Solenoid Operated Directional Valves

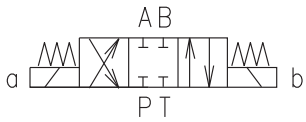
RPE2-04

Size 04 p_{max} up to 320 bar Q_{max} up to 20 l/min

HA 4012
3/2002

Replaces
HA 4012 6/2000

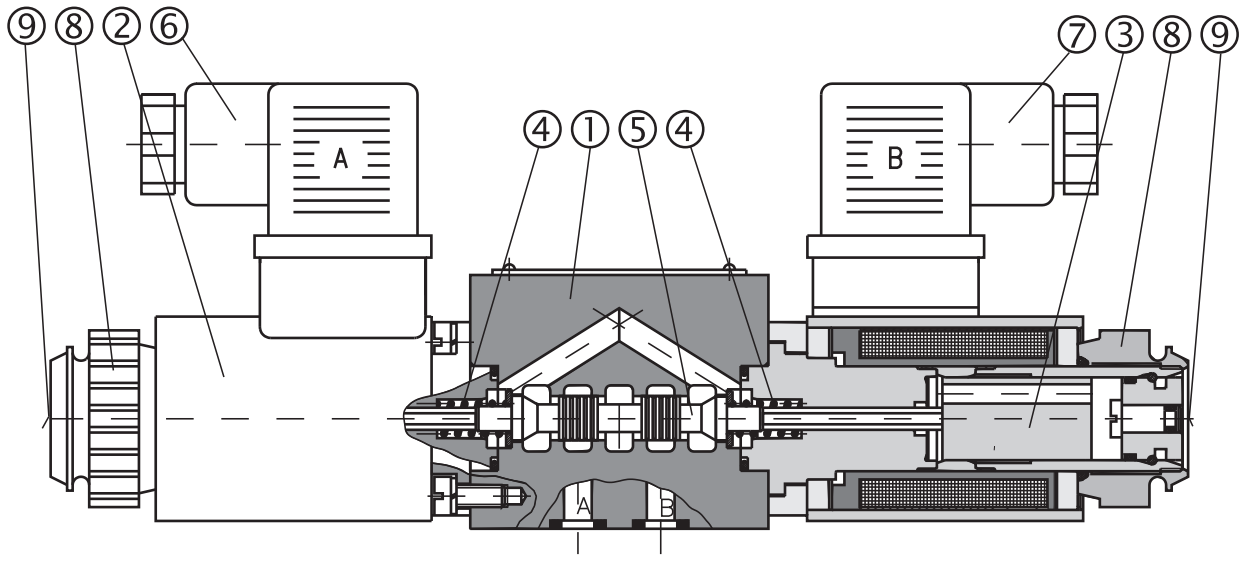
Special model - special installation dimensions



- **4/3-, 4/2- and 3/2-way directional valves with solenoid control**
- **Solenoids can be turned arbitrarily around their axis**
- **Push button manual override**

Functional Description

The directional control valves RPE2-04 consist of cast iron housing (1), control spool (5), centering springs (4) and operating solenoids (2, 3).
The three-position directional valves are fitted with two solenoids and two springs. The two-position directional valves have either one solenoid and one return spring or two solenoids and the detent assembly.
The operating solenoids are D.C. solenoids and are supplied through connectors A, B (6, 7). For A.C. supply the solenoids are provided with rectifiers, which are integrated directly into the connectors A, B (6, 7). The plug connectors can be turned by 90°. By loosening the fixing nut (8), the solenoids (2, 3) can be turned on their axis in the range of 360°.
Provided that the pressure in T-port does not exceed 363.6 psi (25 bar), the spool of the valve can be repositioned by manual override (9).
The surface of the valve housing is phosphate coated and the operating solenoids are zinc coated.



Ordering Code

RPE2-04 □ □ / □ - □

Solenoid Operated Directional Valves

Nominal size

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

Functional Symbols
see the table functional symbols

Installation Dimensions
2 see valve dimensions on pg. 4
3 to DIN 24 340-A-4

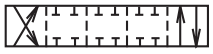
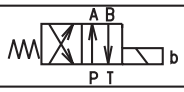
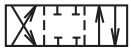
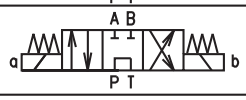
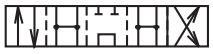
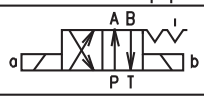
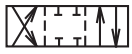
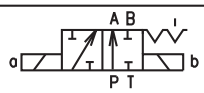
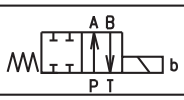
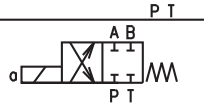
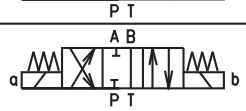
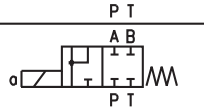
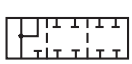
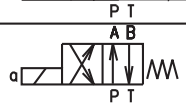
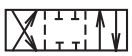
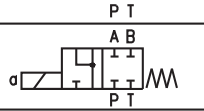
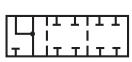
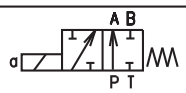
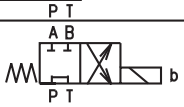
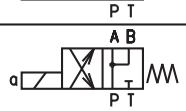
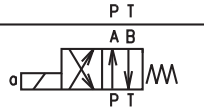
Rated supply voltage at the connector input

01200	D.C. 12V		
01400	D.C. 14V		
02100	D.C. 21V	**02450**	A.C. 24V (50Hz)
02400	D.C. 24V		
04200	D.C. 42V		
04800	D.C. 48V		
06000	D.C. 60V		
10200	D.C. 102V	**11550**	A.C. 115V (50Hz)
20500	D.C. 205V	**23050**	A.C. 230V (50Hz)

Technical Data

Nominal size	mm	04
Maximum flow	l/min	see p-Q characteristics
Max. operating pressure at ports P, A, B	bar	320
Max. operating pressure at port T	bar	100
Pressure drop	bar	see Δp-Q characteristics
Hydraulic fluid		Hydraulics oils of power classes HM, HV to CETOP RP 91 H in viscosity classes ISO VG 32, 46 and 68
Fluid temperature range	°C	-30 ... +80
Ambient temperature, max.	°C	up to +50
Viscosity range	mm^2/s	20 ... 400
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406 (1999).
Rated voltage and current at connector input without rectifier	V/A D.C.	12/2.4 14/2.0 21/1.33 24/1.16 42/0.66 48/0.56 60/0.46 102/0.29 205/0.15
Rated voltage and current at connector input with rectifier	V/A A.C.	24/1.52 115/0.33 230/0.17
Permissible rated voltage variation	%	A.C. ±10 D.C. ±10
Max. switching frequency	1/h	15 000
Switching time, ON; at $\nu = 32\ mm^2/s$	ms	30 ... 50
Switching time, OFF; at $\nu = 32\ mm^2/s$	ms	A.C. 70 ... 100 D.C. 30 ... 50
Duty cycle	%	100
Service life	cycles	10^7
Enclosure type to DIN 40 050		IP 65
Weight - valve with 1 solenoid valve with 2 solenoids	kg	1.10 1.50
Mounting position		optional

Functional Symbols

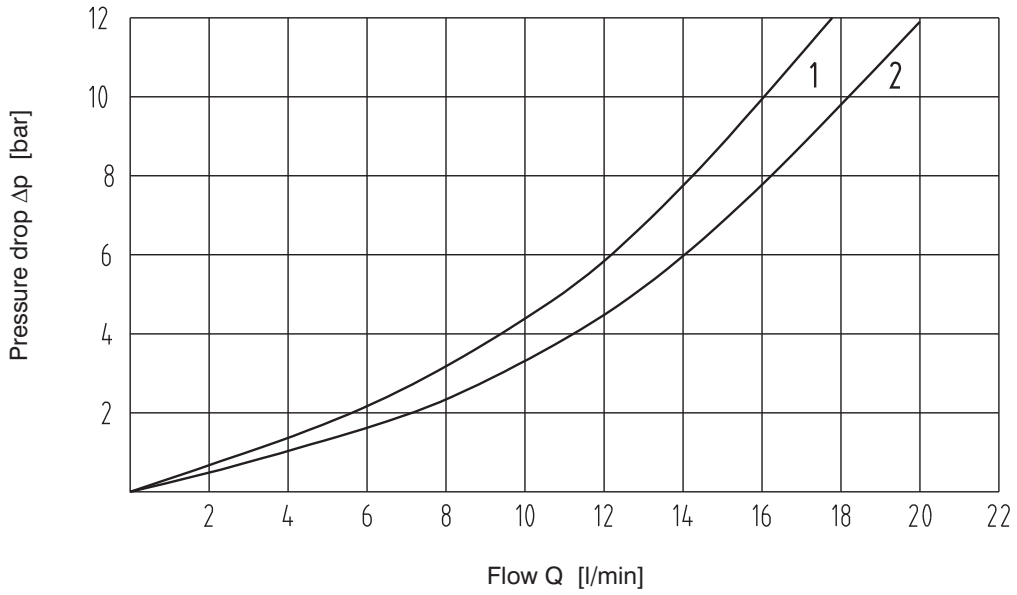
Designation	Symbol	Interposition	Designation	Symbol	Interposition
Z11			X11		
C11			J15		
H11			J75		
P11			Z11		
Y11			Z51		
L21			C51		
B11			Z71		
R11			Z81		
A51			C11		
P51			R21		
Y51					

Caution!

- For applications outside these parameters, please consult the manufacturer.
- With functional symbols A51 and J75 for pressures exceeding 100 bar, the T-port should be connected directly to the tank.
- For directional valves with two solenoids, one solenoid must be without charge before the other solenoid can be charged. Switching time for directional valves with detent assembly should not be shorter than 60 ms.
- Directional valves with other functional symbols as those shown in the table above can be delivered on request.
- The packing foil is recyclable.
- The protective plate can be returned to manufacturer.
- Mounting bolts M5 x 50 DIN 912-10.9 or studs must be orderer separately.
  Tightening torque is 5 Nm.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

Δp-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ and $t = 40\ °C$

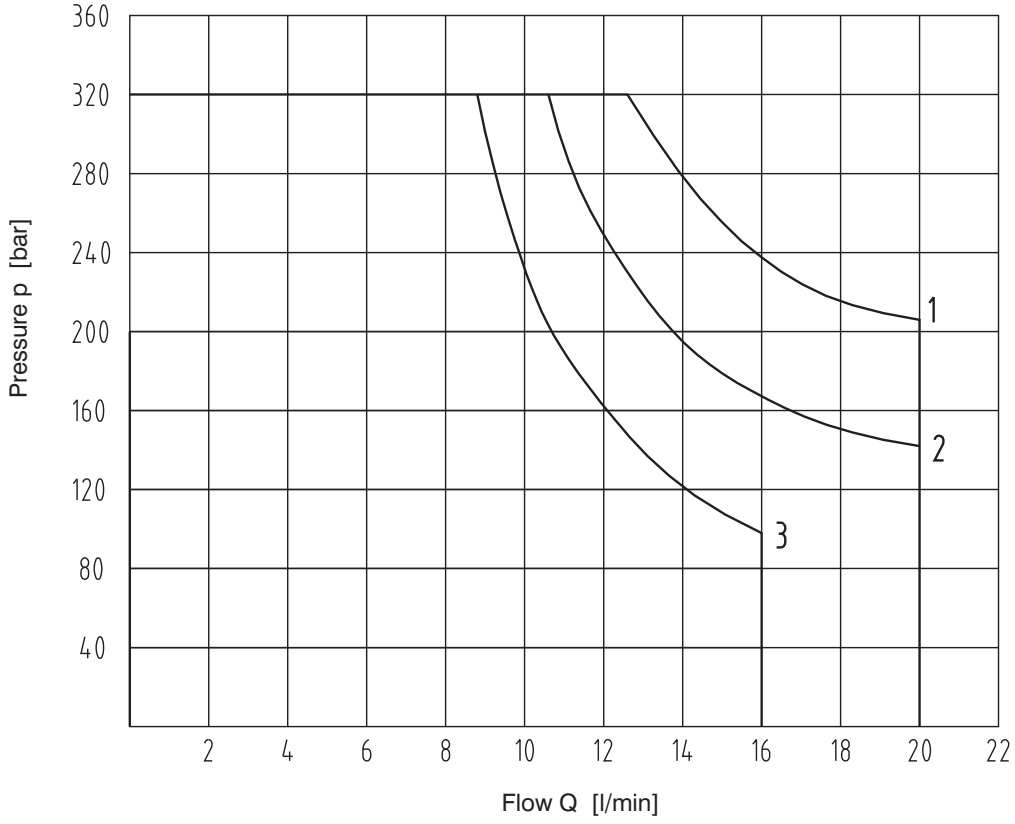


For all Functional Symbols				
P→T	P→A	P → B	A→T	B→T
1	2	2	2	2

p-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ and $t = 40\ °C$

Operating limits for maximum hydraulic power tfansferred by the directional valve. For respective spool type - see functional symbols.



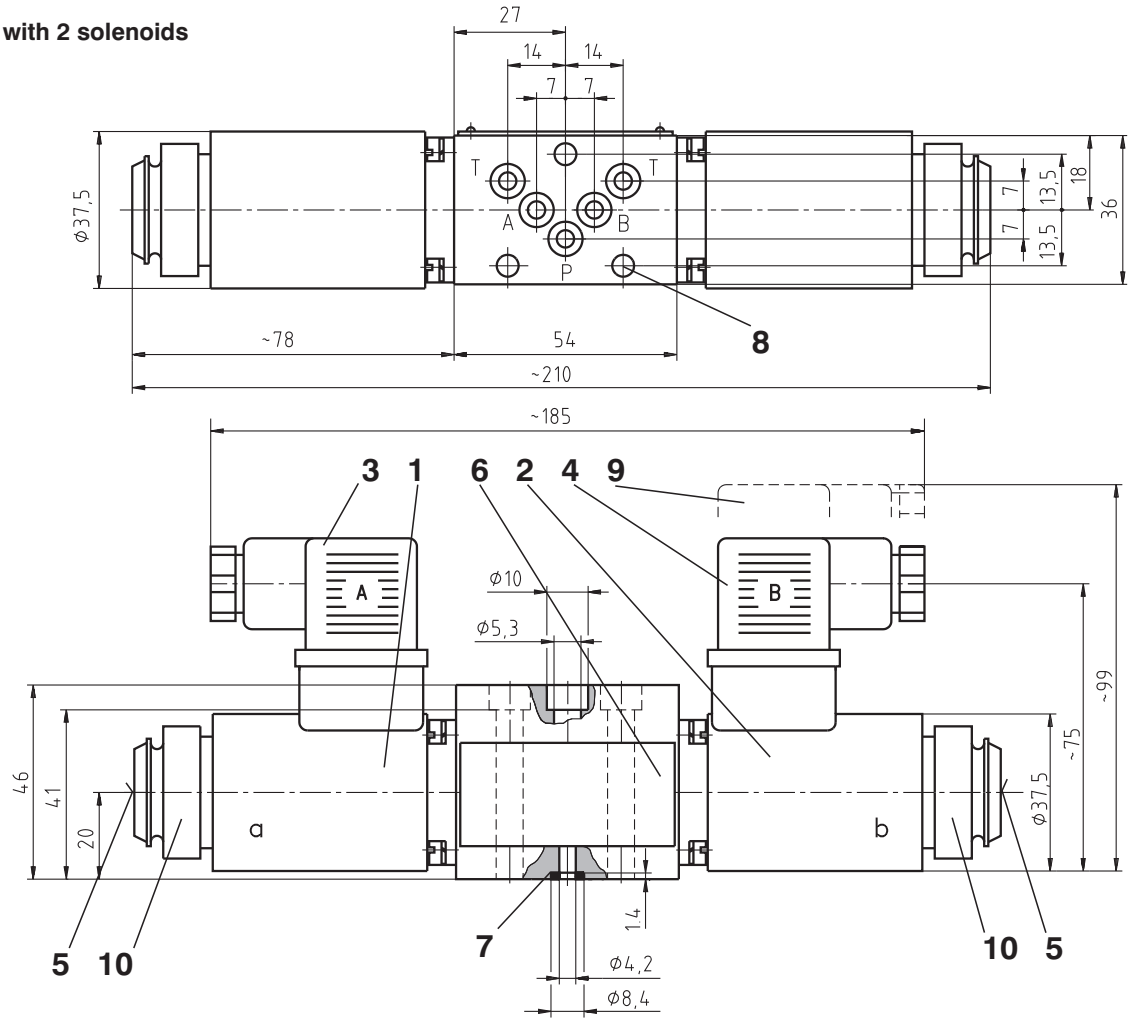
Z11	Z51	H11	P11	P51	Y11	Y51	C11	C51	B11	L21	R11	R21	X11	A51	Z71	Z81	J15	J75
2	2	2	2	2	2	2	3	3	2	3	1	1	1	3	3	3	3	1

Valve Dimensions

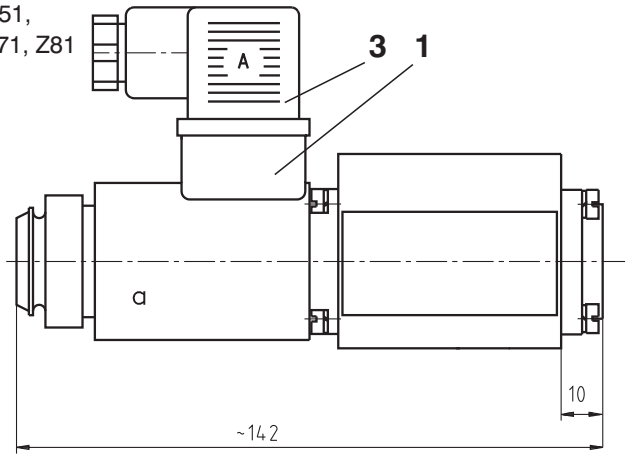
Dimensions in millimeters

Installation dimensions 2

Valve with 2 solenoids

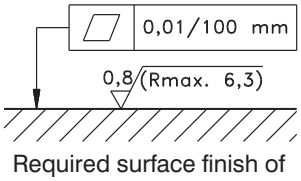


Valve with 1 solenoid
Functional symbols
R11, R21, A51, P51,
Y51, Z51, C51, Z71, Z81

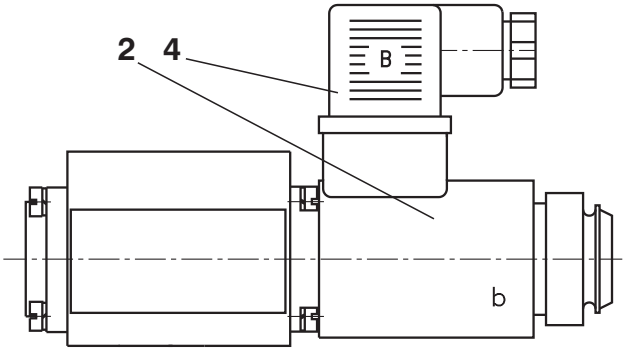


1 Solenoid a
2 Solenoid b
3 Connector plug A, grey color, to DIN 43 650
4 Connector plug B, black color, to DIN 43 650
5 Manual override
6 Name plate
7 Square ring 009 5.28 x 1.68 (5 pcs.) supplied with valve
8 3 mounting holes
9 Distance required to remove plug
10 Fixing nut

Valve with 1 solenoid
Functional symbols X11, Z11, C11



Required surface finish of interface

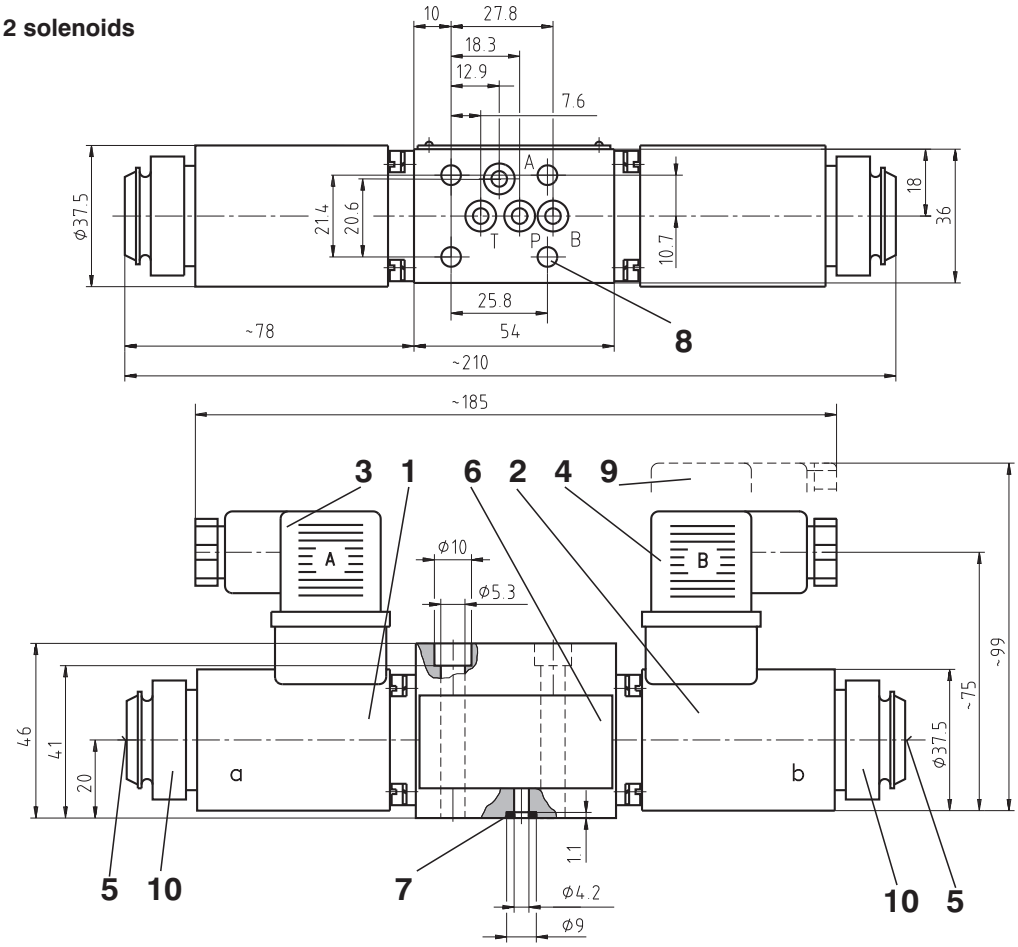


Valve Dimensions

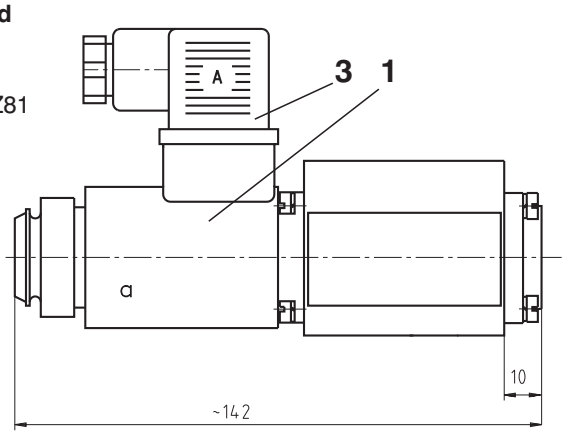
Dimensions in millimeters

Installation dimensions 3 (to DIN 24 340-A4)

Valve with 2 solenoids

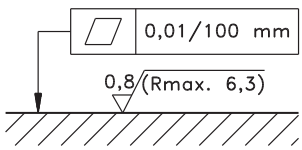


Valve with 1 solenoid
Functional symbols
R11, R21, A51, P51,
Y51, Z51, C51, Z71, Z81

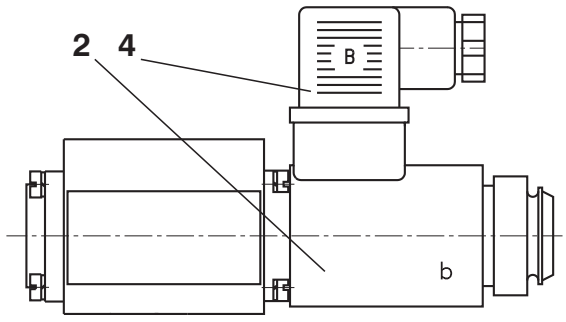


1 Solenoid a
2 Solenoid b
3 Connector plug A, grey color, to DIN 43 650
4 Connector plug B, black color, to DIN 43 650
5 Manual override
6 Name plate
7 Square ring 6 x 1.5 (4 pcs.) supplied with valve
8 4 mounting holes
9 Distance required to remove plug
10 Fixing nut

Valve with 1 solenoid
Functional symbols X11, Z11, C11



Required surface finish of interface



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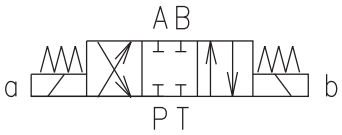
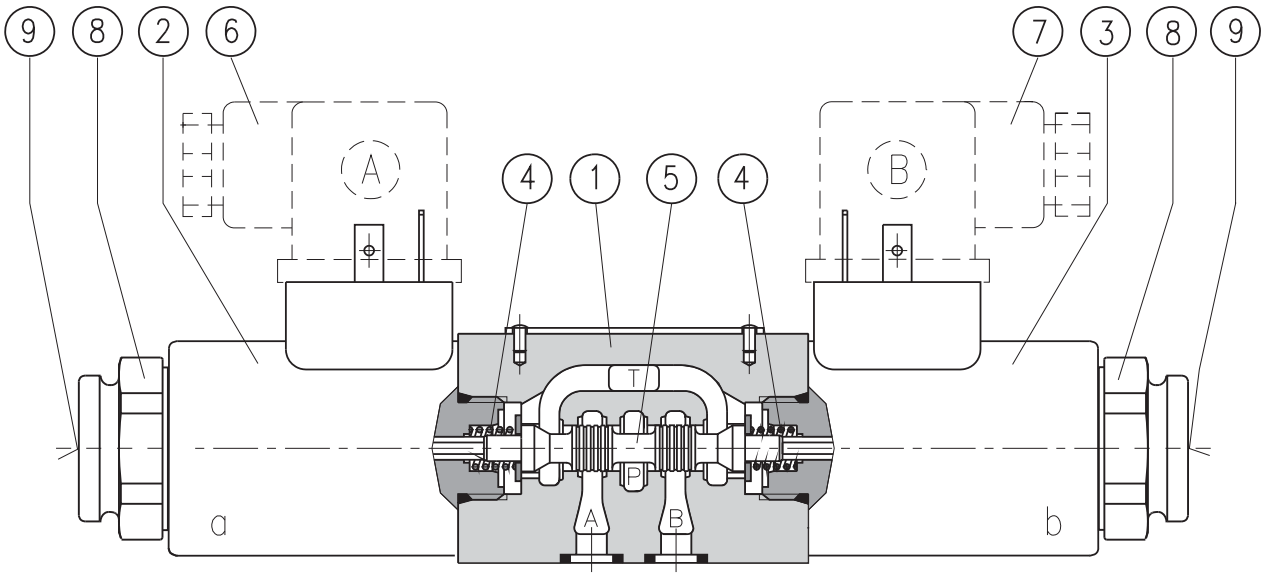


- **4/3-, 4/2- way directional control valves with solenoid control**
- **Solenoids can be turned around their axis to any position**
- **Push button manual override**
- **Installation dimensions acording to DIN 24 340 / ISO 4401 / CETOP RP121-H**
- **Subplates see data sheet HA 0002**
- **CSA Upon request**

Functional Description

The RPE3-04 directional control valves consist of cast iron housing (1), control spool (5) with two centering springs (4) and operating solenoids (2, 3).
The three-position directional valves are fitted with two solenoids and two springs. Two-position directional valves have either one solenoid and one return spring or two solenoids and a detent assembly.
The operating solenoids are DC solenoids supplied through connectors A, B (6, 7). For AC supply the solenoids are provided with a rectifiers which are integrated in the DIN connector socket as part of the solenoid. By loosening the nut (8), the solenoid can be turned around its axis up to 360°.
In the case of solenoid malfunction or power failure, the spool of the valve can be repositioned by manual override (9), provided the pressure in the T-port does not exceed 25 bar (363 PSI).
The valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



Ordering Code

RPE3-04 □□/□□□□□□□

Solenoid Operated Directional Control Valve

Nominal size **04(D02)**

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

Functional symbols
see the table functional symbols

Rated supply voltage of solenoids
(at the coil terminals)

12 V DC / 2.41 A	**01200**
14 V DC / 1.66 A	01400
21 V DC / 1.14 A	02100
24 V DC / 1.16 A	**02400**
42 V DC / 0.59 A	04200
48 V DC / 0.56 A	04800
60 V DC / 0.41 A	06000
102 V DC / 0.24 A	10200
205 V DC / 0.12 A	20500
24 V AC / 1.44 A / 50 (60) Hz	02450
115V AC / 0.26 A / 50 (60) Hz	11550
230 V AC / 0.14 A / 50 (60) Hz	**23050**

The AC coils correspond with E5 type.

CSA Upon request

Type of solenoid coil

E1	with terminal for the connector, EN 1745301-803
E2	with terminal for the connector, EN 1745301-803 and quenching diode
E3	with AMP-Junior-Timer-connectorr
E4	with AMP-Junior-Timer-connectorr and quenching diode
E5	with integrated rectifier and with terminal for the connector, EN 1745301-803

Other coils on demand see catalog HA 8007

***Electrical connector, EN 1745301-803**

no designation	without connector
K1	connector without rectifier
K2	connector without rectifier with LED and quenching diode
K3	connector with rectifier
K4	connector with rectifier with LED and quenching diode
K5	connector without rectifier

Manual override

no designation	standard
N2	covered with rubber protective boot

Orifice in P-Port

no designation	without orifice
D1	∅0.8 mm (0.031 in)
D2	∅1.0 mm (0.039 in)
D3	∅1.2 mm (0.047 in)
D4	∅1.5 mm (0.059 in)
D5	∅0.7 mm (0.027 in)

Seals

no designation	NBR
V	FPM (Viton)

Note: Electrical connectors have to be ordered separately. See see pages 6 and 8.

Recommended solenoid coils used with electrcial connector with rectifiers - type designation K3, K4

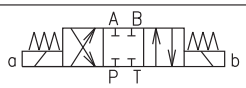
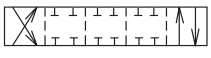
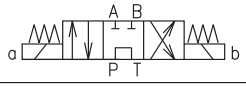
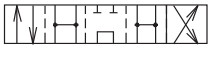
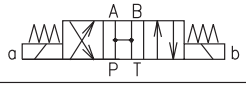
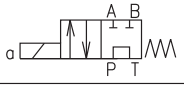
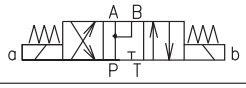
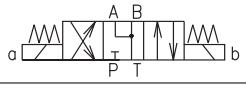
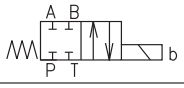
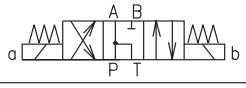
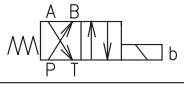
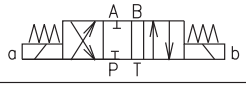
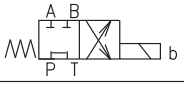
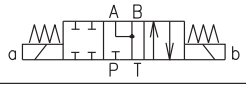
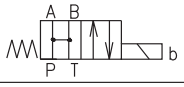
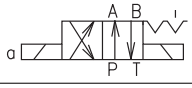
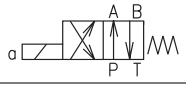
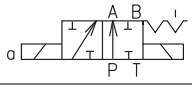
Rated supply source voltage (permissible rated voltage variation ±10 %)	Type designation of the solenoid voltage
24 V AC / 1.44 A / 50 (60) Hz	02100
115 V AC / 0.26 A / 50 (60) Hz	10200
230 V AC / 0.14 A / 50 (60) Hz	20500

FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE, FUNCTIONAL SYMBOLS AND TABLE OF PREFERRED TYPES ON PAGE 8

Technical Data

Valve size	mm (US)	04 (D 02)	
Maximum flow	L/min (GPM)	see p-Q characteristics	
Maximum operating pressure at ports P, A, B	bar (PSI)	320 (4600)	
Maximum operating pressure at port T	bar (PSI)	210 (3045)	
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range (NBR / Viton)	°C (°F)	-30 ... +80 (-22 ... +176) /-20 ... +80 (-4 ... +176)	
Ambient temperature, max.	°C (°F)	+50 (122)	
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)	
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406	
Maximum allowable voltage variation	%	AC: ±10	DC: ±10
Maximum switching frequency	h^{-1}	15 000	
Switching time, ON; at ν = 156 SUS (32 mm^2/s)	ms	30 ... 50	
Switching time, OFF; at ν = 156 SUS (32 mm^2/s)	ms	AC: 70 ... 100	DC: 30 ... 50
Duty cycle	%	100	
Service life	cycles	10^7	
Enclosure type to EN 60 529		IP 65	
Weight - valve with 1 solenoid - valve with 2 solenoid	kg (lbs)	0.9 (1.978) 1.25 (2.747)	
Mounting position		unrestricted	

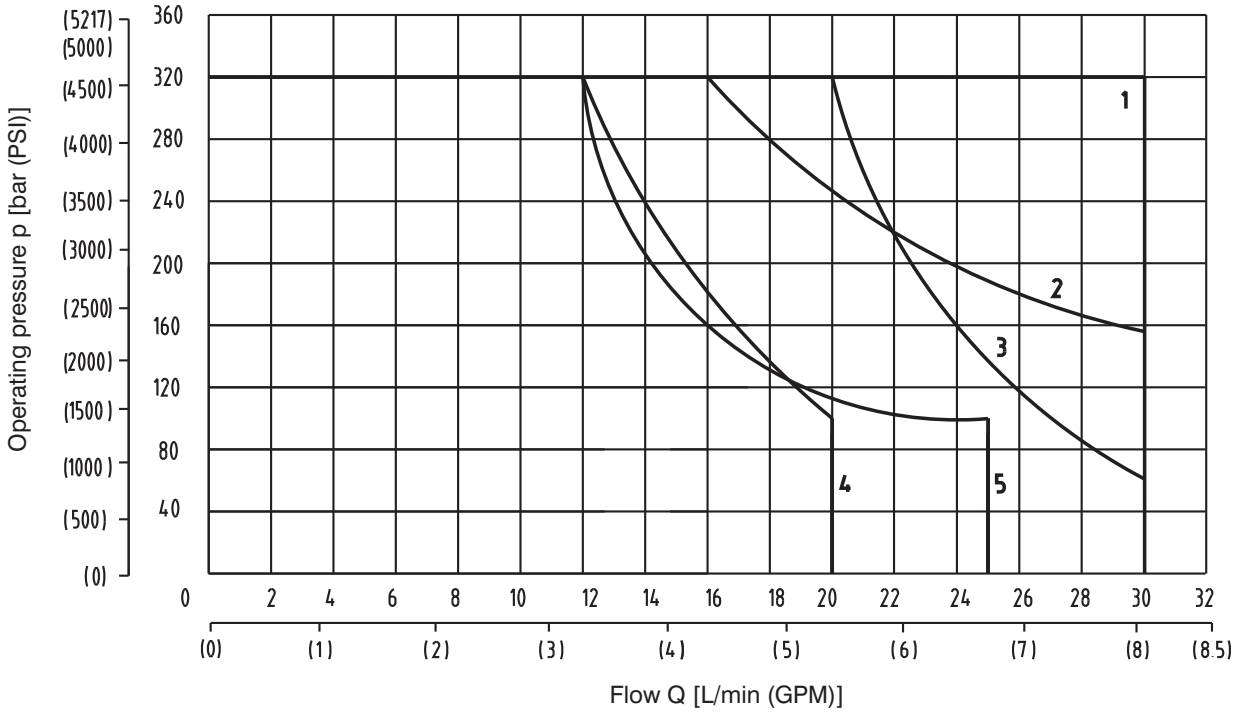
Spool Symbols

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

p-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see spool symbols.

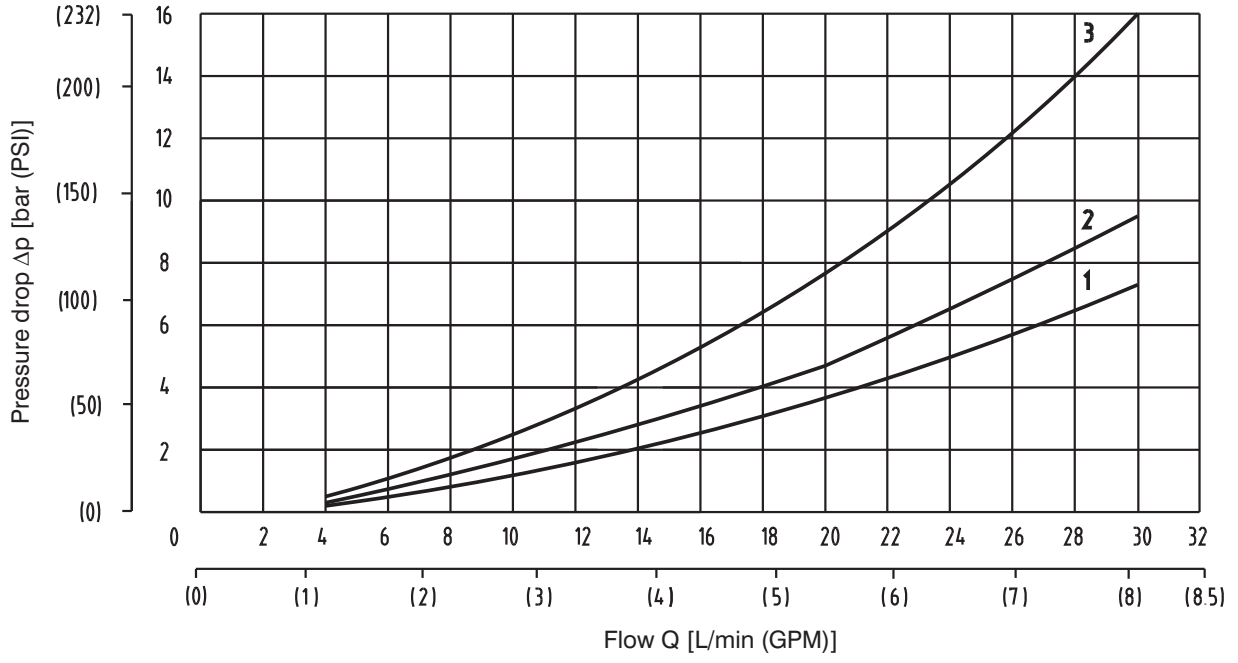


Z11	C11	H11	P11	Y11	L21	B11	Y71	R11	R21	A51	P51	Y51	C51	Z51	X11	J15	J75
1	2	1	1	1	4	1	5	1	3	4	1	1	2	1	1	1	4

Δp-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS)

Pressure drop Δp related to flow rate.

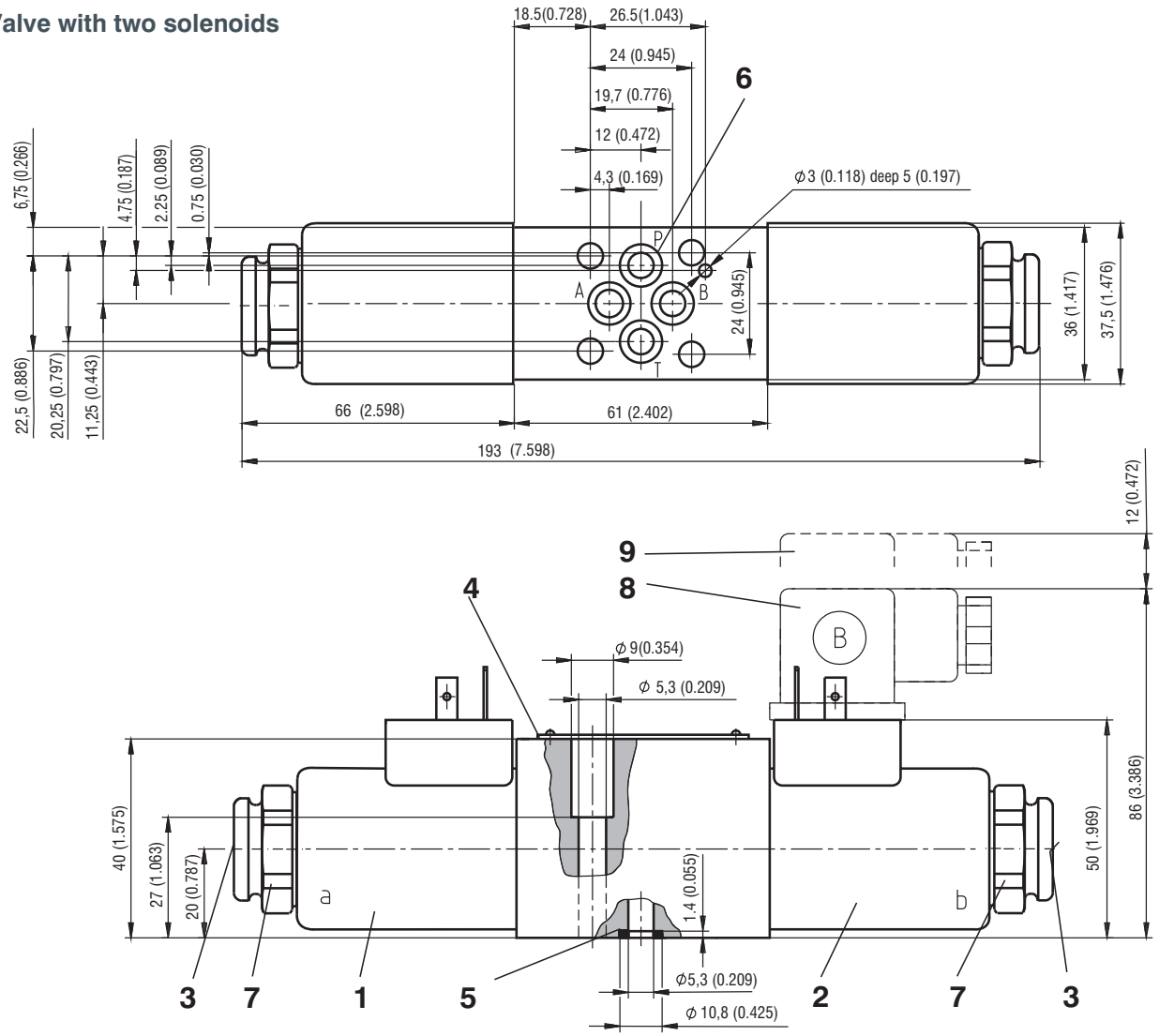


	Z11	C11	H11	P11	Y11	L21	B11	Y71	R11	R21	A51	P51	Y51	C51	Z51	X11	J15	J75
P-A	1	3	1	1	1	1	1	2	2	2	1			3		2	2	1
P-B	1	3	1	1	1	1	1		2	2	1	1	1		1	2	2	1
A-T	1	3	1	1	1	1	1	2	2	2		1	1		1	2	2	
B-T	1	3	1	1	1	1	1	1	2	2				3		2	2	
P-T		2	2											2				

Valve Dimensions

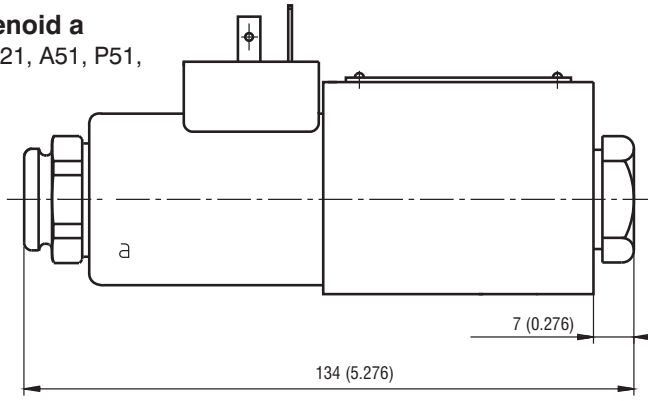
Dimensions in millimeters (inches)

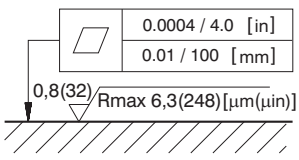
Valve with two solenoids



1 Solenoid a
[(Nut torque 2.21 ft-lbs. (3Nm)]
2 Solenoid b
[(Nut torque 2.21 ft-lbs. (3Nm)]
3 Manual override
4 Name plate
5 Square ring 7.65 x 1.68 (4 pcs.)
supplied with valve
6 4 mounting holes
7 Retaining nut of the solenoid
8 Electrical connector,
DIN EN1745301-803
9 Space required to remove connector

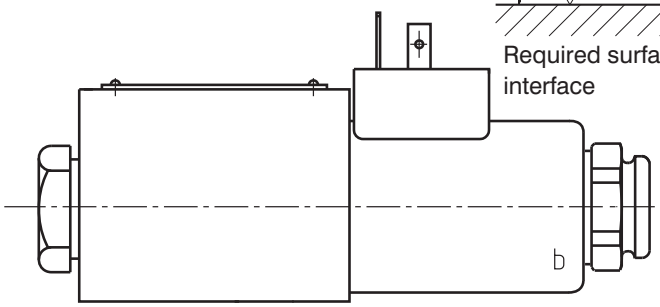
Valve with one solenoid a
Spool symbols R11, R21, A51, P51, Y51, C51, Z51



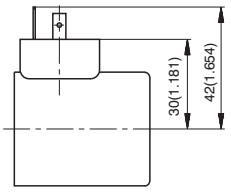
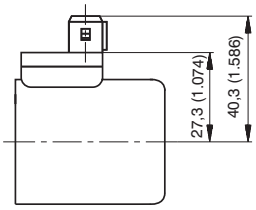
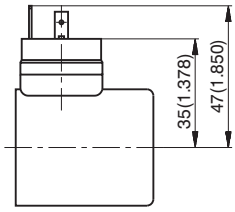


Required surface finish of interface

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

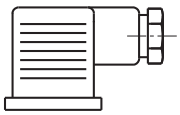


Type of the Solenoid Coil

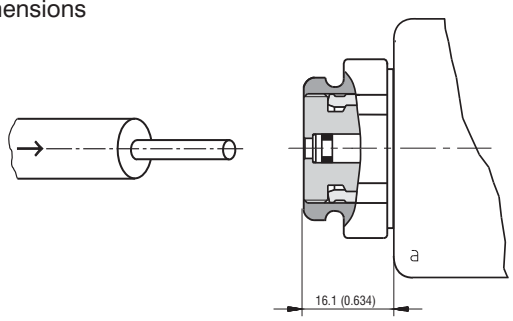
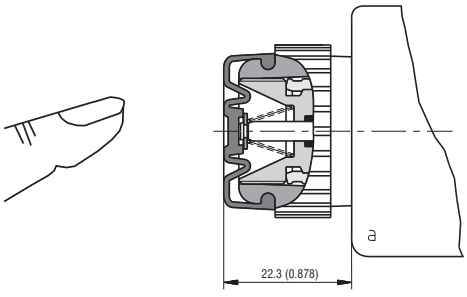
Type	Dimensions	Description
E1		Solenoid coil with terminal for the electrical connector, EN 1745301-803
E2		Solenoid coil with integrated quenching diode (bipolar transil diode) and terminal for the electrical connector, EN 1745301-803
E3		Solenoid coil with terminal for AMP-Junior-Timer electrical connector.
E4		Solenoid coil with integrated quenching diode (bipolar transil diode) and terminal for AMP-Junior-Timer electrical connector.
E5		Solenoid coil with integrated rectifier and terminal for the electrical connector, EN 1745301-803

Electrical connector, EN1745301-803

K1	Connector B (black) Connector A (grey)	without rectifier - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC/DC
K5	Connector B (black) Connector A (grey)	without rectifier - M16x1.5 (bushing bore ∅ 4-6 mm)	230 V AC/DC
K2	Connector B (black) Connector A (grey)	without rectifier with LED and quenching diode - M16x1.5 (bushing bore ∅ 6-8 mm)	12 ... 24 V DC
K3	Connector B (black) Connector A (grey)	with rectifier - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC
K4	Connector B (black)	with rectifier with LED and quenching diode - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC

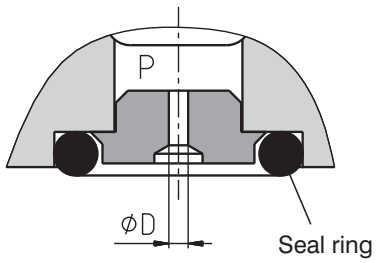


Manual override

STANDARD	RUBBER BOOT
no designation Dimensions  Standard model of manual override. Standard retaining nut of the solenoid.	Type **N2** Dimensions  Manual override protected by rubber boot.

Orifice in P-Port

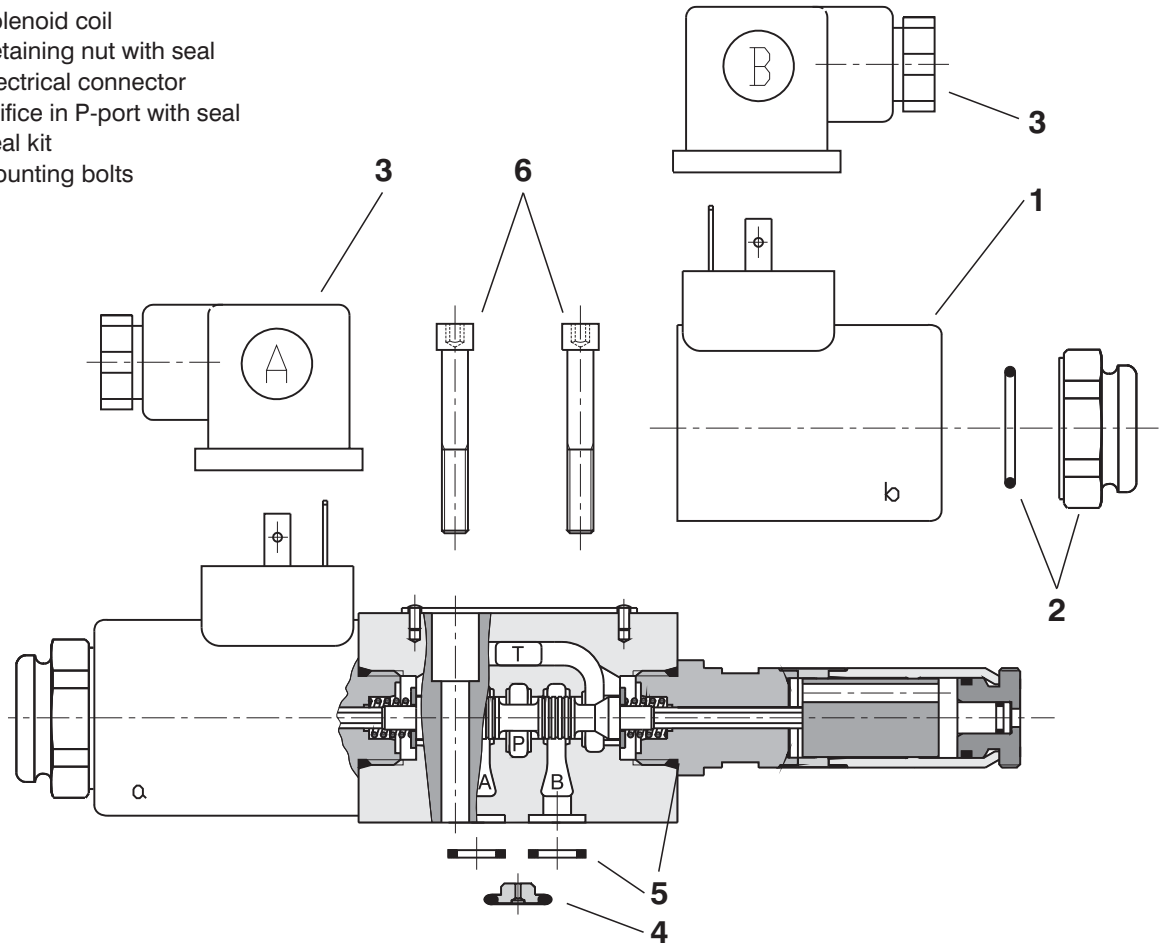
Type	∅D mm (inch)
D1	0,8 (0.032)
D2	1,0 (0.040)
D3	1,2 (0.047)
D4	1,5 (0.059)
D5	0,7 (0.028)



P-port orifices limits the flow into the directional control valve.
Attention:
When the orifice in P port is additionally mounted the standard used square ring NBR is replaced with O-ring from Viton.

Spare Parts

1 Solenoid coil
2 Retaining nut with seal
3 Electrical connector
4 Orifice in P-port with seal
5 Seal kit
6 Mounting bolts



Solenoid coil

Type designation	Type of the coil				
	E1	E2	E3	E4	E5
	Ordering number				
01200	27316600	27631400	27330200	27631600	
*01200	24140700				
02400	27316700	27632400	27449700	27633400	
*02400	24140800				
20500	27382400	-	-	-	
23050					27449900
*23050					24141000

Solenoid retaining nut with seal

Type of the nut	Seal ring	Ordering number
Standard nut	18 x 1.5	15874500
Nut with rubber boot		15874800

* CSA Upon request

Electrical connector, EN 175301-803

Type designation	Connector A grey	Connector B black
	Ordering number	
K1	16202200	16202100
K5	16202600	16202500
K2	16202800	16202700
K3	16202400	16202300
K4	16203000	16202900

Orifice in P-Port

Type designation	∅D mm (in)	Seal ring	Ordering number
D1	0.8 (0.031)	7.65 x 1.78	15874000
D2	1.0 (0.039)		15874100
D3	1.2 (0.047)		15874200
D4	1.5 (0.059)		15874300
D5	0.7 (0.027)		15874900

Seal kit

Type	Dimensions, number		Ordering number
	Square ring	O-ring	
Standard NBR70	7.65 x 1.68 (4 pcs.)	16 x 2 (2 pcs.)	15873800
Viton	7.65 x 1.78 (4 pcs.)	16 x 2 (2 pcs.)	15874400

Mounting bolts

Dimensions, number	Tightening torque	Ordering number
M5 x 35 DIN 912-10.9 (4 pcs.)	5 Nm (3.68 lbf . ft)	15874600

Preferred Types of Valves

Type	Ordering number	Type	Ordering number
RPE3-042Z11/01200E1	16711100	RPE3-042R11/02400E1	15855300
RPE3-043Z11/01200E1	15849000	RPE3-042R21/02400E1	15855700
RPE3-043C11/01200E1	15849900	RPE3-042A51/02400E1	15855200
RPE3-043H11/01200E1	15850300	RPE3-042Y51/02400E1	15855100
RPE3-043Y11/01200E1	15850500	RPE3-042J15/02400E1	15856600
RPE3-042R11/01200E1	15851900	RPE3-042Z11/23050E5	21714900
RPE3-042R21/01200E1	16711000	RPE3-043Z11/23050E5	16712400
RPE3-042A51/01200E1	16710900	RPE3-043C11/23050E5	16712700
RPE3-042Y51/01200E1	15851800	RPE3-043H11/23050E5	15858800
RPE3-042J15/01200E1	16711400	RPE3-043Y11/23050E5	16712500
RPE3-042Z11/02400E1	15855900	RPE3-042R11/23050E5	15859100
RPE3-043Z11/02400E1	15852200	RPE3-042R21/23050E5	21764800
RPE3-043C11/02400E1	15852800	RPE3-042A51/23050E5	16712600
RPE3-043H11/02400E1	15853200	RPE3-042Y51/23050E5	21785500
RPE3-043Y11/02400E1	15853600	RPE3-042J15/23050E5	21785600

Caution!

- When the distributor contains two electromagnets any of the two electromagnets can be switched on only after the other one switches off. The electromagnets switching time on distributors with locking arrangement must not be shorter than 60 ms.
- Distributors with other interconnections than those shown in the catalogue can be supplied on request.
- The packaging foil can be recycled
- The transport base plate can be returned to the manufacturer.
- Mounting screws M5 x 35 DIN 912-10.9 or bolts must be ordered separately.
  The screws tightening torque is 5 Nm (3.68 lbf . ft).
- The mentioned data only serve to describe the product and in no case are to be understood in terms of law as guaranteed characteristics.

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www.argo-hytos.com

Directional Control Valves Solenoid Operated

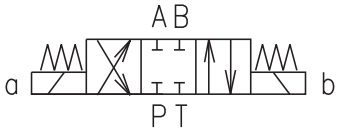
RPE3-06

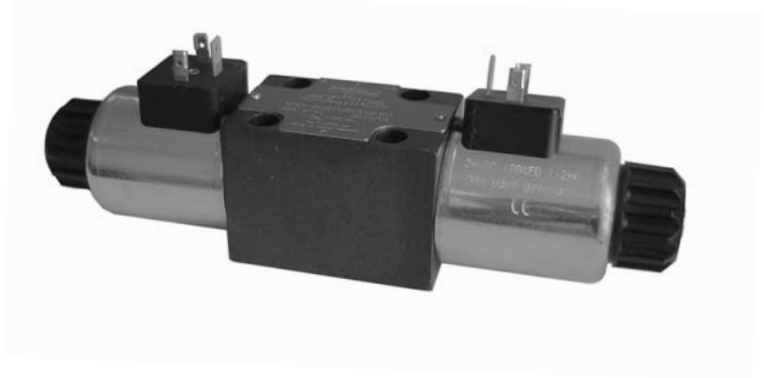
Size D 06 (03) •350 bar (5076 PSI) • 80 L/min(21 GPM)
Size D 06 (03) • p_{max} 320 bar (4641PSI) according to CSA 80 L/min(21 GPM)

HA 4010
11/2011

Replaces
HA 4010 12/2009

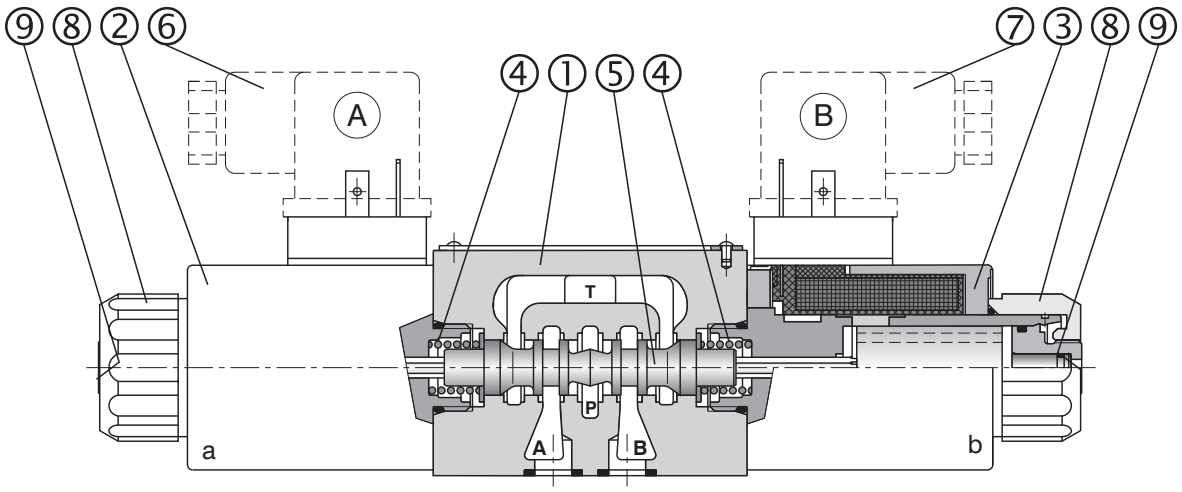
- **4/3-, 4/2- way directional control valves**
- **Solenoids can be turned around their axis to any position**
- **Four-land spool - reduced functional dependence on fluid viscosity**
- **Push button manual override**
- **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**
- **Subplates see data sheet HA 0002**
- **CSA Upon request**





Functional Description

The RPE3 directional control valves consist of housing (1), a control spool (5) with two centering springs (4) and cylindrical operating solenoids (2, 3).
The three-position directional control valves are fitted with two solenoids and two springs. Two-position directional control valves have either one solenoid and one return spring or two solenoids and a detent assembly.
The operating solenoids are DC solenoids. For AC supply the solenoids are provided with a rectifiers which are integrated in the DIN connector socket as part of the solenoid. The connectors (6, 7) can be turned by 90°. By loosening the nut (8), the solenoids can be turned or replaced without interfering with any seals of the valve.
In the case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override (9), provided the pressure in T-port does not exceed 25 bar.
The valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



Ordering Code

RPE3-06 ☐☐/☐☐☐☐☐☐☐☐

Directional Control Valves Solenoid Operated

Valve size

Number of valve positions

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

Spool symbols
see the table spool symbols

Rated supply voltage of solenoids
(at the coil terminals)

12 V DC / 2.72 A	**01200**
24 V DC / 1.29 A	**02400**
205 V DC / 0.15 A	20500
230 V AC / 0.17 A / 50 (60) Hz	**23050**

The AC coils correspond with E5 type

CSA Upon request

Type of solenoid coil

with terminal for the connector, EN 1745301-803	**E1**
with integrated quenching diode and terminal for the connector, EN 1745301-803	E2
with AMP-Junior-Timer-connector	E3A
with integrated quenching diode and terminal for AMP-Junior-Timer connector	E4A
with integrated rectifier and terminal for the connector, EN 1745301-803	**E5**

Other coils on demand see catalog HA8007

Manual overide

no designation	Standard
N1	covered with retaining nut
N2	covered with rubber boot
N3	with detent assembly

Soft Shift - Spool speed control orifice

no designation	without damping
T1	orifice ∅ 0.7 mm (0.03 inch) in solenoid

Orifice in P port

no designation	without orifice
D1	∅1.0 mm (0.039 inch)
D2	∅1.5 mm (0.059 inch)
D3	∅2.0 mm (0.079 inch)
D4	∅2.2 mm (0.087 inch)
D5	∅2.5 mm (0.098 inch)

Seals

no designation	NBR
V	FPM (Viton)

Sensing of the end position

no designation	without sensor
S1	normally-open sensor to 50 bar (725PSI)
S2	normally-open sensor to 210bar (3045 PSI)
S4	normally-closed sensor to 50bar (725 PSI)

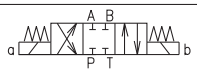
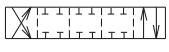
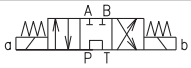
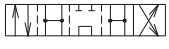
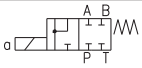
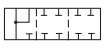
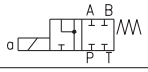
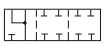
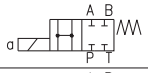
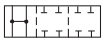
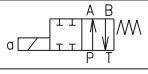
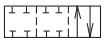
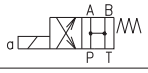
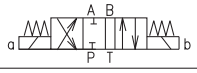
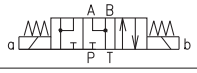
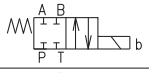
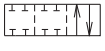
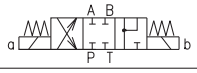
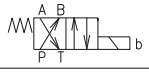
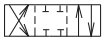
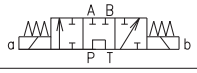
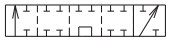
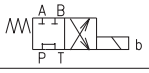
Note: Connector of the position sensor **is not supplied**
(see ordering number on page 10)

FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE, FUNCTIONAL SYMBOLS AND TABLE OF PREFERRED TYPES ON PAGE 10

Technical Data

Valve size	mm (US)	D 06 (03)	
Maximum flow	L/min (GPM)	see p-Q characteristics	
Max. operating pressure at porte P, A, B	bar (PSI)	standard 350 (5076), according to CSA 320 bar (4641PSI)	
Max. operating pressure at port T	bar (PSI)	50 (725) for version **S1, S4** and 210 (3000) for version **S2**	
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range for NBR seals	°C (°F)	-30 ... +80 (-22 ... +176)	
Fluid temperature range for FPM seals	°C (°F)	-20 ... +80 (-4 ... +176)	
Ambient temperature max.	°C (°F)	+50 (+122)	
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)	
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406	
Max. allowable voltage variation	%	DC: ±10	AC: ±10
Max. switching frequency	h^{-1}	15 000	
Switching time, on: at ν=32 $mm^2 .s^{-1}$(156 SUS)	ms	DC: 30 ... 50	AC: 30 ... 40
Switching time, off: at ν=32 $mm^2 .s^{-1}$(156 SUS)	ms	DC: 10 ... 50	AC: 30 ... 70
Duty cycle	%	100	
Service life	cycles	10^7	
Enclosure type to EN 60 529		IP 65	
Weigt - valve with 1 solenoid - valve with 2 solenoids	kg (lbs)	1.6 (3.52) 2.2 (4.84)	
Mounting position		unrestricted	

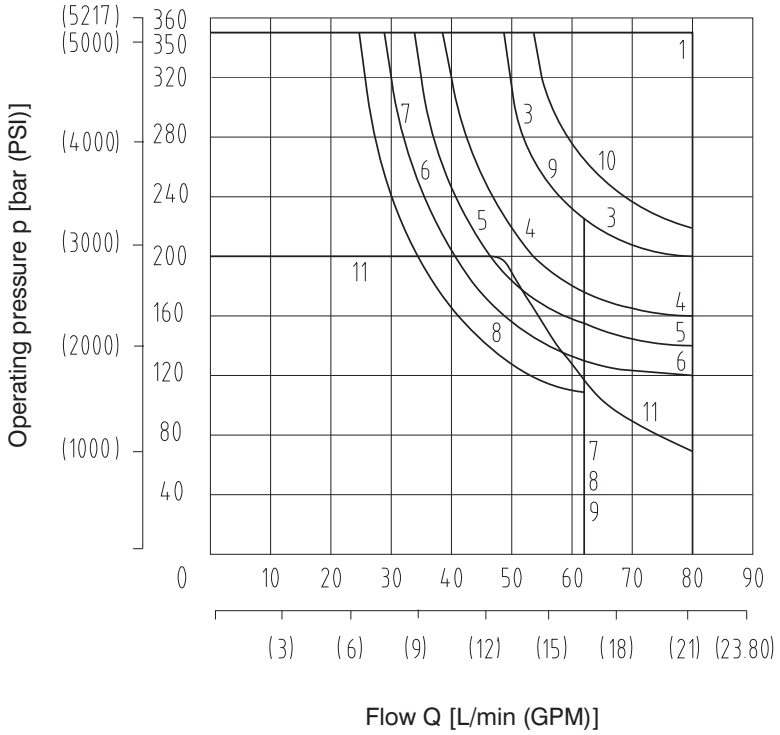
Spool Symbols

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

p-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve.
For respective spool type - see spool symbols.

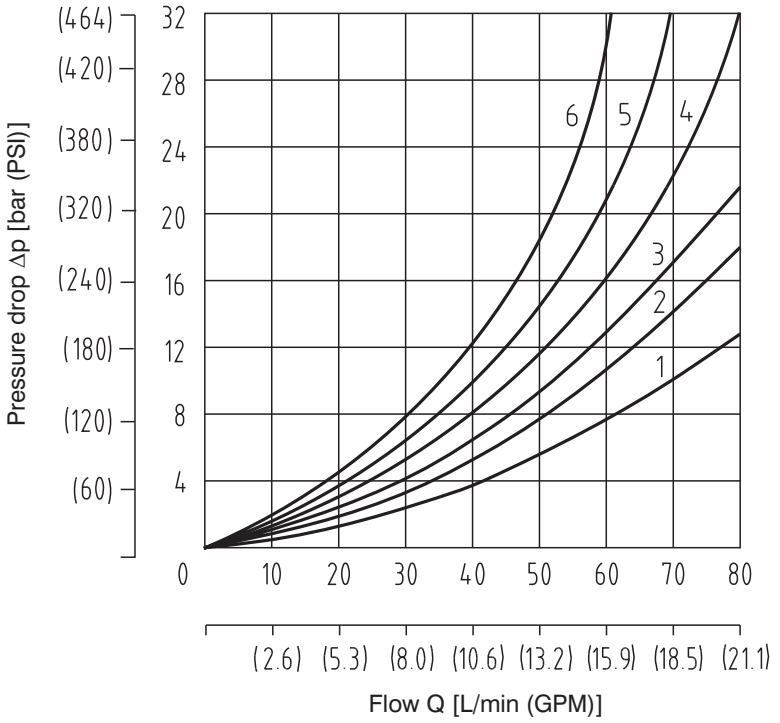


Z11	1
C11	7
H11	4
P11	1
Y11	3
L21	6
B11	9
Y41	7
Z21	1
C41	6
F11	6
R11	4
R21	5
A51	6
P51	1
Y51	3
C51	7
Z51	1
Z71	8
Z81	8
Z91	8
R31	6
H51	8
F51	8
X11	4
K11	8
N11	8
X25	11
J15	1
J75	10

Δp-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Pressure drop Δp related to flow rate.

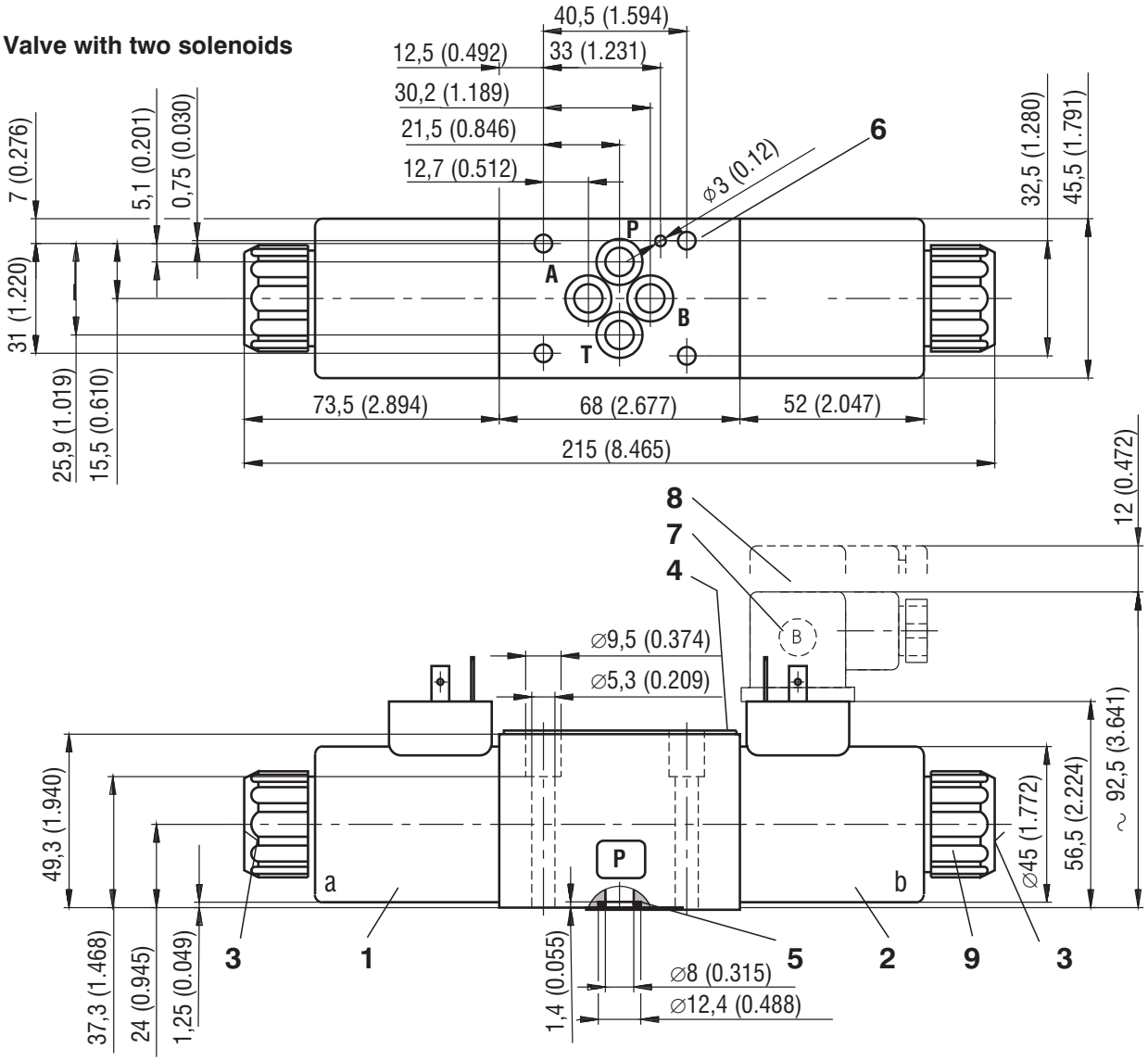


	P-A	P-B	A-T	B-T	P-T
Z11	2	2	3	3	
C11	5	5	5	6	3
H11	2	2	2	3	3
P11	1	1	3	3	
Y11	2	2	2	2	
L21	2	2	3	3	
B11	2	2	3	3	
Y41	3	3	3	3	
Z21		2	3		
C41	4	4			5
F11	1	2		3	3
R11	2	2	3	3	
R21	2	2	3	3	
A51	2	2			
P51		1	3		
Y51		2	2		
C51	2			3	4
Z51		2	3		
Z71	3	3			
Z81			3	3	
Z91	3			3	3
R31	2			3	
H51		2	3		
F51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

Valve Dimensions

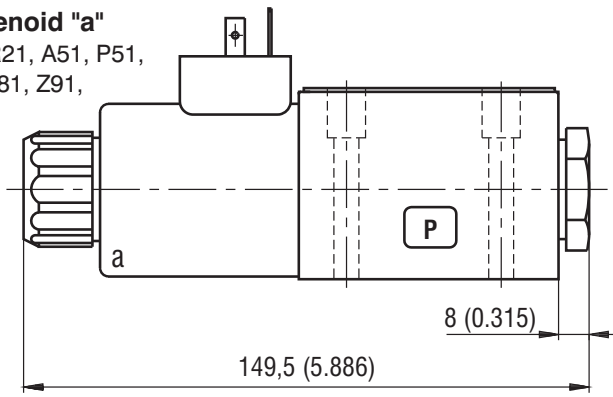
Dimensions in milimeters (inches)

Valve with two solenoids

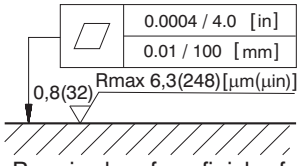


Valve with one solenoid "a"

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



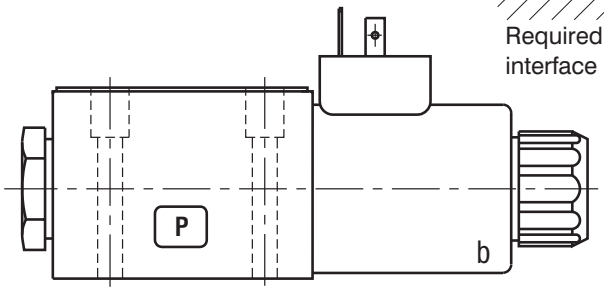
1 Solenoid a
2 Solenoid b
3 Manual override
4 Name plate
5 Square ring (4 pcs.)
9.25 x 1.68 supplied with valve
6 4 mounting holes
7 Electrical connecto, EN 1745301-803
8 Space required to remove connector
9 Solenoid fixing nut
[Nut torque 2.95 ft-lbs (4 Nm)]



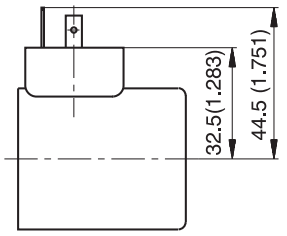
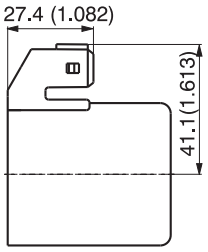
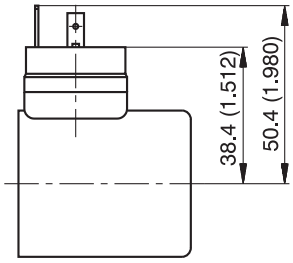
Required surface finish of interface

Valve with one solenoid "b"

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



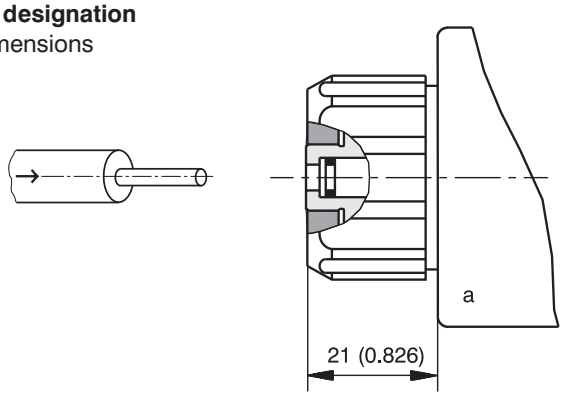
Type of the Solenoid Coil

Designation	Dimensional sketch	Description
E1		Solenoid coil with terminal for the electrical connector, EN 1745301-803.
E2		Solenoid coil with integrated quenching diode (bipolar transil diode) and terminal for the electrical connector, EN 1745301-803.
E3A		Solenoid coil with terminal for AMP-Junior-Timer electrical connector.
E4A		Solenoid coil with integrated quenching diode (bipolar transil diode) and terminal for AMP-Junior-Timer electrical connector.
E5		Solenoid coil with integrated rectifier and terminal for the electrical connector, EN 1745301-803.

Manual Override

STANDARD

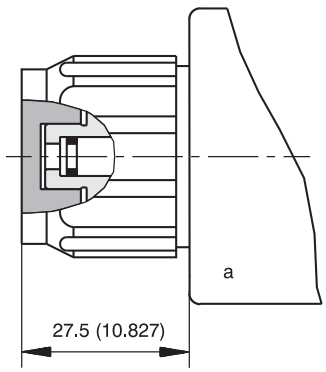
no designation
Dimensions



Standard model of the manual override.
Standard retaining nut of the solenoid.

CLOSED NUT

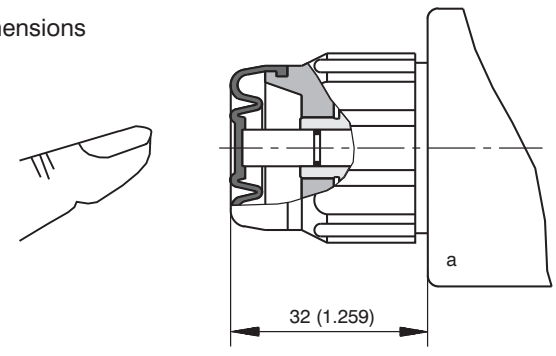
Type **N1**
Dimensions



Manual override with retaining nut.
Can be used after removing nut.

RUBBER BOOT

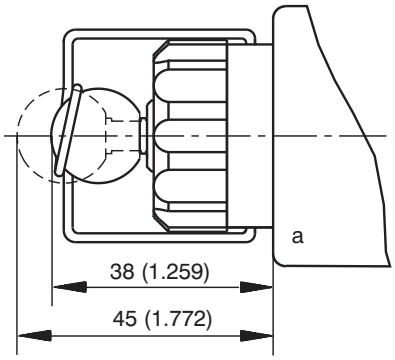
Type **N2**
Dimensions



Manual override protected by rubber boot.

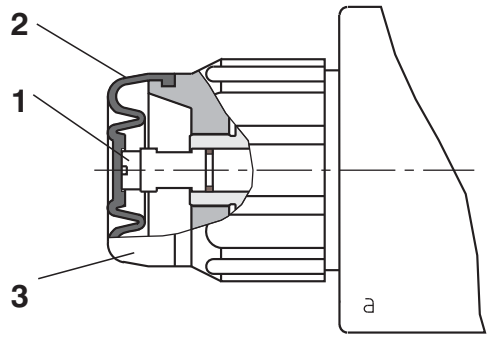
DETENT ASSEMBLY

Type **N3**
Dimensions



Manual override holds the spool in the shiftet position.

Spool Speed Control Orifice

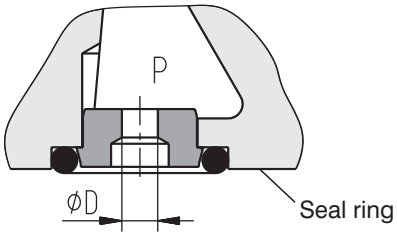
Type	Dimension	Description
T1		Important: This directional valve provides control spool soft shifting by means of orifice situated in the solenoid armature.To ensure the proper function of the valve, perfect air bleeding of the solenoid is required (by us of bleeding plug (1). The plugs are accessible after removing the rubber boot (2) from the solenoid retaining nut (3).

Switching times

Switching time, on and off	ms	300 ... 800

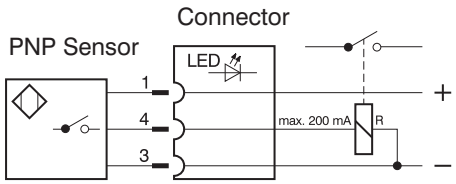
The switching times shown are valid for viscosity ν = 32 mm^2/s (156 SUS) and nominal voltage. They are dependent upon working pressure and flow rate of the directional control valve

Orifice in P-Port

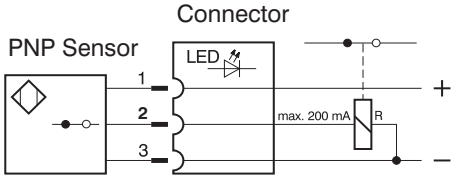
Type	∅D mm (inch)	Dimensions	Description
D1	1,0 (0.039)		P-port orifices limit the flow into the directional control valve. **Attention:** When the orifice in P port is additionally mounted the standard used square ring NBR is replaced with O-ring from Viton.
D2	1,5 (0.059)		
D3	2,0 (0.079)		
D4	2,0 (0.087)		
D5	2,0 (0.098)		

Spool Ship Position Sensor

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



S4 - Circuit diagram of the normally-closed sensor

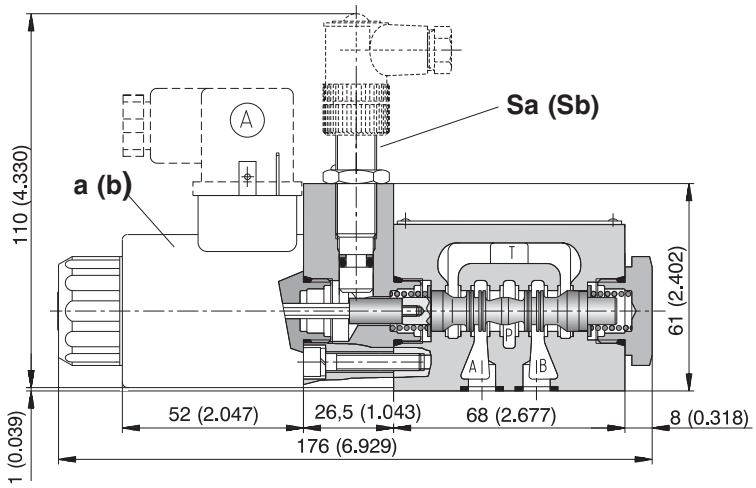


The proximity sensor transforms the spool position into an electrical step signal. It can be used with directional control valves with one or two solenoids.

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	
Enclosure type of sensor to 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)	
Indication		yellow LED	

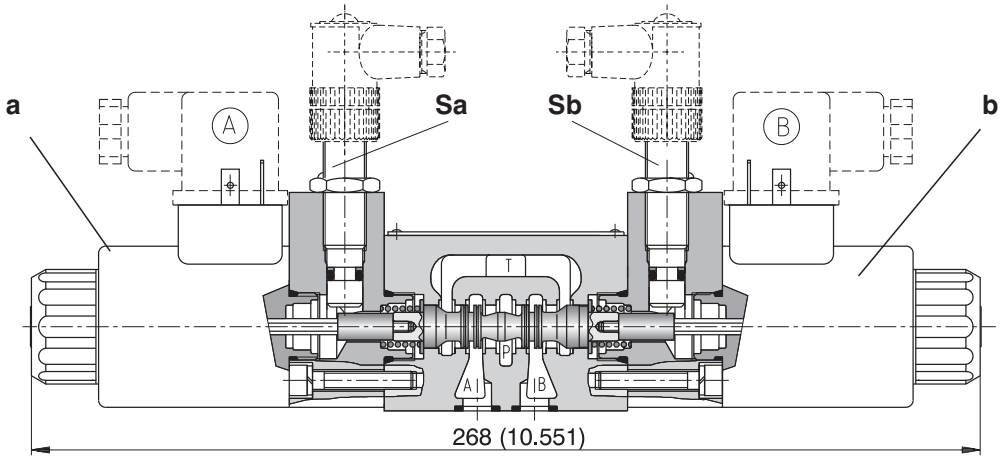
Two-Position Directional Control Valve Dimensions in millimeters (inches)

Signal of solenoid a (b)	Signal of sensor Sa (Sb)		LED	
	S1, S2 - normally-open	**S4** - normally-closed	**S1, S2**	**S4**
0	1	0	ON	OFF
1	0	1	OFF	ON



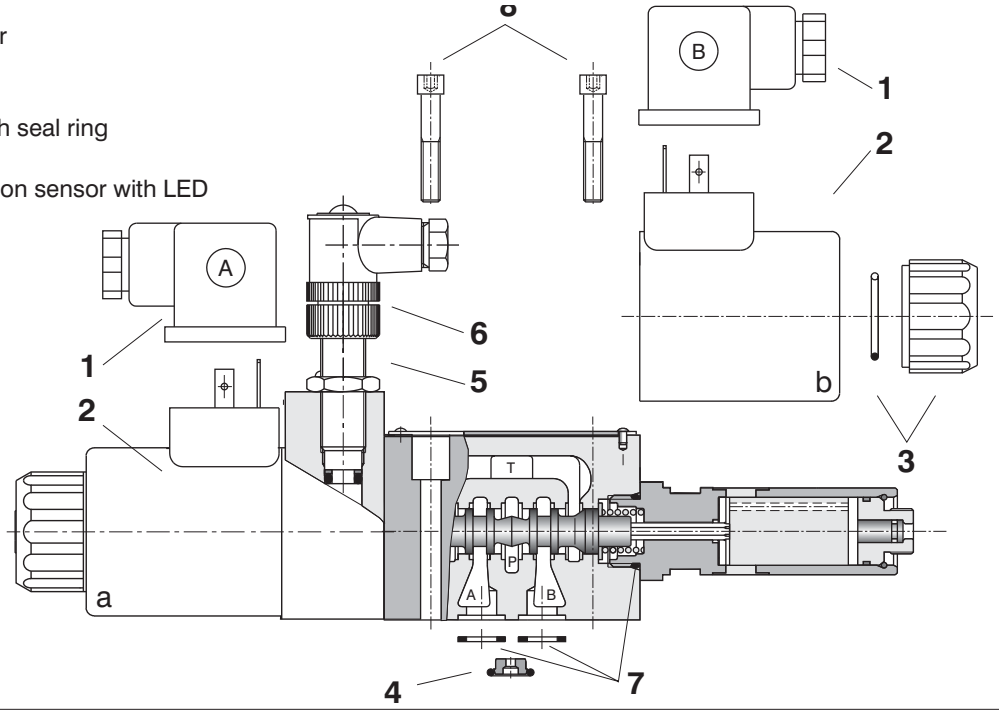
Three-Position Directional Control Valve Dimensions in millimeters (inches)

Signal of solenoid		Signal of sensor Sa (Sb)				LED			
		S1, S2 - normally-open		**S4** - normally-closed		**S1, S2**		**S4**	
a	b	Sa	Sb	Sa	Sb	Sa - LED	Sb - LED	Sa - LED	Sb - LED
0	0	1	1	0	0	ON	ON	OFF	OFF
1	0	0	1	1	0	OFF	ON	ON	OFF



Spare Parts

1 Electrical connector
2 Solenoid coil
3 Nut with seal
4 Orifice in P port with seal ring
5 Sensor
6 Connector of position sensor with LED
7 Seal kit
8 Mounting bolts



Solenoid coil

Solenoid type	Coil type				
	E1	E2	E3A	E4A	E5
	Order number				
01200	16211400	24156100	24159600	24159700	
01200*	24154300	-	-	-	
02400	-	24157400	24159800	24159900	
02400*	24154400				
20500	-				
23500					18849000
23500*					24154600

*CSA Upon request

Solenoid retaining nut with seal

Type of the nut	Seal ring	Order number
Standard nut	22 x 2	15844600
Closed nut		15844700
Nut with rubber boot		15844800
Nut with detent assembly		15844900

Connector of position sensor

Type designation	Model	Max. input voltage	Ordering number
K02	connector of position sensor with LED	10...30 V DC	17364800
S1	normally-open sensor	10...30 V DC	16688500
S2	normally-open sensor	10...30 V DC	18961900
S4	normally-closed sensor	10...30 V DC	20725300

Orifice in P-port

Type	∅D mm (inch)	Seal ring	Order number
D1	1,0 (0.039)	9.25 x 1.75	15845600
D2	1,5 (0.059)		15845700
D3	2,0 (0.079)		15845800
D4	2,2 (0.087)		15846000
D5	2,5 (0.098)		15845900

Bolt kit

Dimensions, quantity	Bolt torque	Order number
M5 x 45 DIN 912-10.9 (4 pcs.)	8.9 Nm (6.6 ft-lbs)	15845100

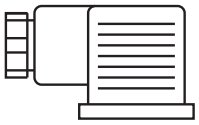
Seal kit

Type	Dimensions, quantity		Order number
Standard - NBR70	9,25 x 1,68 x 1,68 (4 pcs.)	17 x 1.8 (2 pcs.)	15845200
Viton	9,25 x 1,78 (4 pcs.)	17,17 x 1,78 (2 pcs.)	15845400

Electrical connector, EN 1745301-803

Type	Connector **A grey**	Connector **B black**
	Ordering number	
K1	16202200	16202100
K5	16202600	16202500
K2	16202800	16202700
K3	16202400	16202300
K4	16203000	16202900

Electrical Connector, EN 175301-803

K1	Connector B (black) Connector A (grey)	without rectifier - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC/DC	
K5	Connector B (black) Connector A (grey)	without rectifier - M16x1.5 (bushing bore ∅ 4-6 mm)	230 V AC/DC	
K2	Connector B (black) Connector A (grey)	without rectifier with LED and quenching diode - M16x1.5 (bushing bore ∅ 6-8 mm)	12 ... 24 V DC	
K3	Connector B (black) Connector A (grey)	with rectifier - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC	
K4	Connector B (black)	with rectifier with LED and quenching diode - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC	

Recommended solenoid coils used with electrcial connector with rectifiers - **type designation K3, K4**

Rated supply source voltage (permissible rated voltage variation ±10 %)	Type designation of the solenoid voltage
230 V AC / 0.17 A / 50 (60) Hz	20500

Preferred Types of Valves

Type	Ordering Number	Type	Ordering Number
RPE3-062Z11/01200E1	15720300	RPE3-063Y11/02400E1	15728400
RPE3-063Z11/01200E1	15711300	RPE3-062R11/02400E1	15731100
RPE3-062Z51/01200E1	15719300	RPE3-062R21/02400E1	15734500
RPE3-063C11/01200E1	15712600	RPE3-062A51/02400E1	15732800
RPE3-062C51/01200E1	15719600	RPE3-062Y51/02400E1	15737400
RPE3-063H11/01200E1	15713500	RPE3-062J15/02400E1	15733500
RPE3-063Y11/01200E1	15714300	RPE3-062Z11/23050E5	15768800
RPE3-062R11/01200E1	15716000	RPE3-063Z11/23050E5	15747100
RPE3-062R21/01200E1	15717100	RPE3-062Z51/23050E5	21262800
RPE3-062A51/01200E1	15716700	RPE3-063C11/23050E5	15748900

Caution!

- When the distributor contains two electromagnets any of the two electromagnets can be switched on only after the other one switches off. The electromagnets switching time on distributors with locking arrangement must not be shorter than 60 ms.With directional valves with cushioned spool shifting, the switching time must correspond with the shifting time.
- Distributors with other interconnections than those shown in the catalogue can be supplied on request.
- The packaging foil can be recycled
- The transport base plate can be returned to the manufacturer.
- Mounting screws M5 x 45 DIN 912-10.9 or bolts must be ordered separately.
  The screws tightening torque is 8.9 Nm (6.6 ft-lbs).
- The mentioned data only serve to describe the product and in no case are to be understood in terms of law as guaranteed characteristics.

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Directional Control Valves Solenoid Operated

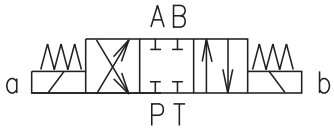
RPE4-10

Size 10 • p_{max} 350 bar • Q_{max} 140 L/min

HA 4039
11/2014

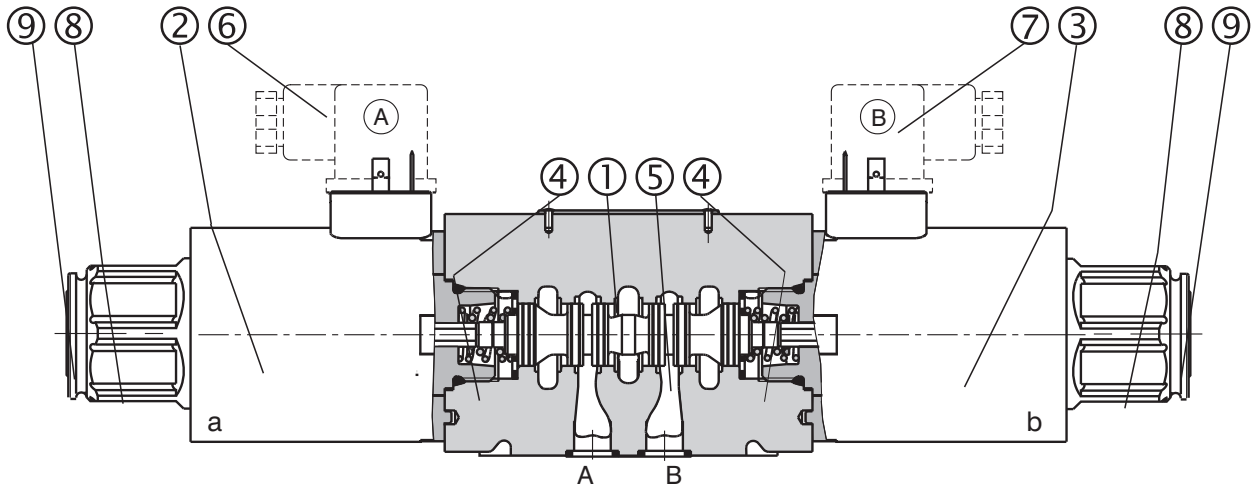
Replaces
HA 4039 7/2009

- 4/3, 4/2 way directional control valves
- Cylindrical DC solenoids with removable coils. Electrical connectors can be rotated in three positions 90° apart
- Spool-position sensor optional
- 4 chamber spool - reducing
- Push button manual override
- Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H
- Subplates see data sheet HA 0002
- CSA Upon request



Functional Description

The RPE4-10 directional control valves consist of housing (1), control spool (5), centering springs (4) and operating solenoids (2, 3).
The three-position directional control valves are fitted with two solenoids and two springs. The two position directional control valves have one solenoid and one return spring.
The operating solenoids are DC solenoids and are supplied through connectors (6, 7) without rectifiers. For AC supply the solenoids are provided with rectifiers, which are integrated directly into the connectors (6, 7) or inside the coil.
By loosening the retaining nut (8), the solenoid can be turned on its axis and locked in three positions 90° apart.
Provided that the pressure in T-port does not exceed (25 bar), the spool of the valve can be shifted by manual override (9).
The basic surface treatment of the valve housing (1) is phosphate coated, the operating solenoids (2, 3) are zinc coated.



Ordering Code

RPE4-10 □ □ / □ □ □ □ □ □

Directional Control Valve Solenoid Operated

Nominal size

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

Functional symbols
see the table functional symbols

Rated supply voltage of solenoids
(at the coil terminals)
12 V DC / 3.17 A **01200**
24 V DC / 1.73 A **02400**
205 V DC / 0.20 A 20500
230 V AC / 0.20 A / 50 (60) Hz **23050**
120V AC / 60Hz* 12060

The AC coils correspond with E5 type.
CSA Upon request

Type of the solenoid coil
with for the electrical connector, EN 175301-803 **E1**
with integrated rectifier and for the electrical connector EN 175301-803 **E5**

Manual override
no designation standard
N2 covered with rubber boot

Sensing of the end position
no designation without s ensor
S1 normally-open sensor to 50bar
S2 normally-open sensor to 210bar
S4 normally-closed sensor to 50bar

Seals
no designation standard (NBR)
V Viton (FPM)

Damping
no designation without damping
T2 with orifice
T3 with throttle screw

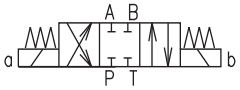
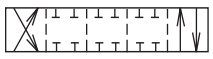
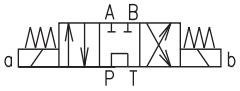
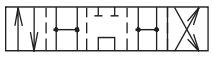
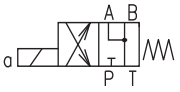
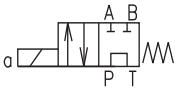
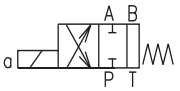
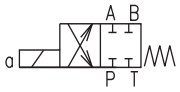
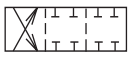
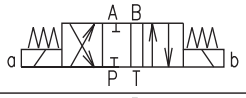
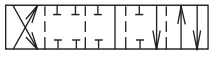
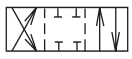
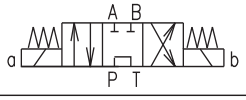
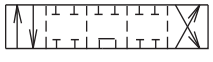
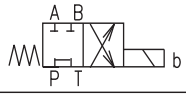
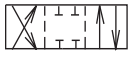
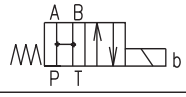
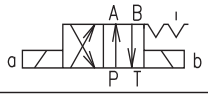
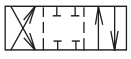
Note: Connector of the position sensor **is not supplied**
(see ordering number on page 9)

FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE, FUNCTIONAL SYMBOLS AND TABLE OF PREFERRED TYPES ON PAGE 10

Technical Data

Nominal size	mm	10	
Maximum flow	L/min	see p-Q characteristics	
Maximum operating pressure at ports P, A, B	bar	350	
Maximum operating pressure at port T	bar	50 for version **S1, S4** and 210 for versinon **S2**	
Pressure drop	bar	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range (NBR / Viton)	°C	-30 ... +80 / -20 ... +80	
Ambient temperature max.	°C	+50	
Viscosity range	mm^2/s	20 ... 400	
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406	
Maximum allowable voltage variation	%	AC: ±10	DC: ±10
Maximum switching frequency	1/h	15 000	
Switching time, ON; at ν = 32 mm^2/s	ms	AC: 50 ... 330	DC: 50 ...120
Switching time, OFF; at ν = 32 mm^2/s	ms	AC: 100 ... 300	DC: 30 ... 90
Duty cycle	%	100	
Service life	cycles	10^7	
Enclosure type to EN 60529		IP 65	
Weight - valve with 1 solenoid - valve with 2 solenoids	kg	3.9 5.4	
Mounting position		unrestricted	

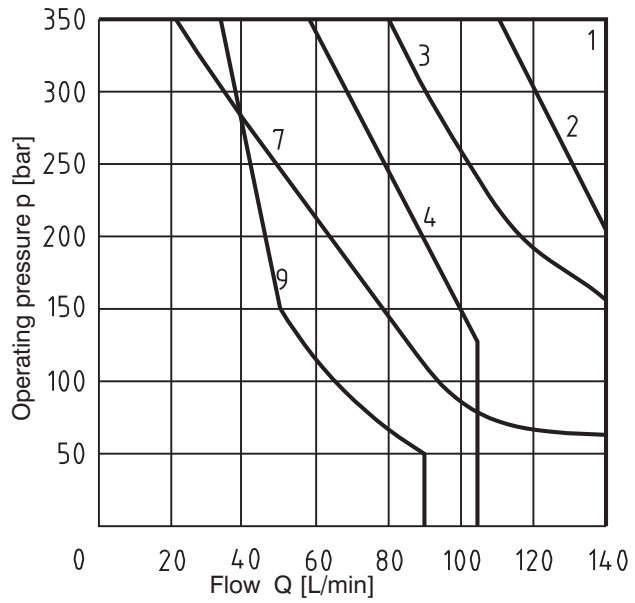
Functional Symbols

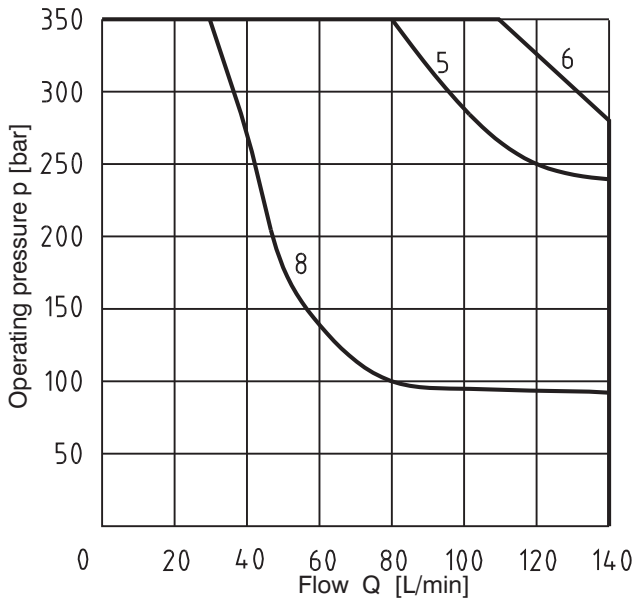
Designation	Symbol	Interposition	Designation	Symbol	Interposition
Z11			P51		
C11			**Y51**		
H11			**C51**		
P11			B51		
Y11			**Z51**		
L21			H51		
B11			X11		
C21			C11		
R11			H11		
R21			J15		
A51			J75		

p-Q Characteristics

Measured at $\nu = 32\ mm^2/s$

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see functional symbols. The power curves hold true for symmetrical valve flows (e.g. flows in directions P-A and B-T are identical). In case of an asymmetric flow, the power curves can lie substantially lower. In such cases we highly recommend to consult the respective power curve with the valve manufacture.



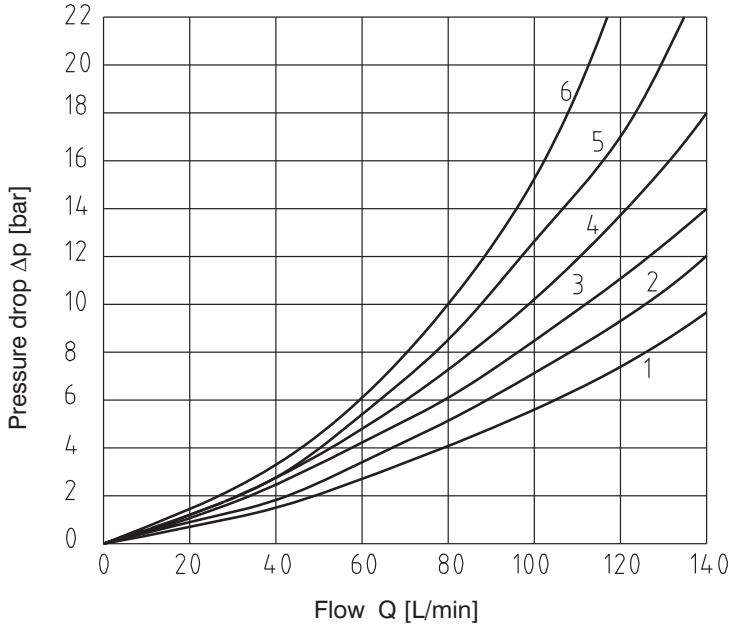


Z11	Z51	H11	H51	P11	P51	Y11	Y51	C11	C51	R11	X11	B11	B51	L21	R21	J15	J75	A51	C21
1	1	1	1	1	1	5	5	3	3	2	2	4	4	7	2	6	6	8	9

Δp-Q Characteristics

Measured at $\nu = 32\ mm^2/s$

Pressure drop Δp related to flow rate.

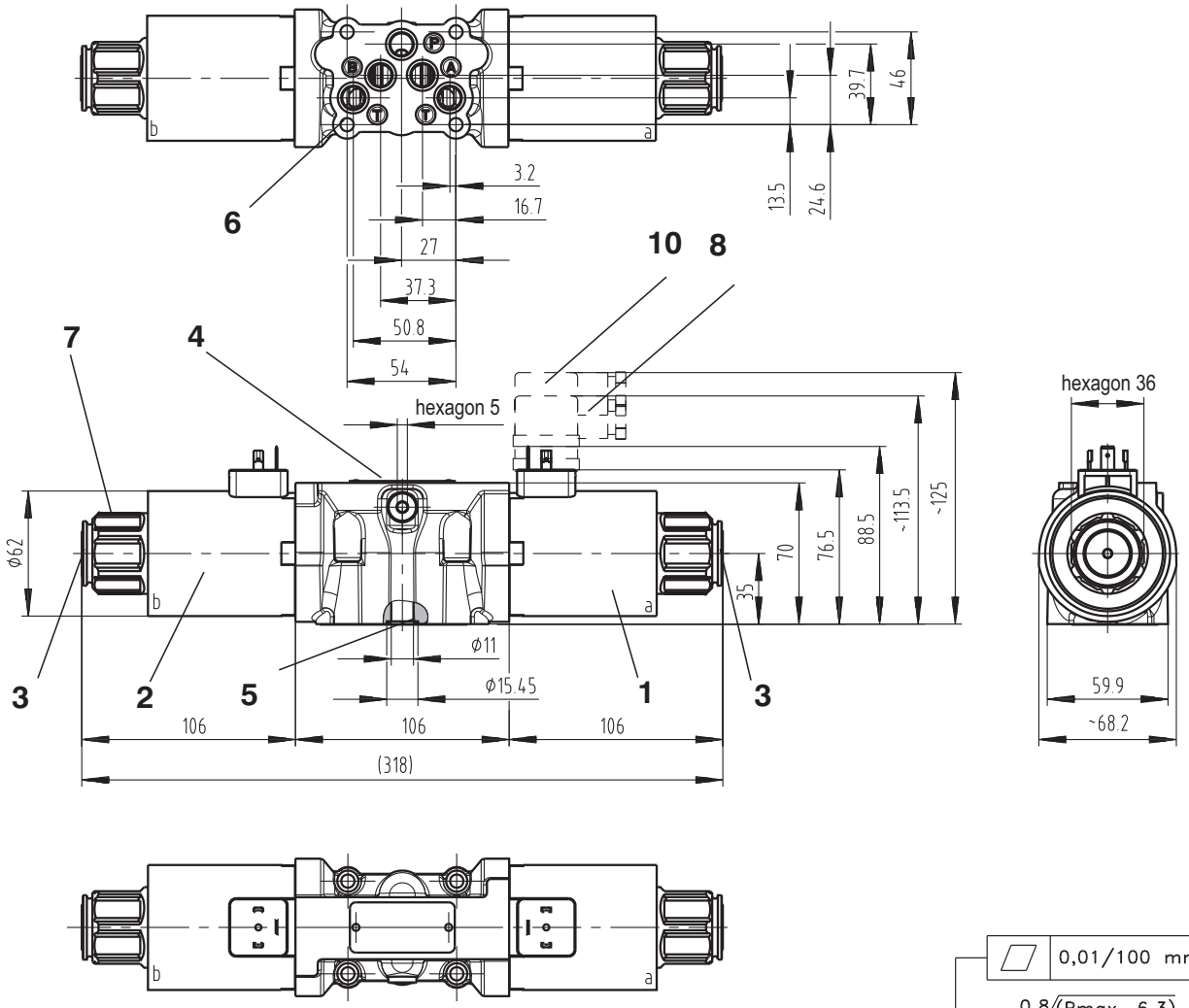


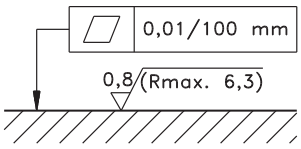
	P-A	P-B	A-T	B-T	P-T
Z11	1	1	2	2	
Z51		1	2		
H11	1	1	2	2	1
H51		1	2		1
P11	1	1	2	2	
P51		1	2		
Y11	1	1	2	2	
Y51		1	2		
C11	4	3	4	5	1
C51	4			5	1
R11	1	1	2	2	
X11	1	1	2	2	
B11	1	1	2	2	
B51		1	2		
L21	1	1	1	2	2
R21	1	1	1	3	
J15	1	1	2	3	
J75	1	1			
A51	1	1			
C21	6	6	6	6	4

Valve Dimensions

Dimensions in millimetres

Valve with two solenoids

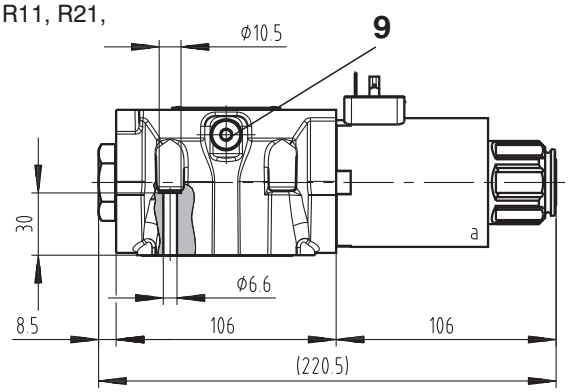


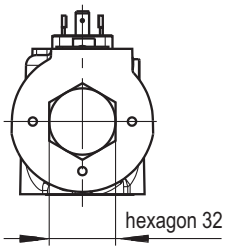


Required surface finish of interface.

Valve with one solenoid "a"

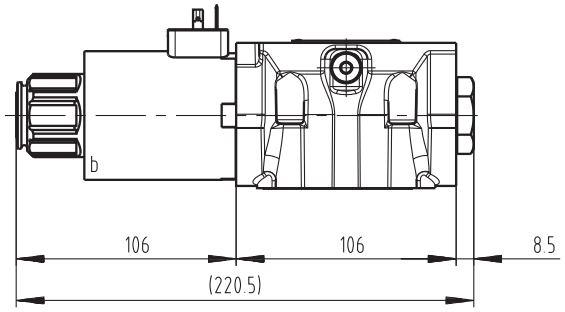
Functional symbols R11, R21, Y51, C51, Z51, H51,





Valve with one solenoid "b"

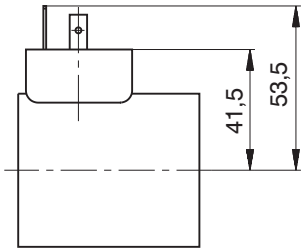
Functional symbols C11, H11



1 Solenoid a
2 Solenoid b
3 Manual override
4 Name plate
5 Square ring 12,42 x 1,68 (5 pcs.) supplied with valve
6 4 mounting holes
7 Retaining nut of the solenoid
8 Electrical connector, EN 175301-803
9 Throttle screw
10 Space reguired to remove connector

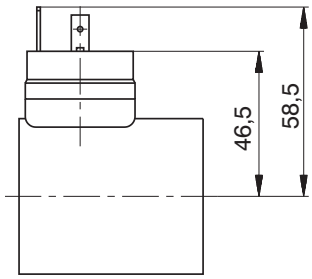
Type of the Solenoid Coil

E1



Solenoid coil with terminal for the electrical connector, EN 175301-803

E5

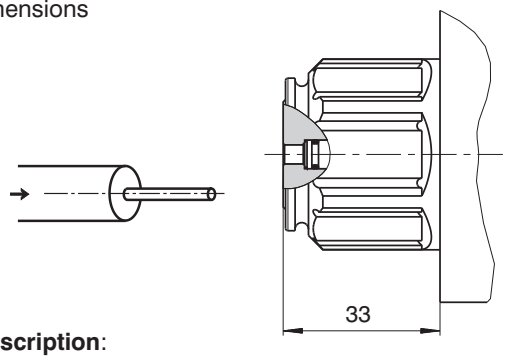


Solenoid coil with integrated rectifier and terminalfor electrical connector, EN 175301-803

Manual Override

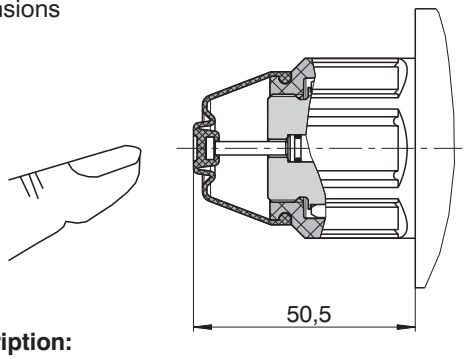
Standard	Rubber boot

Without designation
Dimensions



Description:
Standard model of the manual override.
Standard retaining nut of the solenoid.

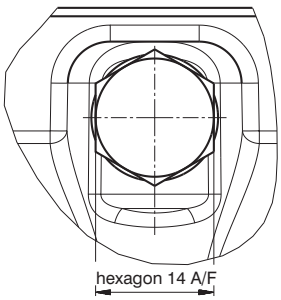
Designation **N2**
Dimensions

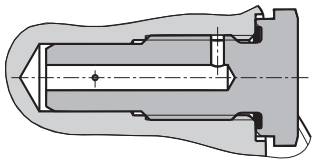


Description:
Manual override protected by rubber boot.

