

Content

Symbol Example	Flow l/min (GPM)	Pressure bar (PSI)	Type Code	Cartridge	Size 03	Size 04; D02	Size 06; D03	Size 10; D05	Size 16; D07	Size 25; D08	Line Mounted	Page	Data Sheet
4/2 and 4/3 Solenoid Operated Directional Control Valves													
	20 (5)	250 (3600)	RPEK1-03		X							40	HA 4027
	20 (5)	320 (4600)	RPE2-04			X						44	HA 4012
	30 (8)	250 (3600)	RPEL1-04			X						48	HA 4037
	30 (8)	320 (4600)	RPE3-04			X						52	HA 4014
	50 (13)	250 (3600)	RPEL1-06				X					56	HA 4056
	80 (21)	350 (5100)	RPE3-06				X					60	HA 4010
	80 (21)	350 (5100)	RPER3-06				X					64	HA 4026
	80 (21)	350 (5100)	RPEA3-06				X					66	HA 4029
	80 (21)	350 (5100)	RPEW4-06				X					70	HA 4035
	140 (37)	350 (5100)	RPE4-10					X				74	HA 4039
	140 (37)	350 (5100)	RPEW4-10					X				78	HA 4044
4/2 and 4/3 Directional Control Valves, Internally and Externally Pilot Operated													
	150 (40)	420 (6100)	RNEH1-10					X				82	HA 4075
	300 (79)	320 (4600)	RNEH5-16						X			86	HA 4023
	600 (159)	320 (4600)	RNEH4-25							X		90	HA 4024
4/2 and 4/3 Directional Control Valves, Manually Operated													
	30 (8)	320 (4600)	RPR3-04			X						94	HA 4018
	80 (21)	350 (5100)	RPR3-06				X					96	HA 4004
	140 (37)	350 (5100)	RPR1-10					X				98	HA 4084
4/2 and 4/3 Hydraulic Operated Directional Control Valves													
	80 (21)	350 (5100)	RPH2-06				X					102	HA 4005
	80 (21)	350 (5100)	RPH3-06				X					104	HA 4006
4/2 Directional Control Valves, Roller Cam Operated													
	80 (21)	350 (5100)	RPK1-06				X					106	HA 4038
2/2 Directional Valves, Solenoid Operated, Spool Type, Screw-In Style													
	30 (8)	350 (5100)	SD2E-A2	X		(X)					(X)	108	HA 4040
	60 (16)	350 (5100)	SD2E-B2	X			(X)				(X)	110	HA 4060
3/2 Directional Valves, Solenoid Operated, Spool Type, Screw and Slip-In Style													
	30 (8)	80 (1200)	PD2E	X							(X)	112	HA 4050
	30 (8)	350 (5100)	SD2E-A3	X		(X)					(X)	114	HA 4041
	60 (16)	350 (5100)	SD2E-B3	X			(X)				(X)	116	HA 4061

Symbol Example	Flow l/min (GPM)	Pressure bar (PSI)	Type Code	Cartridge	Size 04; D02	Size 06; D03	Size 10; D05	Line Mounted	Page	Data Sheet
4/2 Directional Valves, Solenoid Operated, Spool Type, Screw-In Style										
	30 (8)	350 (5100)	SD2E-A4	X	(X)			(X)	118	HA 4042
	60 (16)	350 (5100)	SD2E-B4	X		(X)		(X)	120	HA 4062
2/2 Directional Valves, Solenoid Operated, Poppet Type, Screw-In and Modular Style										
	63 (13)	250 (3600)	ROE3-06S2	X					122	HA 4022
	25 (7)	250 (3600)	ROE3-062S2/M		X	X		X	124	HA 4072
	30 (8)	420 (6100)	SD3E-A2	X	(X)			(X)	128	HA 4043
	75 (20)	420 (6100)	SD3E-B2	X		(X)		(X)	130	HA 4063
2/2 Directional Valves, Solenoid Operated, Poppet Type, Blocking, Screw-In and Modular Style										
	25 (7)	250 (3600)	ROE3-042S5(S6)	X					132	HA 4055
	25 (7)	250 (3600)	ROE3-042S5(S6)/M		X	X		X	134	HA 4073
	30 (8)	350 (5100)	SD1E-A2	X	(X)			(X)	138	HA 4070
3/2 Directional Valves, Solenoid Operated, Poppet Type, Blocking, Screw-In Style										
	30 (8)	350 (5100)	SD1E-A3	X	(X)			(X)	140	HA 4071
2/2 Directional Valves, Manually Operated, Screw-In Style										
	35 (9)	320 (4600)	ROR3-062	X					142	HA 4025
	20 (5)	250 (3600)	SD1M-A2/L	X	(X)			(X)	144	HA 4051
3/3 Directional Valves, Hydraulically Operated, Screw-In Style										
	40 (11)	320 (4600)	SD2H-LA3	X				(X)	146	HA 4080

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

RPEK1-03

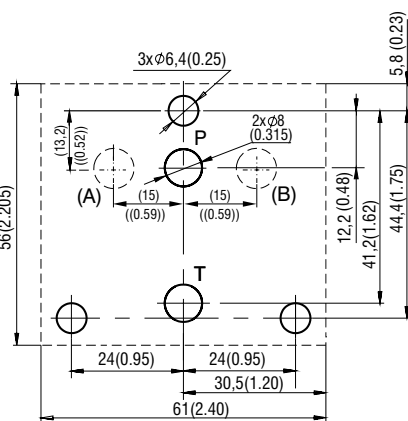
Size 03 • Q_{max} 20 l/min (5 GPM) • p_{max} 250 bar (3600 PSI)

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

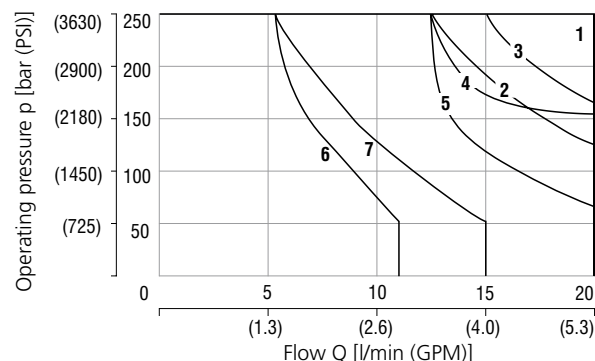
Valve size		03
Max. flow	l/min (GPM)	20 (5.3)
Max. operating pressure at port P, A, B	bar (PSI)	250 (3630)
Max. operating pressure at port T	bar (PSI)	210 (3050)
Fluid temperature range (NBR)	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature range	°C (°F)	-30 ... +50 (-22 ... +122)
Supply voltage tolerance	%	DC: ±10
Max. switching frequency	1/h	15 000
Switching time at v=32 mm ² /s (156 SUS)	ON	ms
	OFF	ms
Mass	- valve with 1 solenoid	kg (lbs)
	- valve with 2 solenoids	kg (lbs)
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 v = 32 mm²/s (156 SUS)

Operating limits

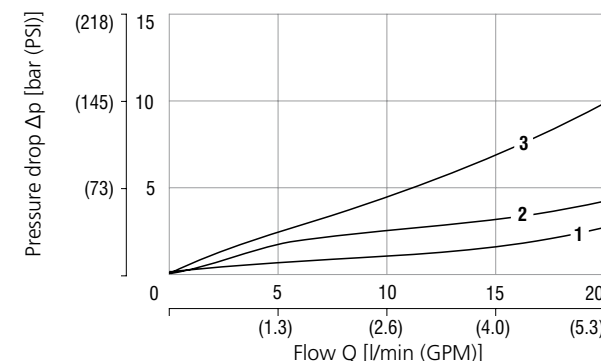
Operating limits for maximum hydraulic power at rated temperature and supplied with voltage equal to 90 % of the nominal value



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
thread A, B - G1/4
thread A, B SAE6 - 9/16-18UNF
stackable

Type of connection
thread A, B - G1/4
thread A, B SAE6 - 9/16-18UNF
stackable

Number of valve positions
two positions
three positions

Spool symbols
see the table of "Spool Symbols"

Rated supply voltage of solenoids (at the coil terminal)
12 V DC / 1.83 A
24 V DC / 0.92 A

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

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

Seals
NBR
FPM (Viton)

Model
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
standard
protected with rubber boot
socket head screw

No designation
N2
N5

E1
E2
E3A
E4A
E12A
E13A

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

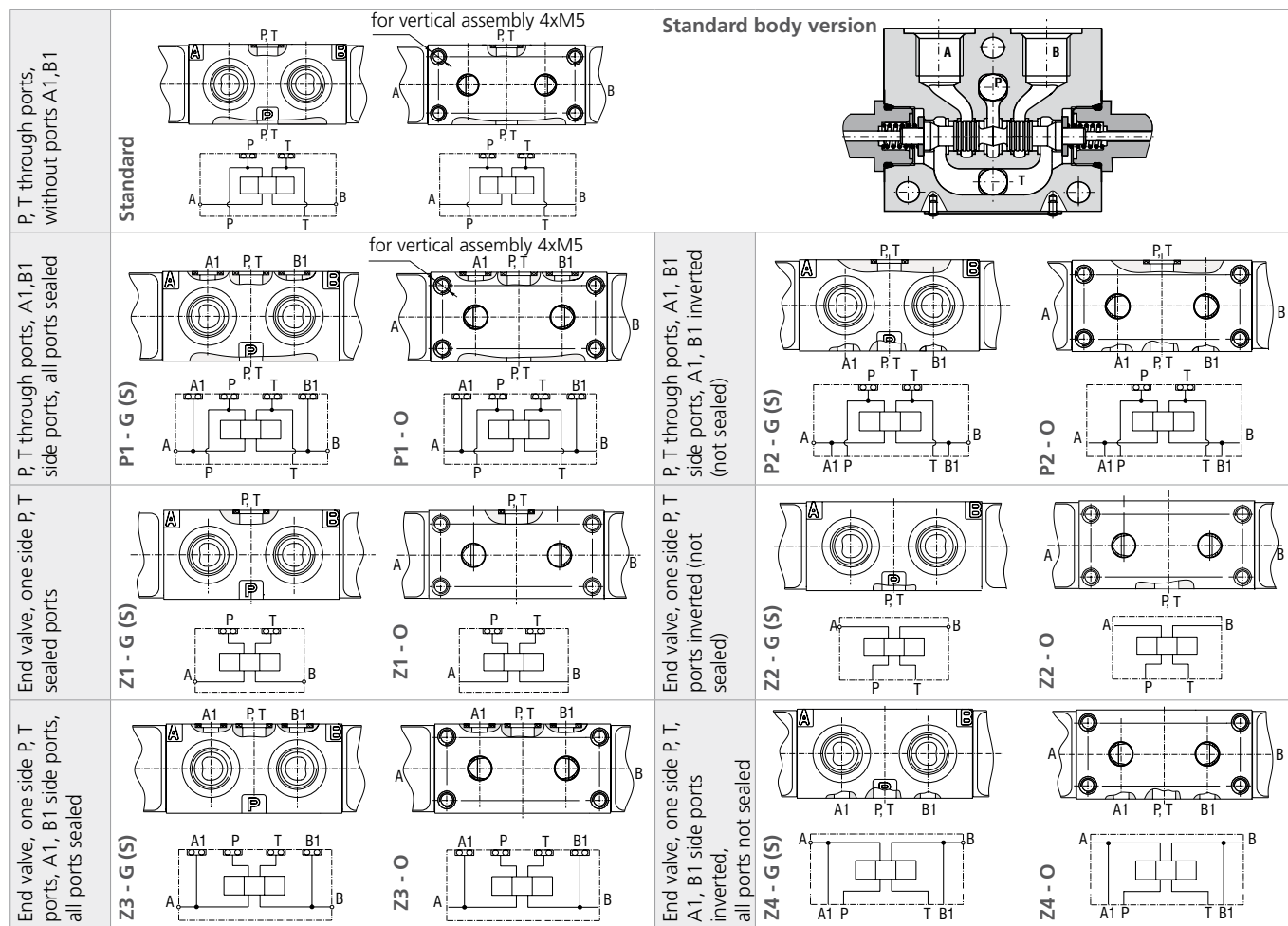
Solenoid Coil in millimeters (inches)

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)

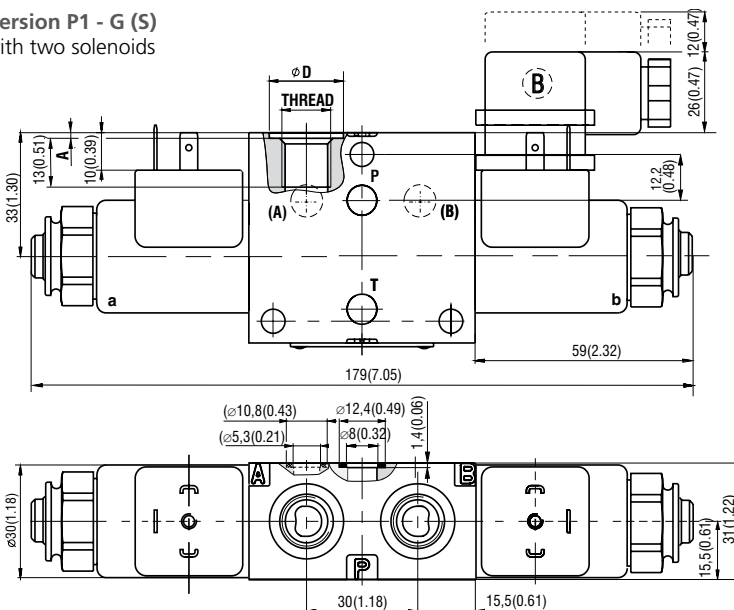
No designation - standard	N2- protected with rubber boot	N5 - socket head screw 3	
			In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact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

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

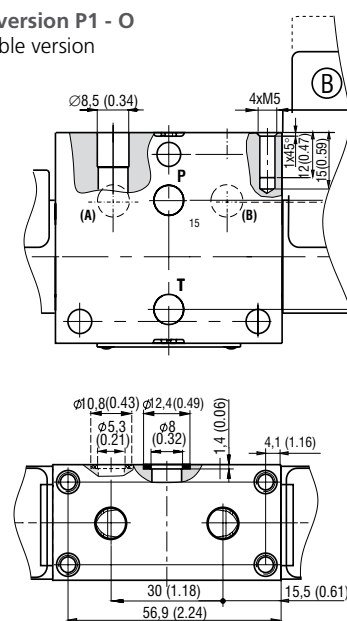


Dimensions in millimeters (inches)

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

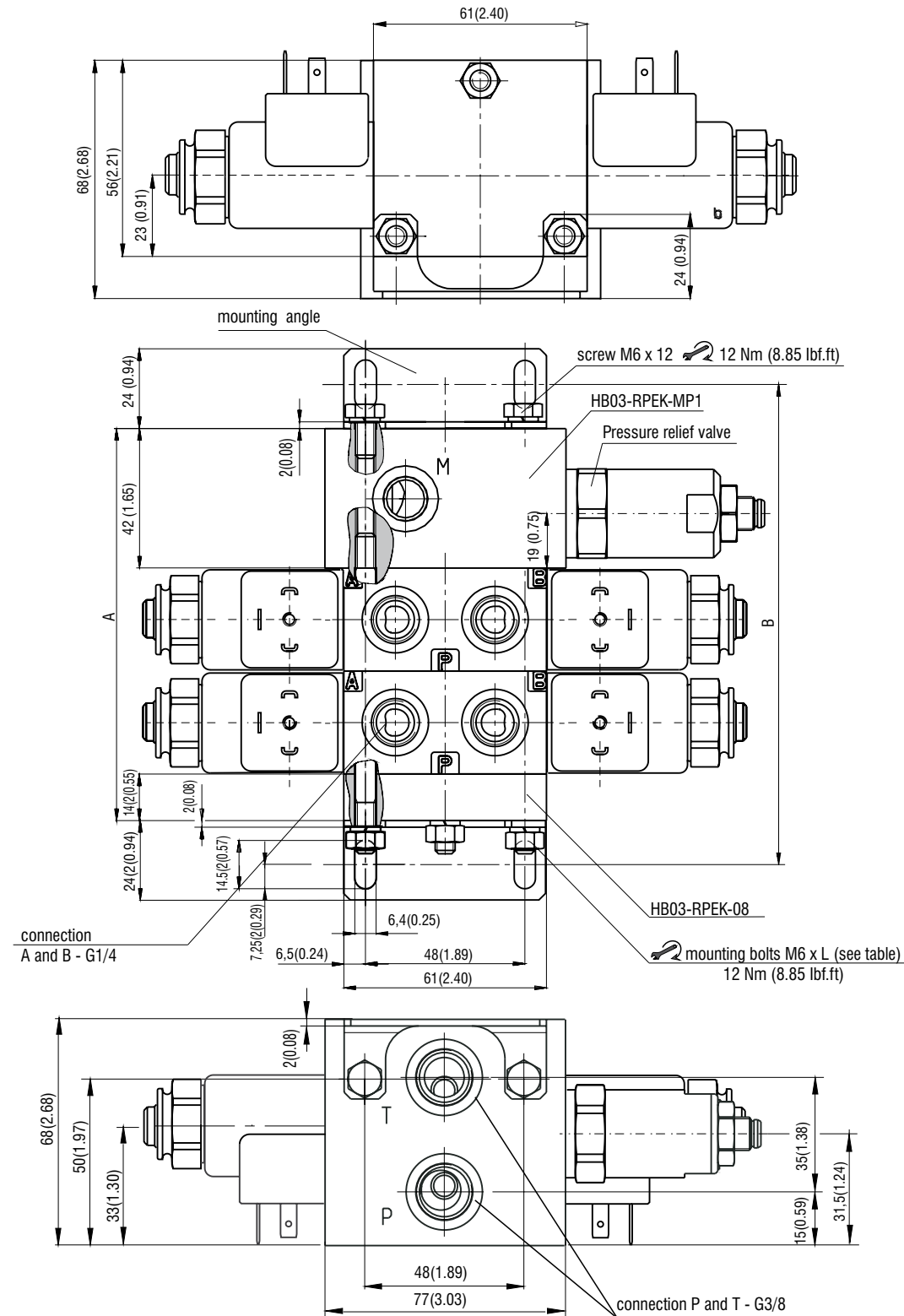


Body version P1 - O
Stackable version



Block Assembly in millimeters (inches)

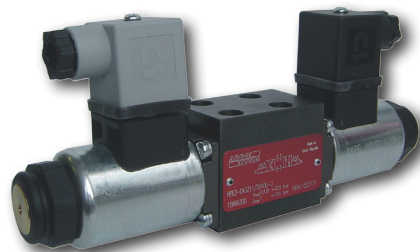
VERSION - valve with inlet block and pressure relief valve see datasheet 4057 - RPEK1-03/B



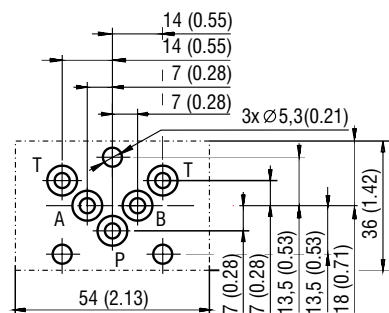
Dimensions mm (inches)								
Number of sections	1	2	3	4	5	6	7	8
Dimension A	87 (3.43)	118 (4.65)	149 (5.87)	180 (7.09)	211 (8.31)	242 (9.53)	273 (10.75)	304 (11.97)
Dimension B	114 (4.49)	145 (5.71)	176 (6.93)	207 (8.15)	238 (9.37)	269 (10.59)	300 (11.81)	331 (13.03)
Dimension L	60 (2.36)	100 (3.94)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

RPE2-04

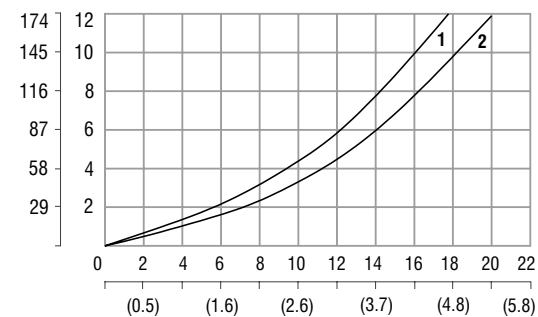
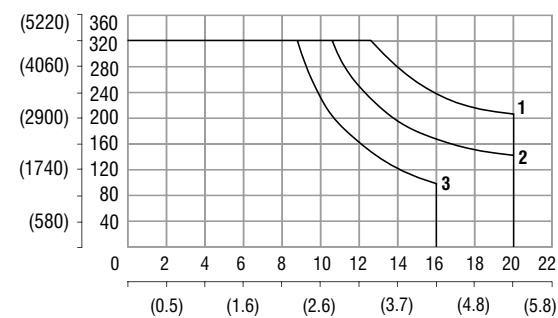
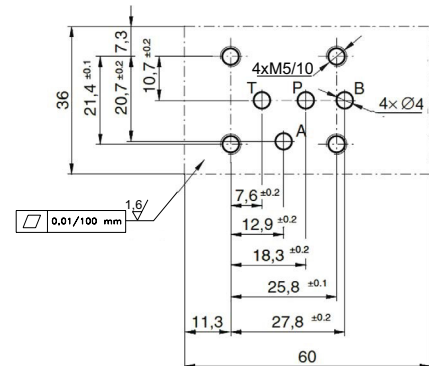
Size 04 (D02) • $Q_{\max}$ 20 l/min (5 GPM) • $p_{\max}$ 320 bar (4600 PSI)



2 - (former CETOP-RP 121H)



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

**Ordering Code**

RPE2-04	[]	[] / []	[]	[]	-	[]	[]
4/2 and 4/3 directional control valve, solenoid operated							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)
Valve size							
Number of valve positions							Mounting surface two positions 2 acc. to former CETOP-RP 121H three positions 3 acc. to former ISO 4401-AA-02-4-A (DIN 24340-A4)
Spool symbols see the table "Spool Symbols"							Seals see the table "Seals" NBR
Rated supply voltage of solenoids (at the coil terminal)							No designation
12 V DC / 2.45 A	01200						Manual override standard
24 V DC / 1.15 A	02400						
27 V DC / 0.89 A	02700						Connector EN 175301-803-A E1 with quenching diode
115 V DC / 0.24 A / 50 (60) Hz	11550 E1						
230 V AC / 0.12 A / 50 (60) Hz	23050 E2						

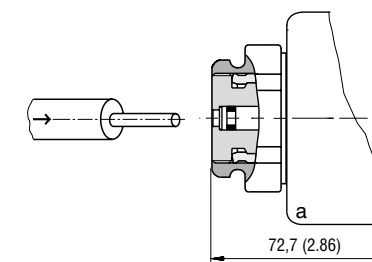
- For directional valves with two solenoids, one solenoid must be de-energized before the other solenoid can be charged.
- If the pressure exceeds 100 bar with spool types A51 or J75, port T should be connected directly to the tank.
- For other solenoid voltage supply options see data sheet C_8007.
- 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 Nm (3.7 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	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



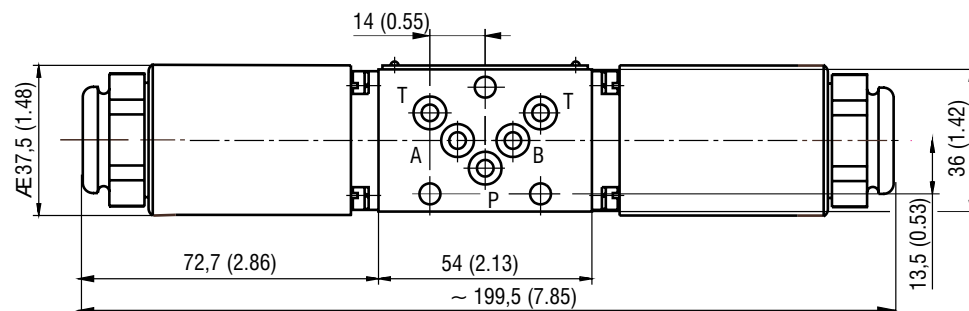
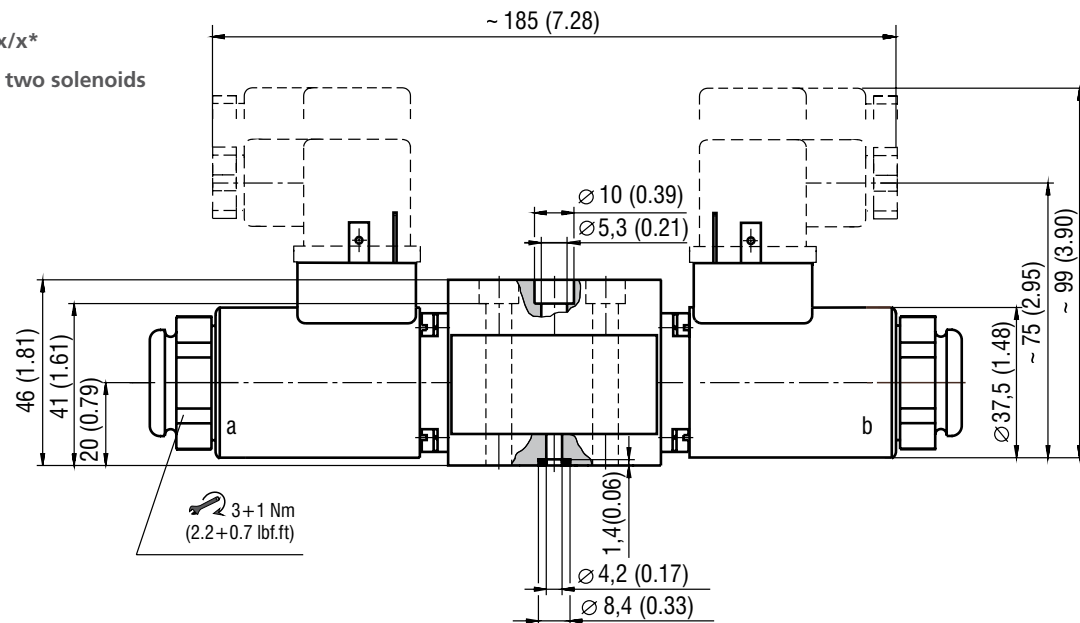
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Dimensions in millimeters (inches)

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

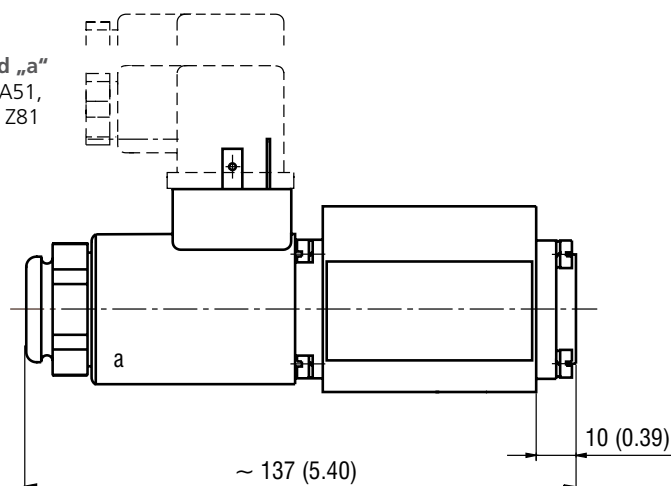
RPE2-043xx/x*

Valve with two solenoids



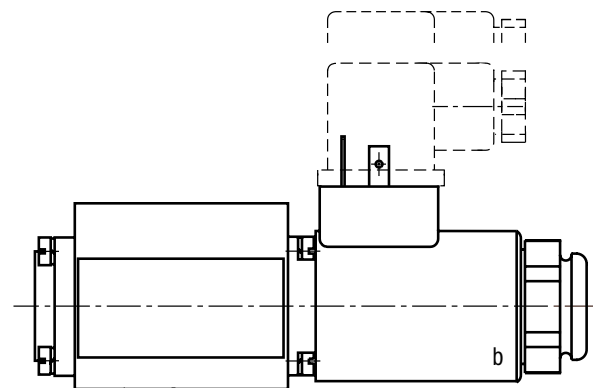
RPE2-042xx/x*

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

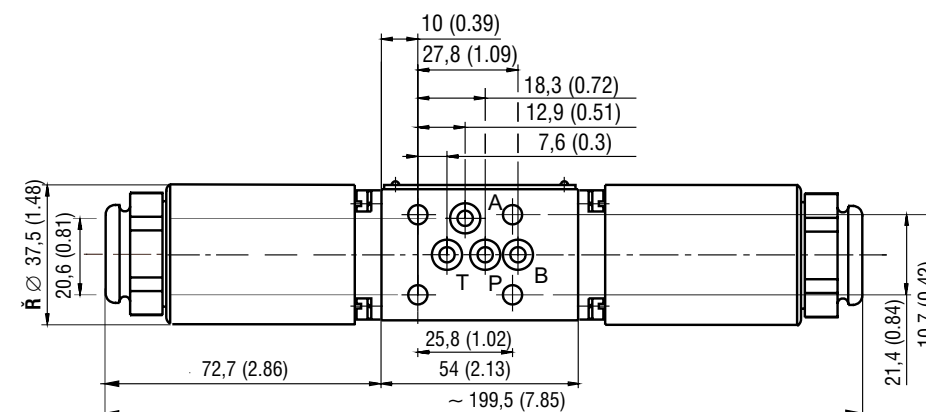
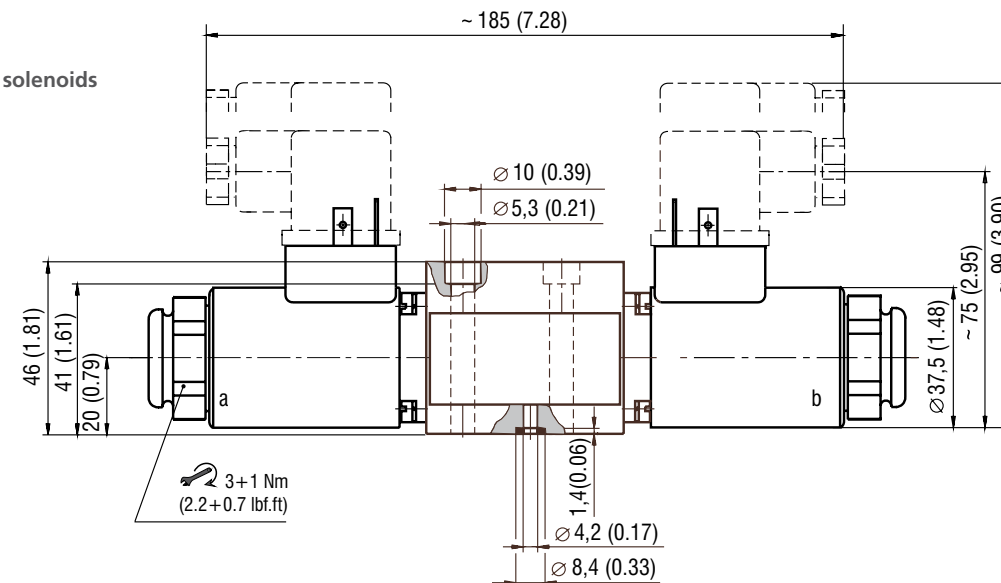


Dimesnsions in millimeters (inches)

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

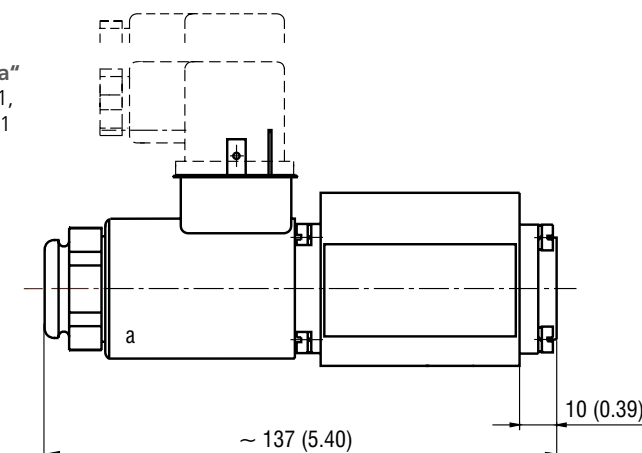
RPE2-043xx/x*

Valve with two solenoids



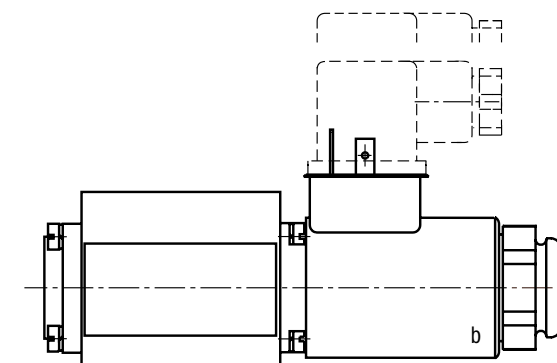
RPE2-042xx/x*

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



RPE2-042xx/x*

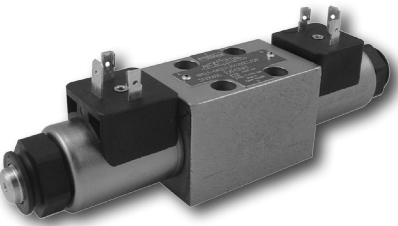
Valve with one solenoid „b“
Spool symbols X11, Z11, C11



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

RPEL1-04

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



Technical Features

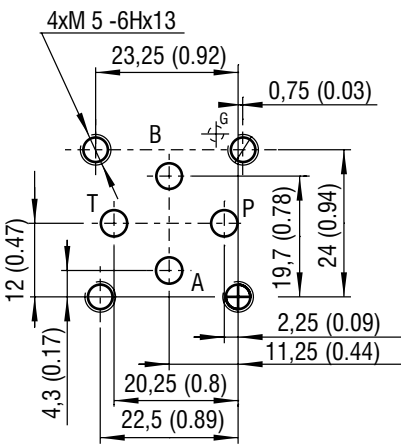
- › Direct acting, directional control valve with subplate mounting surface acc. to ISO 4401, DIN 24340 (CETOP 02)
- › Compact design with reduced solenoid dimensions
- › Three chamber housing design for production cost saving
- › The valve is available with DC solenoids and a wide range of electrical 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)

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 v=32 mm²/s (156 SUS)	ON	ms
	OFF	ms
Mass	- valve with 1 solenoid	kg (lbs)
	- valve with 2 solenoids	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	C 14B*/K*
Mounting interface	SMT_0019	Size 04
Spare parts	SP_8010	

ISO 4401-02-01-0-05

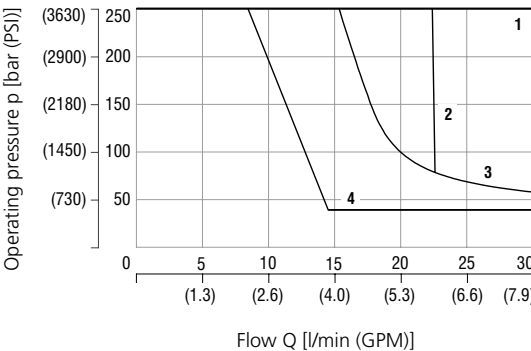


Ports P, A, B, T - max Ø4.5 mm (0.18 in)

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

Operating limits

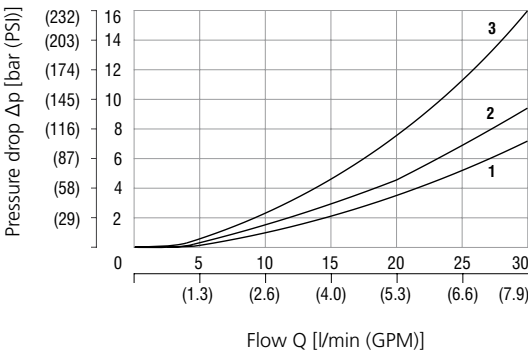
Operating limits for maximum hydraulic power at rated temperature and supply voltage equal to 90% nominal.



