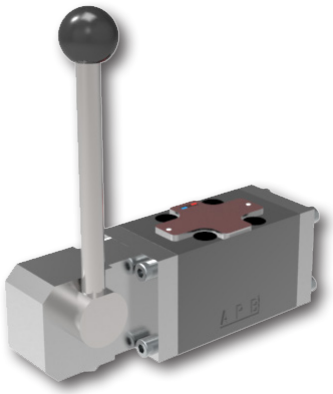
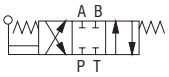
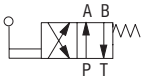
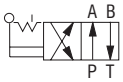
RPR3-04

Size 04 (D 02) • Q_{max} 30 l/min (8 GPM) • p_{max} 320 bar (4600 PSI)

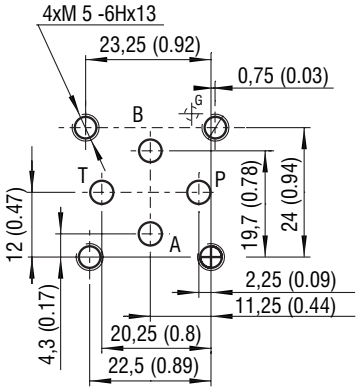


Technical Features

- Direct acting directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 02)
- High transmitted hydraulic power up to 320 bar with optimized design to minimize pressure drop
- Three chamber housing design for production cost saving
- Manual lever and actuating section can be rotated in 90° increments for flexible installation
- Wide range of interchangeable spools available
- Springless, detented valves available, valve holds last selected position, available for all spools
- In the standard version the valve body is phosphated. The steel parts are zinc coated (240 h corrosion protection in NSS acc. to ISO 9227). With optional increased surface corrosion protection of the whole valve 520 h in NSS, e.g. for mobile applications.

Model Code	Z11	R11	J15
Symbol			

ISO 4401-02-01-0-05



Ports P, A, B, T - max. ∅4.5 mm (0.18 in)

Technical Data

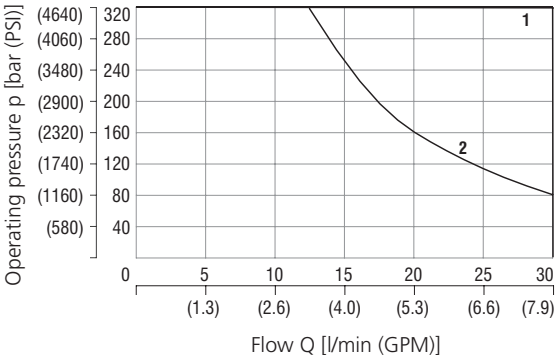
Valve size		04 (D02)
Max. flow	l/min (GPM)	30 (7.9)
Max. operating pressure at ports P, A a B	bar (PSI)	320 (4640)
Max. operating pressure at port T	bar (PSI)	100 (1450)
Operating force	N (lbf)	< 40 (9)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Service life	cycles	10^6
Weight	kg (lbs)	1 (2.20)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 04
Spare parts	SP_8010	

Characteristics measured ati ν = 32 mm²/s (156 SUS)

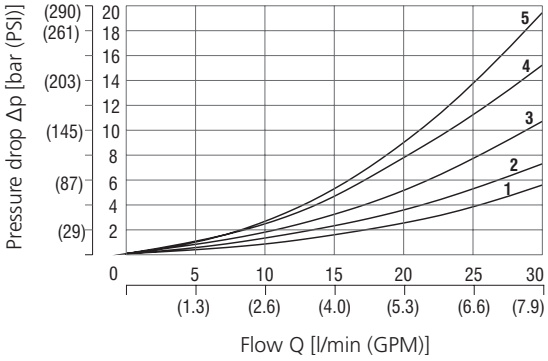
Operating limits

Operating limits for maximum hydraulic power and rated lever force.



1	Z11	2	L21	1	C15	1	Y35
1	C11	1	Y31	1	H15	1	Y75
1	H11	1	Y71	1	P15	1	J15
1	P11	1	R11	1	Y15	1	J75
1	Y11	1	A51	1	B15	1	R25
1	B11	1	R21	1	L15		
2	L11	1	Z15	1	L25		

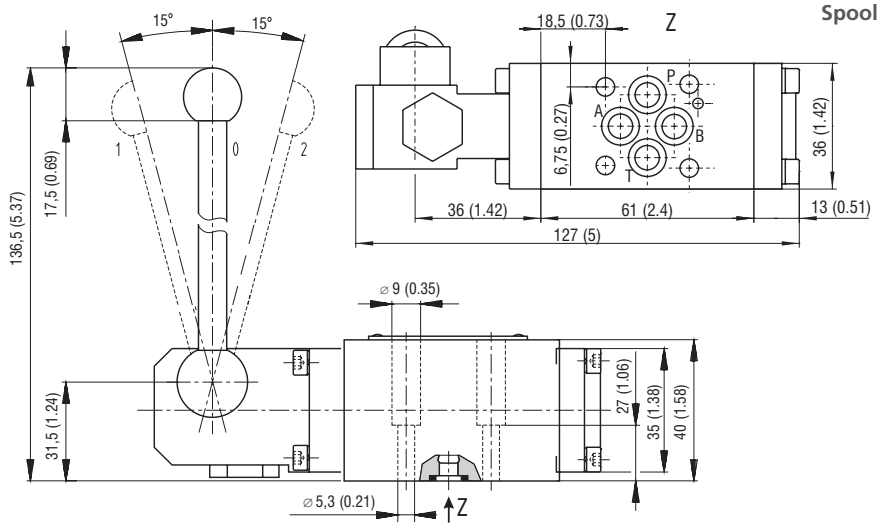
Pressure drop related to flow rate



	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11, Z15	3	2	2	2		B11, B15	3	3	2	1	
C11, C15	5	5	4	4	3	L11, L15	3	2	1	2	4
H11, H15	3	3	2	2	3	L21, L25	2	2	3	3	4
P11, P15	1	1	1	3		Y71, Y75	3	1			
Y11, Y15	3	3	1	1		A51, J75	2	2			
Y31, Y35, R11	3	3	2	2		J15, R21, R25	3	3	2	2	

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

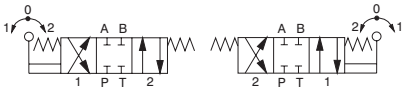
Dimensions in millimeters (inches)



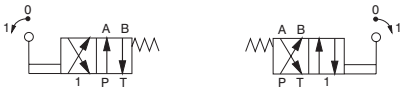
Mounting screws 5+1 Nm (3.7+0.7 lbf.ft)
M5 x 35 DIN 912-10.9 - not supplied

Spool position according to the position of hand lever

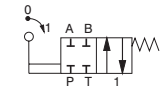
4/3 valve,
lever on side (A) on side (B)



4/2 valve,
lever on side (A) on side (B)

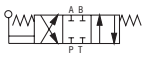
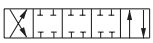
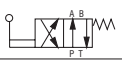
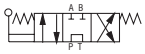
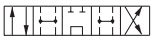
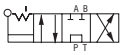
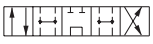
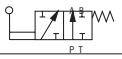
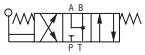
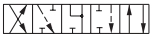
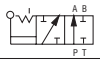
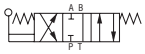
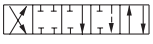
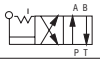
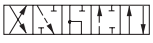
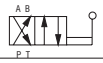
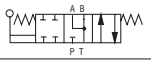
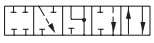
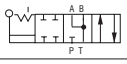
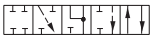


4/2 valve,
lever on side (A)



Manual lever and actuating section are shown in the most frequently used standard position. Both elements can be rotated in 90° increments.
For other positions of lever and actuating section contact our technical support.

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			Z15			R11		
C11			C15			A51		
H11			H15			R21		
P11			P15			J15		
Y11			Y15			J75		
B11			B15			P55		
L11			L15			R25		
L21			L25			X11		
Y31			Y35					
Y71			Y75					

Ordering Code

RPR3-04 ☐ ☐ / ☐ ☐ - ☐

4/2 and 4/3 directional control valve, manually operated

Valve size

Number of valve positions
two positions **2**
three positions **3**

Spool symbols
see the table "Spool Symbols"

Manual lever and actuating section position
A1 standard, lever on side A, upward
B1 standard, lever on side B, upward

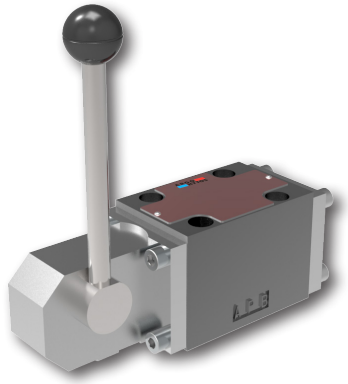
Seals
No designation NBR
V FPM (Viton)

Surface treatment
No designation standard
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

The port restrictor plugs can be ordered separately from the spare parts data sheet HA 8010.
The table of spool connections is an overview of preferred and commonly produced types.
Contact our technical support for their identification, feasibility and operating limits.

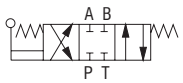
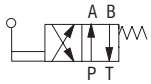
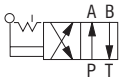
RPR3-06

Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)

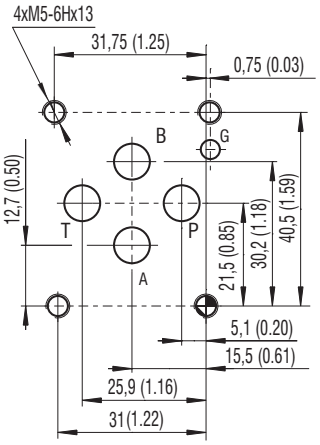


Technical Features

- Direct acting manually operated directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- High transmitted hydraulic power up to 350 bar, optimized design for minimized pressure drop
- Three chamber housing design for production cost saving
- Manual lever and actuation element can be rotated in 90° increments for flexible installation
- Wide range of interchangeable spools available
- Springless, detented valves available, valve holds last selected position, available for all spools
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

Model Code	Z11	R11	J15
Symbol			

ISO 4401-03-02-0-05



Ports P, A, B, T - max ∅7.5 mm (0.29 in)

Technical Data

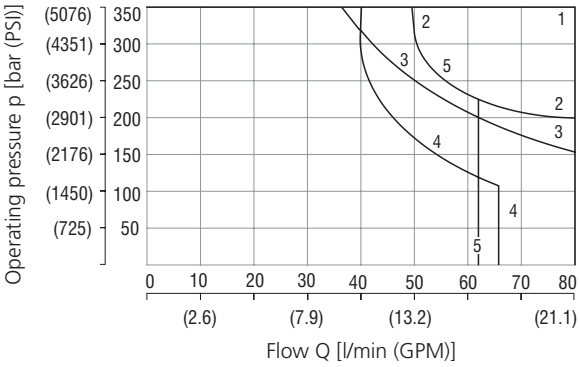
Valve size		06 (D03)
Max. flow	l/min (GPM)	80 (21.1)
Max. operating pressure at ports P, A, B	bar (PSI)	350 (5080)
Max. operating pressure at port T	bar (PSI)	100 (1450)
Operating force	N (lbf)	< 50 (11.2)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Service life	cycles	10^6
Weight	kg (lbs)	1.6 (3.53)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 06
Spare parts	SP_8010	

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

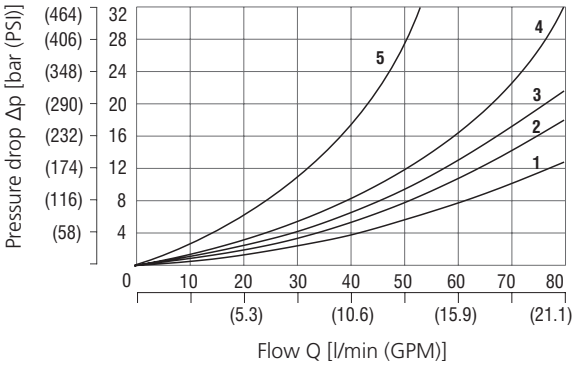
Operating limits

Operating limits for maximum hydraulic power and rated lever force.



A51	3	H15	1	R11	1
B11	5	J15	1	Y11	2
B15	1	J75	1	Y15	1
C11	4	P11	1	Z11	1
C15	1	P15	1	Z15	1
H11	3				

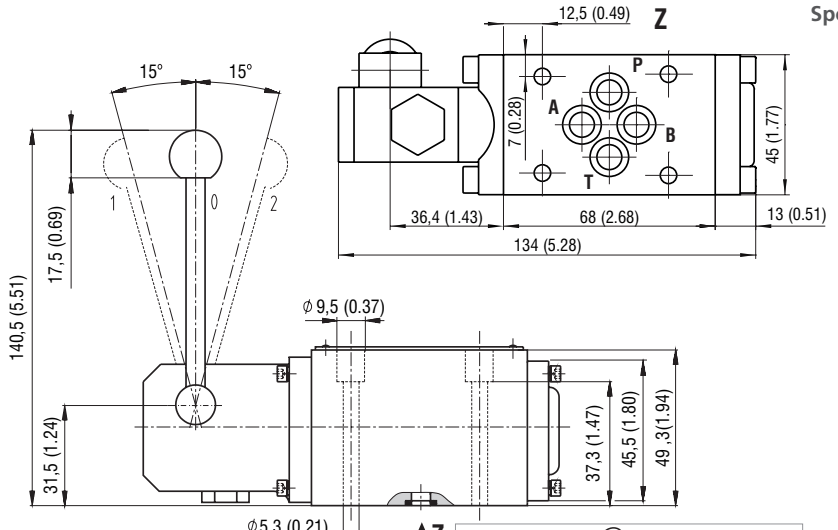
Pressure drop related to flow rate



	P-A	P-B	A-T	B-T	P-T
Z11, Z15,B11, B15R11, J15	2	2	3	3	
C11, C15	3	3	4	3	5
H11, H15	2	2	2	2	3
P11, P15	1	1	3	3	
Y11, Y15	2	2	2	2	
A51, J75	2	2			

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

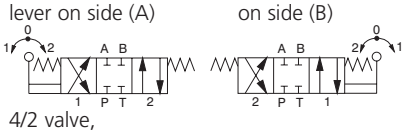
Dimension in millimeters (inches)



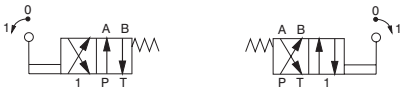
Mounting screws 8.9 Nm (6.56 lbf.ft)
M5 x 45 DIN 912-10.9 - not supplied

Spool position according to the position of hand lever

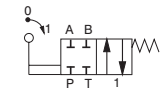
4/3 valve,
lever on side (A) on side (B)



4/2 valve,
lever on side (A) on side (B)



4/2 valve,
lever on side (A)



Manual lever and actuating section are shown in the most frequently used standard position. Both elements can be rotated in 90° increments.
For other positions of lever and actuating section contact our technical support.

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			B15			X11		
C11			Y14			X21		
H11			Z21			C55		
P11			P11			Z15		
Y11			H11			Z55		
B11			C51			Y55		
L21			Z11			J15		
Z15			H51			J75		
C15			Y11			P55		
H15			R11			R25		
P15			A51			X15		
Y15			R21					

Ordering Code

RPR3-06 □ □ / □ □ - □

4/2 and 4/3 directional control valve, manually operated

Valve size

Number of valve positions
two positions **2**
three positions **3**

Spool symbols
see the table "Spool Symbols"

Manual lever and actuating section position
A1 standard, lever on side A, upward
B1 standard, lever on side B, upward

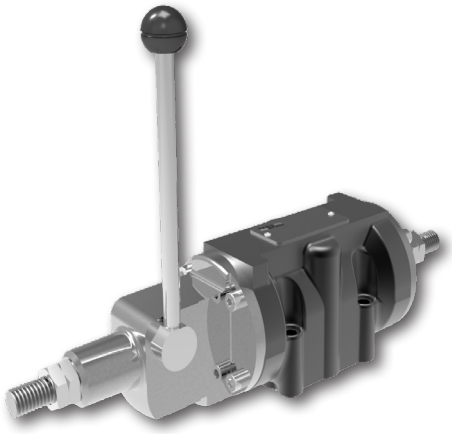
Seals
No designation NBR
V FPM (Viton)

Surface treatment
No designation standard
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

The port restrictor plugs can be ordered separately from the spare parts data sheet HA 8010.
The table of spool connections is an overview of preferred and commonly produced types.
Contact our technical support for their identification, feasibility and operating limits.

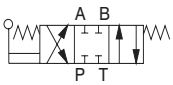
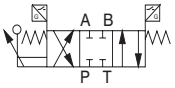
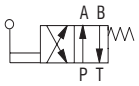
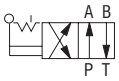
RPR1-10

Size 10 (D05) • Q_{max} 140 l/min (37 GPM) • p_{max} 350 bar (5100 PSI)

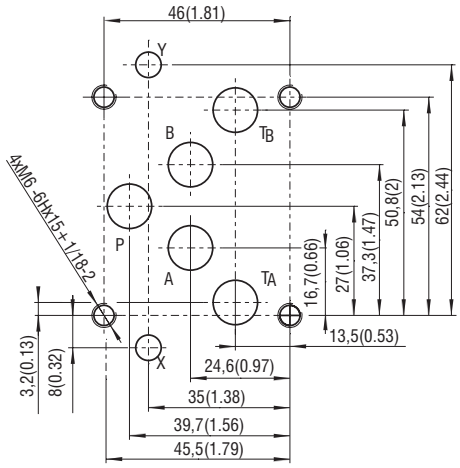


Technical Features

- Directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 05)
- High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drops
- Three chamber housing design for production cost saving
- Manual lever and actuation element can be rotated in 90° increments for flexible installation
- Wide range of interchangeable spools available
- Springless, detented valves available, valve holds last selected position, available for all spools
- Spool end position sensing option
- Spool stroke limit option
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

Model Code	Z11	Z11 with Sensors	R11	J15
Symbol				

ISO 4401-05-04-0-05



Ports P, A, B, T - max ∅11.2 mm (0.44 in)

Technical Data

Valve size		10 (D05)
Max. flow	l/min (GPM)	140 (37)
Max. operating pressure at ports P, A, B	bar (PSI)	350 (5080)
Max. operating pressure at port T	bar (PSI)	100 (1450) 50 (725) for versions with sensor
Operating force	N (lbf)	< 40 (9)
Fluid temperature range (NBR)	°C (°F)	-30 .... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 .... +120 (-4 ... +248)
Service life	cycles	106
Weight	kg (lbs)	3.4 (7.5)

Technical Data Sensor and Connector		S1, S4
Rated power supply voltage	V	24 DC
Power supply voltage range	V	10 ... 30 DC
Rated current	mA	200
Enclosure type of sensor to EN 60529		IP 67
Switching frequency	Hz	1000
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 10
Spare parts	SP_8010	

Ordering Code

RPR1 -10 ☐ ☐ / ☐ - ☐ - ☐ - ☐ / ☐ ☐ - ☐ - ☐

4/2 and 4/3 directional control valve, manually operated

Valve size

Number of valve positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool Symbols"

Spool flow rate

directional control valve spool	**No designation**
prop. spool, nominal flow 30 l/min (7.9 GPM)	**30**
prop. spool, nominal flow 60 l/min (15.8 GPM)	**60**

Manual lever and actuating section position

standard, lever on side A, upward	**A1**
standard, lever on side B, upward	**B1**

Stroke limit option

without stroke limiter	**0**
with stroke limiter, side A	**SLA**
with stroke limiter, side A	**SLB**
with stroke limiter, side A and B	**SLC**

Spool position sensor

0	without spool position sensor
A	one spool position sensor, side A
B	one spool position sensor, side B
C	one spool position sensor, side A and B

Spool position senzor supply voltage

No designation	without sensor
24	rated supply voltage, 24 V DC

Spool and position sensor type

No designation	without sensor
S1	normally-open sensor
S4	normally closed sensor

Seals

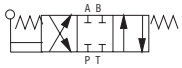
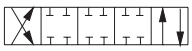
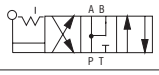
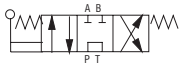
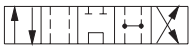
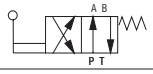
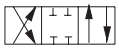
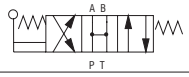
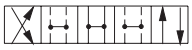
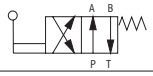
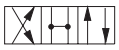
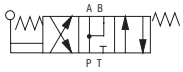
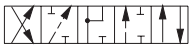
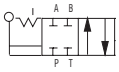
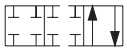
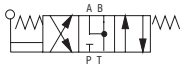
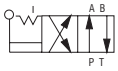
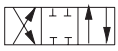
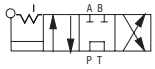
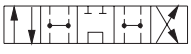
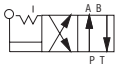
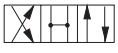
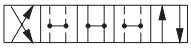
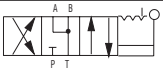
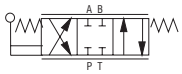
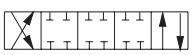
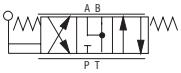
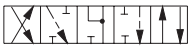
No designation	NBR
V	FPM (Viton)

Surface treatment

No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

The port restrictor plugs can be ordered separately from the spare parts data sheet SP_8010.
Mounting bolts M6 x 45 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 14 Nm (10.3 lbf.ft).
Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

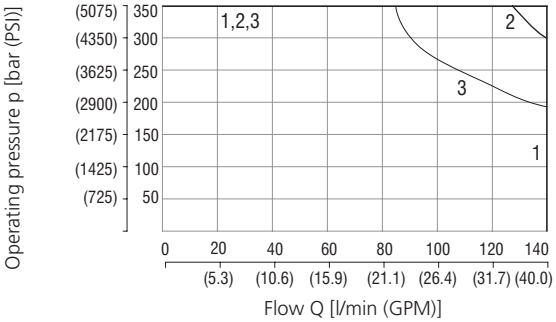
Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			P15		
C11			R11		
H11			R21		
P11			Z15		
Y11			J15		
C15			R25		
H15			Y15		
Z11			Y11		

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

Operating limits (Directional valve)

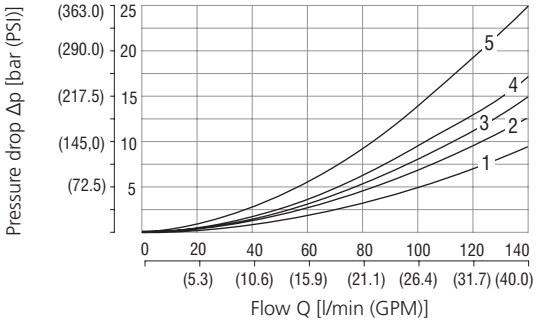
Operating limits for maximum hydraulic power and rated lever force



Z11	1	H11	1
Y11	1	C11	3
P11	1	R11	2

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Pressure drop related to flow rate

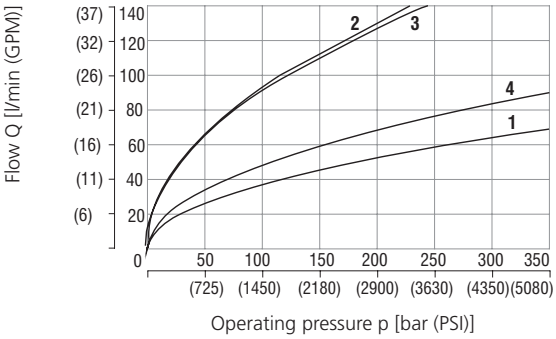


	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11	1	1	3	3		H11	1	1	1	1	3
Y11	1	1	2	2		C11	1	1	3	3	5
P11	1	1	3	3		R11	1	1	4	4	

Operating limits (Proportional valve)

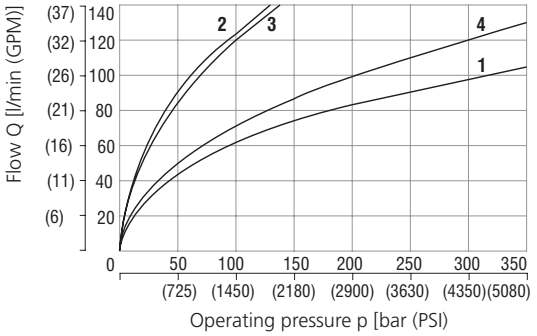
Operating limits for maximum hydraulic power and rated lever force

30 l/min (7.9 GPM)



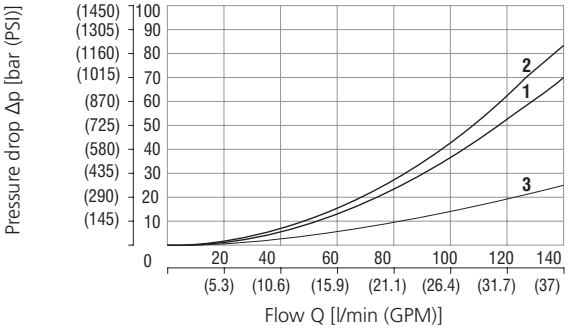
s	50% [2.3mm (0.09in)]	100% [4.6mm (0.18in)]
Z11/30	1	2
Y11/30	3	4

60 l/min (15.8 GPM)



s	50% [2.3mm (0.09in)]	100% [4.6mm (0.18in)]
Z11/60	1	2
Y11/60	3	4

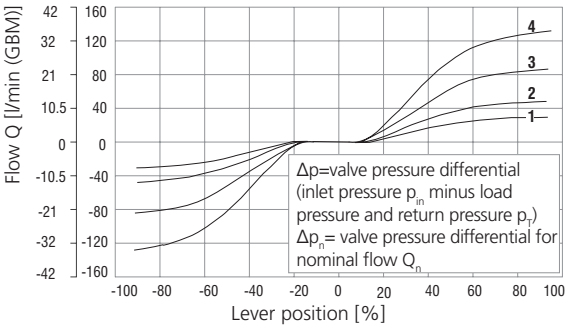
Pressure drop related to flow rate



	P-A	P-B	A-T	B-T
Z11/30	1	1	2	2
Y11/30	1	1	2	2
Z11/60	3	3	3	3
Y11/60	3	3	3	3

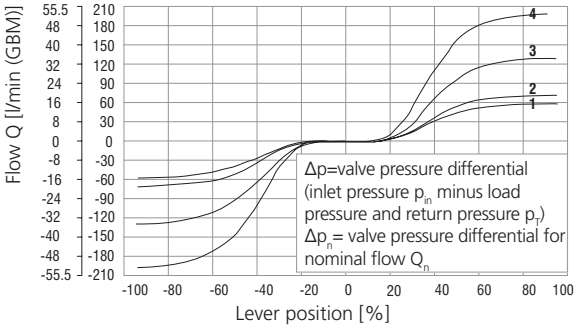
Proportional Valve Actuation Characteristics

Proportional spool flow rate 30 l/min (7.9 GPM)



1	Δp_n= 10 bar (145 PSI)	3	Δp = 160 bar (2321 PSI)
2	Δp = 50 bar (725 PSI)	4	Δp = 350 bar (5076 PSI)

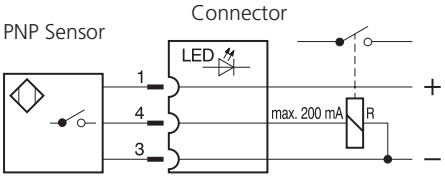
Proportional spool flow rate 60 l/min (15.8 GPM)



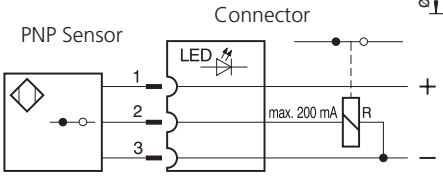
1	Δp_n= 10 bar (145 PSI)	3	Δp = 160 bar (2321 PSI)
2	Δp = 50 bar (725 PSI)	4	Δp = 350 bar (5076 PSI)

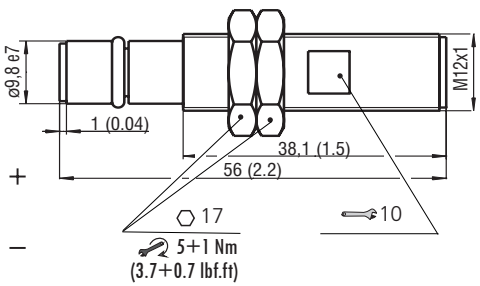
Technical Data - Sensor in millimeters (inches)

S1 Circuit diagram of the normally - **OPEN** sensor



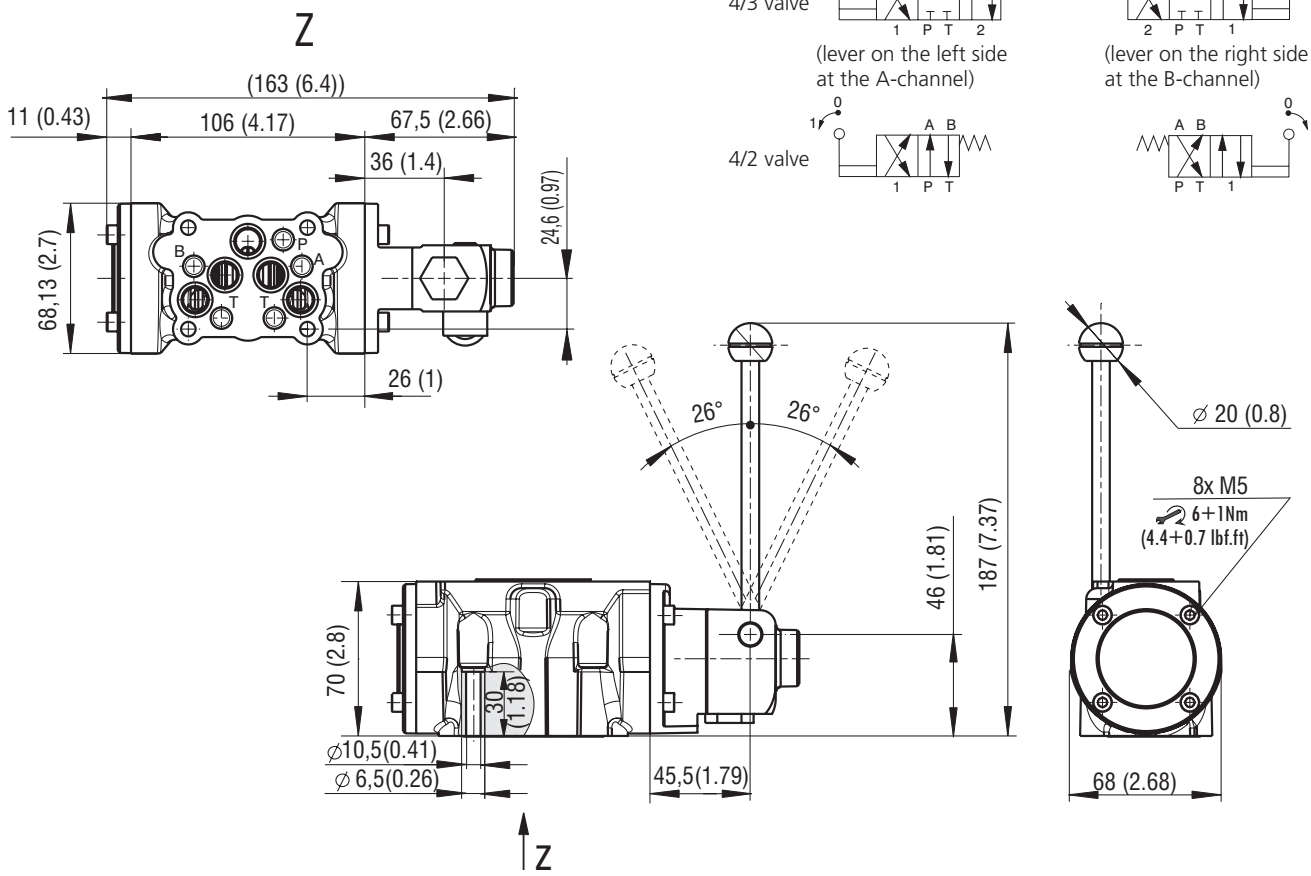
S4 Circuit diagram of the normally - **CLOSED** sensor



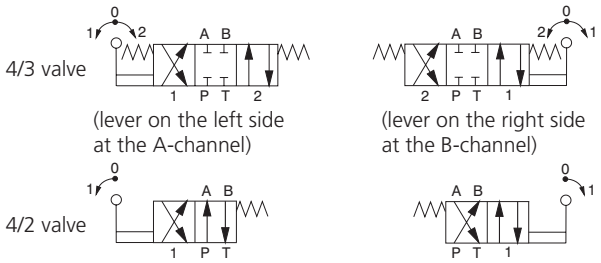


Dimensions in millimeters (inches)

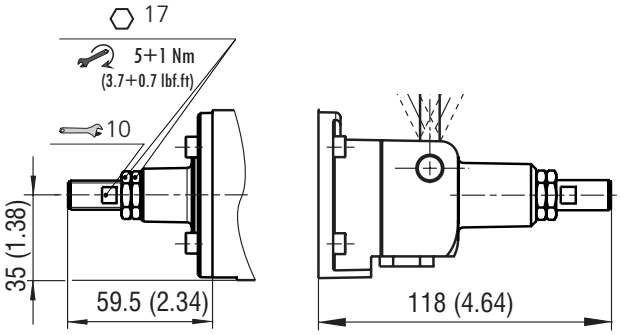
RPR1-10*/A1-0-0
without stroke limiter and position sensor



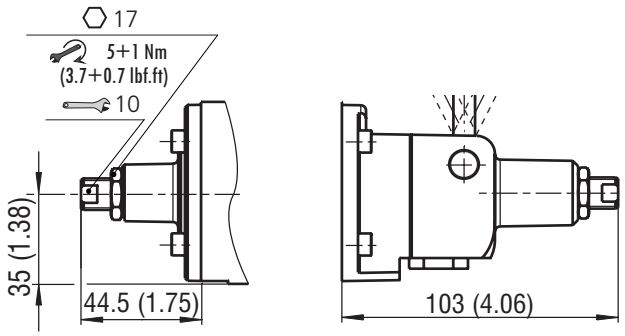
Spool position according to the position of hand lever



RPR1-10*/*A(B,C)
Position sensor



RPR1-10*/SL*
Stroke limiter

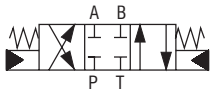


Manual lever and actuating section are shown in the most frequently used standard position. Both elements can be rotated in 90° increments. For other positions of lever and actuating section contact our technical support.

4/2 and 4/3 Directional Control Valve, Hydraulically Operated

RPH2-06

Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)

Symbol	

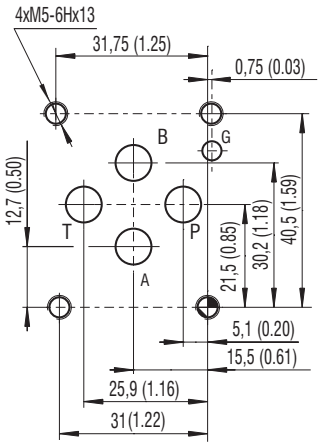
Technical Features

- Direct acting directional control valve, hydraulically operated with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drop
- Five chamber housing design with reduced hydraulic power dependence on fluid viscosity
- Actuating section can be rotated in 90° increments for flexible installation
- Wide range of interchangeable spools available
- Connection for hydraulic operation M10 x 1, G1/8 and 7/16-20 UNF-2B (SAE-4)
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

Functional Description

These hydraulically operated directional control valves are used mainly to control start, stop and direction of fluid. The valves consist of a housing, a control spool with two centering springs, and the actuating section. The actuating section consists of the hydraulic actuation cylinder. The directional control valves are manufactured as two or three position valves (see table with functional symbols).

ISO 4401-03-02-0-05



Ports P, A, B, T max ∅7.5 mm (0.29 in)

Technical Data

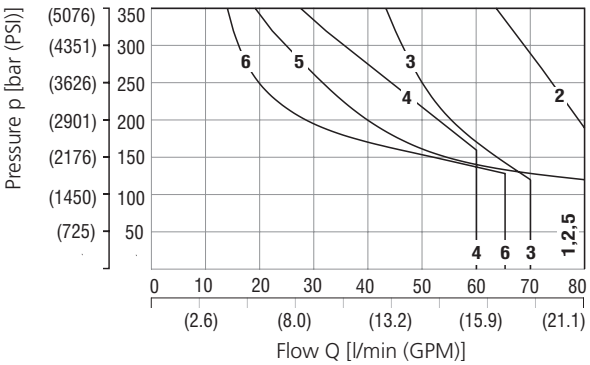
Valve size			06 (D03)
Max. flow		l/min (GPM)	80 (21.1)
Max. operating pressure P, A, B		bar (PSI)	350 (5080)
Max. operating pressure at port T		bar (PSI)	130 (1890)
Min. pilot pressure at max.power of the valve		bar (PSI)	30 (440) + p(T)*
Max. pilot pressure		bar (PSI)	160 (2320)
Pilot volume		cm³ (cu.in)	0.5 (0.03)
Fluid temperature range (NBR)		°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range (FPM)		°C (°F)	-20 ... +120 (-4 ... +248)
Mass	valve with 1 actuator	kg (lbs)	1.6 (3.53)
	valve with 2 actuators		2.7 (5.70)
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Mounting interface		SMT_0019	Size 06
Spare parts		SP_8010	

*The operating pressure, needed for spool moving depends on the hydraulic power of the valve (on the flow and the system pressure), spool type and the pressure in the T-channel. The operating pressure can take value from a minimum value of several bar up to permitted maximum value of 160 bar. Increasing pressure in the T-channel increases the needed oper. pressure in ratio 1:1. To reach surly the basic position of the spool, the actuating section should be relieved without pressure.

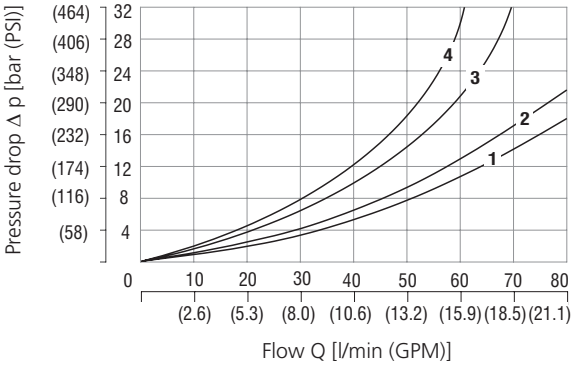
Characteristics measured at ν = 32 mm²/s (156 SUS)

Operating limits

Operating limits for max. hydraulic power with min. piloting pressure



Pressure drop related to flow rate



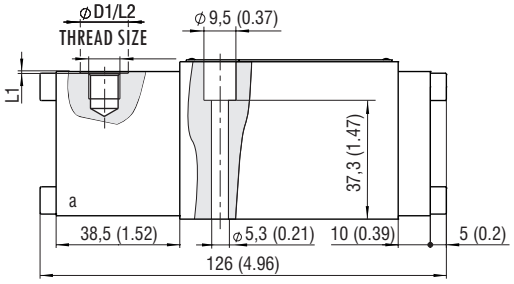
H11	1	J15	3	C51	1	A51	5
H51	1	R11	4	Z11	2	Y11	6
C11	1	X11	4	Z51	2	Y51	6

	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11, R11, X11, J15	1	1	2	2		C51	3			4	2
C11	3	3	3	4	2	Z51		1	2		
H11, H51	1	1	1	1	2	A51	1	1			
Y11	1	1	1	1		Y51		1	1		

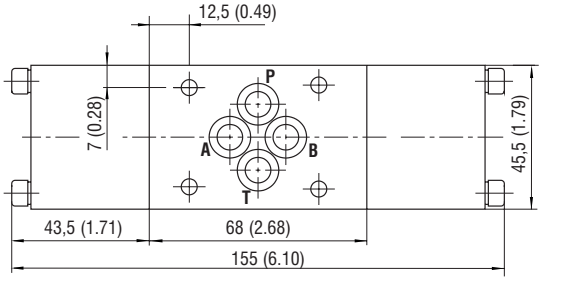
For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Dimension in millimeters (inches)

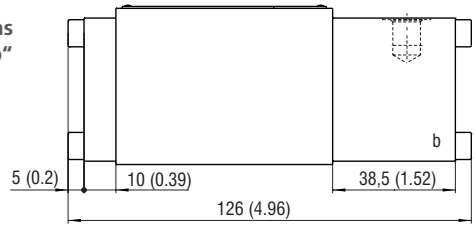
Valve with two positions one actuating section„a“

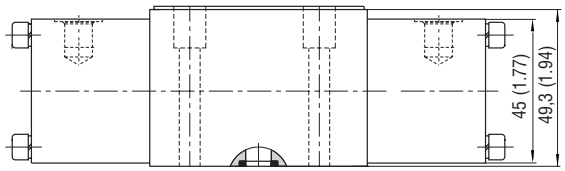


Valve with three positions two actuating sections



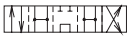
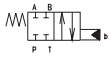
Valve with two positions one actuating section„b“





Thread size	∅ D1	L1	L2
M10 x 1, G1/8	15.5 (0.61)	1 (0.04)	8 (0.32)
7/16-20 UNF-2B, SAE-4	21 (0.83)	0.8 (0.03)	14 (0.55)

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			C51		
C11			H51		
H11			Y51		
Y11			Y11		
L21			H11		
R11			X11		
A51			Z11		
Z51			J15		

Ordering Code

RPH2-06 ☐ ☐ / ☐ - 1 ☐ - ☐

4/2 and 4/3 directional control valve, hydraulically operated

Valve size

Number of valve positions
two positions **2**
three positions **3**

Spool symbols
see the table „Spool Symbols“

Connection for hydraulic operation
1 M10 x 1
2 G1/8
3 7/16-20 UNF-2B, SAE-4

Model

Seals
No designation NBR
V FPM (Viton)

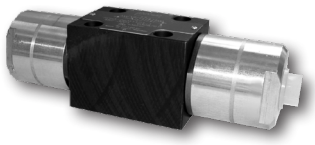
Surface treatment
No designation standard
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

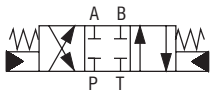
Mounting bolts M5 x 45 DIN 912-10.9 or studs must be orderer separately see Spare Parts data sheet HA 8010. Tightening torque is 8.9 Nm (6.56 lbf.ft). Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

4/2 and 4/3 Directional Control Valve, Hydraulically or Pneumatically Operated

RPH3-06

Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)



Symbol	

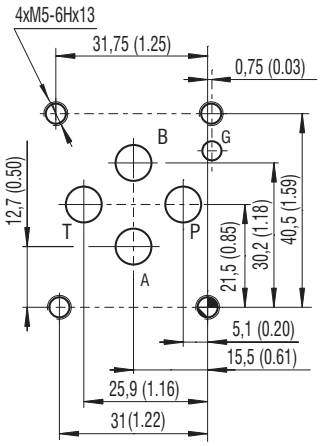
Technical Features

- Direct acting directional control valve, hydraulically or pneumatically operated with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drop
- Five chamber housing design with reduced hydraulic power dependence on fluid viscosity
- Minimum pilot pressure 2 bar (29 PSI) for maximum hydraulic power
- Wide range of interchangeable spools available
- Connection for hydraulic operation M10 x 1, G1/8, G1/4
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

Functional Description

These hydraulically or pneumatically operated directional control valves are used mainly to control start, stop and direction of fluid. The valves consist of a housing, a control spool with two centering springs, and the actuating section. The actuating section consists of the hydraulic or pneumatic actuation cylinder. The directional control valves are manufactured as two or three position valves (see table with functional symbols).

ISO 4401-03-02-0-05



Ports P, A, B, T max ∅7.5 mm (0.29 in)

Technical Data

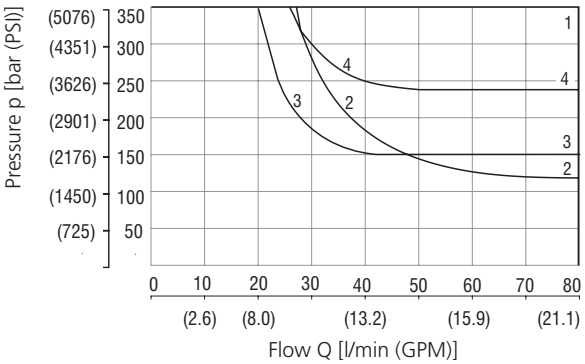
Valve size			06 (D03)
Max. flow		l/min (GPM)	80 (21.1)
Max. operating pressure P, A, B		bar (PSI)	350 (5080)
Max. operating pressure at port T		bar (PSI)	160 (2320)
Min. pilot pressure		bar (PSI)	2 (30)
Max. pilot pressure		bar (PSI)	25 (360)
Pilot volume		cm³ (cu.in)	6,2 (0.38)
Fluid temperature range (NBR)		°C (°F)	-30 ... +100 (-22 ... +212)
Weight	valve with 1 actuator	kg (lbs)	1.8 (3.96)
	valve with 2 actuators		2.5 (5.50)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 06
Spare parts	SP_8010	

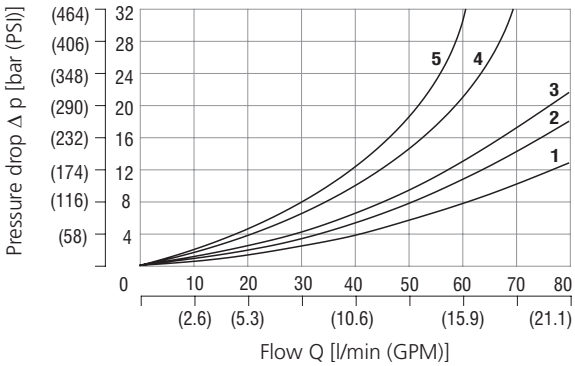
Characteristics measured at ν = 32 mm²/s (156 SUS)

Operating limits

Operating limits for maximum hydraulic power with min. piloting pressure



Pressure drop related to flow rate



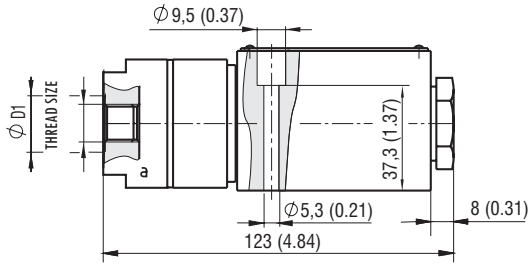
Z11, P11, Y11, B11, R11, A51, P51, X11, J15, J75	1
C11, Y51	2
H11	3
L21	4

	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11, L21, B11, R11, X11, J15	2	2	3	3		Y11	2	2	2	2	
C11	4	4	4	5	3	A51, J75	2	2			
H11	2	2	2	2	3	P51		1	3		
P11	1	1	3	3		Y51		2	2		

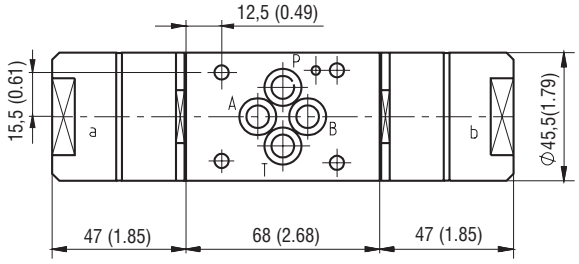
For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Dimension in millimeters (inches)

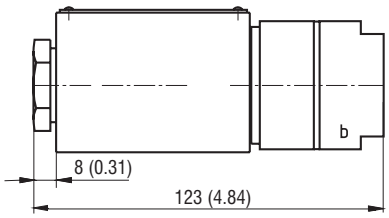
Valve with two positions one actuating section„a“

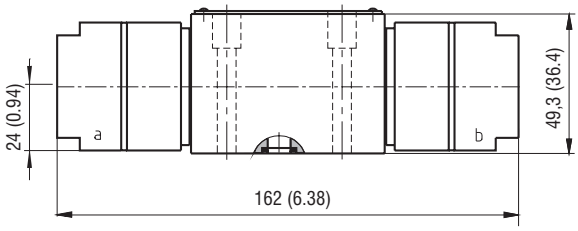


Valve with three positions two actuating sections



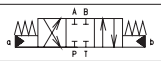
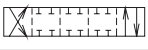
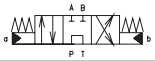
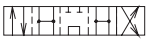
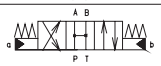
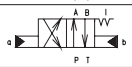
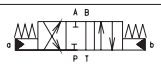
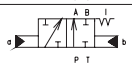
Valve with two positions one actuating section„b“





Thread size	∅ D1
M10 x 1, G1/8	15 (0.59)
G1/4	20 (0.79)

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			R11		
C11			A51		
H11			P51		
P11			Y51		
Y11			X11		
L21			J15		
B11			J75		

Ordering Code

RPH3-06 ☐ ☐ / ☐ - ☐ ☐ - ☐

4/2 and 4/3 directional control valve, hydraulically or pneumatically operated

Valve size

Number of valve positions
two positions **2**
three positions **3**

Spool symbols
see the table „Spool Symbols“

Surface treatment
No designation standard
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

Seals
No designation NBR

Actuation
1 hydraulic
2 pneumatic

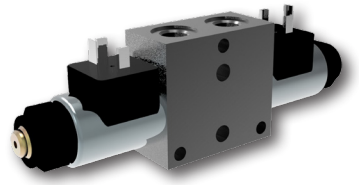
Connection for hydraulic operation
1 M10 x 1
2 G1/8
3 G1/4

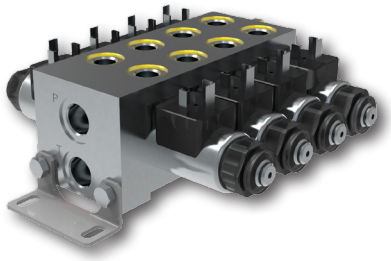
Mounting bolts M5 x 45 DIN 912-10.9 or studs must be orderer separately see Spare Parts data sheet HA 8010. Tightening torque is 8.9 Nm (6.56 lbf.ft). Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

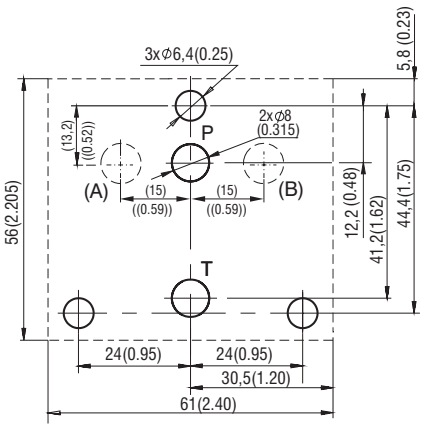
4/2 and 4/3 Directional Control Valve, Solenoid Operated, Bankable

RPEK1-03

Size 03 • Q_{max} 20 l/min (5 GPM) • p_{max} 250 bar (3600 PSI)







Technical Features

- Direct acting, directional control valve with bankable mounting interface
- Designed to be assembled in series or parallel, mounting up to 8 body modules
- High transmitted hydraulic power up to 250 bar, optimized design to minimize the pressure drop
- Housing with three chambers for production cost savings
- The valve is available with interchangeable DC solenoids
- Wide range of solenoid electrical terminal versions available
- Wide range of interchangeable spools and manual overrides available
- Suitable for compact applications in the mobile and mini-power pack industries
- Space and cost saving! With optional end valves
- No need for bar manifold to construct complex circuit assemblies from stock
- In the standard version, the valve housing is phosphated and steel parts are zinc-coated for 240 h protection acc. to ISO 9227
- Enhanced surface protection for mobile sector up to 520h salt spray acc to ISO 9227 available

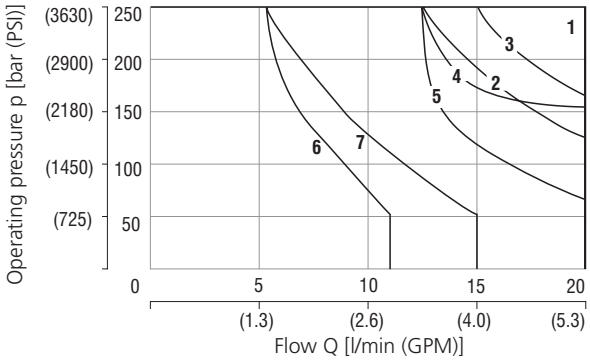
Technical Data

Valve size			03
Max. flow		l/min (GPM)	20 (5.3)
Max. operating pressure at port P, A, B		bar (PSI)	250 (3630)
Max. operating pressure at port T		bar (PSI)	210 (3050)
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 ... +50 (-22 ... +122)
Supply voltage tolerance		%	DC: ±10
Max. switching frequency		1/h	15 000
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	30 ... 50
	OFF	ms	30 ... 50
Mass - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	0.90 (1.98) 1.05 (2.32)
		Data Sheet	Type
General information		GI_0060	Products and operating conditions
Coil types / connectors		C_8007 / K_8008	C14B*/ K*
Mounting interface		SMT_0019	Size 03
Spare parts		SP_8010	

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

Operating limits

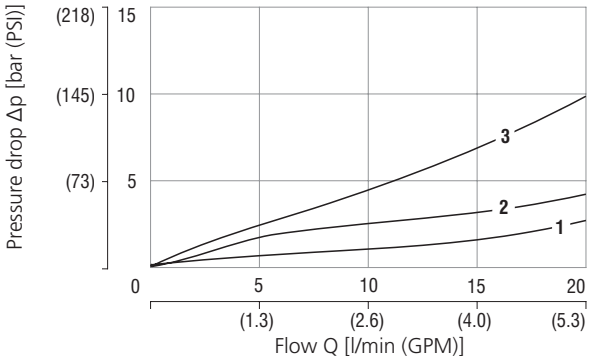
Operating limits for maximum hydraulic power at rated temperature and supplied with voltage equal to 90 % of the nominal value



Spool symbol	
Z11, Z51, R11, P11	1
C11, C51, X11	2
H11, Y11, H51	3
C11, Y11, Y51	4
R21	5
A51, Y82	6
Z81	7

For operating limits under conditions other than shown consult our technical department. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged or without flow).