Soft Shifting Spool Options Delay Time

T2 - Noozle ∅ 0,6

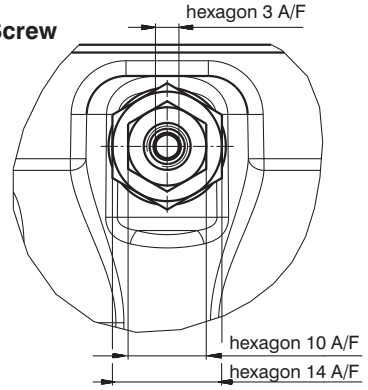


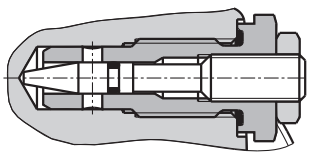


The orifice extends the valve shifting time.

Switching times		
Switching time, on and off	ms	120 ... 350

T3 - Throttle Screw



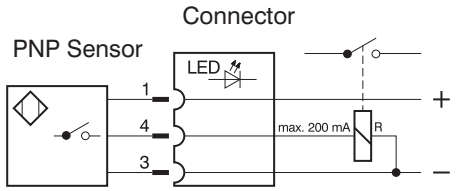


The control orifice allows for stepless adjustment of the valve shifting time.

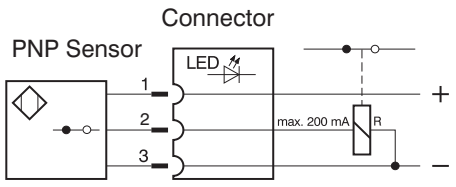
Switching times		
Switching time, on and off	ms	30 ... 2000

Spool Position Sensor

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



S4 - Circuit diagram of the normally-closed sensor

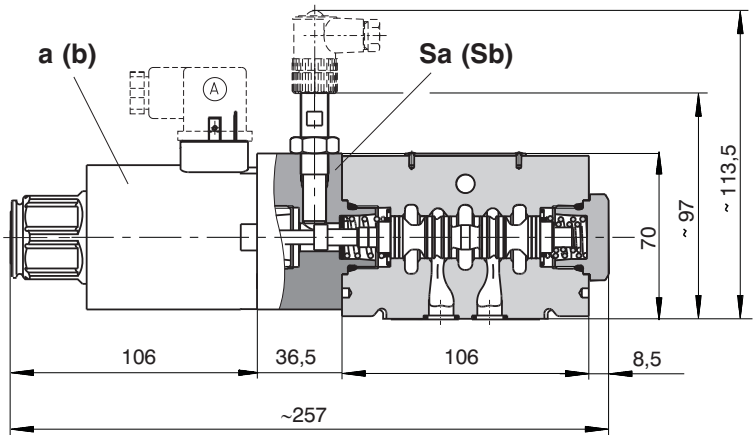


The proximity sensor transforms the spool position into an electrical step signal. It can be used with directional control valves with one or two solenoids.

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	
Enclosure type of sensor to EN 60529		IP 67	
Max. operating pressure	bar	50	210
Switching frequency	Hz	1000	
Ambient temperature range	°C	-25 ... +80	
Technical Data of the Connector			
Power supply voltage range	V	10 ... 30 DC	
Ambient temperature range	°C	-25 ... +80	
Indication		yellow LED	

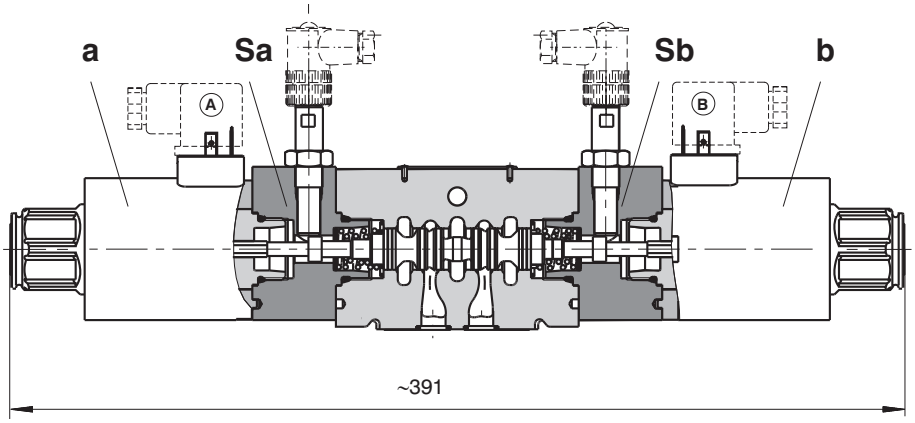
Two-Position Directional Control Valve Dimensions in millimeters

Signal of solenoid a (b)	Signal of sensor Sa (Sb)		LED	
	S1, S2 - normally-open	**S4** - normally-closed	**S1, S2**	**S4**
0	1	0	ON	OFF
1	0	1	OFF	ON

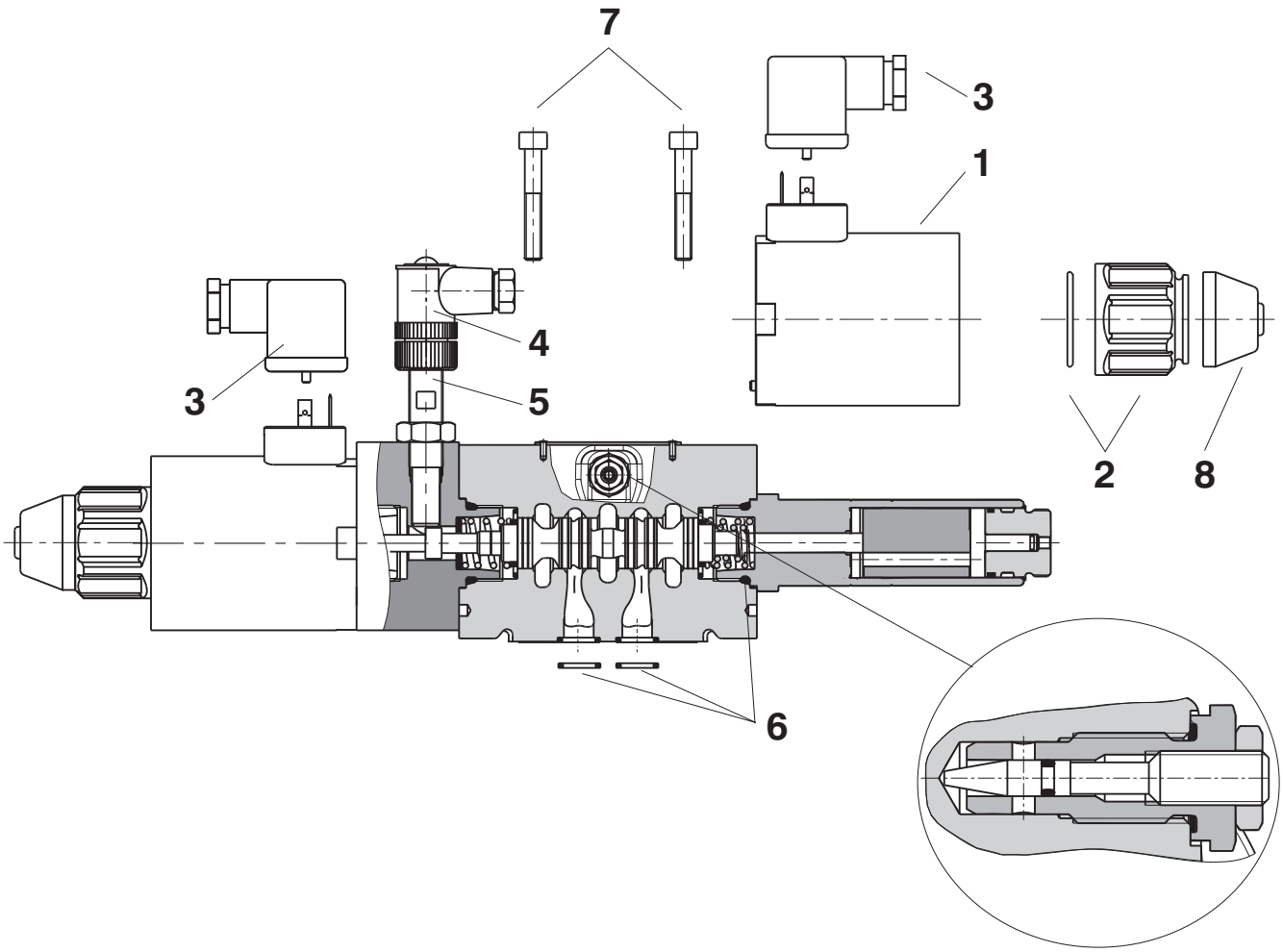


Three-Position Directional Control Valve Dimensions in millimeters

Signal of solenoid		Signal of sensor Sa (Sb)				LED			
		S1, S2 - normally-open		**S4** - normally-closed		**S1, S2**		**S4**	
a	b	Sa	Sb	Sa	Sb	Sa - LED	Sb - LED	Sa - LED	Sb - LED
0	0	1	1	0	0	ON	ON	OFF	OFF
1	0	0	1	1	0	OFF	ON	ON	OFF



Spare Parts



1 Solenoid coil
2 Nut with seal
3 Electrical connector
4 Connector of position sensor with LED
5 Sensor
6 Seal kit
7 Mounting bolts
8 Rubber cap with manual override

Solenoid coil

Type designation of the coil voltage	Type of the coil	
	E1	E5
	Ordering number	
01200	16195700	
02400	16196100	
20500	23898000	
23050		16195100
12060		17366300

Solenoid retaining nut with seal

Type of the nut	Seal ring	Ordering number
Standard nut	30 x 2	15900800
Rubber cap with manual override		15900900

Connector of position sensor

Type designation	Model	Max. input voltage	Ordering number
K02	connector of position sensor with LED	10...30 V DC	17364800
S1	normally-open sensor	10...30 V DC	405111129213
S2	normally-open sensor	10...30 V DC	18838900
S4	normally-clsed sensor	10...30 V DC	20725300

Seal kit

Type	Dimensions		Ordering number
	Square ring	O-ring	
Standard NBR70	12,42 x 1,68 (5 pcs.), 11,9 x 8,4 x 1 (1 pc.)	23,81 x 2,62 (2 pcs.), 1,8 x 1 (1 pc.)	15901000
Viton	12,42 x 1,68 (5 pcs.), 11,9 x 8,4 x 1 (1 pc.)	23,47 x 2,62 (2 pcs.), 1,8 x 1 (1 pc.)	15901100

Mounting bolts

Dimensions	Tightening torque	Ordering number
M6 x 40 DIN 912-10.9 (4 pcs.)	14+2 Nm	15847700

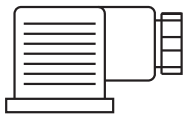
Soft Shift Conversion Kit

T2	10 Nm	15901200
T3	10 Nm	15901300

Electrical connector, EN 175301-803

Type designation	Connector **A grey**	Connector **B black**
	Ordering number	
K1	16202200	16202100
K5	16202600	16202500
K2	16202800	16202700
K3	16202400	16202300
K4	16203000	16202900

Electrical Connector, EN 175301-803

K1	Connector B (black) Connector A (grey)	without rectifier - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC/DC	
K5	Connector B (black) Connector A (grey)	without rectifier - M16x1.5 (bushing bore ∅ 4-6 mm)	230 V AC/DC	
K2	Connector B (black) Connector A (grey)	without rectifier with LED and quenching diode - M16x1.5 (bushing bore ∅ 6-8 mm)	12 ... 24 V DC	
K3	Connector B (black) Connector A (grey)	with rectifier - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC	
K4	Connector B (black)	with rectifier with LED and quenching diode - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC	

Recommended solenoid coils used with electrcial connector with rectifiers - type designation K3, K4

Rated supply source voltage (permissible rated voltage variation ±10 %)	Type designation of the solenoid voltage
230 V AC / 0.17 A / 50 (60) Hz	20500

Preffered Types

Type	Ordering number	Type	Ordering number
RPE4-103Z11	15888500	RPE4-103Z11/02400E1	15889500
RPE4-102Z51	15892000	RPE4-102Z51/02400E1	15892300
RPE4-103C11	15888700	RPE4-103C11/02400E1	15890000
RPE4-102C51	15892100	RPE4-102C51/02400E1	15892500
RPE4-103H11	15889000	RPE4-103H11/02400E1	15892700
RPE4-103Y11	15888900	RPE4-103Y11/02400E1	15893100
RPE4-102R11	15889100	RPE4-102R11/02400E1	15890700
RPE4-102R21	15889200	RPE4-102R21/02400E1	15893400
RPE4-102Y51	15892200	RPE4-102Y51/02400E1	15893700
RPE4-103Z11/01200E1	15891600	RPE4-103Z11/23050E5	21867800
RPE4-102Z51/01200E1	15891200	RPE4-102Z51/23050E5	21868300
RPE4-103C11/01200E1	15891700	RPE4-103C11/23050E5	21868500
RPE4-102C51/01200E1	15891500	RPE4-102C51/23050E5	21868800
RPE4-103H11/01200E1	15891000	RPE4-103H11/23050E5	21862100
RPE4-103Y11/01200E1	15890400	RPE4-103Y11/23050E5	21868900
RPE4-102R11/01200E1	15891900	RPE4-102R11/23050E5	21869400
RPE4-102R21/01200E1	15891300	RPE4-102R21/23050E5	21869900
RPE4-102Y51/01200E1	15891400	RPE4-102Z51/23050E5	21870100

Caution!

- In the case of directional valves with two solenoids, any of the solenoids may be energized, but only after switching off the other.
- Directional valves with other functional symbols as those shown in the table, please consult with the manufacturer.
- The packing foil is recyclable.
- The protective plate can be returned to manufacturer.
- Mounting bolts M6 x 40 DIN 912-10.9 or studs must be ordered separately.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.
- For RPEW4-10 with CSA only: Use supply wires suitable for at least 75°C.

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www.argo-hytos.com

ARGO HYTOS

Directional Control Valves Solenoid Operated with 8W Coil

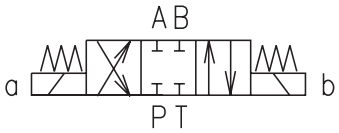
RPEA3-06

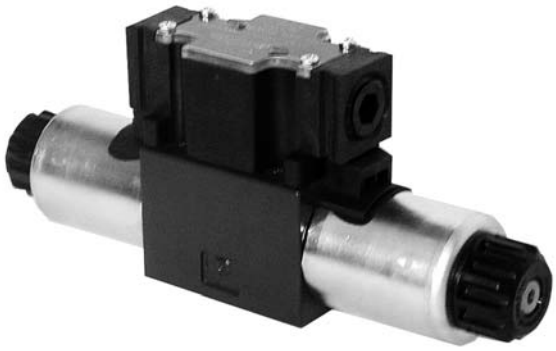
Size 06 (D 03) • 350 bar (5076 PSI) • 80 L/min (21 GPM)

HA 4029
04/2011

Replaces
HA 4029 12/2007

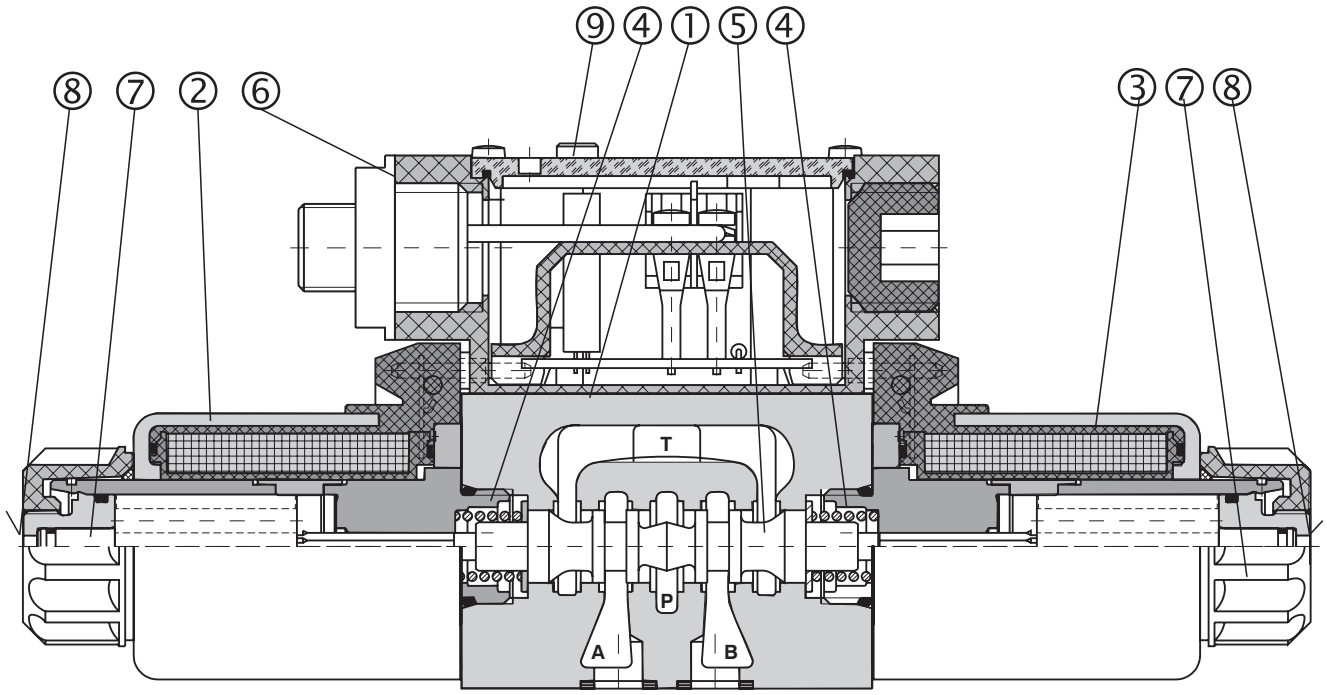
- **4/3-, 4/2- way directional control valves**
- **Enclosure type to IP65**
- **Push button manual override**
- **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**
- **Subplates see data sheet HA 0002**





Functional Description

The RPEA3 directional control valves consist of housing (1), a control spool (5) with two centering springs (4), cylindrical operating solenoids (2, 3), electric wirebox (9) and connector (6).
The three-position directional control valves are fitted with two solenoids and two springs. Two-position directional control valves have either one solenoid and one return spring or two solenoids and a detent assembly.
The solenoids are supplied with DC voltage through the Ports on the wirebox optional on both sides or through Connector Item (5 - Pin) M12, see wiring diagram (page 6). The wires are connected to a terminal plate inside the wirebox. Optional lights are installed on this terminal plate for shift indication. The lights are visible as raised arrows on the valve label. The solenoids are retained by the Nut (7) and plug-in to the wirebox. Plug -in design allows easy removal without wire change.
In the case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override (8), provided the pressure in T- port does not exceed 25 bar (362,5 PSI).
The valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



Ordering Code

RPEA3-06 □ □ / □ □ □ □ □ □ □ □

Solenoid - Operated Directional Control Valves with 8W Coil

Nominal Size

Number of Valve 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**

Type of Solenoid Coil for Wiring Box (Plug-In-Coil)

DC solenoid 8W	**EW1**

Type of Wirebox

Wirebox for DC and AC	**K**

Solenoid identification

no designation	standard ISO
A	US Standard ANSI-B93.9

Seals

no designation	NBR
V	FPM (Viton)

Orifice in P Port

no designation	without orifice
D1	∅1.0 mm (0.039 in)
D2	∅1.5 mm (0.059 in)
D3	∅2.0 mm (0.079 in)
D4	∅2.2 mm (0.087 in)
D5	∅2.5 mm (0.098 in)

Manual Override

no designation	standard
N1	covered with retaining nut
N2	covered with rubber boot

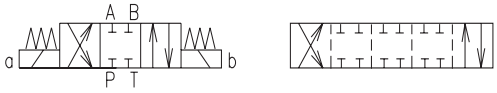
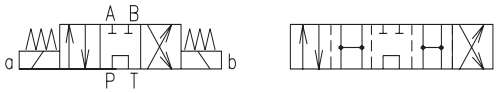
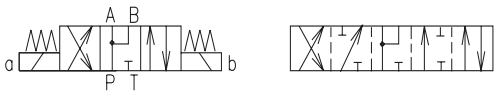
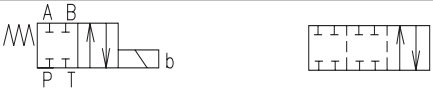
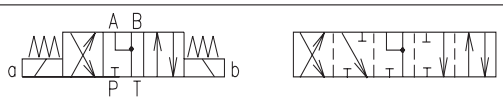
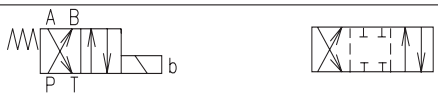
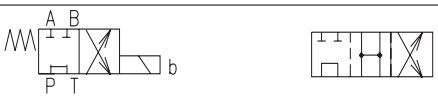
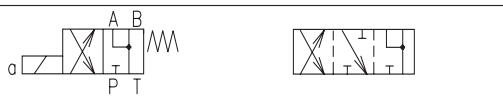
Wirebox Configurations

63	Wiring box with 5 PIN connector M12 mounted on A-side (B-side pluged)
64	Wiring box with 5 PIN connector M12 mounted on B-side (A-side pluged)
65	Wiring box with 5 PIN connector M12 mounted on A-side with LED diode (B-side pluged)
66	Wiring box with 5 PIN connector M12 mounted on B-side with LED diode (A-side pluged)

Technical Data

Valve size	mm (US)	06 (D 03)
Maximum flow	L/min (GPM)	see p-Q characteristics
Max. operating pressure at porte P, A, B	bar (PSI)	350 (5076)
Max. operating pressure at port T	bar (PSI)	210 (3000)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range for NBR seals	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range for FPM seals	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature max.	°C (°F)	+50 (+122)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Max. allowable voltage variation	%	DC: ±10
Max. switching frequency	h^{-1}	15 000
Switching time, on: at ν=32 mm^2/s (156 SUS)	ms	DC: 30 ... 50
Switching time, off: at ν=32 mm^2/s (156 SUS)	ms	DC: 10 ... 50
Duty cycle	%	100
Service life	cycles	10^7
Enclosure type to EN 60529		IP 65
Weigt - valve with 1 solenoid - valve with 2 solenoids	kg (lbs)	1,3 (2.9) 1,9 (4.2)
Mounting position		unrestricted

Functional Symbols

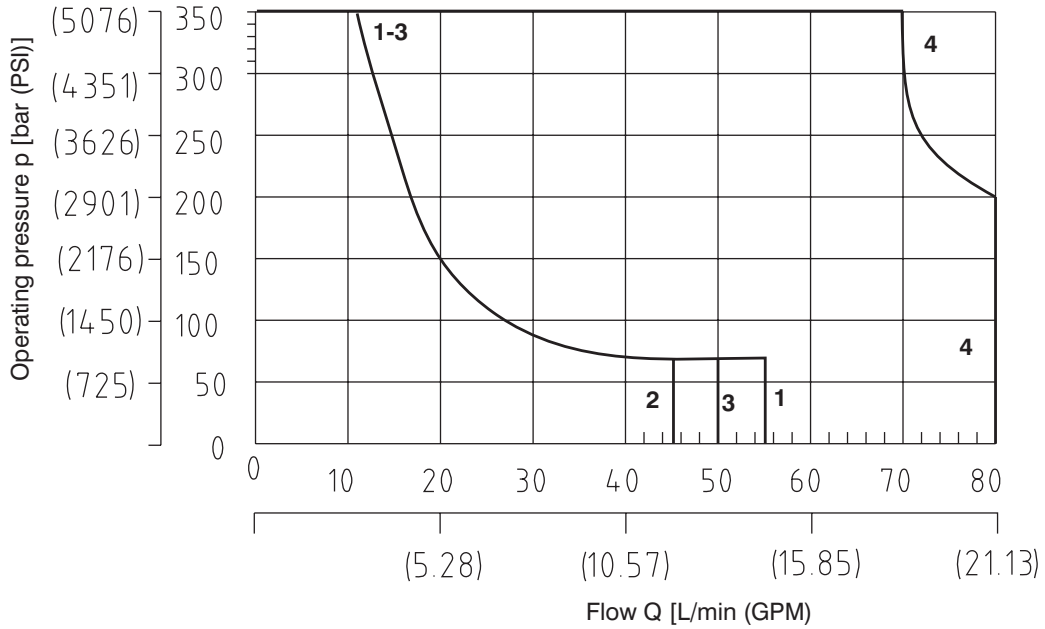
Type	Symbol	Crossover	Type	Symbol	Crossover
Z11			C51		
C11			Z51		
P11			Z11		
Y11			X11		
R11			C11		
P51			Y11		
Y51			P11		

Note: Contrary to the European Norm, the US Standard ANSI-B93.9 states that the solenoid routing on energizing the oil flow to port **A** be marked with **a**, and the solenoid routing on energizing the oil flow to port **B** be marked with **b**. This rule is valid independently from the solenoid lay-out.

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve.

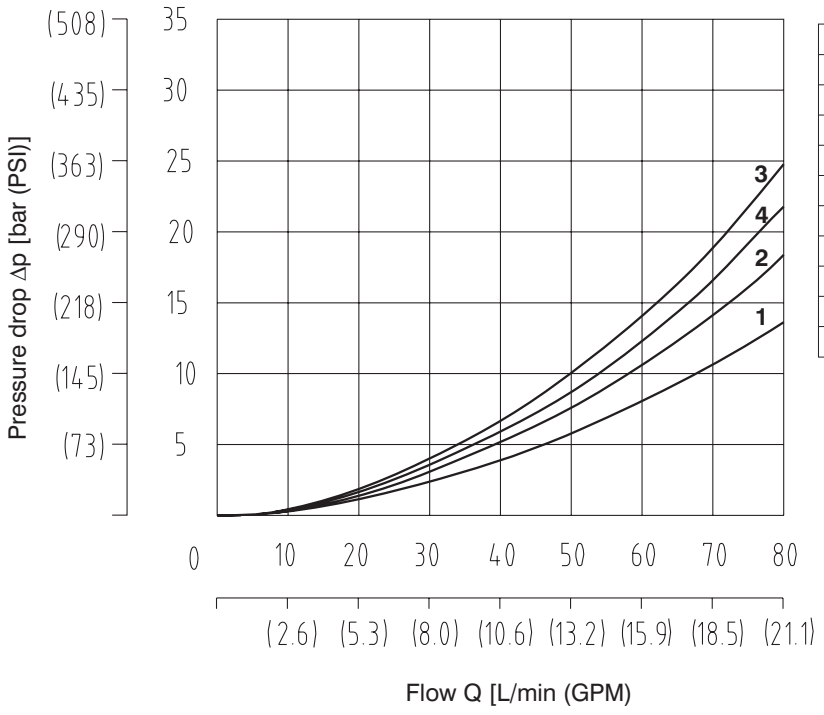


Z11	C11	P11	Y11	R11	P51	Z51	C51	X11	Y51
1	3	4	1	2	4	1	3	2	1

Δp-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Pressure drop Δp related to flow rate.



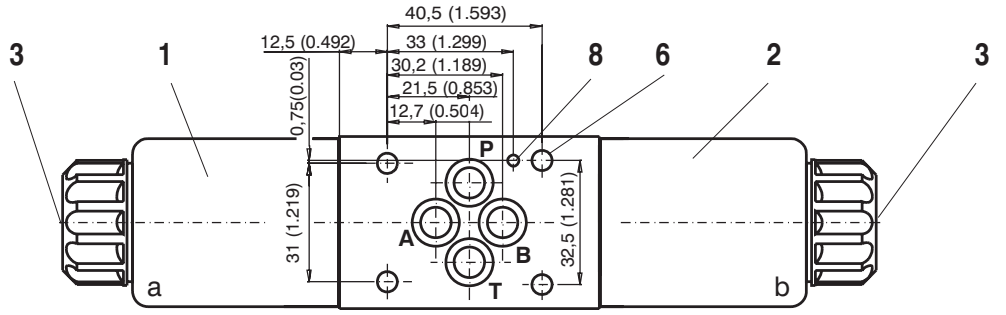
	P-A	P-B	A-T	B-T	P-T
Z11	2	2	2	2	
C11	2	2	2	2	3
P11	2	2	4	4	
Y11	2	2	1		
R11	2	2	4	2	
X11	2	2	4	2	
Z51		2	2		
C51	2			2	3
P51		1	1		
Y51		2	4		

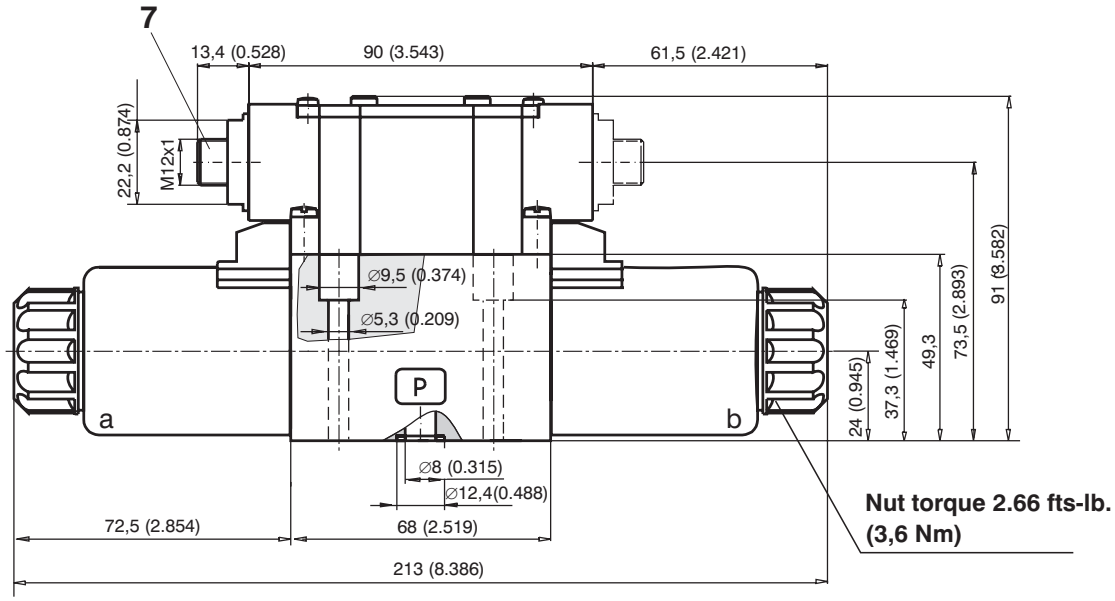
Valve Dimensions

Dimensions in millimeters (inches)

FIRST-ANGLE PROJECTION

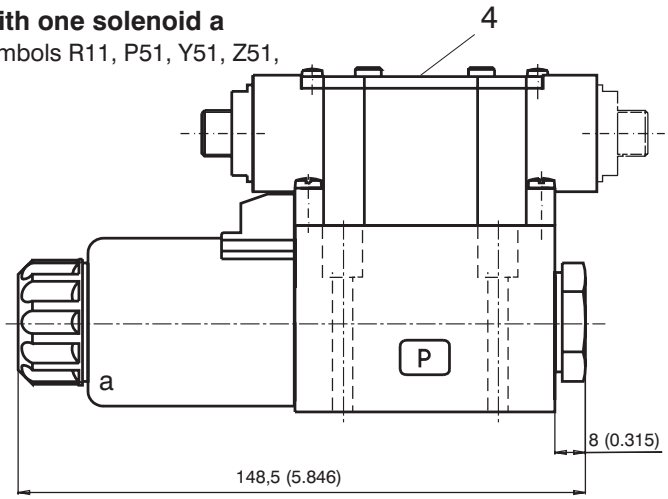
Valve with two solenoids





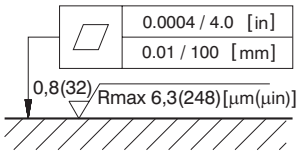
Valve with one solenoid a

Spool symbols R11, P51, Y51, Z51, C51



1 Solenoid a*
2 Solenoid b*
3 Manual override
4 Name plate
5 Square ring (4 pcs.)
0.36 x 0.66 (9.25 x 1.68 mm)
supplied with valve
6 4 mounting holes
7 Electrical connector
8 Pin hole

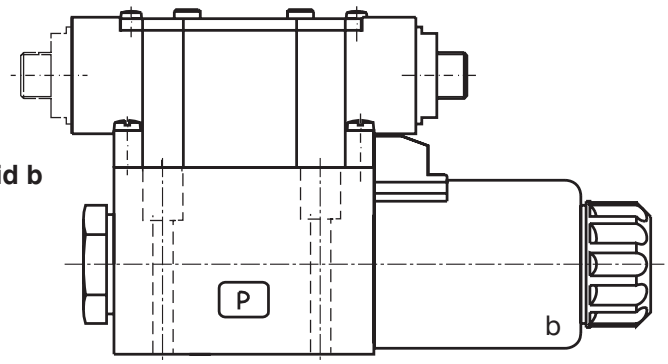
***Note:** On valves with solenoid identification according to US Standard ANSI-B93.9 can the solenoid designation vary from this arangement, this is based on the function symbol.



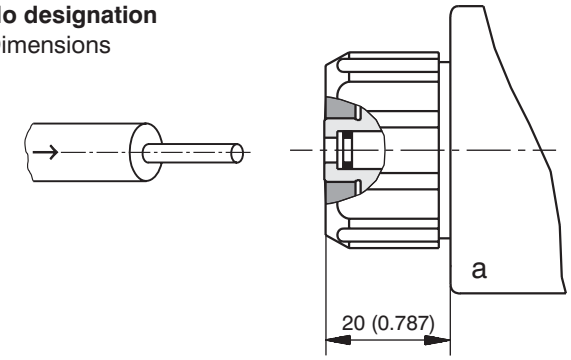
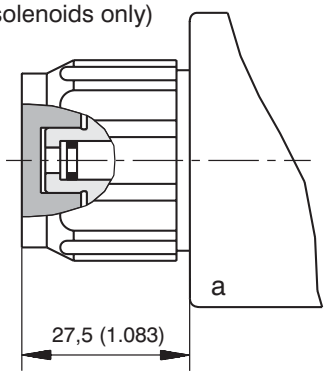
Required surface finish of interface

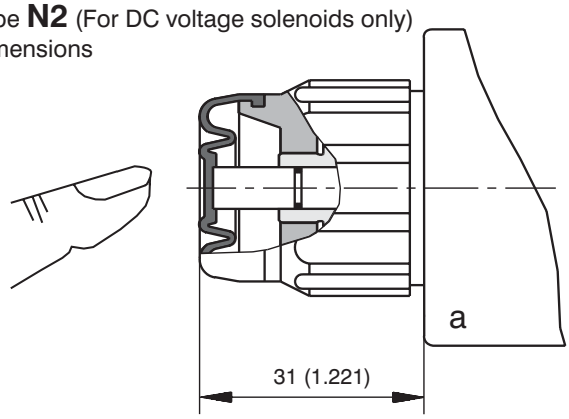
Valve with one solenoid b

Spool symbols
X11, Z11, C11, Y11, P11

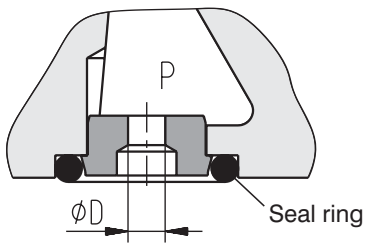


Manual Override

STANDARD	CLOSED NUT
No designation Dimensions  Standard model of the manual override. Standard retaining nut of the solenoid.	Type **N1** (For DC voltage solenoids only) Dimensions  Manual override with retaining nut. Can be used after removing nut.

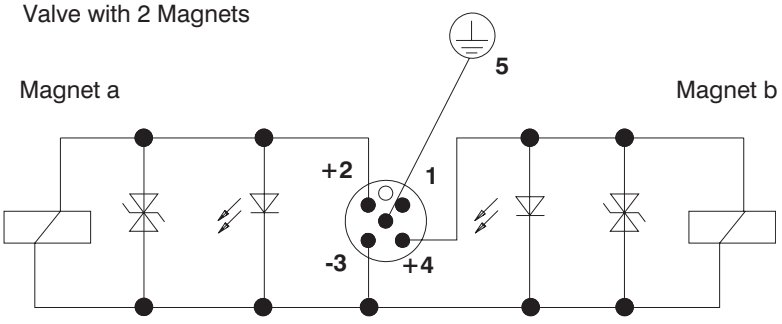
RUBBER BOOT	
Type **N2** (For DC voltage solenoids only) Dimensions  Manual override protected by rubber boot.	

Orifice in P-Port

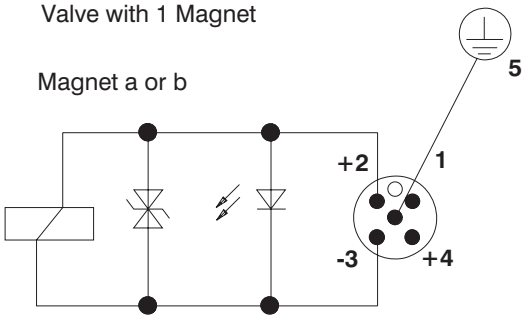
Type	∅D mm (inch)	Dimensions	Description
D1	1,0 (0.039)		P-Port orifices limit the flow into the directional control valve. **Attention:** When the orifice in P port is additionally mounted the standard used square ring NBR is replaced with O-ring from Viton.
D2	1,5 (0.059)		
D3	2,0 (0.079)		
D4	2,2 (0.087)		
D5	2,5 (0.098)		

Connector - M12

Pin - location
Valve with 2 Magnets

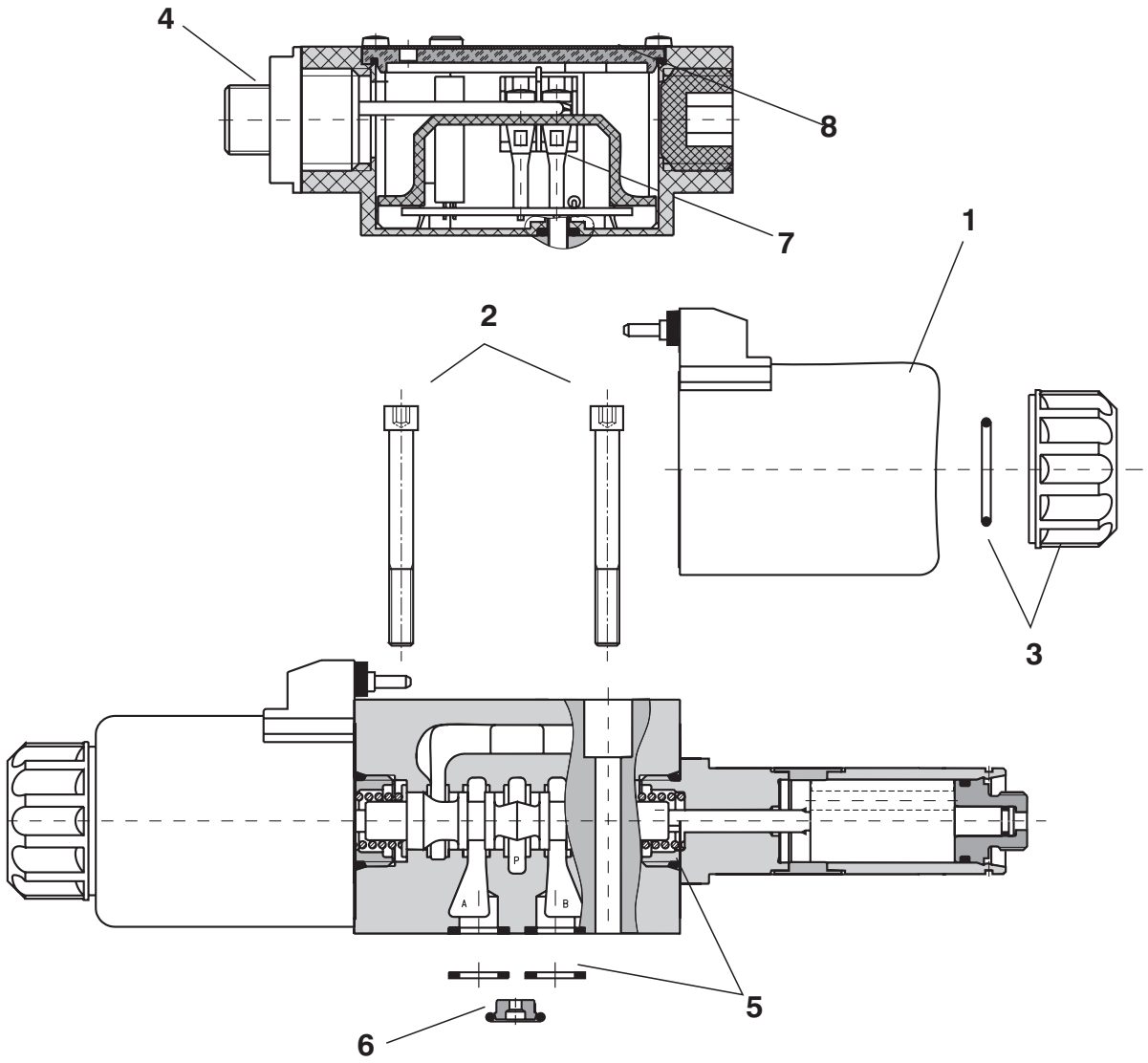


Pin - location
Valve with 1 Magnet



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 always Pin 2 for the a-Solenoid and Pin 4 for the b-Solenoid. This is independent from the actual physical location of the solenoid.

Spare parts



1 - Solenoid coil (DC solenoid)
2 - Mounting bolts
3 - Nut with seal (Nut torque 3 Nm (2.21lbf)
4 - Connector M12
5 - Seal kit
6 - Orifice in P port with seal ring
7 - Terminal plate
8 - Wiring box

Wiringbox	
Type	Ordering number
Wiring box without terminal plate	16203600

Terminal Plates	
Type	Ordering number
Terminal plate 24V - preventive A+B	28572900
Terminal plate 24V - preventive A	24007600
Terminal plate 24V - preventive B	28572800
Terminal plate 24V - LED diode and preventive A+B	24007700
Terminal plate 24V - LED diode and preventive A	24007800
Terminal plate 24V - LED diode and preventive B	28572800

Solenoid Coil		
Voltage rating	Type	Ordering number
24 V DC	EW1	24014000

Solenoid Retaining Nut with Seal		
Type of the nut	Seal ring	Ordering number
Standard nut	22 x 2	15844600
Closed nut (DC only)		15844700
Nut with rubber boot (DC only)		15844800

Electrical Connector M12	
Type	Ordering number
Male 5 PIN	24007900

Orifice in P-Port			
Type	∅D mm (inch)	Seal ring	Ordering number
D1	1.0 (0.039)	9.25 x 1.75	15845600
D2	1.5 (0.059)		15845700
D3	2.0 (0.079)		15845800
D4	2.2 (0.087)		15846000
D5	2.5 (0.098)		15845900

Seal Kit				
Type	Dimensions, quantity			Ordering number
Standard - NBR70	9.25 x 1.68 (4 pcs.)	17 x 1.8 (2 pcs.)	9.25 x 1.75 (1 pc)	21483800
Viton	9.25 x 1.78 (4 pcs.)	17.17 x 1.78 (2 pcs.)		15845400

Bolt Kit (for studs see HU 0030)		
Dimensions, quantity	Bolt torque	Ordering number
M5 x 45 DIN 912-10.9 (4 pcs.)	8.9 Nm (6.6 lbf)	15845100

Caution!

- When the distributor contains two electromagnets any of the two electromagnets can be switched on only after the other one switches off.
- Distributors with other interconnections than those shown in the catalogue can be supplied on request.
- The packaging foil can be recycled
- The transport base plate can be returned to the manufacturer.
- Mounting screws M5 x 45 DIN 912-10.9 or bolts must be ordered separately.
  The screws tightening torque is 8.9 Nm (6.6 ft-lbs).
- The mentioned data only serve to describe the product and in no case are to be understood in terms of law as guaranteed characteristics.

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4/2 and 4/3 Way Directional Control Valves Pilot Operated

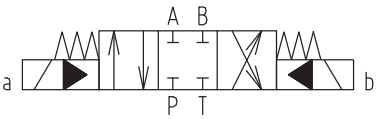
RPEH4-25

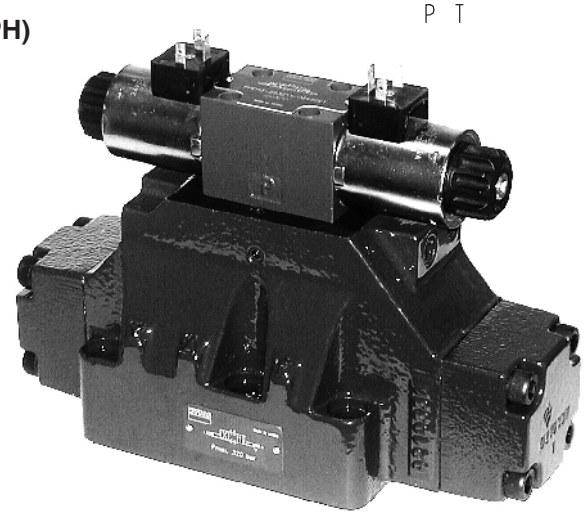
Size 25 (D 08) • 320 bar (4600 PSI) • 600 L/min (159 GPM)

HA 4024
6/2012

Replaces
HA 4024 12/2007

- ❑ **Solenoid pilot operated directional valves (RPEH)**
- ❑ **Hydraulic pilot operated directional valves (RPH)**
- ❑ **Small energy input**
- ❑ **Manual overrides optional (only for RPEH)**
- ❑ **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**

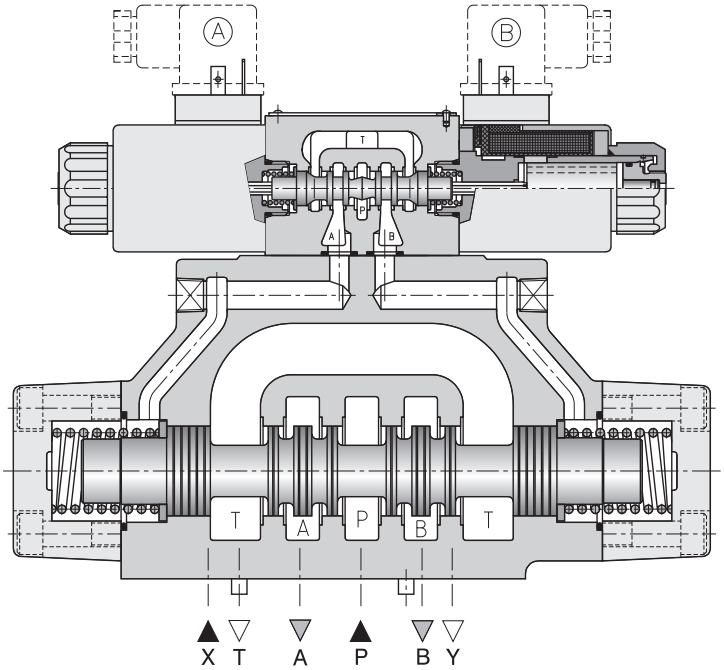




Functional Description

The RPEH solenoid operated - hydropiloted valves are consisting of an RPE3-06 type solenoid operated directional control valve (see data sheet HA 4010) that operates a 4-way hydropiloted control valve with a connection surface in accordance with the ISO 4401 standards. They are available in various configurations and spool types.
The pilot and the drain connections can be made internal or external by inserting or removing the accordant threaded plugs located in the main directional control valve.

A wide range of configurations and different solenoid operated - hydropiloted directional control valve spool positions are available:
– 4-way, 3-position directional control valve, with two solenoids; positioning of the spool in center position is obtained with centering springs.
– 4-way, 2-position directional valve, with one solenoid and one return spring or two solenoids and detent of the spool position.
The basic surface treatment of the valve housing is phosphate coated and the solenoids are zinc coated.



Ordering Code

RP ☐ **4-25** ☐ ☐ / ☐ ☐ ☐ / ☐ /**33-** ☐ ☐ ☐ / ☐

Directional Control Valve Pilot Operated

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

Design series

Valve size **25 (D 08)**

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

Functional symbols
see the table Functional Symbols

Controls
if not required **no designation**
main spool shifting speed control **D**
shifting speed control, with orifice (0.8 mm) in port P of solenoid pilot valve **PF**

Piloting
if not required **no designation**
external piloting (see note herebelow) **E**

Seals
no designation NBR
V FPM (Viton)

Manual overide
no designation standard
N1 covered with retaining nut
N2 covered with rubber boot

Type of solenoid coil
E1 with terminal for the connector*
E2 with integrated quenching diode and terminal for the connector*
E5 with integrated rectifier and terminal for the connector*
* from EN 1745301-803

Rated supply voltage of solenoids *
(at the coil terminals)

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

The AC coils correspond with E5 type.
* Other voltages per request.

Series number

Check valve incorporated on P-line
no designation if not required
C3 with check valve (see pages 5, 7)

Drain
no designation external drain which is recommended when the valve is used with back pressure on the outlet
I internal drain

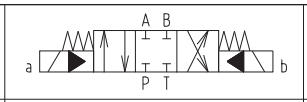
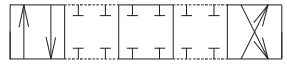
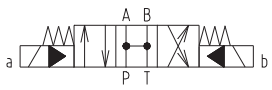
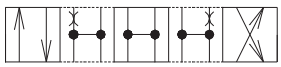
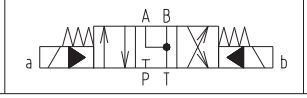
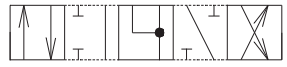
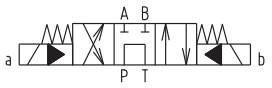
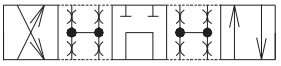
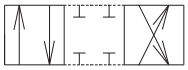
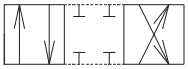
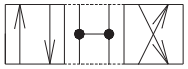
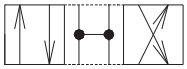
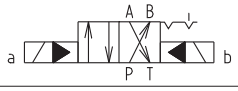
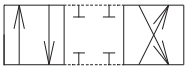
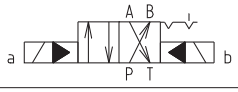
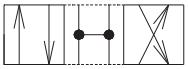
Note:
Piloting must always be external for valves with the H11 type pilot valve (available on request). Also valve must have external piloting for spools with P and T connected in the center position. Internal piloting is possible only with a C3 version valve (see page 7), or by installing a check valve with a setting of min. 5 bar on the outlet line. In this case the valve must have external drainage.
Piloting must always be external for valves with the **RPH** type hydraulic control valve (available on request).

Technical Data

Valve size	mm (US)	25 (D 08)
Maximum flow rate from port P to A, B, T	L/min (GPM)	600 (159)
Max. operating pressure ports P, A, B port T port T (external drain version)	bar (PSI)	 320 (4600) 210 (3000) 250 (3600)
Pressure drop	bar (PSI)	see Pressure Drop Δp-Q
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51 524
Fluid temperature range for NBR seals	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range for FPM seals	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature max.	°C (°F)	+50 (+122)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Service life	cycles	10^7
Enclosure type to EN 60 529		IP 65
Weigt - RPEH4-252 - RPEH4-253	kg (lbs)	15 (33) 15.6 (34.3)

Functional Symbols

Symbols are referred to the solenoid valve RPEH. For the hydraulic control version RPH please verify the connection scheme (see page 7).

Three positions with spring centering			Three positions with spring centering		
Z11			**H11**		
Y11			**C11**		
Two positions with return spring			**Two positions with return spring**		
R51			**X51**		
R52			**X52**		
Two positions with mechanical detent on pilot valve					
J17					
J27					

Besides the diagrams shown, which are the most frequently used, other special versions are available: consult our technical department for their identification, feasibility and operating limits.

Performance Characteristic

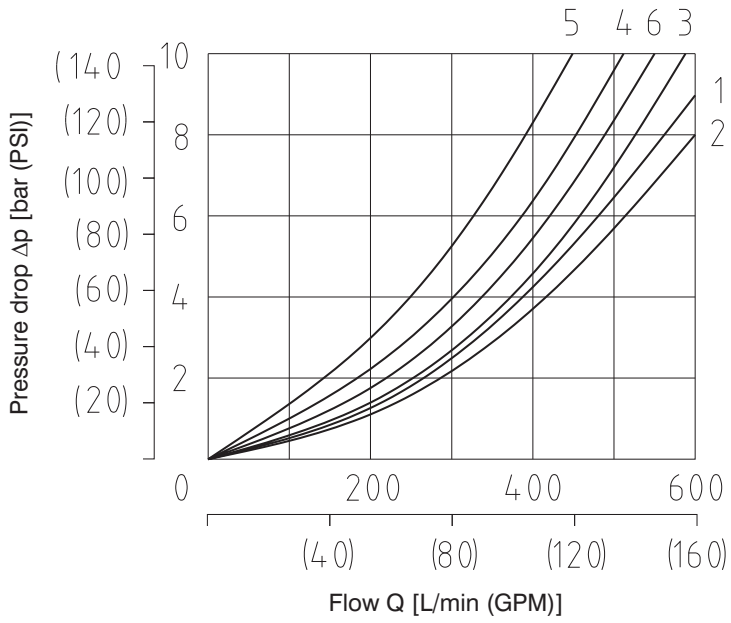
Pressures in bar (PSI)	MIN.	MAX.
Pilot pressure	5 (72.5)	210 (3045)
Pressure on line T with internal drain	-	140 (2030)
Pressure on line T with external drain	-	250 (3625)

Maximum flow rates in L/min (GPM)	PRESSURES	
	210 bar (3045 PSI)	320 bar (4640 PSI)
Spool type C11	500 (133)	450 (119)
All other spools	600 (159)	500 (133)

Pressure Drop Δp-Q

Measured at $\nu = 32\ mm^2/s$ (156 SUS) and t = 40 °C (104 °F)

Pressure drop Δp related to flow rate.



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

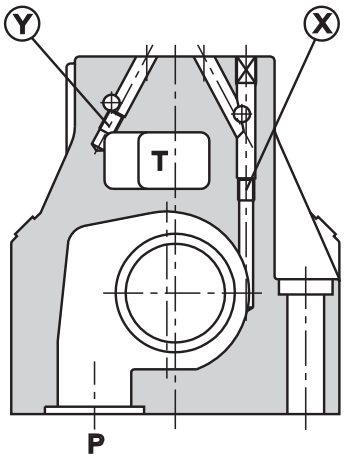
* A-B blocked • B blocked ° A blocked

Pilot and Drain

The RPEH 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.

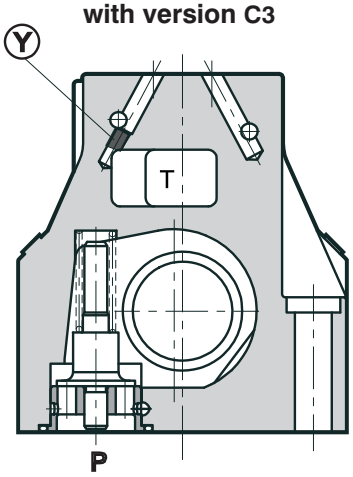
Type of valve		Plug assembly	
		X	Y
RPEH4-25/***	Internal pilot and external drain	NO*	YES
RPEH4-25/*I**	Internal pilot and internal drain	NO*	NO
RPEH4-25/*E**	External pilot and external drain	YES	YES
RPEH4-25/*EI**	External pilot and internal drain	YES	NO

***** C3 version is available only with internal pilot.



X: plug M6 x 8 for external pilot
Y: plug M6 x 8 for external drain

with version C3



Y: plug M6 x 8 for external drain

Electrical Features

Solenoids
The operating solenoids are DC solenoids. For AC supply the solenoids are provided with rectifier which are integrated in the EN 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 the case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override, provided the pressure in T-port does not exceed 25 bar.

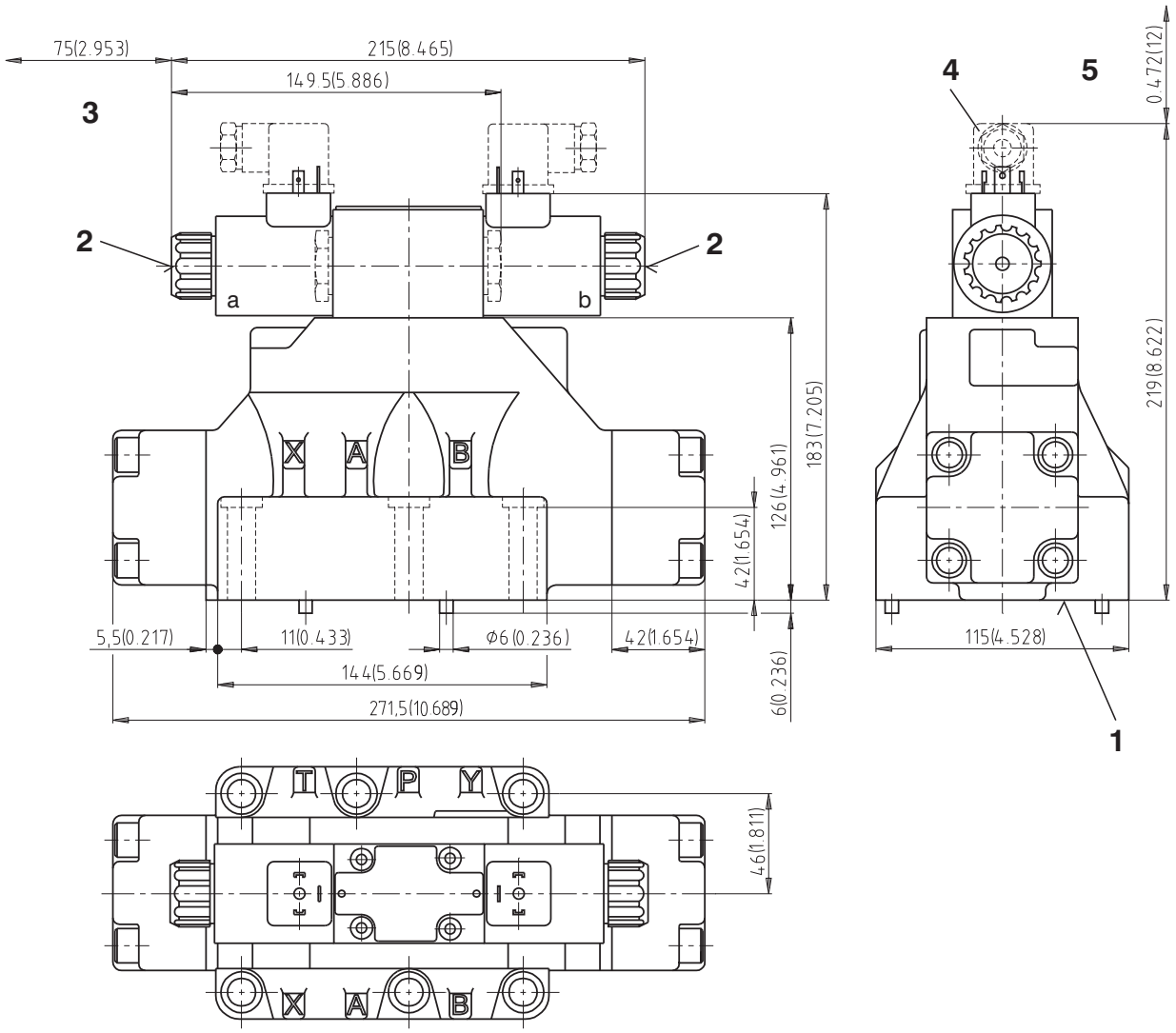
		DC solenoid	AC solenoid
Max. allowable voltage variation	%	-10 ... +6	±10
Max. switching frequency	1/h	8 000	
Switching times ±10 %, energizing (two position)	ms	75	60
Switching times ±10 %, de-energizing (two position)	ms	90	90
Switching times ±10 %, energizing (three position)	ms	55	45
Switching times ±10 %, de-energizing (three position)	ms	60	60
Duty cycle	%	100	
Enclosure type to EN 60 529		IP 65	

The values indicated refer to a solenoid valve operating with piloting pressure 100 bar, with mineral oil at a temperature of 40 °C, a viscosity of 32 mm^2/s and with PA and BT connections. The switch on times are obtained from the time the spool switches over. The switch off times are measured at the time pressure variation occurs in the line.

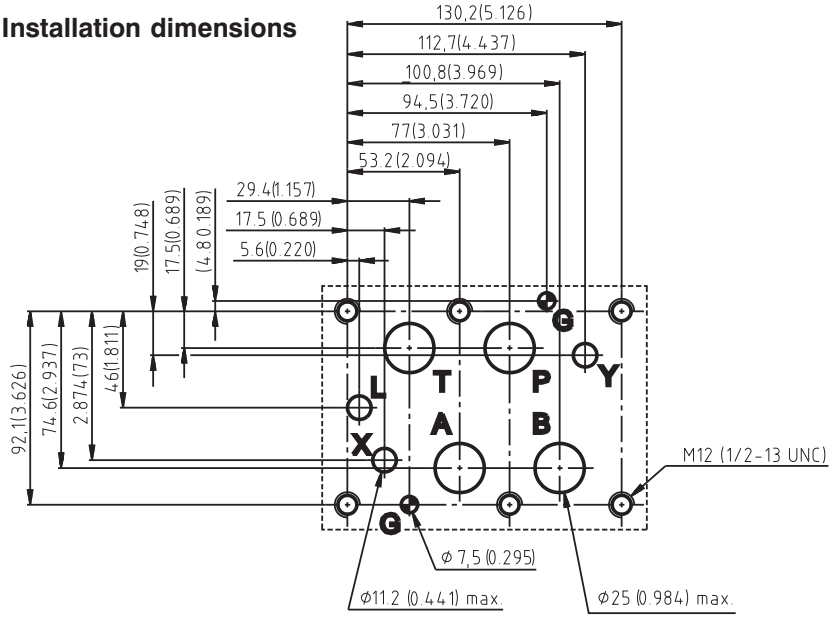
Valve Dimensions

Dimensions in millimetres (inches)

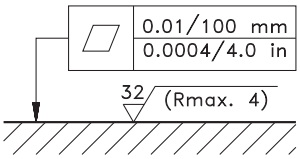
RPEH4-252, RPEH4-253



Installation dimensions



1 Mounting surface with seal rings
2 Manual override
3 Space required to remove coil
4 Electrical connector
(must be ordered separately)
5 Space required to remove connector

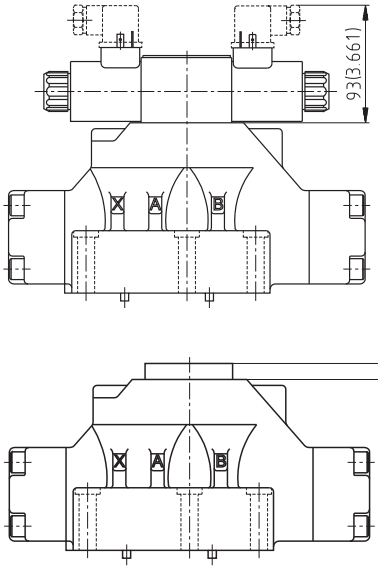


Required surface finish of interface

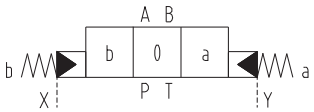
Single valve fastening:	6 bolts M12 x 60 *	* Bolts is not supplied
Bolt torque:	69 Nm (50.9 ft-lbf) - bolts A 8.8	
Threads of mounting holes:	M12 x 20 (1/2-13 UNC)	
Seal rings:	4 O-rings 29,82 x 2,62 2 O-rings 20,29 x 2,62	

Type of Command

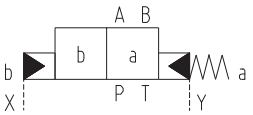
Solenoid control: RPEH
The valve is supplied with a pilot solenoid valve type RPE3-06.



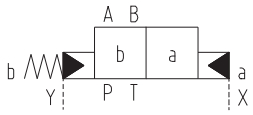
Hydraulic control: RPH
The valve is supplied with a cross-connection cover-plate. X and Y connections are used for the hydraulic control of the valve.



RPH4-253



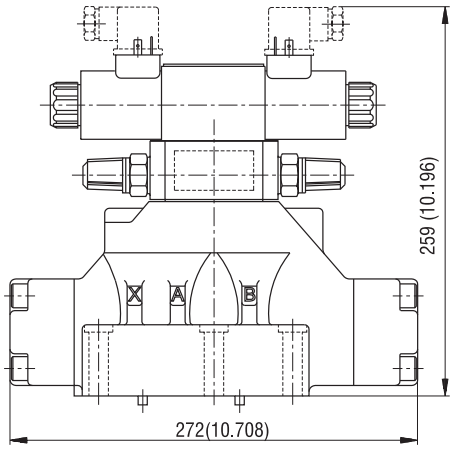
RPH4-252



RPH4-252

Controls

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



Manual Override

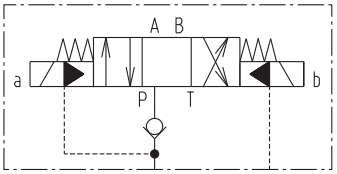
Whenever the solenoid valve installation may involve exposure to atmospheric agents or be used in tropical climates, the manual override, boot protection is recommended. Add the suffix **N1**or **N2** to request this device.

Electrical Connector

The solenoid valves are never supplied with connector. Connectors must be ordered separately.

Special Configurations C3

Check valve incorporated on line P: C3
Valve RPEH is available upon request with check valve incorporated on line P. This is particularly useful to obtain the necessary piloting pressure when the main control valve, in the rest position, has line P connected to the T outlet. The cracking pressure is 5 bar. Add **C3** to the identification code for this request.
C3 version is available only with internal pilot.



Installation

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. Valve fastening takes place by means of screws or tie rods, placing the valve on a flat surface, with values of planarity and smoothness that are equal to or better than those indicated in the drawing. If the minimum values of planarity or smoothness are not met, fluid leakages between valve and mounting surface can easily occur.

Spare Parts

Seal kit

Design		Dimensions, number			Ordering number
		O-ring	Square ring	Back-up ring	
Head vavle size 25 (D 08)	Standard - NBR	29,82 x 2,62 (4 pcs.)	-	-	21850300
		20,29 x 2,62 (2 pcs.)			
		40,94 x 2,62 (2 pcs.)			
		34,59 x 2,62* (1 pc.)			
	Viton	29,82 x 2.62 (4 pcs.)			21850400
		20.29 x 2,62 (2 pcs.)			
		40,94 x 2,62 (2 pcs.)			
		34,59 x 2,62* (1 pc.)			
Throttle valve 2VS3-06-CS type number 15929600	Standard - NBR	18 x 2,65 (2 pcs.)	9,25 x 1,68 (4 pcs.)	6,73 x 9,43 x 1,14 (2 pcs.)	15936300
		6,9 x 1,8 (2 pcs.)	-	17,83 x 22,19 x 1,14 (2 pcs.)	
	Viton	17,12 x 2,62 (2 pcs.)		9,43 x 6.73 x 1,14 (2 pcs.)	15936600
		9,25 x 1,78 (4 pcs.)		17,83 x 22,19 x 1,14 (2 pcs.)	
		6,75 x 1,78 (2 pcs.)		-	
Control valve	see data sheet ARGO-HYTOS - RPE3-06				

Mounting bolt

	Dimensions, number		Tightening torque	Ordering number
Fixation of extension of valve	Bolt M5 x 45	DIN 912-10.9 (4 pcs.)	8.9 Nm (6.6 ft-lbf)	15845100
	Bolt M5 x 98 - 8G	(4 pcs.)		16103700
	Nut M5			

Other

	Design	
Cover plate	PA, BT	15934200
	PB, TA	15933700

Caution!

- Service valve without range stated parameter consultation with manufacturer.
- Detaile information at control vavle - see data sheet RPE3-06, HA 4010
- The packing foil is recyclable.
- The protective plate can be returned to manufacturer.
- The technical information regarding the product presented in this data sheet is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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4/2 and 4/3 Way Directional Control Valves Pilot Operated

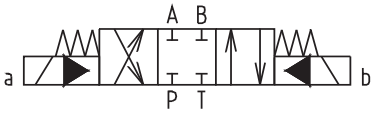
RPEH5-16

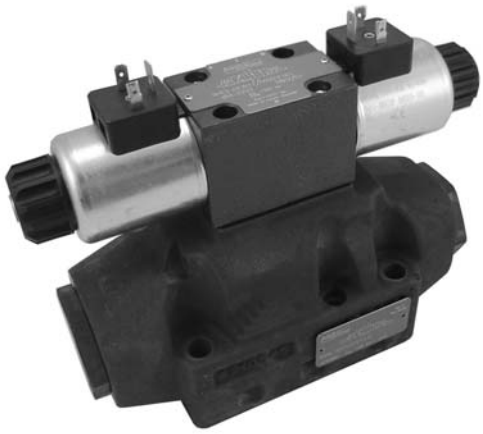
Size 16 (D 07) • 350/420 bar (5080/6090 PSI) • 300 L/min (80 GPM)

HA 4023
9/2014

Replaces
HA 4023 12/2007

- ❑ **Solenoid pilot operated directional valves (RPEH)**
- ❑ **Hydraulic pilot operated directional valves (RPH)**
- ❑ **Small energy input**
- ❑ **Manual overrides optional (only for RPEH)**
- ❑ **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**

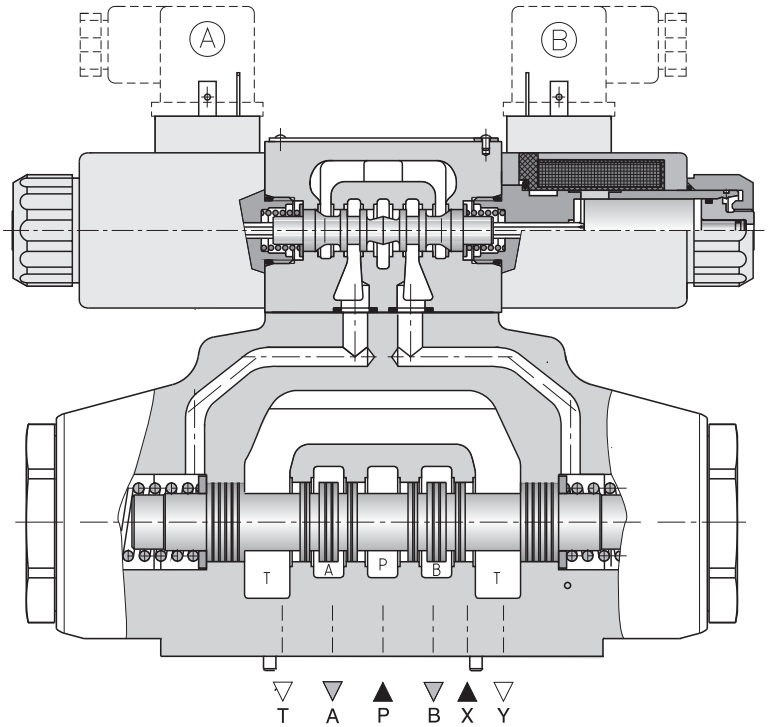




Functional Description

The RPEH solenoid operated - hydropiloted valves are consisting of an RPE3-06 type solenoid operated directional control valve (see data sheet HA 4010) that operates a 4-way hydropiloted control valve with a connection surface in accordance with the ISO 4401 standards. They are available in various configurations and spool types.
The pilot and the drain connections can be made internal or external by inserting or removing the accordant threaded plugs located in the main directional control valve.

A wide range of configurations and different solenoid operated - hydropiloted directional control valve spool positions are available:
– 4-way, 3-position directional control valve, with two solenoids; positioning of the spool in center position is obtained with centering springs.
– 4-way, 2-position directional valve, with one solenoid and one return spring or two solenoids and detent of the spool position.
The basic surface treatment of the valve housing is phosphate coated and the solenoids are zinc coated.



Ordering Code

RP □ □ **-16** □ □ / □ □ □ / □ / □ □ □ / □

Directional Control Valve Pilot Operated

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

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

Valve size

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

Functional symbols
see the table functional symbols

Controls
f not required **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**
External **E**
Internal with pressure reducing valve 30 bar fix setting **Z**

Seals
no designation NBR
V FPM (Viton)

Manual override
no designation Standard
N1 covered with retaining nut
N2 covered with rubber boot

Type of solenoid coil
E1 with terminal for the connector*
E2 with integrated quenching diode and terminal for the connector*
E5 with integrated rectifier and terminal for the connector*
* from EN 1745301-803-A

Rated supply voltage of solenoids *
(at the coil terminals)

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

The AC coils correspond with E5 type.
* Other voltages per request.

see HA 4010 for other pilot valve options

Check valve incorporated in P-line
no designation if not required
C3 with check valve (see page 3)

Drain
no designation External
I Internal

Note:
for spools H11 and C11 use check valve in P line – see option C3 page 7
Piloting must always be external for valves with the **RPH** type hydraulic control valve.

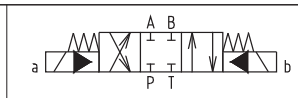
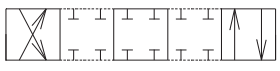
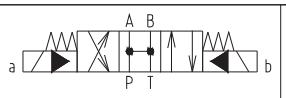
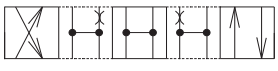
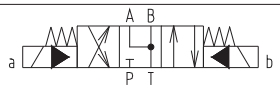
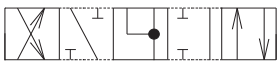
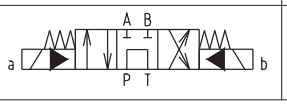
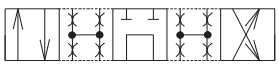
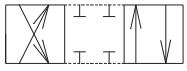
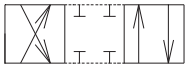
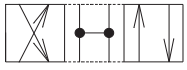
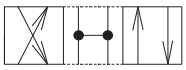
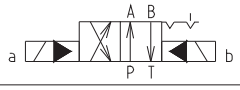
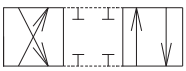
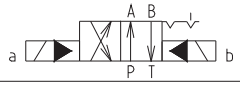
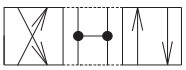
Technical Data

Valve type		RP*5-16	RP*5H-16
Valve size	mm (US)	16 (D 07)	
Maximum flow rate from port P to A, B, T	L/min (GPM)	300 (80)	
Max. operating pressure ports P, A, B - on line T with external drainage - on line T with internal drainage)	bar (PSI)	350 (5800) 210 (3000) 140 (2030)	420 (6090) 350 (5800) 140 (2030)
Minimum pilot pressure	bar (PSI	12 (174)	12 (174)
Maximum pilot pressure	bar (PSI)	210 (3043)*	350 (5800)*
Pressure drop	bar (PSI)	see Pressure Drop Δp-Q	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range for NBR seals	°C (°F)	-30 ... +80 (-22 ... +176)	
Fluid temperature range for FPM seals	°C (°F)	-20 ... +80 (-4 ... +176)	
Ambient temperature max.	°C (°F)	+50 (+122)	
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)	
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406	
Service life	cycles	10^7	
Enclosure type to EN 60529		IP 65	
Weigt - RPH5-16 - RPEH5-162 - RPEH5-163	kg (lbs)	6,6 (14.5) 8,2 (18) 8,8 (19.4)	

*) for higher system pressure use option Z

Functional Symbols

Symbols are referred to the solenoid valve RPEH. For the hydraulic control version RPH please verify the connection scheme (see page 7).

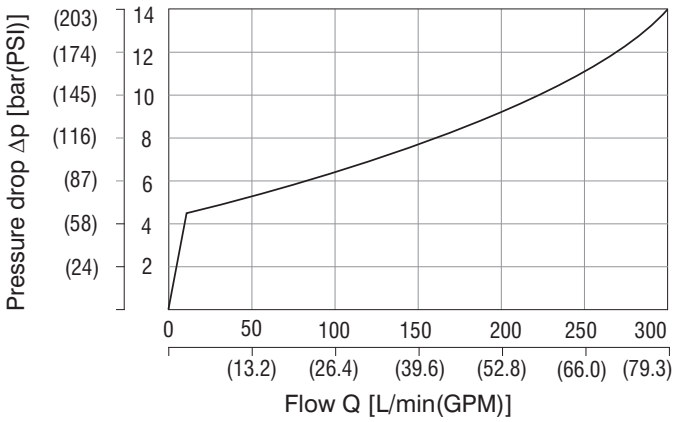
Three positions with spring centering			Three positions with spring centering		
Z11			**H11**		
Y11			**C11**		
Two positions with return spring			**Two positions with return spring**		
X51			**R51**		
X52			**R52**		
Two positions with mechanical detent on pilot valve					
J17					
J27					

Besides the diagrams shown, which are the most frequently used, other special versions are available: consult our technical department for their identification, feasibility and operating limits.

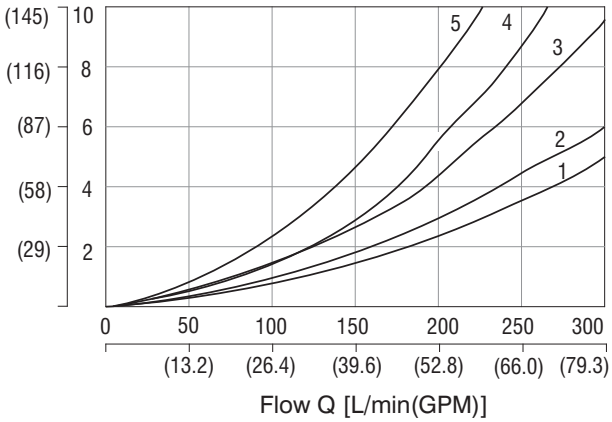
Δp-Q Characteristic

Measured at ν = 32 mm²/s (156 SUS) and t = 40 °C (104 °F)

Check valve - Pressure Drop Δp-Q



Spool types - Pressure Drop Δp-Q



This curve refers to the pressure drop (body part only) with option C3 (check valve in P port). This pressure drop must be added to the pressure drop of the reference spool

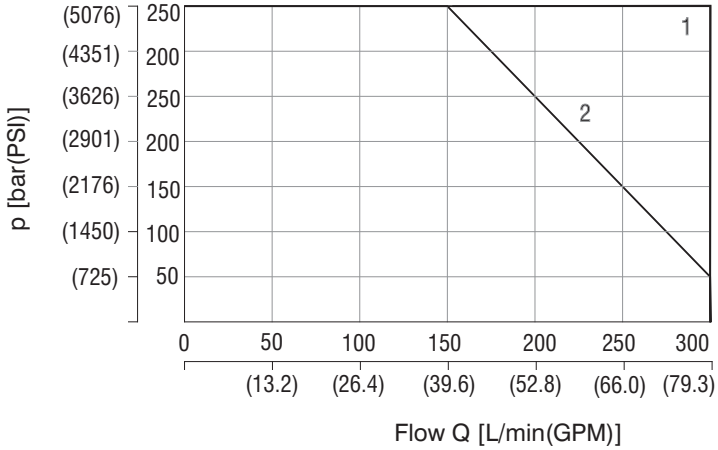
Spool type	Spool position	P - A	P - B	A - T	B - T	P - T
		Curves on graph				
Z11	Energized	1	1	3	4	
H11	Energized	1	1	4	4	
	De-energized					2
Y11	Energized	1	1	4	4	
	De-energized			4	4	
C11	Energized	2	2	4	5	
	De-energized					4
R51, R52		1	1	3	4	
X51, X52		1	1	4	4	
J17, J27		1	1	3	4	

Q Characteristic

Measured at ν = 32 mm²/s (156 SUS) and t = 40 °C (104 °F)1

Operating limits

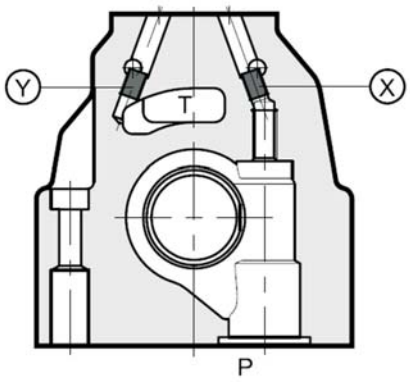
Spool type	P - A	P - B
	Curves on graph	
Z11	1	1
H11	1	1
Y11	1	1
C11	2	2
R51, R52	1	1
X51, X52	1	1
J17, J27	1	1



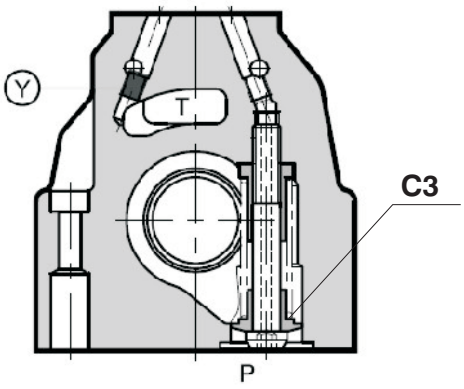
Pilot and Drain

The RPEH 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
RPEH5-16/***	Internal pilot and external drain	NO	YES
RPEH5-16/*I**	Internal pilot and internal drain	NO	NO
RPEH5-16/*E**	External pilot and external drain	YES	YES
RPEH5-16/*EI**	External pilot and internal drain	YES	NO



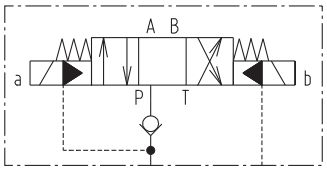
X: plug M6 x 8 for external pilot
Y: plug M6 x 8 for external drain



Always without **X** plug

Special Configurations C3

Check valve incorporated on line P: C3
Valve RPEH is available upon request with check valve incorporated on line P. This is particularly useful to obtain the necessary piloting pressure when the main control valve, in the rest position, has line P connected to the T outlet. The cracking pressure is 5 bar. Add **C3** to the identification code for this request.



Electrical Features

Solenoids
The operating solenoids are DC solenoids. For AC supply the solenoids are provided with rectifier which are 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 the case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override, provided the pressure in T-port does not exceed 25 bar.

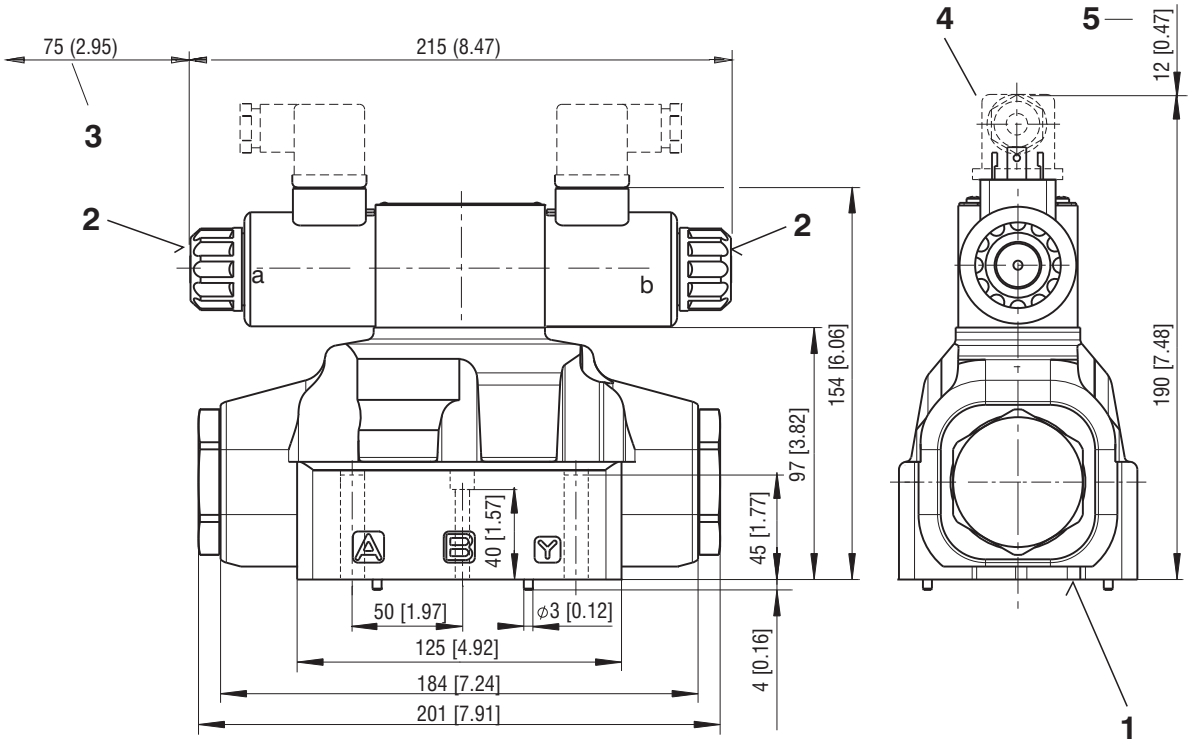
		DC solenoid	AC solenoid
Max. allowable voltage variation	%	±10	±10
Max. switching frequency	1/h	10 000	
Switching times ±10 %, energizing (two position)	ms	70	60
Switching times ±10 %, de-energizing (two position)	ms	80	80
Switching times ±10 %, energizing (three position)	ms	50	80
Switching times ±10 %, de-energizing (three position)	ms	60	60
Duty cycle	%	100	
Enclosure type to EN 60 529		IP 65	

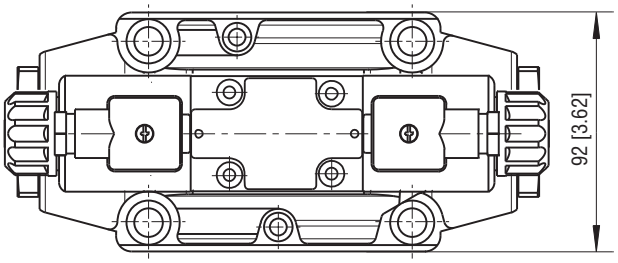
The values indicated refer to a solenoid valve operating with piloting pressure 100 bar, viscosity of 32 mm^2/s and with PA and BT connections. The switch on times are obtained from the time the spool switches over. The switch off times are measured at the time pressure variation occurs in the line.

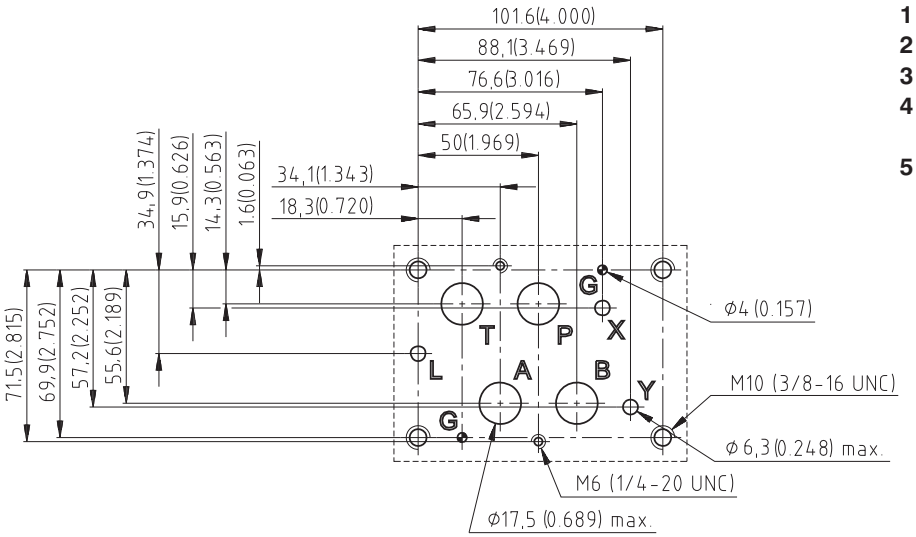
Valve Dimensions

Dimensions in millimeters (inches)

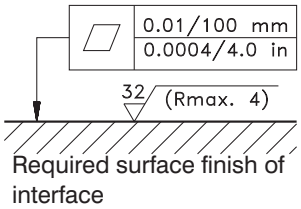
RPEH5-162, RPEH5-163







1 Mounting surface with seal rings
2 Manual override
3 Space required to remove coil
4 Electrical connector
(must be ordered separately)
5 Space required to remove connector

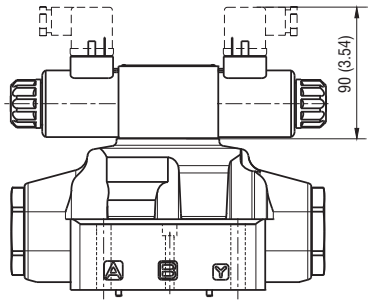


Single valve fastening:	4 bolts M10 x 60 * 2 bolts M6 x 60 *	* Bolts is not supplied
Bolt torque:	M10 x 60: 40 Nm (29.5 ft-lbs) - bolts A 8.8 M6 x 60: 8 Nm (5.9 ft-lbs) - bolts A 8.8	67 Nm(49.5 ft-lbs) - bolts A 12.9 14 Nm(10.3 ft-lbs) - bolts A 12.9
Threads of mounting holes:	M6 x 18; M10 x 18	
Seal rings:	4 O-rings type 22.22 x 2.62 2 O-rings type 10.82 x 1.78	

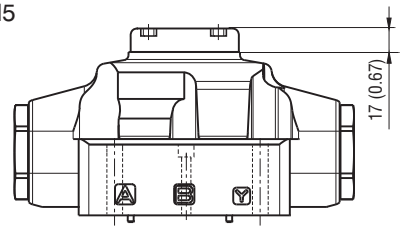
Type of Command

Solenoid control: RPEH
The valve is supplied with a pilot solenoid valve type RPE3-06.

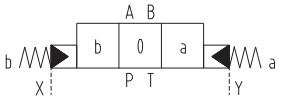
RPHE5



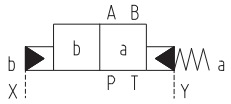
RPH5



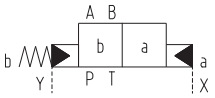
Hydraulic control: RPH
The valve is supplied with a cross-connection cover-plate.
X and Y connections are used for the hydraulic control of the valve.



RPH5-163



RPH5-162R*

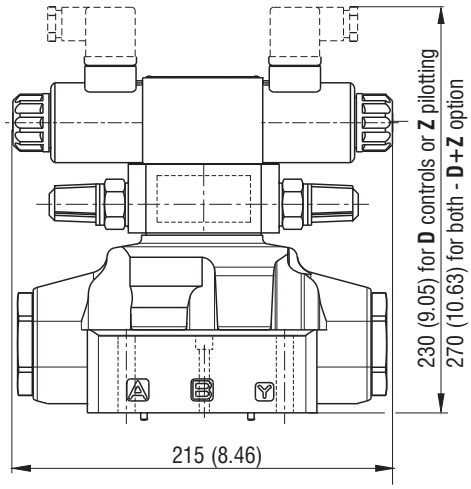


RPH5-162X*

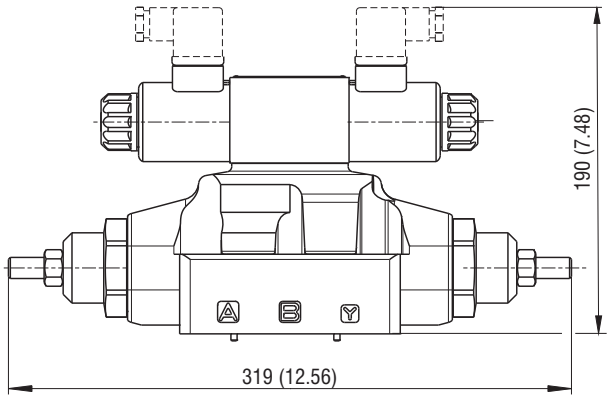
Controls and pilotting

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

Pilot pressure reducing valve - 30 bar fix setting: Z
Instead of option D or together with option **D** can be used option **Z**.



Main spool stroke limiter: C
Stroke limiters reduce flow through the valve.



Manual Override

Whenever the solenoid valve installation may involve exposure to atmospheric agents or be used in tropical climates, the manual override, boot protection is recommended. Add the suffix **N1** or **N2** to request this device.

Electrical Connector

The solenoid valves are never supplied with connector. Connectors must be ordered separately.

Installation

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. Valve fastening takes place by means of screws or tie rods, placing the valve on a flat surface, with values of planarity and smoothness that are equal to or better than those indicated in the drawing. If the minimum values of planarity or smoothness are not met, fluid leakages between valve and mounting surface can easily occur.

Spare Parts

Seal kit

Design		Dimensions, number			Ordering number
		O-ring	Square ring	Back-up ring	
Head valve size 16 (D 07)	Standard - NBR	22.22 x 2.62 (4 pcs.)	-	-	21833700
		10.82 x 1.78 (2 pcs.)			
		31.42 x 2.62 (2 pcs.)			
	Viton	22.22 x 2.62 (4 pcs.)			21833800
		10.82 x 1.78 (2 pcs.)			
		31.42 x 2.62 (2 pcs.)			
Throttle valve 2VS3-06-CS type number 15929600	Standard - NBR	18 x 2.65 (2 pcs.)	9.25 x 1.68 (4 pcs.)	6.73 x 9.43 x 1.14 (2 pcs.)	15936300
		6.9 x 1.8 (2 pcs.)	-	17.83 x 22.19 x 1.14 (2 pcs.)	
	Viton	17.12 x 2.62 (2 pcs.)		9.43 x 6.73 x 1.14 (2 pcs.)	15936600
		9.25 x 1.78 (4 pcs.)		17.83 x 22.19 x 1.14 (2 pcs.)	
		6.75 x 1.78 (2 pcs.)		-	
Control valve	see data sheet ARGO-HYTOS - HA 4010 - RPE3-06				

Mounting bolt

	Dimensions, number		Tightening torque	Ordering number
Fixation of extension of valve	Bolt M5 x 45	DIN 912-10.9 (4pcs.)	8.9 Nm (6.6 ft-lbs)	15845100
	Bolt M5 x 98 - 8G	(4 pcs.)		16103700
	Nut M5			

Other

	Design	
Cover plate	PA, BT	15934200
	PB, TA	15933700

Caution!

- Service valve without range stated parameter consultation with manufacturer.
- Detaile information at control vavle - see data sheet RPE3-06, HA 4010
- The packing foil is recyclable.
- The protective plate can be returned to manufacturer.
- The technical information regarding the product presented in this data sheet is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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ARGO HYTOS

Directional Control Valves Solenoid Operated

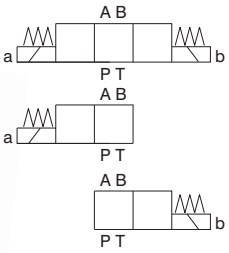
RPEK1-03

Size 03 • p_{max} 250 bar (3625 PSI) • Q_{max} 20 L/min (5.28 GPM)

HA 4027
01/2012

Replaces
HA 4027 12/2007

- ❑ **4/3-, 4/2 way directional control valves with solenoid control**
- ❑ **Solenoids can be turned around their axis to any position**
- ❑ **Push button manual override**
- ❑ **Possibility of vertical and horizontal assembly, see data sheet HA 4057**



Functional Description

Distributors of the RPEK1-03 type are the basic elements for building blocks through horizontal and vertical assembly. This catalogue describes the preparation of the main unit, made up of two to eight distributors, by horizontal assembly. The distributors controlling the direction of the working fluid's flow to the individual appliances share common channels P and T. During the circuit design it is always necessary to check if the flow through the common channels covers the consumption of all appliances in all phases of the hydraulic equipment working cycle. Channels A, B outputs at the upper surface of the body are provided with threads G1/4 (type G), or SAE 9/16-18 (type S), or are prepared for vertical assembly (type O) – i.e. brought out onto a ground surface. Channels P, T, A, B outlets on the side surfaces of the body are prepared for horizontal assembly – i.e. brought out onto a ground surfaces or provided with a sealing ring recess.

The individual distributor bodies are connected into a compact block using three bolts. Fastening angles serve to mount the block to the base with four screws.

An assembled block feed is provided by a plate with connecting threads G3/8 in channels P, T. It is also possible to use plate with a built-in pressure relief valve to regulate the maximum pressure in the circuit.

Use data sheet No. HA 5027 to create more complex assemblies with the use of the horizontal and vertical assembly, while also using additional building elements.

The RPEK1-03 directional control valves consist of cast iron housing (1), control spool (5) with two centering springs (4) and operating solenoids (2, 3).

The three-position directional valves are fitted with two solenoids, two-position directional valves have either one solenoid.

*The operating solenoids are DC solenoids supplied through connectors A, B (6, 7). For AC supply the solenoids are provided with rectifiers, which are integrated directly into the connectors A, B (6, 7). Tthe connectors can be turned by 90° around . By loosening the nut (8), the solenoid can be turned around its axis up to 360°.

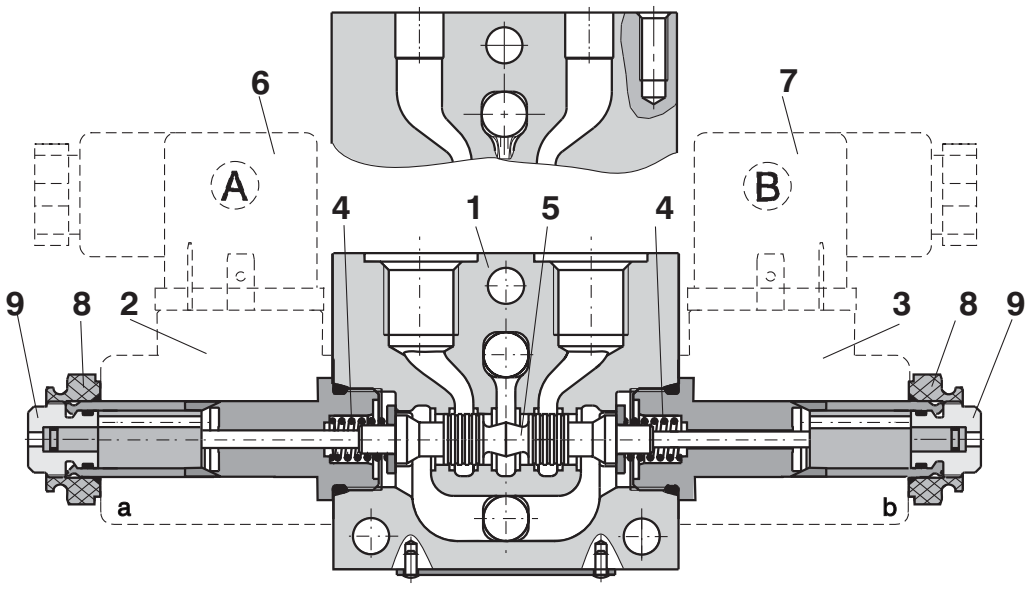
In the case of solenoid malfunction or power failure, the spool of the valve can be repositioned by manual override (9), provided the pressure in the T-port does not exceed 25 bar.The standard design of the emergency control may be additionally fitted with a pushbutton with a rubber cover.

The basic surface treatment of the valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.

*Magnet coils are not included in the valve supply. The coil types selected by the customer must be ordered separately.

Type of connection "O"

Type of connection "G", "S"



Ordering Code

RPEK1-03 □□□ / □□□

Solenoid Operated Directional Control Valve

Nominal size

Type of connection
G1/4 **G**
SAE 9/16-18 **S**
without thread **O**

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

Functional symbols
see the table functional symbols

Seals
no designation NBR
V FPM (Viton)

Design form
no designation standard
P1 through channels P, T; inlets A, B with sealing rings
Z1 one side inlets of channels P, T with sealing rings
Z3 one side inlets of channels P, T, A, B with sealing rings

Manual override *
no designation standard

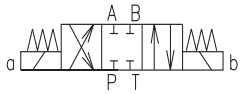
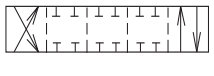
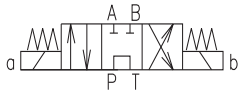
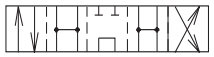
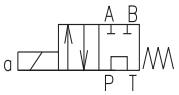
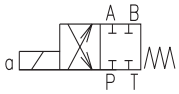
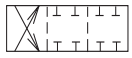
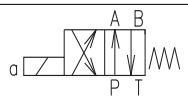
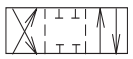
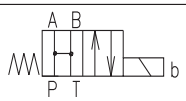
*The standard design of the manual override may be additionally fitted with a pushbutton with a rubber cover (N2).

Note: solenoid coil, electrical connector and manual override (N2) **is not supplied as mounted on**, must be ordered separately (see ordering number on page 6; 7 and 10)

Technical Data

Nominal size		03
Maximum flow	L/min (GPM)	see p-Q characteristics
Maximum operating pressure at ports P, A, B	bar (PSI)	250 (3625)
Maximum operating pressure at port T	bar (PSI)	210 (3045)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51 524
Fluid temperature range NBR	°C (°F)	-30 ... +80 (-22 ...+176)
Fluid temperature range FPM (Viton)	°C (°F)	-20 ... +80 (-4 .... +176)
Ambient temperature, max.	°C (°F)	up to +50 (+122)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 .... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Maximum allowable voltage variation	%	AC: $\pm$ 10 DC: $\pm$ 10
Maximum switching frequency	1/h	15 000
Switching time, ON; at ν = 32 mm^2/s	ms	30 ... 50
Switching time, OFF; at ν = 32 mm^2/s	ms	AC: 70 ... 100 DC: 30 ... 50
Duty cycle	%	100
Service life	cycles	10^7
Enclosure type to EN 60 529		see page 7
Weight - valve with 1 solenoid - valve with 2 solenoid	kg (lb)	0.90 (1.98) 1,05 (2.32)
Mounting position		unrestricted

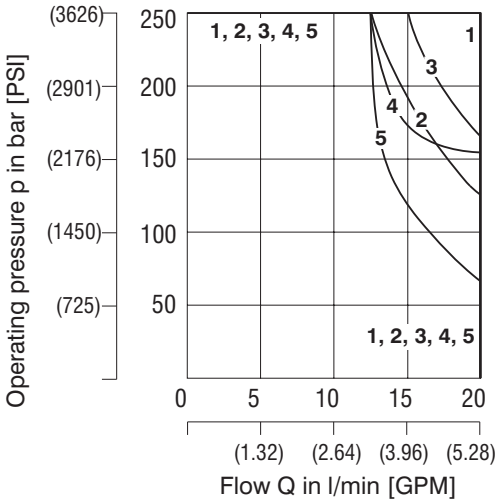
Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
Z11			R21		
C11			Y51		
H11			C51		
Y11			Z51		
R11			H11		

p-Q Characteristic

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve.

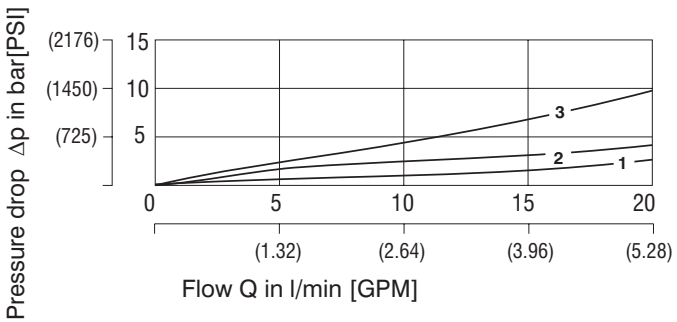


Z11	Z51	R11	R21	C11	C51	H11	Y11	Y51
1	1	1	5	2	2	3	4	4

Δp-Q Characteristic

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Pressure drop Δp ralated to flow rate.



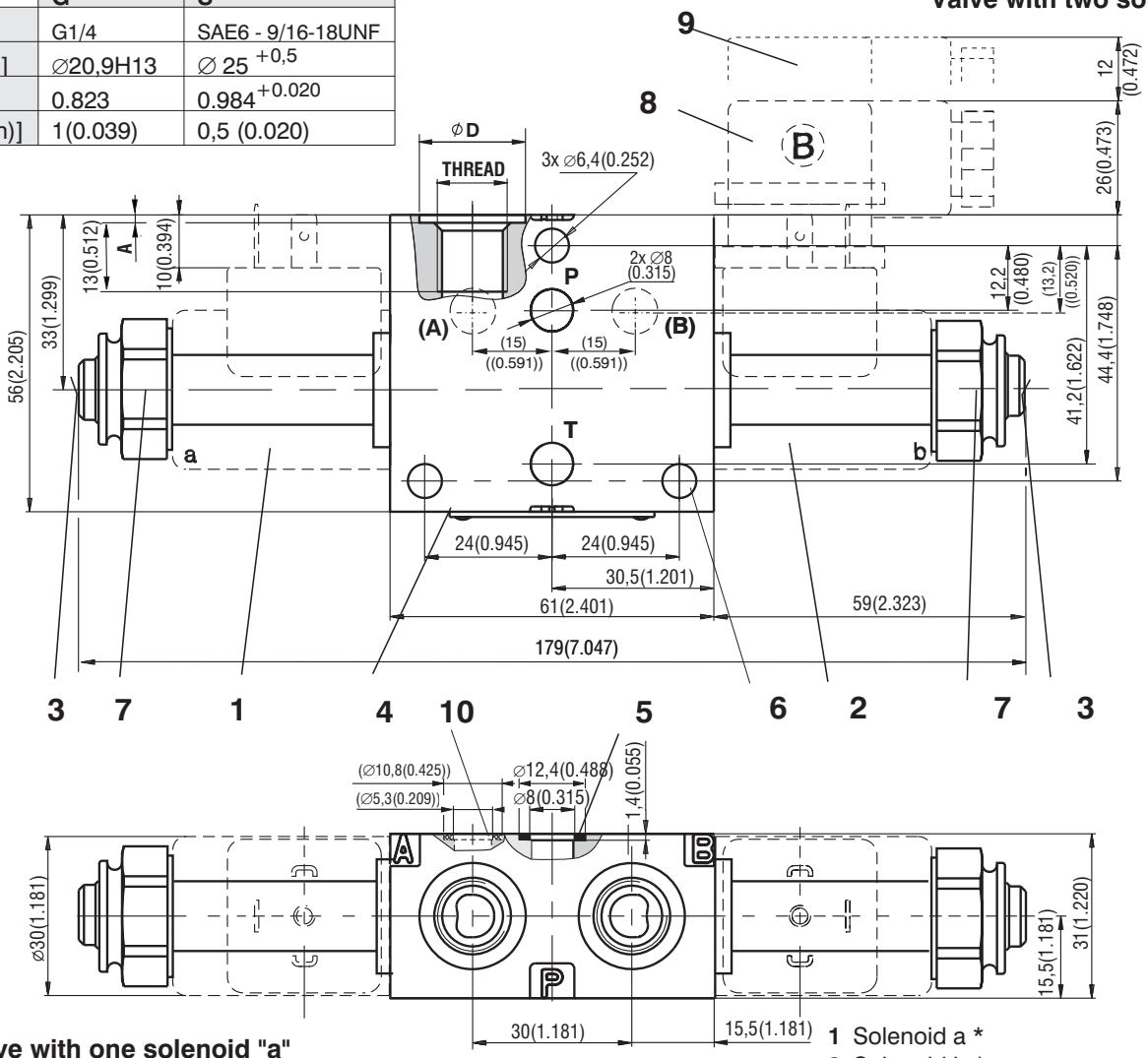
	Z11	C11	H11	Y11	R11	R21	Y51	C51	Z51
P-A	1	3	1	1	2	2		3	
P-B	1	3	1	1	2	2	1		1
A-T	1	3	1	1	2	2	1		1
B-T	1	3	1	1	2	2		3	
P-T		2	2					2	

Valve Dimensions **Standard body version "G" , "S"**

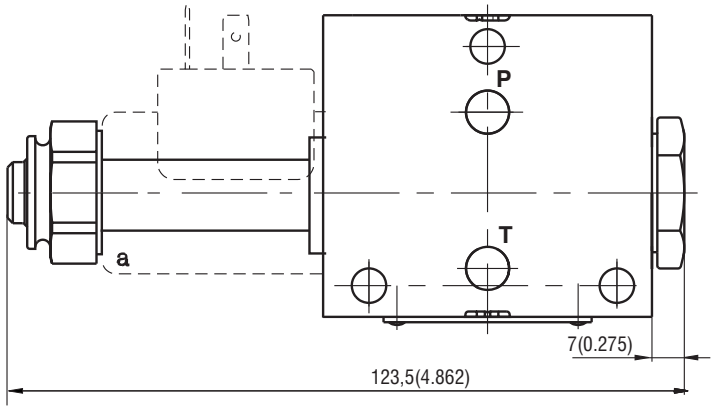
Dimensions in millimeters (inches)

	G	S
THREAD	G1/4	SAE6 - 9/16-18UNF
∅D [mm]	∅20,9H13	∅ 25 $^{+0,5}$
∅D [in]	0.823	0.984$^{+0.020}$
A [mm (in)]	1(0.039)	0,5 (0.020)

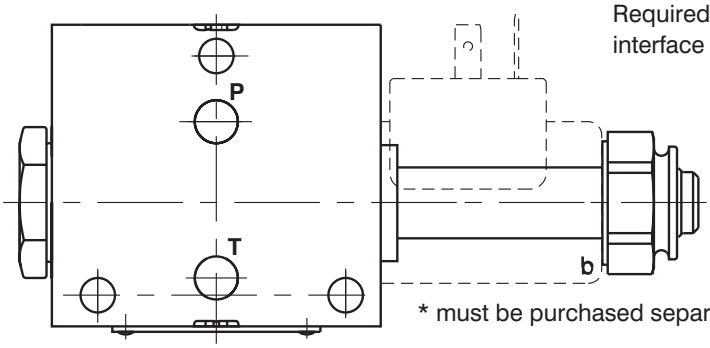
Valve with two solenoids



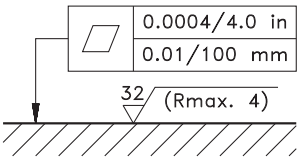
Valve with one solenoid "a"
Functional symbols R11, R21, Y51, C51, Z51



Valve with one solenoid "b"
Functional symbols H11



1 Solenoid a *
2 Solenoid b *
3 Manual override
4 Name plate
5 Square ring 9,25 x 1,68 (2 pcs) supplied with valve
6 3 mounting holes
7 Retaining nut of the solenoid
8 Electrical connector, EN 1745301-803
9 Space required to remove connector
10 Outlets A/B are only at the versions P1, Z1; Z3, Seal 7,65x1,68



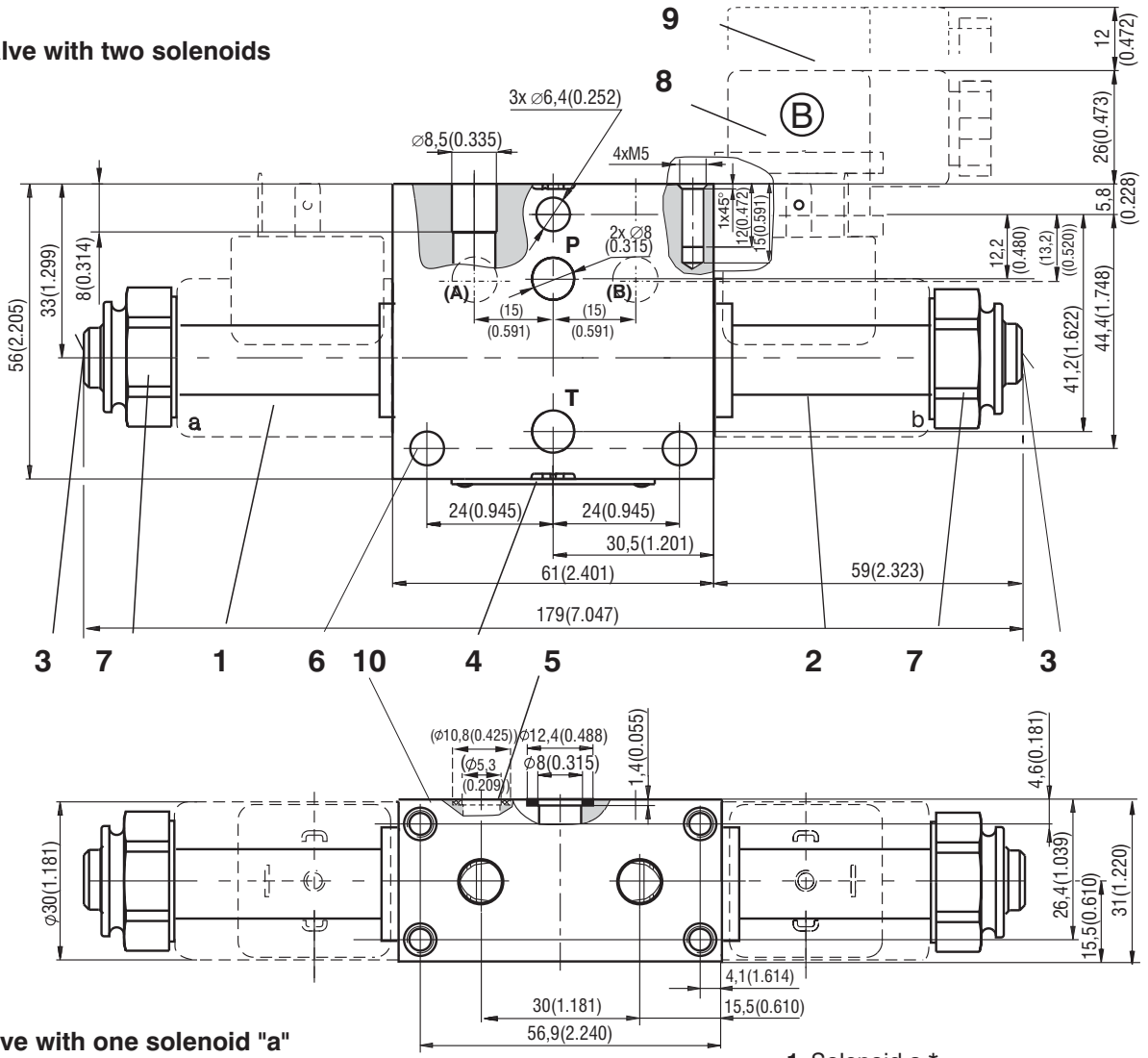
Required surface finish of interface

* must be purchased separately (see page 7)

Valve Dimensions **Standard body version "O"**

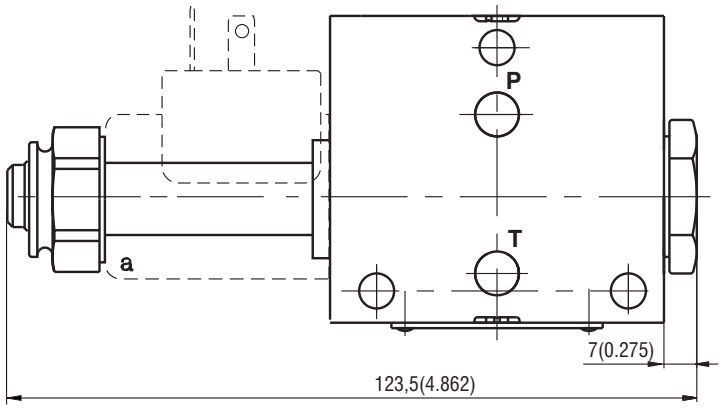
Dimensions in millimeters (inches)

Valve with two solenoids



Valve with one solenoid "a"

Functional symbols R11, R21, Y51, C51, Z51



1 Solenoid a *
2 Solenoid b *
3 Manual override
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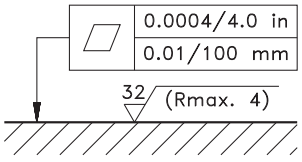
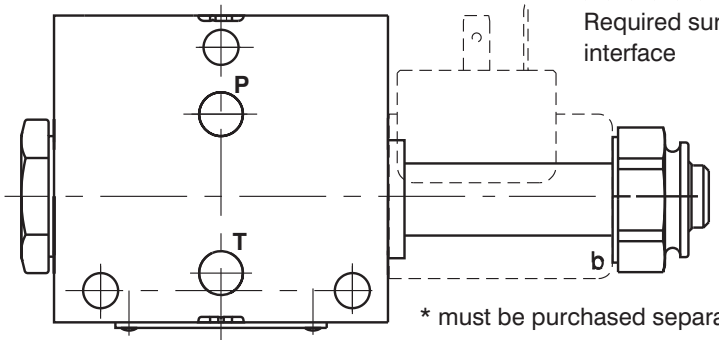


Required surface finish of interface

Valve with one solenoid "b"

Functional symbols H11

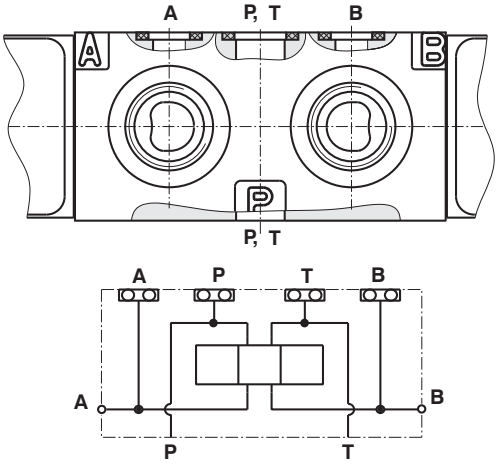


* must be purchased separately (see page 7)

Design form "G" ("S"), "O"

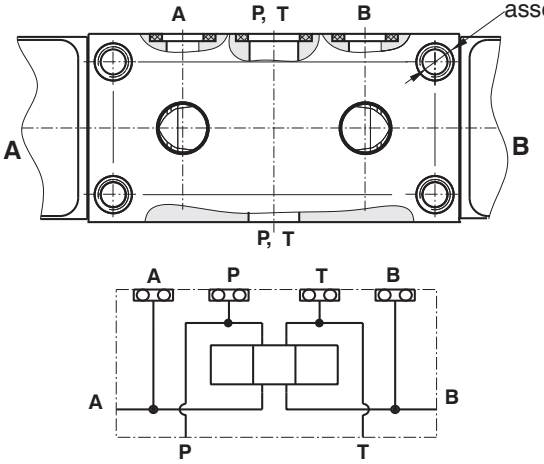
P1 - "G"("S")

hrough channels P, T; outlets A, B with sealing rings



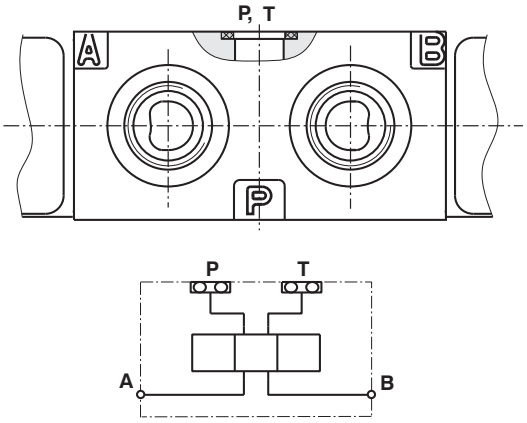
P1 - "O"

4xM5
for vertical
assembly

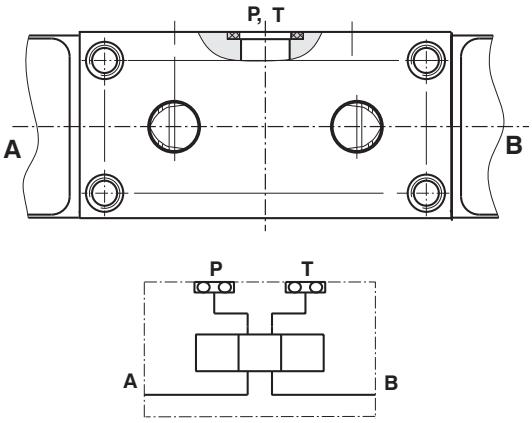


Z1 - "G"("S")

one side inlets of channels P, T with sealing rings (outlets A, B only on the upper surface)

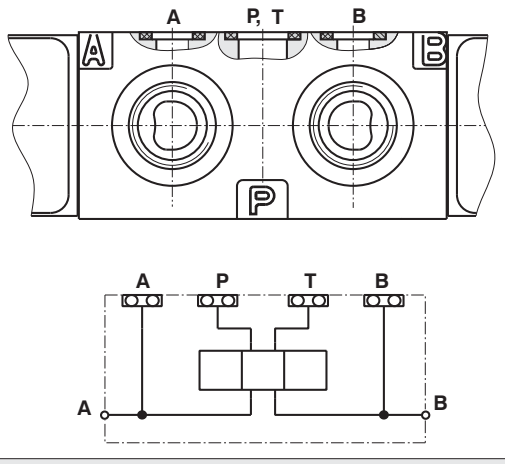


Z1 - "O"

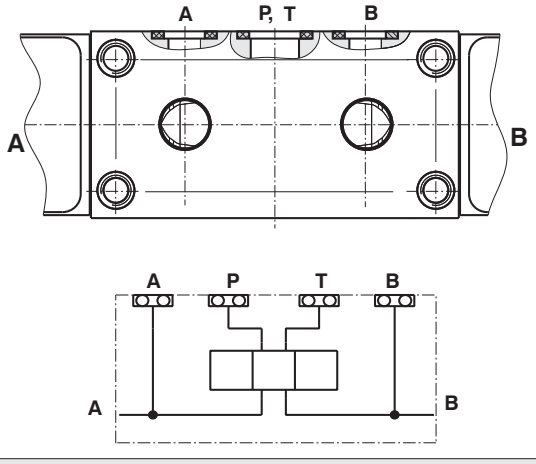


Z3 - "G"("S")

combination of options **Z1 a P1**
one side inlets of channels P, T, A, B with sealing rings



Z3 - "O"



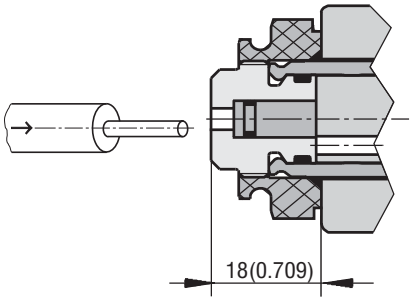
Spare Seal kit

Type	Dimensions, number			Ordering nr. **Z1**
	Sealing - ring	O-ring		
Standard	9,25 x 1,68 NBR 70 (2 pcs.)	16 x 2 NBR 90 (2 pcs.)		15691300
Viton	9,25 x 1,78 (2 pcs.)	16 x 2 (2 pcs.)		15691400
Type	Dimensions, number			Ordering nr. **P1, Z3**
	Sealing - ring	O-ring	Sealing - ring	
Standard	9,25 x 1,68 NBR 70 (2 pcs.)	16 x 2 NBR 90 (2 pcs.)	7,65 x 1,68 (2 pcs.)	28839800
Viton	9,25 x 1,78 (2 pcs.)	16 x 2 (2 pcs.)	7,65 x 1,78 (2 pcs.)	28840100

Manual Override

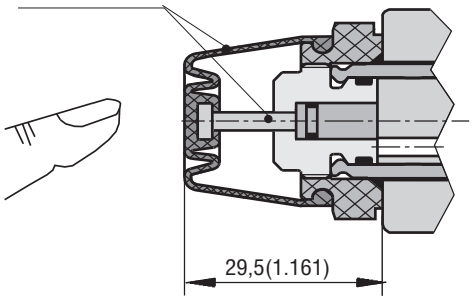
Dimensions in millimeters (inches)

STANDARD	RUBBER BOOT		
NO DESIGNATION	N2	Ordering number / Kit	29269100



Standard model of the manual override.
Standard retaining nut of the solenoid.