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

Ordering Code structure for RPEL1-04:

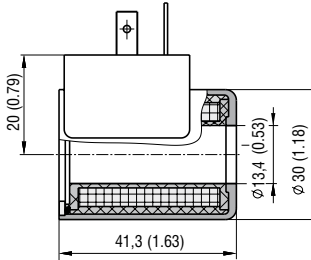
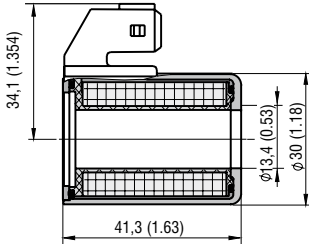
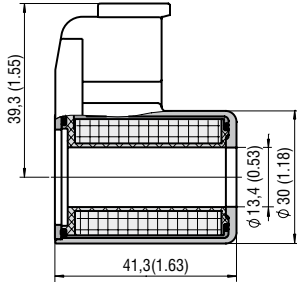
- 4/2 and 4/3 directional control valve, solenoid operated, Lightline**
- Valve size**
- Number of valve positions**
 - two positions: 2
 - three positions: 3
- Spool symbols**
see the table "Spool Symbols"
- Rated supply voltage of solenoids (at the coil terminal)**
 - 12 V DC / 1.83 A: 01200
 - 24 V DC / 0.92 A: 02400
- 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)
- Seals**
 - No designation: NBR
 - V: FPM (Viton)
- Manual override**
 - No designation: standard
 - N2: rubber boot protected
 - N5: socket head screw
- Connector**
 - No designation: 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:

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

Spool Symbols

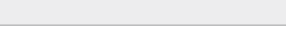
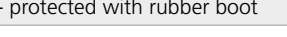
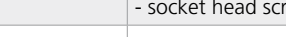
Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			Z51		
C11			H51		
H11			Z11		
Y11			X11		
R11			C11		
Y51			H11		
C51			Y11		

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)

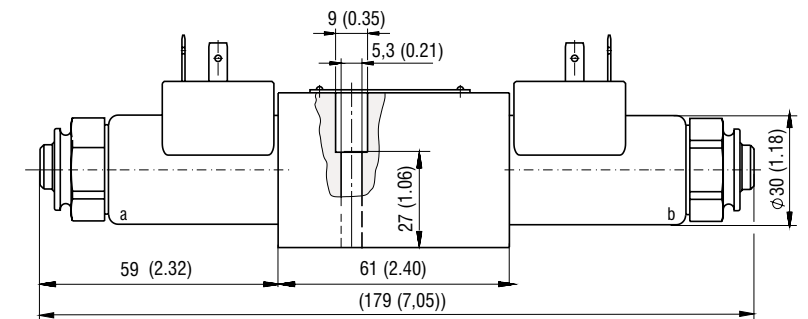
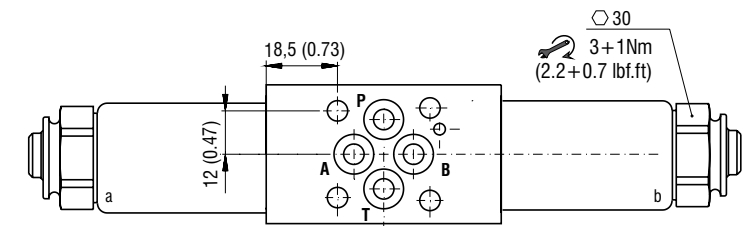
No designation - standard	Designation N2 - protected with rubber boot	Designation N5 - socket head screw 3
 59 (2.32)	 71 (2.80)	 66 (3.00)

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.

Valve Dimension in millimeters (inches)

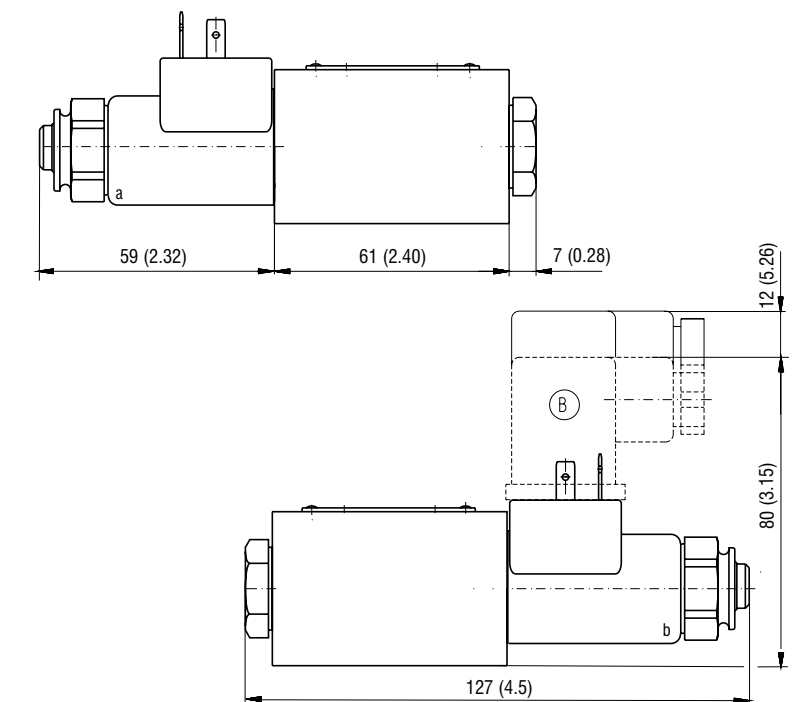
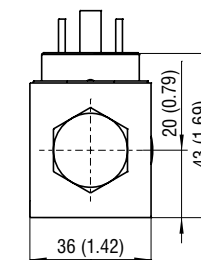
RPEL1-043x/xE1*

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



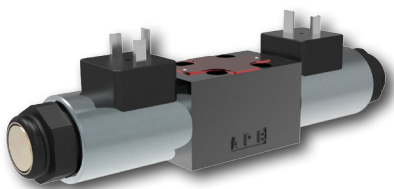
RPEL1-062x/xE1*

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

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

RPE3-04

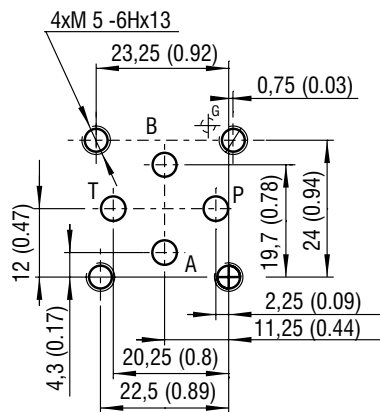
Size 04 (D02) • Q_{max} 30 l/min (8 GPM) • p_{max} 320 bar (4600 PSI)



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 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
- 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)

ISO 4401-02-01-0-05



Ports P, A, B, T - max Ø4.5 mm (0.18 in)

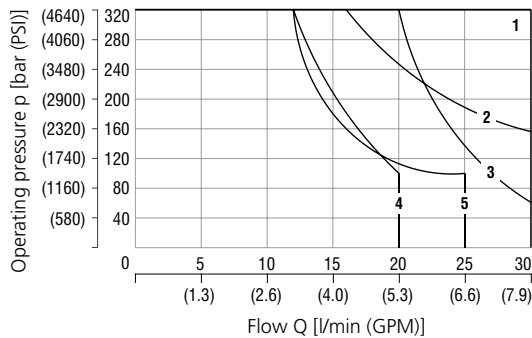
Technical Data

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 v=32 mm²/s (156 SUS)	ON	ms	30 ... 50
	OFF	ms	AC: 70 ... 100 DC: 30 ... 50
Mass	- 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		SP_0002	DP*-04

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

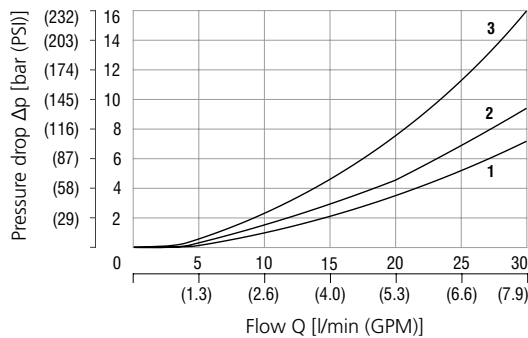
Operating limits

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

Pressure drop related to flow rate



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

	P-A	P-B	A-T	B-T	P-T
C11	3	3	3	3	2
C51	3			3	2
H11	1	1	1	1	2
Y71	2		2	1	

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

Ordering Code

RPE3 - 04		/															
4/2 and 4/3 directional control valve, solenoid operated																	
Valve size																	
Number of valve positions																	
two positions																	
three positions																	
Spool symbols																	
see the table "Spool Symbols"																	
Rated supply voltage of solenoids																	
(at the coil terminal)																	
12 V DC / 2.45 A																	
24 V DC / 1.15 A																	
27 V DC / 0.89 A																	
205 V DC / 0.12 A																	
24 V AC / 1.31 A / 50 (60) Hz																	
120 V AC / 0.22 A / 50 (60) Hz																	
230 V AC / 0.12 A / 50 (60) Hz																	

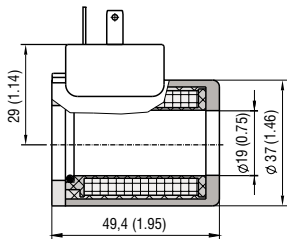
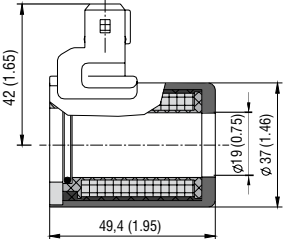
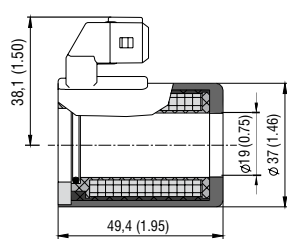
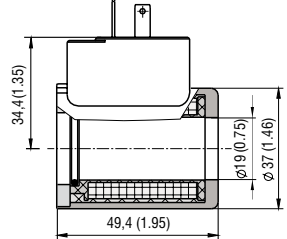
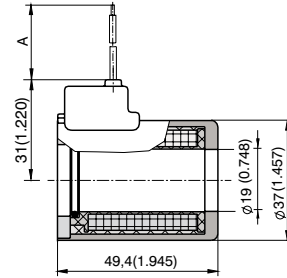
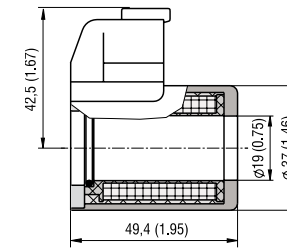
CSA upon request

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

Spool Symbols

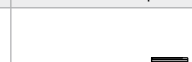
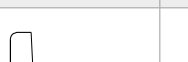
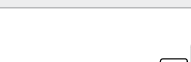
Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			Y71			Z51		
C11			R11			Z11		
H11			R21			X11		
P11			A51			C11		
Y11			P51			H11		
L21			Y51			J15		
B11			C51			J75		

Solenoid Coil in millimeters (inches)

E1 - 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) Protection degree IP65		E12A - Deutsch DT04-2P E13A - E12A with quenching 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  65,5 (2.58)	Designation N2 - rubber boot protected  72 (2.83)	Designation N4 - hand screw  88,5 (3.48)	Designation N5 - socket head screw, size 3  75,5 (2.97)
---	--	---	--

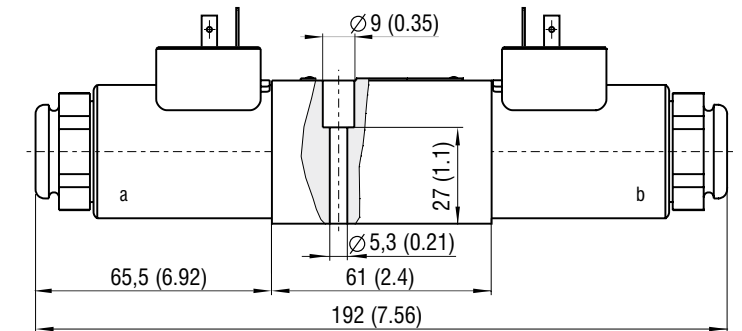
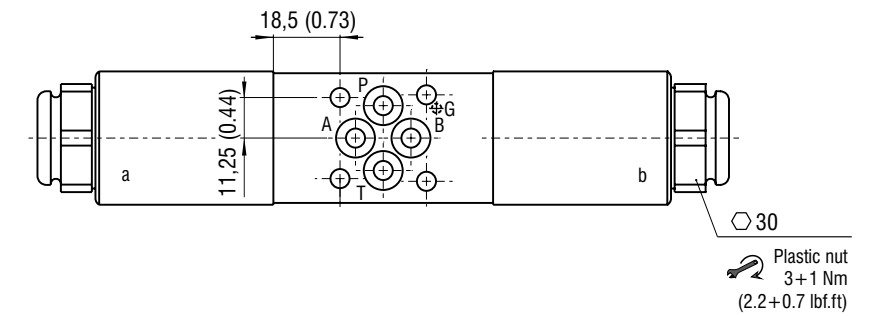
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Dimensions in millimeters (inches)

RPE3-043*/*E1*

Valve with two solenoids

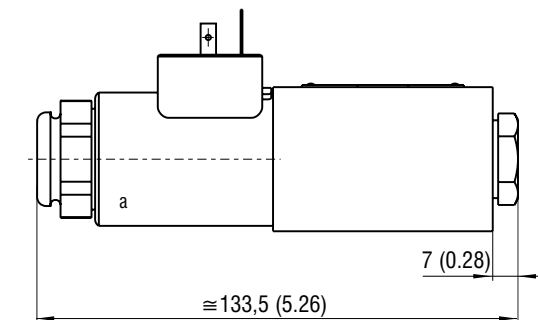
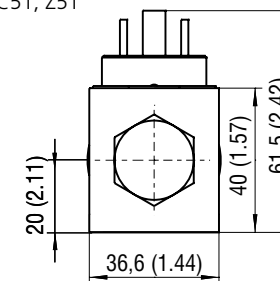
Spool symbols Z11, C11, H11,
P11, Y11, L21, B11, Y71



RPE3-042*/*E1*

Valve with one solenoid „a”

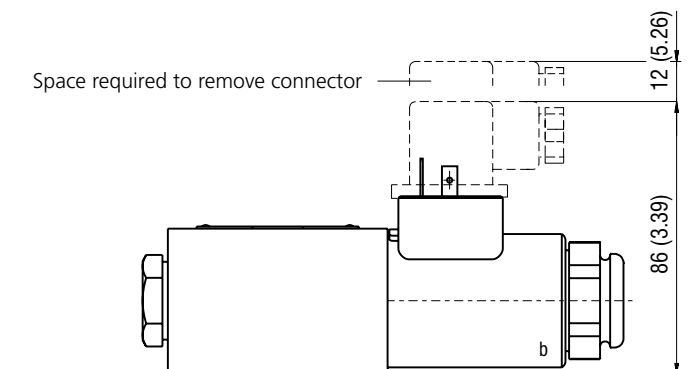
Spool symbols R11, R21,
A51, P51, Y51, C51, Z51



RPE3-042*/*E1*

Valve with one solenoid „b”

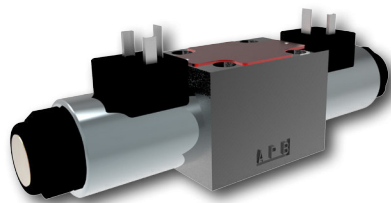
Spool symbols Z11, X11, C11, H11



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

RPEL1-06

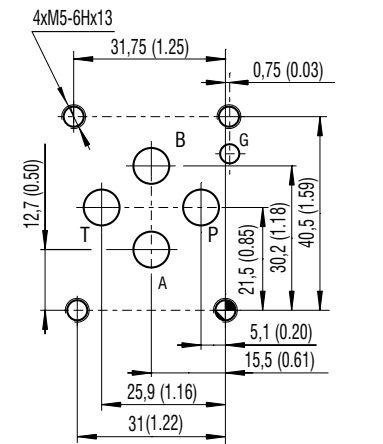
Size 06 (D03) • Q_{max} 50 l/min (13 GPM) • p_{max} 250 bar (3600 PSI)



Technical Features

- › Direct acting directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- › Compact design with reduced solenoid dimensions
- › Three chamber housing design for production cost saving
- › The valve is available with DC solenoids and wide range of electrical terminals
- › 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 and manual overrides available
- › 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 4401-03-02-0-05



Ports P, A, B, T - max Ø7.5 mm (0.29 in)

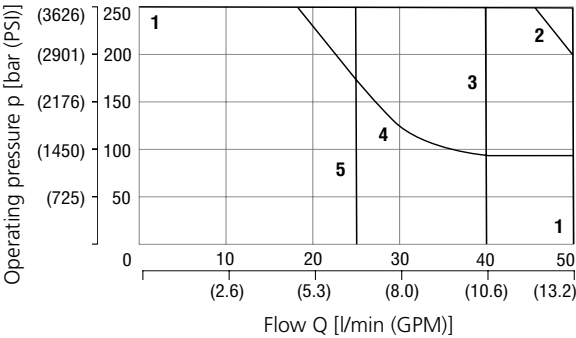
Technical Data

Valve size		06 (D03)
Max. flow	l/min (GPM)	50 (13.2)
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 v=32 mm²/s (156 SUS)	ON	ms
	OFF	ms
Weight	- valve with 1 solenoid	kg (lbs)
	- valve with 2 solenoids	kg (lbs)
		1.3 (2.9) 1.6 (3.5)
		Datasheet
		Type
General information		GI_0060
Coil types / connectors		C_8007 / K_8008
Mounting interface		SMT_0019
Spare parts		SP_8010
Subplates		SP_0002
		DP*-06

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

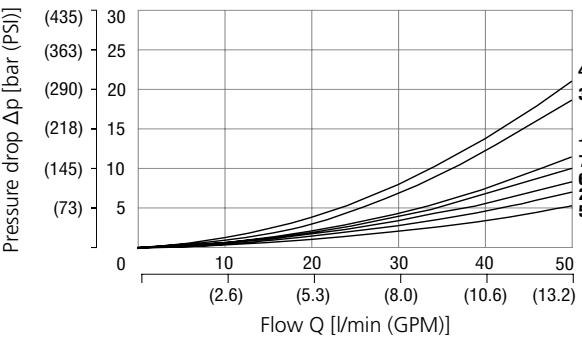
Operating limits

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



Spool symbol	
1	H11, H51, R11, X11
2	Z11, Z51
3	Y11, Y51
4	C11, C51
5	L21

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	1	1		X11	3	2	2	3	
C11	4	4	4	4	7	Z51		1	1		
H11	5	5	5	5		C51	4			4	7
Y11	6	6	5	5		H51		5	5		
L21	5	6	5	6	4	Y51		6	5		
R11	2	3	3	2							

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

Ordering Code

RPEL1-06 [] [] / [] [] [] [] - []

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

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)

Seals
No designation NBR
V FPM (Viton)

Manual override
No designation standard
M2 rubber boot protected

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
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

- 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 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			Z51		
C11			H51		
H11			Z11		
Y11			X11		
L21			C11		
R11			H11		
Y51			Y11		
C51					

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	E12A - Deutsch DT04-2P - axial direction E13A - E12A with quenching diode Protection degree IP67 / IP69K
E8 - Loose conductors (two insulated wires) E9 - (E8 with quenching diode) Protection degree IP65			
 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)

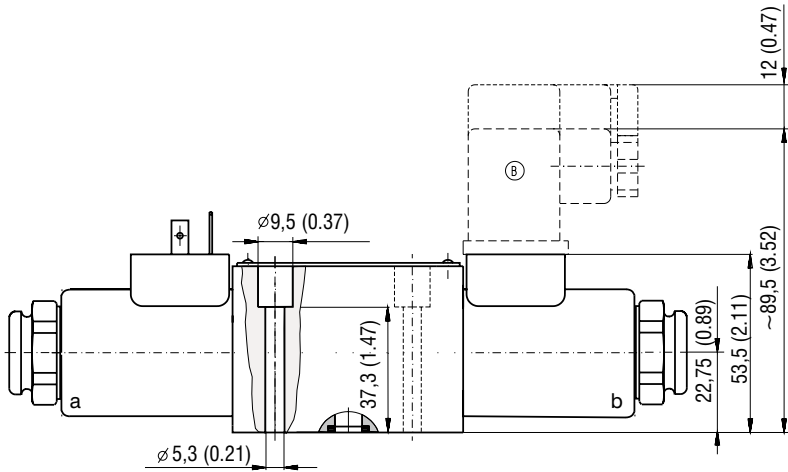
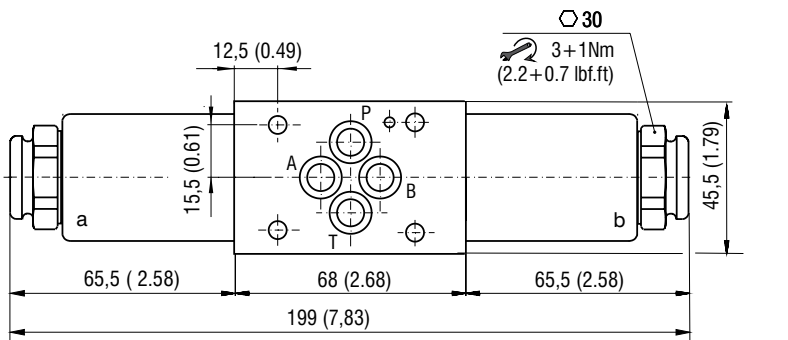
No designation - standard	Designation M2 - rubber boot protected

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.

Valve Dimension in millimeters (inches)

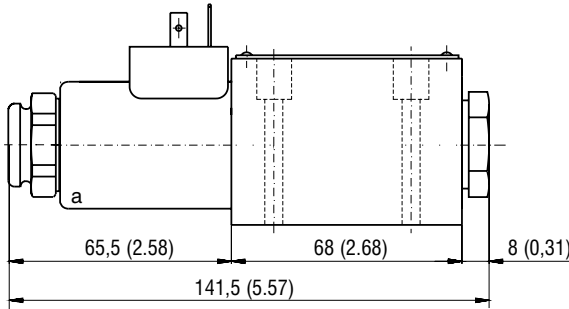
RPEL1-063x/xE1*

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



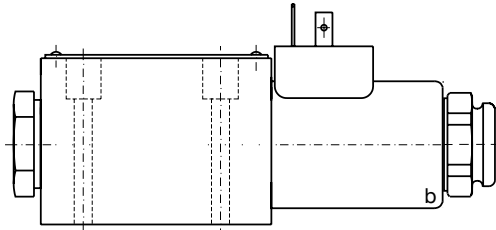
RPEL1-062x/xE1*

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

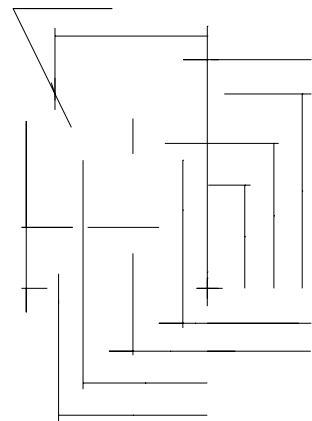
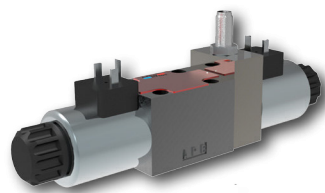


RPEL1-062x/xE1*

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



RPE3-06 Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)



Ordering Code

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

Valve size

Number of spool positions
two positions
three positions

Spool symbols
see the table "Spool Symbols"

Rated supply voltage of solenoids
(at the coil terminals)
12 V DC / 2.72 A
24 V DC / 1.29 A
27 V DC / 1.07 A
205 V DC / 0.15 A
24 V AC / 1.56 A / 50 (60 Hz)
120 V AC / 0.26 A / 60 Hz
230 V AC / 0.15 A / 50 (60) Hz
CSA upon request - only for 320 bar (4640 PSI)

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

RPE3 - 06

01200
02400
02700
20500
02450
12060
23050

E1
E2
E3A
E4A
E5
E8
E9
E12A
E13A

No designation
U

No designation
A
B

No designation
S1
S2
S4

No designation
V

No designation
T1

No designation
N1
N2
N3
N4
N5
N9

CSA Certified
standard
CSA marking

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

Spool monitoring
without sensors
normally-open sensor, 50 bar (730 PSI)
normally-open sensor, 210 bar (3050 PSI)
normally-closed sensor, 50 bar (730 PSI)

Seals
NBR
FPM (Viton)

Soft-shift spool speed control
without soft-shift control
orifice Ø 0.7 mm (0.03 inch) in solenoid

Manual override
standard
cap nut covered
rubber boot protected
detent assembly
hand screw
socket head screw
without manual override

- 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 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	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					

Solenoid Coil in millimeters (inches)

E1, E2	E3A, E4A	E5	E8, E9	E12A, E13A
Protection degree IP65	Protection degree IP67	Protection degree IP65	Protection degree IP65	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.

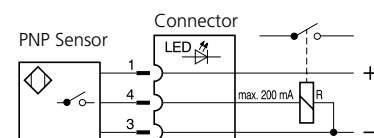
Manual Override in millimeters (inches)

No designation - standard	Designation N1 - cap nut covered	Designation N2 - rubber boot protected	Designation N3 - detent assembly	Designation N4 - hand screw	Designation N5 - socket head screw, size 3	Designation N9 - without manual override

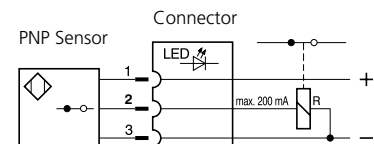
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Spool Position Sensor

S1, S2 - Circuit diagram for the normally - OPEN sensor



S4 - Circuit diagram of the normally - CLOSED sensor



Technical Data of the Sensor		S1, S4	S2
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)	50 (725)	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	

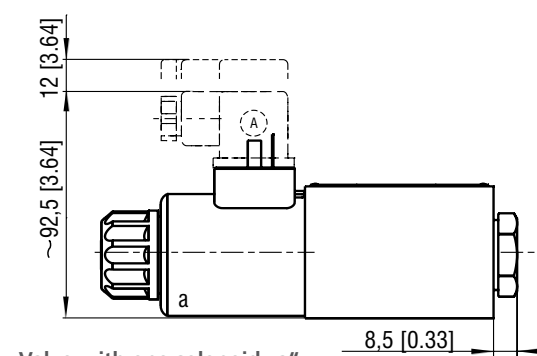
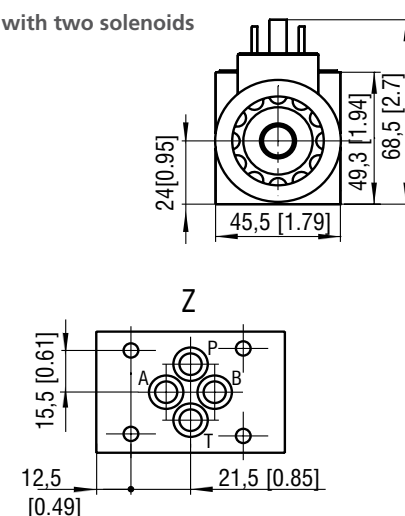
Two-Position Directional Control Valve		Three-Position Directional Control Valve	
① a(b)	③ Sa(Sb)	① a(b)	③ Sa(Sb)
	S1, S2		S1, S2
0	1	0	1
1	0	1	0
	S4		S4
	S1, S2		S1, S2
	S4		S4
	ON		ON
	OFF		OFF
	OFF		OFF
	ON		ON

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 $\nu = 32 \text{ mm}^2/\text{s}$ (156 SUS) and nominal voltage. They depend on working pressure and flow rate of the directional control valve.	

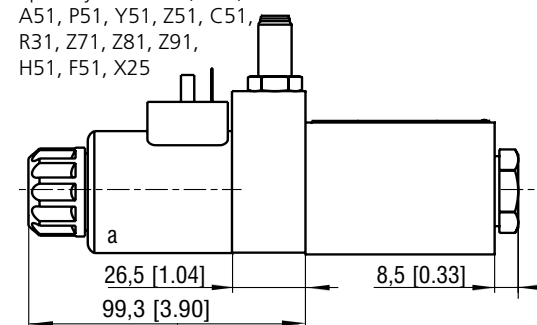
Dimensions in millimeters (inches)

Valve with two solenoids

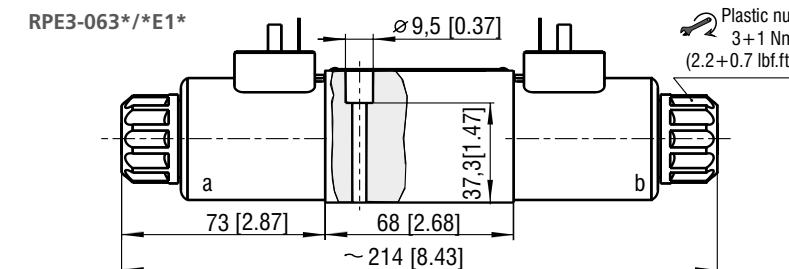


Valve with one solenoid „a“

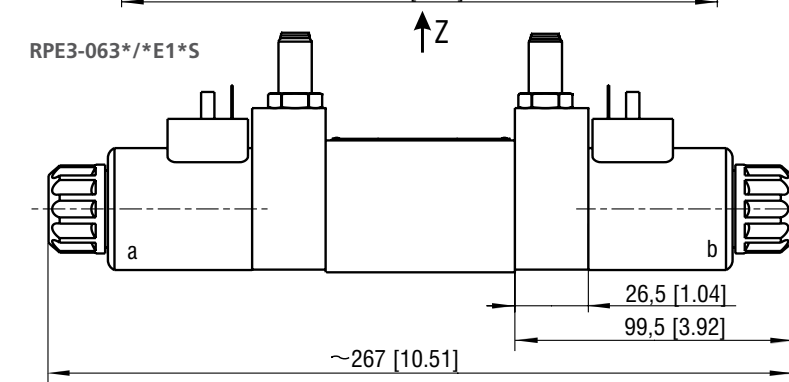
Spool symbols R11, R21, A51, P51, Y51, Z51, C51, R31, Z71, Z81, Z91, H51, F51, X25



RPE3-063*/*E1*

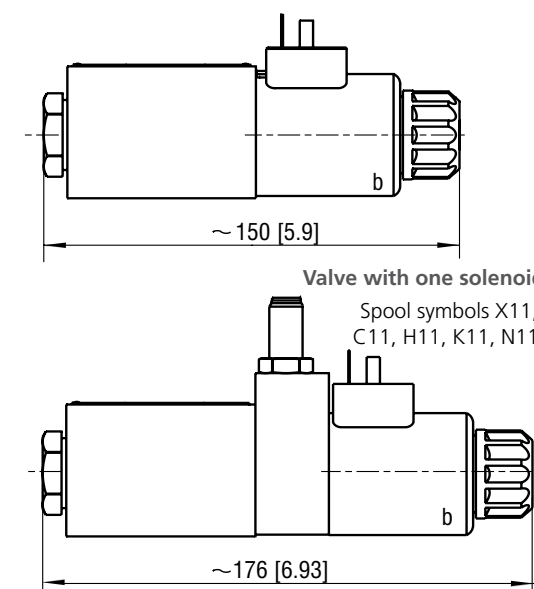


RPE3-063*/*E1*S



Valve with one solenoid „b“

Spool symbols X11, Z11, C11, H11, K11, N11, F11

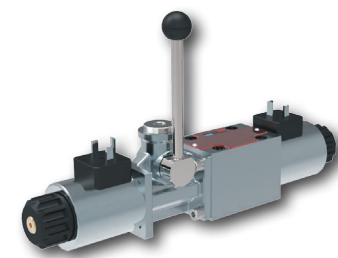


Mounting screws 8.9 Nm (7 lbf.ft)
M5 x 45 DIN 912-10.9

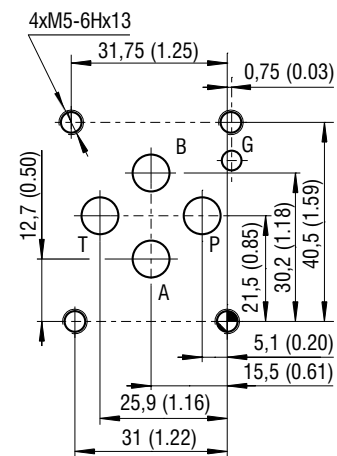
Auxiliary Lever Override for Solenoid Operated Valves

RPER3-06

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



ISO 4401-03-02-0-05



Ports P, A, B, T max $\varnothing$ 7.5 mm (0.29 in)

Technical Features

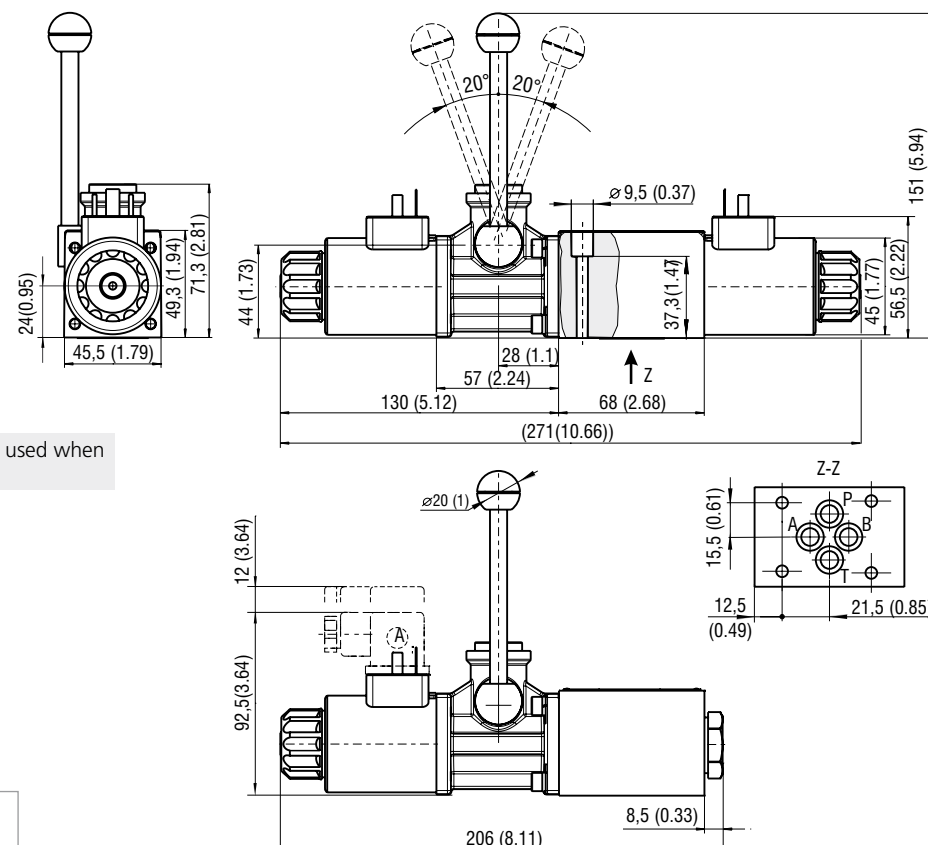
- › Auxiliary lever overrides for ON-OFF solenoid valves of the type RPE3-06 (Datasheet No. 4010) with Size 06 and mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- › Auxiliary lever operators allow the valve to be operated when electrical system is de-energized, e.g. emergency operation, electrical failures, maintenance activities
- › For proportional valves please consult our technical department for their identification and feasibility
- › 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)

Technical Data

Valve size		06 (D03)	
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)	
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 mass	kg (lbs)	0.59 (1.3)	
	Data Sheet	Type	
General information	GI_0060	Products and operating conditions	
Coil types / connectors	C_8007 / K_8008	C22B* / K*	
Mounting interface / tolerances	SMT_0019	Size 06	
Spare parts	SP_8010		

Dimensions in millimeters (inches)

RPER3-063 */ A19



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

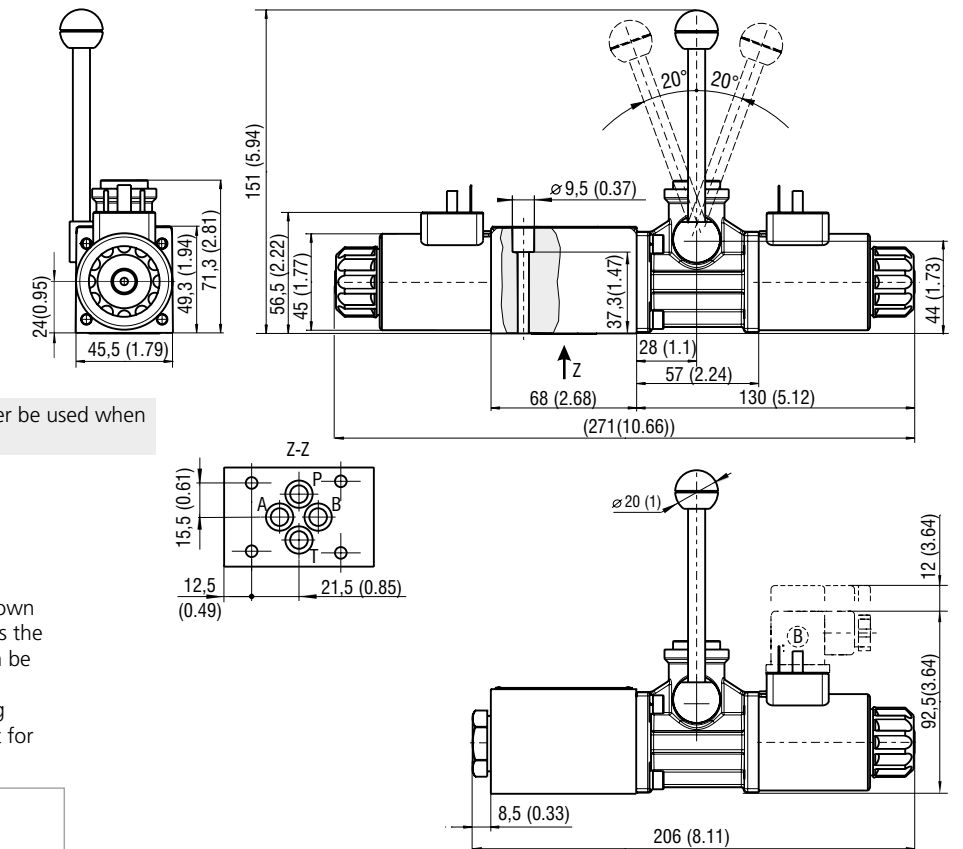
RPER3-062 */ A19

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 Nm (6.56 lbf.ft)
M5 x 45 DIN 912-10.9

Dimensions in millimeters (inches)

RPER3-063 */ B19



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

RPER3-062 */ 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 Nm (6.56 lbf.ft)
M5 x 45 DIN 912-10.9

Ordering Code[illegible]

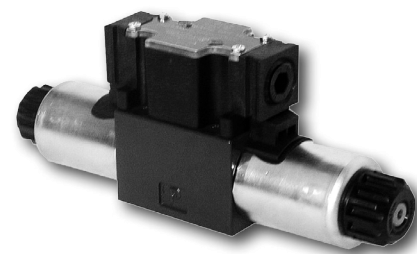
Tightening torque is 8.9 Nm (6.56 lbf.ft)
Besides the shown, commonly used valve versions other special models are available.
Contact our technical support for their identification, feasibility and operating limits.

