (4 GPM)

Dimensions in millimeters (inches)



Manual Override in millimeters (inches)

No designation - standard	Designation N2 - rubber boot protected	Designation N4 - hand screw

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

ROE3 - 042 -

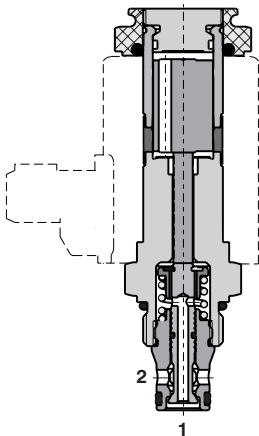
<p>2/2 Solenoid Operated Poppet Valve, Direct Acting M22x1.5</p> <p>Valve size</p> <p>Functional symbol</p> <p>normally closed (NC), blocking</p> <p>normally open (NO), blocking</p>	<p>Surface treatment</p> <p>A zinc-coated (ZnCr-3), ISO 9227 (240 h)</p> <p>B zinc-coated (ZnNi), ISO 9227 (520 h)</p> <p>Seals</p> <p>No designation NBR</p> <p>V FPM (Viton)</p> <p>Manual override</p> <p>No designation standard</p> <p>N2 rubber boot protected</p> <p>N4 hand screw</p>
--	---

2/2 Directional Valve, Solenoid Operated, Poppet Type, Blocking, Direct Acting

SD1E-A2

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 350 bar (5100 PSI)

2S5



Technical Features

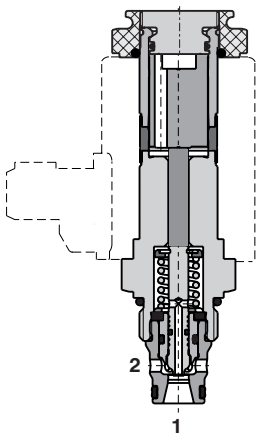
- › Hardened precision parts
- › High flow capacity and leak-free closing
- › High transmitted hydraulic power up to 350 bar
- › Normally open and normally closed version
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Coil interchangeability among SD*-A*/H product line
- › In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

2-way, 2 position high pressure direct acting poppet valve in form of a screw-in cartridge. The valve is used mainly for ON-OFF bi-directional control of flow to actuators with leak-free closing in both directions.

Model Code	2S5	2S6
Symbol		

2S6



Technical Data

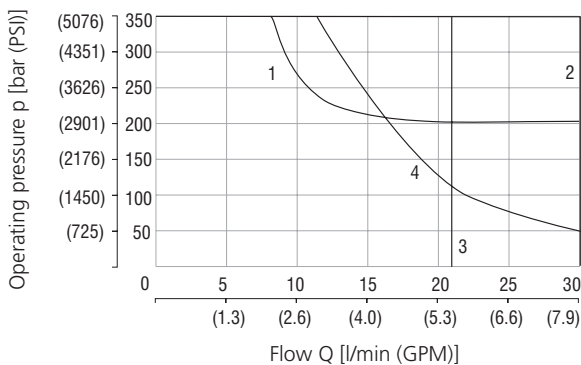
Valve size / Cartridge cavity		3/4-16 UNF-2A / A2 (C-8-2)
Max. flow	l/min (GPM)	30 (7.9)
Max. operating pressure	bar (PSI)	350 (5100)
Max. internal leakage in the direction 1→2; 2→1 ($v=32$ mm ² /s)	cm ³ /min	≤ 0.25 at 250 bar
Fluid temperature range (NBR)	°C (°F)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...80 (-22...176)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500
Weight without coil	kg (lbs)	0.19 (0.42)

	Datasheet	Type
General information	HA 0060	Products and operating conditions
Coil types	HA 8007	C 19B*
Valve bodies	In-line mounted	HA 0018
	Sandwich mounted	HA 0028
Cavity details / Form tools	HA 0019	SMT-A2*
Spare parts	HA 8010	

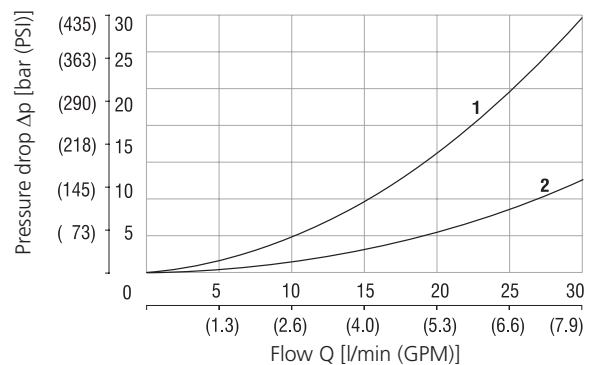
Characteristics measured at $v = 32$ mm²/s (156 SUS)

Operating limits

Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)

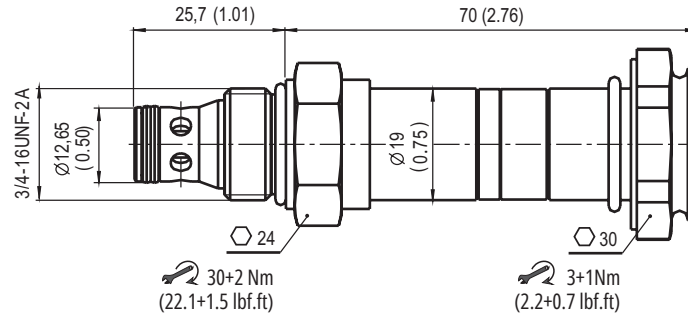


Pressure drop related to flow rate

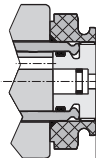
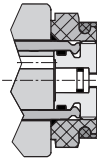
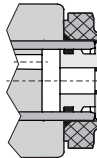
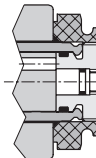
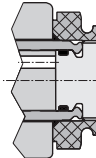


Dimensions in millimeters (inches)

2S5, 2S6



Manual Override in millimeters (inches)

No designation - standard	Designation M2 - rubber boot protected	Designation M4 - hand screw	Designation M5 - socket head screw, size 2.5	Designation M9 - without manual override
 ~ 70.0 (2.76)	 ~ 81.5 (3.21)	 ~ 90 (3.54)	 ~ 77.5 (3.05)	 ~ 70.0 (2.76)

In case of solenoid malfunction or power failure, the valve spool can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

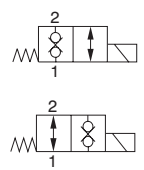
SD1E-A2 / H -

2/2 directional valve, solenoid operated, poppet type, blocking, direct acting

Valve cavity
3/4-16 UNF (C-8-2)