KIT N2



Manual override protected by rubber boot.
Kit must be purchased separately.

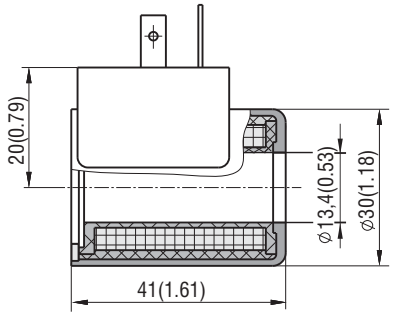
Dimensions of Coils C14

Dimensions in millimeters (inches)

Connector design

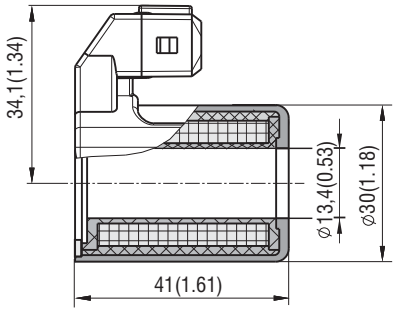
E1, E2
EN 175301-803-A

Protection degree IP65



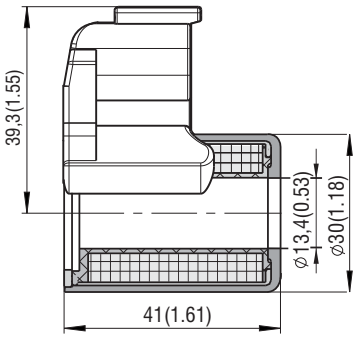
E3A, E4A
AMP Junior Timer

Protection degree IP65



E12, E13
Deutsch DT04-2P

Protection degree IP67, IP69



Coils C14B			Type	Ordering number
Nominal voltage	Nominal current	Connector		
12 VDC	1,83 A	E1 - EN 175301-803-A	C14B-01200E1-6,55NA	16210300
24 VDC	0,92 A	E1 - EN 175301-803-A	C14B-02400E1-26,2NA	16210400
205 V DC*	0,08 A	E1 - EN 175301-803-A	C14B-20500E1-2476NA	16210500
12 VDC	1,83 A	E2 - E1 with quenching diode	C14B-01200E2-6,55NA	24101600
24 VDC	0,92 A	E2 - E1 with quenching diode	C14B-02400E2-26,2NA	24101800
12 VDC	1,83 A	E3A - AMP Junior Timer (2 pins; male)	C14B-01200E3A-6,55NA	28822500
24 VDC	0,92 A	E3A - AMP Junior Timer (2 pins; male)	C14B-02400E3A-26,2NA	28686400
12 VDC	1,83 A	E4A - E3A with quenching diode	C14B-01200E4A-6,55NA	28822600
24 VDC	0,92 A	E4A - E3A with quenching diode	C14B-02400E4A-26,2NA	28822400
12 VDC	1,83 A	E12 - Deutsch DT04-2P	C14B-01200E12-6,55NA	29268200
24 VDC	0,92 A	E12 - Deutsch DT04-2P	C14B-02400E12-26,2NA	29268900
12 VDC	1,83 A	E13 - E12 with quenching diode	C14B-01200E13-6,55NA	29268800
24 VDC	0,92 A	E13 - E12 with quenching diode	C14B-02400E13-26,2NA	29269000

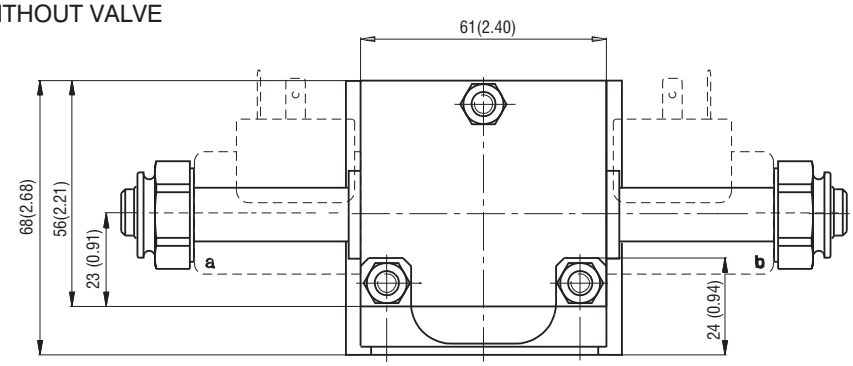
Note:

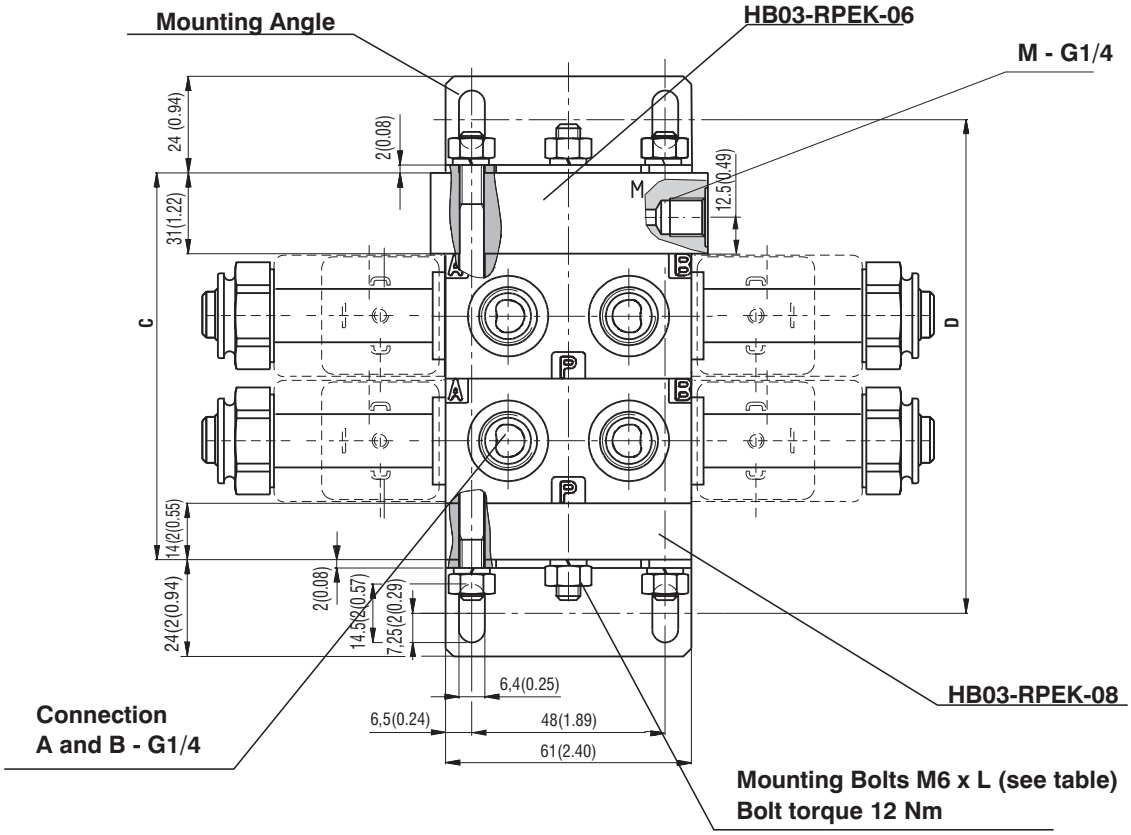
* Coil version 205 are suitable for the rectified voltage of 230V /50Hz, Rectifier in coil included
Other designs available at request.

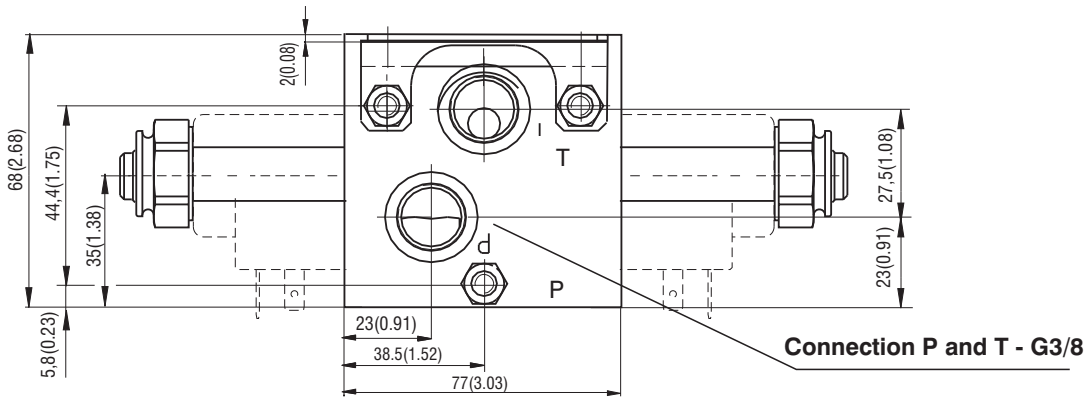
Block Assembly

Dimensions in millimeters

VERSION 1 - WITHOUT VALVE







Notte:
Example of simple block assembly with two to eight distributors, feeding plate and the end plate.

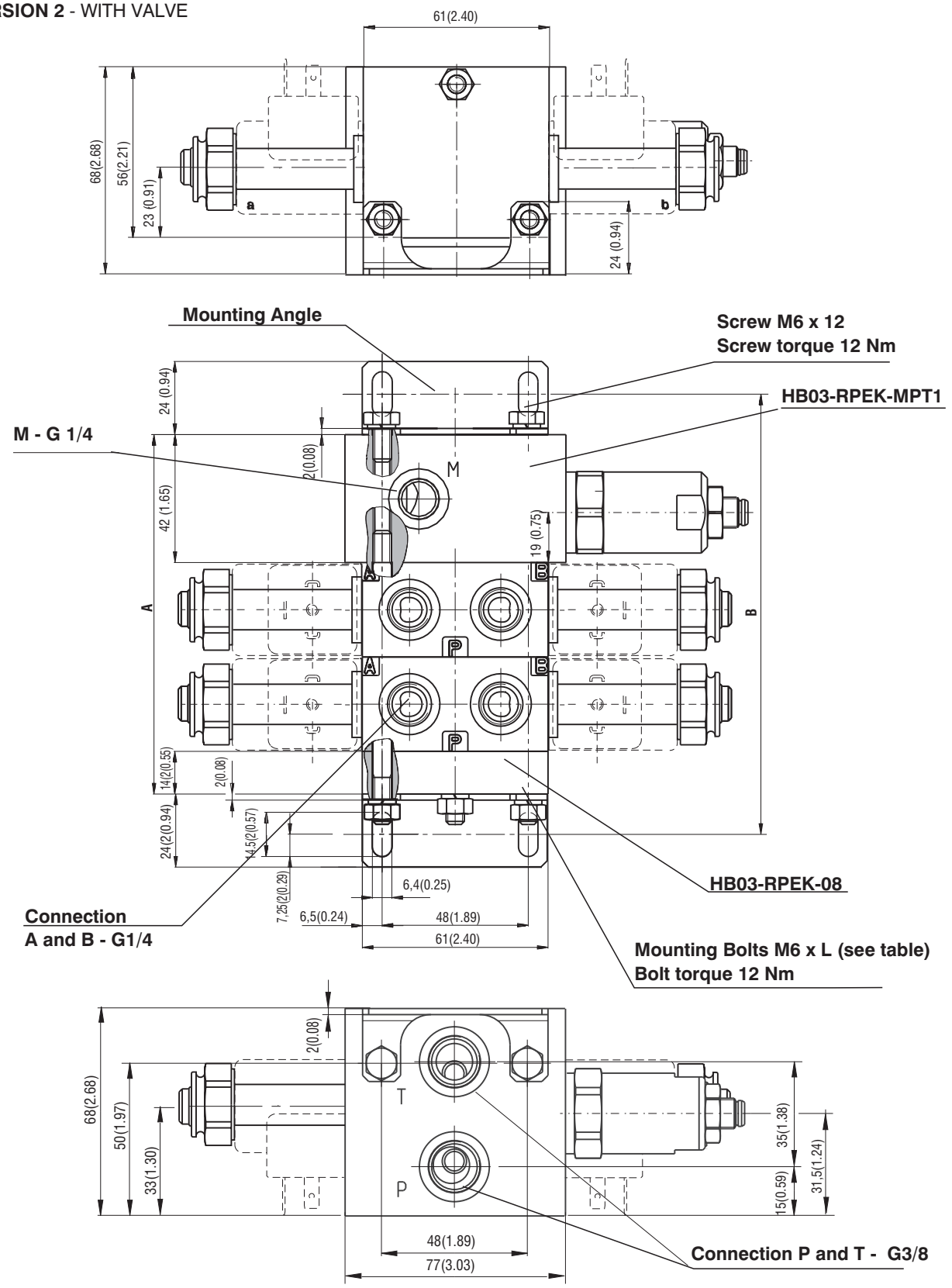
Dimensions

Number of section	1	2	3	4	5	6	7	8
Dimension A [mm]	76(2.992)	107(4.212)	138(5.433)	169(6.653)	200(7.874)	231(9.094)	262(10.315)	293(11.535)
Dimension B [mm]	103(4.055)	134(5.275)	165(6.496)	196(7.716)	227(8.937)	258(10.157)	289(11.378)	320(12.598)
Dimension L [mm]	100(3.937)	133(5.236)	163(6.417)	194(7.638)	224(8.819)	256(10.079)	287(11.299)	320(12.598)

Block Assembly

Dimensions in millimeters

VERSION 2 - WITH VALVE



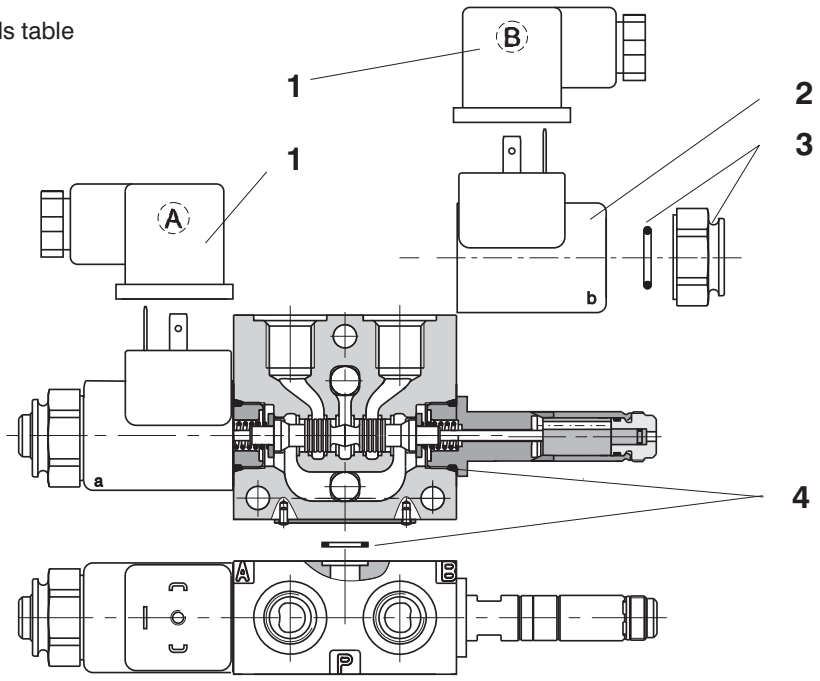
Notte:
Example of simple block assembly with two to eight distributors, feeding block with a pressure relief valve and the end plate.

Dimensions

Number of section	1	2	3	4	5	6	7	8
Dimension A [mm]	87(3.425)	118(4.646)	149(5.866)	180(7.089)	211(8.307)	242(9.527)	273(10.748)	304(11.968)
Dimension B [mm]	114(4.488)	145(5.709)	176(6.929)	207(8.150)	238(9.370)	269(10.590)	300(11.811)	331(13.031)
Dimension L [mm]	60(2.362)	100(3.937)	133(5.236)	163(6.417)	194(7.638)	224(8.819)	256(10.079)	287(11.299)

Spare Parts

1 Electrical connector
2 Solenoid coil - see coils table
3 Nut with seal
4 Seal kit



Solenoid retaining nut with seal (Kit)

Type of the nut - Mu 3 Nm(2.21lbs-ft)	Seal ring	Ordering number
Standard nut	13 x 2	15691500
Manual Override N2		29269100

Electrical connector, EN 1745301-803

Type designation	Model	Max. input voltage	Connector A grey	Connector B black
			Ordering number	
K1	without rectifier - M16x1,5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC/DC	16202200	16202100
K2	without rectifier with LED and quenching diode M16x1,5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	12...24 V DC	16202800	16202700
K3	with rectifier - M16x1,5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC	16202400	16202300
K4	with rectifier with LED and quenching diode - M16x1,5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC	16203000	16202900
K5	without rectifier - M16x1,5 bushing bore ∅ 4-6 mm (0.158 - 0.236 in)	230 V AC/DC	16202600	16202500

Mounting Angle		**Tightening torque**	Ordering number
Kit	Mounting Angle (1 pc.)	12 Nm (8.85lbf-ft)	28799600
	Bold M6 x 12 (2 pcs.)		
	Washer 6 (2 pcs.)		

Spare Seal kit	see side 6
Coils table C14B	see side 7

Caution

- When the distributor contains two electromagnets any of the two electromagnets can be switched on only after the other one switches off.
- Distributors with other interconnections than those shown in the catalogue can be supplied on request.
- The packaging foil can be recycled
- The transport base plate can be returned to the manufacturer.
- The mentioned data only serve to describe the product and in no case are to be understood in terms of law as guaranteed characteristics.

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RPEK1-03 Modular Valve Assembly

RPEK1-03/B

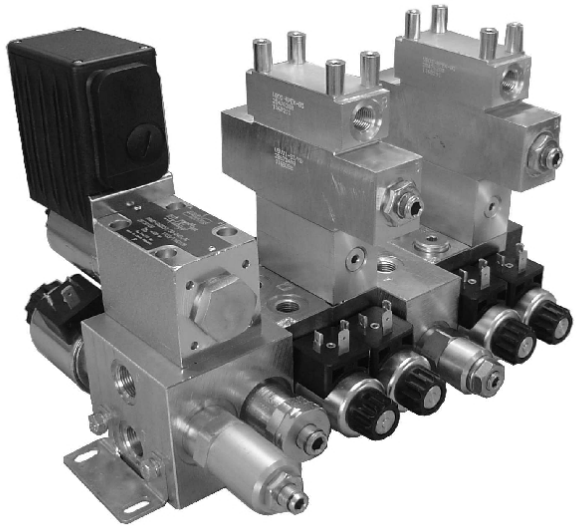
HA 4057
12/2011

D_n 03 • p_{max} 250 bar (3626 PSI) • Q_{max} 60 l/min (15.8 GPM)

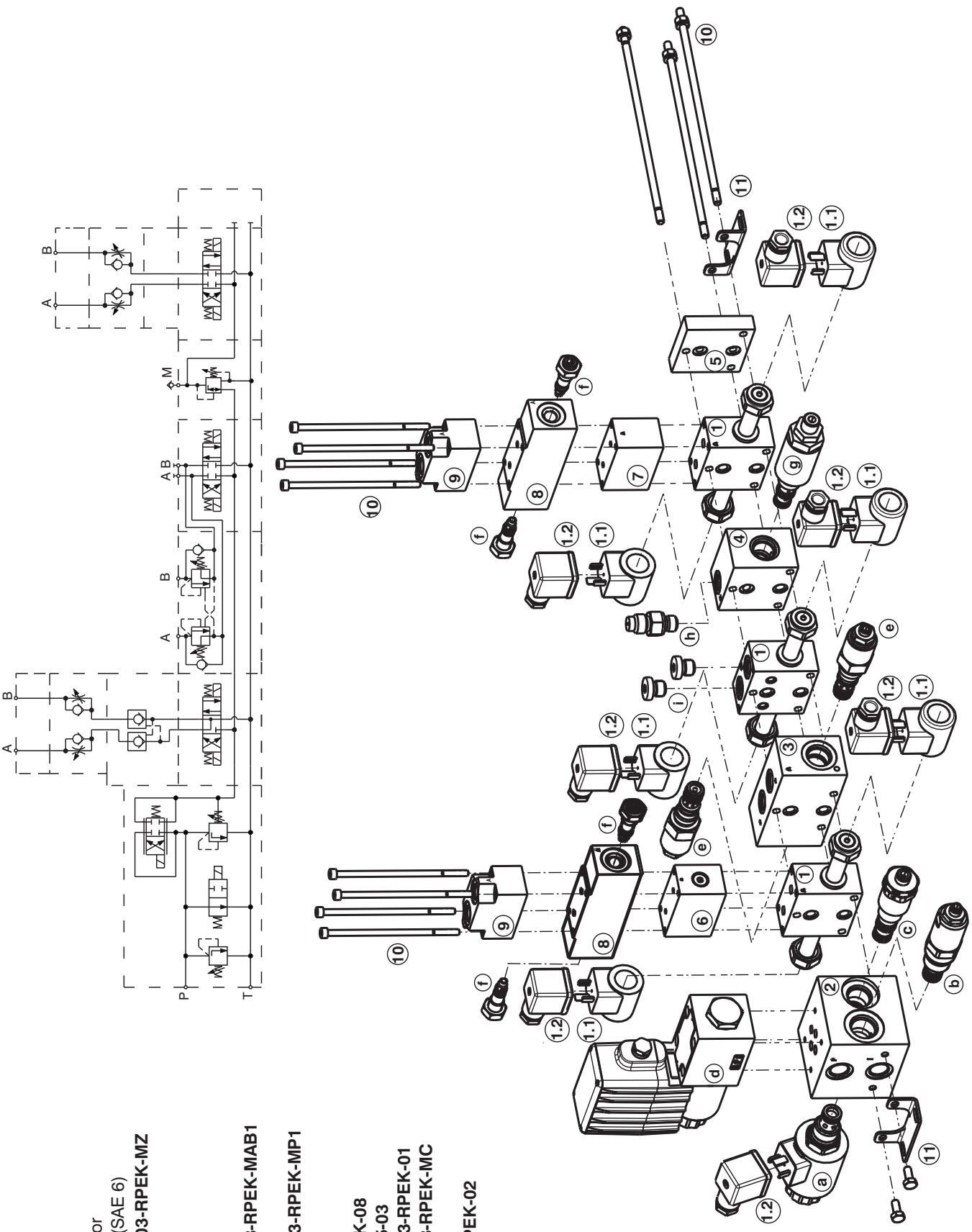
- ❑ **Compact modular valve system assembly**
- ❑ **Easy to build complex circuits**
- ❑ **The possibility of subsequent rebuilding or extending the valve assembly**
- ❑ **High variability of functional options**

Functional Description

Modular assembly blocks are designed for the control of one or more hydraulic circuits, used in open hydraulic circuits. The high variability of the modular set design allows its wide use in the construction of lifting and handling equipment, machine tools and also in the field of mobile technique.
The base of the modular set is the body of the section distributor RPEK1-03. The bodies are manufactured in more several variants, which enable horizontal and vertical assembly (see RPEK1-03 directional valve data sheet HA 4027).
Channels P, T run through all horizontal sections. Inlet flow is 60 L/min nominal, sectional flow is limited with performance of RPEK directional valve 20 L/min (5.28 GPM) nominal.
Channel A, B, which run through the upper surface of the distributor body are provided with threads G1/4, or SAE6 - 9/16-18 UNF, all measuring ports are G1/4 or SAE4 -7/16-20 UNF Unthreaded outlets on the upper or side ground surface of the body are prepared for assembly.
Pressure and flow supply can be provided on the face side by a inlet P, T plate / block or in the centre of the assembled block using a central plate with radial ports of channels P, T. Furthermore, the block can be provided with a built-in pressure relief valve, which protects channel P against overloading, and the solenoid controlled valve that allows channels P-T connection thus relieving the source of the pressure fluid to tank. The supply block with the proportional distributor is used for the flow regulation in the “P” channel. Combination of 3 way pressure compensator and proportional valve allows to cave constant regulated flow independent of load.
Vertical assembly allows installation of valves into channels A, B. In vertical stacking assembly is possible to mount throttle valves, or Pilot operated check valves, and secundar pressure relief valves,
Horizontal direction blocks, plates and bodies of distributors are connected into one unit using 3 screws / bolts and 4 bolts in the vertical direction. All connected plates are sealed.
Two fastening angles serve to mount the complete block to the base by screwing them to the face surfaces, or by using threads M6 at the bottom side of the plates and blocks.
A modular set allows horizontal assembly up to eight sections or up to sixteen sections when the centre plate is used for feeding and the blocks are grouped from both sides. It is possible to group up to four blocks vertically.
In cases of more complicated block assemblies we recommend to first create a hydraulic circuit diagram.

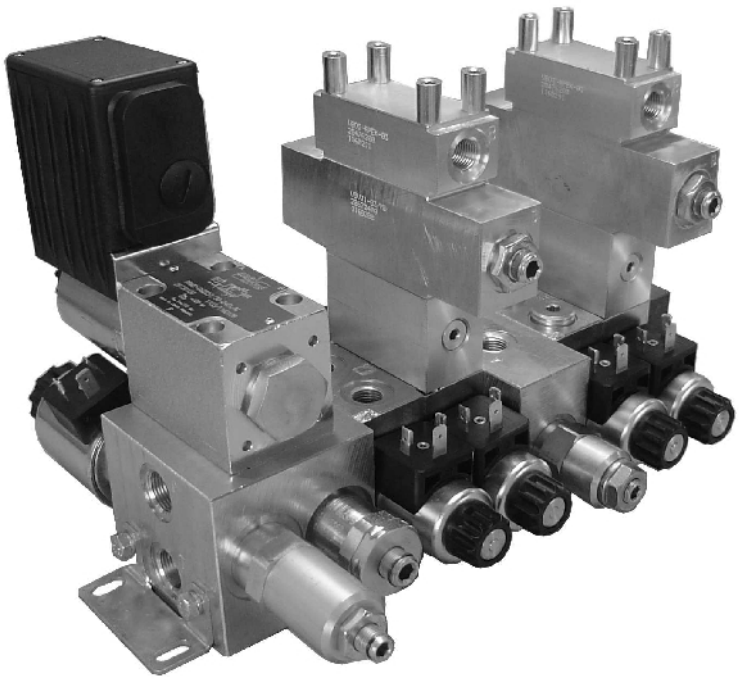


Horizontal and Vertical Assembly Ilustrative Figure



1. **RPEK**
   - 1.1. Coils
   - 1.2. Electrical connector
   - i) Pressure plug G1/4 (SAE 6)
2. **Inlet P,T plates HB03-RPEK-MZ**
   - a) SD2E-B2
   - b) SR1A-B2
   - c) TV2-063
   - d) PRM2-06
3. **Sandwich plate HB03-RPEK-MAB1**
   - e) SOPA-Q3
4. **Sandwich plate HB03-RPEK-MP1**
   - g) SP2A-A3
   - h) Minimes
5. **End plate HB03-RPEK-08**
6. **PO check valve VJR5-03**
7. **Extension plate VB-03-RPEK-01**
8. **Sandwich plate VB03-RPEK-MC**
   - f) VSV2
9. **Cover plate VB03-RPEK-02**
10. **Kit studs**
11. **Kit**

CONTENT



ARGO HYTOS

Directional Control Valves Solenoid Operated

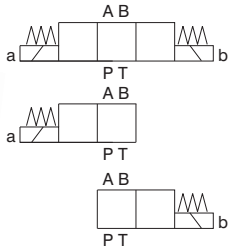
RPEK1-03

Size 03 • p_{max} up to 250 bar (3625 PSI) • Q_{max} up to 20 L/min (5.28 GPM)

HA 4027
11/2011

Replaces
HA 4027 12/2007

- **4/3-, 4/2 way directional control valves with solenoid control**
- **Solenoids can be turned around their axis to any position**
- **Push button manual override**
- **Possibility of vertical and horizontal assembly, see data sheet HA 4057**



Functional Description

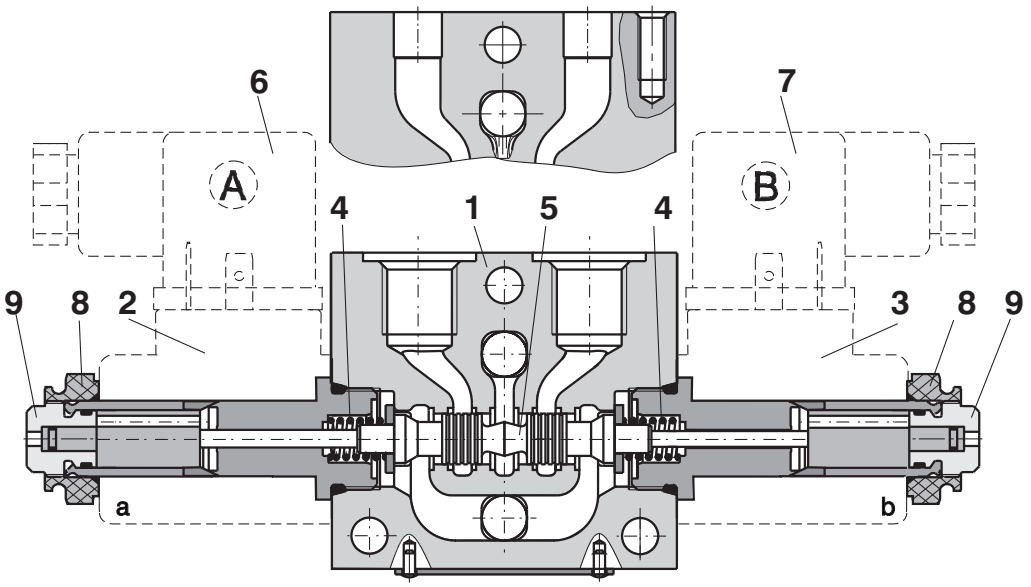
Distributors of the RPEK1-03 type are the basic elements for building blocks through horizontal and vertical assembly. This catalogue describes the preparation of the main unit, made up of two to eight distributors, by horizontal assembly. The distributors controlling the direction of the working fluid's flow to the individual appliances share common channels P and T. During the circuit design it is always necessary to check if the flow through the common channels covers the consumption of all appliances in all phases of the hydraulic equipment working cycle. Channels A, B outputs at the upper surface of the body are provided with threads G1/4 (type G), or SAE 9/16-18 (type S), or are prepared for vertical assembly (type O) – i.e. brought out onto a ground surface. Channels P, T, A, B outlets on the side surfaces of the body are prepared for horizontal assembly – i.e. brought out onto a ground surfaces or provided with The standard design of the emergency control may be additionally fitted with a pushbutton with a rubber cover. a sealing ring recess.
The individual distributor bodies are connected into a compact block using three bolts. Fastening angles serve to mount the block to the base with four screws.
An assembled block feed is provided by a plate with connecting threads G3/8 in channels P, T. It is also possible to use plate with a built-in pressure relief valve to regulate the maximum pressure in the circuit.

Use data sheet No. HA 5027 to create more complex assemblies with the use of the horizontal and vertical assembly, while also using additional building elements.

The RPEK1-03 directional control valves consist of cast iron housing (1), control spool (5) with two centering springs (4) and operating solenoids (2, 3).
The three-position directional valves are fitted with two solenoids, two-position directional valves have either one solenoid.
*The operating solenoids are DC solenoids supplied through connectors A, B (6, 7). For AC supply the solenoids are provided with rectifiers, which are integrated directly into the connectors A, B (6, 7). Tthe connectors can be turned by 90° around . By loosening the nut (8), the solenoid can be turned around its axis up to 360°.
In the case of solenoid malfunction or power failure, the spool of the valve can be repositioned by manual override (9), provided the pressure in the T-port does not exceed 25 bar.The standard design of the emergency control may be additionally fitted with a pushbutton with a rubber cover.
The basic surface treatment of the valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.
*Magnet coils are not included in the valve supply. The coil types selected by the customer must be ordered separately.

Type of connection "O"

Type of connection "G", "S"



Ordering Code

RPEK1-03 □ □ □ / □ □ □

Solenoid Operated Directional Control Valve

Nominal size

Type of connection
G1/4 **G**
SAE 9/16-18 **S**
without thread **O**

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

Functional symbols
see the table functional symbols

Seals
no designation NBR
V FPM (Viton)

Design form
no designation standard
P1 through channels P, T; inlets A, B with sealing rings
Z1 one side inlets of channels P, T with sealing rings
Z3 one side inlets of channels P, T, A, B with sealing rings

Manual override *
no designation standard

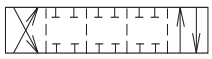
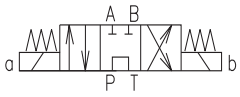
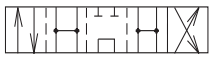
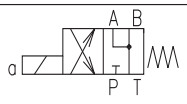
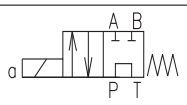
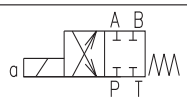
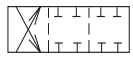
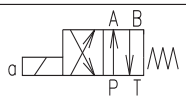
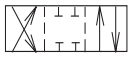
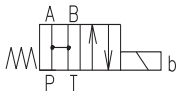
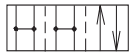
*The standard design of the manual override may be additionally fitted with a pushbutton with a rubber cover (N2).

Note: solenoid coil, electrical connector and manual override (N2) **is not supplied as mounted on**, must be ordered separately (see ordering number on page 10, 11)

Technical Data

Nominal size		03	
Maximum flow	l/min (GPM)	see p-Q characteristics	
Maximum operating pressure at ports P, A, B	bar (PSI)	250 (3625)	
Maximum operating pressure at port T	bar (PSI)	210 (3045)	
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51 524	
Fluid temperature range NBR	°C (°F)	-30 ... +80 (-22 ...+176)	
Fluid temperature range FPM (Viton)	°C (°F)	-20 ... +80 (-4 .... +176)	
Ambient temperature, max.	°C (°F)	up to +50 (+122)	
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 .... 1840)	
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406 (2006)	
Maximum allowable voltage variation	%	AC: ± 10	DC: ± 10
Maximum switching frequency	1/h	15 000	
Switching time, ON; at $\nu = 32\ mm^2/s$	ms	30 ... 50	
Switching time, OFF; at $\nu = 32\ mm^2/s$	ms	AC: 70 ... 100	DC: 30 ... 50
Duty cycle	%	100	
Service life	cycles	10^7	
Enclosure type to EN 60 529		see page 10	
Weight - valve with 1 solenoid - valve with 2 solenoid	kg (lb)	0.90 (1.98) 1,05 (2.32)	
Mounting position		optional	

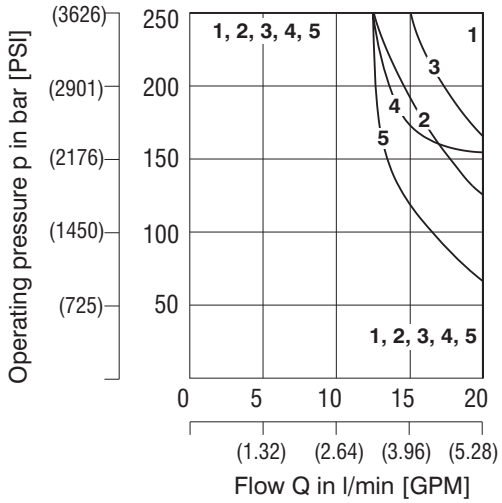
Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
Z11			R21		
C11			Y51		
H11			C51		
Y11			Z51		
R11			H11		

p-Q Characteristic

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve.

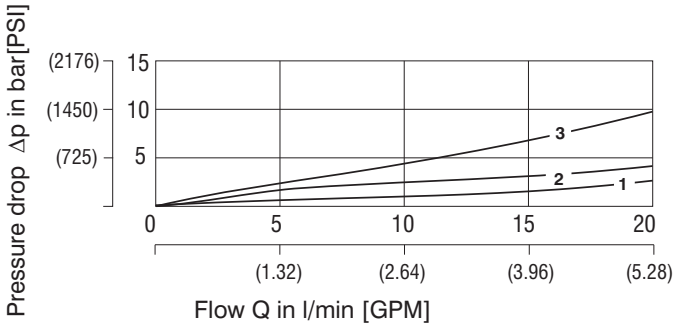


Z11	Z51	R11	R21	C11	C51	H11	Y11	Y51
1	1	1	5	2	2	3	4	4

Δp-Q Characteristic

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Pressure drop Δp ralated to flow rate.



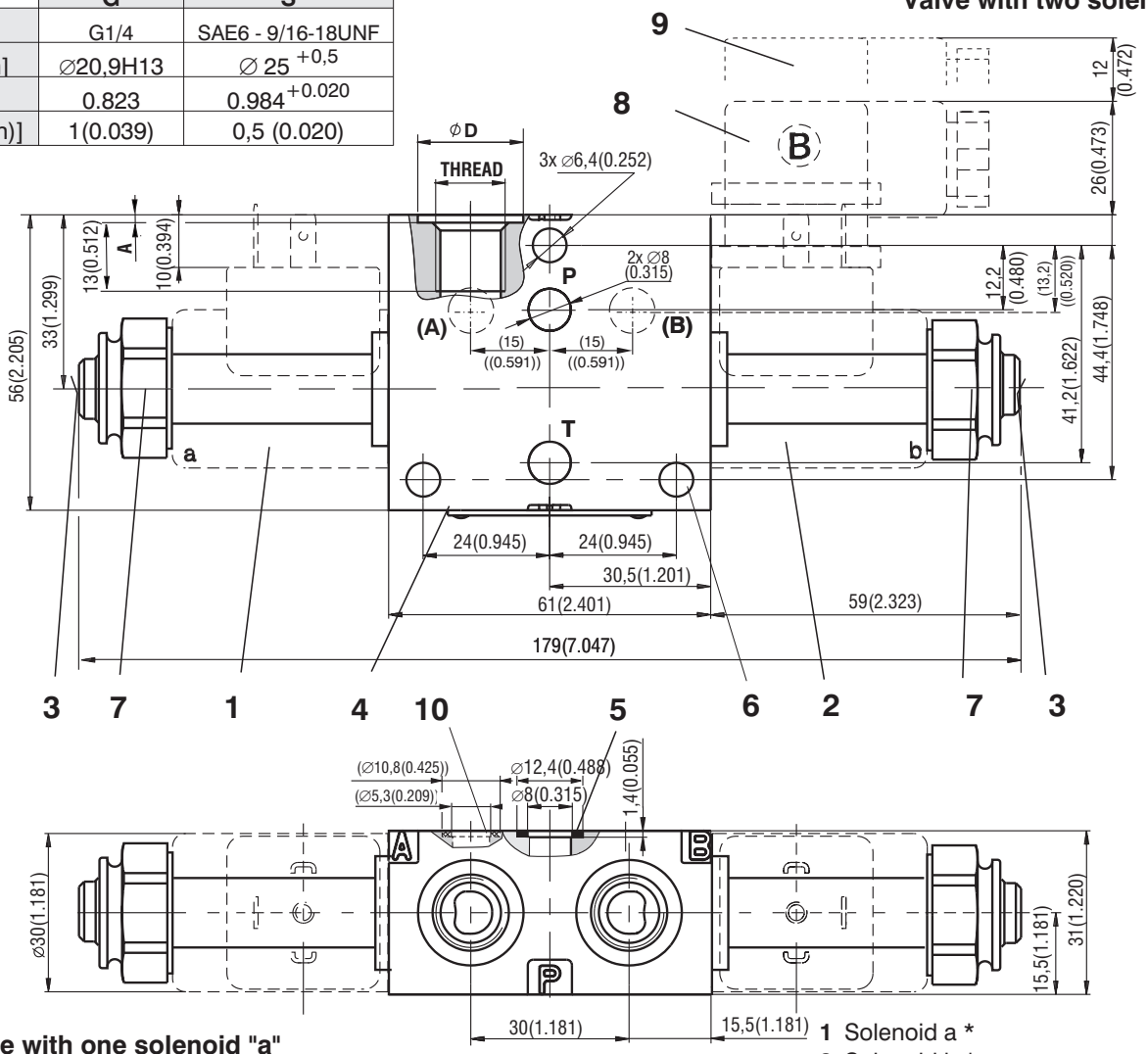
	Z11	C11	H11	Y11	R11	R21	Y51	C51	Z51
P-A	1	3	1	1	2	2		3	
P-B	1	3	1	1	2	2	1		1
A-T	1	3	1	1	2	2	1		1
B-T	1	3	1	1	2	2		3	
P-T		2	2					2	

Valve Dimensions **Standard body version "G" , "S"**

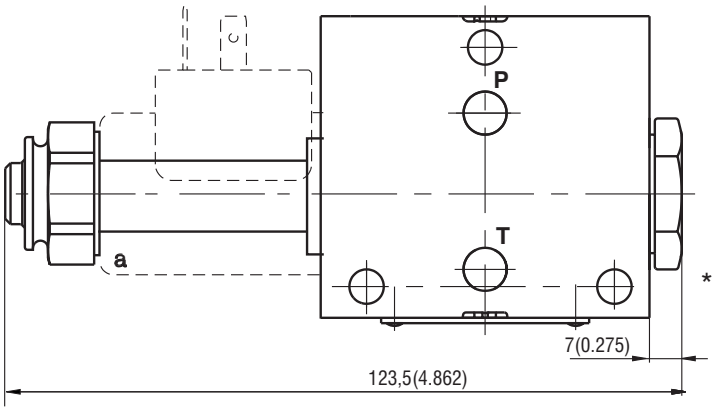
Dimensions in millimeters (inches)

	G	S
THREAD	G1/4	SAE6 - 9/16-18UNF
∅D [mm]	∅20,9H13	$\varnothing 25^{+0,5}$
∅D [in]	0.823	$0.984^{+0.020}$
A [mm (in)]	1(0.039)	0,5 (0.020)

Valve with two solenoids

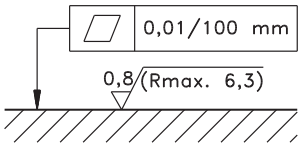


Valve with one solenoid "a"
Functional symbols R11, R21, Y51, C51, Z51



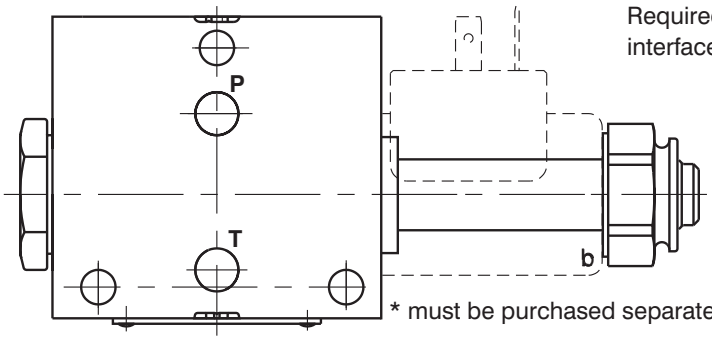
1 Solenoid a *
2 Solenoid b *
3 Manual override
4 Name plate
5 Square ring 9,25 x 1,68 (2 ks.) supplied with valve
6 3 mounting holes
7 Retaining nut of the solenoid
8 Electrical connector, EN 1745301-803
9 Space required to remove connector
10 Outlets A/B are only at the versions P1, Z1; Z3, Seal 7,65x1,68

* must be purchased separately (see page 7)



Required surface finish of interface

Valve with one solenoid "b"
Functional symbols H11

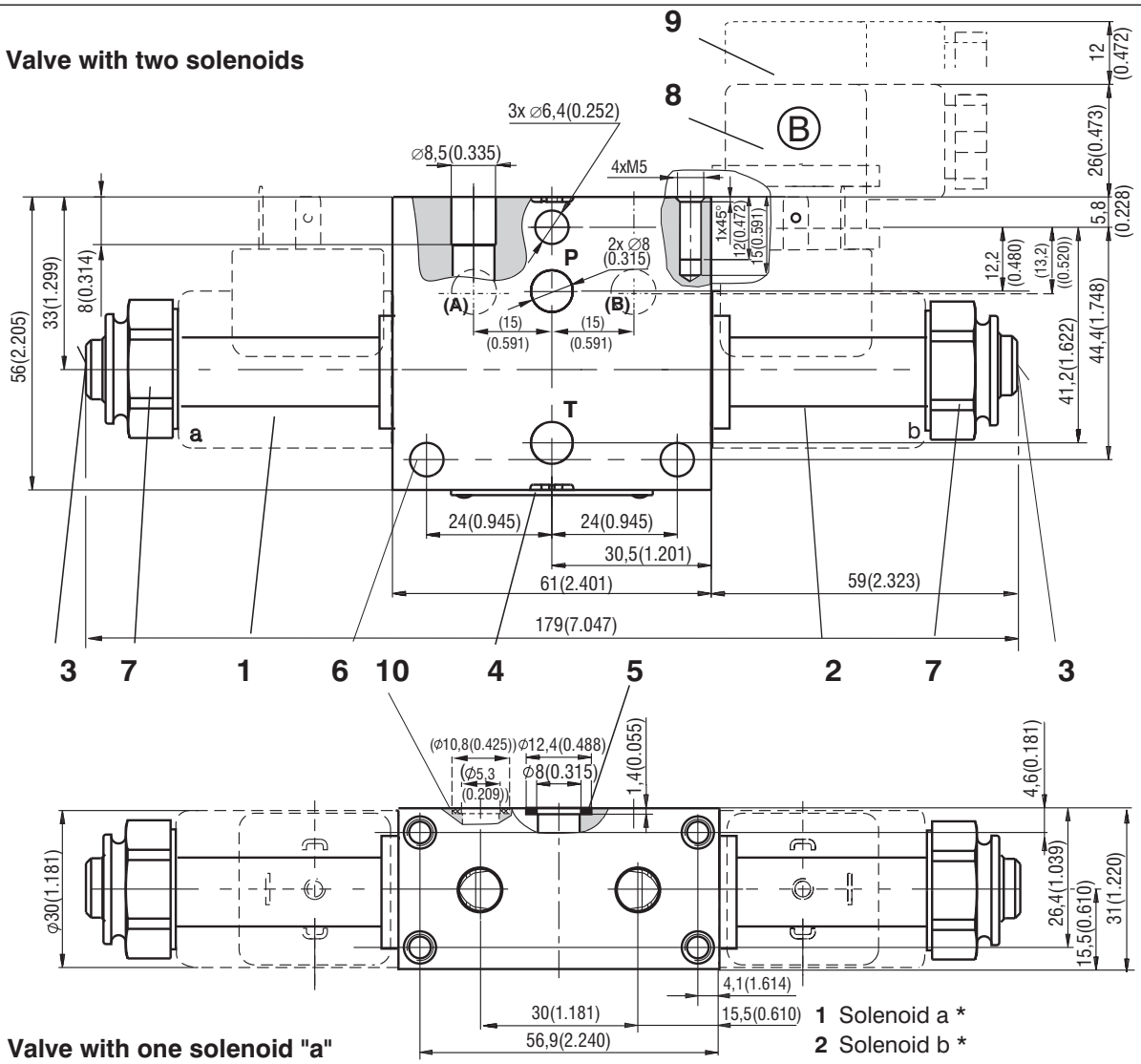


* must be purchased separately (see page 7)

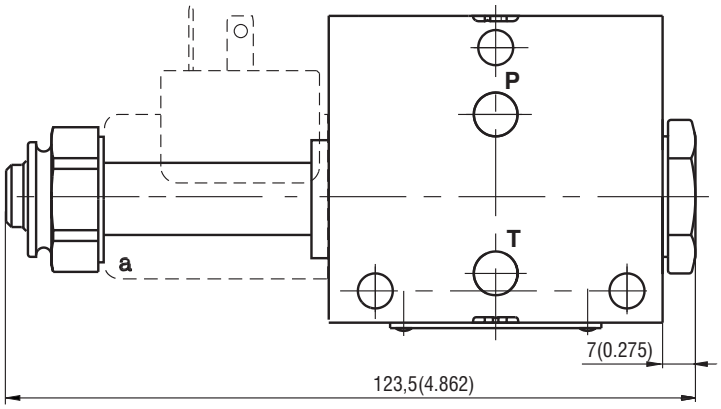
Valve Dimensions **Standard body version "O"**

Dimensions in millimeters (inches)

Valve with two solenoids

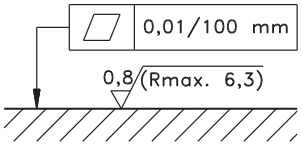


Valve with one solenoid "a"
Functional symbols R11, R21, Y51, C51, Z51



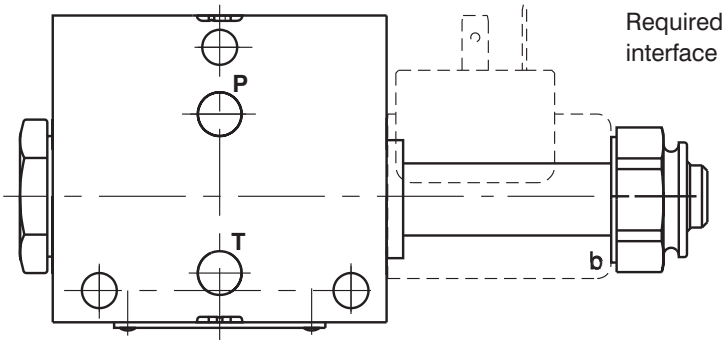
1 Solenoid a *
2 Solenoid b *
3 Manual override
4 Name plate
5 Square ring 9,25 x 1,68 (2 ks.) supplied with valve
6 3 mounting holes
7 Retaining nut of the solenoid
8 Electrical connector, EN 1745301-803
9 Space required to remove connector
10 Outlets A/B are only at the versions P1, Z3, Seal 7,65x1,68

* must be purchased separately (see page 7)



Required surface finish of interface

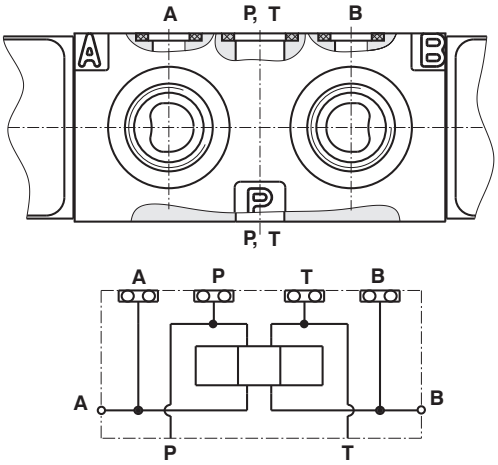
Valve with one solenoid "b"
Functional symbols H11



Design form "G" ("S"), "O"

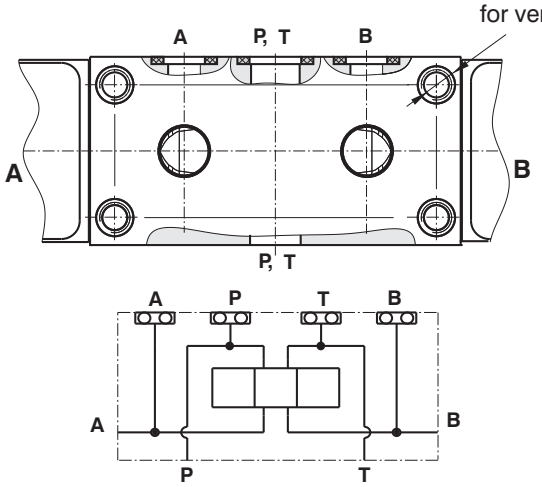
P1 - "G"("S")

hrough channels P, T; outlets A, B with sealing rings



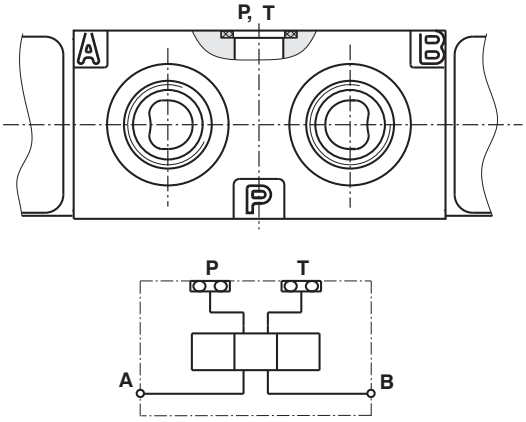
P1 - "O"

4xM5
for vertical assembly

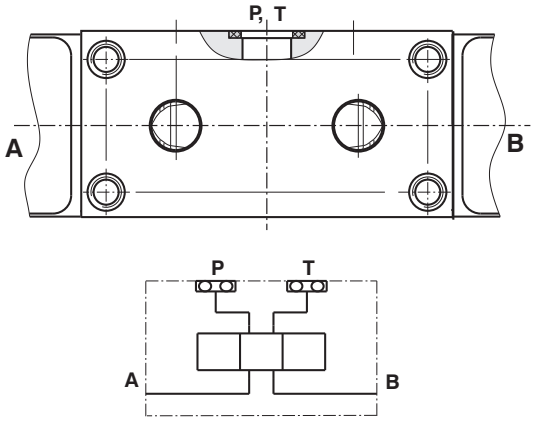


Z1 - "G"("S")

one side inlets of channels P, T with sealing rings (outlets A, B only on the upper surface)

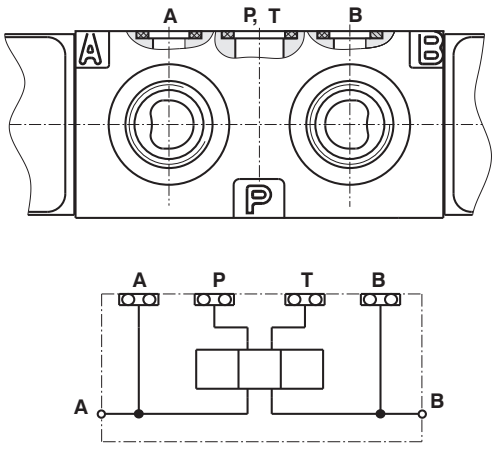


Z1 - "O"

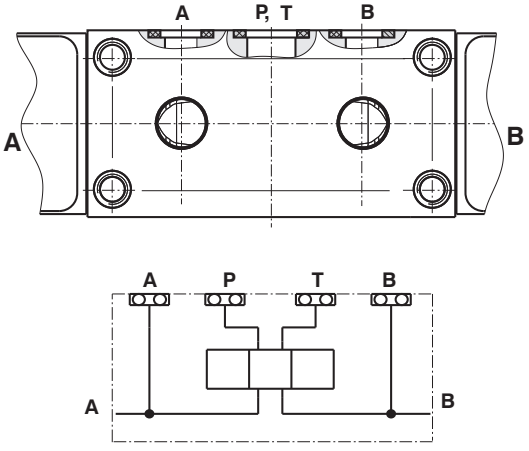


Z3 - "G"("S")

combination of options **Z1 a P1**
one side inlets of channels P, T, A, B with sealing rings



Z3 - "O"



Spare Seal kit

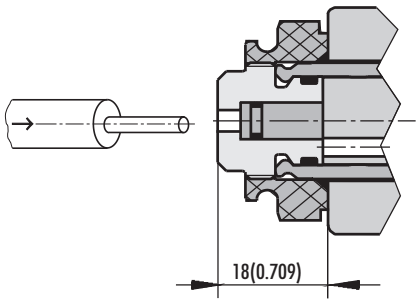
Type	Dimensions, number		Ordering nr. **Z1**
	Sealing - ring	O-ring	
Standard	9,25 x 1,68 NBR 70 (2 ks.)	16 x 2 NBR 90 (2ks.)	15691300

Type	Dimensions, number			Ordering nr. **P1, Z3**
	Sealing - ring	O-ring	Sealing - ring	
Standard	9,25 x 1,68 NBR 70 (2 ks.)	16 x 2 NBR 90 (2 ks.)	7,65 x 1,68 (2 pcs.)	28839800
Viton	9,25 x 1,78 (2 pcs.)	16 x 2 (2 pcs.)	7,65 x 1,78 (2 pcs.)	28840100

Manual Override

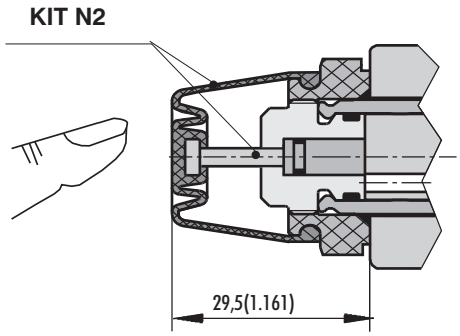
Dimensions in millimeters (inches)

STANDARD	RUBBER BOOT		
NO DESIGNATION	N2	Ordering number / Kit	29269100



Standard model of the manual override.
Standard retaining nut of the solenoid.

KIT N2



Manual override protected by rubber boot.
Kit must be purchased separately.

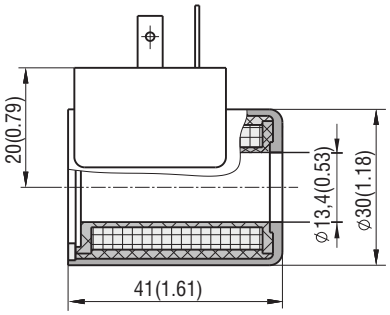
Dimensions of Coils C14

Dimensions in millimeters (inches)

Connector design

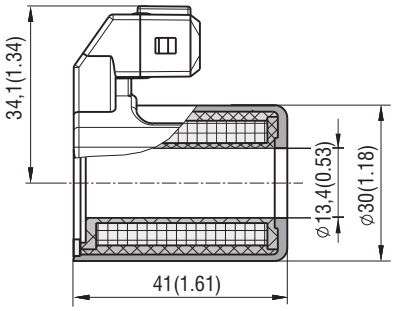
E1, E2
EN 175301-803-A

Protection degree IP65



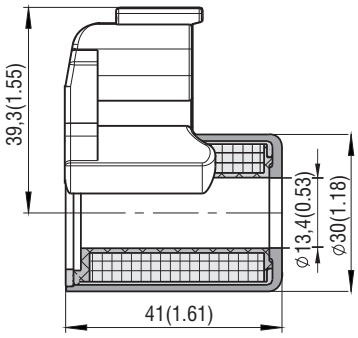
E3A, E4A
AMP Junior Timer

Protection degree IP65



E12, E13
Deutsch DT04-2P

Protection degree IP67, IP69



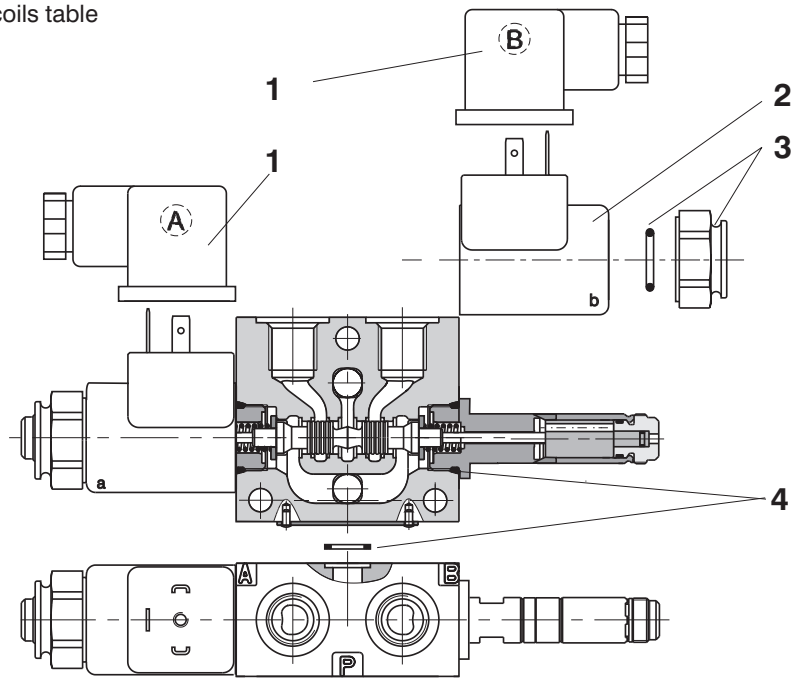
Coils C14B			Type code	Ordering number
Nominal voltage	Nominal current	Connector		
12 VDC	1,83 A	E1 - EN 175301-803-A	C14B-01200E1-6,55NA	16210300
24 VDC	0,92 A	E1 - EN 175301-803-A	C14B-02400E1-26,2NA	16210400
205 V DC*	0,08 A	E1 - EN 175301-803-A	C14B-20500E1-2476NA	16210500
12 VDC	1,83 A	E2 - E1 with quenching diode	C14B-01200E2-6,55NA	24101600
24 VDC	0,92 A	E2 - E1 with quenching diode	C14B-02400E2-26,2NA	24101800
12 VDC	1,83 A	E3A - AMP Junior Timer (2 pins; male)	C14B-01200E3A-6,55NA	28822500
24 VDC	0,92 A	E3A - AMP Junior Timer (2 pins; male)	C14B-02400E3A-26,2NA	28686400
12 VDC	1,83 A	E4A - E3A se zhášecí diodou	C14B-01200E4A-6,55NA	28822600
24 VDC	0,92 A	E4A - E3A se zhášecí diodou	C14B-02400E4A-26,2NA	28822400
12 VDC	1,83 A	E12 - Deutsch DT04-2P	C14B-01200E12-6,55NA	29268200
24 VDC	0,92 A	E12 - Deutsch DT04-2P	C14B-02400E12-26,2NA	29268900
12 VDC	1,83 A	E13 - E12 se zhášecí diodou	C14B-01200E13-6,55NA	29268800
24 VDC	0,92 A	E13 - E12 se zhášecí diodou	C14B-02400E13-26,2NA	29269000

Note:

* Coil version 205 are suitable for the rectified voltage of 230V /50Hz, Rectifier in coil included
Other designs available at request.

Spare Parts

1 Electrical connector
2 Solenoid coil - see coils table
3 Nut with seal
4 Seal kit



Solenoid retaining nut with seal

Type of the nut - Mu 3 Nm(2.21lbs-ft)	Seal ring	Ordering number
Standard nut	13 x 2	15691500
Manual Override N2		29269100

Electrical connector, EN 1745301-803

Type designation	Model	Max. input voltage	Connector A grey	Connector B black
			Ordering number	
K1	without rectifier - M16x1,5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC/DC	16202200	16202100
K2	without rectifier with LED and quenching diode M16x1,5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	12...24 V DC	16202800	16202700
K3	with rectifier - M16x1,5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC	16202400	16202300
K4	with rectifier with LED and quenching diode - M16x1,5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC	16203000	16202900
K5	without rectifier - M16x1,5 bushing bore ∅ 4-6 mm (0.158 - 0.236 in)	230 V AC/DC	16202600	16202500

Caution

- When the distributor contains two electromagnets any of the two electromagnets can be switched on only after the other one switches off.
- Distributors with other interconnections than those shown in the catalogue can be supplied on request.
- The packaging foil can be recycled
- The transport base plate can be returned to the manufacturer.
- The mentioned data only serve to describe the product and in no case are to be understood in terms of law as guaranteed characteristics.

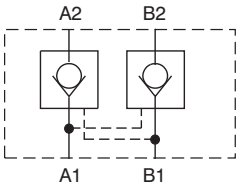
ARGO HYTOS

Pilot Operated Check Valves Sandwich Plates

VJR5-03/M

HA 5027
11/2011

Size 03 • p_{max} up to 250 bar (3625 PSI) • Q_{max} up to 20 l/min (5.28 GPM)

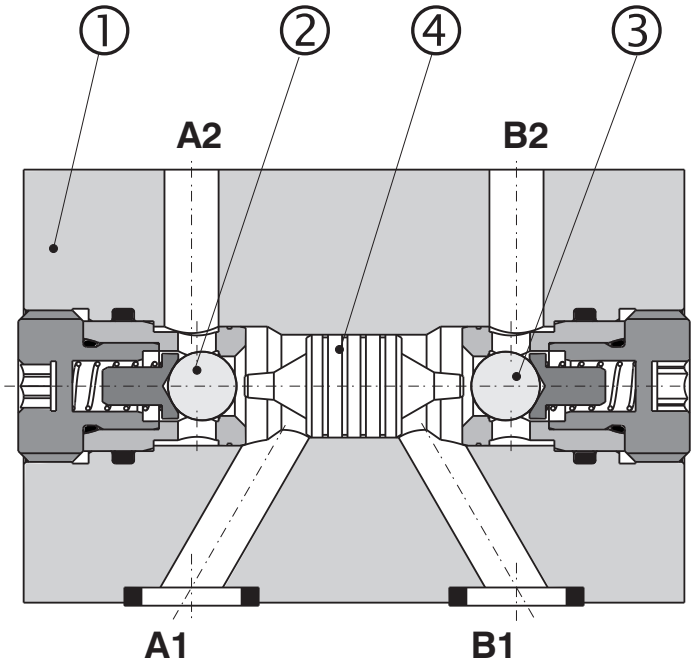


- **Sandwich plate design for use in vertical stacking assemblies**
- **3 models:**
  leakfree closure of both sides with check valves in lines A and B
  leakfree closure with check valve in line A
  leakfree closure in line B

Functional Description

A hydraulic lock serves to close tightly a hydraulic circuit under pressure. It provides a load against a pressure drop and secures a stable position of piston of the cylinder under pressure also for a longer period.
The valve consist of an aluminium body (1), one or two check valves (2), (3) and a control piston (4).
If a fluid is flowing in the direction from A1 (B1) into A2 (B2), a ball lifts (2)or (3), and the control piston (4) shifts at the same time to the right (left) and pushes out the ball (3) or (2) from the seat. This releases the connection B2 →B1 (A2→A1). If the pressure drops in channels A1 and B1 (e.g. when the distributor shifts to the centre position), the spring presses the ball springs (2) and (3) into the seats and the cylinder circuit is closed under pressure.
To ensure a tight seal of the spaces A2 and B2, the distributor with Y interconnection must be used, which, when in the centre position, connects both sides of the control piston (4) with the tank.

Without surface finish.



Ordering Code

VJR5-03/M □ □

Pilot Operated Check Valve Sandwich Plate

Nominal size

Modular design

A
B
C

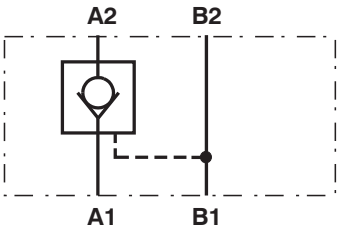
Functional Symbols
check valve in line A*
check valve in line B*
check valves in lines A and B*
* see the table Functional symbols

Seals
no designation NBR
V FPM (Viton)

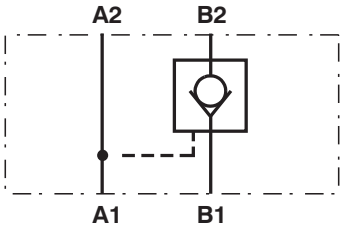
Functional Symbols

Arrangement of the check valves in the valve body

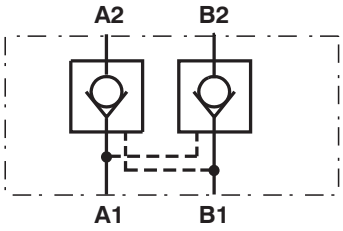
VJR5-03/MA



VJR5-03/MB



VJR5-03/MC



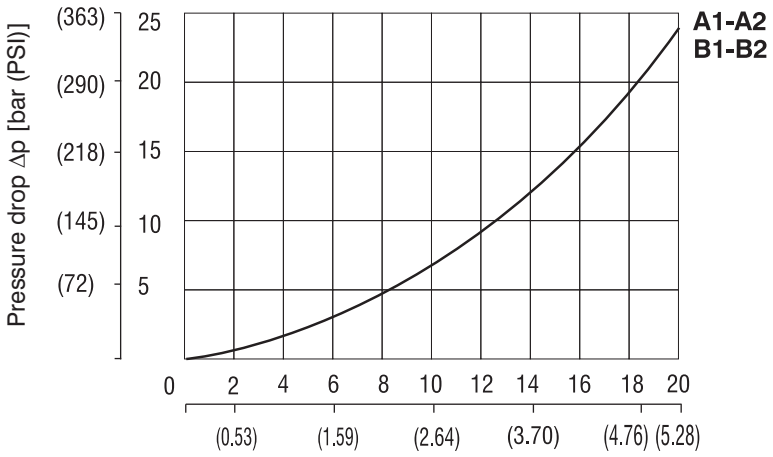
Technical Data

Nominal size		03
Maximum flow	L/min (GPM)	20 (5.28)
Maximum operating pressure	bar (PSI)	250 (3625)
Cracking pressure	bar (PSI)	0,25 (3.625)
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range (NBR)	°C (°F)	-30 ... +80 (-22 ...+176)
Fluid temperature range (Viton)	°C (°F)	-20 ... +80 (-4 .... +176)
Viscosity range	mm^2/s	20 ... 400 (98 .... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406 (2006)
Area ratio (pilot piston / poppet)		3 : 1
Mounting position		optional
Weight	kg (lb)	0,2 (0.44)

Δp-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

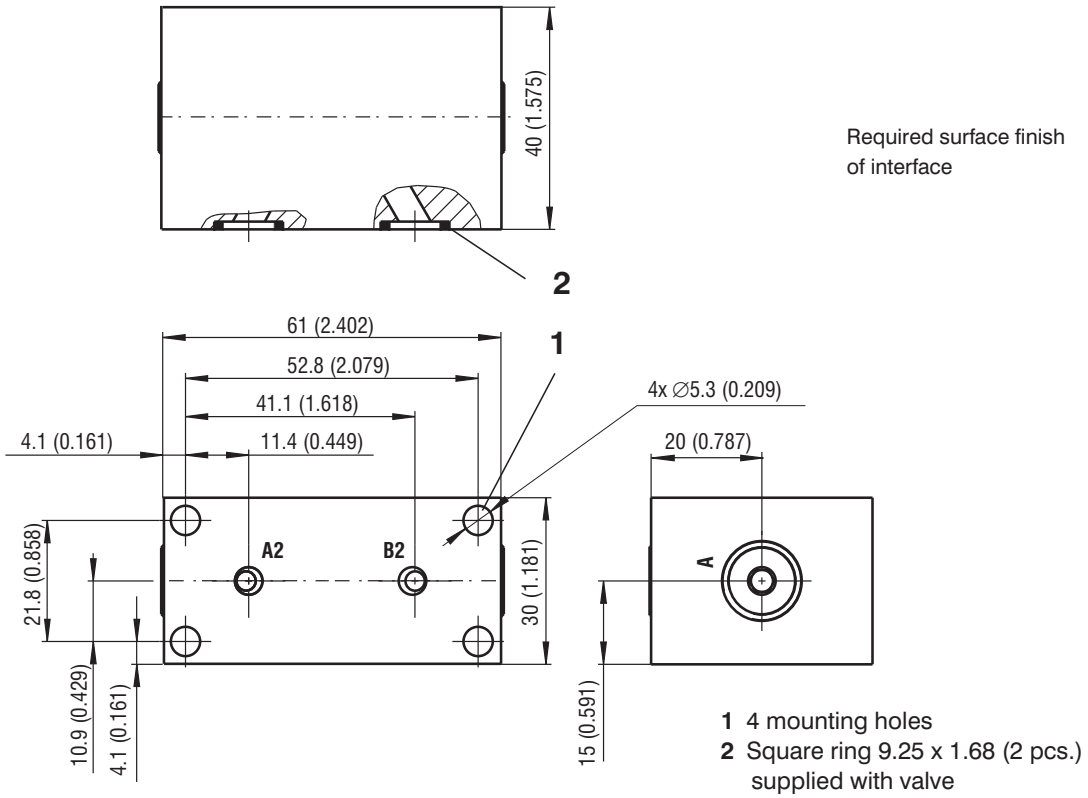
Pressure drop Δp related to flow rate.
Pressure loss with distributor **RPEK1-033/Y11**



	Flow in direction
1	A1 → A2 (B1 → B2)
2	A2 → A1 (B2 → B1)

Valve Dimensions

Dimensions in millimeters (inches)



Required surface finish of interface

1 4 mounting holes
2 Square ring 9.25 x 1.68 (2 pcs.) supplied with valve

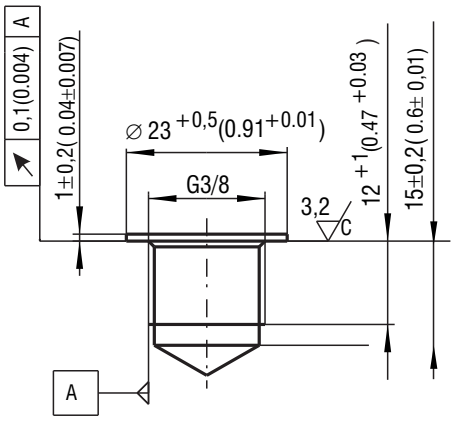
Spare Parts

Seal kit			
Type	Dimensions, quantity		Ordering number
	Square ring	O-ring	
Standard NBR70	9,25 x 1,68 (2 pcs.)	4,47 x 1,78 (2 pcs.)	28407200
Viton	-	9,25 x 1,78 (2 pcs.)	28407300
		4,47 x 1,78 (2 pcs.)	

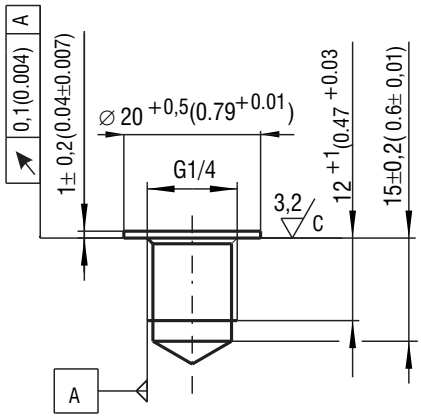
Threaded Chambers for the RPEK Kit Connecting

INLET/OUTLET PORTS FOR HORIZONTAL AND VERTICAL ASSEMBLY

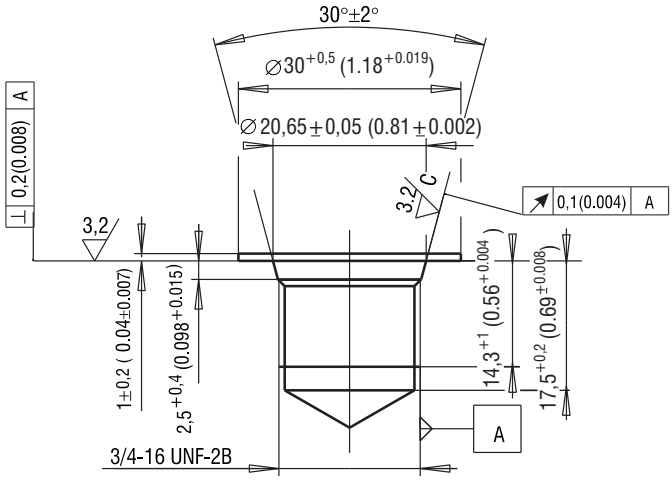
G3/8 ..... P, T



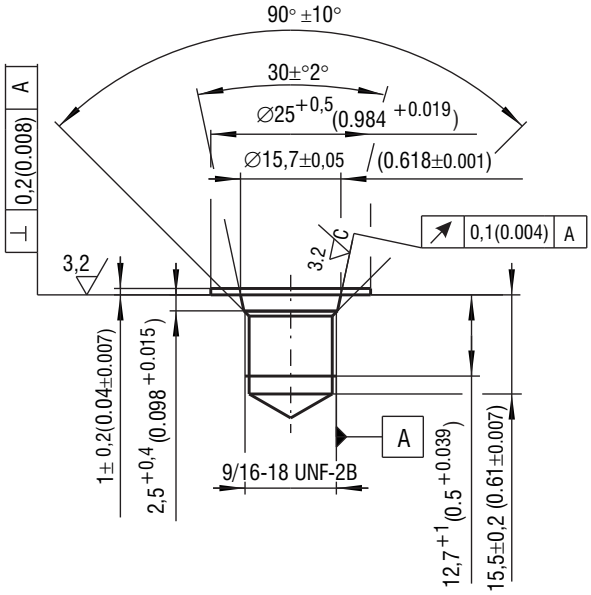
G1/4 ..... M, A, B



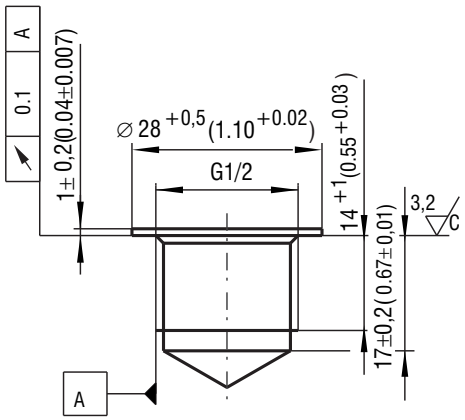
SAE8 - 3/4-16 UNF ..... P, T



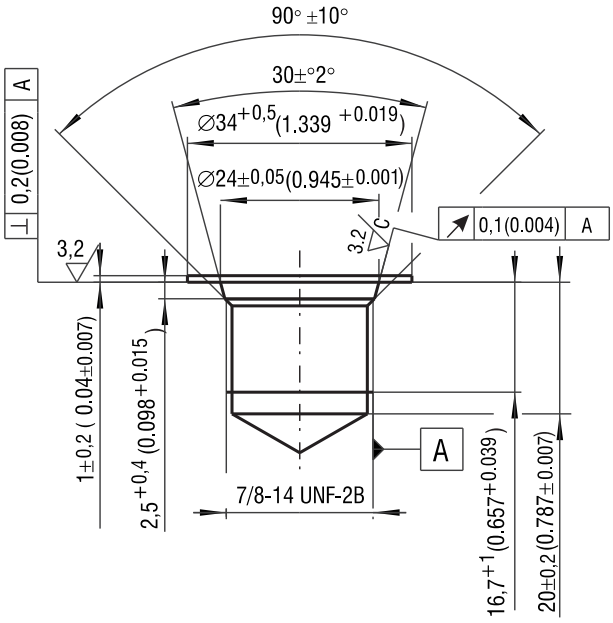
SAE6 - 9/16-18 UNF ..... A, B



G1/2 ..... P, T



SAE4 - 7/16-20 UNF ..... M



HORIZONTAL ASSEMBLY PLATES

1- 8 sections (up to 16 sections – when using centre feeding plate with bolt threads from both sides)

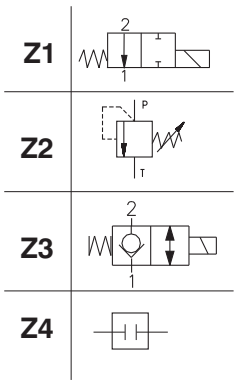
Complete valves in modular configuration

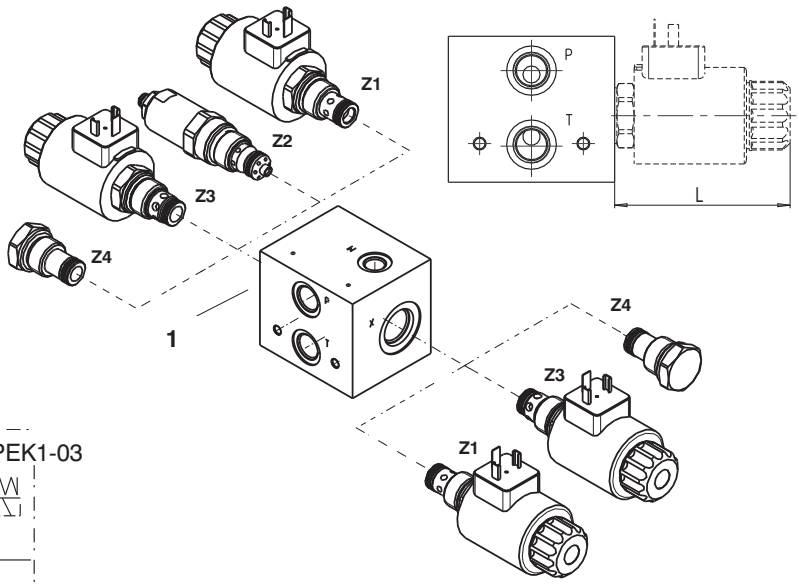
RPEK1-03	Dn03	Data sheet HA 4027		4-13	L2=31 mm (1.22 in)
Type	**Cavity**	**Connecting threads**	**Ordering number**	**Page**	**Description** (to select the studs)
Inlet P,T Plates with Valves					
HB03-RPEK-**MPT**	2/2 - 7/8-14UNF	G 3/8 - P, T, G 1/4 - M	28566200	17	---
HB03-RPEK-**MPT-S**	2/2 - 7/8-14UNF	SAE 8 - P, T, SAE 4 - M	29342200	17	---
HB03-RPEK-**MPT1**	2/2 - 7/8-14UNF	G 3/8 - P, T, G 1/4 - M	28813600	18	---
HB03-RPEK-**MPT1-S**	2/2 - 7/8-14UNF	SAE 8 - P, T, SAE 4 - M	29342300	18	---
HB03-RPEK-**MPT2**	2/2 - 7/8-14UNF	G 1/2 - P, T, G 1/4 - M	29401100	19	---
HB03-RPEK-**MZ**	2/2 - 7/8-14UNF	G 3/8 - P, T	28566300	20	---
HB03-RPEK-**MZ-S**	2/2 - 7/8-14UNF	SAE 8 - P, T	29342400	20	---
Centre P,T Plates					
Bolt threads from both sides					
HB03-RPEK-**01**		G 3/8 - P, T,	28659800	21	---
HB03-RPEK-**01-S**		SAE 8 - P, T	29344600	21	---
HB03-RPEK-**02**		G 3/8 - P, T, G 1/4 - M	28659900	21	---
HB03-RPEK-**02-S**		SAE 8 - P, T, SAE 4 - M	29344700	21	---
Straight-through holes for bolts					
HB03-RPEK-**03**		G 3/8 - P, T	28660000	22	L2=31 mm (1.22 in)
HB03-RPEK-**03-S**		SAE 8 - P, T	29344800	22	L2=31 mm (1.22 in)
HB03-RPEK-**04**		G 3/8 - P, T, G 1/4 - M	28660100	22	L2=31 mm (1.22 in)
HB03-RPEK-**04-S**		SAE 8 - P, T, SAE 4 - M	29344900	22	L2=31 mm (1.22 in)
Inlet P,T and End Plates without Valves					
Without recess for sealing rings					
HB03-RPEK-**05**			16786901	23	L3=14 mm (0.55 in)
HB03-RPEK-**06**		G 3/8 - P, T, G 1/4 - M	28566800	23	L2=31 mm (1.22 in)
HB03-RPEK-**06-S**		SAE 8 - P, T, SAE 4 - M	29343300	23	L2=31 mm (1.22 in)
With sealing rings' recess					
HB03-RPEK-**07**		G 3/8 - P, T, G 1/4 - M	28660200	24	L2=31 mm (1.22 in)
HB03-RPEK-**07-S**		SAE 8 - P, T, SAE 4 - M	29345000	24	L2=31 mm (1.22 in)
HB03-RPEK-**08**			28660300	24	L3=14 mm (0.55 in)
Horizontal Sandwich Plates with Valves					
HB03-RPEK-**MP1**	3/2 - 3/4-16UNF	G 1/4 - M	28658500	25	L1=40 mm (1.57 in)
HB03-RPEK-**MP1-S**	3/2 - 3/4-16UNF	SAE 4 - M	29344000	25	L1=40 mm (1.57 in)
HB03-RPEK-**MP2**	3/2 - 3/4-16UNF	G 1/4 - M	28658900	26	L1=40 mm (1.57 in)
HB03-RPEK-**MP2-S**	3/2 - 3/4-16UNF	SAE 4 - M	29344100	26	L1=40 mm (1.57 in)
HB03-RPEK-**MC**	2/2 - 3/4-16UNF		28659200	27	L1=40 mm (1.57 in)
HB03-RPEK-**MD**	2/2 - 3/4-16UNF		28659400	28	L1=40 mm (1.57 in)
HB03-RPEK-**MAB**	2/2 - 3/4-16UNF	G 1/4 - A, B	28659700	29	L1=40 mm (1.57 in)
HB03-RPEK-**MAB-S**	2/2 - 3/4-16UNF	SAE 6 - A, B	29344200	29	L1=40 mm (1.57 in)
HB03-RPEK-**MAB1**	M20x1,5	G 1/4 - A, B	28650700	30	L1=40 mm (1.57 in)
HB03-RPEK-**MAB1-S**	M20x1,5	SAE 6 - A, B	29344500	30	L1=40 mm (1.57 in)
HB03-RPEK-**MAB2**	2/2 - 3/4-16UNF		29397800	31	L1=40 mm (1.57 in)

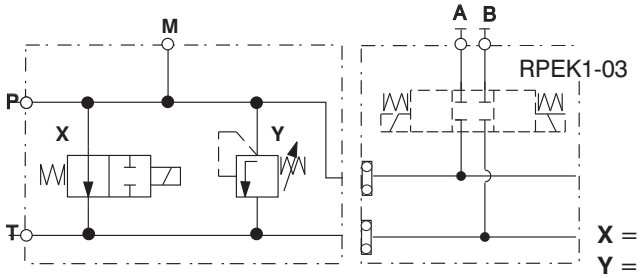
Other possible assembly parts - for connecting material see pages 32, 33.

- A pressure plug **15625300** can be ordered measuring outlet and off the **A, B - G1/4** valve outlet.
- A pressure plug **20400400** can be ordered measuring outlet and off the **A, B - SAE 6** valve outlet.
- A pressure plug **20399400** can be ordered to blank off the **M - SAE 4**.

Inlet Palate HB03-RPEK-MPT/-(S) 28566200/(29342200)





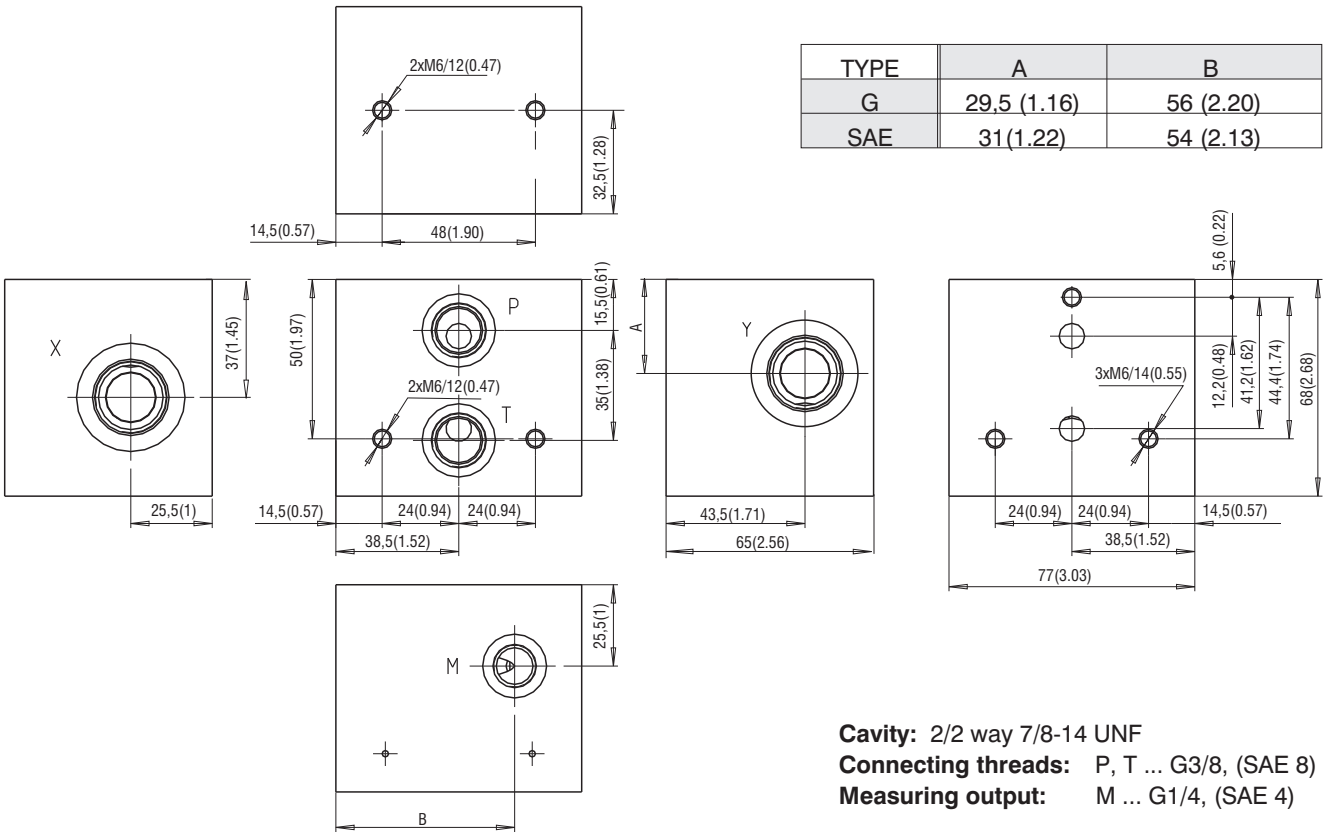


X = Z1, Z3, Z4, Z5
Y = Z1, Z2, Z3, Z5

Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering nummer
1	Inlet Palate	HB03-RPEK-MPT		0,813(1.79)		28566200
		HB03-RPEK-MPT-S				29342200
Z1	Directional valve	SD2E-B2	82 (3.23)		HA 4060	
Z2	Pressure valve	SR1A-B2	65 (2.56)		HA 5064	
Z3	Directional valve	SD3E-B2	82 (3.23)		HA 4063	
Z4	Check valve	SC1F-B2	28 (1.10)		HA 5017	
Z5	Plug 2/2-7/8-14UNF		10 (0.39)			19356300

Valve Dimensions - MPT/-(S)

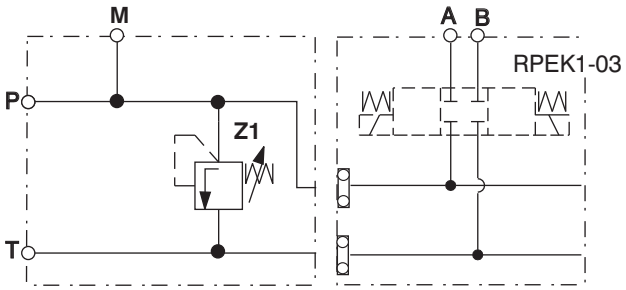
Dimensions in millimeters (inches)

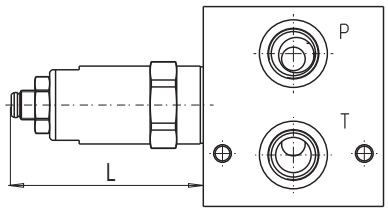


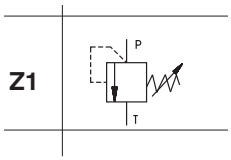
TYPE	A	B
G	29,5 (1.16)	56 (2.20)
SAE	31(1.22)	54 (2.13)

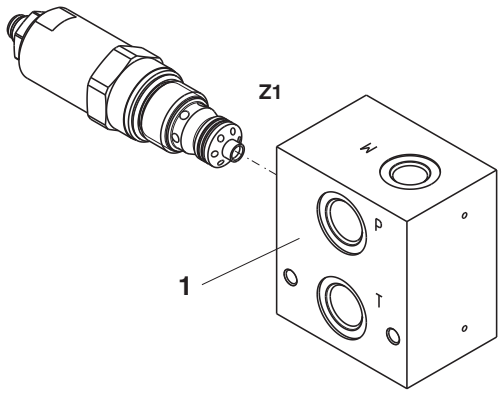
Cavity: 2/2 way 7/8-14 UNF
Connecting threads: P, T ... G3/8, (SAE 8)
Measuring output: M ... G1/4, (SAE 4)

Inlet Palate HB03-RPEK-MPT1/-(S) 28813600/(29342300)





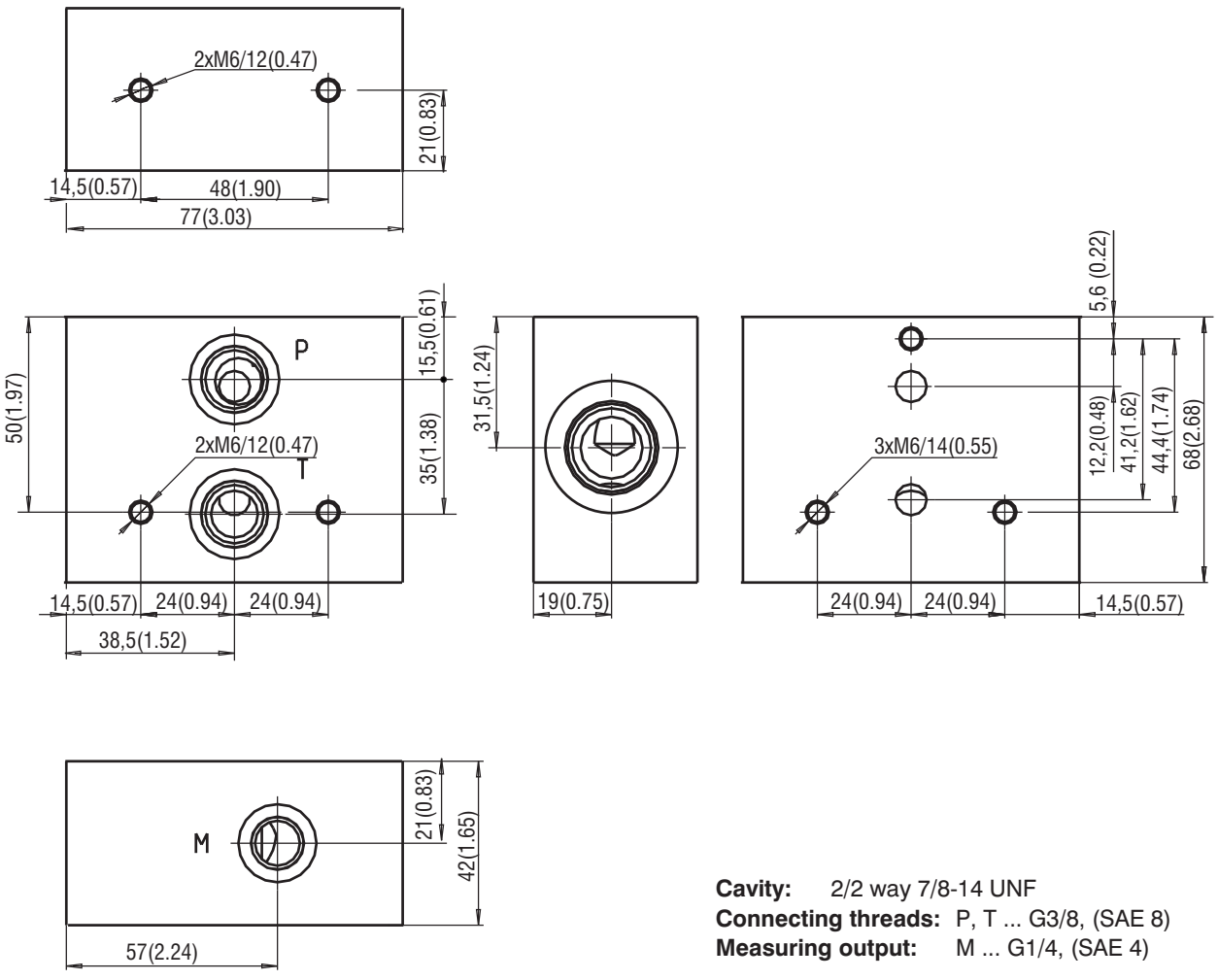




Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering nummer
1	Inlet Palate	HB03-RPEK-MPT1		0,407(0.897)		28813600
		HB03-RPEK-MPT1-S				29342300
Z1	Pressure valve	SR1A-B2	65 (2.56)		HA 5064	

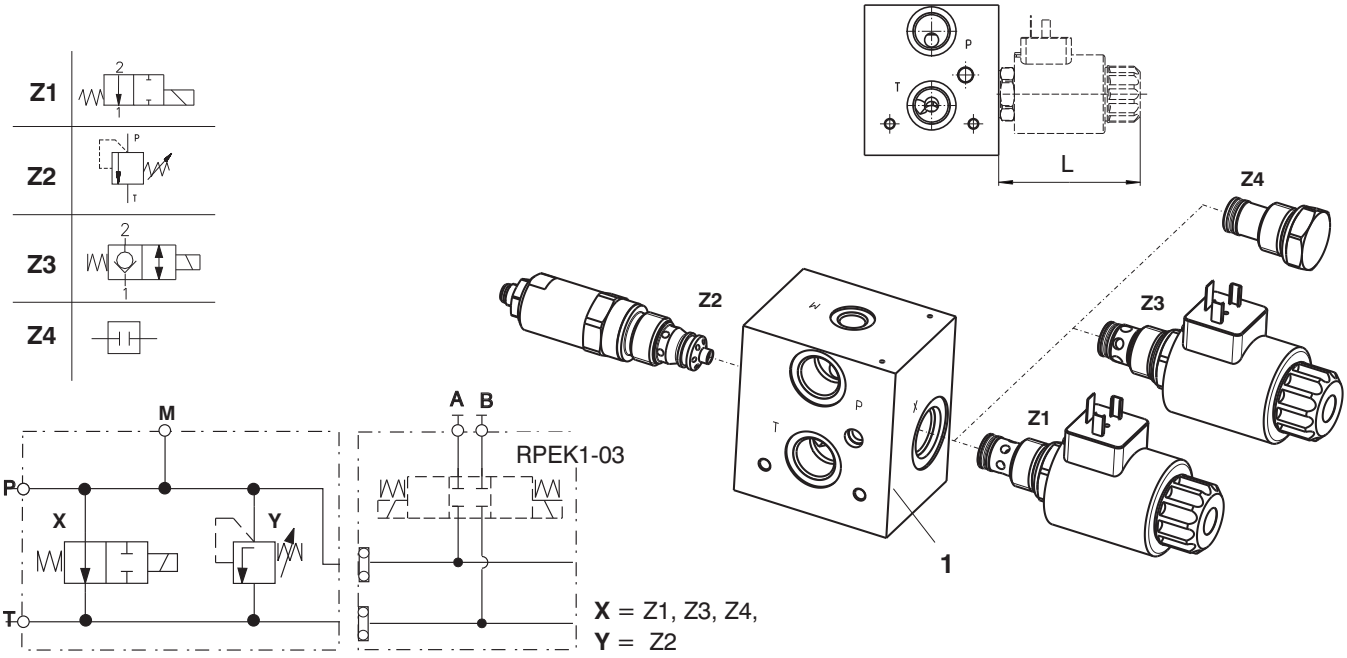
Valve Dimensions - MPT1/-(S)

Dimensions in millimeters (inches)



Cavity: 2/2 way 7/8-14 UNF
Connecting threads: P, T ... G3/8, (SAE 8)
Measuring output: M ... G1/4, (SAE 4)

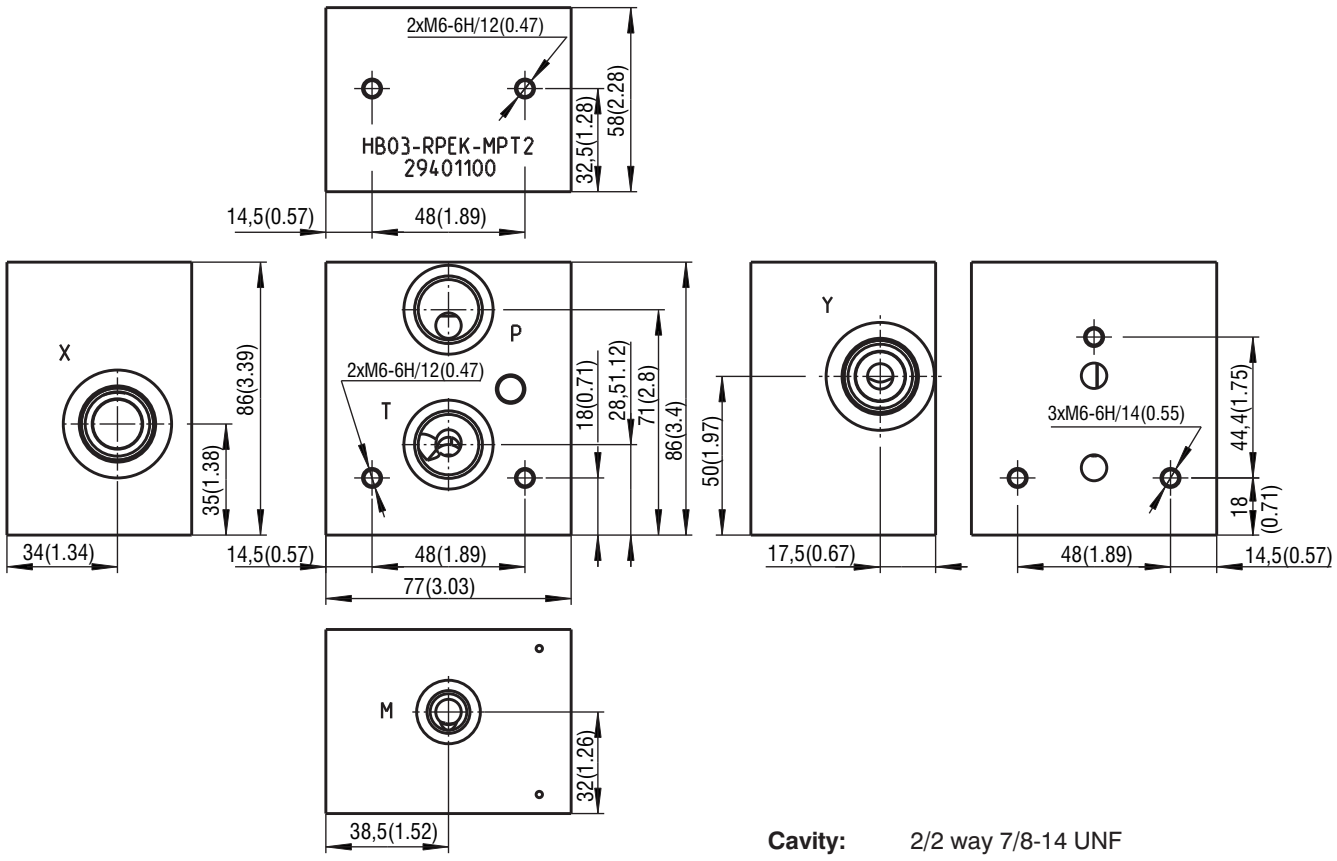
Inlet Palate HB03-RPEK-MPT2 29401100



Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering nummer
1	Inlet Palate	HB03-RPEK-MPT2		0.934 (2.059)		29401100
Z1	Directional valve	SD2E-B2	82 (3.23)		HA 4060	
Z2	Pressure valve	SR1A-B2	65 (2.56)		HA 5064	
Z3	Directional valve	SD3E-B2	82 (3.23)		HA 4063	
Z4	Plug 2/2-7/8-14UNF		10 (0.39)			19356300