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

4/2 and 4/3 Directional Control Valve, Solenoid Operated, 8 Watt

RPEA3-06

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

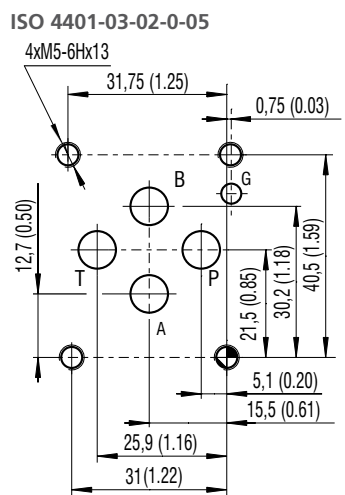


Technical Features

- Direct acting directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- Low power/current (8 W/ <0.35 A) solenoid allows direct connection to a PLC or a bus node
- High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drop
- Five chamber housing with reduced hydraulic power dependence on fluid viscosity
- Solenoid electrical terminal (as per EN 175301-803) and wire box version with 5-Pin M12x1 connection as per IEC 61076-2-101 (code D)
- The valve is available with interchangeable DC solenoids
- Wide range of interchangeable spools and manual overrides available
- 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
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

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)	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
Enclosure type acc.to EN 60529			IP65
Switching time at v=32 mm³/s (156 SUS)	ON	ms	30 ... 50
	OFF	ms	10 ... 50
Mass	- valve with 1 solenoid	kg (lbs)	1.3 (2.8)
	- valve with 2 solenoids		1.9 (4.2)
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Coil types / connectors		C_8007 / K_8008	
Mounting interface		SMT_0019	Size 06
Spare parts		SP_8010	

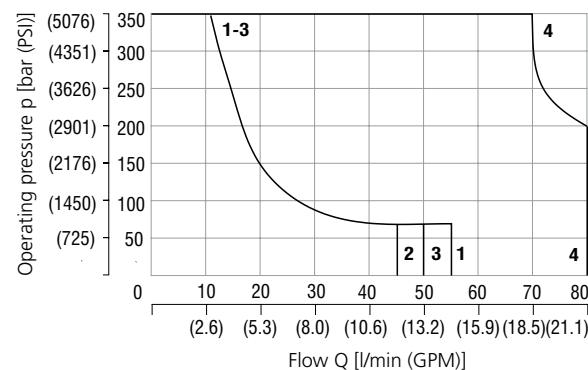


Ports P, A, B, T - max Ø7.5 mm (0.29 in)

Characteristics measured at v = 32 mm³/s (156 SUS)

Operating limits

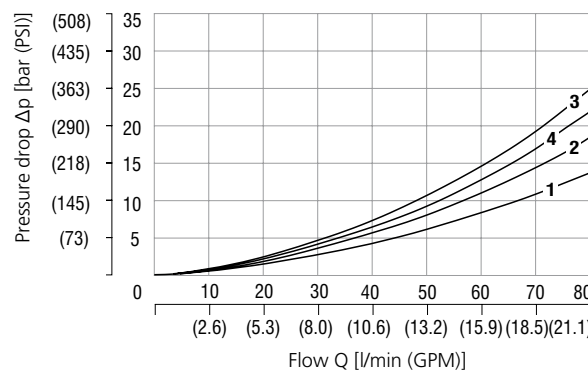
Operating limits for maximum hydraulic power at rated temperature and supply voltage equal to 90% nominal.



Z11, Y11, Z51, Y51	1
R11, X11	2
C11, C51	3
P11, P51	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.)

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	2	2	2	2		Z51	2	2			
C11	2	2	2	2	3	C51	2			2	3
P11	2	2	4	4		P51		1	1		
Y11	2	2	1			Y51		2	4		
R11, X11	2	2	4	2							

Ordering Code

RPEA3-06

4/2 and 4/3 directional control valve, solenoid operated, 8 watt

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 / 0.33 A 02400

Connector
EN 175301-803-A
Wire box (plug-in coil), DC version E1 EW1K

Wire box version EW1K supply connector
5-Pin connector M12x1 as per IEC 61076-2-101 (code D) 63
mounted on A-side (B-side plugged)
5-Pin connector M12x1 as per IEC 61076-2-101 (code D) 64
mounted on B-side (A-side plugged)
63 with LED diode 65
64 with LED diode 66

No designation U
No designation A
No designation B

CSA Certified standard CSA marking

Surface treatment
housing phosphated, steel parts
zinc-coated (ZnCr-3), ISO 9227 (240 h)
zinc-coated (ZnCr-3), ISO 9227 (240 h)
zinc-coated (ZnNi), ISO 9227 (520 h)

Spool symbol - solenoid identification standards
No designation AN*
ISO 4401
ANSI-B93.9

*see comment at spool symbol section

No designation V
No designation T1

Seals
NBR
FPM (Viton)

Soft-shift spool speed control
without soft shift control
orifice Ø 0.7 mm (0.03 inch) in actuator

Manual override
standard
cap nut covered
rubber boot protected
detent assembly
hand screw
socket head screw
without manual override

- 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 Nm (6.56 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.

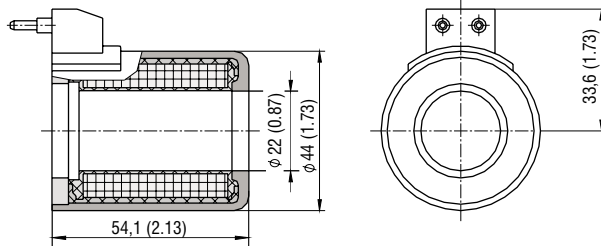
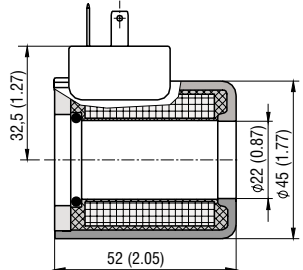
Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			C51		
C11			Z51		
P11			Z11		
Y11			X11		
R11			C11		
P51			Y11		
Y51			P11		

Note:

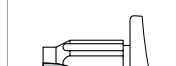
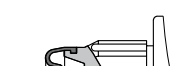
Contrary to the European Norm, the US Standard ANSI-B93.9 states that the energized solenoid routing oil flow to port A be marked with „a“ and the energized solenoid routing oil flow to port B be marked with „b“. This rule is valid independently of the solenoid lay-out.

Solenoid Coil in millimeters (inches)

EW1 - Solenoid coil with terminals for wire box electrical connector Protection degree IP65	E1 - Connector EN 175301-803-A Protection degree IP65
 Technical drawing of the solenoid coil EW1. The side view shows a length of 54,1 (2.13) and an outer diameter of $\varnothing 44$ (1.73). The internal coil diameter is $\varnothing 22$ (0.87). The front view shows a circular profile with a diameter of 33,6 (1.73) and two mounting holes.	 Technical drawing of the connector E1. The side view shows a length of 52 (2.05) and an outer diameter of $\varnothing 45$ (1.77). The internal connector diameter is $\varnothing 22$ (0.87). The total height of the assembly is 32,5 (1.27).

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 N3 - detent assembly	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.

Connector - 5-Pin M12x1 (IEC 61076-2-101)

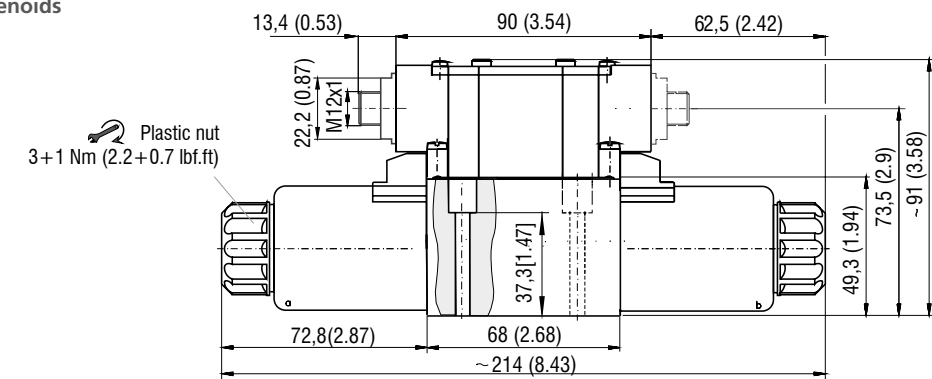
Pinout Valve with 1 magnet	Pinout Valve with 2 magnets
solenoid „a“ or „b“	solenoid „a“ solenoid „b“

Note:

On valves with solenoid identification according to US Standard ANSI-B93.9 wiring will be different from above:
on valves with one (1) solenoid Pin 2 is always driving solenoid „a“ and Pin 4 solenoid „b“. This is independent from the actual physical location of the solenoid.

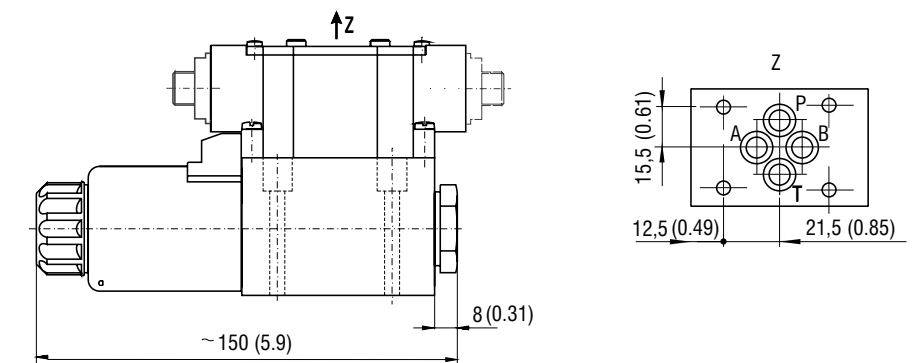
Dimensions in millimeters (inches)

Valve with two solenoids
EW1



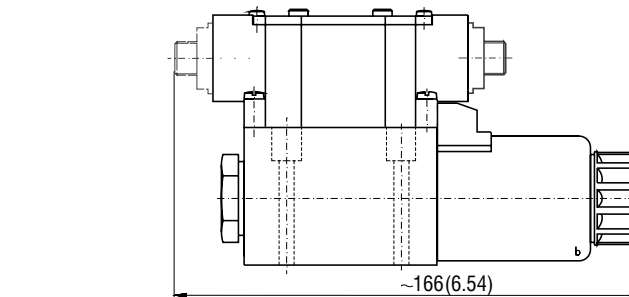
Valve with one solenoid „a”

Spool symbols R11, P51, Y51, Z51, C51

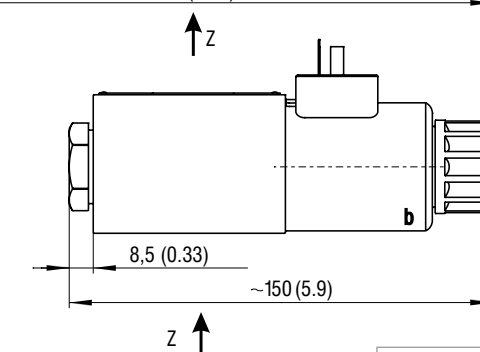
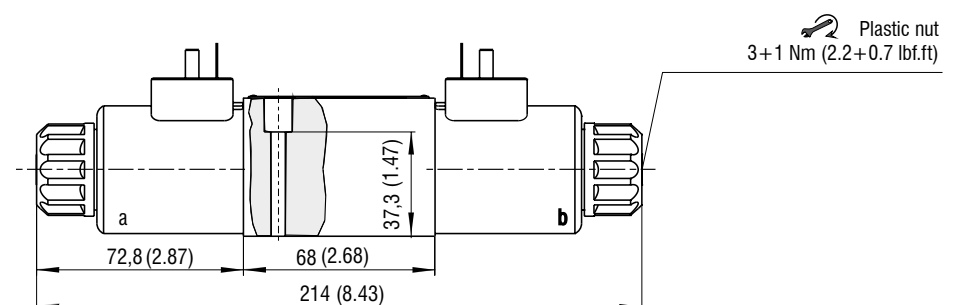
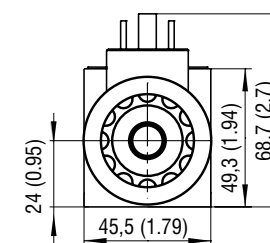


Valve with one solenoid „b”

Spool symbols X11, Z11, C11, Y11, P11



Valve with two solenoids
E1

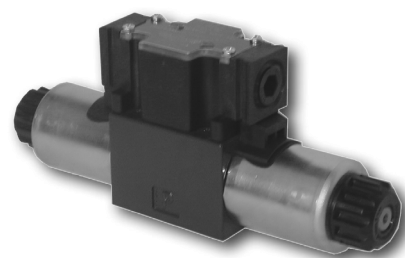


Mounting screws  8.9 Nm (7 lbf.ft)
M5 x 45 DIN 912-10.9

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

RPEW4-06

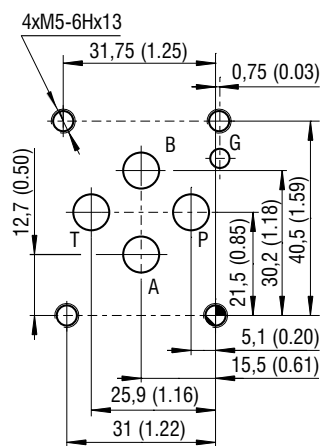
Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 350 bar (5100 PSI)



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
- 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 Ø7.5 mm (0.29 in)

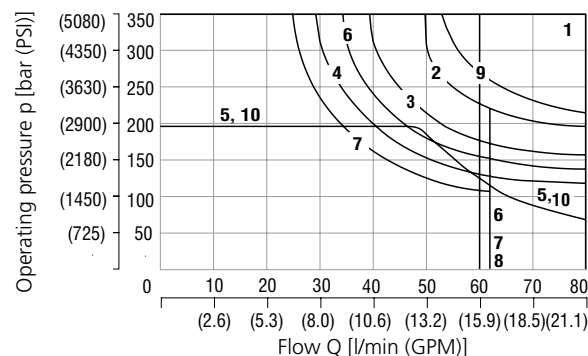
Technical Data

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 v=32 mm²/s (156 SUS)	ON	ms	AC: 30 ... 40 DC: 30 ... 50
	OFF	ms	AC: 30 ... 70 DC: 10 ... 50
Mass - 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 v = 32 mm²/s (156 SUS)

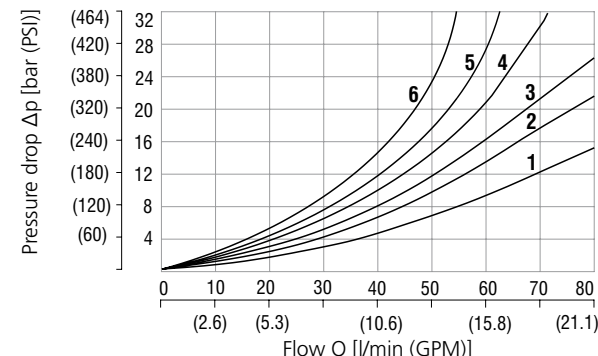
Operating limits

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



1	Z11	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		

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

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
24 V DC / 1.29 A
120 V AC / 0.26 A, 60 Hz*

*DC coils with rectifier in wire box

Connector for wire box
DC solenoid (DC-rectified)
DC solenoid with quenching diode

Wire box power supply
DC power supply
AC power supply (rectifier in wire box)

CSA Certified standard
CSA marking

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

Seals
NBR
V FPM (Viton)

Soft-shift spool speed control
without soft-shift control
T1 orifice Ø 0.7 mm (0.03 inch) in solenoid

Manual override
standard
N1 cap nut covered
N2 rubber boot protected
N3 detent assembly
N4 hand screw
N5 socket head screw
N9 without manual override

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
3-pin connector (ANSI/B93.55M) mounted on A-side (B-side plugged, only for single solenoid valves)	52
3-pin connector (ANSI/B93.55M) mounted on B-side (A-side plugged, only for single solenoid valves)	53
52 with LED	54
53 with LED	55
5-pin connector (ANSI/B93.55M) mounted on A-side (B-side plugged, only for double solenoid valves)	56
5-pin connector (ANSI/B93.55M) mounted on B-side (A-side plugged, only for double solenoid valves)	57
56 with LED	58
57 with LED	59

- 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 Nm (6.56 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	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)

EW1 - Plug-In Coil	
EW2 - EW1 with quenching diode	
Protection degree IP65	

Manual Override in millimeters (inches)

No designation - standard	Designation N1 - cap nut covered	Designation N2 - rubber boot protected	Designation N3 - detent assembly	Designation N4 - hand screw	Designation N5 - socket head screw, size 3	Designation N9 - without manual override
73 (2.87)	79,5 (3.13)	85 (3.35)	97 (3.82)	96 (3.78)	81,5 (3.21)	73 (2.87)

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)

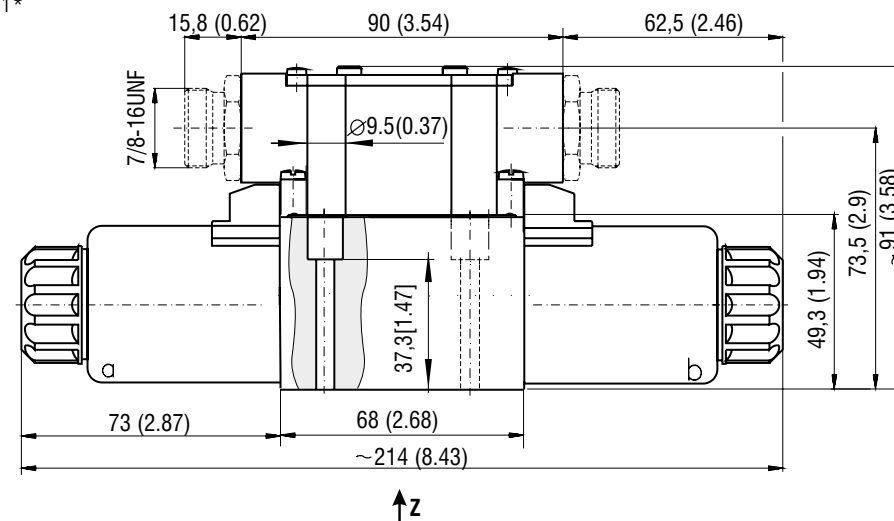
Designation T1	Important:
	This directional valve provides the means to control spool soft shifting by an orifice situated in the solenoid armature. To ensure the proper function of the valve, unobstructed venting of the solenoid is required through the bleeding plug (1). The plugs are accessible after 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 $\nu = 32 \text{ mm}^2/\text{s}$ (156 SUS) and nominal voltage. They depend on working pressure and flow rate of the directional control valve.	

Connector - US - Standard - ANSI/B93.55M

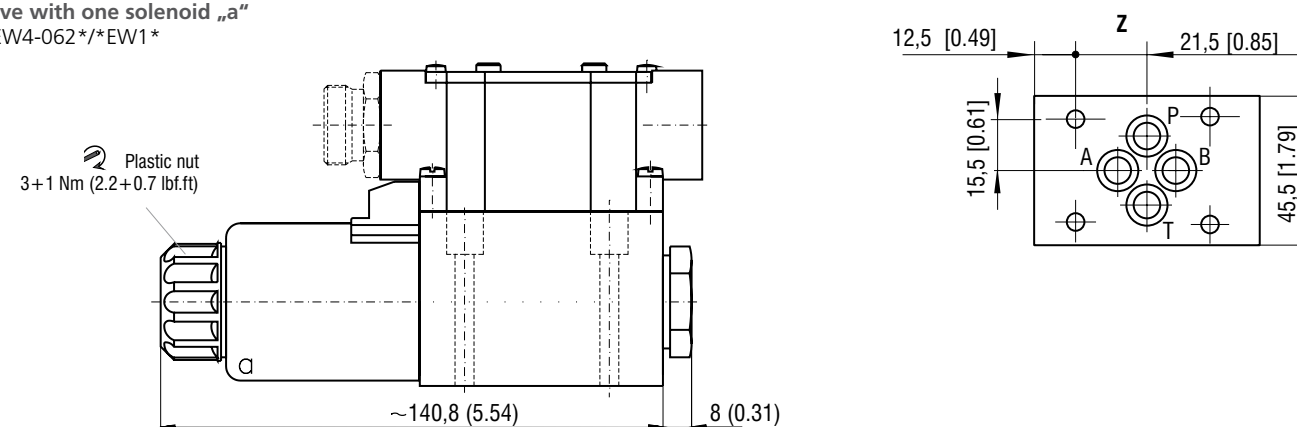
Pinout - 3-pin connector	Pinout - 5-pin connector
1 - green 2 - black 3 - white	1 - white 2 - red 3 - green 4 - orange 5 - black

Dimensions in millimeters (inches)

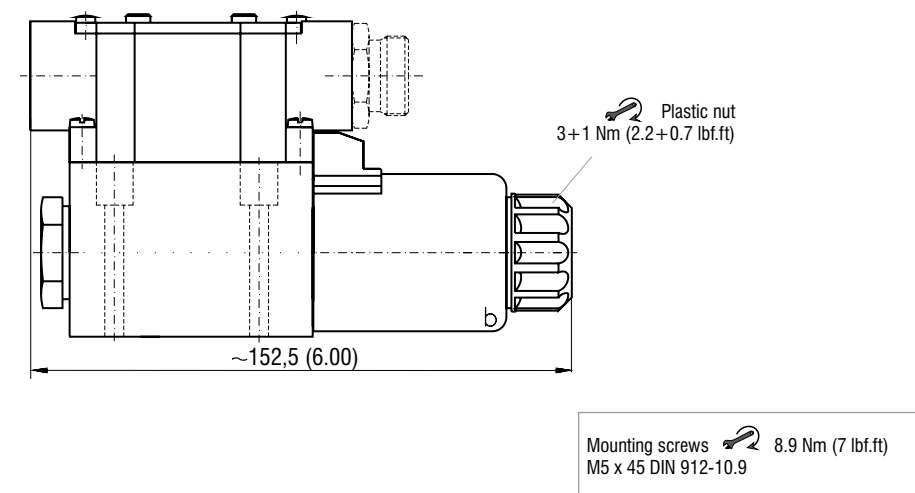
Valve with two solenoids
RPEW4-063*/*EW1*



Valve with one solenoid „a”
RPEW4-062*/*EW1*



Valve with one solenoid „b”
Spool symbols X11, Z11, C11, H11, N11, F11
RPEW4-062*/*EW1*



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)

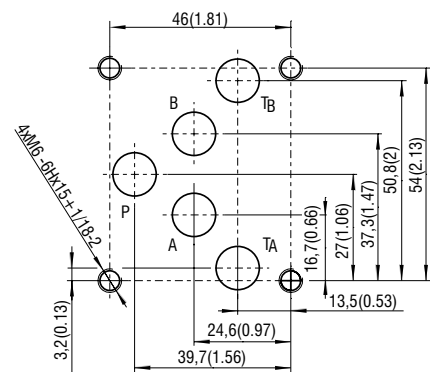
Technical Features

- 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 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	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), 50 (730), for version S1, S4
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 v=32 mm²/s (156 SUS)	ON OFF	ms
Enclosure type acc. to EN 60529	IP65 / IP67 (see Dimensions, page 3)	
Mass	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	

ISO 4401-05-04-0-05

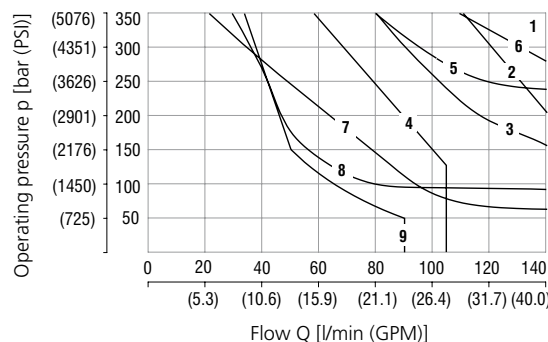


Ports P, A, B, T - max Ø11.2 mm (0.44 in)

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

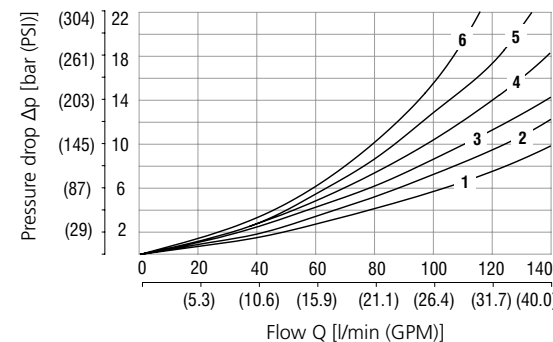
Operating limits

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



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



P-A	P-B	A-T	B-T	P-T	P-A	P-B	A-T	B-T	P-T
1	1	2	2		4	3	4	5	1
1	1	2	2	1	4	1	1	2	2
1	1	2	2	1	1	1	1	3	
1	1	2	2	1	1	1	2	3	
1	1	2	2	1	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 E12A
E12A with quenching diode E13A

CSA Certified standard CSA marking

Surface treatment
housing phosphated, steel parts
zinc-coated (ZnCr-3), ISO 9227 (240 h)
zinc-coated (ZnCr-3), ISO 9227 (240 h)
zinc-coated (ZnNi), ISO 9227 (520 h)

Spool monitoring
without sensors
S1 normally-open sensor, 50 bar (730 PSI)
S2 normally-open sensor, 210 bar (3050 PSI)
S4 normally-closed sensor, 50 bar (730 PSI)

Seals
NBR
FPM (Viton)

Soft-shift spool speed control
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

Manual override
standard
N1 cap nut covered
N2 rubber boot protected
N4 hand screw
N5 socket head screw
N9 without manual override

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 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. 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

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

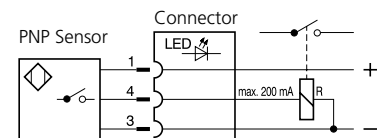
Manual Override in millimeters (inches)

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

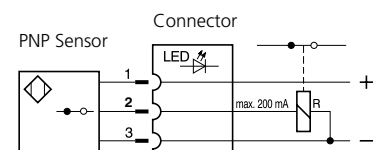
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Spool Position Sensor

S1, S2 - Circuit diagram of the normally - OPEN sensor



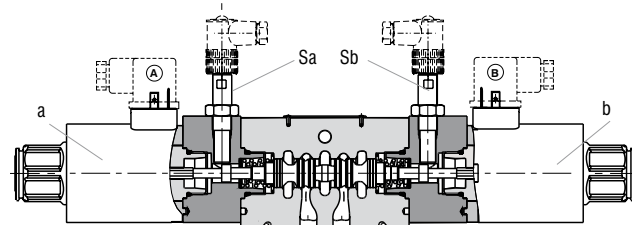
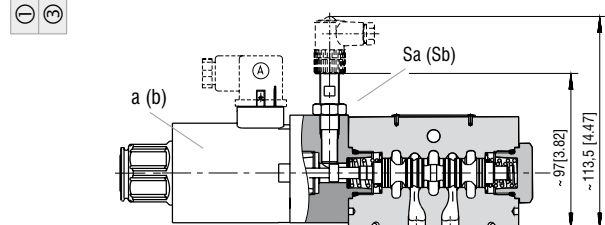
S4 - Circuit diagram of the normally - CLOSED sensor



Technical Data of the Sensor		S1, S4	S2
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)	50 (725)	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	

Two-Position Directional Control Valve				
① a(b)	③ Sa(Sb)	LED		
	S1, S2	S4	S1, S2	S4
0	1	0	ON	OFF
1	0	1	OFF	ON

Three-Position Directional Control Valve									
① a(b)		③ Sa(Sb)				LED			
		S1, S2		S4		S1, S2		S4	
		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



Spool Speed Control in millimeters (inches)

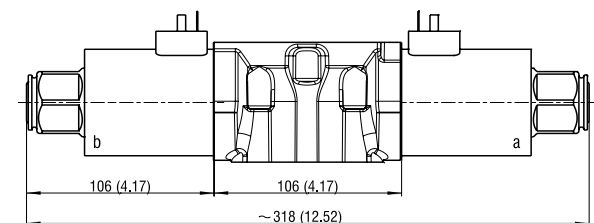
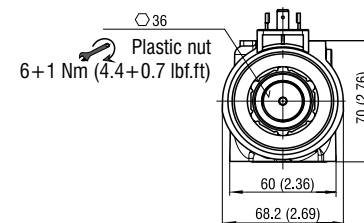
Designation T0 - Plug VSTI M10x1	Designation T2 - Orifice Ø 0.6 (0.02)	Designation T3 - Needle valve
Plugged cavity for optional soft-shift control devices installation (T2, T3)	Switching time ON and OFF	The orifice extends the valve shifting time. 120 ... 350 ms
		The needle valve allows continuous adjustment of the shifting time. 30 ... 2000 ms

The switching times shown are valid for viscosity $\nu = 32 \text{ mm}^2/\text{s}$ (156 SUS) and nominal voltage. They depend on working pressure and flow rate of the directional control valve.