Model
High performance

Functional symbol



2S5 No designation

2S6 M2
 M4
 M5
 M9

Surface treatment

A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

Seals

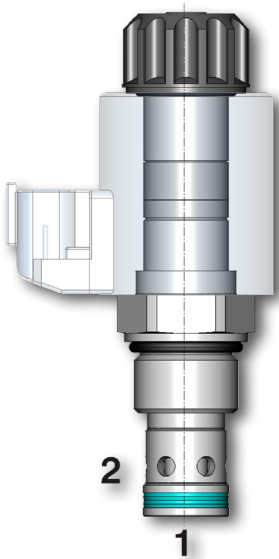
No designation
V NBR
 FPM (Viton)

Manual override

standard
rubber boot protected
hand screw
socket head screw
without manual override

2/2 Directional Valve, Solenoid Operated, Poppet Type, Piloted

SD3E-C2*S5(S6) 1-1/16-12 UN • Q_{max} 150 l/min (40 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- › Hardened precision parts
- › High flow capacity and high tightness of poppet in the seat
- › High transmitted hydraulic power, max. pressure 350 bar
- › Normally open and normally closed version
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Coil interchangeability among SD*- C/H* product line
- › In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

2-way, 2-position pilot operated poppet valve in form of a screw-in cartridge. The valve is used mainly for on-off bi-directional control of flow to actuators with leak-free closing in both directions.

Model Code	2S5	2S6
Symbol		

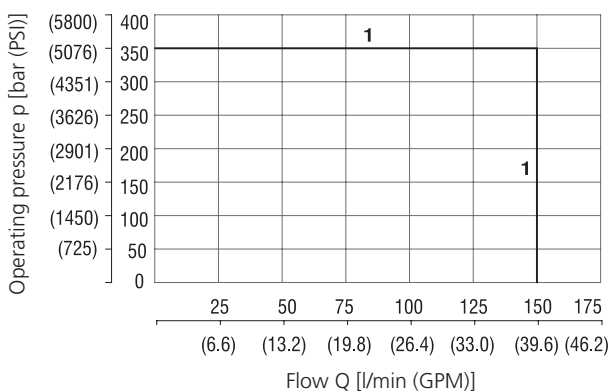
Technical Data

Valve size / Cartridge cavity		1-1/16-12 UN / C2 (VC12-2)	
		High performance	
Max. flow	l/min (GPM)	150 (39.6)	
Max. operating pressure	bar (PSI)	350 (5100)	
Max. internal leakage in the direction 1→2; 2→1	cm ³ /min	≤ 0.25 at 250 bar (v=32 mm ² /s)	
Fluid temperature range (NBR)	°C (°F)	-30...80 (-22...176)	
Fluid temperature range (FPM)	°C (°F)	-20...80 (-4...176)	
Ambient temperature range	°C (°F)	-30...80 (-22...176)	
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Weight without coil	kg (lbs)	0.40 (0.88)	
		Datasheet	
		Type	
General information	HA 0060	Products and operating conditions	
Coil types	HA 8007	C22B*	
Valve bodies	In-line mounted	HA 0018	SB-C2*
	Sandwich mounted	HA 0028	on request
Cavity details / Form tools	HA 0019	SMT-C2*	
Spare parts	HA 8010		

Characteristics measured at v = 32 mm²/s (156 SUS)

Operating limits - High performance

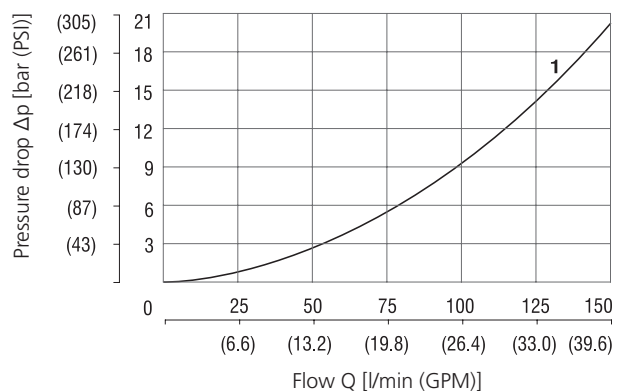
Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 V DC)



	Model	Connection
1	2S5	1→2, 2→1
1	2S6	1→2, 2→1

Pressure drop related to flow rate

- High performance

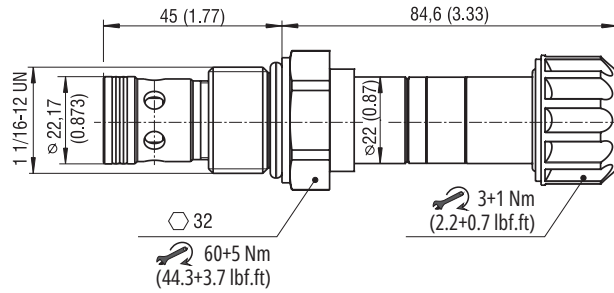


	Model	Connection	Solenoid
1	2S5	1→2, 2→1	on
1	2S6	1→2, 2→1	off

For operating limits under conditions other than shown contact the technical support.

Dimensions in millimeters (inches)

High performance



Manual Override in millimeters (inches)

No designation - for 2S6 - standard	Designation M2 for 2S6 - rubber boot protected	Designation M5 - for 2S6 - socket head screw, hex. 2.5	Designation M9 - for 2S6 - without manual override
 84,6 (3.33)	 101,8 (4.01)	 86,8 (3.42)	 84,7 (3.33)
		Designation M5 - for 2S5 - socket head screw, hex. 2.5	Designation M9 - for 2S5 - without manual override
		 95,6 (3.76)	 84,6 (3.33)

In case of solenoid malfunction or power failure, the valve poppet can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD3E - C2 / H **- B**

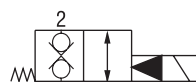
2/2 directional valve, solenoid operated, poppet type, piloted

Valve cavity
1-1/16-12 UN (VC12-2)

Model
High performance

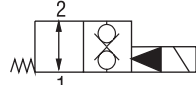
Functional symbol

normally closed (NC), blocking



2S5

normally open (NO), blocking



2S6

No designation
V

Surface treatment
zinc-coated (ZnNi), ISO 9227 (520 h)

Seals
NBR
FPM (Viton)

No designation
M2
M5
M9

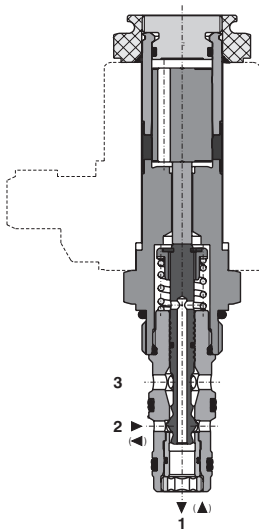
Manual override
standard for 2S6
rubber boot protected for 2S6
socket head screw (hex. 2.5)
without manual override