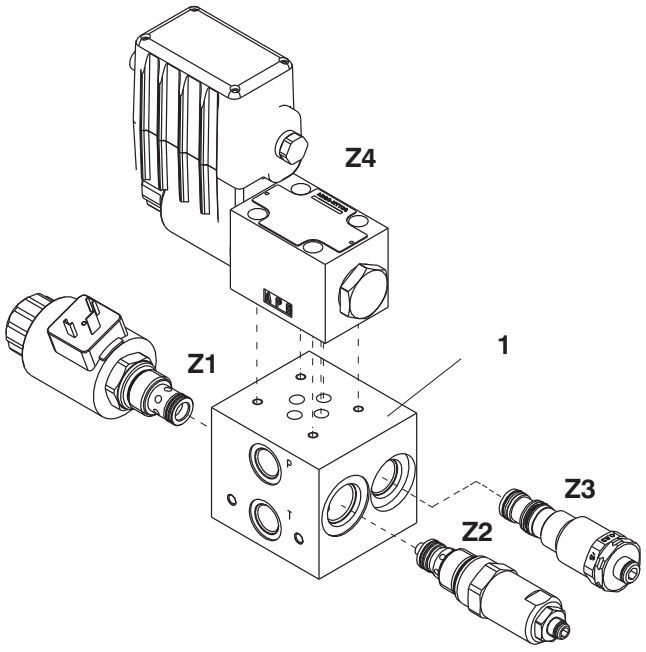
Valve Dimensions - MPT2

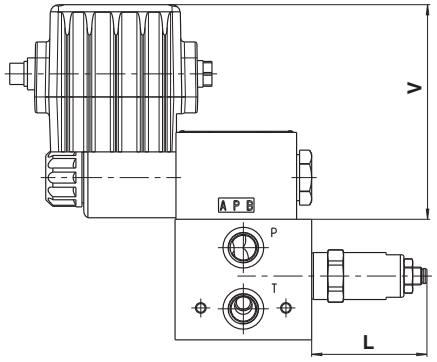
Dimensions in millimeters (inches)

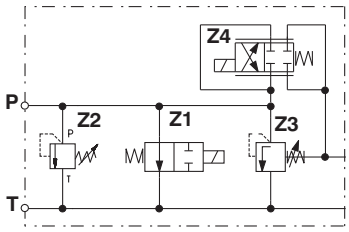


Cavity: 2/2 way 7/8-14 UNF
Connecting threads: P, T... G 1/2
Measuring output: M ... G1/4

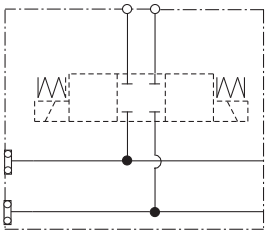
Inlet Palate HB03-RPEK-MZ/-(S) 28566300/(29342400)







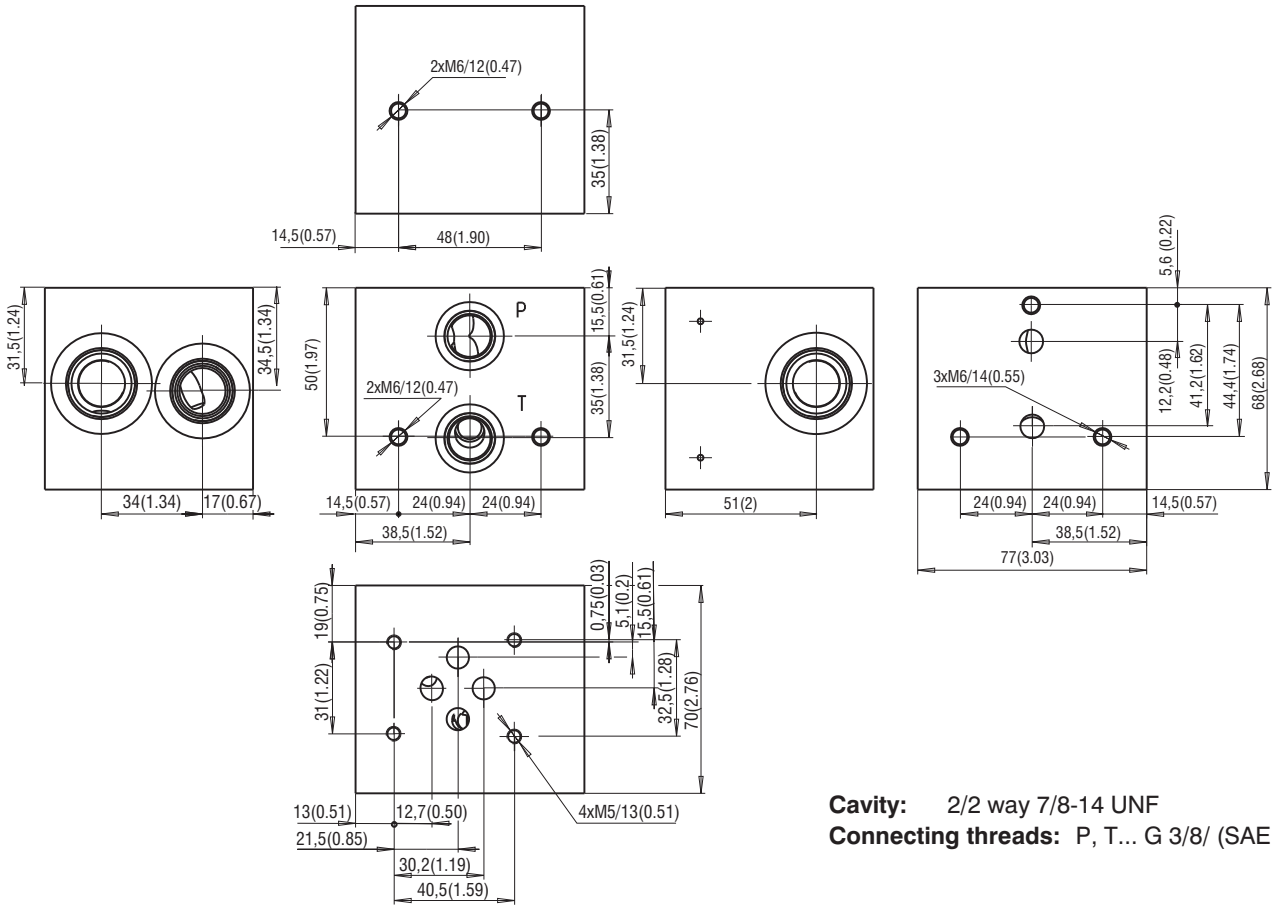
RPEK1-03



Pos.	Name	Type	Max. L [mm (in)]	Max. V [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering nummer
1	Inlet Palate	HB03-RPEK-MZ			0,846 (1.865)		28566300
		HB03-RPEK-MZ-S					29342400
Z1	Directional valve	SD2E-B2	82 (3.23)			HA 4060	
Z2	Pressure valve	SR1A-B2	65 (2.56)			HA 5064	
Z3	3 way Pressure compensator	TV2-063	42 (1.65)			HA 5168	
Z4	Proportional valve	PRM2-06	140 (5.51)	121(4.76)		HA 5105	
Z3	Plug 2/2-7/8-14UNF		10 (0.39)				19356300

Valve Dimensions - MZ/-(S)

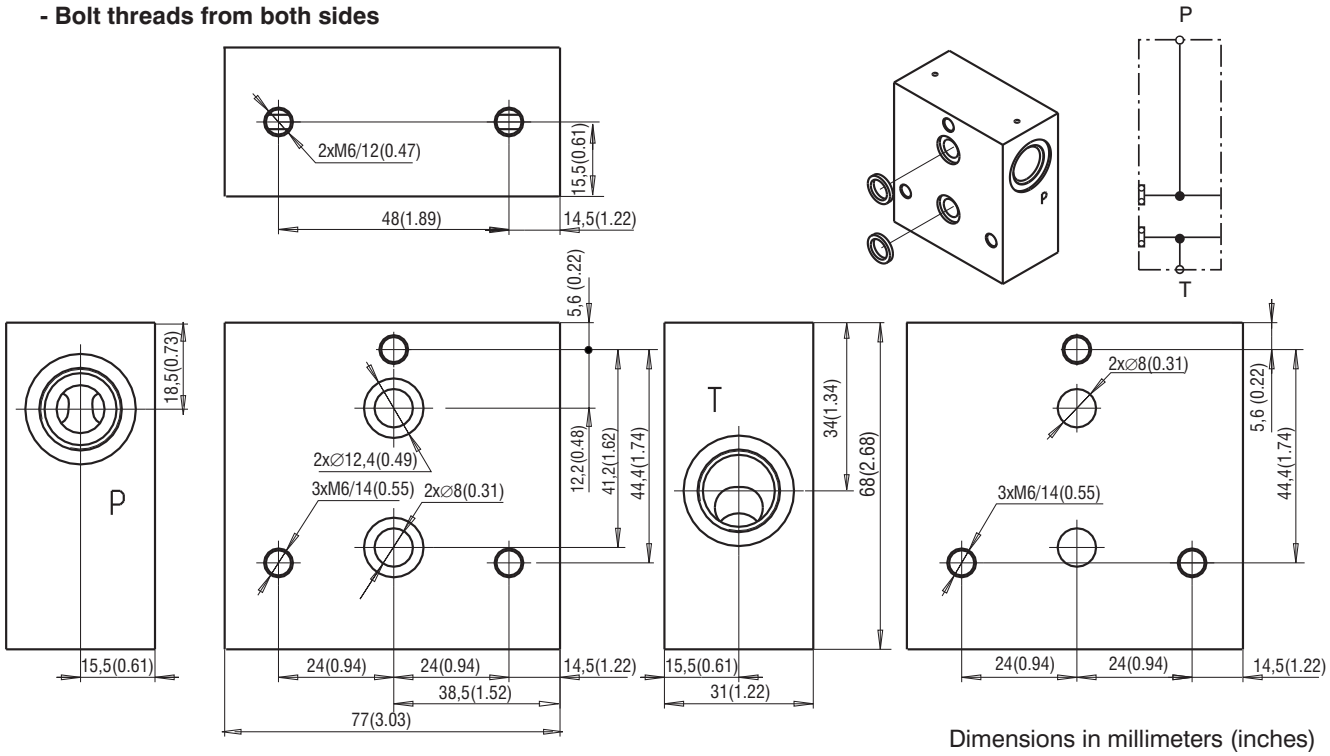
Dimensions in millimeters (inches)



Cavity: 2/2 way 7/8-14 UNF
Connecting threads: P, T... G 3/8/ (SAE 8)

Centre P,T Plate HB03-RPEK-01/-(S) 28659800/(29344600)

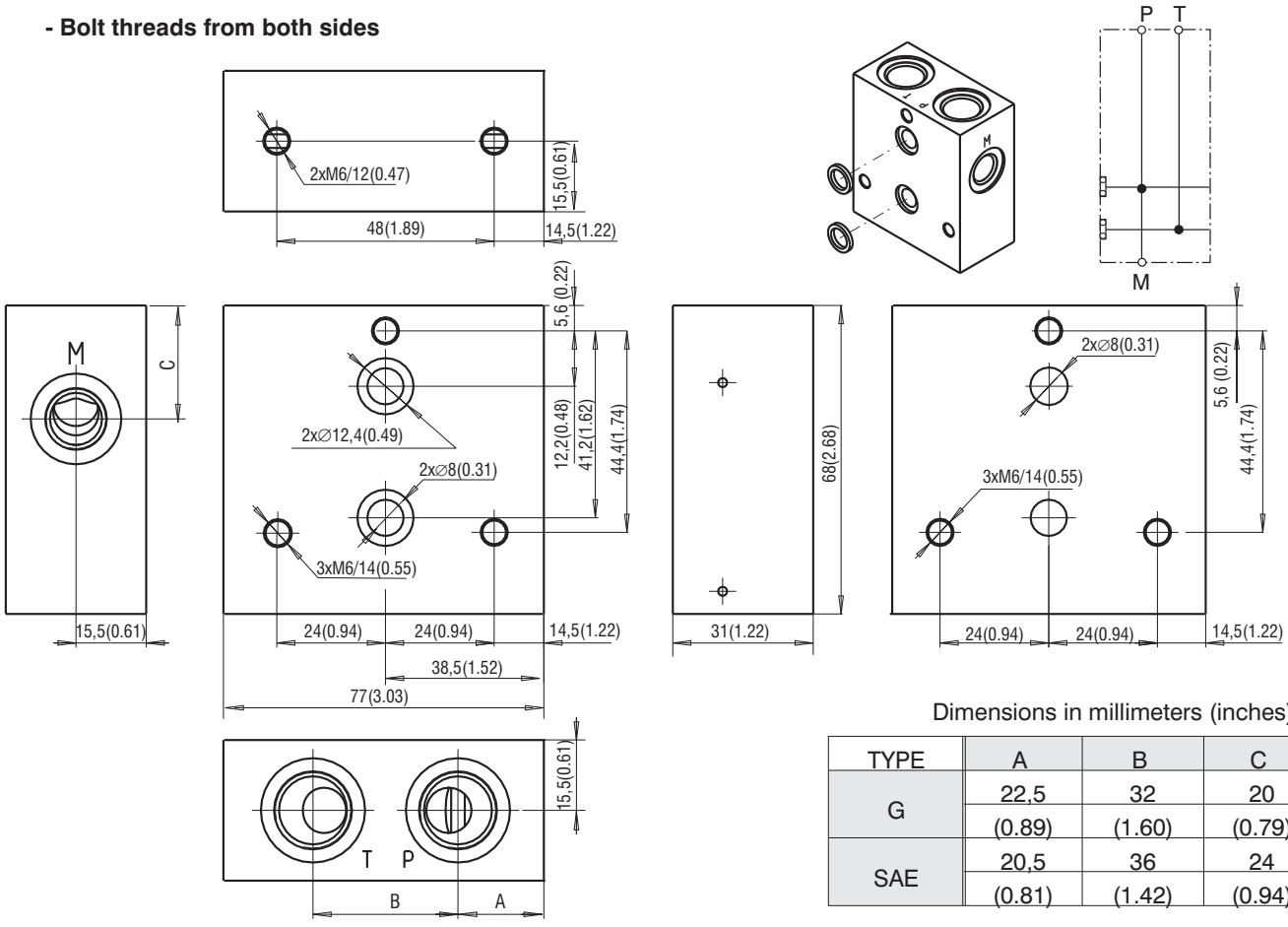
- Bolt threads from both sides



Dimensions in millimeters (inches)

Centre P,T Plate HB03-RPEK-02/-(S) 28659900/(29344700)

- Bolt threads from both sides



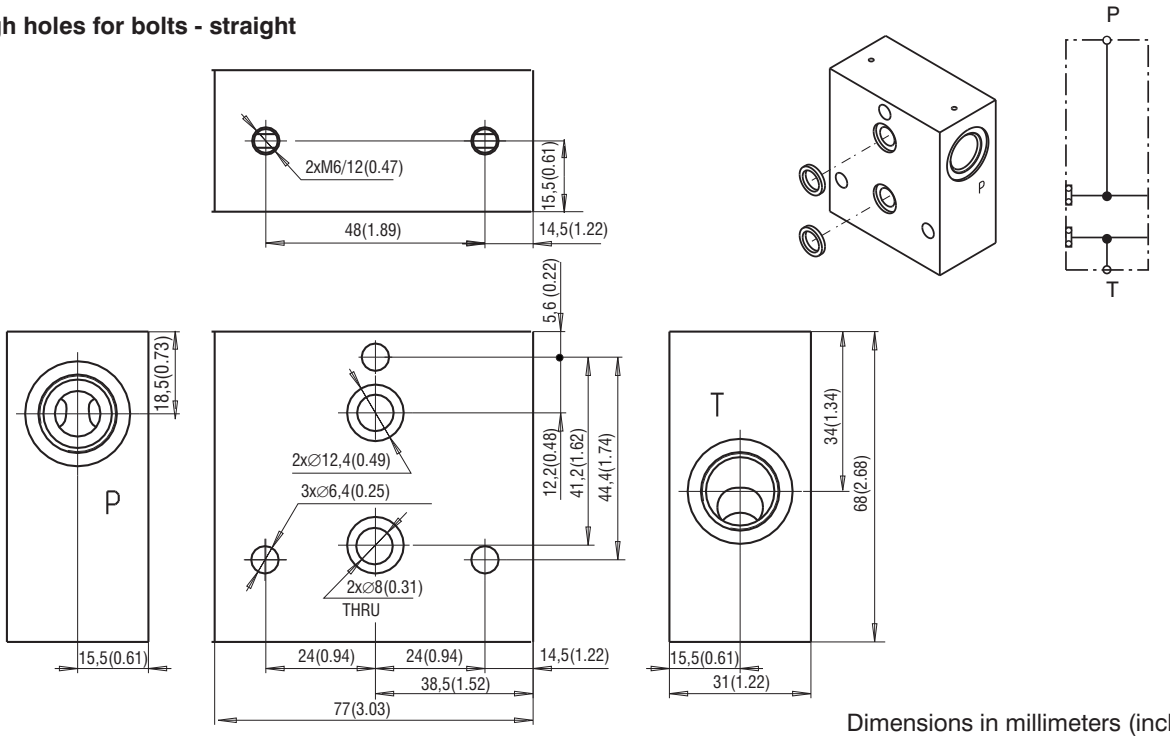
Dimensions in millimeters (inches)

TYPE	A	B	C
G	22,5	32	20
	(0.89)	(1.60)	(0.79)
SAE	20,5	36	24
	(0.81)	(1.42)	(0.94)

Name	Type	Port size			Ordering number	Weight [kg (lb)]
		P	T	M		
Plate+seals	HB03-RPEK-01	G3/8	G3/8	-	28659800	0,318 (0.701)
Plate+seals	HB03-RPEK-01-S	SAE 8	SAE 8	-	29344600	
Plate+seals	HB03-RPEK-02	G3/8	G3/8	G1/4	28659900	0,318 (0.701)
Plate+seals	HB03-RPEK-02-S	SAE 8	SAE 8	SAE 4	29344700	

Centre P,T Plate HB03-RPEK-03/-(S) 28660000/(29344800)

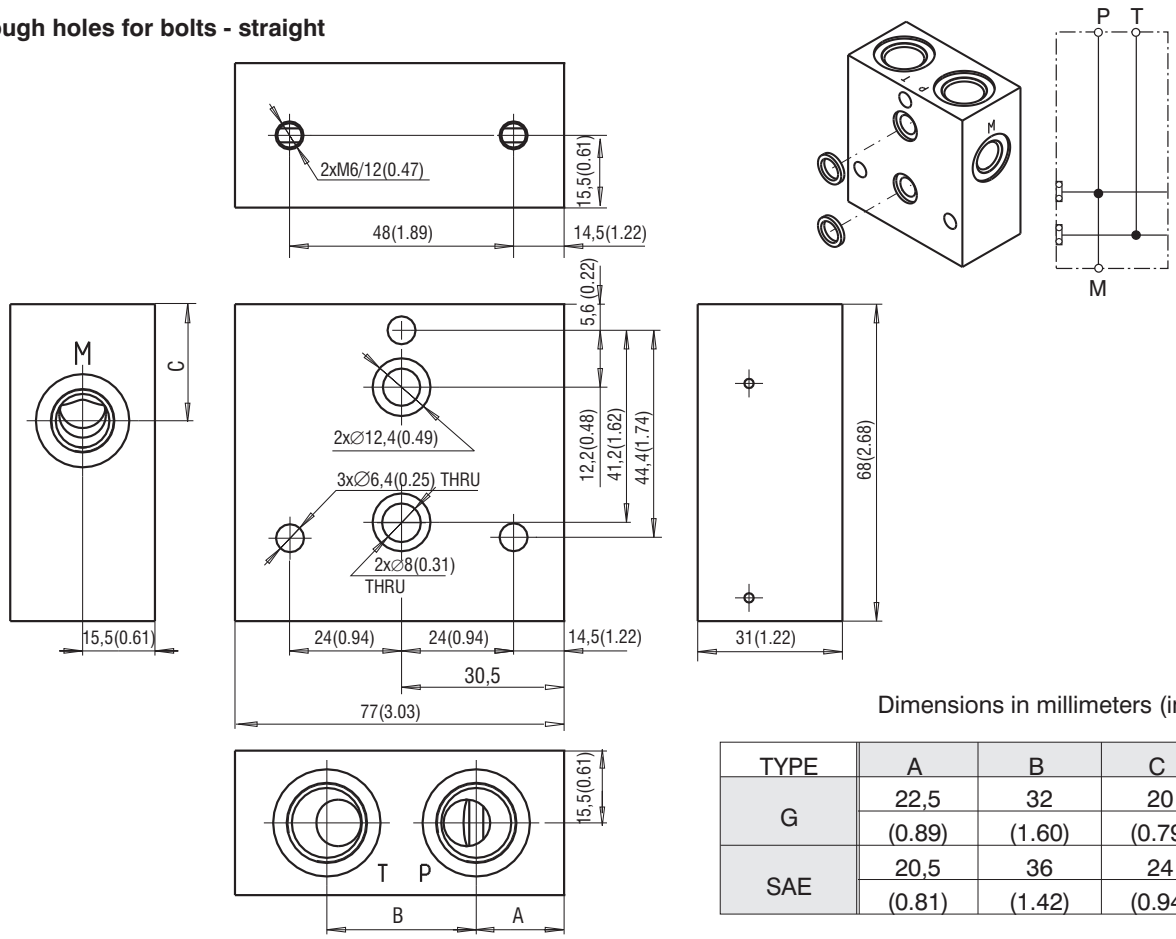
- through holes for bolts - straight



Dimensions in millimeters (inches)

Centre P,T Plate HB03-RPEK-04/-(S) 28660100/(29344900)

- through holes for bolts - straight



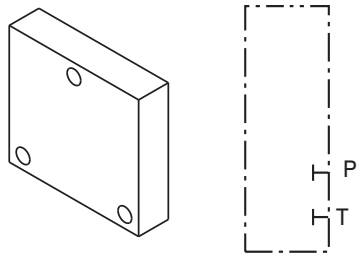
Dimensions in millimeters (inches)

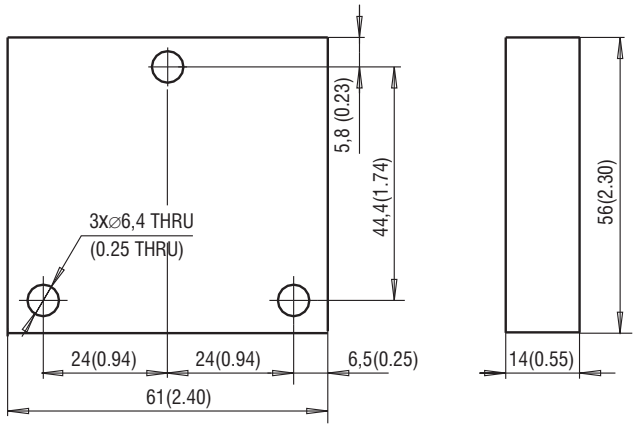
TYPE	A	B	C
G	22,5	32	20
	(0.89)	(1.60)	(0.79)
SAE	20,5	36	24
	(0.81)	(1.42)	(0.94)

Name	Type	Port size			Ordering number	Weight [kg (lb)]
		P	T	M		
Plate+seals	HB03-RPEK-03	G3/8	G3/8	-	28660000	0,315 (0.694)
Plate+seals	HB03-RPEK-03-S	SAE 8	SAE 8	-	29344800	
Plate+seals	HB03-RPEK-04	G3/8	G3/8	G1/4	28666010	0,305 (0.672)
Plate+seals	HB03-RPEK-04-S	SAE 8	SAE 8	SAE 4	29344900	

End Plate HB03-RPEK-05 16786901

- without sealing rings





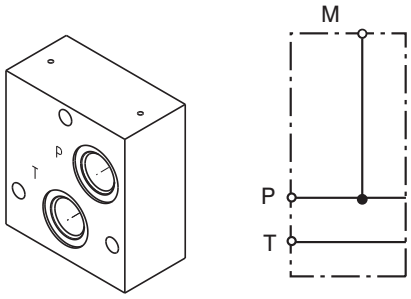
Dimensions in millimeters (inches)

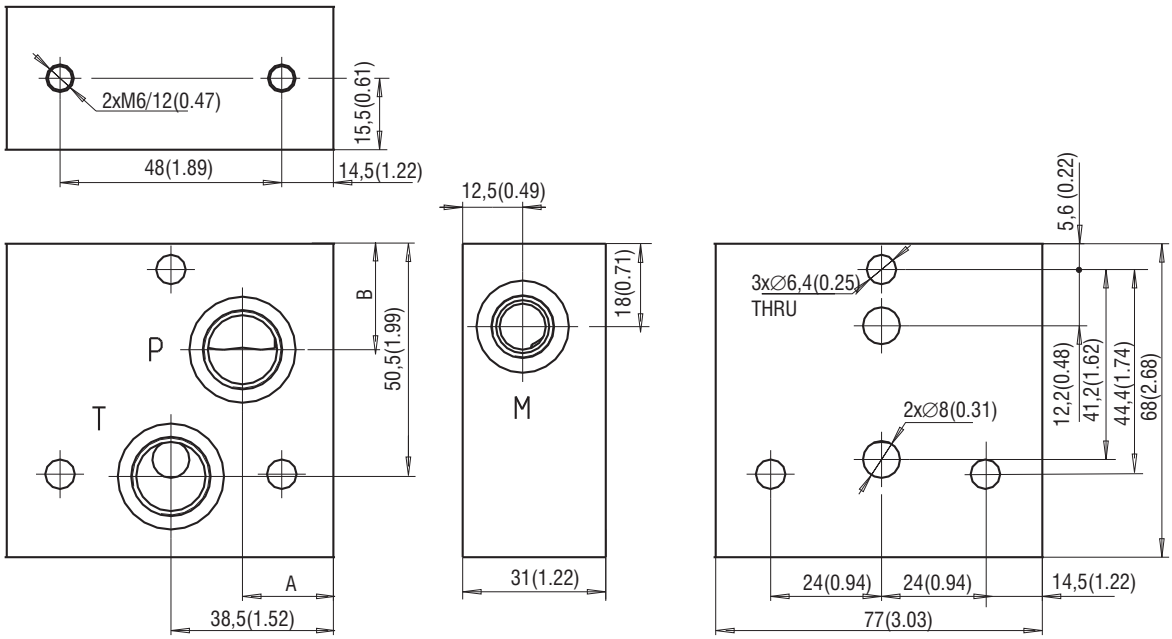
Inlet P,T Plate HB03-RPEK-06/-(S) 28566800/(29343300)

- without recess for sealing

Dimensions in millimeters (inches)

TYPE	A	B
G	23 (0.91)	23 (0.91)
SAE	18 (0.71)	21(0.83)





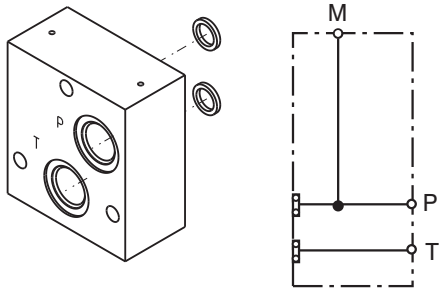
Name	Type	Port size			Ordering number	Weight [kg (lb)]
		P	T	M		
Plate	HB03-RPEK-05	-	-	-	16786901	0,130 (0.287)
Plate	HB03-RPEK-06	G3/8	G3/8	G1/4	28566800	0,315 (0.694)
Plate	HB03-RPEK-06-S	SAE 8	SAE 8	SAE 4	29343300	

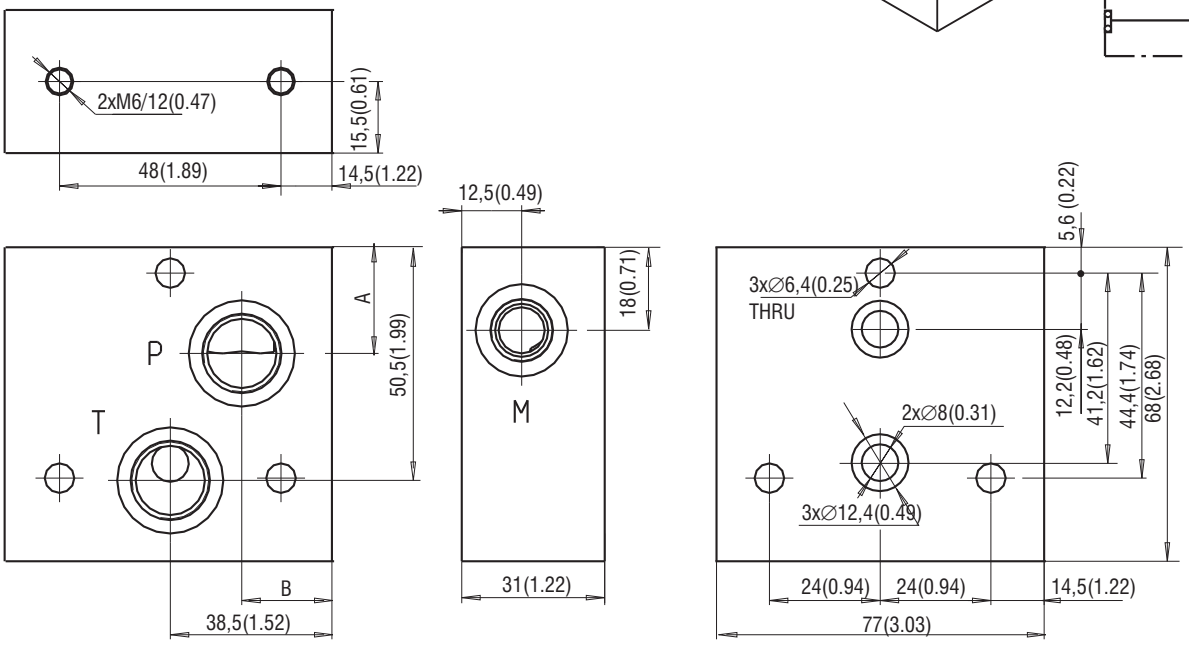
Inlet P,T Plate HB03-RPEK-07/-(S) 28660200/(29345000)

- with sealing rings

Dimensions in millimeters (inches)

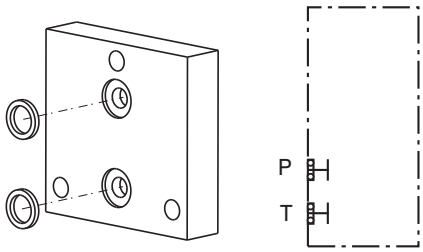
TYPE	A	B
G	23 (0.91)	23 (0.91)
SAE	18 (0.71)	21(0.83)

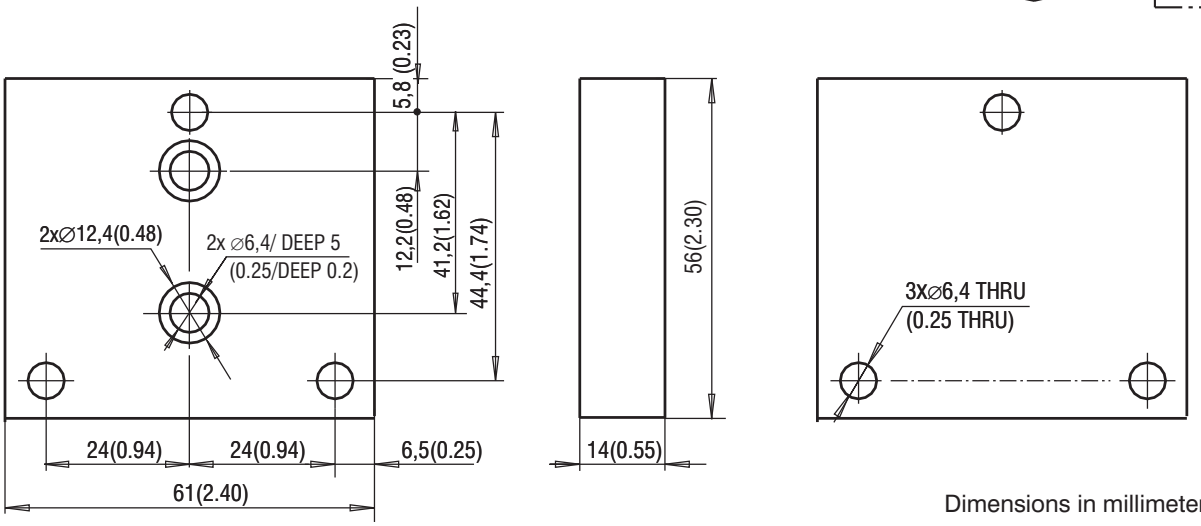




End Plate HB03-RPEK-08 28660300

- with sealing rings

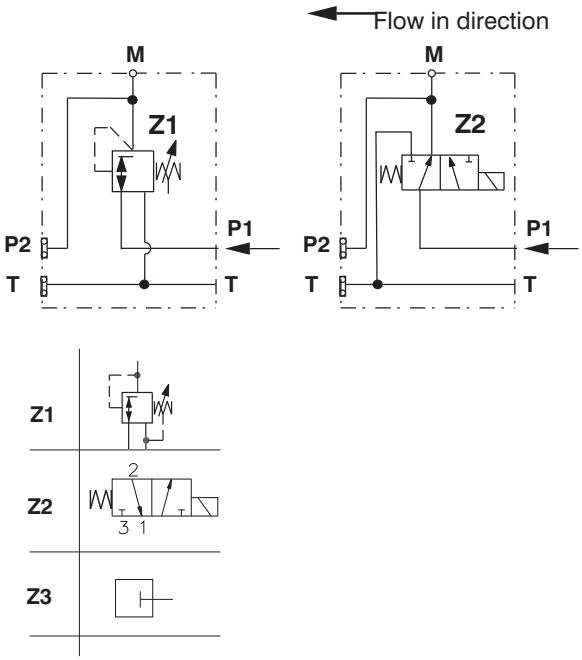


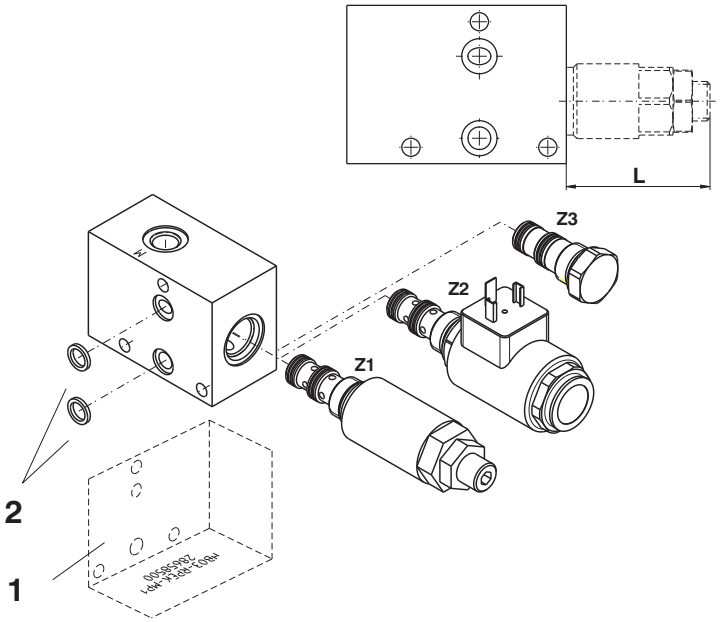


Dimensions in millimeters (inches)

Name	Type	Port size			Ordering number	Weight [kg (lb)]
		P	T	M		
Plate+seals	HB03-RPEK-07	G3/8	G3/8	G1/4	28660200	0,314 (0.692)
Plate+seals	HB03-RPEK-07-S	SAE 8	SAE 8	SAE 4	29345000	
Plate+seals	HB03-RPEK-08	-	-	-	28660300	0,135 (0.298)

Sandwich Plate HB03-RPEK-MP1/-(S) 28658500/(29344000)

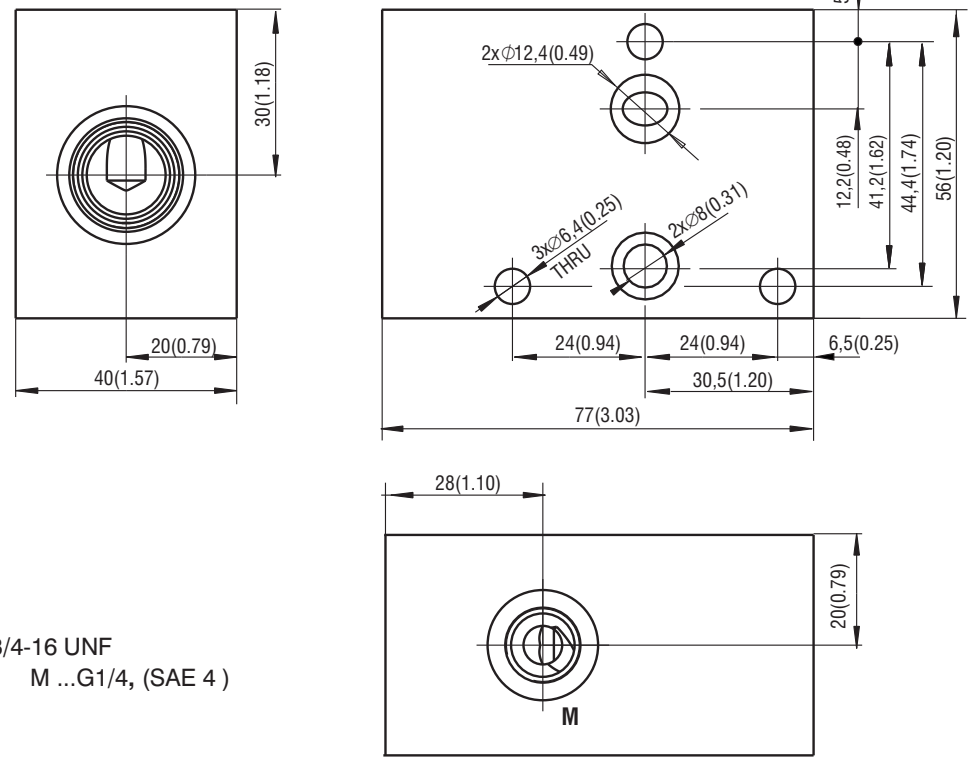




Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering number
1	Sandwich plate + seals	HB03-RPEK-MP1		0,325(0.716)		28658500
		HB03-RPEK-MP1-S				29344000
Z1	Pressure valve	SP2A-A3	77 (3.03)		HA 5143	
Z2	Directional valve	SD2E-A3	70 (2.75)		HA 4041	
Z3	Plug 3/4-16UNF		5 (0.20)			22751900
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400

Valve Dimensions - MP1/-(S)

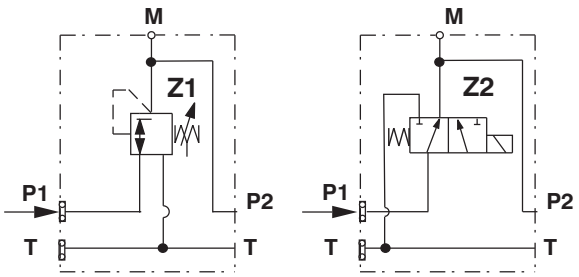
Dimensions in millimeters (inches)

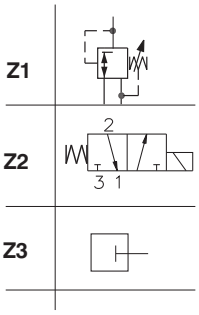


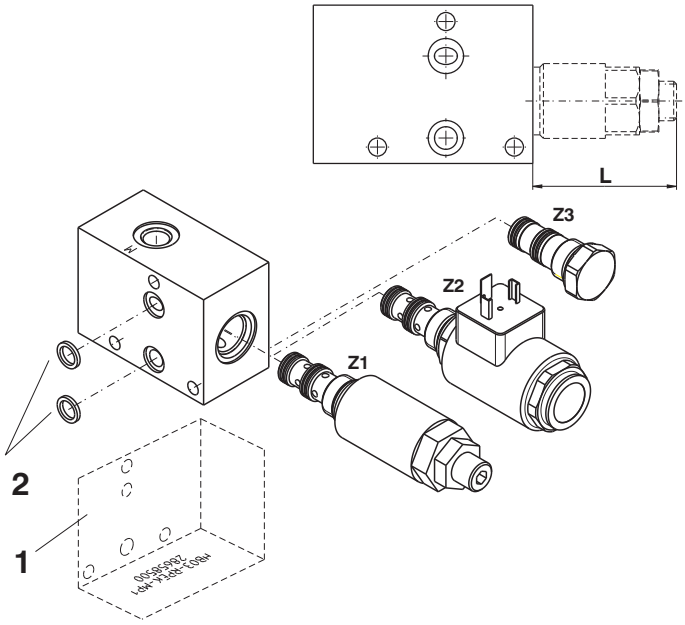
Cavity: 3/2 way 3/4-16 UNF
Measuring output: M ...G1/4, (SAE 4)

Sandwich Plate HB03-RPEK-MP2/-(S) 28658900/(29344100)

Flow in direction



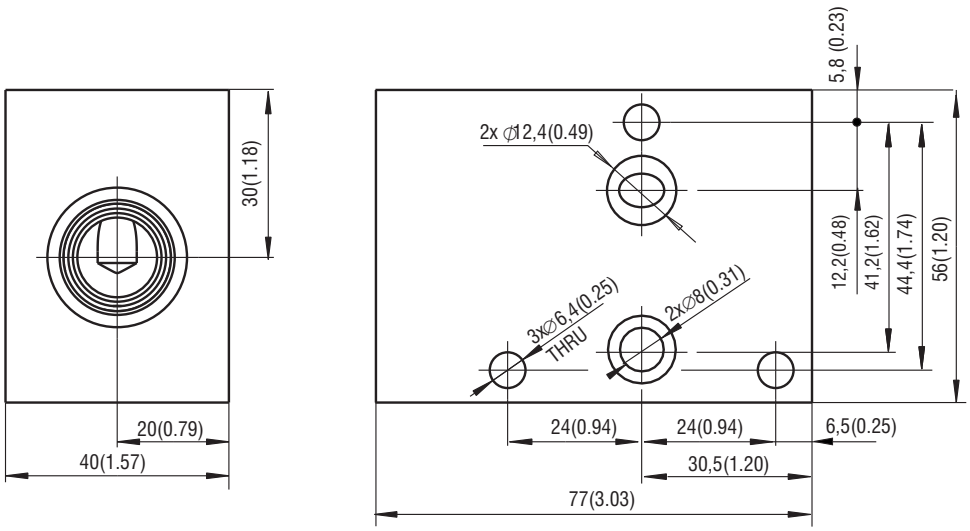


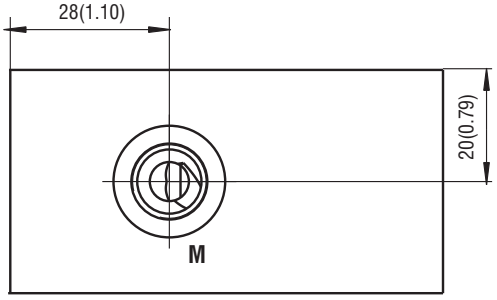


Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering number
1	Sandwich Plate + seals	HB03-RPEK-MP2		0,325(0.716)		28658900
		HB03-RPEK-MP2-S				29344100
Z1	Pressure reducing valve	SP2A-A3	77 (3.03)		HA 5143	
Z2	Directional valve	SD2E-A3	70 (2.75)		HA 4041	
Z3	Plug 3/4-16UNF		5 (0.20)			22751900
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400

Valve Dimensions - MP2/-(S)

Dimensions in millimeters (inches)

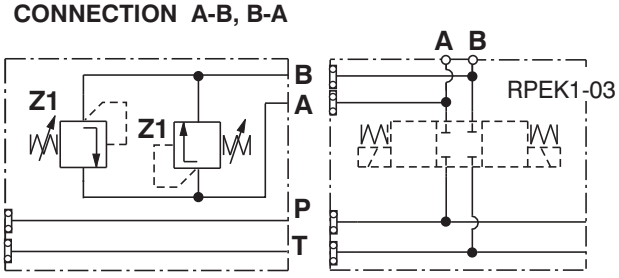


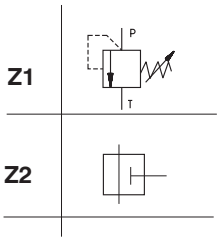


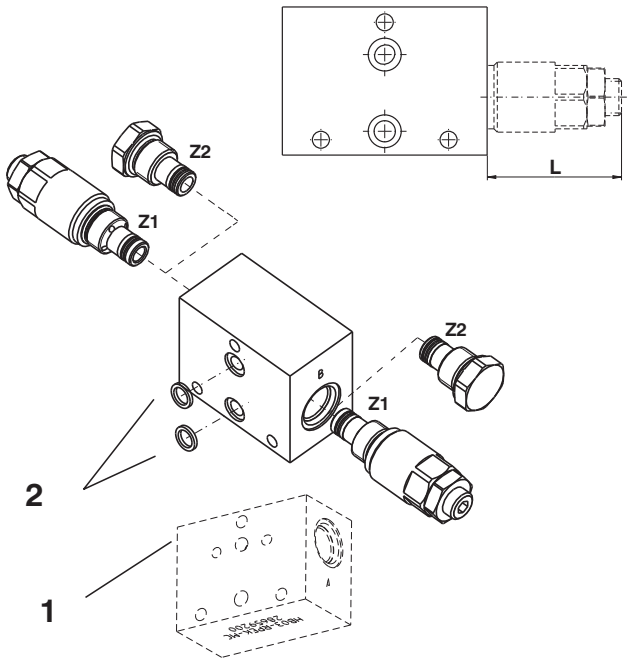
Cavity: 3/2 way 3/4-16 UNF
Measuring output: M ...G1/4, (SAE 4)

Sandwich Plate HB03-RPEK-MC 28659200

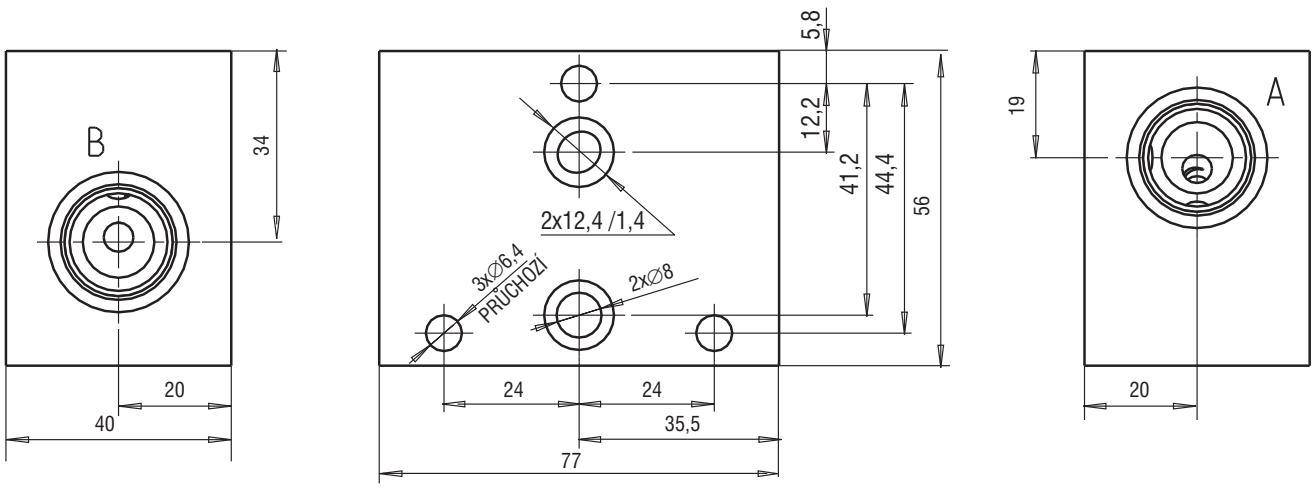
CONNECTION A-B, B-A







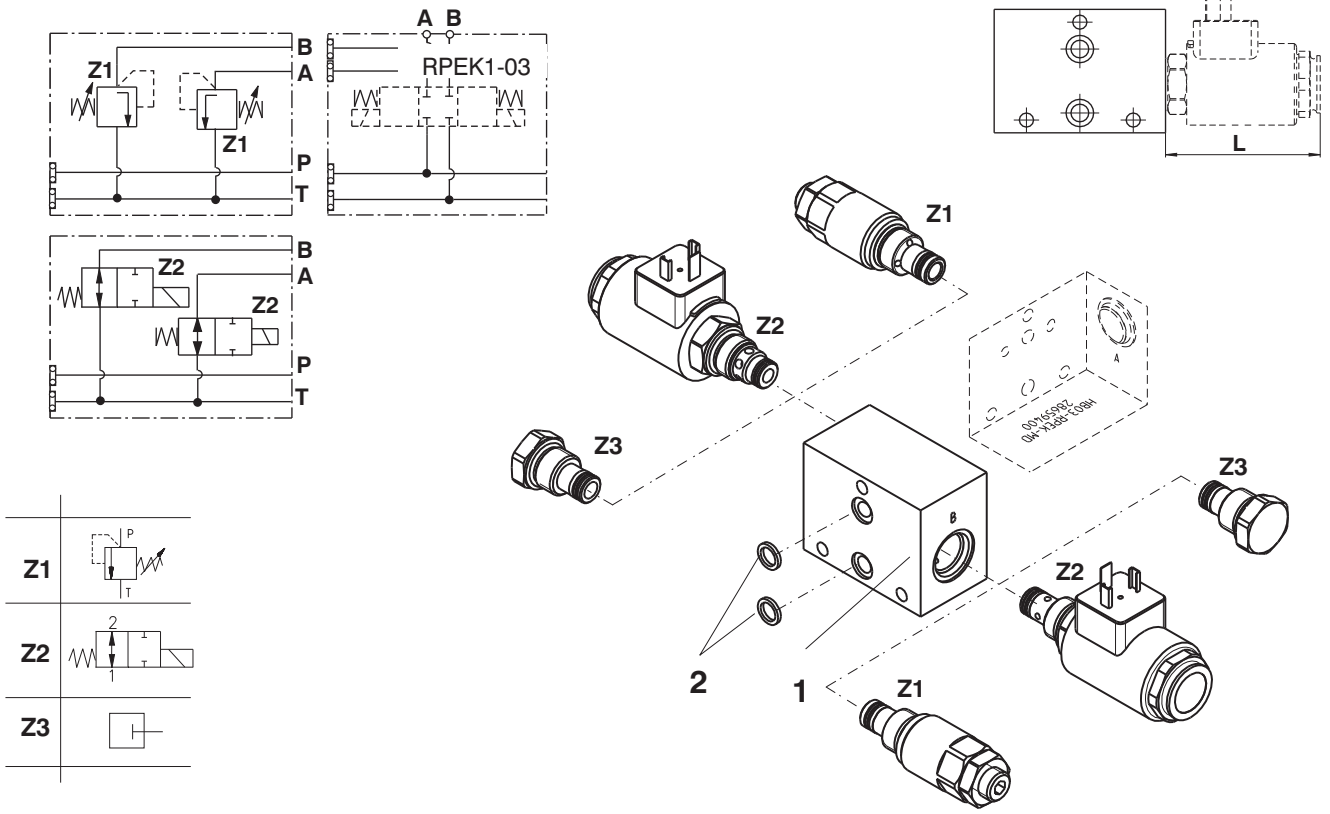
Pos.	Name	Type	max L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering number
1	Block + seals	HB03-RPEK-MC		0,379 (0.835)		28659200
Z1	Pressure valve	SR1A-A2	49,5 (1.95)		HA 5063	
Z2	Plug 2/2- 3/4-16UNF		7,5 (0.29)			15960800
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400



Cavity: **2/2-3/4-16 UNF**

Sandwich Plate HB03-RPEK-MD 28659400

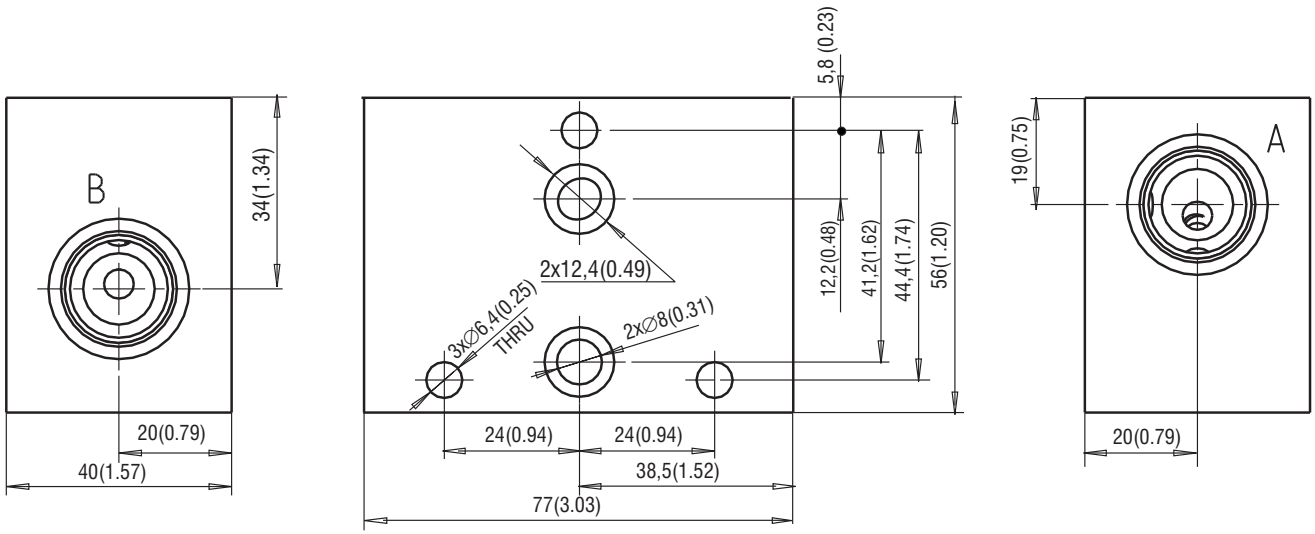
CONNECTION A-T, B-T



Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering number
1	Sandwich Plate + seals	HB03-RPEK-MD		0,378(0.833)		28659400
Z1	Pressure valve	SR1A-A2	49,5 (1.95)		HA 5063	
Z2	Directional valve	SD2E-A2	70 (2.75)		HA 4040	
Z3	Plug 3/4-16UNF		7,5 (0.29)			15960800
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400

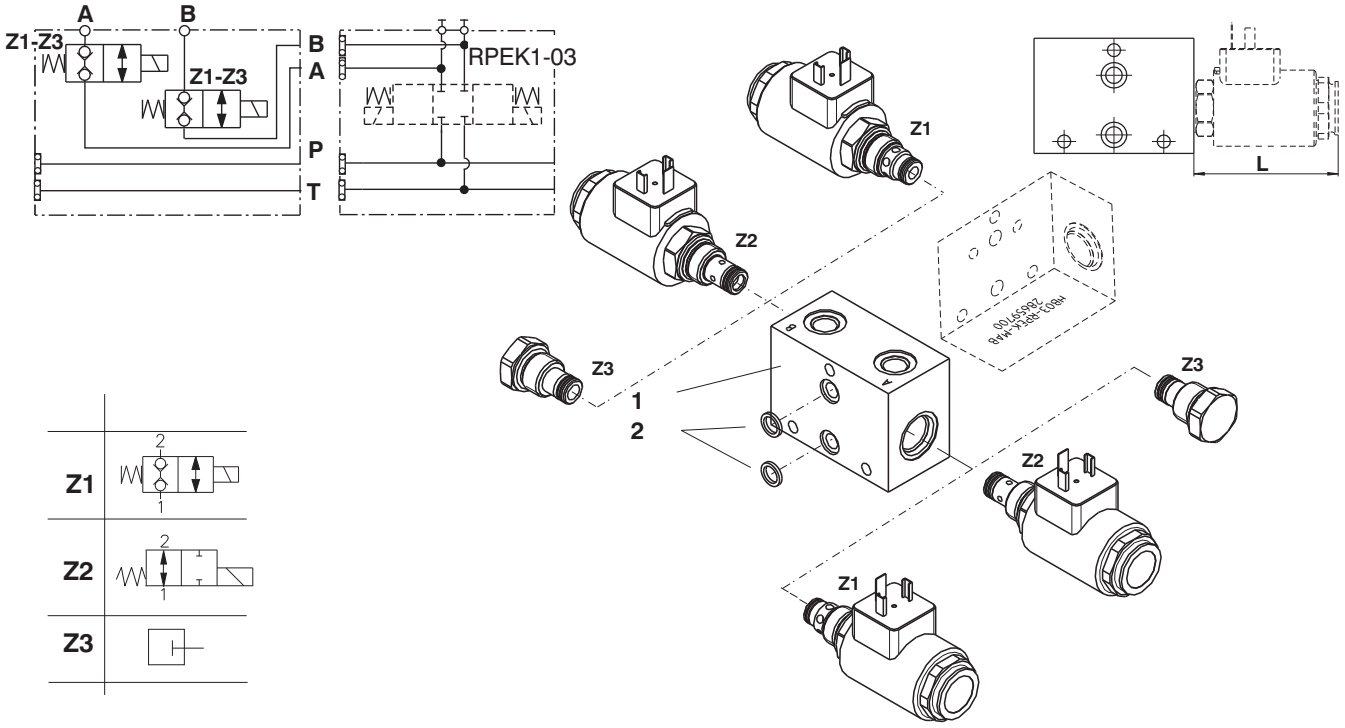
Valve Dimensions - MD

Dimensions in millimeters (inches)



Cavity: 2/2 way 3/4-16 UNF

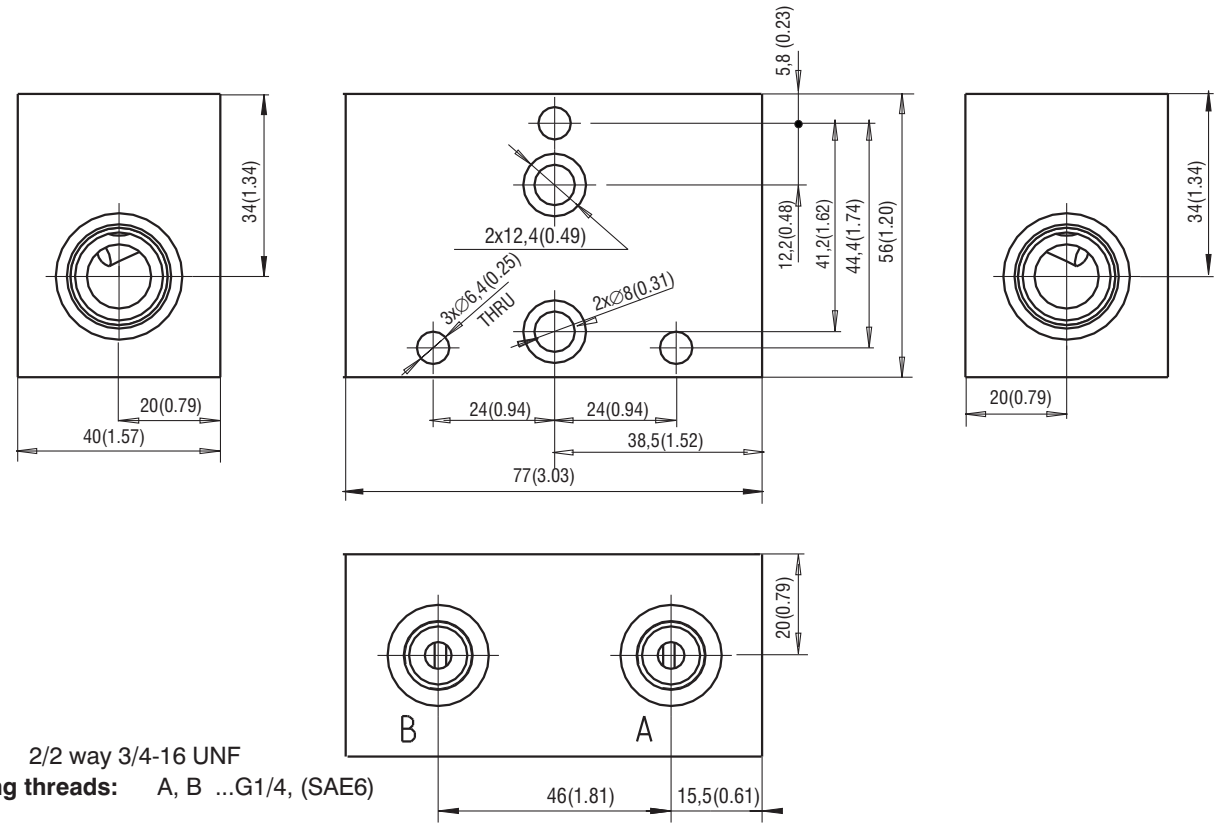
Sandwich Plate HB03-RPEK-MAB/-(S) 28659700/(29344200)



Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering number
1	Sandwich Plate + seals	HB03-RPEK-MAB		0,407(0.897)		28659700
		HB03-RPEK-MAB-S				29344200
Z1	Directional valve	SD3E-A2	70 (2.75)		HA 4043	
Z2	Directional valve	SD2E-A2	70 (2.75)		HA 4040	
Z3	Plug 3/4-16UNF		7,5(0.29)			15960800
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400

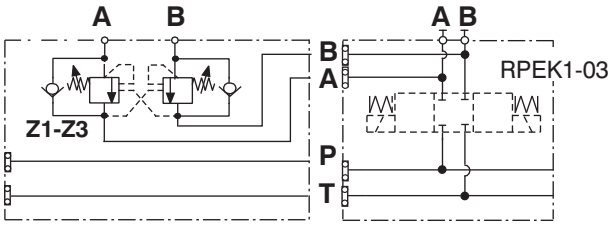
Valve Dimensions - MAB/-(S)

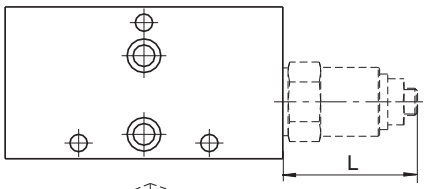
Dimensions in millimeters (inches)

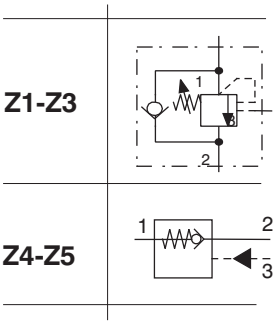


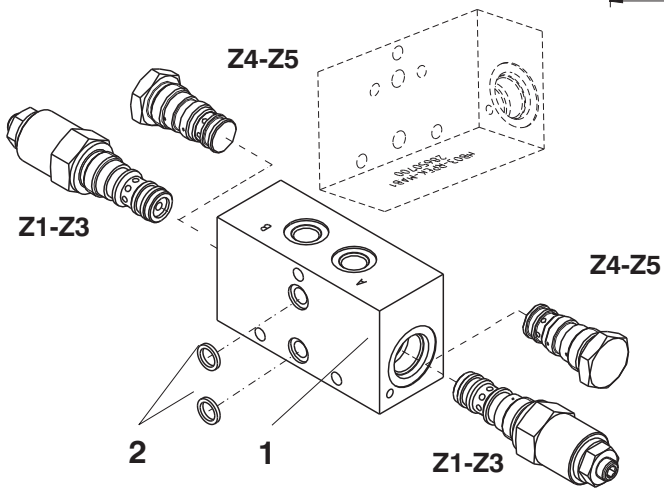
Cavity: 2/2 way 3/4-16 UNF
Connecting threads: A, B ...G1/4, (SAE6)

Sandwich Plate HB03-RPEK-MAB1/-(S) 28650700/(29344500)





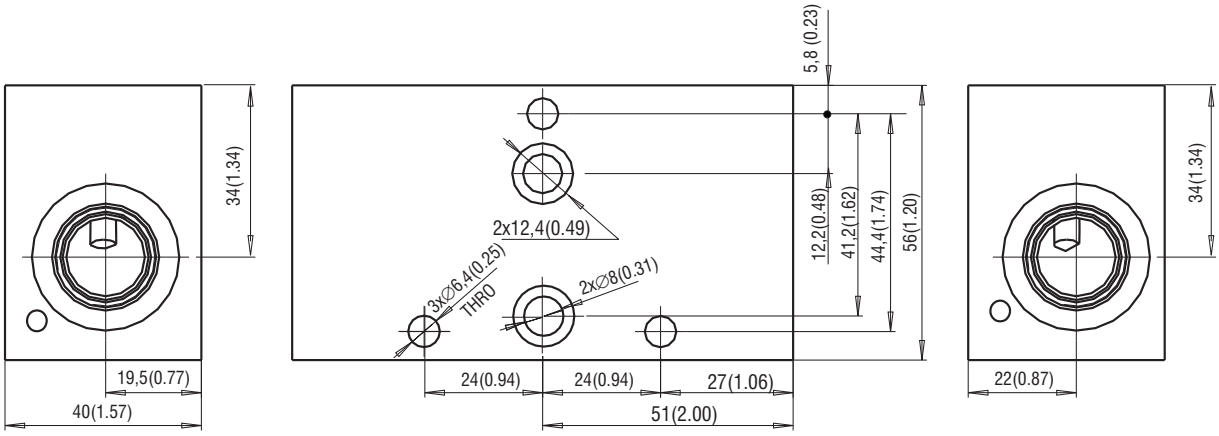


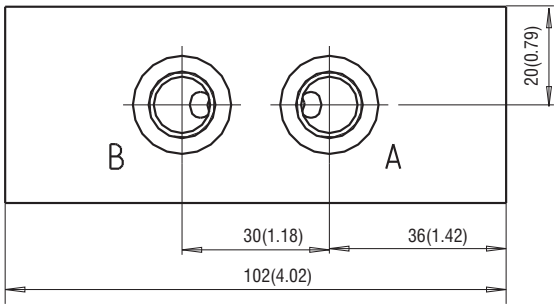


Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering number
1	Sandwich Plate +seals	HB03-RPEK-MAB1		0,532(1.173)		28650700
		HB03-RPEK-MAB1-S				29344500
Z1	Overcentre valve	SOPA-Q3	47 (1.85)		HA 5200	
Z2	Overcentre valve	SOP5A-Q3/I	47 (1.85)		HA 5201	
Z3	Overcentre valve	SOB5A-Q3/I	47 (1.85)		HA 5202	
Z4	Check valve	SC5H-Q3/I	7 (0.27)		HA 5217	
Z5	Check valve	SCC5H-Q3/I	7 (0.27)		HA 5221	
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400

Valve Dimensions - MAB1/-(S)

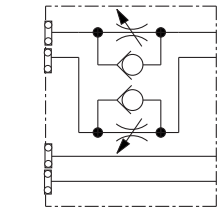
Dimensions in millimeters (inches)

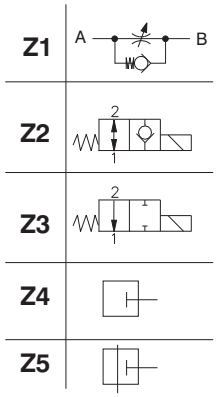


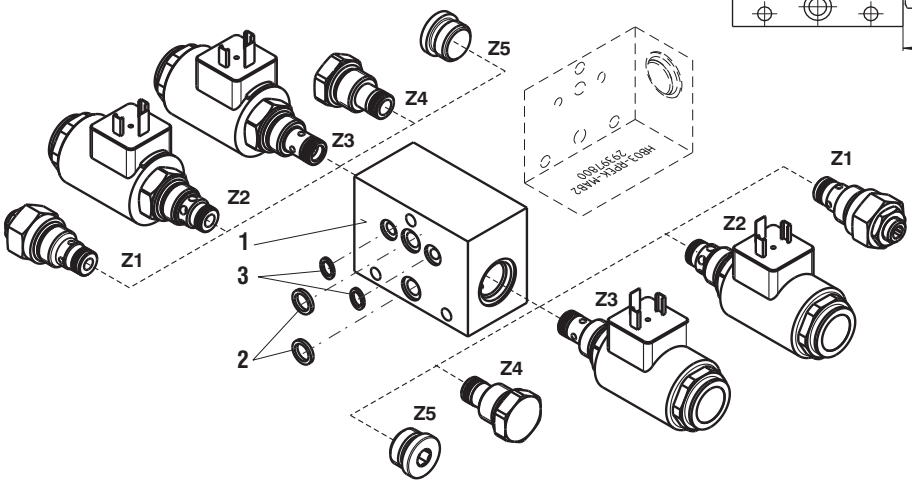


Cavity:
M20x1,5

Sandwich Plate HB03-RPEK-MAB2 29397800



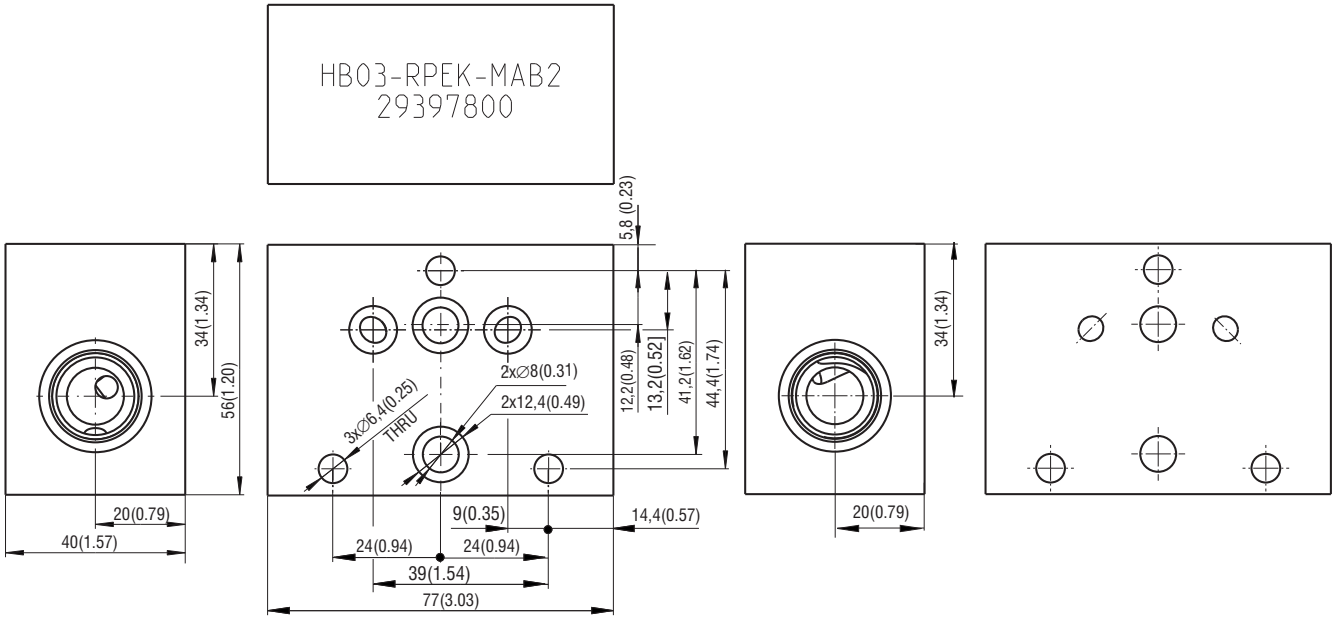




Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering number
1	Sandwich Plate +seals	HB03-RPEK-MAB2		0,415(0.915)		29397700
Z1	Flow valve	VSV2-J1-3/4-16UNF	22 (0.87)		HA 5132	29399300
Z2	Directional valve	SD3E-A2	70 (2.75)		HA 4043	
Z3	Directional valve	SD2E-A2	70 (2.75)		HA 4040	
Z4	Plug 3/4-16UNF		7,5 (0.29)			15960800
Z5	Plug 3/4-16UNF		3 (0.12)			17250900
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400
3	DKAR 00011BN7033	7,65 x 1,68 (2 pcs.)				15608700

Valve Dimensions - MAB2

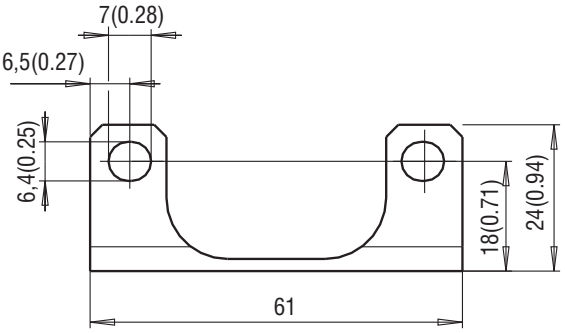
Dimensions in millimeters (inches)

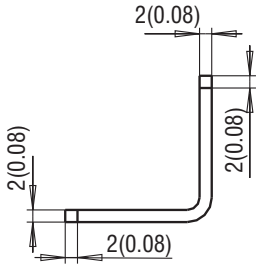


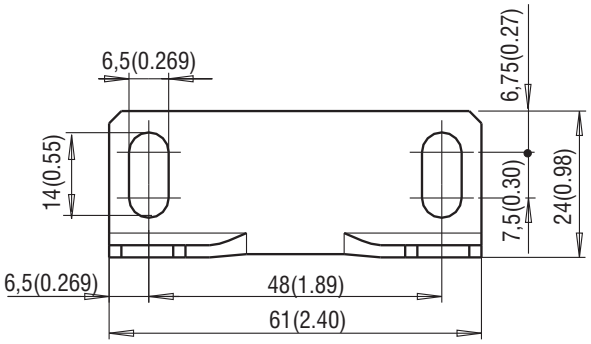
Cavity: 2/2 way 3/4-16 UNF

Mounting Angle

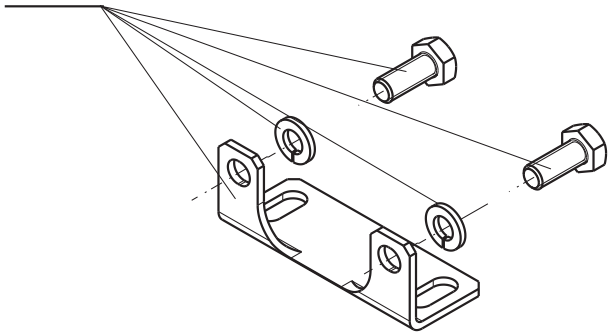
Dimensions in millimeters (inches)







Kit



Name		Tightening torque	Ordering number / Kit
Kit	Mounting Angle (1 pc.)	12 (8.85) [Nm (lbf-ft)]	28799600
	Bold M6 x 12 (2 pcs.)		
	Washer 6 (2 pcs.)		

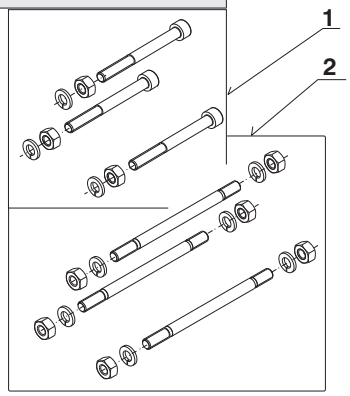
Spare Parts - Plates

Seal kit - Square ring

Name	Dimensions, number	Ordering number
Standard - NBR70	9,25 x 1,68 (2 pcs.)	15608800
Viton	9,25 x 1,78 (2 pcs.)	20152400

M6 BOLTS/STUDS LENGTH – for Horizontal Assembly (**Mu** -12 (8.85)[Nm (lbf-ft)])

$$L = (L1 \times X) + (L2 \times X) + (L3 \times X) + Y$$



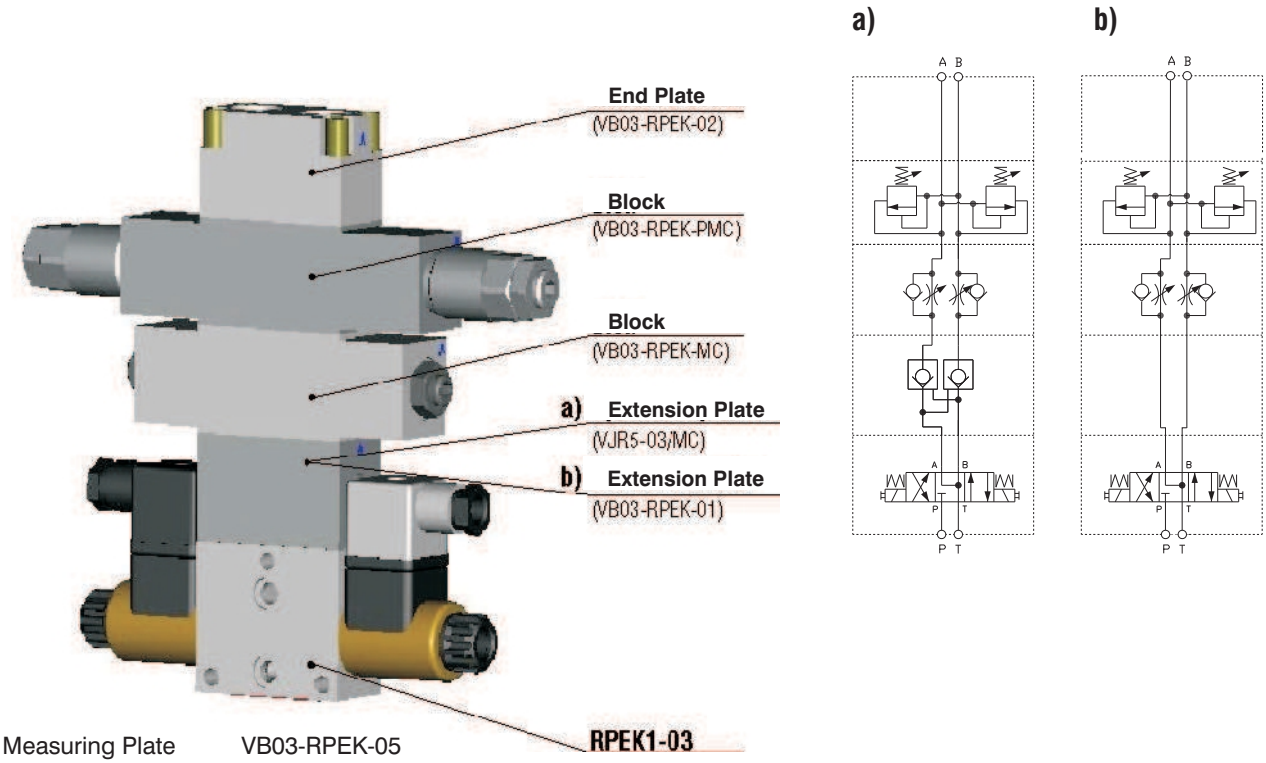
L = **total length** (to 100 cm screw bolt hereinafter)
L1 = 40 mm (1.57 in) (Horizontal plate with lenght 40 mm (1.57 in))
L2 = 31 mm (1.22 in) (Horizontal plate with lenght 31 mm (1.22 in))
L3 = 14 mm (0.55 in) (End plate)
X = Number of plates of the given width (see page 3)
Y = 14 mm (0.55 in) **for bolts**
- Additional length of bolt thread used for nuts mounting

25 mm (0.98 in) **for studs**
- Additional length of bolt thread used for nuts mounting

L [mm (in)]	Ordering number / Kit	L [mm (in)]	Ordering number / Kit
1 -BOLTS		**2 - STUDS**	
45 (1.772)	29204400	199 (7.835)	29207300
60 (2.362)	29204600	203 (7.992)	29207400
75 (2.953)	29204800	209 (8.228)	29207500
85 (3.346)	29205000	219 (8.622)	29207600
100 (3.937)	29205100	224 (8.819)	29207700
2 - STUDS		229 (9.015)	29207800
109 (4.291)	29205300	236 (9.291)	29207900
115 (4.527)	29205400	245 (9.646)	29208000
125 (4.921)	29205500	253 (9.961)	29208100
133 (5.24)	29205600	256 (10.078)	29208300
136 (5.35)	29205700	259 (10.197)	29208400
143 (5.630)	29205800	265 (10.433)	29208500
147 (5.787)	29205900	273 (10.748)	29208600
152 (5.984)	29206000	279 (10.984)	29208700
157 (6.181)	29206200	287 (11.299)	29208800
163 (6.417)	29206300	295 (11.614)	29208900
167 (6.575)	29206400	300 (11.811)	29209000
172 (6.772)	29206900	309 (12.165)	29209100
179 (7.047)	29207000	314 (12.362)	29209200
187 (7.362)	29207100	320 (12.59)	29209300
194 (7.638)	29207200	328 (12.913)	29209400

Note:
Select the bolt or screw length according to the nearest dimension available in the table.

Vertical Assembly Illustrative Figure



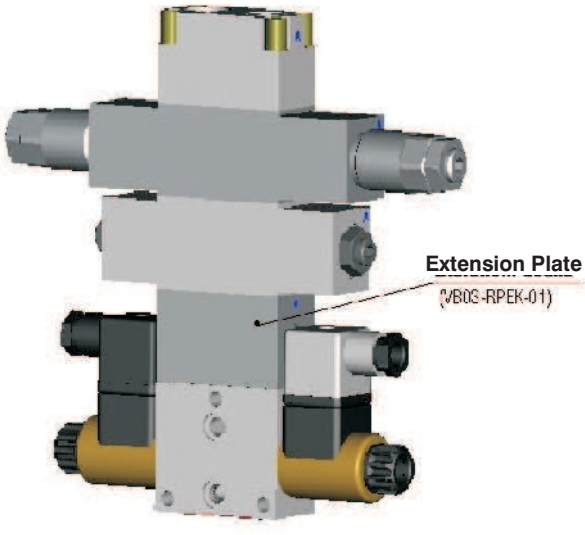
Measuring Plate VB03-RPEK-05
29585100

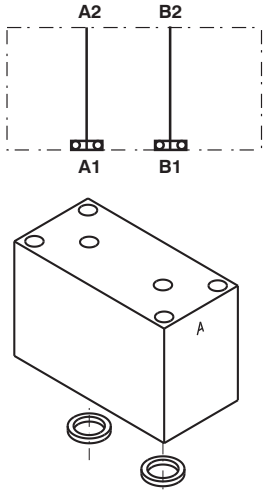
VERTICAL ASSEMBLY

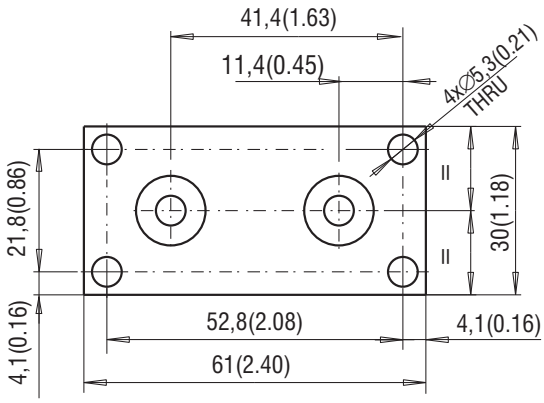
1- 4 Section

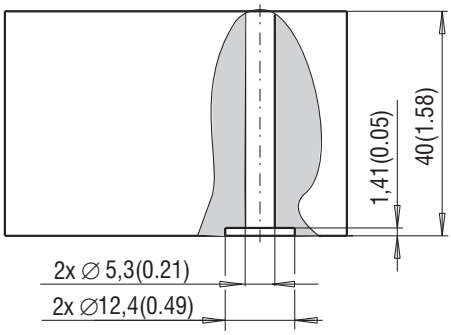
Type	Cavity	Connecting threads	Ordering number	Page	Description (to select the studs)
Extension Plate					
VB03-RPEK-**01**			28131500	35	L1=40 mm (1.57 in)
Pilot Operated Check Valve					
VJR5-03	Dn 03	Katalog HA 5027		36	L1=40 mm (1.57 in)
Vertical Sandwich Plate with Valves					
VB03-RPEK-**PMC**	2/2 - 3/4-16UNF		28672700	37	L1=40 mm (1.57 in)
VSVJ1-03/**MC**	M12x1		28672500	38	L1=40 mm (1.57 in)
VSVJ1-03/**MD**	M12x1		28672400	39	L1=40 mm (1.57 in)
Cover Plate - A,B Ports					
VB03-RPEK-**02**		A,B - G1/4	28130400	40	L2=26 mm (1.02 in)
VB03-RPEK-**02-S**		A,B - SAE 6		40	L2=26 mm (1.02 in)
VB03-RPEK-**03**		A,B - G1/4 - side	28476200	41	L2=26 mm (1.02 in)
VB03-RPEK-**03-S**		A,B - SAE 6 - side	29009000	41	L2=26 mm (1.02 in)
VB03-RPEK-**04**		A,B - G3/8 - side	28672900	41	L2=26 mm (1.02 in)
Measuring Plate - A,B Ports					
VB03-RPEK-**05**		A,B - G1/4	295851000	40	L2=26 mm (1.02 in)

Extension Plate VB03-RPEK-01 28131500









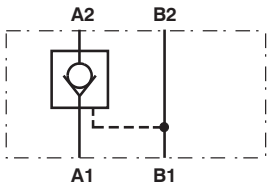
Dimensions in millimeters (inches)

The application of a extension plate is required only in vertical assembly situation in case no Pilot Operated Check valve is used and is required a free space for electrical connectors of RPEK directional valve (see example of assembly in picture).

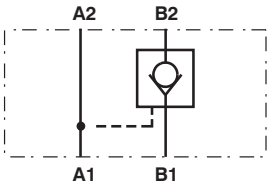
Name	Type	Port size		Ordering number	Weight [kg (lb)]
		A	B		
Extension Plate+ seals	VB03-RPEK-01	-	-	28131500	0,189 (0.436)

Pilot Operated Check Valve HA 5027

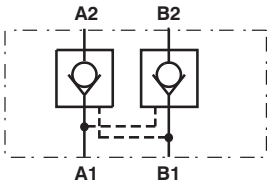
VJR5-03/MA

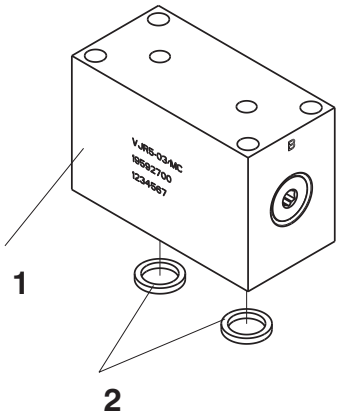


VJR5-03/MB



VJR5-03/MC

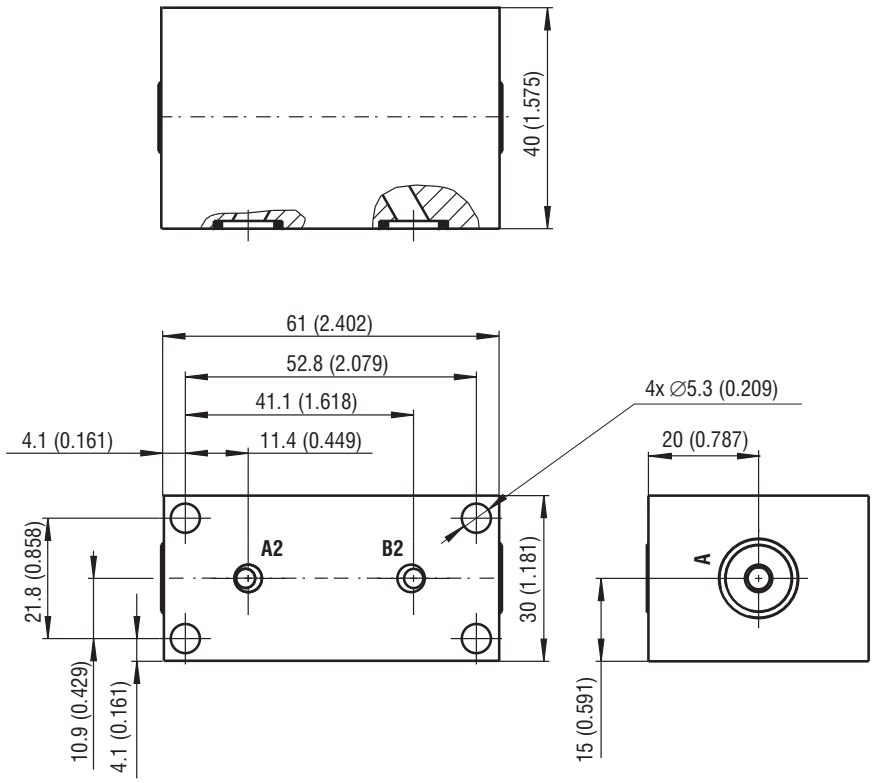




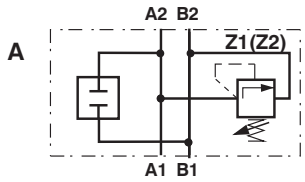
Pos.	Name	Type	Weight [kg (lb)]	Data sheet	Ordering number
1	Hydraulic lock + seals	VJR5-03/Mx	0,2 (0.441)	HA 5027	
2	**Spare Seal kit**	**Square ring**	**O-ring**		
	Standard - NBR70	9,25 x 1,68 (2 pcs.)	4,47 x 1,78 (2 pcs.)		28407200
	Viton	-	9,25 x 1,78 (2 pcs.) 4,47 x 1,78 (2 pcs.)		28407300

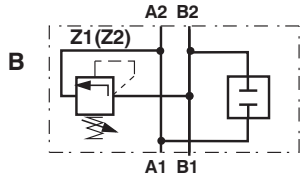
Valve Dimensions

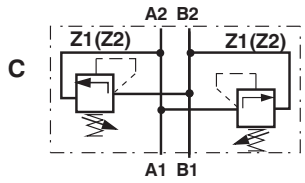
Dimensions in millimeters (inches)

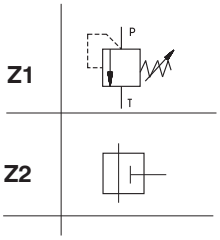


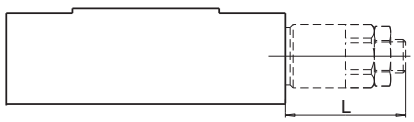
Sandwich Plate VB03-RPEK-PMx 28672700

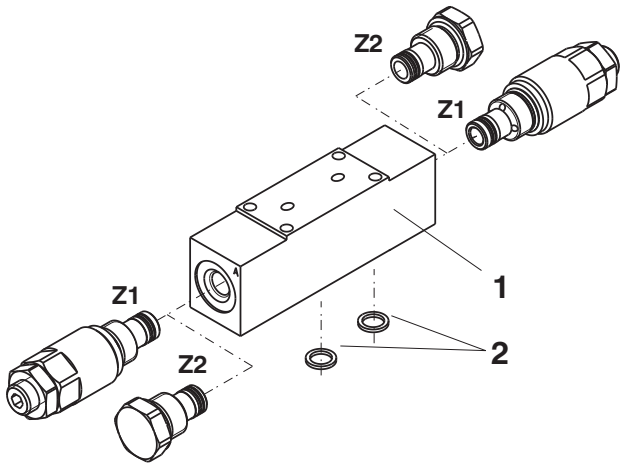








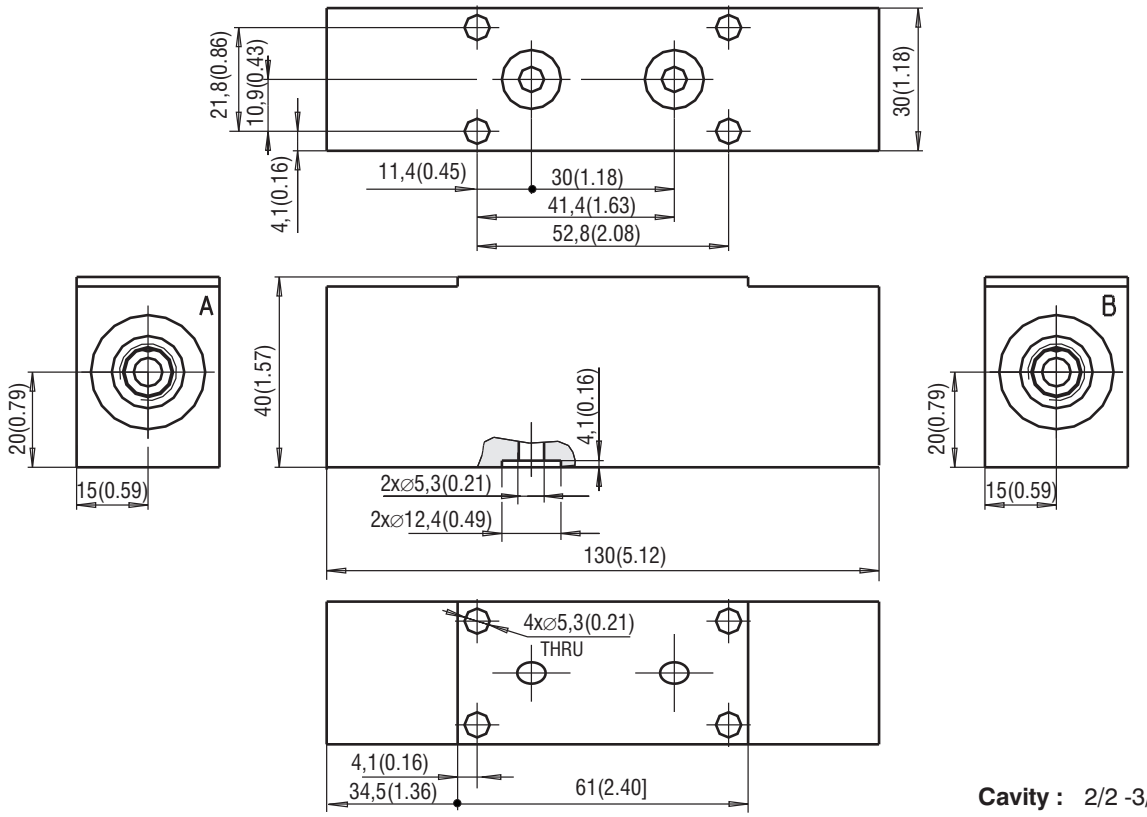




Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering number
1	Sandwich plate +seals	VB03-RPEK-PMx		0,349 (0.769)		28672700
Z1	Pressure valve	SR1A-A2	78 (3.07)		HA 5063	
Z2	Plug 3/4-16UNF		7,5 (0.29)			15960800
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400

Valve Dimensions - PMC

Dimensions in millimeters (inches)

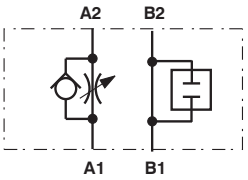


Cavity : 2/2 -3/4/16UNF

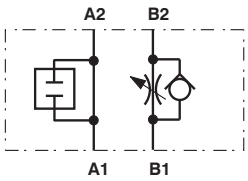
Sandwich Plate VB03-RPEK-Mx 28672500

Screw-in Cartridge Throttle Valve with Bypass Check Valve

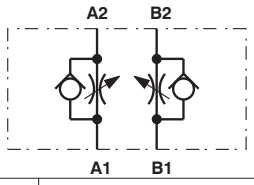
MA

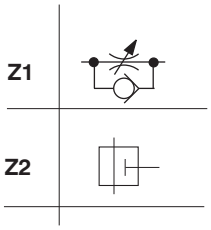


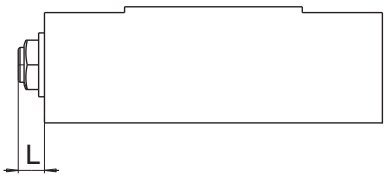
MB

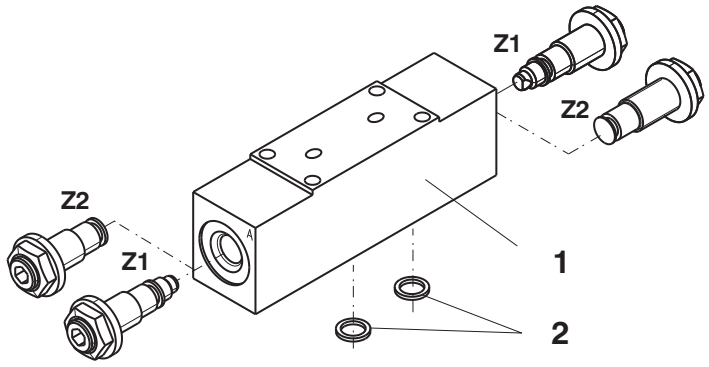


MC





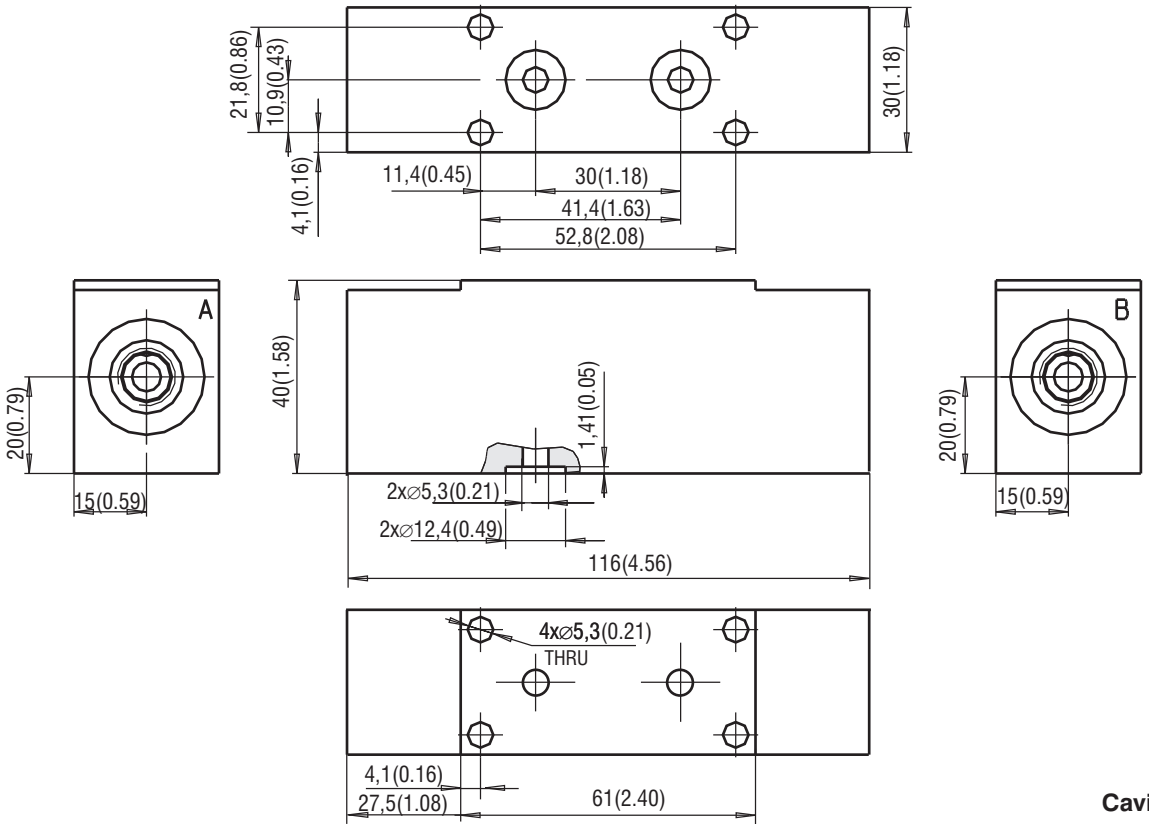




Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering nummer
1	Sandwich plate+seals	VB03-RPEK-MC		0,361(0.795)		28672500
Z1	Flow valve	VSV2 (only model **-1**, **- J1**)	11 (0.43)		HA 5132	
Z2	Plug	VSV/ M12x1	11 (0.43)			22727000
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400

Valve Dimensions - MC

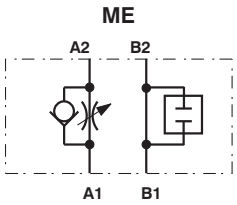
Dimensions in millimeters (inches)

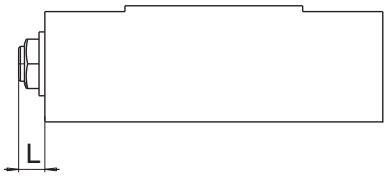


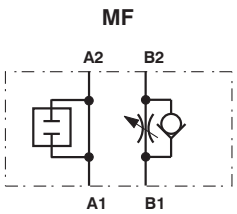
Cavity: M12x1

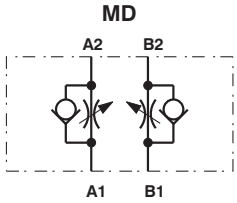
Sandwich Plate VB03-RPEK-Mx 28672400

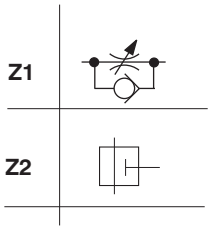
Screw-in Cartridge Throttle Valve with Bypass Check Valve

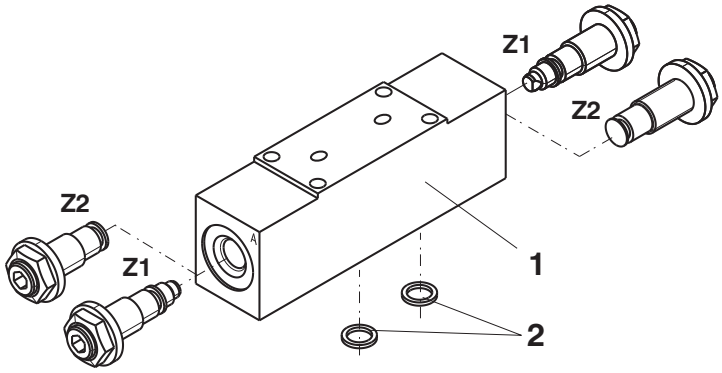








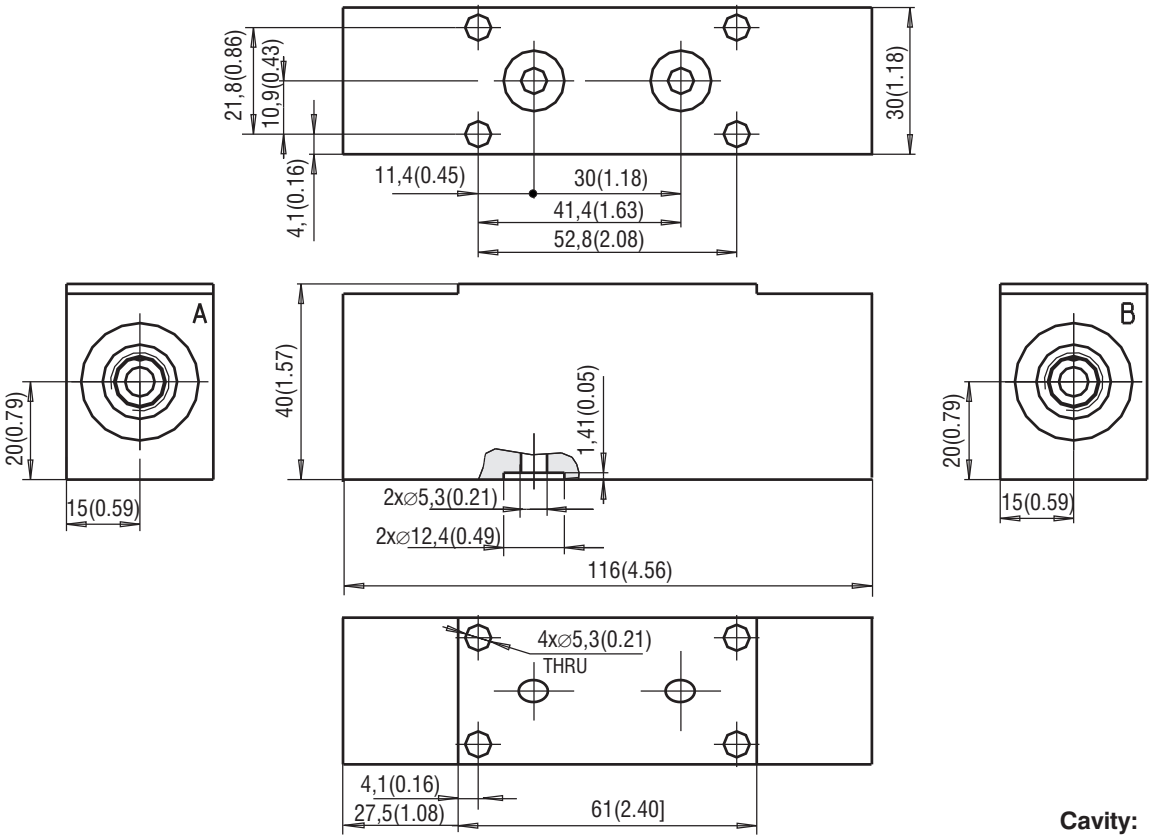




Pos.	Name	Type	Max. L [mm (in)]	Weight [kg (lb)]	Data sheet	Ordering nummer
1	Sandwich plate +seals	VB03-RPEK-MD		0,361(0.795)		28672400
Z1	Flow valve	VSV2 (only model **-1**, **- J1**)	11 (0.43)		HA 5132	
Z2	Plug	VSV/ M12x1	11 (0.43)			22727000
2	**Spare Seal kit- Square ring**					
	Standard - NBR70	9,25 x 1,68 (2 pcs.)				15608800
	Viton	9,25 x 1,78 (2 pcs.)				20152400

Valve Dimensions - MD

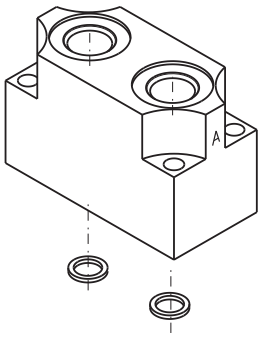
Dimensions in millimeters (inches)



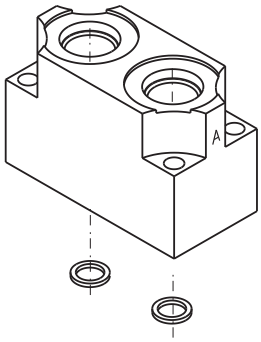
Cavity: M12x1

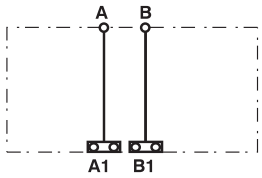
Cover Plate VB03-RPEK-02- /(S) 28130400/(29008900)

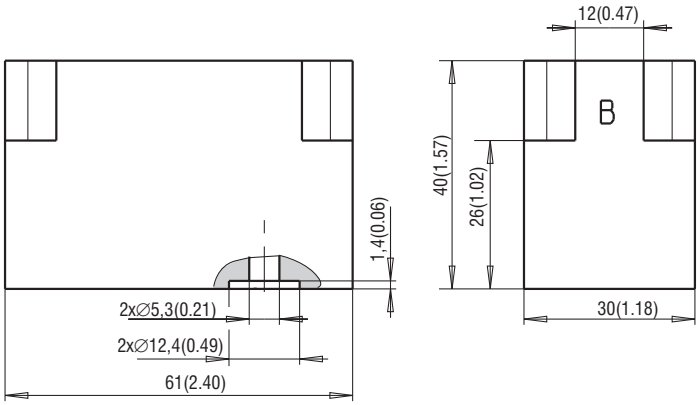
VB03-RPEK-02



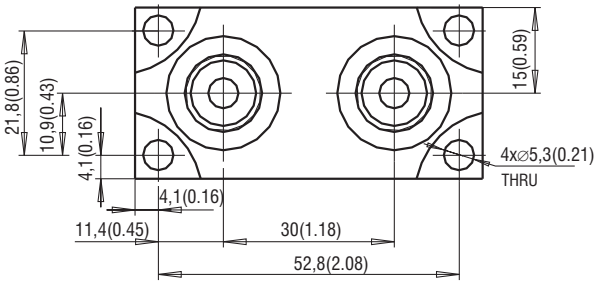
VB03-RPEK-02-S



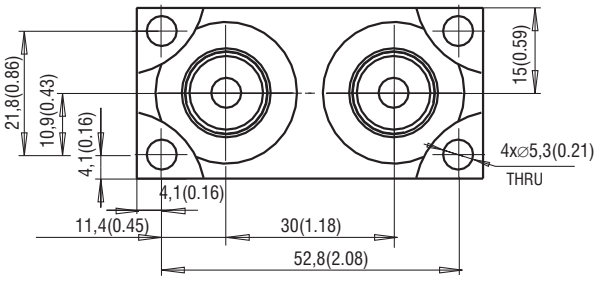




VB03-RPEK-02



VB03-RPEK-02-S

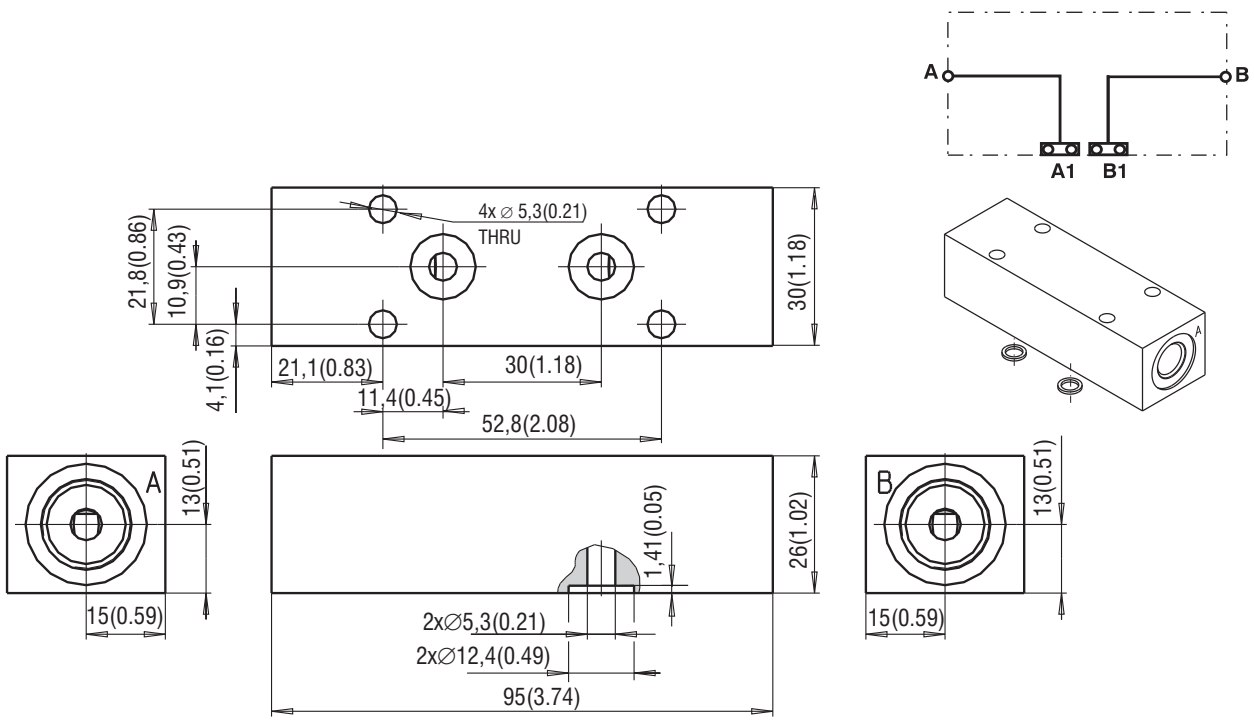


Dimensions in millimeters (inches)

Connecting threads: : A, B ... G1/4 (SAE6)

Name	Type	Port size		Ordering number	Weight [kg (lb)]
		A	B		
Cover plate + seals	VB03-RPEK-02	G1/4	G1/4	28130400	0,172 (0.379)
	VB03-RPEK-02-S	SAE 6	SAE 6	29008900	

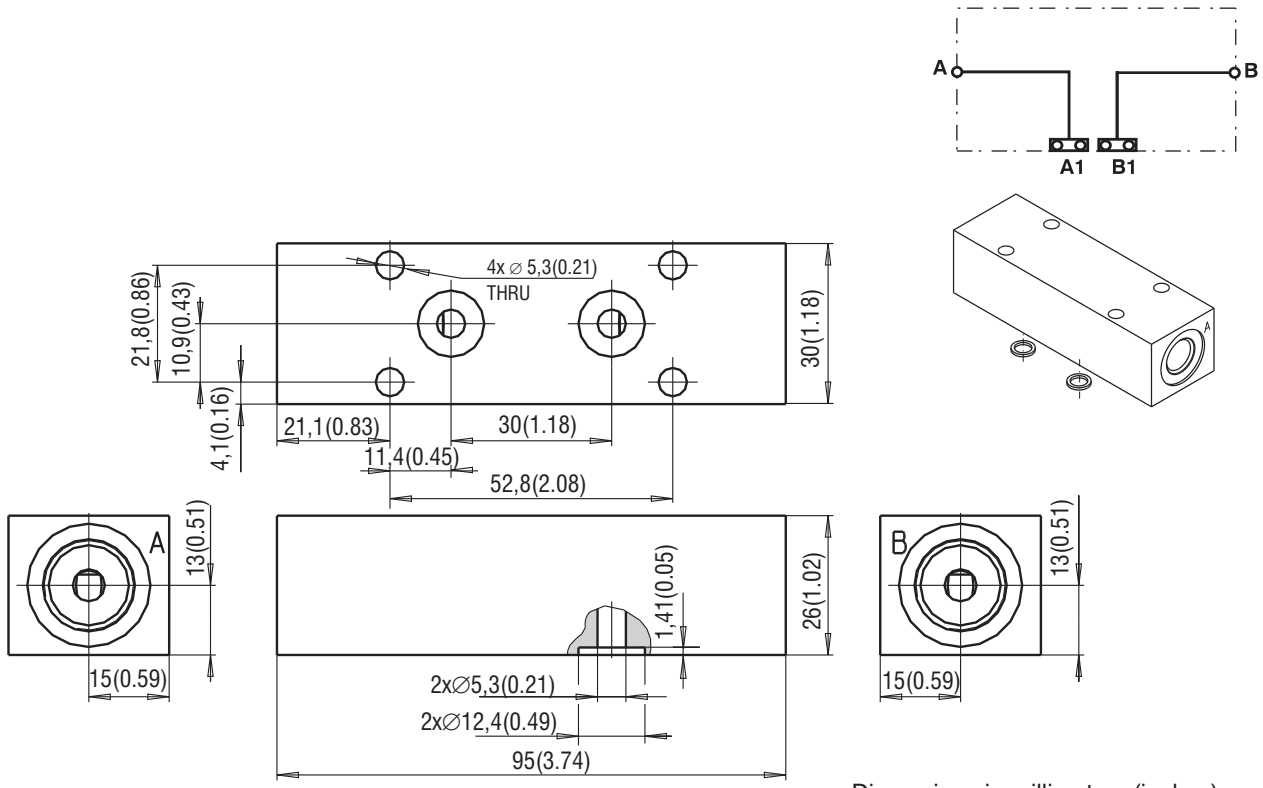
Cover Plate VB03-RPEK-03-/(S) 28476200/(29009000)



Dimensions in millimeters (inches)

Connecting threads: A, B ... G1/4 (SAE 6)

Cover Plate VB03-RPEK-04 28672900

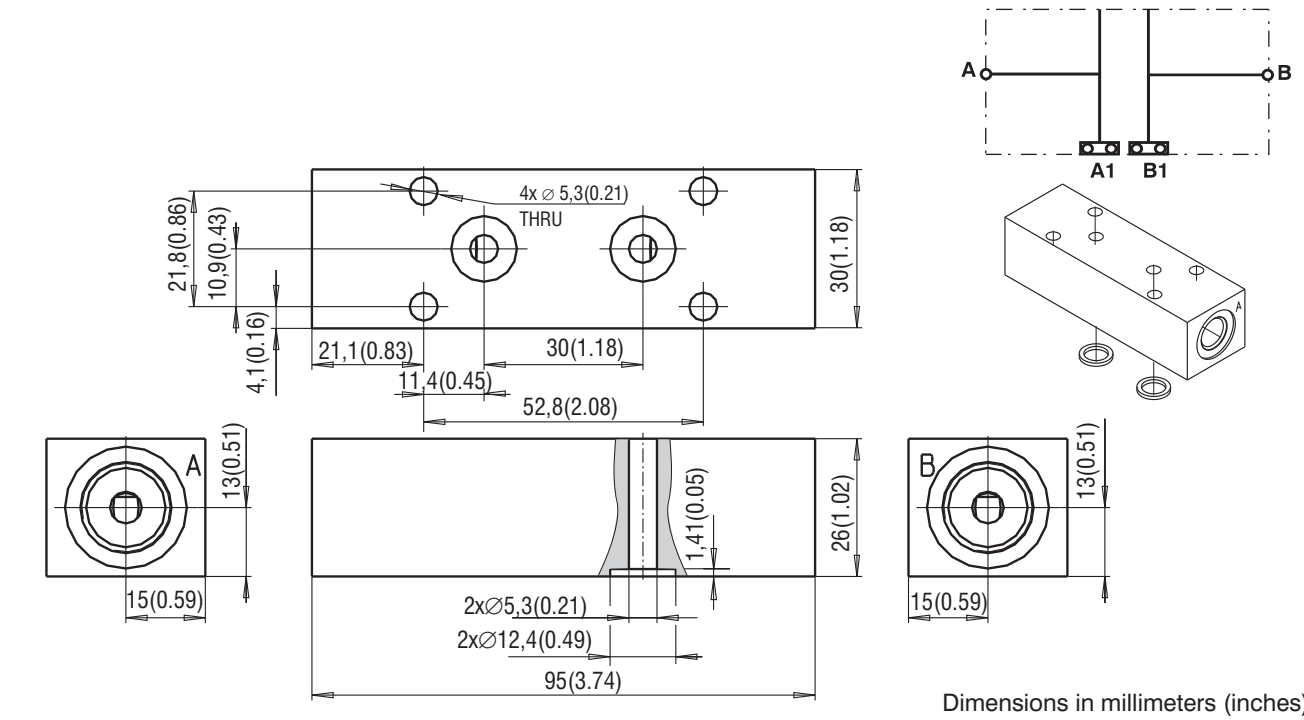


Dimensions in millimeters (inches)

Connecting threads: A, B ... G 3/8

Name	Type	Port size		Ordering number	Weight [kg (lb)]
		A	B		
Cover plate +seals	VB03-RPEK-03	G1/4	G1/4	28476200	0,131 (0.289)
	VB03-RPEK-03-S	SAE 6	SAE 6	29009000	
Cover plate +seals	VB03-RPEK-04	G3/8	G3/8	28672900	0,177 (0.390)

Measuring Plate VB03-RPEK-05 29585100



Dimensions in millimeters (inches)

Connecting threads: A, B ... G1/4

Name	Type	Port size		Ordering number	Weight [kg (lb)]
		A	B		
Measuring plate +seals	VB03-RPEK-05	G1/4	G1/4	29585100	0,177 (0.390)

Spare Parts - Plates

Seal kit - **Square ring**

Name	Dimensions, number	Ordering number
Standard - NBR70	9,25 x 1,68 (2 pcs.)	15608800
Viton	9,25 x 1,78 (2 pcs.)	20152400

M5 SCREWS LENGTH – for Vertical Assembly (**Mu** - 5(3.69) [Nm (lbf-ft)])

L = (L1 x X) + L2 + 9

L = total length
L1 = 40 mm (1.57 in) (Vertical plates with hight 40 mm (1.57 in))
L2 = 26 mm (1.02 in) (Vertical plates with hight 26 mm (1.02 in))
X = Number of plates of the given width (see page 3)

L [mm (in)]	Ordering number/Kit (4x bolts)
75 (2.952)	29245200
115 (4.527)	29245300
155 (6.102)	29245400

Note:
Select the bolt or screw length according to the nearest dimension available in the table.