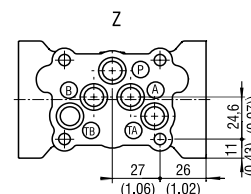
Dimensions in millimeters (inches)

Valve with two solenoids

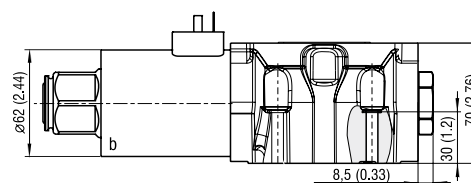
RPE4-103*/E1



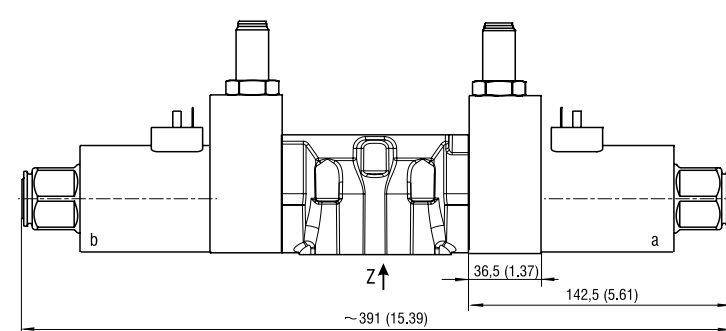
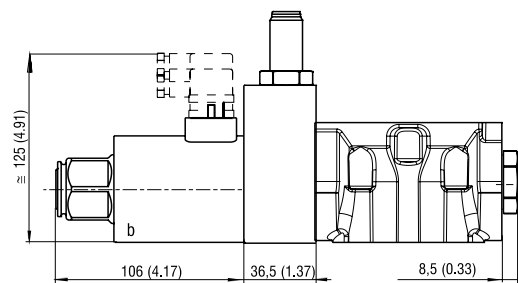
RPE4-103*/E1*S



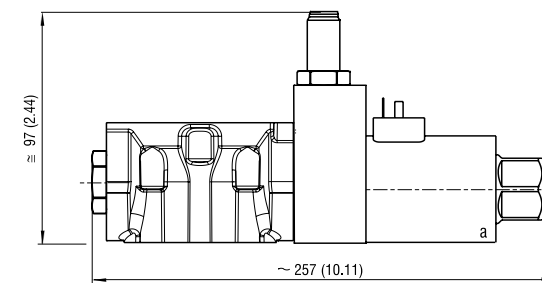
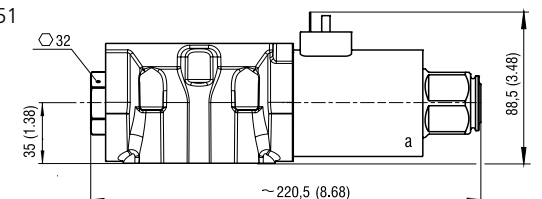
Valve with one solenoid „b“
Spool symbols X11, C11, H11



RPE4-102*/E1*S



Valve with one solenoid „a“
Spool symbols R11, R21, A51, P51,Y51, C51, B51, Z51, H51

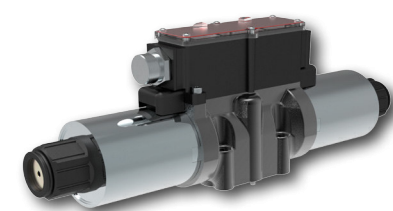


Mounting screws 14 Nm (10.3 lbf.ft)
M6 x 40 DIN 912-10.9

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

RPEW4-10

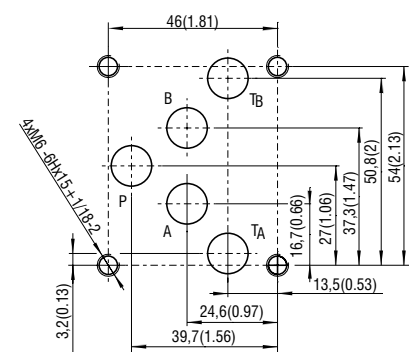
Size 10 (D05) • Q_{max} 140 l/min (37 GPM) • p_{max} 350 bar (5100 PSI)



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
- 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 Ø11.2 mm (0.44 in)

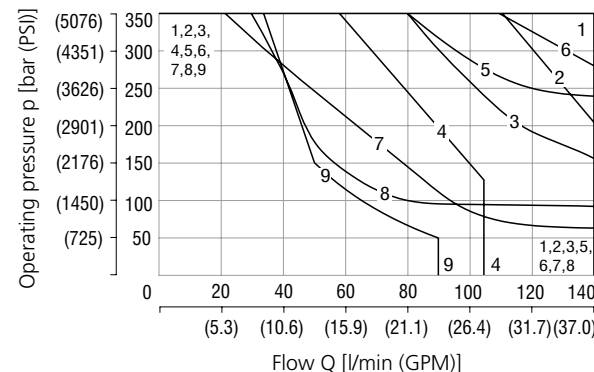
Technical Data

Valve size	10 (D05)
Max. flow	140 (37)
Max. operating pressure at ports P, A, B	350 (5080)
Max. operating pressure at port T	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 v=32 mm²/s (156 SUS)	ON ms AC: 50 ... 330 DC: 50 ... 120
	OFF ms AC: 100 ... 300 DC: 30 ... 90
Mass	- valve with 1 solenoid 3.9 (8.6)
	- valve with 2 solenoids 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 v = 32 mm²/s (156 SUS)

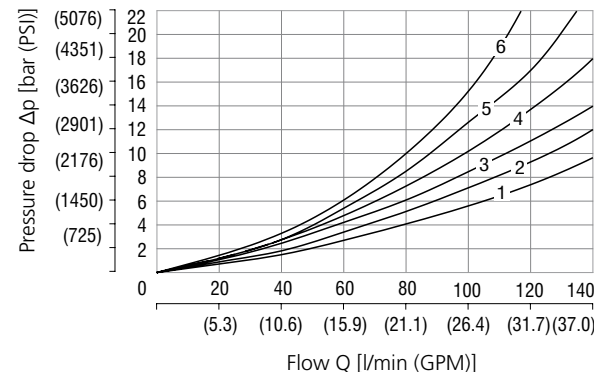
Operating limits

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

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 solenoids (at the wire box terminal)

12 V DC / 3.17 A 01200

24 V DC / 1.73 A 02400

120 coil V AC / 0.38 A / 60 Hz* 12060

*DC coils with rectifier in wire box

Connector for wire box

DC solenoid (DC-rectified) EW1

DC solenoid with quenching diode EW2

Wire box power supply

DC power supply K

AC power supply (rectifier in wire box) R

CSA Certified standard CSA marking

No designation U

No designation Surface treatment 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)

No designation Seals NBR FPM (Viton)

V

No designation Soft-shift spool speed control 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

No designation Manual override standard

N1 cap nut covered

N2 rubber boot protected

N4 hand screw

N5 socket head screw

N9 without manual override

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

3-pin connector (ANSI/B93.55M) mounted on A-side (B-side plugged, only for single solenoid valves) 52

3-pin connector (ANSI/B93.55M) mounted on B-side (A-side plugged, only for single solenoid valves) 53

52 with LED 54

53 with LED 55

5-pin connector (ANSI/B93.55M) mounted on A-side (B-side plugged, only for double solenoid valves) 56

5-pin connector (ANSI/B93.55M) mounted on B-side (A-side plugged, only for double solenoid valves) 57

56 with LED 58

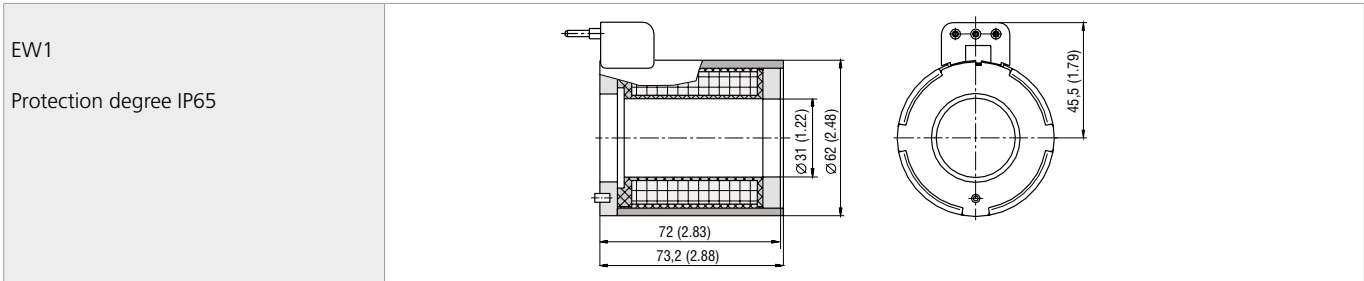
57 with LED 59

- 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.
- Mounting bolts M6 x 40 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.

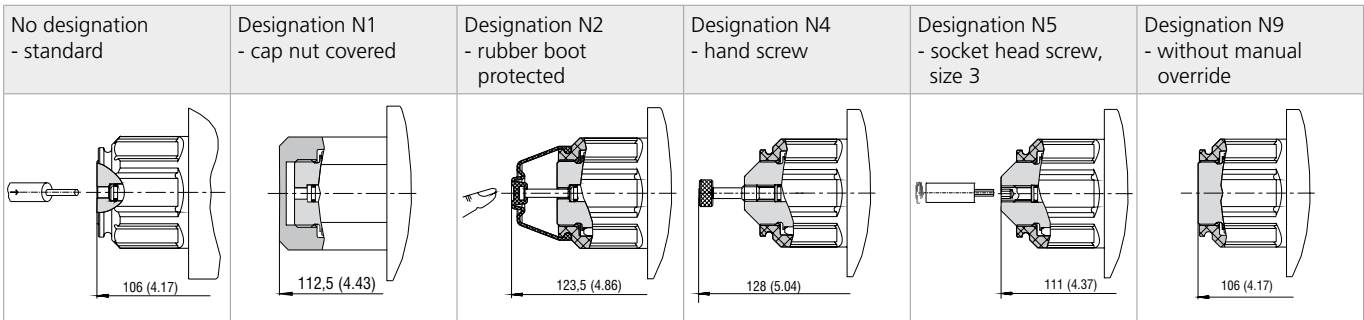
Spool Symbols

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)

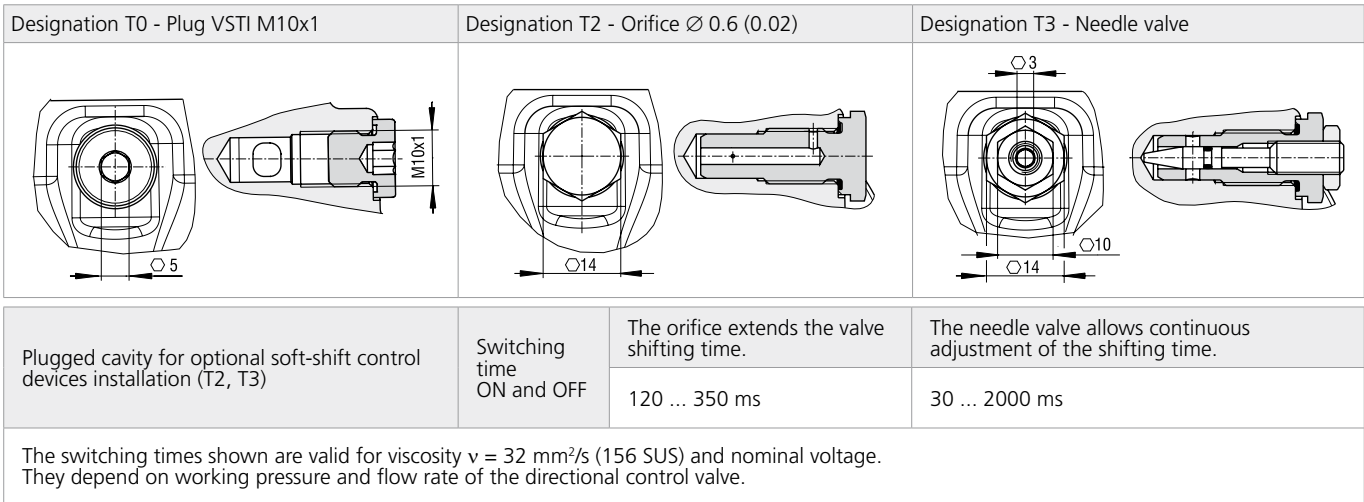


Manual Override in millimeters (inches)



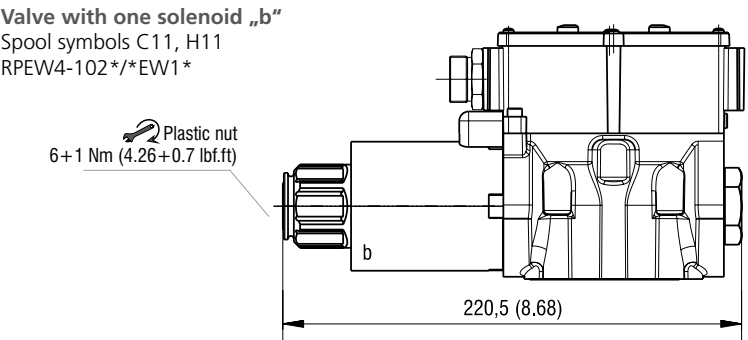
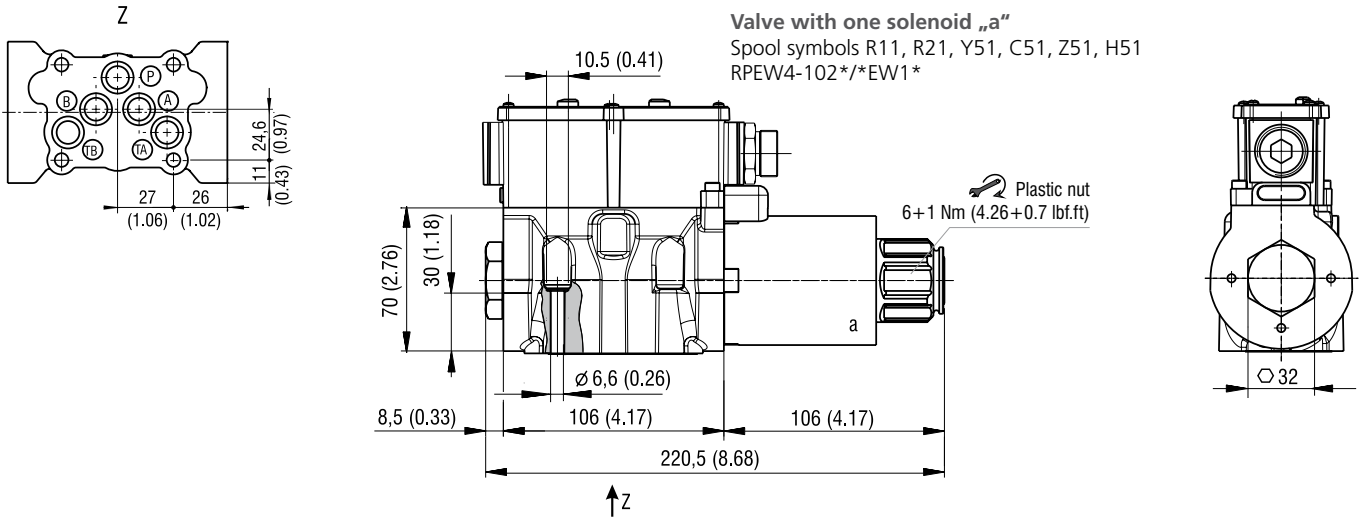
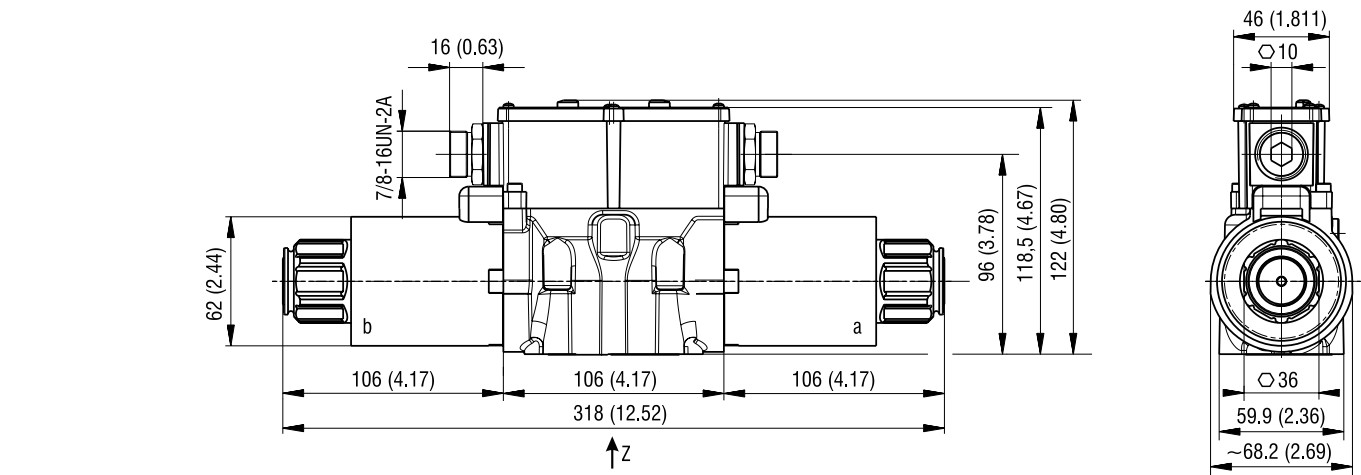
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Spool Speed Control in millimeters (inches)



Dimensions in millimeters (inches)

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

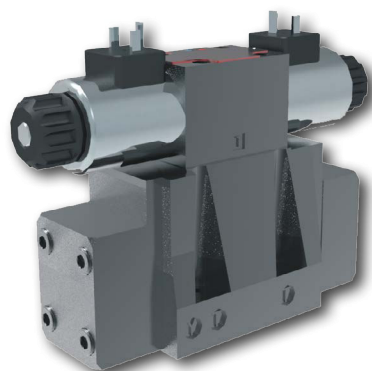


Mounting screws 14 Nm (10.3 lbf.ft)
M6 x 40 DIN 912-10.9

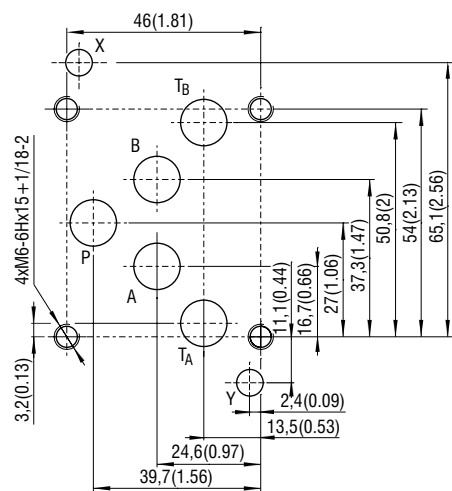
4/2 and 4/3 Directional Control Valve, Pilot Operated

RNEH1-10

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

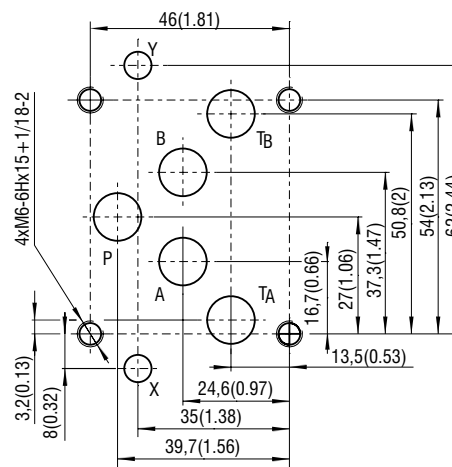


CETOP 4.2-4 P05-320 STANDARD PATTERN



Ports P, A, B, T - max.- Ø11.2 mm (0.44 in)
Ports X, Y - max. - Ø6.3 mm (0.25 in)

ISO 4401-05-05-005 CETOP 4.2-4 R05-320



Ports P, A, B, T - max.- Ø11.2 mm (0.44 in)
Ports X, Y - max. - Ø6.3 mm (0.25 in)

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)

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)
- 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 are parts 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

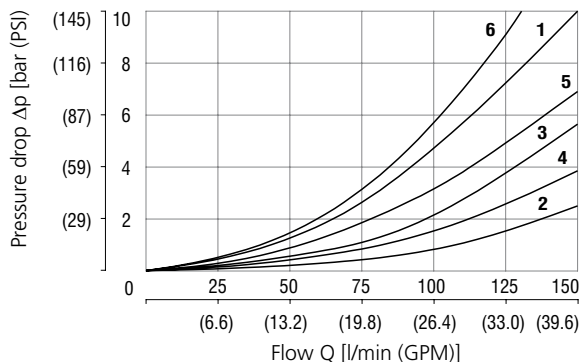
Technical Data

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		320 (4640)	420 (6090)
- at port T (external drain)	bar (PSI)	210 (3050)	350 (5080)
- at port T (internal drain)		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 v=32 mm ² /s (156 SUS)	ON OFF	ms	AC: 45 ... 60 DC: 55 ... 75 AC: 60 ... 90 DC: 60 ... 90
Weight	RNH1-10	kg (lbs)	4.6 (10.1)
	RNEH1-102		6.4 (14.1)
	RNEH1-103		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 v = 32 mm²/s (156 SUS)

Pressure drop related to flow rate



	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

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

Ordering Code: RN [] - [] / [] / [] - []

Type of control: electrohydraulically operated (EH), hydraulically operated (H)

Design series: standard 320 bar, high pressure 420 bar (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)

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

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 1745301-803-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

Drain: No designation (I), external, internal

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 connectors 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.

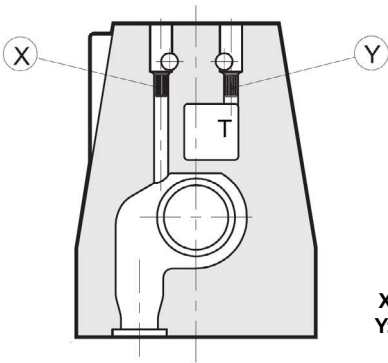
Spool Symbols

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

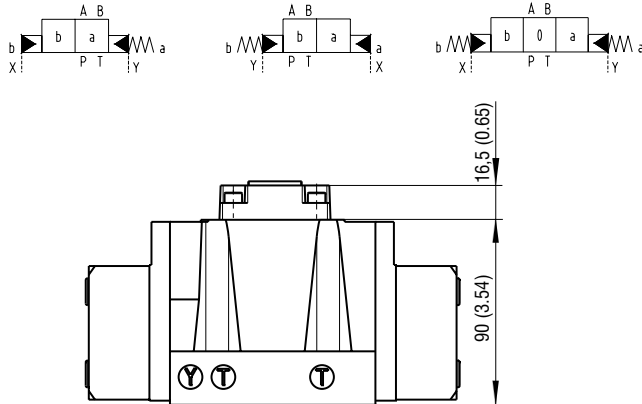
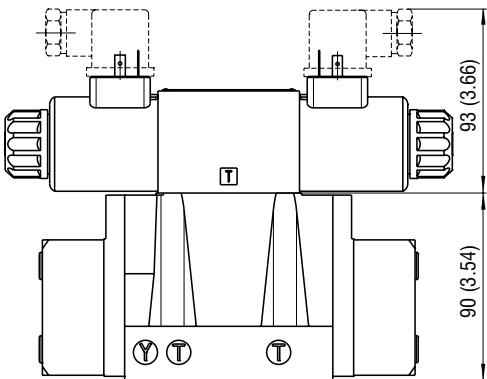
Solenoids
The operating solenoids are DC solenoids. For AC supply, the solenoids are provided with a rectifier integrated in the DIN connector socket as part of the solenoid. The connectors can be turned by 90°. By loosening the nut, the solenoids can be turned or replaced without interfering with any 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.

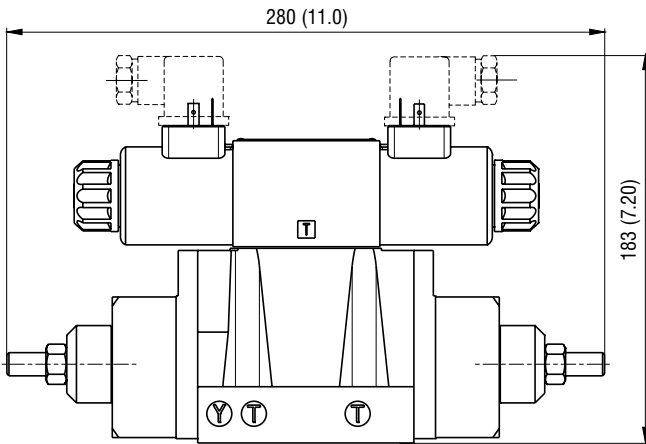
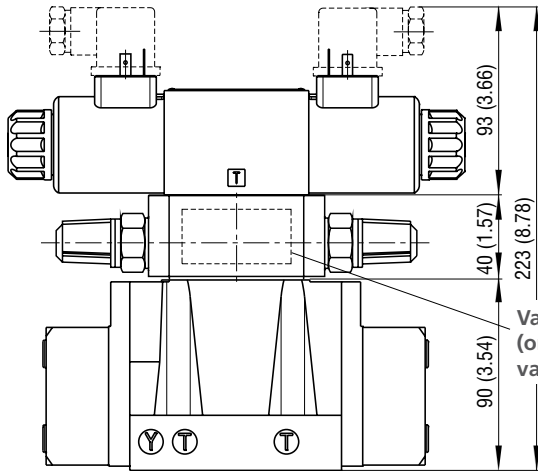
Control Options - Special Features

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**.

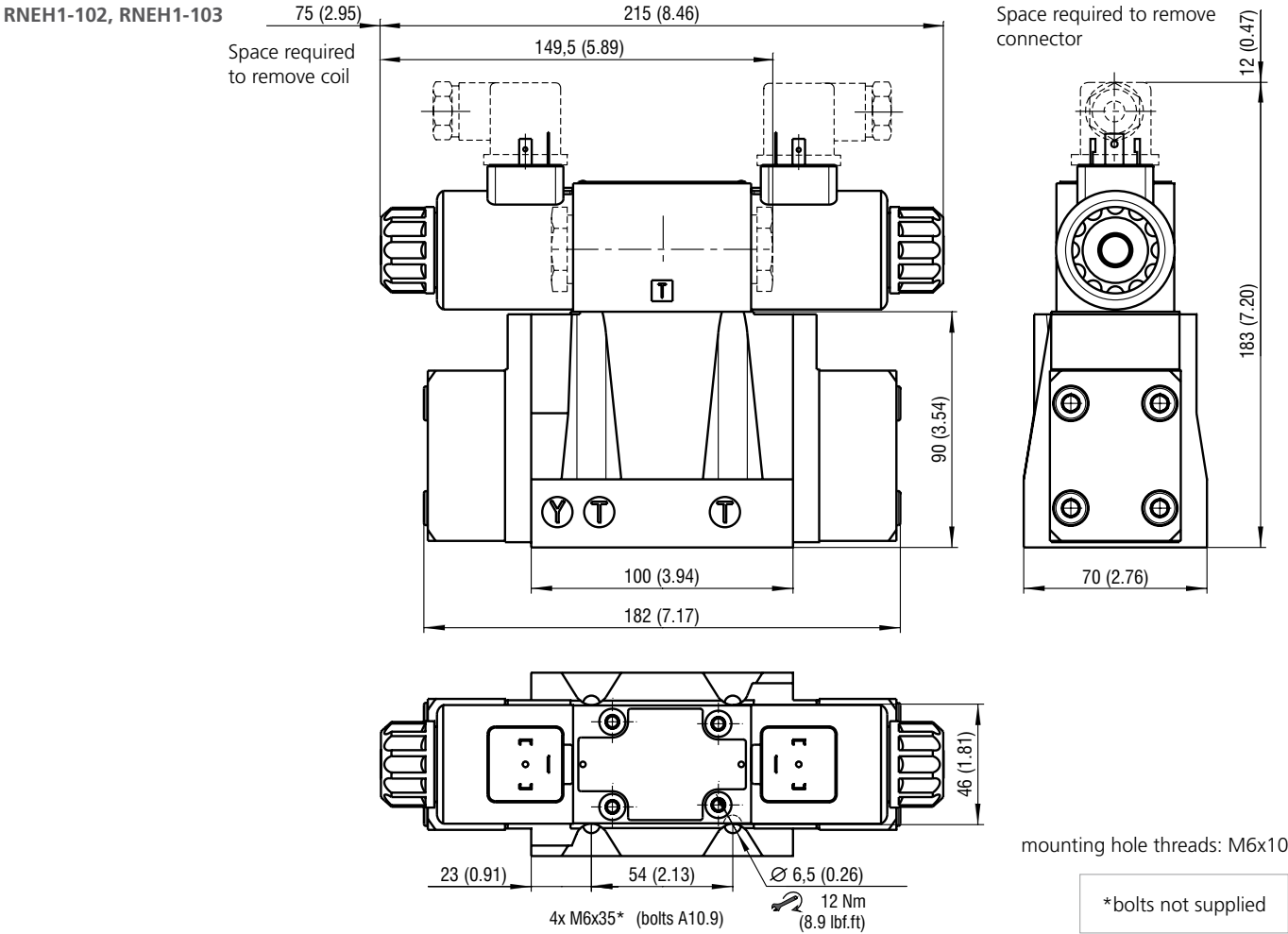
Control of the main spool stroke: C
Using special side plugs, it is possible to introduce stroke control the piloted valve so as to vary the maximum spool opening clearance. This solution allows the control of the flow rate from the pump to the actuator and from the actuator to the outlet, resulting 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 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.

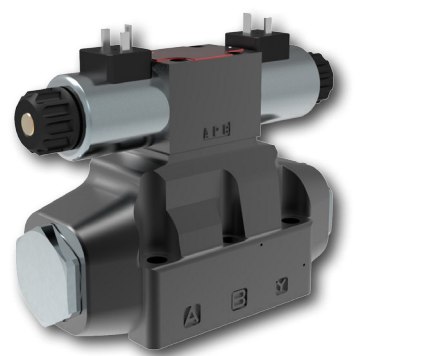
Dimensions in millimeters (inches)



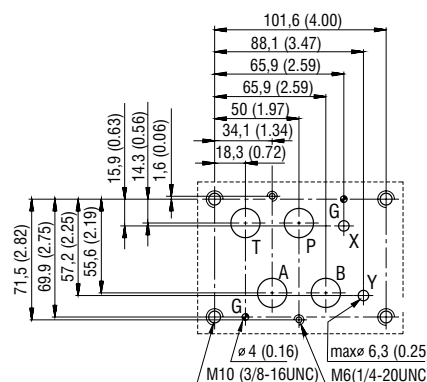
mounting hole threads: M6x10
*bolts not supplied

RNEH5-16

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



ISO 4401-07-07-0-05



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

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 are parts 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

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			350 (5080)	420 (6090)
- at port T (external drain)		bar (PSI)	210 (3050)	350 (5080)
- at port T (internal drain)			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	ON	ms	AC: 60 ... 80**	DC: 50 ... 70**
at v=32 mm/s (156 SUS)	OFF		AC: 60 ... 80**	DC: 60 ... 80**
Mass	RNH5-16	kg (lbs)	6.6 (14.6)	
	RNEH5-162		8.2 (18.1)	
	RNEH5-163		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			

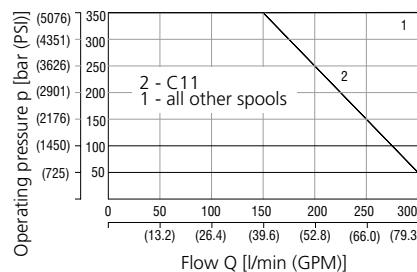
* For higher system pressure use option „Z“

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

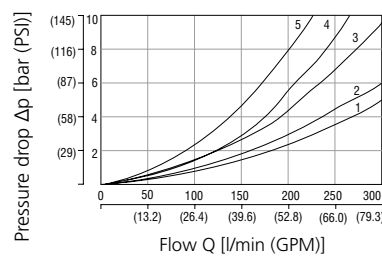
Operating limits

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)

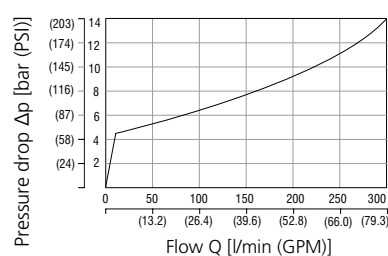
Pressure drop related to flow rate



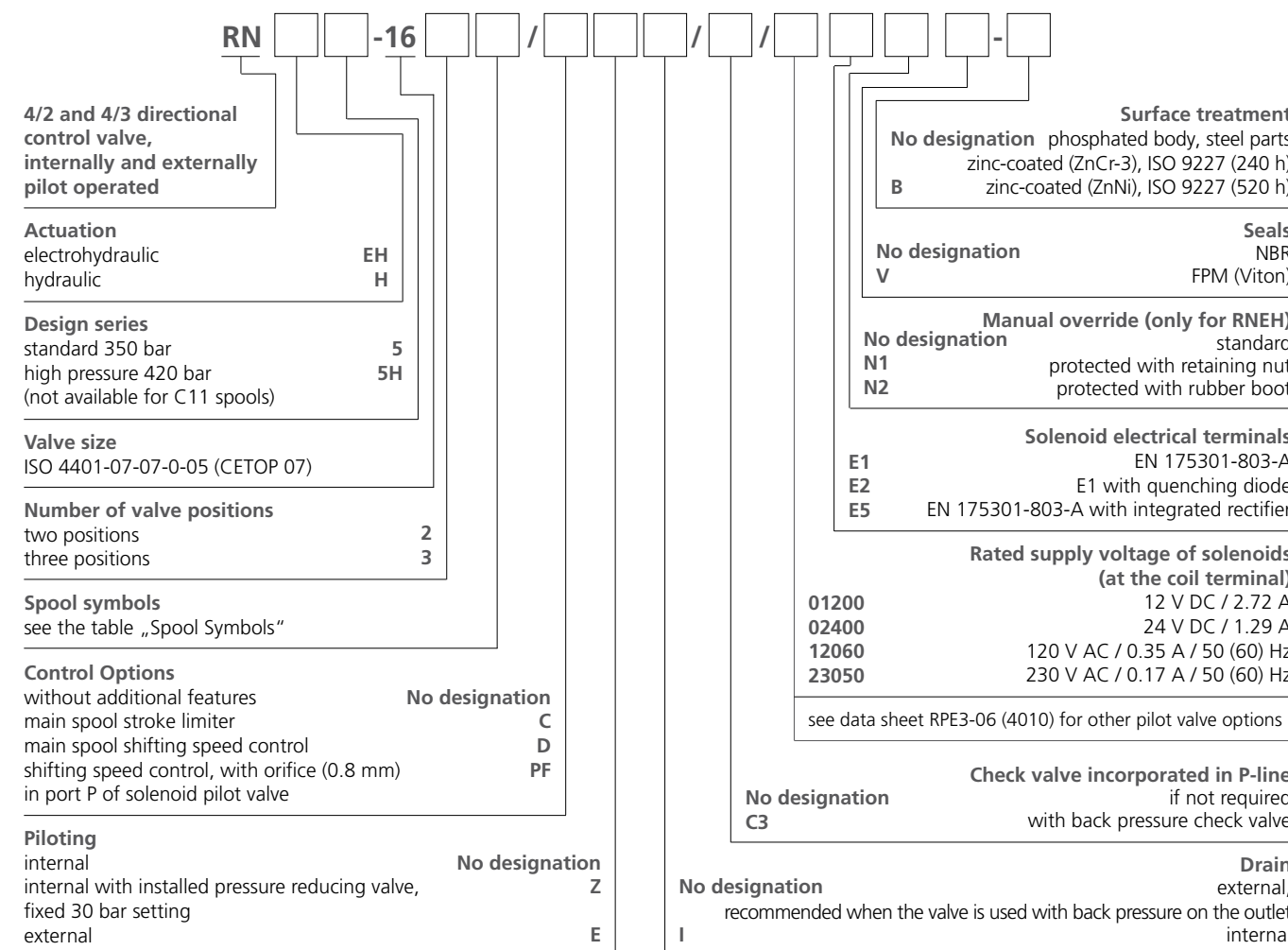
	Spool position	P-A	P-B	A-T	B-T	P-T
		Curves on graph				
Z11	Energized	1	1	3	4	
H11	Energized	1	1	4	4	
	De-energized					2
Y11	Energized	1	1	4	4	
	De-energized			4	4	
C11	Energized	2	2	4	5	
	De-energized					4
R11, R21		1	1	3	4	
X11, X21		1	1	4	4	
I15, I19		1	1	3	4	

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

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

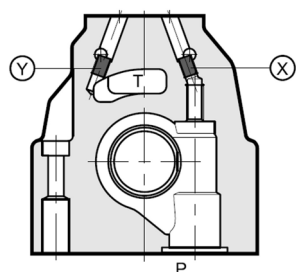
Three positions with centering spring			Two positions with return spring		
Z11			X11		
H11			X21		
Y11			R11		
C11			R21		
Z41			Two positions with mechanical detent on pilot valve		
Z22			J15		
Symbols are referred to the solenoid valve RNEH. For the hydraulic control version RNH please see the connection schematic (see page 3)			J19		

Symbols are referred to the solenoid valve RNEH. For the hydraulic control version RNEH please see the connection schematic (see page 3)

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

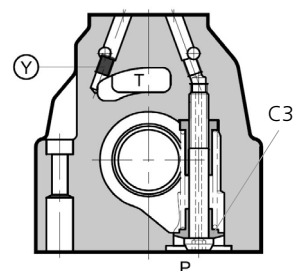
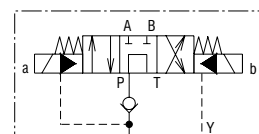
Check Valve Incorporated in Line P

Check valve incorporated in line P: C3

Valves RNEH are available with 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, 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

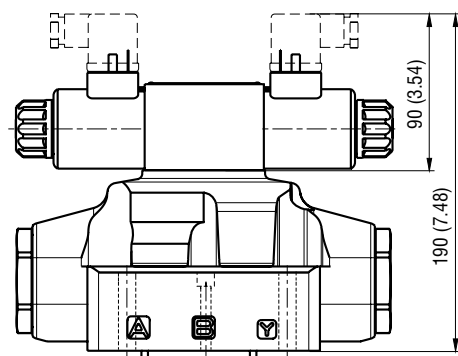
The operating solenoids are DC solenoids. For AC supply, the solenoids are provided with a rectifier integrated in the DIN connector socket as part of the solenoid. The connectors can be turned by 90°. By loosening the nut, the solenoids can be turned or replaced without interfering with any seals of 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

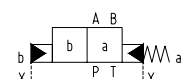
The valve is supplied with an RPE3-06 pilot solenoid valve.