Pressure drop related to flow rate



Spool symbol	P-A	P-B	A-T	B-T	P-T
Z11, Y11, P11	1	1	1	1	
R11, R21, X11	2	2	2	2	
Y51, Z51		1	1		
C11	3	3	3	3	2
H11, H51	1	1	1	1	2
C51	3			3	2
A51	2	2			
X11	2	2	2	2	
Y82	2	2	1	3	
Z81			1	2	

Ordering Code

RPEK1-03 ☐ ☐ ☐ / ☐ ☐ ☐ ☐ ☐ - ☐

4/2 and 4/3 directional control valve, solenoid operated, bankable

Valve size

Type of connection

thread A, B - G1/4	**G**
thread A, B SAE6 - 9/16-18UNF	**S**
stackable	**O**

Number of valve positions

two positions	**2**
three positions	**3**

Spool symbols
see the table of "Spool Symbols"

Rated supply voltage of solenoids (at the coil terminal)

12 V DC / 1.83 A	**01200**
24 V DC / 0.92 A	**02400**

Connector

EN 175301-803-A	**E1**
E1 with quenching diode	**E2**
AMP Junior Timer - axial direction (2 pins; male)	**E3A**
E3A with quenching diode	**E4A**
Deutsch DT04-2P - axial direction (2 pins; male)	**E12A**
E12A with quenching diode	**E13A**

Surface treatment

No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

Seals

No designation	NBR
V	FPM (Viton)

Model

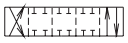
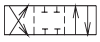
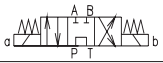
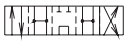
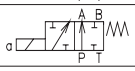
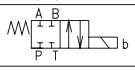
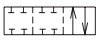
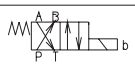
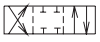
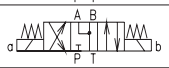
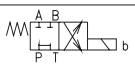
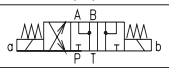
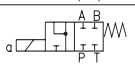
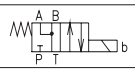
No designation	standard, P, T through ports, without ports A1,B1
P1	P, T through ports, A1, B1 side ports, all ports sealed
P2	P, T through ports, A1, B1 side ports inverted (not sealed)
Z1	end valve, one side P, T sealed ports
Z2	end valve, one side P, T ports inverted (not sealed)
Z3	end valve, one side P, T ports, A1, B1 side ports, all ports not sealed
Z4	end valve, one side P, T, A1, B1 side ports inverted, all ports not sealed

Manual override

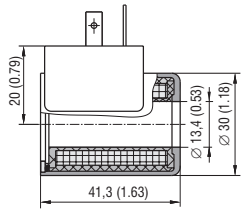
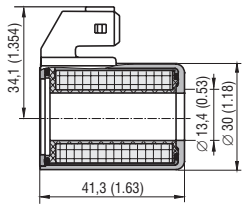
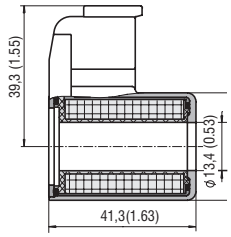
No designation	standard
N2	protected with rubber boot
N5	socket head screw

- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be energized.
- For other solenoid voltages see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For connectors version see data sheet K_8008.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

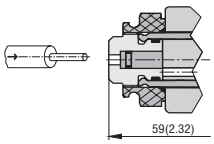
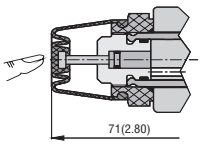
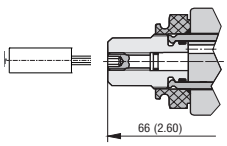
Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			R11			H51		
C11			R21			Z51		
H11			A51			Z11		
P11			Y51			X11		
Y11			C51			C11		
Y82			Z81			Y11		

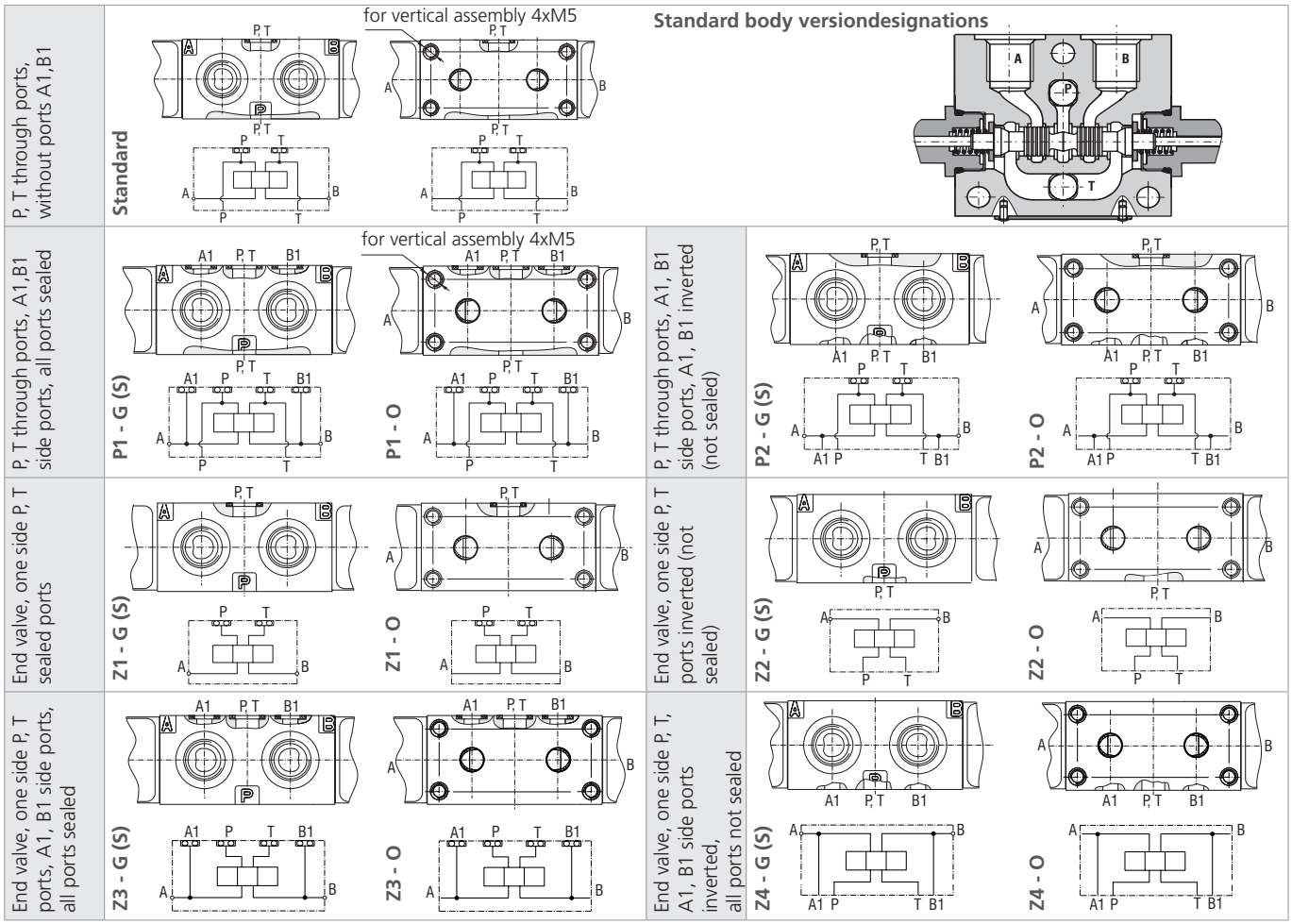
Solenoid Coil in millimeters (inches)

E1, E2 - Protection degree IP65	E3A, E4A - Protection degree IP67	E12A, E13A - Protection degree IP67 / IP69	
			The indicated IP protection level is only reached with a properly mounted connector.

Manual Override in millimeters (inches)

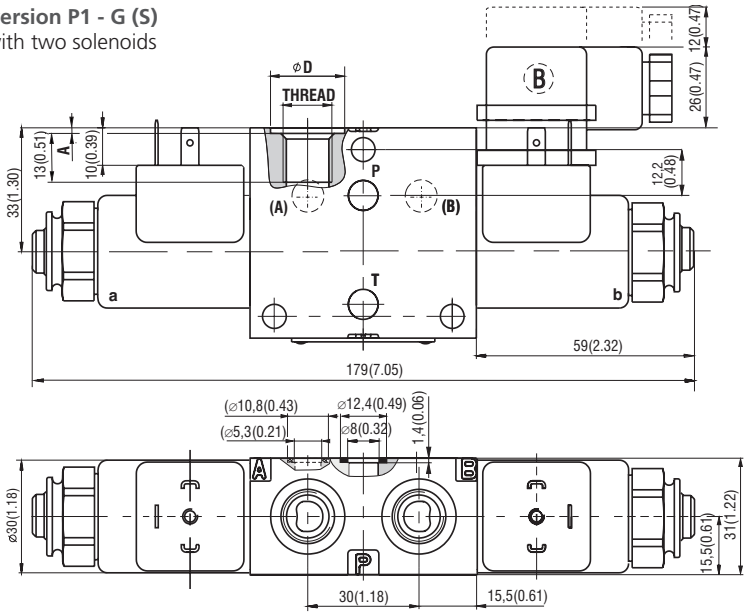
No designation - standard	N2- protected with rubber boot	N5 - socket head screw 3	
			In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Design Forms G (S), O in millimeters (inches)

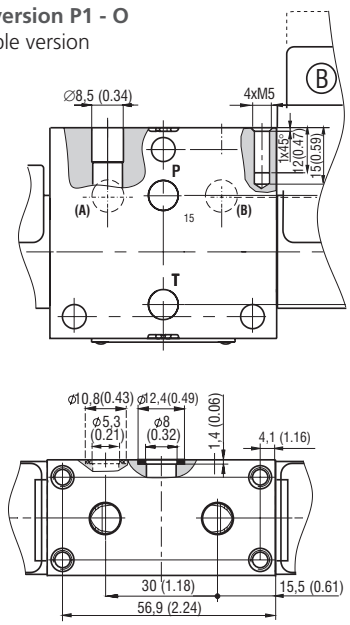


Dimensions in millimeters (inches)

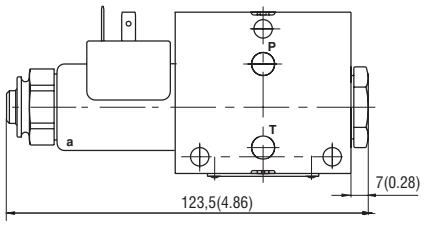
Body version P1 - G (S)
Valve with two solenoids



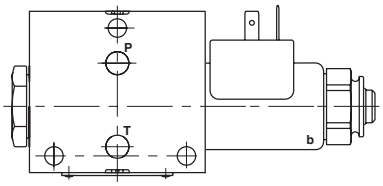
Body version P1 - O
Stackable version



Valve with one solenoid „a“
Spool symbols R11, R21, Y51, C51, Z51



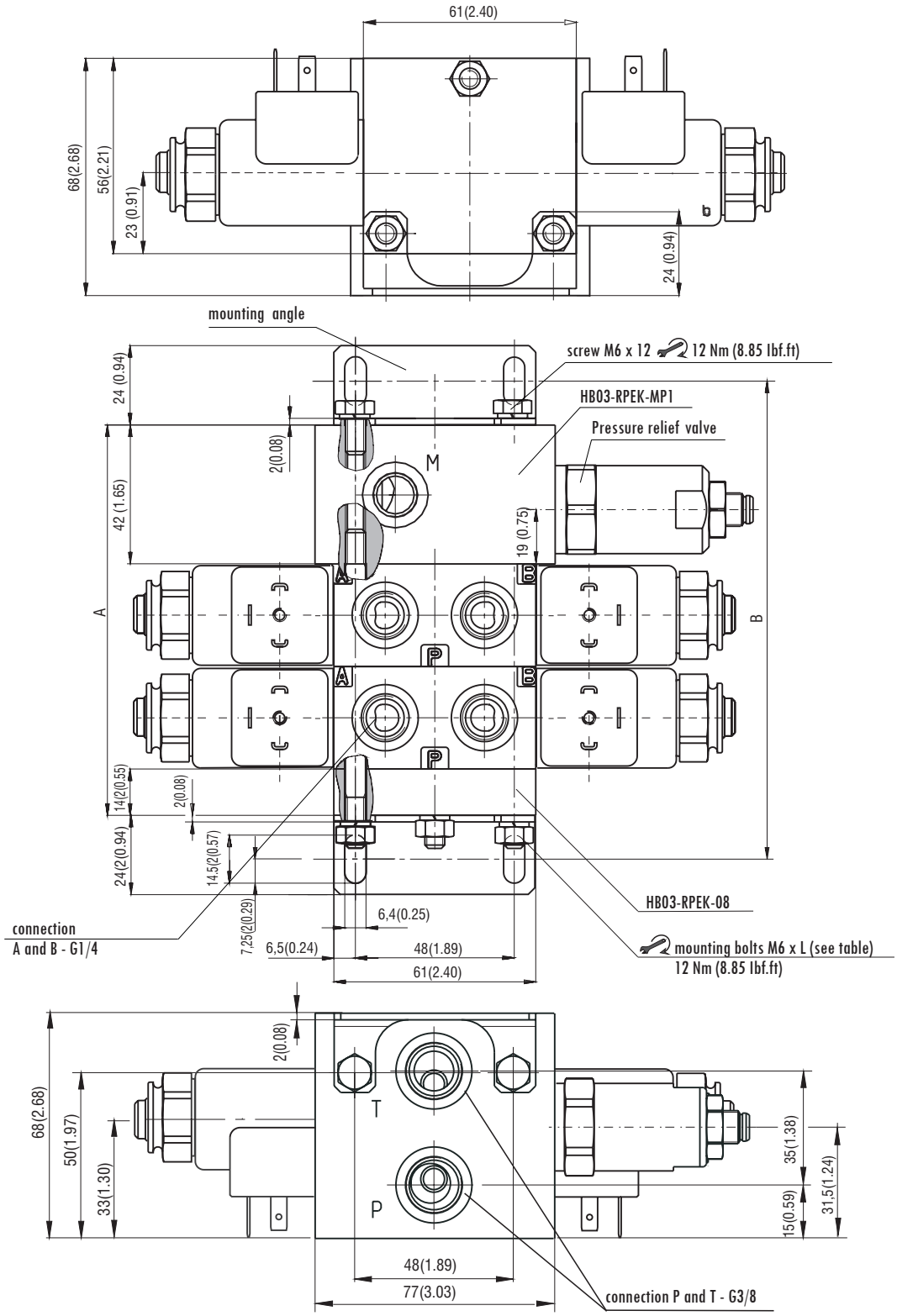
Valve with one solenoid „b“
Spool symbols H11



	G	S
THREAD	G1/4	SAE6-9/16-18UNF
Ø D [mm]	20.9H13	25+0.5
Ø D [in]	0.823	0.984+0.02
A [mm (in)]	1 (0.039)	0.5 (0.020)

Block Assembly in millimeters (inches)

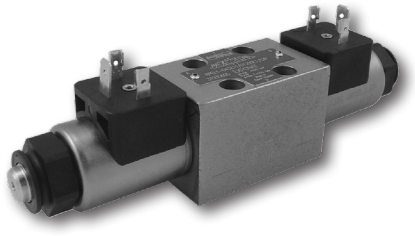
VERSION - valve with inlet block and pressure relief valve see datasheet 4057 - RPEK1-03/B



Dimensions mm (inches)								
Number of sections	1	2	3	4	5	6	7	8
Dimension A	87 (3.43)	118 (4.65)	149 (5.87)	180 (7.09)	211 (8.31)	242 (9.53)	273 (10.75)	304 (11.97)
Dimension B	114 (4.49)	145 (5.71)	176 (6.93)	207 (8.15)	238 (9.37)	269 (10.59)	300 (11.81)	331 (13.03)
Dimension L	60 (2.36)	100 (3.94)	133 (5.24)	163 (6.42)	194 (7.64)	224 (8.82)	256 (10.08)	287 (11.30)

RPEL1-04

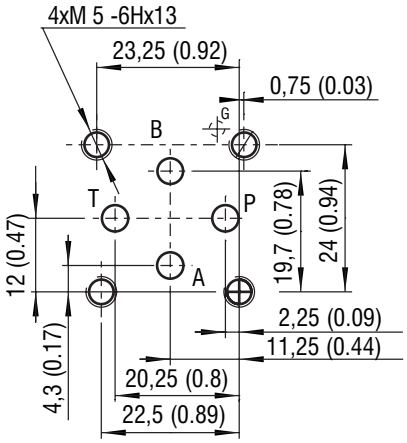
Size 04 (D02) • Q_{max} 30 l/min (8 GPM) • p_{max} 250 bar (3600 PSI)



Technical Features

- Direct acting, directional control valve with subplate mounting surface acc. to ISO 4401, DIN 24340 (CETOP 02)
- Compact design with reduced solenoid dimensions
- Three chamber housing design for production cost saving
- The valve is available with DC solenoids and a wide range of electrical terminals
- Solenoid electrical terminal options acc. to EN 175301-803-A, AMP Junior Timer and Deutsch DT04-2P
- Wide range of interchangeable spools and manual overrides available
- The coil is fastened to the core tube by a retaining nut, and can be rotated by 360° to suit the available space.
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

ISO 4401-02-01-0-05



Ports P, A, B, T - max ∅4.5 mm (0.18 in)

Technical Data

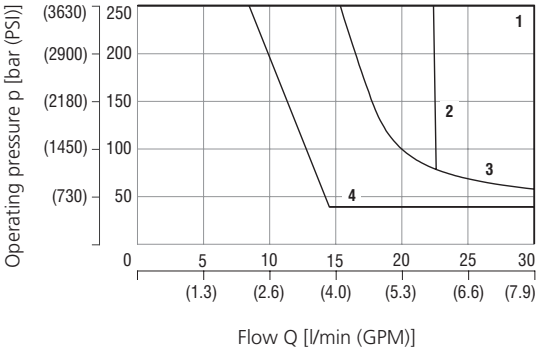
Valve size			04 (D02)
Max. flow		l/min (GPM)	30 (8)
Max. operating pressure at ports P, A, B		bar (PSI)	250 (3630)
Max. operating pressure at port T		bar (PSI)	100 (1450)
Fluid temperature range (NBR)		°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)		°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature range		°C (°F)	-30 ... +50 (-22 ... +122)
Supply voltage tolerance		%	DC: ±10
Max. switching frequency		1/h	10 000
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	DC: 30 ... 50
	OFF	ms	DC: 30 ... 50
Weight - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	0.75 (1.65) 0.9 (1.98)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Coil types / connectors	C_8007 / K_8008	C14B*/K*
Mounting interface	SMT_0019	Size 04
Spare parts	SP_8010	

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

Operating limits

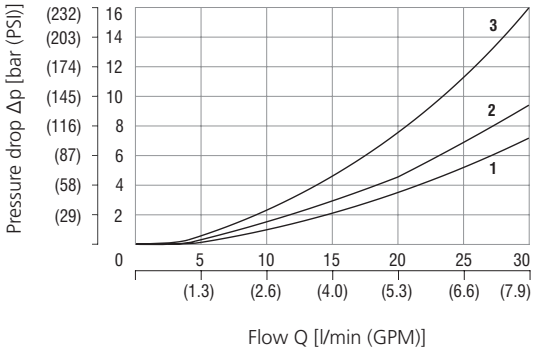
Operating limits for maximum hydraulic power at rated temperature and supply voltage equal to 90% nominal.



Spool symbol	
Z11, Z51, H11, H51	1
R11, X11	2
Y11, Y51	3
C11, C51	4

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

Pressure drop related to flow rate



Spool symbol	P-A	P-B	A-T	B-T	P-T
Z11, Y11	1	1	1	1	
R11, X11	2	2	2	2	
Z51, H51, Y51		1	1		
C11	3	3	3	3	2
C51	3			3	2
H11	1	1	1	1	2

Ordering Code

RPEL1-04 ☐ ☐ / ☐ ☐ ☐ ☐ - ☐

4/2 and 4/3 directional control valve, solenoid operated, Lightline

Valve size

Number of valve positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids (at the coil terminal)

12 V DC / 1.83 A	**01200**
24 V DC / 0.92 A	**02400**

Connector

E1	EN 175301-803-A
E2	E1 with quenching diode
E3A	AMP Junior Timer - axial direction (2 pins; male)
E4A	E3A with quenching diode
E12A	Deutsch DT04-2P - axial direction (2 pins; male)
E13A	E12A with quenching diode

Manual override

No designation	standard
N2	rubber boot protected
N5	socket head screw

Seals

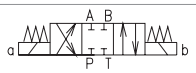
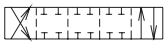
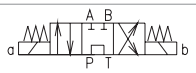
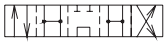
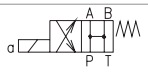
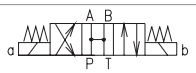
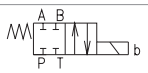
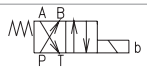
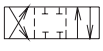
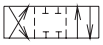
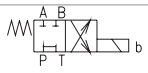
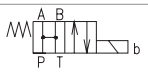
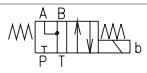
No designation	NBR
V	FPM (Viton)

Surface treatment

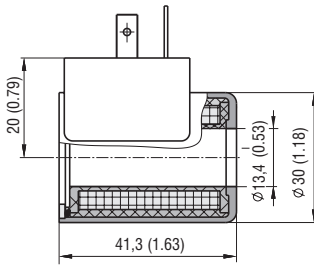
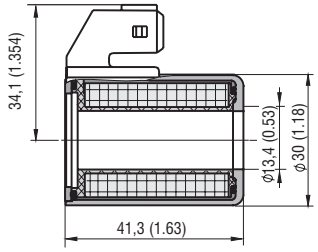
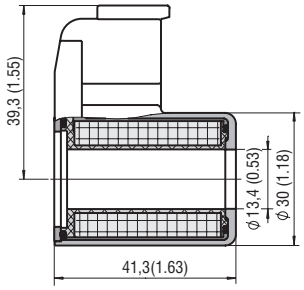
No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- For other solenoid voltage supply options see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M5 x 35 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 5 Nm (3.7 lbf.ft).
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

Spool Symbols

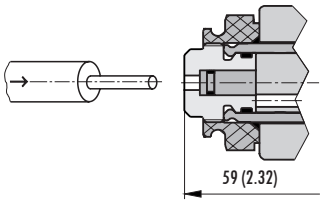
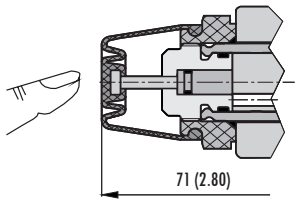
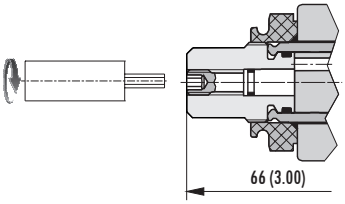
Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			Z51		
C11			H51		
H11			Z11		
Y11			X11		
R11			C11		
Y51			H11		
C51			Y11		

Solenoid Coil in millimeters (inches)

E1 - connector EN 175301-803-A E2 - E1 with quenching diode Protection degree IP65	E3A - AMP Junior Timer (2-pins; male) E4A - E3A with quenching diode Protection degree IP67	E12A - connector Deutsch DT04-2P (2-pins; male) E13A - E12A with quenching diode Protection degree IP67 / IP69K
		

The indicated IP protection level is only achieved if the connector is properly mounted.

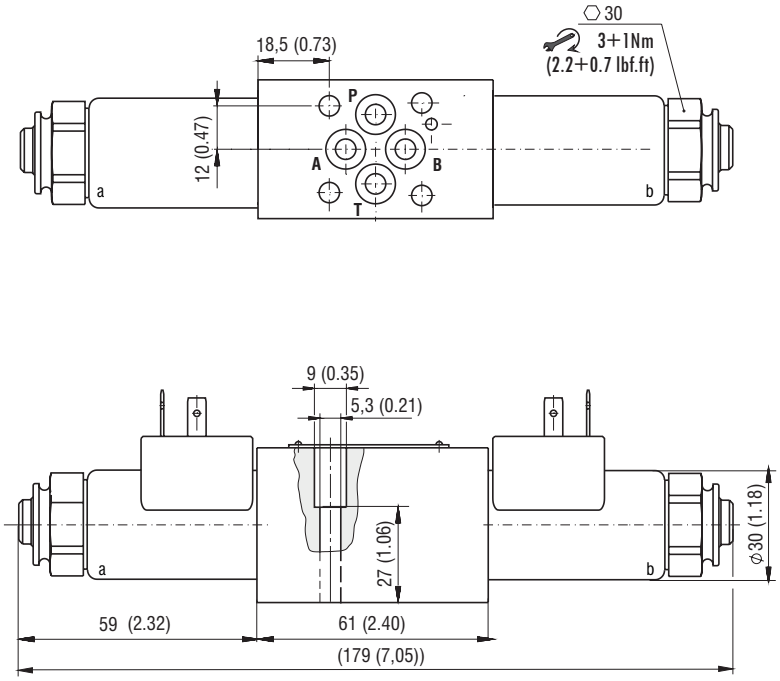
Manual Override in millimeters (inches)

No designation - standard	Designation N2 - protected with rubber boot	Designation N5 - socket head screw 3
		

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

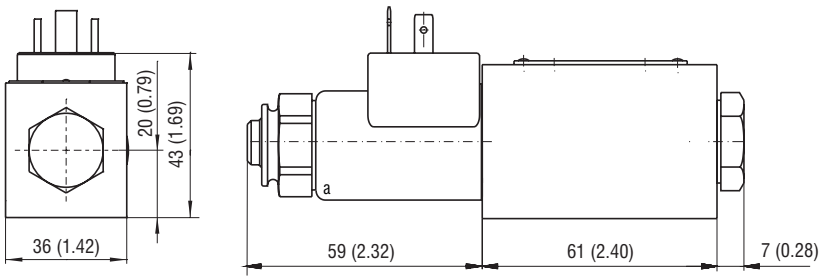
RPEL1-043x/xE1*

Valve with two solenoids
Spool symbols
Z11, C11, H11, Y11



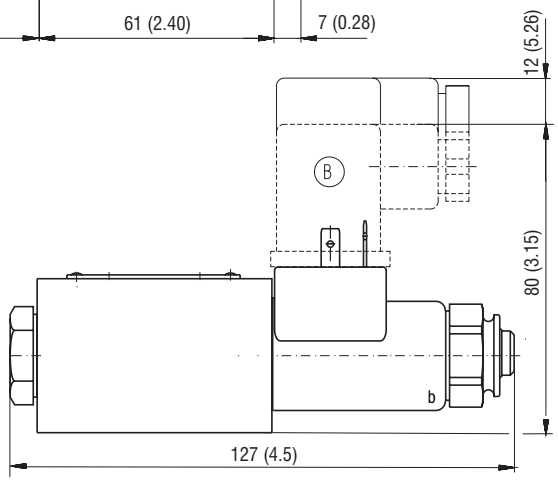
RPEL1-042x/xE1*

Valve with one solenoid „a"
Spool symbols
R11, Y51, C51, Z51, H51



RPEL1-062x/xE1*

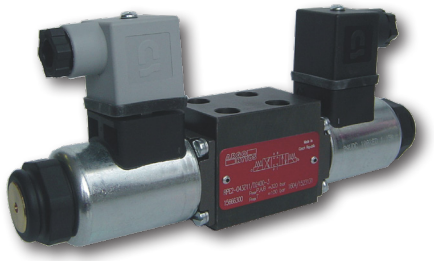
Valve with one solenoid „b"
Spool symbols
Z11, X11, C11, H11, Y11



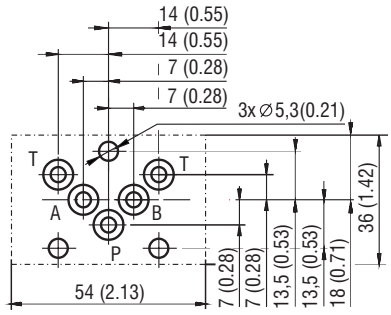
Mounting screws 5 Nm (3.7 lbf.ft)
4x M5 x 35 DIN 912-10.9

RPE2-04

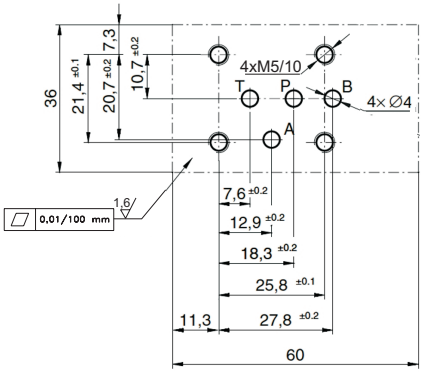
Size 04 (D02) • Q_{max} 20 l/min (5 GPM) • p_{max} 320 bar (4600 PSI)



2 - (former CETOP-RP 121H)



3 - ISO 4401-AA-02-4-A (DIN 24340-A4)



Technical Features

- Direct acting, directional control valve with subplate mounting surface acc. to (CETOP-RP 121H) and ISO 4401-AA-02-4-A (DIN 24340-A4)
- High transmitted hydraulic power up to 320 bar with optimized design to minimize the flow pressure drop
- Three chamber housing design for production cost saving
- The valve is available with interchangeable DC solenoids, also with AC power supply, using a built-in rectifier bridge
- Solenoid electrical terminal option acc. to EN 175301-803-A
- Wide range of interchangeable spools available
- The coil is fastened to the core tube with a retaining nut, and can be rotated by 360°, to suit the available space.
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

Technical Data

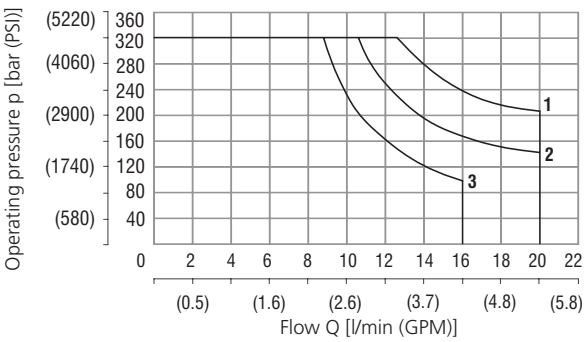
Valve size			04 (D02)	
Max. flow			20 (5.3)	
Max. operating pressure at port P, A, B		bar (PSI)	320 (4600)	
Max. operating pressure at port T		bar (PSI)	100 (1450)	
Fluid temperature range (NBR)		°C (°F)	-30 ... +80 (-22 ... +176)	
Fluid temperature range (FPM)		°C (°F)	-20 ... +80 (-4 ... +176)	
Ambient temperature range		°C (°F)	-30 ... +50 (-22 ... +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	15 000	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	30 ... 50	
	OFF	ms	AC: 70 ... 100	DC: 30 ... 50
Weight - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	1.1 (2.43) 1.5 (3.31)	

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Coil types / connectors	C_8007 / K_8008	C19B* / K*
Mounting interface	SMT_0019	2 - (Former CETOP-RP 121H) / 3 - ISO 4401-AA-02-4-A (DIN 24340-A4)
Spare parts	SP_8010	

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

Operating limits

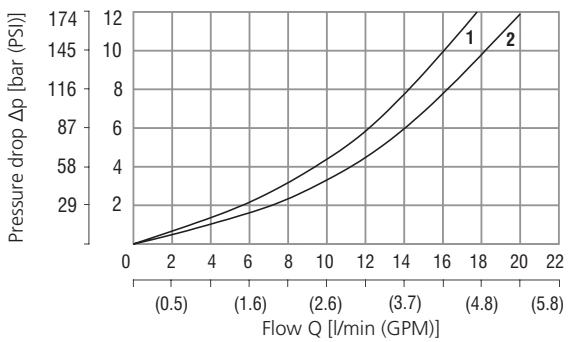
Operating limits for maximum hydraulic power at rated temperature and supply voltage equal to 90% nominal.



Spool symbol	
1	R11, R21, X11, J75
2	Z11, Z51, H11, P11, P51, Y11, Y51, B11
3	C11, C51, L21, A51, Z71, Z81, J15

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

Pressure drop related to flow rate



For all Functional Symbols	
P → T	1
P → A	2
P → B	2
A → T	2
B → T	2

Ordering Code

RPE2-04 ☐ ☐ / ☐ ☐ ☐ ☐ - ☐ ☐

4/2 and 4/3 directional control valve, solenoid operated

Valve size

Number of valve positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids (at the coil terminal)

12 V DC / 2.45 A	**01200**
24 V DC / 1.15 A	**02400**
27 V DC / 0.89 A	**02700**
115 V DC / 0.24 A / 50 (60) Hz	**11550**
230 V AC / 0.12 A / 50 (60) Hz	**23050**

Connector

E1	EN 175301-803-A
E2	E1 with quenching diode

Manual override

No designation	standard

Seals

No designation	NBR

Mounting surface

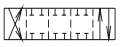
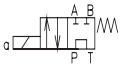
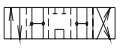
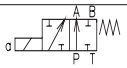
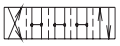
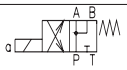
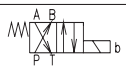
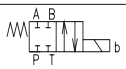
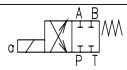
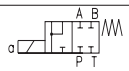
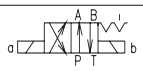
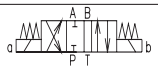
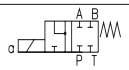
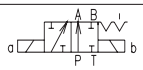
2	acc. to former CETOP-RP 121H
3	acc. to former ISO 4401-AA-02-4-A (DIN 24340-A4)

Surface treatment

No designation	housing phosphated, steel parts zinc-coated (ZnCr-3), ISO 9227 (240 h)
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

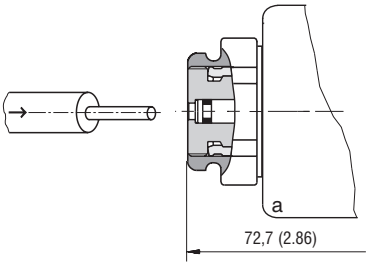
- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- If the pressure exceeds 100 bar with spool types A51 or J75, port T should be connected directly to the tank.
- For other solenoid voltage supply options see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M5 x 35 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 5+1 Nm (3.7+0.7 lbf.ft).
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			R11			C51		
C11			A51			R21		
H11			P51			X11		
P11			Y51			Z11		
Y11			Z51			C11		
L21			Z71			J15		
B11			Z81			J75		

Manual Override in millimeters (inches)

No designation - standard

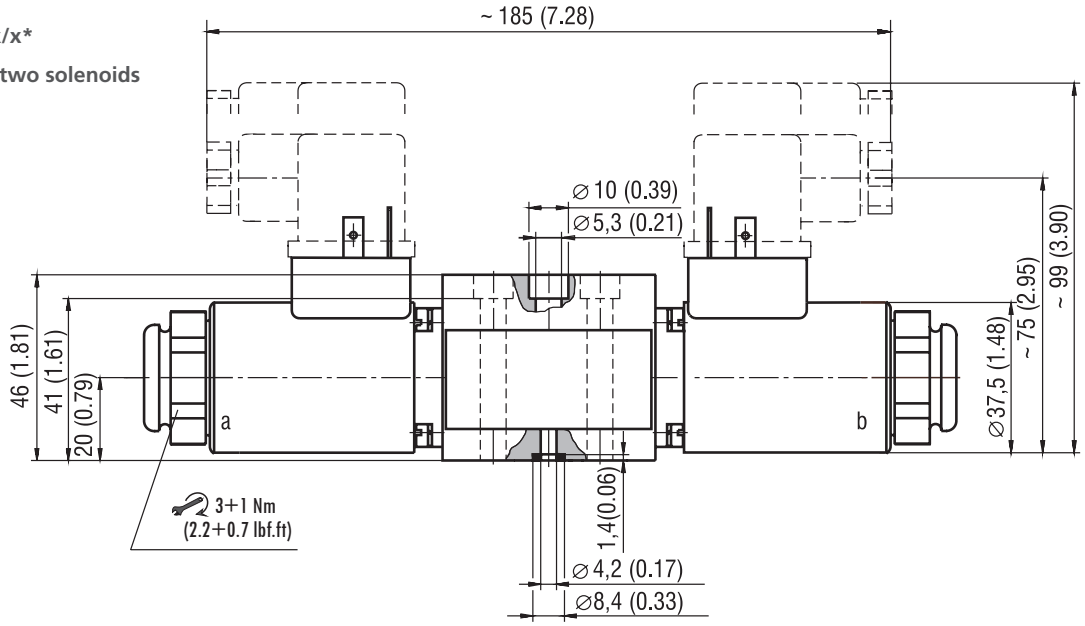


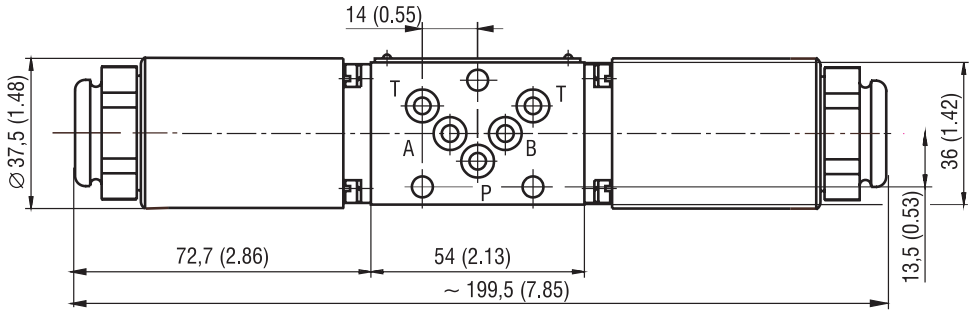
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Installation dimensions 2 (former Norm CETOP-RP 121H)

RPE2-043xx/x*

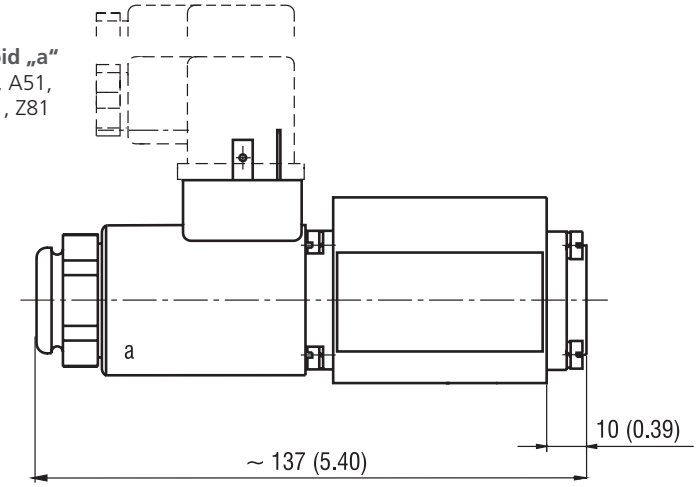
Valve with two solenoids





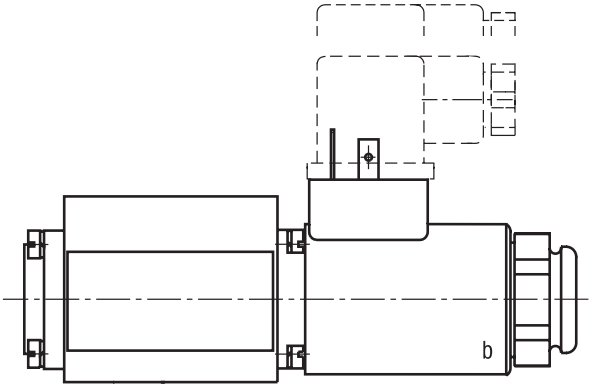
RPE2-042xx/x*

Valve with one solenoid „a"
Spool symbols R11, R21, A51, P51, Y51, Z51, C51, Z71, Z81



RPE2-042xx/x*

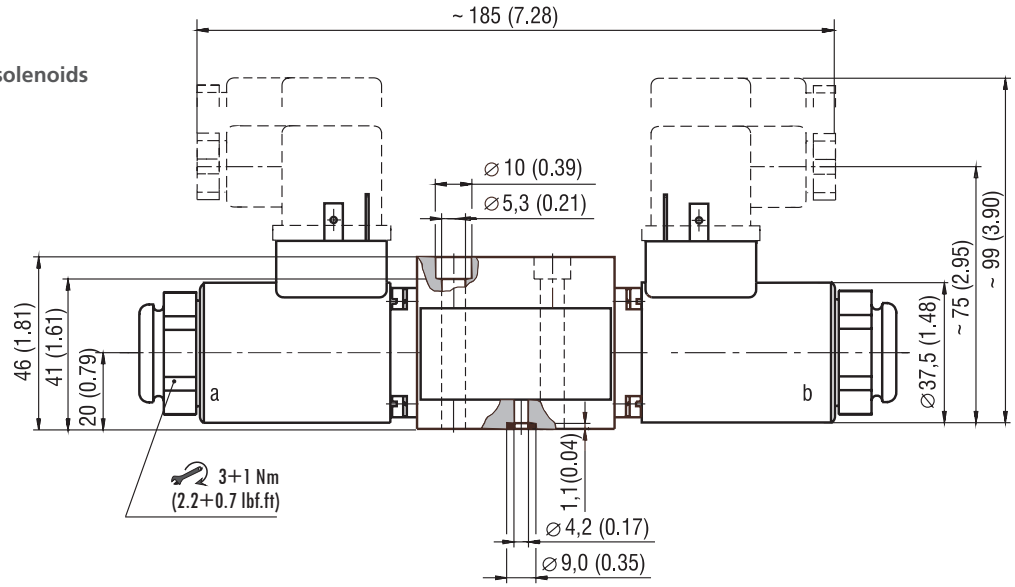
Valve with one solenoid „b"
Spool symbols X11, Z11, C11

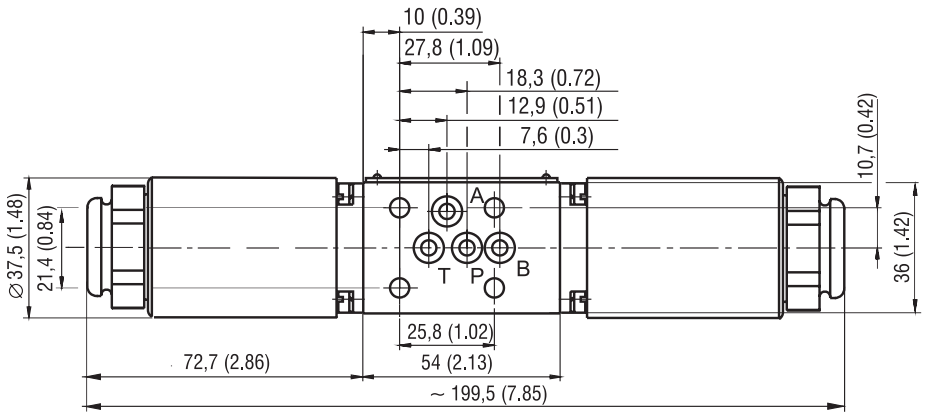


Installation dimensions 3 (former Norm to DIN 24340-A4)

RPE2-043xx/x*

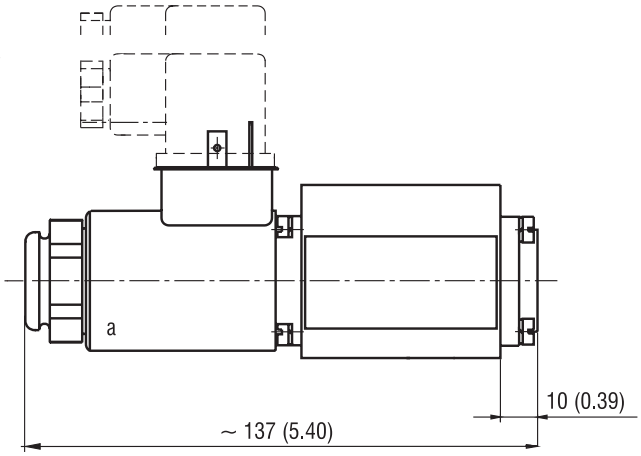
Valve with two solenoids





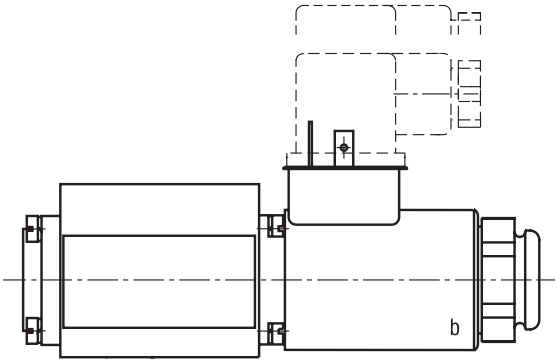
RPE2-042xx/x*

Valve with one solenoid „a"
Spool symbols R11, R21, A51, P51, Y51, Z51, C51, Z71, Z81



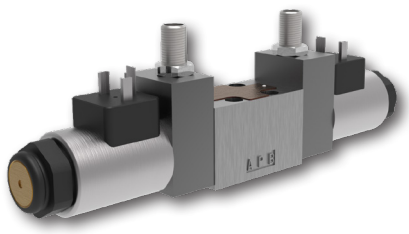
RPE2-042xx/x*

Valve with one solenoid „b"
Spool symbols X11, Z11, C11



RPE3-04

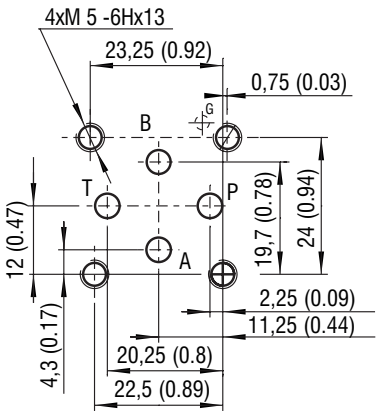
Size 04 (D02) • Q_{max} 30 l/min (8 GPM) • p_{max} 320 bar (4600 PSI)



Technical Features

- Direct acting, directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 02)
- High transmitted hydraulic power up to 320 bar with optimized design to minimize pressure drop
- Three chamber housing design for production cost saving
- The coil is fastened to the core tube with a retaining nut and can be rotated by 360° to suit the available space
- The valve is available with interchangeable DC solenoids, also for AC power supply using a built-in rectifier bridge
- Wide range of solenoid electrical terminal versions available
- CSA Certificate upon request
- Inductive contactless Normally Open and Normally Closed spool position sensor option
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

ISO 4401-02-01-0-05



Ports P, A, B, T - max ∅4.5 mm (0.18 in)

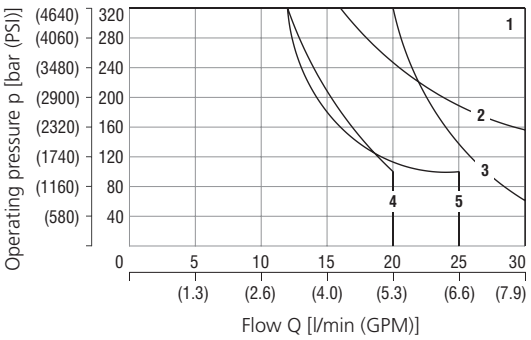
Technical Data

Valve size			04 (D02)	
Max. flow		l/min (GPM)	30 (8)	
Max. operating pressure at ports P, A, B		bar (PSI)	320 (4640)	
Max. operating pressure at port T		bar (PSI)	210 (3050)	
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 ... +50 (-22 ... +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	15 000	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	30 ... 50	
	OFF	ms	AC: 70 ... 100	DC: 30 ... 50
Weight - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	0.9 (1.98) 1.3 (2.75)	
		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types / connectors		C_8007 / K_8008	C19B* / K*	
Mounting interface / tolerances		SMT_0019	Size 04	
Spare parts		SP_8010		
Subplates		DP_0002	DP*-04	

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

Operating limits

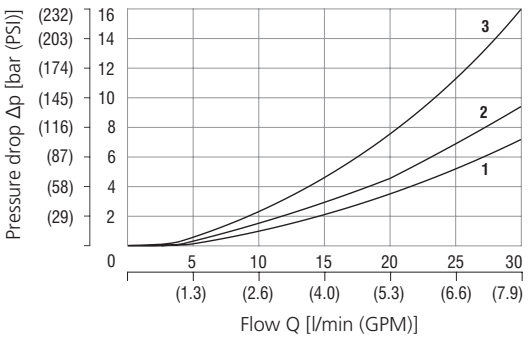
Operating limits for maximum hydraulic power at rated temperature and supply voltage equal to 90% nominal.



Spool symbol	
1	Z11, Z51, H11, P11, P51, Y11, Y51, B11, R11, X11, J15
2	C11, C51
3	R21
4	L21, A51, J75
5	Y71

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

Pressure drop related to flow rate



Spool symbol	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11, P11, Y11, L21,B11	1	1	1	1		C11	3	3	3	3	2
R11, R21, X11, J15	2	2	2	2		C51	3			3	2
A51, J75	1	1				H11	1	1	1	1	2
P51, Y51, Z51		1	1			Y71	2		2	1	

Ordering Code

RPE3 - 04 ☐☐ / ☐☐☐☐☐ - ☐☐

4/2 and 4/3 directional control valve, solenoid operated

Valve size

Number of valve positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids
(at the coil terminal)

12 V DC / 2.45 A	**01200**
24 V DC / 1.15 A	**02400**
27 V DC / 0.89 A	**02700**
205 V DC / 0.12 A	**20500**
24 V AC / 1.31 A / 50 (60) Hz	**02450**
120 V AC / 0.22 A / 50 (60) Hz	**12060**
230 V AC / 0.12 A / 50 (60) Hz	**23050**

CSA upon request

Connector

E1	EN 175301-803-A
E2	E1 with quenching diode
E3	AMP Junior Timer - radial direction
E4	E3 with quenching diode
E3A	AMP Junior Timer - axial direction (2 pins; male)
E4A	E3A with quenching diode
E5	EN 175301-803-A with integrated rectifier
E8	Loose conductors (two insulated wires)
E9	E8 with quenching diode
E12A	Deutsch DT04-2P - axial direction (2 pins; male)
E13A	E12A with quenching diode

Manual override

No designation	standard
N2	rubber boot protected
N4	hand screw
N5	socket head screw

Seals

No designation	NBR
V	FPM (Viton)

Spool monitoring

No designation	without sensors
S1	normally-open sensor
S4	normally-closed sensor

Surface treatment

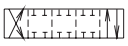
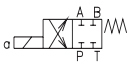
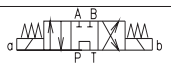
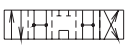
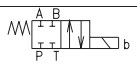
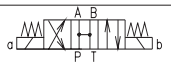
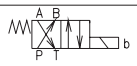
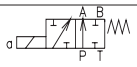
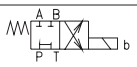
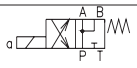
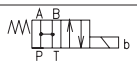
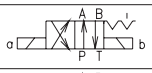
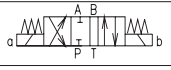
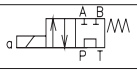
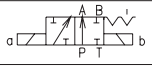
No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

CSA Certified

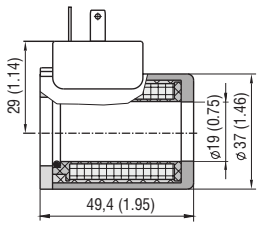
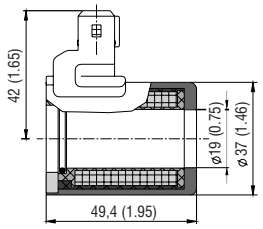
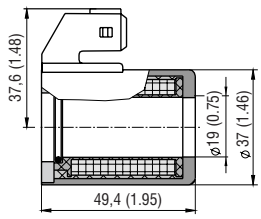
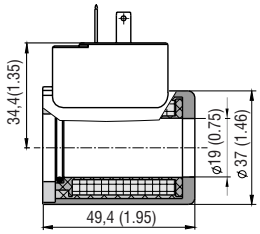
No designation	standard
U	CSA marking

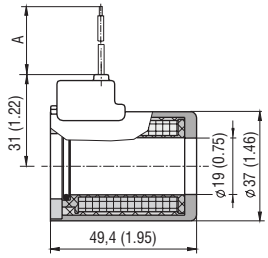
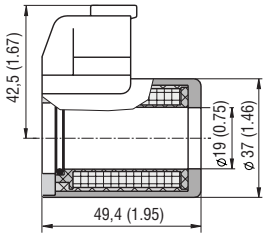
- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- For AC voltage supply use coils with connector type E5.
- For other solenoid voltage supply options see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M5 x 35 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 5 Nm (3.7 lbf.ft).
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			Y71			Z51		
C11			R11			Z11		
H11			R21			X11		
P11			A51			C11		
Y11			P51			H11		
L21			Y51			J15		
B11			C51			J75		

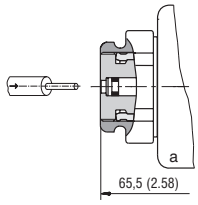
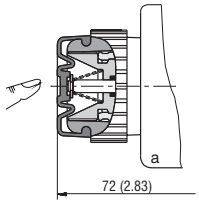
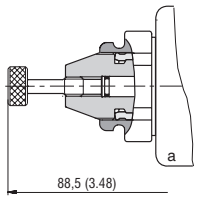
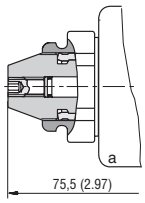
Solenoid Coil in millimeters (inches)

E1, E2 Protection degree IP65	E3, E4 Protection degree IP67	E3A, E4A Protection degree IP67	E5 Protection degree IP65
			

E8, E9 Protection degree IP65		E12A, E13A Protection degree IP67 / IP69K
	**Note:** A = Standard 300 mm (11.81 in), other lengths on demand	

The indicated IP protection level is only achieved if the connector is properly mounted.

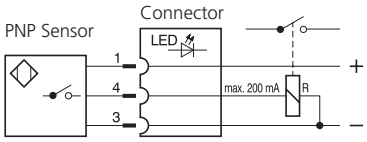
Manual Override in millimeters (inches)

No designation - standard	Designation N2 - rubber boot protected	Designation N4 - hand screw	Designation N5 - socket head screw, size 3
			

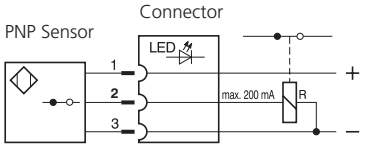
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Spool Position Sensor

S1 - Circuit diagram for the normally - **OPEN** sensor



S4 - Circuit diagram for the normally - **CLOSED** sensor



Function of the position sensor:
In the basic position (when the solenoid is switched off), a steel core, connected to the spool, is under the position sensor. The sensor is activated, it means contacts of the sensor S1 are closed and contacts of the sensor S4 are open. After switching on the solenoid the spool with core moves out of the sensor range and the sensor is deactivated.

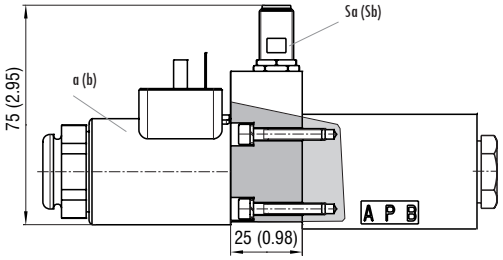
Technical Data of the Sensor		S1, S4
Rated power supply voltage	V	24 DC
Power supply voltage range	V	10 ... 30 DC
Rated current	mA	200
Sensor enclosure protection (EN 60529)		IP 67
Max. operating pressure	bar (PSI)	210 (3046)
Switching frequency	Hz	1000
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)
Technical Data of the Connector		
Power supply voltage range	V	10 ... 30 DC
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)
Indicator		yellow LED

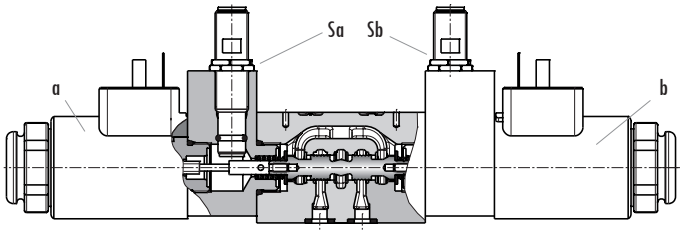
Typical configurations of the valve with a sensor:
3-position valve with two solenoids, equipped with two sensors
2-position valve with one solenoid, equipped with one sensor on the solenoid side
2-position valve with a detent assembly of spool, equipped with one sensor on the side of the solenoid which moves the spool from the basic position to the switched position according to the spool symbol
Note: the sensor always indicates the change of spool position realised by the energised solenoid, mounted on the side of sensor.