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tel.: 499 403 111
e-mail: info.cz@argo-hytos.com
www.argo-hytos.com

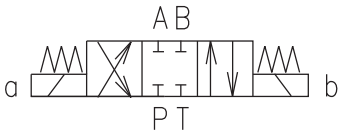
Solenoid - Operated Directional Control Valves

RPEL1-04

HA 4037
05/2014

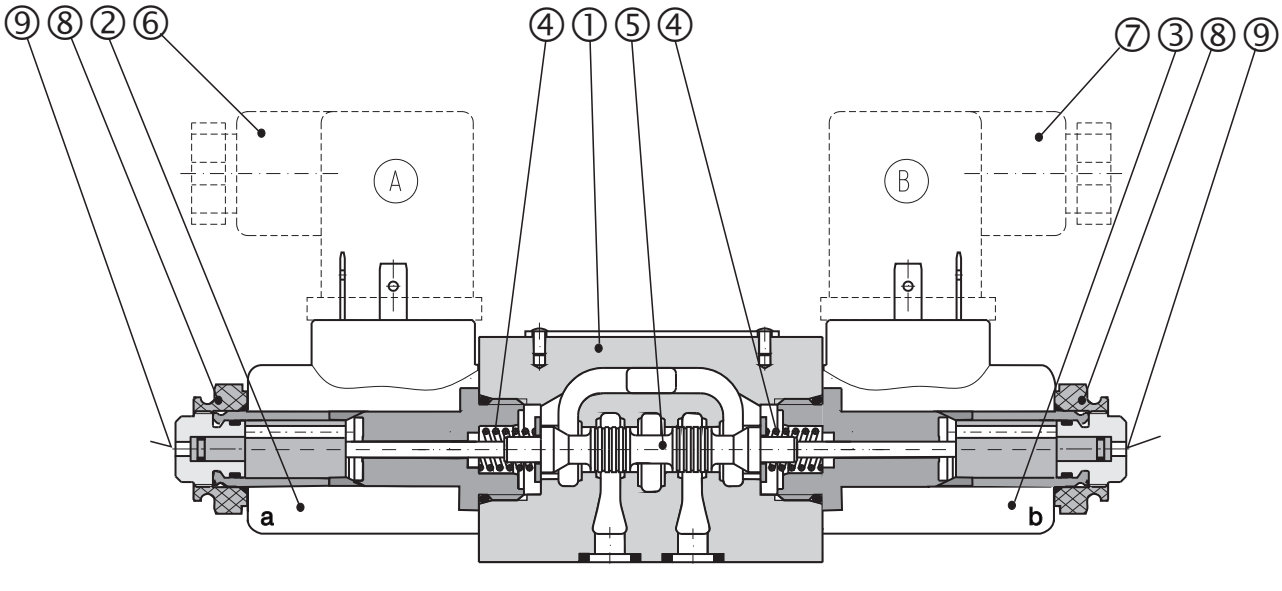
Size 04 (D 02) • 250 bar (3600 PSI) • 30 l/min (8.0 GPM)

- **4/3-, 4/2- and 3/2-way directional control valves with solenoid control**
- **Solenoids can be turned around their axis to any position**
- **Push button manual override**
- **Installation dimensions acording to ISO 4401 CETOP - RP 121H**
- **Subplates see data sheet HA 0002**



Functional Description

The RPEL1-04 directional control valves consist of cast iron housing (1), control spool (5) with two centering springs (4) and operating solenoids (2, 3).
The three-position directional valves are fitted with two solenoids and two springs. Two-position directional valves have either one solenoid and one return spring or two solenoids and a detent assembly.
The operating solenoids are DC solenoids supplied through connectors A, B (6, 7). For AC supply the solenoids are provided with a rectifiers which are integrated in the DIN connector socket as part of the solenoid. By loosening the nut (8), the solenoid can be turned around its axis up to 360°.
In the case of solenoid malfunction or power failure, the spool of the valve can be repositioned by manual override (9), provided the pressure in the T-port does not exceed 25 bar (363 PSI).
The valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



Ordering Code

RPEL1-04 □ □ / □ □ □

Solenoid Operated Directional Control Valve

Nominal size

Number of valve positions

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

Functional symbols
see the table functional symbols

Rated supply voltage of solenoids
(at the coil terminals)

12 V DC / 1,83 A	**01200**
24 V DC / 0,92 A	**02400**
*205 V DC / 0,08 A	**20500**
Other voltages per request	

Seals

No designation	NBR
V	FPM (Viton)

Type of the solenoid coil

E1	with the connector to EN 1745301-803-A
E2	with the integrated quenching diode and the connector to EN 1745301-803-A
E3	with the connector AMP-Junior-Timer 2 PIN
E4	with integrated quenching diode and the connector AMP-Junior-Timer 2 PIN
E12	with the connector Deutsch DT04-2P
E13	with integrated quenching diode and the connector Deutsch DT04-2P

For selection of the solenoid coil and the terminal box type use catalogue HA 8007.

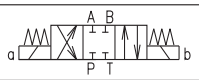
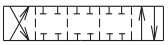
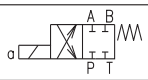
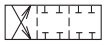
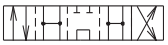
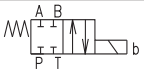
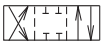
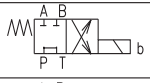
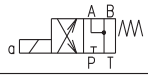
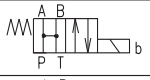
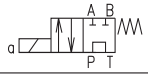
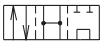
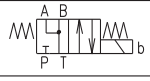
Voltage of Recommended solenoid coils used with electrical connector with rectifiers - see page 3

Rated supply source voltage (permissible rated voltage variation ±10 %)	Type designation of the solenoid voltage
230 V AC / 0.20 A / 50 (60) Hz	20500

Technical Data

Nominal size	mm(US)	04 (D 02)		
Maximum flow	l/min (GPM)	see p-Q characteristics		
Maximum operating pressure at ports P, A, B	bar (PSI)	250 (3600)		
Maximum operating pressure at port T	bar (PSI)	100 (1450)		
Pressure drop	bar (PSI)	see Δp-Q characteristics		
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524		
Fluid temperature range (NBR / Viton)	°C (°F)	-30 ... +80 (-22 ... +176) / -20 ... +80 (-4 ... +176)		
Ambient temperature, max.	°C (°F)	+50 (+122)		
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)		
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406 (1999)		
Maximum allowable voltage variation	%	AC: ±10	DC: ±10	
Coil design see HA 8007		C14B		
Maximum switching frequency	1/h	15 000		
Switching time, ON; at n = 156 SUS (32 mm^2/s)	ms	30 ... 50		
Switching time, OFF; at n = 156 SUS (32 mm^2/s)	ms	AC: 70 ... 100	DC: 30 ... 50	
Duty cycle	%	100		
Service life	cycles	10^7		
Enclosure type to EN 60 529		E1; E2	E3A; E4A	E12; E13
		IP 65	IP 65	IP 67; IP 69
Weight - valve with 1 solenoid - valve with 2 solenoid	kg (lbs)	0,75 (1.65) 0,9 (1.98)		
Mounting position		unrestricted		

Functional Symbols

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

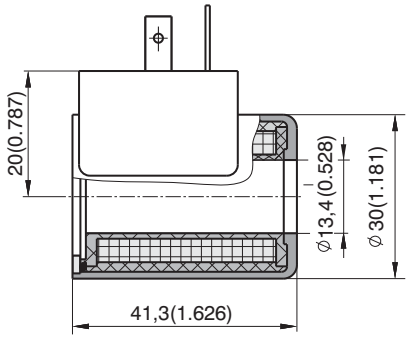
Dimensions of Coils C14

Dimensions in millimeters (inches)

Connector design

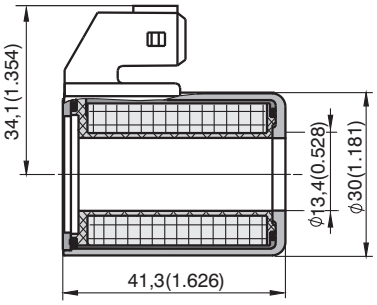
E1, E2
EN 175301-803-A

Protection degree IP65



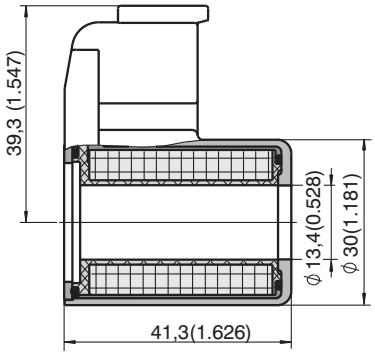
E3A, E4A
AMP Junior Timer

Protection degree IP65



E12, E13
Deutsch DT04-2P

Protection degree IP67, IP69



Coils C14B			Type	Ordering number
Nominal voltage	**Nominal current**	**Connector**		
12 VDC	1,83 A	E1 - EN 175301-803-A	C14B-01200E1-6,55NA	16210300
24 VDC	0,92 A	E1 - EN 175301-803-A	C14B-02400E1-26,2NA	16210400
205 V DC*	0,08 A	E1 - EN 175301-803-A	C14B-20500E1-2476NA	16210500
12 VDC	1,83 A	E2 - E1 with quenching diode	C14B-01200E2-6,55NA	24101600
24 VDC	0,92 A	E2 - E1 with quenching diode	C14B-02400E2-26,2NA	24101800
12 VDC	1,83 A	E3A - AMP Junior Timer (2 pins; male)	C14B-01200E3A-6,55NA	28822500
24 VDC	0,92 A	E3A - AMP Junior Timer (2 pins; male)	C14B-02400E3A-26,2NA	28686400
12 VDC	1,83 A	E4A - E3A with quenching diode	C14B-01200E4A-6,55NA	28822600
24 VDC	0,92 A	E4A - E3A with quenching diode	C14B-02400E4A-26,2NA	28822400
12 VDC	1,83 A	E12 - Deutsch DT04-2P	C14B-01200E12-6,55NA	29268200
24 VDC	0,92 A	E12 - Deutsch DT04-2P	C14B-02400E12-26,2NA	29268900
12 VDC	1,83 A	E13 - E12 with quenching diode	C14B-01200E13-6,55NA	29268800
24 VDC	0,92 A	E13 - E12 with quenching diode	C14B-02400E13-26,2NA	29269000

Note:

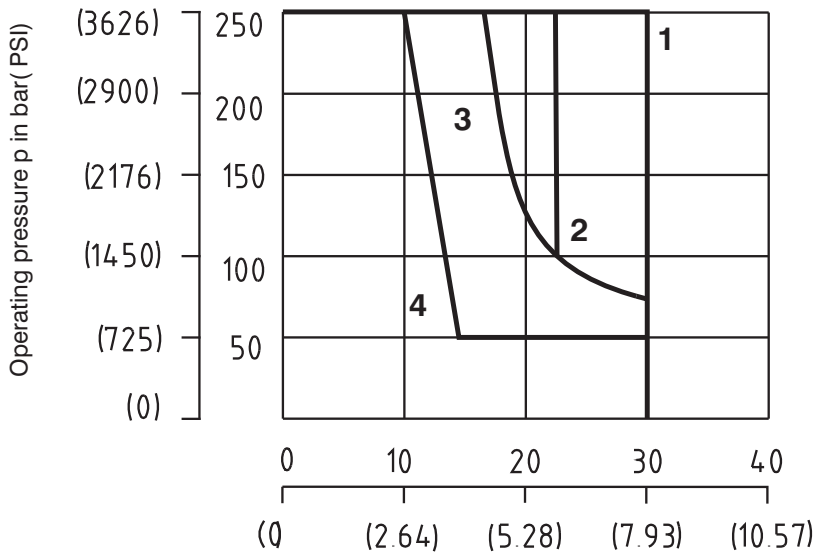
* Coil version 205 are suitable for the rectified voltage of 230V /50Hz, Rectifier in coil included

Other designs available at request.

p-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS) and t = 40 °C (104 °F)

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see spool symbols.

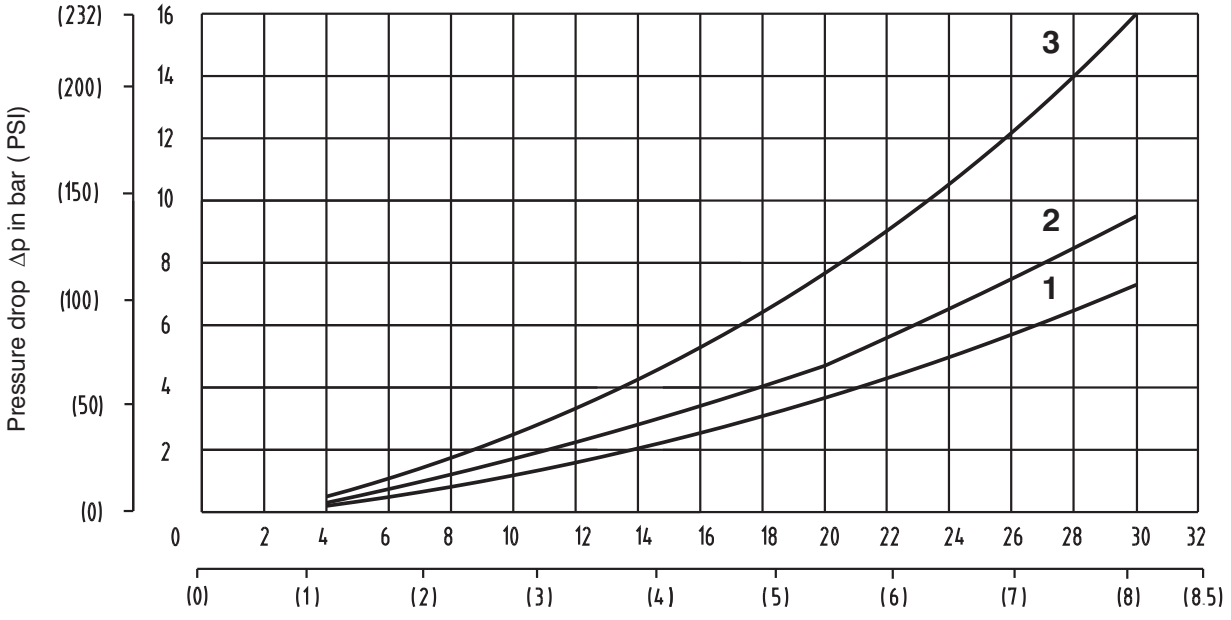


Z11	C11	H11	Y11	R11	X11	Z51	C51	H51	Y51
1	4	1	3	2	2	1	4	1	3

Δp-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS) and t = 40 °C (104 °F)

Pressure drop Δp related to flow rate.

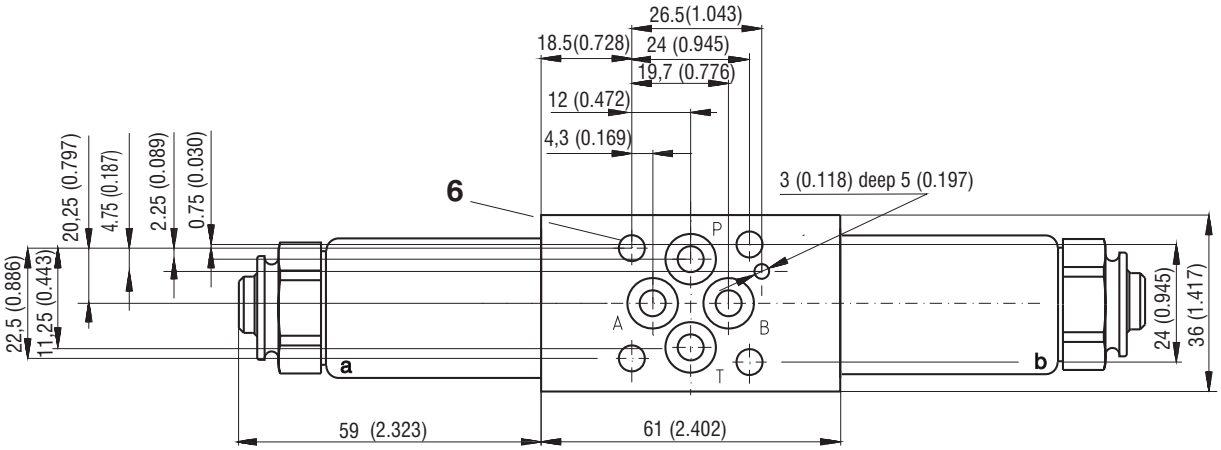


	Z11	C11	H11	Y11	R11	X11	Z51	C51	H51	Y51
P-A	1	3	1	1	2	2		3		
P-B	1	3	1	1	2	2	1		1	1
A-T	1	3	1	1	2	2	1		1	1
B-T	1	3	1	1	2	2		3		
P-T		2	2					2		

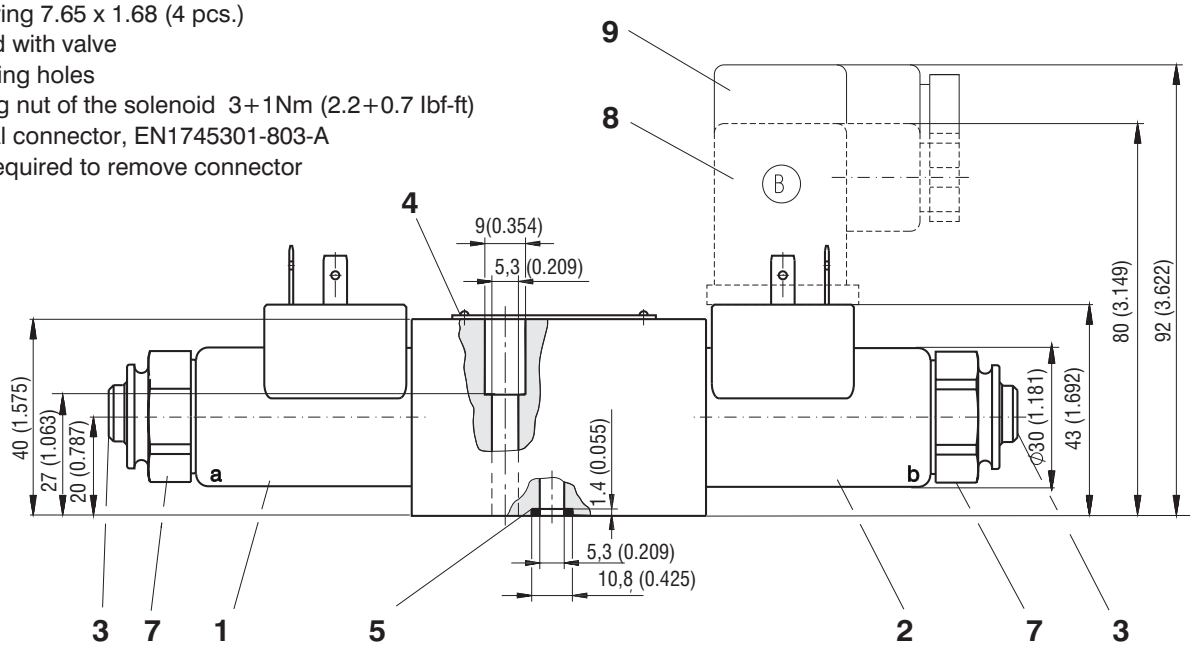
Valve Dimensions

Dimensions in millimeters and inches

Valve with two solenoids

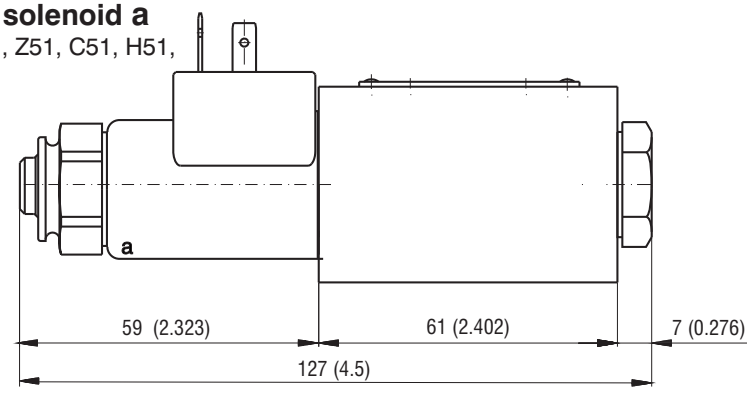


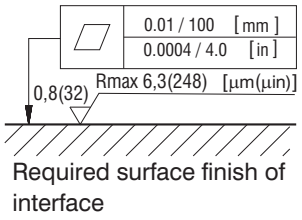
1 Solenoid a
2 Solenoid b
3 Manual override
4 Name plate
5 Square ring 7.65 x 1.68 (4 pcs.) supplied with valve
6 4 mounting holes
7 Retaining nut of the solenoid 3+1Nm (2.2+0.7 lbf-ft)
8 Electrical connector, EN1745301-803-A
9 Space required to remove connector



Valve with one solenoid a

Spool symbols R11, Z51, C51, H51, Y51

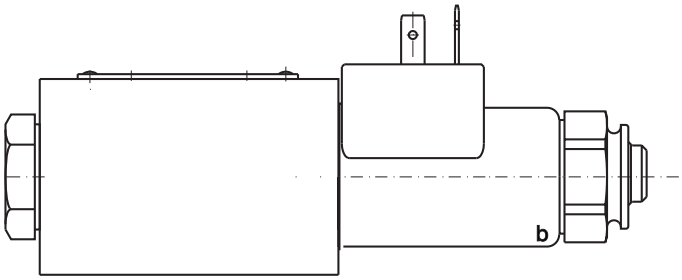




Required surface finish of interface

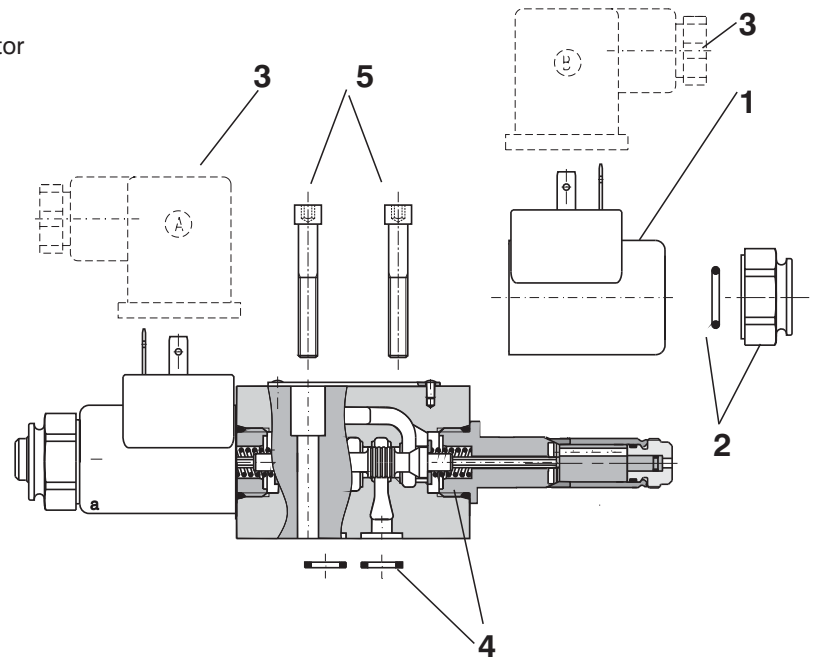
Valve with one solenoid b

Spool symbols X11, Z11, C11, H11, Y11



Spare Parts

1 Solenoid coil - see coils table
2 Nut with seal
3 Electrical connector
4 Seal kit
5 Mounting bolts



Electrical connector, EN 1745301-803-A

Type designation	Model	Max. input voltage	Connector A Gray	Connector B Black
			Ordering number (kit)	
K1	without rectifier - M16x1.5, bushing bore ∅ 0.24-0.31 in (∅ 6-8 mm)	230 V AC/DC	16202200	16202100
K2	without rectifier with LED and quenching diode - M16x1.5, bushing bore ∅ 0.24-0.31 in (∅ 6-8 mm)	12...24 V DC	16202800	16202700
K3	with rectifier - M16x1.5, bushing bore ∅ 0.24-0.31 in (∅ 6-8 mm)	230 V AC	16202400	16202300
K4	with rectifier with LED and quenching diode - M16x1.5, bushing bore ∅ 0.24-0.31 in (∅ 6-8 mm)	230 V AC	16203000	16202900
K5	without rectifier - M16x1.5, bushing bore ∅ 0.16-0.24 in (∅ 4-6 mm)	230 V AC/DC	16202600	16202500

Seal kit

Type	Dimensions, quantity		Ordering number (kit)
	Square ring	O-ring	
Standard NBR70	7,65 x 1,68 (4 pcs)	16 x 2 (2 pcs)	15873800
Viton	7,65 x 1,78 (4 pcs)	16 x 2 (2 pcs)	15874400

Mounting bolts (kit)

Dimensions, number	Bolt torque	Ordering number (kit)
M5 x 35 DIN 912-10.9 (4 pcs)	5+2 Nm (3.7+1.5 lbf-ft)	15874600

Caution!

- For directional valves with two solenoids, one solenoid must be without power before the other solenoid can be powered. Switching time for directional valves with detent assembly (impulse control) should not be shorter than 60 ms.
- Other functional symbols on request.
- The packing foil is recyclable.
- Mounting bolts M5 x 35 EN 1745301-803-A or studs must be ordered separately.
- Tightening torque of the bolts is 5+2 Nm (3.7+1.5 lbf-ft).
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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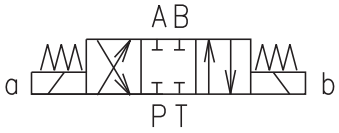
Directional Control Valve Solenoid Operated

RPEL1-06

HA 4056
04/2013

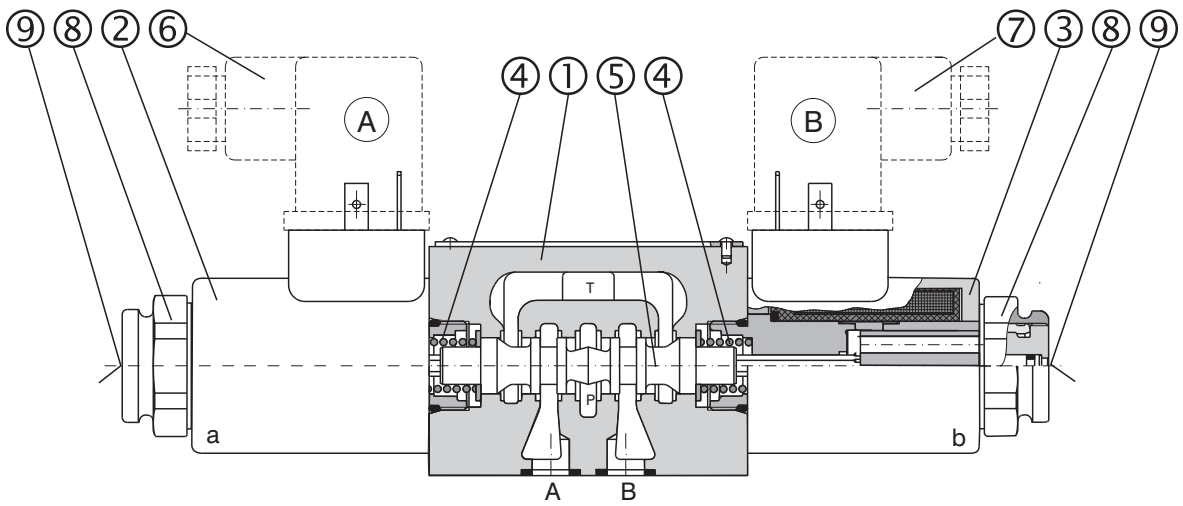
Size 06 • p_{max} 250 bar (3626 PSI) • Q_{max} 50 L/min (13.2 GPM)

- ❑ **4/3 - and 4/2- way directional control valve**
- ❑ **Solenoid with removable coils - electrical connector can be rotated in direction by 90°**
- ❑ **Push button manual override**
- ❑ **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**
- ❑ **Subplates see datasheet HA 0002**



Functional Description

The RPEL1directional control valves consist of housing (1), a control spool (5) with two centering springs (4) and cylindrical operating solenoids (2, 3).
The three-position directional control valves are fitted with two solenoids and two springs. Two-position directional control valves have either one solenoid and one return spring.
The operating solenoids are DC solenoids. The connectors (6, 7) can be turned by 90°. By loosening the nut (8), solenoids can be turned around the actuator axis.
In the case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override (9), provided the pressure in T-port does not exceed 25 bar.
The basic surface treatment of the valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



Ordering Code

RPEL1-06 □ □ / □ □ □

Directional Control Valve Solenoid Operated

Nominal size

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

Spool symbols
see the table Spool symbols

Rated supply voltage of solenoids
(at the coil terminals)
12 V DC / 2.41 A **01200**
24 V DC / 1.16 A **02400**
Other voltage on request.

Manual overide
no designation standard
M2 covered with rubber boot

Type of the solenoid coil
E1 with the connector to EN 1745301-803-A
E2 with the integrated quenching diode and the connector to EN 1745301-803-A
E3 with the connector AMP-Junior-Timer 2 PIN
E4 with integrated quenching diode and the connector AMP-Junior-Timer 2 PIN
E12 with the connector Deutsch DT04-2P
E13 with integrated quenching diode and the connector Deutsch DT04-2P

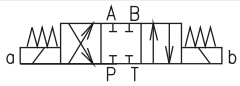
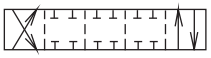
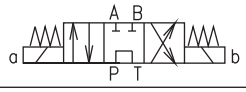
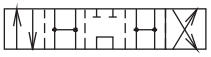
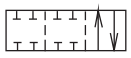
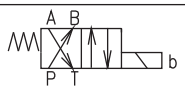
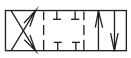
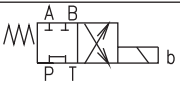
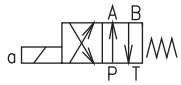
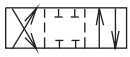
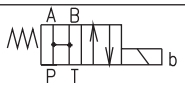
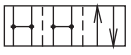
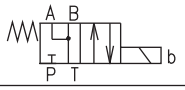
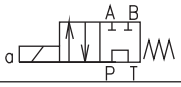
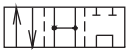
For selection of the solenoid coil and the terminal box type use catalogue HA 8007.

Technical Data

Nominal size	mm (US)	06 (03)
Maximum flow	L/min (GPM)	see p-Q characteristics
Max. operating pressure at porte P, A, B	bar (PSI)	250 (3626)
Max. operating pressure at port T	bar (PSI)	100 (1450)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range for NBR seals	°C (°F)	-30 ... +80 (-22... +176)
Ambient temperature, max.	°C (°F)	up to +50 (122)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Max. allowable voltage variation	%	±10
Max. switching frequency	1/h	10 000
Switching time, on: at ν=32 mm^2/s (156 SUS)	ms	30 ... 50
Switching time, off: at ν=32 mm^2/s (156 SUS)	ms	10 ... 50
Duty cycle	%	100
Service life	cycles	10^6
Type of protection to EN 60 529	see connector definition	IP 65, IP 67, IP 69K according to the selected design coils*
Weigt - valve with 1 solenoid - valve with 2 solenoids	kg (lbs)	1.4 (3.1) 1.6 (3.5)
Mounting position		unrestricted

*That degree of protection only applies with a properly attached connector plug

Spool Symbols

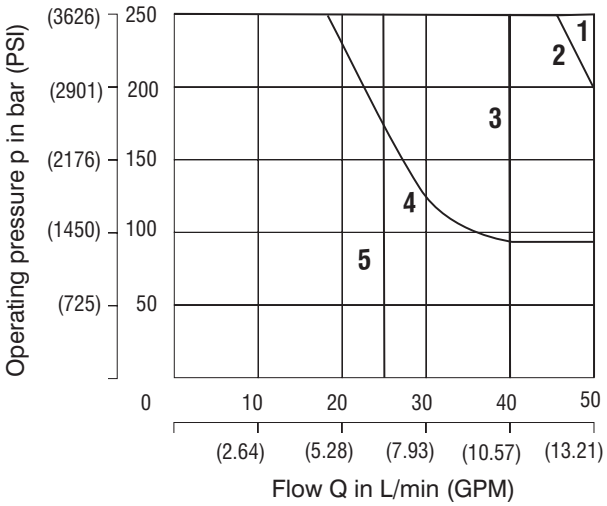
Designation	Symbol	Interposition	Designation	Symbol	Interposition
Z11			Z51		
C11			H51		
H11			Z11		
Y11			X11		
L21			C11		
R11			H11		
Y51			Y11		
C51					

p-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS) and $t = 40\ °C$ (104 °F)

Operating limits for maximum hydraulic power transferred by the directional valve.

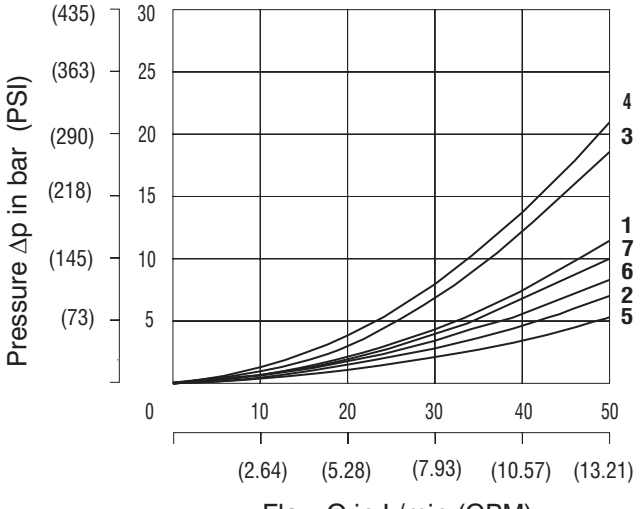
Z11	2	Z51	2
C11	4	C51	4
H11	1	H51	1
R11	1	Y51	3
Y11	3	L21	5
X11	1		



Δp-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS) and $t = 40\ °C$ (104 °F)

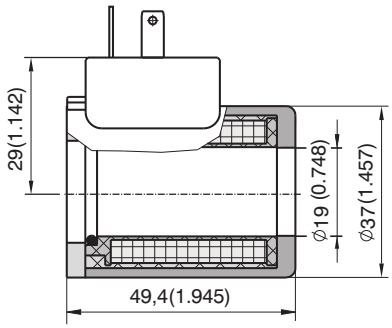
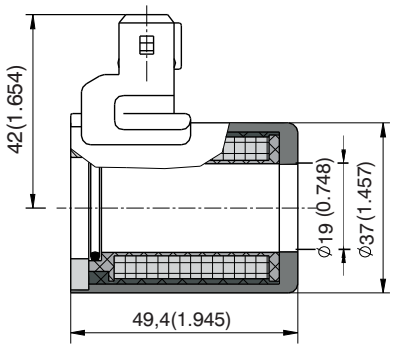
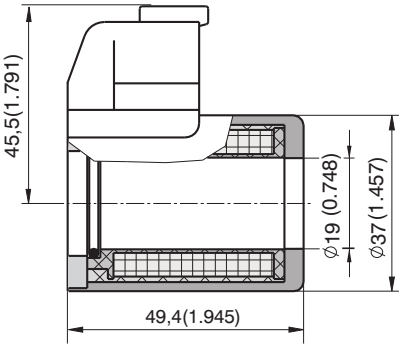
Pressure drop Δp related to flow rate.



	P-A	P-B	A-T	B-T	P-T
Z11	1	1	1	1	
C11	4	4	4	4	7
H11	5	5	5	5	
Y11	6	6	5	5	
L21	5	6	5	6	4
R11	2	3	3	2	
X11	3	2	2	3	
Z51		1	1		
C51	4			4	7
H51		5	5		
Y51		6	5		

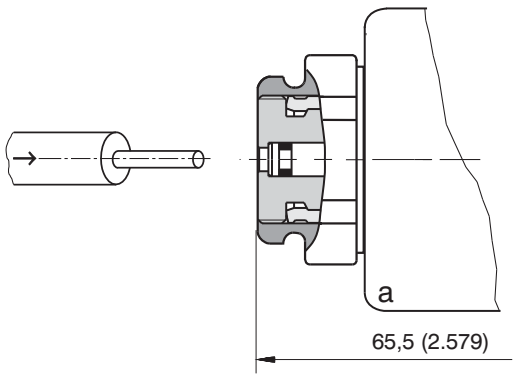
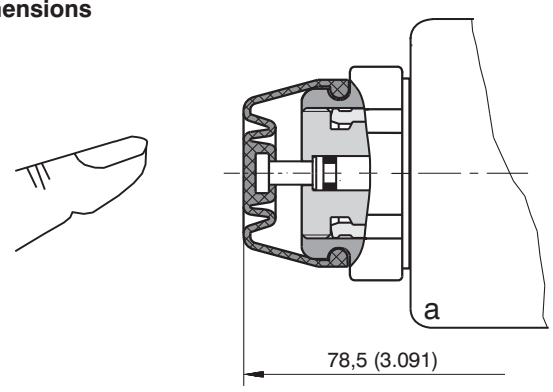
Type of the Solenoid Coil

Dimensions in millimeters (inches)

Designation	Dimensional sketch	Description
E1		Solenoid coil with the connector to EN 1745301-803-A Type of protection to EN 60 529 - IP 65
E2		Solenoid coil with the integrated quenching diode (bipolar transil diode) and the connector to EN 1745301-803-A Type of protection to EN 60 529 - IP 65
E3		Solenoid coil with the connector AMP- Junior-Timer 2 PIN Type of protection to EN 60 529 - IP 67
E4		Solenoid coil with the integrated quenching diode (bipolar transil diode) and the connector AMP- Junior-Timer 2 PIN Type of protection to EN 60 529 - IP 67
E12		Solenoid coil with the connector Deutsch DT04-2P Type of protection to EN 60 529 - IP 67 / IP 69K
E13		Solenoid coil with the integrated quenching diode (bipolar transil diode) and the connector Deutsch DT04-2P Type of protection to EN 60 529 - IP 67 / IP 69K

Manual Override

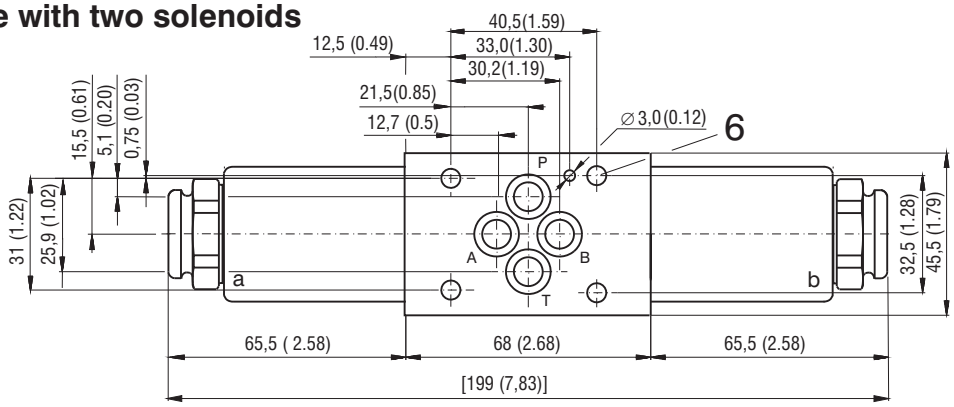
Dimensions in millimeters (inches)

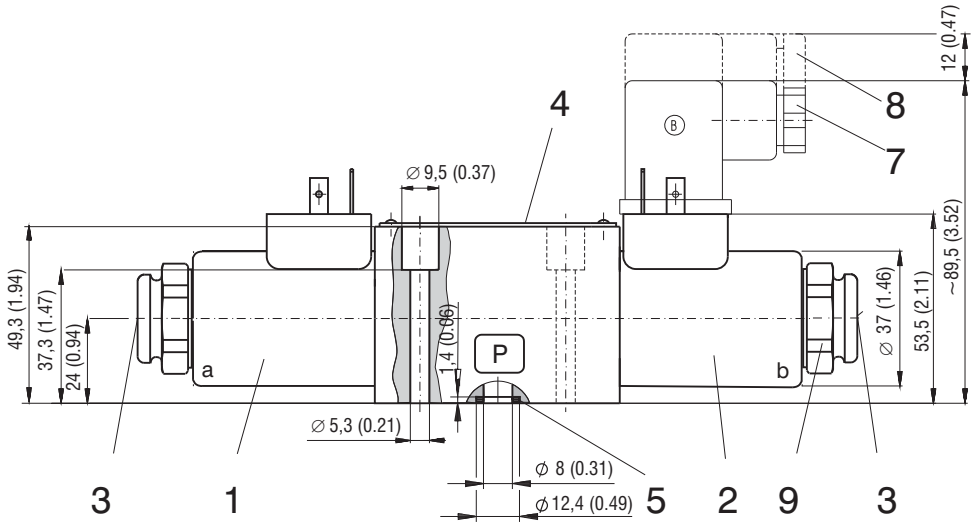
STANDARD	RUBBER BOOT
Dimensions	**Type M2** **Dimensions**
	
Standard model of the manual override.	Manual override protected by rubber boot.

Valve Dimensions

Dimensions in millimeters (inches)

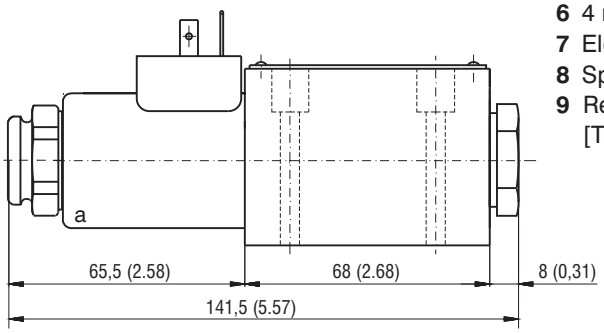
Valve with two solenoids





Valve with one solenoid "a"

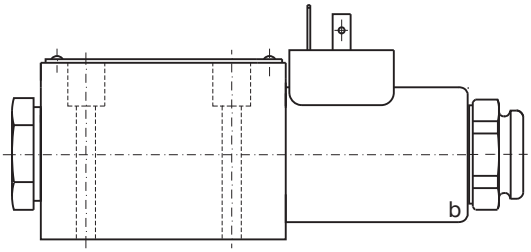
Spool symbols R11, Z51, C51, H51, Y51

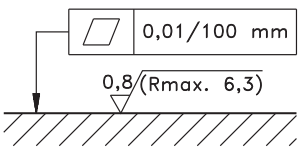


1 Solenoid a
2 Solenoid b
3 Manual override
4 Name plate
5 Square ring (4 pcs.)
9.25 x 1.68 supplied with valve
6 4 mounting holes
7 Electrical connector, EN 1745301-803-A
8 Space required to remove connector
9 Retaining nut of the solenoid
[Tightening torque 3+1 Nm (2.2+0.7 lbf.ft)]

Valve with one solenoid "b"

Spool symbols Z11, X11, C11, H11, Y11

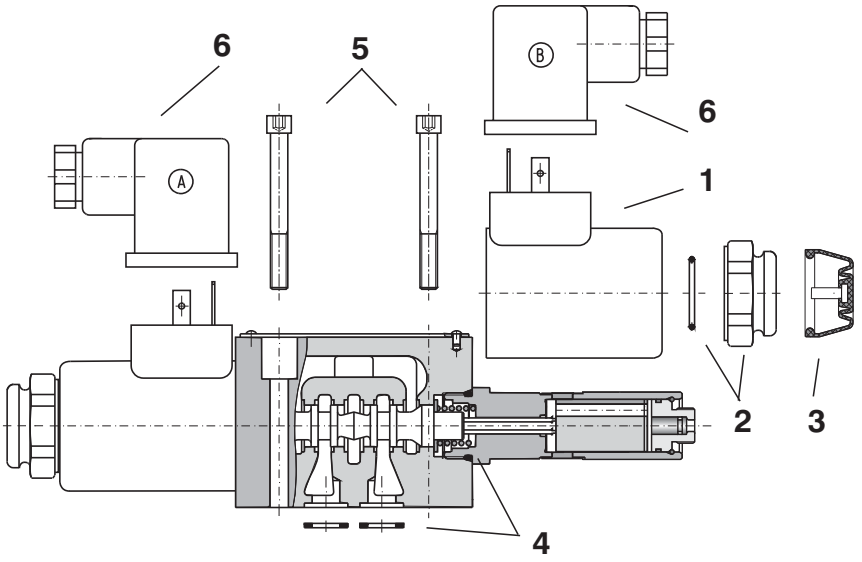




Required surface finish of interface

Spare Parts

1 Solenoid coil
2 Nut with seal
3 Kit M2
4 Seal kit
5 Mounting bolts
6 Electrical connector



1. Solenoid coil **For selection of solenoid coil and terminal box type use catalogue HA 8007.**

Solenoid type	Coil type					
	E1	E2	E3	E4	E12	E13
	Ordering number					
01200	27316600	27631400	27330200	27631600	27351400	27632000
02400	27316700	27632400	27449700	27633400	27330500	27633500

2. Solenoid retaining nut with seal

Type of the nut	Seal ring	Ordering number
Standard nut	18 x 1,5	15874500
3. Kit M2 Rubber boot with pin		24142800

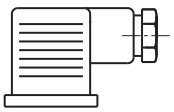
4. Seal kit

Type	Dimensions, number		Ordering number
Standard - NBR70	9,25 x 1,68 (4 pcs.)	17 x 1,8 (2 pcs.)	15845200

5. Mounting bolts

Dimensions, number	Tightening torque	Ordering number
M5 x 45 DIN 912-10.9 (4 pcs.)	8,9 Nm	15845100

6. Electrical connector, EN 175301-803

Type designation	Type	Model	Max. input voltage	Ordering number	
K1	Connector B (black)	without rectifier - M16x1.5 (bushing bore ∅ 6-8 mm)	230 V AC/DC	16202100	
	Connector A (gray)			16202200	
K2	Connector B (black)	without rectifier with LED and quenching diode - M16x1.5 (bushing bore ∅ 6-8)	12...24 V DC	16202700	
	Connector A (gray)			16202800	

Caution!

- For applications outside the given parameters, please consult us.
- For directional control valves with two solenoids, one solenoid must be without power before the other solenoid can be powered charged. Other spool types are available on request.
- The packing foil is recyclable.
- The protective plate can be returned to the manufacturer.
- The tightening torque is 8,9 Nm.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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www.argo-hytos.com

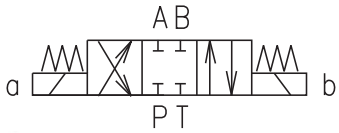
Directional Control Valves Solenoid Operated with Wirebox

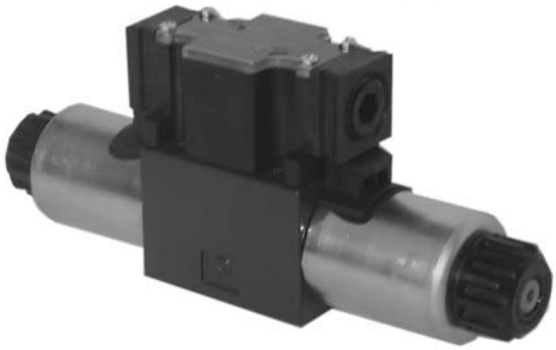
RPEW4-06

Size 06 (D 03) • 350 bar (5076 PSI) • 80 L/min (21 GPM)

HA 4035
10/2013
Replaces
HA 4035 5/2012

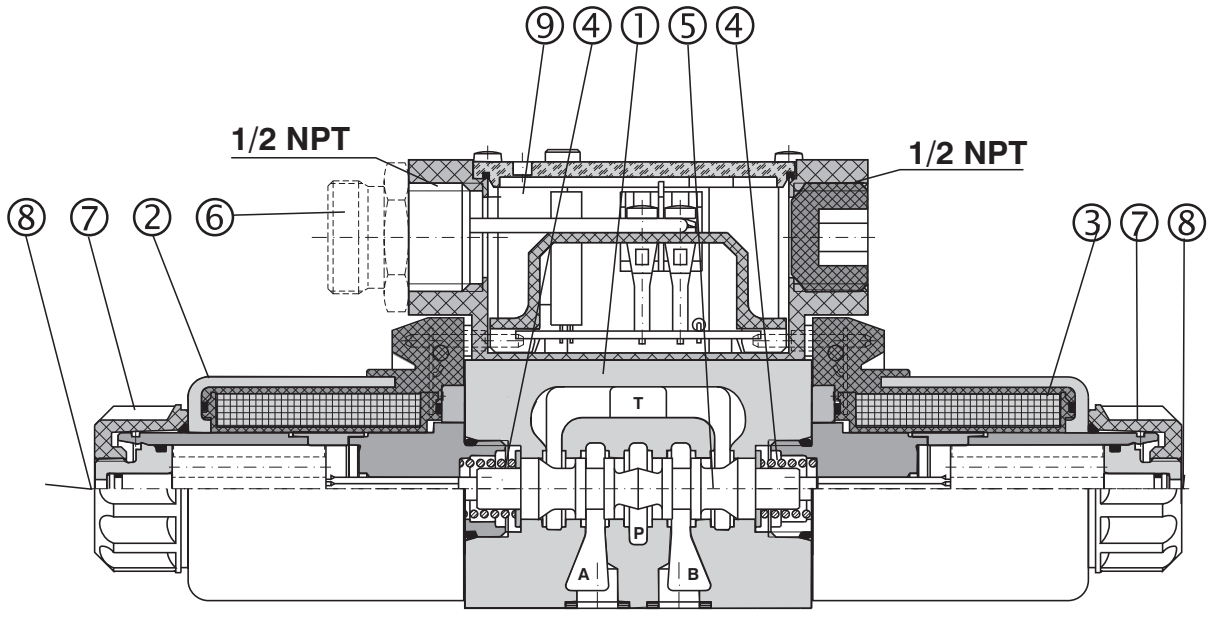
- ❑ **4/3-, 4/2- way directional control valves**
- ❑ **Four-land spool - reduced functional dependence on fluid viscosity**
- ❑ **Push button manual override**
- ❑ **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**
- ❑ **Subplates see Data Sheet HA 0002**
- ❑ **CSA Upon request**





Functional Description

The RPEW4 directional control valves consist of housing (1), a control spool (5) with two centering springs (4) and cylindrical operating solenoids (2, 3), electric wirebox (9) and connector (6). 12 and 24 volt DC solenoids can be supplied with diodes (build in) the AC/DC rectifier is part of the terminal plate in the wirebox.
The three-position directional control valves are fitted with two solenoids and two springs. Two-position directional control valves have either one solenoid and one return spring or two solenoids and a detent assembly.
The solenoids are supplied with DC (2,3) voltage through the 1/2 NPT Ports on the wirebox (standard on both sides) or through Connector Item (3 - Pin single solenoid, 5 - Pin - double solenoid) see wiring diagram (page 7). The wires are connected to a terminal plate inside the wirebox. Optional lights are installed on this terminal plate for shift indication. The lights are visible as raised arrows on the valve label. The solenoids are retained by the Nut (7) and plug-in to the wirebox. Plug -in design allows easy removal without wire change.
In the case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override (8), provided the pressure in T- port does not exceed 25 bar (362,5 PSI).
The valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



Ordering Code

RPEW4-06 □ □ / □ □ □ □ □ □ □ □

Solenoid Operated Directional Control Valves with Wirebox

Valve Size **06 (D 03)**

Number of Valve Positions

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

Spool Symbols
see the table spool symbols

Rated Supply Voltage of Wirebox
(at the wirebox terminals)

12 V DC / 2.64 A	**01200**
24 V DC / 1.32 A	**02400**
120 V AC / 60 Hz*	**12060**

*DC coils with rectifier in wirebox

Note: For other voltages consult factory

Type of Solenoid Coil for Wirebox (Plug-In-Coil)

DC solenoid (DC-rectified)	**EW1**
DC solenoid with quenching diode	**EW2**

Type of Wirebox

Wirebox for DC	**K**
Wirebox for AC (rectifier in wirebox)	**R**

CSA upon request

Seals

no designation	NBR
V	FPM (Viton)

Orifice in P Port

no designation	without orifice
D1	∅1,0 mm (0.039 inch)
D2	∅1,5 mm(0.059 inch)
D3	∅2,0 mm (0.079 inch)
D4	∅2,2 mm (0.087 inch)
D5	∅2,5 mm (0.098 inch)

Spool Speed Control Orifice

no designation	without damping
T1	orifice ∅0.7 mm (0.003 inch) in solenoid

Note: For soft shift details / performance see HA 4010

Manual Override

no designation	standard
N1	covered with retaining nut
N2	covered with rubber boot

Wirebox Configurations:

50 Standard wiring box with 1/2 NPT both ends (Either side can be used for wiring, Remove cover -plug accordingly)

51 Standard wiring box with 1/2 NPT both ends and LED diodes (B- side plugged, A - side covert for shipping)

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

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

54 Wiring box with 3 PIN connector ANSI/B93.55M mounted on A-side with LED diode (B-side plugged, only for single solenoid valves)

55 Wiring box with 3 PIN connector ANSI/B93.55M mounted on B-side with LED diode (A-side plugged, only for single solenoid valves)

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

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

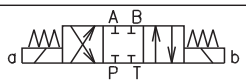
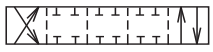
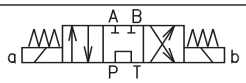
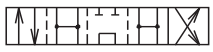
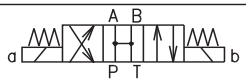
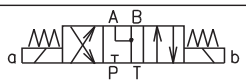
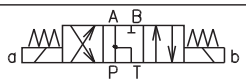
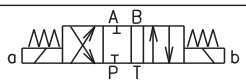
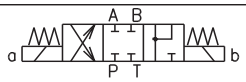
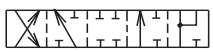
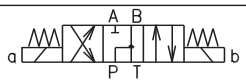
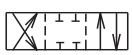
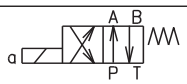
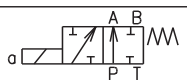
58 Wiring box with 5 PIN connector ANSI/B93.55M mounted on A-side with LED diode (B-side plugged, only for double solenoid valves)

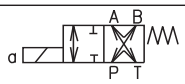
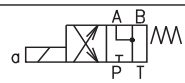
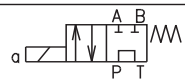
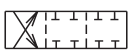
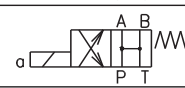
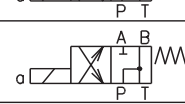
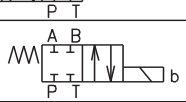
59 Wiring box with 5 PIN connector ANSI/B93.55M mounted on B-side with LED diode (A-side plugged, only for double solenoid valves)

Technical Data

Valve size	mm (US)	06 (D 03)
Maximum flow	L/min (GPM)	see p-Q characteristics
Max. operating pressure at porte P, A, B	bar (PSI)	350 (5076)
Max. operating pressure at port T	bar (PSI)	210 (3000)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51 524
Fluid temperature range for NBR seals	°C (°F)	-30 ... +80 (-22 ... +176)
Fluid temperature range for FPM seals	°C (°F)	-20 ... +80 (-4 ... +176)
Ambient temperature max.	°C (°F)	+50 (+122)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Max. allowable voltage variation	%	DC: ± 10 / AC: ± 10
Max. switching frequency	1/h	15 000
Switching time, on: at ν=32 mm^2/s (156 SUS)	ms	DC: 30 ... 50
Switching time, off: at ν=32 mm^2/s (156 SUS)	ms	DC: 10 ... 50
Duty cycle	%	100
Service life	cycles	10^7
Enclosure type to EN 60 529		IP 65
Weigt - valve with 1 solenoid - valve with 2 solenoids	kg (lbs)	1,3 (2.9) 1,9 (4.2)
Mounting position		unrestricted

Functional Symbols

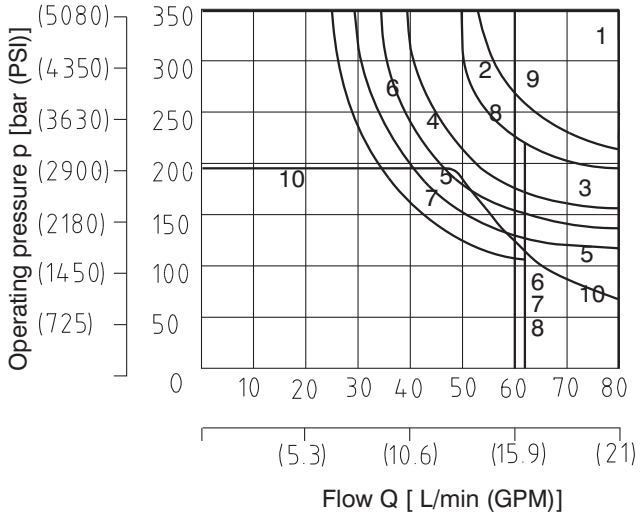
Type	Symbol	Crossover
Z11		
C11		
H11		
P11		
Y11		
L21		
B11		
Z21		
F11		
R11		
R21		
A51		
P51		

Type	Symbol	Crossover
X25		
Y51		
C51		
Z51		
H51		
F51		
Z11		
X11		
C11		
H11		
N11		
F11		
J15		
J75		

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see Functional Symbols.

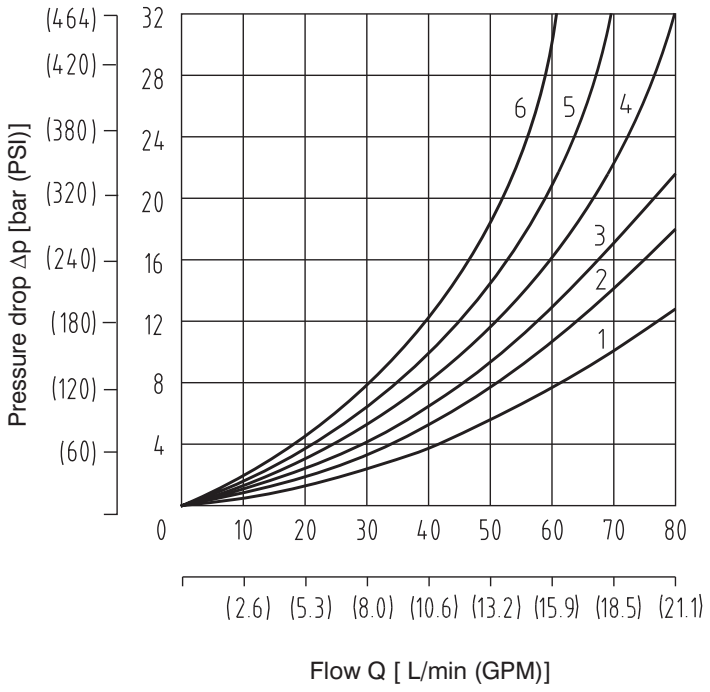


DC		DC		DC	
Z11	1	J75	9	H51	7
C11	6	F11	5	F51	7
H11	3	R11	3	X11	3
P11	1	R21	4	N11	7
Y11	2	A51	5	X25	10
L21	5	P51	1		
B11	8	Y51	2		
J15	1	C51	6		
Z21	1	Z51	1		

Δp-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Pressure drop Δp related to flow rate.

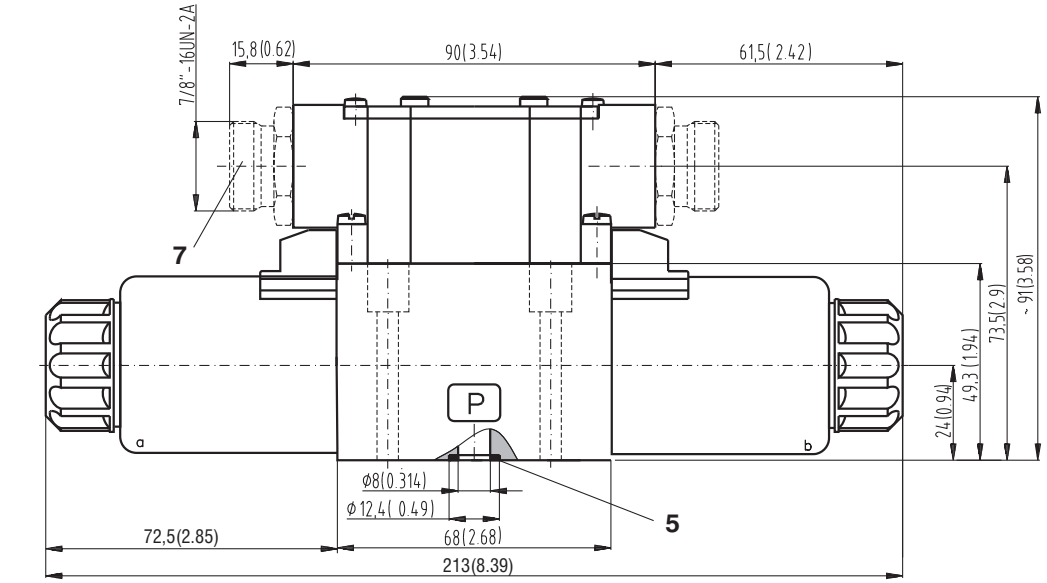


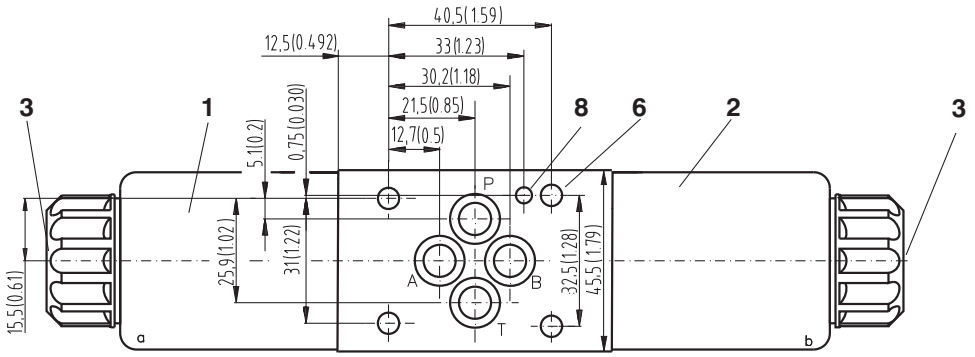
	P-A	P-B	A-T	B-T	P-T
Z11	2	2	3	3	
C11	5	5	5	6	3
H11	2	2	2	3	3
P11	1	1	3	3	
Y11	2	2	2	2	
L21	2	2	3	3	
B11	2	2	3	3	
Z21		2	3		
F11	1	2		3	3
R11	2	2	3	3	
R21	2	2	3	3	
A51	2	2			
P51		1	3		
Y51		2	2		
C51	2			3	4
Z51		2	3		
H51		2	3		
F51		2	3		
X11	2	2	3	3	
N11	2	2	3	3	
J15	2	2	3	3	
J75	2	2			

Valve Dimensions

Dimensions in millimeters and inches

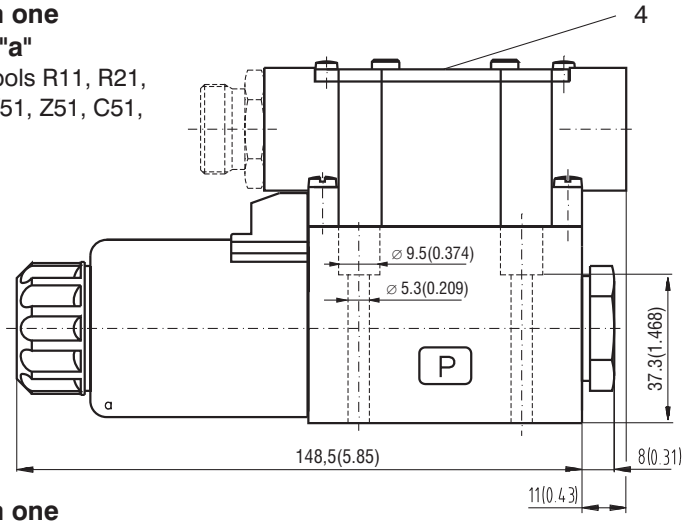
Valve with two solenoids





Valve with one solenoid "a"

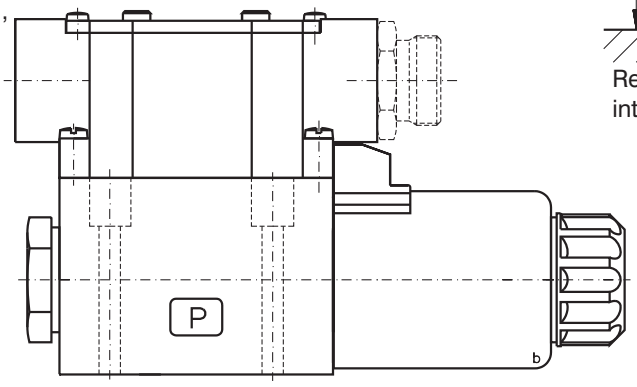
Spool symbols R11, R21, A51,P51, Y51, Z51, C51, H51, F51

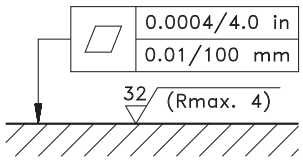


1 Solenoid a [(Nut torque 3 Nm (2.21 ft-lbs.)]
2 Solenoid b [(Nut torque 3 Nm (2.21 ft-lbs.)]
3 Manual override
4 Name plate
5 Square ring (4 pcs.)
9,25 x 1,68 supplied with valve
6 4 mounting holes
7 Electrical connector
8 Pin Hole

Valve with one solenoid "b"

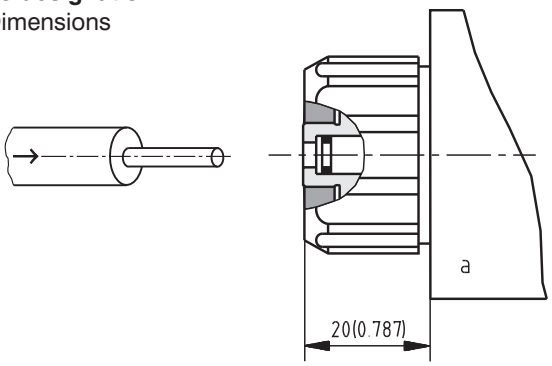
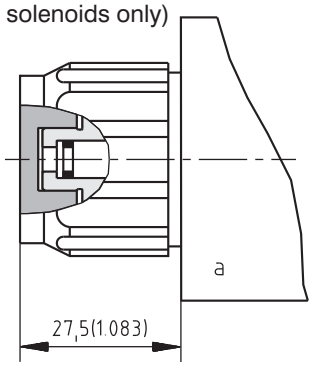
Spool symbols X11, Z11, C11, H11, N11, F11

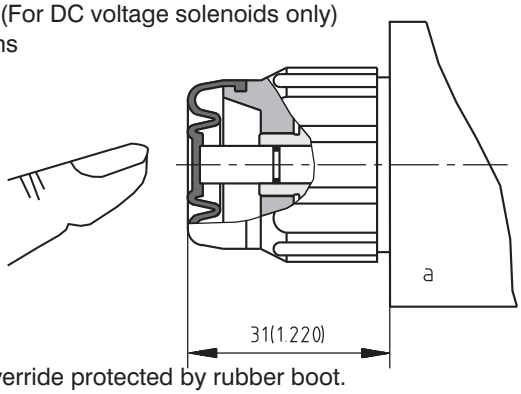




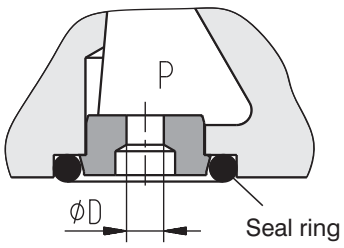
Required surface finish of interface

Manual Override

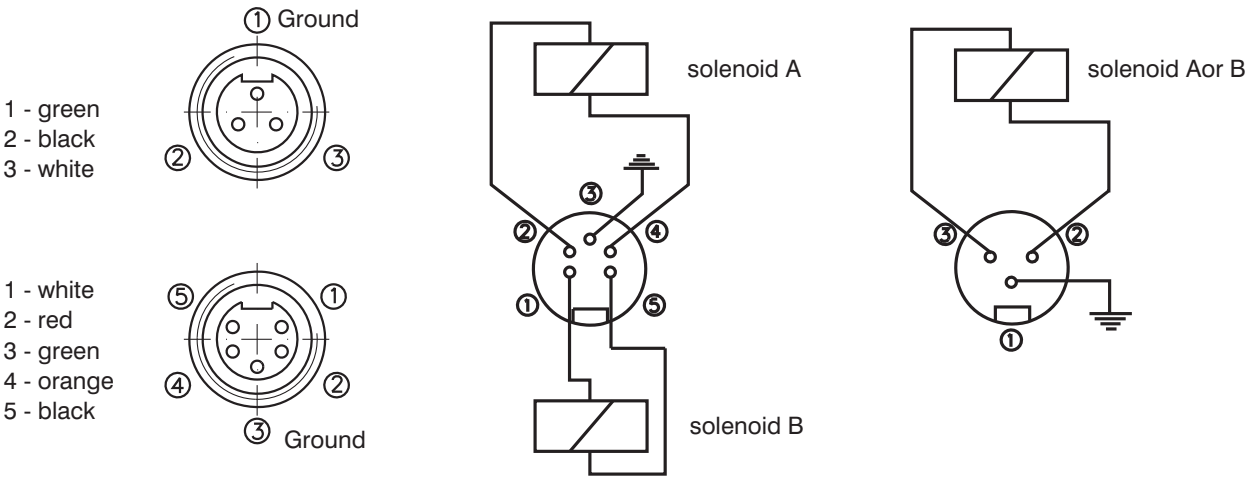
STANDARD	CLOSED NUT
no designation Dimensions  Standard model of the manual override. Standard retaining nut of the solenoid.	Type **N1** (For DC voltage solenoids only) Dimensions  Manual override with retaining nut. Can be used after removing nut.

RUBBER BOOT	
Type **N2** (For DC voltage solenoids only) Dimensions  Manual override protected by rubber boot.	

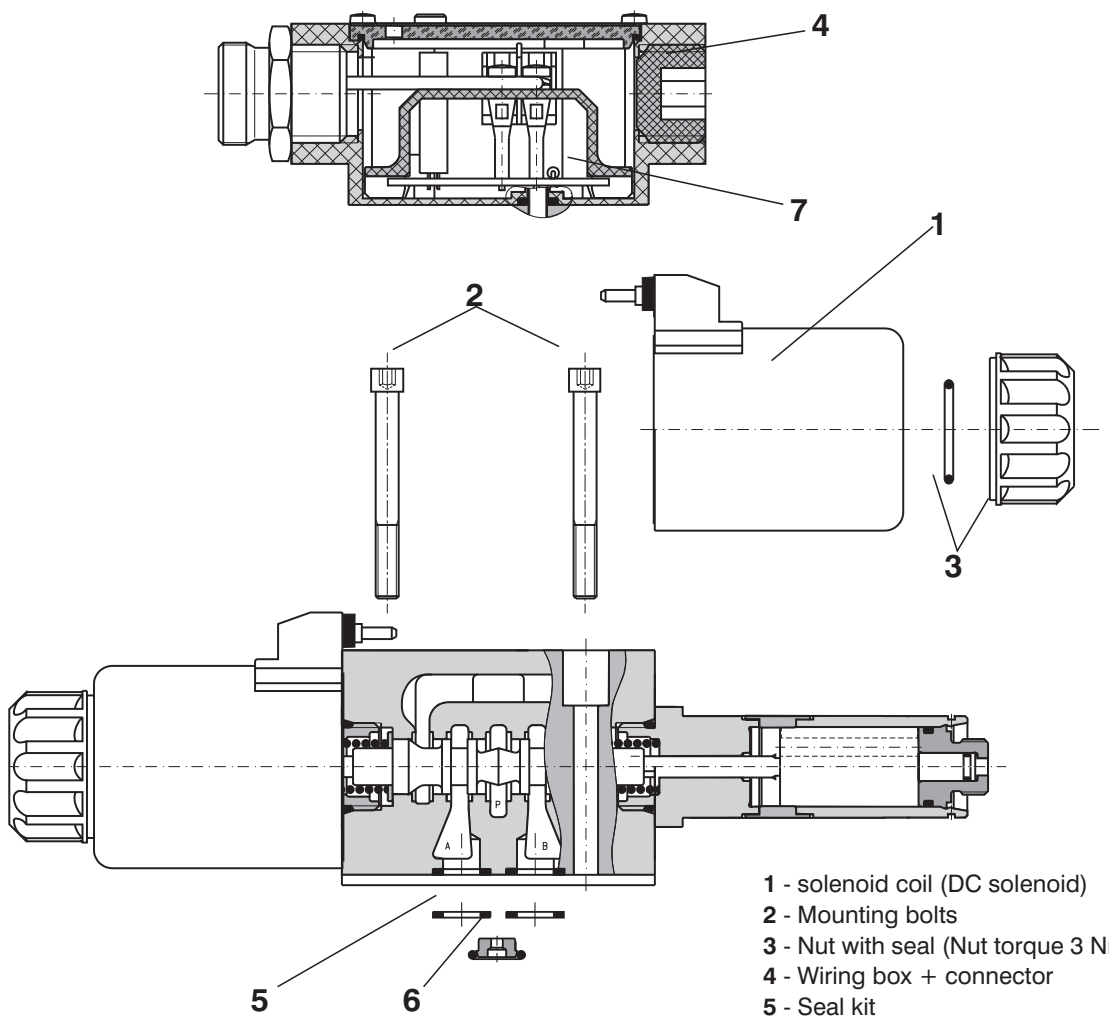
Orifice in P-Port

Type	∅D mm(inch)	Dimensions	Description
D1	1,0 (0.039)		P-Port orifices limit the flow into the directional control valve. **Attention**: When the orifice in P port is additionally mounted the standard used square ring NBR is replaced with O-ring from Viton.
D2	1,5 (0.059)		
D3	2,0 (0.079)		
D4	2,2 (0.087)		
D5	2,5 (0.098)		

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



Spare Parts



1 - solenoid coil (DC solenoid)
2 - Mounting bolts
3 - Nut with seal (Nut torque 3 Nm (2.21 ft-lbs))
4 - Wiring box + connector
5 - Seal kit
6 - Orifice in P port with seal ring
7 - Terminal plate

Wirebox	
Type	**Ordering number**
Wirebox without terminal plate	24008400
Terminal Plates	
Type	**Ordering number**
Terminal plate - basic design A+B	16204400
Terminal plate A - basic design	24010800
Terminal plate B - basic design	24008600
Terminal plate 12V DC - lights A+B	16204500
Terminal plate 24V DC - lights A+B	16204600
Terminal plate 12V DC - LED diode A	24008800
Terminal plate 12V DC -LED diode B	24008900
Terminal plate 24V DC - LED diode A	24009100
Terminal plate 24V DC - LED diode B	24009200
Terminal plate 120V AC - rectifier A+B	16204800
Terminal plate 120V AC - rectifier A	24010000
Terminal plate 120V AC - rectifier B	24010100
Terminal plate 120V AC - rectifier A+B and lights A+B	16204900
Terminal plate 120V AC - rectifier and light A	24010300
Terminal plate 120V AC - rectifier and light B	24010400

Solenoid Coil

Voltage rating	Type	Ordering number
01200 DC	EW1	16205100
*01200 DC	EW1	24154700
02400 DC	EW1	16205000
*02400 DC	EW1	24154900
10600 DC (120V/60Hz rectifier in wirebox)	EW1	16205200
01200 DC	EW2	16205400
02400 DC	EW2	16205500

Solenoid Retaining Nut with Seal

Type of the nut	Seal ring	Ordering number
Standard nut	22 x 2	15844600
Nut with detent assembly (DC only)		15844900
Closed nut (DC only)		15844700
Nut with rubber boot (DC only)		15844800

Electrical Connector, ANSI/B93.55M

Type	Ordering number
3 PIN	24007300
5 PIN	24007400

Orifice in P-Port

Type	∅D mm (inch)	Seal ring	Ordering number
D1	1,0 (0.039)	9.25 x 1.75	15845600
D2	1,5 (0.059)		15845700
D3	2,0 (0.079)		15845800
D4	2,2 (0.087)		15846000
D5	2,5 (0.098)		15845900

Seal Kit

Type	Dimensions, quantity			Ordering number
Standard - NBR70	9.25 x 1.68 (4 pcs.)	17 x 1.8 (2 pcs.)	9.25 x 1.75 (1 pc)	21483800
Viton	9.25 x 1.78 (4 pcs.)	17.17 x 1.78 (2 pcs.)		15845400

Bolt Kit (for studs see HA 0030)

Dimensions, quantity	Bolt torque	Ordering number
M5 x 45 DIN 912-10.9 (4 pcs.)	8.9 Nm(6.6 ft-lbs)	15845100
10-24 UNC x 1.75 (4 pcs.)		2 000 107

* for valve vith CSA

Caution!

- When the distributor contains two electromagnets any of the two electromagnets can be switched on only after the other one switches off. The electromagnets switching time on distributors with locking arrangement must not be shorter than 60 ms.With directional valves with cushioned spool shifting, the switching time must correspond with the shifting time.
- Distributors with other interconnections than those shown in the catalogue can be supplied on request.
- The packaging foil can be recycled
- The transport base plate can be returned to the manufacturer.
- Mounting screws M5 x 45 DIN 912-10.9 or bolts must be ordered separately.
  The screws tightening torque is 8.9 Nm (6.6 ft-lbs).
- The mentioned data only serve to describe the product and in no case are to be understood in terms of law as guaranteed characteristics.

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Solenoid Operated Directional Control Valves with Wirebox

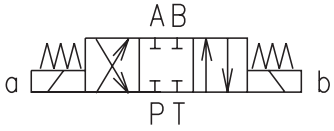
RPEW4-10

Size 10 (D 05) • 350 bar (5076 PSI) • 140 L/min (37 GPM)

HA 4044
5/2012

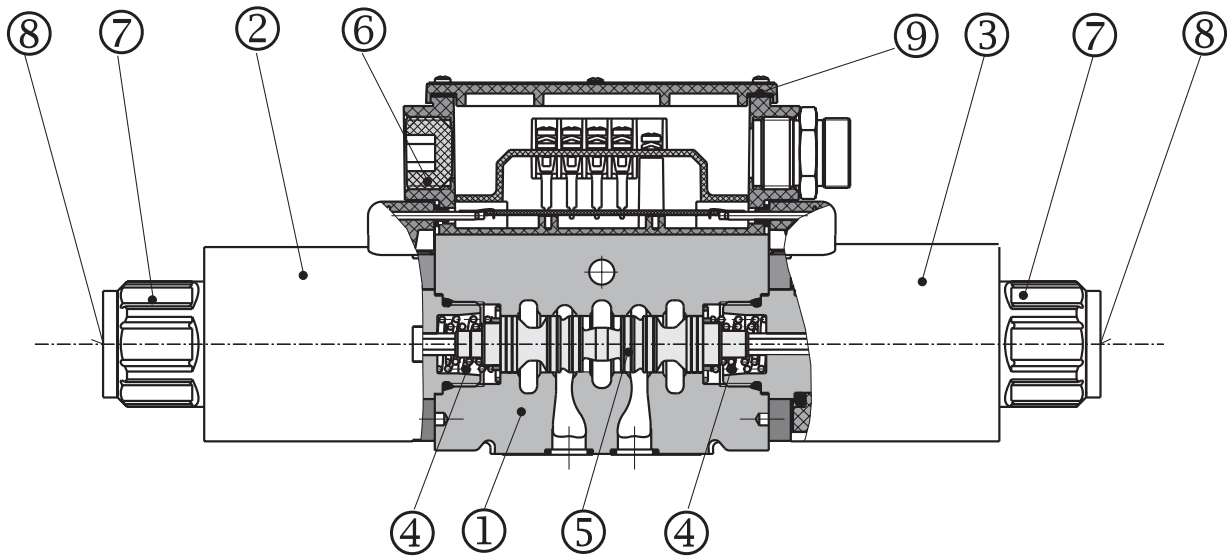
Replaces
HA 4044 2/2006

- **4/3, 4/2 way directional control valves**
- **Four-land spool - reduced functional dependence on fluid viscosity**
- **Push button manual override**
- **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**
- **Subplates see data sheet HU 0002**
- **CSA Upon request**



Functional Description

The RPEW4 directional control valves consist of housing (1), a control spool (5) with two centering springs (4) and cylindrical operating solenoids (2, 3), electric wirebox (9) and connector (6).
The three-position directional control valves are fitted with two solenoids and two springs. Two-position directional control valves have either one solenoid and one return spring or two solenoids and a detent assembly.
The solenoids are supplied with DC and AC - voltage through the 1/2 NPT Ports on the wirebox (optional on both sides) or through Connector Item (3 - Pin single solenoid, 5 - Pin - double solenoid) see wiring diagram (page 7). The wires are connected to a terminal plate inside the wirebox. Optional lights are installed on this terminal plate for shift indication. The lights are visible as raised arrows on the valve label. The solenoids are retained by the Nut (7) and plug-in to the wirebox. Plug -in design allows easy removal without wire change.
In the case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override (8), provided the pressure in T- port does not exceed 25 bar (363 PSI).
The valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



Ordering Code

RPEW4 - 10 □□ / □□□□□□□□□

Solenoid Operated Directional Control Valve with Wirebox

Valve Size **10 (05)**

Number of Valve Positions
two positions **2**
three positions **3**

Functional symbols
see the table functional symbols

Rated Supply Voltage of Wirebox (at the wirebox terminals)
12 V DC / 2.64 A **01200**
24 V DC / 1.32 A **02400**
120V AC / 60Hz* **12060**

* DC coils with rectifier in wirebox only type of Wirebox R

Note: For other voltages consult factory

Type of Solenoid Coil for Wiring Box (Plug-In-Coil)

DC solenoid (DC and AC - rectified) **EW1**

Type of Wirebox
Wirebox for DC **K**
Wirebox AC rectified (rectifier in wirebox) **R**

Wirebox Configurations:

50 Standard wiring box with 1/2 NPT both ends (Either side can be used for wiring, Remove cover -plug accordingly)

51 Standard wiring box with 1/2 NPT both ends and LED diodes (B- side plugged, A - side covert for shipping)

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

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

54 Wiring box with 3 PIN connector ANSI/B93.55M mounted on A-side with LED diode (B-side plugged, only for single solenoid valves)

55 Wiring box with 3 PIN connector ANSI/B93.55M mounted on B-side with LED diode (A-side plugged, only for single solenoid valves)

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

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

58 Wiring box with 5 PIN connector ANSI/B93.55M mounted on A-side with lLED diode (B-side plugged, only for double solenoid valves)

59 Wiring box with 5 PIN connector ANSI/B93.55M mounted on B-side with LED diode (A-side plugged, only for double solenoid valves)

Damping
no designation without damping
T2 nozzle
T3 throttle screw

Manual override
no designation standard
N2 covered with rubber boot

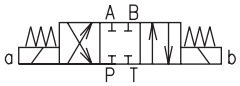
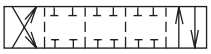
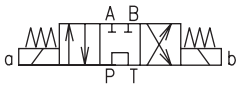
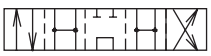
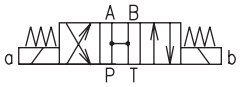
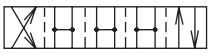
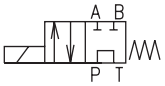
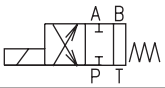
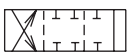
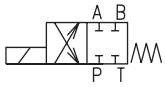
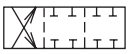
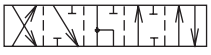
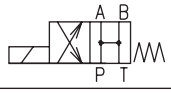
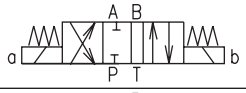
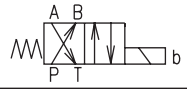
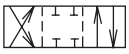
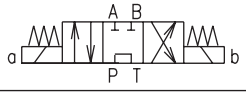
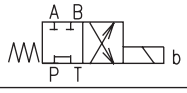
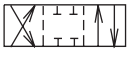
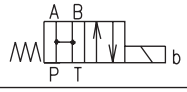
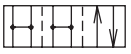
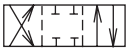
Seals
no designation NBR
V FPM (Viton)

CSA Upon request

Technical Data

Valve size	mm (US)	10 (D 05)	
Maximum flow	L/min (GPM)	see p-Q characteristics	
Maximum operating pressure at ports P, A, B	bar (PSI)	350 (5076)	
Maximum operating pressure at port T	bar (PSI)	210 (3050)	
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range (NBR / Viton)	°C (°F)	-30 ... +80 (-22 ... +176) / -20 ... +80 (-4 ... +176)	
Ambient temperature max.	°C (°F)	+50 (+122)	
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)	
Maximum degree of fluid contamination		Class 18/15 to ISO 4406. A filter with a retention rate $\beta_{10} \geq 75$ is recommended.	
Maximum allowable voltage variation	%	AC: ±10	DC: ±10
Maximum switching frequency	1/h	15 000	
Switching time, ON; at ν = 32 mm^2/s (156 SUS)	ms	AC: 50 ... 330	DC: 50 ... 120
Switching time, OFF; at ν =32 mm^2/s (156 SUS)	ms	AC: 100 ... 300	DC: 30 ... 90
Duty cycle	%	100	
Service life	cycles	10^7	
Enclosure type to EN 60529		IP 65	
Weight - valve with 1 solenoid - valve with 2 solenoids	kg (lbs)	3.9 (8.60) 5.4 (11.90)	
Mounting position		unrestricted	

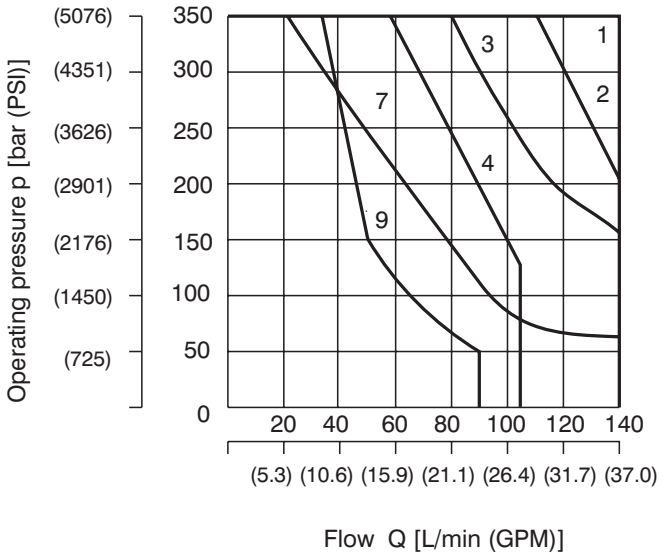
Spool Symbols

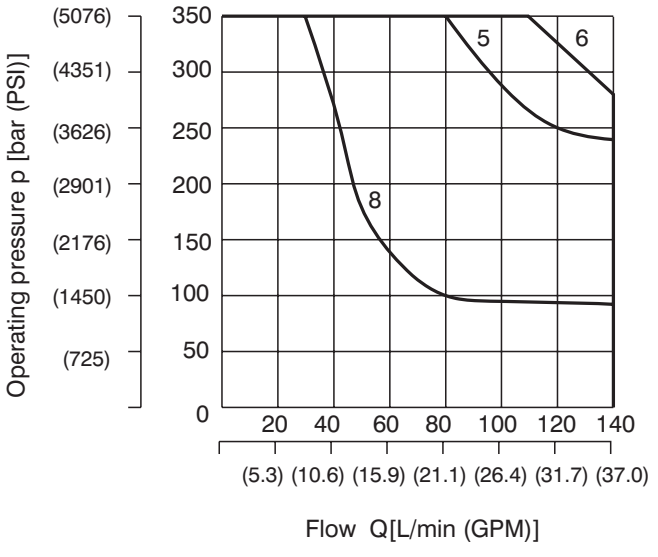
Designation	Symbol	Interposition	Designation	Symbol	Interposition
Z11			P51		
C11			Y51		
H11			C51		
P11			B51		
Y11			Z51		
L21			H51		
B11			X11		
C21			C11		
R11			H11		
R21			J15		
A51			J75		

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see spool symbols.The power curves hold true for symmetrical valve flows (e.g. flows in directions P-A and B-T are identical). In case of an asymmetric flow, the power curves can lie substantially lower. In such cases we highly recommend to consult the respective power curve with the valve manufacture.



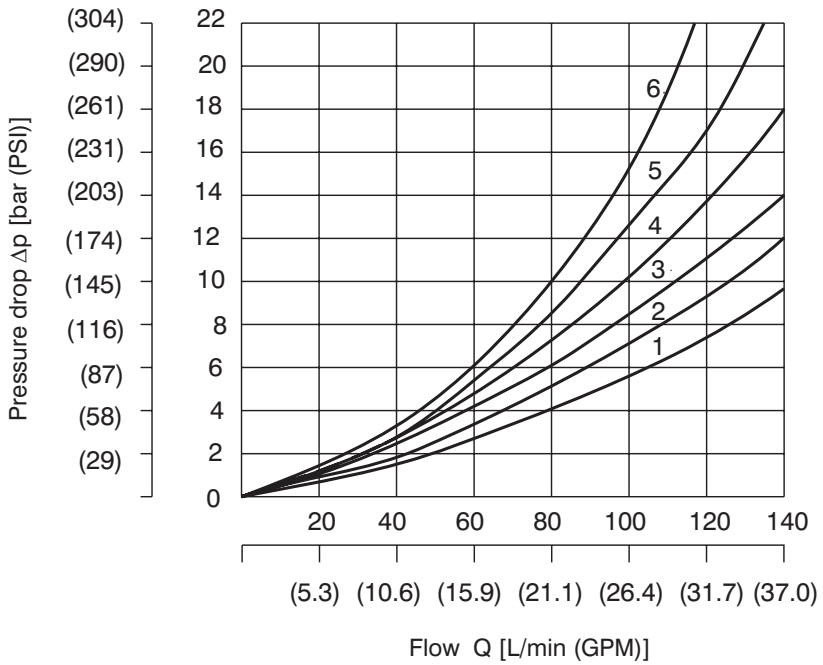


Z11	Z51	H11	H51	P11	P51	Y11	Y51	C11	C51	R11	X11	B11	B51	L21	R21	J15	J75	A51	C21
1	1	1	1	1	1	5	5	3	3	2	2	4	4	7	2	6	6	8	9

Δp-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Pressure drop Δp related to flow rate.

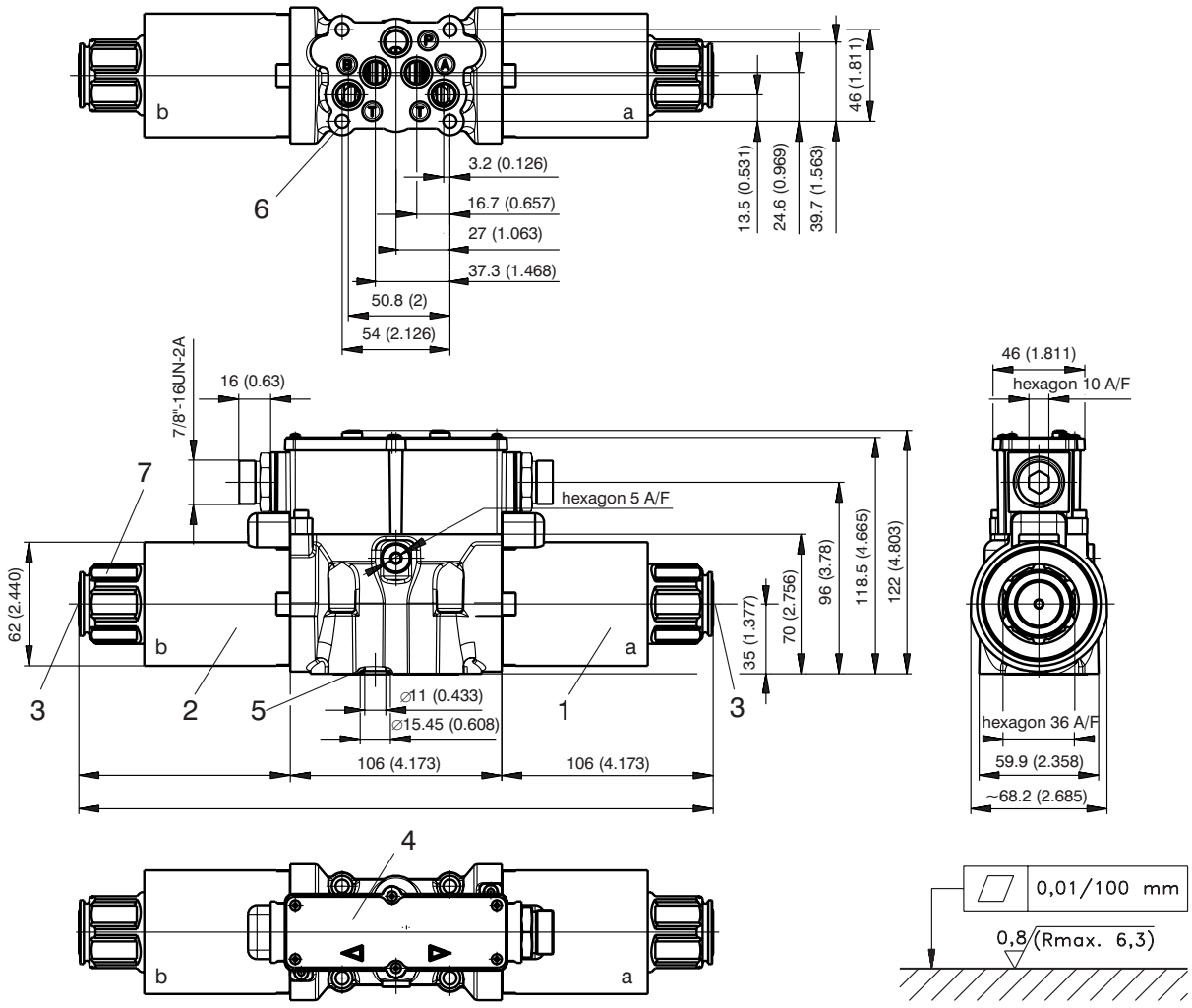


	P-A	P-B	A-T	B-T	P-T
Z11	1	1	2	2	
Z51		1	2		
H11	1	1	2	2	1
H51		1	2		1
P11	1	1	2	2	
P51		1	2		
Y11	1	1	2	2	
Y51		1	2		
C11	4	3	4	5	1
C51	4			5	1
R11	1	1	2	2	
X11	1	1	2	2	
B11	1	1	2	2	
B51		1	2		
L21	1	1	1	2	2
R21	1	1	1	3	
J15	1	2	2	3	
J75	1	1			
A51	1	1			
C21	6	6	6	6	4

Valve Dimensions

Dimensions in millimeters and inches

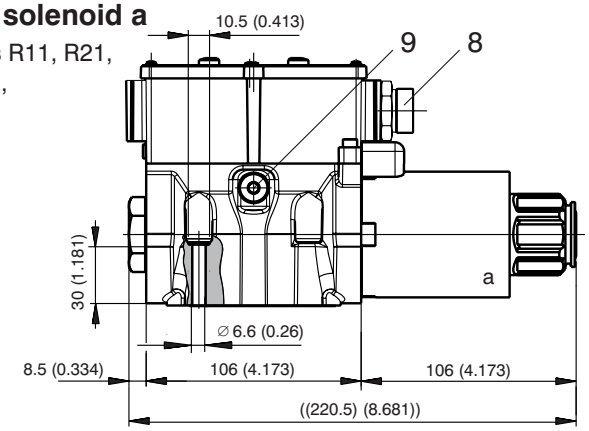
Valve with two solenoids

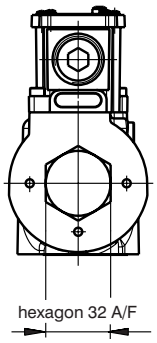


Required surface finish of interface.

Valve with one solenoid a

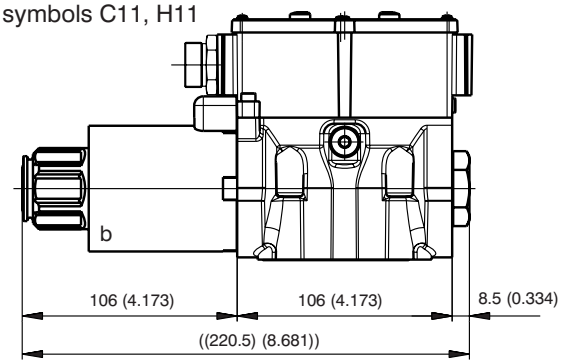
Functional symbols R11, R21, Y51, C51, Z51, H51,





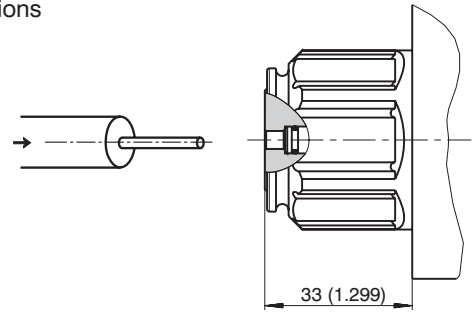
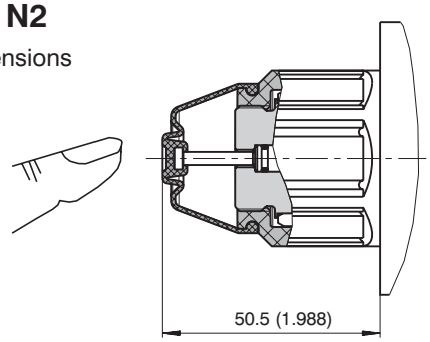
Valve with one solenoid b

Functional symbols C11, H11



1 Solenoid a (Nut torque 6Nm)
2 Solenoid b (Nut torque 6Nm)
3 Manual override
4 Name plate
5 Square ring 12.42 x 1.68 (5 pcs.) supplied with valve
6 4 mounting holes
7 Retaining nut of the solenoid
8 Electrical connector

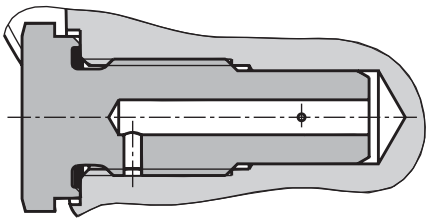
Manual Override

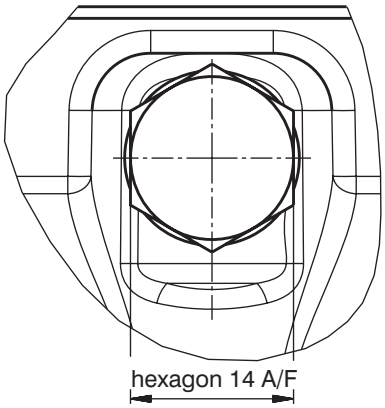
Sandard	Rubber boot
No designation Dimensions  Standard model of the manual override. Standard retaining nut of the solenoid.	Type **N2** Dimensions  Manual override protectedby the rubber boot.

Soft Shifting Spool Options Delay Time

T2 - Noozle ∅ 0.157 (0.6)

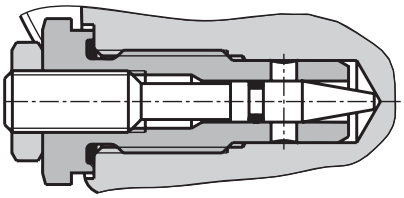
The orifice extends the valve shifting time.

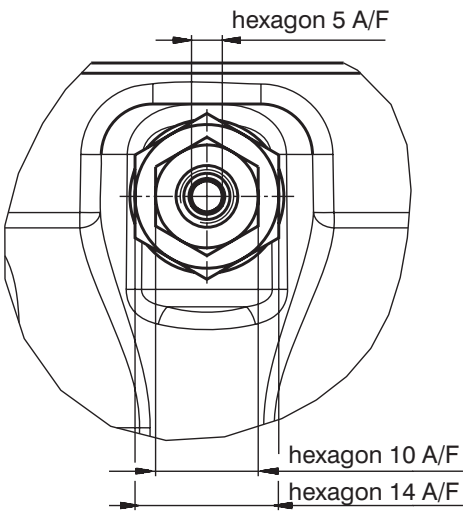




T3 - Throttle Screw

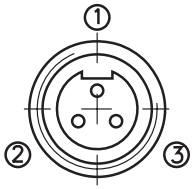
The control orifice allows for stepless adjustment of the valve shifting time.



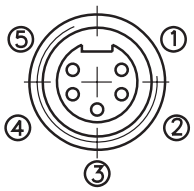


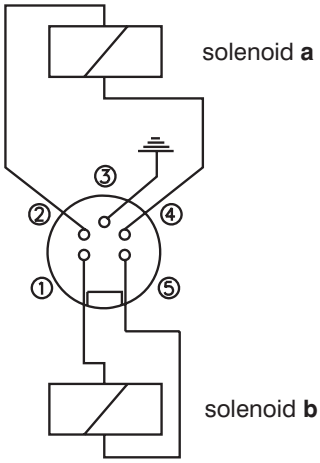
Connector - US - Standard - ANSI/B93.55M

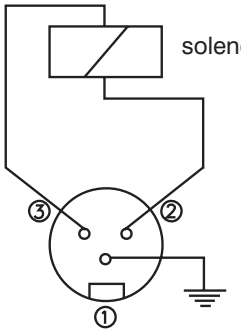
1 - green
2 - black
3 - white



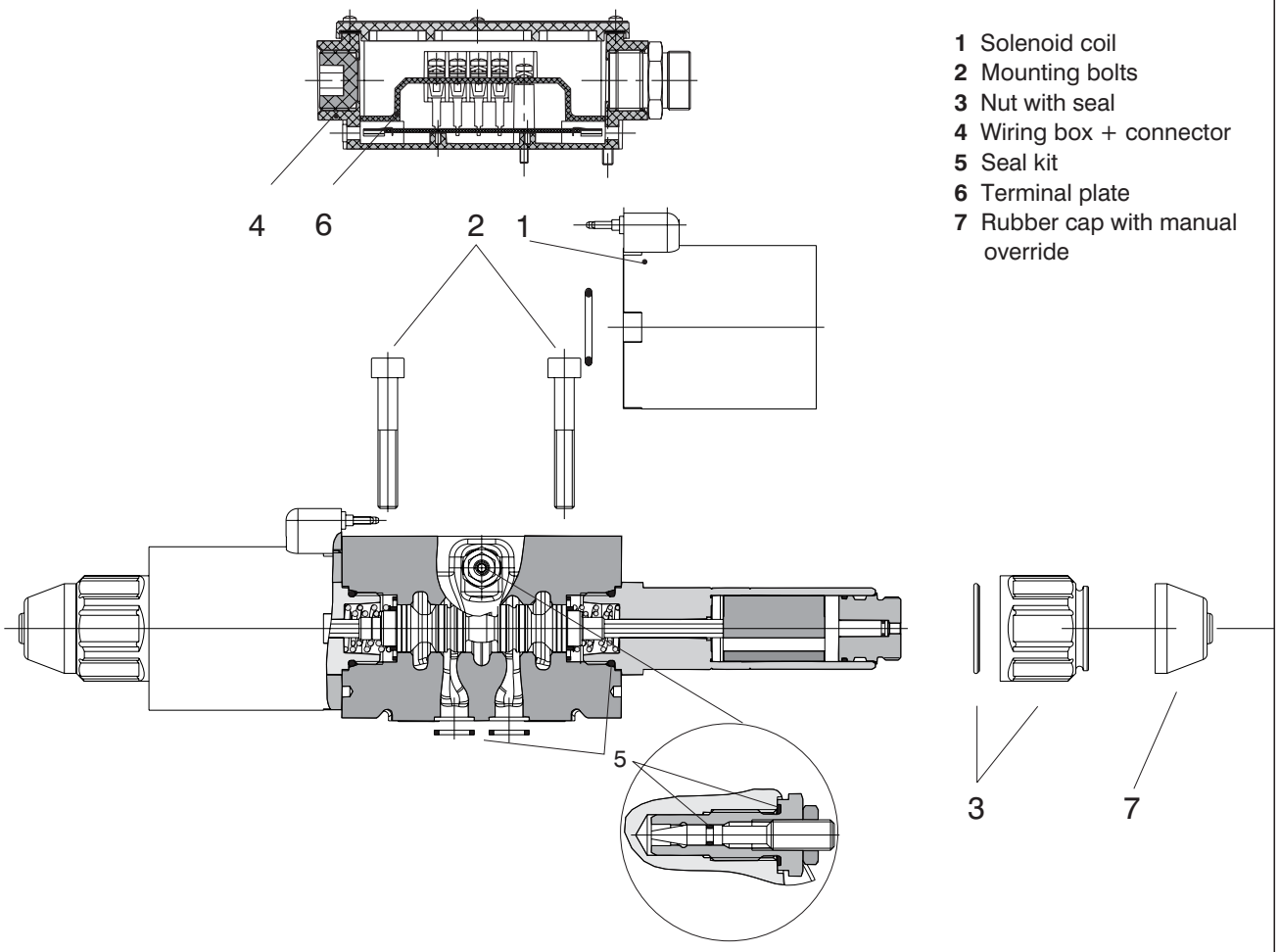
1 - white
2 - red
3 - green
4 - orange
5 - black







Spare Parts



1 Solenoid coil
2 Mounting bolts
3 Nut with seal
4 Wiring box + connector
5 Seal kit
6 Terminal plate
7 Rubber cap with manual override

Wiringbox	
Type	Ordering number
Wiring box without terminal plate	24175100

Terminal Plates	
Type	Ordering number
Terminal plate - basic design A+B	24173700
Terminal plate 12V DC -LED diodes A+B	24173800
Terminal plate 24V DC - LED diodes A+B	24173900
*Terminal plate 120V AC - rectifier A+B	24174000
*Terminal plate 120V AC - rectifier A+B and LED diodes A+B	24174100

* CSA Upon request

Solenoid Coil		
Voltage rating	Type	Ordering number
01200 DC	EW1	24174200
02400 DC	EW1	24174300
10600 DC (120V/60Hz rectified)	EW1	24174400

Solenoid Retaining Nut with Seal		
Type of the nut	Seal ring	Ordering number
Standard nut	O-ring 30 x 2	15900800
Nut with rubber boot		15900900

Electrical Connector, ANSI/B93.55M	
Type	Ordering number
3 PIN	24007300
5 PIN	24007400

Seal kit			
Type	Dimensions		Ordering number
	Square ring	O-ring	
Standard NBR70	12.42 x 1.68 (5 pcs.), 11,9 x 8,4 x 1 (1 pc.)	23.81 x 2.62 (2 pcs.), 1,8 x 1 (1 pc.)	15901000
Viton	12.42 x 1.68 (5 pcs.), 11,9 x 8,4 x 1 (1 pc.)	23.47 x 2.62 (2 pcs.), 1,8 x 1 (1 pc.)	15901100

Mounting bolts		
Dimensions	Tightening torque	Ordering number
M6 x 40 DIN 912-10.9 (4 pcs.)	14+2 Nm (10.33+1.48 lbf.ft)	15847700

Soft Shift Conversion Kit		
T2	10 Nm (7.376 lbf.ft)	15901200
T3	10 Nm (7.376 lbf.ft)	15901300

Caution!

- In the case of directional control valves with two solenoids, any of the solenoids may be energized, but only after powering off the other.
- For directional control valves with other spool symbols as those shown in the table, please consult with the manufacturer.
- Other spool symbols on request.
- The plastic packaging is recyclable.
- The protective plate can be returned to manufacturer.
- Mounting bolts, studs and DIN-connectors must be ordered separately.
  Certified documentation is available per request.