3/2 Directional Valve, Solenoid Operated, Poppet Type, Direct Acting

SD1E-A3

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 350 bar (5100 PSI)

2S7



Technical Features

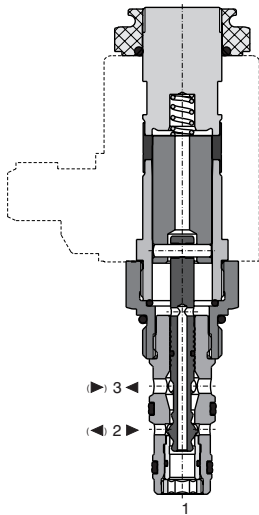
- › Hardened precision parts
- › High flow capacity and leak-free closing (up to 3 drops per minute)
- › High transmitted hydraulic power up to 350 bar
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Coil interchangeability among SD*-A*/H product line
- › In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

3-way, 2 positions, high pressure direct acting poppet valve in form of a screw-in cartridge. The valve is used mainly for ON-OFF bi-directional control of flow to actuators with leak-free closing in both directions.

Model Code	2S7	2S8
Symbol		

2S8



Technical Data

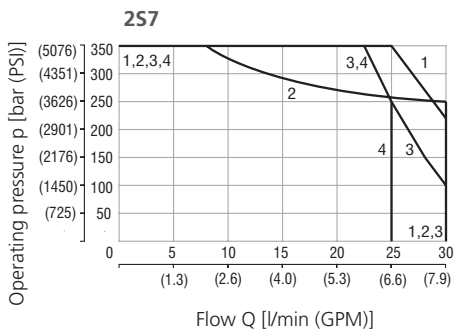
Valve size / Cartridge cavity	3/4-16 UNF-2A / A3 (C-8-3)		
Max. flow	l/min (GPM)	30 (7.9)	
Max. operating pressure	bar (PSI)	350 (5100)	
Max. internal leakage in the direction 3→1 ($v=32$ mm ² /s)	cm ³ /min	≤ 0.25 at 250 bar	
Fluid temperature range (NBR)	°C (°F)	-30...80 (-22...176)	
Fluid temperature range (FPM)	°C (°F)	-20...80 (-4...176)	
Ambient temperature range	°C (°F)	-30...80 (-22...176)	
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Weight without coil	2S7	0.21 (0.45)	
	2S8	0.22 (0.47)	
	Datasheet	Type	
General information	HA 0060	Products and operating conditions	
Coil types	HA 8007	C 19B*	
Valve bodies	In-line mounted	HA 0018	SB-A3*
	Sandwich mounted	HA 0028	SB-*A3*
Cavity details / Form tools	HA 0019	SMT-A3*	
Spare parts	HA 8010		

Characteristics measured at $v = 32$ mm²/s (156 SUS)

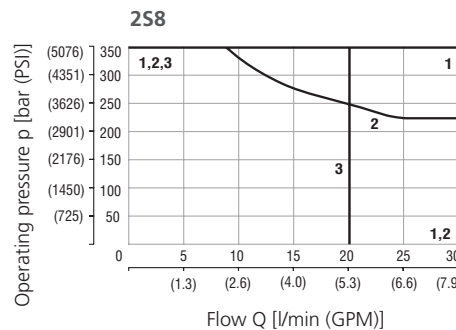
Operating limits

Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_N -10% (21.6 V DC)

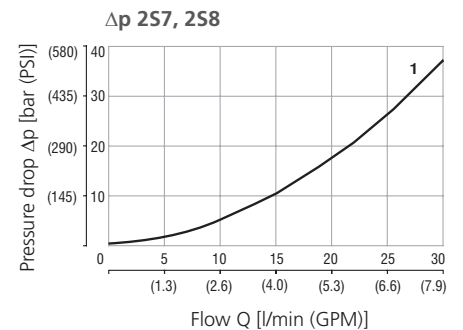
Pressure drop related to flow rate



	Model	Connection
1	2S7	2→1
2	2S7	2→3
3	2S7	3→2
4	2S7	1→2



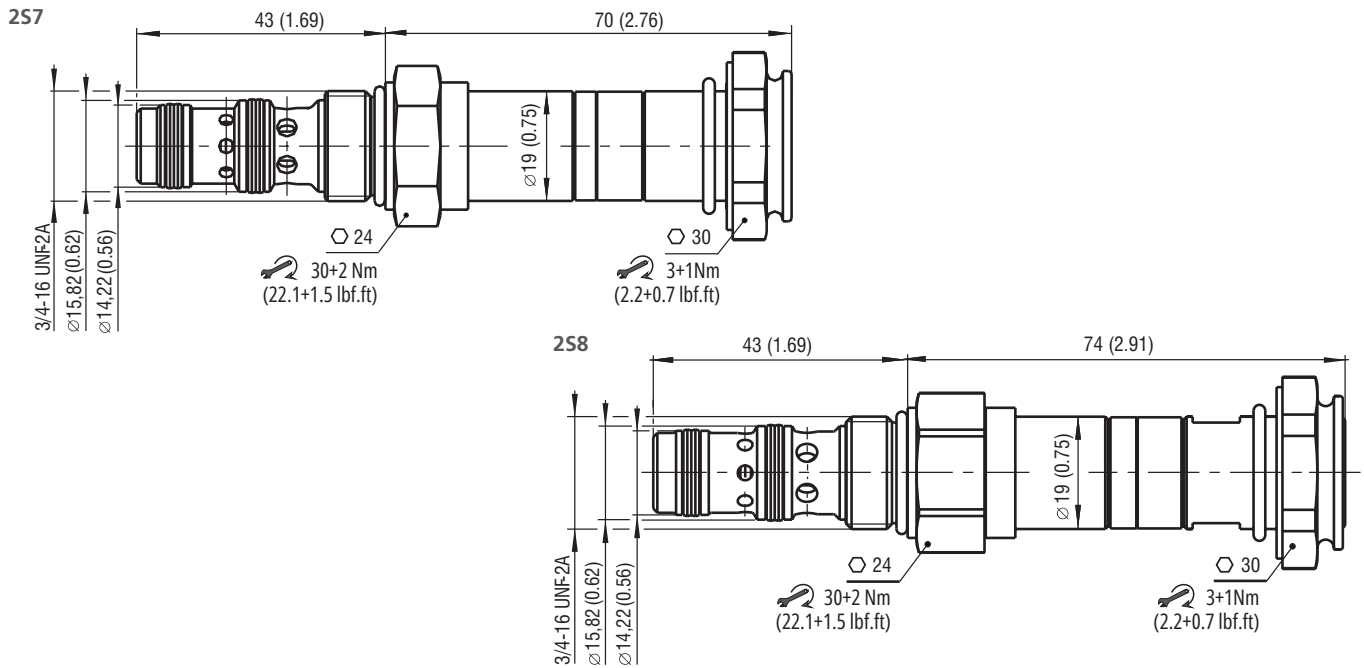
	Model	Connection
1	2S8	1→2, 3→2
2	2S8	2→3
3	2S8	2→1