①	Signal of solenoid
③	Signal of sensor

Two-Position Directional Control Valve				
①a(b)	③Sa(Sb)		LED	
	S1	S4	S1	S4
0	1	0	ON	OFF
1	0	1	OFF	ON

Three-Position Directional Control Valve									
①a(b)		③ Sa(Sb)				LED			
		S1		S4		S1		S4	
a	b	Sa	Sb	Sa	Sb	Sa - LED	Sb - LED	Sa - LED	Sb - LED
0	0	1	1	0	0	ON	ON	OFF	OFF
1	0	0	1	1	0	OFF	ON	ON	OFF
0	1	1	0	0	1	ON	OFF	OFF	ON

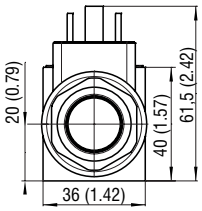


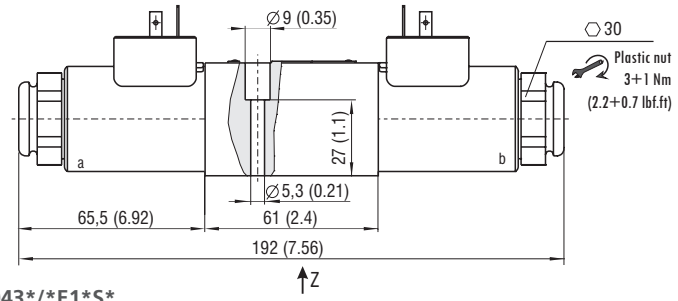


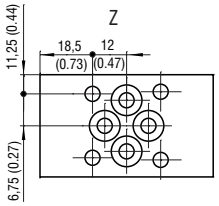
Dimensions in millimeters (inches)

RPE3-043*/*E1*

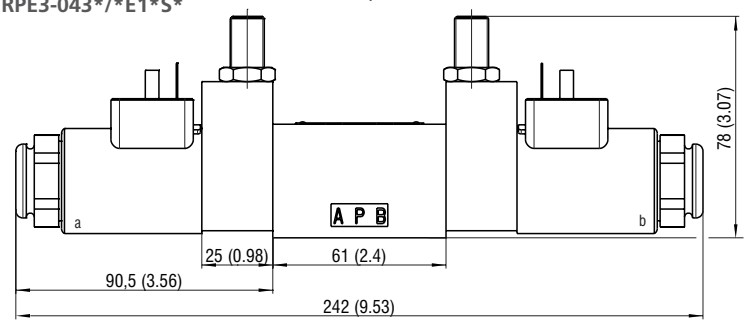
Valve with two solenoids
Spool symbols Z11, C11, H11, P11, Y11, L21, B11, Y71





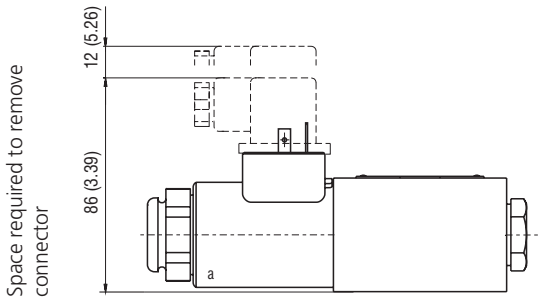


RPE3-043*/*E1*S*



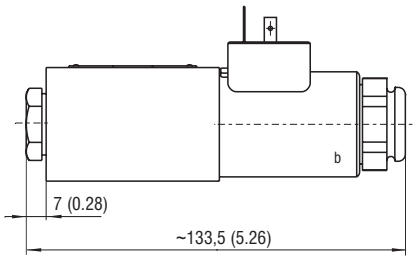
RPE3-042*/*E1*

Valve with one solenoid „a“
Spool symbols R11, R21, A51, P51, Y51, C51, Z51

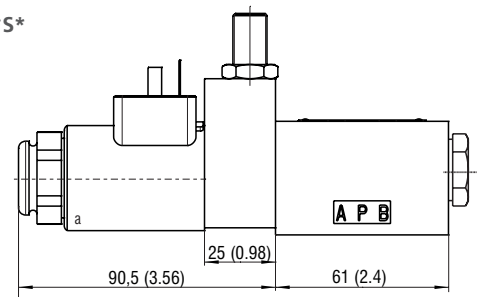


RPE3-042*/*E1*

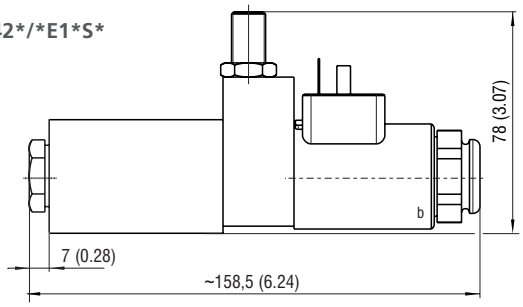
Valve with one solenoid „b“
Spool symbols Z11, X11, C11, H11



RPE3-042*/*E1*S*



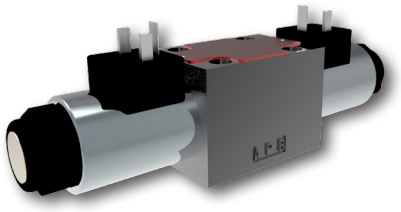
RPE3-042*/*E1*S*



4/2 and 4/3 Directional Control Valve, Solenoid Operated, Lightline

RPEL2-06

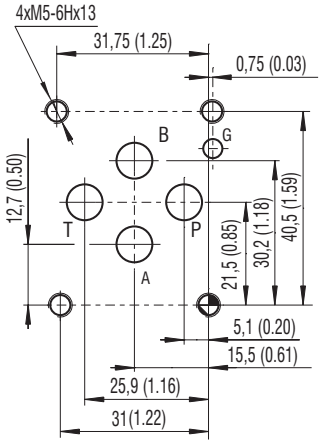
Dn 06 (D03) • Q_{max} 60 l/min (16 GPM) • p_{max} 320 bar (4600 PSI)



Technical Features

- Direct acting directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- Cost-effective Lightline design with reduced solenoid dimensions
- Five chamber valve design for high transmitted hydraulic power
- Decreased dependence of function on fluid viscosity
- Wide range of solenoid electrical terminas and supply voltage types for electromagnets
- The coil, fastened to the core tube with a retaining nut, can be rotated by 360° to suit the available space
- Wide range of interchangeable spools
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h protection in NSS acc. to ISO 9227.
- Enhanced surface protection for mobile sector available (520 h in NSS, ISO 9227)

ISO 4401-03-02-0-05



Ports P, A, B, T - max ∅7.5 mm (0.29 in)

Technical Data

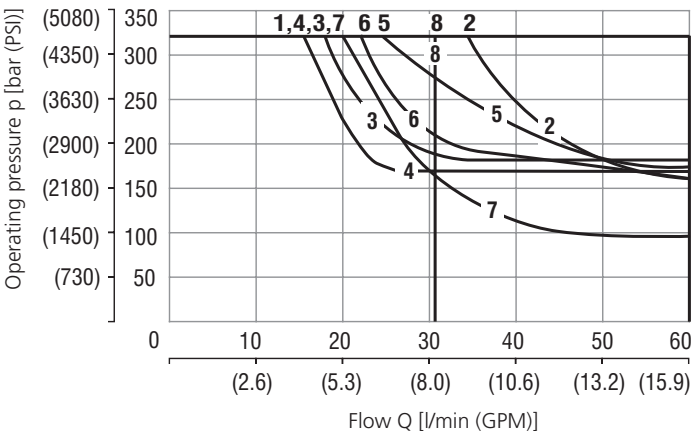
Valve size			06 (D03)
Max. flow		l/min (GPM)	60 (15.8)
Max. operating pressure at ports P, A, B		bar (PSI)	320 (4640)
Max. operating pressure at port T		bar (PSI)	210 (3045)
Fluid temperature range (NBR)		°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)		°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature range		°C (°F)	-30 ... +50 (-22 ... +122)
Supply voltage tolerance		%	DC, AC ±10
Max. switching frequency		1/h	10 000
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	DC: 30 ... 50
	OFF	ms	DC: 30 ... 50
Weight - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	1.3 (2.9) 1.6 (3.5)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Coil types / connectors	C_8007 / K_8008	C19B*/K*
Mounting interface	SMT_0019	Size 06
Spare parts	SP_8010	
Subplates	DP_0002	DP*-06

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

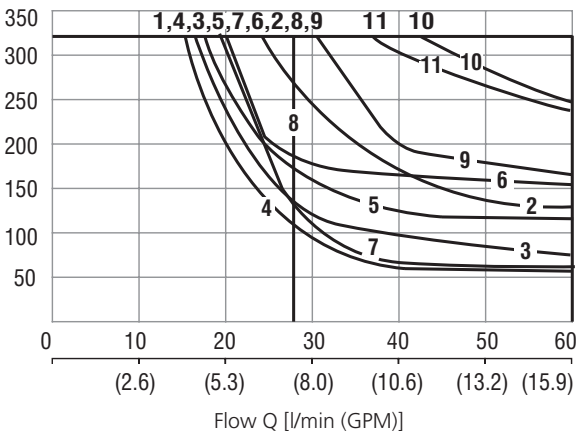
Operating limits - Power limit characteristics valid for 80% of nominal current.

DC



Spool symbol - DC			
1	Z11, Z51, R11, X11, R30, R31,R32, X32, Z71, Z81,Y91	5	R21, X21
		6	Z91
2	Y11, Y51	7	A51
3	C11, C51	8	Y41, Y82
4	H11, H51		

AC

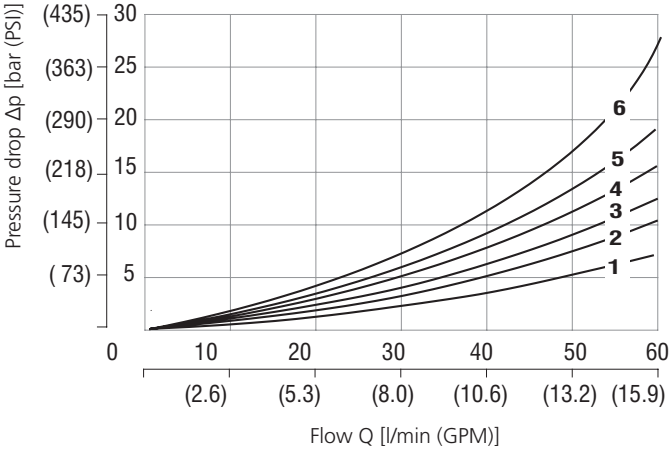


Spool symbol - AC					
1	Z11, Z51, R11, R30, X11, Z71, Z81	5	R21, X21	10	R31
		6	Z91	11	Y91
2	Y11, Y51	7	A51		
3	C11, C51	8	Y41, Y82		
4	H11, H51	9	R32, X32		

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

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

Pressure drop related to flow rate



Spool symbol	P-A	P-B	A-T	B-T	P-T
Z11,Z21,R11,R21, X11,R32,X32	2	2	3	3	
C11	5	5	5	6	3
H11	2	2	2	3	3
A51	2	2			
Y11,Y51	2	2	2	2	
Y41,	3	3	3	3	
Z51,H51		2	3		
R30	5	4	4	5	
C51	2			3	4
Z71	3	3			
Z81			3	3	
Z91	3			3	3
R31	2			3	
Y91		3	3		

Ordering Code

RPEL2-06 □ □ / □ □ □ □ - □

4/2 and 4/3 directional control valve, solenoid operated, Lightline

Valve size

Number of valve positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids (at the coil terminal)

12 V DC / 2.45 A	**01200**
14 V DC / 1.70 A	**01400**
24 V DC / 1.15 A	**02400**
27 V DC / 0.89 A	**02700**
48 V DC / 0.55 A	**04800**
230 V AC / 0.12 A / 50 (60) Hz	**23050**

Connector

E1	EN 175301-803-A
E2	E1 with quenching diode
E3	AMP Junior Timer - radial direction
E4	E3 with quenching diode
E3A	AMP Junior Timer - axial direction (2 pins; male
E4A	E3A with quenching diode
E5	EN 175301-803-A with integrated rectifier
E8	loose conductors (two insulated wires)
E9	E8 with quenching diode
E12A	Deutsch DT04-2P - axial direction (2 pins; male)
E13A	E12A with quenching diode

Manual override

No designation	standard
M2	rubber boot protected

Seals

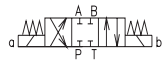
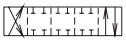
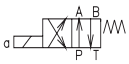
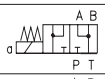
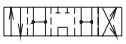
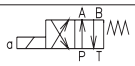
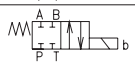
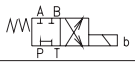
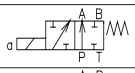
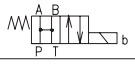
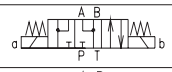
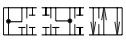
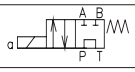
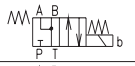
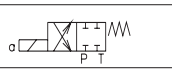
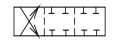
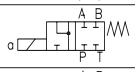
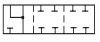
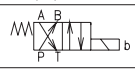
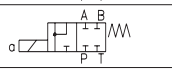
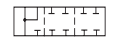
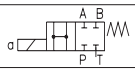
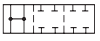
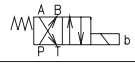
No designation	NBR
V	FPM (Viton)

Surface treatment

No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- For AC voltage supply use coils with connector type E5.
- For other solenoid voltage supply options see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M5 x 45 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 8.9 Nm (6.56 lbf.ft).
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

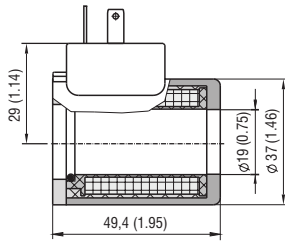
Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			R11			Y82		
C11			R21			Z11		
H11			R32			C11		
Y11			A51			H11		
Y41			C51			Y11		
Y51			H51			Y41		
Z51			Z81			X11		
Z71			Z91			R21		

Solenoid Coil in millimeters (inches)

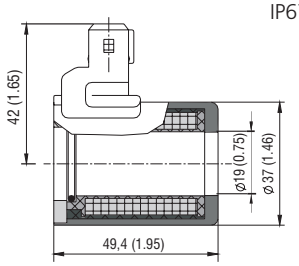
E1 - EN 175301-803-A
E2 - E1 with quenching diode

IP65



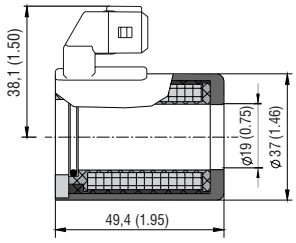
E3 - AMP Junior Timer
- radial direction
E4 - E3 with quenching diode

IP67



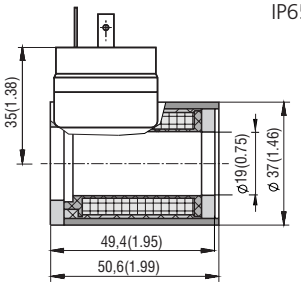
E3A - AMP Junior Timer
- axil direction
E4A - E3A with quenching diode

IP67



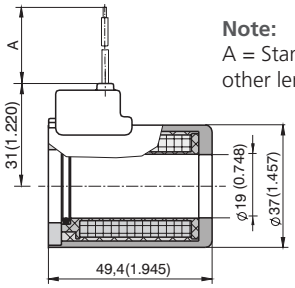
E5 - Connector EN 175301-803-A
+ integrated rectifier

IP65



E8 - Loose conductors
(two insulated wires)
E9 - (E8 with quenching diode)

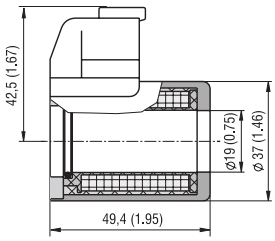
IP65



Note:
A = Standard 300 mm (11.8 inch),
other lengths on demand

E12A - Deutsch DT04-2P
- axil direction
E13A - E12A with quenching diode

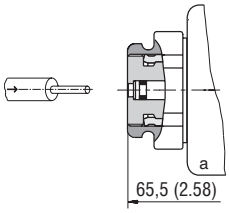
IP67 / IP69



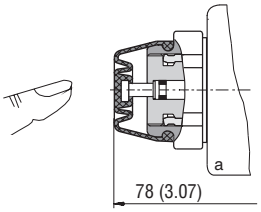
The indicated IP protection level is only achieved if the connector is properly mounted.

Manual Override in millimeters (inches)

No designation
- standard



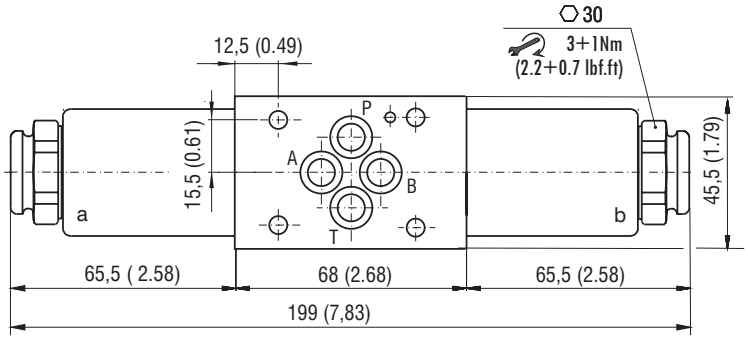
Designation M2
- rubber boot protected

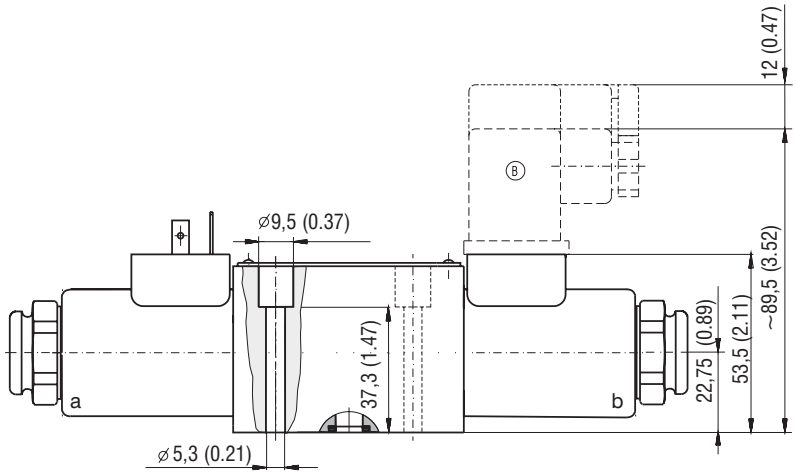


In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

RPEL2-063x/xE1*

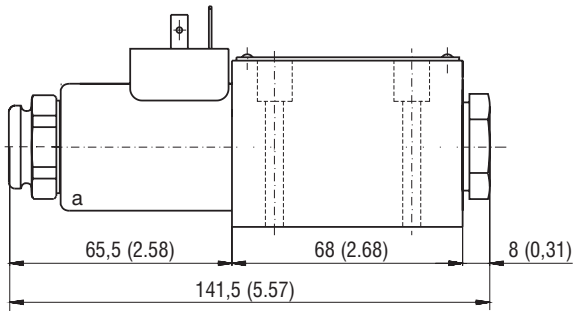
Valve with two solenoids
Spool symbols
Z11, C11, H11, Y11, H11, Y41





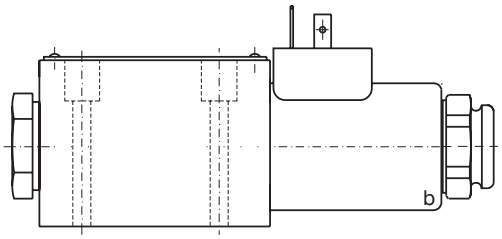
RPEL2-062x/xE1*

Valve with one solenoid „a"
Spool symbols
Z51, Y51, C51, H51,Y82, X11, X21, X32



RPEL2-062x/xE1*

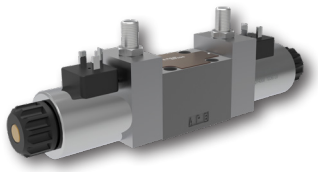
Valve with one solenoid „b"
Spool symbols
Z11, Y11, C11,H11, Y41, R11, R21, R32, A51, Z71, Z81, Z91



Mounting screws 8.9 Nm (7 lbf.ft)
M5x45 DIN 912-10.9

RPE3-06

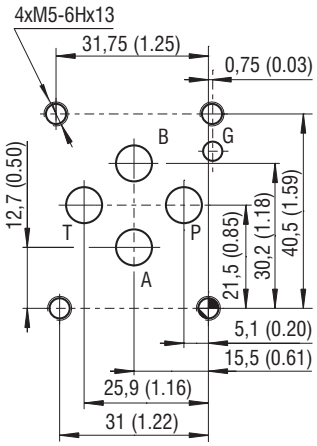
Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- Direct acting, directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drop
- Five chamber housing design with reduced hydraulic power dependence on fluid viscosity
- The valve is available with interchangeable DC solenoids, also for AC power supply using a built-in rectifier bridge
- Wide range of solenoid electrical terminal versions available
- Wide range of interchangeable spools and manual overrides available
- CSA Certificate upon request
- Inductive contactless Normally Open and Normally Closed spool position sensor option
- Soft-shift spool speed control option
- The coil is fastened to the core tube with a retaining nut and can be rotated by 360° to suit the available space
- In the standard version, the valve housing is phosphated. The steel parts are zinc coated (240 h corrosion protection in NSS acc. to ISO 9227)
- With optional increased surface corrosion protection of the whole valve 520 h in NSS, e.g. for mobile applications

ISO 4401-03-02-0-05



Ports P, A, B, T - max ∅7.5 mm (0.29 in)

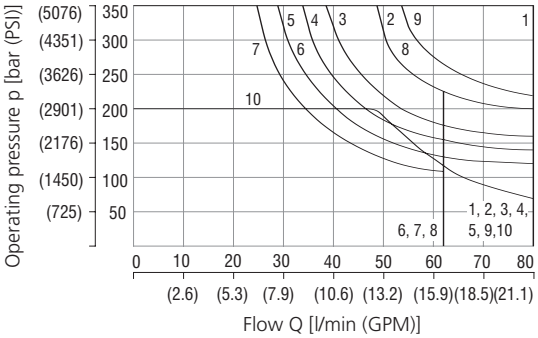
Technical Data

Valve size			06 (D03)	
Max. flow		l/min (GPM)	80 (21.1)	
Max. operating pressure at ports P, A, B		bar (PSI)	standard 350 (5080)	
			320 (4640) acc. to CSA	
Max. operating pressure at port T		bar (PSI)	210 (3050)	
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 ... +50 (-22 ... +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	15 000	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 30 ... 40	DC: 30 ... 50
	OFF	ms	AC: 30 ... 70	DC: 10 ... 50
Weight - valve with 1 solenoid		kg (lbs)	1.6 (3.52)	
- valve with 2 solenoids			2.2(4.85)	
		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types / connectors		C_8007 / K_8008	C22B* / K*	
Mounting interface		SMT_0019	Size 06	
Spare parts		SP_8010		

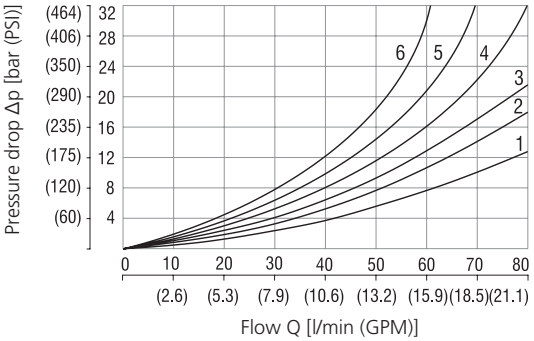
Characteristics measured at ν = 32 mm²/s (156 SUS)

Operating limits

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



Pressure drop related to flow rate



Spool symbol					
1	Z11	5	F11	7	Z91
6	C11	3	R11	5	R31
5	H11	4	R21	5	H51
1	P11	5	A51	7	F51
2	Y11	1	P51	3	X11
5	L21	2	Y51	7	K11
8	B11	6	C51	7	N11
6	Y41	1	Z51	10	X25
1	Z21	7	Z71	1	J15
5	C41	7	Z81	9	J75

Spool symbol	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11,L21,B11,R11 R21,X11,N11,J15	2	2	3	3		P51		1	3		
C11	5	5	5	6	3	Y51		2	2		
H11	2	2	2	3	3	C51	2			3	4
P11	1	1	3	3		Z71	3	3			
Y11	2	2	2	2		Z81			3	3	
Y41	3	3	3	3		Z91	3			3	3
Z21,Z51,H51		2	3			R31	2			3	
C41	4	4			5	F51		2	3		
F11	1	2		3	3	K11		2	3		
A51,J75	2	2				X25	3	3	3		

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Ordering Code

RPE3 - 06 □□/□□□□□□-□□

4/2 and 4/3 directional control valve, solenoid operated

Valve size

Number of spool positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids
(at the coil terminals)

12 V DC / 2.72 A	**01200**
24 V DC / 1.29 A	**02400**
27 V DC / 1.07 A	**02700**
205 V DC / 0.15 A	**20500**
24 V AC / 1.56 A / 50 (60 Hz)	**02450**
120 V AC / 0.26 A / 60 Hz	**12060**
230 V AC / 0.15 A / 50 (60) Hz	**23050**

CSA upon request - only for 320 bar (4640 PSI)

Connector

EN 175301-803-A	**E1**
E1 with quenching diode	**E2**
AMP Junior Timer - axial direction (2 pins; male)	**E3A**
E3A with quenching diode	**E4A**
EN 175301-803-A with integrated rectifier	**E5**
Loose conductors (two insulated wires)	**E8**
E8 with quenching diode	**E9**
Deutsch DT04-2P - axial direction (2 pins; male)	**E12A**
E12A with quenching diode	**E13A**

- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- For AC voltage supply use coils with connector type E5.

Manual override

No designation	standard
N1	cap nut covered
N2	rubber boot protected
N3	detent assembly with the ball
N4	hand screw
N5	socket head screw, size 3
N7	detent assembly with the nut
N8	with ball
N9	without manual override

Soft-shift spool speed control

No designation	without soft-shift control
T1	orifice ∅ 0.7 mm (0.03 inch) in solenoid

Seals

No designation	NBR
V	FPM (Viton)

Spool monitoring

No designation	without sensors
S1	normally-open sensor
S4	normally-closed sensor

Surface treatment

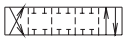
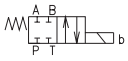
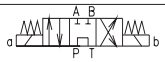
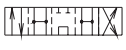
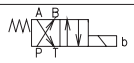
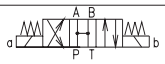
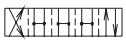
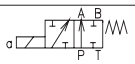
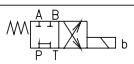
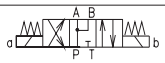
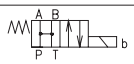
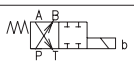
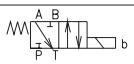
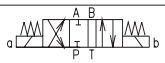
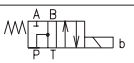
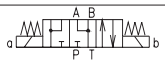
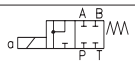
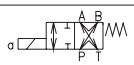
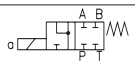
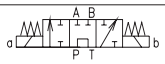
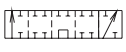
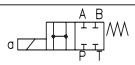
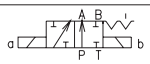
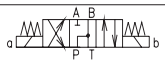
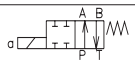
No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

CSA Certified

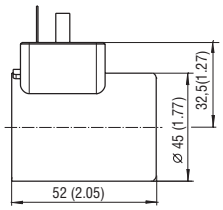
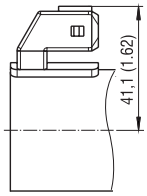
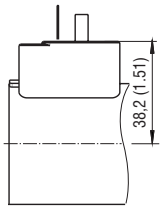
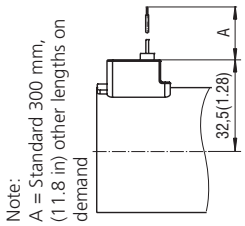
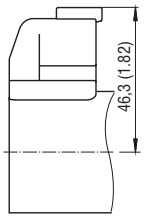
No designation	standard
U	CSA marking

- For other solenoid voltage supply options see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M5 x 45 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 8.9 Nm (6.56 lbf.ft).
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

Spool Symbols

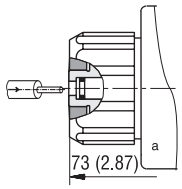
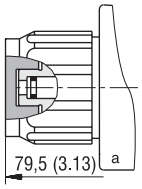
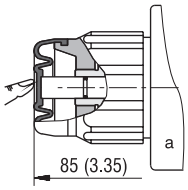
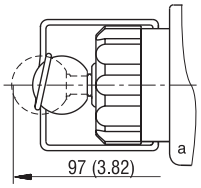
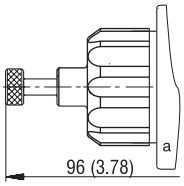
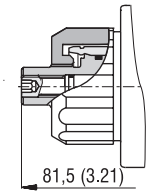
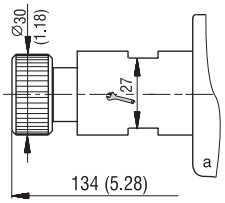
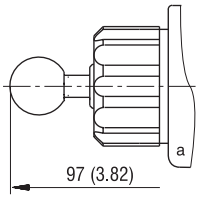
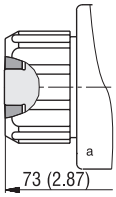
Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			R11			Z11		
C11			R21			X11		
H11			A51			C11		
P11			P51			H11		
Y11			Y51			K11		
L21			C51			N11		
B11			Z51			F11		
Y41			Z71			X25		
Z21			Z81			J15		
C41			Z91			J75		
F11			R31					
			H51					
			F51					

Typ konektoru cívky elektromagnetu rozměry v milimetrech (in) / Stupeň ochrany

E1, E2 / IP65	E3A, E4A / IP67	E5 / IP65	E8, E9 / IP65	E12A, E13A / IP67 / 69K
				

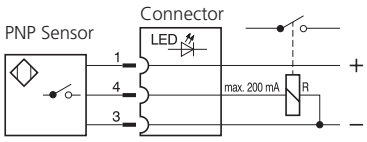
The indicated IP protection level is only achieved if the connector is properly mounted.

Manual Override in millimeters (inches)

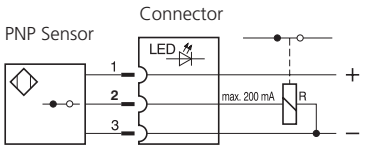
No designation - standard	N1- cap nut covered	N2- rubber boot protected	N3 - detent assembly with the ball	N4 - hand screw
				
N5 - socket head screw, size 3	**N7 - detent assembly with the nut**	**N8 - with ball**	**N9 - without manual override**	In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.
				

Spool Position Sensor

S1 - Circuit diagram for the normally - **OPEN** sensor



S4 - Circuit diagram of the normally - **CLOSED** sensor



Function of the position sensor:
In the basic position (when the solenoid is switched off), a steel core, connected to the spool, is under the position sensor. The sensor is activated, it means contacts of the sensor S1 are closed and contacts of the sensor S4 are open. After switching on the solenoid the spool with core moves out of the sensor range and the sensor is deactivated.

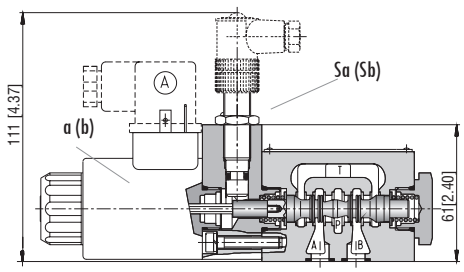
Technical Data of the Sensor		S1, S4
Rated power supply voltage	V	24 DC
Power supply voltage range	V	10 ... 30 DC
Rated current	mA	200
Sensor enclosure protection (EN 60529)		IP 67
Max. operating pressure at port T	bar (PSI)	210 (3046)
Switching frequency	Hz	1000
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)
Technical Data of the Connector		
Power supply voltage range	V	10 ... 30 DC
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)
Indicator		yellow LED

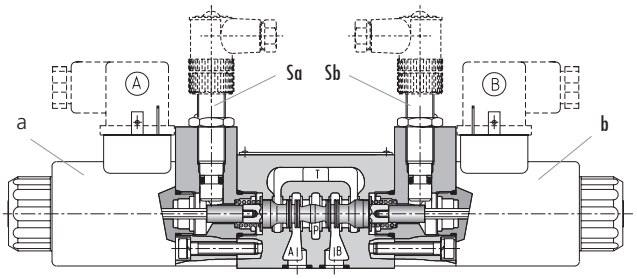
Typical configurations of the valve with a sensor:
3-position valve with two solenoids, equipped with two sensors
2-position valve with one solenoid, equipped with one sensor on the solenoid side
2-position valve with a detent assembly of spool, equipped with one sensor on the side of the solenoid which moves the spool from the basic position to the switched position according to the spool symbol
Note: the sensor always indicates the change of spool position realised by the energised solenoid, mounted on the side of the sensor.

① Signal of solenoid
③ Signal of sensor

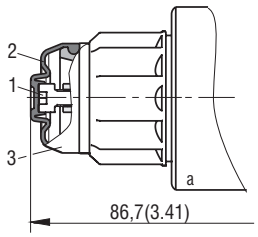
Two-Position Directional Control Valve				
①a(b)	③Sa(Sb)		LED	
	S1	S4	S1	S4
0	1	0	ON	OFF
1	0	1	OFF	ON

Three-Position Directional Control Valve									
①a(b)		③ Sa(Sb)				LED			
		S1		S4		S1		S4	
a	b	Sa	Sb	Sa	Sb	Sa - LED	Sb - LED	Sa - LED	Sb - LED
0	0	1	1	0	0	ON	ON	OFF	OFF
1	0	0	1	1	0	OFF	ON	ON	OFF
0	1	1	0	0	1	ON	OFF	OFF	ON



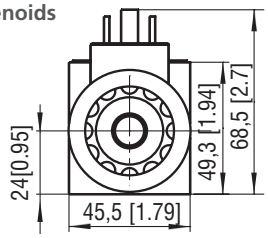


Spool Speed Control in millimeters (inches)

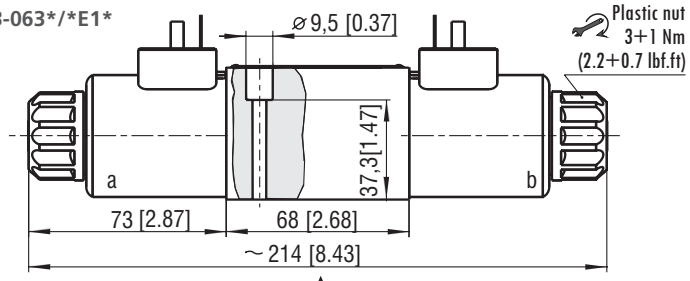
Designation T1	Important:
	This directional valve provides the means to control spool soft shifting by an orifice situated in the solenoid armature. To ensure the proper function of the valve, unobstructed venting of the solenoid is required through the bleeding plug (1). The plugs are accessible after removing the rubber boot (2) from the solenoid cap nut (3).
Switching time ON and OFF	300 ... 800 ms
The switching times shown are valid for viscosity ν = 32 mm²/s (156 SUS) and nominal voltage. They depend on working pressure and flow rate of the directional control valve.	

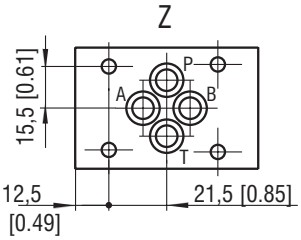
Dimensions in millimeters (inches)

Valve with two solenoids

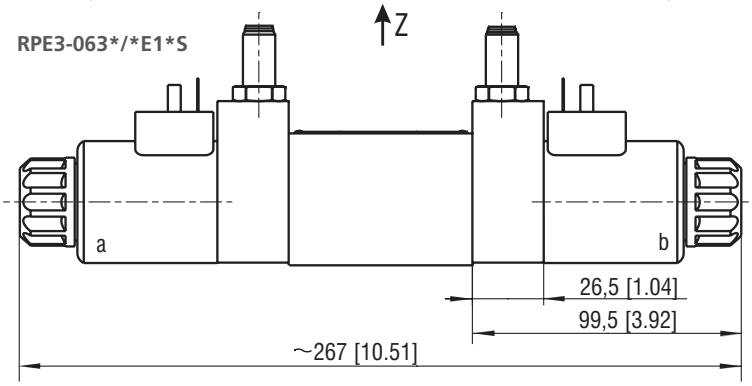


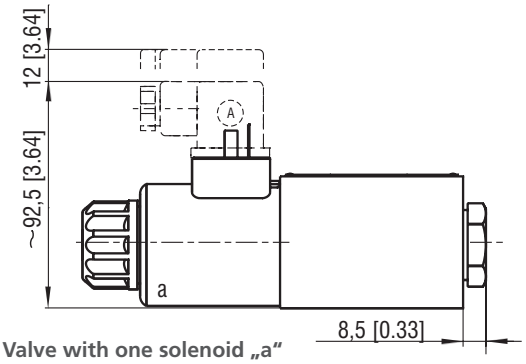
RPE3-063*/*E1*

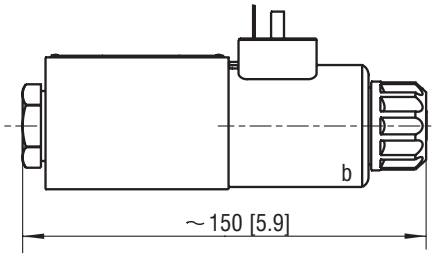




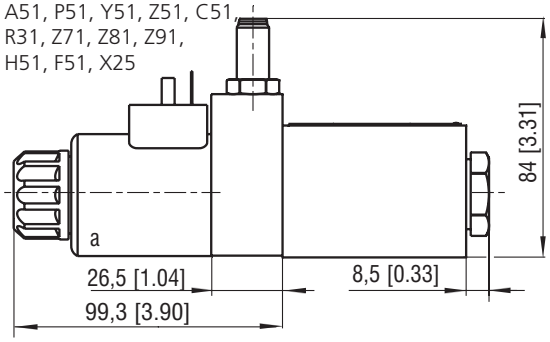
RPE3-063*/*E1*S



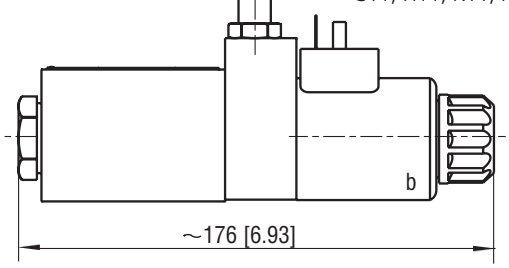




Valve with one solenoid „a"
Spool symbols R11, R21,
A51, P51, Y51, Z51, C51,
R31, Z71, Z81, Z91,
H51, F51, X25



Valve with one solenoid „b"
Spool symbols X11, Z11,
C11, H11, K11, N11, F11

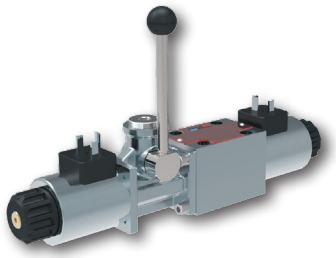


Mounting screws 8.9 Nm (7 lbf.ft)
M5x45 DIN 912-10.9

Solenoid Operated Directional Control Valve with Auxiliary Lever Override

RPER3-06

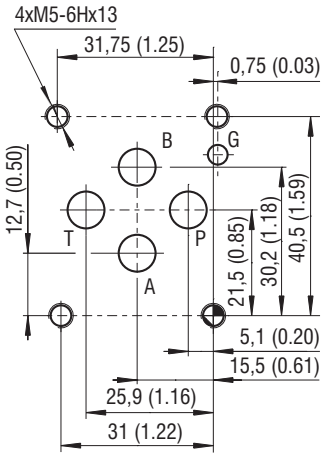
Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- Auxiliary lever overrides for ON-OFF solenoid valves of the type RPE3-06 (Datasheet No. 4010) with Size 06 and mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- Auxiliary lever operators allow the valve to be operated when electrical system is de-energized, e.g. emergency operation, electrical failures, maintenance activities
- Manual lever and actuation element can be rotated in 90° increments for flexible installation
- When the valve is electrically operated the hand lever remains stopped in its neutral position
- The lever override does not affect the performances of the base valve
- In the standard version, the valve housings are phosphated and the steel parts are zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

ISO 4401-03-02-0-05



Ports P, A, B, T - max. ∅7.5 mm (0.9 in)

Technical Data

Valve size		06 (D03)	
Max. flow	l/min (GPM)	80 (21.1)	
Max. operating pressure at port P, A, B	bar (PSI)	350 (5080)	
Max. operating pressure at port T	bar (PSI)	100 (1450)	
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 ... +50 (-22 ... +122)	
Service life	cycles	10^6	
Rated power supply voltage	%	AC: ±10	DC: ±10
Max. switching frequency	1/h	10 000	
Lever characteristics			
Total stroke angle	deg	±20	
Working stroke angle		±12 to 20	
Operating force	N (lbf)	40 (29.5)	
Lever device weight	kg (lbs)	0.59 (1.3)	
	Datasheet	Type	
General information	GI_0060	Products and operating conditions	
Coil types / connectors	C_8007 / K_8008	C22B* / K*	
Mounting interface	SMT_0019	Size 06	
Spare parts	SP_8010		

Objednací klíč

RPER3-06 □□ / □□□□ / □ - □ - □

4/2 and 4/3 solenoid operated directional control valve with auxiliary lever override

Valve size

Number of valve positions

two	**2**
three	**3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids
(at the coil terminals)

12 V DC / 2,72 A	**01200**
24 V DC / 1,29 A	**02400**
27 V DC / 1,07 A	**02700**
205 V DC / 0,15 A	**20500**
24 V AC / 1,56 A / 50 (60) Hz	**02450**
120 V AC / 0,26 A / 60 Hz	**12060**
230 V AC / 0,15 A / 50 (60) Hz	**23050**

For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
For AC voltage supply use coils with connector type E5.
For other solenoid voltage supply options see data sheet C_8007.
The solenoid operated valves are delivered without connectors.
For available connectors see data sheet K_8008.
The orifice to the P port can be ordered separately, see data sheet SP_8010.
Mounting bolts M5 x 45 DIN 912-10.9 or studs must be ordered separately
Tightening torque is 8.9+1 Nm (6.56+0.7 lbf.ft)

Surface treatment

No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

Lever override length

No designation	standard 102 mm

Manual lever and position of override actuating section

A19	standard, lever on side A, upward
B19	standard, lever on side B, upward

Seals

No designation	NBR
V	FPM (Viton)

Manual override at actuator system

No designation	standard

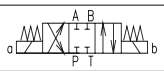
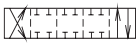
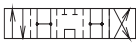
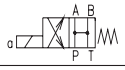
Conector

E1	EN 175301-803-A
E2	E1 with quenching diode
E3A	AMP Junior Timer - axial direction (2 pins; male)
E4A	E3A with quenching diode
E5	EN 175301-803-A with integrated rectifier
E8	loose conductors (two insulated wires)
E9	E8 with quenching diode
E12A	Deutsch DT04-2P - axial direction (2 pins; male)
E13A	E12A with quenching diode

Besides the commonly used valve versions shown other special models are available.
Contact our technical support for their identification, feasibility and operating limits.

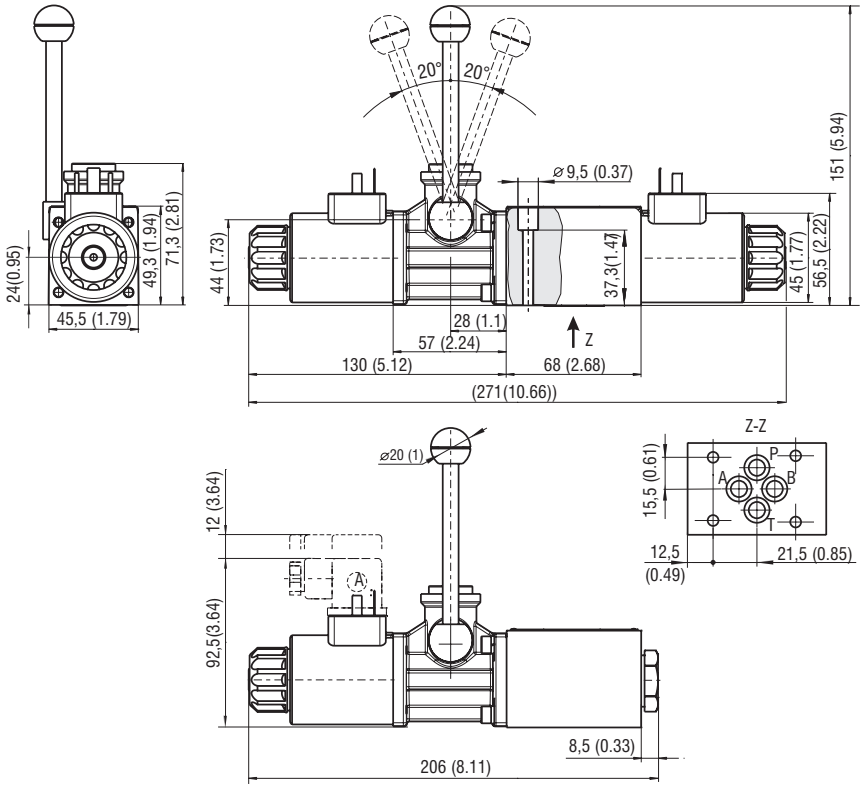
For operating limits and pressure drop refer to Datasheet No. 4010 of the base valve RPE3-06.

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			R11		
C11			H51		
H11					
Y11					

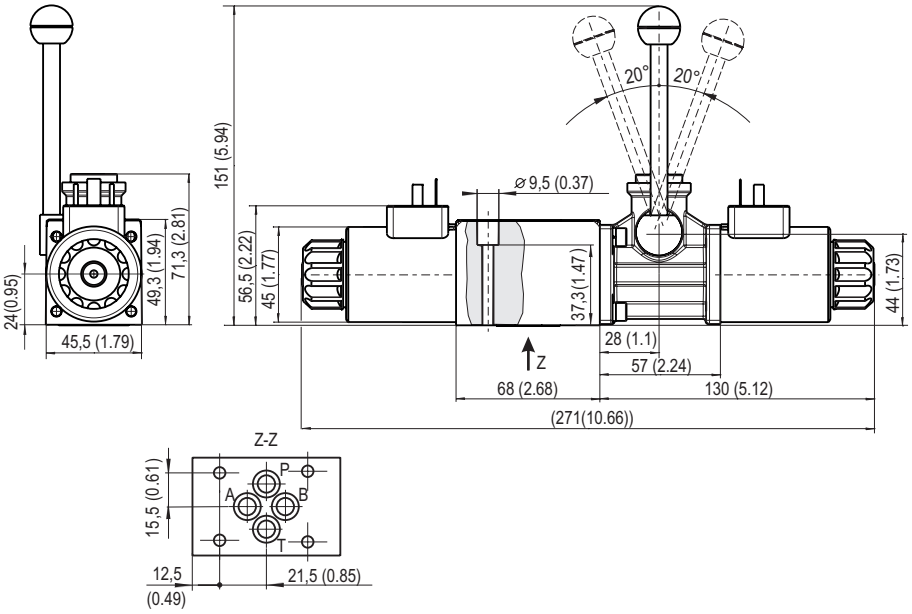
Dimensions in millimeters (in)

RPER3-063 */ A19



The lever operator should never be used when any solenoid is energized.

RPER3-063 */ B19

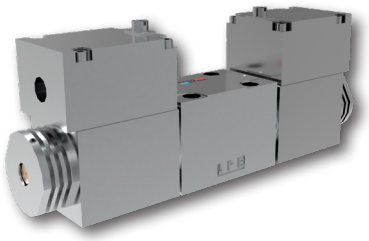


Manual lever and actuating section is shown in the standard supplied position which is the most frequently used. Both elements can be rotated to various positions 90° apart.
For other positions of lever and actuating section consult our technical department for their identification.

Mounting screws 8.9+1 Nm (6.56+0.7 lbf.ft)
M5x45 DIN 912-10,9

RPET3-06

Size 06 (D03) • Q_{max} 60 l/min (16 GPM) • p_{max} 350 bar (5100 PSI)



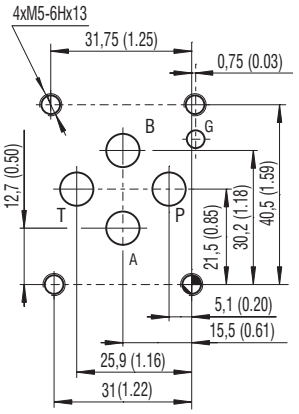
Technical Features

- Solenoid operated directional control valve, spool type, with subplate mounting surface acc. to ISO 4401, DIN 24340 (CETOP 03) standards
- Robust design of coil with high resistance to mechanical damage
- Encapsulation enclosure solenoid version (m)
- High transmitted hydraulic power
- Operating pressure up to 350 bar, pressure in T- channel up to 210 bar
- Low pressure drop achieved by design optimization
- Five chambers housing design with reduced hydraulic power dependence on fluid viscosity
- Wide range of interchangeable spools, optional type of manual override
- Easily interchangeable coil with adjustable connector position by rotating the coil
- In the standard version, the valve is zinc coated for 520 h protection in NSS acc. to ISO 9227

Functional description

Solenoid operated directional control valves in heavy-duty design have higher protection against mechanical damage, against dust, gas and moisture ingress into the coil. They are intended for operation in heavy working conditions.

ISO 4401-03-02-0-05



Ports P, A, B, T - max. ∅ 7.5 mm (0.29 in)

Technical Data

Valve size			06 (D03)
Max. flow		l/min (GPM)	60 (15.9)
Max. operating pressure at ports P, A, B		bar (PSI)	350 (5080)
Max. operating pressure at ports T		bar (PSI)	210 (3050)
Pressure drop		bar (PSI)	see Δp-Q characteristics
Fluid temperature range (NBR)		°C (°F)	-30 ... +80 (-22 ... +176)
Max. switching frequency		1/h	15 000
Switching time ON at ν=32 mm²/s (156 SUS)		ms	30 ... 50
Switching time OFF at ν=32 mm²/s (156 SUS)		ms	10 ... 50
Weight	valve with 1 solenoid	kg (lbs)	2.52 (5.56)
	valve with 2 solenoids		3.97 (8.75)
Technical Data - Heavy-duty Solenoid			
Voltage type			DC
Available voltages		V	24
Available nominal power		W	18
Supply voltage tolerance		%	DC: ±10
Duty cycle			100 % ED
Enclosure type of the Solenoid to EN 60529			IP 66/68
Ambient temperature range		°C (°F)	-30 ... +50 (-22 ... +122)
		Data Sheet	Type
General information		GI_0060	products and operating conditions
Mounting interface		SMT_0019	Size 06
Subplates		Subplates_0002	
Spare parts		SP_8010	
Solenoid Code		Ordering No.	
ET22-46/02400C32-B		42278700	

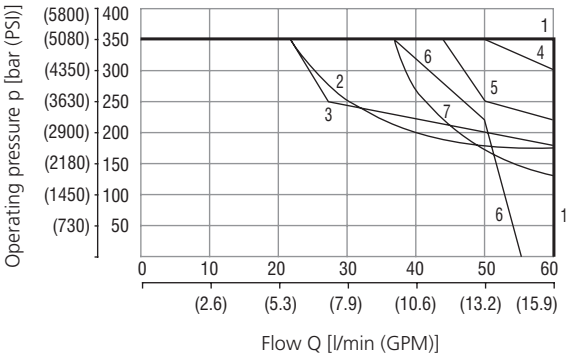
Danger – safety notice

- Always disconnect the coil from the power supply before any maintenance, assembly, disassembly or other work on it
- For directional valves with two solenoids, one solenoid must be without supply voltage charge before the other solenoid can be charged
- The temperature of the valve – coil surface can exceed 100 °C during the operation. There is a risk of burns
- Damaged or malfunctioning coils (inclusive cable) must be immediately disconnected from the power supply

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

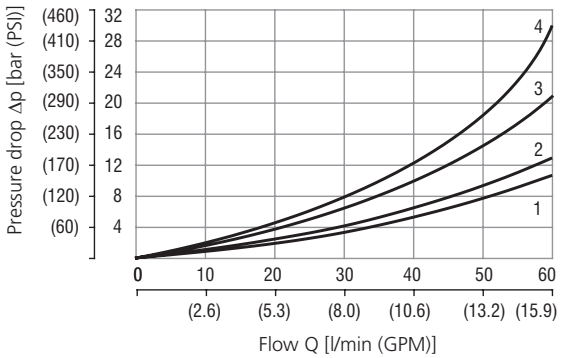
Operating limits (p-Q)

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



Z11, J15	1
C11	2
H11, X30, B71	3
R11	4
Y11, N11, V41	5
Y51	6
R30	7

Pressure drop related to flow rate (Δp-Q)



	P→A	P→B	A→T	B→T	P→T
Z11, J15, R11, R30, X30	1	1	2	2	
C11	3	3	3	4	2
H11	1	1	1	2	2
B71	1			1	
Y11	1	1	1	1	
Y51		2	2	2	
N11	1		2	2	
V41		1		2	

Ordering Code

RPET3-06 □ □ / □ □ □ □ - □

4/2 and 4/3 directional control valve, solenoid operated, heavy-duty design

Valve size

Number of spool positions
two positions **2**
three positions **3**

Spool symbols
see the table „Spool Symbols“

Rated supply voltage of solenoids
24 V DC / 0.75 A **02400**

ET1 **Solenoid electric connection**
connection box without cable gland

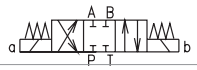
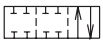
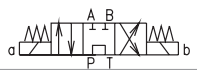
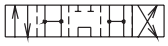
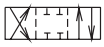
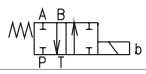
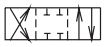
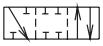
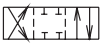
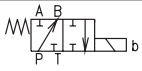
Manual override
No designation standard (operated by pin)
N1 metal cap nut covered
N9 without manual override

Seals
No designation NBR

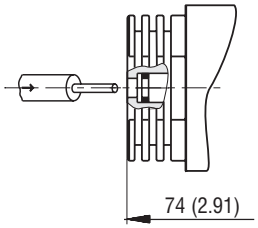
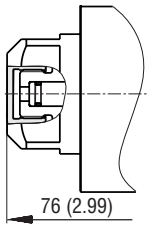
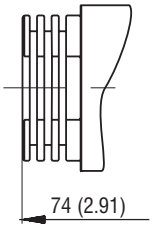
Surface treatment
B zinc-coated (Zn-Ni), ISO 9227 (520 h)

- The valves are delivered without cable glands.
- Mounting bolts M5x45 DIN 912-10.9 or studs must be ordered separately.
- Tightening torque is 8.9+1 Nm (6.56+0.7 lbf.ft).
- The orifice to the P-port can be ordered separately, see data sheet SP_8010.
- Besides the shown types, commonly used valve versions other special models are available. Contact our technical department for their identification, feasibility and operating limits.

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			Y51			Z11		
C11			R30			B71		
H11			R11			N11		
Y11			X30			V41		
						J15		

Manual Override in millimeters (inches)

No designation - standard (operated by pin)	Designation N1 - metal cap nut covered	Designation N9 - without manual override
		

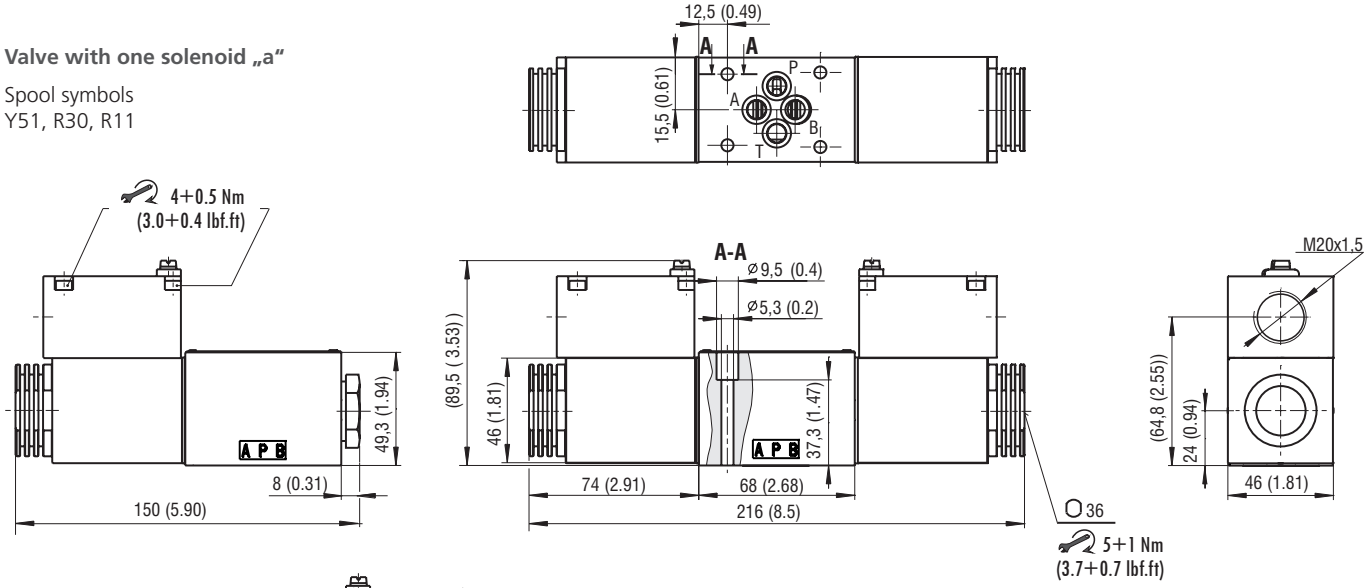
Installation

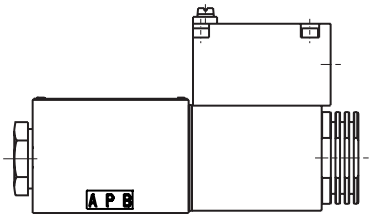
- Ambient operating temperature of the used connecting cable and cable gland shall be at least +105 °C (+221 °F). Use the cable shoe M3 – 0.75 mm^2 for wire connecting.
- Fastening torque of screws in connecting plate is 0.4 Nm (0.30 lbf.ft). Fastening torque of screws for cover is 4 Nm (2.95 lbf.ft).
- The user shall to ensure free heat emission from the coil surface during operation. The coil must not be activated alone – without connecting to the valve.
- We recommend connecting of the coil to the ground via the purpose-built ground clamp on the coil casing.