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E-mail: sales.cz@argo-hytos.com
www.argo-hytos.com

ARGO HYTOS

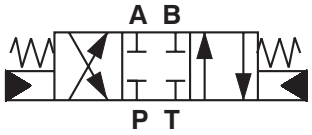
Directional Control Valves Hydraulically Operated

RPH2-06

Size 06 (D 03) • 350 bar (5076 PSI) • 80 L/min (21 GPM)

HA 4005
04/2011
Replaces
HA 4005 12/2007

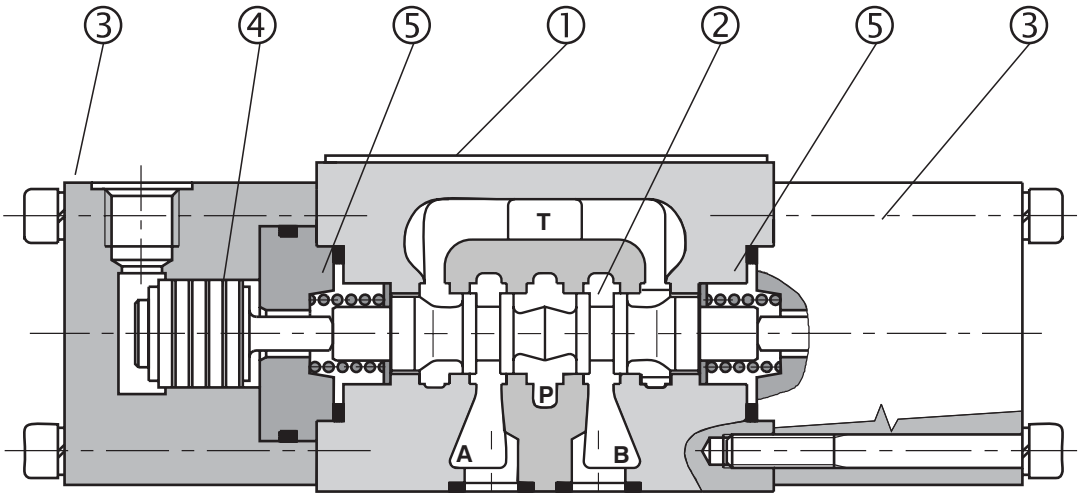
- **4/3-, 4/2-way spool type directional valves hydraulic operated**
- **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**
- **Three-chamber valve**



Functional Description

The directional control valves are of modular design and comprise a housing (1) with a cylidrical spool (2) and one or two operating elements (3) consisting of hydraulic pistons (4) and return springs (5).
Three-position directional valves are fitted with two hydraulic operating elements and two centering springs. Two-position directional valves have only one hydraulic operating element and one springs.

The basic surface treatment of valve is phosphate coated.



Ordering Code

RPH2-06 □ □ / □ **-1** □

Directional control valves hydraulically operated

Valve size
06 (D 03)

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

Spool symbols
see the table spool symbols

Connecting threads
1 M10x1
2 G1/8
3 7/16-20 UNF-2B,SAE-4

Model

Seals
no designation NBR
V FPM (Viton)

Technical Data

Valve size	mm (US)	06 (D 03)
Maximum flow (according to pressure and functional symbols)	L/min (GPM)	see p-Q characteristic
Maximum operating pressure at ports P, A, B	bar (PSI)	350 (5076)
Maximum operating pressure at port T	bar (PSI)	130 (1885)
Minimum pilot pressure	bar (PSI)	30 (435) + pressure at port T
Maximum pilot pressure	bar (PSI)	160 (2300)
Pilot volume	cm^3 (cu.in.)	0,5(0.031)
Pressure drop	bar (PSI)	see Δp-Q characteristic
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range for standard sealing (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range for Viton seals (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Service life	cycles	10^7
Weight valve with 1 actuatop valve with 2 actuators	kg (lbs)	1,8 (3.96) 2,5 (5.50)
Mounting position		unrestricted

Spare Parts

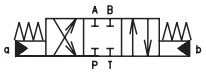
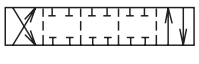
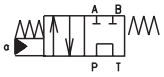
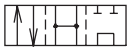
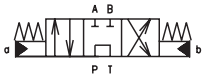
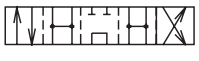
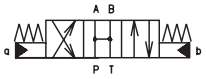
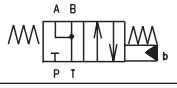
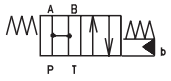
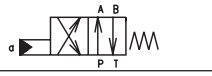
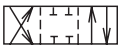
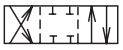
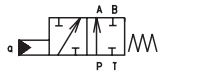
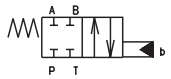
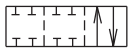
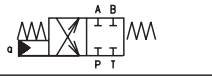
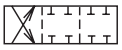
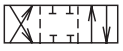
Bolt kit

Dimensions, quantity	Bolt torque	Ordering number
M5 x 45 DIN 912-10.9	8.9 Nm(6.6 ft-lbs)	15845100
10-24 UNC x1.75		2 000 107

Seal kit Dimensions in millimeters

Type	Dimensions, quantity		Ordering number
	O-ring	Square ring	
Standard NBR	22 x 2 NBR90 (2 pcs.)	9.25 x 1.68 NBR70 (4 pcs.)	20980500
	28 x 2 (2 pcs.)	-	
Viton	22 x 2 (2 pcs.)	-	20980600
	9.25 x 1.78 (4 pcs.)	-	
	28 x 2 (2 pcs.)	-	

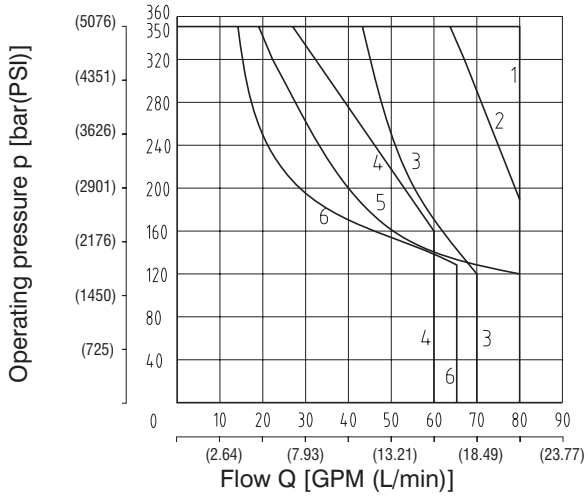
Spool Symbols

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

p-Q Characteristic

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Operating limits for maximum hydraulic power tfansferred by the directional valve. Measured by steering pressure 30 bar (435PSI) + pressure at port T. For respective spool type - see spool symbols.

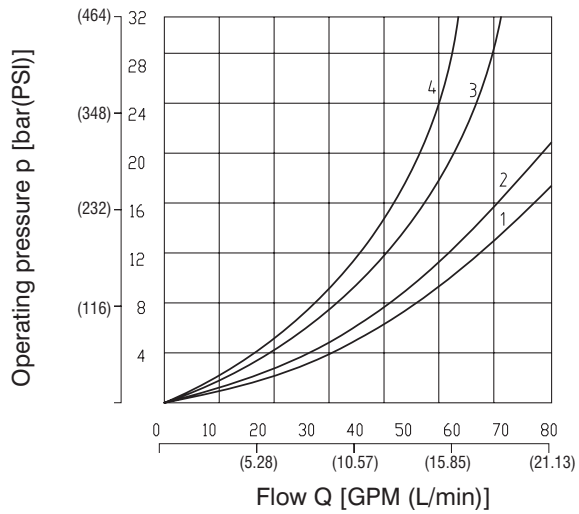


H11	1
H51	1
C11	1
C51	1
Z11	2
Z51	2
J15	3
R11	4
X11	4
A51	5
Y11	6
Y51	6

Δp-Q Characteristic

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

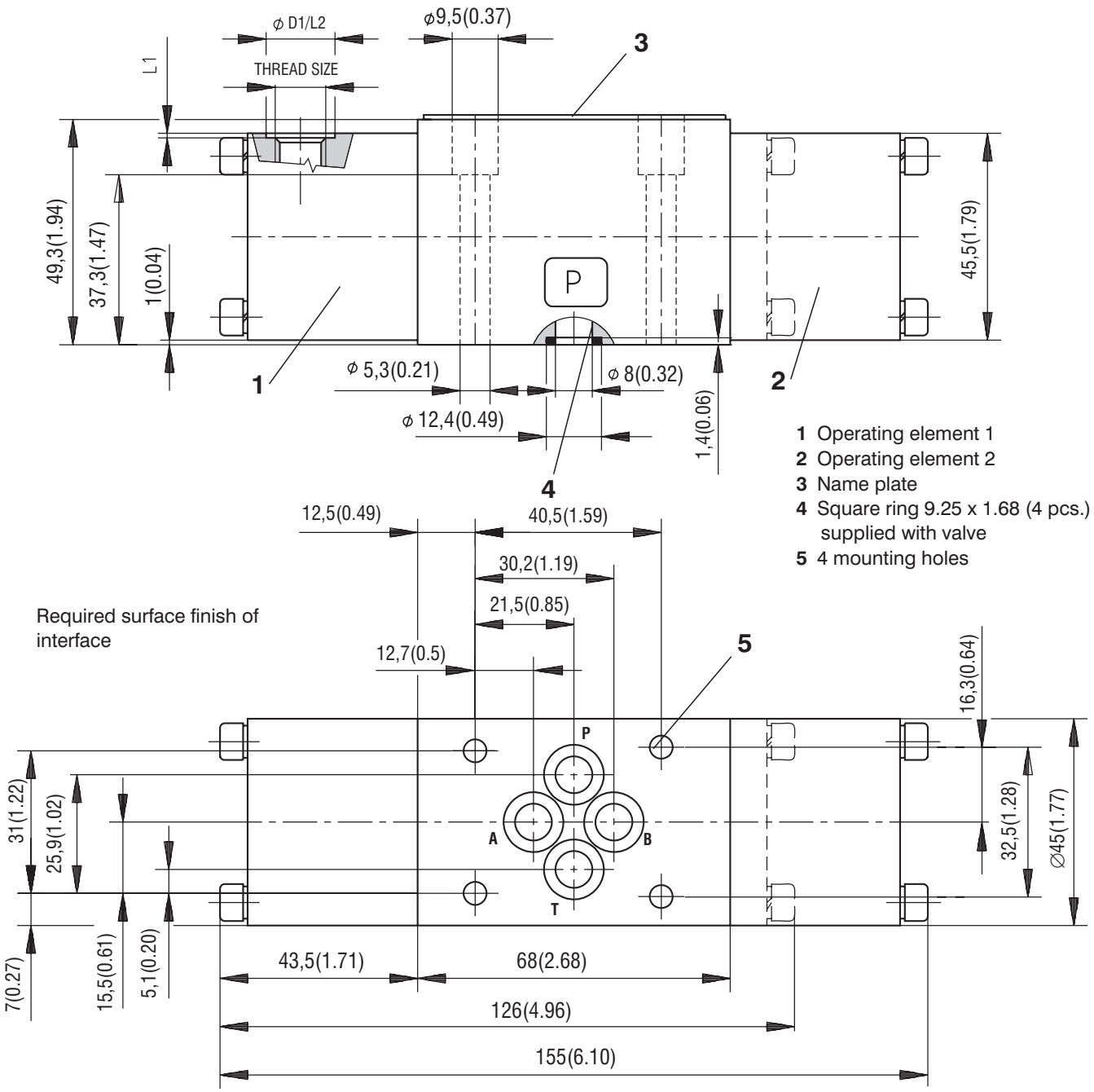
Pressure drop Δp related to flow rate.



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

Valve Dimensions

Dimensions in millimeters (inches)



1 Operating element 1
2 Operating element 2
3 Name plate
4 Square ring 9.25 x 1.68 (4 pcs.) supplied with valve
5 4 mounting holes

Required surface finish of interface

Thread size	⌀ D1	L1	L2
M10x1	15,5 (0.610)	1(0.039)	8 (0.315)
G1/8			
7/16-20 UNF-2B, SAE-4	21 (0.827)	0,8 (0.032)	14 (0.551)

Caution!

- For applications outside the given parameters, please consult us.
- Other for spool symbols on request.
- The packing foil is recyclable.
- The protective plate can be returned to manufacturer.
- Mounting screws M5 x 45 DIN 912-10.9 or bolts must be ordered separately. The screws tightening torque is 8.9 Nm (6.6 ft-lbs).
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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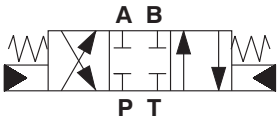
Hydraulic Operated Directional Control Valves

RPH3-06

Size 06 (D 03) • 350 bar(5076 PSI) • 80 L/min(21 GPM)

HA 4006
04/2011

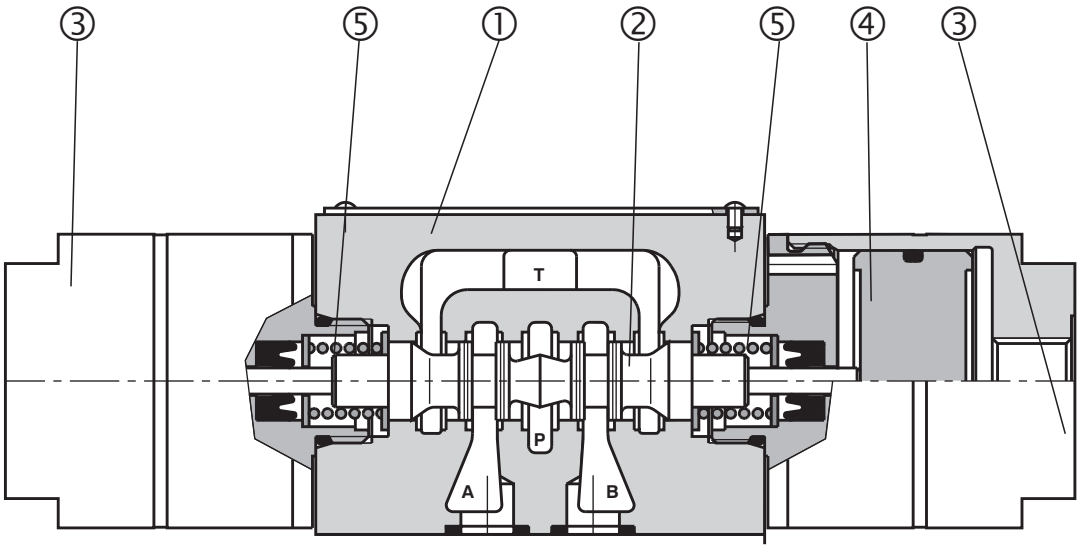
Replaces
HA 4006 12/2007



- **4/3, 4/2 way spool type directional valves hydraulic operated**
- **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**
- **Connecting threads M10x1, G1/8**

Functional Description

The directional control valves are of modular design and comprise a housing (1) with a cylidrical spool (2) and one or two operating elements (3) consisting of hydraulic pistons (4) and return spring (5).
Three-position directional valves are fitted with two hydraulic operating elements and two centering springs. Two-position directional valves have only one hydraulic operating element and one springs.
The basic surface treatment of the valve housing is phosphate.



Ordering Code

RPH3-06 ☐ ☐ / ☐ ☐ ☐

Hydraulic Operated Directional Control Valve

Nominal size

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

Functional symbols
see the table functional symbols

Model
1 Hydraulic
2 Pneumatic

Seals
no designation NBR
V FPM (Viton)

Connecting threads
1 M10x1
2 G1/8

Technical Data

Valve size	mm(US)	06
Maximum flow (according to pressure and functional symbols)	L/min (GPM)	see p-Q characteristics
Maximum operating pressure at ports P, A, B	bar (PSI)	350 (5076)
Maximum operating pressure at port T	bar (PSI)	160 (2321)
Minimum pilot pressure	bar (PSI)	2 (29)
Maximum pilot pressure	bar (PSI)	25 (362.6)
Pilot volume	cm^3 (cu.in).	6,2 (0,378)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range for standard sealing (NBR)	°C (°F)	-30 ... +100 (-22 ... +21)
Fluid temperature range for Viton seals (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Service life	cycles	10^7
Weight valve with 1 actuator valve with 2 actuators	kg (lbs)	1,8 (3.96) 2,5 (5.50)
Mounting position		unrestricted

Spare Parts

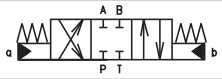
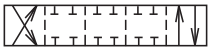
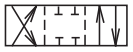
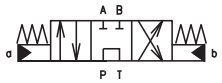
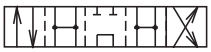
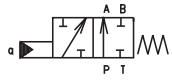
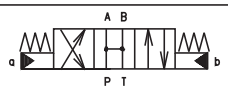
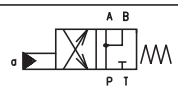
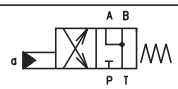
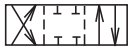
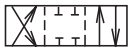
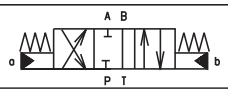
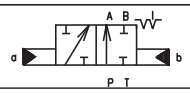
Seal kit

Type	Dimansions, number		Ordering number
Standard NBR	9,25 x 1,68 NBR70 (4 pcs.)	17 x 1,8 (2 pcs.)	15845200
Viton	9,25 x 1,78 (4 pcs.)	17,17 x 1,78 (2 pcs.)	15845400

Mounting bolts

Dimensions, number	Tightening torque	Ordering number
M5 x 45 DIN 912-10.9 (4 pcs.)	8.9 Nm (6.6 ft-lbf)	15845100

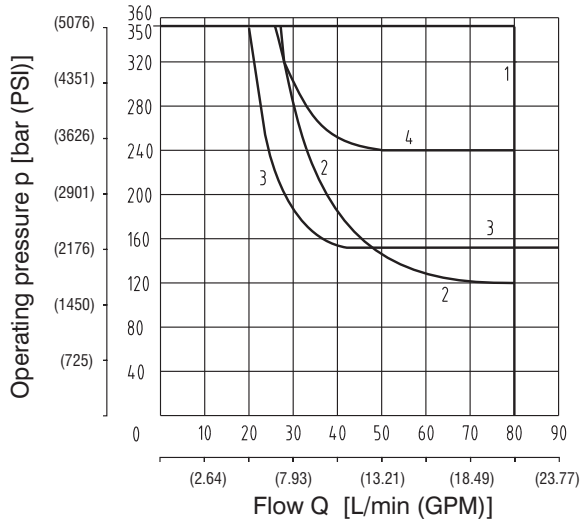
Functional Symbols

Three position directional valves RPH3-063			Two position directional valves RPH3-062		
Type	Symbol	Crossover	Type	Symbol	Crossover
Z11			R11		
C11			A51		
H11			P51		
P11			Y51		
Y11			X11		
L21			J15		
B11			J75		

p-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve. Measured by steering pressure 2 bar (29 PSI). For respective spool type - see Functional Symbols.

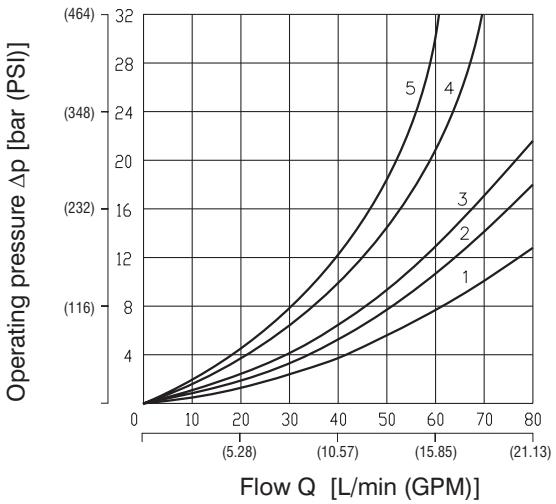


Z11	1
C11	2
H11	3
P11	1
Y11	1
L21	4
B11	1
R11	1
A51	1
P51	1
Y51	2
X11	1
J15	1
J75	1

Δp-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

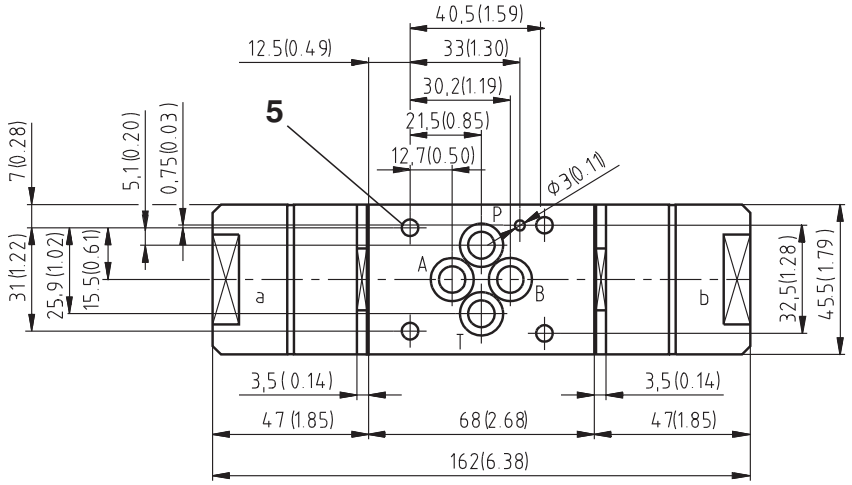
Pressure drop Δp related to flow rate.

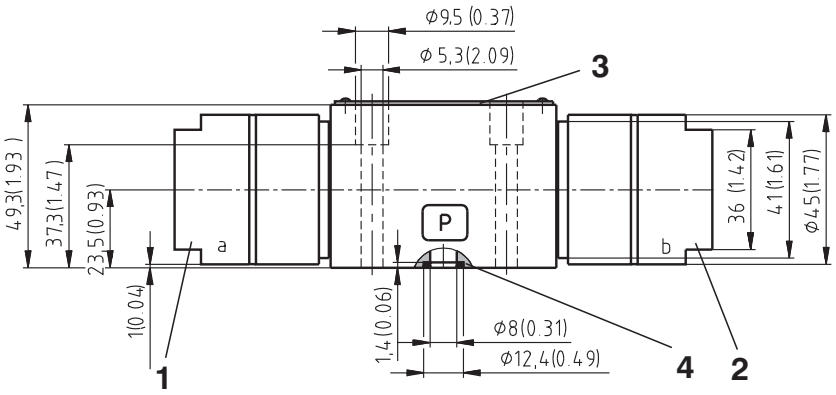


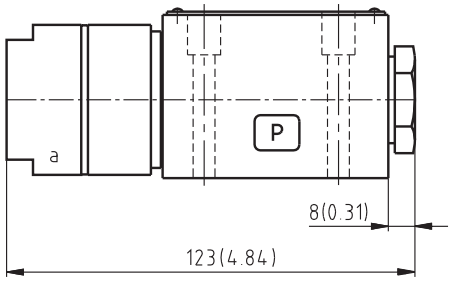
	P-A	P-B	A-T	B-T	P-T
Z11	2	2	3	3	
C11	4	4	4	5	3
H11	2	2	2	2	3
P11	1	1	3	3	
Y11	2	2	2	2	
L21	2	2	3	3	
B11	2	2	3	3	
R11	2	2	3	3	
A51	2	2			
P51		1	3		
Y51		2	2		
X11	2	2	3	3	
J15	2	2	3	3	
J75	2	2			

Valve Dimensions

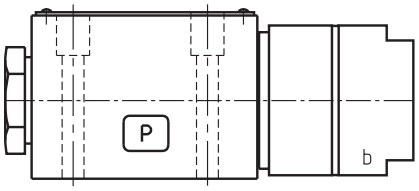
Dimensions in millimeters (inches)







Required surface finish of interface



1 Operating element 1
2 Operating element 2
3 Name plate
4 Square ring 9.25 x 1.68 (4 pcs.) supplied with each valve
5 4 mounting holes

Caution!

- For applications outside the given parameters, please consult us.
- Other for spool symbols on request.
- The packing foil is recyclable.
- The protective plate can be returned to manufacturer.
- Mounting screws M5 x 45 DIN 912-10.9 or bolts must be ordered separately. The screws tightening torque is 8.9 Nm (6.6 ft-lbs).
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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Roller cam-operated Directional Control Valves

RPK1-06

Size 06 (D 03) • ... 350 bar (5076 PSI) • ... 80 l/min (21 GPM)

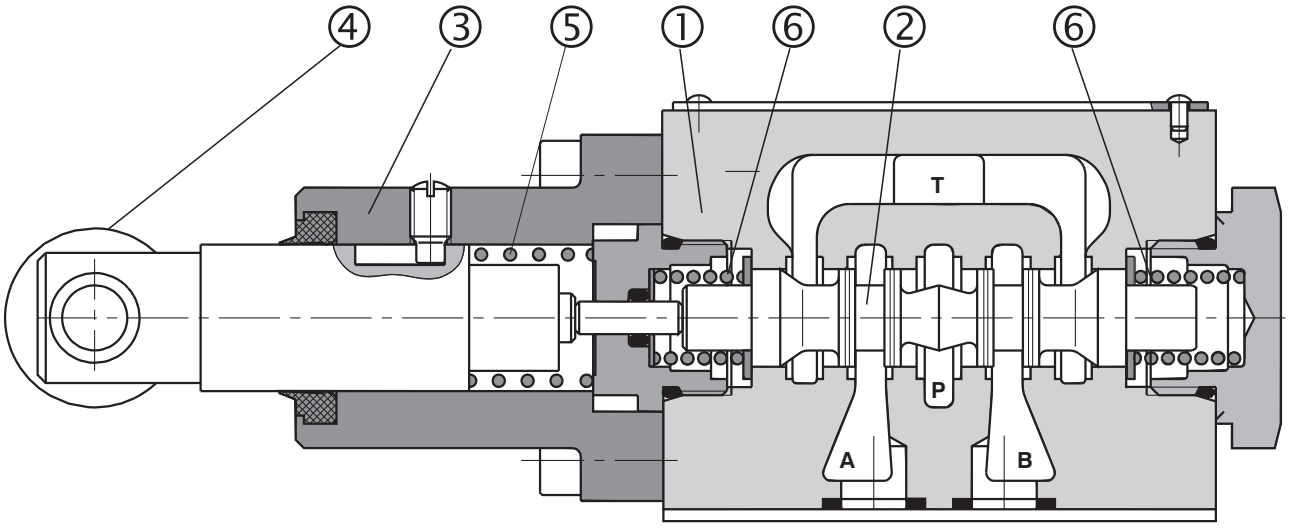
HA 4038
12/2007

Replaces
HA 4038 12/2006

- 4/2 -way spool type directional control valves
- Roller cam-operated
- Actuating section can be rotated 90°
- Installation dimensions to ISO 4401 / CETOP RP121-H / DIN 24 340

Functional Description

The Roller cam-operated directional control valves are used mainly to control start, stop and direction of fluid. The valves consist of housing (1) with control spool (2) with two centering springs (6) and the actuating section (3). The actuating section consists either of the roller-pin (4) and of one return spring (5). The directional control valves are being manufactured as two-position valves (see table with functional symbols).
The valve housing (1) is phosphate coated.



Ordering Code

RPK1-06 □ □ - □

Directional Control Valves
Roller cam-operated

Valve size

Number of valve positions
two positions

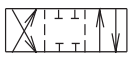
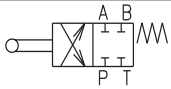
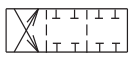
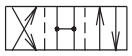
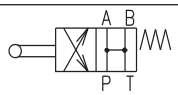
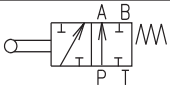
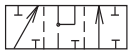
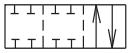
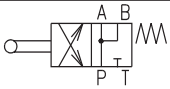
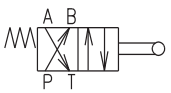
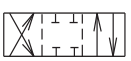
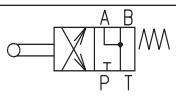
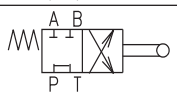
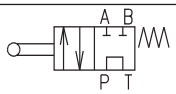
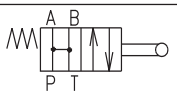
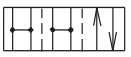
Seals
no designation NBR
V FPM (Viton)

Spool symbols
see the table spool symbols

Technical Data

Valve size	US (mm)	06 (D 03)
Maximum flow	l/min (GPM)	80 (21)
Maximum operating pressure at ports P, A, B	bar (PSI)	350 (5076)
Maximum operating pressure at port T	bar (PSI)	20 (290)
Pressure drop	bar (PSI)	see Δp -Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range - NBR	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range - Viton	°C (°F)	-20 ... +120 (-4 ... +248)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406 (1999).
Service life	cycles	10^6
Weight	kg (lbs)	1,6 (3.53)
Mounting position		any

Spool Symbols

Type	Symbol	Crossover	Type	Symbol	Crossover
R11			Z51		
R21			H51		
A51			Z11		
P51			X11		
Y51			C11		
C51			H11		

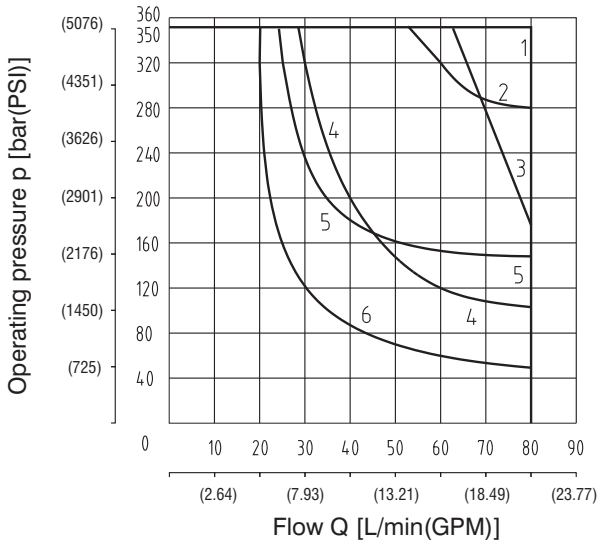
Operating Power

	for 0 bar(0 PSI) pressure in T port			for 20 bar (290 PSI) pressure in T port		
Operating press.	Stroke begg.	Oper. stroke	Total stroke	Stroke begg.	Oper. stroke	Total stroke
100 bar(1450 PSI)	35 N (8 lbs)	135 N (30 lbs)	195 N (44 lbs)	60 N (13 lbs)	160 N (36 lbs)	220 N (49 lbs)
200 bar(2901 PSI)	35 N (8 lbs)	135 N (30 lbs)	195 N (44 lbs)	60 N (13 lbs)	160 N (36 lbs)	220 N (49 lbs)
300 barl(4351 PS)	35 N (8 lbs)	135 N (30 lbs)	195 N (44 lbs)	60 N (13 lbs)	160 N (36 lbs)	220 N (49 lbs)

p-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see spool symbols.

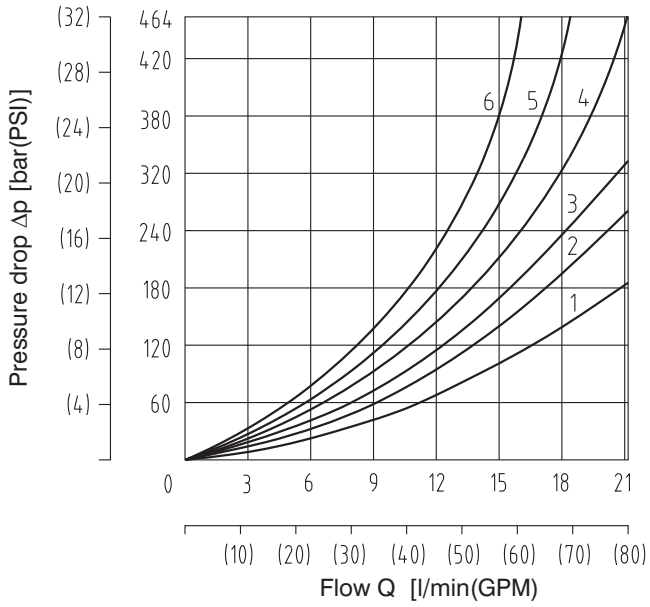


Y11	1
Y51	1
R11	2
Z11	3
Z51	3
C11	4
C51	4
R21	5
H11	6
H51	6

Δp-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS)

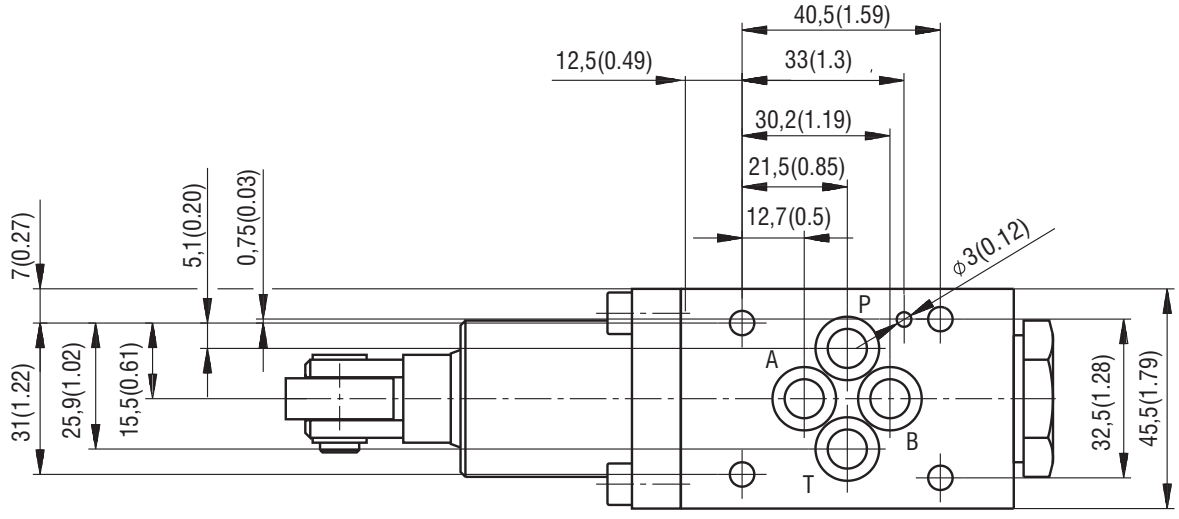
Pressure drop Δp related to flow rate.



	P-A	P-B	A-T	B-T	P-T
Z11	2	2	3	3	
C11	5	5	5	6	3
H11	2	2	2	2	3
R11	2	2	3	3	
R21	2	2	3	3	
A51	2	2			
P51		1	3		
Y51		2	2		
C51	2			3	4
Z51		2	3		
H51		2	3		
X11	2	2	3	3	

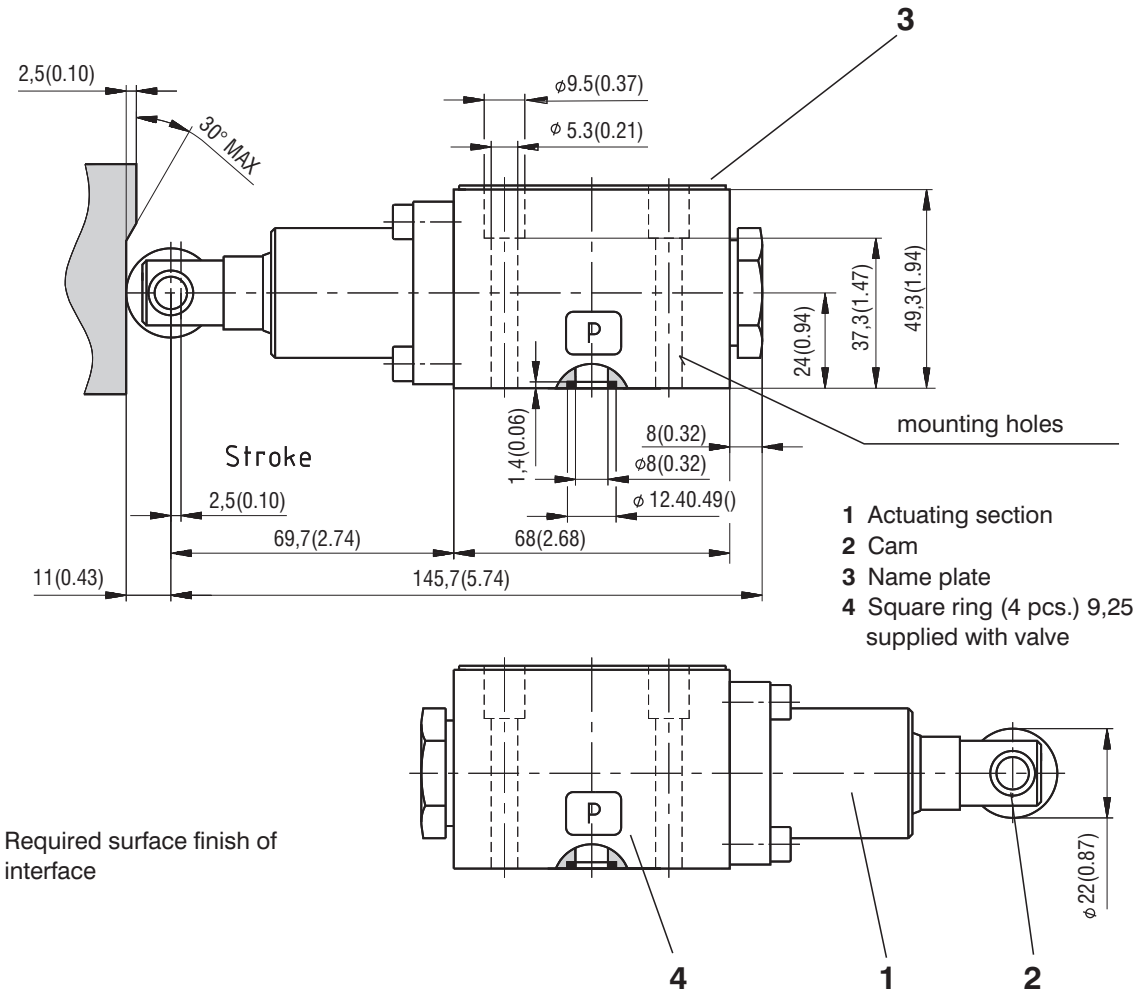
Valve Dimensions

Dimensions in millimeters and inches



Valve Dimensions

Dimensions in millimeters and inches



1 Actuating section
2 Cam
3 Name plate
4 Square ring (4 pcs.) 9,25 x 1,68 supplied with valve

Required surface finish of interface

Spare Parts

Dimensions in millimeters

Seal kit

Type	Dimensions, quantity	Order number
O-ring - NBR90	17 x 1.8 (2 pcs.)	20980900
Square ring - NBR70	9.25 x 1.68 (4 pcs.)	
O-ring - NBR70	3.68 x 1.78 (1 pc.)	
Wiper ring	WSW 000180 ASW (1 pc.)	

Bolt kit (for studs see HA 0030)

Dimensions, quantity	Bolt torque	Order number
M5 x 45 DIN 912-10.9 (4 pcs.)	6.6 ft-lbs (8.9 Nm)	15845100

Caution!

- For applications outside the given parameters, please consult us.
- Other for spool symbols on request.
- The packing foil is recyclable.
- The protective plate can be returned to manufacturer.
- Mounting screws M5 x 45 DIN 912-10.9 or bolts must be ordered separately. The screws tightening torque is 8.9 Nm (6.6 ft-lbs).
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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ARGO HYTOS

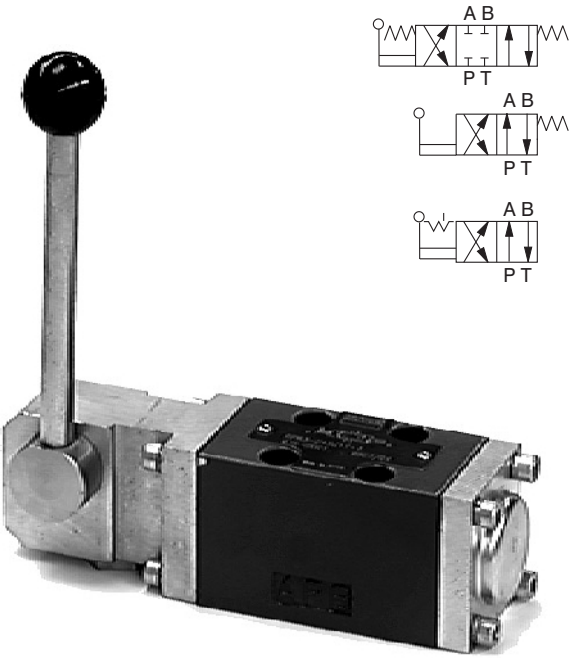
Directional Control Valves Manually Operated

RPR3-04

Size 04 (D 02) • 320 bar (4600 PSI) • 30 L/min (8.0 GPM)

HA 4018
6/2012

Replaces
HA 4018 1/2008

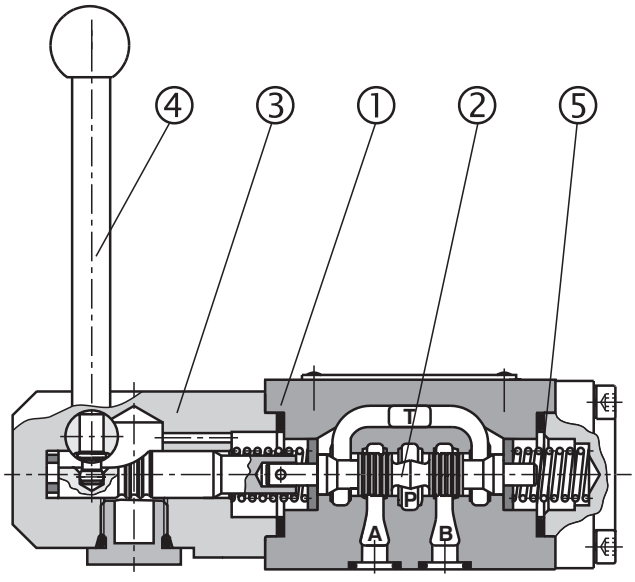


- **4/3 and 4/2- way spool type directional control valves**
- **Hand-lever operated**
- **Actuating section can be rotated in four positions 90° apart**
- **Installation dimensions acording to DIN 24 340 / ISO 4401 / CETOP RP121-H**

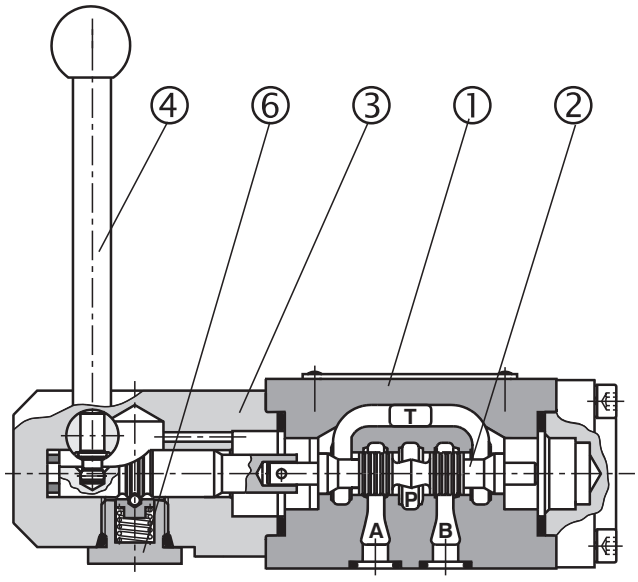
Functional Description

The hand operated directional control valves are used mainly to control start, stop and direction of fluid.
The valves consist of housing (1) with control spool (2) and the actuating section (3). The actuating section consists either of the hand lever (4) and of one or two return springs (5), or of the hand lever (4) and the detent assembly (6). The detent assembly holds the spool in its last shifted position.

The directional control valves are being manufactured as two-position and three-position valves (see table with functional symbols).
The valve housing (1) is phosphate coated, the components of the actuating section (3) are zinc coated.



Type with return springs



Type with detent assembly

Ordering Code

RPR3-04 □ □ - □

Directional control valves manually operated

Valve size — **04 (D 02)**

Number of operating positions
two positions — **2**
three positions — **3**

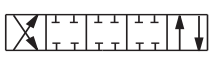
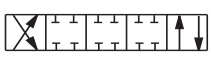
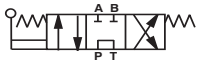
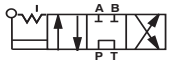
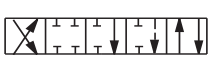
Spool symbols
see table spool symbols

Seals
no designation — NBR
V — FPM (Viton)

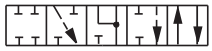
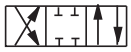
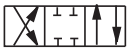
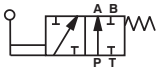
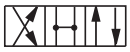
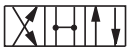
Technical Data

Valve size	mm (US)	04 (D 02)
Maximum flow	L/min (GPM)	30 (8.0)
Maximum operating pressure at ports P, A, B	bar (PSI)	320 (4600)
Maximum operating pressure at port T	bar (PSI)	100 (1450)
Pressure losses	bar (PSI)	see p-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range for standard seal (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range for Viton sealing (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Operating force on lever	N (lbf)	< 40 (<8.99)
Service life	cycles	10^6
Weight	kg (lbs)	1.0 (2.21)
Mounting position		unrestricted

Spool Symbols

Type	Symbol	Crossover	Type	Symbol	Crossover
Z11			Z15		
C11			C15		
H11			H15		
P11			P15		
Y11			Y15		
B11			B15		
L11			L15		
L21			L25		

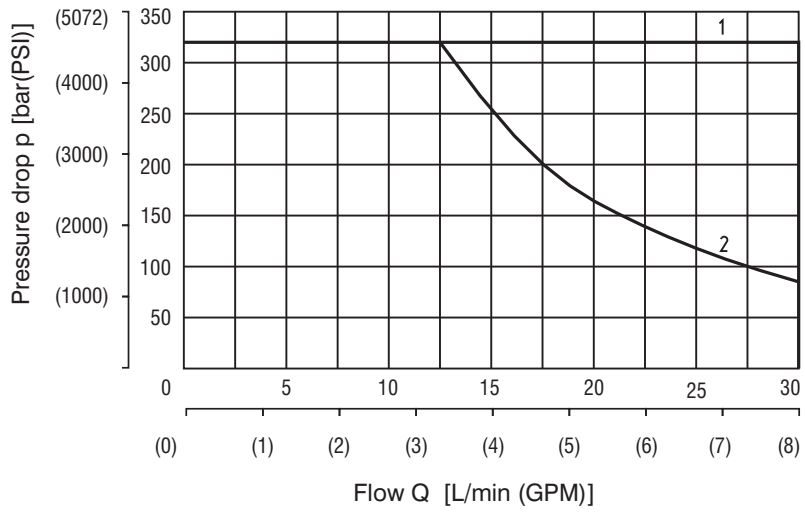
Spool Symbols

Type	Symbol	Crossover	Type	Symbol	Crossover
Y31			Y35		
Y71			Y75		
R11			J15		
A51			J75		
R21			R25		

p-Q Characteristic

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve.

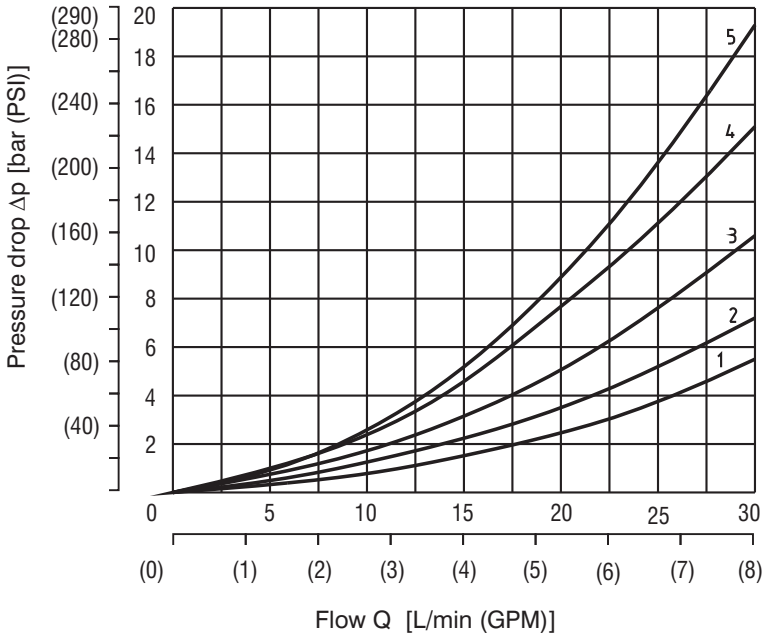


Z11	1	Z15	1
C11	1	C15	1
H11	1	H15	1
P11	1	P15	1
Y11	1	Y15	1
B11	1	B15	1
L11	2	L15	1
L21	2	L25	1
Y31	1	Y35	1
Y71	1	Y75	1
R11	1	J15	1
A51	1	J75	1
R21	1	R25	1

Δp-Q Characteristic

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

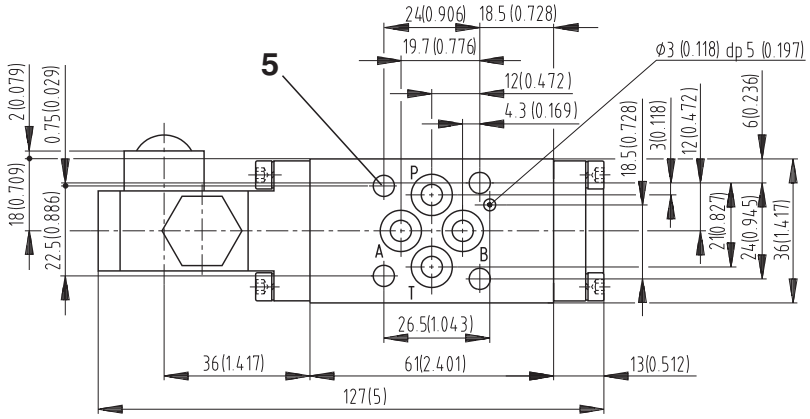
Pressure drop Δp related to flow rate.

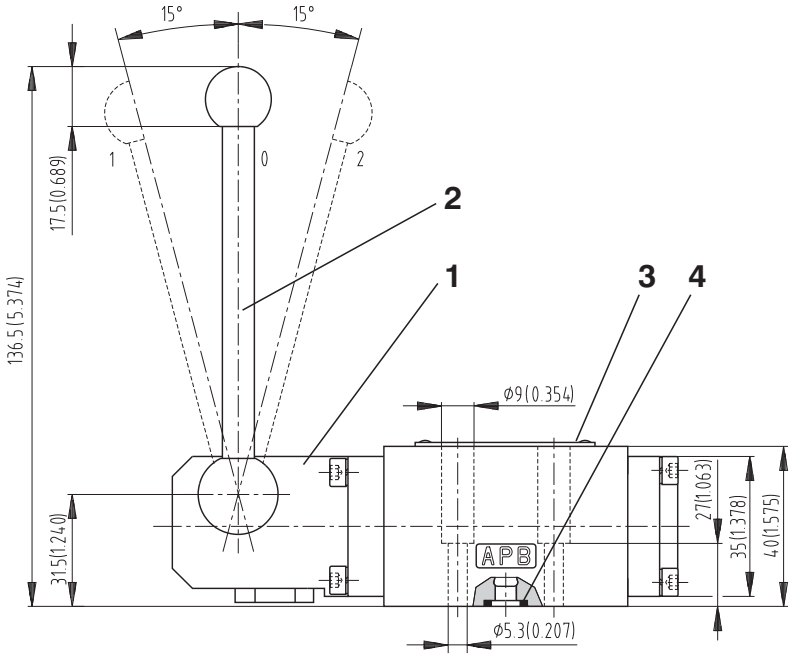


	P-A	P-B	A-T	B-T	P-T
Z11, Z15	3	2	2	2	
C11, C15	5	5	4	4	3
H11, H15	3	3	2	2	3
P11, P15	1	1	1	3	
Y11, Y15	3	3	1	1	
B11, B15	3	3	2	1	
L11, L15	3	2	1	2	4
L21, L25	2	2	3	3	4
Y31, Y35	3	3	2	2	
Y71, Y75	3	1			
R11, J15	3	3	2	2	
A51, J75	2	2			
R21, R25	3	3	2	2	

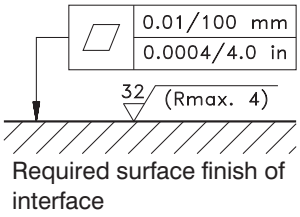
Valve Dimensions

Dimensions in inches and millimeters (in brackets)





1 Actuating section
2 Hand lever
3 Name plate
4 Square ring 7.65x1.68 (4 pcs.) supplied with valve
5 4 mounting holes



Required surface finish of interface

Spare Parts

Dimensions in millimeters

Seal kit

Type	Dimensions, quantity				Ordering number
	O-ring	Square ring	O-ring	O-ring	
Standard NBR70	22 x 2 (2 pcs.)	7.65 x 1.68 (4 pcs.)	11 x 1.5 (2 pcs.)	11.3 x 2.4 (1 pc.)	15673600
Viton	22 x 2 (2 pcs.)	7.65 x 1.68 (4 pcs.)	11 x 1.5 (2 pcs.)	11.3 x 2.4 (1 pc.)	20897200

Bolt kit (for studs see HA 0020)

Dimensions, quantity	Bolt torque	Ordering number
M5x35 DIN 912-10.9 (4 pcs.)	3.7 ft-lbs (5 Nm)	15874600

Caution!

- Directional valves with other functional symbols as those shown in the table above can be delivered on request.
- The plastic packaging is recyclable.
- Mounting bolts or studs must be ordered separately.
- Certified documentation is available per request.

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Directional Control Valves Manually Operated

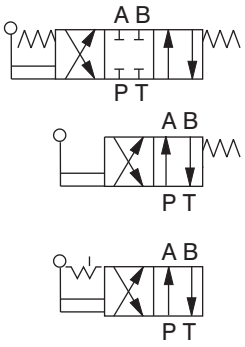
RPR3-06

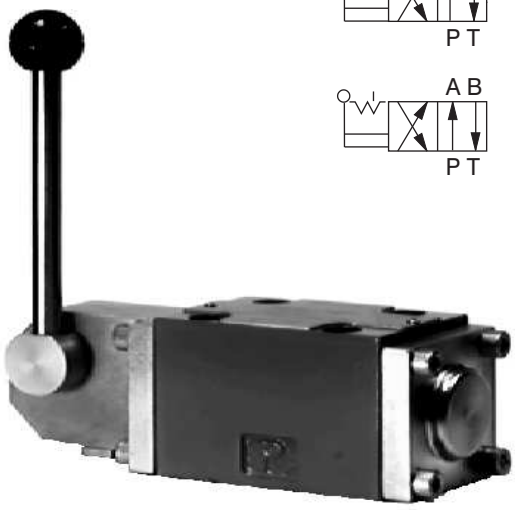
Size 06 (D 03) • 350 bar (5076 PSI) • 80 L/min (21 GPM)

HA 4004
04/2011

Replaces
HA 4004 1/2008

- **4/3 and 4/2 - way spool type directional control valves**
- **Hand-lever operated**
- **Actuating section can be rotated in four positions 90° apart**
- **Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H**

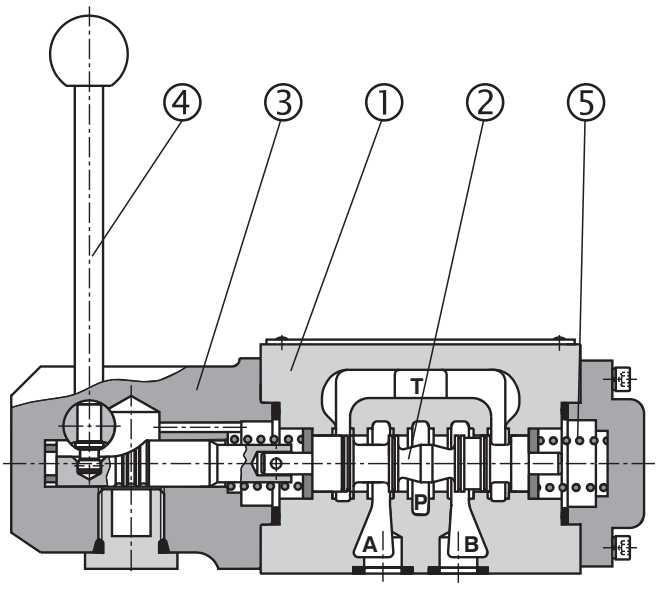




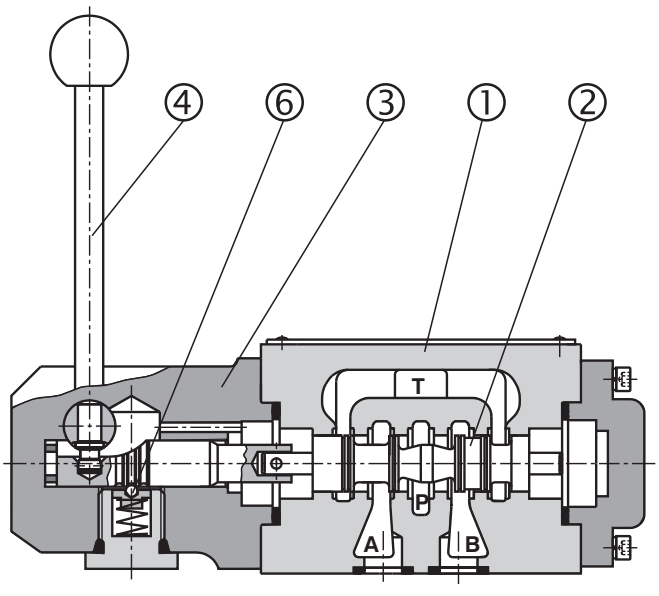
Functional Description

The hand operated directional control valves are used mainly to control start, stop and direction of fluid.
The valves consist of housing (1) with control spool (2) and the actuating section (3). The actuating section consists either of the hand lever (4) and of one or two return spring (5), or of the hand lever (4) and the detent assembly (6). The detent assembly holds the spool in its last shifted position.

The directional control valves are being manufactured as two-position and three-position valves (see table with functional symbols).
The valve housing (1) is phosphate coated, the components of the actuating section (3) are zinc coated.



Type with return springs



Type with detent assembly

Ordering Code

RPR3-06 [ ] [ ] - [ ]

Directional Control Valves Manually Operated

Valve size

Number of valve positions

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

Spool symbols
see the table spool symbols

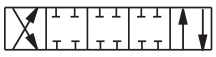
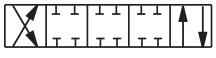
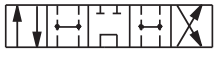
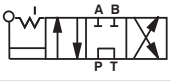
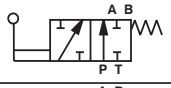
Seals

no designation	NBR
V	FPM (Viton)

Technical Data

Valve size	mm (US)	06 (D 03)
Maximum flow	L/min (GPM)	80 (21)
Maximum operating pressure at ports P, A, B	bar (PSI)	350 (5076)
Maximum operating pressure at port T	bar (PSI)	100 (1450)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range - NBR	°C (°F)	-30 ... +100 (-22 ... +21)
Fluid temperature range - Viton	°C (°F)	-20 ... +120 (-4 ... +248)
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Operating force on lever	Nm (lbf)	< 50 (< 10.8)
Service life	cycles	10^6
Weight	kg (lbs)	1,6 (3.53)
Mounting position		unrestricted

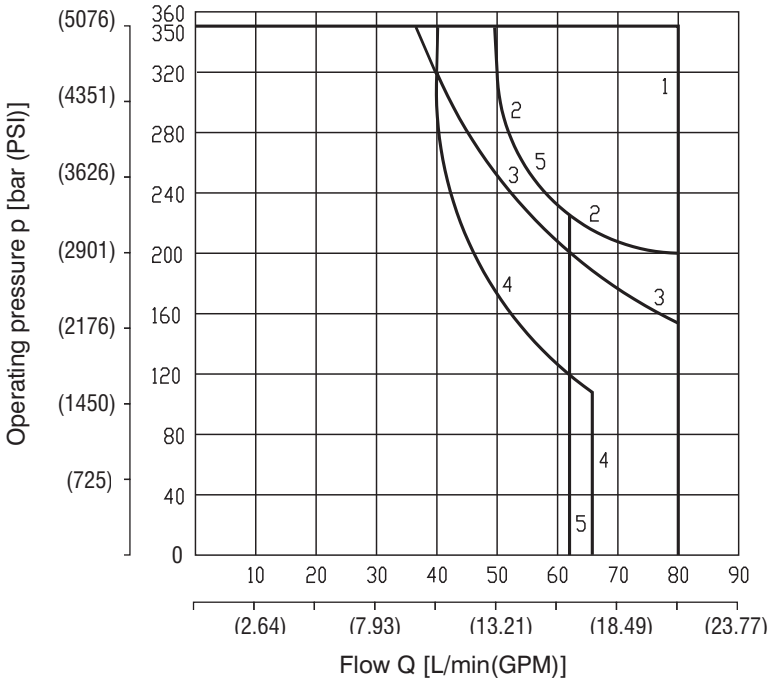
Spool Symbols

Type	Symbol	Crossover	Type	Symbol	Crossover
Z11			Y11		
Z15			Y15		
C11			B11		
C15			B15		
H11			R11		
H15			J15		
P11			A51		
P15			J75		

p-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see spool symbols.

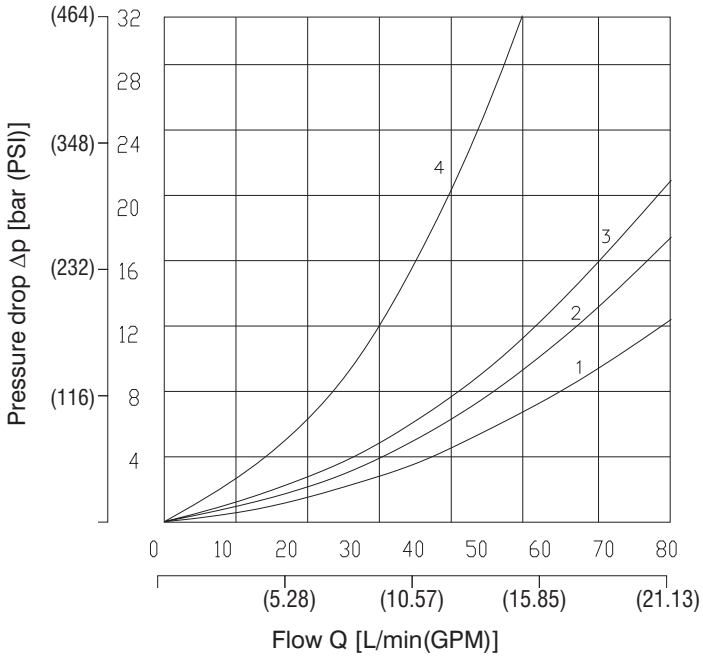


Z11	1	Z15	1
C11	4	C15	1
H11	3	H15	1
P11	1	P15	1
Y11	2	Y15	1
B11	5	B15	1
R11	1	J15	1
A51	3	J75	1

Δp-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS)

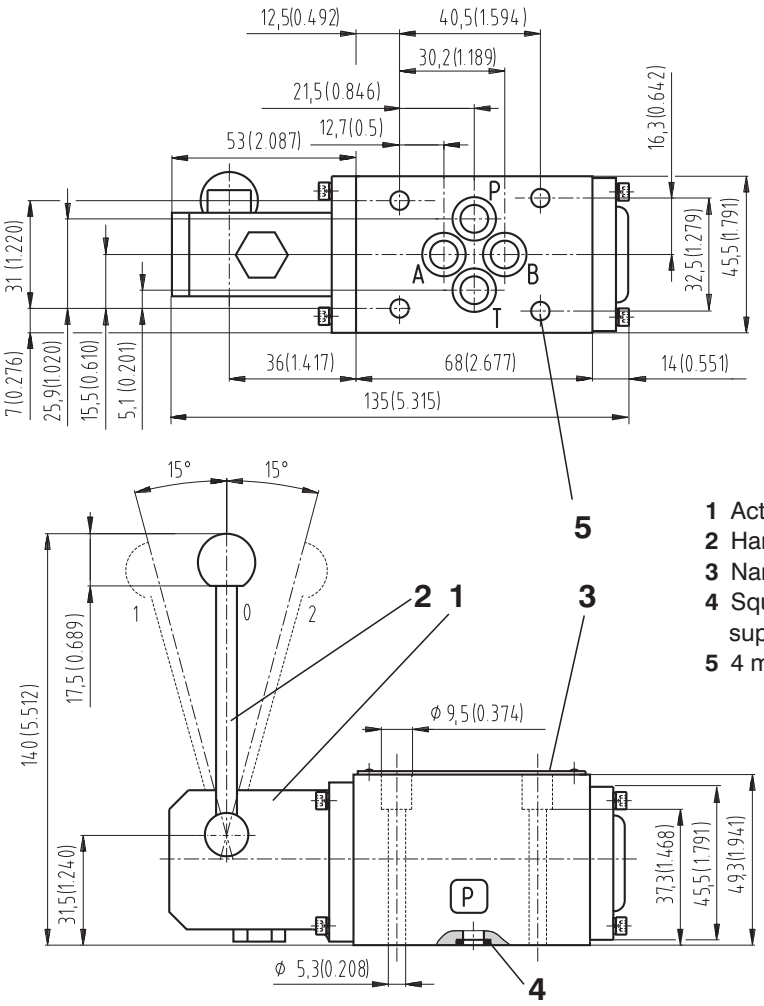
Pressure drop Δp related to flow rate.



	P-A	P-B	A-T	B-T	P-T
Z11, Z15	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	
B11, B15	2	2	3	3	
R11, J15	2	2	3	3	
A51, J75	2	2			

Valve Dimensions

Dimensions in millimeters (inches)



1 Actuating section
2 Hand lever
3 Name plate
4 Square ring (4 pcs.) 9.25 x 1.68 supplied with valve
5 4 mounting holes

Required surface finish of interface

Spare Parts

Dimensions in millimeters

Seal kit

Type	Dimensions, quantity	Ordering number
O-ring - NBR90	22 x 2 (2 pcs.)	15700300
Square ring - NBR70	9.25 x 1.68 (4 pcs.)	
O-ring - NBR70	11 x 1.5 (2 pcs.)	
O-ring - NBR70	11.3 x 2.4 (1 pc.)	

Bolt kit (for studs see HA 0030)

Dimensions, quantity	Bolt torque	Ordering number
M5 x 45 DIN 912-10.9 (4 pcs.)	8.9 Nm (6.6 ft-lbs)	15845100

Caution!

- Directional valves with other functional symbols as those shown in the table above can be delivered on request.
- The plastic packaging is recyclable.
- Mounting bolts or studs must be ordered separately.
- Certified documentation is available per request.

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Directional Valves Solenoid Operated Slip-In

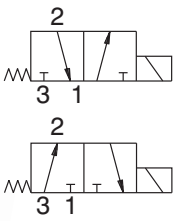
PD2E

Size to 04 • 80 bar (1160 PS) • 30 L/min (7.93 GPM)

HA 4050
7/2012

Replaces
HA 4050 9/2010

- ❑ **3/2 way valves construction**
- ❑ **Reducing valves suitable for mobile applications**
- ❑ **Compact design**
- ❑ **Economical Slip-In**
- ❑ **Two cavities sizes**

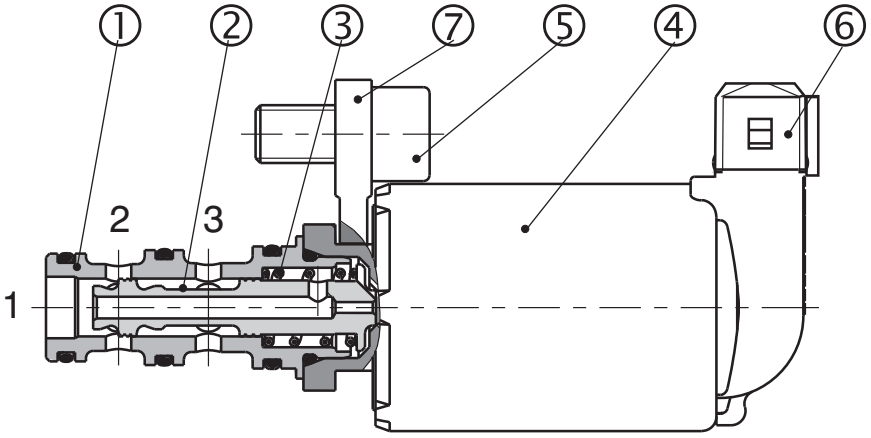


Functional Description

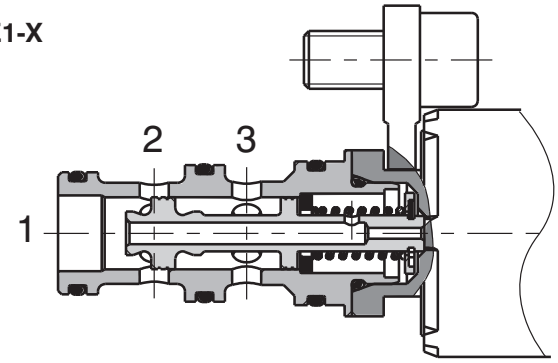
This directly-controlled electromagnetic distributor, in the 3/2 arrangement, is used mostly for opening, blocking and direction controlling of the flow of liquids. The distributor consists of the housing (1), control gate valve (2), counter-spring (3) and magnet coil (4). The electromagnet coil is pressed on (and thus fixed to) the valve control system. The direct current electromagnet coils are supplied for 12 V and 24 V voltage levels.

Once the fixing screw is released, it is possible to turn the distributor around its axis by 360° and change thus the connector socket position (6).
The fixing screw (5) and fork (fastening member) (7) form also a part of the supply.
In basic variant a part of the valve is exhibited to influence of the environmental atmosphere and the coil zinc plated.

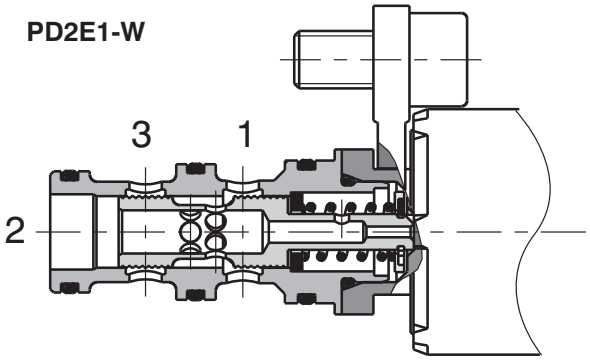
PD2E1-Y



PD2E1-X



PD2E1-W



Ordering Code

PD2E □-□ □/□ □-□ □ □

3/2 Way cartridge Directional Valve Solenoid Operated Slip-In

Type of construction 1

Valve cavity
- D17 (mm) (0.669 in) **Y**
- D20 (mm) (0.787 in) **W**
- D20 (mm) (0.787 in) **X**

Number of connections 3

Number of operating positions 2

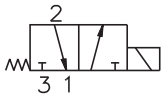
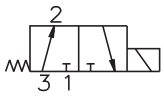
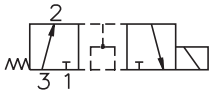
Functional Symbols
- **D21**
- **D26**

Nominal supply voltage
- **12** 12 V DC / 1,67 A
- **24** 24 V DC / 0,84 A

Electronics
- E3 with AMP-Junior-Timer-connector
- E4 with integrated quenching diode and terminal for AMP-Junior-Timer
- E12A connector with DEUTSCH DT 04-2P
- E13A with integrated quenching diode and terminal for DEUTSCH DT 04-2P

Seals
- no designation NBR
- **V** FPM (Viton)

Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
2D21			2D26		

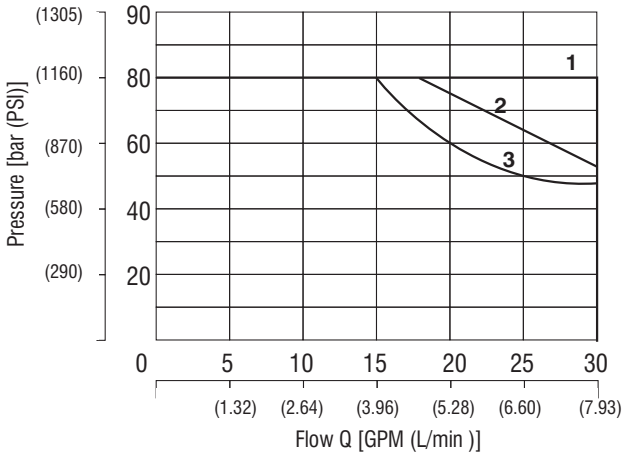
Technical Data

		Standard	
Mounting mode		D17	D20
Maximum flow	L/min (GPM)	30 (7.93)	
Max.operating pressure in Canals Y, X -2, 3, W-3	bar (PSI)	80 (1160)	
Max.operating pressure in Canals Y, X -1, W-2	bar (PSI)	30 (435)	
Pressure drop	bar (PSI)	see Δp-Q characteristisc	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range	°C (°F)	-30 ...90 (-22 ...194), +100 °C (212 °F for a short term)	
Ambient temperature, max.	°C (°F)	-30 ...90 (-22 ...194), +100 °C (212 °F for a short term)	
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)	
Supply voltage	V	12 DC	24DC
Quenching (E4, E13A)		BZW06-19B	BZW06-33B
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406	
Supply voltage	%	± 10	
Quenching (E4, E13A)	hod^{-1}	15 000	
Duty cycle	%	100	
Enclosure type to EN 60529		IP 67	
Service life		10^7	
Weight Directional Control Valves	kg (lbs)	0.2 (0.44)	
Maximum fixing bolt tightening torque	Nm (lbf.ft)	9+2 (6.64+1.48)	
Mounting positiion		unrestricted	

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

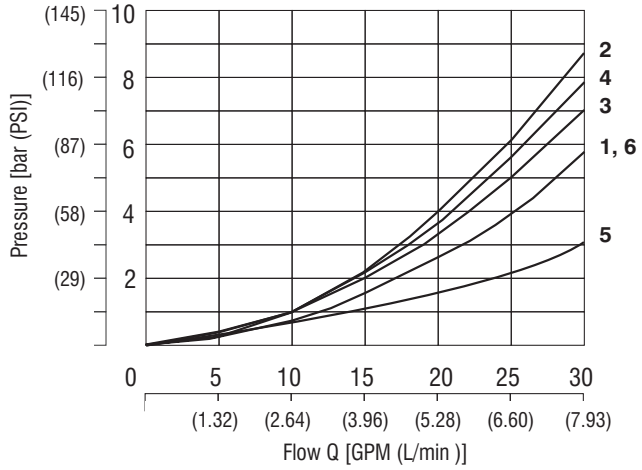
Oil 90 °C / Ambient temperature 90 °C, Voltage rating Un ± 10%



Y3	Connection	Dirrection
1	2D21	2→1
1		3→2
1	2D26	3→2
1		2→1
X3	**Connection**	**Dirrection**
1	2D21	2→1
2		3→2
W3	**Connection**	**Dirrection**
3	2D21	2→1
1		3→2

Δp-Q Characteristics

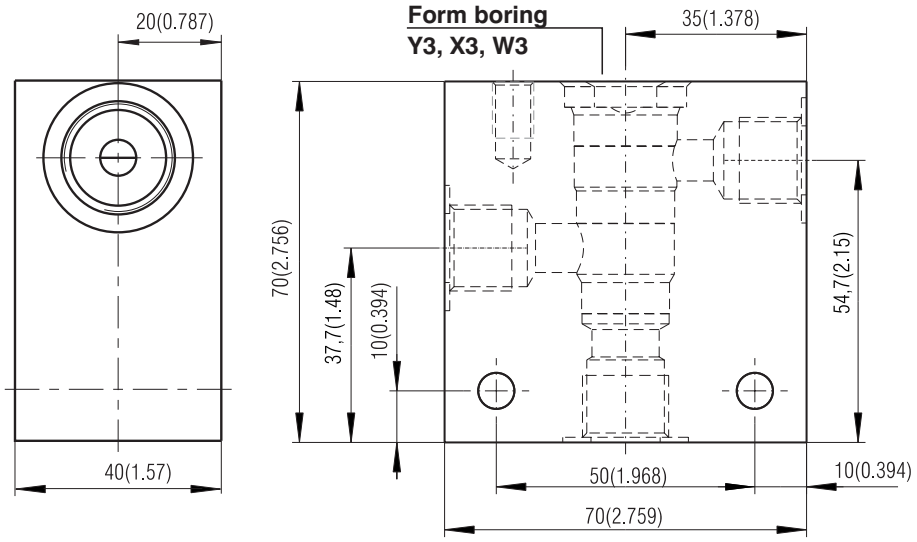
Measured at ν = 32 mm^2/s (156 SUS)



Y3	Connection	Dirrection
1	2D21	2→1
2		3→2
4	2D26	2→1
2		3→2
X3	**Connection**	**Dirrection**
4	2D21	3→2
5		2→1
W3	**Connection**	**Dirrection**
1	2D21	2→1
6		3→2

Valve body

Dimensions in mm (inches)

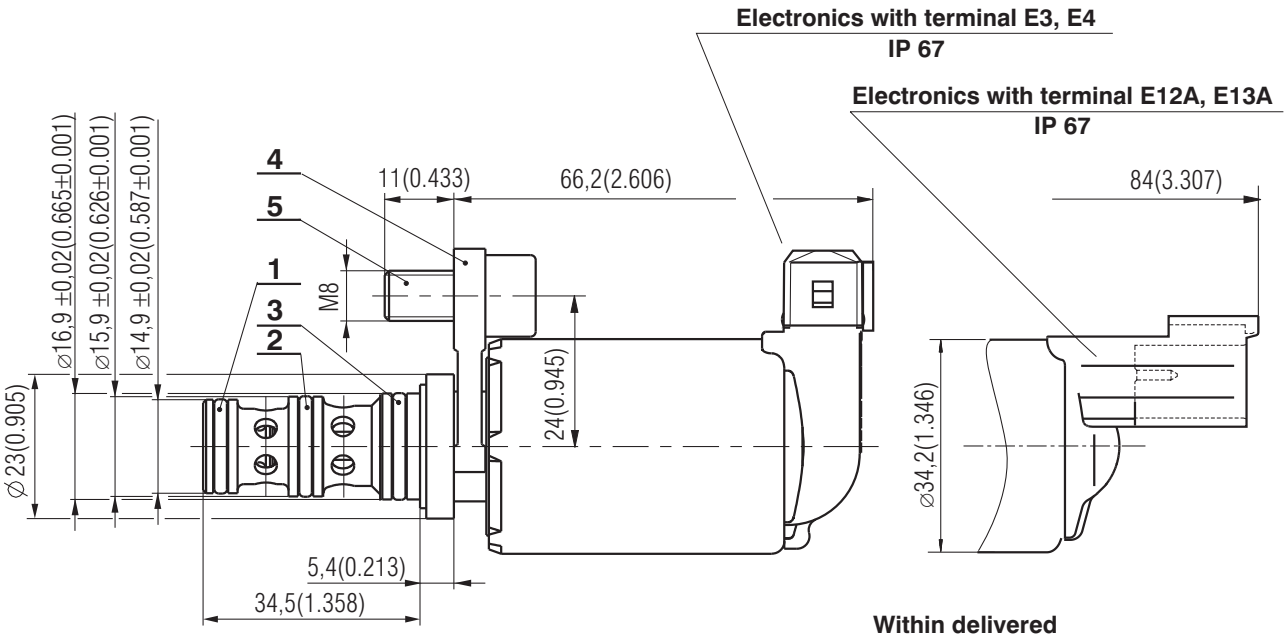


Design	Connecting size	Type code	Body material	Operating pressures
Y	G3/8	SB-Y3-0103AL	Aluminium	250 bar (3625 PSI)
W, X	G3/8	SB-W3-0103AL	Aluminium	250 bar (3625 PSI)

Valve dimensions

Dimensions in mm (inches)

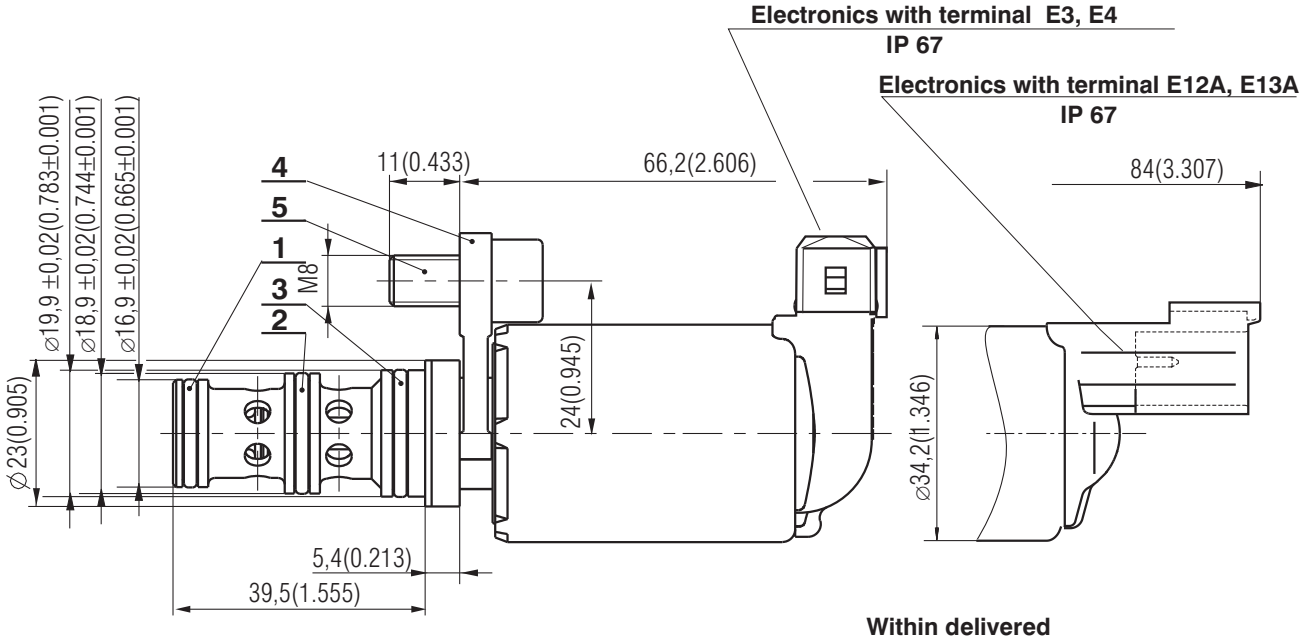
PD2E1- Y



Within delivered

1 O-ring 11,2x1,8 NBR 70 (1pc.)
2 O-ring 12,42x1,78 NBR 70 (1pc.)
3 O-ring 14x1,78-NBR 70 (1 pc.)
4 Fork Slip-In M8
5 Bolt M8x16 ČSN 021143

PD2E1- X, W



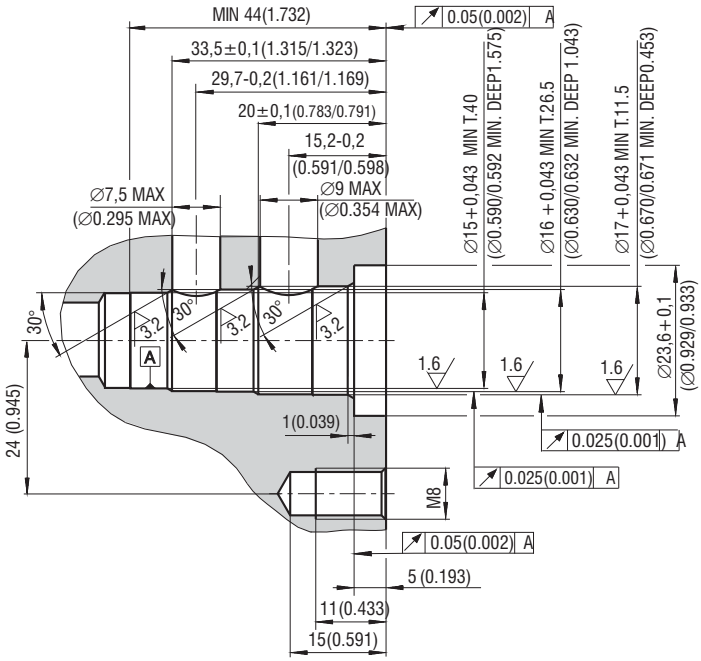
Within delivered

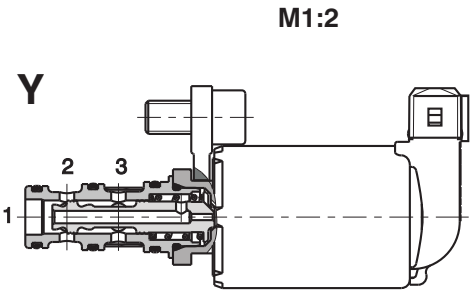
1 O-ring 14x1,78 NBR 70 (1pc.)
2 O-ring 16x1,8 NBR 70 (1pc.)
3 O-ring 17x1,8 NBR 70 (1 pc.)
4 Fork Slip-In M8
5 Bolt M8x16 ČSN 021143

Cavity

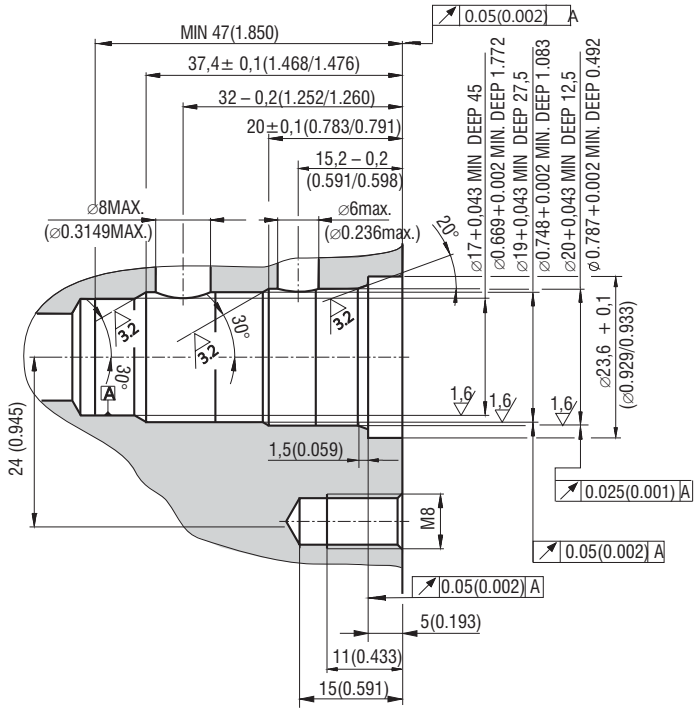
Dimensions in mm

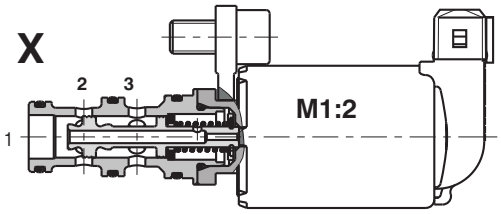
Y - ⌀D17

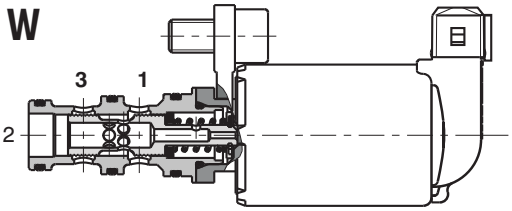




X, W - ⌀D20







Spare parts

Seal set

Design -Standard (NBR70)	Size, number			Ordering number
Y	11,2x1,8 (1pc.)	12,42x1,78 (1pc.)	14x1,78 (1pc.)	17938600
X, W	14x1,78 (1pc.)	16x1,8 (1pc.)	17x1,8 (1pc.)	16961300
Fork+Bolt M8	Fork SLIP-IN M8 (1pc.)	Bolt M8x16 021143 Zn PO-A (1pc.)		16961500

Caution!

- The plastic packaging is recyclable.
- Certified documentation is available per request.

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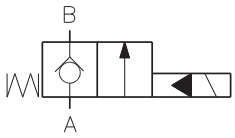
2-way Directional Poppet Valves Solenoid Operated

ROE3

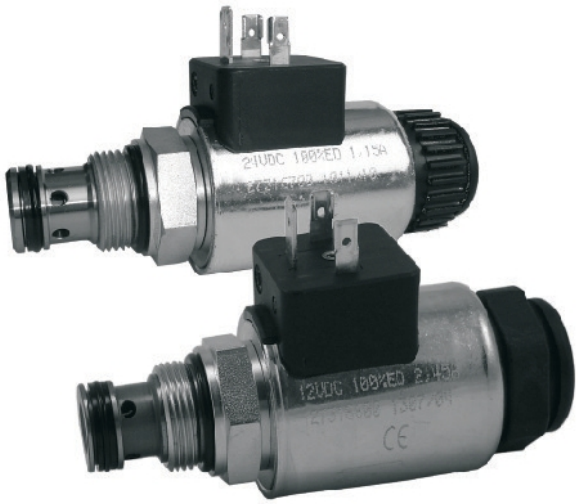
Size 04 (D 02), 06 (D 03) • 250 bar (3600 PSI) • 25/63 L/min (6.6/13 GPM)

HA 4022
5/2012

Replaces
HA 4022 10/2010

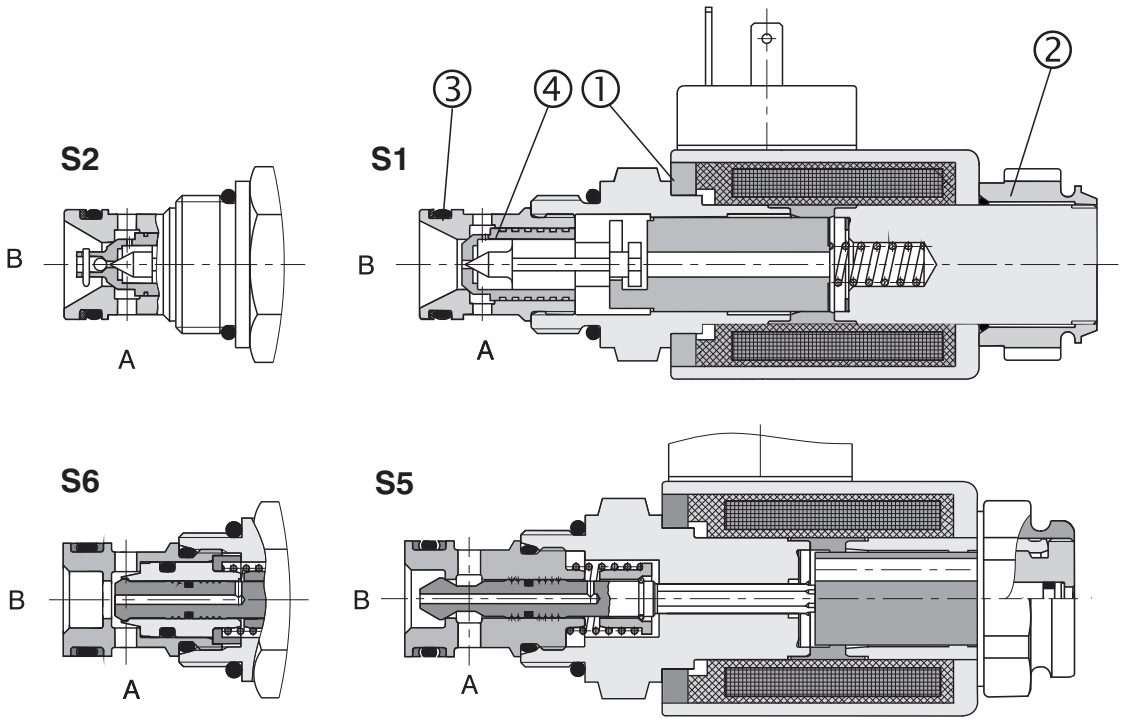


- **Screw-in cartridge, sandwich size 04 (02), size 06 (03) and in-line design**
- **Leak-free closing up to 3 drops/min at 250 bar**
- **High switching reliability after long idling time**
- **High transmitted power**



Functional Description

2-way directional poppet valves with solenoid operation are designed to check and open the flow of the hydraulic fluid. The opening and closing of the valve is ensured by an electro-hydraulically controlled poppet (4) which sits on the seat (3) and guarantees in its closed position practically leak-free sealing.
The operating solenoid (1) is a DC solenoid. For AC supply the solenoid is provided with a rectifier which is integrated in the DIN connector socket as part of the solenoid. The electrical connector can be turned by 90°. By loosening the retaining nut (2), the solenoid (1) can be turned arbitrarily in the range of 360°, or replaced.
The valve body is zinc coated, bodies M and R are phosphate coated.



Order Code

ROE3 - □ 2 □ □ / □ □ □ □

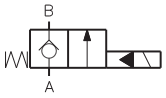
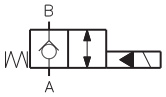
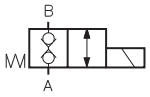
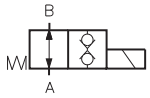
2 Way Directional Poppet Valve with Solenoid Operation

Nominal size

04 (D 02)	**04**
06 (D 03)	**06**

Number of operating positions

Model and functional symbols

screw-in cartridge		**S1**
screw-in cartridge		**S2**
screw-in cartridge		**S5***
screw-in cartridge		**S6***

* only for nominal size 04 (D 02)

Model

screw-in cartridge	**no designation**
modular valve, connection of A2 - A1	MA04
modular valve, connection of B2 - B1	MB04
modular valve, connection of A - B	MX04
modular valve, connection of A - T	MD04
modular valve, connection of B - T	ME04
modular valve, connection of B2 - B1, A2 - A1	MC04
modular valve, connection of B - T, A - T	MF04
modular valve, connection of P - T	MG04
modular valve, connection of A2 - A1	MA06
modular valve, connection of B2 - B1	MB06
modular valve, connection of A - B	MX06
modular valve, connection of A - T	MD06
modular valve, connection of B - T	ME06
modular valve, connection of B2 - B1, A2 - A1	MC06
modular valve, connection of B - T, A - T	MF06
modular valve, connection of P - T	MG06
modular valve, connection of P1 -P2	MP06
tube-mounting valve, thread G3/8	R1
tube-mounting valve, thread G1/2	R2
tube-mounting valve, thread SAE8, 3/4-16	R3
tube-mounting valve, thread SAE 10,7/8-14	R4

Seals

no designation	NBR
V	FPM (Viton)

****Electrical connector, EN 1745301-803**

no designation	without connector
K1	connector without rectifier
K2	connector without rectifier with LED and quenching diode
K3	connector with rectifier
K4	connector with rectifier with LED and quenching diode
K5	connector without rectifier

Type of solenoid coil

E1	with terminal for the connector, EN 1745301-803
E2	with terminal for the connector, EN 1745301-803 and quenching diode
E3	with AMP-Junior-Timer-connectorr
E4	with AMP-Junior-Timer-connectorr and quenching diode
E5	with integrated rectifier and with terminal for the connector, EN 1745301-803

Rated supply voltage of solenoids

01200	12 V DC / 2.41 A
01400	14 V DC / 1.66 A
02100	21 V DC / 1.14 A
02400	24 V DC / 1.15 A
04200	42 V DC / 0.59 A
04800	48 V DC / 0.56 A
06000	60 V DC / 0.41 A
10200	102 V DC / 0.24 A
20500	205 V DC / 0.12 A
02450	24 V AC / 1.44 A / 50 (60) Hz
11550	115 V AC / 0.26 A / 50 (60) Hz
23050	230 V AC / 0.14 A / 50 (60) Hz

**Note: Electrical connectors have to be ordered separately see page 13 and 15

FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE, AND TABLE OF PREFERRED TYPES ON PAGE 15

Recommended solenoid coils used with electrical connector with rectifiers - type designation K3, K4

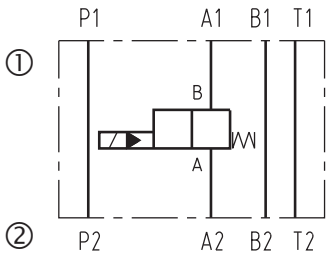
Rated supply source voltage (permissible rated voltage variation ±10 %)	Type designation of the solenoid voltage
24 V AC / 1.44 A / 50 (60) Hz	02100
115 V AC / 0.26 A / 50 (60) Hz	10200
230 V AC / 0.14 A / 50 (60) Hz	20500

Ordering Numbers of Sandwich / Valve Bodies (without screw-in cartridge)

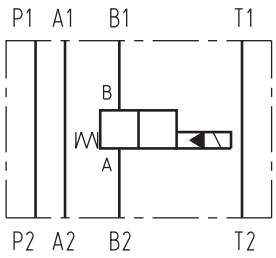
Modular valve - sealing NBR	Order number	Modular valve - sealing Viton	Order number
MA04-ROE3	15652600	MA04-ROE3/V	28592100
MB04-ROE3	15652800	MB04-ROE3/V	28592500
MX04-ROE3	15652900	MX04-ROE3/V	28592600
MD04-ROE3	15653000	MD04-ROE3/V	28592700
ME04-ROE3	15653100	ME04-ROE3/V	28593000
MC04-ROE3	15653200	MC04-ROE3/V	28593100
MF04-ROE3	15653300	MF04-ROE3/V	28593200
MG04-ROE3	15653800	MG04-ROE3/V	20717800
MA06-ROE3	15649200	MA06-ROE3/V	28593400
MB06-ROE3	15649300	MB06-ROE3/V	28593700
MX06-ROE3	15649400	MX06-ROE3/V	28594000
MD06-ROE3	16687400	MD06-ROE3/V	28594300
ME06-ROE3	15649600	ME06-ROE3/V	28594400
MC06-ROE3	15649700	MC06-ROE3/V	28594500
MF06-ROE3	15649800	MF06-ROE3/V	20690300
MG06-ROE3	15649900	MG06-ROE3/V	20690500
MP06-ROE3	16687500	MP06-ROE3/V	20690800
Tube-mounting valve	**Order number**	**Tube-mounting valve**	**Order number**
R1-ROE3	15653400	R3-ROE3	15653600
R2-ROE3	15653500	R4-ROE3	15653700

Functional Symbols

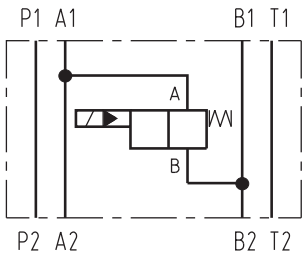
Model MA



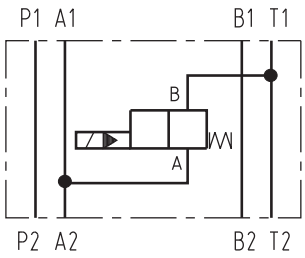
Model MB



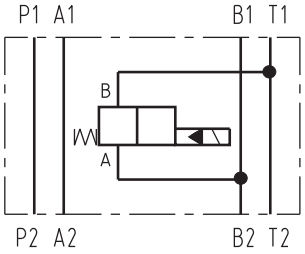
Model MX



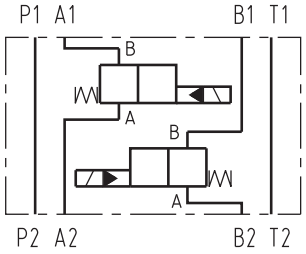
Model MD



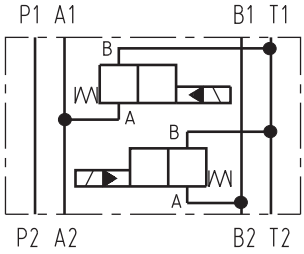
Model ME



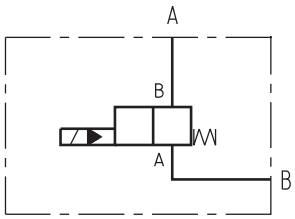
Model MC



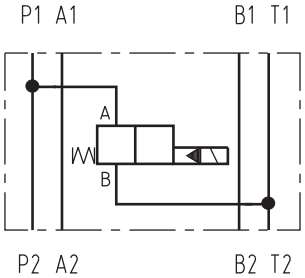
Model MF



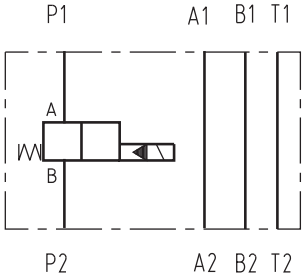
Model R1, R2



Model MG



Model MP



① **Valve side**
② **Subplate side**

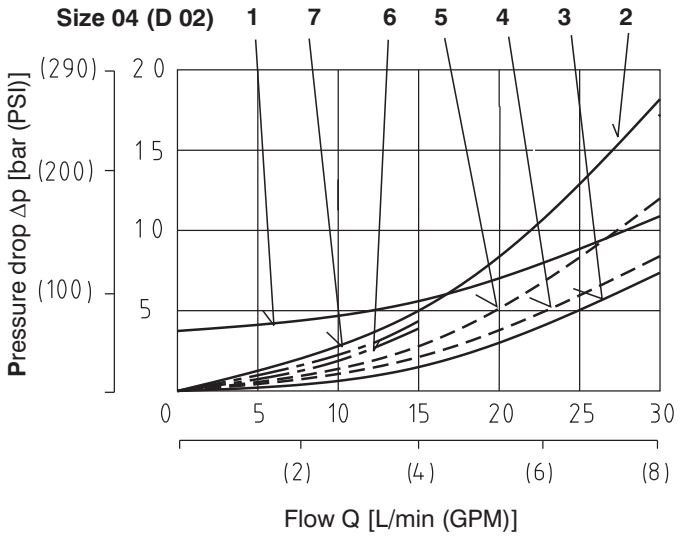
Technical Data

Valve size	mm (US)	04 (D 02)	06 (D 03)
Maximal flow	L/min (GPM)	25 (6.6)	63 (13)
Maximal operating pressure	bar (PSI)	250 (3600)	250 (3600)
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range	°C (°F)	-30 ... +80 (-22 ... +176) for NBR seals -20 ... +80 (-4 ... +176) for FPM seals	
Ambient temperature, max.	°C (°F)	50 (+122)	
Viscosity range	mm^2/s (SUS)	20 ... 400 (98 ... 1840)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406	
Permissible rated voltage variation	%	DC: ± 10 AC: ± 10	
Maximal switching frequency	1/h	15 000	10 000
Switching time, ON; at rated voltage and $\nu = 32\ mm^2/s$ (156 SUS)	ms	DC 25 ... 35 AC 25 ... 35	DC 30 ... 50 AC 30 ... 110
Switching time, OFF; at $\nu = 32\ mm^2/s$ (156 SUS)	ms	DC 15 ... 25 AC 50 ... 100	DC 80 ... 130 AC 100 ... 150
Duty cycle	%	100	
Service life		10^7	
Enclosure type to EN 60 529		IP 65	
Weight - screw-in cartridge - model MA, MB, MX, MD, ME, MG, MP - model MC, MF - model R1, R2, R3, R4	kg (lbs)	0.5 (1.1) 1.15 (2.5) 1.65 (3.6) 1.60 (3.5)	0.5 (1.1) 1.45 (3.2) 1.95 (4.3) 1.60 (3.5)
Mounting position		unrestricted	

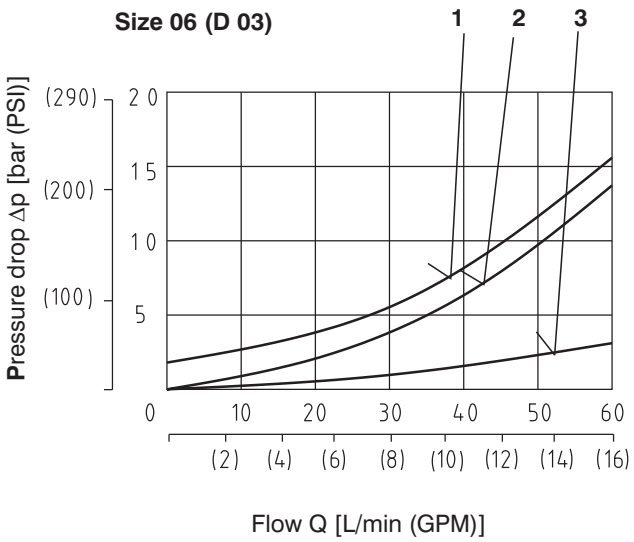
Δp-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

For the screw-in cartridge without valve body



1 - S1, S2 (B - A) Solenoid OFF
2 - S1, S2 (A - B) Solenoid ON
3 - S2 (B - A) Solenoid ON
4 - S5 (A - B)
5 - S5 (B - A)
6 - S6 (A - B)
7 - S6 (B - A)
flow up to 15 L/min (4 GPM)



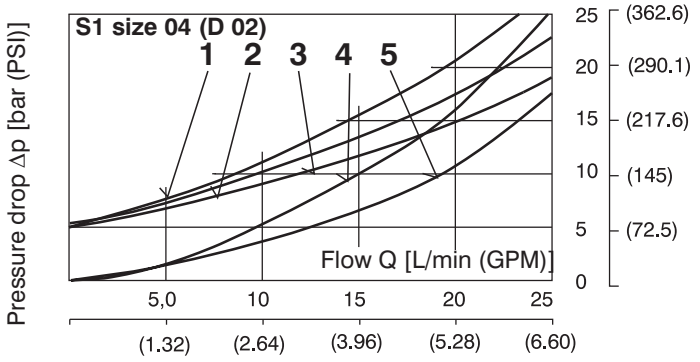
1 - S1, S2 (B - A) Solenoid OFF
2 - S1, S2 (A - B) Solenoid ON
3 - S2 (B - A) Solenoid ON

In connection with a valve body, the additional pressure loss of the valve body is to be considered.