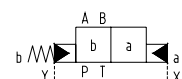
Hydraulic control: RNH

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

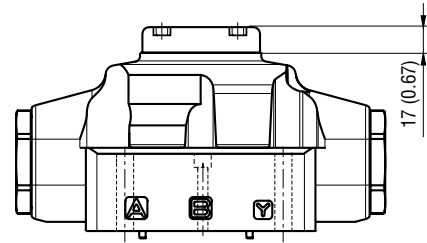
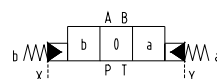
RNH5-162R



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

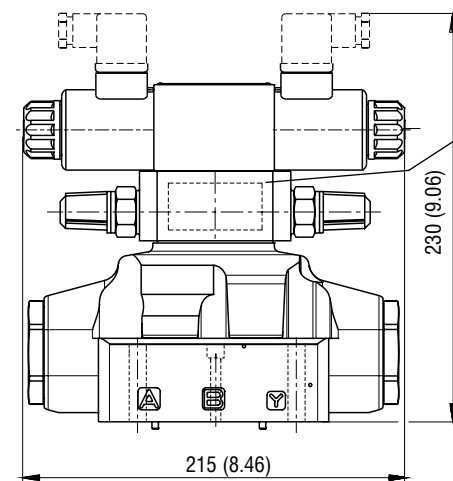
Internal piloting with mounted pressure reducing valve with 30 bar fixed setting. The option **Z** may be used together with option **D**.

Control of the main spool stroke: C

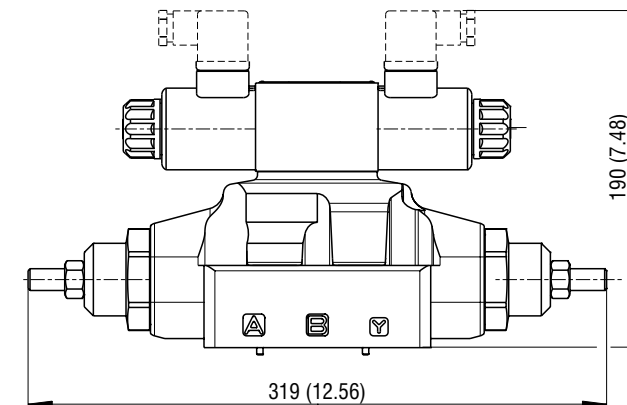
Using special side plugs, it is possible to introduce stroke control the piloted valve so as to vary the maximum spool opening clearance. This solution allows the control of the flow rate from the pump to the actuator and from the actuator to the outlet, resulting in double adjustable control of the 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



Valve 2VS3-06
(or reducing valve)

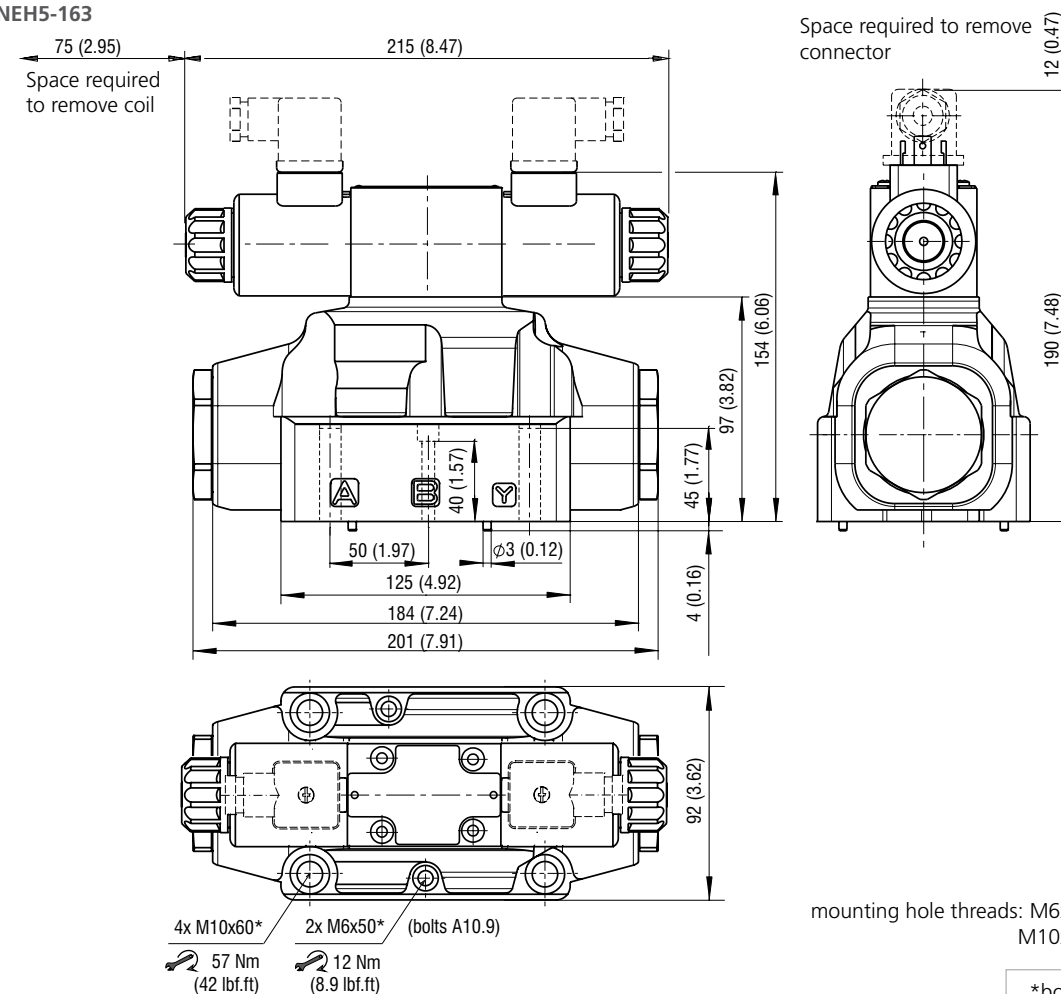


Solenoid operated distributor with pilot valve in the configuration 3H11

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

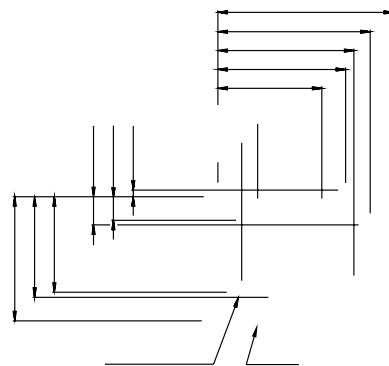
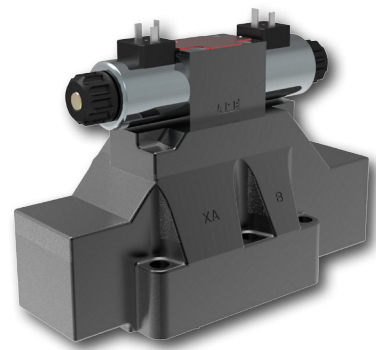


mounting hole threads: M6x12 (1/2-13 UNC)
M10x20 (1/2-13 UNC)

*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)

**Ordering Code**

RN												-25			/			/		/				-	
4/2 and 4/3 directional control valve, internally and externally pilot operated																									
Actuation electrohydraulic hydraulic										EH H															
Design series standard 320 bar high pressure 420 bar (not available for C11 spools)										4 4H															
Valve size ISO 4401-08-08-0-05 (CETOP 08)																									
Number of valve positions two positions three positions										2 3															
Spool symbols see the table „Spool Symbols“																									
Control Options without additional features main spool stroke limiter main spool shifting speed control shifting speed control, with orifice (0.8 mm) in port P of solenoid pilot valve										No designation C D PF															
Piloting internal, 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 external										No designation Z E															
										Surface treatment standard No designation A zinc-coated (ZnCr-3), ISO 9227 (240 h) B zinc-coated (ZnNi), ISO 9227 (520 h)															
										Seals NBR No designation V FPM (Viton)															
										Manual override (only for RNEH) standard No designation N1 protected with retaining nut N2 protected with rubber boot															
										Solenoid electrical terminals EN 175301-803-A E1 E1 with quenching diode E2 EN 175301-803-A with integrated rectifier E5															
										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 none No designation C3 with back pressure check valve															
										Drain external, No designation recommended when the valve is used with back pressure on the outlet 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.

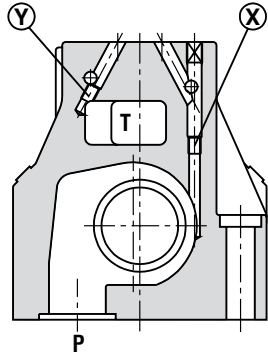
Spool Symbols

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

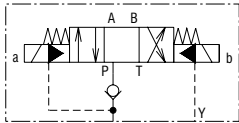


X: plug M6x8 for external pilot
Y: plug M6x8 for external drain

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.

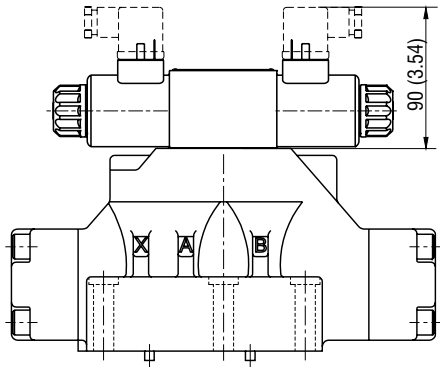
Electrical Features

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.

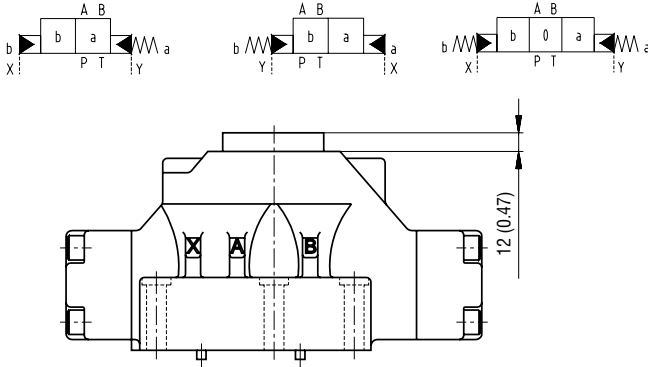
For detail information on the pilot valve RPE3-06 refer to data sheet No.4010.

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.



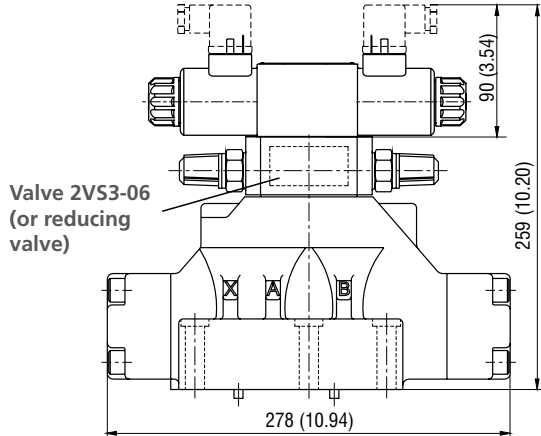
The minimum piloting pressure can be as low as 5 bar at low flow rates, but with higher flow rates a pressure of 12 bar is needed.

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

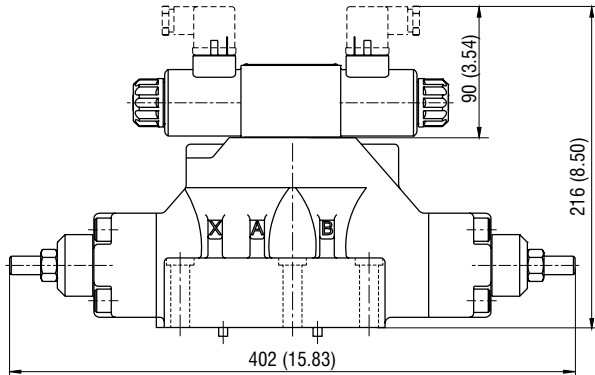
Control of the main spool shifting speed: D
By placing a 2VS3-06 flow control valve between the pilot solenoid valve and the hydropiloted valve, the pilot flow rate can be controlled and therefore the shifting speed adjusted. Add the letter **D** to the identification code to request this device.

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.

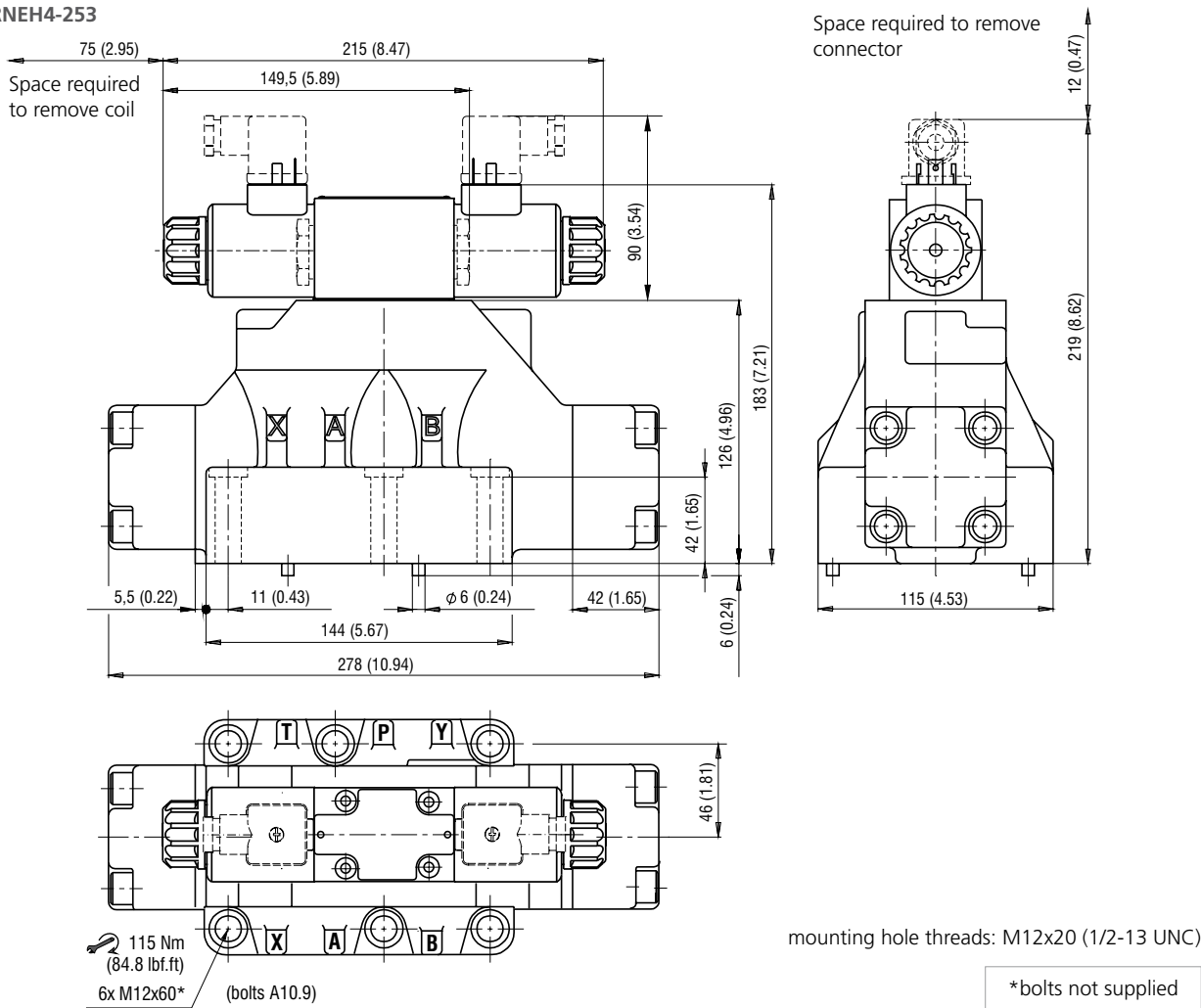
Shifting speed control: PF
with an orifice (0.8 mm) in port P of the solenoid pilot valve
Add **PF** to the identification code to request this device



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

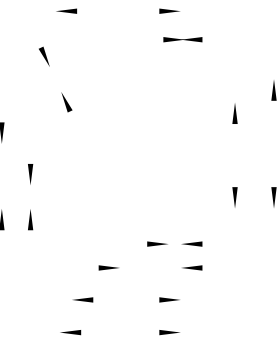
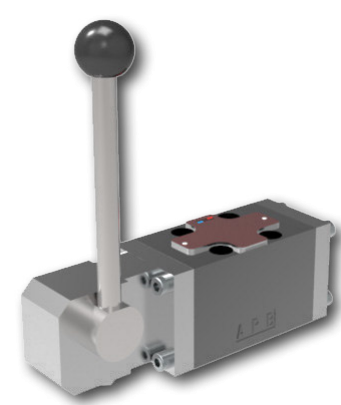


mounting hole threads: M12x20 (1/2-13 UNC)

*bolts not supplied

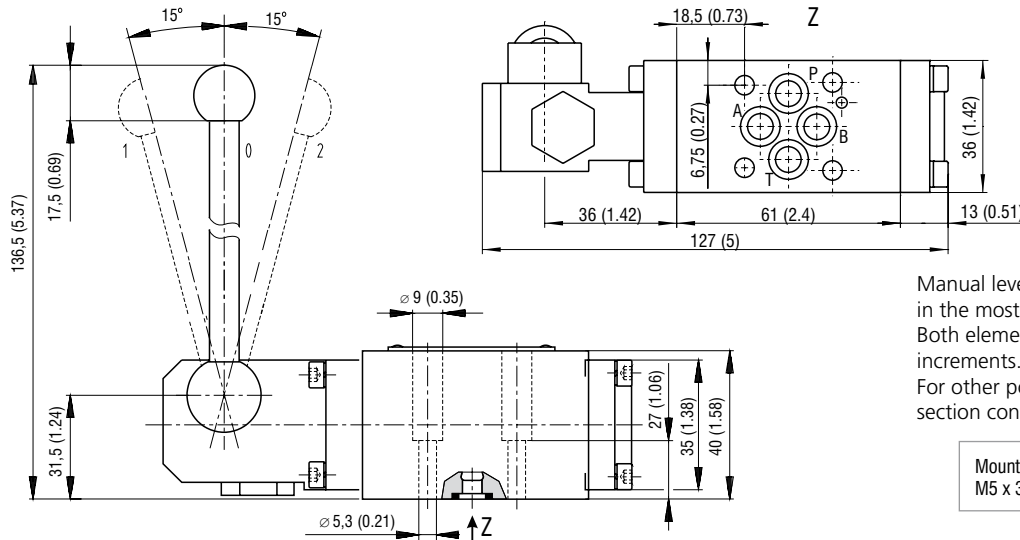
RPR3-04

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



Ports P, A, B, T - max Ø4.5 mm (0.18 in)

Dimensions in millimeters (inches)



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.

Mounting screws 5 Nm (3.69 lbf.ft)
M5 x 35 DIN 912-10.9 - not supplied

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
three positions

Spool symbols
see the table "Spool Symbols"

2

3

A1

No designation

A

B

No designation

V

Surface treatment
housing phosphated, steel parts
zinc-coated (ZnCr-3), ISO 9227 (240 h)
zinc-coated (ZnCr-3), ISO 9227 (240 h)
zinc-coated (ZnNi), ISO 9227 (520 h)

Seals
NBR
FPM (Viton)

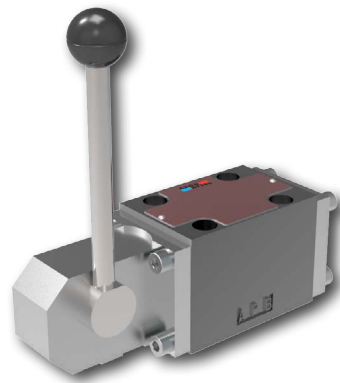
Manual lever and actuating section position
standard, lever on side A, upward

The port restrictor plugs can be ordered separately from the spare parts data sheet HA 8010. Besides the shown, commonly used valve versions other special models are available. Contact our technical support for their identification, feasibility and operating limits.

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

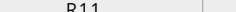
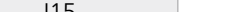
RPR3-06

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



Technical Features

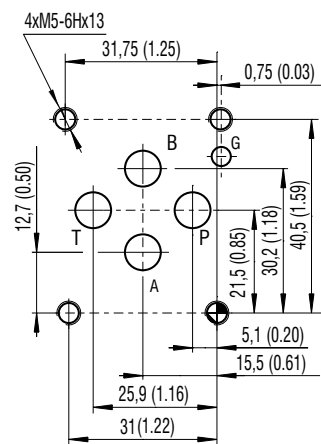
- › Direct acting manually operated directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- › High transmitted hydraulic power up to 350 bar, optimized design for minimized pressure drop
- › Three chamber housing design for production cost saving
- › Manual 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			

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
Mass	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	

ISO 4401-03-02-0-05

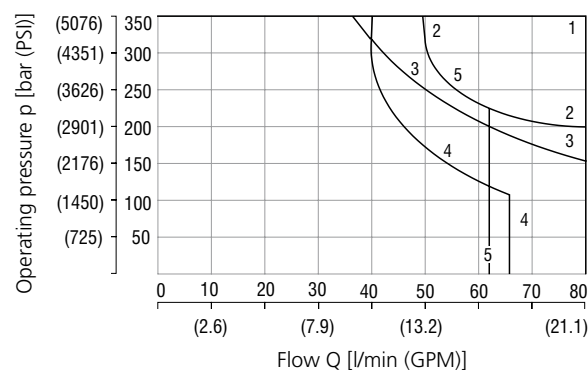


Ports P, A, B, T - max $\varnothing 7.5$ mm (0.29 in)

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

Operating limits

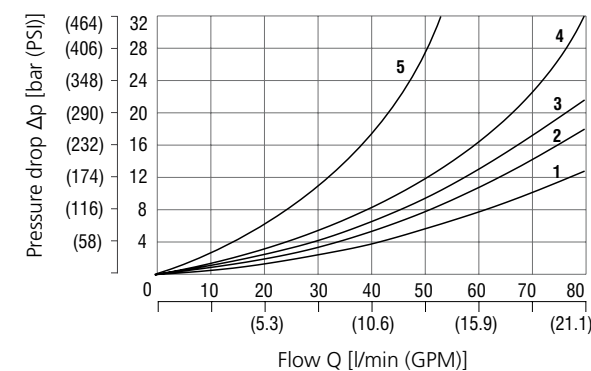
Operating limits for maximum hydraulic power and rated lever force.



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				

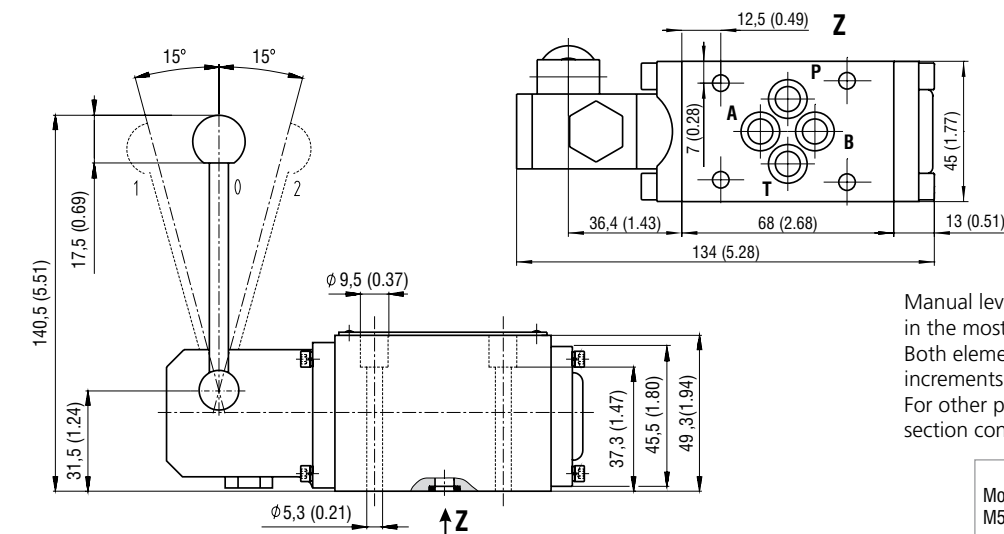
For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Pressure drop related to flow rate



	P-A	P-B	A-T	B-T	P-T
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			

Dimension in millimeters (inches)



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.

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

Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			Y14			X21		
C11			Z21			C55		
H11			P11			Z15		
P11			H11			Z55		
Y11			C51			Y55		
B11			Z11			J15		
L21			H51			J75		
Z15			Y11			P55		
C15			R11			R25		
H15			A51			X15		
P15			R21			Y15		
Y15			J19					
B15			X11					

Ordering Code

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

Valve size

Number of valve positions
two positions
three positions

Spool symbols
see the table "Spool Symbols"

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

No designation	Seals
V	NBR
	FPM (Viton)

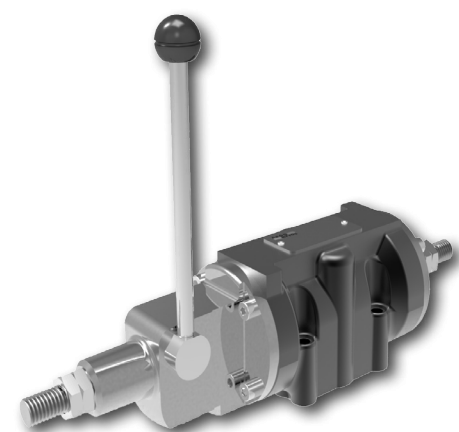
Manual lever and actuating section position
standard, lever on side A, upward

The port restrictor plugs can be ordered separately from the spare parts data sheet HA 8010. Besides the shown, commonly used valve versions other special models are available. Contact our technical support for their identification, feasibility and operating limits.

4/2, 4/3 Directional Control Valve, Manually Operated

RPR1-10

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 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				

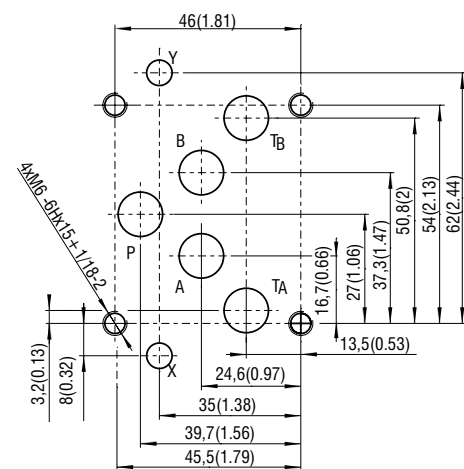
Technical Data

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
Mass	kg (lbs)	3.4 (7.5)

Technical Data Sensor and Connector		SO, SC
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	

ISO 4401-05-04-0-05



Ports P, A, B, T - max Ø11.2 mm (0.44 in)

Ordering Code

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

Surface treatment
No des. 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)

Seals
No designation NBR
V FPM (Viton)

Spool and position sensor type
No designation without sensor
SO normally-open sensor
SC normally closed sensor

Spool position sensor supply voltage
No designation without sensor
24 rated supply voltage, 24 VDC

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

The port restrictor plugs can be ordered separately from the spare parts data sheet SP_8010.
Mounting bolts M6 x 40 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.

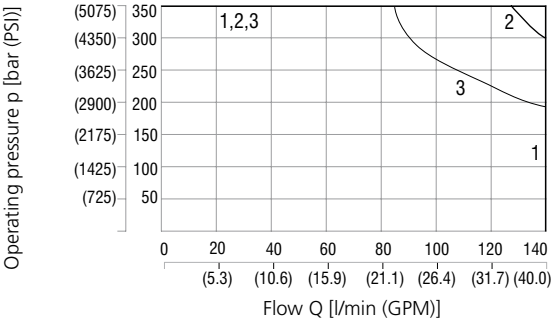
Spool Symbols

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

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

Operating limits (Directional valve)

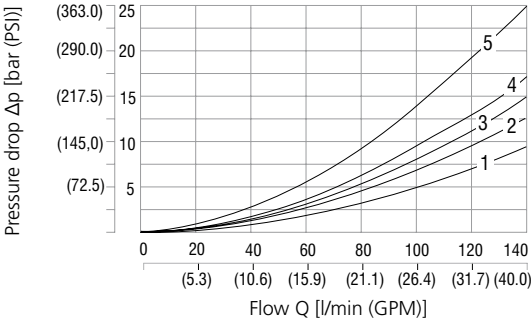
Operating limits for maximum hydraulic power and rated lever force



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

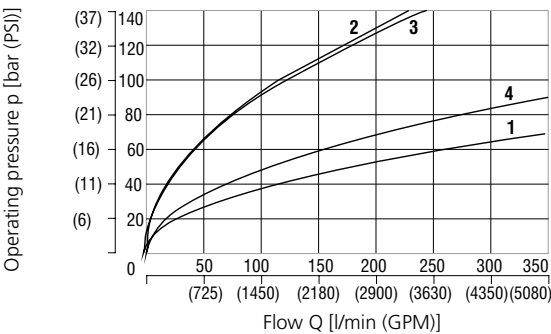


	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11	1	1	3	3		H11	1	1	1	1	3
Y11	1	1	2	2		C11	1	1	3	3	5
P11	1	1	3	3		R11	1	1	4	4	

Operating limits (Proportional valve)

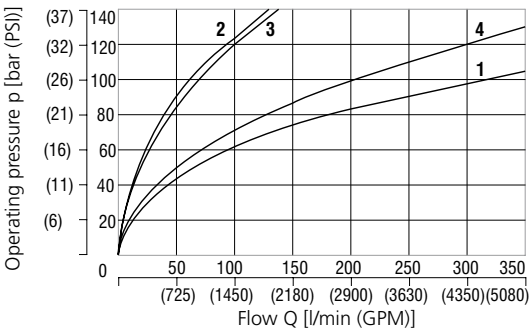
Operating limits for maximum hydraulic power and rated lever force

30 l/min (7.9 GPM)



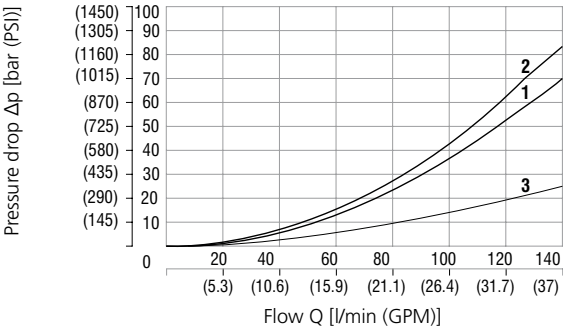
s	50% [2.3mm (0.09in)]	100% [4.6mm (0.18in)]
Z11/30	1	2
Y11/30	3	4

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

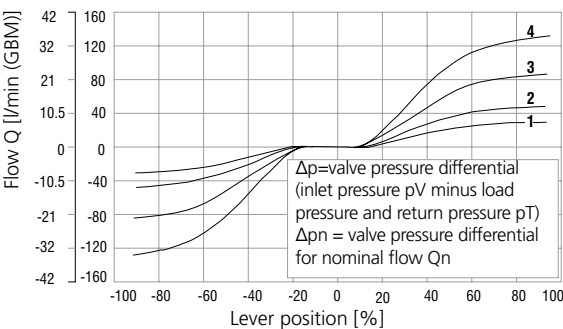
Pressure drop related to flow rate



	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

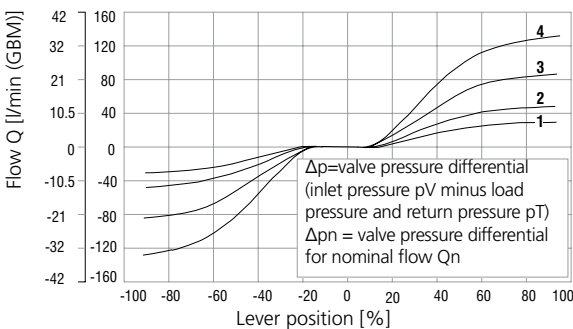
Proportional Valve Actuation Characteristics

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



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

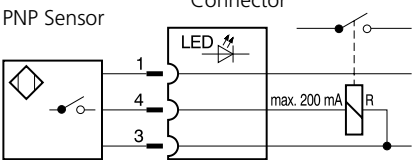
Proportional spool flow rate 60 l/min (15.8 GPM)



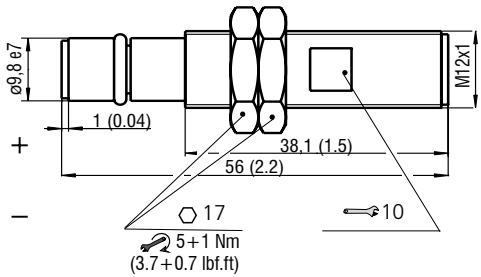
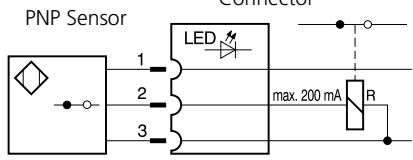
1	Δpn = 10 bar (145 PSI)	3	Δp = 160 bar (2321 PSI)
2	Δp = 50 bar (725 PSI)	4	Δp = 350 bar (5076 PSI)

Technical Data - Sensor in millimeters (inches)

SO Circuit diagram of the normally - OPEN sensor



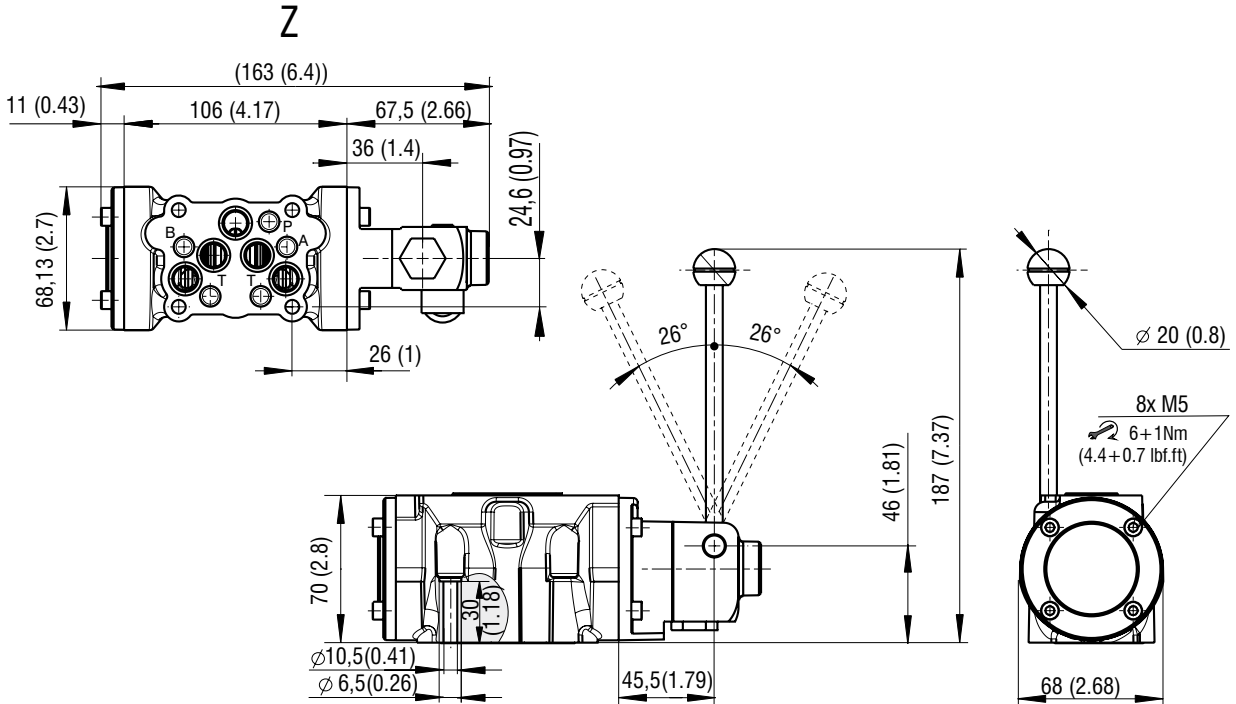
SC Circuit diagram of the normally - CLOSED sensor



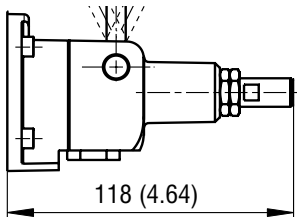
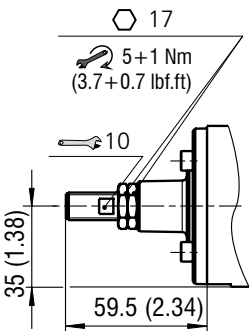
Dimensions in millimeters (inches)

RPR1-10*/A1-0-0

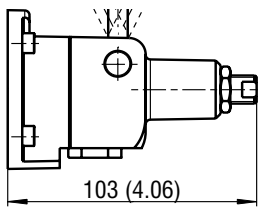
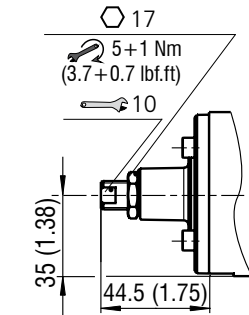
without stroke limiter and position sensor



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



RPR1-10*/SL*
Stroke limiter

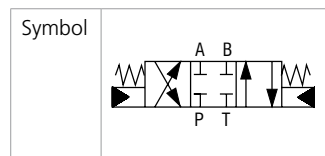
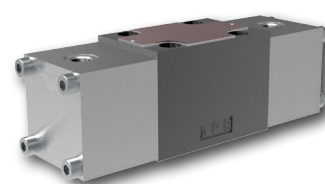


Manual lever and actuating section are shown in the most frequently used standard position. Both elements can be rotated in 90° increments. For other positions of lever and actuating section contact our technical support.