RPET3-06/*ET1-B, RPET3-06**/*ET1N9-B**

Valve with one solenoid „a“

Spool symbols
Y51, R30, R11





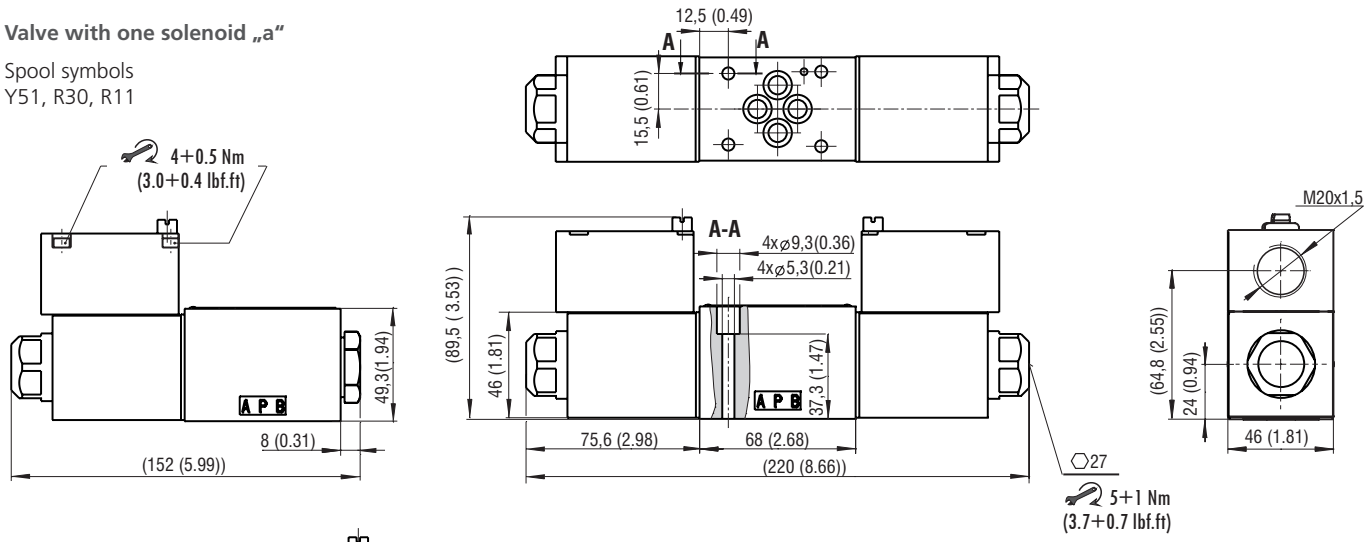
Valve with one solenoid „b“

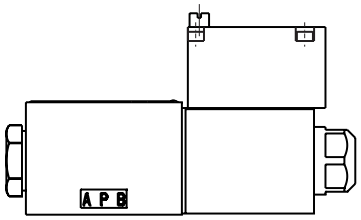
Spool symbols
X30, Z11, B71, N11, V41

RPET3-06/*ET1N1-B**

Valve with one solenoid „a“

Spool symbols
Y51, R30, R11





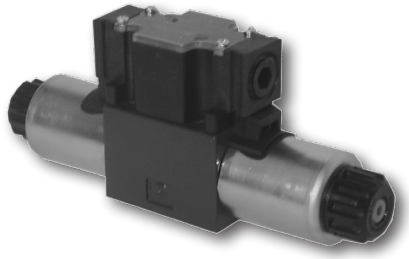
Valve with one solenoid „b“

Spool symbols
X30, Z11, B71, N11, V41

Mounting screws 8.9+1 Nm (6.56+0.7 lbf.ft)
M5x45 DIN 912-10.9

RPEW4-06

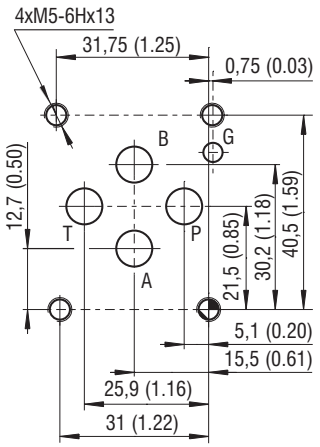
Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- Direct acting directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drop
- Five chamber housing design with reduced hydraulic power dependence on fluid viscosity
- Wire box for solenoid electrical connection with cable gland [1/2" NPT]
- Optional 3-pin or 5-pin connector acc. to ANSI/B93.55M
- Type for AC power supply with a rectifier bridge built in the wire box
- Wide range of interchangeable spools and manual overrides available
- CSA Certificate upon request
- Soft-shift spool speed control option
- Optional shift position indicators (raised arrows) installed on the terminal plate
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227

ISO 4401-03-02-0-05



Ports P, A, B, T - max ∅7.5 mm (0.29 in)

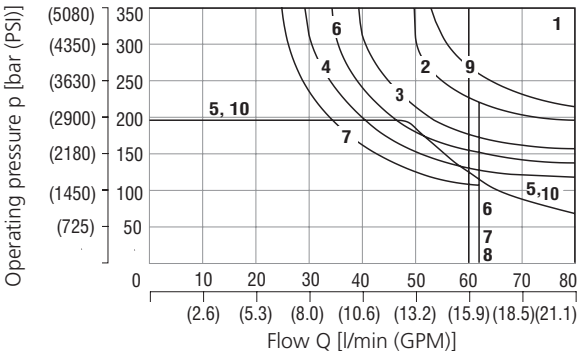
Technical Data

Valve size			06 (D03)	
Max. flow		l/min (GPM)	80 (21.1)	
Max. operating pressure at ports P, A, B		bar (PSI)	350 (5080) 320 (4640) for CSA	
Max. operating pressure at port T		bar (PSI)	210 (3050)	
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 … +50 (-22 … +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	15 000	
Enclosure type acc.to EN 60529			IP 65	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 30 … 40	DC: 30 … 50
	OFF	ms	AC: 30 … 70	DC: 10 … 50
Weight - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	1.3 (2.8) 1.9 (4.2)	
		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types		C_8007	C22B*	
Mounting interface		SMT_0019	Size 06	
Spare parts		SP_8010		

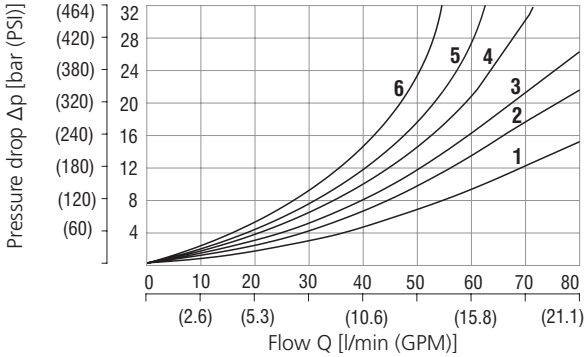
Characteristics measured at ν = 32 mm²/s (156 SUS)

Operating limits

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



Pressure drop related to flow rate



1	Z11	1	Z21	6	C51
6	C11	9	J75	1	Z51
3	H11	5	F11	7	H51
1	P11	3	R11	7	F51
2	Y11	4	R21	3	X11
5	L21	5	A51	7	N11
8	B11	1	P51	10	X25
1	J15	2	Y51		

	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11,L21,B11,R11 R21,X11,N11,J15	2	2	3	3		P51		1	3		
C11	5	5	5	6	3	Y51		2	2		
H11	2	2	2	3	3	C51	2			3	4
P11	1	1	3	3		C51	2			3	4
A51,J75	2	2				F11	1	2		3	3
Z21,Z51,H51,F51		2	3			Y11	2	2	2	2	

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Ordering Code

RPEW4 - 06 ☐ ☐ / ☐ ☐ ☐ ☐ ☐ ☐ ☐ - ☐

4/2 and 4/3 directional control valve, solenoid operated, wire box

Valve size

Number of valve positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool symbols"

Rated supply voltage of solenoid
(at the wire box terminal)

12 V DC / 2.72 A	**01200**
24 V DC / 1.29 A	**02400**
120 V AC / 0.26 A, 60 Hz*	**12060**

*DC coils with rectifier in wire box

Connector for wire box and wire box power

DC solenoid for DC power supply	**EW1K**
DC solenoid for AC power supply (rectifier in wirebox)	**EW1R**
DC solenoid with quenching diode for DC power supply	**EW2K**

Wire box version, supply connector

without connector, 1/2 NPT thread at both ends (either side can be used for wiring, remove cover-plug accordingly)	**50**
50 with LED (B side plugged, A side with feed-through plug)	**51**

Manual override

No designation	standard
N2	rubber boot protected

Soft-shift spool speed control

No designation	without soft-shift control
T1	orifice ∅ 0.7 mm (0.03 inch) in solenoid

Seals

No designation	NBR
V	FPM (Viton)

Surface treatment

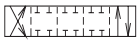
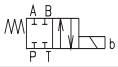
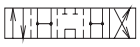
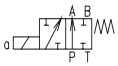
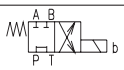
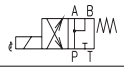
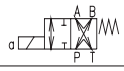
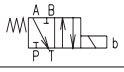
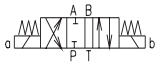
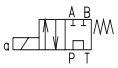
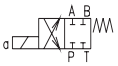
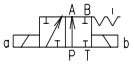
No designation	standard

CSA Certified

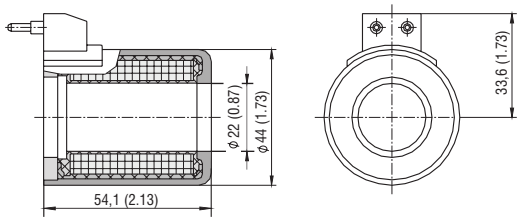
No designation	standard
U	CSA marking

- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M5 x 45 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 8.9+1 Nm (6.56+0.7 lbf.ft).
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

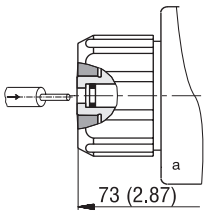
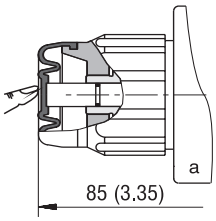
Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			R11			Z11		
C11			R21			X11		
H11			A51			C11		
P11			P51			H11		
Y11			X25			N11		
L21			Y51			F11		
B11			C51			J15		
Z21			Z51			J75		
F11			H51					
			F51					

Solenoid Coil for Wire Box in millimeters (inches)

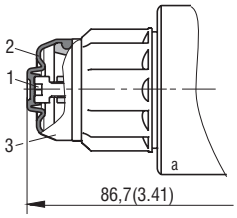


Manual Override in millimeters (inches)

No designation - standard	Designation N2 - rubber boot protected
	

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

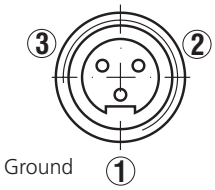
Spool Speed Control Orifice in millimeters (inches)

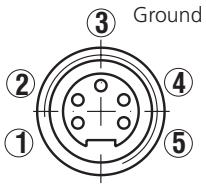
Designation T1	**Important:**
	This directional valve provides the means to control spool soft shifting by an orifice situated in the solenoid armature. To ensure the proper function of the valve, unobstructed venting of the solenoid is required through the bleeding plug (1). The plugs are accessible after removing the rubber boot (2) from the solenoid cap nut (3).
Switching time ON and OFF	300 … 800 ms

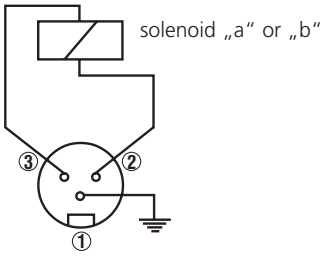
The switching times shown are valid for viscosity ν = 32 mm²/s (156 SUS) and nominal voltage.
They depend on working pressure and flow rate of the directional control valve.

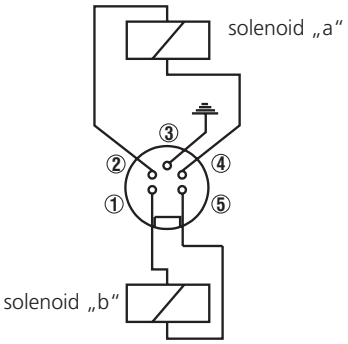
Example - connecting of connectors ANSI / B93.55M

Pinout - 3-pin connector	Pinout - 5-pin connector
1 - green 2 - black 3 - white	1 - white 2 - red 3 - green 4 - orange 5 - black

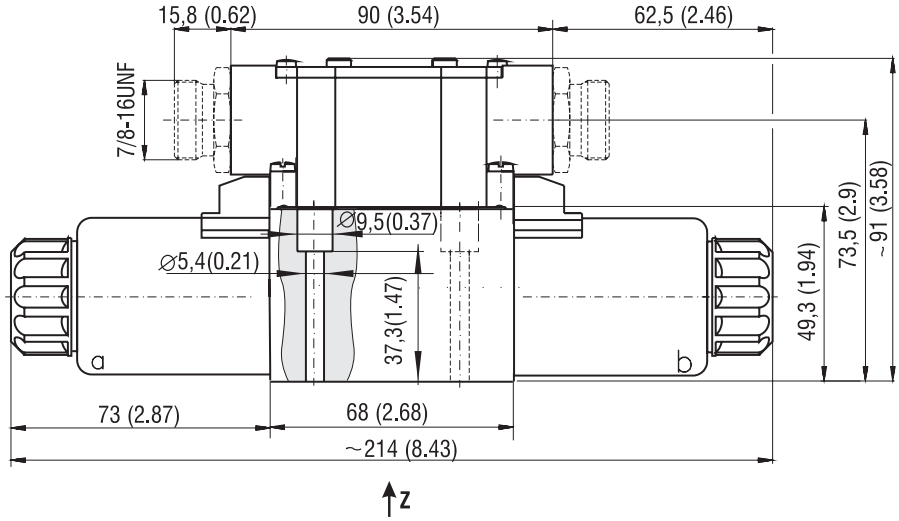




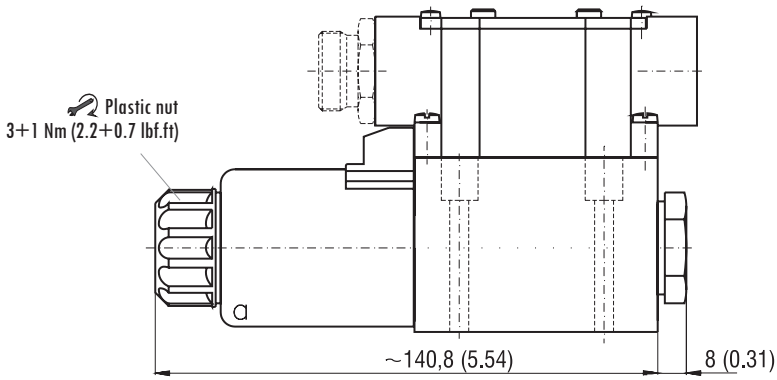


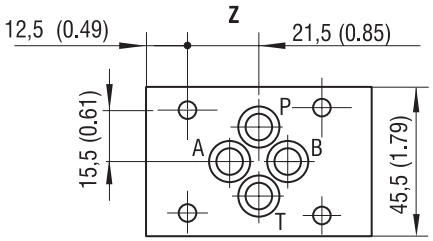


Valve with two solenoids
RPEW4-063*/*EW*

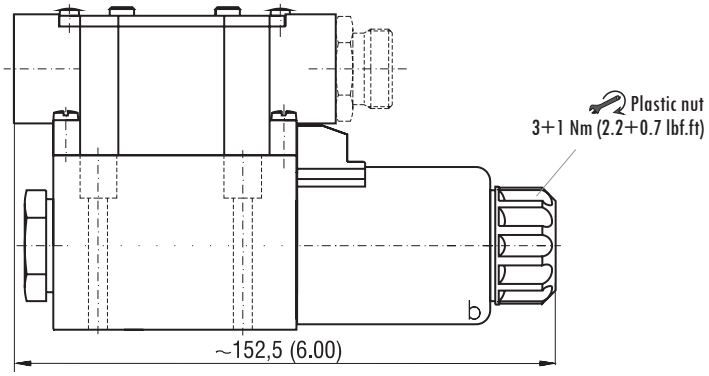


Valve with one solenoid „a"
RPEW4-062*/*EW*





Valve with one solenoid „b"
Spool symbols X11, Z11, C11, H11, N11, F11
RPEW4-062*/*EW*

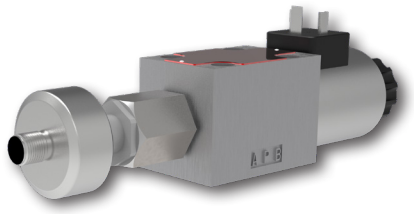


Mounting screws 8.9+1 Nm (6.56+0.7 lbf.ft)
M5 x 45 DIN 912-10.9

4/2 Solenoid operated directional control valve with axial sensor

RPE3-062x/xS3

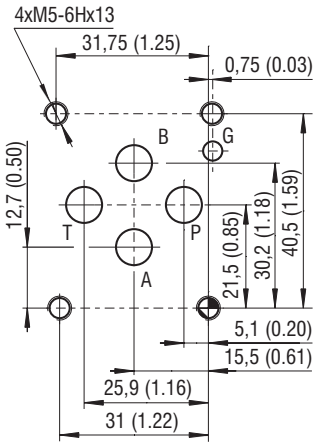
Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- Directly solenoid operated spool valve with subplate mounting interface acc. to standards ISO 4401, DIN 24340 (CETOP 03)
- Contactless inductive spool position sensor with double output signal for safe operation (e.g. of presses or forming machines)
- High transmitted hydraulic power and low pressure drop
- Wide range of control voltages and solenoid electrical terminals
- Various spool types (other possible)
- Additional damping of the spool moving to prevent pressure surges in the circuit
- In the standard version the valve body is phosphated. The steel parts are zinc coated (240 h corrosion protection in NSS acc. to ISO 9227).
- With optional increased surface corrosion protection of the whole valve 520 h in NSS, e.g. for mobile applications

ISO 4401-03-02-0-05



Ports P, A, B, T - max. ∅7,5 mm (0.29 in)

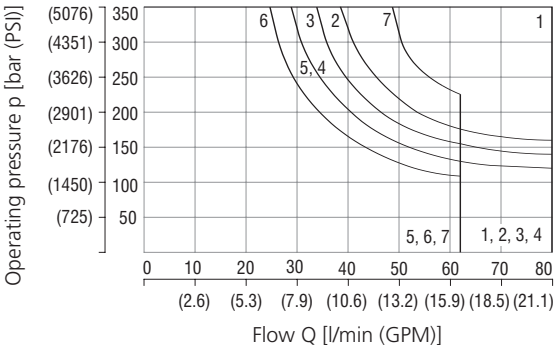
Technical Data

Valve size			06 (D03)	
Max. flow		l/min (GPM)	80 (21.1)	
Max. operating pressure at ports P, A and B		bar (PSI)	350 (5080)	
Max. operating pressure at port T		bar (PSI)	210 (3050)	
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 ... +50 (-22 ... +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	15 000	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 30 ... 40	DC: 30 ... 50
	OFF	ms	AC: 30 ... 70	DC: 10 ... 50
Weight		kg (lbs)	1.9 (4.2)	
		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types / connectors		C_8007 / K_8008	C22B* / K*	
Mounting interface		SMT_0019	Size 06	
Spare parts		SP_8010		

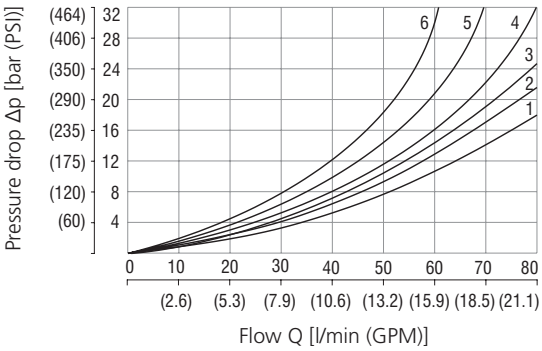
Characteristics measured at ν = 32 mm²/s (156 SUS)

Operating limits

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



Pressure drop related to flow rate



Spool symbol														
Z11	C11	H11	R11	R21	C51	Z51	R31	H51	X11	K11	X32	V51	R30	X30
1	5	4	2	3	5	1	4	4	2	6	3	3	7	7

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Spool symbol	P-A	P-B	A-T	B-T	P-T
Z11,R1,R21,X11,X32	1	1	2	2	
C11	5	5	5	6	2
H11	1	1	1	2	2
Z51,H51		1	2		
C51	1			2	4
R31	1			2	
K11		1	2		
R30	3	1	1	2	
X30	1	1	2	3	
V51	3	3			

Ordering Code

RPE3 - 06 2 ☐ / ☐ ☐ N1 ☐ ☐ S3 - ☐

4/2 Solenoid operated directional control valve

Valve size

Number of spool positions
two positions

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids
(at the coil terminals)

12 V DC / 2.72 A	**01200**
24 V DC / 1.29 A	**02400**
27 V DC / 1.07 A	**02700**
205 V DC / 0.15 A	**20500**
24 V AC / 1.56 A / 50 (60 Hz)	**02450**
120 V AC / 0.26 A / 60 Hz	**12060**
230 V AC / 0.15 A / 50 (60) Hz	**23050**

- For AC voltage supply use coils with connector type E5.
- For other solenoid voltage supply options see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M5 x 45 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 8.9+1 Nm (7+0.7 lbf.ft).
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

Surface treatment

No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

Spool monitoring
axial sensor with two outputs

Seals

No designation	NBR
V	FPM (Viton)

Soft-shift spool speed control

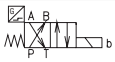
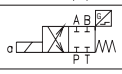
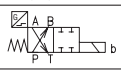
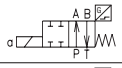
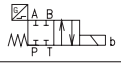
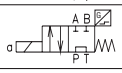
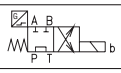
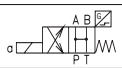
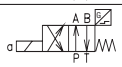
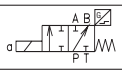
No designation	without soft-shift control

Manual override
cap nut covered

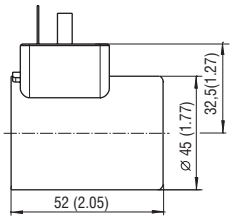
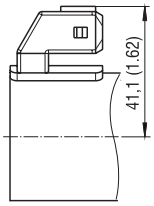
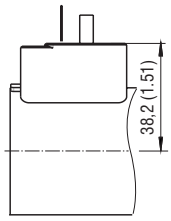
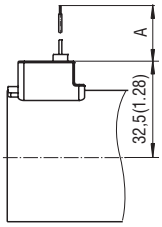
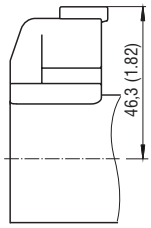
Connector

E1	EN 175301-803-A
E2	E1 with quenching diode
E3A	AMP Junior Timer - axial direction (2 pins; male)
E4A	E3A with quenching diode
E5	EN 175301-803-A with integrated rectifier
E8	Loose conductors (two insulated wires)
E9	E8 with quenching diode
E12A	Deutsch DT04-2P - axial direction (2 pins; male)
E13A	E12A with quenching diode

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition
R11			X11		
R30*			X30*		
Z51			K11		
R31			Z11		
C51			C11		
H51			H11		
R21			X32		
V51			* Three-chamber design		

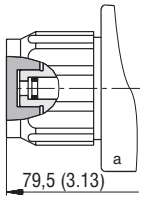
Solenoid Coil in millimeters (inches)

E1, E2 Protection degree IP65	E3A, E4A Protection degree IP67	E5 Protection degree IP65	E8, E9 Protection degree IP65	E12A, E13A Protection IP67 / 69K
			 Note: A = Standard 300 mm (11.8 in) other lengths on demand	

The indicated IP protection level is only achieved if the connector is properly mounted.

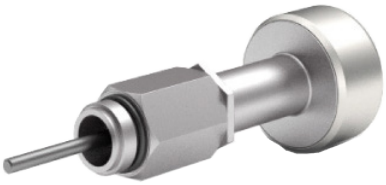
Manual Override in millimeters (inches)

Designation N1
- cap nut covered



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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

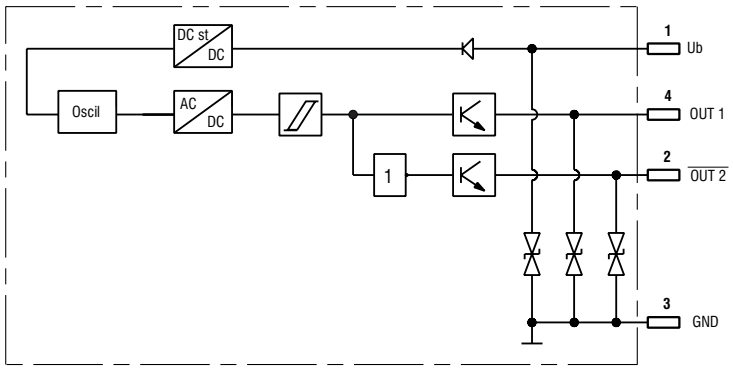
Spool Position Sensor



4-pin connector with the thread M12

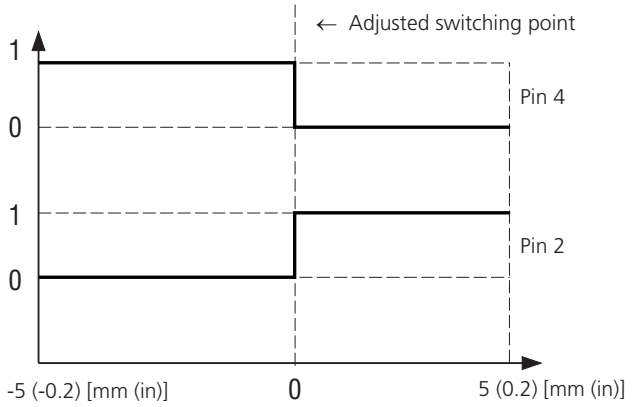
Technical Data		
Max. pressure resistance	bar (PSI)	315 (dynamic)
Operating temperature	°C (°F)	-20 … +85 (-4 ... +185)
Storage temperature	°C (°F)	-25 … +85 (-13 ... +185)
Supply voltage Ub	V	24 V DC ± 20 %
Current consumption (max.)	mA	20
Output voltage (min.)	V	Ub – 2.5 V
Output current	mA	2 x 250
Enclosure type (EN 60529)		IP65
Hysteresis of switching point (max.)	mm (in)	0.06 (0.002)
Reproducibility at 25 °C (77 °F)	mm (in)	± 0.02 (± 0.0008)
Temperature drift	mm / °C	0.002
Weight	kg (lbs)	0.250 (0.55)

Connection scheme of the spool position sensor



Description of sensor:
Contactless inductive sensor with two transistor switched outputs. The output $\overline{\text{OUT 2}}$ is inverted. The double output signal is protected against mutual interference and increases the reliability of the spool end position signalization, which is important for command system ensuring the safety of such machines as presses, forming machines etc. The switching point can be set within ± 2 mm by rotating the sensor housing with a coil after loosening the locknut (hexagon 24) and its positioning to the valve body.

Switching diagram of contacts:

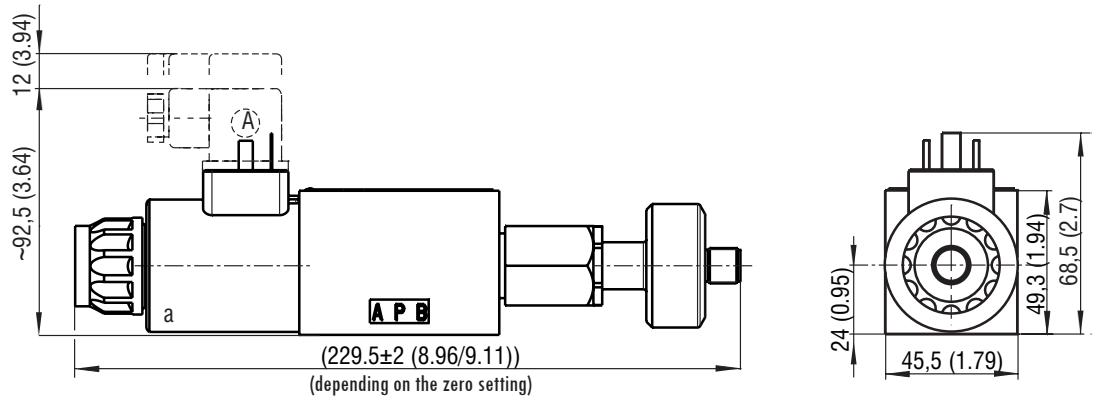


0 —— max. voltage 1.8 V DC
1 —— min. voltage Ub – 2.5 V DC

Dimensions in millimeters (inches)

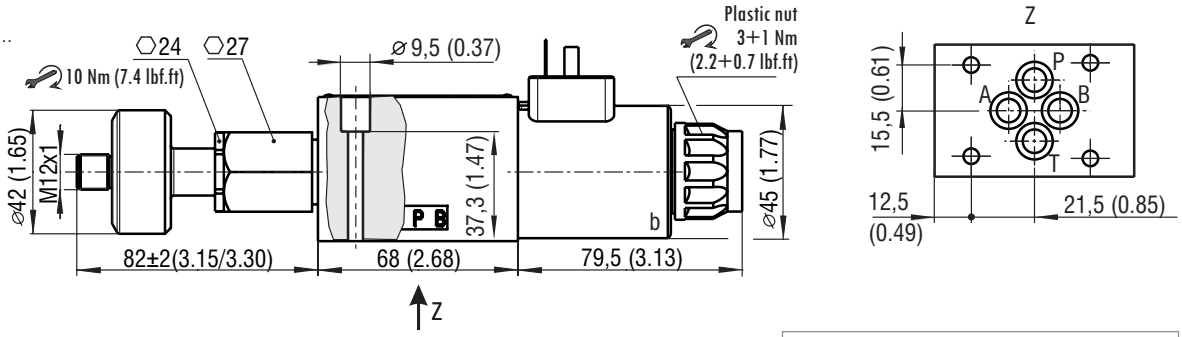
Valve with one solenoid „a“

Spool symbols
R11, Z51, R31...



Valve with one solenoid „b“

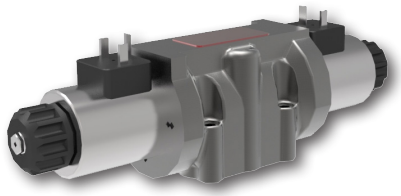
Spool symbols
X11, K11, Z11...



Mounting screws 8.9+1 Nm (7+0.7 lbf.ft)
M5 x 45 DIN 912-10.9

RPEL1-10

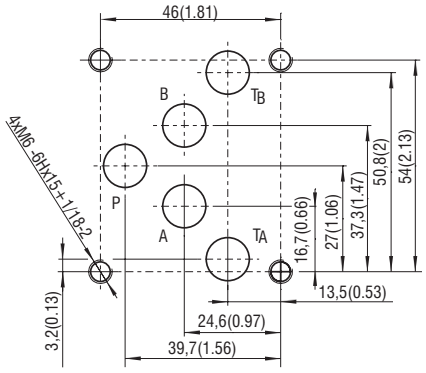
Size 10 (D05) • Q_{max} 100 l/min (26 GPM) • p_{max} 250 bar (3600 PSI)



Technical Features

- Direct acting directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 05)
- Cost-effective Lightline design with reduced solenoid dimensions, suitable for applications with lower required power
- Three or five chamber design for high transmitted hydraulic power
- Wide range of solenoid electrical terminas and supply voltage types for electromagnets
- The coil, fastened to the core tube with a retaining nut, can be rotated by 360° to suit the available space
- Wide range of interchangeable spools
- In the standard version the valve body is phosphated. The steel parts are zinc coated (240 h corrosion protection in NSS acc. to ISO 9227
- With optional increased surface corrosion protection of the whole valve 520 h in NSS, e.g. for mobile applications

ISO 4401-05-04-0-05



Ports P, A, B, T - max ∅11.2 mm (0.44 in)

Technical Data

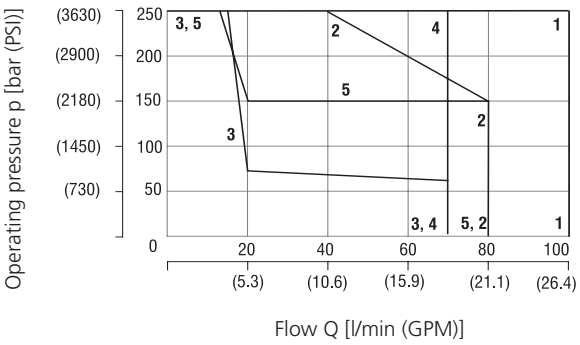
Valve size			10 (D05)
Max. flow		l/min (GPM)	100 (26.4)
Max. operating pressure at ports P, A, B		bar (PSI)	250 (3630)
Max. operating pressure at port T		bar (PSI)	210 (3045)
Fluid temperature range (NBR)		°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)		°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature range		°C (°F)	-30 ... +50 (-22 ... +122)
Supply voltage tolerance		%	DC: ±10
Max. switching frequency		1/h	10 000
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	30 ... 50
	OFF	ms	30 ... 50
Weight - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	2.9 (6.4) 3.4 (7.5)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Coil types / connectors	C_8007 / K_8008	C22B*/K*
Mounting interface	SMT_0019	Size 10
Subplates	Subplates_0002	DP1-10
Spare parts	SP_8010	

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

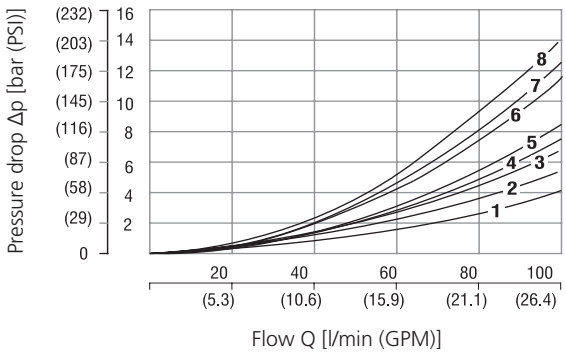
Operating limits (p-Q)

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



Spool symbol	
1	Z11, Z51
2	Y11 (3k)
1	H11
4	R11, X11 (3k)
3	C11
5	R21 (3k)

Pressure drop related to flow rate (Δp-Q)



	P-A	P-B	A-T	B-T	P-T
Z11	3	3	3	5	
Z51		3	3		
C11	6	6	7	8	6
H11	1	1	2	4	2
Y11	3	3	2	4	
R11, R21, X11	2	2	4	5	

Directional control valve Dn 10 has double T channel. If only one is directly connected to the tank, the pressure drop in the appliance channel on the closed side A/ B →T will be higher by 3 bars.

Ordering Code

RPEL1-10 ☐ ☐ / ☐ ☐ ☐ ☐ - ☐

4/2 and 4/3 directional control valve, solenoid operated, Lightline

Valve size

Number of valve positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids

12 V DC / 2,72 A	**01200**
14 V DC / 2,14 A	**01400**
24 V DC / 1,29 A	**02400**
27 V DC / 1,07 A	**02700**

Connector

E1	EN 175301-803-A
E2	E1 with quenching diode
E3A	AMP Junior Timer - axial direction (2 pins; male)
E4A	E3A with quenching diode
E8	loose conductors (two insulated wires)
E9	E8 with quenching diode
E12A	Deutsch DT04-2P - axial direction (2 pins; male)
E13A	E12A with quenching diode

Manual override

No designation	standard (operated by pin)
N1	cap nut covered

Seals

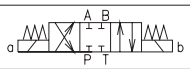
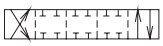
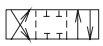
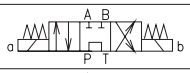
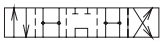
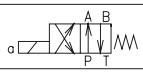
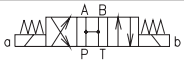
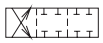
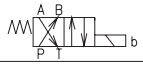
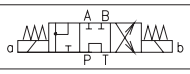
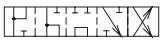
No designation	NBR
V	FPM (Viton)

Surface treatment

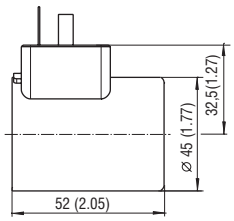
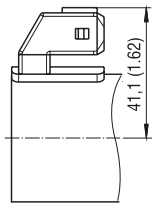
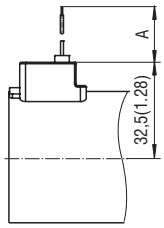
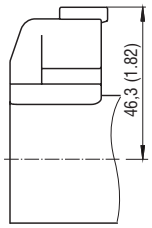
No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- For other solenoid voltage supply options see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.
- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M6 x 40 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 14^{+1} Nm ($10.3^{+0.7}$ lbf.ft).
- Besides the shown, commonly used valve versions other special models are available. Contact our technical support for their identification, feasibility and operating limits.

Spool Symbols

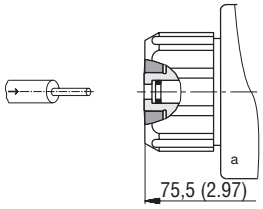
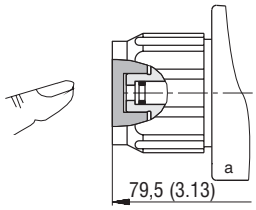
Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			R11		
C11			R21		
H11			Z51		
Y11			X11		
P11					
C12					

Solenoid Coil in millimeters (inches)

E1 - EN 175301-803-A E2 - E1 with quenching diode Protection degree IP65	E3A - AMP Junior Timer - axial direction E4A - E3A with quenching diode Protection degree IP67	E8 - Loose conductors (two insulated wires) E9 - E8 with quenching diode Protection degree IP65	E12A - Deutsch DT04-2P - axial direction E13A - E12A with queching diode Protection degree IP67 / IP69K
		 Note: A = Standard 300 mm (11.81 in), other lengths on demand	

The indicated IP protection level is only achieved if the connector is properly mounted.

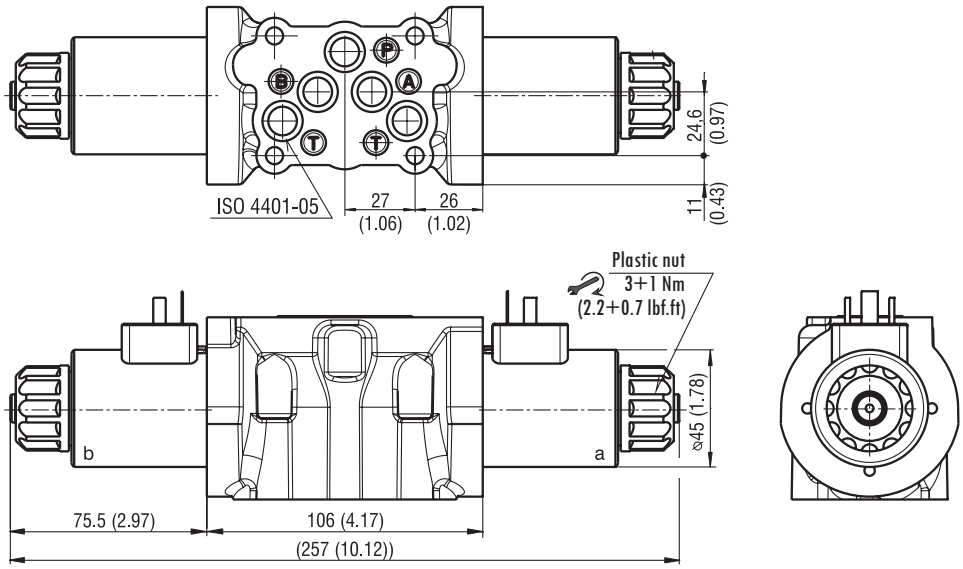
Manual Override in millimeters (inches)

No designation - standard (operated by pin)	Designation N1 - cap nut covered
	

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

RPEL1-103x/xE1*

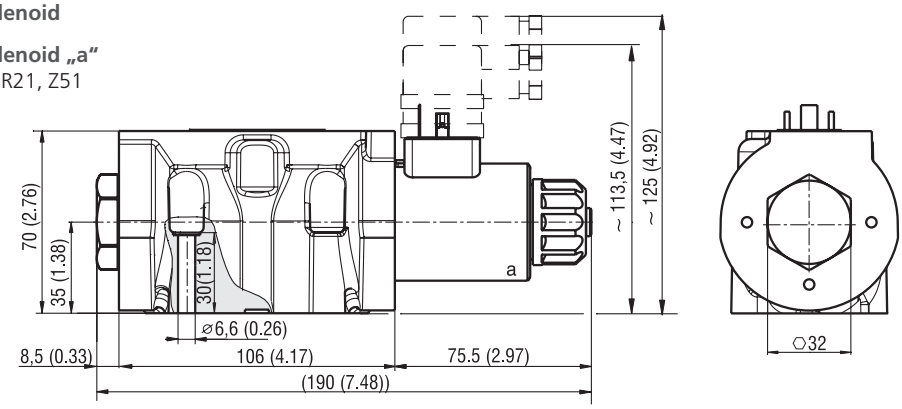
Valve with two solenoids

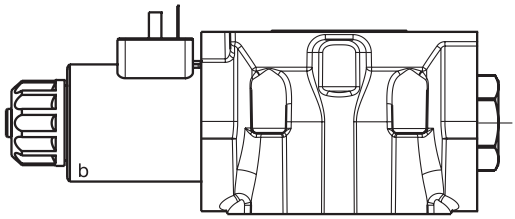


RPEL1-102x/xE1*

Valve with one solenoid

Valve with one solenoid „a"
Spool symbols R11, R21, Z51





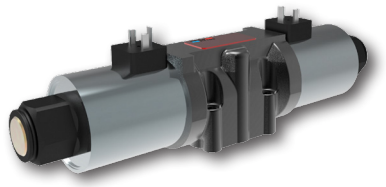
Valve with one solenoid „b"
Spool symbols X11

Mounting screws 14^{+1} Nm (10.3$^{+0.7}$ lbf.ft)
4x M6 x 40 DIN 912-10.9

4/2 and 4/3 Directional Control Valve, Solenoid Operated

RPE4-10

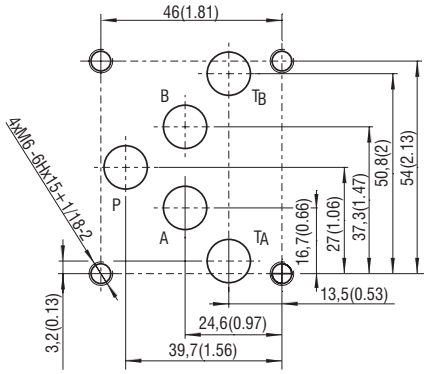
Size 10 (D05) • Q_{max} 140 l/min (37 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- Direct acting directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 05)
- High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drop
- Five chamber housing design with reduced hydraulic power dependence on fluid viscosity
- The valve is available with interchangeable DC solenoids, also for AC power supply using a built-in rectifier bridge
- Wide range of solenoid electrical terminal versions available
- Wide range of interchangeable spools and manual overrides available
- CSA Certificate upon request
- Inductive contactless Normally Open and Normally Closed spool position sensor option
- Soft-shift spool speed control option
- The coil is fastened to the core tube with a retaining nut and can be rotated by 90° to suit the available space.
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

ISO 4401-05-04-0-05



Ports P, A, B, T - max ∅11.2 mm (0.44 in)

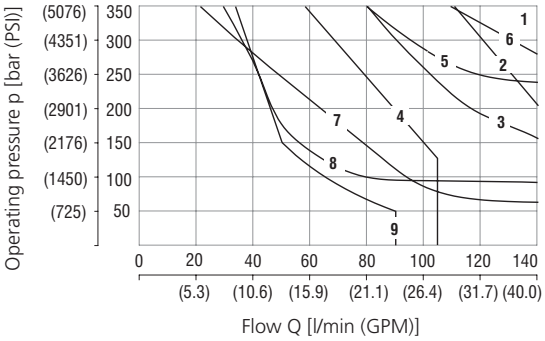
Technical Data

Valve size			10 (D05)	
Max. flow		l/min (GPM)	140 (37)	
Max. operating pressure at ports P, A, B		bar (PSI)	standard 350 (5080)	
Max. operating pressure at port T		bar (PSI)	210 (3050)	
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 ... +50 (-22 ... +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	15 000	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 30 ... 40	DC: 30 ... 40
	OFF		AC: 30 ... 70	DC: 10 ... 50
Enclosure type acc. to EN 60529			IP65 / IP67 (see Dimensions, page 3)	
Weight - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	3.9 (8.60) 5.4 (11.90)	
		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types / connectors		C_8007 / K_8008	C31* / K*	
Mounting interface		SMT_0019	Size 10	
Spare parts		SP_8010		

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

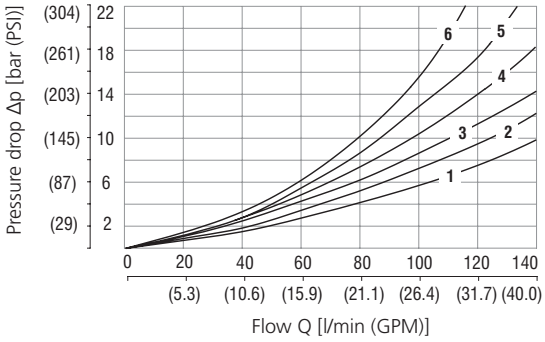
Operating limits

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



Spool symbol			
Z11, Z51, H11, H51, P11, P51	1	J15, J75	6
R11, X11, R21	2	L21	7
C11,C51	3	A51	8
B11,B51	4	C21	9
Y11,Y51	5		

Pressure drop related to flow rate



Spool symbol	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11, P11, Y11, R11, X11, B11	1	1	2	2		C11	4	3	4	5	1
Z51, Y51, B51		1	2			C51	4			5	1
H11	1	1	2	2	1	L21	1	1	1	2	2
H51		1	2		1	R21	1	1	1	3	
P51		1	2			J15	1	1	2	3	
J75, A51	1	1				C21	6	6	6	6	4

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Ordering Code

RPE4 - 10 ☐☐/☐☐☐☐☐☐-☐☐

4/2 and 4/3 directional control valve, solenoid operated

Valve size

Number of spool positions

two positions	**2**
three positions	**3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids
(at the coil terminals)

12 V DC / 3.17 A	**01200**
24 V DC / 1.73 A	**02400**
27 V DC / 1.52 A	**02700**
205 V DC / 0.20 A	**20500**
120 V AC / 0.38 A / 60 Hz	**12060**
230 V AC / 0.20 A / 50 (60) Hz	**23050**

CSA upon request.

Connector

EN 175301-803-A	**E1**
E1 with quenching diode	**E2**
AMP Junior Timer - radial direction (2 pins; male)	**E3**
E3 with quenching diode	**E4**
EN 175301-803-A with integrated rectifier	**E5**
Loose conductors (two insulated wires)	**E8**
E8 with quenching diode	**E9**
Deutsch DT04-2P - axial direction (2 pins; male)	**E12A**
E12A with quenching diode	**E13A**

- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- For AC voltage supply use coils with connector type E5.
- For other solenoid voltage supply options see data sheet C_8007.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.

Manual override

No designation	standard
N1	cap nut covered
N2	rubber boot protected
N4	hand screw
N5	socket head screw
N9	without manual override

Soft-shift spool speed control

No designation	without soft-shift control
T0	with plugged cavity for optional soft shift installation
T2	orifice Ø0.6 mm (0.02 inch) in T line bridge
T3	adjustable needle valve in T line bridge

Seals

No designation	NBR
V	FPM (Viton)

Spool monitoring

No designation	without sensors
S1	normally-open sensor
S4	normally-closed sensor

Surface treatment

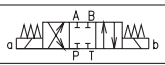
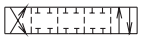
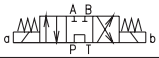
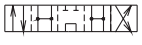
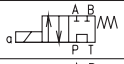
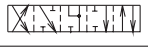
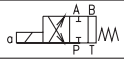
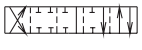
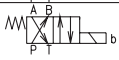
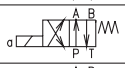
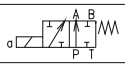
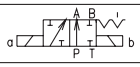
No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

CSA Certified

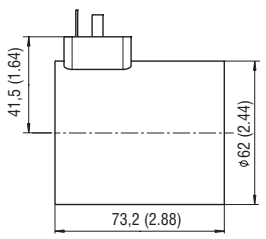
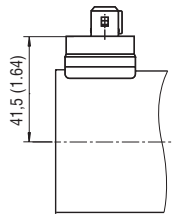
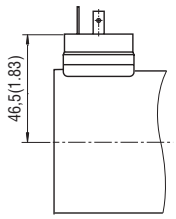
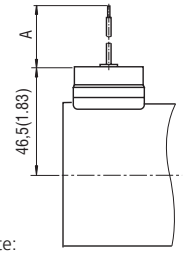
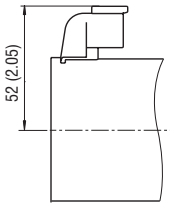
No designation	standard
U	CSA marking

- The orifice to the P port can be ordered separately, see data sheet SP_8010.
- Mounting bolts M6 x 45 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 14 Nm (10.3 lbf.ft).
- Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits. versions are available: consult our technical department for their identification, feasibility and operating limits.

Spool Symbols

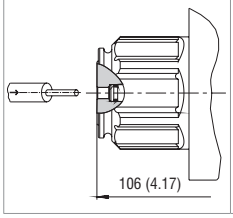
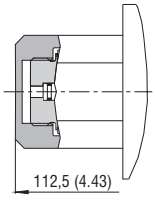
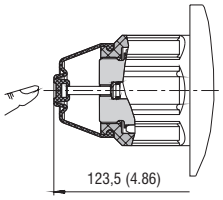
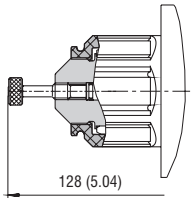
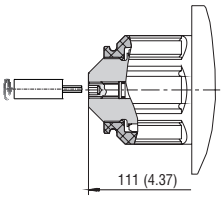
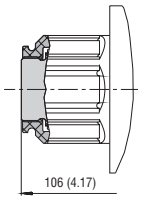
Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			P51		
C11			Y51		
H11			C51		
P11			Z51		
Y11			B51		
L21			H51		
B11			X11		
C21			C11		
R11			H11		
R21			J15		
A51			J75		

Type of Solenoid Coil in millimeters (inches)

E1, E2 Protection degree IP65	E3, E4 Protection degree IP65	E5 Protection degree IP65	E8, E9 Protection degree IP65	E12A, E13A Protection IP67 / 69K
			 Note: A = Standard 300 mm (11.81 in), other lengths on demand	

The indicated IP protection level is only achieved if the connector is properly mounted.

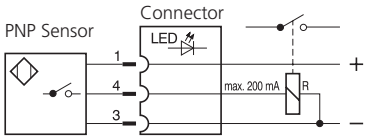
Manual Override in millimeters (inches)

No designation - standard	Designation N1 - cap nut covered	Designation N2 - rubber boot protected	Designation N4 - hand screw	Designation N5 - socket head screw size 3	Designation N9 - without manual override
					

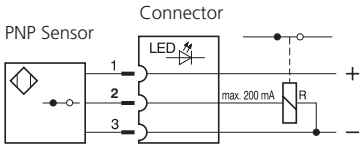
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Spool Position Sensor

S1 - Circuit diagram of the normally - **OPEN** sensor



S4 - Circuit diagram of the normally - **CLOSED** sensor



Function of the position sensor:
In the basic position (when the solenoid is switched off), a steel core, connected to the spool, is under the position sensor. The sensor is activated, it means contacts of the sensor S1 are closed and contacts of the sensor S4 are open. After switching on the solenoid the spool with core moves out of the sensor range and the sensor is deactivated.

Technical Data of the Sensor		S1, S4
Rated power supply voltage	V	24 DC
Power supply voltage range	V	10 ... 30 DC
Rated current	mA	200
Sensor enclosure protection (EN 60529)		IP67
Max. operating pressure	bar (PSI)	210 (3046)
Switching frequency	Hz	1000
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)
Technical Data of the Connector		
Power supply voltage range	V	10 ... 30 DC
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)
Indicator		yellow LED

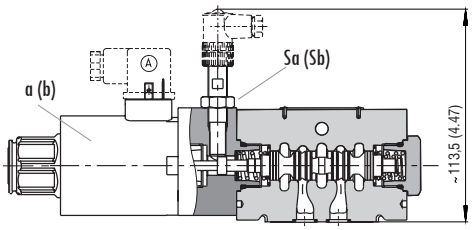
Typical configurations of the valve with a sensor:

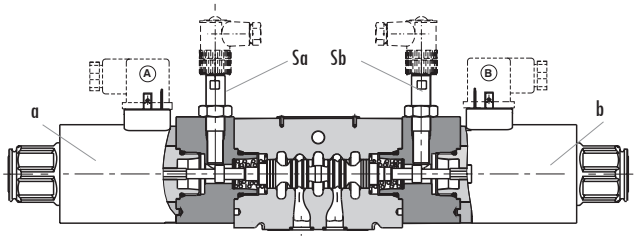
3-position valve with two solenoids, equipped with two sensors
2-position valve with one solenoid, equipped with one sensor on the solenoid side
2-position valve with a detent assembly of spool, equipped with one sensor on the side of the solenoid which moves the spool from the basic position to the switched position according to the spool symbol
Note: the sensor always indicates the change of spool position realised by the energised solenoid, mounted on the side of the sensor.

① Signal of solenoid
③ Signal of sensor

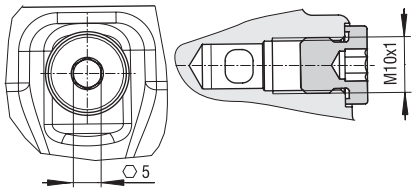
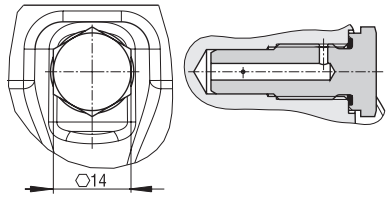
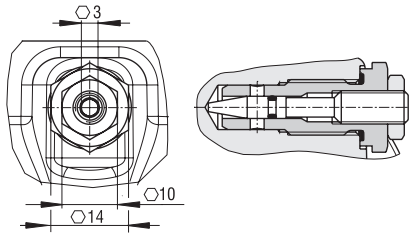
Two-Position Directional Control Valve				
①a(b)	③Sa(Sb)		LED	
	S1	S4	S1	S4
0	1	0	ON	OFF
1	0	1	OFF	ON

Three-Position Directional Control Valve									
①a(b)		③Sa(Sb)				LED			
		S1		S4		S1		S4	
a	b	Sa	Sb	Sa	Sb	Sa - LED	Sb - LED	Sa - LED	Sb - LED
0	0	1	1	0	0	ON	ON	OFF	OFF
1	0	0	1	1	0	OFF	ON	ON	OFF
0	1	1	0	0	1	ON	OFF	OFF	ON





Spool Speed Control in millimeters (inches)

Designation T0 - Plug VSTI M10x1	Designation T2 - Orifice ∅ 0.6 (0.02)	Designation T3 - Needle valve
		

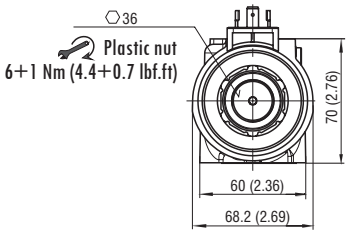
Plugged cavity for optional soft-shift control devices installation (T2, T3)	Switching time ON and OFF	The orifice extends the valve shifting time.	The needle valve allows continuous adjustment of the shifting time.
		120 ... 350 ms	30 ... 2000 ms

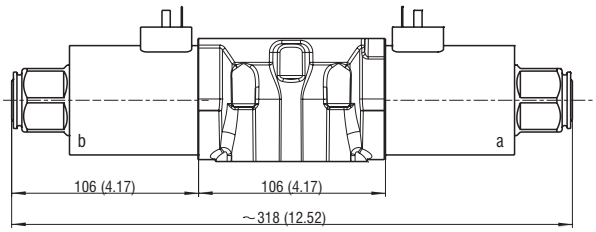
The switching times shown are valid for viscosity ν = 32 mm²/s (156 SUS) and nominal voltage.
They depend on working pressure and flow rate of the directional control valve.