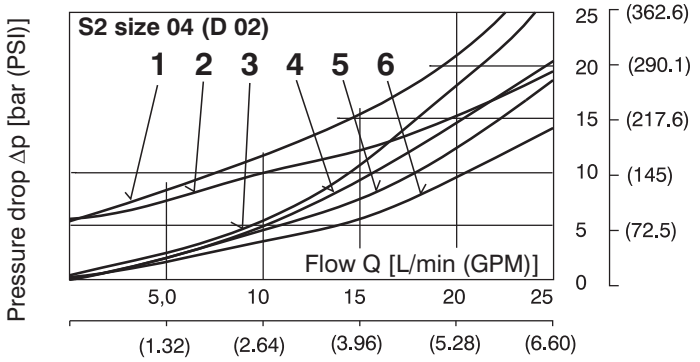
Δp-Q Characteristics

Measured at ν = 32 mm²/s (156 SUS)

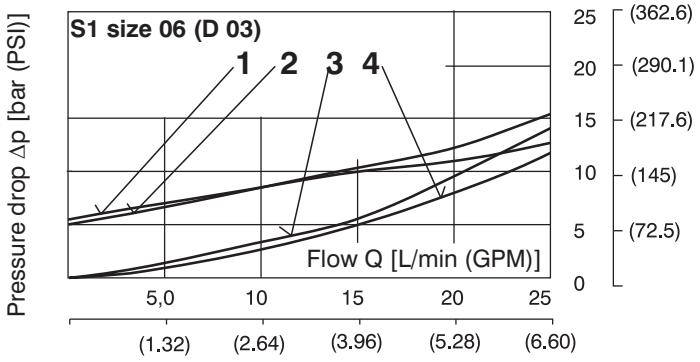
Pressure drops for valves S1, S2 in sandwich blocks
Blocks R1, R2, R3, R4 for inline-mounting



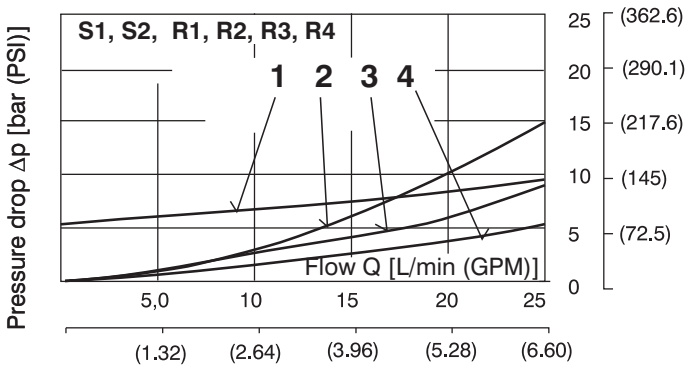
1- MD 04 (T-A)
2 -MX 04 (B-A)
3 -MA 04 (A1-A2)
4 -MX 04 (A-B), MD 04 (A-T), MG 04 (P-T)
5 -MA 04 (A2-A1)



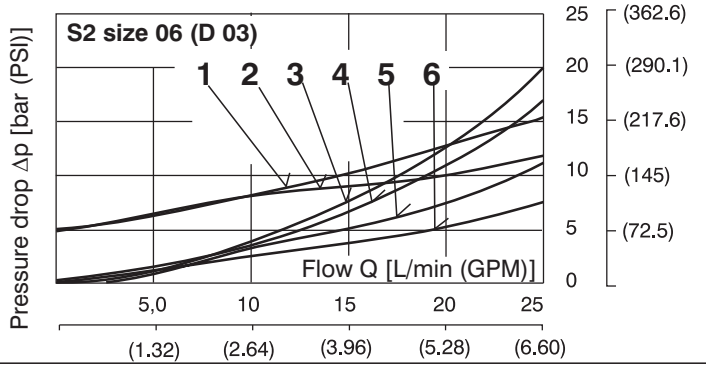
1 - MD 04 (T-A) Solenoid OFF
MX 04 (B-A) Solenoid OFF
2 - MA 04 (A1-A2) Solenoid OFF
3 - MD 04 (A-T)
4 - MA 04 (A2-A1)
MD 04 (T-A) Solenoid ON
5 - MX 04 (B-A) Solenoid ON
6 - MA 04 (A1-A2) Solenoid ON



1 - MA 06 (A1-A2), MX 06 (B-A)
2 - MD 06 (T-A)
3 - MD 06 (A-T), MG 06 (P-T)
4 - MA 06 (A2-A1), MX 06 (A-B)



1 - S2 R1 (R3), (A-B) Solenoid OFF
S2 R2 (R4), (A-B) Solenoid OFF
S1 R1 (R3), (A-B),S1 R4 (A-B)
2 - S2 R1 (R3), (B-A), S2 R4(B-A)
3 - S1 R1 (R3), (B-A), S1 R4(B-A)
4 - S2 R1 (R3), (A-B) Solenoid ON
S2 R2 (R4), (A-B) Solenoid ON

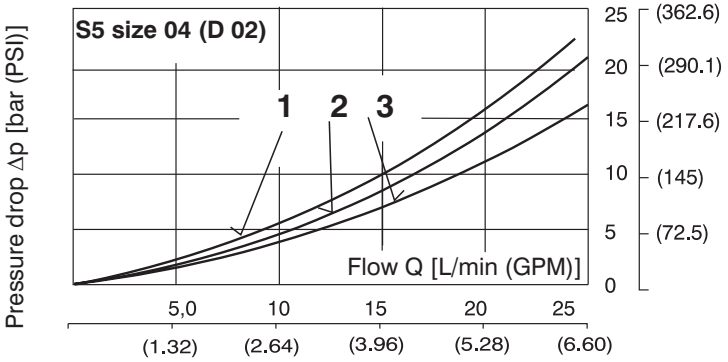


1 - MD 06 (T-A) Solenoid OFF
2 - MX 06 (B-A) Solenoid OFF
MA 06 (A1-A2) Solenoid OFF
3 - MD 06 (A-T)
4 - MA 06 (A2-A1), MX 06 (A-B)
5 - MD 06 (A-T)
6 - MA 06 (A1-A2) Solenoid ON
MX 06 (B-A) Solenoid ON

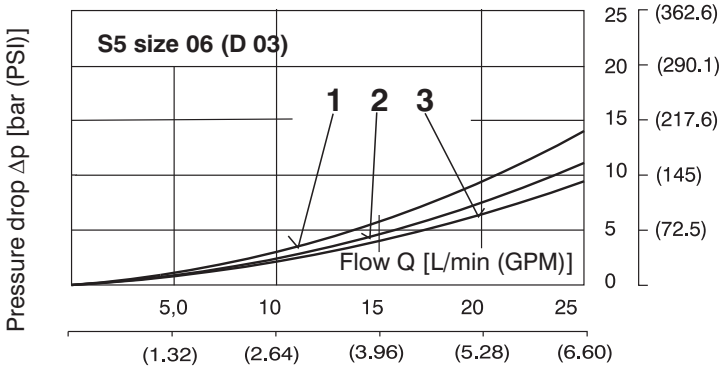
Δp-Q Characteristics

Measured at ν = 32 mm²/s (156 SUS)

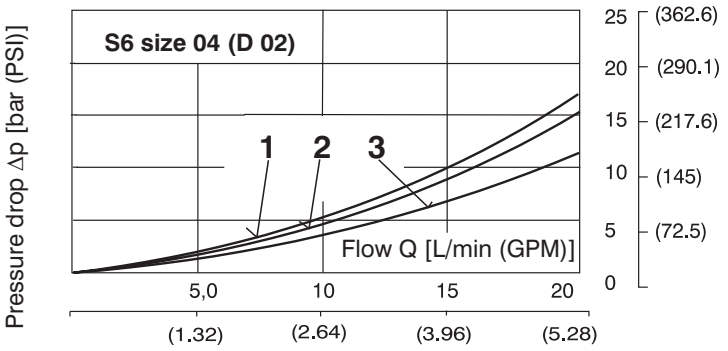
Pressure drops for valves S5, S6 in modular blocks
Blocks R1, R2, R3, R4 for thread connection



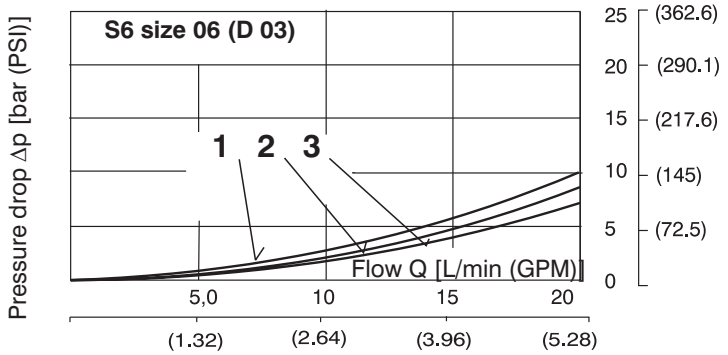
1 - MD 04 (A-T, T-A), ME 04 (B-T, T-B)
MF 04 (A-T, T-A)
2 - MX 04 (A-B, B-A)
3 - MA 04 (A1-A2, A2-A1), MB 04 (B1-B2, B2-B1)



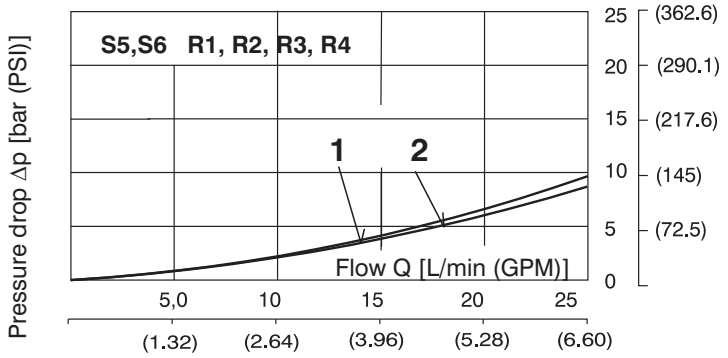
1 - MD 06 (A-T, T-A), ME 06 (B-T, T-B)
MF 06 v(A-T, B-T / T-A, T-B)
2 - MA 06 (A1-A2), MB 06 v(B1-B2),
MC 06 (A1-A2 / B1-B2), MX (B-A)
3 - MA 06 (A2-A1), MB 06 (B1-B2)
MC 06 (A2-A1/B2-B1), MX 06 (A-B)



1 - MD 04 (A-T, T-A), ME 04 (T-B, B-T)
MF 04 (A-T, B-T / T-A, T-B)
2 - MX 04 (A-B, B-A)
3 - MA 04 (A1-A2, A2-A1),MB (B1-B2, B2-B1)
MC 04 (A1-A2, A2-A1 / B1-B2, B2-B1)



1- MD (T-A), ME (T-B), MF (T-A, T-B)
2 - MD (A-T), ME (B-T), MF (A-T, B-T)
3 - MA (A1-A2, A2-A1), MB (B1 -B2, B2-B1)
MC (A1-A2, A2-A1/ B1 -B2, B2-B1)



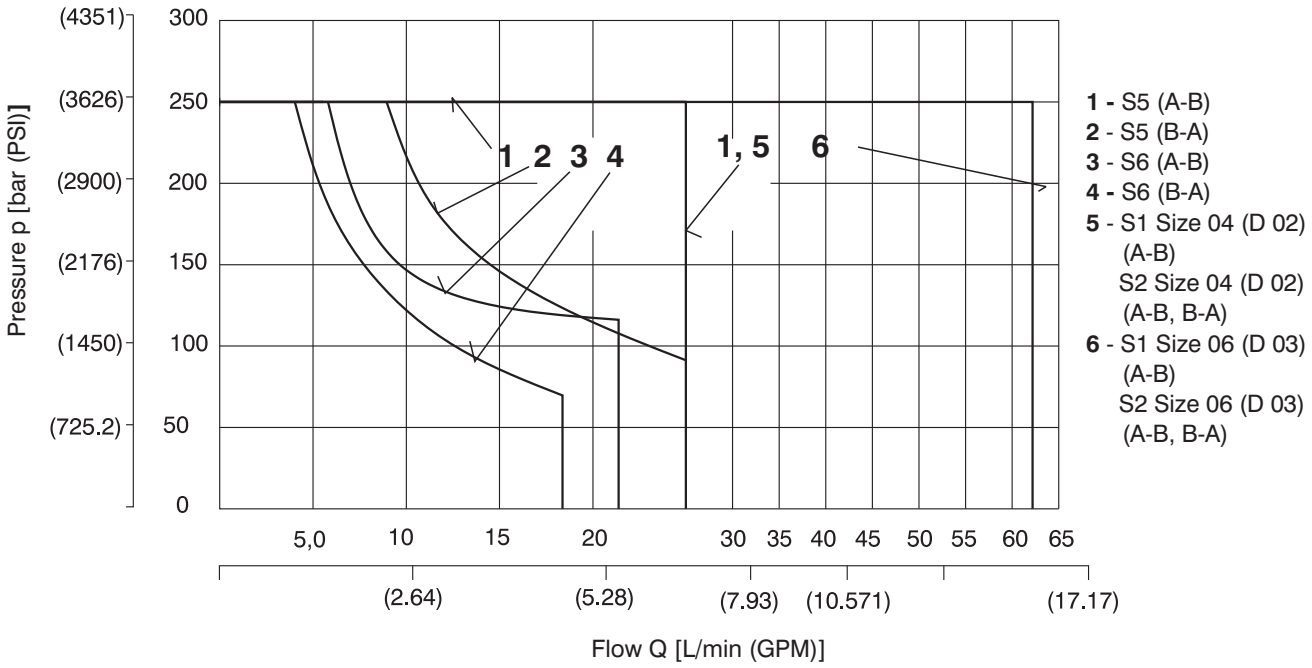
S5 **1 -** R1 (R3) A-B, B-A
2 - R2 (R4) A-B, B-A

S6 **1** - R1(R3) A-B, B-A
2- R2(R4) A-B, B-A

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for maximum hydraulic power for valves S1, S2, S5, S6

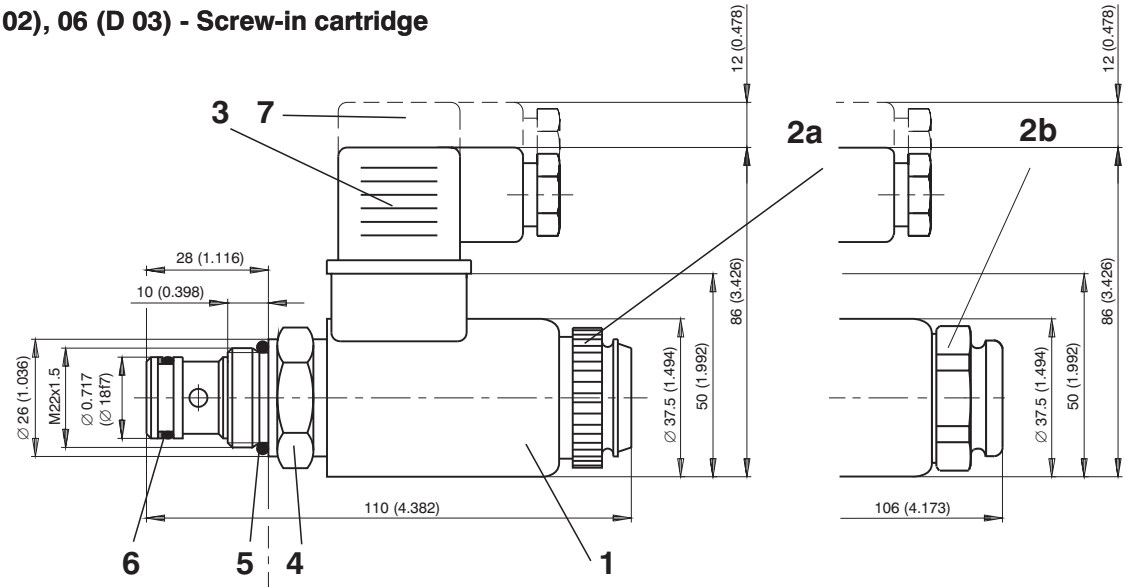


1 - S5 (A-B)
2 - S5 (B-A)
3 - S6 (A-B)
4 - S6 (B-A)
5 - S1 Size 04 (D 02) (A-B)
S2 Size 04 (D 02) (A-B, B-A)
6 - S1 Size 06 (D 03) (A-B)
S2 Size 06 (D 03) (A-B, B-A)

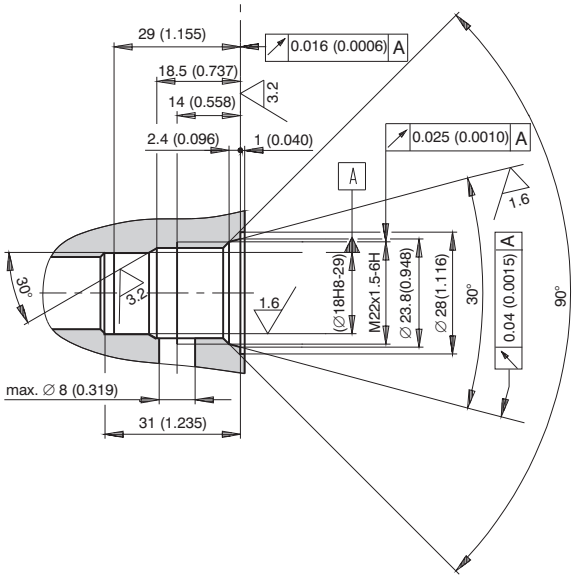
Valve Dimensions

Dimensions in millimeters (inches)

Size 04 (D 02), 06 (D 03) - Screw-in cartridge



Cavity

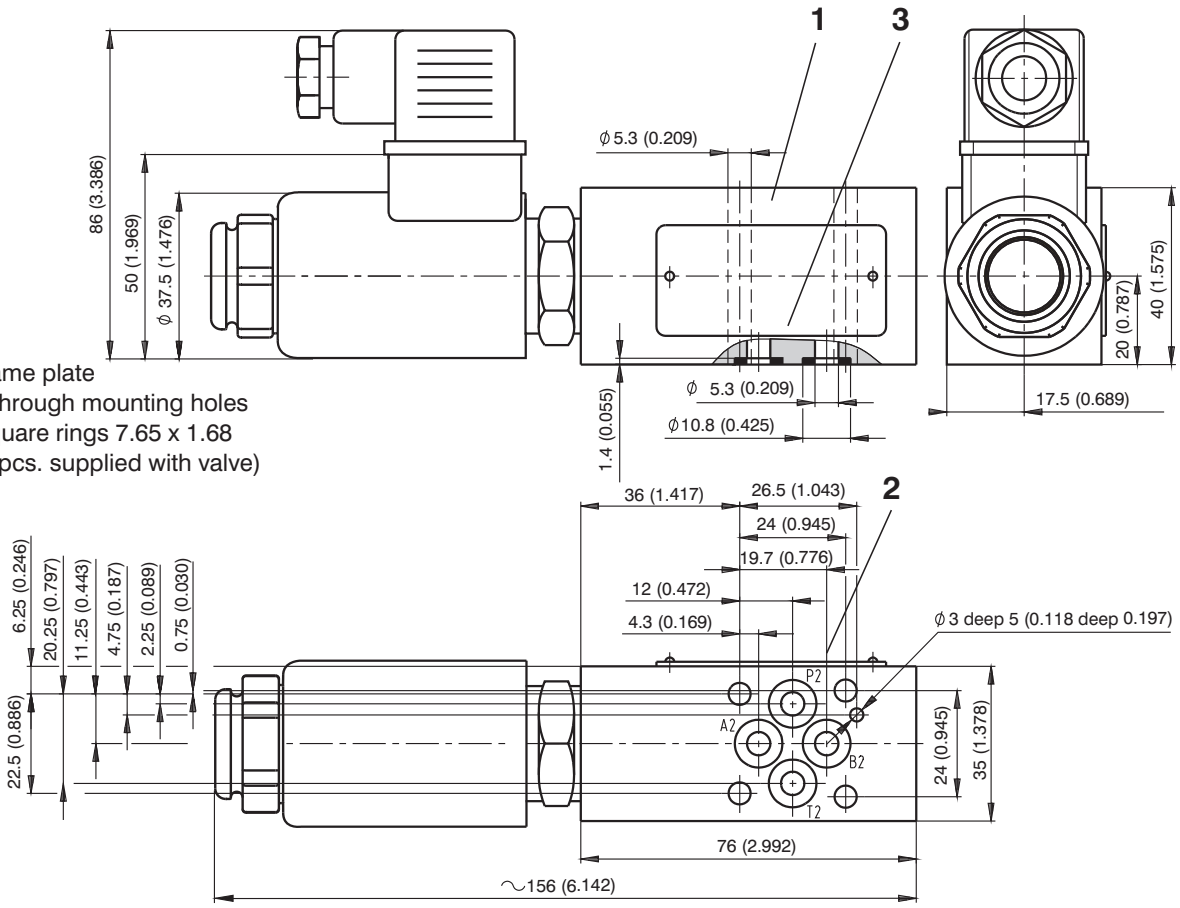


1 Solenoid turnable in the range of 360°
2a Retaining nut of the solenoid size 06 [Nut torque 3 Nm (2.21 ft-lbs)]
2b Retaining nut of the solenoid size 04 [Nut torque 3 Nm (2.21 ft-lbs)]
3 Electrical connector, EN 175301-803
4 Outside hexagon s = 27 mm (1.06 in.) Tightening torque 25 Nm (18.5 ft-lbs)
5 O-ring 19.4 x 2.1 NBR 80 (1 pc.) supplied with valve
6 Combined sealing: O-ring 14 x 1.78 (1 pc.) Back-up ring 14.73 x 17.43 x 1.14 (1 pc.) supplied with valve
7 Space required to remove connector

Valve Dimensions

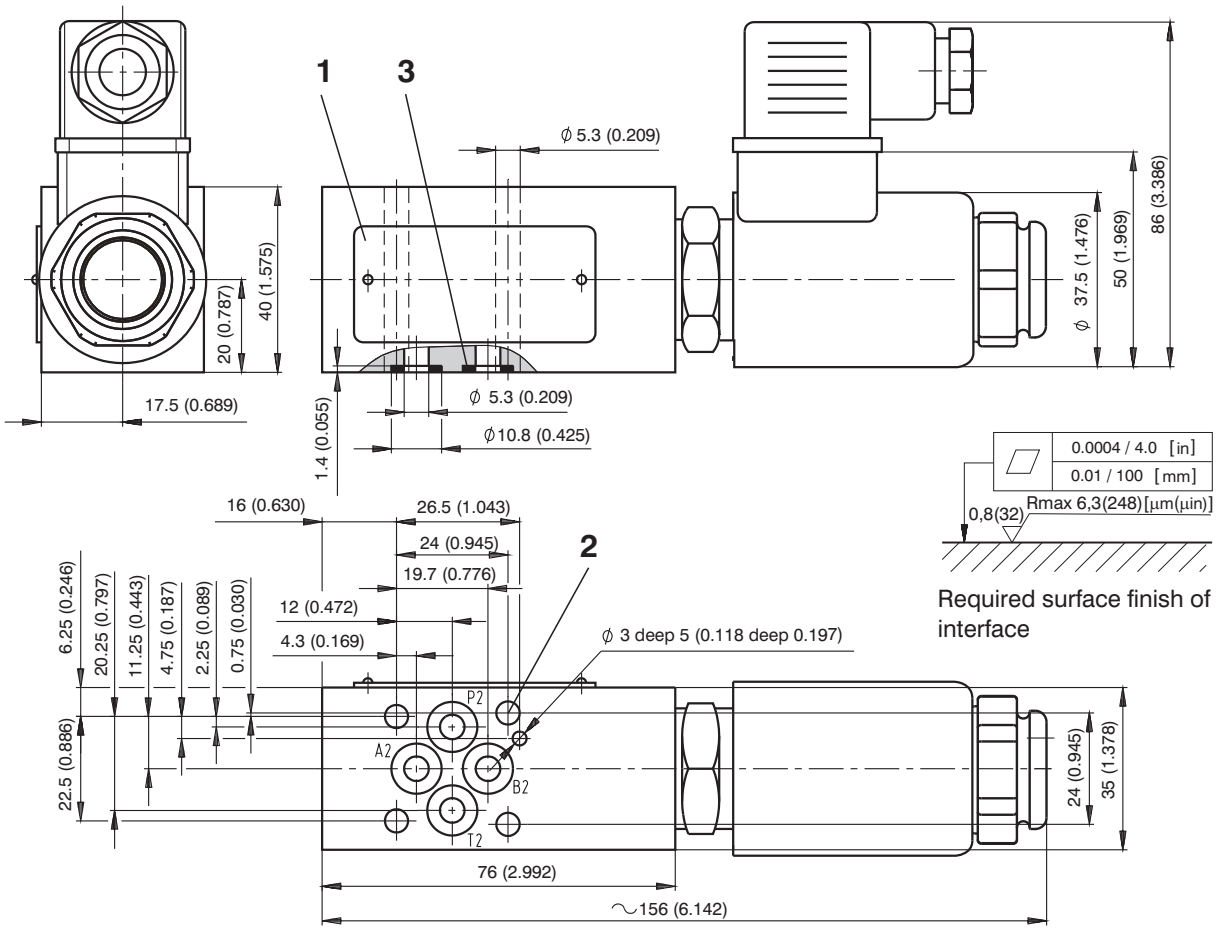
Dimensions in millimeters (inches)

Size 04 (D 02)- S5, S6 - Connecting dimensions according to ISO 4401, CETOP - RP 121H
Model MA, MX, MD, MG



1 Name plate
2 4 through mounting holes
3 Square rings 7.65 x 1.68
(4 pcs. supplied with valve)

Model MB, ME

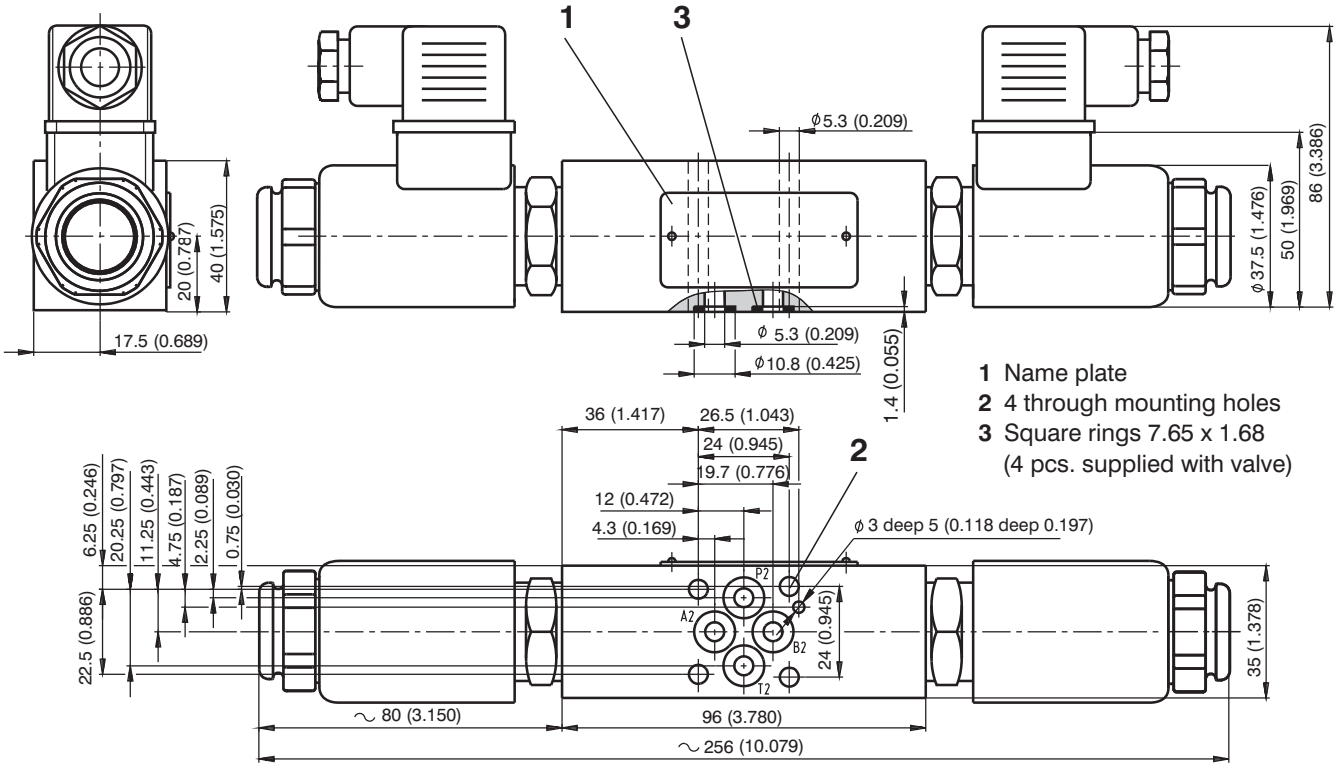


Required surface finish of interface

Valve Dimensions

Dimensions in millimeters (inches)

Model MC, MF

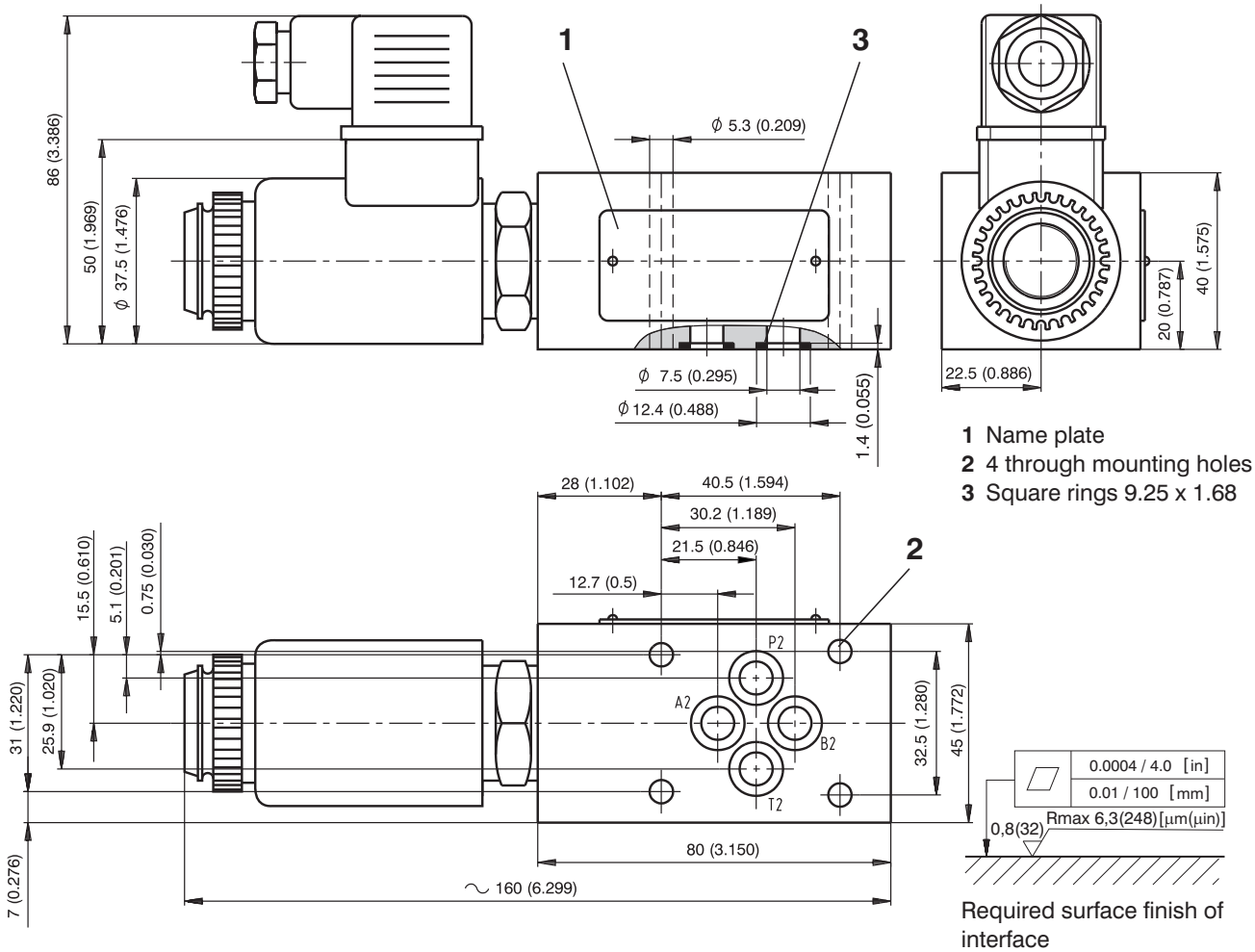


1 Name plate
2 4 through mounting holes
3 Square rings 7.65 x 1.68
(4 pcs. supplied with valve)

Valve Dimensions

Dimensions in millimeters (inches)

Size 06 (D 03) - S1, S2 - Connecting dimensions acording to ISO 4401, DIN 24 340
Model MA, MX, MD, MG, MP



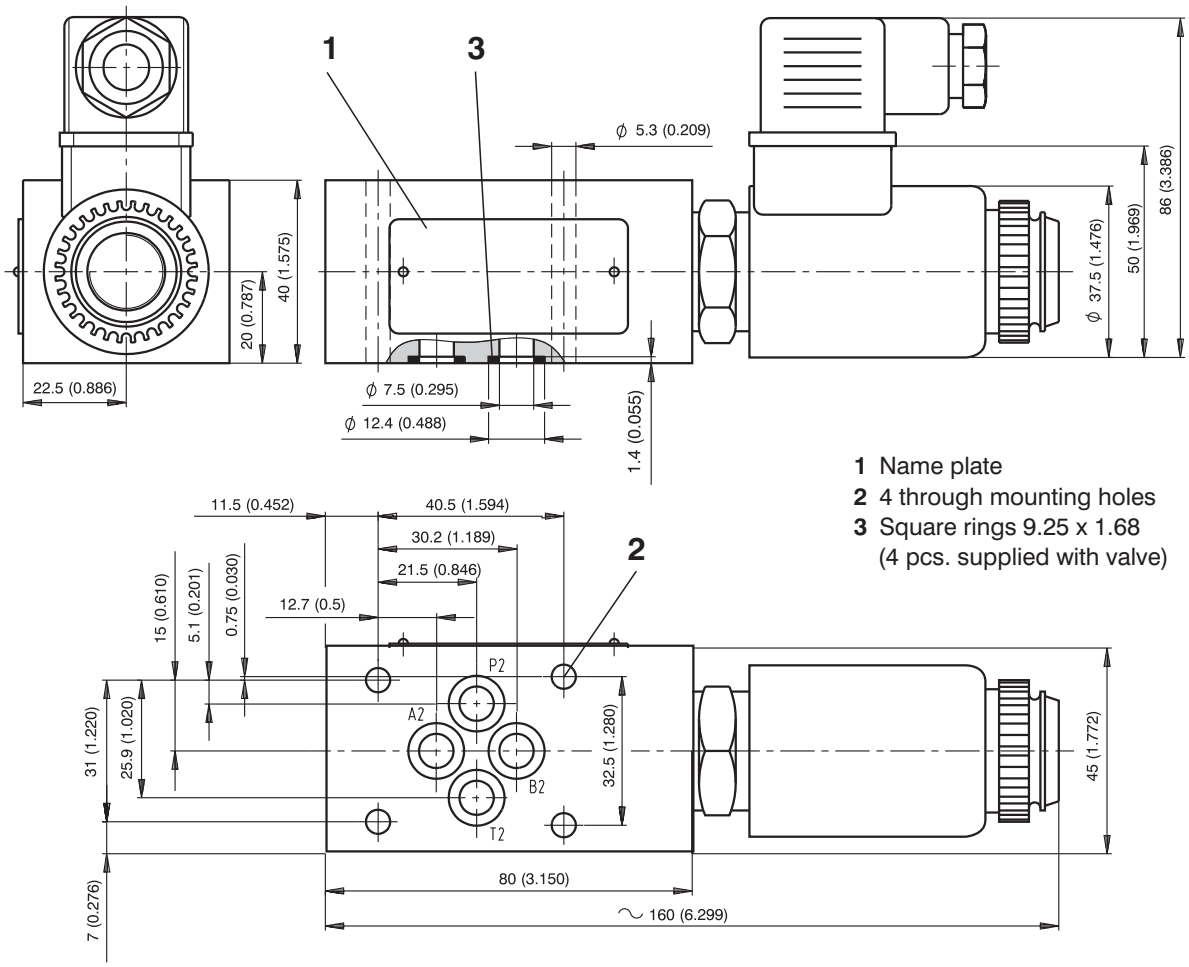
1 Name plate
2 4 through mounting holes
3 Square rings 9.25 x 1.68

Required surface finish of interface

Valve Dimensions

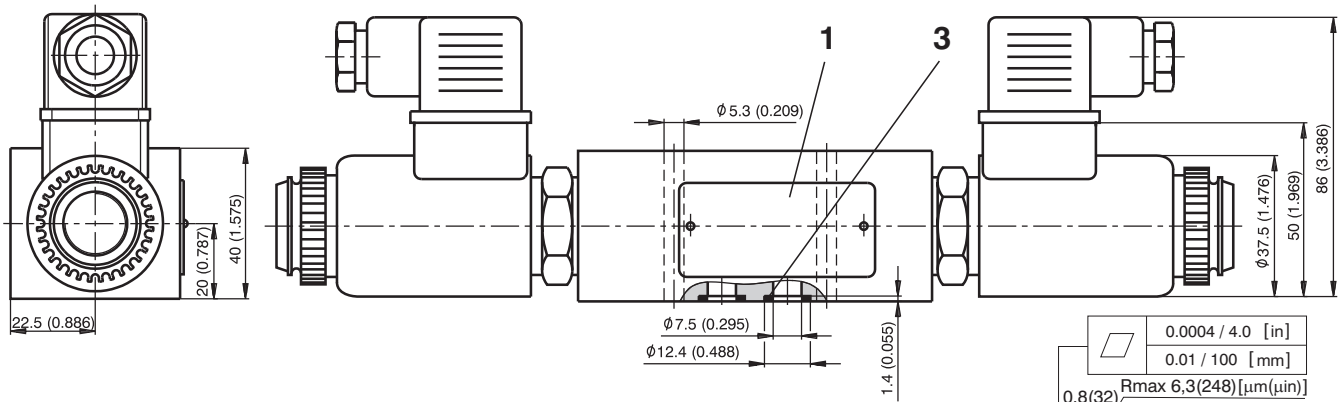
Dimensions in millimeters (inches)

Model MB, ME

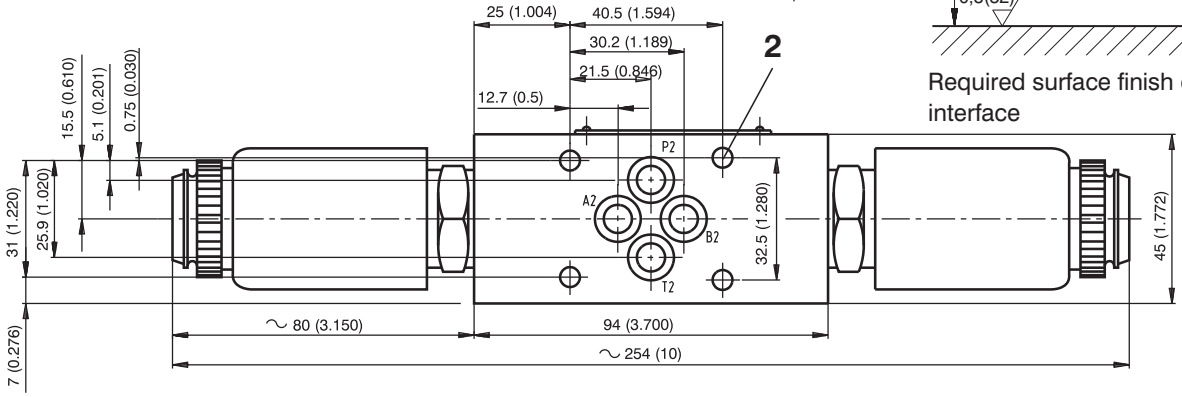


1 Name plate
2 4 through mounting holes
3 Square rings 9.25 x 1.68
(4 pcs. supplied with valve)

Model MC, MF



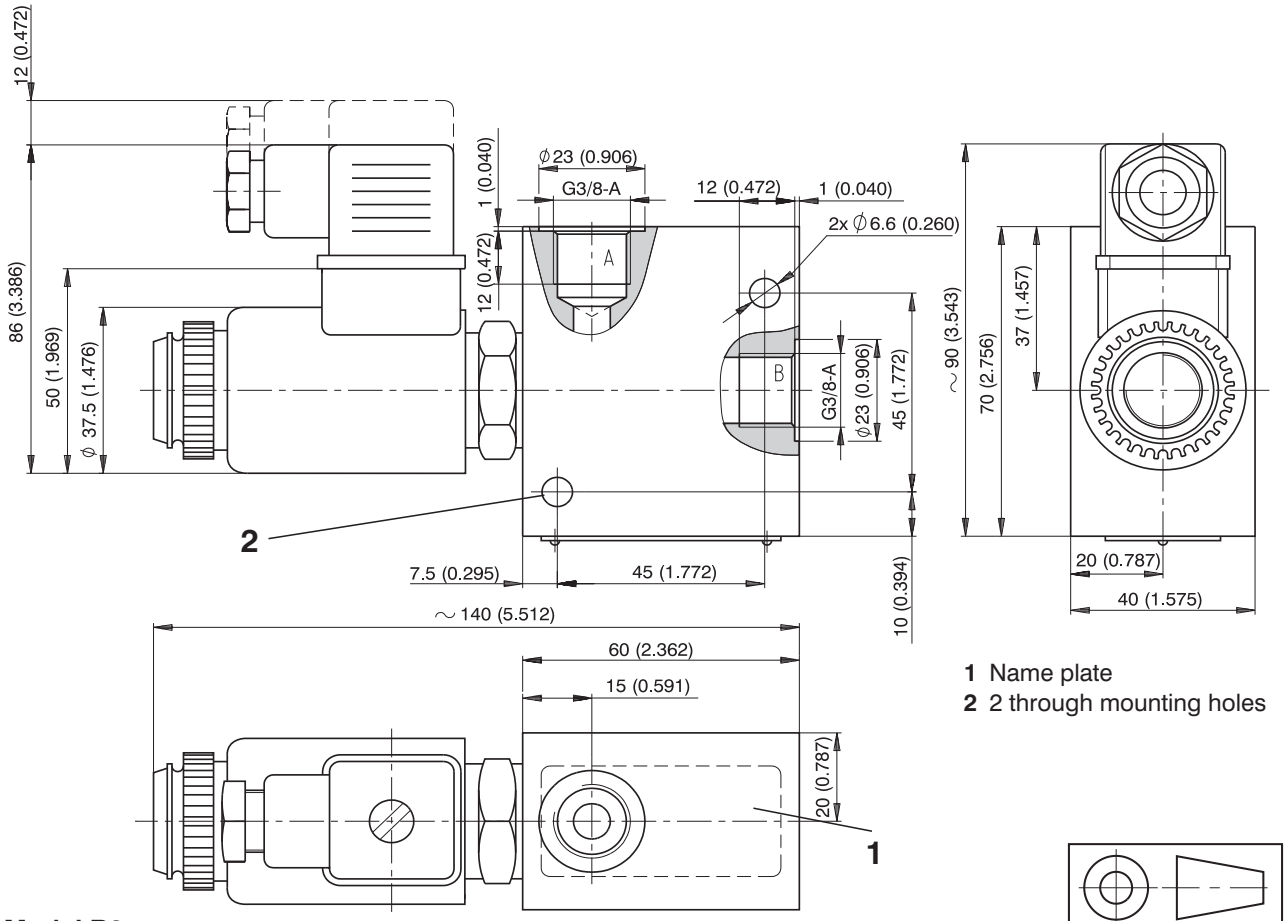
Required surface finish of interface



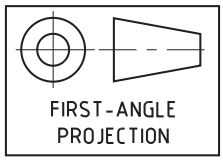
Valve Dimensions

Dimensions in millimeters (inches)

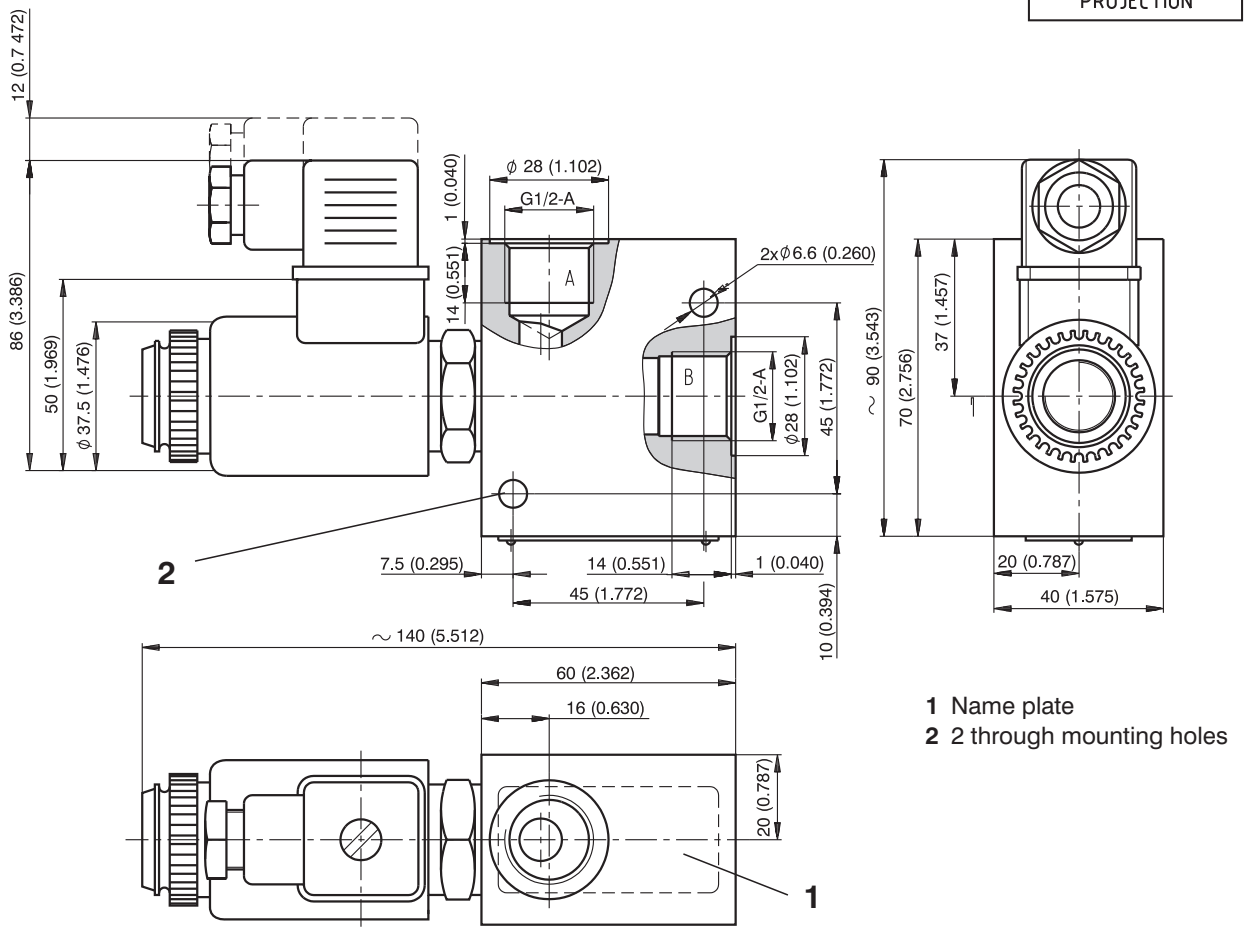
Model R1



1 Name plate
2 2 through mounting holes



Model R2

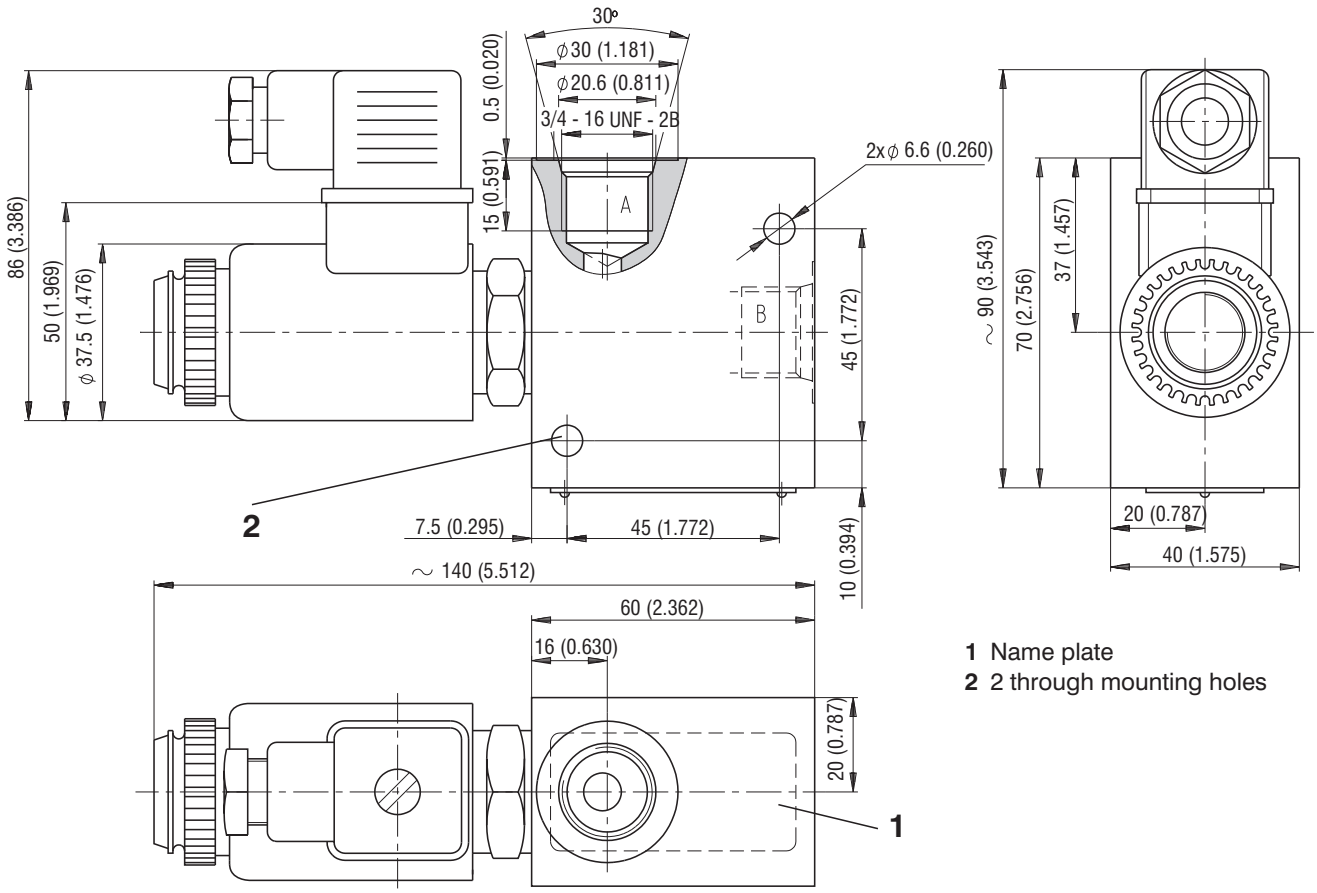


1 Name plate
2 2 through mounting holes

Valve Dimensions

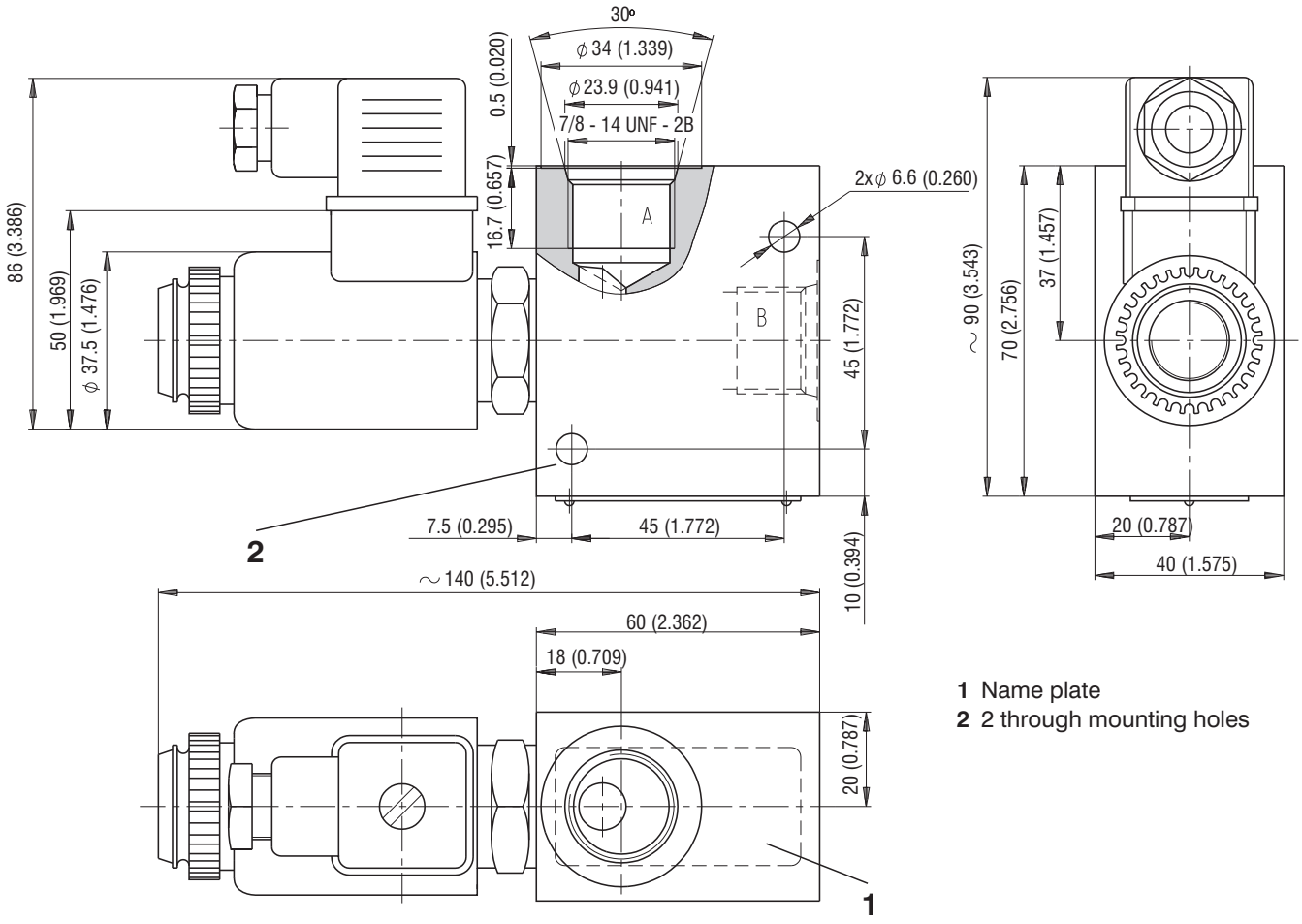
Dimensions in millimeters (inches)

Model R3



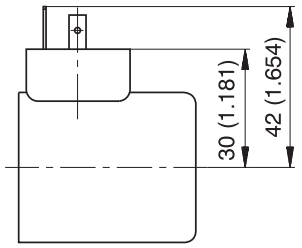
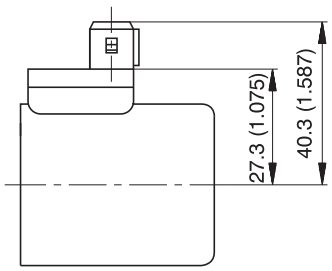
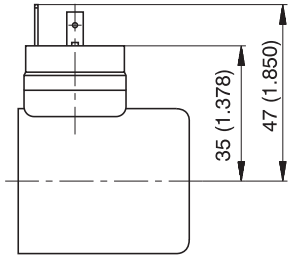
1 Name plate
2 2 through mounting holes

Model R4

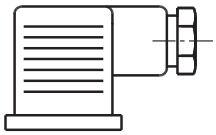


1 Name plate
2 2 through mounting holes

Type of the Solenoid Coil

Designation	Dimensional sketch	Description
E1		Solenoid coil with terminal for the electrical connector, EN 175301-803
E2		Solenoid coil with integrated quenching diode (bipolar transil diode) and terminal for the electrical connector, EN 175301-803
E3		Solenoid coil with terminal for AMP electrical connector.
E4		Solenoid coil with integrated quenching diode (bipolar transil diode) and terminal for AMP electrical connector.
E5		Solenoid coil with integrated rectifier and terminal for the electrical connector, EN 175301-803

Electrical Connector, EN 175301-803

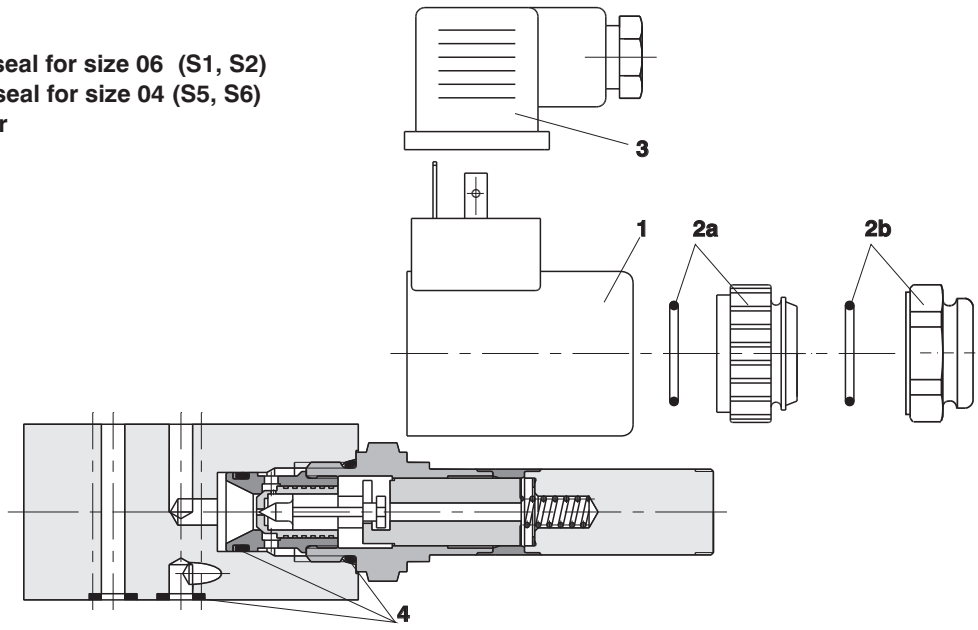
Designation	Type	Model	Max. input voltage	
K1	Connector B (black) Connector A (grey)	without rectifier - M16x1.5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC/DC	
K5	Connector B (black) Connector A (grey)	without rectifier - M16x1.5 bushing bore ∅ 4-6 mm (0.158 - 0.236 in)	230 V AC/DC	
K2	Connector B (black) Connector A (grey)	without rectifier with LED and quenching diode - M16x1.5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	12...24 V DC	
K3	Connector B (black) Connector A (grey)	with rectifier - M16x1.5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC	
K4	Connector B (black) Connector A (grey)	with rectifier with LED and quenching diode - M16x1.5 bushing bore ∅ 6-8 mm (0.236 - 0.315 in)	230 V AC	

Solenoid coil

Type designation of the coil voltage	Type of the coil				
	E1	E2	E3	E4	E5
	∅ 6-8 mm (0.236				
01200	27316600	27631400	27330200	27631600	
01400	27634100	27634200	27634300	27634400	
02400	27316700	27632400	27330300	27633200	
02700	27636100	27639400	27641600	27641700	
04800	27825500	-	-	-	
10600	27642600	-	-	-	
01200 CSA	24140700	-	-	-	
02400 CSA	24140800	-	-	-	
11550 CSA					24140900
23050 CSA					24141000

Spare Parts

1 Solenoid coil
2a Retaining nut with seal for size 06 (S1, S2)
2b Retaining nut with seal for size 04 (S5, S6)
3 Electrical connector
4 Seal kit



Solenoid retaining nut with seal

Type of the nut	Seal ring	Order number
Standard nut for size 06 (S1, S2)	18 x 1.5	17314100
Standard nut for size 04 (S5, S6)	18 x 1,5	15874500
Standard		

Electrical connector, EN 175301-803

Type	Connector A gray	Connector B black
	Order number	
K1	16202200	16202100
K5	16202600	16202500
K2	16202800	16202700
K3	16202400	16202300
K4	16203000	16202900

Seal kit

Type	Model	Dimensions, quantity	Order number
ROE3	O-ring - NBR 80	19.4 x 2.1 (1 pc.)	15650200
	O-ring - NBR 80	14 x 1.78 (1 pc.)	
	Back-up ring	14.73 x 17.43 x 1.14 (1 pc.)	
ROE3	O-ring - Viton	19.4 x 2.1 (1 pc.)	16954700
	O-ring - Viton	14 x 1.78 (1 pc.)	
	Back-up ring	14.73 x 17.43 x 1.14 (1 pc.)	
Subplate size 04 (D 02)	Square ring - NBR 70	7.65 x 1.68 (4 pcs.)	20718400
Subplate size 06 (D 03)	Square ring - NBR 70	9.25 x 1.68 (4 pcs.)	15650300
Subplate size 04 (D 02)	O-ring - Viton	7.65 x 1.68 (4 pcs.)	28618000
Subplate size 06 (D 03)	O-ring - Viton	9.25 x 1.68 (4 pcs.)	28608100

Caution

- The packing foil is recyclable.
- The protecting plate can be returned to the manufacturer.
- Mounting studs must be ordered separately. Tightening torques are 5 Nm (size 04) and 8.9 Nm (size 06).
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It
- should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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3/2 Way Solenoid Operated Directional Control Valves Spool Type

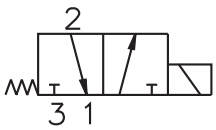
SD2E-A3

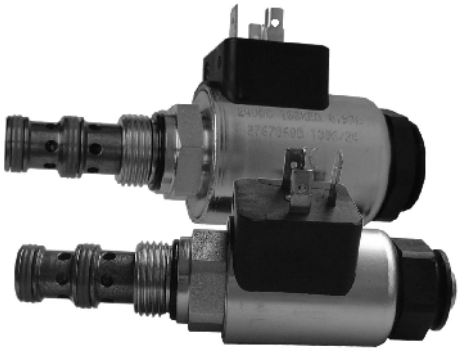
3/4-16 UNF • p_{max} 350 bar (5076 PSI) • Q_{max} 30 L/min (7.9 GPM)

HA 4041
07/2014

Replaces
HA 4041 11/2013

- ❑ **Hardened and precision working parts**
- ❑ **High flow capacity**
- ❑ **High transmitted hydraulic power**
- ❑ **Wide range of manual overrides available**
- ❑ **All ports may be fully pressurized**
- ❑ **Variety of optional spools connections available**
- ❑ **Coil interchangeability with all series SD*- A* valves**



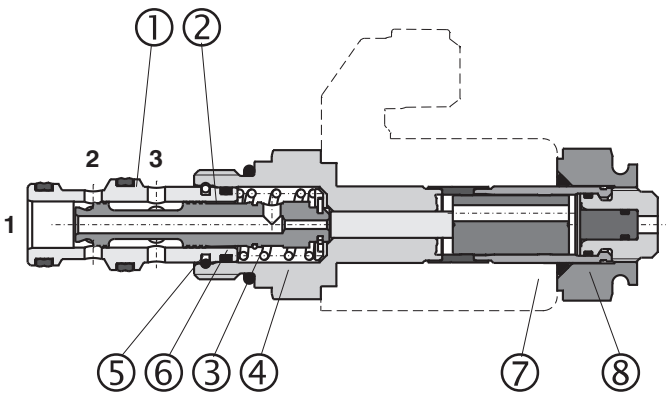


Functional Description

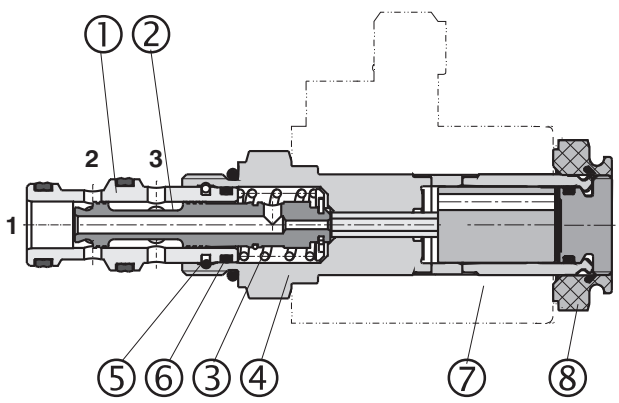
The directly operated 3/2 way solenoid actuated spool valve controls in the first line the start and stop function of the oil flow. The valve consists of the valve body (1), control spool (2), return spring (3), cartridge with actuating system (4) and of the solenoid coil (7) that is mounted on the actuating system. The valve bushing is screwed into the cartridge part (4).
The valve bushing is fixed in the cartridge by a wire ring (5) and sealed with the seal ring (6). Separation of the valve bushing and the cartridge prevent transmitting the stresses, which could be caused by too high tightening torques. The DC solenoid coils can be delivered for 12 V and 24 V supply voltages. For AC applications 120 V/ 60 Hz or 230 V/ 50 Hz, the suitable rectifiers for the Light line solenoid coils are available, with them being mounted in an additional terminal box. With the high power solenoid coils in AC variants, the rectifiers are integrated directly in the connector. By loosening the fixing nut (8), the solenoid coil can be replaced or turned in the range of 360°. The valve body is zinc coated.

Note:
The valves are supplied without solenoids coils. The solenoid coil, the terminal box and the housing body for line mounting have to be ordered separately.

Light line



High performance



Ordering Code

SD2E-A3 / □ □ □ □

3/2 Way Solenoid Operated Directional Control Valve

Light line **L**
High performance **H**

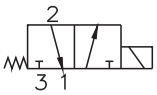
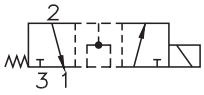
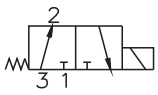
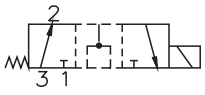
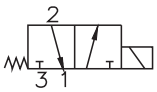
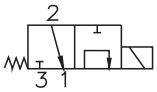
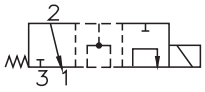
Description
Refer to the table with functional symbols

No designation **Seals**
V NBR
FPM (Viton)

No designation **Manual override**
M5 standard
M9 socket head screw
without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA0018.

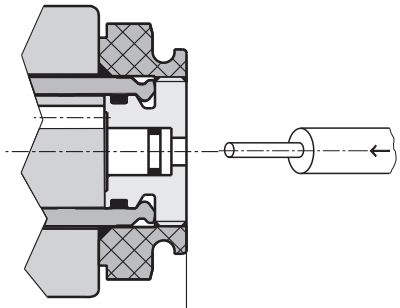
Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
2D21			**2D26**		
2D25			**2D31**		

Manual Override

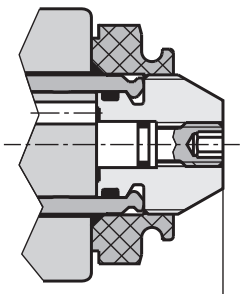
Dimensions in millimeters (inches)

No designation - standard



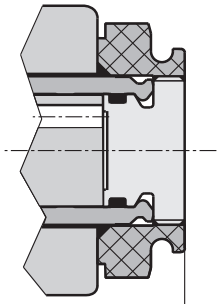
Light line ~70.2(2.63)
High performance ~70,0 (2.76)

Designation **M5** - with socket head 2.5 (0.098)



Light line ~77,2(3.04)
High performance ~77,5(3.05)

Designation **M9** - without manual override



Light line ~67,2 (2.65)
High performance ~70,0 (2.76)

Technical Data

		Light line	High performance
Cartridge thread		3/4-16 UNF-2B	
Maximum flow	L/min (GPM)	20 (5.3)	30 (7.9)
Max. operating pressure	bar (PSI)	250 (3626)	350 (5076)
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range	°C (°F)	-20 ... 60 (-4 ... 140)	-20 ... 80 (-4 ...176)
Ambient temperature, max.	°C (°F)	-20 ... 50 (-4 ...122)	-20 ... 80 (-4 ... 176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406 (2006)	
Coil groups [1]		C14B	C19B
Permissible rated voltage variation	%	AC,DC ±10	AC,DC ±15
Max. switching frequency	1/h	15 000	
Duty cycle	%	100	
Enclosure type to EN 60529 [1]		IP 67 (IP 65)	
Service life	cycles	10^7	
Valve tightening torque	Nm (lbf.ft)	30+2 (22.127+1.475)	
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.213+0.738)	3+1 (2.213+0.738)
Weight	kg(lbs)	0,15 (0.33)	0,20 (0.44)
Mounting position		unrestricted	

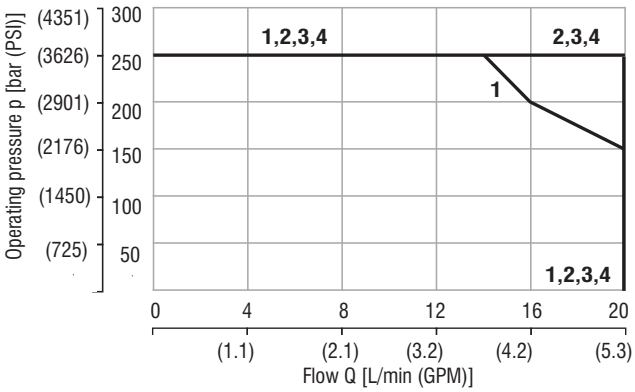
[1] see data sheet coils HA 8007

p-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

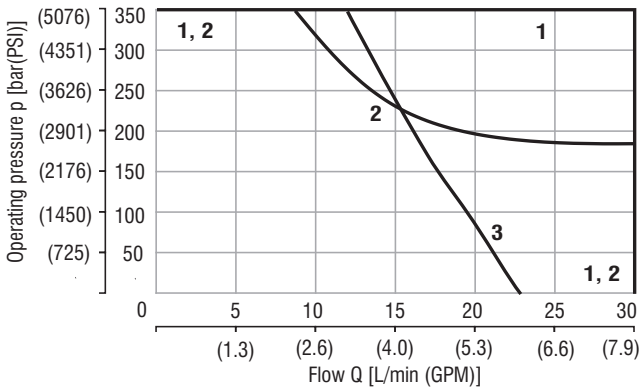
Operating limits for hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

Light line
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V] 24VDC



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

High performance
Öl 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V] 24VDC



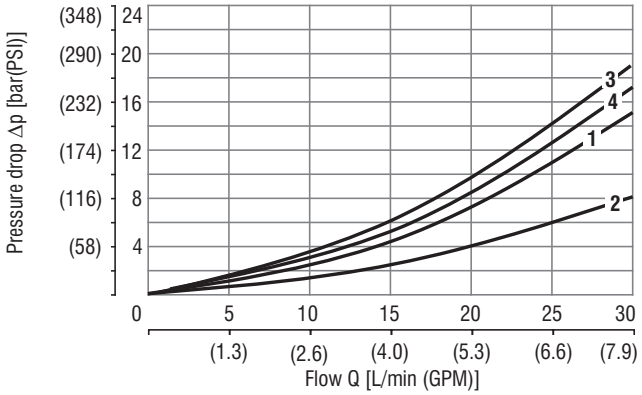
	Connection	Direction
1	2D21	3→2, 2→1
1	2D25	3→2, 2→1
1	2D31	3→1
2	2D26	3→2, 2→1
3	2D31	2→1

Δp-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Pressure drops related to flow rate.

Light line + High performance

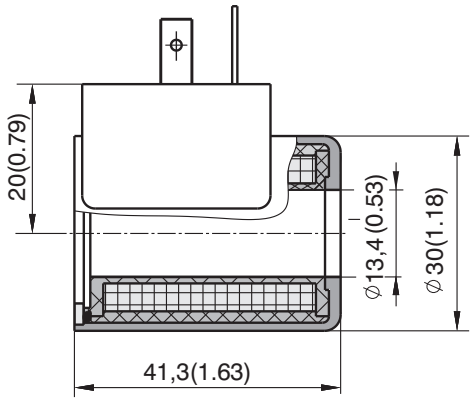


	Connection	Direction
1	2D21	3→2
1	2D25	3→2
1	2D31	2→1
2	2D21	2→1
3	2D26	3→2
4	2D25	2→1
4	2D26	2→1
4	2D31	3→1

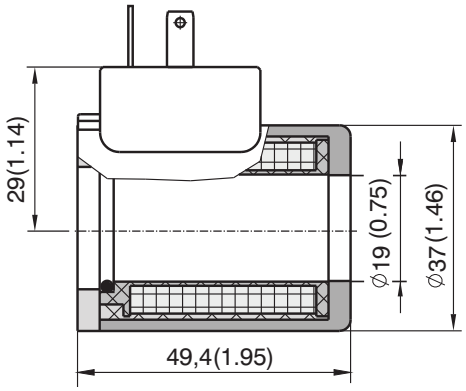
Type of the Solenoid Coils

Dimensions in millimeters (inches)

Coil for Light line
C14B



Coil for High performance
C19B



Note:
Example of most frequent coil types.
For complete range of SD2E-A3 valve coils with technical informatik about voltage, enclosure type, terminal box please offer to coil data sheet HA 8007.

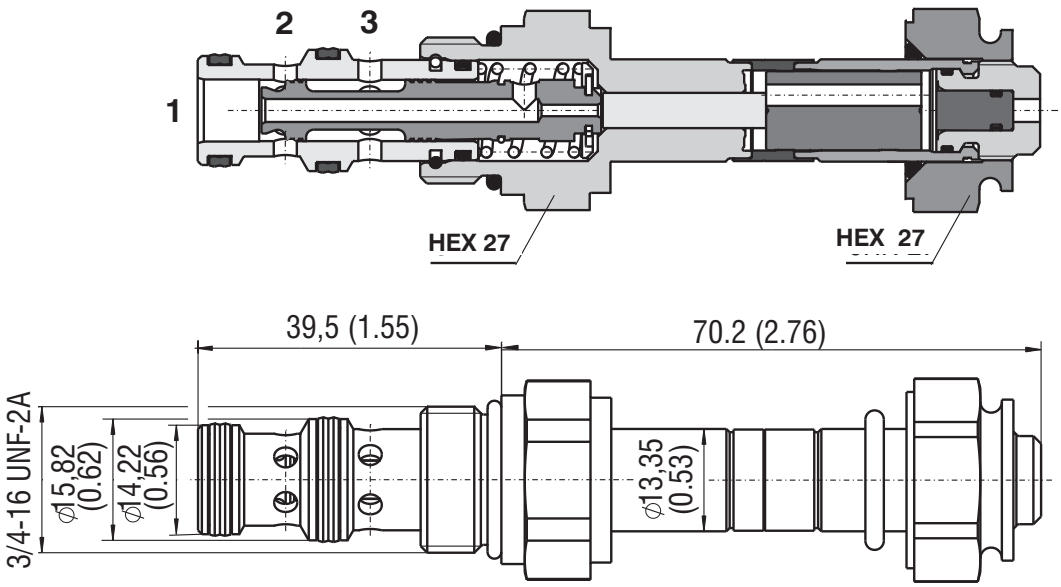
Solenoid	Connector	Light line	High performance
		SD2E-A3 / **L...**	SD2E-A3 / **H...**
		Type code	**Type code**
12 VDC	EN 175301-803-A	C14B-01200E1-6,55NA	C19B-01200E1-7,1NA
24 VDC	EN 175301-803-A	C14B-02400E1-26,2NA	C19B-02400E1-28,8NA
12 VDC	AMP-Junior-Timer	C14B-01200E3A-6,55NA	C19B-01200E3-7,1NA
24 VDC	AMP-Junior-Timer	C14B-02400E3A-26,2NA	C19B-02400E3-28,8NA
120 VAC	EN 175301-803-A with integrated rectifier	-	C19B-12060E5-527NA
230 VAC	EN 175301-803-A with integrated rectifier	-	C19B-23050E5-2065NA
120 VAC*	EN 175301-803-A (with rectifier)	C14B-10600E1-536NA	C19B-10600E1-527NA
230 VAC*	EN 175301-803-A (with rectifier)	C14B-20500E1-2476NA	C19B-20500E1-2065NA

*Use the terminal box with rectifier!

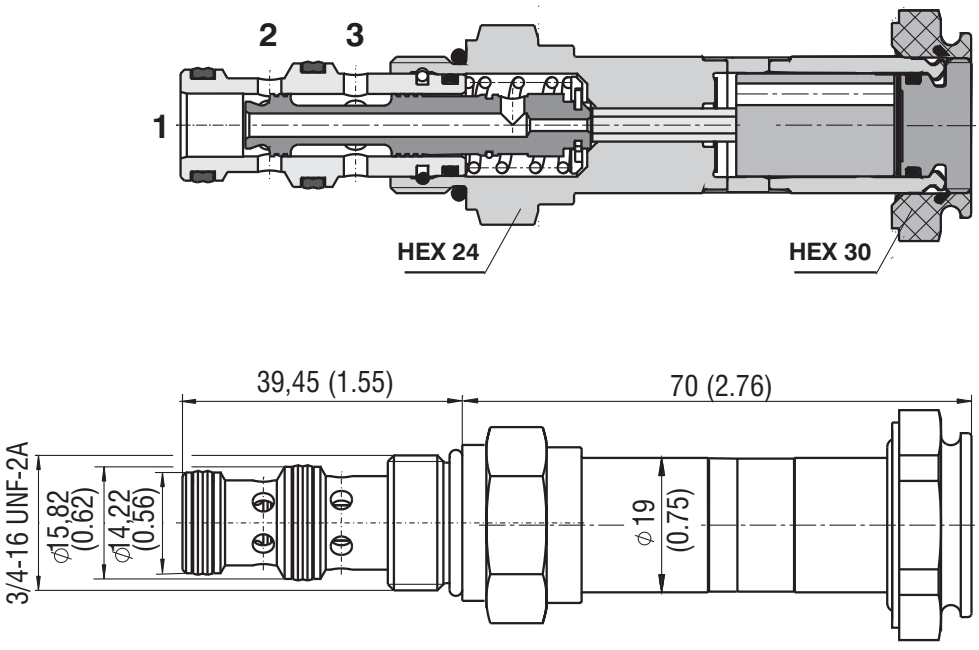
Valve Dimensions

Dimensions in millimeters (inches)

Light line

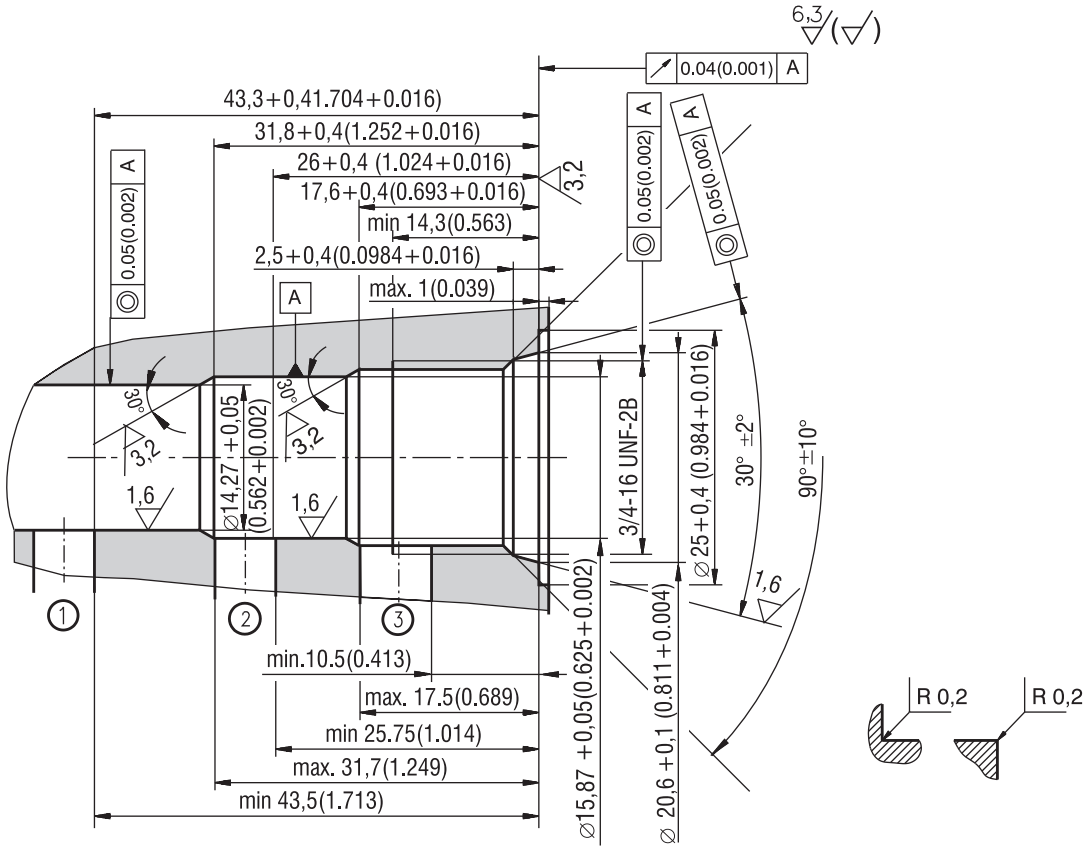


High performance



Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters

Light line and High performance

Dualseal - PU	O-ring - NBR	O-ring - Viton	Ordering number
11,87 x 14,27 x 3,1 (1pc.)	17 x 1,8 (1pc.)	-	15661700
13,4 x 15,87 x 3,1 (1pc.)			
11,87 x14,27 x 3,1 (1pc)	-	17,17 x 1,78 (1pc.)	20777200
13,4 x 15,87 x 3,1 (1pc.)			

Solenoid retaining nut with seal for Light line

Type of nut	O-ring - Viton	Ordering number
Standard nut	12,3 x 2,4 (1pc.)	20776900

Solenoid retaining nut with seal for High performance

Type of nut	O-ring - Viton	Ordering number
Standard nut	18 x1,5 (1pc.)	20777000

Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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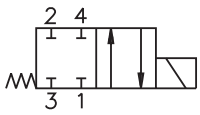
4/2 Way Solenoid Operated Directional Control Valves Spool Type

SD2E-A4

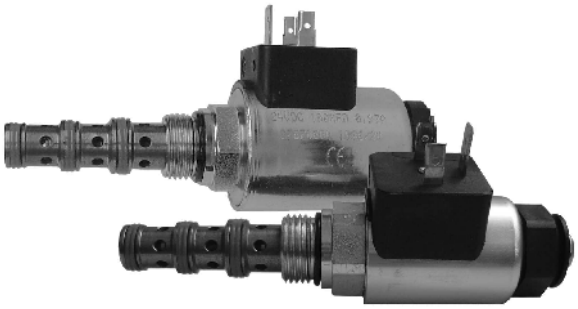
3/4-16 UNF • p_{max} 350 bar (5076 PSI) • Q_{max} 30 L/min (7.9 GPM)

HA 4042
07/2014

Replaces
HA 4042 10/2013



- ❑ **Hardened precision working parts**
- ❑ **High flow capacity**
- ❑ **High transmitted hydraulic power**
- ❑ **Wide range of manual overrides available**
- ❑ **All ports may be fully pressurized**
- ❑ **Variety of optional spools connections available**
- ❑ **Coil interchangeability with all series SD*- A* valves**

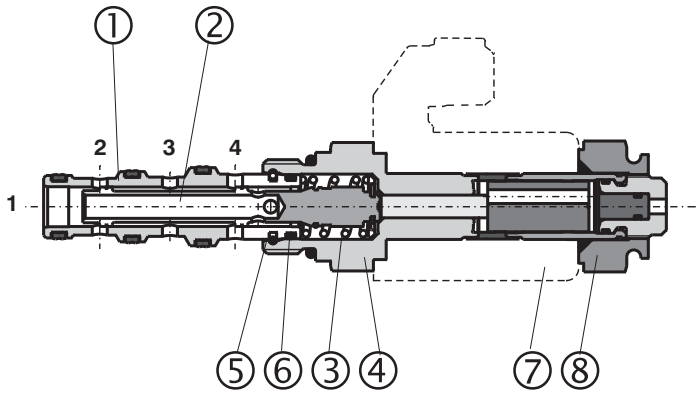


Functional Description

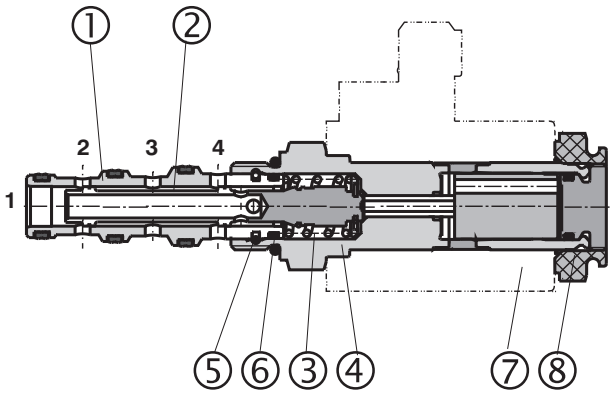
The directly operated 4/2 way solenoid actuated spool valve controls in the first line the start and stop function of the oil flow. The valve consists of the valve body (1), control spool (2), return spring (3), cartridge with actuating system (4) and of the solenoid coil (7) that is mounted on the actuating system. The valve bushing is screwed into the cartridge part (4).
The valve bushing is fixed in the cartridge by a wire ring (5) and sealed with the seal ring (6). Separation of the valve bushing and the cartridge prevent transmitting the stresses, which could be caused by too high tightening torques. The DC solenoid coils can be delivered for 12 V and 24 V supply voltages. For AC applications 120 V/ 60 Hz or 230 V/ 50 Hz, the suitable rectifiers for the Light line solenoid coils are available, with them being mounted in an additional terminal box. With the high power solenoid coils in AC variants, the rectifiers are integrated directly in the connector. By loosening the fixing nut (8), the solenoid coil can be replaced or turned in the range of 360°. The valve body is zinc coated.

Note:
The valves are supplied without solenoids coils. The solenoid coil, the terminal box and the housing body for line mounting have to be ordered separately.

Light line



High performance



Ordering Code

SD2E-A4 / □ □ □ □

4/2 Way Solenoid Operated Directional Control Valve

Light line **L**
High Performance **H**

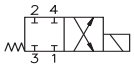
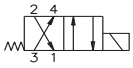
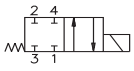
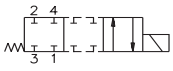
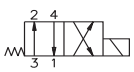
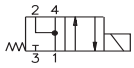
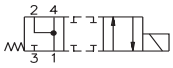
Description
Refer to the table with functional symbols

No designation — **Seals**
V — NBR
FPM (Viton)

No designation — **Manual override**
M5 — standard
M9 — socket head screw
without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA0018.

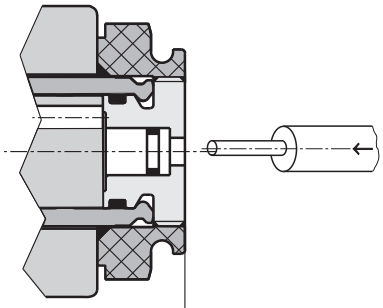
Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
2Z51			2X21		
2Z11			2R21		
2Y11			* only for High Performance		

Manual Override

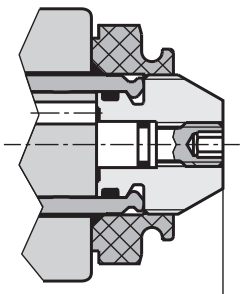
Dimensions in millimeters (inches)

No designation - standard



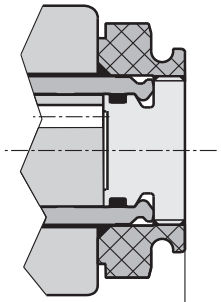
Light line ~70,2 (2.63)
High performance ~70,0 (2.76)

Designation **M5** - with socket head screw 2.5 (0.098)



Light line ~77,2(3,04)
High performance ~77,5(3.05)

Designation **M9** - without manual override



Light line ~67,2(2.65)
High performance ~70,0(2.76)

Technical Data

		Light line	High performance
Cartridge thread		3/4-16 UNF- 2B	
Maximum flow	L/min (GPM)	20 (5.3)	30 (7.9)
Max. operating pressure	bar (PSI)	250 (3625)	350 (5076)
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Coil groups [1]		C14B	C19B
Fluid temperature range	°C (°F)	-20 ... 60 (-4 ... 140)	-20 ... 80 (-4 ... 176)
Ambient temperature, max.	°C (°F)	-20 ... 50 (-4 ...122)	-20 ... 80 (-4 ... 176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406 (2006).	
Permissible rated voltage variation	%	AC,DC ±10	AC,DC ±15
Max. switching frequency	1/h	15 000	
Duty cycle	%	100	
Enclosure type to EN 60529 [1]		IP 67 (IP 65)	
Service life	cycles	10^7	
Weight	kg (lbs)	0,18 (0.40)	0,23 (0.51)
Valve tightening torque	Nm (lbf.ft)	30+2 (22.127+1.475)	
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.213+0.738)	3+1 (2.213+0.738)
Mounting position		unrestricted	

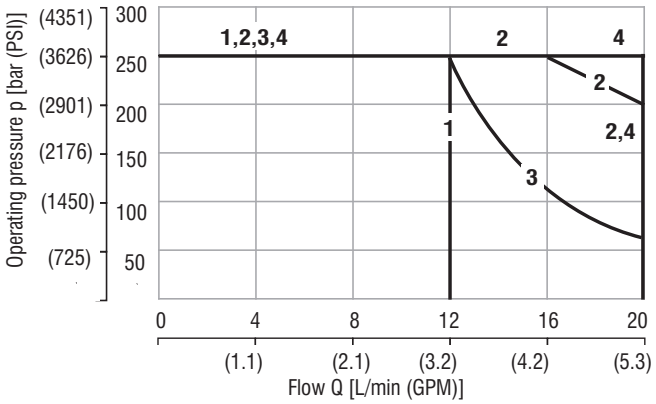
[1] see data sheet coils HA 8007

p-Q Characteristics

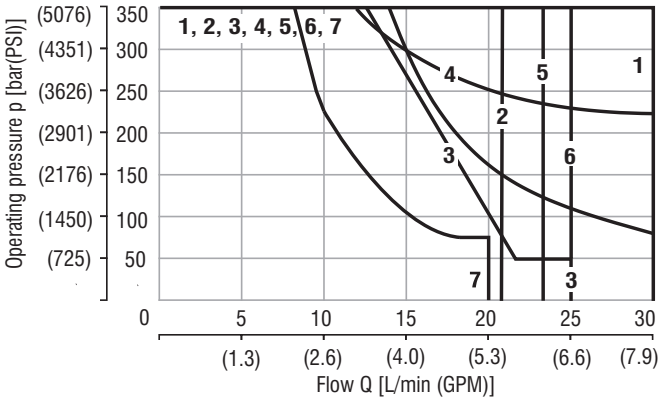
Measured at ν = $32mm^2/s$ (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

Light line
Oil 60 °C (140 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un-10% [V] 24VDC



High performance
Oil 80 °C (176 °F) / Ambient temperature 50 °C(122 °F)
Voltage Un-10% [V] 24VDC



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

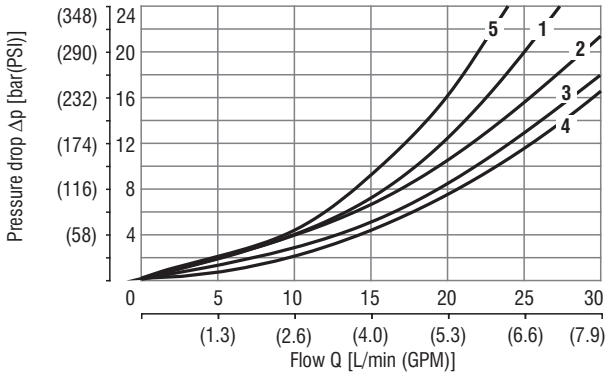
	Connection	Direction
1	2Z51	3→4, 2→1
2	2Z11	3→2, 4→1
3	2R21	3→2, 4→1
4	2X21	3→4, 2→1
5	2X21	3→2, 4→1
1	2R21	3→4, 2→1
6	2Y11	3→2, 4→1
7	2C51	3→1

Δp-Q Characteristics

Measured at ν = 32mm^2 /s (156 SUS)

Pressure drops related to flow rate.

Light line + High performance

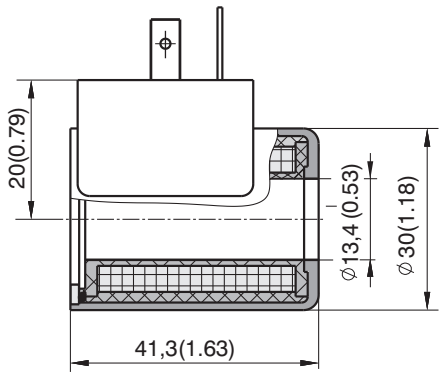


	Connection	Direction
1	2Z11	4→1
1	2R21	2→1
2	2Z11	3→2
2	2Z51	2→1
2	2X21	3→4, 4→1
2	2R21	3→2
3	2Z51	3→4
3	2R21	3→4
3	2Y11	3→2, 4→1
4	2X21	3→2, 2→1
4	2C51	3→2, 4→1
5	2R21	4→1
5	2C51	3→1

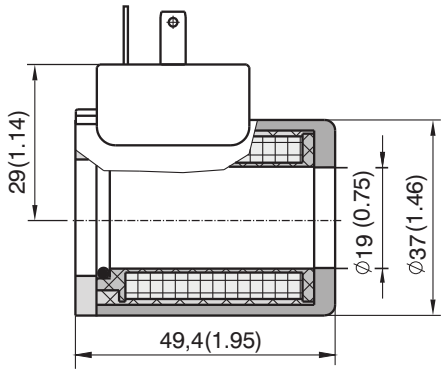
Type of the Solenoid Coils

Dimensions in millimeters (inches)

Coil for Light line
C14B



Coil for High performance
C19B



Note:
Example of most frequent coil types.
For complete range of SD2E-A4 valve coils with technical informatik about voltage, enclosure type, terminal box please afer to coil data sheet HA 8007.

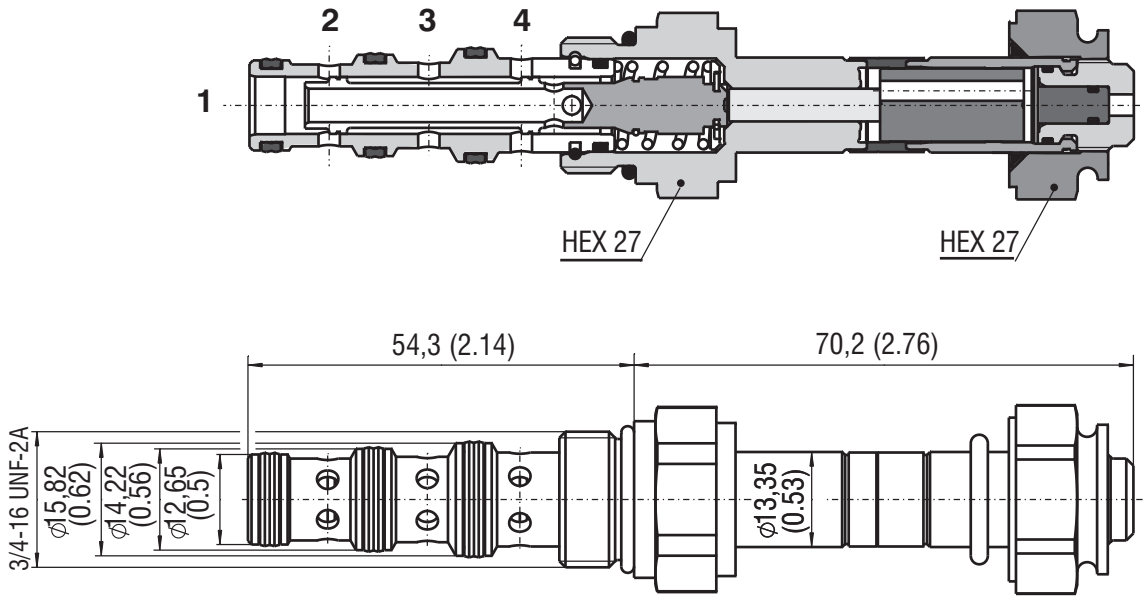
Solenoid	Connector	Light line	High performance
		SD2E-A4 / **L...**	SD2E-A4 / **H...**
		Type code	**Type code**
12 VDC	EN 175301-803-A	C14B-01200E1-6,55NA	C19B-01200E1-7,1NA
24 VDC	EN 175301-803-A	C14B-02400E1-26,2NA	C19B-02400E1-28,8NA
12 VDC	AMP-Junior-Timer	C14B-01200E3A-6,55NA	C19B-01200E3-7,16NA
24 VDC	AMP-Junior-Timer	C14B-02400E3A-26,2NA	C19B-02400E3-28,8NA
120 VAC	EN 175301-803-A with integrated rectifier	-	C19B-12060E5-527NA
230 VAC	EN 175301-803-A with integrated rectifier	-	C19B-23050E5-2065NA
120 VAC*	EN 175301-803-A (with rectifier)	C14B-10600E1-536NA	C19B-10600E1-527NA
230 VAC*	EN 175301-803-A (with rectifier)	C14B-20500E1-2476NA	C19B-20500E1-2065NA

*Use the terminal box with rectifier!

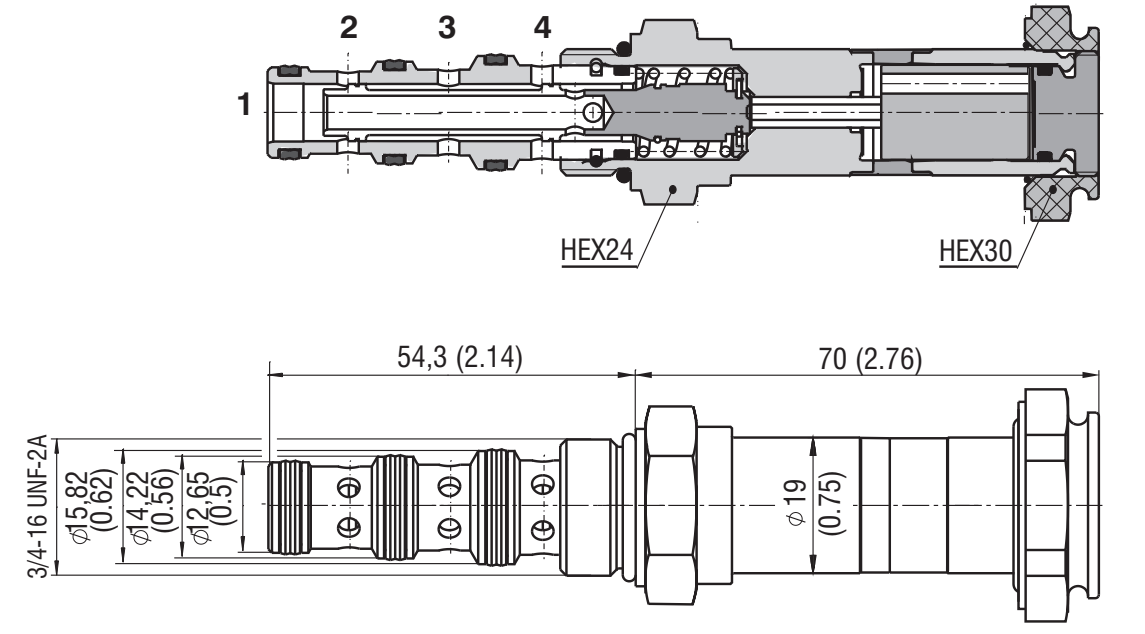
Valve Dimensions

Dimensions in millimeters (inches)

Light line

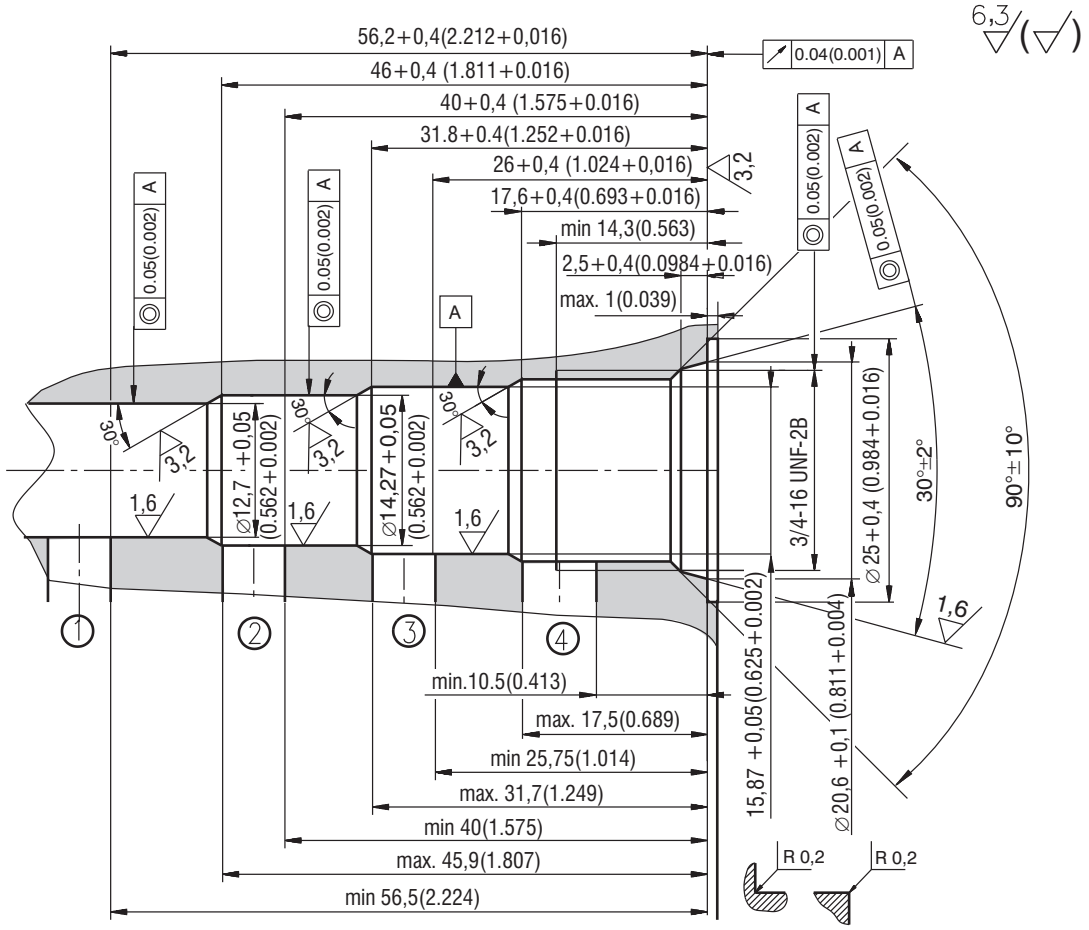


High performance



Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters

Light line and high performance

Dualseal - PU	O-ring - NBR	O-ring - Viton	Ordering number
10,3 x 12,7 x 3,1 (1pc.)	17 x 1,8 (1pc.)	-	20777300
11,87 x 14,27 x 3,1 (1pc.)			
13,4 x 15,87 x 3,1 (1pc.)			
10,3 x 12,7 x 3,1 (1pc.)	-	17,17 x 1,78 (1pc.)	20777400
11,87 x 14,27 x 3,1 (1pc.)			
13,4 x 15,87 x 3,1 (1pc.)			

Solenoid retaining nut with seal for Light line

Type of nut	O-ring - Viton	Ordering number
Standard nut	12,3 x 2,4 (1pc.)	20776900

Solenoid retaining nut with seal for High performance

Type of nut	O-ring - Viton	Ordering number
Standard nut	20 x 2,5 (1pc.)	20777000

Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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2/2 Way Solenoid Operated Directional Control Valves Spool Type

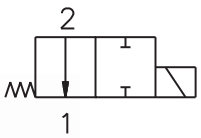
SD2E-B2

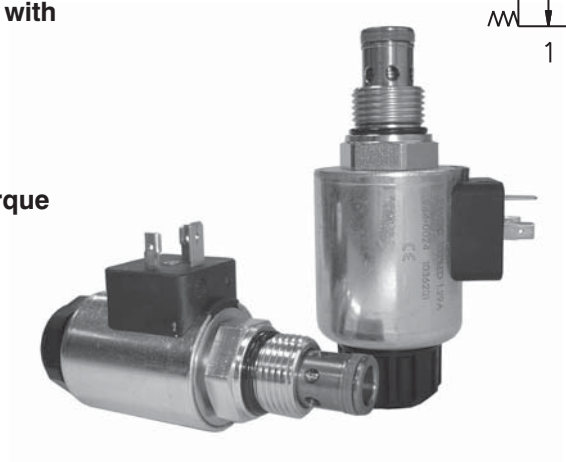
7/8-14 UNF • p_{max} 350 bar(5076 PSI) • Q_{max} 60 L/min(15.85 GPM)

HA 4060
7/2012

Replaces
HA 4060 9/2010

- ❑ **2/2 way cartridge valves solenoid operated with spool direction**
- ❑ **Manual override**
- ❑ **No spool sticking by too high tightening torque**
- ❑ **High transmitted power**





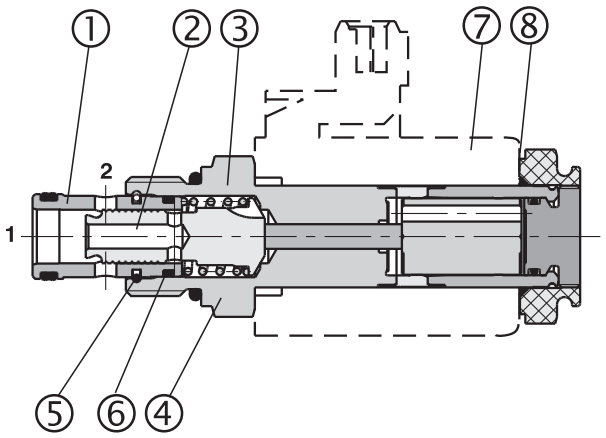
Functional Description

The directly operated 2/2 way solenoid actuated spool valve controls in the first line the start and stop function of the oil flow. The valve consists of the valve body (1), control spool (2), return spring (3), cartridge with actuating system (4) and of the solenoid coil (7) that is mounted on the actuating system. The valve bushing is screwed into the cartridge part (4).
The valve bushing is fixed in the cartridge by a wire ring (5) and sealed with the seal ring (6). Separation of the valve bushing and the cartridge prevent transmitting the stresses, which could be caused by too high tightening torques. The DC solenoid coils can be delivered for 12 V and 24 V supply voltages.

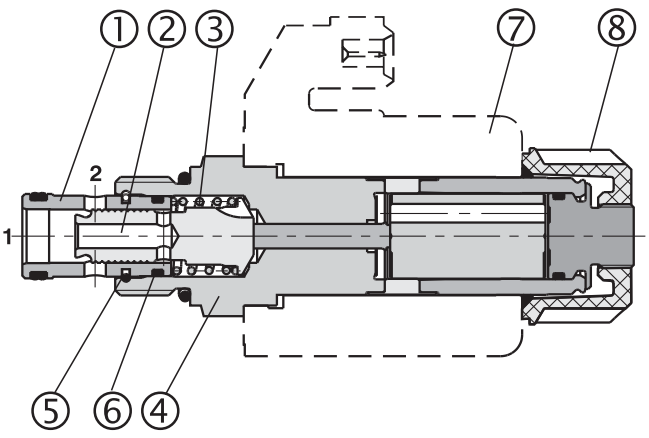
For the alternating current supply, either of 120V/60Hz or 230V/50Hz voltage, the relevant rectifiers for the C19 coil types are available in the auxiliary connector. For the C22 coil types and AC voltage design, the rectifiers are integrated directly into the connector base. By loosening the fixing nut (8), the solenoid coil can be replaced or turned in the range of 360°. The valve body is zinc coated.

Note:
The valves are supplied without solenoids coils. The solenoid coil, the terminal box and the housing body for line mounting have to be ordered separately.

Standard performance



High performance



Ordering Code

SD2E-B2 / □ □ □ □

2/2 Way Solenoid Operated Directional Control Valve Spool 7/8-14 UNF

Standard	**S**
High performance	**H**

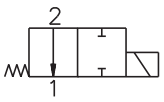
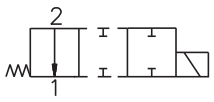
Description
Refer to the table with functional symbols

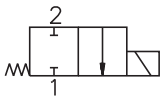
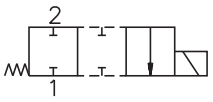
	Seals
No designation	NBR
V	FPM (Viton)

	Manual override
No designation	standard
M2	covered with rubber bootn
M5	socket head screw
M9	without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA 0018.

Functional Symbols

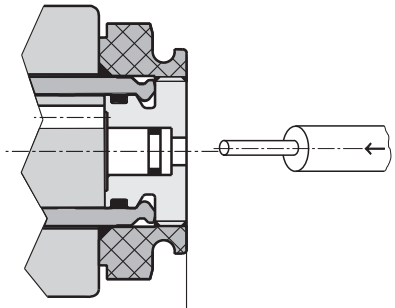
Designation	Symbol	Interposition
2111		

Designation	Symbol	Interposition
2112		

Manual Override

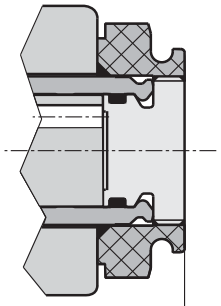
Dimensions in millimeters (inches)

No designation - standard



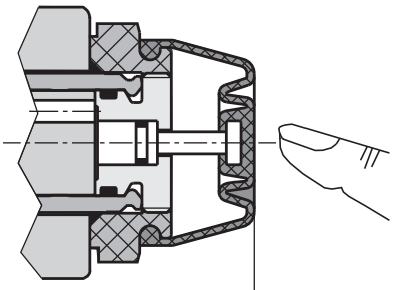
Standard valve~70,5 (2.776)
High performance valve~83,0 (3.268)

Designation **M9 -** without manual override



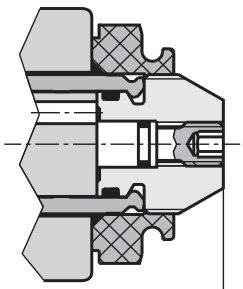
Standard valve~70,5 (2.776)
High performance valve~83,0 (3.268)

Designation **M2 -** covered with rubber boot



Standard valve ~82,0 (3.228)
High performance valve ~100,0 (3.937)

Designation **M5 -** with socket head screw 2.5 (0.098)



Standard valve ~78,0 (3.071)
High performance valve ~84,8 (3.339)

Technical Data

		Standard	High performance
Valve size		B2	
Cartridge cavity		7/8-14 UNF-2A	
Maximum flow	L/min (GPM)	50 (13.21)	60 (15.85)
Max. operating pressure	bar (PSI)	250 (3626)	350 (5076)
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Coil groups [1)]		C19B	C22B
Fluid temperature range	°C (°F)	-20 ... +80 (-4 ...+176)	-20 ... +80 (-4 ...+176)
Ambient temperature, max.	°C (°F)	-20 ... +50 (-4 .. +122)	-20 ... +80 (-4 ... +176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406	
Permissible rated voltage variation	%	AC,DC ±10	AC,DC ±15
Max. switching frequency	1/ h	15 000	
Duty cycle	%	100	
Enclosure type to EN 60529 [1)]		IP 67 (IP 65)	
Service life	cycles	10^7	
Valve tightening torque	Nm (lbf.ft)	35+5 (25.81+3.68)	
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.21+0.74)	3+1 (2.21+0.74)
Weight	kg(lbs)	0,22 (0.49)	0,29 (0.64)
Mounting position		unrestricted	
Valve body (data sheet HA 0018)		SB-B2	

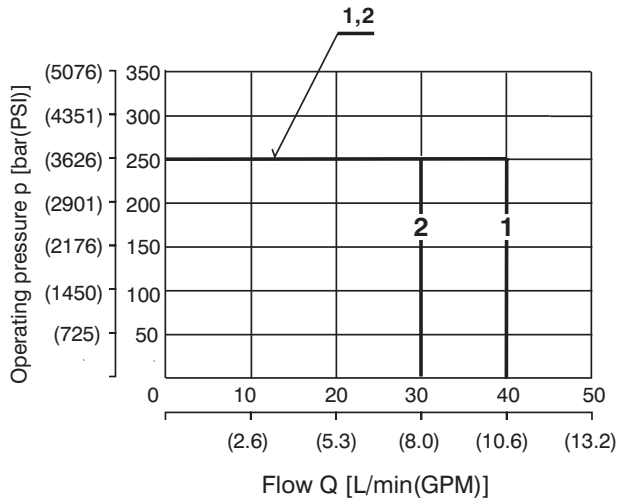
[1)] see data sheet coils HA 8007

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

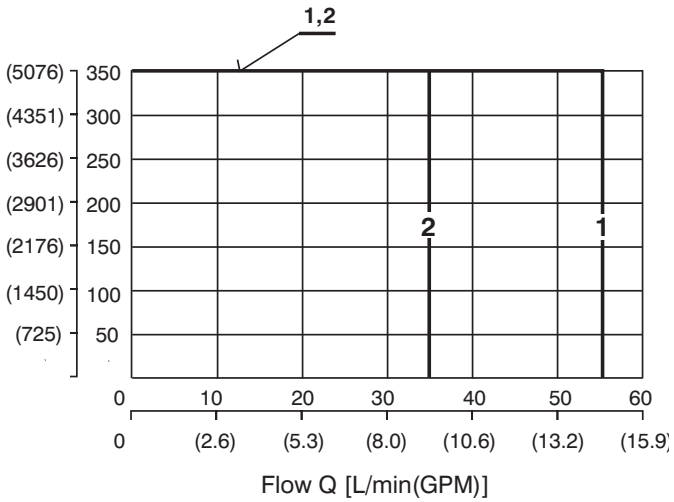
Operating limits for hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

Standard valve
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V], 24V



	Connection	Direction
1	2I11	2→1
2	2I12	2→1

High performance valve
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V], 24V



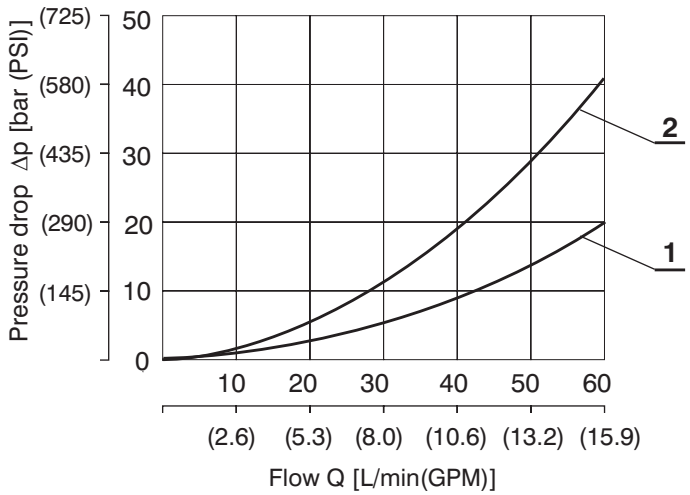
	Connection	Direction
1	2I11	2→1
2	2I12	2→1

Δp-Q Characteristics

Measured at ν = 32 mm²/ s (156 SUS)

Pressure drops Δp related to flow rate

Standard valve + High performance valve

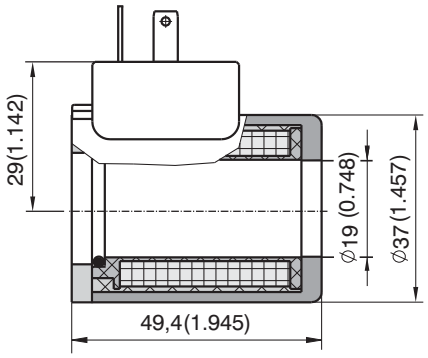


	Connection	Direction
1	2I11	1→2
1	2I11	2→1
2	2I12	1→2
2	2I12	2→1

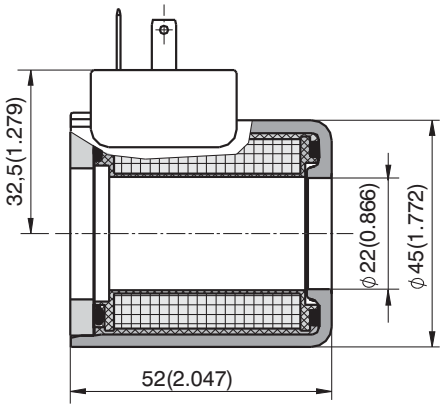
Type of the Solenoid Coils

Dimensions in millimeters (inches)

Coil for Standard valve
C19B



Coil for High performance valve
C22B



Note:
Example of most frequent coil types.
For complete range of SD2E-B2 valve coils with technical informatik about voltage, enclosure type, terminal box please afer to coil data sheet HA 8007.

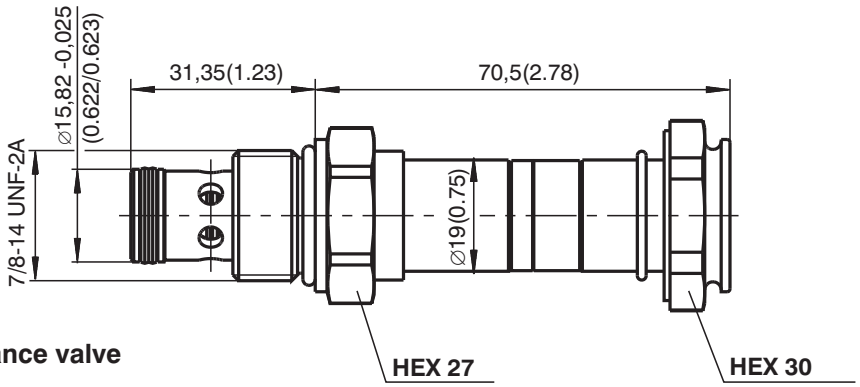
Solenoid	Connector	Standard valve SD2E-B2 / **S**... Type code	High performance valve SD2E-B2 / **H**... Type code
12 VDC	EN 175301-803-A	C19B-01200E1-6NA	C22B-01200E1-6,55NA
24 VDC	EN 175301-803-A	C19B-02400E1-25,75NA	C22B-02400E1-25,3NA
12 VDC	AMP-Junior-Timer (2-pins)	C19B-01200E3-6NA	C22B-01200E3A-6,55NA
24 VDC	AMP-Junior-Timer (2-pins)	C19B-02400E3-25,75NA	C22B-02400E3A-25,3NA
12 VDC	Flying leads**	C19B-01200E8N300-6NA	C22B-01200E8N300-6,55NA
24 VDC	Flying leads**	C19B-02400E8N300-25,75NA	C22B-02400E8N300-25,3NA
12 VDC	Deutsch DT04-2P	---	C22B-01200E12-6,55NA
24 VDC	Deutsch DT04-2P	---	C22B-02400E12-25,3NA
120 VAC	EN 175301-803-A	C19B-10600E1-494NA*	C22B-10600E1-545NA*
230 VAC	EN 175301-803-A	C19B-20500E1-1653NA*	C22B-20500E1-2353NA*
120 VAC	EN 175301-803-A (with rectifier)	C19B-12060E5-494NA	C22B-12060E5-545NA
230 VAC	EN 175301-803-A (with rectifier)	C19B-23050E5-1653NA	C22B-23050E5-2353NA

*Use the terminal box with rectifier!
**Standard length of connecting wire is 300 mm, other lengths on request.