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)



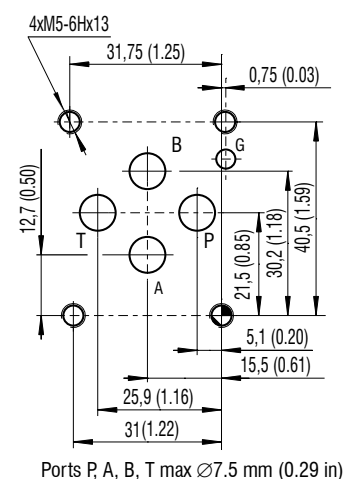
Technical Features

- 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 M10x1, 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



Technical Data

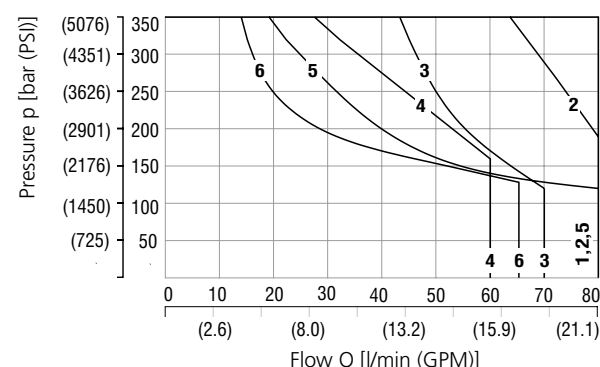
Valve size		06 (D03)
Max. flow	l/min (GPM)	80 (21.1)
Max. operating pressure P, A, B	bar (PSI)	350 (5080)
Max. operating pressure at port T	bar (PSI)	130 (1890)
Min. pilot pressure	bar (PSI)	30 (440)
Max. pilot pressure	bar (PSI)	160 (2320)
Pilot volume	cm³ (cu.in)	0.5 (0.03)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Mass	kg (lbs)	1.6 (3.53) 2.7 (5.70)

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

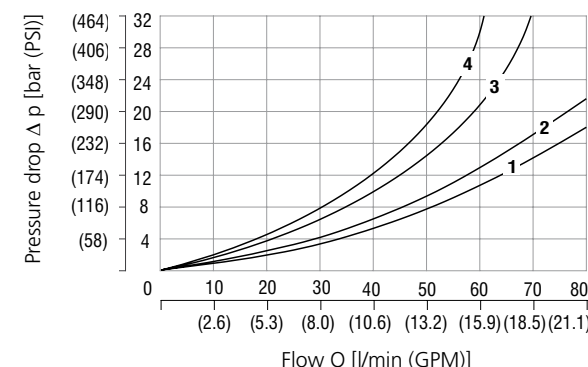
Characteristics measured at v = 32 mm³/s (156 SUS)

Operating limits

Operating limits for maximum hydraulic power with min. piloting pressure



Pressure drop related to flow rate



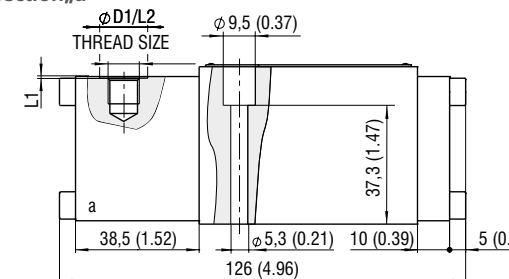
H11	1	J15	3	C51	1	A51	5
H51	1	R11	4	Z11	2	Y11	6
C11	1	X11	4	Z51	2	Y51	6

	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				
Y11	1	1	1	1		Y51	1	1			

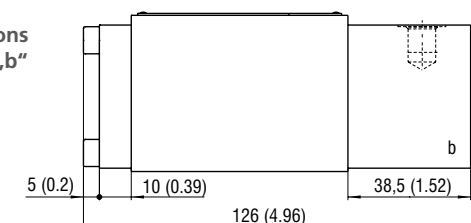
For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Dimension in millimeters (inches)

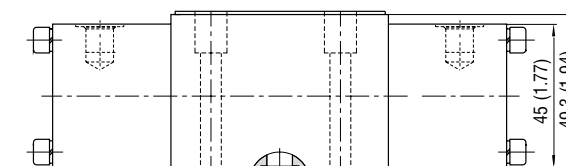
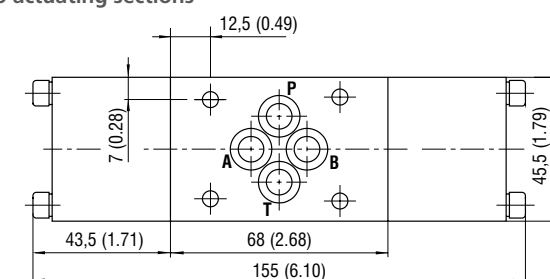
Valve with two positions
one actuating section „a“



Valve with two positions
one actuating section „b“



Valve with three positions
two actuating sections

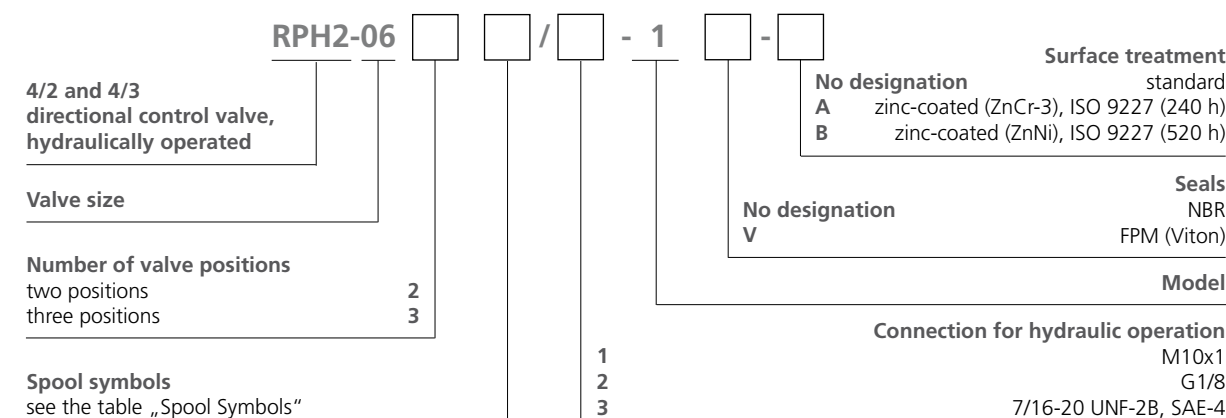


Thread size	Ø D1	L1	L2
M10x1, G1/8	15,5 (0.61)	1 (0.04)	8 (0.32)
7/16-20 UNF-2B, SAE-4	21 (0.83)	0,8 (0.03)	14 (0.55)

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



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 shown, commonly used valve versions 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)

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 M10x1, 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).

Technical Data

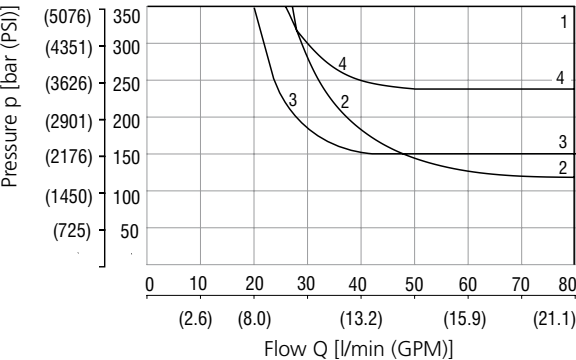
Valve size		06 (D03)
Max. flow	l/min (GPM)	80 (21.1)
Max. operating pressure P, A, B	bar (PSI)	350 (5080)
Max. operating pressure at port T	bar (PSI)	160 (2320)
Min. pilot pressure	bar (PSI)	2 (30)
Max. pilot pressure	bar (PSI)	25 (360)
Pilot volume	cm³ (cu.in)	6,2 (0.38)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Mass	kg (lbs)	
	valve with 1 actuator	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 v = 32 mm³/s (156 SUS)

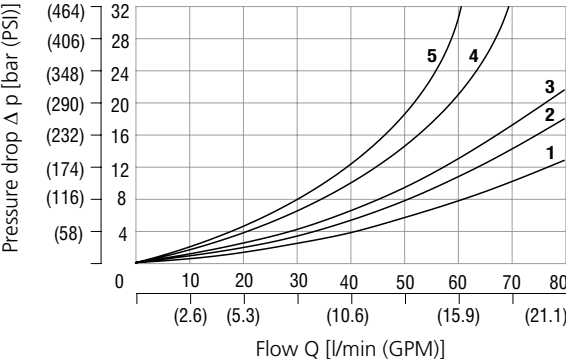
Operating limits

Operating limits for maximum hydraulic power with min. piloting pressure



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

Pressure drop related to flow rate

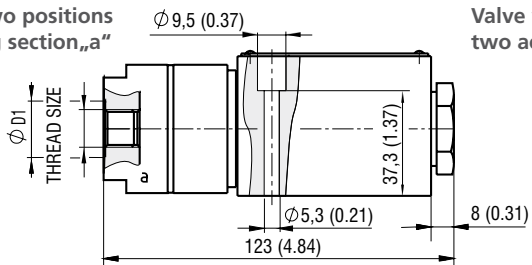


	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11, L21, B11, R11, X11, J15	2	2	3	3		Y11	2	2	2	2	
C11	4	4	4	5	3	A51, J75	2	2			
H11	2	2	2	2	3	P51		1	3		
P11	1	1	3	3		Y51		2	2		

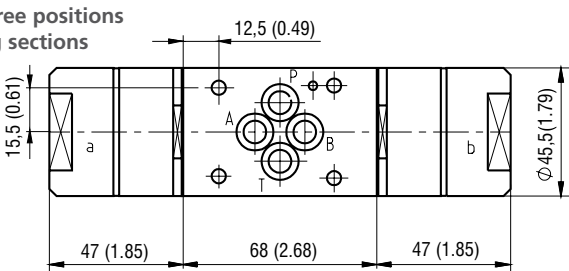
For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

Dimension in millimeters (inches)

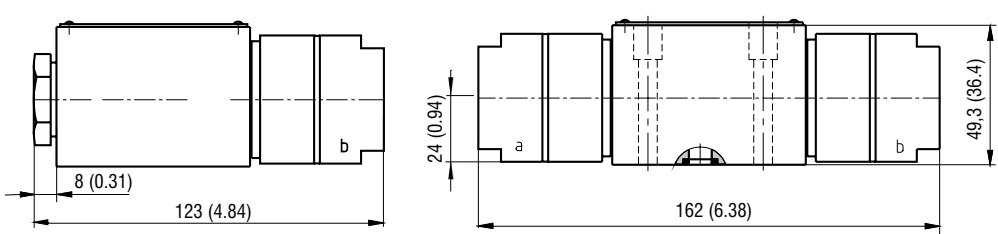
Valve with two positions
one actuating section „a“



Valve with three positions
two actuating sections



Valve with two positions
one actuating section „b“



Thread size	Ø D1
M10x1, 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
three positions

Spool symbols
see the table „Spool Symbols“

No designation

No designation

1
2
3

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

Seals
NBR
FPM (Viton)

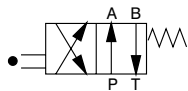
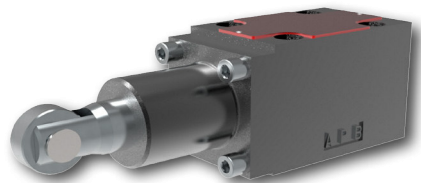
Actuation
hydraulic
pneumatic

Connection for hydraulic operation
M10x1
G1/8
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 shown, commonly used valve versions other special models are available. Contact our technical support for their identification, feasibility and operating limits.

RPK1-06

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

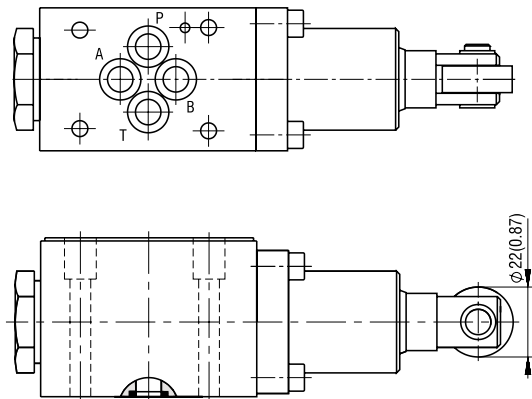
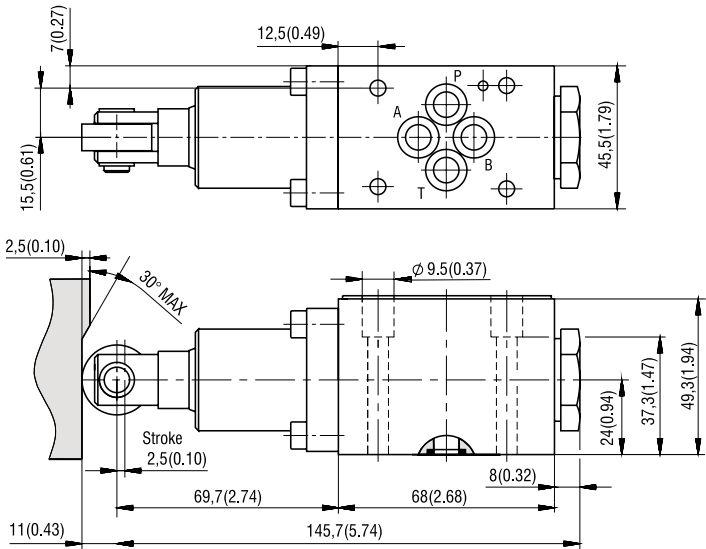


Y11, Y51	1
R11	2
Z11, Z51	3
C11, C51	4
R21	5
H11, H51	6

Dimensions in millimeters (inches)

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

Spool symbols
Z11, X11, C11, H11



Spool Symbols					
Type	Symbol	Interposition	Type	Symbol	Interposition
R11			Z51		
R21			H51		
A51			Z11		
P51			X11		
Y51			C11		
C51			H11		

Operating Force

Operating pressure	Pressure at port T: 0 bar (0 PSI)			Pressure at port T: 20 bar (290 PSI)		
	Start stroke	Working stroke	Max stroke	Start stroke	Working stroke	Max stroke
100 bar (1450 PSI)	35 N (8 lbf)	135 N (30 lbf)	195 N (44 lbf)	60 N (13 lbf)	160 N (36 lbf)	220 N (49 lbf)
200 bar (2900 PSI)	35 N (8 lbf)	135 N (30 lbf)	195 N (44 lbf)	60 N (13 lbf)	160 N (36 lbf)	220 N (49 lbf)
300 bar (4350 PSI)	35 N (8 lbf)	135 N (30 lbf)	195 N (44 lbf)	60 N (13 lbf)	160 N (36 lbf)	220 N (49 lbf)

Ordering Code

RPK1 - 06

4/2 directional control valve, roller cam operated

Valve size

Number of valve positions
two positions

Spool symbols
see the table "Spool Symbols"

2

No designation

Surface treatment
housing phosphated, steel parts
zinc-coated (ZnCr-3), ISO 9227 (240 h)
zinc-coated (ZnCr-3), ISO 9227 (240 h)
zinc-coated (ZnNi), ISO 9227 (520 h)

No designation

Seals
NBR
FPM (Viton)

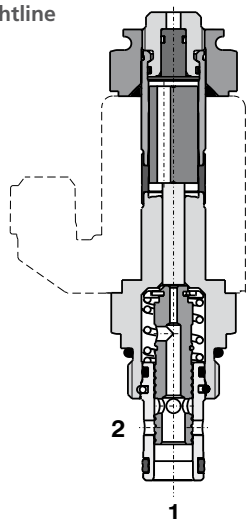
The port restrictor plugs can be ordered separately from the spare parts data sheet HA 8010. The port restrictor plugs can be ordered separately in spare parts data sheet. Mounting bolts M5x45 DIN 912-10.9 or studs must be orderer separately. Tightening torque is 8.9 Nm (6.56 lbf.ft). Besides the shown, commonly used valve versions other special models are available. Contact our technical support for their identification, feasibility and operating limits.

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

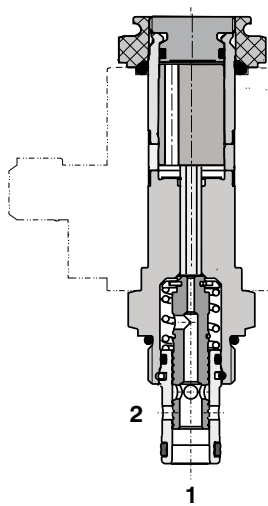
SD2E-A2

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

Lightline



High performance



Technical Features

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

Functional Description

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

Model Code	2111	2112
Symbol		

Technical Data

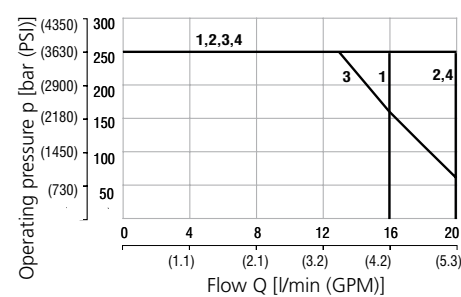
Valve size / Cartridge cavity		3/4-16 UNF-2A / A2	
		Lightline	High performance
Max. flow	l/min (GPM)	20 (5.3)	30 (7.9)
Max. operating pressure	bar (PSI)	250 (3630)	350 (5080)
Fluid temperature range	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-20...50 (-4...122)	-20...80 (-4...176)
Supply voltage tolerance	%	DC ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Mass 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	C 14B*	C 19B*
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 $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Operating limits - Lightline

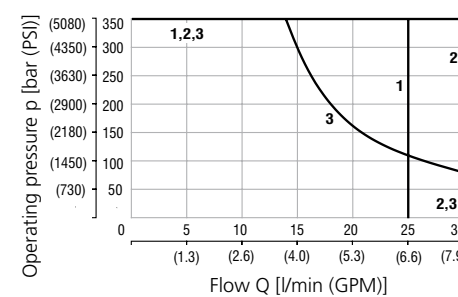
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



	Model	Connection
1	2112	$2 \rightarrow 1$
2	2112	$1 \rightarrow 2$
3	2111	$1 \rightarrow 2$
4	2111	$2 \rightarrow 1$

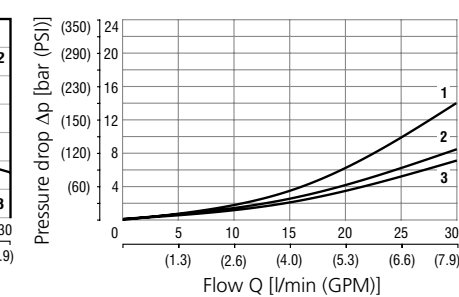
Operating limits - High performance

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



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

Pressure drop related to flow rate
- Lightline, High performance

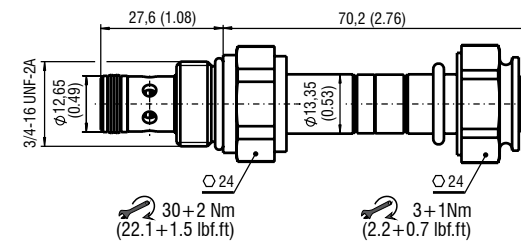


	Model	Connection
1	2I12	1→2
1	2I12	2→1
2	2I11	1→2
3	2I11	2→1

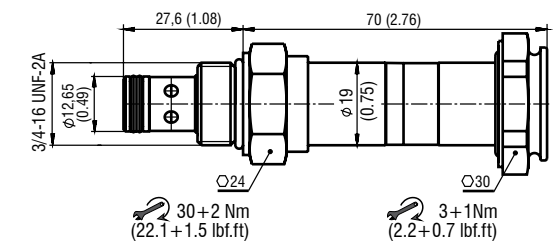
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

Lightline



High performance

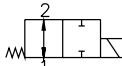
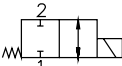


Manual Override in millimeters (inches)

No designation - standard	Designation M2 - rubber boot protected	Designation 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)	 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

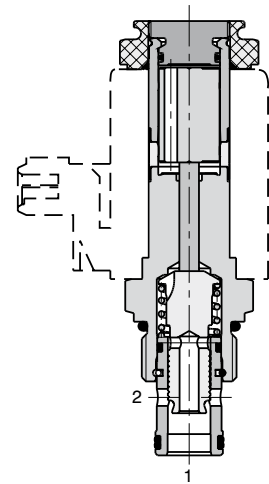
				-	
SD2E-A2 /					
2/2 directional valve, solenoid operated, spool type, direct acting, 3/4-16 UNF					
Lightline High performance	L H			A B	Surface treatment zinc-coated (ZnCr-3), ISO 9227 (240 h) zinc-coated (ZnNi), ISO 9227 (520 h)
Model				No designation V	Seals NBR FPM (Viton)
		2I11			
		2I12	No designation M2 M5 M9		Manual override standard rubber boot protected socket head screw 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
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

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

Model Code	2111	2112
Symbol		

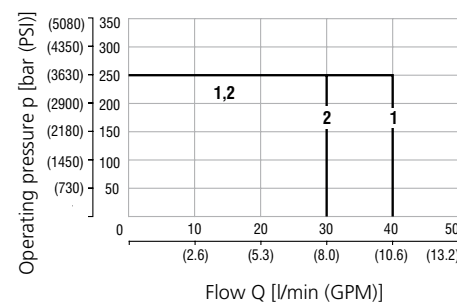
Technical Data

Valve size / Cartridge cavity		7/8-14 UNF-2A / B2	
		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	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-20...50 (-4...122)	-20...80 (-4...176)
Supply voltage tolerance	%	AC, DC: ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Mass without coil	kg (lbs)	0.22 (0.49)	0.29 (0.64)
		Type	
General information		Products and operating conditions	
Coil types	Datasheet GI_0060 C_8007	C19B*	C22B*
Valve bodies	In-line mounted	SB-B2*	
	Sandwich mounted	SB-*B2*	
Cavity details / Form tools		SMT-B2*	
Spare parts	SMT_0019 SP_8010		

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

Operating limits - Lightline

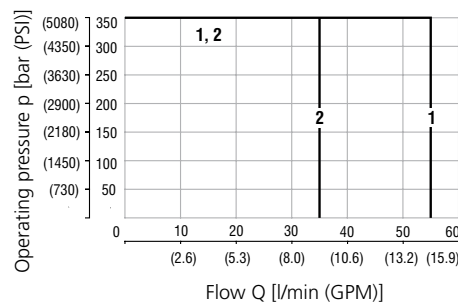
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



	Model	Connection
1	2111	$2 \rightarrow 1$
2	2112	$2 \rightarrow 1$

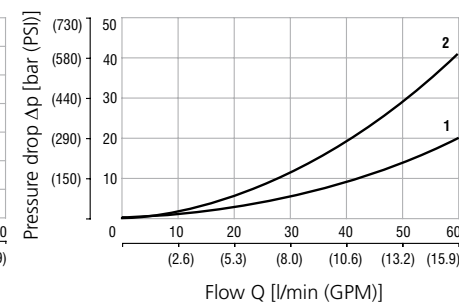
Operating limits - High performance

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



	Model	Connection
1	2I11	$2 \rightarrow 1$
2	2I12	$2 \rightarrow 1$

Pressure drop related to flow rate
- Lightline, High performance

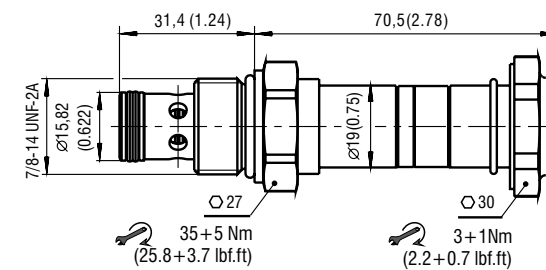


	Model	Connection
1	2I11	2→1
2	2I12	2→1

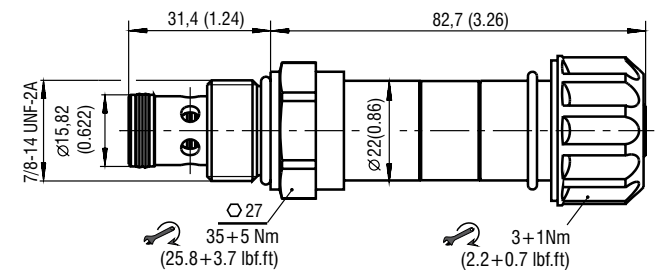
For operating limits under conditions and flow directions other than shown contact our technical support.

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.

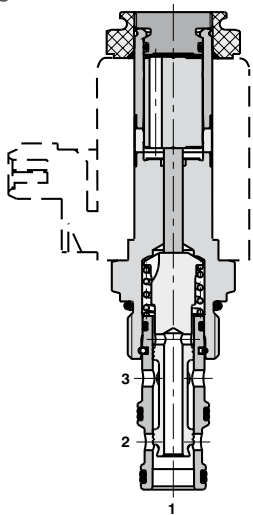
Ordering Code[illegible]

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

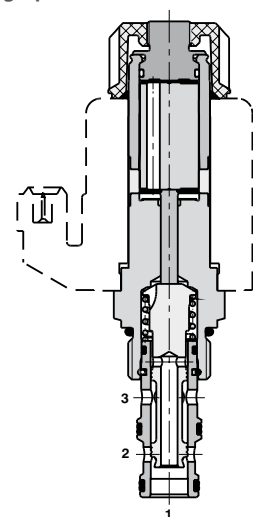
SD2E-B3

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
Symbol			

Technical Data

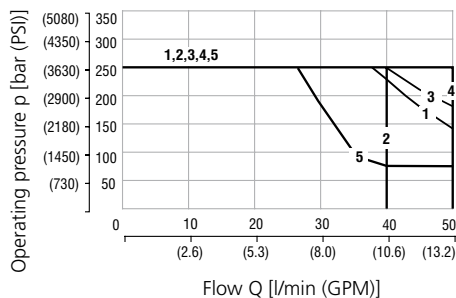
Valve size / Cartridge cavity		7/8-14 UNF-2A / B3	
		Lightline	High performance
Max. flow	l/min (GPM)	50 (13.2)	60 (15.9)
Max. operating pressure	bar (PSI)	250 (3630)	350 (5080)
Fluid temperature range	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-20...50 (-4...122)	-20...80 (-4...176)
Supply voltage tolerance	%	AC, DC: ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Mass 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 Sandwich mounted	SB-B3* SB-*B3*
Cavity details / Form tools	SMT_0019	SMT-B3*
Spare parts	SP_8010	

Characteristics measured at v = 32 mm³/s (156 SUS)

Operating limits - Lightline

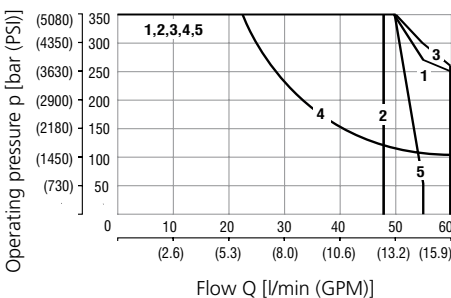
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



	Model	Connection
1	2D21	3→2
2	2D21	2→1
3	2D25	3→2
4	2D25	2→1
5	2D26	3→2
2	2D26	2→1

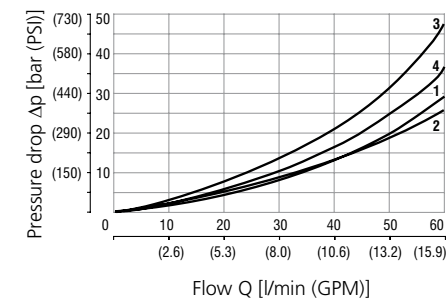
Operating limits - High performance

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	2→1
4	2D26	3→2
5	2D26	2→1

Pressure drop related to flow rate
- Lightline, High performance

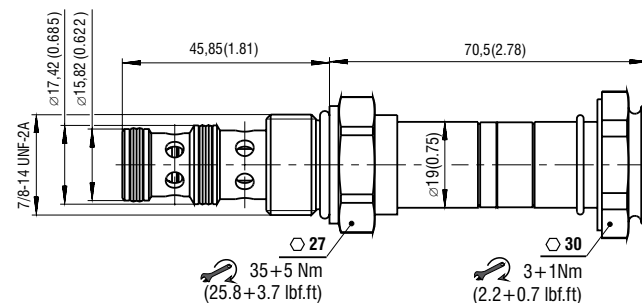


	Model	Connection
1	2D21	2→1
2	2D21	3→2
3	2D25	3→2
4	2D25	2→1
1	2D26	3→2
1	2D26	2→1

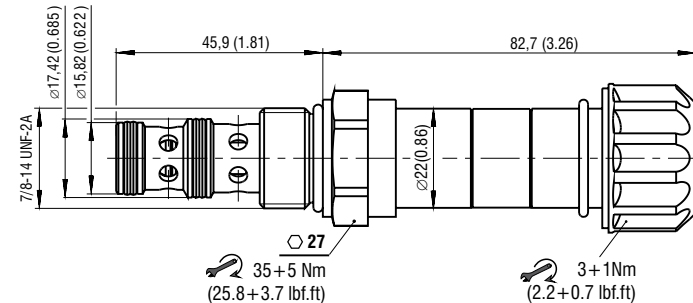
For operating limits under conditions and flow directions other than shown contact our technical support.