Dimensions in millimeters (inches)

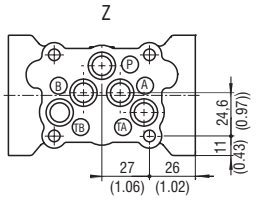
Valve with two solenoids

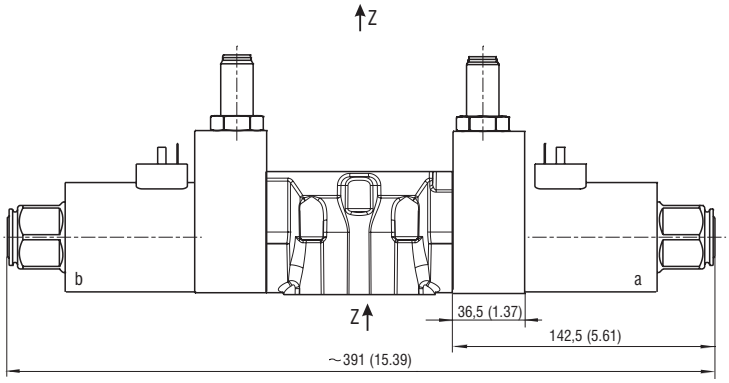
RPE4-103*/*E1





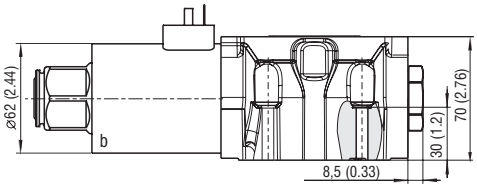
RPE4-103*/*E1*S





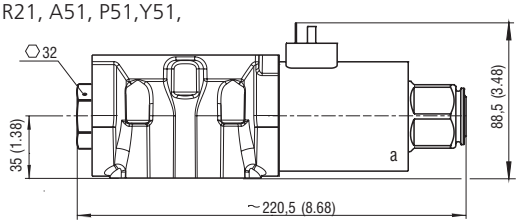
Valve with one solenoid „b"

Spool symbols X11, C11, H11

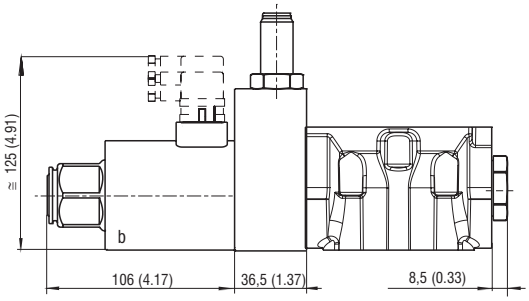


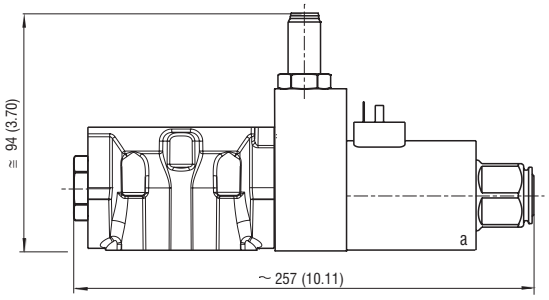
Valve with one solenoid „a"

Spool symbols R11, R21, A51, P51,Y51, C51, B51, Z51, H51



RPE4-102*/*E1*S

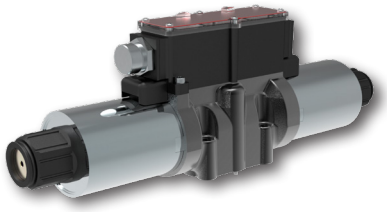




Mounting screws 14 Nm (10.3 lbf.ft)
M6 x 45 DIN 912-10.9

RPEW4-10

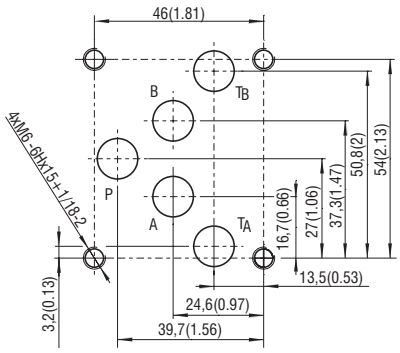
Size 10 (D05) • Q_{max} 140 l/min (37 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- Direct acting directional control valve with subplate mounting surface acc. to ISO 4401, DIN 24340 (CETOP 05)
- High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drop
- Five chamber housing design with reduced hydraulic power dependence on fluid viscosity
- Wire box for solenoid electrical connection with cable gland [1/2" NPT]
- Optional 3-pin or 5-pin connector acc. to ANSI/B93.55M
- Type for AC power supply with a rectifier bridge built in the wire box
- Wide range of interchangeable spools and manual overrides available
- CSA Certificate upon request
- Soft-shift spool speed control option
- Optional shift position indicators (raised arrows) installed on the terminal plate
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227

ISO 4401-05-04-0-05



Ports P, A, B, T - max ∅11.2 mm (0.44 in)

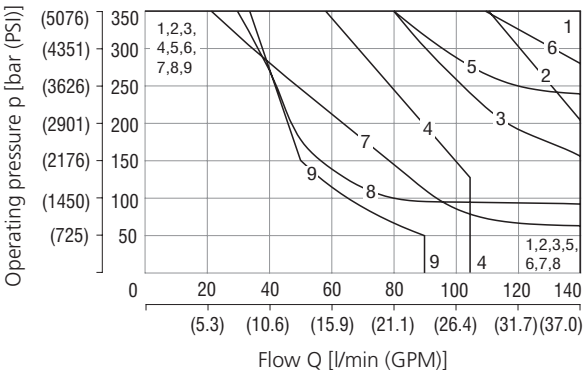
Technical Data

Valve size			10 (D05)
Max. flow		l/min (GPM)	140 (37)
Max. operating pressure at ports P, A, B		bar (PSI)	350 (5080)
Max. operating pressure at port T		bar (PSI)	210 (3050)
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 … +50 (-22 … +122)
Supply voltage tolerance		%	AC: ±10 / DC: ±10
Max. switching frequency		1/h	15 000
Enclosure type acc.to EN 60529			IP65
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 50 ... 330 / DC: 50 ... 120
	OFF	ms	AC: 100 ... 300 / DC: 30 ... 90
Weight - valve with 1 solenoid - valve with 2 solenoids		kg (lbs)	3.9 (8.6) 5.4 (11.9)
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Coil types		C_8007	C31K*
Mounting interface		SMT_0019	Size 10
Spare parts		SP_8010	

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

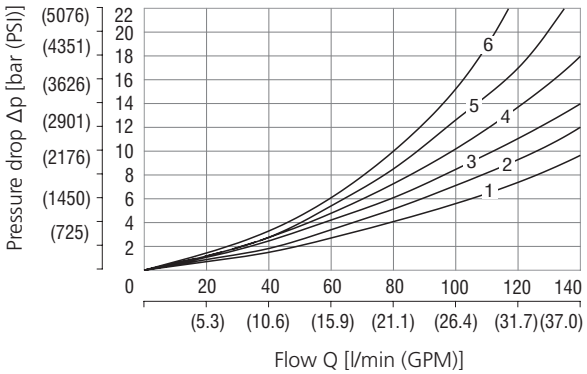
Operating limits

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



1	Z11	5	Y51	7	L21
1	Z51	3	C11	2	R21
1	H11	3	C51	6	J15
1	H51	2	R11	6	J75
1	P11	2	X11	8	A51
1	P51	4	B11	9	C21
5	Y11	4	B51		

Pressure drop related to flow rate



	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11,P11,Y11, R11,X11,B11	1	1	2	2		C11	4	3	4	5	1
Z51,P51,Y51, B51		1	2			C21	6	6	6	6	4
R21	1	1	1	3		C51	4			5	1
J15	1	2	2	3		L21	1	1	1	2	2
J75,A51	1	1				H11	1	1	2	2	1
H51		1	2		1						

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Ordering Code

RPEW4 - 10 ☐ ☐ / ☐ ☐ ☐ ☐ ☐ ☐ ☐ - ☐

4/2 and 4/3 directional control valve, solenoid operated, wire box

Valve size

Number of valve positions
two positions **2**
three positions **3**

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoid
(at the wire box terminal)
12 V DC / 3.17 A **01200**
24 V DC / 1.73 A **02400**
120 V AC / 0.38 A, 60 Hz* **12060**

*DC coils with rectifier in wire box

Connector for wire box and wire box power
DC solenoid for DC power supply **EW1K**
DC solenoid for AC power supply (rectifier in wirebox) **EW1R**

Wire box version
without connector, 1/2 NPT thread at both ends (either side can be used for wiring, remove cover-plug accordingly) **50**
50 with LED (B side plugged, A side with feed-through plug) **51**

Manual override
No designation standard
N2 rubber boot protected

Soft-shift spool speed control
No designation without soft-shift control
T0 with plugged cavity for optional soft shift installation
T2 orifice Ø 0.6 mm (0.02 inch) in T line bridge
T3 adjustable needle valve in T line bridge

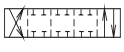
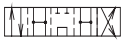
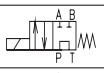
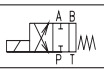
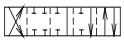
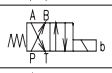
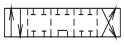
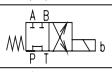
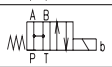
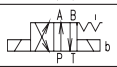
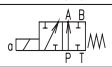
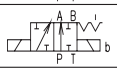
Seals
No designation NBR
V FPM (Viton)

Surface treatment
No designation standard

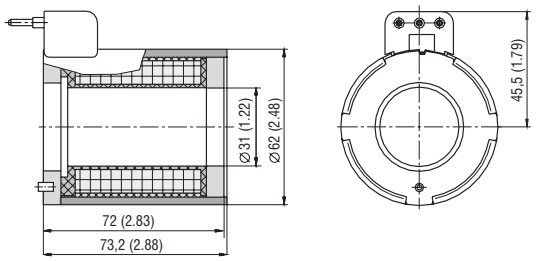
CSA Certifed
No designation standard
U CSA marking

- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- The port restrictor plugs can be ordered separately from the spare parts data sheet SP_8010.
- Mounting bolts M6 x 45 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 14 Nm (10.3 lbf.ft).
- Besides the shown, commonly used valve versions other special models are available. Contact our technical support for their identification, feasibility and operating limits.

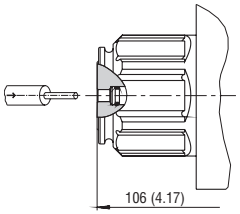
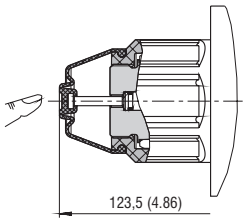
Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			P51		
C11			Y51		
H11			C51		
P11			B51		
Y11			Z51		
L21			H51		
B11			X11		
C21			C11		
R11			H11		
R21			J15		
A51			J75		

Solenoid Coil for Wire box in millimeters (inches)

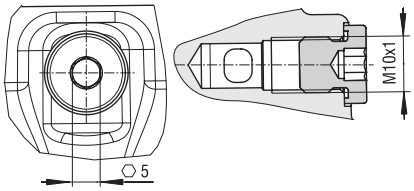
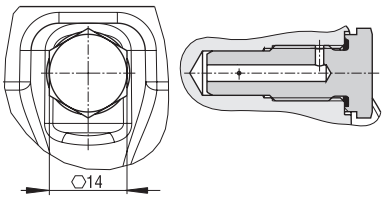
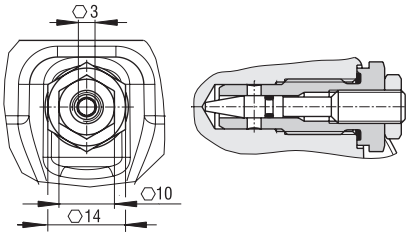


Manual Override in millimeters (inches)

No designation - standard	Designation N2 - rubber boot protected
	

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Spool Speed Control in millimeters (inches)

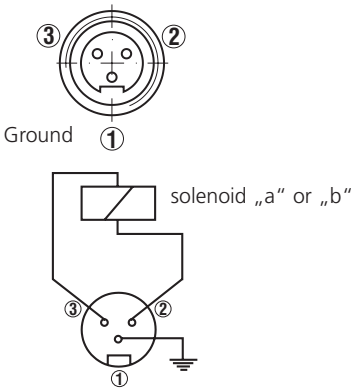
Designation T0 - Plug VSTI M10 x 1	Designation T2 - Orifice ∅ 0.6 (0.02)	Designation T3 - Needle valve
		

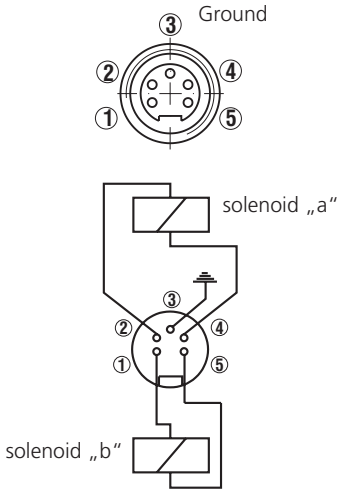
Plugged cavity for optional soft-shift control devices installation (T2, T3)	Switching time ON and OFF	The orifice extends the valve shifting time.	The needle valve allows continuous adjustment of the shifting time.
		120 ... 350 ms	30 ... 2000 ms

The switching times shown are valid for viscosity ν = 32 mm²/s (156 SUS) and nominal voltage.
They depend on working pressure and flow rate of the directional control valve.

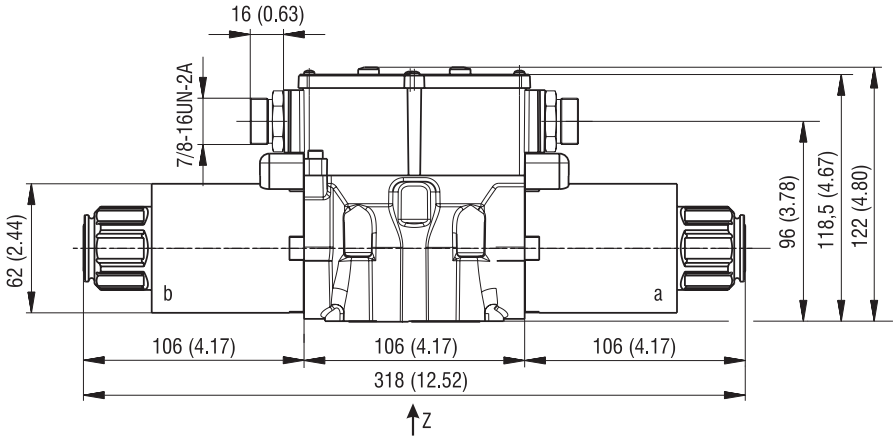
Example - connecting of connectors ANSI / B93.55M

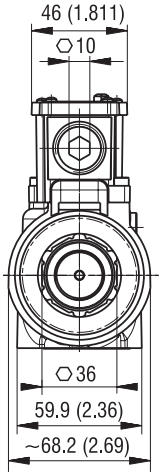
Pinout - 3-pin connector	Pinout - 5-pin connector
1 - green 2 - black 3 - white	1 - white 2 - red 3 - green 4 - orange 5 - black

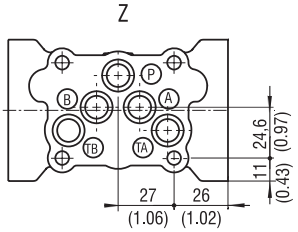




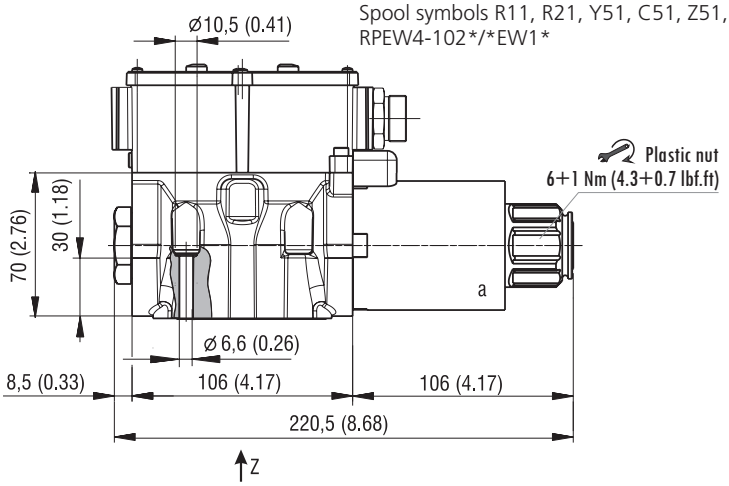
Valve with two solenoids
RPEW4-103*/*EW1*

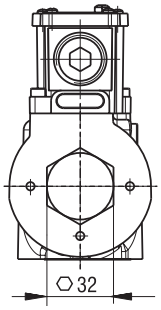




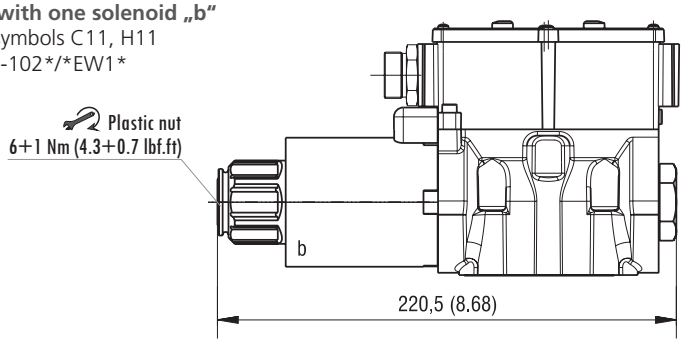


Valve with one solenoid „a"
Spool symbols R11, R21, Y51, C51, Z51, H51
RPEW4-102*/*EW1*





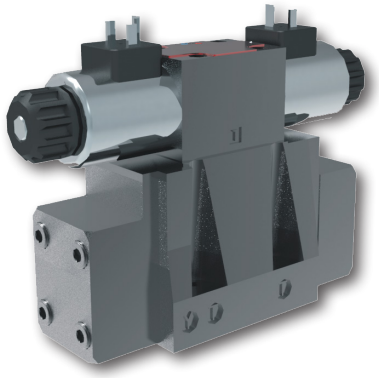
Valve with one solenoid „b"
Spool symbols C11, H11
RPEW4-102*/*EW1*



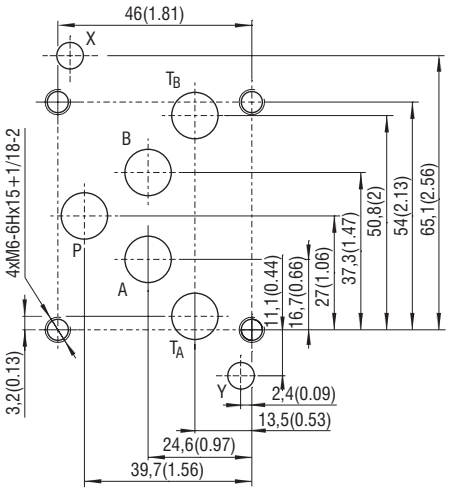
Mounting screws 14 Nm (10.3 lbf.ft)
M6 x 45 DIN 912-10.9

RNEH1-10

Size 10 (D05) • Q_{max} 150 l/min (40 GPM) • p_{max} 320 bar (4600 PSI) / 420 bar (6100 PSI)

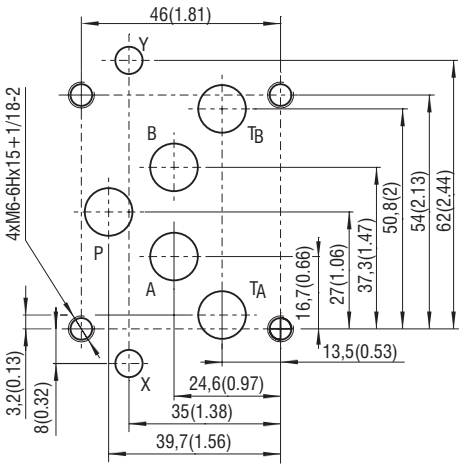


CETOP 4.2-4 P05-320 STANDARD PATTERN



Ports P, A, B, T - max.- ∅11.2 mm (0.44 in)
Ports X, Y - max. - ∅6.3 mm (0.25 in)

ISO 4401-05-05-0-05 CETOP 4.2-4 R05-320



Ports P, A, B, T - max.- ∅11.2 mm (0.44 in)
Ports X, Y - max. - ∅6.3 mm (0.25 in)

Technical Features

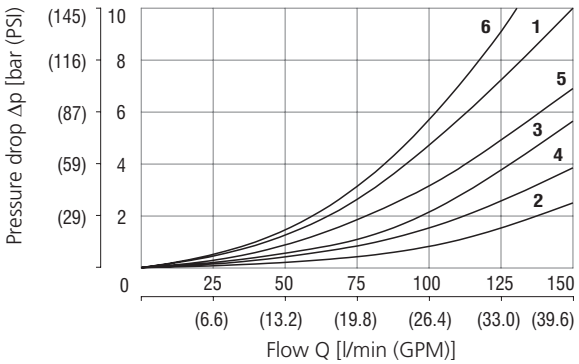
- Directional control valve internally or externally pilot operated with standard mounting interface CETOP 4.2-4 P05-320, optional interface acc. to ISO 4401-05-05-0-05
- Driven by an ISO 4401-03 (CETOP 03) solenoid operated directional valve (RNEH) or a hydraulic pilot operated directional valve (RNH)
- Hydraulic control ports X and Y
- High transmitted hydraulic power up to 320 bar with optimized design to minimize pressure drop
- Version for high pressures (420 bar) available
- High transmitted hydraulic power, optimized design to minimize the pressure drop
- Flexibly changed from internal pilot or drain to external by inserting or removing threaded plugs in the main control valve body
- Wide range of interchangeable spools and valve controls available
- Soft-shift, spool speed, main stroke limiter control options
- In the standard version, the valve housing is phosphated and steel parts are zinc-coated for 240 h protection acc. to ISO 9227
- Enhanced surface protection for mobile sector for up to 520h salt spray acc to ISO 9227

Technical Data

Valve type			RN*1-10	RN*1H-10
Valve size			10 (D05)	
Max. flow		l/min (GPM)	150 (37)	
Max. operating pressure at port P, A, B		bar (PSI)	320 (4640)	420 (6090)
- at port T (external drain)		bar (PSI)	210 (3050)	350 (5080)
- at port T (internal drain)		bar (PSI)	210 (3050)	
Minimum pilot pressure		bar (PSI)	12 (174)	
Maximum pilot pressure		bar (PSI)	210 (3050)*	350 (5080)*
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 ... +50 (-22 ... +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	10 000	
Enclosure type acc.to EN 60529			IP 65	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 45 ... 60	DC: 55 ... 75
	OFF	ms	AC: 60 ... 90	DC: 60 ... 90
Weight	RNH1-10	kg (lbs)	4.6 (10.1)	
	RNEH1-102	kg (lbs)	6.4 (14.1)	
	RNEH1-103	kg (lbs)	7 (15.4)	
		Data Sheet	Type	
General information		GI_0060	products and operating conditions	
Mounting interface		SMT_0019	Size 10	
Spare parts		SP_8010		
*For higher system pressure use option „Z“				

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

Pressure drop related to flow rate



Operating limits

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

Maximum flow rates in l/min (GPM)	at pressure	
	210 bar (3050 PSI)	320 bar (4640 PSI)
Spool type C11	120 (32)	100 (26)
All other spools	150 (40)	120 (32)

	Spool position	P-A	P-B	A-T	B-T	P-T		Spool position	P-A	P-B	A-T	B-T	P-T
Z11	Energized	1	1	2	3		J17, J27	Energized	1	1	4	3	
H11	De-energized					6*	R51, R52, X51, X52	De-energized	1			3	
	Energized	5	5	2	4			Energized		1	4		
Y11	De-energized			1**	1***		P11	De-energized					6***
	Energized	1	1	2	4			Energized	6	6	3	5	
C11	De-energized					6							
	Energized	6	6	3	5								

*A-B blocked **B blocked ***A blocked

Ordering Code

RN ☐☐ - ☐☐☐ / ☐☐☐ / ☐☐☐☐ - ☐

4/2 and 4/3 directional control valve, internally and externally pilot operated

Type of control
electrohydraulically operated **EH**
hydraulically operated **H**

Design series
standard 320 bar **1**
high pressure 420 bar **1H**
(not available for C11 spools)

Valve size and connecting pattern
Standard pattern **10**
Pattern ISO 4401-05-05-0-05 **10R**

Number of spool positions
two positions **2**
three positions **3**

Spool symbols
see the table spool symbols

Control Options
without additional features **No designation**
main spool stroke limiter **C**
main spool shifting speed control **D**
shifting speed control, with orifice (0.8 mm) in port P of solenoid pilot valve **PF**

Piloting
internal **No designation**
not available for spools 3H11, 3C11, 2R52, 2X52, 2J27
internal with installed pressure reducing valve, fixed 30 bar setting **Z**
external **E**

Drain
No designation external
I internal

see data sheet RPE3-06 (4010) for other pilot valve options

Rated supply voltage of solenoids
(at the coil terminal)
01200 12 V DC / 2,72 A
02400 24 V DC / 1,29 A
12060 120 V AC / 0,35 A / 50 (60) Hz
23050 230 V AC / 0,17 A / 50 (60) Hz

Solenoid electrical terminals
E1 EN 175301-803-A
E2 E1 with quenching diode
E5 EN 1745301-803-A with integrated rectifier

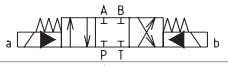
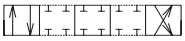
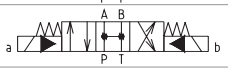
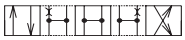
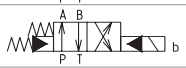
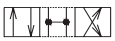
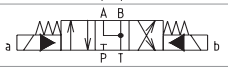
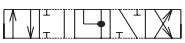
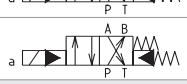
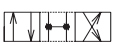
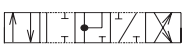
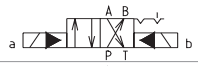
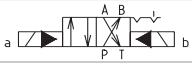
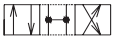
Manual override (only for RNEH)
No designation Standard
N1 protected with retaining nut
N2 protected with rubber boot

Seals
No designation NBR
V FPM (Viton)

Surface treatment
No designation phosphated body, steel parts for 240h salt spray test (ISO 9227)
B 520 h salt spray test (ISO 9227)

Installation note:
- Piloting must always be external for all types RNH and for types RNEH with spools H11, C11, R52, X52, J27.
- For directional valves with two solenoids, one solenoid must be without supply voltage charge before the other solenoid can be charged.
- The AC coils correspond to E5 Solenoid electrical terminal.
- Other voltage of solenoids see data sheet HA 8007
- The solenoid operated valves are delivered without connectors.
- Connectors are not supplied. For connector versions see data sheet HA 8008.
- Configurations with centering and recall springs can be mounted in any position; type J17, J27 valves - without springs and with mechanical retention must be mounted with the longitudinal axis horizontal.
- Other special versions are available. Consult our technical department.

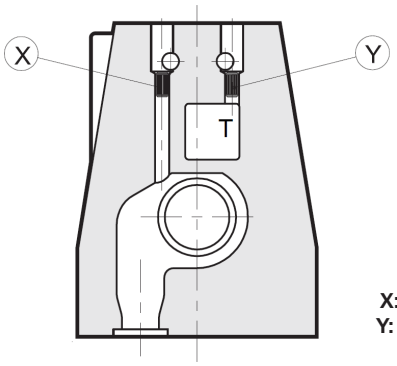
Spool Symbols

Three positions with centering spring			Two positions with return spring		
Z11			R51		
H11			R52		
Y11			X51		
C11			X52		
P11			Two positions with mechanical detent on pilot valve		
Symbols are referred to the solenoid valve RNEH. For the hydraulic control version RNH please see the connection schematic (see page 3)			J17		
			J27		

Pilot and Drain

The RNEH valves are available with pilot and drain, both internal and external. The version with external drain allows for a higher back pressure on the outlet.

Type of valve		Plug assembly	
		X	Y
RNEH1-10**/*	internal pilot and external drain	NO	YES
RNEH1-10**/*I	internal pilot and internal drain	NO	NO
RNEH1-10**/*E	external pilot and external drain	YES	YES
RNEH1-10**/*EI	external pilot and internal drain	YES	NO



X: plug M5x6 for external pilot
Y: plug M5x6 for external drain

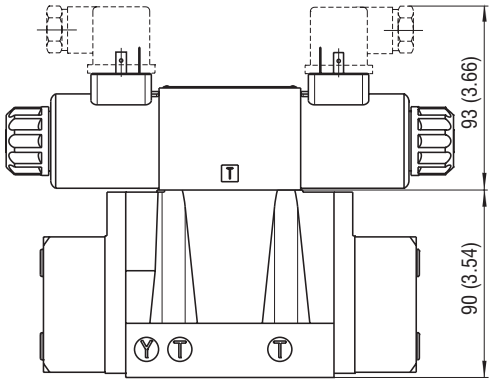
Electrical Features

Solenoids
The operating solenoids are DC solenoids. For AC supply, the solenoids are provided with a rectifier integrated in the DIN connector socket as part of the solenoid. The connectors can be turned by 90°. By loosening the nut, the solenoids can be turned or replaced without interfering with any of the valve seals. In case of a solenoid malfunction or power failure, the spool of the valve can be shifted by manual override, provided the pressure in port T does not exceed 25 bar.

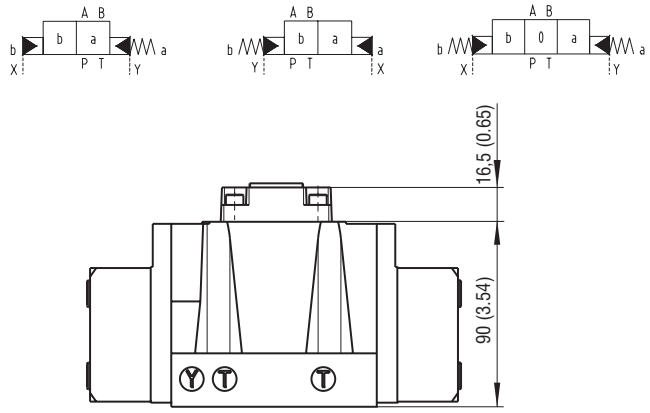
For detailed information on the pilot valve RPE3-06 refer to data sheet No. 4010.

Actuation in millimeters (inches)

Solenoid control: RNEH
The valve is supplied with an RPE3-06 pilot solenoid valve.



Hydraulic control: RNH
The valve is supplied with a cross-connection cover plate.
X and Y connections are used for the hydraulic control of the valve.



The minimum piloting pressure can be as low as 5 bar at low flow rates, but with higher flow rates a pressure of 12 bar is needed.

If the valve operates with higher pressures it is necessary to use the version with external pilot and reduced pilot pressure.
Otherwise, the valve with internal pilot and a pressure reducing valve with a 30 bar fixed setting can be ordered.

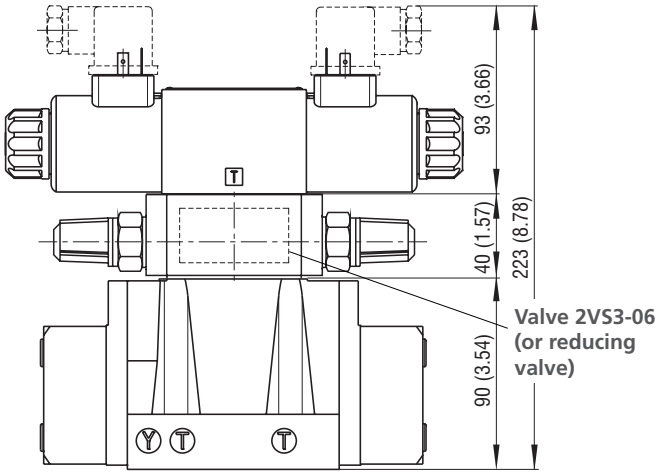
Control Options - Special Features

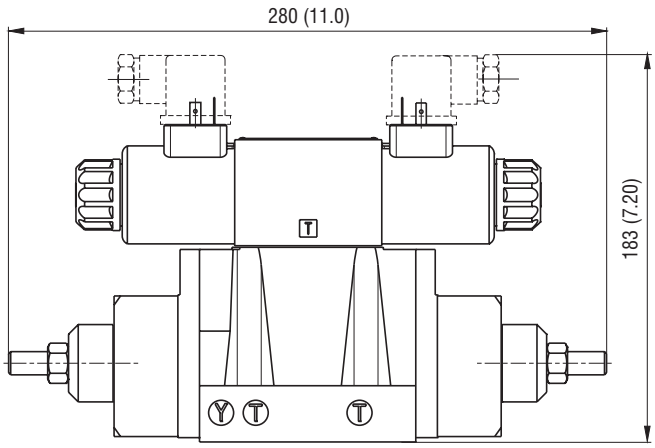
Control of the main spool shifting speed: D
By placing a 2VS3-06 flow control valve between the pilot solenoid valve and the hydropiloted valve, the pilot flow rate can be controlled and therefore the shifting speed adjusted. Add the letter **D** to the identification code to request this device.

Pilot pressure reducing valve - 30 bar fixed setting: Z
Internal piloting with mounted pressure reducing valve with 30 bar fixed setting. The option **Z** may be used together with option **D**.

Control of the main spool stroke: C
Using special side plugs, it is possible to introduce stroke control the piloted valve so as to vary the maximum spool opening clearance. This solution allows the control of the flow rate from the pump to the actuator and from the actuator to the outlet, resulting in double adjustable control of the actuator. Add the letter C to the identification code to request this device.

Shifting speed control: PF
with an orifice (0.8 mm) in port P of the solenoid pilot valve
Add **PF** to the identification code to request this device

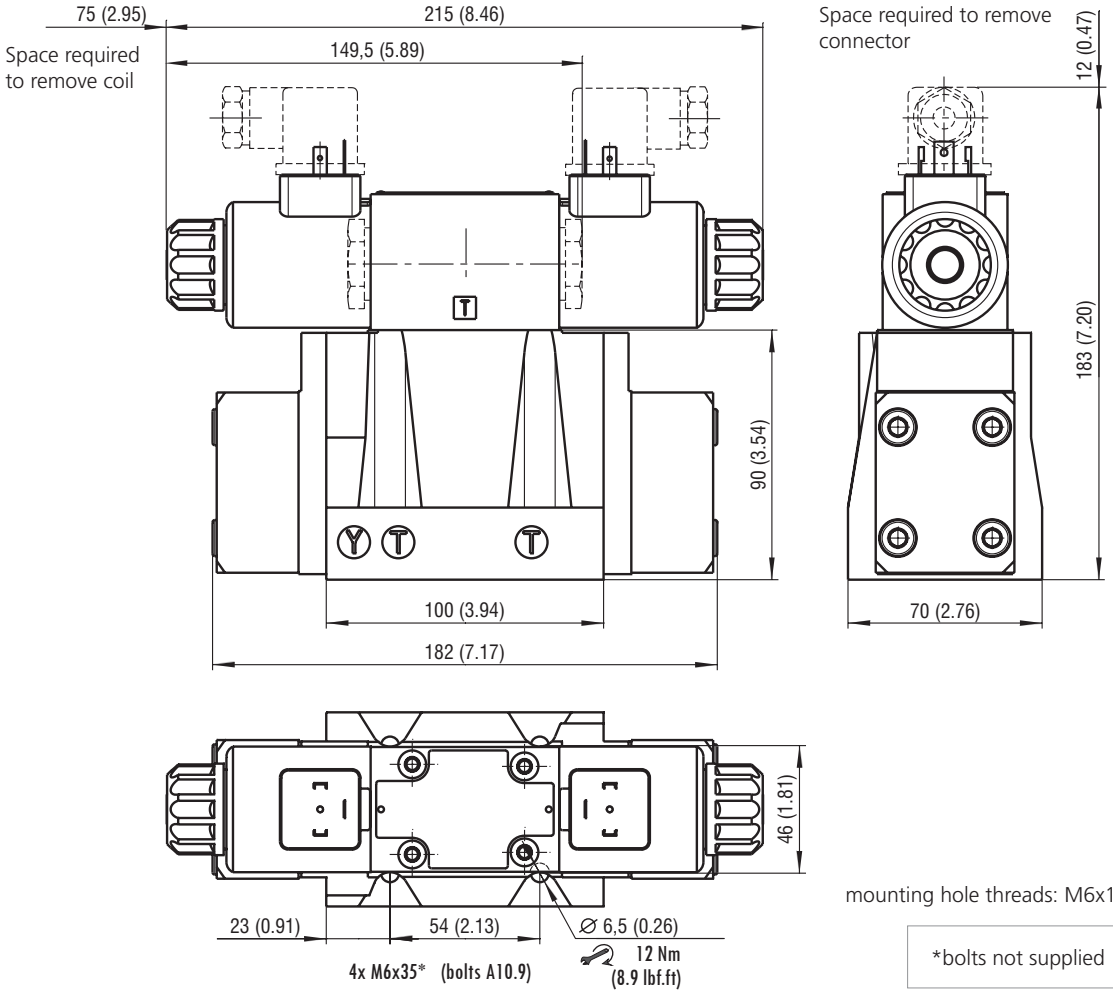




Solenoid operated distributor with pilot valve in the configuration 3H11
It is possible to deliver the solenoid operated distributor with the pilot valve in configuration 3H11 (all the ports at the outlet).
This configuration is used with external piloting in order to allow the unloading of the piloting line when the solenoid operated valve is in the rest position.
With this option, the piloting is necessarily external.

Dimensions in millimeters (inches)

RNEH1-102, RNEH1-103

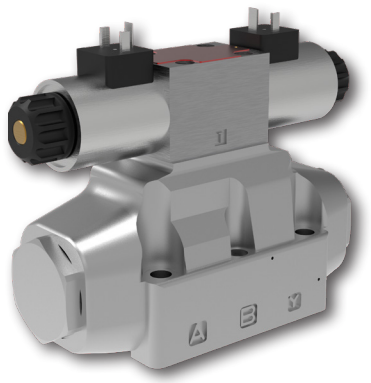


mounting hole threads: M6x10

*bolts not supplied

RNEH5-16

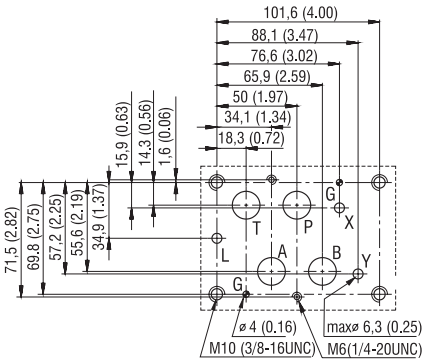
Size 16 (D07) • Q_{max} 300 l/min (80 GPM) • p_{max} 350 bar (5100 PSI) / 420 bar (6100 PSI)



Technical Features

- Directional control valve, internally or externally pilot operated with mounting interface acc. to ISO 4401, DIN 24340 (CETOP 07)
- Driven by an ISO 4401-03 (CETOP 03) solenoid operated directional valve (RNEH) or a hydraulic pilot operated directional valve (RNH) without pilot valve
- Electrohydraulic and hydraulic control ports X and Y
- Version for high pressures 420 bar (6090 PSI) available
- High transmitted hydraulic power, optimized design to minimize the pressure drop
- Flexibly changed from internal pilot or drain to external by inserting or removing threaded plugs in the main control valve body
- Wide range of interchangeable spools and valve controls available
- Soft-shift, spool speed, main stroke limiter control options
- In the standard version, the valve housing is phosphated and steel parts are zinc-coated for 240 h protection acc. to ISO 9227
- Enhanced surface protection for mobile sector for up to 520 h salt spray acc to ISO 9227 available

ISO 4401-07-07-0-05



Ports P, A, B, T max ∅ 17.5 mm (0.69 in)

Technical Data

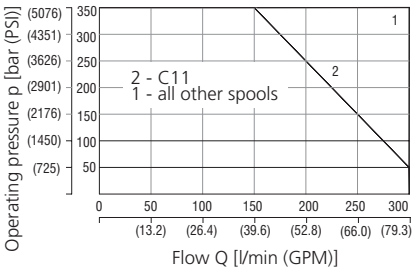
Valve type			RN*5-16	RN*5H-16
Valve size			16 (D07)	
Max. flow		l/min (GPM)	300 (80)	
Max. operating pressure at port P, A, B		bar (PSI)	350 (5080)	420 (6090)
- at port T (external drain)		bar (PSI)	210 (3050)	350 (5080)
- at port T (internal drain)		bar (PSI)	210 (3050)	
Minimum pilot pressure		bar (PSI)	12 (174)	
Maximum pilot pressure		bar (PSI)	210 (3050)*	350 (5080)*
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 ... +50 (-22 ... +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	10 000	
Enclosure type acc.to EN 60529			IP 65	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 60 ... 80**	DC: 50 ... 70**
	OFF	ms	AC: 60 ... 80**	DC: 60 ... 80**
Weight	RNH5-16	kg (lbs)	6.6 (14.6)	
	RNEH5-162	kg (lbs)	8.2 (18.1)	
	RNEH5-163	kg (lbs)	8.8 (19.4)	
		Data Sheet	Type	
General information		GI_0060	Products and operating conditions	
Mounting interface		SMT_0019	Size 16	
Spare parts		SP_8010		

* For higher system pressure use option „Z"
** The values indicated refer to a solenoid valve working with a pilot pressure of 100 bar (mineral oil, temperature = 50°C, viscosity = 36 mm²/s, P - A and B - T connected). The energizing and de-energizing times are obtained at the pressure variation which occurs on the lines.

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

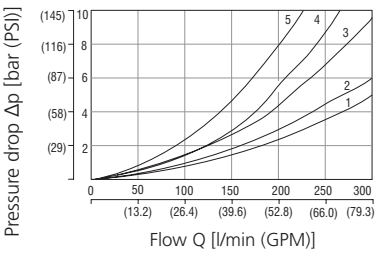
Operating limits

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



Pressures bar (PSI)		RNEH5	RNEH5H	RNH5	RNH5H
	Min.	Max.			
Pressure in P, A, B ports	-	350 (5100)	420 (6090)	350 (5100)	420 (6090)
Piloting pressure (X port and / or Y port)	12 (175)	210 (3050)	350 (5100)	210 (3050)	350 (5100)
Pressure in T line with internal drainage	-	210 (3050)	210 (3050)	-	-
Pressure in T line with external drainage	-	210 (3050)	350 (5100)	210 (3050)	350 (5100)

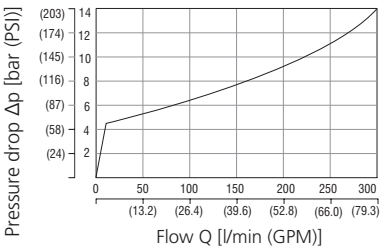
Pressure drop related to flow rate



	Spool position	P-A	P-B	A-T	B-T	P-T
		Curves on graph				
Z11	Energized	1	1	3	4	
H11	Energized	1	1	4	4	
	De-energized					2
Y11	Energized	1	1	4	4	
	De-energized			4	4	
C11	Energized	2	2	4	5	
	De-energized					4
R11, R21		1	1	3	4	
X11, X21		1	1	4	4	
J15, J19		1	1	3	4	

Pressure drop related to flow rate

Back pressure valve incorporated on line P (type C3)



The curve refers to the pressure drop (body part only) with back pressure valve energized to which the pressure drop of the reference spool must be added.

Ordering Code

RN □□-16 □□/□□□/□/□□□□-□

4/2 and 4/3 directional control valve, internally and externally pilot operated

Actuation
electrohydraulic **EH**
hydraulic **H**

Design series
standard 350 bar **5**
high pressure 420 bar **5H**
(not available for C11 spools)

Valve size
ISO 4401-07-07-0-05 (CETOP 07)

Number of valve positions
two positions **2**
three positions **3**

Spool symbols
see the table „Spool Symbols“

Control Options
without additional features **No designation**
main spool stroke limiter **C**
main spool shifting speed control **D**
shifting speed control, with orifice (0.8 mm) in port P of solenoid pilot valve **PF**

Piloting
internal **No designation**
internal with installed pressure reducing valve, fixed 30 bar setting **Z**
external **E**

Drain
No designation external, recommended when the valve is used with back pressure on the outlet
I internal

Check valve incorporated in P-line
No designation if not required
C3 with back pressure check valve

Rated supply voltage of solenoids (at the coil terminal)
01200 12 V DC / 2.72 A
02400 24 V DC / 1.29 A
12060 120 V AC / 0.35 A / 50 (60) Hz
23050 230 V AC / 0.17 A / 50 (60) Hz

see data sheet RPE3-06 (4010) for other pilot valve options

Solenoid electrical terminals
E1 EN 175301-803-A
E2 E1 with quenching diode
E5 EN 175301-803-A with integrated rectifier

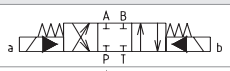
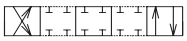
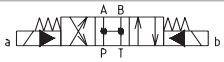
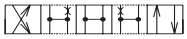
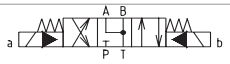
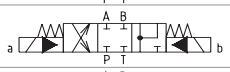
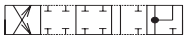
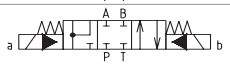
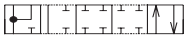
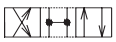
Manual override (only for RNEH)
No designation standard
N1 protected with retaining nut
N2 protected with rubber boot

Seals
No designation NBR
V FPM (Viton)

Surface treatment
No designation standard
B zinc-coated (ZnNi), ISO 9227 (520 h)

Installation Note:
- It is necessary to ensure minimum pilot pressure , therefore either external piloting or option C3 (check valve in P port) must be used for spools which have connection between P and T ports (C11, H11, X21, R21, J19).
- Attention: spools J15, J19 may assume an undefined position without energy supply.
- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be energized.
- The AC coils correspond to E5 solenoid electrical terminal.
- For other solenoid voltages see data sheet HA 8007.
- The solenoid operated valves are delivered without connectors. For connectors see data sheet HA 8008.
- Configurations with centering and recall springs can be mounted in any position; J15, J19 valves - without springs or mechanical retention - must be mounted with the longitudinal axis in the horizontal.
- Other special versions are available. Consult our technical department.

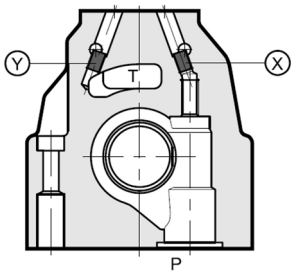
Spool Symbols

Three positions with centering spring			Two positions with return spring		
Z11			X11		
H11			X21		
Y11			R11		
C11			R21		
Z21			Two positions with mechanical detent on pilot valve		
Z22			J15		
Symbols are referred to the solenoid valve RNEH. For the hydraulic control version RNH please see the connection schematic (see page 3)			J19		

Pilot and Drain

The RNEH valves are available with pilot and drain, both internal and external. The version with external drain allows for a higher back pressure on the outlet.

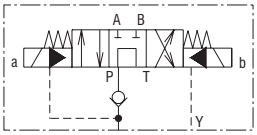
Type of valve		Plug assembly	
		X	Y
RNEH5-16**/***	internal pilot and external drain	NO	YES
RNEH5-16**/**I	internal pilot and internal drain	NO	NO
RNEH5-16**/*E*	external pilot and external drain	YES	YES
RNEH5-16**/*EI	external pilot and internal drain	YES	NO



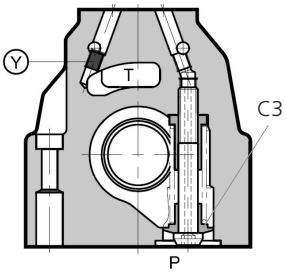
plug M6x8
X: for external pilot, **Y:** for external drain

Check Valve Incorporated in Line P

Check valve incorporated in line P: C3
Valves RNEH are available with an incorporated back pressure valve on line P (Type „C3"). This is necessary to obtain the piloting pressure when the control valve (in the rest position) has the line P connected to the port T (spools H11, C11, X21, R21, J19). The cracking pressure is 5 bar with a minimum flow rate of 15 l/min.



In the C3 version the piloting is always internal. The back pressure valve can't be used as a check valve because it doesn't guarantee sealing.



pilot always internal

Y: plug M6x8 for external drain

The back pressure valve can be also delivered separately and it can be easily mounted on line P of the main control valve. Specify the code to order the back pressure valve separately from the spare part data sheet No. 8010.

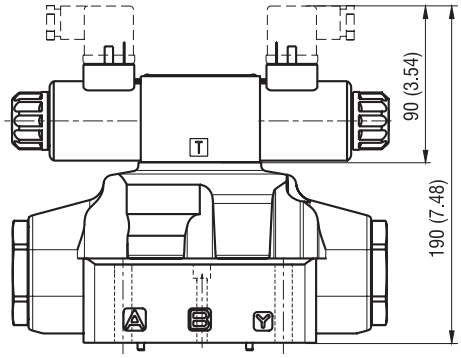
Electrical Features

Solenoids
The operating solenoids are DC solenoids. For AC supply, the solenoids are provided with a rectifier integrated in the DIN connector socket as part of the solenoid. The connectors can be turned by 90°. By loosening the nut, the solenoids can be turned or replaced without interfering with any seals of the valve. In case of a solenoid malfunction or power failure, the spool of the valve can be shifted by manual override, provided the pressure in port T does not exceed 25 bar.

For detail information on the pilot valve RPE3-06 refer to data sheet No. 4010.

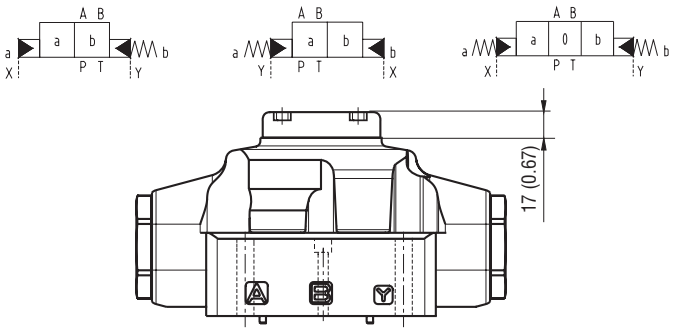
Actuation in millimeters (inches)

Solenoid control: RNEH
The valve is supplied with an RPE3-06 pilot solenoid valve.



Hydraulic control: RNH
The valve is supplied with a cross-connection cover plate.
X and Y connections are used for the hydraulic control of the valve.

RNH5-162R **RNH5-162X** **RNH5-163**



The minimum piloting pressure can be as low as 5 bar at low flow rates, but with higher flow rates a pressure of 12 bar is needed.

If the valve operates with higher pressures it is necessary to use the version with external pilot and reduced pilot pressure.
Otherwise, the valve with internal pilot and a pressure reducing valve with a 30 bar fixed setting can be ordered.

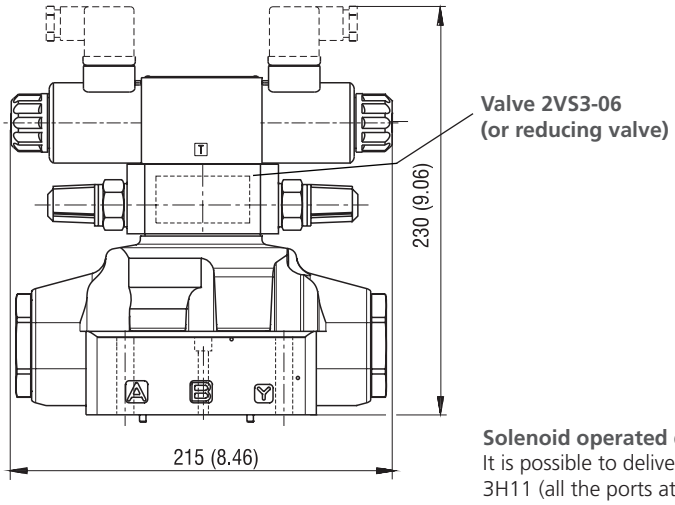
Control Options - Special Features

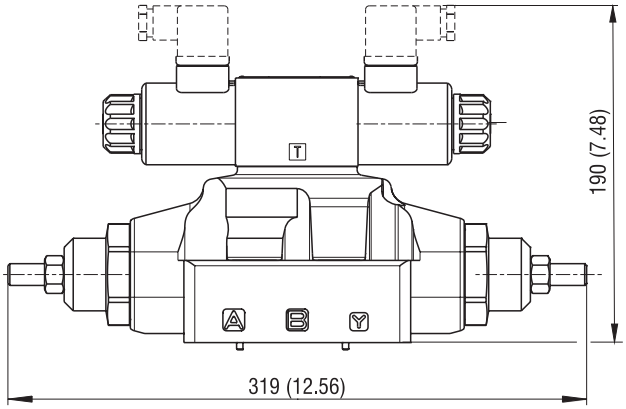
Control of the main spool shifting speed: D
By placing a 2VS3-06 flow control valve between the pilot solenoid valve and the hydropiloted valve, the pilot flow rate can be controlled and therefore the shifting speed adjusted. Add the letter **D** to the identification code to request this device.

Pilot pressure reducing valve - 30 bar fixed setting: Z
Internal piloting with mounted pressure reducing valve with 30 bar fixed setting. The option **Z** may be used together with option **D**.

Control of the main spool stroke: C
Using special side plugs, it is possible to introduce stroke control the piloted valve so as to vary the maximum spool opening clearance. This solution allows the control of the flow rate from the pump to the actuator and from the actuator to the outlet, resulting in double adjustable control of the actuator. Add the letter C to the identification code to request this device.