	Model	Connection
1	2S7, 2S8	1→2*, 2→1, 2→3, 3→2

* max. 25 l/min (6.6 GPM)

Dimensions in millimeters (inches)



Manual Override in millimeters (inches)

No designation - for 2S7 - standard (operated by pin)	Designation M2 - for 2S7 - rubber boot protected	Designation M4 - for 2S7 - hand screw	Designation M5 - for 2S7 - socket head screw, size 2.5
Designation M9 - without manual override - for 2S7	Designation M9 - without manual override - for 2S8		Designation M5 - for 2S8 - socket head screw, size 2.5

In case of solenoid malfunction or power failure, the valve poppet can be shifted by manual override under the condition that the pressure in the back line does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD1E-A3 / H [] [] [] - []

3/2 directional valve, solenoid operated, poppet type, direct acting

Valve cavity
3/4-16 UNF (C-8-3)

Model
High performance

Functional symbol

2S7

2S8

Surface treatment

A zinc-coated (ZnCr-3), ISO 9227 (240 h)

B zinc-coated (ZnNi), ISO 9227 (520 h)

Seals

NBR

FPM (Viton)

No designation

V

Manual override

No designation standard (operated by pin)

M2 rubber boot protected

M4 hand screw

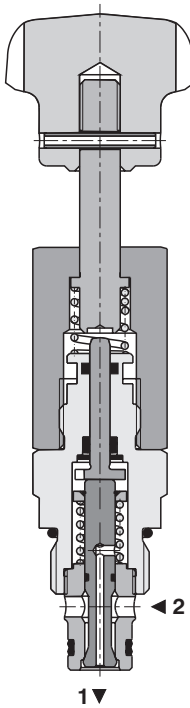
M5 socket head screw

M9 without manual override

2/2 Directional Valve, Manually Operated, Poppet Type, Blocking, Direct Acting

SD1M-A2

3/4-16 UNF • Q_{max} 20 l/min (5 GPM) • p_{max} 250 bar (3600 PSI)



Technical Features

- › Hardened precision parts
- › High flow capacity and leak-free closing
- › Wide range of manual operations
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

A manually operated, 2-way, blocking, push-to-open valve in the form of a screw-in cartridge. The preferential flow is from 2 to 1. The valve provides the possibility to throttle the flow. Position 0 middle hand lever position - the valve is closed. Position I opens the valve against the return spring.

Model Code	2S5	
Symbol		

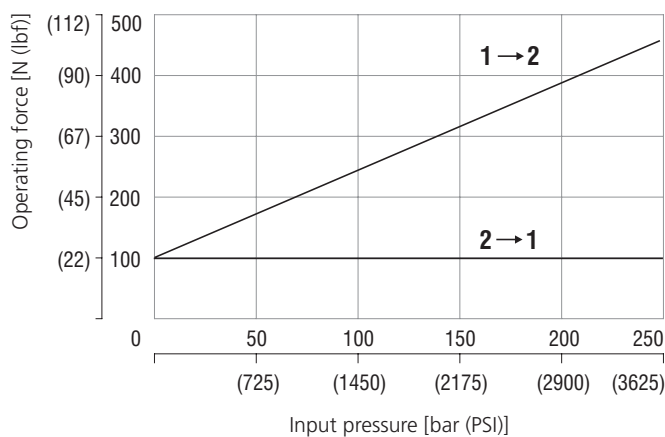
Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / A2 (C-8-2)
Max. flow	l/min (GPM)	20 (5.3)
Max. operating pressure	bar (PSI)	250 (3600)
Max. operating force	N (lbf)	see characteristics
Max. internal leakage in the direction 2→1 ($v=32 \text{ mm}^2/\text{s}$)	cm^3/min	≤ 0.25 at 250 bar
Fluid temperature range (NBR)	$^{\circ}\text{C}$ ($^{\circ}\text{F}$)	-30 ... 100 (-22 ... +212)
Fluid temperature range (FPM)	$^{\circ}\text{C}$ ($^{\circ}\text{F}$)	-20 ... 120 (-4 ... +248)
Fluid viscosity range	mm^2s^{-1}	10 ... 500
Service life	cycles	10^6
Weight	model	1 2
	kg (lbs)	0.27 (0.60) 0.38 (0.84)

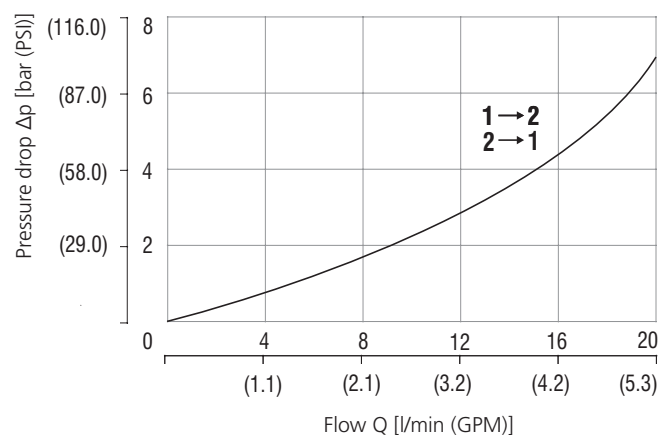
		Datasheet	Type
General information		HA 0060	Products and operating conditions
Valve bodies	In line mounted	HA 0018	SB-A2*
	Sandwich mounted	HA 0028	SB-*A2*
Cavity details / Form tools		HA 0019	SMT-A2*
Spare parts		HA 8010	

Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

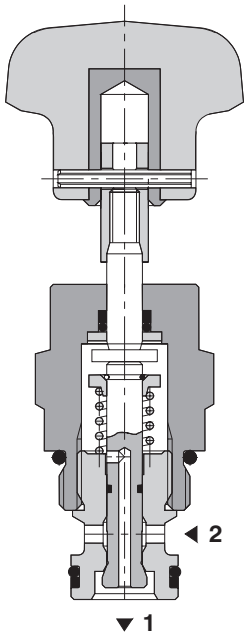
Operating limits



Pressure drop related to flow rate



Normally closed
Push-to-open



Technical Features

- › Hardened precision parts
- › High flow capacity and leak-free closing
- › Wide range of actuation alternatives
- › In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

A screw-in cartridge poppet valve manually operated by hand lever or push knob with a connecting thread M22x1.5. The bidirectional valve with a preferential flow direction 2→1 is designed for leakage free closing. In basic position the valve is closed. When adjusting the lever, the valve gradually opens against spring force and the flow increases up to the maximum.