Dimensions in millimeters (inches)

Lightline



High performance

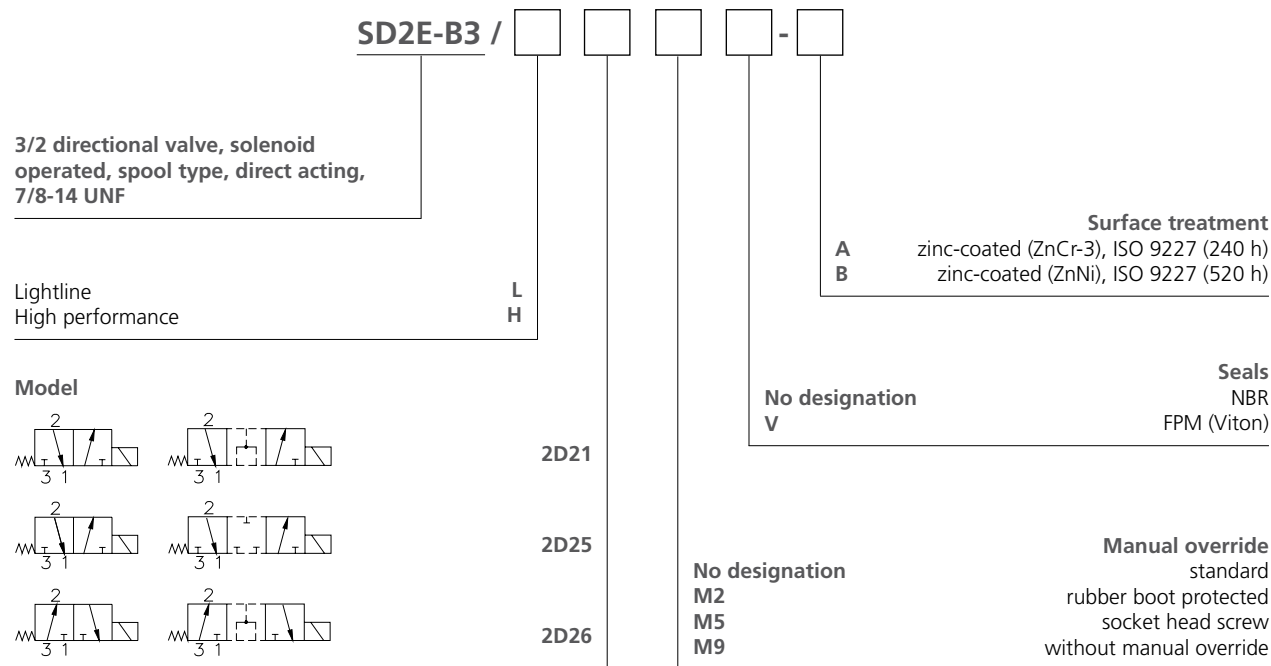


Manual Override in millimeters (inches)

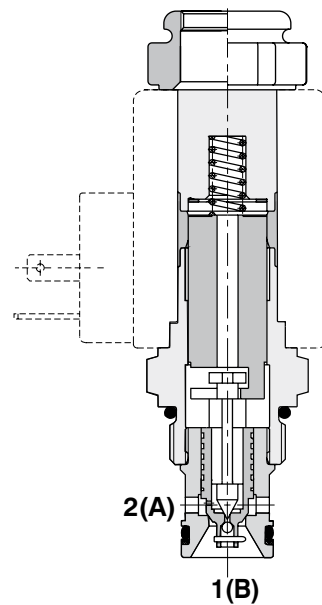
No designation - standard	Designation M2 - rubber boot protected	Designation M5 - socket head screw, size 2.5	Designation M9 - without manual override
 L ~ 70,5 (2.78) H ~ 82,7 (3.26)	 L ~ 82,0 (3.23) H ~ 100,0 (3.94)	 L ~ 78,1 (3.07) H ~ 84,8 (3.34)	 L ~ 70,5 (2.78) H ~ 82,7 (3.26)

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



Normally closed



Technical Features

- › Hardened precision parts
- › High flow capacity and leak-free closing
- › High transmitted hydraulic power
- › Normally closed version
- › All ports may be fully pressurized
- › Coil interchangeability among ROE / RPE3-04 product line
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

2-way, 2-position piloted 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	S2
Symbol	

Technical Data

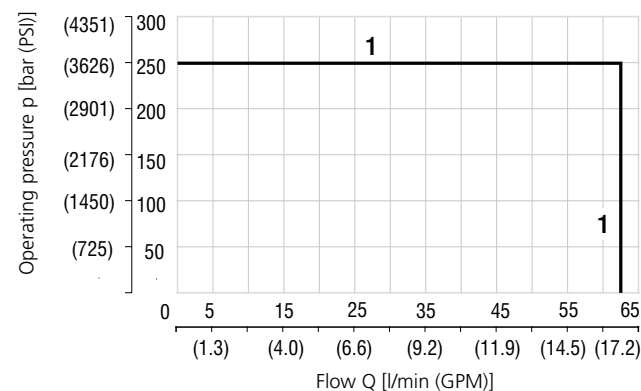
Valve size / Cartridge cavity		M22x1.5 / QG2
Max. flow	l/min (GPM)	63 (16.6)
Max. operating pressure	bar (PSI)	250 (3630)
Fluid temperature range (NBR)	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature	°C (°F)	-20 ... 50 (-4 ... 122)
Supply voltage tolerance	%	AC, DC: ± 10
Max. switching frequency	1/h	15 000
Mass 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 $\nu = 32 \text{ mm}^2/\text{s}$ (156 SUS)

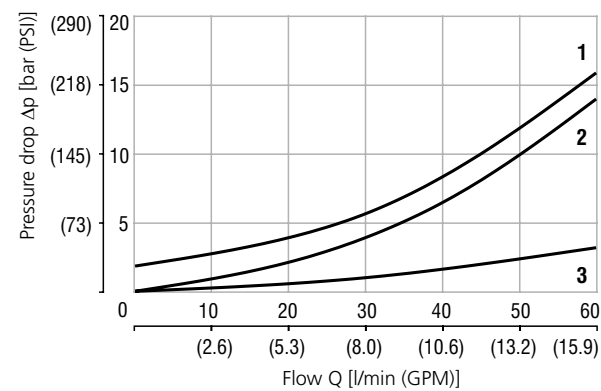
Operating limits

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

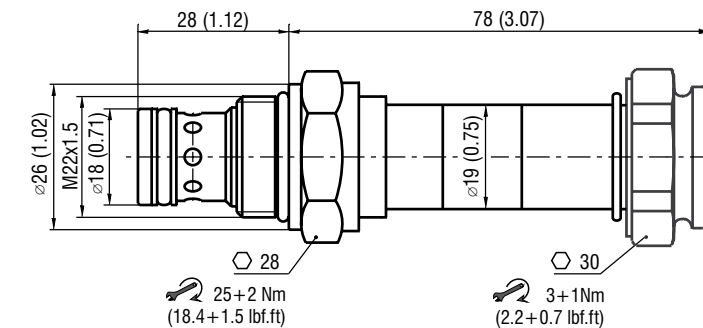


	Model	Connection
1	S2	$2 \rightarrow 1, 1 \rightarrow 2$

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
 ~ 78 (3.07)	 OFF 89 (3.50) ON 92 (3.62)

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

2/2 directional valve, solenoid operated, poppet type, piloted, M22x1.5

Model

1(B)

2(A)

S2

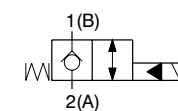
No designation
N5

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

Seals
NBR
FPM (Viton)

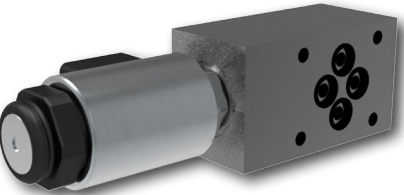
Manual override
standard - without manual override
external hexagon, across flats 14

Model

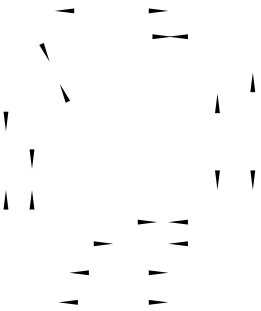


ROE3-062S2/M

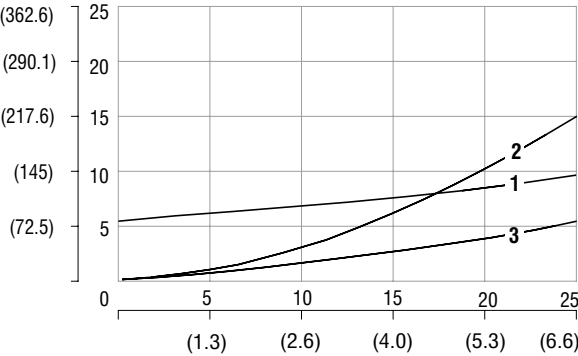
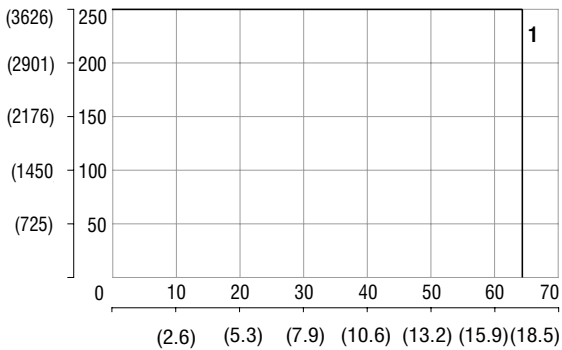
Size 04 (D02), 06 (D03) • Q_{max} 60 l/min (16 GPM) • p_{max} 250 bar (3600 PSI)



ISO 4401-02-01-0-05



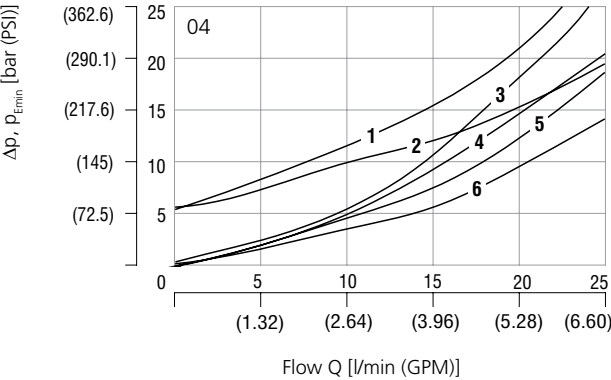
Ports P, A, B, T max Ø 4.5 mm (0.18 in)



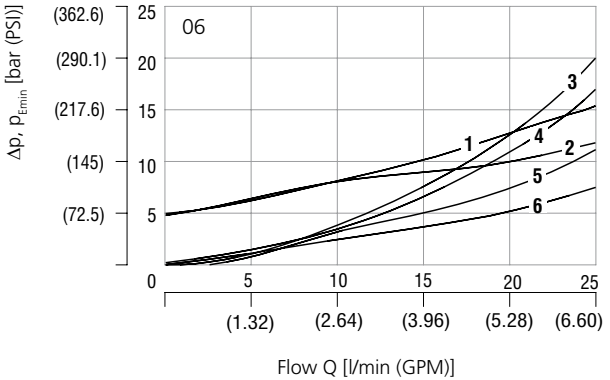
Characteristics measured at v = 32 mm²/s (156 SUS)

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



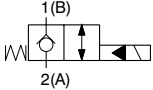
	Model	Direction	Solenoid
1	MD06	T-A	OFF
2	MX06	B-A	OFF
2	MA06	A1-A2	OFF
3	MD06	A-T	
4	MA06	A2-A1	
4	MX06	A-B	
5	MD06	A-T	
6	MA06	A1-A2	ON
6	MX06	B-A	ON

Ordering Code

ROE3-062 S2 / [] / [] / [] / [] - []

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

normally closed (NC)



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

Seals
No designation NBR
V FPM (Viton)

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

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
modular valve, connection A-T, B2-B1 MI
in-line valve, 2 ports, thread G3/8 R1
in-line valve, 2 ports, thread G1/2 R2
in-line valve, 2 ports, thread SAE 8, 3/4-16 R3
in-line valve, 2 ports, thread SAE 10, 7/8-14 R4
in-line valve, 2 ports, thread SAE 10, 7/8-14 R7

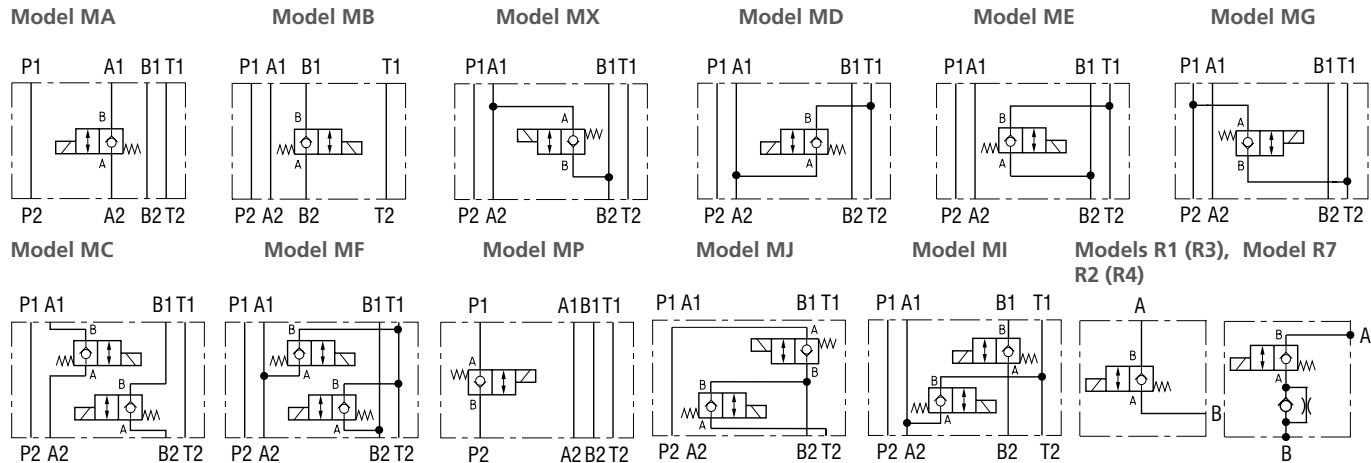
*only available for size 06 (D03)

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

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 quenchind 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

Rated supply voltage of solenoids (at the coil terminals)
12 V DC / 2.41 A
14 V DC / 1.66 A
21 V DC / 1.31 A
24 V DC / 1.15 A
27 V DC / 0.89 A
205 V DC / 0.12 A
24 V AC / 1.44 A / 50 (60) Hz
120 V AC / 0.22 A / 50 (60) Hz
230 V AC / 0.12 A / 50 (60) Hz

Functional Symbols



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) Protection degree IP65	E12A - Deutsch DT04-2P E13A - E12A with queching diode Protection degree IP67 / IP69K		
 Note: A = Standard 300 mm (11.81 in), other sizes on demand			

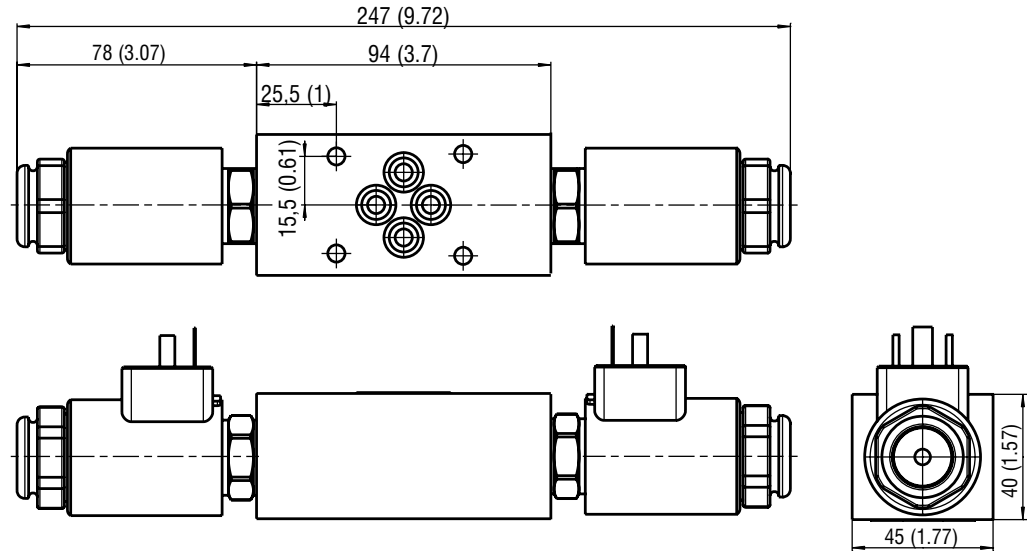
The indicated IP protection level is only reached with a properly mounted connector.

Manual Override in millimeters (inches)

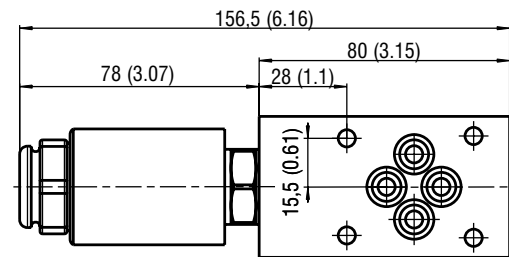
No designation - standard - without manual override	Designation N5 - with external hexagon 14

Dimensions in millimeters (inches)

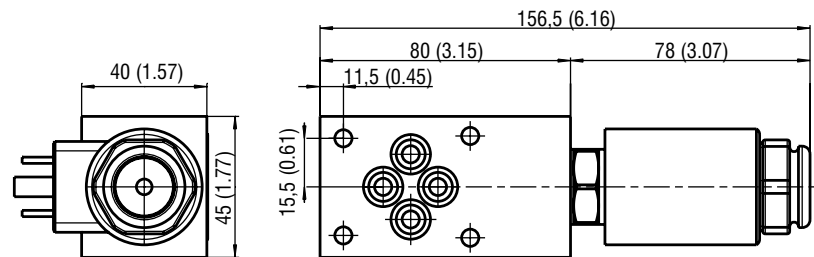
Models MC, MF, MI, MJ



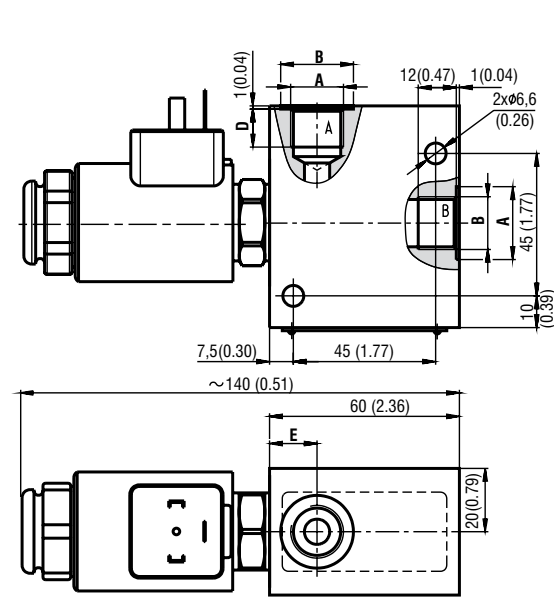
Models MA, MX, MD, MG, MP



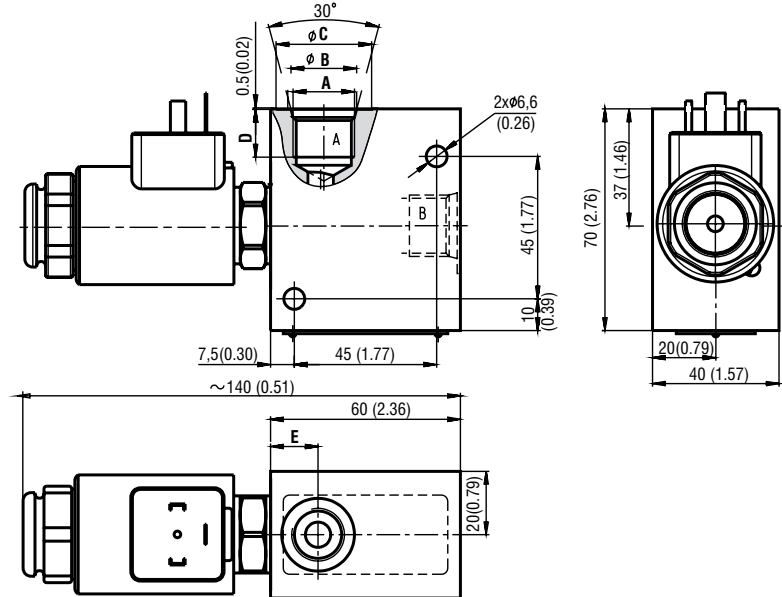
Models MB, ME



Models R1 (R2)



Model R3 (R4)



	A	B	D
R1	G3/8-A	Ø 23	12 (0.47)
R2	G1/2-A	Ø 28	14 (0.55)

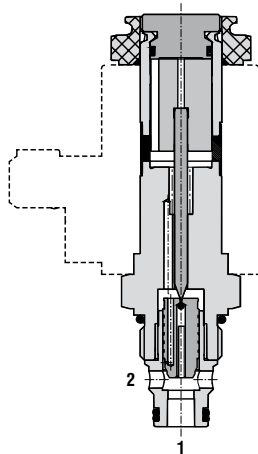
	A	B	C	D	E
R3	3/4-16UNF-2B	Ø 20.6	Ø 30	15 (0.59)	16 (0.61)
R4	7/8-14UNF-2B	Ø 23.9	Ø 34	16.7 (0.66)	18 (0.71)

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

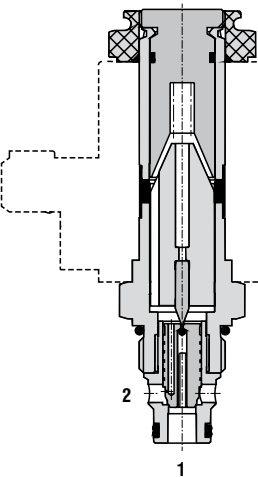
SD3E-A2

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

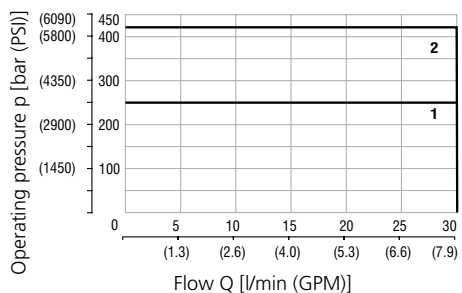
Valve size / Cartridge cavity		3/4-16 UNF-2A / A2	
		Lightline	High performance
Max. flow	l/min (GPM)	30 (7.9)	30 (7.9)
Max. operating pressure	bar (PSI)	250 (3630)	420 (6090)
Fluid temperature range	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-20...50 (-4...122)	-20...80 (-4...176)
Supply voltage tolerance	%	DC: ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Mass 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 v = 32 mm³/s (156 SUS)

Operating limits - Lightline + High performance

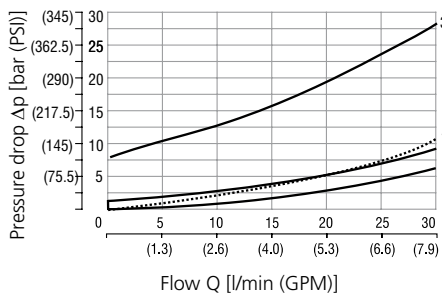
L - Oil 60 °C (140 °F) / Ambient temperature/
50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)
HP - Oil 80 °C (176 °F) Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



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

Pressure drop related to flow rate

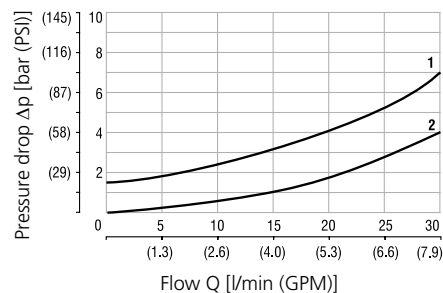
- Lightline



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

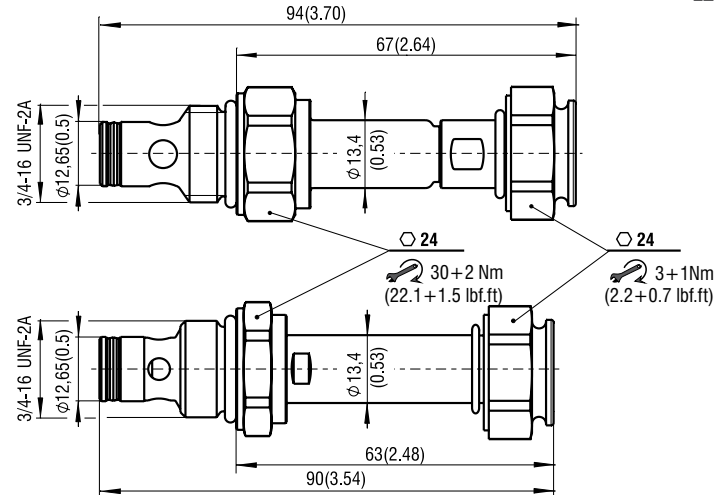


Model	Connection	Solenoid
1 H2L2	1→2	off
2 H2L2	1→2	on
2 H2L2	2→1	on
2 H2O2	1→2	off
2 H2O2	2→1	off
2 H2O2	1→2	on

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

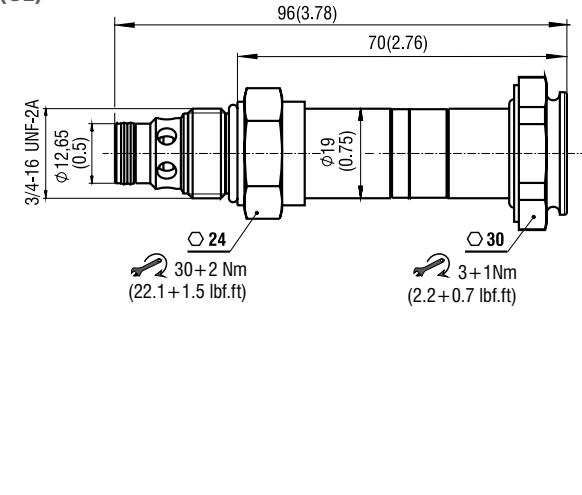
Dimensions in millimeters (inches)

Lightline
L2



O2

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
Only for High performance version		Designation M5 for 2L2 - socket head screw, size 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 T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

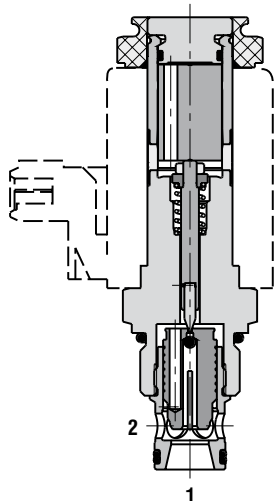
SD3E-A2 /						-	
2/2 directional valve, solenoid operated, poppet type, piloted, 3/4-16 UNF							
Lightline							
High performance							
Model							

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

SD3E-B2

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

Normally Open



Technical Features

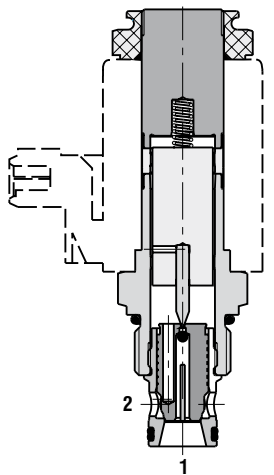
- › Hardened precision parts
- › High flow capacity and leak-free closing
- › High transmitted hydraulic power up to 420 bar
- › Normally open and normally closed version
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Coil interchangeability among SD*- B* product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

Functional Description

2-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		

Normally Closed



Technical Data

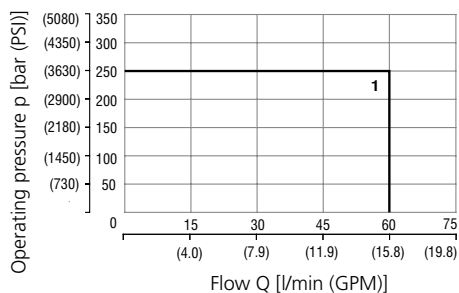
Valve size / Cartridge cavity		7/8-14 UNF-2A / B2	
		Lightline	High performance
Max. flow	l/min (GPM)	60 (13.2)	75 (15.9)
Max. operating pressure	bar (PSI)	250 (3630)	420 (5080)
Fluid temperature range	°C (°F)	-20...60 (-4...140)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-20...50 (-4...122)	-20...80 (-4...176)
Supply voltage tolerance	%	AC, DC: ± 10	AC, DC: ± 15
Max. switching frequency	1/h	15 000	
Mass without coil	kg (lbs)	0.23 (0.51)	0.30 (0.66)

		Datasheet	Type	
General information		GI_0060	Products and operating conditions	
Coil types	In-line mounted	C_8007	C 19B*	C 22B*
	Sandwich mounted	SB_0018	SB-B2*	
Valve bodies	In-line mounted	SB-04(06)_0028	SB-*B2*	
	Sandwich mounted	SMT_0019	SMT-B2*	
Cavity details / Form tools		SP_8010		
Spare parts				

Characteristics measured at v = 32 mm³/s (156 SUS)

Operating limits - Lightline

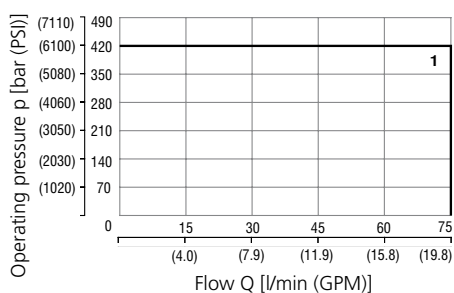
Oil 60 °C (140 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



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

Operating limits - High performance

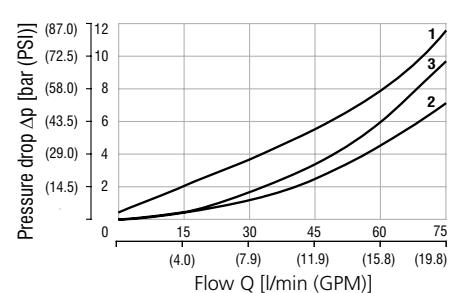
Oil 80 °C (176 °F) / Ambient temperature
50 °C (122 °F) / Voltage U_n -10% (21.6 VDC)



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

Pressure drop related to flow rate

- Lightline, High performance

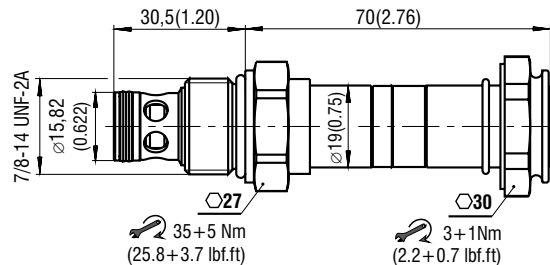


Model	Connection	Solenoid
1 2L2	1→2	off
2 2L2	2→1	on
2 2L2	1→2	on
2 2O2	1→2	off
3 2O2	2→1	off

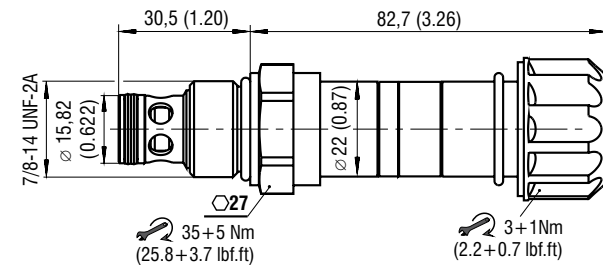
For operating limits under conditions and flow directions other than shown contact our technical support.

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 M5 - for 2L2 - socket head screw, size 2.5	Designation M9 - for 2L2 - without manual override
		 L ~ 81,8 (3.22) H ~ 93,6 (3.69)	 L ~ 70,0 (2.76) H ~ 82,7 (3.26)

In case of solenoid malfunction or power failure, the 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.

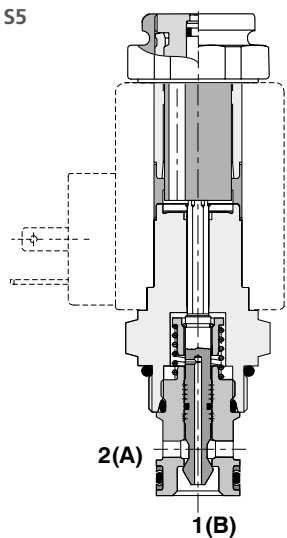
Ordering Code

SD3E-B2 /									
2/2 directional valve, solenoid operated, poppet type, piloted, 7/8-14 UNF		L		H		A		Surface treatment	
Lightline								zinc-coated (ZnCr-3), ISO 9227 (240 h)	
High performance								zinc-coated (ZnNi), ISO 9227 (520 h)	
Model								Seals	
								NBR	
								FPM (Viton)	
								Manual override	
								standard for 2O2	
								rubber boot protected	
								socket head screw	
								without manual override	

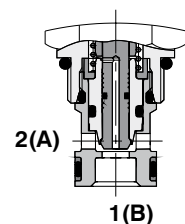
2/2 Directional Valve, Solenoid Operated, Poppet Type, Blocking, Direct Acting

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

55



56



Technical Features

- Hardened precision parts
- High flow capacity and leak-free closing
- High transmitted hydraulic power
- Wide range of manual overrides available
- All ports may be fully pressurized
- Normally open and normally closed version
- Coil interchangeability among ROE / RPE3-04 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, direct acting poppet valve in the 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	S5	S6
Symbol		

Technical Data

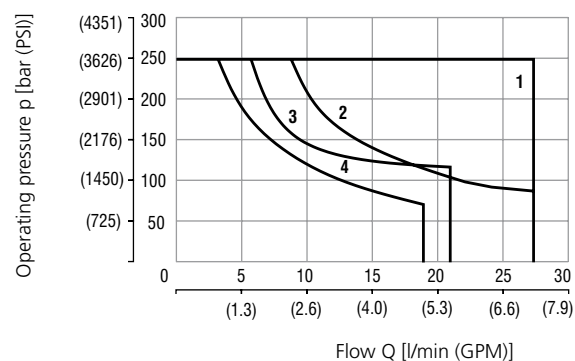
Valve size / Cartridge cavity	M22x1.5 / QG2	
Max. flow	l/min (GPM)	25 (6.6)
Max. operating pressure	bar (PSI)	250 (3630)
Fluid temperature range (NBR)	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range (FPM)	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature	°C (°F)	-20 ... 50 (-4 ... 122)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

		Datasheet	Type
General information		GI_0060	Products and operating conditions
Coil types		C_8007	C 19B*
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 v = 32 mm²/s (156 SUS)

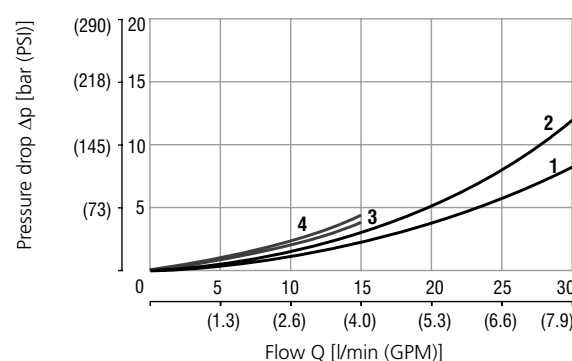
Operating limits

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*

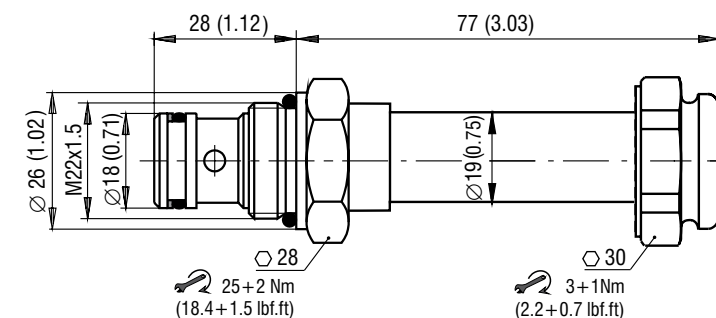
Pressure drop related to flow rate



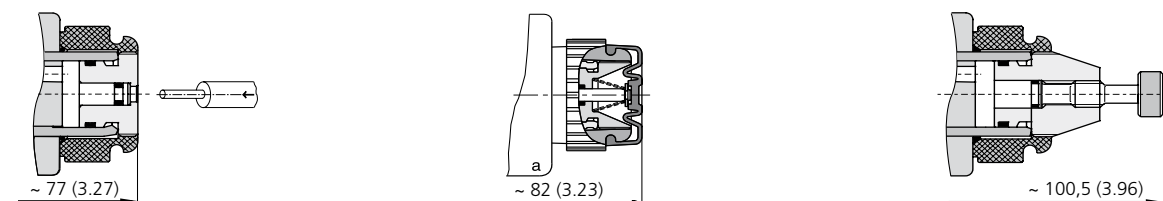
	Model	Connection
1	S5	2→1
2	S5	1→2
3	S6	2→1*
4	S6	1→2*

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

Dimensions in millimeters (inches)



Manual Override in millimeters (inches)



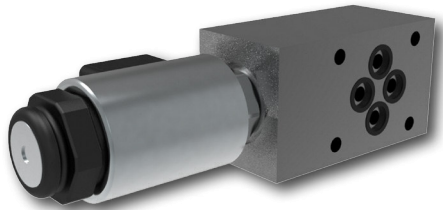
In case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override as long as the pressure in port T does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Ordering Code

ROE3-042				
2/2 directional valve, solenoid operated, poppet type, blocking, direct acting M22x1.5				
Model	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

ROE3-042S5(S6)/M

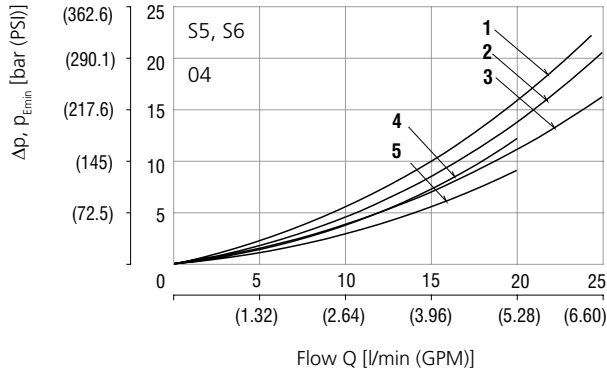
Size 04 (D02), 06 (D03) • Q_{max} 25 l/min (7 GPM) • p_{max} 250 bar (3600 PSI)



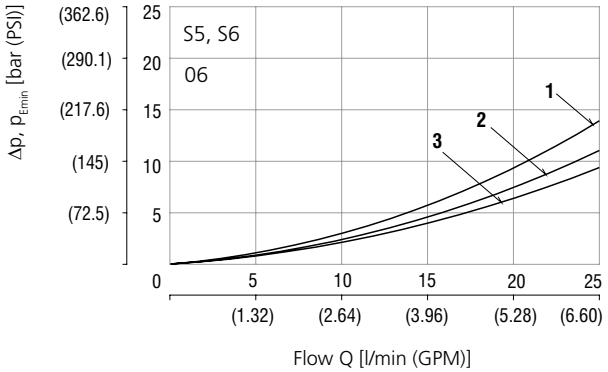
Characteristics measured at v = 32 mm²/s (156 SUS)

Pressure drop related to flow rate

Modular plate M*



S5	Model	Direction	S6	Model	Direction	
1	MD04	A-T, T-A	2	MD04	A-T, T-A	(to 20 l/min)
	ME04	B-T, T-B		ME04	B-T, T-B	
	MF04	A-T, T-A		MF04	A-T, B-T	
		T-A, T-B			T-A, T-B	
2	MX04	A-B, B-A	4	MX04	A-B, B-A	
3	MA04	A1-A2	5	MA04	A1-A2, A2-A1	
	MB04	A2-A1		MB04	B1-B2, B2-B1	
		B1-B2, B2-B1			MC04	A1-A2, A2-A1
	MC04	A1-A2, A2-A1				B1-B2, B2-B1



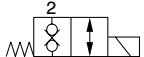
S5	Model	Direction	S6	Model	Direction (to 20 l/min)
1	MD06	A-T, T-A	MD06	T-A	T-B
	ME06	B-T, T-B	ME06	T-B	
	MF06	A-T, B-T / T-A, T-B	MF06	T-A, T-B	
2	MA06	A1-A2	MD06	A-T	B-T
	MB06	B1-B2	ME06	B-T	
	MC06	A1-A2 / B1-B2	MF06	A-T, B-T	
	MX06	B-A	MA06	A1-A2, A2-A1	
3	MA06	A2-A1	MB06	B1-B2, B2-B1	A1-A2, A2-A1
	MB06	B1-B2	MC06	A1-A2, A2-A1	
	MC06	A2-A1 / B2-B1	MC06	B1-B2, B2-B1	
	MX06	A-B			

Ordering Code

ROE3-042 / / -

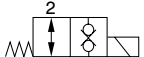
2/2 directional valve,
solenoid operated, poppet type,
blocking, direct acting, modular

normally closed (NC),
blocking



S5

normally open (NO),
blocking



S6

Model

modular valve, connection A2-A1
modular valve, connection B2-B1
modular valve, connection A-B
modular valve, connection A-T
modular valve, connection B-T
modular valve, connection B2-B1, A2-A1
modular valve, connection B-T, A-T
modular valve, connection P-T
modular valve, connection P2-P1
modular valve, connection B2-P2, B2-T2
modular valve, connection A-T, B2-B1
in-line valve, 2 ports, thread G3/8
in-line valve, 2 ports, thread G1/2
in-line valve, 2 ports, thread SAE 8, 3/4-16
in-line valve, 2 ports, thread SAE 10, 7/8-14
in-line valve, 2 ports, thread SAE 10, 7/8-14

MA
MB
MX
MD
ME
MC
MF
MG
MP*
MJ
MI
R1
R2
R3
R4
R7

*only available for size 06 (D03)

Modular plate size

ISO 4401-02-01-0-05, DIN 24340 (CETOP 02), NG04 04
ISO 4401-03-02-0-05, DIN 24340 (CETOP 03), NG06 06

Surface treatment
No designation phosphated body, 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)

Seals
No designation NBR
V FPM (Viton)

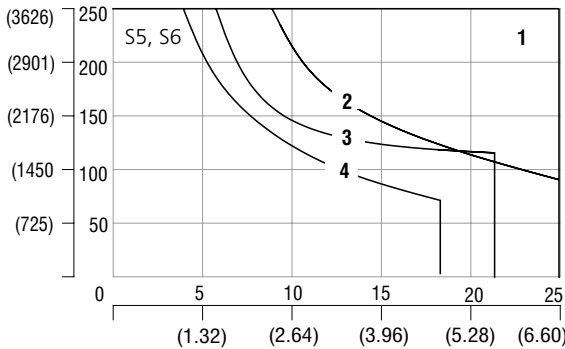
Manual override
No designation standard
N2 covered with rubber boot
N4 with hand screw

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 quenchind 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

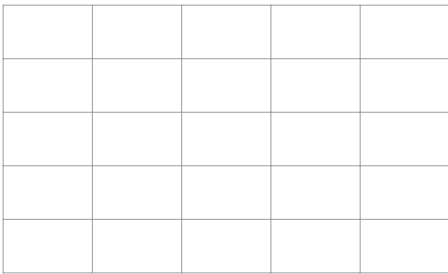
The AC coils correspond to E5.