Shifting speed control: PF
with an orifice (0.8 mm) in port P of the solenoid pilot valve
Add **PF** to the identification code to request this device

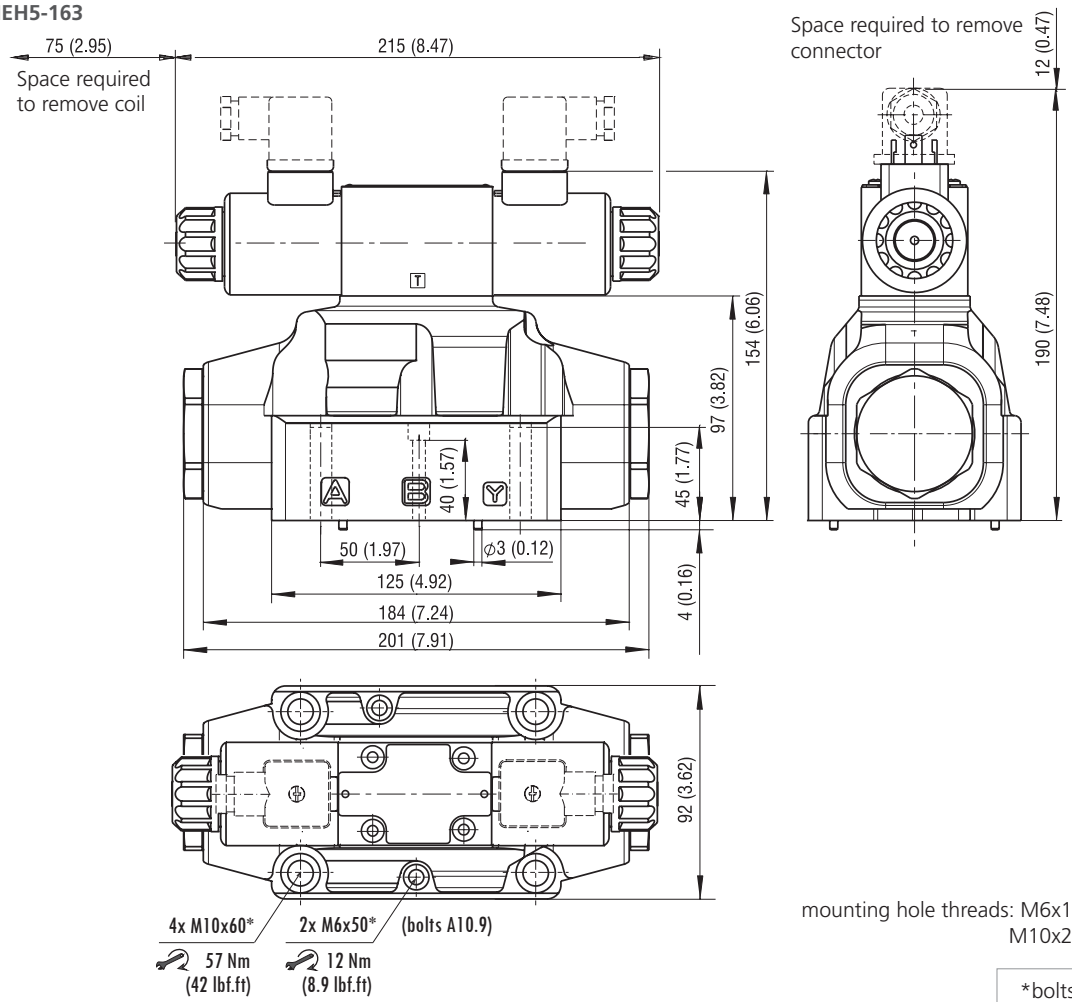




Solenoid operated distributor with pilot valve in the configuration 3H11
It is possible to deliver the solenoid operated distributor with the pilot valve in configuration 3H11 (all the ports at the outlet). This configuration is used with external piloting in order to allow the unloading of the piloting line when the solenoid operated valve is in the rest position. With this option, the piloting is necessarily external.

Dimensions in millimeters (inches)

RNEH5-162, RNEH5-163

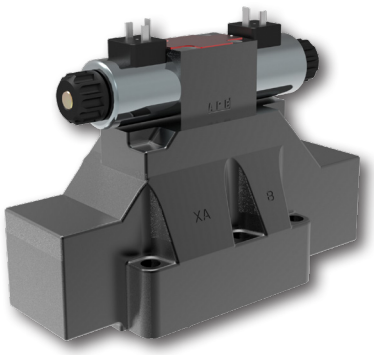


mounting hole threads: M6x12 (1/2-13 UNC)
M10x20 (1/2-13 UNC)

*bolts not supplied

RNEH4-25

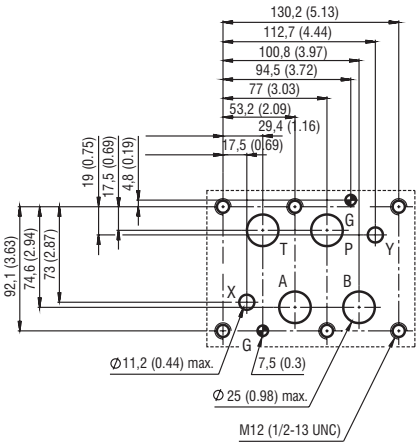
Size 25 (D08) • Q_{max} 600 l/min (160 GPM) • p_{max} 320 bar (4600 PSI) / 420 bar (6100 PSI)



Technical Features

- Directional control valve, internally or externally pilot operated with mounting interface acc. to ISO 4401, DIN 24340 (CETOP 08)
- Driven by an ISO 4401-03 (CETOP 03) solenoid operated directional valve (RNEH) or a hydraulic pilot operated directional valve (RNH)
- Electrohydraulic and hydraulic control ports X and Y
- Version for high pressures 420 bar (6090 PSI) available
- High transmitted hydraulic power, optimized design to minimize the pressure drop
- Flexibly changed from internal pilot or drain to external by inserting or removing threaded plugs in the main control valve body
- Wide range of interchangeable spools and valve controls available
- Soft-shift, spool speed, main stroke limiter control options
- In the standard version the valve body is phosphated and operating solenoids are zinc coated for 240 h corrosion protection in NSS acc. to ISO 9227
- Enhanced surface protection for mobile sector for up to 520h salt spray acc to ISO 9227

ISO 4401-08-08-0-05



Ports P, A, B, T max ∅25 mm (0.98 in)

Technical Data

Valve type			RN*4-25	RN*4H-25
Valve size			25 (D08)	
Max. flow		l/min (GPM)	600 (159)	
Max. operating pressure at port P, A, B		bar (PSI)	320 (4640)	420 (6090)
- at port T (external drain)		bar (PSI)	210 (3050)	350 (5080)
- at port T (internal drain)		bar (PSI)	210 (3050)	
Minimum pilot pressure		bar (PSI)	12 (174)	
Maximum pilot pressure		bar (PSI)	210 (3050)*	350 (5080)*
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 ... +50 (-22 ... +122)	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	10 000	
Enclosure type acc.to EN 60529			IP 65	
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 45 ... 60	DC: 55 ... 75
	OFF	ms	AC: 60 ... 90	DC: 60 ... 90
Weight	RNH4-25	kg (lbs)	13.2 (29.1)	
	RNEH4-252	kg (lbs)	15 (33.1)	
	RNEH4-253	kg (lbs)	15.6 (34.4)	
		Data Sheet	Type	
General information		GI_0060	Products and operating conditions	
Mounting interface		SMT_0019	Size 25	
Spare parts		SP_8010		
*For higher system pressure use option „Z“.				

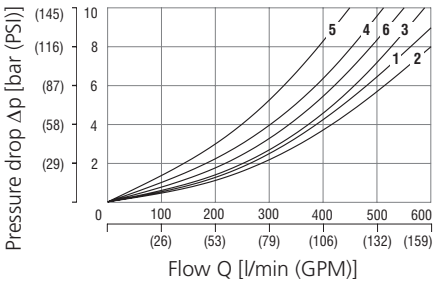
Characteristics measured at ν = 32 mm²/s (156 SUS)

Operating limits

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

Maximum flow rates in l/min (GPM)	at pressure	
	210 bar (3050 PSI)	320 bar (4640 PSI)
Spool type C11	500 (133)	450 (119)
All other spools	600 (159)	500 (133)

Pressure drop related to flow rate

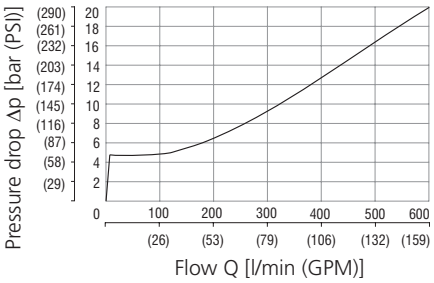


	Spool position	P-A	P-B	A-T	B-T	P-T
Z11	Energized	1	1	2	3	
H11	De-energized					6*
	Energized	2	2	1	2	
Y11	De-energized			4**	4***	
	Energized	1	1	1	2	
C11	De-energized					5
	Energized	6	6	3	4	
R51, R52, J17 X51, X52, J27	Energized	1	1	2	3	

* A-B blocked ** B blocked *** A blocked

Pressure drop related to flow rate

Back pressure valve incorporated on line P



The curve refers to the pressure drop (body part only) with back pressure valve energized to which the pressure drop of the reference spool must be added.

Ordering Code

RN □□-25 □□ / □□□ / □ / □□□□-□

4/2 and 4/3 directional control valve, internally and externally pilot operated

Actuation
electrohydraulic **EH**
hydraulic **H**

Design series
standard 320 bar **4**
high pressure 420 bar **4H**
(not available for C11 spools)

Valve size
ISO 4401-08-08-0-05 (CETOP 08)

Number of valve positions
two positions **2**
three positions **3**

Spool symbols
see the table „Spool Symbols“

Control Options
without additional features **No designation**
main spool stroke limiter **C**
main spool shifting speed control **D**
shifting speed control, with orifice (0.8 mm) in port P of solenoid pilot valve **PF**

Piloting
internal, **No designation**
not available for spools 3H11, 3C11, 2X52, 2R52, 2J27,
if internal pilot is required, choose „internal piloting with check valve C3“
internal with installed pressure reducing valve, fixed 30 bar setting **Z**
external **E**

Surface treatment
No designation standard
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

Seals
No designation NBR
V FPM (Viton)

Manual override (only for RNEH)
No designation standard
N1 protected with retaining nut
N2 protected with rubber boot

Solenoid electrical terminals
E1 EN 175301-803-A
E2 E1 with quenching diode
E5 EN 175301-803-A with integrated rectifier

Rated supply voltage of solenoids (at the coil terminal)
01200 12 V DC / 2.72 A
02400 24 V DC / 1.29 A
12060 120 V AC / 0.35 A / 50 (60) Hz
23050 230 V AC / 0.17 A / 50 (60) Hz

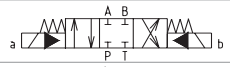
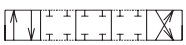
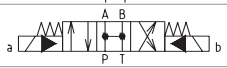
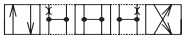
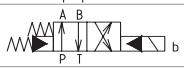
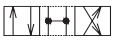
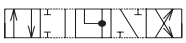
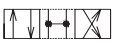
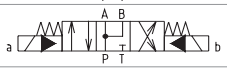
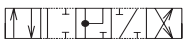
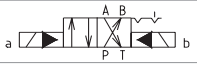
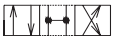
see data sheet RPE3-06 (4010) for other pilot valve options

Check valve incorporated in P-line
No designation none
C3 with back pressure check valve

Drain
No designation external, recommended when the valve is used with back pressure on the outlet
I internal

Installation Note:
- It is necessary to ensure minimum pilot pressure, that is why either external piloting or option C3 (check valve in P port) must be used for spools which have connection between P and T ports (H11, C11, R52, X52, J27). In this case, the valve must be externally drained.
- Attention: spools J17, J27 may assume an undefined position without energy supply.
- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be energized.
- The AC coils correspond to E5 solenoid electrical terminal.
- For other solenoid voltages see data sheet HA 8007.
- The solenoid operated valves are delivered without connectors. For connectors see data sheet HA 8008.
- Configurations with centering and recall springs can be mounted in any position; J17, J27 valves - without springs or mechanical retention - must be mounted with the longitudinal axis in the horizontal.
- Other special versions are available. Consult our technical department.

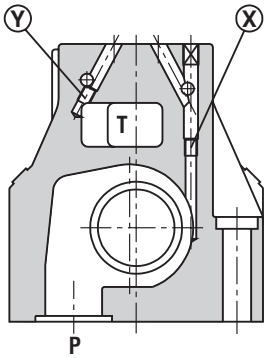
Spool Symbols

Three positions with centering spring			Two positions with return spring		
Z11			R51		
H11			R52		
Y11			X51		
C11			X52		
P11			Two positions with mechanical detent on pilot valve		
Symbols are referred to the solenoid valve RNEH. For the hydraulic control version RPH please see the connection schematic (see page 3)			J17		
			J27		

Pilot and Drain

The RNEH valves are available with pilot and drain, both internal and external. The version with external drain allows for a higher back pressure on the outlet.

Type of valve		Plug assembly	
		X	Y
RNEH4-25**/***	internal pilot and external drain	NO	YES
RNEH4-25**/**I	internal pilot and internal drain	NO	NO
RNEH4-25**/*E*	external pilot and external drain	YES	YES
RNEH4-25**/*EI	external pilot and internal drain	YES	NO

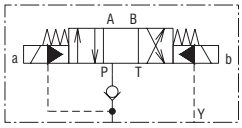


X: plug M6x8 for external pilot
Y: plug M6x8 for external drain

Check Valve incorporated in Line P

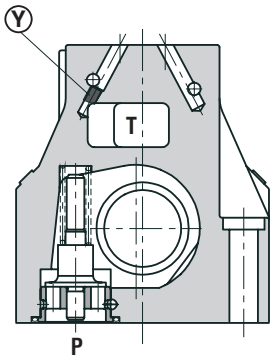
Valves RNEH are available with a back pressure valve incorporated on line P (Type „C3"). This is necessary to obtain the piloting pressure when the control valve (in the rest position) has the line P connected to the port T (spools H11, C11, R52, X52, J27). The cracking pressure is 5 bar with a minimum flow rate of 15 l/min.

Add „C3" to the identification code for this request (see „Ordering Code" section).



In the C3 version the piloting is always internal. The back pressure valve can't be used as a check valve because it doesn't guarantee sealing.

The back pressure valve can be also delivered separately and it can be easily mounted on line P of the main control valve. Specify the code to order the back pressure valve separately from the spare part data sheet No. 8010.



pilot always internal

Y: plug M6x8 for external drain

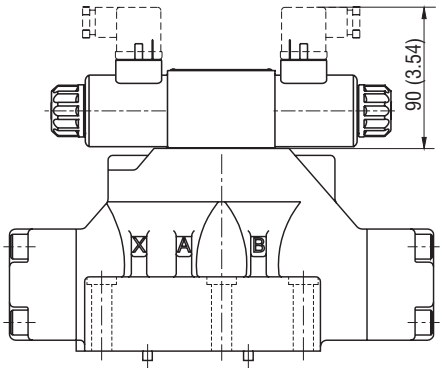
Electrical Features

Solenoids
The operating solenoids are DC solenoids. For AC supply, the solenoids are provided with a rectifier integrated in the DIN connector socket as part of the solenoid. The connectors can be turned by 90°. By loosening the nut, the solenoids can be turned or replaced without interfering with any seals of the valve. In case of a solenoid malfunction or power failure, the spool of the valve can be shifted by manual override, provided the pressure in port T does not exceed 25 bar.

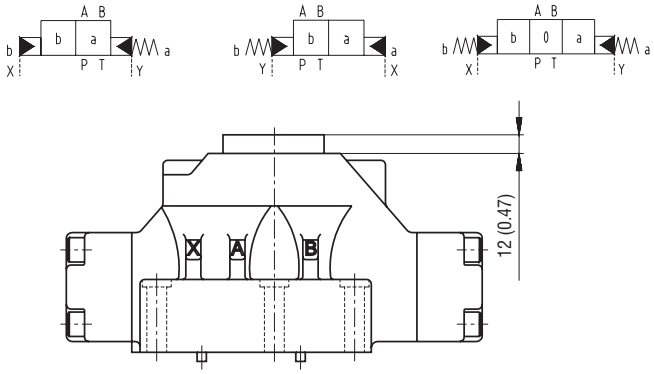
For detail information on the pilot valve RPE3-06 refer to data sheet No.4010.

Actuation in millimeters (inches)

Solenoid control: RNEH
The valve is supplied with an RPE3-06 pilot solenoid valve.



Hydraulic control: RNH
The valve is supplied with a cross-connection cover plate.
X and Y connections are used for the hydraulic control of the valve.



The minimum piloting pressure can be as low as 5 bar at low flow rates, but with higher flow rates a pressure of 12 bar is needed.

If the valve operates with higher pressures it is necessary to use the version with external pilot and reduced pilot pressure.
Otherwise, the valve with internal pilot and a pressure reducing valve with a 30 bar fixed setting can be ordered.

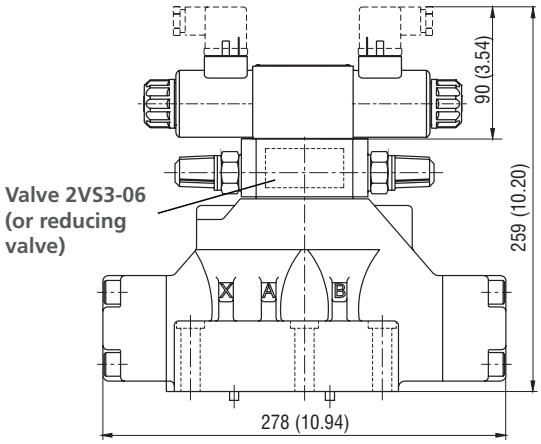
Control Options - Special Features

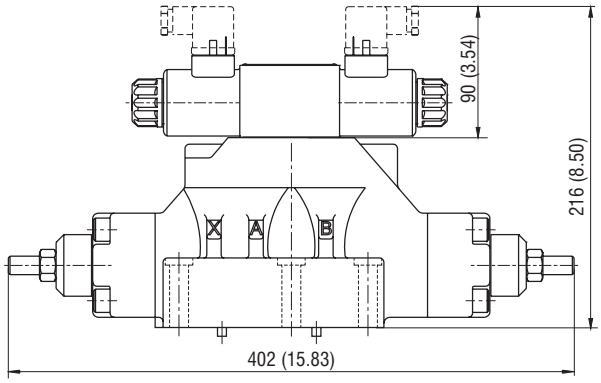
Control of the main spool shifting speed: D
By placing a 2VS3-06 flow control valve between the pilot solenoid valve and the hydropiloted valve, the pilot flow rate can be controlled and therefore the shifting speed adjusted. Add the letter **D** to the identification code to request this device.

Pilot pressure reducing valve - 30 bar fixed setting: Z
Internal piloting with mounted pressure reducing valve with 30 bar fixed setting. The option **Z** may be used together with option **D**.

Control of the main spool stroke: C
Using special side plugs, it is possible to introduce stroke control the piloted valve so as to vary the maximum spool opening clearance. This solution allows the control of the flow rate from the pump to the actuator and from the actuator to the outlet, resulting in double adjustable control of the actuator. Add the letter C to the identification code to request this device.

Shifting speed control: PF
with an orifice (0.8 mm) in port P of the solenoid pilot valve
Add **PF** to the identification code to request this device

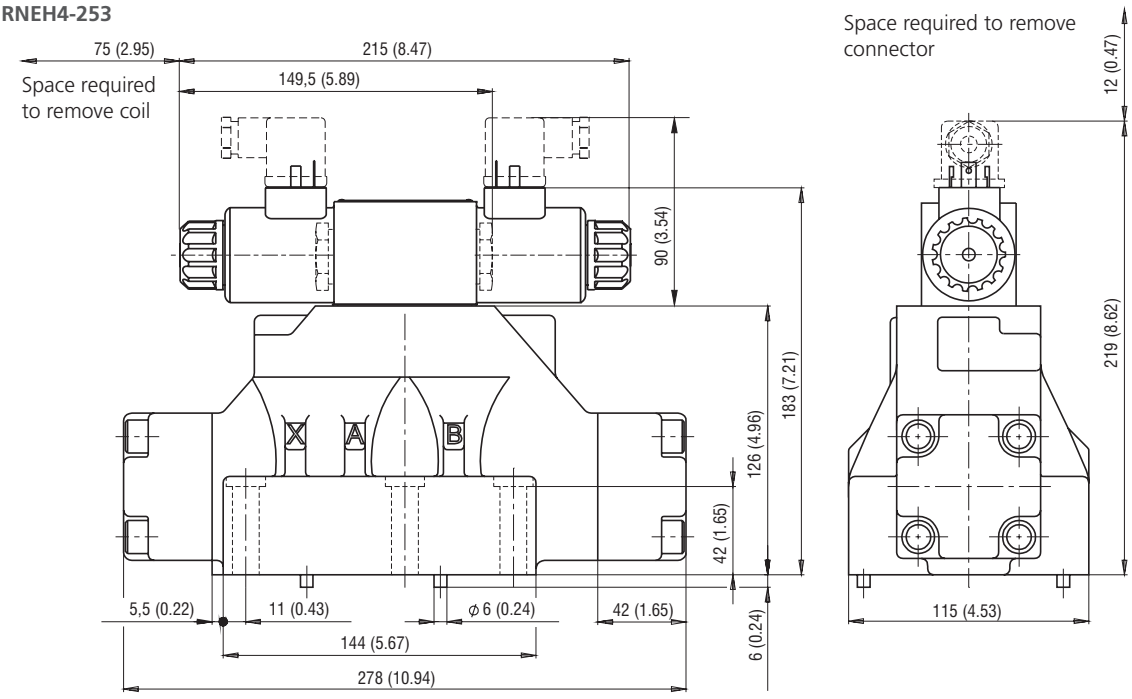


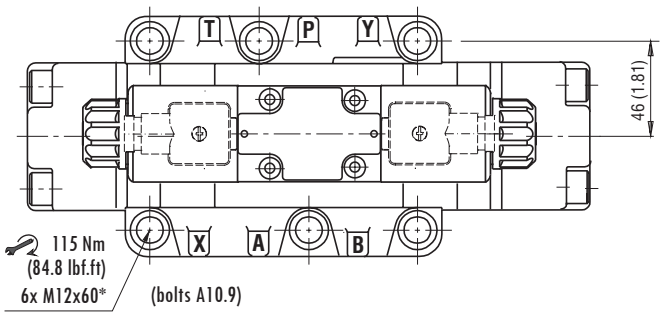


Solenoid operated distributor with pilot valve in configuration 3H11
It is possible to deliver the solenoid operated distributor with the pilot valve in configuration 3H11 (all the ports at the outlet). This configuration is used with external piloting in order to allow the unloading of the piloting line when the solenoid operated valve is in the rest position. With this option, the piloting is necessarily external.

Dimensions in millimeters (inches)

RNEH4-252, RNEH4-253





mounting hole threads: M12x20 (1/2-13 UNC)

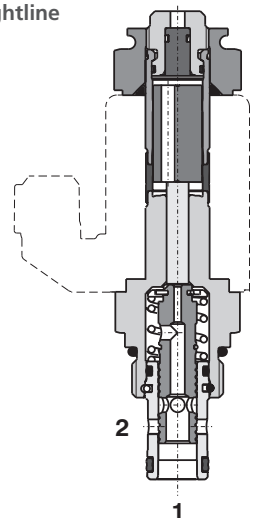
*bolts not supplied

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

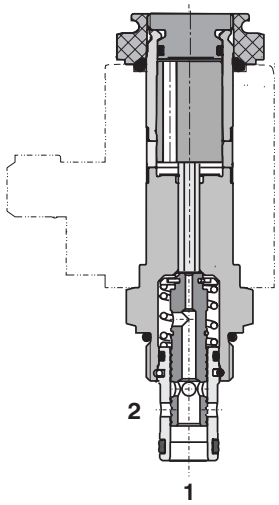
SD2E-A2

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

Lightline



High performance

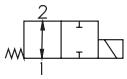
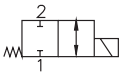


Technical Features

- 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	2I11	2I12
Symbol		

Technical Data

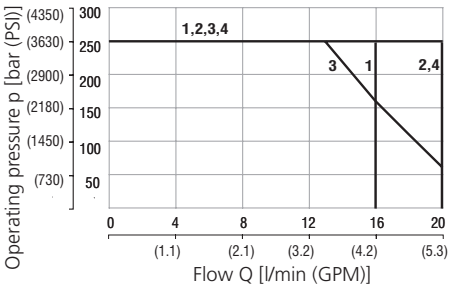
Valve size / Cartridge cavity		3/4-16 UNF-2A / A2 (C-8-2)	
		Lightline	High performance
Max. flow	l/min (GPM)	20 (5.3)	30 (7.9)
Max. operating pressure	bar (PSI)	250 (3630)	350 (5080)
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Supply voltage tolerance	%	DC ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Weight without coil	kg (lbs)	0.14 (0.31)	0.20 (0.44)

		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types		C_8007	C14B*	C19B*
Valve bodies	In-line mounted	SB_0018	SB-A2*	
	Sandwich mounted	SB-04(06)_0028	SB-*A2*	
Cavity details / Form tools		SMT_0019	SMT-A2*	
Spare parts		SP_8010		

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

Operating limits - Lightline

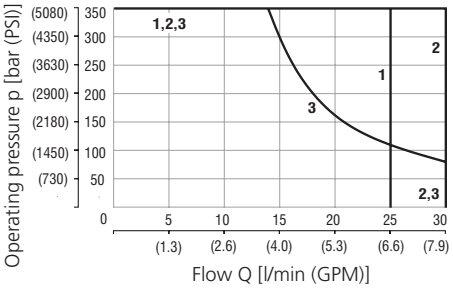
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 V DC)



	Model	Connection
1	2I12	2→1
2	2I12	1→2
3	2I11	1→2
4	2I11	2→1

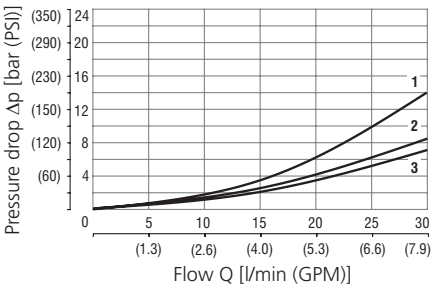
Operating limits - High performance

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



	Model	Connection
1	2I12	2→1
2	2I12	1→2
2	2I11	2→1
3	2I11	1→2

Pressure drop related to flow rate
- Lightline, High performance

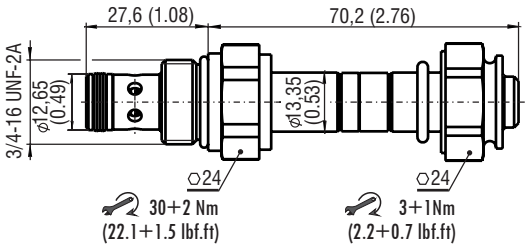


	Model	Connection
1	2I12	1→2
1	2I12	2→1
2	2I11	1→2
3	2I11	2→1

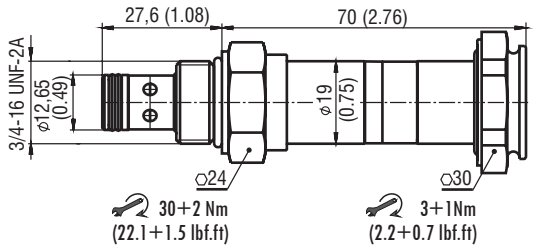
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

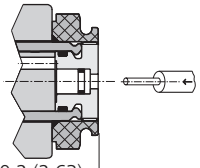
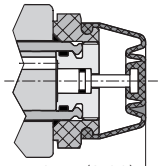
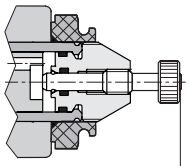
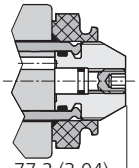
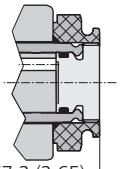
Lightline



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 spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

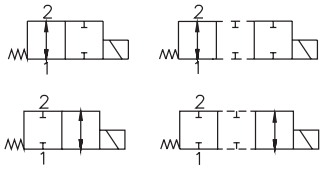
SD2E-A2 / ☐ ☐ ☐ ☐ - ☐

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

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

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)

Seals

No designation	NBR
V	FPM (Viton)

Manual override

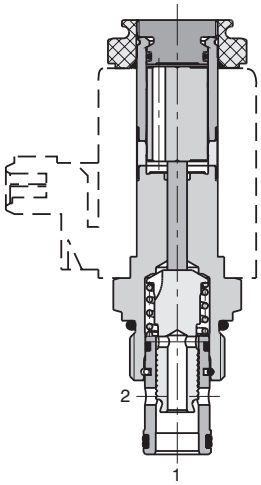
No designation	standard
M2	rubber boot protected
M4	hand screw (only for High performance)
M5	socket head screw
M9	without manual override

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

SD2E-B2

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

Lightline

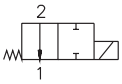
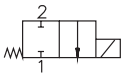


Technical Features

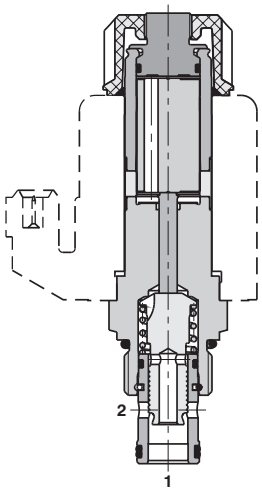
- Hardened precision parts
- High flow capacity
- High transmitted hydraulic power
- Wide range of manual overrides available
- All ports may be fully pressurized
- Variety of optional spools available
- Coil interchangeability among SD*-B* product line
- In the standard version, the valve is zinc-coated (240 h corrosion protection in NSS acc. to ISO 9227)

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	2I11	2I12
Symbol		

High performance



Technical Data

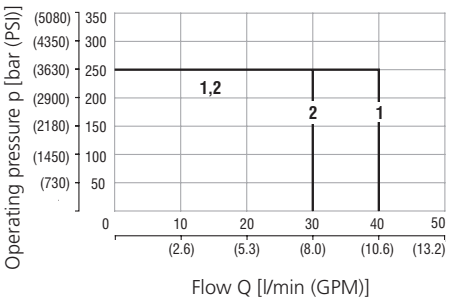
Valve size / Cartridge cavity		7/8-14 UNF-2A / B2 (C-10-2)	
		Lightline	High performance
Max. flow	l/min (GPM)	50 (13.2)	60 (15.9)
Max. operating pressure	bar (PSI)	250 (3630)	350 (5080)
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Supply voltage tolerance	%	AC, DC: ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Weight without coil	kg (lbs)	0.22 (0.49)	0.29 (0.64)

		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types		C_8007	C19B*	C22B*
Valve bodies	In-line mounted	SB_0018	SB-B2*	
	Sandwich mounted	SB-04(06)_0028	SB-*B2*	
Cavity details / Form tools		SMT_0019	SMT-B2*	
Spare parts		SP_8010		

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

Operating limits - Lightline

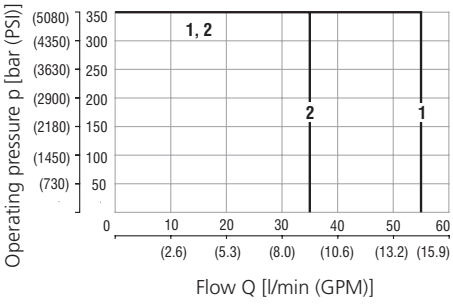
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_n -10% (21.6 V DC)



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

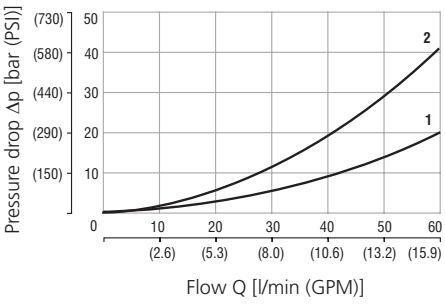
Operating limits - High performance

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



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

Pressure drop related to flow rate
- Lightline, High performance

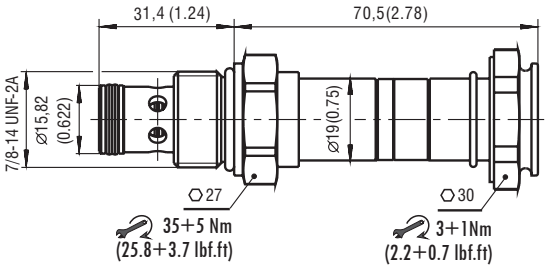


	Model	Connection
1	2I11	2→1
2	2I12	2→1

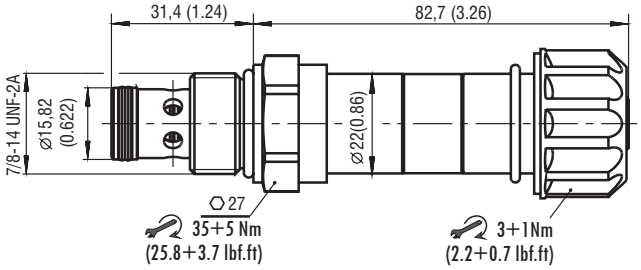
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

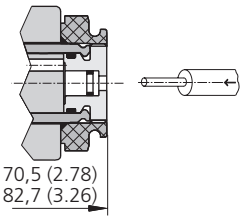
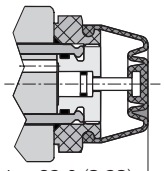
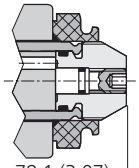
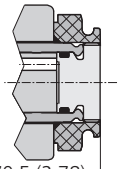
Lightline



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
 L ~ 70,5 (2.78) H ~ 82,7 (3.26)	 L ~ 82,0 (3.23) H ~ 100,0 (3.94)	 L ~ 78,1 (3.07) H ~ 84,8 (3.34)	 L ~ 70,5 (2.78) H ~ 82,7 (3.26)

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

SD2E - B2 / □ □ □ □ - □

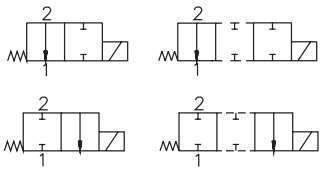
2/2 directional valve, solenoid operated, spool type, direct acting

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

Model

Lightline	**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)

Seals

No designation	NBR
V	FPM (Viton)

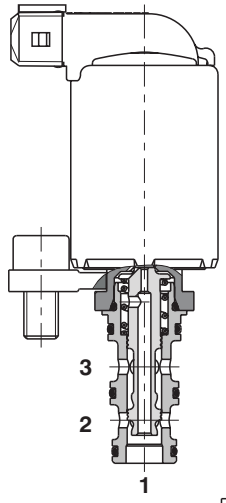
Manual override

No designation	standard
M2	rubber boot protected
M5	socket head screw
M9	without manual override

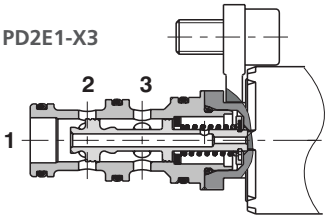
PD2E1

Size D17/D20 • Q_{max} 30 l/min (8 GPM) • p_{max} 80 bar (1200 PSI)

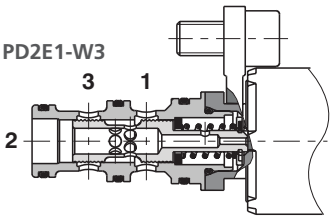
PD2E1-Y3



PD2E1-X3



PD2E1-W3

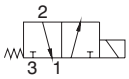
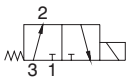


Technical Features

- 3/2 directional valve in an economical design
- Hardened precision parts
- High flow capacity
- Variety of optional spools available
- Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

3-way, 2-position spool valve in the form of an economically designed slip-in cartridge. The valve is designed for use in the low-pressure systems of mobile applications, e.g. for functional control of transmissions.

Model Code	2D21	2D26
Symbol		

Technical Data

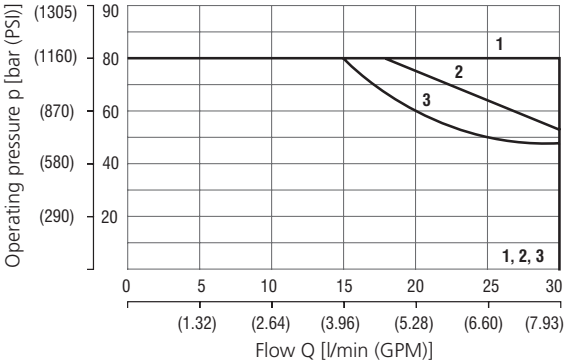
Valve size / Cartridge cavity		D17 / Y3	D20 / X3, W3
Max. flow	l/min (GPM)	30 (7.9)	
Max. operating pressure version Y, X (2, 3), W (3,1)	bar (PSI)	80 (1160)	
Max.operating pressure version Y, X (1), W (2)	bar (PSI)	30 (440)	
Fluid temperature range	°C (°F)	-30...90 (-22...194), +100 (212) short-time	
Ambient temperature range	°C (°F)	-30...90 (-22...194), +100 (212) short-time	
Supply voltage tolerance	%	± 10	
Supply voltage	V	12 DC	24 DC
Quenching diode		BZW06-19B	BZW06-33B
Enclosure type acc. to EN 60529		IP67 / IP 69K	
Weight	kg (lbs)	0.2 (0.44)	

		Datasheet	Type		
Valve			PD2E1-Y3	PD2E1-X3	PD2E1-W3
General information		GI_0060	Products and operating conditions		
Valve bodies	In-line mounted	SB_0018	SB-Y3-*	SB-W3-*	
Cavity details		SMT_0019	SMT-Y3*	SMT-W3*	
Spare parts		SP_8010			

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

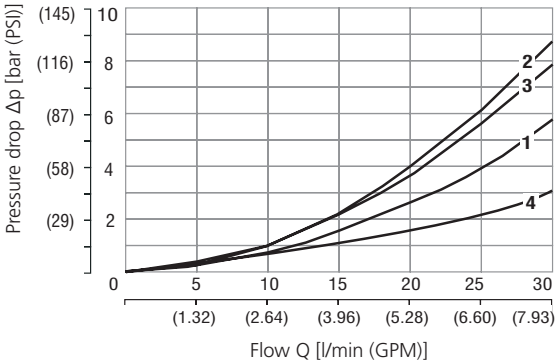
Operating limits

Oil 90 °C (194 °F) / Ambient temperature 90 °C (194 °F) / Voltage U_n ± 15% (21.6 VDC)



		Model	Connection
Y3	1	2D21	2→1
	1		3→2
	1	2D26	3→2
	1		2→1
X3	1	2D21	2→1
	2		3→2
W3	3	2D21	2→1
	1		3→2

Pressure drop related to flow rate

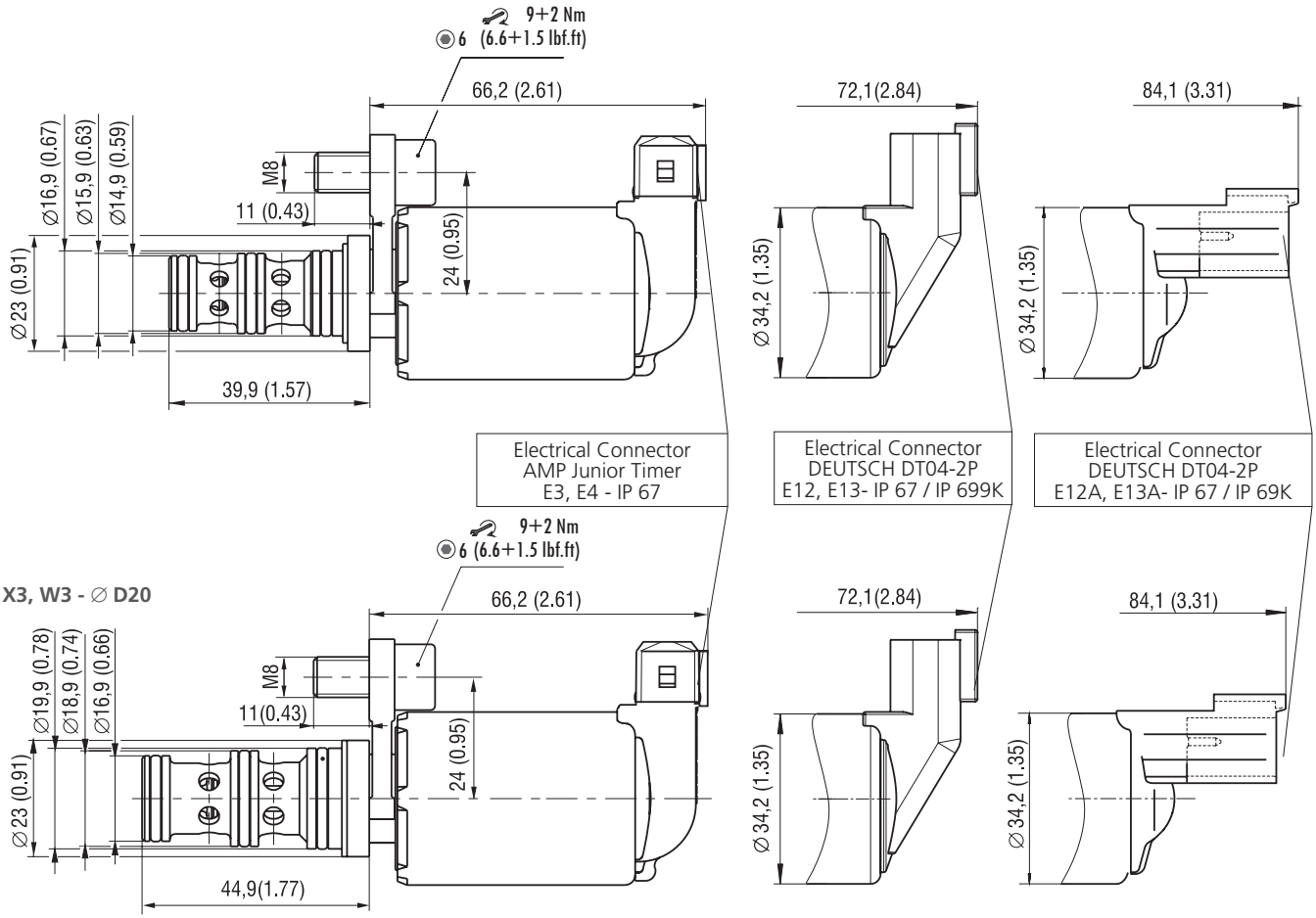


		Model	Connection
Y3	1	2D21	2→1
	2		3→2
	3	2D26	2→1
	2		3→2
X3	3	2D21	3→2
	4		2→1
W3	1	2D21	2→1
	1		3→2

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

Dimensions in millimeters (inches)

Y3 - ∅ D17



Ordering Code

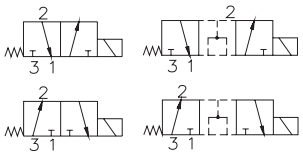
PD2E1 - ☐ / ☐ - ☐ ☐ ☐ - ☐

3/2 directional valve, solenoid operated, spool type, direct acting, slip-in style

Valve cavity

D17	**Y3**
D20	**W3**
D20	**X3**

Functional symbol



	2D21
	2D26

Surface treatment

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

Seals

No designation	NBR
V	FPM (Viton)

Connector

E3	AMP Junior Timer - radial direction (2 pins; male)
E4	E3 with quenching diode
E12	Deutsch DT04-2P - radial direction (2 pins; male)
E13	E12 with quenching diode
E12A	Deutsch DT04-2P - axial direction (2 pins; male)
E13A	E12A with quenching diode

Nominal supply voltage

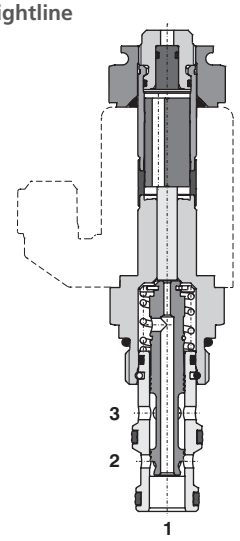
12	12 V DC / 1.67 A
24	24 V DC / 0.84 A

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

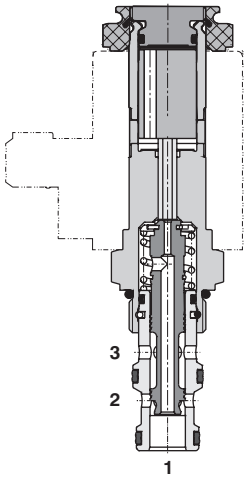
SD2E-A3

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

Lightline



High performance

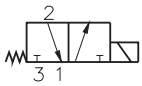
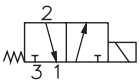
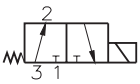
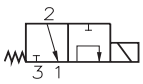


Technical Features

- 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

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				

Technical Data

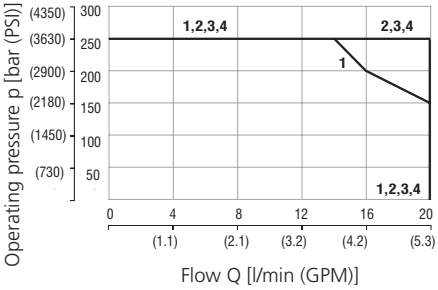
Valve size / Cartridge cavity		3/4-16 UNF-2A / A3 (C-8-3)	
		Lightline	High performance
Max. flow	l/min (GPM)	20 (5.3)	30 (7.9)
Max. operating pressure	bar (PSI)	250 (3630)	350 (5080)
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Supply voltage tolerance	%	DC ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Weight without coil	kg (lbs)	0.14 (0.31)	0.20 (0.44)

		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types		C_8007	C14B*	C19B*
Valve bodies	In-line mounted	SB_0018	SB-A3*	
	Sandwich mounted	SB-04(06)_0028	SB-*A3*	
Cavity details / Form tools		SMT_0019	SMT-A3*	
Spare parts		SP_8010		

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

Operating limits - Lightline

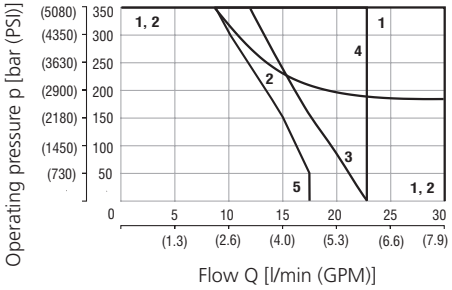
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



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

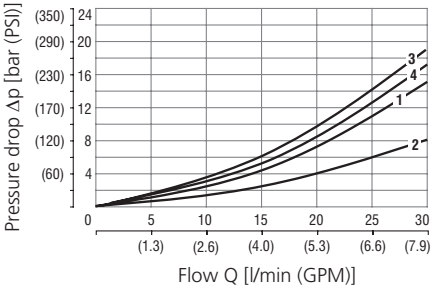
Operating limits - High performance

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

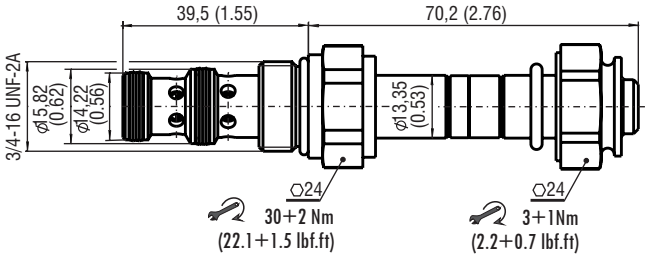


	Model	Connection
1	2D21	3→2
1	2D25	3→2
1	2D31	2→1
1	2D27	2→1
2	2D21	2→1
3	2D26	3→2
3	2D27	3→1
4	2D25	2→1
4	2D26	2→1
4	2D31	3→1

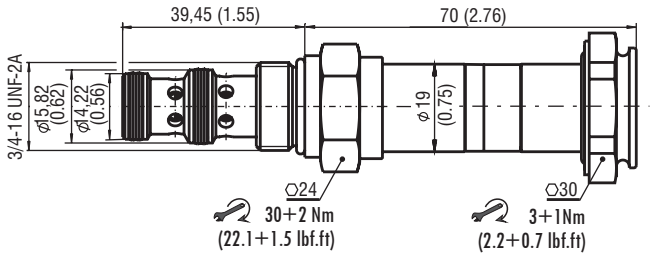
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

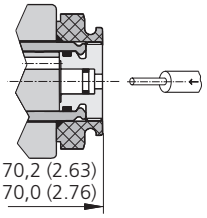
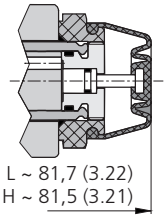
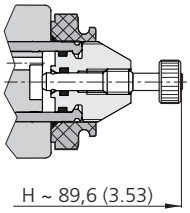
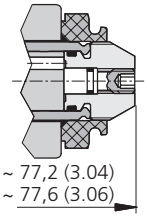
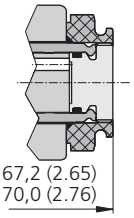
Lightline



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 spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

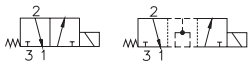
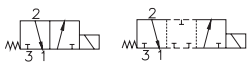
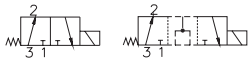
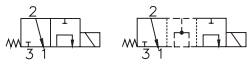
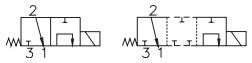
Ordering Code

SD2E-A3 / ☐ ☐ ☐ ☐ - ☐

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

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

Functional symbol

Lightline		**L**
High performance		**H**
		**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)

Seals

No designation	NBR
V	FPM (Viton)

Manual override

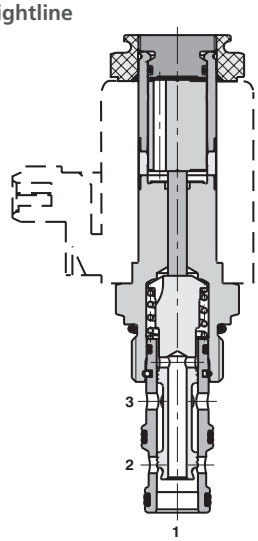
No designation	standard
M2	rubber boot protected
M4	hand screw (only for High performance)
M5	socket head screw
M9	without manual override

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

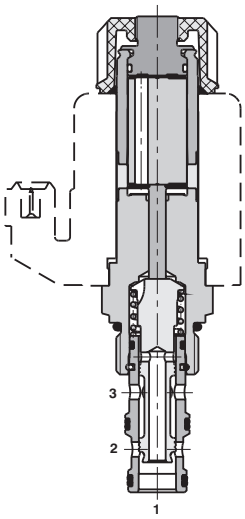
SD2E-B3

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

Lightline



High performance

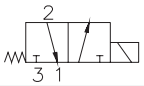
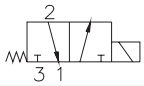
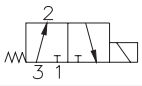
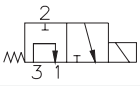


Technical Features

- 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

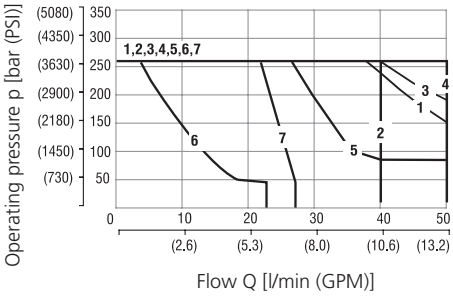
Valve size / Cartridge cavity		7/8-14 UNF-2A / B3 (C-10-3)	
		Lightline	High performance
Max. flow	l/min (GPM)	50 (13.2)	60 (15.9)
Max. operating pressure	bar (PSI)	250 (3630)	350 (5080)
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Supply voltage tolerance	%	AC, DC: ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Weight without coil	kg (lbs)	0.24 (0.53)	0.31 (0.68)

		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types		C_8007	C19B*	C22B*
Valve bodies	In-line mounted	SB_0018	SB-B3*	
	Sandwich mounted	SB-04(06)_0028	SB-*B3*	
Cavity details / Form tools		SMT_0019	SMT-B3*	
Spare parts		SP_8010		

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

Operating limits - Lightline

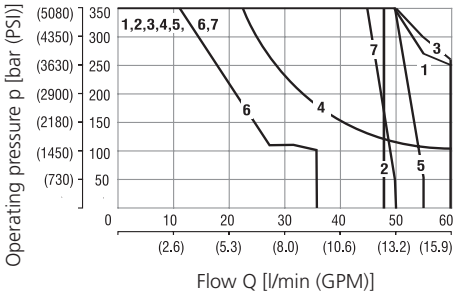
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



	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

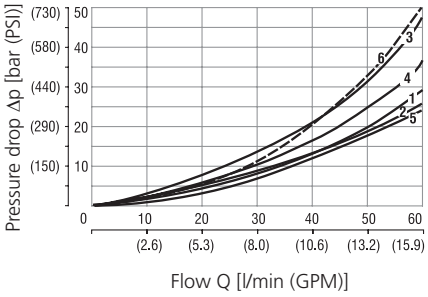
Operating limits - High performance

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

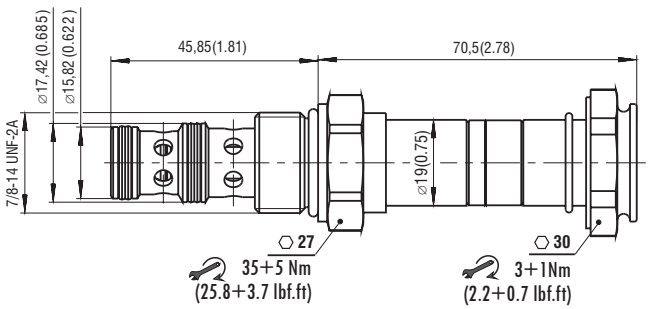


	Model	Connection
1	2D21, 2D26	2→1
2	2D21	3→2
3	2D25	3→2
4	2D25, 2D34	2→1
1	2D26	3→2
5	2D34	3→1
6	2D34	2→1

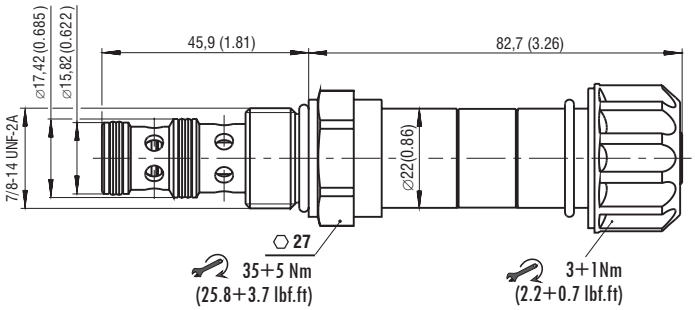
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

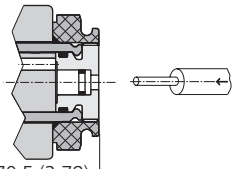
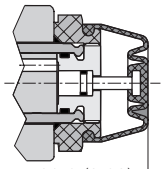
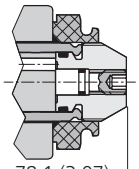
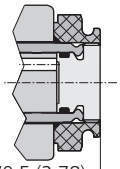
Lightline



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
 L ~ 70,5 (2.78) H ~ 82,7 (3.26)	 L ~ 82,0 (3.23) H ~ 100,0 (3.94)	 L ~ 78,1 (3.07) H ~ 84,8 (3.34)	 L ~ 70,5 (2.78) H ~ 82,7 (3.26)

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

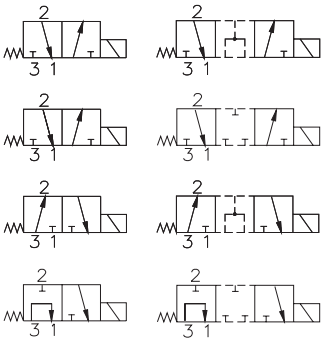
SD2E-B3 / ☐ ☐ ☐ ☐ - ☐

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

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

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

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	NBR
V	FPM (Viton)

Manual override

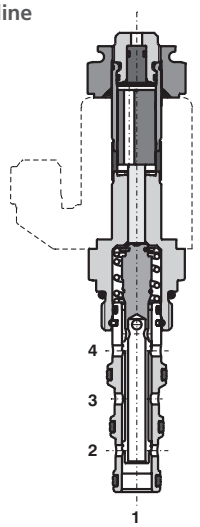
No designation	standard
M2	rubber boot protected
M5	socket head screw
M9	without manual override

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

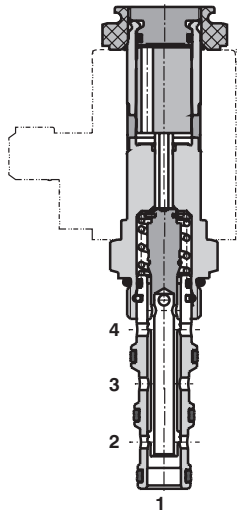
SD2E-A4

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

Lightline



High performance

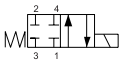
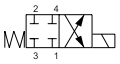
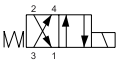
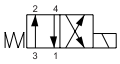
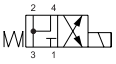
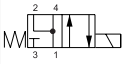
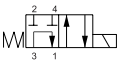
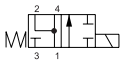


Technical Features

- 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

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.