Modell	1,2	3
Symbol		

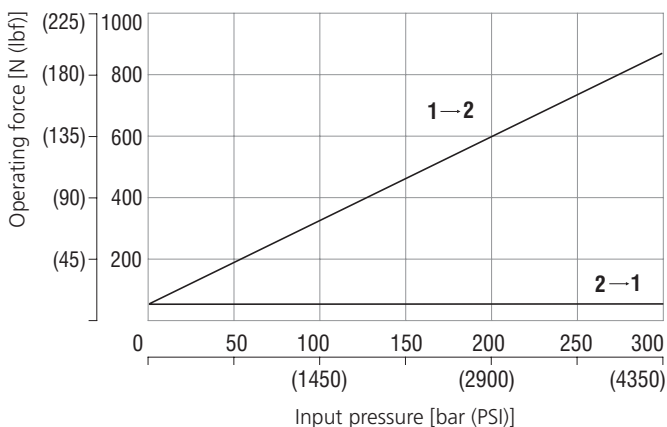
Technical Data

Valve size / Cartridge cavity	M22x1.5 / QG2			
Max. flow	l/min (GPM)	35 (9.2)		
Max. operating pressure	bar (PSI)	320 (4600)		
Max. operating force	N (lbf)	see characteristics		
Max. internal leakage in the direction 2→1 ($v=32 \text{ mm}^2/\text{s}$)	cm ³ /min	≤ 0.25 at 250 bar		
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +176)		
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)		
Fluid viscosity range	mm ² s ⁻¹	10 ... 500		
Service life	cycles	10 ⁶		
Weight	model	1	2	3
	kg (lbs)	0.15 (0.33)	0.25 (0.55)	0.66 (1.46)

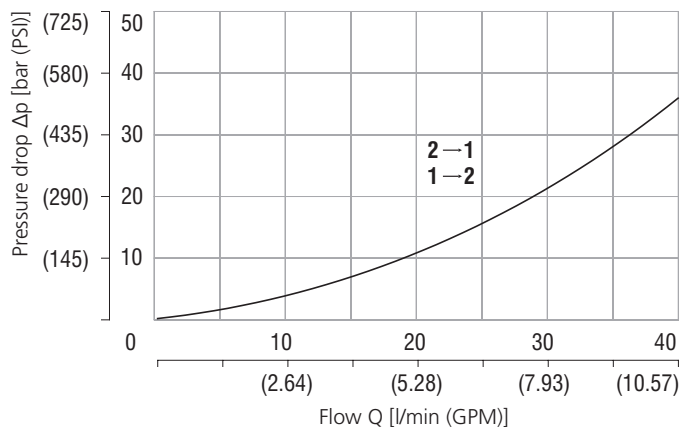
		Datasheet	Type
General information		HA 0060	Products and operating conditions
Valve bodies	In-line mounted	HA 0018	SB-QG2*
	Sandwich mounted	HA 0028	SB-*QG2*
Cavity details		HA 0019	SMT-QG2*
Spare parts		HA 8010	

Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Operating limits

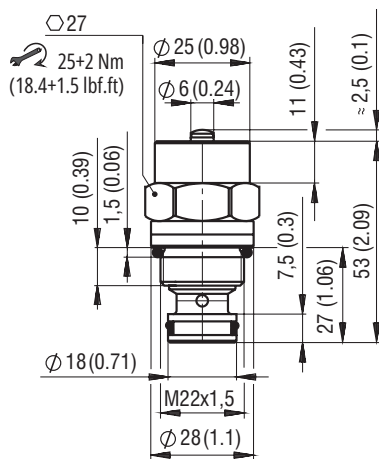


Pressure drop related to flow rate

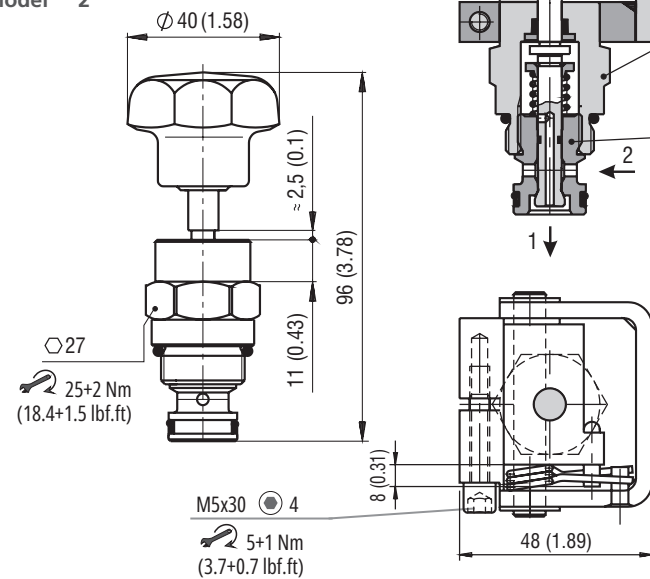


Dimensions in millimeters (inches)