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

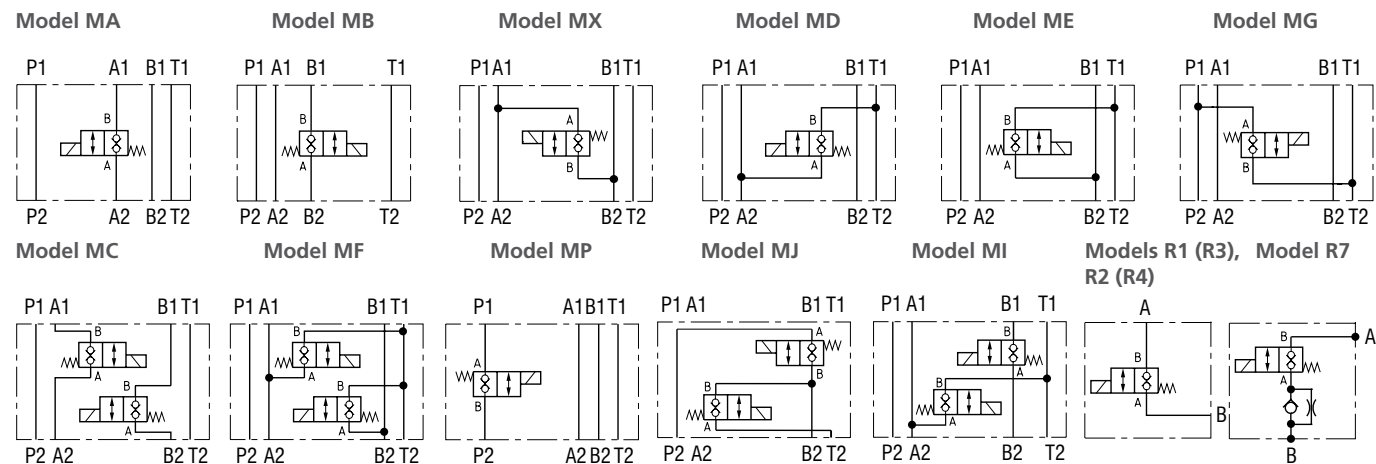


(290.1)
(217.6)
(145)
(72.5)



Functional Symbols

Example: ROE3-042S5M*



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) Protection degree IP65	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		

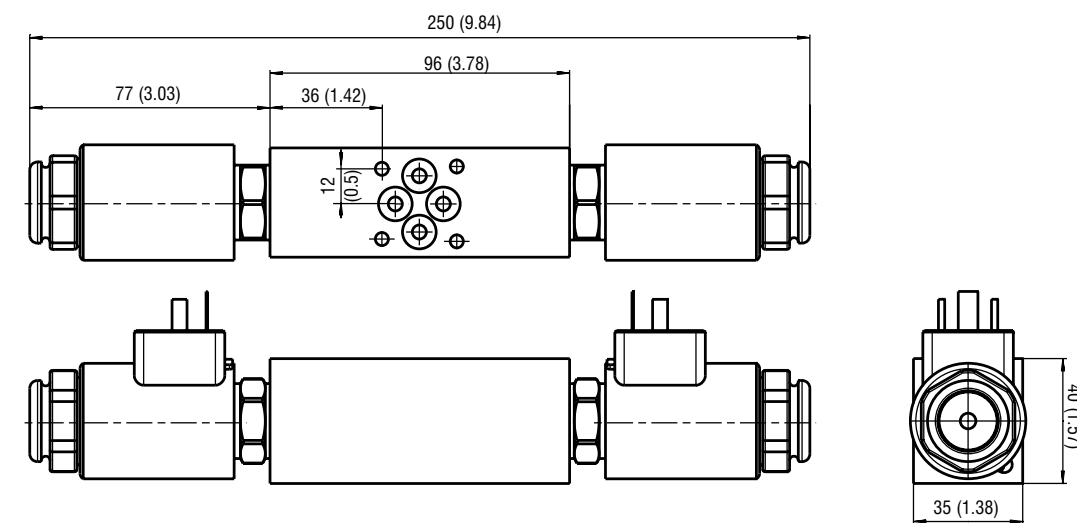
The indicated IP protection level is only reached with a properly mounted connector.

Manual Override in millimeters (inches)

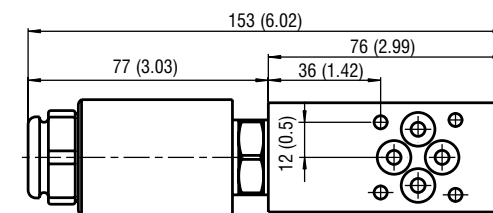
No designation - standard	Designation N2 - rubber boot	Designation N4 - hand screw

Dimensions in millimeters (inches)

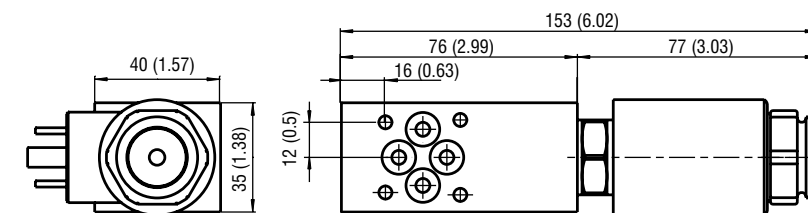
Models MC, MF, MI, MJ



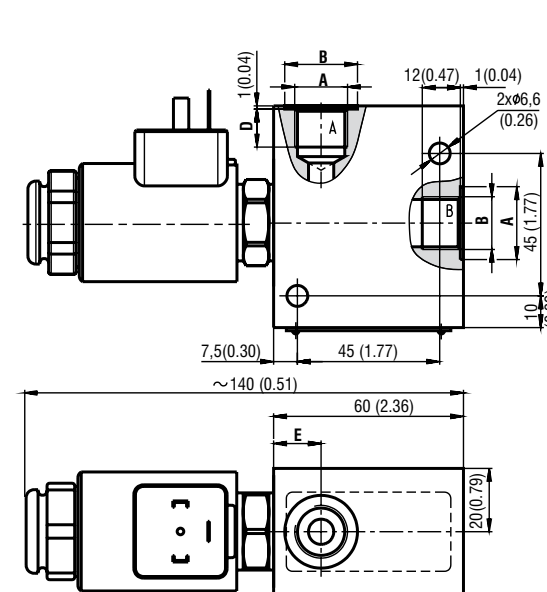
Models MA, MX, MD, MG, MP



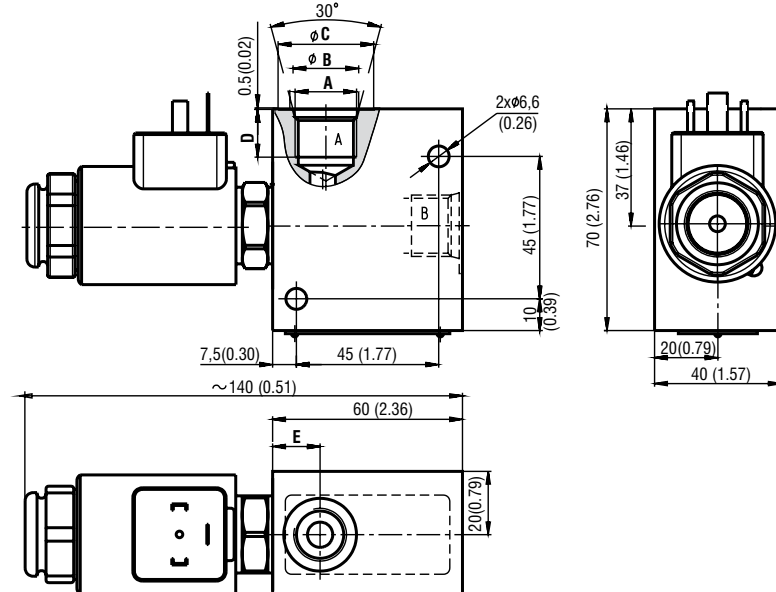
Models MB, ME



Models R1 (R2)



Models R3 (R4)



	A	B	D
R1	G3/8-A	Ø 23	12 (0.47)
R2	G1/2-A	Ø 28	14 (0.55)

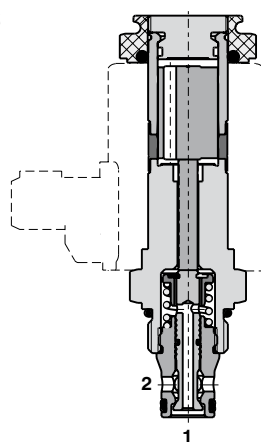
	A	B	C	D	E
R3	3/4-16UNF-2B	Ø 20.6	Ø 30	15 (0.59)	16 (0.61)
R4	7/8-14UNF-2B	Ø 23.9	Ø 34	16.7 (0.66)	18 (0.71)

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

SD1E-A2

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

255



Technical Features

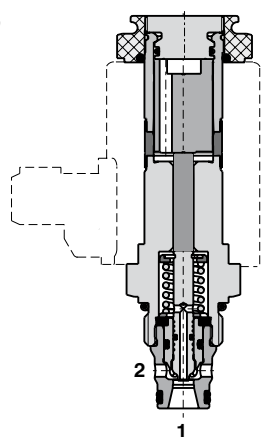
- › Hardened precision parts
- › High flow capacity and leak-free closing (up to 3 drops per minute)
- › High transmitted hydraulic power up to 350 bar
- › Normally open and normally closed version
- › Wide range of manual overrides available
- › All ports may be fully pressurized
- › Coil interchangeability 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	255	256
Symbol		

256



Technical Data

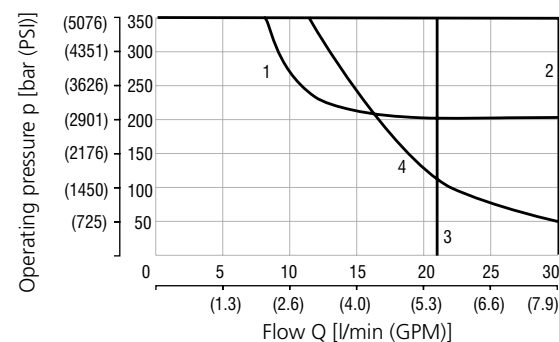
Valve size / Cartridge cavity		3/4-16 UNF-2A / A2
Max. flow	l/min (GPM)	30 (7.9)
Max. operating pressure	bar (PSI)	350 (5080)
Fluid temperature range	°C (°F)	-20...80 (-4...176)
Ambient temperature range	°C (°F)	-20...80 (-4...176)
Supply voltage tolerance	%	AC, DC: ± 15
Max. switching frequency	1/h	15 000
Mass 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 v = 32 mm²/s (156 SUS)

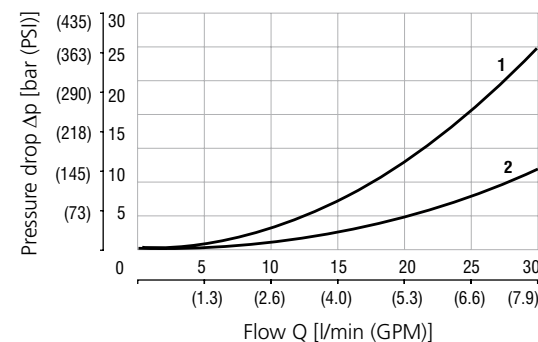
Operating limits

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



	Model	Connection
1	255	1→2
2	255	2→1
3	256	2→1
4	256	1→2

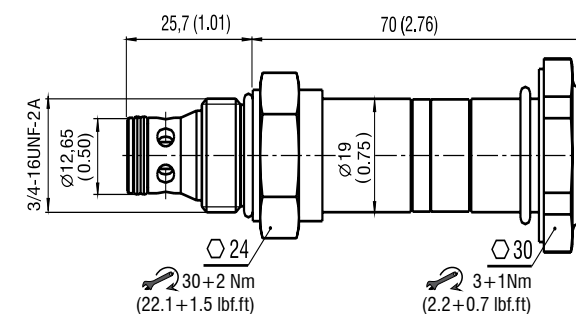
Pressure drop related to flow rate



	Model	Connection
1	255	1→2
1	255	2→1
2	256	1→2
2	256	2→1

Dimensions in millimeters (inches)

255, 256



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

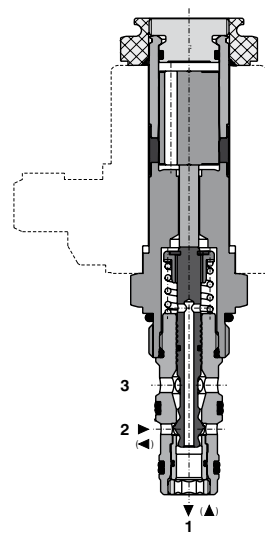
SD1E-A2 /						-	
2/2 directional valve, solenoid operated, poppet type, blocking, direct acting, 3/4-16 UNF		H	High performance	Model	255	256	No designation
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR	FPM (Viton)	Manual override
		V	No designation	Seals	NBR		

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

SD1E-A3

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

257



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
- › 3-way valve with two basic spool types
- › 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		

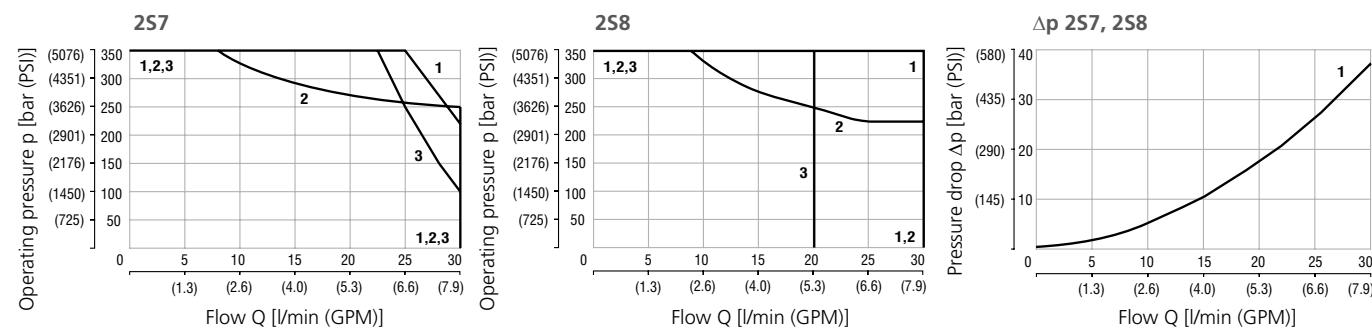
Technical Data

Valve size / Cartridge cavity			3/4-16 UNF-2A / A3
Max. flow		l/min (GPM)	30 (7.9)
Max. operating pressure		bar (PSI)	350 (5080)
Fluid temperature range		°C (°F)	-20...80 (-4...176)
Ambient temperature range		°C (°F)	-20...80 (-4...176)
Supply voltage tolerance		%	AC, DC: ± 15
Max. switching frequency		1/h	15 000
Mass 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 $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Operating limits

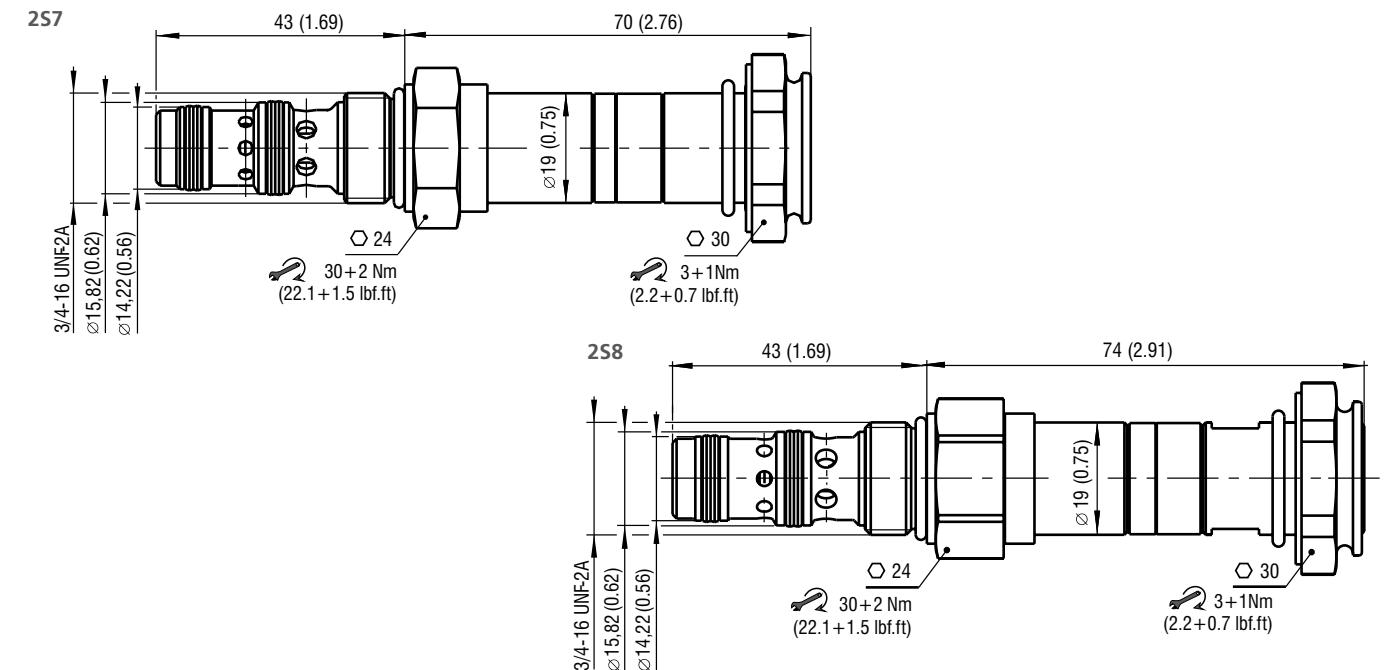
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F) /
Voltage U_n -10% (21.6 VDC)



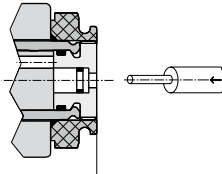
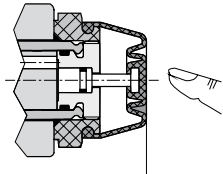
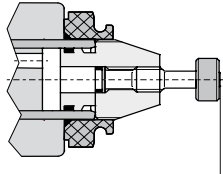
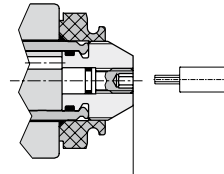
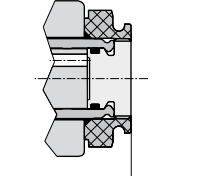
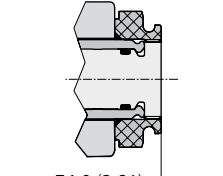
	Model	Connection
1	2S7	2→1
2	2S7	2→3
3	2S7	1→2, 3→2

	Model	Connection
1	2S8	$1 \rightarrow 2, 3 \rightarrow 2$
2	2S8	$2 \rightarrow 3$
3	2S8	$2 \rightarrow 1$

	Model	Connection
1	2S7, 2S8	$1 \rightarrow 2, 2 \rightarrow 1, 2 \rightarrow 3, 3 \rightarrow 2$

Dimensions in millimeters (inches)

Manual Override in millimeters (inches)

No designation - for 2S7 - standard	Designation M2 - for 2S7 - rubber boot protected	Designation M4 - for 2S7 - hand screw	Designation M5 - for 2S7 - socket head screw, size 2.5
 ~ 70.0 (2.76)	 ~ 81.5 (3.21)	 ~ 90 (3.54)	 ~ 77.5 (3.05)
Designation M9 - without manual override - for 2S7			
 ~ 70.0 (2.76)	 ~ 74.0 (2.91)		

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

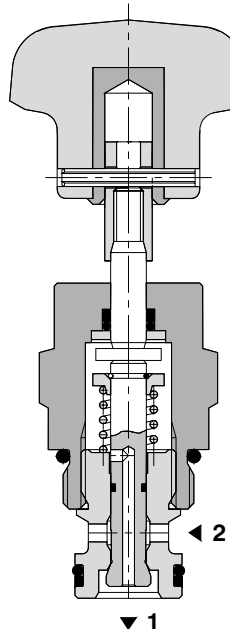
SD1E-A3 /						-	
3/2 directional valve, solenoid operated, poppet type, blocking, direct acting, 3/4-16 UNF							
High performance		H					
Model							
		2S7					
		2S8					
			No designation				
			M2	Manual override			
			M4	standard			
			M5	rubber boot protected			
			M9	hand screw			
				socket head screw			
				without manual override			
				Seals			
				NBR			
				FPM (Viton)			
				Surface treatment			
				zinc-coated (ZnCr-3), ISO 9227 (240 h)			
				zinc-coated (ZnNi), ISO 9227 (520 h)			

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

ROR3-062

M22x1.5 • 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, available with microswitch option
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

A manually operated 2-way blocking and push-to-open directional valve in form of a screw-in cartridge. The preferential flow is from 2 to 1. Possibility to throttle the flow. The model with a hand lever and microswitch has 3 positions. In position 0 - middle position - the valve is closed. Position I opens the valve against the return spring. Position II actuates a contact (only the model with micro switch).

Model Code	1, 2	3	4
Symbol			

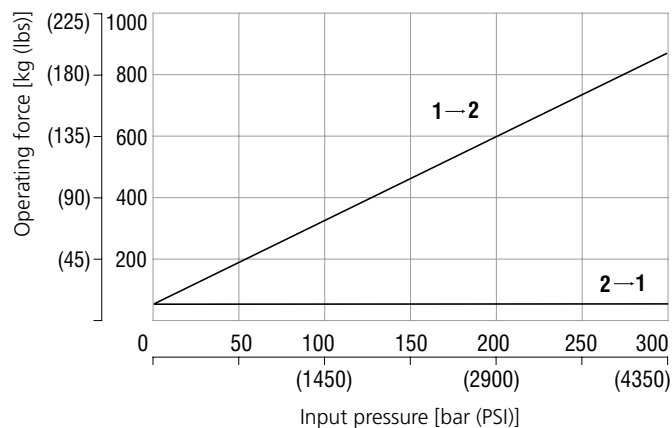
Technical Data

Valve size / Cartridge cavity		M22x1.5 / 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			
Microswitch	D2SW-3D	2 A - 250 V ~		0.1 A - 30 V =	
Mass	model	1	2	3	4
	kg (lbs)	0.15 (0.33)	0.25 (0.55)	0.66 (1.46)	0.77 (1.7)

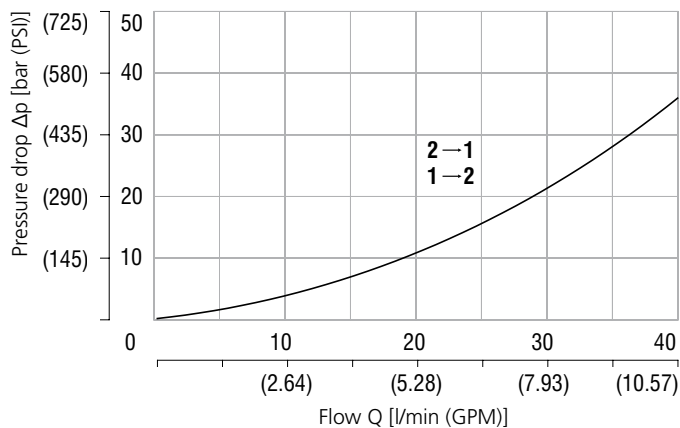
General information		Datasheet	Type
		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-QG2*
	Sandwich mounted	SB-4(06)_0028	SB-*QG2*
Cavity details		SMT_0019	SMT-QG2*
Spare parts		SP_8010	

Characteristics measured at v = 32 mm³/s (156 SUS)

Operating limits

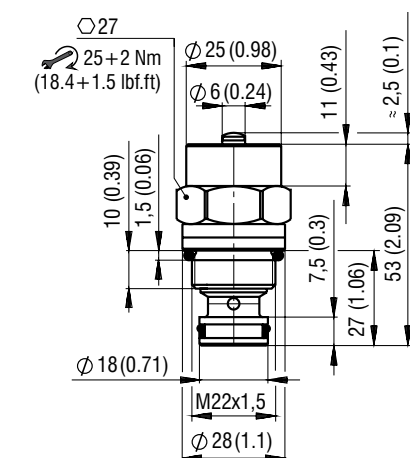


Pressure drop related to flow rate

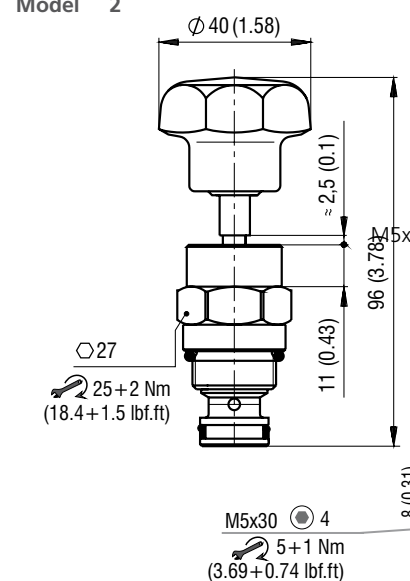


Dimensions in millimeters (inches)

Model 1



Model 2



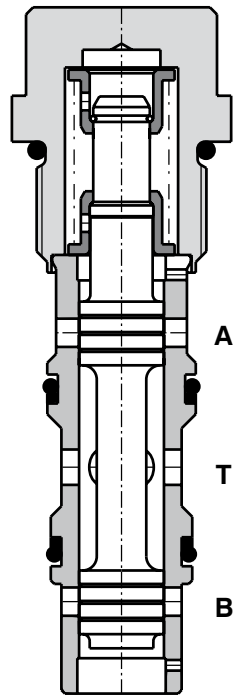
Ordering Code

ROR3-062 - [] - [] - []			
2/2 directional valve, manually operated, poppet type, blocking, direct acting M22x1.5	Flow restrictor without flow restrictor	00	Surface treatment
			A zinc-coated (ZnCr-3), ISO 9227 (240 h) B zinc-coated (ZnNi), ISO 9227 (520 h)
			Seals
			No designation V
			Actuation
			1 plunger 2 hand push knob 3 hand lever without microswitch 4 hand lever with microswitch

3/3 Directional Valve, Hydraulically Operated, Spool Type, Direct Acting, (Hot Oil) Shuttle

SD2H-LA3

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

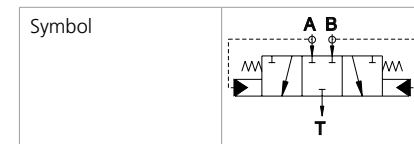


Technical Features

- › Hardened precision parts
- › High flow capacity
- › Simple and reliable design
- › Optional spring ranges
- › Automatic alternating fluid discharge from the low-pressure side of the circuit
- › Standard version zinc-coated with surface protection acc. to ISO 9227 (240 h salt spray)

Functional Description

3-way, 3-position spool type, spring centered hot oil shuttle valve, used typically on hydrostatic transmissions for hot oil discharge to a system cooler or tank.



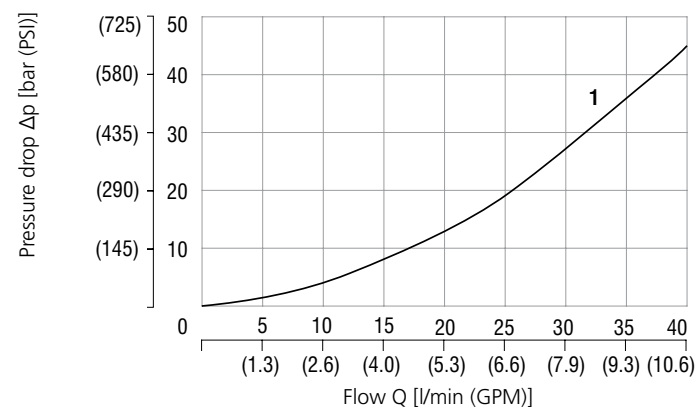
Technical Data

Valve size / Cartridge cavity		M24x1.5 / LA3	
Max flow	l/min (GPM)	40 (10.6)	
Max. operating pressure	bar (PSI)	320 (4640)	
Cracking pressure	bar (PSI)	7 (101.5)	12 (174.0)
Fluid temperature range (NBR)	°C (°F)	-30...+100 (-22 ...+212)	
Fluid temperature range (FPM)	°C (°F)	-20 ...+120 (-4 ...+248)	
Mass	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*
	Sandwich mounted	SB-04(06)_0028	SB-*LA3*
Cavity details		SMT_0019	SMT-LA3*
Spare parts		SP_8010	

Characteristics measured at v = 32 mm³/s (156 SUS)

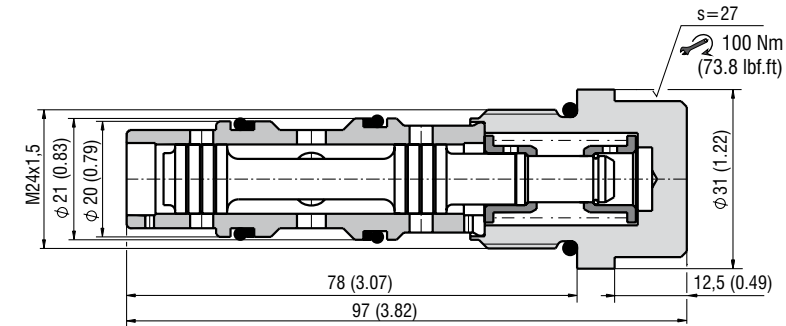
Pressure drop related to flow rate



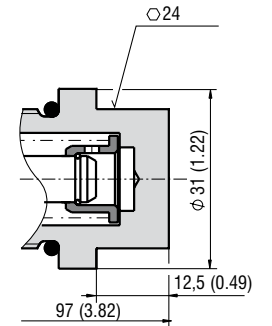
Connection	
1	B → T, A → T

Dimensions in millimeters (inches)

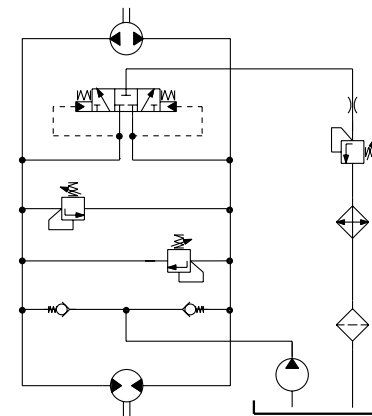
Cover cup - Standard



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 to the cooler or to the tank. The respective high pressure side of the circuit automatically pilots the valve to the discharge position of the low pressure side. The discharge amount is normally controlled by a downstream pressure relief valve which is typically set at 15 to 30 bar (200 to 400 PSI).

Ordering Code

SD2H-LA3 /								
3/3 directional valve, hydraulically operated, spool type, direct acting, (hot oil) shuttle M24x1.5		High performance		Cracking pressure 7.0 bar (102 PSI) 12.0 bar (174 PSI)		Surface treatment A zinc-coated (ZnCr-3), ISO 9227 (240 h) B zinc-coated (ZnNi), ISO 9227 (520 h)		Seals NBR FPM (Viton)
		H		070 120		No designation		Cover cup standard - across flats 27 mm HEX 24
						V		P