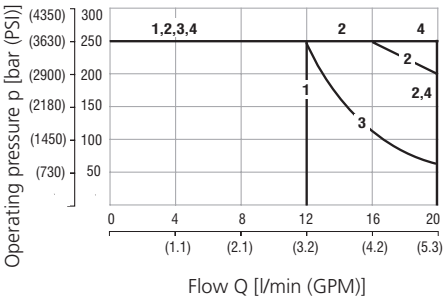
2Z11	2Z51	2X21	2R21	2P51	2Y11	2C51	2Y61
							

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 (7.9)
Max. operating pressure		bar (PSI)	250 (3630)	350 (5080)
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)
Supply voltage tolerance		%	DC ± 10	AC, DC: ± 15
Max. switching frequency		1/h	15 000	
Weight without coil		kg (lbs)	0.15 (0.33)	0.23 (0.51)
		Datasheet	Type	
General information			Products and operating conditions	
Coil types		C_8007	C14B*	C19B*
Valve bodies	In-line mounted	SB_0018	SB-A4*	
	Sandwich mounted	SB-04(06)_0028	SB-*A4*	
Cavity details / Form tools		SMT_0019	SMT-A4*	
Spare parts		SP_8010		

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

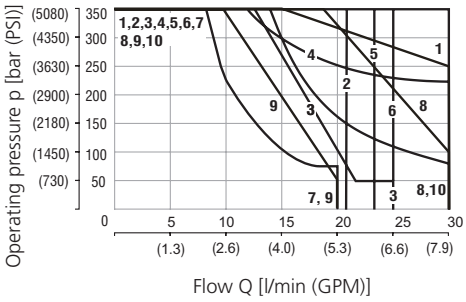
Operating limits - Lightline
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_n -10% (21.6 V DC)



	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

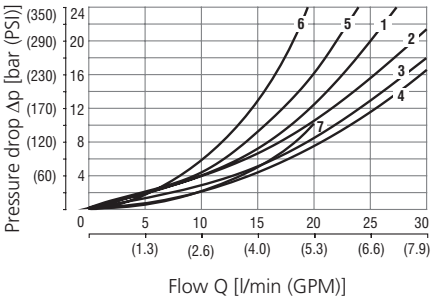
For operating limits under conditions and flow directions other than shown contact our technical support.

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
1	2R21	3→4, 2→1
6	2Y11	3→2, 4→1
7	2C51	3→1
8	2Y61	3→2
9	2Y61	4→1
10	2Y61	1→4

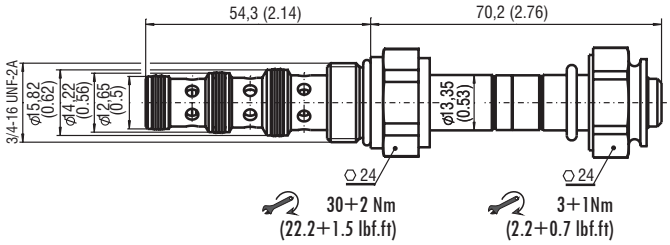
Pressure drop related to flow rate
- Lightline, High performance



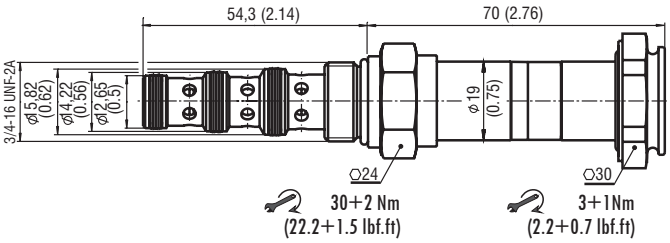
	Model	Connection	Model	Connection
1	2Z11	4→1	2R21	2→1
1	2Y61	3→2		
2	2Z11	3→2	2Z51	2→1
2	2X21	3→4, 4→1	2R21	3→2
3	2Z51	3→4	2R21	3→4
3	2Y11	3→2, 4→1		
4	2X21	3→2, 2→1	2C51	3→2, 4→1
5	2R21	4→1		
6	2C51	3→1		
7	2Y61	4→1		

Dimensions in millimeters (inches)

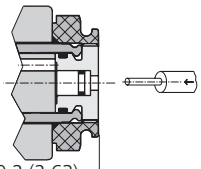
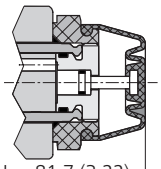
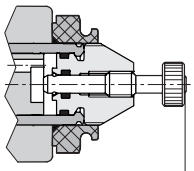
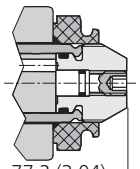
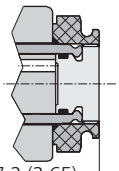
Lightline



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 spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

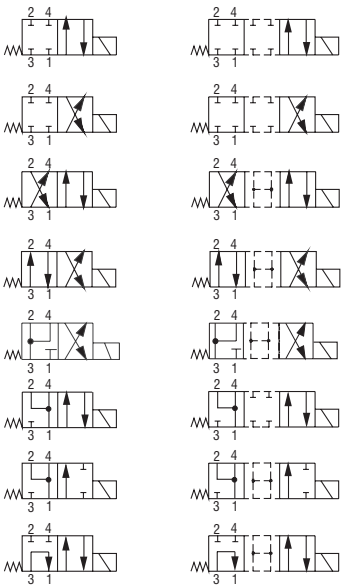
SD2E-A4 / ☐ ☐ ☐ ☐ - ☐

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

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

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

Functional symbol



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

Surface treatment

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

Seals

No designation	NBR
V	FPM (Viton)

Manual override

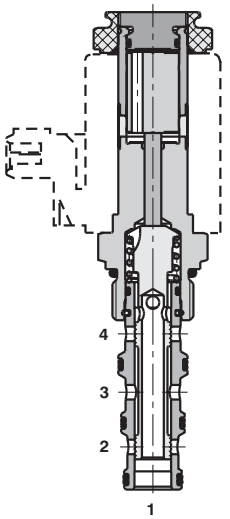
No designation	standard
M2	rubber boot protected
M4	hand screw (only for High performance)
M5	socket head screw
M9	without manual override

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

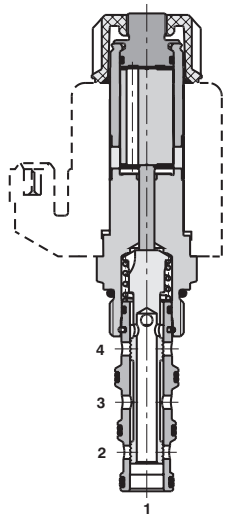
SD2E-B4

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

Lightline



High performance

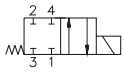
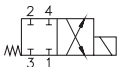
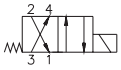


Technical Features

- 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

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	2X21
Symbol			

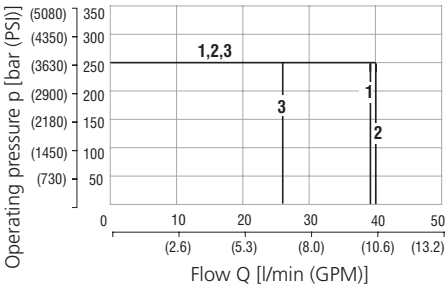
Technical Data

Valve size / Cartridge cavity			7/8-14 UNF-2A / B4 (C-10-4)	
			Lightline	High performance
Max. flow		l/min (GPM)	50 (13.2)	60 (15.9)
Max. operating pressure		bar (PSI)	250 (3630)	350 (5080)
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)
Supply voltage tolerance		%	AC, DC: ± 10	AC, DC: ± 15
Max. switching frequency		1/h	15 000	
Weight without coil		kg (lbs)	0.25 (0.55)	0.32 (0.71)
		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types		C_8007	C19B*	C22B*
Valve bodies	In-line mounted	SB_0018	SB-B4*	
	Sandwich mounted	SB-04(06)_0028	SB-*B4*	
Cavity details / Form tools		SMT_0019	SMT-B4*	
Spare parts		SP_8010		

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

Operating limits - Lightline

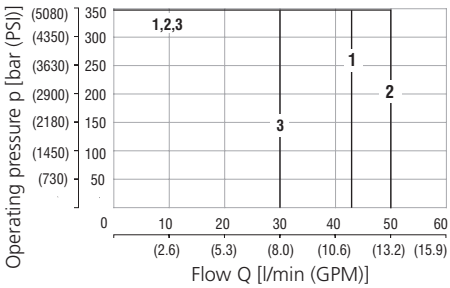
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



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

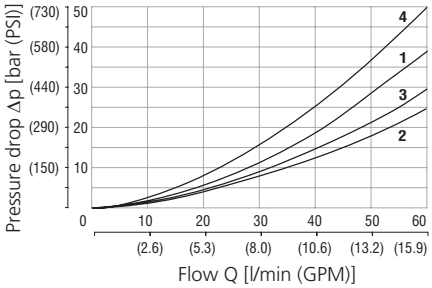
Operating limits - High performance

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



	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

Pressure drop related to flow rate
- Lightline, High performance

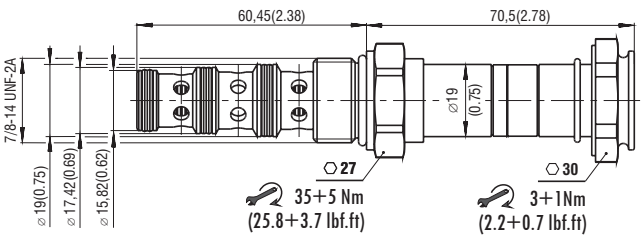


	Model	Connection
1	2Z11	3→2
1	2Z11	4→1
3	2Z51 - only for L	3→4
3	2Z51 - only for L	2→1
2	2Z51 - only for H	3→4
3	2Z51 - only for H	2→1
3	2X21	3→2
4	2X21	4→1
3	2X21 Q_{max} 50 l/min	3→4
2	2X21 Q_{max} 40 l/min	2→1

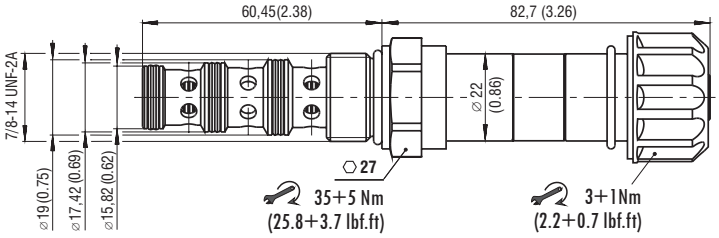
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

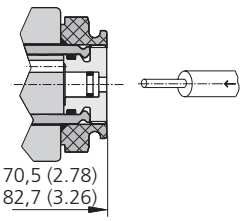
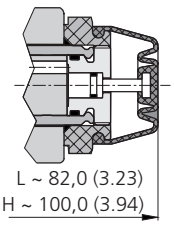
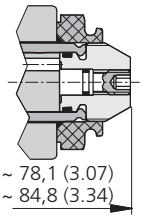
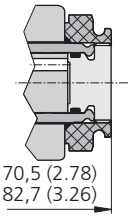
Lightline



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
 L ~ 70,5 (2.78) H ~ 82,7 (3.26)	 L ~ 82,0 (3.23) H ~ 100,0 (3.94)	 L ~ 78,1 (3.07) H ~ 84,8 (3.34)	 L ~ 70,5 (2.78) H ~ 82,7 (3.26)

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

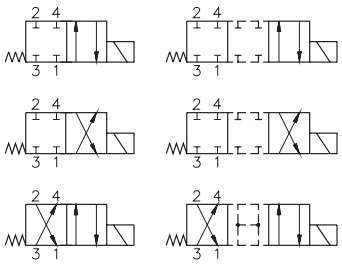
SD2E-B4 / □ □ □ □ - □

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

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

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

Functional symbol



2Z11

2Z51

2X21

Surface treatment

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

Seals

No designation	NBR
V	FPM (Viton)

Manual override

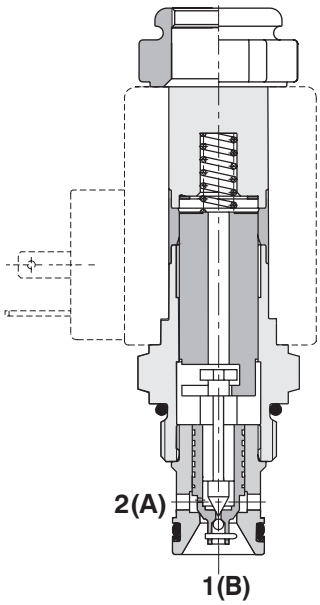
No designation	standard
M2	rubber boot protected
M5	socket head screw
M9	without manual override

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

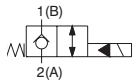


Technical Features

- 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	

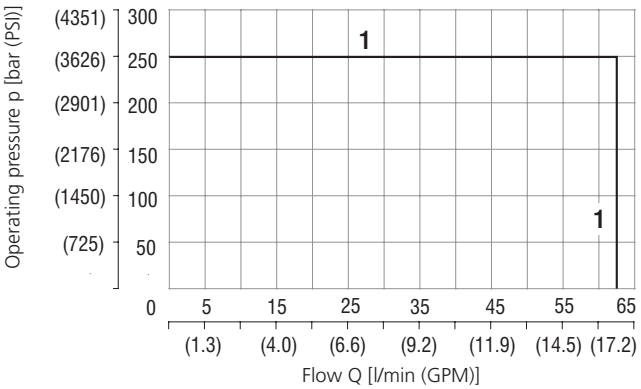
Technical Data

Valve size / Cartridge cavity		M22x1.5 / QG2
Max. flow	l/min (GPM)	63 (16.6)
Max. operating pressure	bar (PSI)	250 (3630)
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)
Supply voltage tolerance	%	AC, DC: ± 10
Max. switching frequency	1/h	15 000
Weight without coil	kg (lbs)	0.20 (0.44)

		Datasheet	Type
General information		GI_0060	Products and operating conditions
Coil types		C_8007	C19B*
Valve bodies	In line mounted	SB_0018	SB-QG2*
	Sandwich mounted	SB-04 (06)_0028	SB-06-QG2*
Cavity details		SMT_0019	SMT-QG2*
Spare parts		SP_8010	

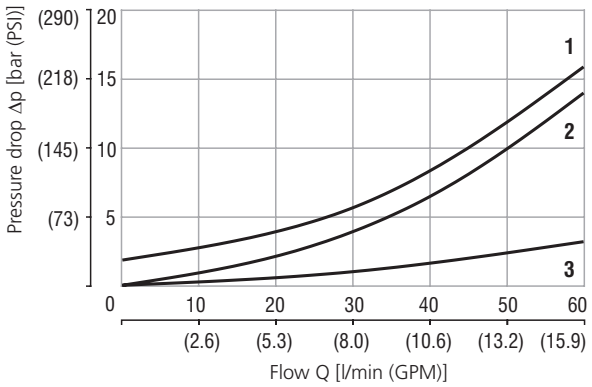
Characteristics measured at ν = 32 mm²/s (156 SUS)

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



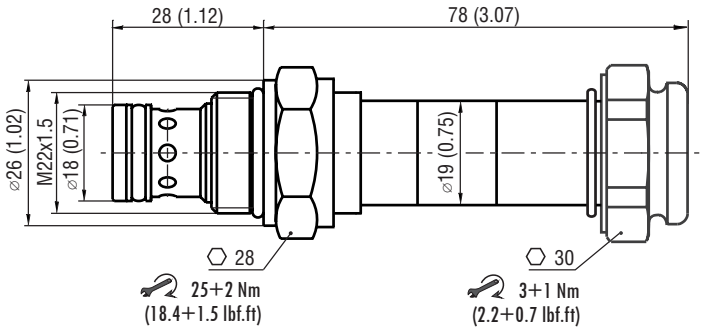
	Model	Connection
1	S2	2→1, 1→2

Pressure drop related to flow rate

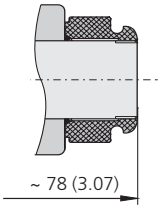
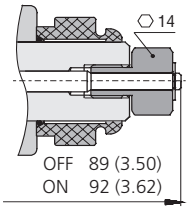


	Model	Connection	Solenoid
1	S2	1→2	OFF
2	S2	2→1	ON
3	S2	1→2	ON

Dimensions in millimeters (inches)



Manual Override in millimeters (inches)

Standard - without manual override	Designation N5 - with external hexagon, across flats 14
	

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

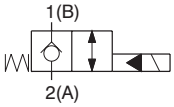
Ordering Code

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)

Seals

No designation	NBR
V	FPM (Viton)

Manual override

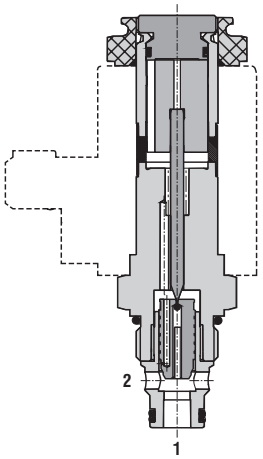
No designation	standard - without manual override
N5	external hexagon, across flats 14

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

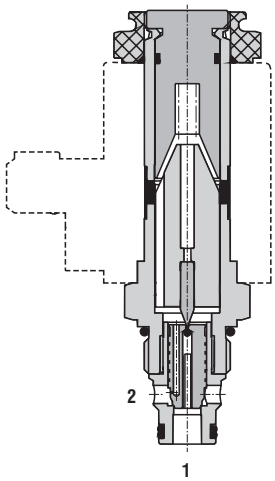
SD3E-A2

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

Normally Open



Normally Closed

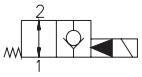
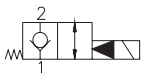


Technical Features

- 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-way, 2-position high pressure, 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 one direction.

Model Code	2O2	2L2
Symbol		

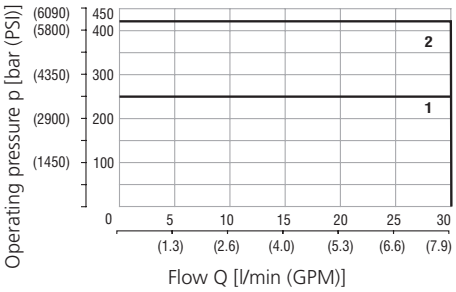
Technical Data

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 (3630)	420 (6090)
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)
Supply voltage tolerance		%	DC: ± 10	AC, DC: ± 15
Max. switching frequency		1/h	15 000	
Weight without coil		kg (lbs)	0.12 (0.26)	0.20 (0.44)
		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types		C_8007	C14B*	C19B*
Valve bodies	In-line mounted	SB_0018	SB-A2*	
	Sandwich mounted	SB-04(06)_0028	SB-*A2*	
Cavity details / Form tools		SMT_0019	SMT-A2*	
Spare parts		SP_8010		

Characteristics measured at ν = 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)

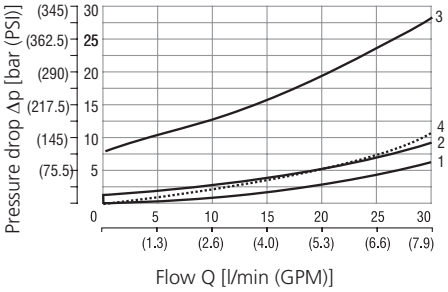


	Model	Connection
1	L2L2	1→2, 2→1
1	L2O2	1→2, 2→1
2	H2L2	1→2, 2→1
2	H2O2	1→2, 2→1

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

Pressure drop related to flow rate

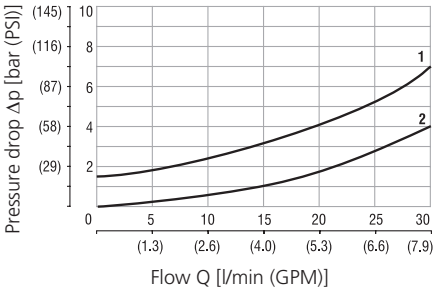
- Lightline



	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

Pressure drop related to flow rate

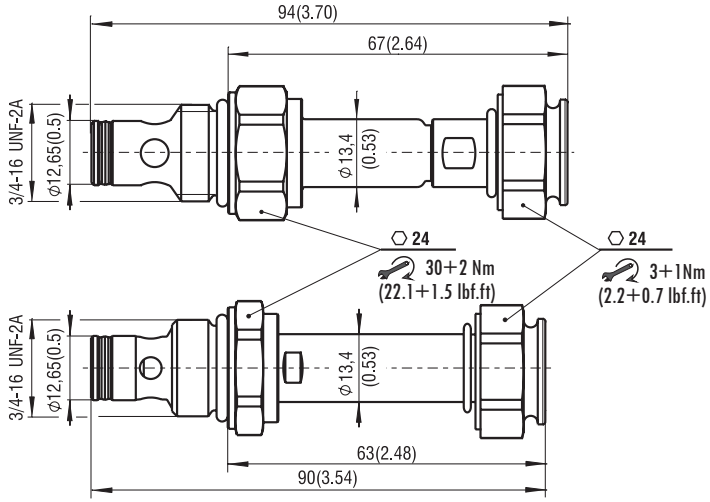
- High performance



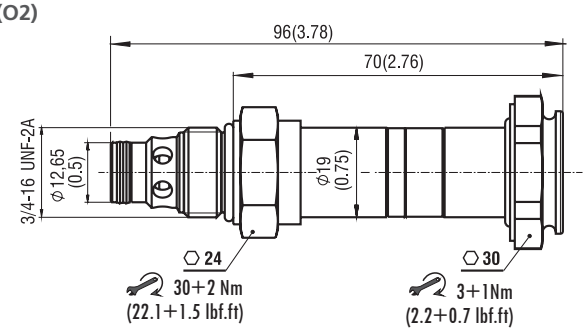
	Model	Connection	Solenoid
1	H2L2	1→2	off
2	H2L2	1→2	on
2	H2L2	2→1	on
2	H2O2	1→2	off
2	H2O2	2→1	off
2	H2O2	1→2	on

Dimensions in millimeters (inches)

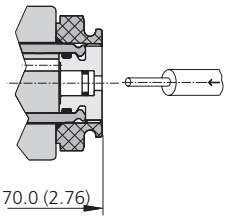
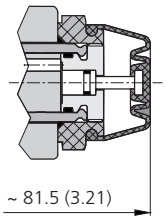
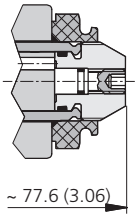
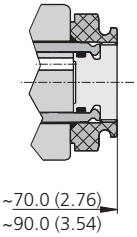
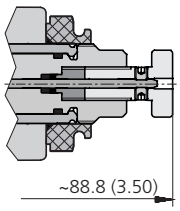
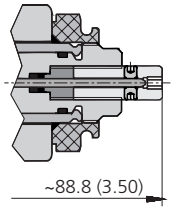
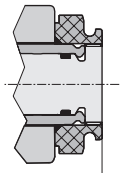
Lightline
L2



High performance
L2 (O2)



Manual Override in millimeters (inches)

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 M4 for 2L2 * - hand screw	Designation M5 for 2L2 * - socket head screw, size 2.5	Designation M9 for 2L2 - without manual override
*Only for High performance version	 ~88.8 (3.50)	 ~88.8 (3.50)	 H ~70.0 (2.76) L ~94.0 (3.70)

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

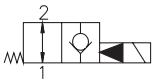
SD3E-A2 / □ □ □ □ - □

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

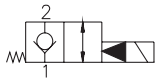
Valve cavity
3/4-16 UNF (C-8-2)

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)*

*Only for High performance version

Seals

No designation	NBR
V	FPM (Viton)*

*Only for High performance version

Manual override

No designation	standard for 2O2*
M2	rubber boot protected*
M4	hand screw*
M5	socket head screw*
M9	without manual override

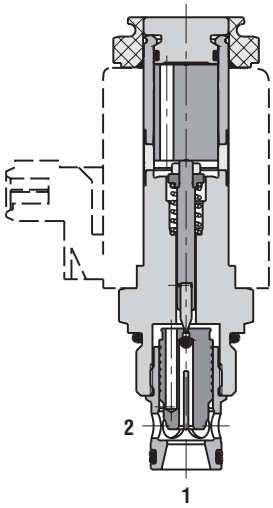
*Only for High performance version

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

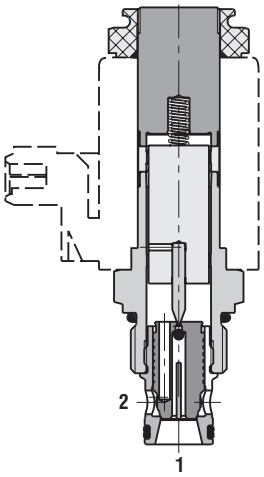
SD3E-B2

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

Normally Open



Normally Closed

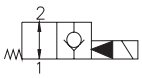
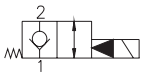


Technical Features

- 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		

Technical Data

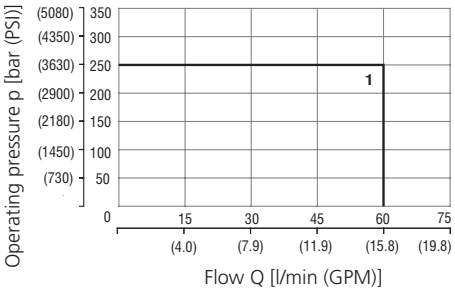
Valve size / Cartridge cavity		7/8-14 UNF-2A / B2 (C-10-2)	
		Lightline	High performance
Max. flow	l/min (GPM)	60 (15.9)	75 (19.8)
Max. operating pressure	bar (PSI)	250 (3630)	420 (6090)
Fluid temperature range (NBR)	°C (°F)	-30...60 (-22...140)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...50 (-22...122)	-30...80 (-22...176)
Supply voltage tolerance	%	AC, DC: ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Weight without coil	kg (lbs)	0.23 (0.51)	0.30 (0.66)

		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types		C_8007	C19B*	C22B*
Valve bodies	In-line mounted	SB_0018	SB-B2*	
	Sandwich mounted	SB-04(06)_0028	SB-*B2*	
Cavity details / Form tools		SMT_0019	SMT-B2*	
Spare parts		SP_8010		

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

Operating limits - Lightline

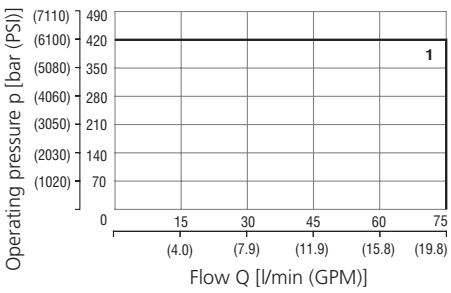
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_n -10% (21.6 V DC)



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

Operating limits - High performance

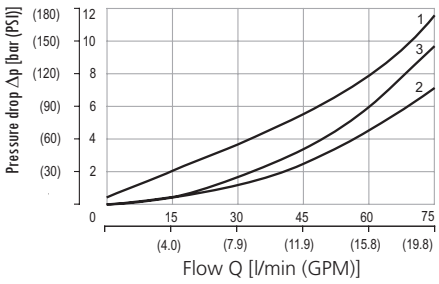
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F) / Voltage U_n -10% (21.6 V DC)



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

Pressure drop related to flow rate

- Lightline, High performance

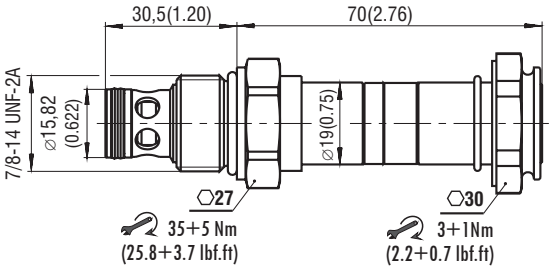


	Model	Connection	Solenoid
1	2L2	1→2	off
2	2L2	2→1	on
2	2L2	1→2	on
2	2O2	1→2	off
3	2O2	2→1	off

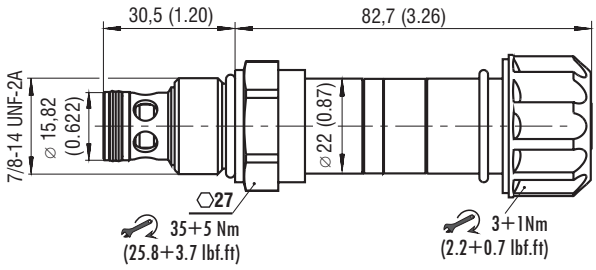
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

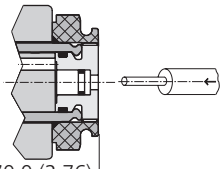
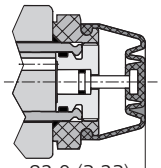
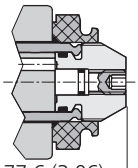
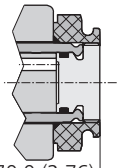
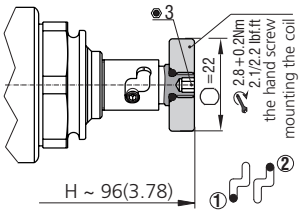
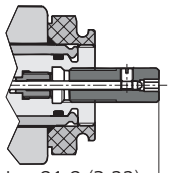
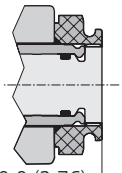
Lightline



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	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 M8 for 2L2 * **- removable handwheel with locking**		**Designation M5 - for 2L2** **- socket head screw, size 2.5**	**Designation M9 - for 2L2** **- without manual override**
 H ~ 96(3.78) **1** basic position, valve operated by solenoid **2** set position, valve open by hand		 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 spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

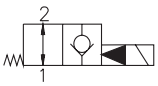
SD3E-B2 / □ □ □ □ - □

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

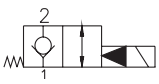
Valve cavity
7/8-14 UNF (C-10-2)

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
No designation NBR
V FPM (Viton)

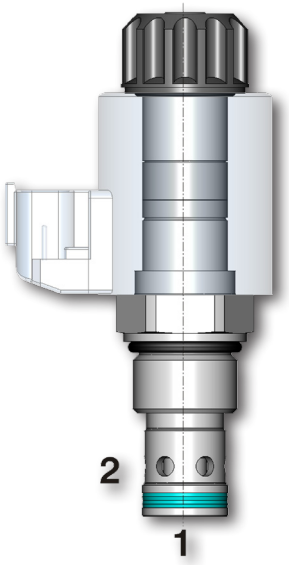
Manual override
No designation standard for 2O2
M2 rubber boot protected
M5 socket head screw
M8 removable handwheel with locking*
M9 without manual override

*Only for High performance version

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

SD3E-C2

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

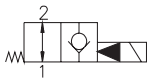
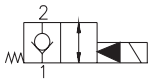


Technical Features

- 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
- In the standard version, the valve is zinc-coated (520 h corrosion protection in NSS acc. to ISO 9227)

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		

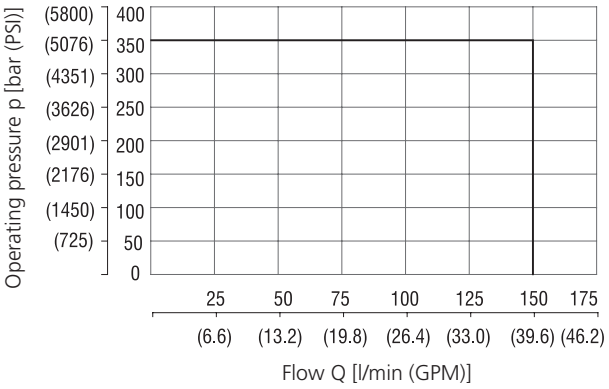
Technical Data

Valve size / Cartridge cavity			1-1/16-12 UN / C2 (C-12-2)
			High performance
Max. flow		l/min (GPM)	150 (39.6)
Max. operating pressure		bar (PSI)	350 (5080)
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)
Supply voltage tolerance		%	AC, DC: ± 15
Max. switching frequency		1/h	7 000
Weight without coil		kg (lbs)	0.40 (0.88)
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Coil types		C_8007	C22B*
Valve bodies	In-line mounted	SB_0018	SB-C2*
	Sandwich mounted	SB-04(06,10)_0028	on request
Cavity details / Form tools		SMT_0019	SMT-C2*
Spare parts		SP_8010	

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

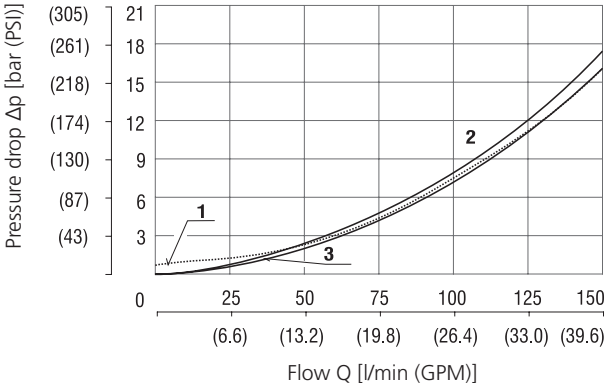
Operating limits - High performance

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



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

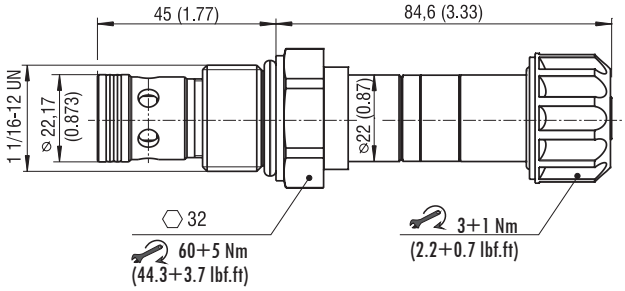
Pressure drop related to flow rate
- High performance



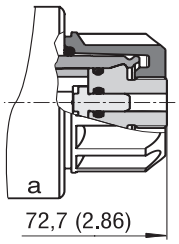
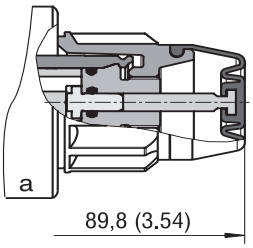
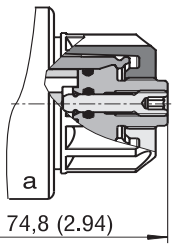
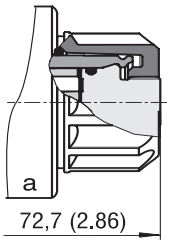
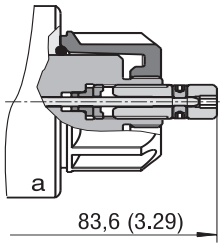
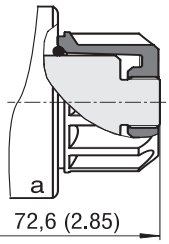
	Model	Connection	Solenoid
1	2L2	1→2	off
2	2L2	2→1	on
3	2L2	1→2	on
2	2O2	1→2	off
3	2O2	2→1	off

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
			
		Designation M5 - for 2L2 - socket head screw, hex. 2.5	Designation M9 - for 2L2 - without manual override
			

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 does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

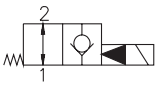
SD3E - C2 / H □ □ □ - B

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

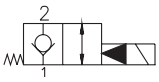
Valve cavity
1-1/16-12 UN / C2 (C-12-2)

Model
High performance

Model



2O2



2L2

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

Seals

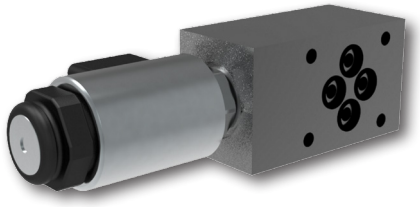
No designation	NBR
V	FPM (Viton)

Manual override

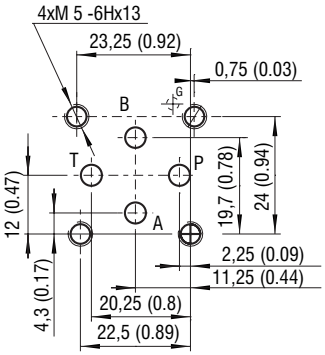
No designation	standard for 2O2
M2	rubber boot protected for 2O2
M5	socket head screw (hex. 2.5)
M9	without manual override

ROE3-062S2M

Size 04 (D02), 06 (D03) • Q_{max} 25 l/min (6.6 GPM) • p_{max} 250 bar (3600 PSI)

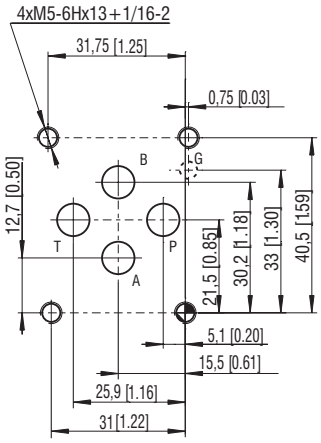


ISO 4401-02-01-0-05



Ports P, A, B, T max ∅ 4.5 mm (0.18 in)

ISO 4401-03-02-0-05



Ports P, A, B, T max ∅ 7.5 mm (0.29 in)

Technical Features

- Valve built-in a modular block with subplate interface acc. to ISO 4401, DIN 24340 (CETOP 02 and 03) or an in-line body
- 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 (NC) version
- Optional type of manual override
- Coils interchangeable across ROE / RPE3-04 product line
- In the standard version, the valve body is phosphated and the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

Solenoid operated poppet valve, pilot operated, built-in a modular block size (DN) 04 or 06, designed for creating hydraulic circuits by vertical grouping. The second variant is the valve in an in-line body. The one-directional valve is used for leak-free closing in specified flow direction (see Functional Symbols).

Technical Data

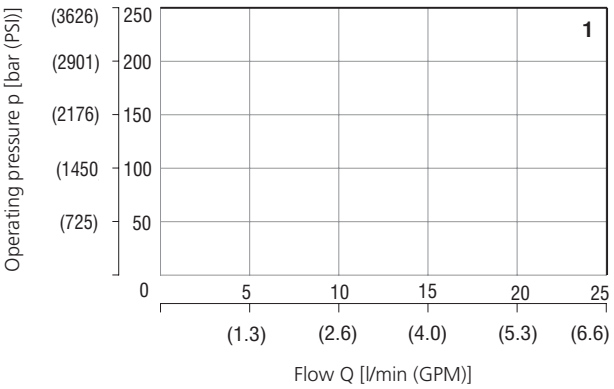
Valve size / Cartridge cavity			04 (02) / QG2	06 (03) / QG2
Max. flow		l/min (GPM)	25 (6.6)	25 (6.6)
Max. operating pressure		bar (PSI)	250 (3630)	
Fluid temperature range (NBR)		°C (°F)	-30 ... +80 (-22 ... +176)	
Fluid temperature range (FPM)		°C (°F)	-20 ... +80 (-4 ... +176)	
Ambient temperature range		°C (°F)	-20 ... +50 (-4 ... +122)	
Supply voltage tolerance		%	AC, DC: ± 10	
Max. switching frequency		1/h	15 000	
Switching time, at v = 32 mm²/s (156 SUS)	ON	ms	DC 25 … 35 AC 25 … 35	DC 30 … 50 AC 30 … 110
	OFF		DC 15 … 25 AC 50 … 100	DC 80 … 130 AC 100 … 150
Weight	- valve with 1 solenoid	kg (lbs)	Modular 1.2 (2.5)	Modular 1.5 (3.2)
	- valve with 2 solenoids		Modular 1.7 (3.6)	Modular 2.0 (4.3)
			In-line 1.6 (3.5)	

	Data Sheet	Type
General information	GI_0060	Products and operating conditions
Cavity details	SMT_0019	Size 04, 06
Spare parts	SP_8010	

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

Operating limits

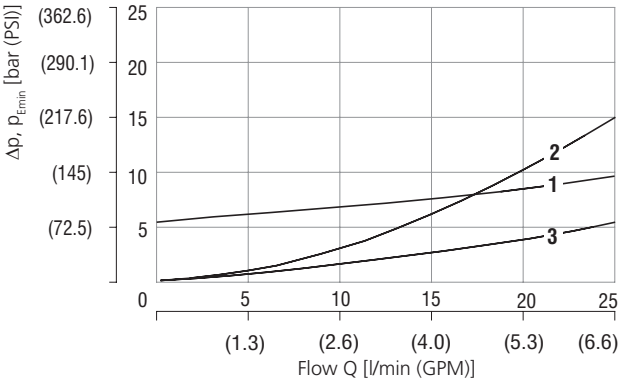
Operating limits for maximum hydraulic power at rated temperature and supplied with voltage equal to 90% of the nominal value



	Model	Direction
1	S2	A-B

Pressure drop related to flow rate

In-line body design R*

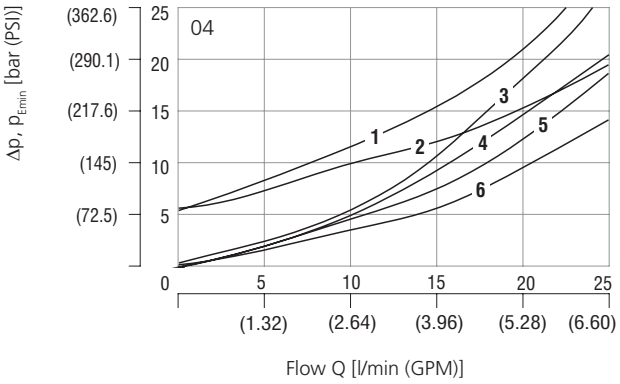


	Model	Direction
1	R1, R2, R3, R4	B-A, Solenoid OFF
2	R1, R3, R4	B-A, Solenoid ON
3	R1, R2, R3, R4	A-B, Solenoid ON

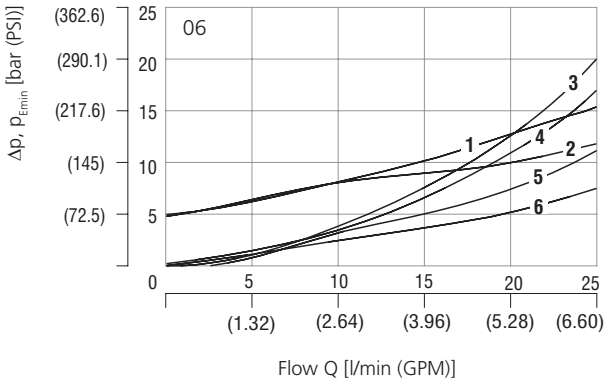
Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop related to flow rate

In-line body design M*



	Model	Direction	Solenoid
1	MD04	T-A	OFF
1	MX04	B-A	OFF
2	MA04	A1-A2	OFF
3	MD04	A-T	
4	MA04	A2-A1	
4	MD04	T-A	ON
5	MX04	B-A	ON
6	MA04	A1-A2	ON



	Model	Direction	Solenoid
1	MD06	T-A	OFF
2	MX06	B-A	OFF
2	MA06	A1-A2	OFF
3	MD06	A-T	
4	MA06	A2-A1	
4	MX06	A-B	
5	MD06	A-T	
6	MA06	A1-A2	ON
6	MX06	B-A	ON

Ordering Code

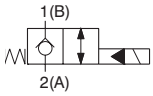
ROE3 - 062 S2 □ □ / □ □ □ □ - □

2/2 Solenoid Operated Poppet Valve, Pilot Operated, Modular

Valve size

Spool symbols

normally closed (NC)



Model

modular valve, connection A2-A1	**MA**
modular valve, connection B2-B1	**MB**
modular valve, connection A-B	**MX**
modular valve, connection A-T	**MD**
modular valve, connection B-T	**ME**
modular valve, connection B2-B1, A2-A1	**MC**
modular valve, connection B-T, A-T	**MF**
modular valve, connection P-T	**MG**
modular valve, connection P2-P1	**MP***
in-line valve, 2 ports, thread G3/8	**R1**
in-line valve, 2 ports, thread G1/2	**R2**
in-line valve, 2 ports, thread 3/4-16, (SAE 8)	**R3**
in-line valve, 2 ports, thread 7/8-14 (SAE 10)	**R4**
in-line valve, 2 ports, thread G3/8, G1/4	**R7**

*only available for size 06 (D03)

Modular plate size

ISO 4401-02-01-0-05, DIN 24340 (CETOP 02), size 04	**04**
ISO 4401-03-02-0-05, DIN 24340 (CETOP 03), size 06	**06**

Rated supply voltage of solenoids (at the coil terminals)

01200	12 V DC / 2.41 A
01400	14 V DC / 1.66 A
02100	21 V DC / 1.31 A
02400	24 V DC / 1.15 A
02700	27 V DC / 0.89 A
20500	205 V DC / 0.12 A
02450	24 V AC / 1.44 A / 50 (60) Hz
12060	120 V AC / 0.22 A / 50 (60) Hz
23050	230 V AC / 0.12 A / 50 (60) Hz

Connector

E1	EN 175301-803-A
E2	E1 with quenching diode
E3	AMP Junior Timer - radial direction (2 pins; male)
E4	E3 with quenching diode
E3A	AMP Junior Timer - axial direction (2 pins; male)
E4A	E3A with quenching diode
E5	EN 175301-803-A with integrated rectifier
E8	loose conductors (two insulated wires)
E9	E8 with quenching diode
E12A	Deutsch DT04-2P - axial direction
E13A	E12A with quenching diode

The AC coils correspond to E5.

Manual override

No designation	standard - without manual override
N5	with external hexagon 14

Seals

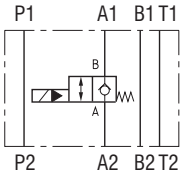
No designation	NBR
V	FPM (Viton)

Surface treatment

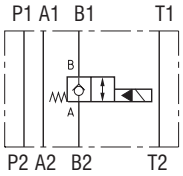
No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

Functional Symbols

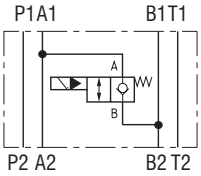
Model MA



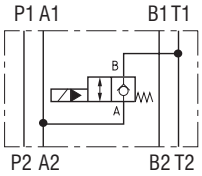
Model MB



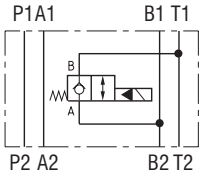
Model MX



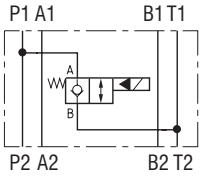
Model MD



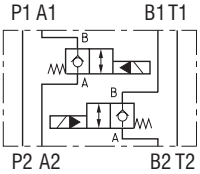
Model ME



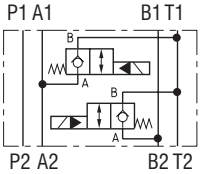
Model MG



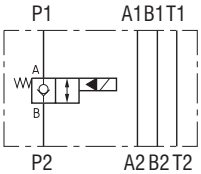
Model MC



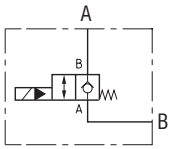
Model MF



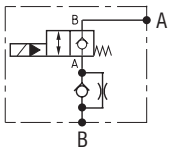
Model MP



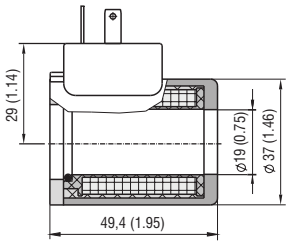
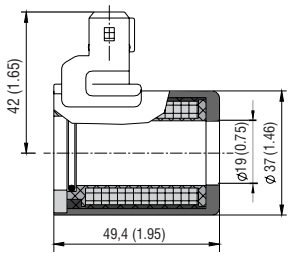
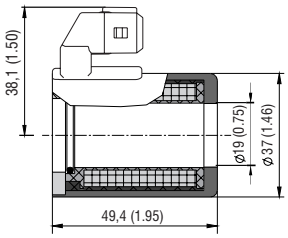
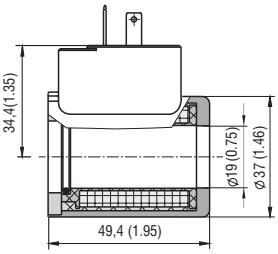
Model R1(R3), R2(R4)

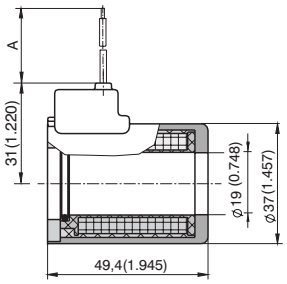
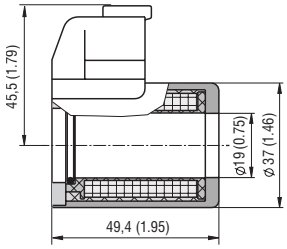


Model R7



Solenoid Coil in millimeters (inches)

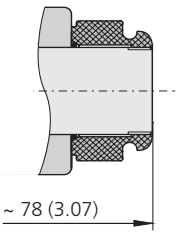
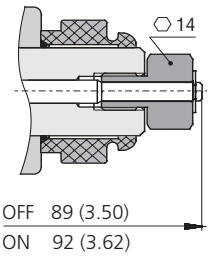
E1 - EN 175301-803-A E2 - E1 with quenching diode Protection degree IP65	E3 - AMP Junior Timer - radial direction E4 - E3 with quenching diode Protection degree IP67	E3A - AMP Junior Timer - axial direction E4A - E3A with quenching diode Protection degree IP67	E5 - EN 175301-803-A and integrated rectifier Protection degree IP65
			

E8 - Loose conductors (two insulated cables) E9 - (E8 with quenching diode)	E12A - Deutsch DT04-2P E13A - E12A with quenching diode Protection degree IP67 / IP69K
	

Note:
A = Standard 300 mm (11.81 in), other sizes on demand

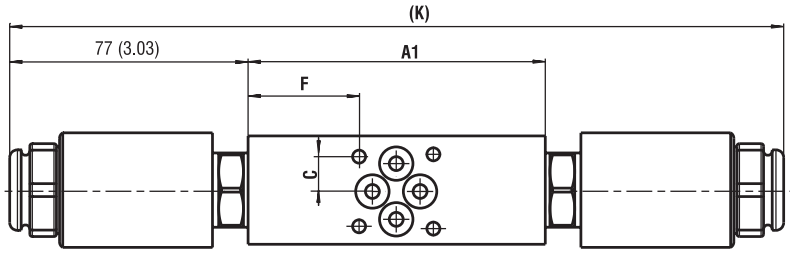
The indicated IP protection level is only reached with a properly mounted connector.