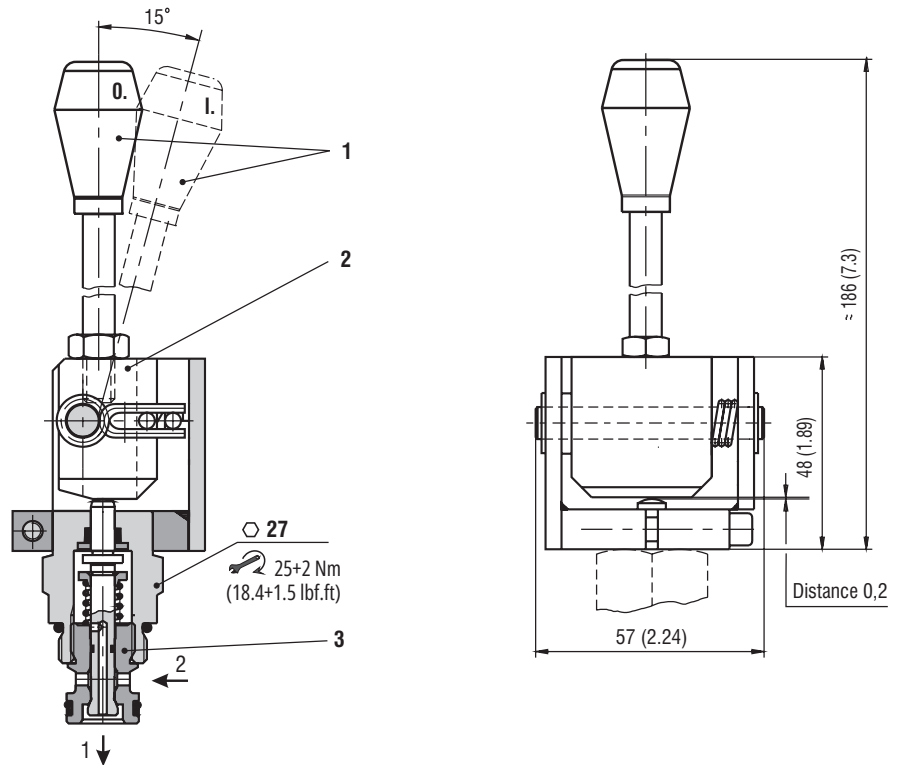
Model 1



Model 2



Model 3



- 1 Hand lever
- 0 position with detent
- 1. position opens the valve
- 2 Section of the hand lever
- 3 SD1M-QG2

Ordering Code

ROR3-06 2 - 00 - - -

2/2 directional valve, manually operated, poppet type, blocking, direct acting M22x1.5

Valve size

Number of valve positions

Flow restrictor
without flow restrictor

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

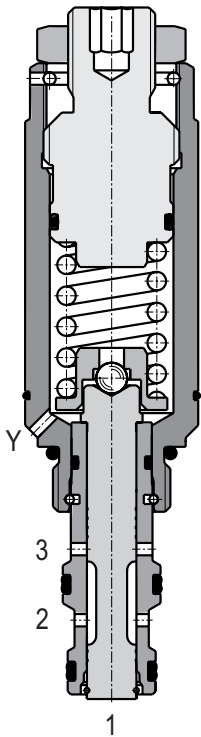
No designation
V

Seals
NBR
FPM (Viton)

Actuation
1 plunger
2 hand push knob
3 hand lever

SD6H-AY3

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- › 2-way hydraulically operated screw-in cartridge valve
- › Two basic spool types
- › Two pressure ranges for pressure setting
- › Adjustable pressure needed for changeover of spool position
- › External drainage of spring chamber – stable setting
- › The surface of the valve body and the adjusting screw are zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

The valve is intended to a distribution of working hydraulic fluid with the help of spool moving in the steel bush by pressure acting on the front surface of spool (1). The pressure needed for the changeover of the spool position is set by spring compression with the help of adjusting screw. The point transfer of spring force to the front surface of spool by means of a hardened steel ball eliminates the effect of radial forces and protects the spool against jamming in the bush. Two basic spool connections are available. In the basic spool position the ports 2↔3 are connected (2I11) or closed (2I12). The fluid from the spring chamber is unloaded through the external drain outlet (Y) and cannot influence the set pressure value.



The spool is fully shifted within the control pressure (1) increase range 3 bars above the cracking pressure value. When moving the spool back to its initial position due the spring force after the control pressure drop, a hysteresis must be taken into account.

Model Code	2I11	2I12
Symbol		

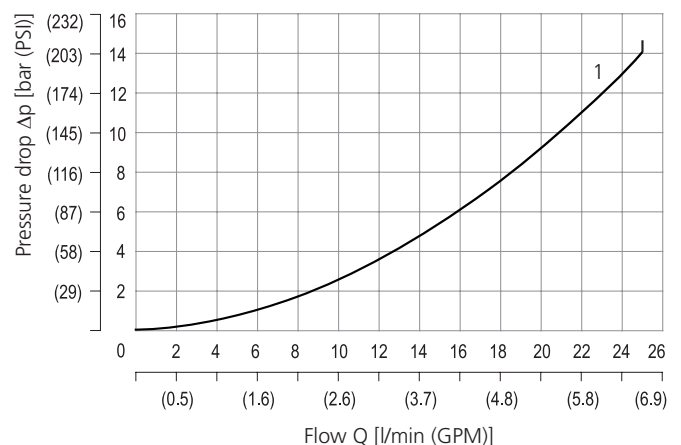
Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / AY3	
Max. flow	l/min (GPM)	30 (7.9)	
Max. operating pressure	bar (PSI)	350 (5100)	
Max. pressure in the spring space (Y)	bar (PSI)	30 (435)	
Max. internal leakage in the direction 3→1	cm ³ /min	≤ 35 at 250 bar (v=32 mm ² /s)	
Fluid temperature range (NBR)	°C (°F)	-30 ... 100 (-22 ... 212)	
Fluid temperature range (FPM)	°C (°F)	-20 ... 120 (-4 ... 248)	
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Pressure for changeover of spool position		6	13
	bar (PSI)	10 - 60 (145 - 870)	35 - 130 (510 - 1890)
Pressure drop		see Δp-Q Charakteristic	
Weight		2I11	2I12
	kg (lbs)	0.28 (0.62)	0.39 (0.86)
	Datasheet	Type	
General information	HA 0060	Products and operating conditions	
Cavity details / Form tools	HA 0019	SMT-AY3*	
Spare parts	HA 8010		

Characteristics measured at v = 32 mm²/s (156 SUS)

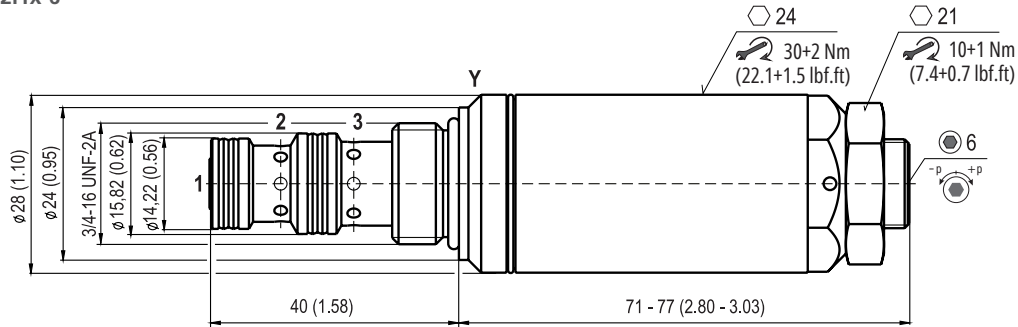
Pressure drop related to flow rate

	Model	Connection
1	2I11	1→2
1	2I12	1→2

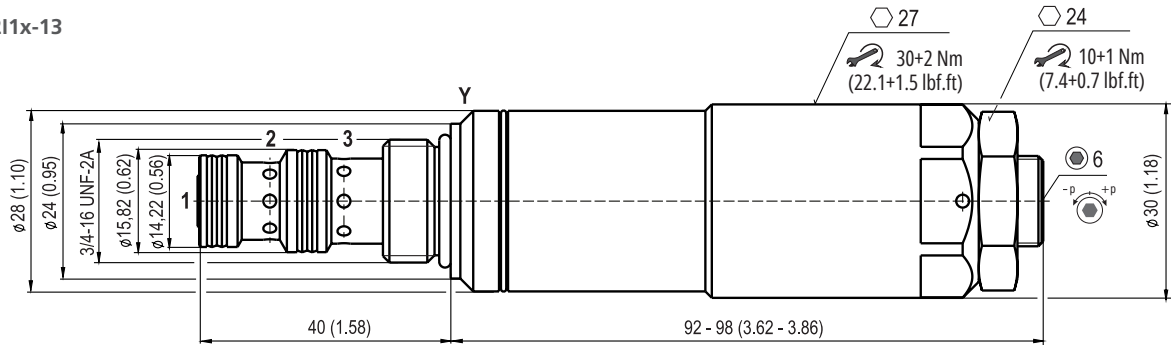


Dimensions in millimeters (in)

SD6H-AY3/H211x-6



SD6H-AY3/H211x-13



Ordering Code

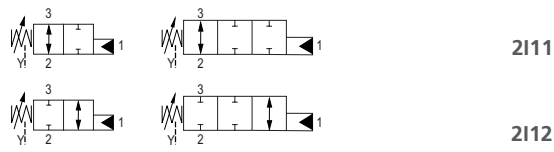
SD6H - AY3 / H [] - [] S [] - A

2/2 Hydraulically operated directional control valve screw-in cartridge design

Valve cavity
3/4-16 UNF-2B

Model
High performance

Functional symbol



Surface treatment
zinc-coated (ZnCr-3), ISO 9227 (240 h)

No designation
V

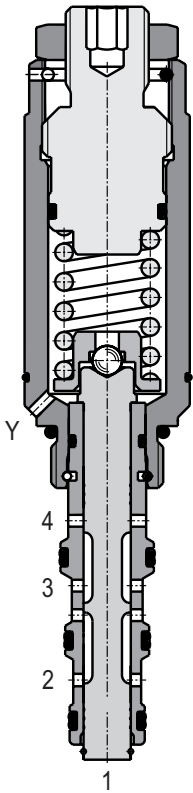
Seals
NBR
FPM (Viton)

Adjustment option
allen key (hex. 6)

Range of adjustable pressure for changeover of spool position
6 10 - 60 bar (145 - 870 PSI)
13 35 - 130 bar (508 - 1885 PSI)

SD6H-AY4

3/4-16 UNF • Q_{max} 30 l/min (8 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- > 3-way hydraulically operated screw-in cartridge valve
- > Two basic spool types
- > Two pressure ranges for pressure setting
- > Adjustable pressure needed for changeover of spool position
- > External drainage of spring chamber – stable setting
- > The surface of the valve body and the adjusting screw are zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

The valve is intended to a distribution of working hydraulic fluid with the help of spool moving in the steel bush by pressure acting on the front surface of spool (1). The pressure needed for the changeover of the spool position is set by spring compression with the help of adjusting screw. The point transfer of spring force to the front surface of spool by means of a hardened steel ball eliminates the effect of radial forces and protects the spool against jamming in the bush. Two basic spool connections are available. In the interposition of spool all three ports (2, 3, 4) are connected to each other (2D26) or mutually separated (2D29). The fluid from the spring chamber is unloaded through the external drain outlet (Y) and cannot influence the set pressure value.



The spool is fully shifted within the control pressure (1) increase range 3 bars above the cracking pressure value. When moving the spool back to its initial position due the spring force after the control pressure drop, a hysteresis must be taken into account.

Model Code	2D26		2D29	
Symbol				

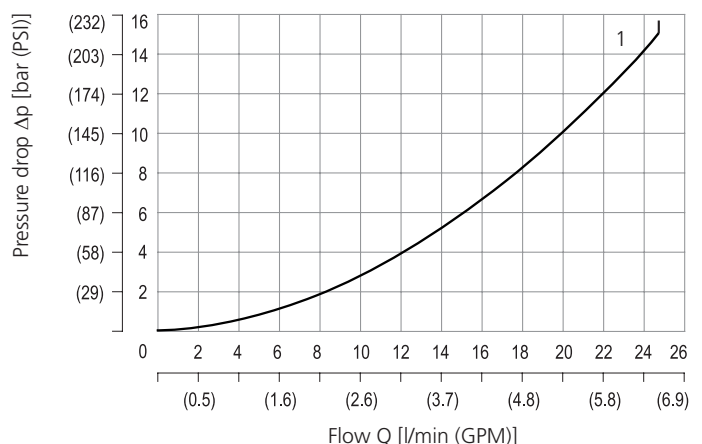
Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / AY4	
Max. flow	l/min (GPM)	30 (7.9)	
Max. operating pressure	bar (PSI)	350 (5100)	
Max. pressure in the spring space (Y)	bar (PSI)	30 (435)	
Max. internal leakage in the direction 4→1	cm ³ /min	≤ 35 p _{ri} 250 bar (v=32 mm ² /s)	
Fluid temperature range (NBR)	°C (°F)	-30 ... 100 (-22 ... 212)	
Fluid temperature range (FPM)	°C (°F)	-20 ... 120 (-4 ... 248)	
Fluid viscosity range	mm ² s ⁻¹	10 ... 500	
Pressure for changeover of spool position		6	13
	bar (PSI)	10 - 60 (145 - 870)	35 - 130 (510 - 1890)
Pressure drop		see Δp - Q Characteristics	
Weight		2D26	2D29
	kg (lbs)	0.30 (0.66)	0.40 (0.88)
	Datasheet	Type	
General information	HA 0060	Products and operating conditions	
Cavity details / Form tools	HA 0019	SMT-AY4*	
Spare parts	HA 8010		

Characteristics measured at v = 32 mm²/s (156 SUS)