Manual Override in millimeters (inches)

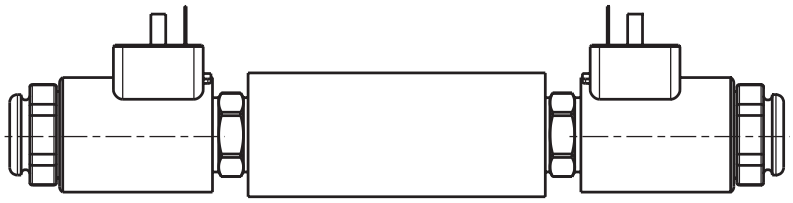
No designation - standard - without manual override	Designation N5 - with external hexagon 14
	

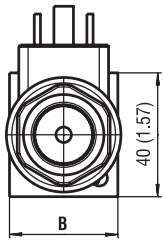
Dimensions in millimeters (inches)

Models MC, MF

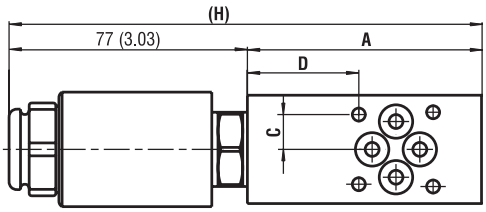


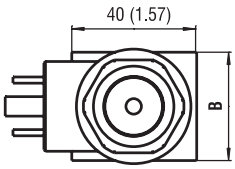
	Size 04	Size 06
A	76 (2.99)	80 (3.15)
A1	96 (3.78)	94 (3.70)
B	35 (1.38)	45 (1.77)
C	11,25 (0.44)	15,5 (0.61)
D	36 (1.42)	28 (1.10)
E	16 (0.63)	11,5 (0.45)
F	36 (1.42)	25,5 (1.00)
H	153 (6.02)	157 (6.18)
K	250 (9.84)	248 (9.76)



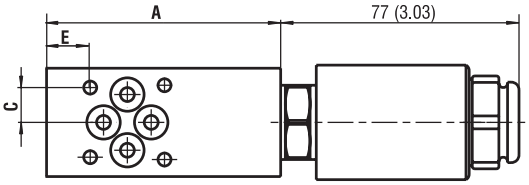


Models MA, MX, MD, MG, MP

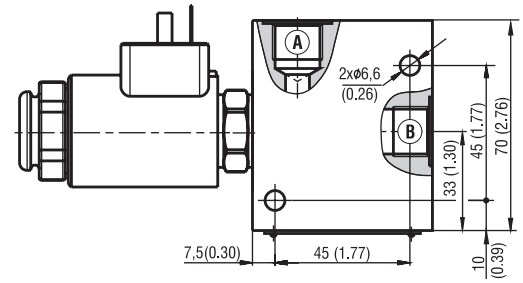


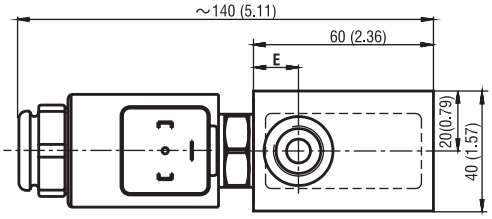


Models MB, ME

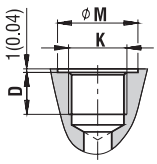


Models R1 (R2)
Models R3 (R4)

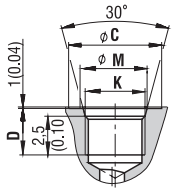




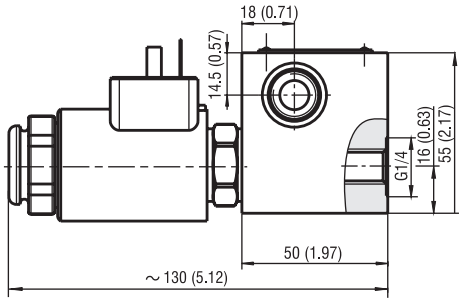
Cavity A, B
for models **R1 (R2)**
DIN 3852

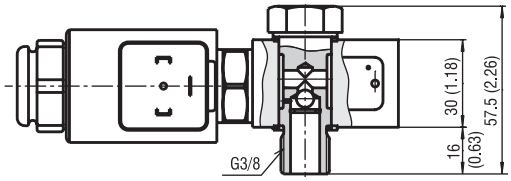


for models **R3 (R4)**
ISO 11926



Model R7



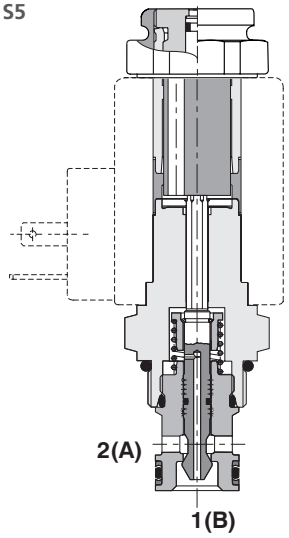


Model	K	M	C	D	E
R1	G3/8	∅23 (0.91)	-	12 (0.47)	15 (0.59)
R2	G1/2	∅28 (1.10)	-	14 (0.55)	16 (0.61)
R3	3/4-16UNF-2B (SAE 8)	∅20,6 (0.81)	∅30 (1.18)	14,3 (0.56)	16 (0.61)
R4	7/8-14UNF-2B (SAE 10)	∅23,9 (0.94)	∅34 (1.34)	16,7 (0.66)	18 (0.71)

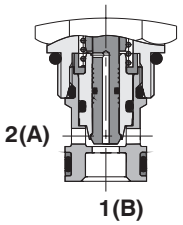
ROE3-042S5(S6)

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

S5



S6

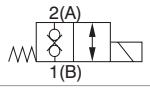
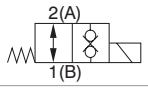


Technical Features

- 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

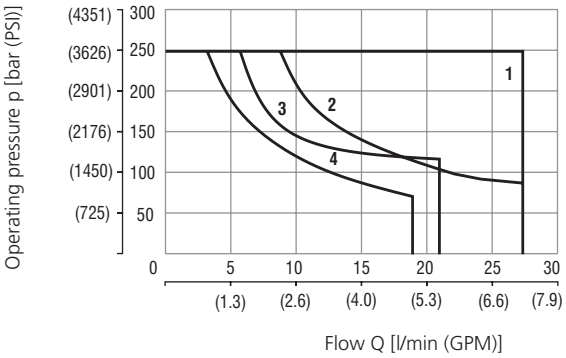
Valve size / Cartridge cavity		M22x1.5 / QG2
Max. flow	l/min (GPM)	25 (6.6)
Max. operating pressure	bar (PSI)	250 (3630)
Fluid temperature range (NBR)	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature	°C (°F)	-20 ... 50 (-4 ... 122)
Supply voltage tolerance	%	AC, DC: ± 10
Max. switching frequency	1/h	15 000
Weight without coil	kg (lbs)	0.2 (0.44)

		Datasheet	Type
General information		GI_0060	Products and operating conditions
Coil types		C_8007	C19B*
Valve bodies	In-line mounted	SB_0018	SB-QG2*
	Sandwich mounted	SB-04 (06)_0028	SB-04-QG2*
Cavity details		SMT_0019	SMT-QG2*
Spare parts		SP_8010	

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

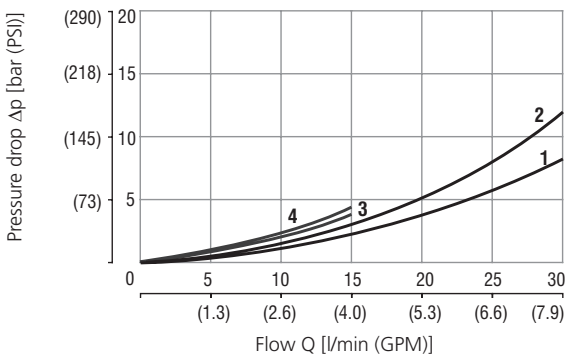
Operating limits

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



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

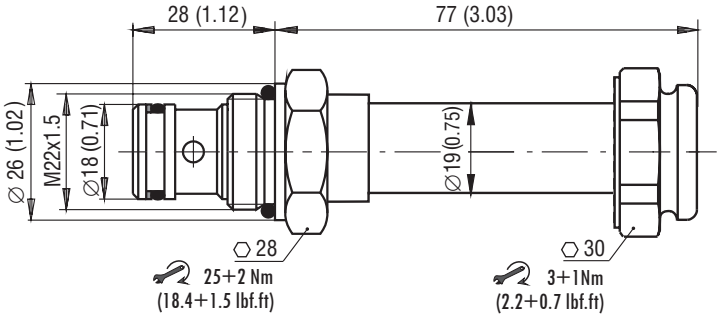
Pressure drop related to flow rate



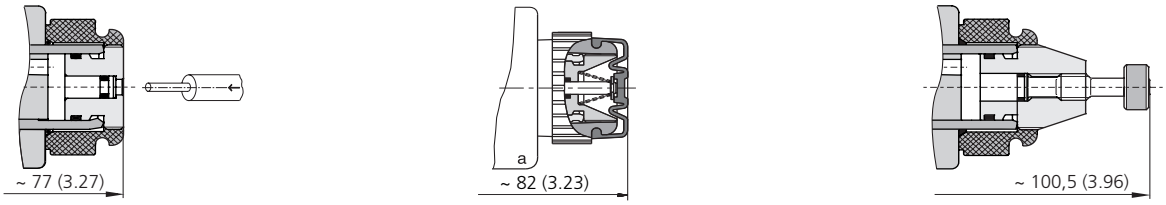
	Model	Connection
1	S5	2→1
2	S5	1→2
3	S6	2→1*
4	S6	1→2*

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

Dimensions in millimeters (inches)



Manual Override in millimeters (inches)



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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

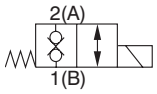
Ordering Code

ROE3 - 042 □ □ □ - □

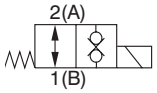
2/2 Solenoid Operated Poppet Valve, Direct Acting **M22x1.5**

Valve size

Functional symbol



S5



S6

Surface treatment

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

Seals

No designation	NBR
V	FPM (Viton)

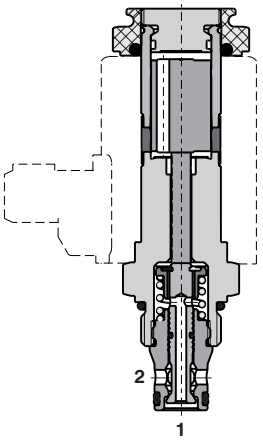
Manual override

No designation	standard
N2	rubber boot protected
N4	hand screw

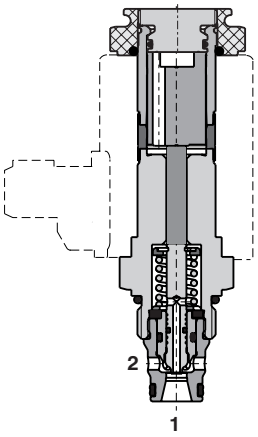
SD1E-A2

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

2S5



2S6

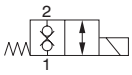
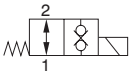


Technical Features

- Hardened precision parts
- High flow capacity and leak-free closing (up to 3 drops per minute)
- High transmitted hydraulic power up to 350 bar
- 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		

Technical Data

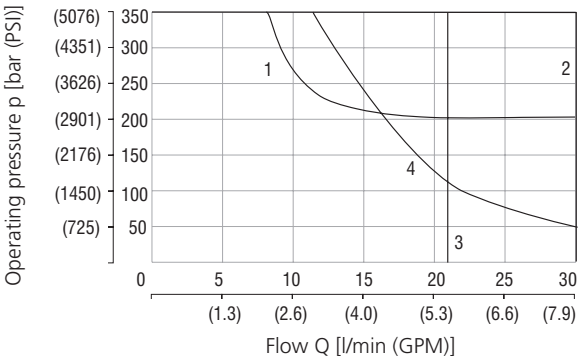
Valve size / Cartridge cavity		3/4-16 UNF-2A / A2 (C-8-2)
Max. flow	l/min (GPM)	30 (7.9)
Max. operating pressure	bar (PSI)	350 (5080)
Fluid temperature range (NBR)	°C (°F)	-30...80 (-22...176)
Fluid temperature range (FPM)	°C (°F)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-30...80 (-22...176)
Supply voltage tolerance	%	AC, DC: ± 15
Max. switching frequency	1/h	15 000
Weight without coil	kg (lbs)	0.19 (0.42)

		Datasheet	Type
General information		GI_0060	Products and operating conditions
Coil types		C_8007	C19B*
Valve bodies	In-line mounted	SB_0018	SB-A2*
	Sandwich mounted	SB-04(06)_0028	SB-*A2*
Cavity details / Form tools		SMT_0019	SMT-A2*
Spare parts		SP_8010	

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

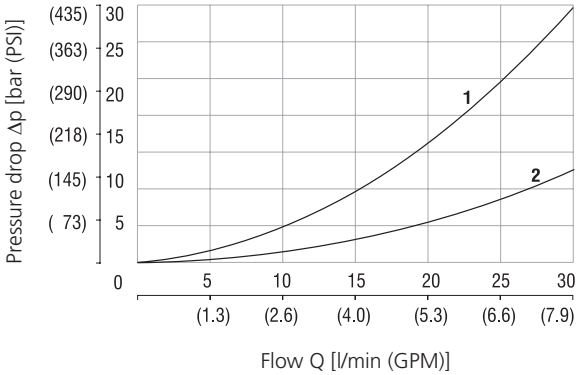
Operating limits

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



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

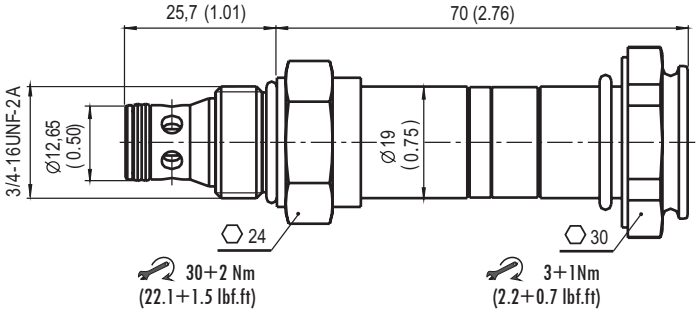
Pressure drop related to flow rate



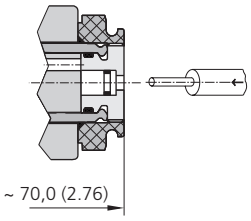
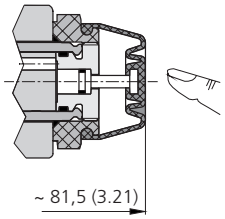
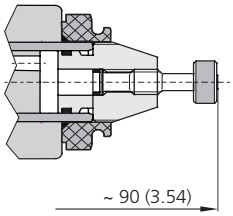
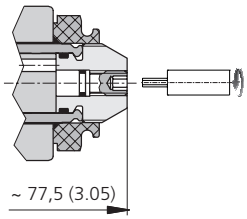
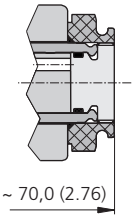
	Model	Connection
1	2S5	1→2
1	2S5	2→1
2	2S6	1→2
2	2S6	2→1

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 spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

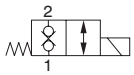
SD1E-A2 / H □ □ □ - □

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

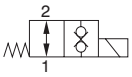
Valve cavity
3/4-16 UNF (C-8-2)

High performance

Functional symbol



2S5



2S6

Surface treatment

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

Seals

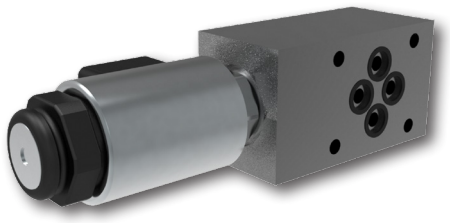
No designation	NBR
V	FPM (Viton)

Manual override

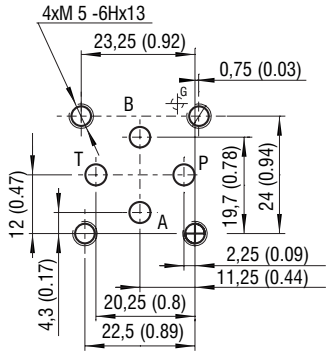
No designation	standard
M2	rubber boot protected
M4	hand screw
M5	socket head screw
M9	without manual override

ROE3-042S5(S6)M

Size 04 (D02), 06 (D03) • Q_{max} 25 l/min (7 GPM) • p_{max} 250 bar (3600 PSI)

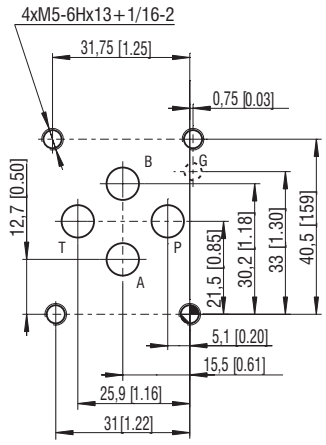


ISO 4401-02-01-0-05



Ports P, A, B, T - max ∅ 4.5 mm (0.18 in)

ISO 4401-03-02-0-05



Ports P, A, B, T - max ∅ 7.5 mm (0.29 in)

Technical Features

- Valve built-in a modular block with subplate interface acc. ISO 4401, DIN 24340 (CETOP 02 and 03) or an in-line body
- 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 (NO) and normally closed (NC) versions
- Optional type of manual override
- Coils interchangeable across ROE / RPE3-04 product line
- In the standard version, the valve body is phosphated and the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

Solenoid operated poppet valve, direct acting, built-in a modular block size (DN) 04 or 06, designed for creating hydraulic circuits by vertical grouping. The second variant is the valve in an in-line body. The bi-directional valve is used for leak-free closing in both flow directions (see Functional Symbols).

Technical Data

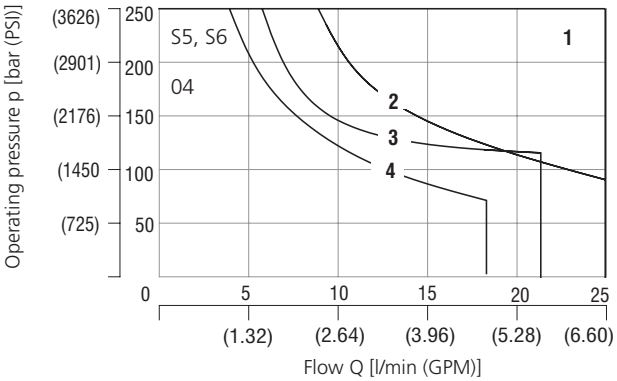
Valve size / Cartridge cavity			04 (02) / QG2	06 (03) / QG2
Max. flow		l/min (GPM)	25 (6.6)	25 (6.6)
Max. operating pressure		bar (PSI)	250 (3630)	
Fluid temperature range (NBR)		°C (°F)	-30 ... +80 (-22 ... +176)	
Fluid temperature range (FPM)		°C (°F)	-20 ... +80 (-4 ... +176)	
Ambient temperature range		°C (°F)	-20 ... +50 (-4 ... +122)	
Supply voltage tolerance		%	AC, DC: ± 10	
Max. switching frequency		1/h	15 000	
Switching time, at v = 32 mm²/s (156 SUS)	ON	ms	DC 25 … 35 AC 25 … 35	DC 30 … 50 AC 30 … 110
	OFF		DC 15 … 25 AC 50 … 100	DC 80 … 130 AC 100 … 150
Weight	- valve with 1 solenoid	kg (lbs)	Modular 1.2 (2.5)	Modular 1.5 (3.2)
	- valve with 2 solenoids		Modular 1.7 (3.6)	Modular 2.0 (4.3)
			In-line 1.6 (3.5)	

	Data Sheet	Type
General information	GI_0060	Products and operating conditions
Cavity details	SMT_0019	Size 04, 06
Spare parts	SP_8010	

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

Operating limits

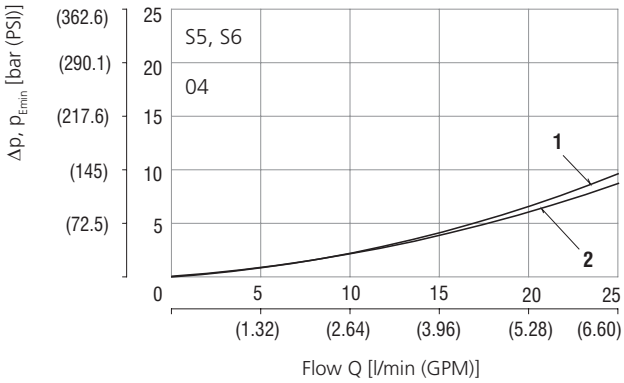
Operating limits for maximum hydraulic power at rated temperature and supplied with voltage equal to 90% of the nominal value



	1	2	3	4
Model	S5	S5	S6	S6
Direction	A-B	B-A	A-B	B-A

Pressure drop related to flow rate

In-line body design R*

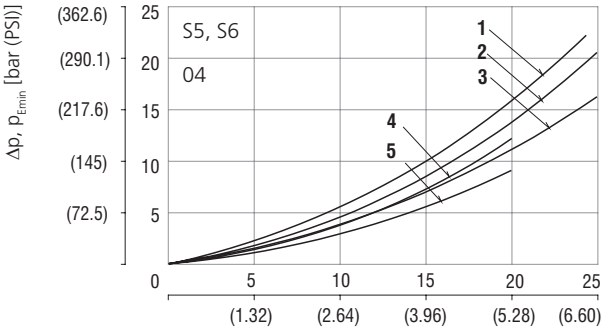


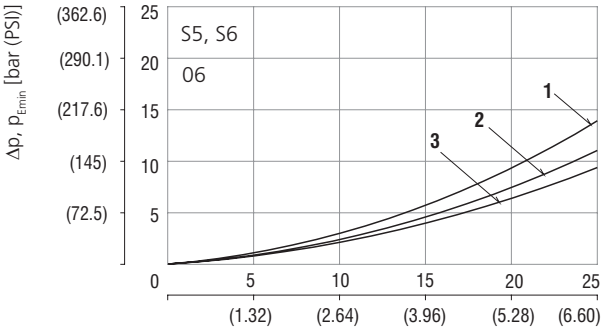
	1	2
Model	R1, R3	R2, R4
Direction	A-B, B-A	A-B, B-A

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

Pressure drop related to flow rate

Modular plate M*





S5	Model	Direction
1	MD04	A-T, T-A
	ME04	B-T, T-B
	MF04	A-T, T-A
		A-T, B-T
		T-A, T-B
2	MX04	A-B, B-A
3	MA04	A1-A2
		A2-A1
	MB04	B1-B2, B2-B1
	MC04	A1-A2, A2-A1
		B1-B2, B2-B1

S6	Model	Direction	
2	MD04	A-T, T-A	(to 20 l/min)
	ME04	B-T, T-B	
	MF04	A-T, B-T	
		T-A, T-B	
4	MX04	A-B, B-A	
5	MA04	A1-A2, A2-A1	
	MB04	B1-B2, B2-B1	
	MC04	A1-A2, A2-A1	
		B1-B2, B2-B1	

S5	Model	Direction
1	MD06	A-T, T-A
	ME06	B-T, T-B
	MF06	A-T, B-T / T-A, T-B
2	MA06	A1-A2
	MB06	B1-B2
	MC06	A1-A2 / B1-B2
	MX06	B-A
3	MA06	A2-A1
	MB06	B1-B2
	MC06	A2-A1 / B2-B1
	MX06	A-B

S6	Model	Direction (to 20 l/min)
1	MD06	T-A
	ME06	T-B
	MF06	T-A, T-B
2	MD06	A-T
	ME06	B-T
	MF06	A-T, B-T
3	MA06	A1-A2, A2-A1
	MB06	B1-B2, B2-B1
	MC06	A1-A2, A2-A1
		B1-B2, B2-B1

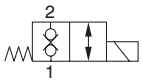
Ordering Code

ROE3 - 042 □ □ □ / □ □ □ □ - □

2/2 Solenoid Operated Poppet Valve, Direct Acting, Modular

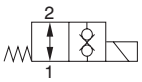
Jmenovitá světlost

normally closed (NC), blocking



S5

normally open (NO), blocking



S6

Model

modular valve, connection A2-A1	**MA**
modular valve, connection B2-B1	**MB**
modular valve, connection A-B	**MX**
modular valve, connection A-T	**MD**
modular valve, connection B-T	**ME**
modular valve, connection B2-B1, A2-A1	**MC**
modular valve, connection B-T, A-T	**MF**
modular valve, connection P-T	**MG**
modular valve, connection P2-P1	**MP***
modular valve, connection B2-P2, B2-T2	**MJ**
in-line valve, 2 ports, thread G3/8	**R1**
in-line valve, 2 ports, thread G1/2	**R2**
in-line valve, 2 ports, thread 3/4-16, (SAE 8)	**R3**
in-line valve, 2 ports, thread 7/8-14 (SAE 10)	**R4**
in-line valve, 2 ports, thread G3/8, G1/4	**R7**

*only available for size 06 (D03)

Modular plate size

ISO 4401-02-01-0-05, DIN 24340 (CETOP 02), size 04	**04**
ISO 4401-03-02-0-05, DIN 24340 (CETOP 03), size 06	**06**

Rated supply voltage of solenoids (at the coil terminals)

01200	12 V DC / 2.41 A
01400	14 V DC / 1.66 A
02100	21 V DC / 1.31 A
02400	24 V DC / 1.15 A
02700	27 V DC / 0.89 A
20500	205 V DC / 0.12 A
02450	24 V AC / 1.44 A / 50 (60) Hz
12060	120 V AC / 0.22 A / 50 (60) Hz
23050	230 V AC / 0.12 A / 50 (60) Hz

Connector type

E1	EN 175301-803-A
E2	E1 with quenching diode
E3	AMP Junior Timer - radial direction (2 pins; male)
E4	E3 with quenching diode
E3A	AMP Junior Timer - axial direction (2 pins; male)
E4A	E3A with quenching diode
E5	EN 175301-803-A with integrated rectifier
E8	loose conductors (two insulated wires)
E9	E8 with quenching diode
E12A	Deutsch DT04-2P - axial direction
E13A	E12A with quenching diode

The AC coils correspond to E5.

Manual override

No designation	standard
N2	covered with rubber boot
N4	with hand screw

Seals

No designation	NBR
V	FPM (Viton)

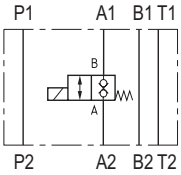
Surface treatment

No designation	standard
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

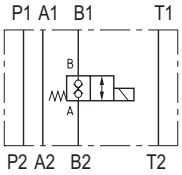
Functional Symbols

Example: ROE3-042S5(S6)M*

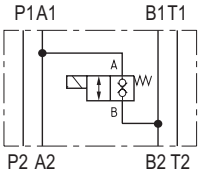
Model MA



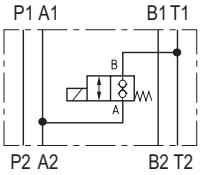
Model MB



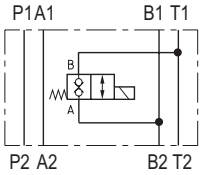
Model MX



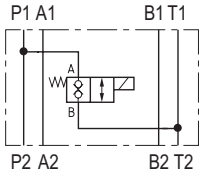
Model MD



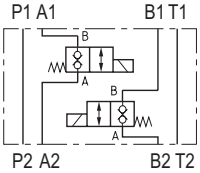
Model ME



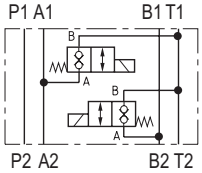
Model MG



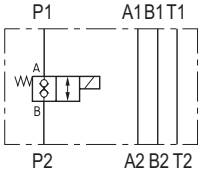
Model MC



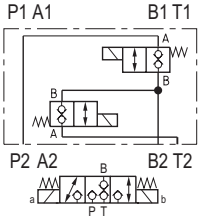
Model MF



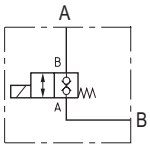
Model MP



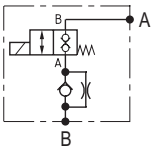
Model MJ



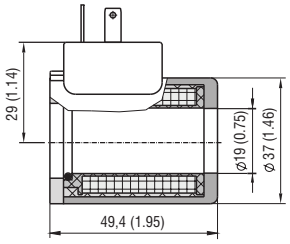
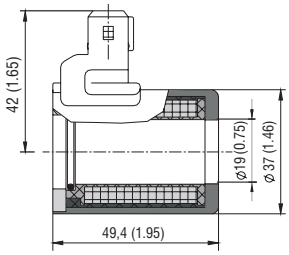
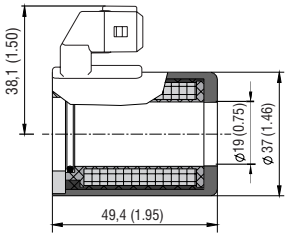
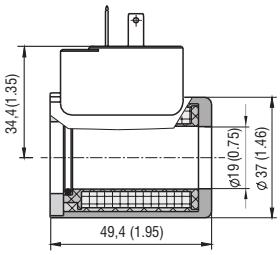
Model R1(R3), R2(R4)

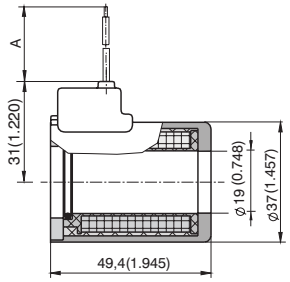
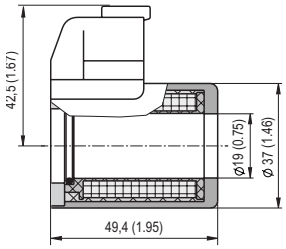


Model R7



Solenoid Coil in millimeters (inches)

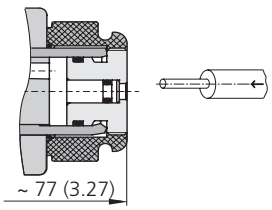
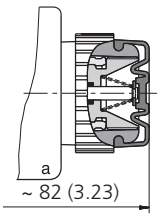
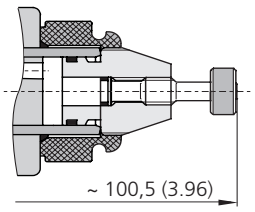
E1 - EN 175301-803-A E2 - E1 with quenching diode Protection degree IP65	E3 - AMP Junior Timer - radial direction E4 - E3 with quenching diode Protection degree IP67	E3A - AMP Junior Timer - axial direction E4A - E3A with quenching diode Protection degree IP67	E5 - EN 175301-803-A and integrated rectifier Protection degree IP65
			

E8 - Loose conductors (two insulated cables) E9 - (E8 with quenching diode)	E12A - Deutsch DT04-2P E13A - E12A with quenching diode Protection degree IP67 / IP69K
	

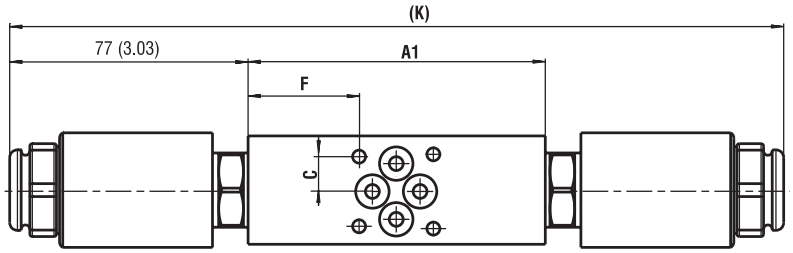
Note:
A = Standard 300 mm (11.81 in), other sizes on demand

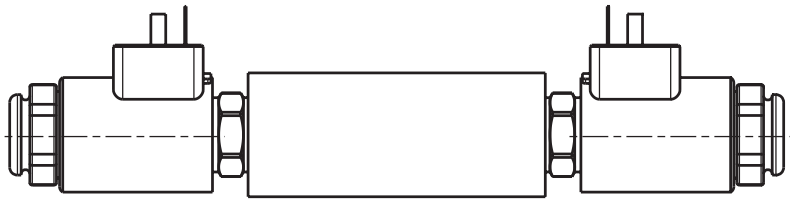
The indicated IP protection level is only reached with a properly mounted connector.

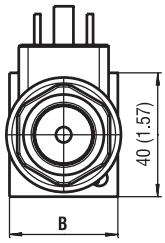
Manual Override in millimeters (inches)

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

Models MC, MF, MJ

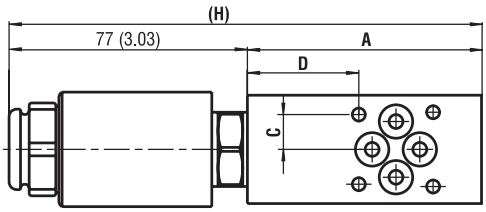


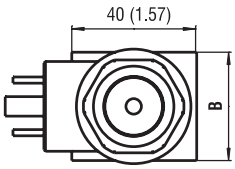




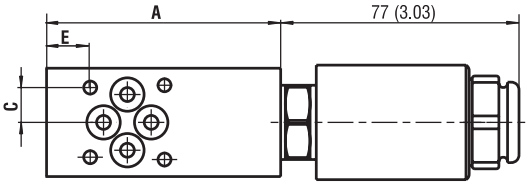
	Size 04	Size 06
A	76 (2.99)	80 (3.15)
A1	96 (3.78)	94 (3.70)
B	35 (1.38)	45 (1.77)
C	11.25 (0.44)	15.5 (0.61)
D	36 (1.42)	28 (1.10)
E	16 (0.63)	11.5 (0.45)
F	36 (1.42)	25.5 (1.00)
H	153 (6.02)	157 (6.18)
K	250 (9.84)	248 (9.76)

Models MA, MX, MD, MG, MP

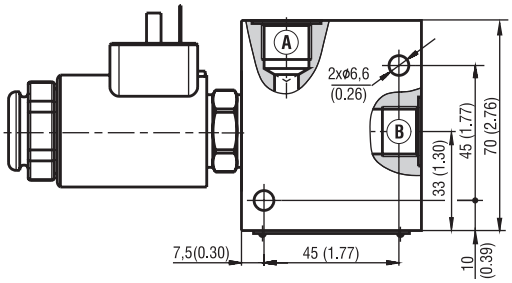


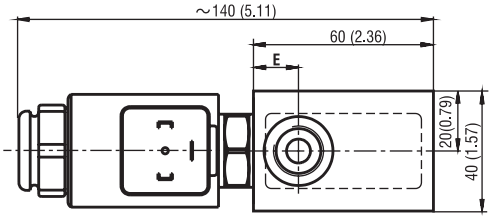


Models MB, ME

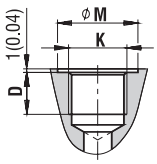


Models R1 (R2)
Models R3 (R4)

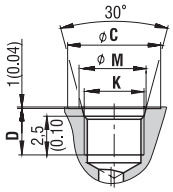




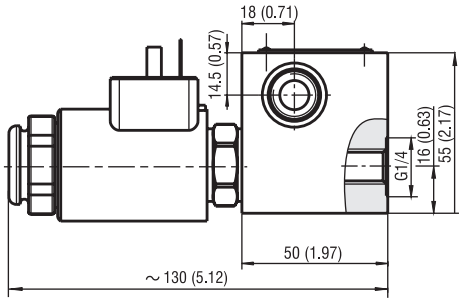
Cavity A, B
for models **R1 (R2)**
DIN 3852

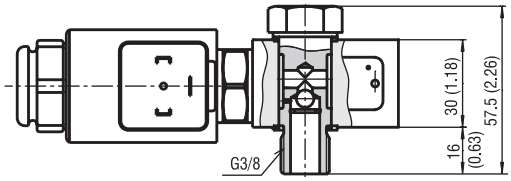


for models **R3 (R4)**
ISO 11926



Model R7



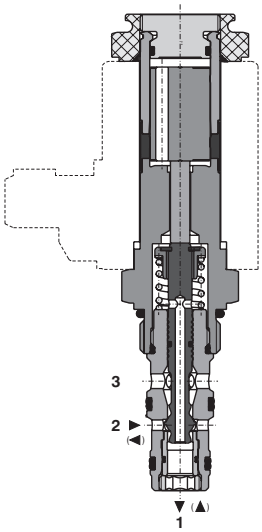


Model	K	M	C	D	E
R1	G3/8	∅23 (0.91)	-	12 (0.47)	15 (0.59)
R2	G1/2	∅28 (1.10)	-	14 (0.55)	16 (0.61)
R3	3/4-16UNF-2B (SAE 8)	∅20.6 (0.81)	∅30 (1.18)	14.3 (0.56)	16 (0.61)
R4	7/8-14UNF-2B (SAE 10)	∅23.9 (0.94)	∅34 (1.34)	16.7 (0.66)	18 (0.71)

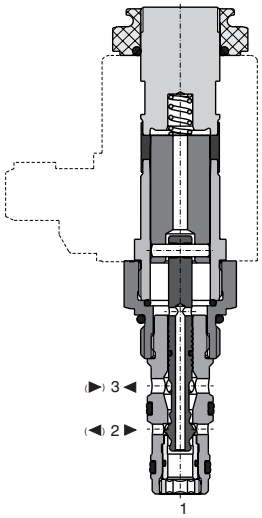
SD1E-A3

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

2S7



2S8

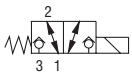
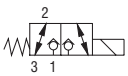


Technical Features

- 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		

Technical Data

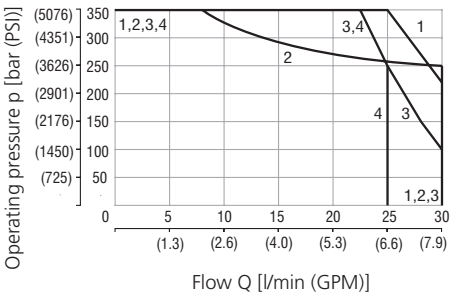
Valve size / Cartridge cavity			3/4-16 UNF-2A / A3 (C-8-3)
Max. flow		l/min (GPM)	30 (7.9)
Max. operating pressure		bar (PSI)	350 (5080)
Fluid temperature range (NBR)		°C (°F)	-30...80 (-22...176)
Fluid temperature range (FPM)		°C (°F)	-20...80 (-4...176)
Ambient temperature range		°C (°F)	-30...80 (-22...176)
Supply voltage tolerance		%	AC, DC: ± 15
Max. switching frequency		1/h	15 000
Weight without coil	2S7	kg (lbs)	0.21 (0.45)
	2S8		0.22 (0.47)
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Coil types		C_8007	C19B*
Valve bodies	In-line mounted	SB_0018	SB-A3*
	Sandwich mounted	SB-04(06)_0028	SB-*A3*
Cavity details / Form tools		SMT_0019	SMT-A3*
Spare parts		SP_8010	

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

Operating limits

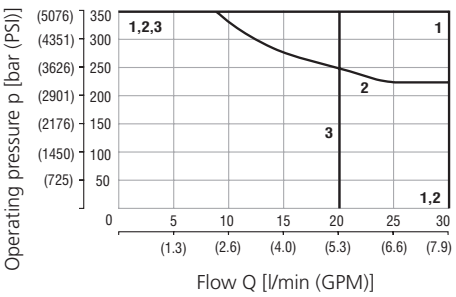
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F) /
Voltage U_n -10% (21.6 V DC)

2S7



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

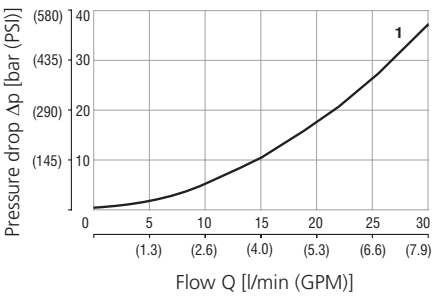
2S8



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

Pressure drop related to flow rate

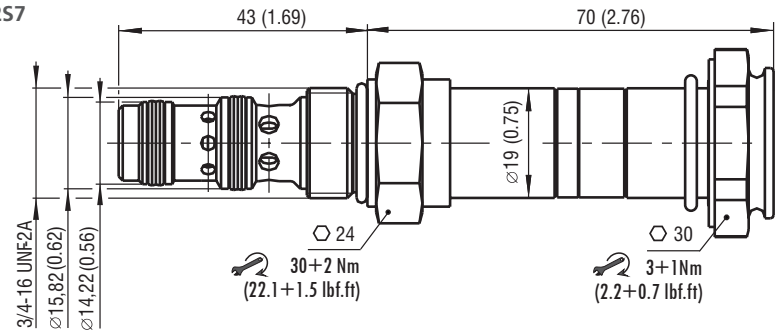
Δp 2S7, 2S8



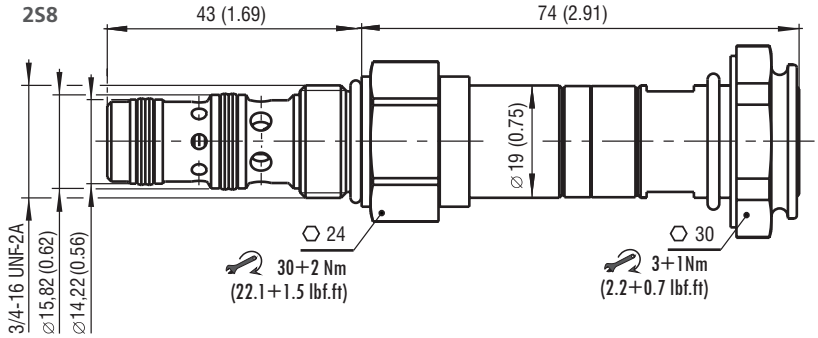
	Model	Connection
1	2S7, 2S8	1→2*, 2→1, 2→3, 3→2
* max. 25 l/min (6.6 GPM)		

Dimensions in millimeters (inches)

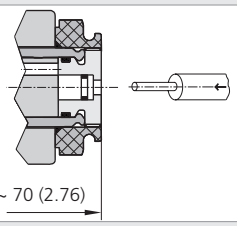
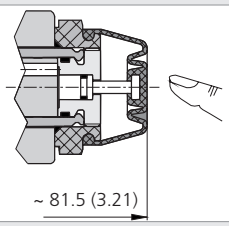
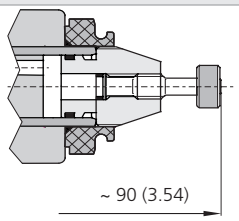
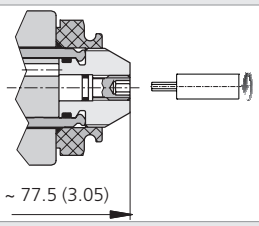
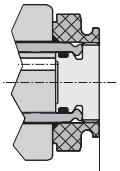
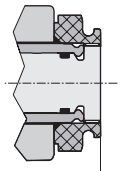
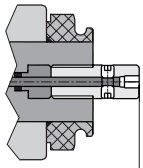
2S7



2S8



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
 ~ 70 (2.76)	 ~ 81.5 (3.21)	 ~ 90 (3.54)	 ~ 77.5 (3.05)
Designation M9 - without manual override - for 2S7	- for 2S8		Designation M5 - for 2S8 - socket head screw, size 2.5
 ~ 70,0 (2.76)	 ~ 74,0 (2.91)		 ~85 (3.35)

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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

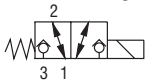
SD1E-A3 / H □ □ □ - □

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

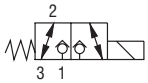
Valve cavity
3/4-16 UNF (C-8-3)

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

No designation	NBR
V	FPM (Viton)

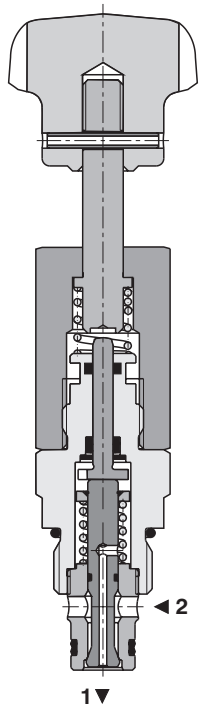
Manual override

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)

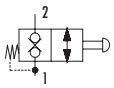
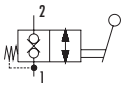


Technical Features

- 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	
	1	2
Symbol		

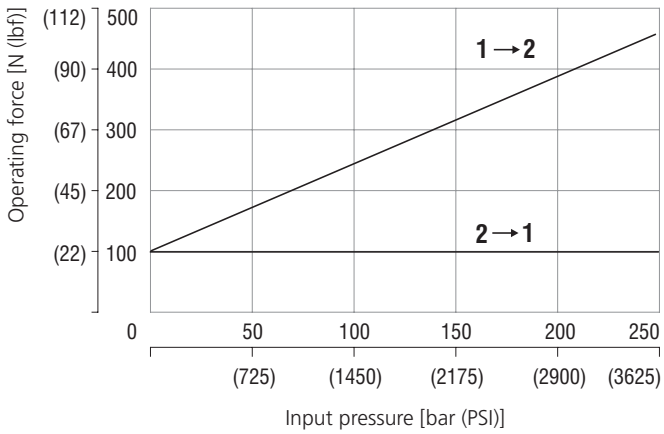
Technical Data

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 (3630)	
Max. operating force	N (lbf)	see characteristics	
Fluid temperature range (NBR)	°C (°F)	-30 ... 100 (-22 ... +212)	
Fluid temperature range (FPM)	°C (°F)	-20 ... 120 (-4 ... +248)	
Service life	cycles	10^6	
Weight	model	1	2
	kg (lbs)	0.27 (0.60)	0.38 (0.84)

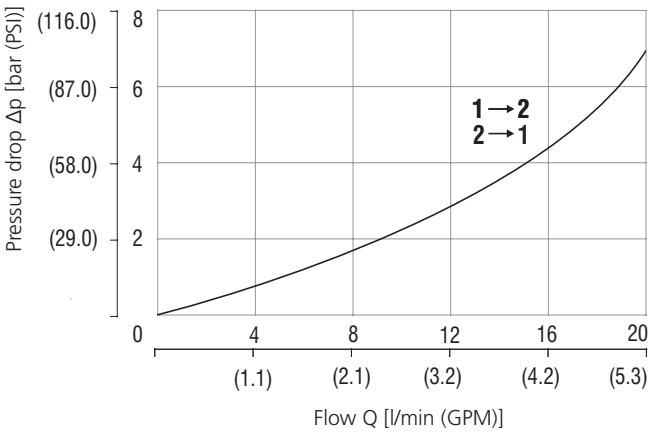
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In line mounted	SB_0018	SB-A2*
	Sandwich mounted	SB-04(06)_0028	SB-*A2*
Cavity details / Form tools		SMT_0019	SMT-A2*
Spare parts		SP_8010	

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

Operating limits

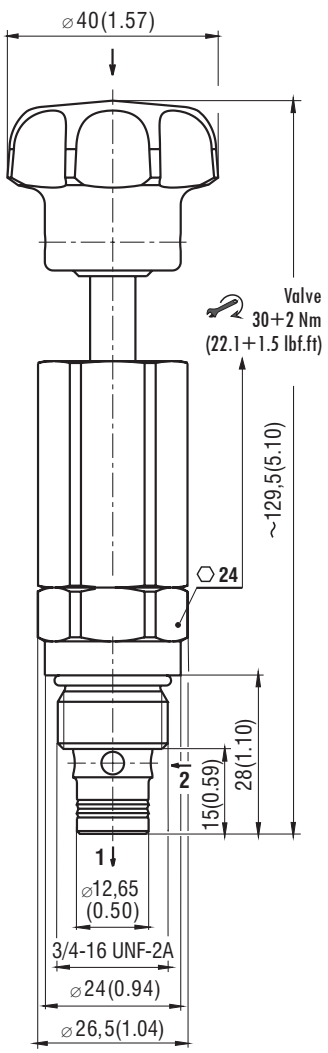


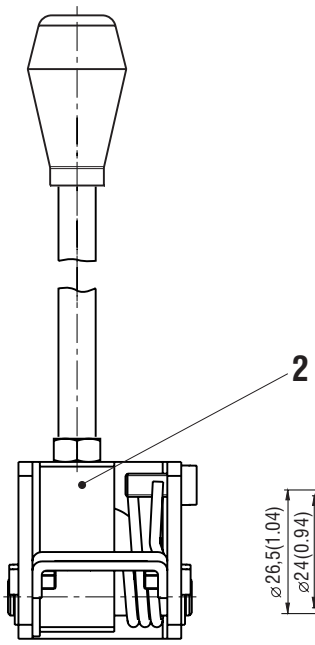
Pressure drop related to flow rate



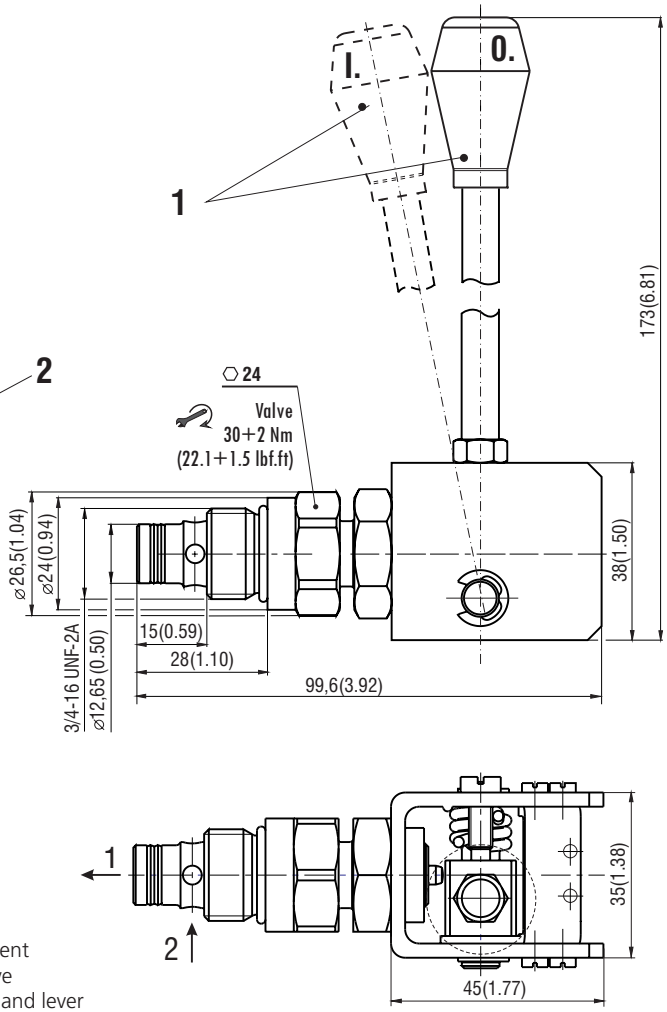
Dimensions in millimeters (inches)

Model 1





Model 2



1. Hand lever
   0. basic position with detent
   I. position opens the valve
2. Control segment of the hand lever

Ordering Code

SD1M - A2 / L 2S5 - □ □ - □

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

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

Model
Lightline

Model

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

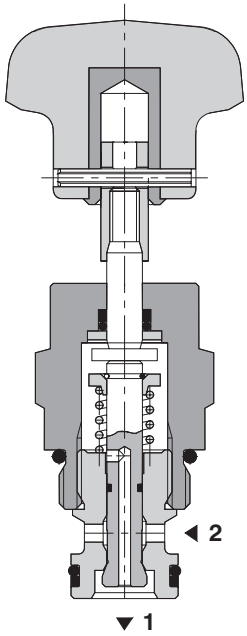
Seals
- **No designation** NBR
- **V** FPM (Viton)

Actuation
- **1** hand push knob
- **2** hand lever

ROR3-062

M22 x 1.5 • Q_{max} 35 l/min (9 GPM) • p_{max} 320 bar (4600 PSI)

Normally closed
Push-to-open

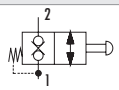
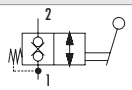


Technical Features

- Hardened precision parts
- High flow capacity and leak-free closing
- Wide range of actuation alternatives
- Standard version zinc-coated (240 h corrosion protection in NSS 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		

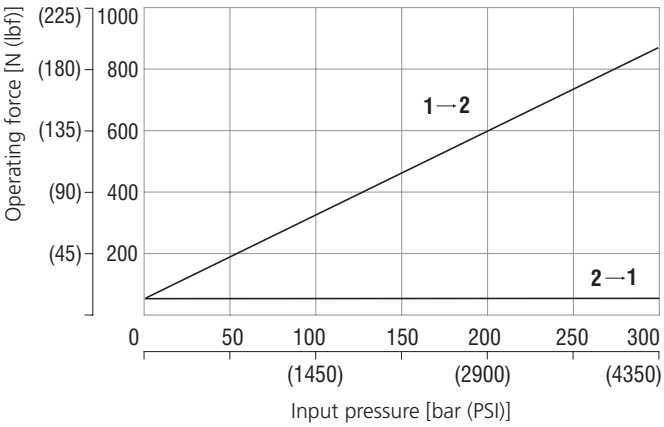
Technical Data

Valve size / Cartridge cavity		M22 x 1.5 / QG2		
Max. flow	l/min (GPM)	35 (9.2)		
Max. operating pressure	bar (PSI)	320 (4640)		
Max. operating force	N (lbf)	see characteristics		
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +176)		
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)		
Service life	cycles	10^6		
Weight	model	1	2	3
	kg (lbs)	0.15 (0.33)	0.25 (0.55)	0.66 (1.46)

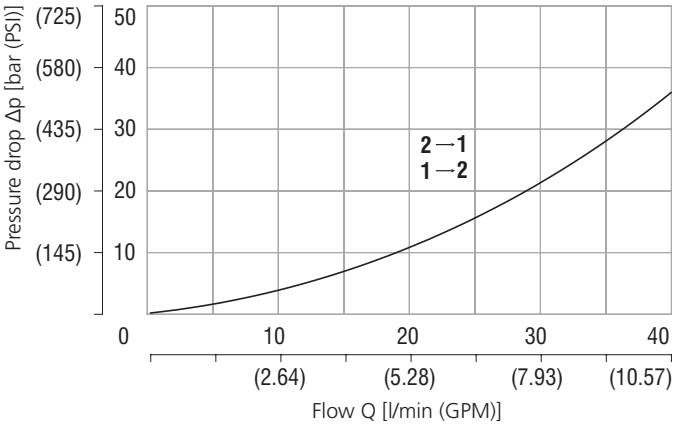
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-QG2*
	Sandwich mounted	SB-4(06)_0028	SB-*QG2*
Cavity details		SMT_0019	SMT-QG2*
Spare parts		SP_8010	

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

Operating limits

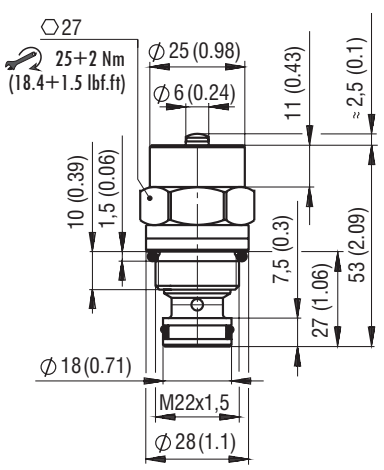


Pressure drop related to flow rate

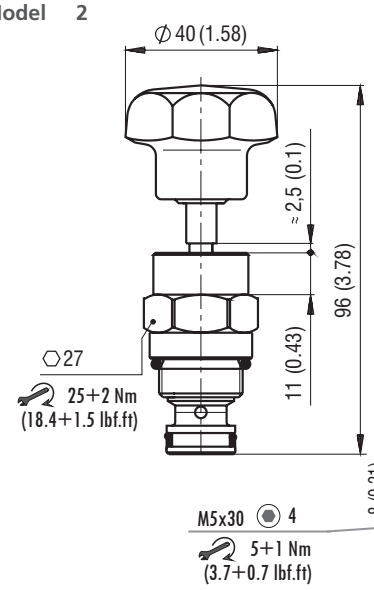


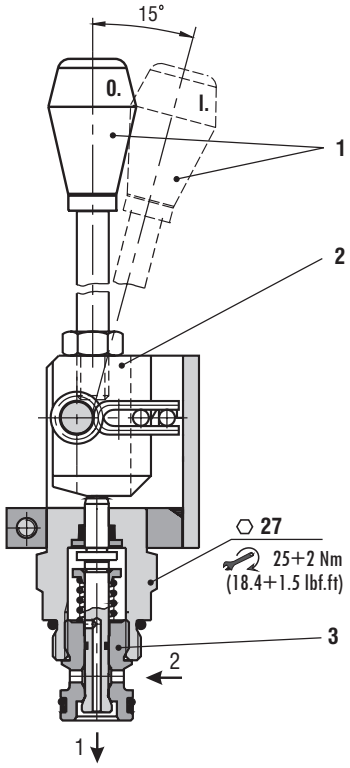
Dimensions in millimeters (inches)

Model 1

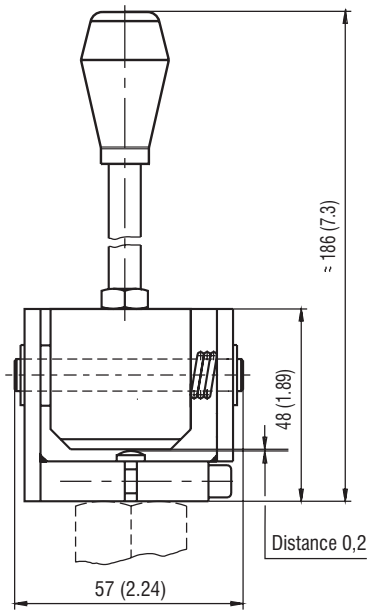


Model 2





Model 3



1 Hand lever
0 position with detent
I. 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

Actuation
1 plunger
2 hand push knob
3 hand lever

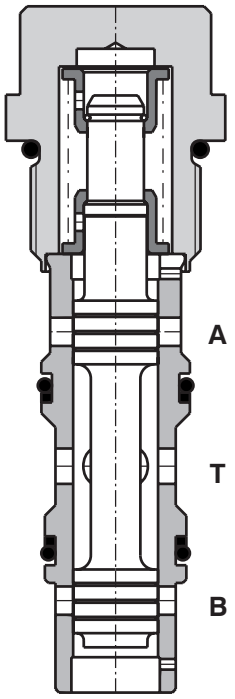
Seals
No designation NBR
V FPM (Viton)

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

3/3 Hydraulically operated hot oil shuttle valve for hydrostatic drives, screw-in cartridge design

SD2H-LA3

M24 x 1.5 • Q_{max} 40 l/min (11 GPM) • p_{max} 320 bar (4600 PSI)

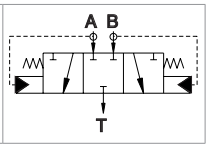


Technical Features

- 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.

Symbol	

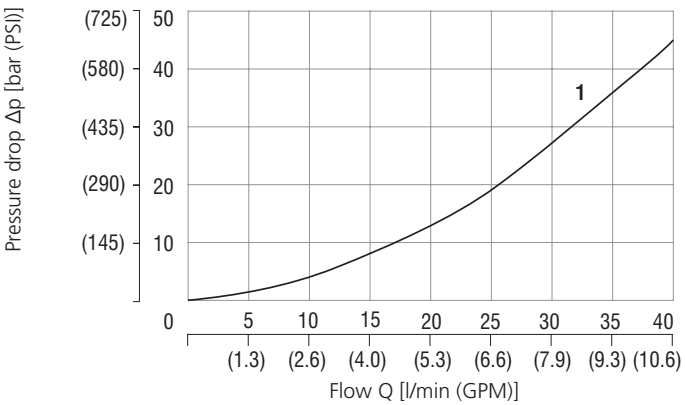
Technical Data

Valve size / Cartridge cavity		M24 x 1.5 / LA3	
Max flow	l/min (GPM)	40 (10.6)	
Max. operating pressure	bar (PSI)	320 (4640)	
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)	
Weight	kg (lbs)	0.23 (0.50)	

		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-LA3* (On request)
	Sandwich mounted	SB-04(06)_0028	SB-*LA3* (On request)
Cavity details		SMT_0019	SMT-LA3*
Spare parts		SP_8010	

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

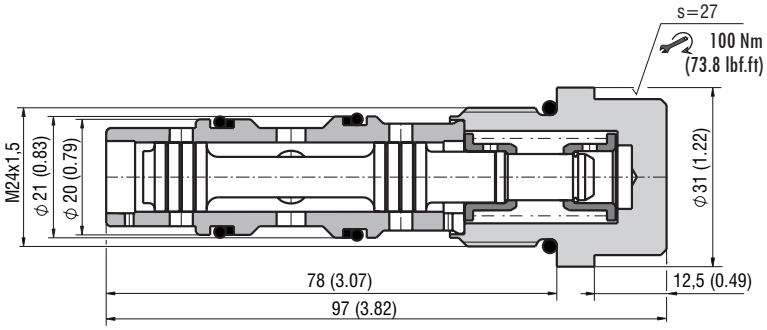
Pressure drop related to flow rate



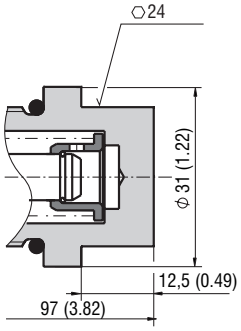
	Connection
1	B → T, A → T

Dimensions in millimeters (inches)

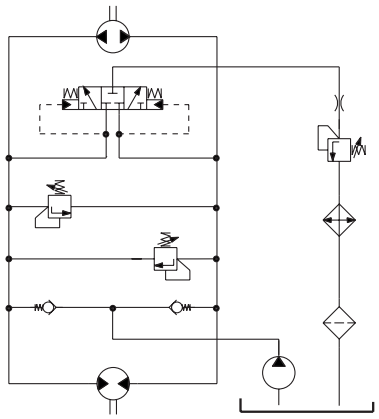
Cover cup - Standard



Cover cup - P



Application example



This hot oil shuttle valve is typically used in hydrostatic transmissions. It discharges approximately 10% of the closed-loop hydrostatic flow through a cooler and a filter back to the tank. The valve senses the pressure in both branches and the spool is automatically operated to drain the heated fluid from the low-pressure line, it means from the line leading the fluid from the actuator back to the pump inlet. Reversing the pump rotation the pressure in branches is changed and the spool of valve is switched-over. The discharged flow is adjusted with downstream pressure relief valve which is typically set at 15 to 30 bar (at 200 to 400 PSI). The cooled and filtered fluid is refilled to the low-pressure line by means of a gear pump via check valves.

Ordering Code

SD2H - LA3 / H ☐ ☐ ☐ - ☐

3/3 Hydraulically operated hot oil shuttle valve for hydrostatic drives, screw-in cartridge design

Valve cavity
M24 x 1.5

Model
High performance

Cracking pressure
7.0 bar (102 PSI) **070**
12.0 bar (174 PSI) **120**

Cover cup
No designation standard - across flats 27 mm
P HEX 24

Seals
No designation NBR
V FPM (Viton)

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