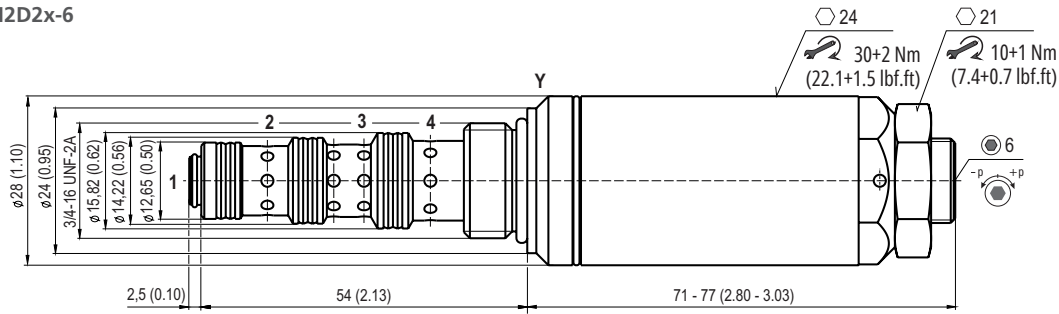
Pressure drop related to flow rate

	Model	Connection
1	2D26	2→3
1	2D26	3→4
1	2D29	2→3
1	2D29	3→4

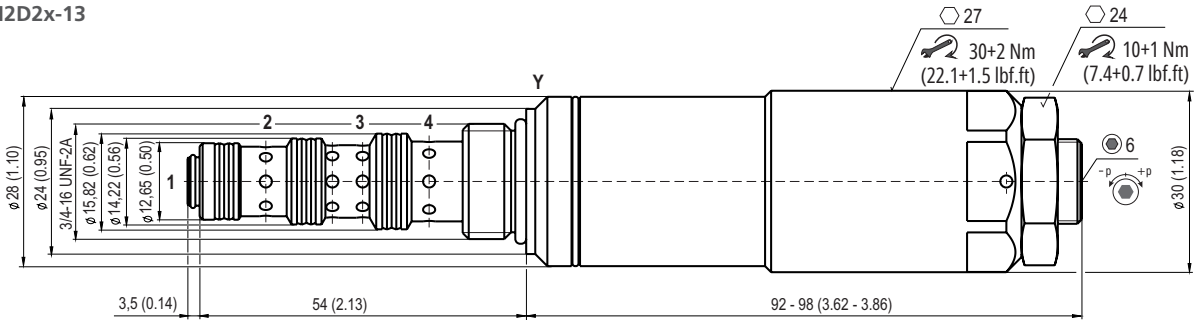


Dimensions in millimeters (in)

SD6H-AY4/H2D2x-6



SD6H-AY4/H2D2x-13



Ordering Code

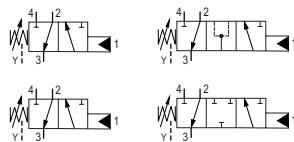
SD6H - AY4 / H - **S** - **A**

3/2 Hydraulically operated directional control valve screw-in cartridge design

Valve cavity
3/4-16 UNF-2B

Model
High performance

Functional symbol



Surface treatment
zinc-coated (ZnCr-3), ISO 9227 (240 h)

No designation
V

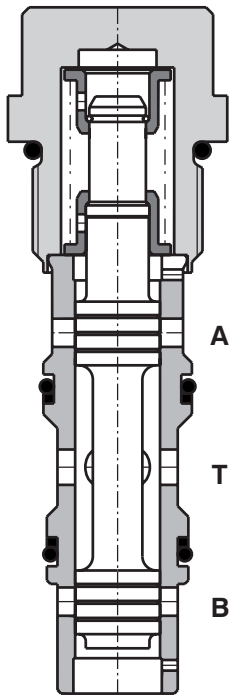
Seals
NBR
FPM (Viton)

Adjustment option
allen key (hex. 6)

Range of adjustable pressure for changeover of spool position
6 10 - 60 bar (145 - 870 PSI)
13 35 - 130 bar (510 - 1890 PSI)

SD2H-LA3

M24x1.5 • Q_{max} 40 l/min (11 GPM) • p_{max} 320 bar (4600 PSI)

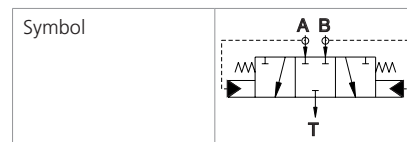


Technical Features

- > Hardened precision parts
- > High flow capacity
- > Simple design and reliable function
- > Optional pressure ranges
- > Automatic alternating fluid discharge from the low-pressure line of hydrostatic circuit
- > Standard version of the valve is zinc-coated with the surface corrosion protection 240 h in NSS acc. to ISO 9227

Functional Description

3-way screw-in cartridge valve is designed for the specific function discharging of heated working fluid from the closed hydrostatic circuit through a cooler and a filter to the tank. The spool is operated hydraulically and provides automatically fluid discharging always from the low-pressure line. Closed hydrostatic drives are generally loaded with high transmitted power. Losses, generating due the transformation of mechanical energy into pressure energy and vice versa, turn into heat. It leads to the thermal load of equipment and to the necessity to connect a cooler to the circuit.



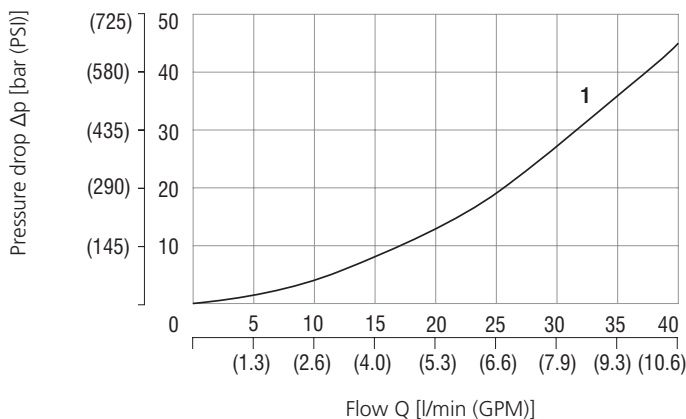
Technical Data

Valve size / Cartridge cavity		M24x1.5 / LA3
Max flow	l/min (GPM)	40 (10.6)
Max. operating pressure	bar (PSI)	320 (4640)
Max. internal leakage in the direction A→T ($v=32 \text{ mm}^2/\text{s}$)	cm ³ /min	≤ 35 at 250 bar
Cracking pressure	bar (PSI)	7 (102) 12 (174)
Fluid temperature range (NBR)	°C (°F)	-30...+100 (-22 ...+212)
Fluid temperature range (FPM)	°C (°F)	-20 ...+120 (-4 ...+248)
Fluid viscosity range	mm ² s ⁻¹	10 ... 500
Weight	kg (lbs)	0.23 (0.50)

		Datasheet	Type
General information		HA 0060	Products and operating conditions
Valve bodies	In-line mounted	HA 0018	SB-LA3* (on request)
	Sandwich mounted	HA 0028	SB-*LA3* (on request)
Cavity details		HA 0019	SMT-LA3*
Spare parts		HA 8010	

Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Pressure drop related to flow rate



Connection	
1	B→T, A→T