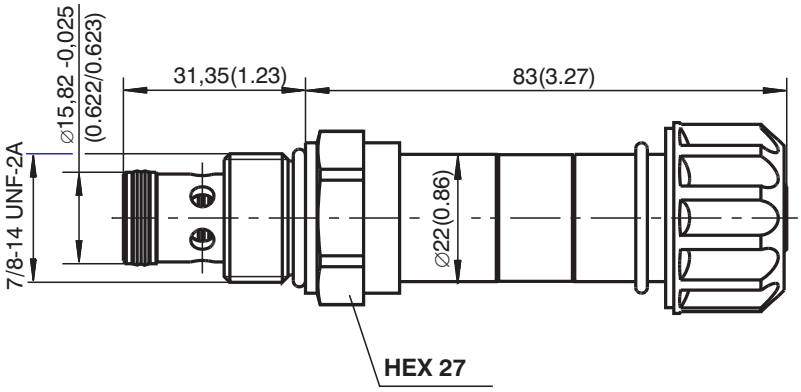
Valve Dimensions

Dimensions in millimeters (inches)

Standard valve

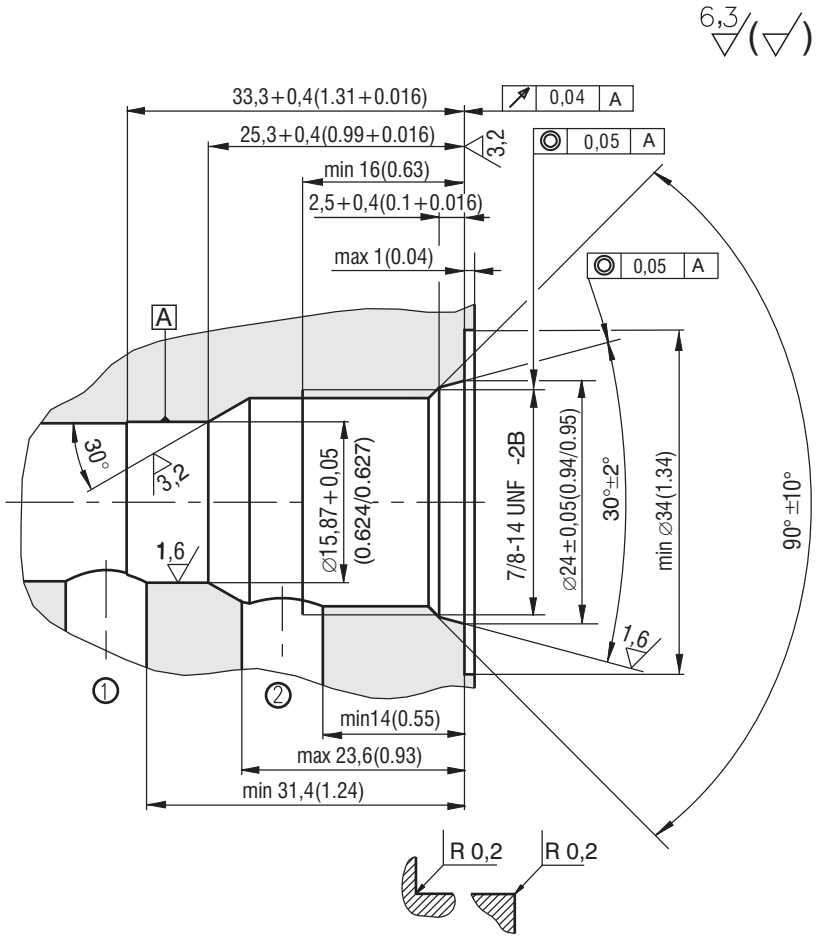


High performance valve



Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters

Standard and high performance valve

Dualseal - PU	O-ring - NBR	O-ring - Viton	Ordering number
13,47 x 15,87 x 3,1 (1pc.)	19,4 x 2,1 (1pc.)	-	18960400
13,47 x 15,87 x 3,1 (1pc.)	-	19,4 x 2,1 (1pc.)	18960500

Solenoid retaining nut with seal for standard valve

Type of nut	O-ring - Viton	Ordering number
Standard nut	18 x1,5 (1pc.)	20777000
Nut M2	18 x1,5 (1pc.)	20777600

Solenoid retaining nut with seal for high performance valve

Type of nut	O-ring - Viton	Ordering number
Standard nut	22 x 2 (1pc.)	15844600
Nut M2	22 x 2 (1pc.)	18961700

Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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3/2 Way Solenoid Operated Directional Control Valves Spool Type

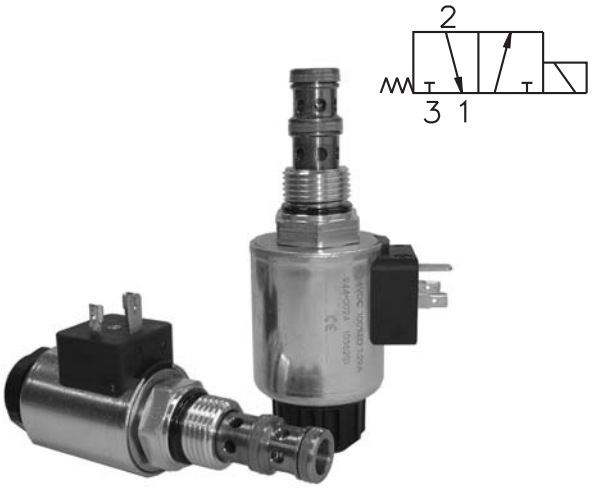
SD2E-B3

7/8-14 UNF • p_{max} 350 bar (5076 PSI) • Q_{max} 60 L/min (15.8 GPM)

HA 4061
7/2012

Replaces
HA 4061 9/2010

- ❑ **3/2 way cartridge valves solenoid operated with spool direction**
- ❑ **Manual override**
- ❑ **No spool sticking by too high tightening torque**
- ❑ **High transmitted power**



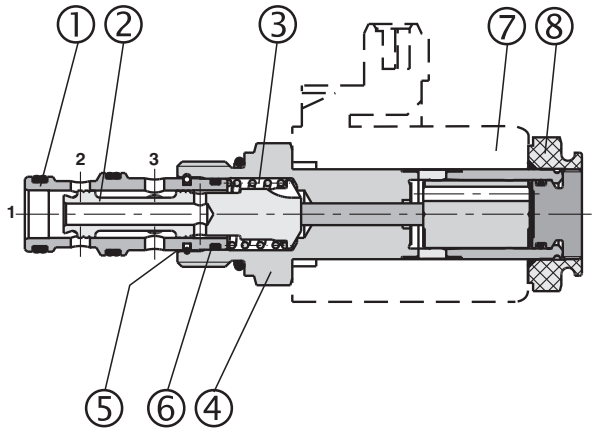
Functional Description

The directly operated 3/2 way solenoid actuated spool valve controls in the first line the start and stop function of the oil flow. The valve consists of the valve body (1), control spool (2), return spring (3), cartridge with actuating system (4) and of the solenoid coil (7) that is mounted on the actuating system. The valve bushing is screwed into the cartridge part (4).
The valve bushing is fixed in the cartridge by means of the wire ring (5) and sealed with the seal ring (6). Separation of the valve bushing and the cartridge prevent transmitting the stresses, which could be caused by too high tightening torques. The DC solenoid coils can be delivered for 12 V and 24 V supply voltages.

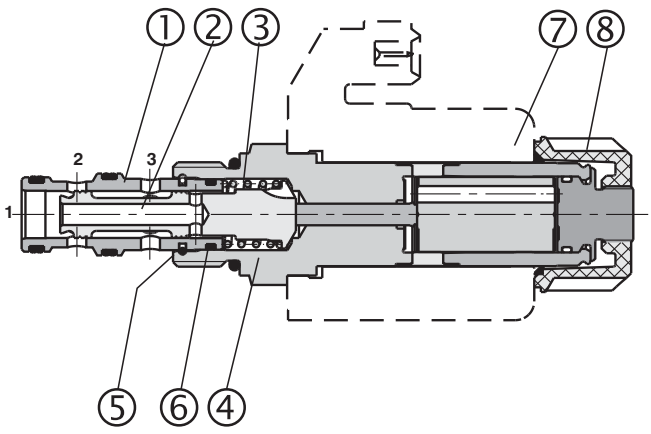
For the alternating current supply, either of 120V/60Hz or 230V/50Hz voltage, the relevant rectifiers for the C19 coil types are available in the auxiliary connector. For the C22 coil types and AC voltage design, the rectifiers are integrated directly into the connector base. . By loosening the fixing nut (8), the solenoid coil can be replaced or turned in the range of 360^0. The valve body is zinc coated.

Note:
The valves are supplied without solenoids coils. The solenoid coil, the terminal box and the housing body for pipeline mounting have to be ordered separately.

Standard performance



High performance



Ordering Code

SD2E-B3 / □ □ □ □

3/2 Way Solenoid Operated Directional Control Valve Spool 7/8-14 UNF

Standard	**S**
High performance	**H**

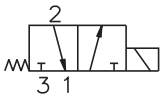
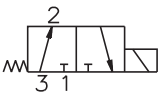
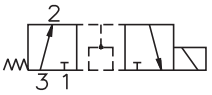
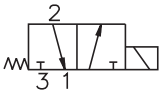
Description
Refer to the table with functional symbols

	Seals
No designation	NBR
V	FPM (Viton)

	Manual override
No designation	standard
M2	covered with rubber bootn
M5	socket head screw
M9	without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA0018.

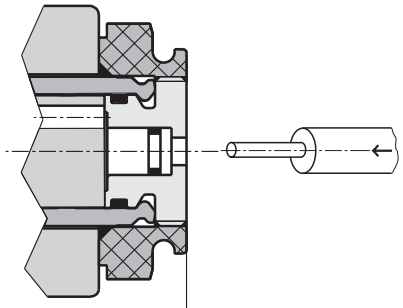
Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
2D21			2D26		
2D25					

Manual Override

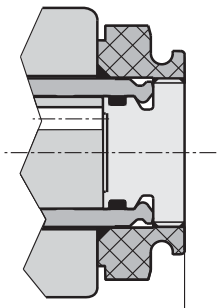
Dimensions in millimeters (inches)

No designation - standard



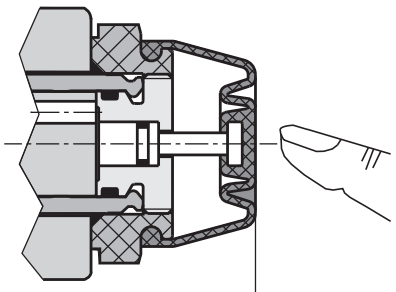
Standard valve~70,5 (2.776)
High performance valve~83,0 (3.268)

Designation **M9 -** without manual override



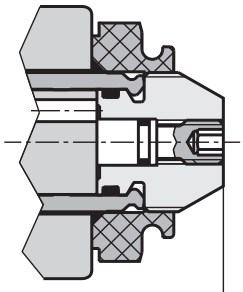
Standard valve~70,5 (2.776)
High performance valve~83,0 (3.268)

Designation **M2 -** covered with rubber boot



Standard valve ~82,0(3.228)
High performance valve ~100,0(3.937)

Designation **M5 -** with socket head screw 2.5 (0.098)



Standard valve ~78,0(3.071)
High performance valve ~84,8(3.339)

Technical Data

		Standard	High performance
Valve size		B3	
Cartridge cavity		7/8-14 UNF-2A (according to ISO 17209)	
Maximum flow	L/min (GPM)	50 (13.2)	60 (15.8)
Max. operating pressure	bar (PSI)	250 (3626)	350 (5076)
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Coil groups[1)]		C19B	C22B
Fluid temperature range	°C (°F)	-20 ... +80 (-4 ...+176)	-20 ... +80 (-4 ...+176)
Ambient temperature, max.	°C (°F)	-20 ... +50 (-4 ... +122)	-20 ... +80 (-4 ...+176)
Viscosity range	mm^2 /s (SUS)	10 ... 500 (49 ... 2450)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406	
Permissible rated voltage variation	%	AC, DC ±10	AC, DC ±15
Max. switching frequency	1/ h	15 000	
Duty cycle	%	100	
Enclosure type to EN 60529 [1)]		IP 67 (IP 65)	
Service life	cycles	10^7	
Valve tightening torque	Nm (lbf.ft)	35+5 (25.81+3.68)	
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.213+0.738)	3+1 (2.21+0.738)
Weight	kg (lbs)	0,24 (0.53)	0,31 (0.68)
Mounting position		unrestricted	
Valve body (data sheet HA 0018)		SB-B3	

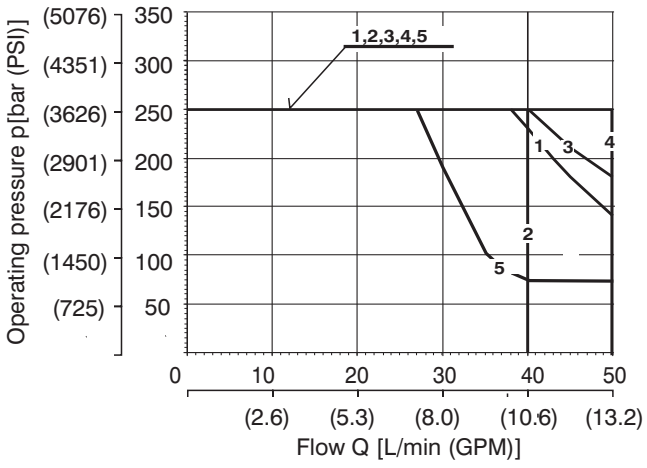
[1)] see data sheet coils HA 8007

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

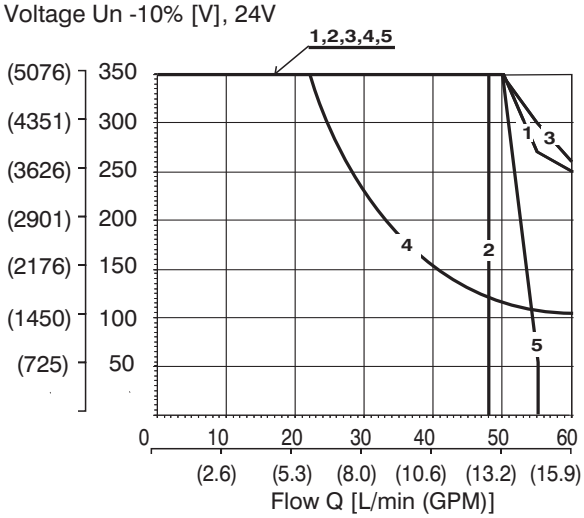
Standard valve
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V], 24V



Flow Q [L/min (GPM)]

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

High performance valve
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V], 24V



Flow Q [L/min (GPM)]

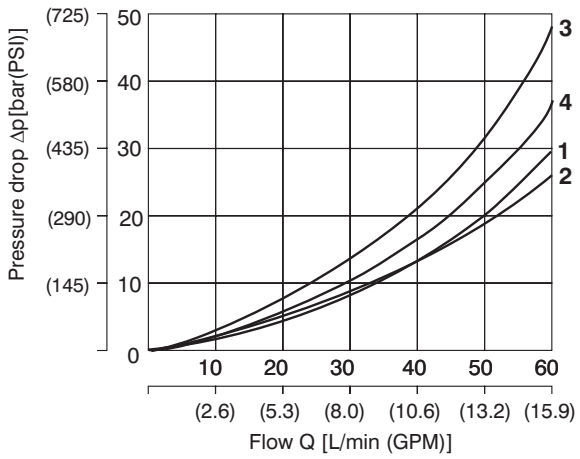
	Connection	Direction
1	2D21	3→2
2	2D21	2→1
3	2D25	3→2
5	2D25	2→1
4	2D26	3→2
5	2D26	2→1

Δp-Q Characteristics

Measured at ν = 32 mm²/s (156 SUS)

Pressure drops Δp related to flow rate

Standard valve + High performance valve

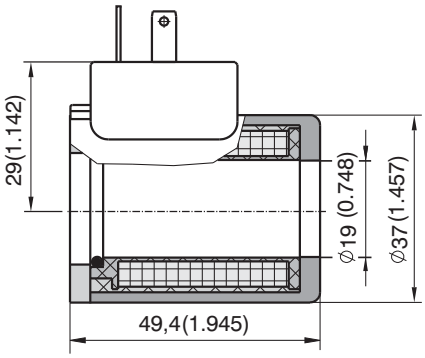


	Connection	Direction
1	2D21	2→1
1	2D21	3→2
3	2D25	3→2
4	2D25	2→1
1	2D26	3→2
1	2D26	2→1

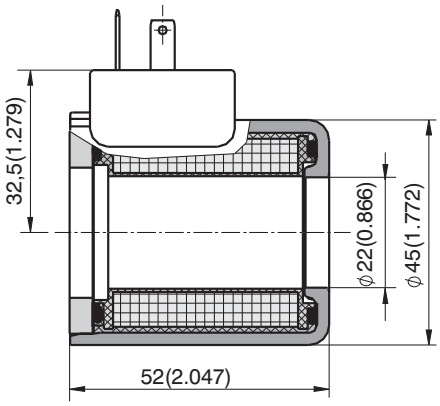
Type of the Solenoid Coils

Dimensions in millimeters (inches)

Coil for Standard valve
C19B



Coil for High performance valve
C22B



Note:
Example of most frequent coil types.
For complete range of SD2E-B3 valve coils with technical informatik about voltage, enclosure type, terminal box please afer to coil data sheet HA 8007.

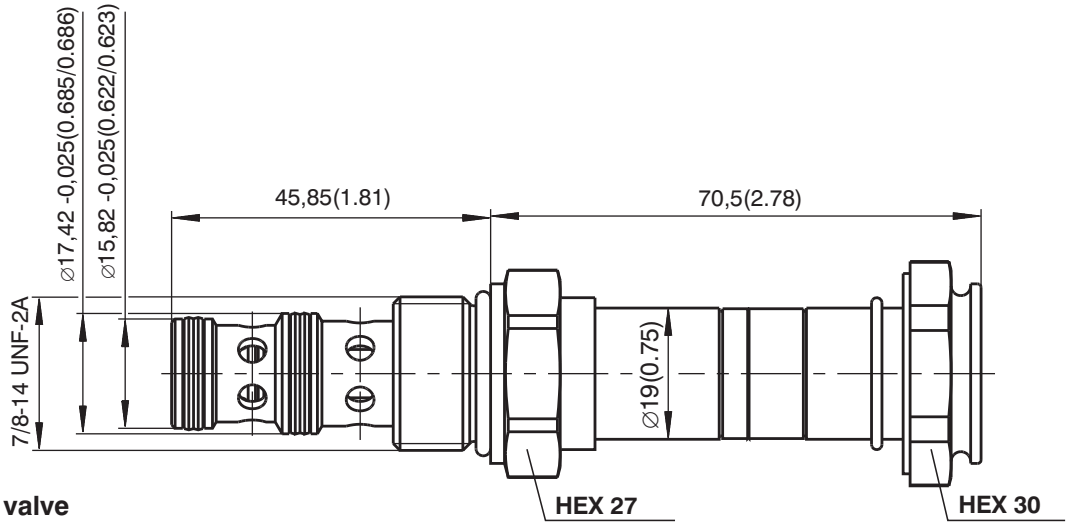
Solenoid	Connector	Standard valve	High performance valve
		SD2E-B3 / S...	SD2E-B3 / H...
		Type code	**Type code**
12 VDC	EN 175301-803-A	C19B-01200E1-6NA	C22B-01200E1-6,55NA
24 VDC	EN 175301-803-A	C19B-02400E1-25,75NA	C22B-02400E1-25,3NA
12 VDC	AMP-Junior-Timer (2-pins)	C19B-01200E3-6NA	C22B-01200E3A-6,55NA
24 VDC	AMP-Junior-Timer (2-pins)	C19B-02400E3-25,75NA	C22B-02400E3A-25,3NA
12 VDC	Flying leads**	C19B-01200E8N300-6NA	C22B-01200E8N300-6,55NA
24 VDC	Flying leads**	C19B-02400E8N300-25,75NA	C22B-02400E8N300-25,3NA
12 VDC	Deutsch DT04-2P	---	C22B-01200E12-6,55NA
24 VDC	Deutsch DT04-2P	---	C22B-02400E12-25,3NA
120 VAC	EN 175301-803-A	C19B-10600E1-494NA*	C22B-10600E1-545NA*
230 VAC	EN 175301-803-A	C19B-20500E1-1653NA*	C22B-20500E1-2353NA*
120 VAC	EN 175301-803-A (with rectifier)	C19B-12060E5-494NA	C22B-12060E5-545NA
230 VAC	EN 175301-803-A (with rectifier)	C19B-23050E5-1653NA	C22B-23050E5-2353NA

*Use the terminal box with rectifier!
**Standard length of connecting wire is 300 mm, other lengths on request.

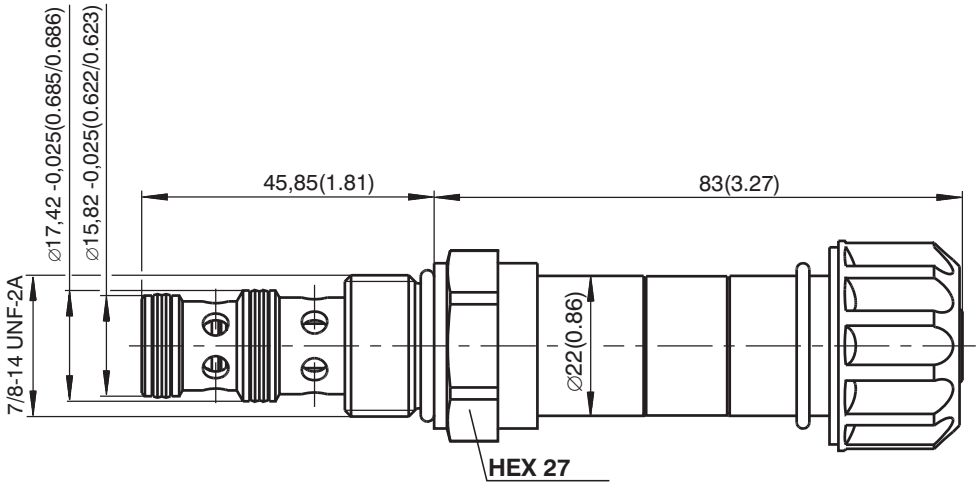
Valve Dimensions

Dimensions in millimeters (inches)

Standard valve

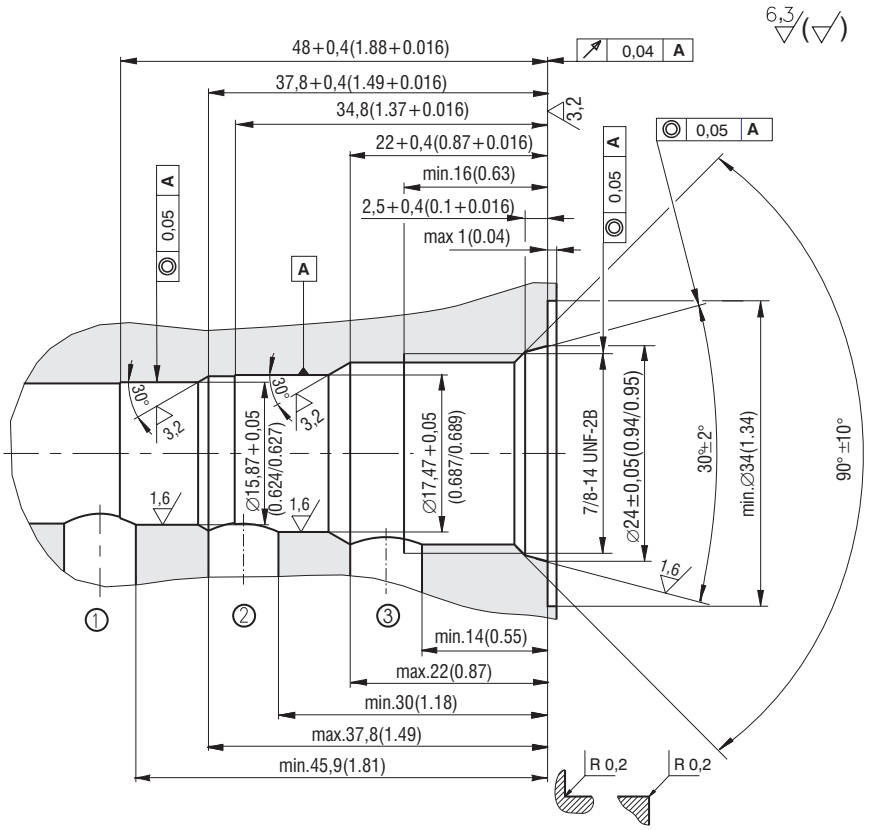


High performance valve



Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters (inches)

Standard and high performance valve

Dualseal - PU	O-ring - NBR	O-ring - Viton	Ordering number
13,47 x 15,87 x 3,1 (1pc.)	19,4 x 2,1 ((1pc.)	-	18960700
17,47 x 15,07 x 3,1 (1pc.)			
13,47 x 15,87 x 3,1 (1pc)	-	19,4 x 2,1 (1pc.)	18960600
17,47 x 15,07 x 3,1 (1pc.)			

Solenoid retaining nut with seal for standard valve

Type of nut	O-ring - Viton	Ordering number
Standard nut	18 x 1,5 (1pc.)	20777000
Nut M2	18 x 1,5 (1pc.)	20777600

Solenoid retaining nut with seal for high performance valve

Type of nut	O-ring - Viton	Ordering number
Standard nut	22 x 2 (1pc.)	15844600
Nut M2	22 x 2 (1pc.)	18961700

Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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4/2 Way Solenoid Operated Directional Control Valves Spool Type

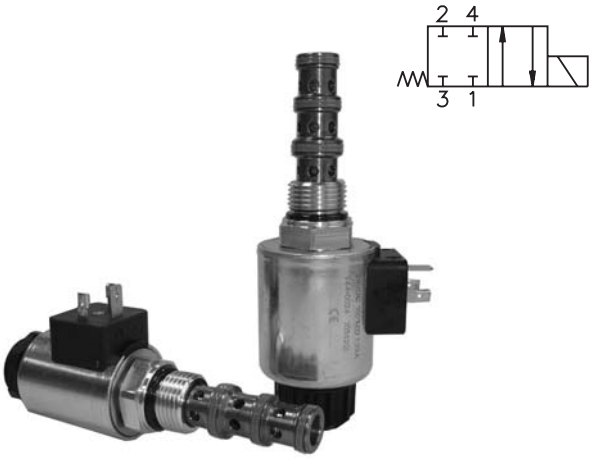
SD2E-B4

7/8-14 UNF • p_{max} 350 bar (5076 PSI) • Q_{max} 60 L/min (15.8 GPM)

HA 4062
7/2012

Replaces
HA 4062 10/2010

- ❑ **4/2 way cartridge valves solenoid operated with spool direction**
- ❑ **Manual override**
- ❑ **No spool sticking by too high tightening torque**
- ❑ **High transmitted power**



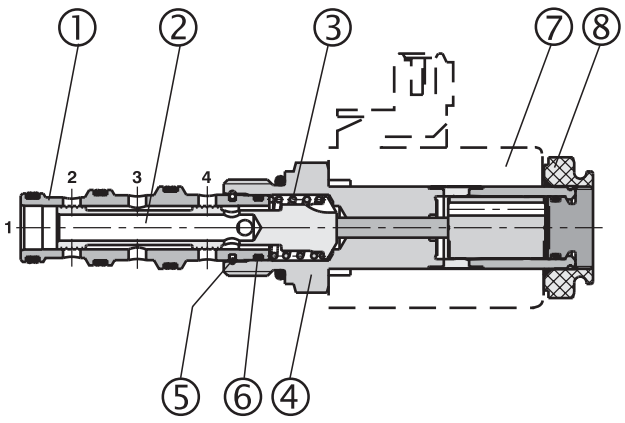
Functional Description

The directly operated 4/2 way solenoid actuated spool valve controls in the first line the start and stop function of the oil flow. The valve consists of the valve body (1), control spool (2), return spring (3), cartridge with actuating system (4) and of the solenoid coil (7) that is mounted on the actuating system. The valve bushing is screwed into the cartridge part.
The valve bushing is fixed in the cartridge by a wire ring (5) and sealed with the seal ring (6). Separation of the valve bushing and the cartridge prevent transmitting the stresses, which could be caused by too high tightening torques. The DC solenoid coils can be delivered for 12 V and 24 V supply voltages.

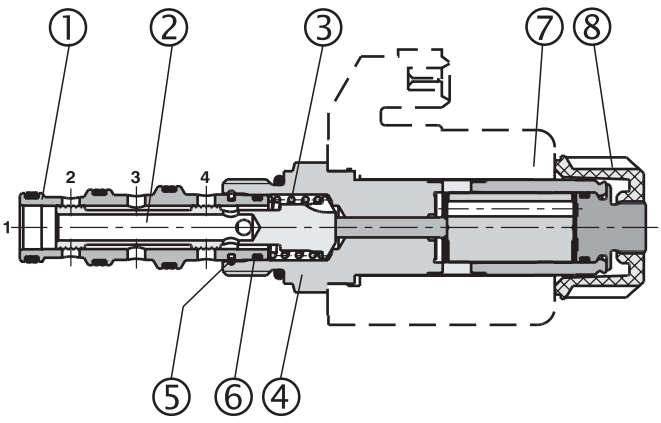
For the alternating current supply, either of 120V/60Hz or 230V/50Hz voltage, the relevant rectifiers for the C19 coil types are available in the auxiliary connector. For the C22 coil types and AC voltage design, the rectifiers are integrated directly into the connector base. By loosening the fixing nut (8), the solenoid coil can be replaced or turned in the range of 180^0. The valve body is zinc coated.

Note:
The valves are supplied without solenoids coils. The solenoid coil, the terminal box and the housing body for line mounting have to be ordered separately.

Standard performance



High performance



Ordering Code

SD2E-B4 / □ □ □ □

4/2 Way Solenoid Operated Directional Control Valve 7/8-14 UNF

Standard **S**
High Performance **H**

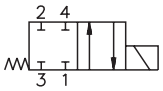
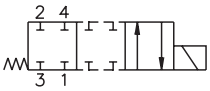
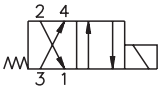
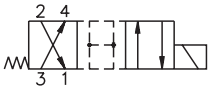
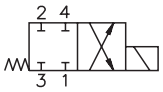
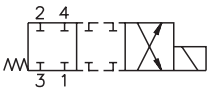
Description
Refer to the table with functional symbols

Seals
No designation NBR
V FPM (Viton)

Manual override
No designation standard
M2 covered with rubber bootn
M5 socket head screw
M9 without manual override

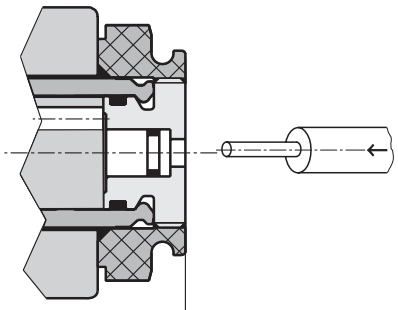
Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA0018.

Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
2Z11			2X21		
2Z51					

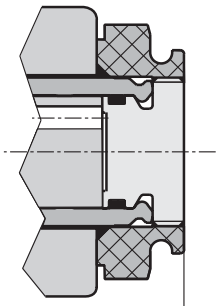
Manual Override

No designation - standard



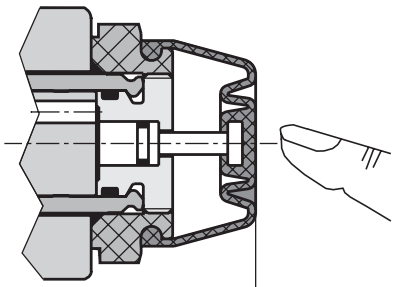
Standard valve~70,5 (2.776)
High performance valve~83,0 (3.268)

Designation **M9 -** without manual override



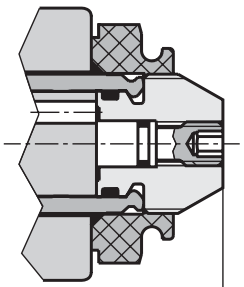
Standard valve~70,5 (2.776)
High performance valve~83,0 (3.268)

Designation **M2 -** covered with rubber boot



Standard valve ~82,0(3.228)
High performance valve ~100,0(3.937)

Designation **M5 -** with socket head screw 2.5 (0.098)



Standard valve ~78,0(3.071)
High performance valve ~84,8(3.339)

Technical Data

		Standard	High performance
Valve size		B4	
Cartridge cavity		7/8-14 UNF-2A (according to ISO 17209)	
Maximum flow	L/min (GPM)	50 (13.21)	60 (15.85)
Max. operating pressure	bar (PSI)	250 (3625)	350 (5076)
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Coil groups [1]		C19B	C22B
Fluid temperature range	°C (°F)	-20 ... +80 (-4... +176)	-20 ... +80 (-4 ... +176)
Ambient temperature, max.	°C (°F)	-20 ... +50 (-4 ...+122)	-20 ... +80 (-4 ... +176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406	
Permissible rated voltage variation	%	AC,DC ±10	AC,DC ±15
Max. switching frequency	1/h	15 000	
Duty cycle	%	100	
Enclosure type to EN 60529 [1]		IP 65	
Service life	cycles	10^7	
Valve tightening torque	Nm (lbf.ft)	35+5 (25.81+3.68)	
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.213+0.738)	3+1 (2.21+0.738)
Weight	kg (lbs)	0,25 (0.55)	0,32 (0.71)
Mounting position		unrestricted	
Valve body (data sheet HA 0018)		SB-B4	

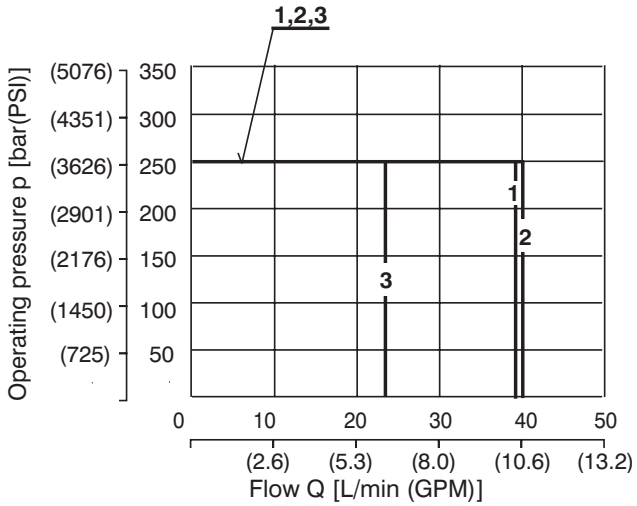
[1] see data sheet coils HA 8007

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

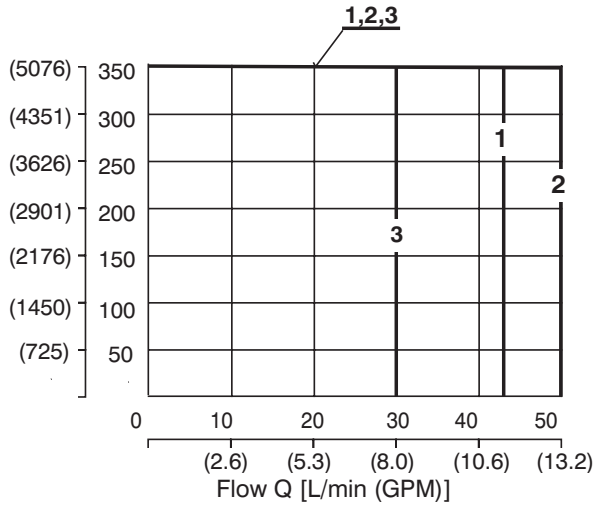
Operating limits for maximum hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

Standard valve
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V], 24V



	Connection	Direction
1	2Z11	3-2 → 4-1
2	2Z51	3-4 → 2-1
2	2X21	3-4 → 2-1
3	2X21	3-2 → 4-1

High performance valve
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V], 24V



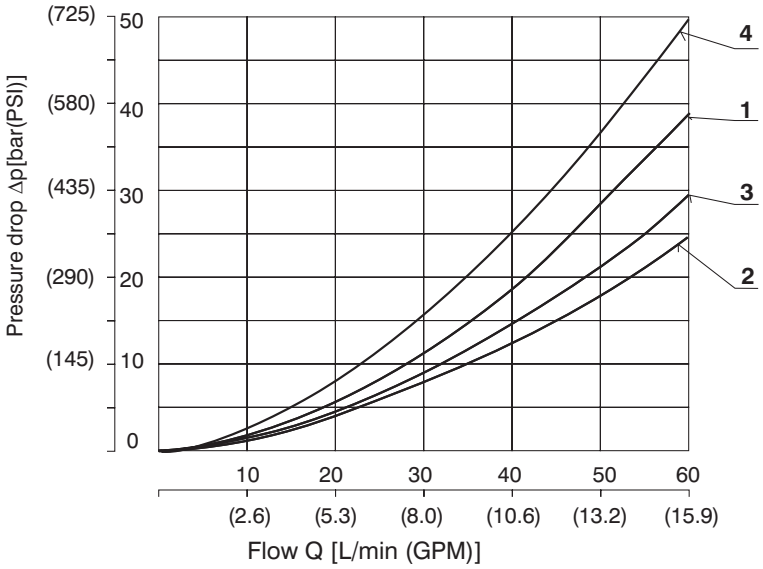
	Connection	Direction
1	2Z11	3-2 → 4-1
2	2Z51	3-4 → 2-1
3	2X21	3-2 → 4-1
2	2X21	3-4 → 2-1

Δp-Q Characteristics

Measured at ν = 32 mm²/s (156 SUS)

Pressure drops Δp related to flow rate.

Standard valve + High performance valve

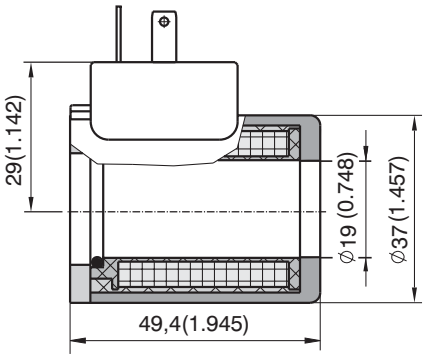


	Connection	Direction
1	2Z11	3→2
1	2Z11	4→1
3	S2Z51	3→4
3	S2Z51	2→1
2	H2Z51	3→4
3	H2Z51	2→1
3	2X21	3→2
4	2X21	4→1
3	2X21Qmax 50 l/min	3→4
2	2X21Qmax 40 l/min	2→1

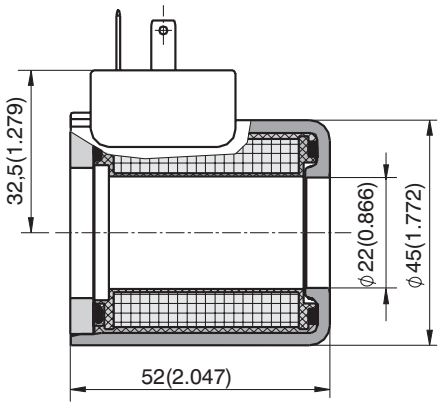
Type of the Solenoid Coils

Dimensions in millimeters (inches)

Coil for Standard valve
C19B



Coil for High performance valve
C22B



Note:
Example of most frequent coil types.
For complete range of SD2E-B4 valve coils with technical informatik about voltage, enclosure type, terminal box please afer to coil data sheet HA 8007.

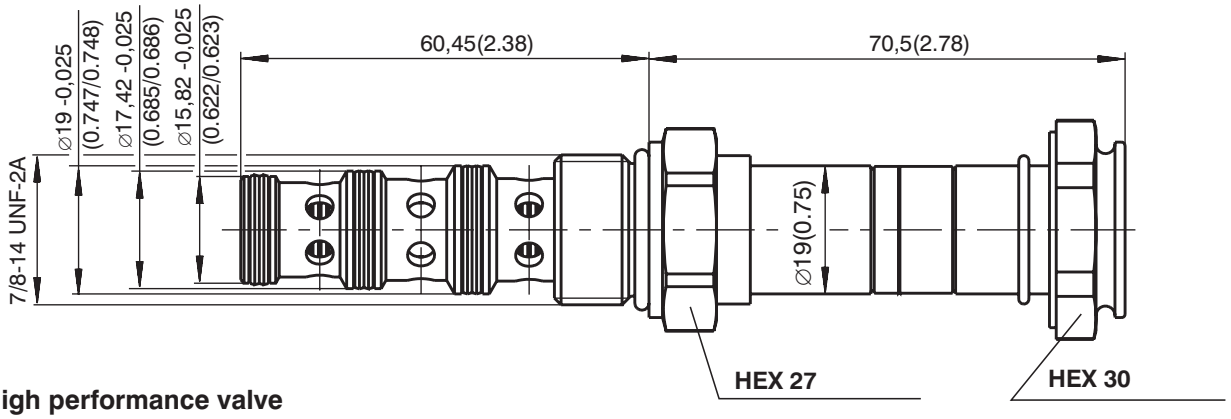
		Standard	High performance
Voltage	**Connector**	SD2E-B4 / S...	SD2E-B4 / H...
		Type code	**Type code**
12 VDC	EN 175301-803-A	C19B-01200E1-6NA	C22B-01200E1-6,55NA
24 VDC	EN 175301-803-A	C19B-02400E1-25,75NA	C22B-02400E1-25,3NA
12 VDC	AMP-Junior-Timer	C19B-01200E3-6NA	C22B-01200E3A-6,55NA
24 VDC	AMP-Junior-Timer	C19B-02400E3-25,75NA	C22B-02400E3A-25,3NA
12 VDC	free cables**	C19B-01200E8N300-6NA	C22B-01200E8N300-6,55NA
24 VDC	free cables**	C19B-02400E8N300-25,75NA	C22B-02400E8N300-25,3NA
12 VDC	Deutsch DT04-2P	---	C22B-01200E12-6,55NA
24 VDC	Deutsch DT04-2P	---	C22B-02400E12-25,3NA
120 VAC	EN 175301-803-A	C19B-10600E1-494NA*	C22B-10600E1-545NA*
230 VAC	EN 175301-803-A	C19B-20500E1-1653NA*	C22B-20500E1-2353NA*
120 VAC	EN 175301-803-A (with rectifier)	C19B-12060E5-494NA	C22B-12060E5-545NA
230 VAC	EN 175301-803-A (with rectifier)	C19B-23050E5-1653NA	C22B-23050E5-2353NA

*Use the terminal box with rectifier!
**Standard length of connecting wire is 300 mm, other lengths on request.

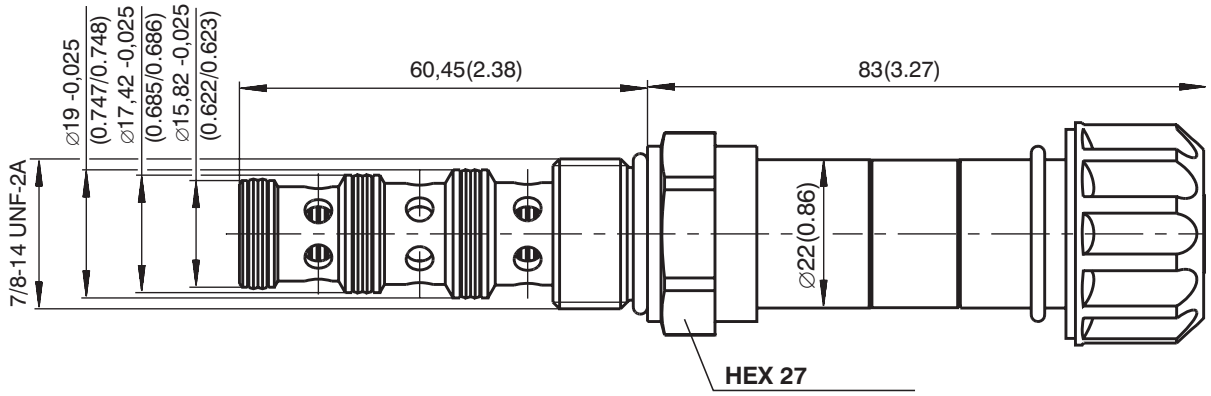
Valve Dimensions

Dimensions in millimeters (inches)

Standard valve

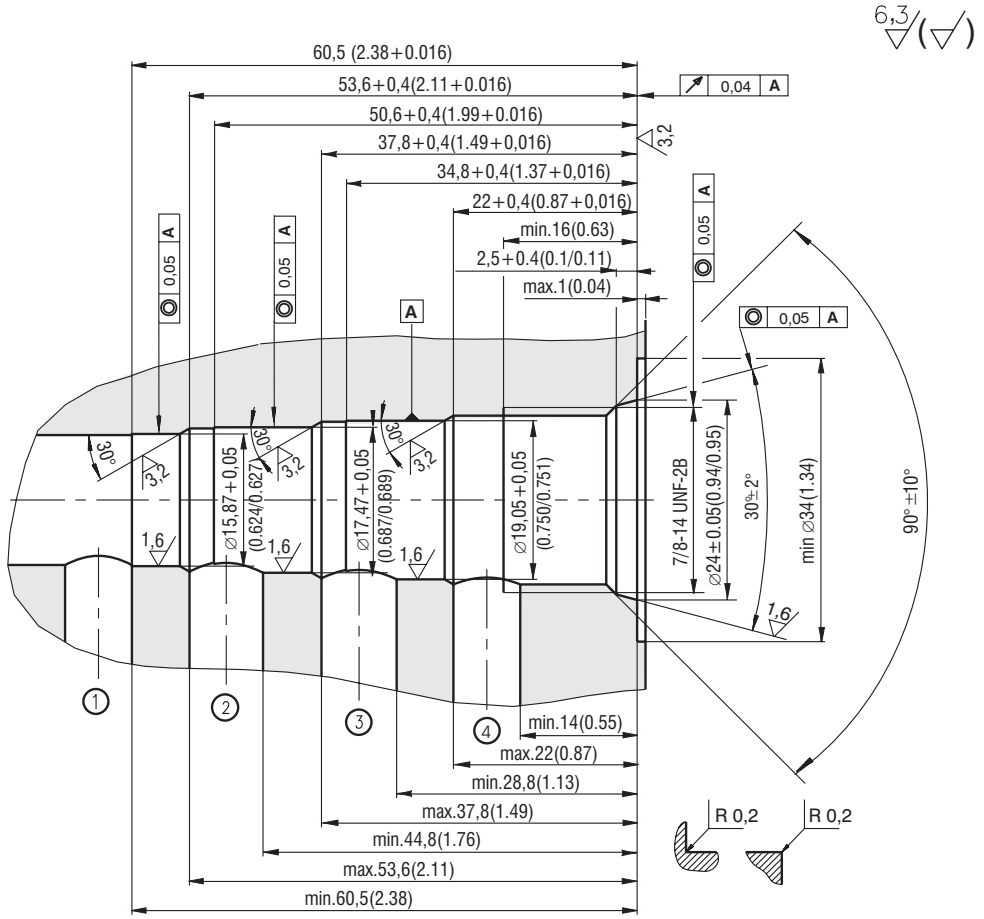


High performance valve



Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters

Standard and high performance valve

Dualseal - PU	O-ring - NBR	O-ring - Viton	Ordering number
13,47 x 15,87 x 3,1 (1pc.)	19,4 x 2,1 (1pc.)	-	18960800
17,47 x 15,07 x 3,1 (1pc.)			
19,05 x 16,65 x 3,1 (1pc.)			
13,47 x 15,87 x 3,1 (1pc.)	-	19,4 x 2,1 (1pc.)	18960900
17,47 x 15,07 x 3,1 (1pc.)			
19,05 x 16,65 x 3,1 (1pc.)			

Solenoid retaining nut with seal for standard valve

Type of nut	O-ring - Viton	Ordering number
Standard nut	18 x 1,5 (1pc.)	20777000
Nut M2	18 x 1,5 (1pc.)	20777600

Solenoid retaining nut with seal for high performance valve

Type of nut	O-ring - Viton	Ordering number
Standard nut	22 x 2 (1pc.)	15844600
Nut M2	22 x 2 (1pc.)	18961700

Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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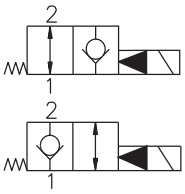
www.argo-hytos.com

2/2 Way Solenoid Operated Directional Control Valves Poppet Type SD3E-A2

3/4-16 UNF • p_{max} 420 bar (6091 PSI) • Q_{max} 30 L/min (7.9 GPM)

HA 4043
7/2012

Replaces
HA 4043 10/2010



- ❑ **Screw-in cartridge and in-line design**
- ❑ **Poppet valve - leak-free closing**
- ❑ **High switching reliability after long idling time**
- ❑ **Short switching times**

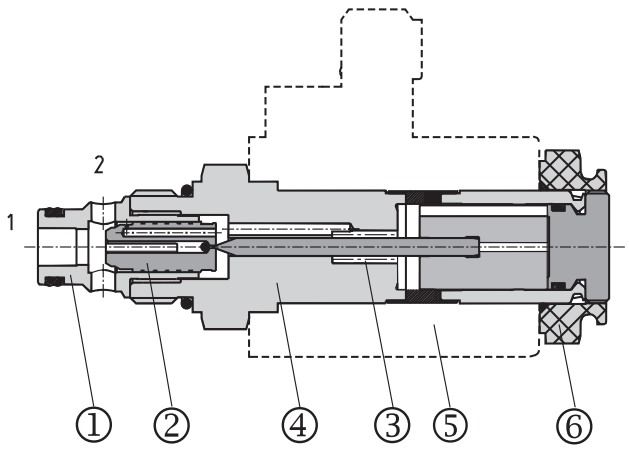
Functional Description

The pilot operated 2/2 way solenoid actuated poppet valves control in the first line the start and stop function of the oil flow. The valve consists of the valve bushing (1), main control spool (2), return spring (3), cartridge with actuating system (4) and of the solenoid coil (5) that is mounted on the actuating system. The valve bushing is screwed into the cartridge part.
In the variant normally closed / normally open, the valve is securely held in the respective basic position by a spring. By energizing the solenoid coil the spring force is overcome and the pilot valve is pressed onto the seat or lifted. Opening and closing of the main control spool is hydraulically supported through the orifice boring created in the main control spool.

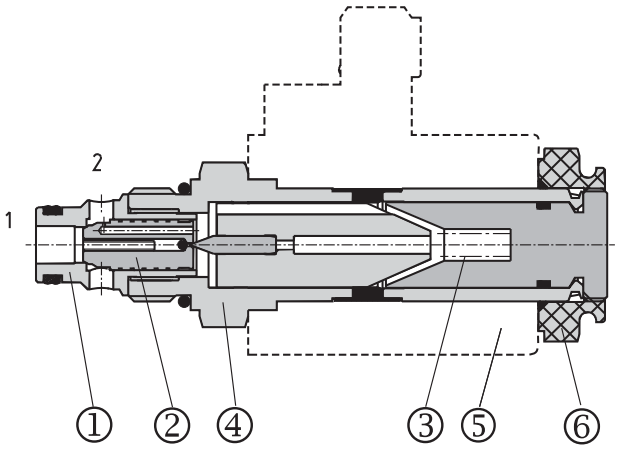
The DC solenoid coils can be delivered for 12 V and 24 V supply voltages. For AC applications 120 V/ 60 Hz or 230 V/ 50 Hz. With the AC high power solenoid coils, the rectifiers are integrated directly in the connector. By loosening the fixing nut (6), the solenoid coil can be replaced or turned in the range of 360°.

Notice.
The valves are supplied without solenoids coils. The solenoid coil, the terminal box and the body for line mounting have to be ordered separately.

Absence of current opened 2O2



Absence of current closed 2L2



Ordering Code

SD3E-A2 / □ □ □ □

2/2 Way Solenoid Operated Directional Control Valve Poppet Type 3/4-16UNF

High Performance **H**

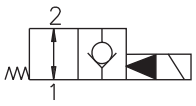
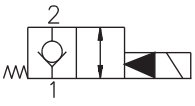
Description
Refer to the table with functional symbols

Seals
No designation NBR
V FPM (Viton)

Manual override
No designation standard for 2O2
M2 covered with rubber bootn only for 2O2
M5 socket head screw
M9 without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA0018.

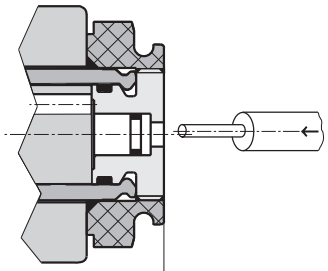
Functional Symbols

Designation	Symbol	Designation	Symbol
2O2		2L2	

Manual Override

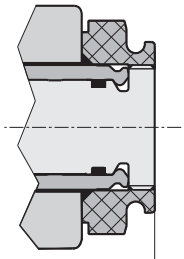
Dimensions in millimeters (inches)

No designation - Standard for **2O2**



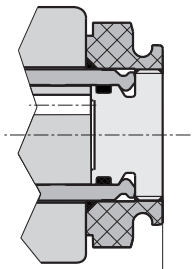
High performance ~70,0 (2.756)

Designation **M9 -** for **2L2**
without manual override



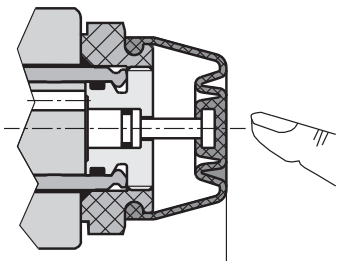
High performance ~70,0 (2.756)

Designation **M9 -** for **2O2**
without manual override



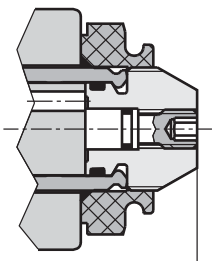
High performance ~70,0 (2.756)

Designation **M2 -** for **2O2**
covered with rubber bootn



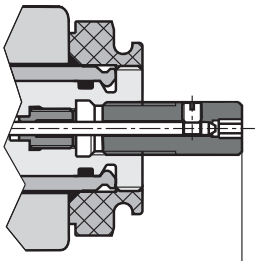
High performance ~81,5(3.209)

Designation **M5 -** for **2O2**
by screwing in of the socket head screw 2,5(0.098)



High performance ~77,5(3.051)

Designation **M5 -** for **2L2**
by screwing in of the socket head screw 2,5(0.098)



High performance ~89,0(3.504)

Technical Data

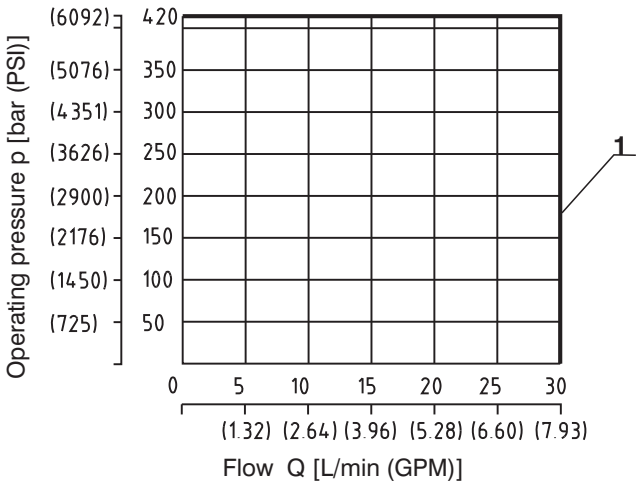
Valve size		A2
Cartridge cavity		3/4-16 UNF -2A (according to ISO 17209)
Maximum flow	L/min (GPM)	30 (7.9)
Max. operating pressure	bar (PSI)	420 (6091)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Coil groups [1)]		C19B
Fluid temperature range	°C (°F)	-20 ... 80 (-4 ...176)
Ambient temperature, max.	°C (°F)	-20 ... 80 (-4 ...176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406.
Permissible rated voltage variation	%	AC, DC ±15
Max. switching frequency	1/h	15 000
Duty cycle	%	100
Service life	cycles	10^7
Enclosure type to EN 60529 [1)]		IP 67 (IP 65)
Weight	kg (lbs)	0,20 (0.44)
Valve tightening torque	Nm (lbf.ft)	30+2 (22.127+1.475)
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.213+0.738)
Mounting position		unrestricted
Valve body (data sheed HA 0018)		SB-A2

[1)] see data sheet coils HA 8007

p-Q Characteristics

Operating limits for hydraulic power transferred by the directional valve.
For respective spool type - see functional symbols.

Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V] 24 VDC

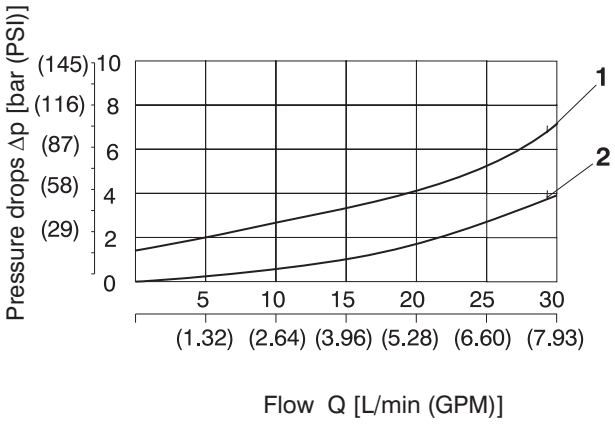


	Connection
1	2L2
1	2O2

Δp-Q Characteristic

Measured at ν = 32 mm^2/s (156 SUS)

Pressure drops related to flow rate

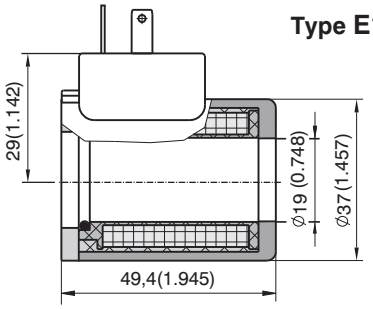


	Connection	Direction	Solenoid
1	H2L2	1→ 2	switched off
2	H2L2	1→ 2	switched on
2	H2L2	2→ 1	switched on
2	H2O2	1→ 2	switched off
2	H2O2	2→ 1	switched off

Type of the Solenoid Coils

Dimensions in millimeters (inches)

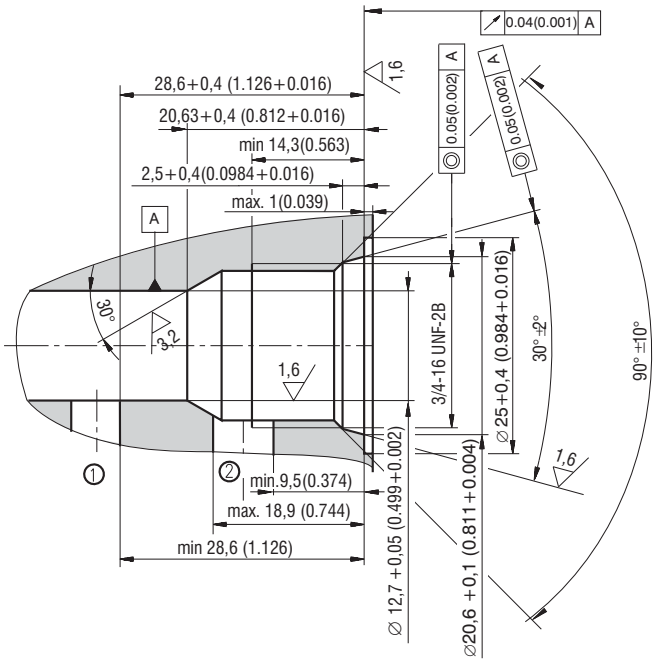
Example of most frequent coil types.
For complete range of valve coils with technical informatik about voltage, enclosure type, terminal box please afer to coil data sheet HA 8007.

Coil example	Solenoid	Connector	Type code
 *Use the terminal box with rectifier!	12 VDC	EN 175301-803-A	C19B-01200E1-7,1NA
	24 VDC	EN 175301-803-A	C19B-02400E1-28,8NA
	12 VDC	AMP Junior Timer	C19B-01200E3-7,1NA
	24 VDC	AMP Junior Timer	C19B-02400E3-28,8NA
	120 VAC	EN 175301-803-A with integrated rectifier	C19B-12060E5-527NA
	230 VAC	EN 175301-803-A with integrated rectifier	C19B-23050E5-2065NA
	120 VAC	EN 175301-803-A (with rectifier)	C19B-10600E1-527NA*
	230 VAC	EN 175301-803-A (with rectifier)	C19B-20500E1-2065NA*

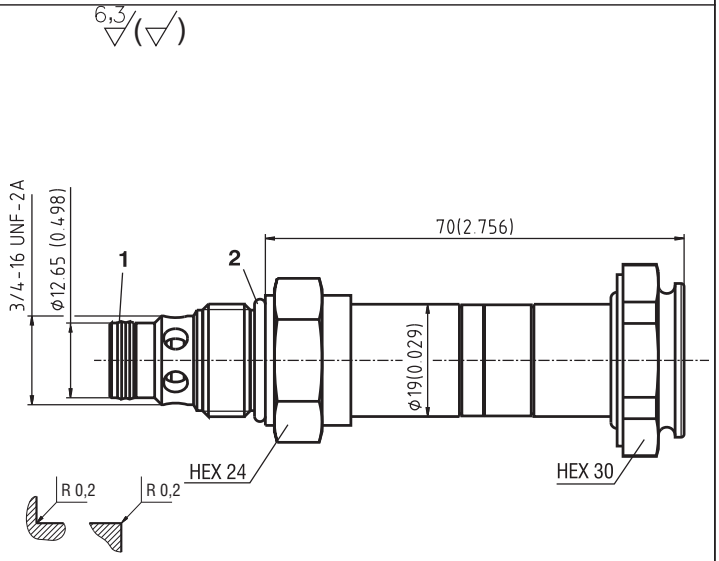
Valve Dimensions

Dimensions in millimeters (inches)

Cavity



Standard manual override



Seal kit - see Spare Parts
1. Dualseal - PU
2. O-ring

Spare Parts

Dimensions in millimeters

Seal kit

Dualseal - PU	O-Ring - NBR	O-Ring - Viton	Ordering number (kit)
10,3 x 12,7 x 3,1 (1pc.)	17 x 1,8 (1pc.)	-	20776700
10,3 x 12,7 x 3,1 (1pc.)	-	17,17 x 1,78 (1pc.)	17014300

Type of nut	
Standard nut	20777000
Nut M2	20777600

Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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www.argo-hytos.com

2/2 Way Solenoid Operated Directional Control Valves Poppet Type

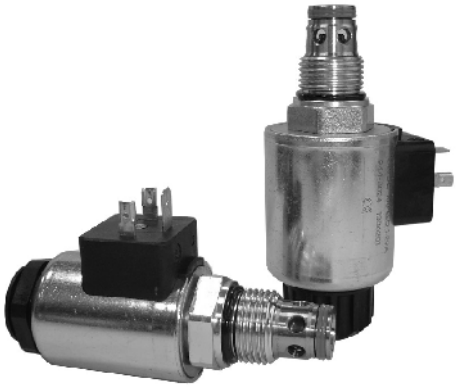
SD3E-B2

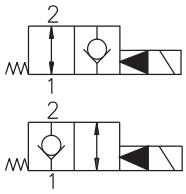
7/8-14 UNF • p_{max} 420 bar (6091 PSI) • Q_{max} 75 L/min (19.81 GPM)

HA 4063
7/2012

Replaces
HA 4063 10/2010

- ❑ **2/2 way cartridge valves solenoid operated with spool direction**
- ❑ **Manual override**
- ❑ **High transmitted power**





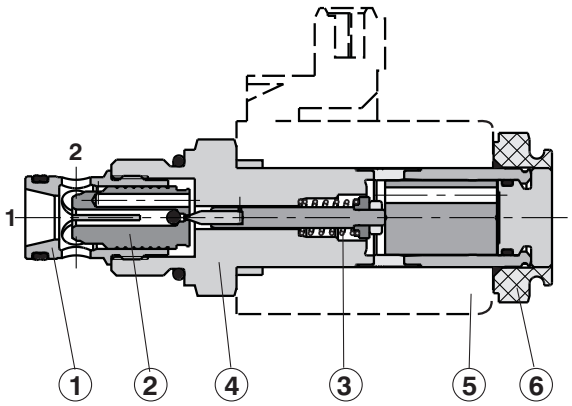
Functional Description

The pilot operated 2/2 way solenoid actuated poppet valves control in the first line the start and stop function of the oil flow. The valve consists of the valve bushing (1), main control spool (2), return spring (3), cartridge with actuating system (4) and of the solenoid coil (5) that is mounted on the actuating system. The valve bushing is screwed into the cartridge part.
In the variant normally closed / normally open, the valve is securely held in the respective basic position by a spring. By energizing the solenoid coil the spring force is overcome and the pilot valve is pressed onto the seat or lifted. Opening and closing of the main control spool is hydraulically supported through the orifice boring created in the main control spool.

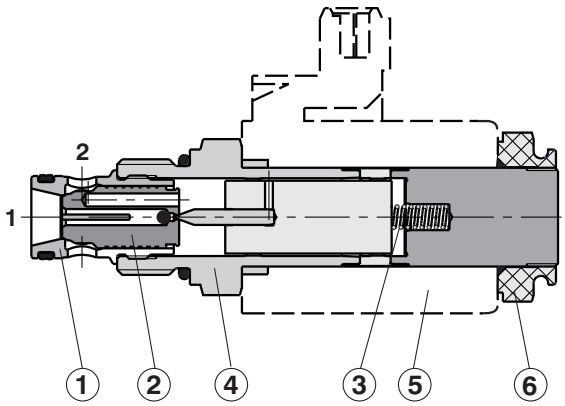
The DC solenoid coils can be delivered for 12 V and 24 V supply voltages.
For the alternating current supply, either of 120V/60Hz or 230V/50Hz voltage, the relevant rectifiers for the C19 coil types are available in the auxiliary connector. For the C22 coil types and AC voltage design, the rectifiers are integrated directly into the connector base. . By loosening the fixing nut (6), the solenoid coil can be replaced or turned in the range of 360°.

Notice.
The valves are supplied without solenoids coils. The solenoid coil, the terminal box and the body for line mounting have to be ordered separately.

Absence of current opened 2O2



Absence of current closed 2L2



Ordering Code

SD3E-B2 / □ □ □ □

2/2 Way Solenoid Operated Directional Control Valve Poppet Type 7/8-14 UNF

Standard	**S**
High Performance	**H**

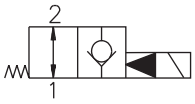
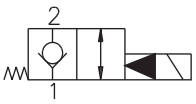
Description
Refer to the table with functional symbols

No designation	**Seals** NBR
V	FPM (Viton)

No designation	**Manual override** standard for 2O2
M2	covered with rubber bootn only for 2O2
M5	socket head screw
M9	without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA0018.

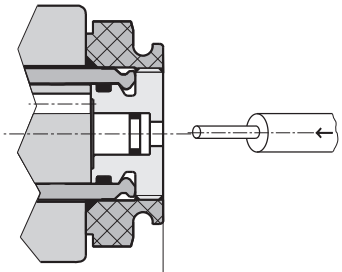
Functional Symbols

Designation	Symbol	Designation	Symbol
2O2		2L2	

Manual Override

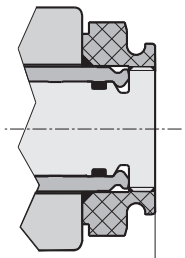
Dimensions in millimeters (inches)

No designation - Standard for **2O2**



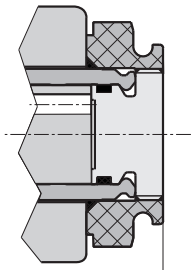
Standard valve~70,5 (2.776)
High performance valve ~83,0 (3.268)

Designation **M9 -** for **2L2** without manual override



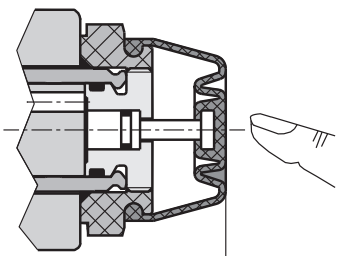
Standard valve~71,0 (2.795)
High performance valve ~83,0 (3.268)

Designation **M9 -** for **2O2** without manual override



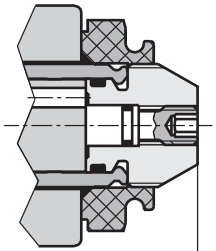
Standard valve~70,5 (2.776)
High performance valve ~83,0 (3.268)

Designation **M2 -** for **2O2** covered with rubber bootn



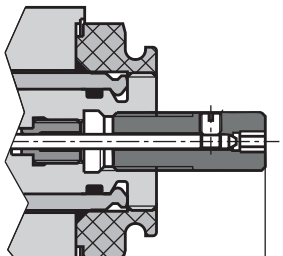
Standard valve ~82,0(3.228)
High performance valve ~100,0(3.937)

Designation **M5 -** for **2O2** by screwing in of the socket head screw 2,5(0.098)



Standard valve ~78,0(3.071)
High performance valve ~84,8(3.339)

Designation **M5 -** for **2L2** by screwing in of the socket head screw 2,5(0.098)



Standard valve ~78,0(3.071)
High performance valve ~90,0(3.543)

Technical Data

		Standard	High performance
Valve size		B2	
Cartridge cavity		7/8-14 UNF-2A	
Maximum flow	L/min(GPM)	60 (15.85)	75 (19.81)
Max. operating pressure	bar (PSI)	250 (3626)	420 (6091)
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range	°C (°F)	-20 ... +80 (-4 ...+176)	-20 ... +80 (-4 ...+176)
Ambient temperature, max.	°C (°F)	-20 ... +50 (-4 ...+122)	-20 ...+ 80 (-4 ...+176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406	
Coil groups [1]		C19B	C22B
Permissible rated voltage variation	%	AC,DC ±10	AC,DC ±15
Max. switching frequency	1/h	15 000	
Duty cycle	%	100	
Service life	cycles	10^7	
Enclosure type to EN 60529 [1]		P 67 (IP 65)	
Valve tightening torque	Nm (lbf.ft)	35+5 (25.81+3.68)	
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.213+0.738)	3+1 (2.213+0.738)
Weight	kg (lbs)	0.23 (0.51)	0.30 (0.66)
Mounting position		unrestricted	
Valve body (data sheet HA 0018)		SB-B2	

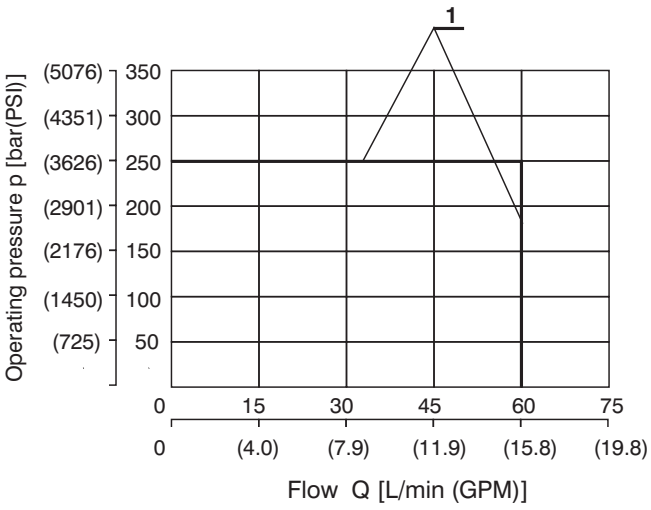
[1] see data sheet coils HA 8007

p-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

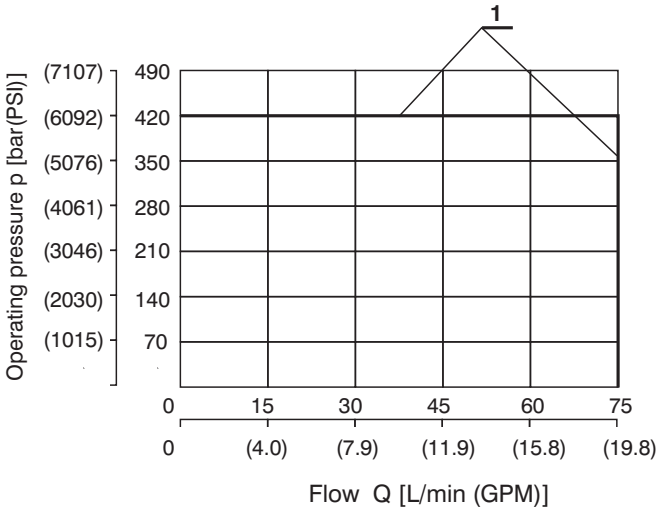
Operating limits for hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

Standard valve
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V], 24V



	Connection
1	2L2
1	2O2

High performance valve
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V], 24V



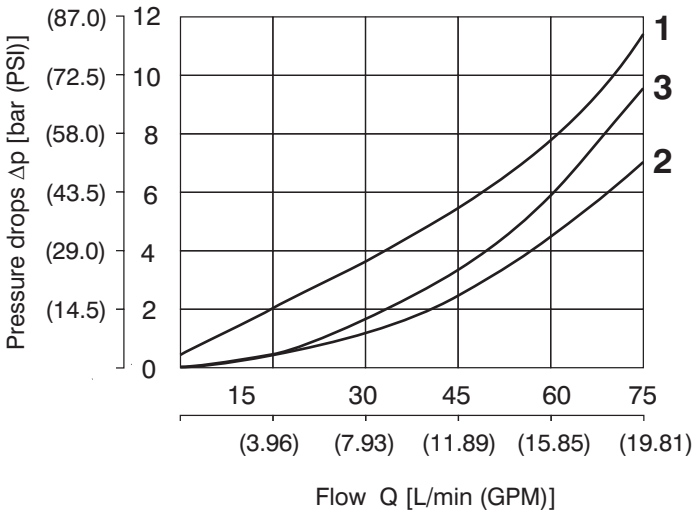
	Connection
1	2L2
1	2O2

Δp-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

Pressure drop Δp related to flow rate.

Standard valve + High performance valve

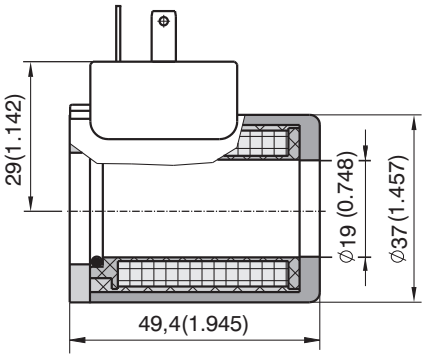


	Connection	Dirrection	Solenoid
1	2L2	1→ 2	switched off
2	2L2	2→ 1	switched on
2	2L2	1→ 2	switched on
2	2O2	1→ 2	switched off
3	2O2	2→ 1	switched off

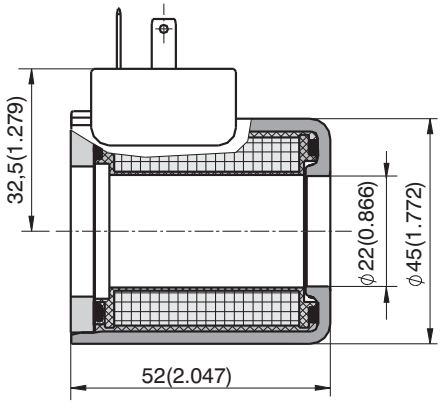
Type of the Solenoid Coils

Dimensions in millimeters (inches)

Coil for Standard valve
C19B



Coil for High performance valve
C22B



Note:
Example of most frequent coil types.
For complete range of SD3E-B2 valve coils with technical information about voltage, enclosure type, terminal box please refer to coil data sheet HA 8007.

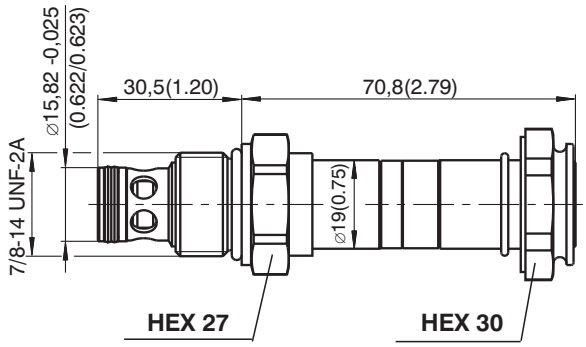
Solenoid	Connector	Standard valve SD3E-B2 / S... Type code	High performance valve SD3E-B2 / H... Type code
12 VDC	EN 175301-803-A	C19B-01200E1-6NA	C22B-01200E1-6,55NA
24 VDC	EN 175301-803-A	C19B-02400E1-25,75NA	C22B-02400E1-25,3NA
12 VDC	AMP-Junior-Timer (2-pins)	C19B-01200E3-6NA	C22B-01200E3A-6,55NA
24 VDC	AMP-Junior-Timer (2-pins)	C19B-02400E3-25,75NA	C22B-02400E3A-25,3NA
12 VDC	Flying leads**	C19B-01200E8N300-6NA	C22B-01200E8N300-6,55NA
24 VDC	Flying leads**	C19B-02400E8N300-25,75NA	C22B-02400E8N300-25,3NA
12 VDC	Deutsch DT04-2P	---	C22B-01200E12-6,55NA
24 VDC	Deutsch DT04-2P	---	C22B-02400E12-25,3NA
120 VAC	EN 175301-803-A	C19B-10600E1-494NA*	C22B-10600E1-545NA*
230 VAC	EN 175301-803-A	C19B-20500E1-1653NA*	C22B-20500E1-2353NA*
120 VAC	EN 175301-803-A (with rectifier)	C19B-12060E5-494NA	C22B-12060E5-545NA
230 VAC	EN 175301-803-A (with rectifier)	C19B-23050E5-1653NA	C22B-23050E5-2353NA

*Use the terminal box with rectifier!
**Standard length of connecting wire is 300 mm, other lengths on request.

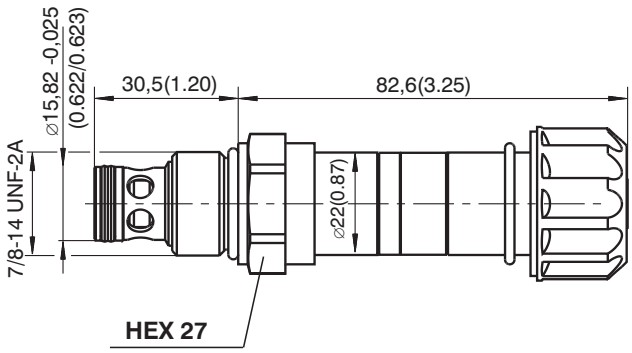
Valve Dimensions

Dimensions in millimeters (inches)

Standard valve

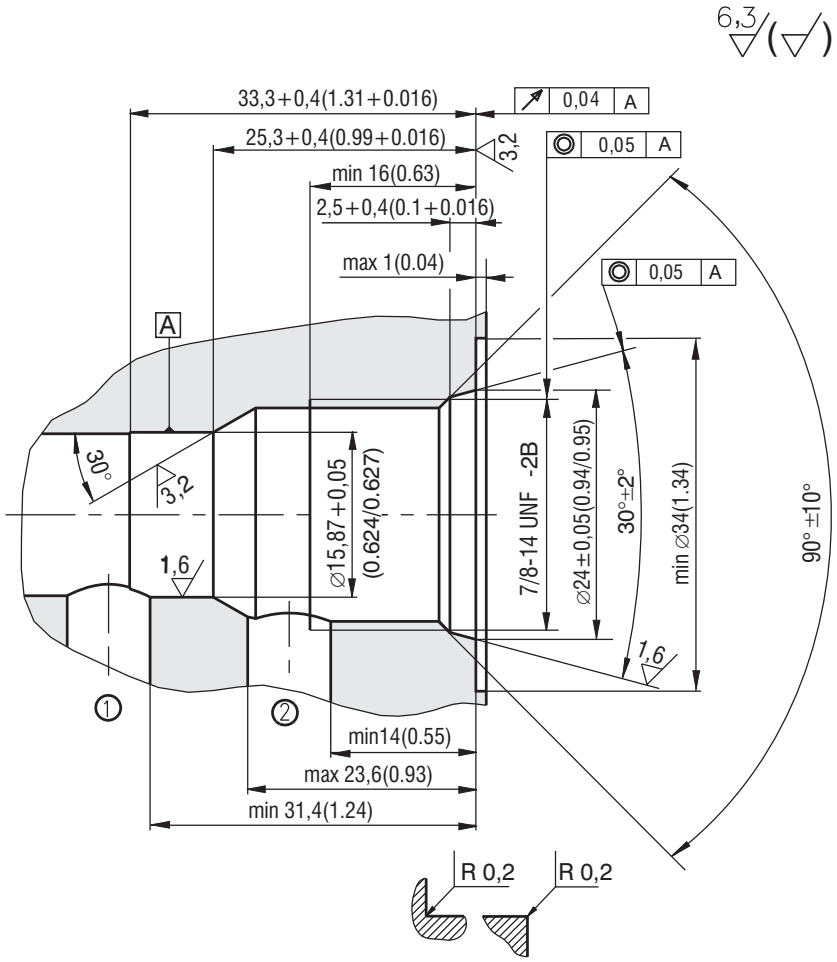


High performance valve



Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters

Standard and high performance valve

Dualseal - PU	O-ring - NBR	O-ring - Viton	Ordering number
13,47 x 15,87 x 3,1 (1pc.)	19,4 x 2,1 (1pc.)	-	18960400
13,47 x 15,87 x 3,1 (1pc.)	-	19,4 x 2,1 (1pc.)	18960500

Solenoid retaining nut with seal for standard valve

Type of nut	O-ring - Viton	Ordering number
Standard nut	18 x1,5 (1pc.)	20777000
Nut M2	18 x1,5 (1pc.)	20777600

Solenoid retaining nut with seal for high performance valve

Type of nut	O-ring - Viton	Ordering number
Standard nut	22 x 2 (1pc.)	15844600
Nut M2	22 x 2 (1pc.)	18961700

Caution!

- The packing foil is recyclable.
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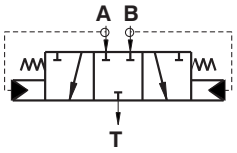
Hot Oil Shuttle Valve SD2H-LA3

M24x1,5 • p_{max} 320 bar (4640 PSI) • Q_{max} 40 $dm^3 \cdot min^{-1}$ (10.6 GPM)

HA 4080
07/2014

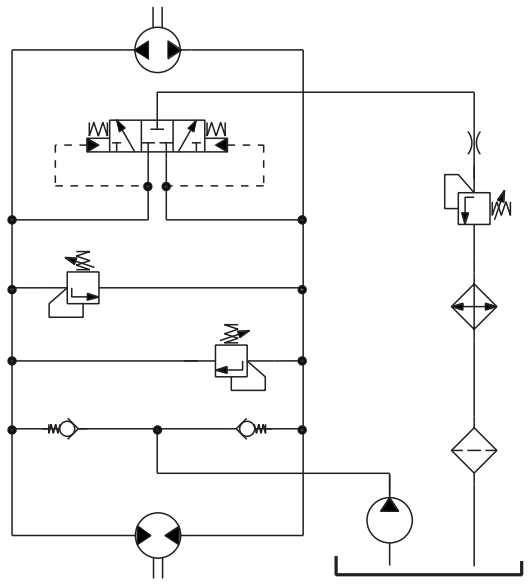
Replaces
HA 4080 03/2012

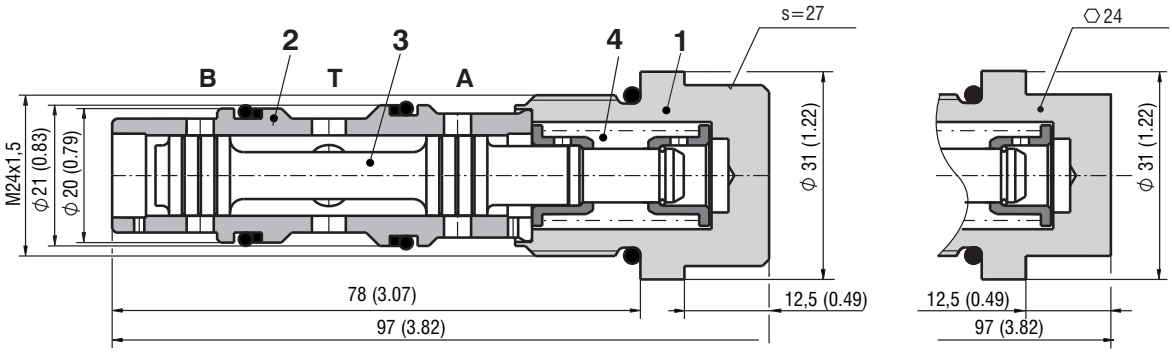
- ❑ **Simple design**
- ❑ **Reliable hydraulic control**
- ❑ **Automatic alternating fluid discharge from the circuit beyond the appliance**



Functional Description

In the terms of its design, this is a three-position, three-way hydraulically controlled valve. It consists of the threaded valve body (1), steel casing (2) and slider (3). In its normal position, the slider is kept by the centring spring (4) and the working liquid pressure shifts the valve to the extreme positions. The working liquid is brought to the slider heads from the A and B channels. As the pressure level in either channel (A or B) increases, the slider will change its position and connect the lower pressure channel to the T-shaped channel.
In particular, the valve is used in closed-loop hydrostatic systems with reverse-operating generators, where is a danger of working fluid overheating due to a small fluid volume and high transmitted throughput. The valve is connected in parallel between the hydraulic generator discharge outlets. The valve is opened due to the pressure difference in these branches; a part of the working fluid beyond the appliance passes over the pressure pretension valve and the cooler into the reservoir. At the same time, the fluid volume flowing away is being replenished into the circuit by an independent pump.





Technical Data

Cartridge thread	mm	M24 x1,5
Maximum flow	L/min (GPM)	40 (10.6)
Max. operating pressure	bar (PSI)	320 (4640)
Pressure difference in channels A and B	bar (PSI)	5 - 7 (72.5 - 101.5)
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)
Valve tightening torque	Nm (lbf-ft)	100 (73.76)
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406
Weight	kg (lb)	0,227 (0.50)

Ordering Code

SD2H-LA3 / □ □ □ □ □

Hot Oil Shuttle Valve **M24x1,5**

High performance **H**

Pressure range
7,0 bar (101.5 PSI) **070**
12,0 bar (174,0 PSI) **120**

Standard
P

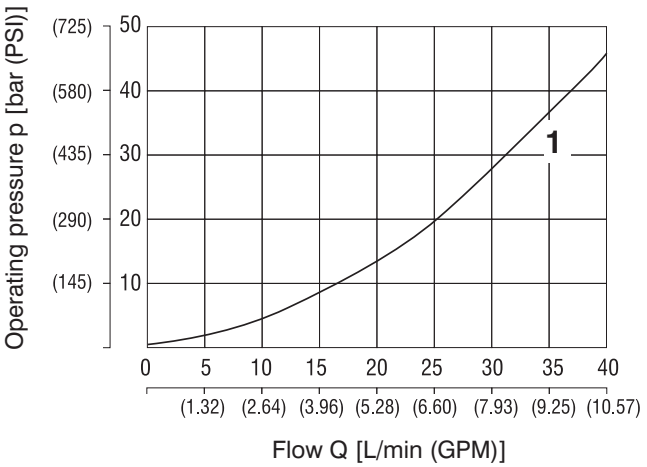
Seale
No designation NBR
V Viton (FPM)

Surface treatment
No designation. 240 h salt spray (ISO 9227)
B 900 h salt spray (ISO 9227)

Cover cup
wrench flats s=27 mm
HEX 24

p-Q Characteristics

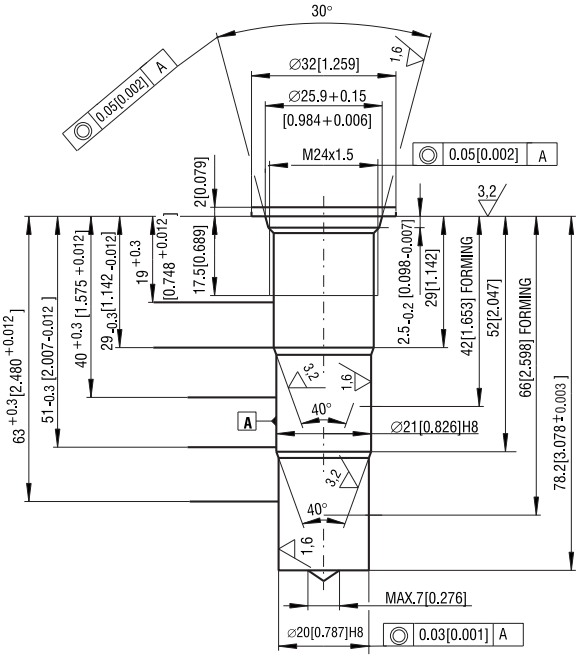
Measured at ν = 32 mm^2/s (156 SUS)



	Direction
1	B → T
1	A → T

Cavity

Dimensions in millimeters (inches)



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ARGO HYTOS

2/2 Way Solenoid Operated Directional Control Poppet Valve

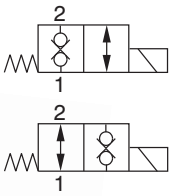
SD1E-A2

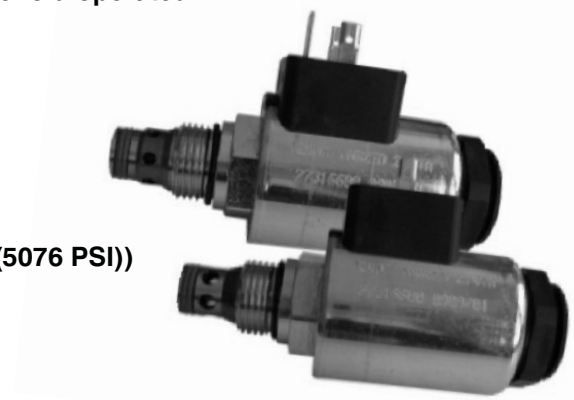
3/4-16 UNF • p_{max} 350 bar (5076 PSI) • Q_{max} 30 L/min (7.9 GPM)

HA 4070
3/2013

Replaces
HA 4047 7/2012

- ❑ **2/2 way cartridge poppet valves solenoid operated**
- ❑ **Manual override**
- ❑ **High transmitted power**
- ❑ **Leakfree**
  (Less than 3 drops/min at 350 bar ((5076 PSI))





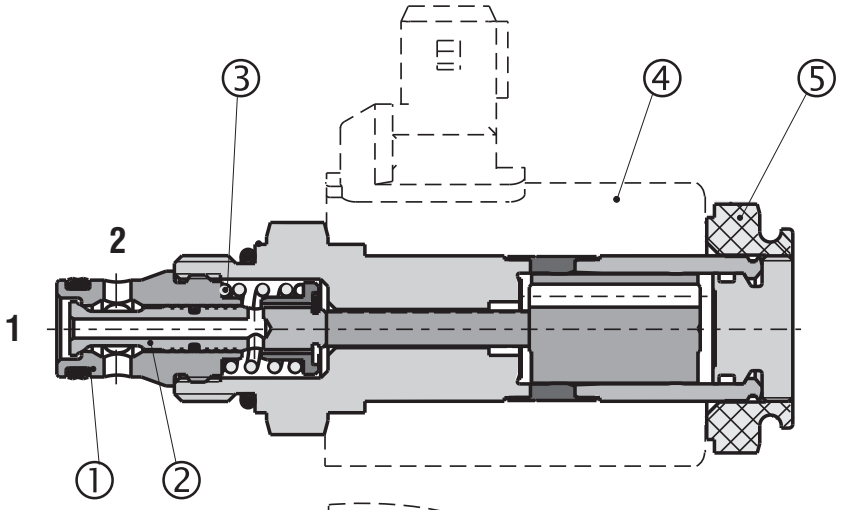
Functional Description

The directly controlled two-way two-position directional control poppet valve is used to open or close the medium flow to the consumer and, simultaneously, from the consumer to discharge. The typical example is control of a single-action cylinder. The control valve consists of the valve saddle (1), poppet (2), return spring (3) and controling electromagnet (4). The opening and closing of the valve is ensured by the electromagnet controlled poppet which sits on the seat and guarantees it is in the closed, leak-free position. When energized, the valve allows free flow in both directions, 1-2 or 2-1.

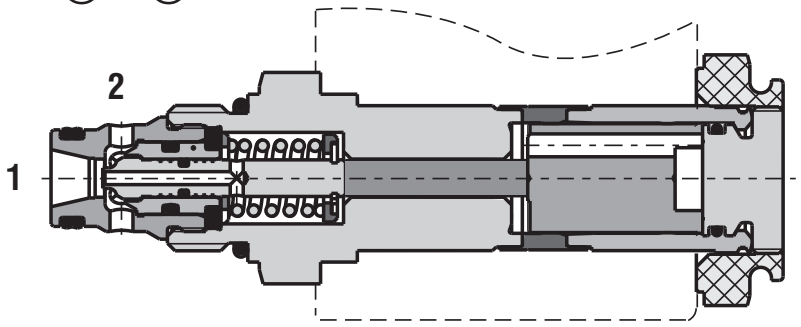
Coils are available for both DC or AC voltage. The solenoid coil can be replaced or adjusted up to 360 ° by loosening the fixing nut (5). The solenoid is zinc coated.

Note:
The valves are supplied without solenoid coils. The solenoid coil, the terminal box and the housing body for line mounting have to be ordered separately.

Designation 2S5



Designation 2S6



Ordering Code

SD1E-A2 / □ □ □ □

2/2 Way Solenoid Operated Directional Control Poppet Valve 3/4-16UNF

High Performance **H**

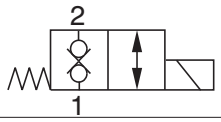
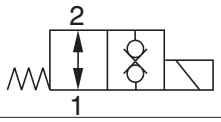
Designation
Refer to the table with functional symbols

Seals
No designation NBR
V FPM (Viton)

Manual override
No designation standard
M2 covered with rubber boot
M5 socket head screw
M9 without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA 0018.

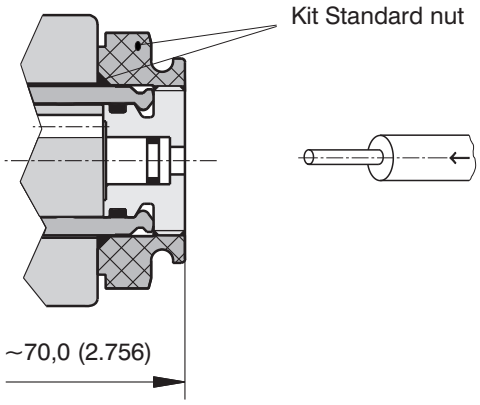
Functional Symbols

Designation	Symbol	Designation	Symbol
2S5		**2S6**	

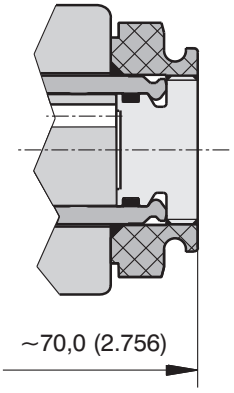
Manual Override

Dimensions in millimeters (inches)

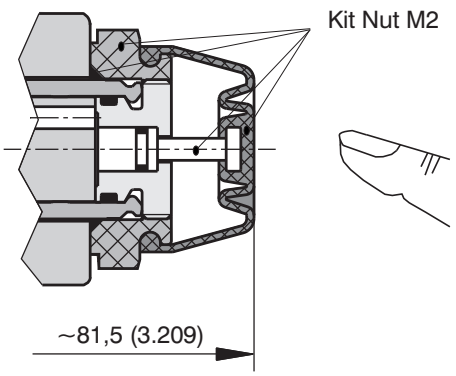
No designation - standard



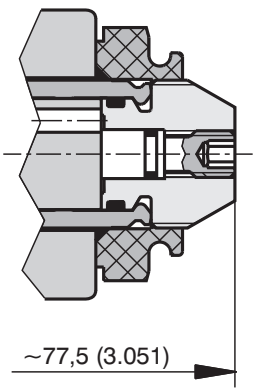
Designation **M9 -** without manual override



Designation **M2 -** covered with rubber boot



Designation **M5 -** with socket head screw 2.5 (0.098)



Technical Data

Valve size		A2
Cartridge cavity		3/4-16 UNF-2A
Maximum flow	L/min (GPM)	30 (7.9)
Max. operating pressure	bar (PSI)	350 (5076)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range	°C (°F)	-20 ... 80 (-4 ... 176)
Ambient temperature, max.	°C (°F)	-20 ... 80 (-4 ...176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406
Group coils [1)]		C19B
Permissible rated voltage variation	%	±15% AC,DC
Max. switching frequency	1/h	15 000
Duty cycle	%	100
Enclosure type to EN 60529		IP 65; IP 67[1)]
Service life	cycles	10^7
Valve tightening torque	Nm (lbf.ft)	30+2 (22.127+1.475)
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.213+0.738)
Weight	kg(lbs)	0,19 (0.42)
Mounting position		unrestricted
Valve body (data sheed HA 0018)		SB-A2

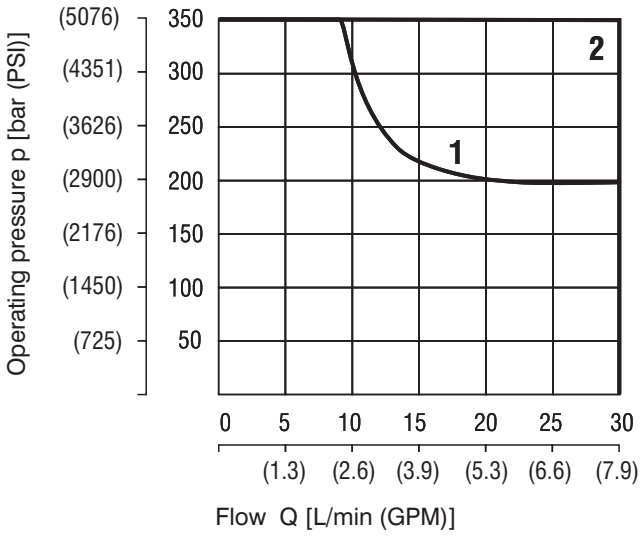
[1)] see data sheet coils HA 8007

p-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

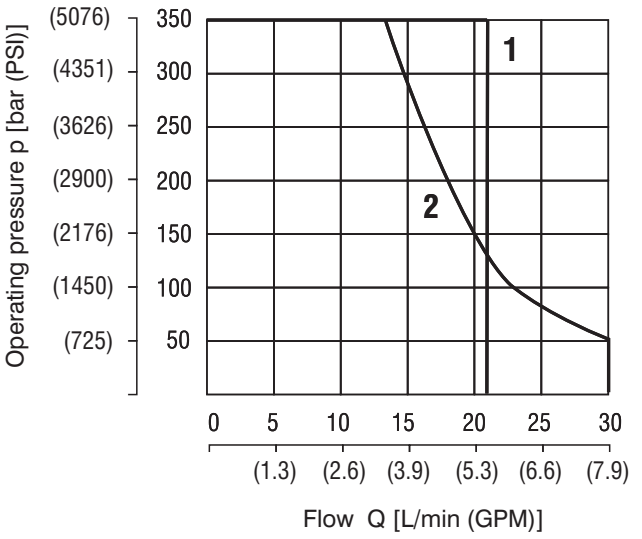
Operating limits for hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

Designation 2S5
Oil 80 °C(176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V]



	Direction
1	1→2
2	2→1

Designation 2S6
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V]



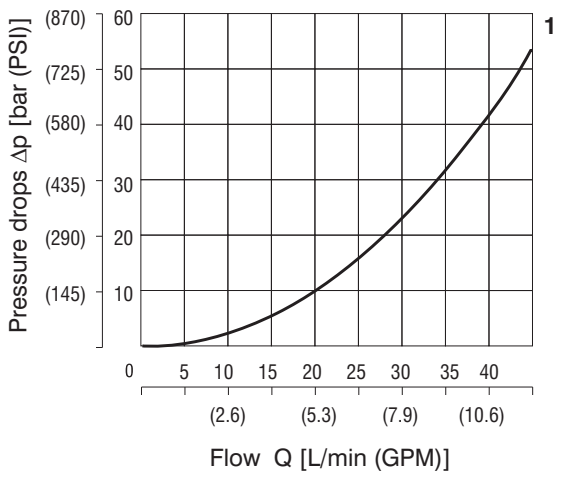
	Direction
1	2→1
2	1→2

Δp-Q Characteristics

Measured at ν = 32 mm^2/ s (156 SUS)

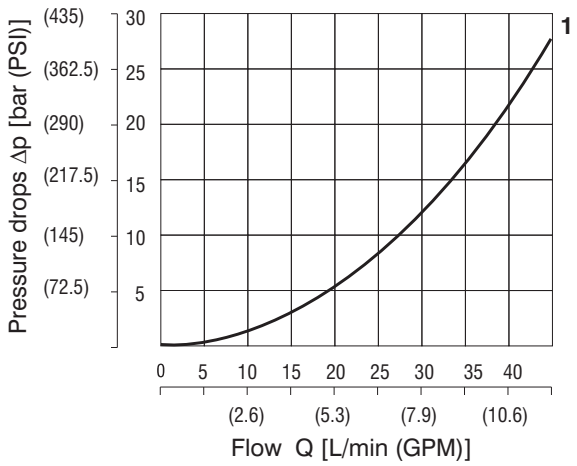
Pressure drops related to flow rate.

Designation 2S5



	Direction
1	1→2
1	2→1

Designation 2S6

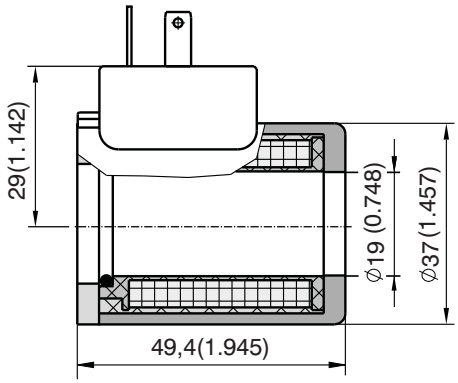


	Direction
1	1→2
1	2→1

Type of the Solenoid Coils

Dimensions in millimeters (inches)

Coil C19B
with connector **E1 (E2)**



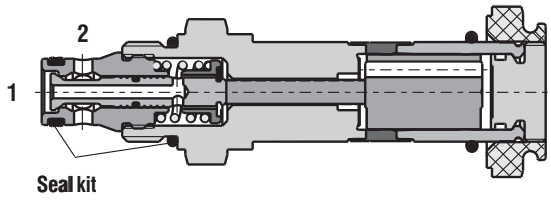
Note:
Example of most frequent coil types.
For complete range of SD1E-A2 valve coils with technical information about voltage, enclosure type, terminal box please refer to coil data sheet HA 8007.

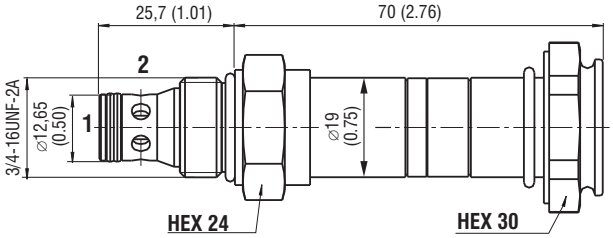
			High performance
Voltage	**Connector**		SD1E-A2 / **H...**
			Type code
12 VDC	EN 175301-803-A		C19B-01200E1-6NA
24 VDC	EN 175301-803-A		C19B-02400E1-25,75NA
12 VDC	AMP Junior Timer		C19B-01200E3-6NA
24 VDC	AMP Junior Timer		C19B-02400E3-25,75NA
120 VAC	EN 175301-803-A with integrated rectifier		C19B-12060E5-494NA
230 VAC	EN 175301-803-A with integrated rectifier		C19B-23050E5-1653NA
120 VAC	EN 175301-803-A	Use the connector plug with rectifier!	C19B-10600E1-494NA
230 VAC	EN 175301-803-A	Use the connector plug with rectifier!	C19B-20500E1-1653NA

Valve Dimensions

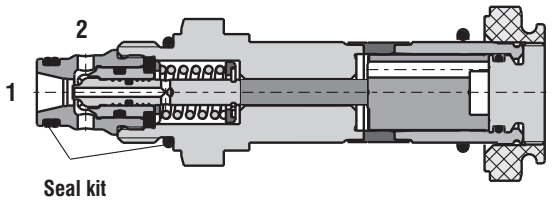
Dimensions in millimeters (inches)

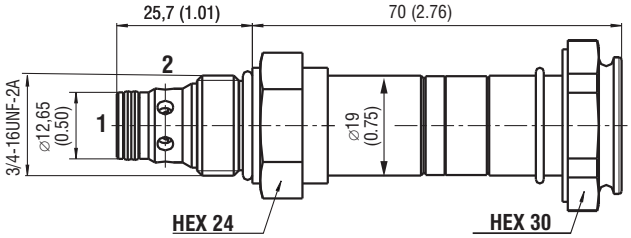
Designation 2S5





Designation 2S6

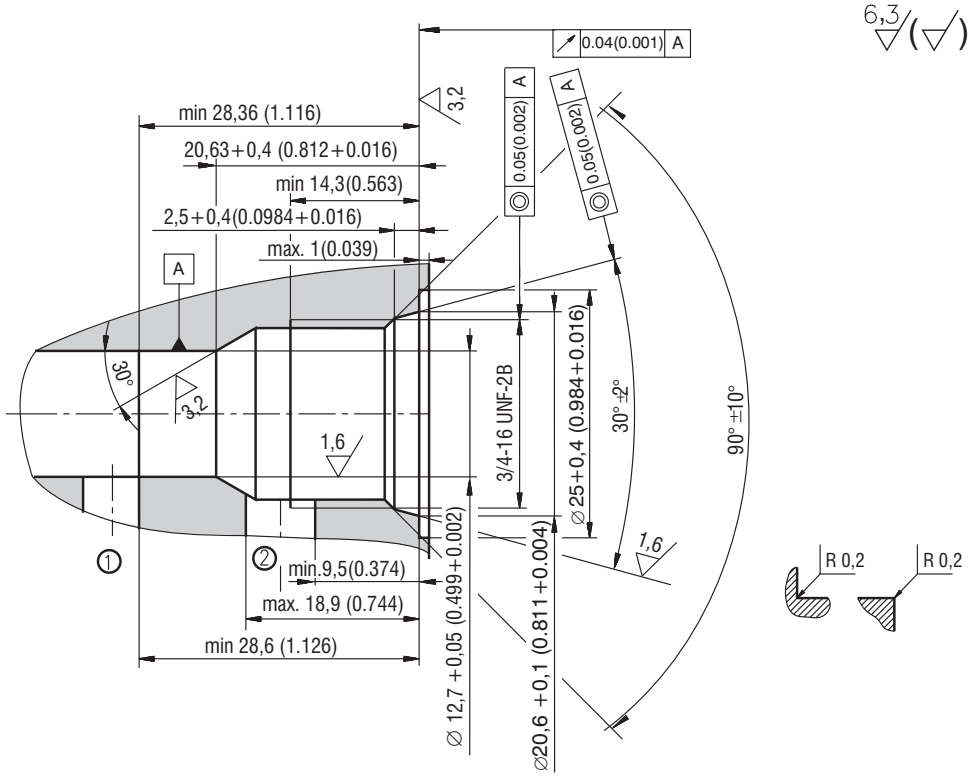




Seal kit - see Spare Parts
Dualseal - PU
O-ring

Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters (inches)

Seal kit

Dualseal - PU	O-ring - NBR	O-ring - Viton	Ordering number
10,3 x 12,7 x 3,1 (1pc.)	17 x 1,8 (1pc.)	-	20776700
10,3 x 12,7 x 3,1 (1pc.)	-	17,17 x 1,78 (1pc.)	17014300

Type of nut

Kit Standard nut	Nut +O-ring	20777000
Kit Nut M2	Nut +O-ring + Rubber cap + Pin	20777600

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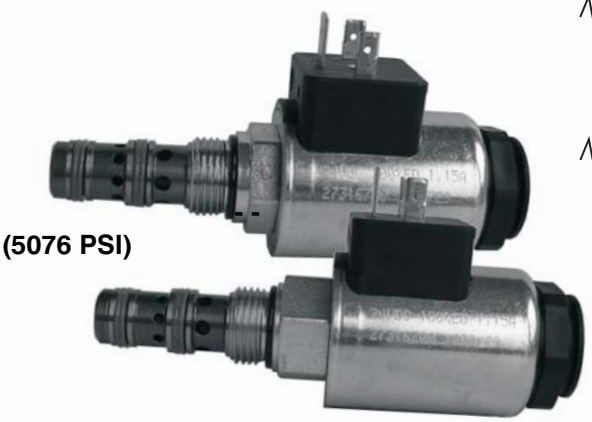
3/2 Way Solenoid Operated Directional Control Poppet Valve

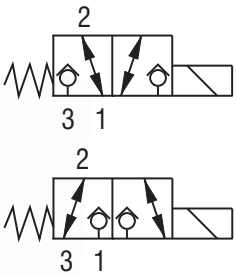
SD1E-A3

HA 4071
3/2013

3/4-16 UNF • p_{max} 350 bar (5076 PSI) • Q_{max} 30 L/min (7.93 GPM)

- ❑ **3/2 way cartridge poppet valves solenoid operated**
- ❑ **Manual override**
- ❑ **High transmitted power**
- ❑ **Leakfree -**
  - less than 3 drops/min at 350 bar (5076 PSI)



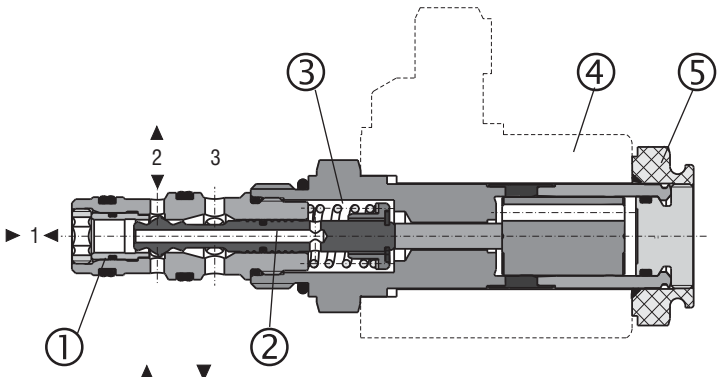


Functional Description

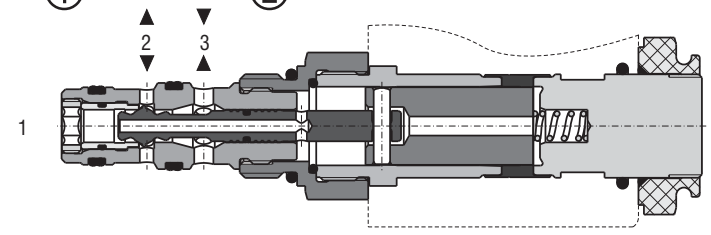
The directly controlled three-way two-position poppet vavle is used to open or close the medium flow to the consumer and, simultaneously, from the consumer to discharge. A typical example is control of a single-action cylinder. The control valve consists of the two seat bush (1), poppet (2), return spring (3) and controlling solenoid (4). Design 2S7 -when the coil is without current, the spring forces the poppet into the rear seat (closer to the solenoid) allowing free flow through canal 2 to canal 1 or vice versa. Energizing the solenoid forces the poppet closing the front seat. Will connect canals 1 and 2. Design 2s8 – in de-energized mode, the spring forces the poppet through the anchor to the front seat (away from the solenoid) allowing free flow through canal 2 to canal 3 or vice versa. Energizing the solenoid forces the poppet closing the rear seat. Will connect canals 1 and 2. Coils are available for both DC or AC voltage. The solenoid coil can be replaced or adjusted up to 360 ° by loosening the fixing nut (5). The solenoid is zinc coated.

Note: The valves are supplied without solenoid coils. The solenoid coil, the terminal box and the housing body for line mounting have to be ordered separately.

Designation **2S7**



Designation **2S8**



Ordering Code

SD1E-A3 / □ □ □ □

3/2 Way Solenoid Operated Directional Control Poppet Valve 3/4-16UNF

High performance **H**

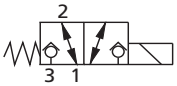
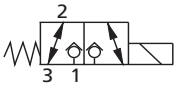
Description
Refer to the table with functional symbols

Seals
No designation NBR
V FPM (Viton)

Manual override
No designation standard only for 2S7
M2 covered with rubber boot only for 2S7
M5 socket head screw only for 2S7
M9 without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA 0018.

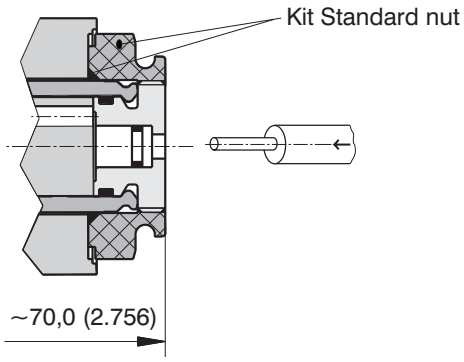
Functional Symbols

Designation	Symbol	Designation	Symbol
2S7		**2S8**	

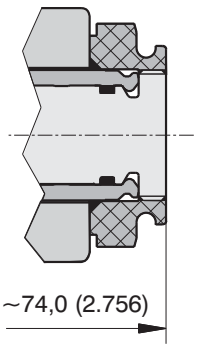
Manual Override

Dimensions in millimeters (inches)

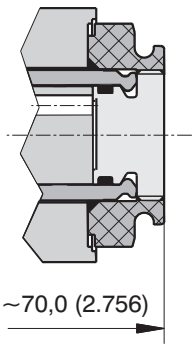
No designation - only for **2S7**



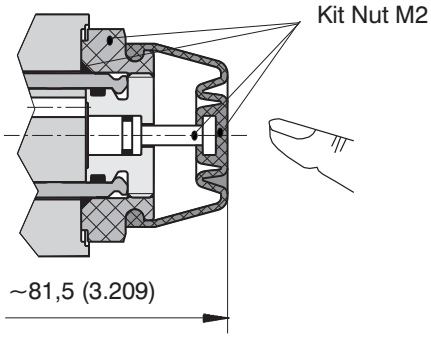
Designation **M9 -** only for **2S8**
without manual override



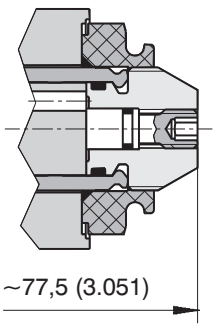
Designation **M9 -** only for **2S7**
without manual override



Designation **M2 -** only for **2S7**
covered with rubber boot



Designation **M5 -** only for **2S7**
with socket head screw 2.5 (0.098)



Technical Data

Valve size		A3
Cartridge cavity		3/4-16 UNF - 2A
Maximum flow	L/min (GPM)	30 (7.9)
Max. operating pressure	bar (PSI)	350 (5076)
Pressure drop	bar (PSI)	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range	°C (°F)	-20 ... 80 (-4 ... 176)
Ambient temperature, max.	°C (°F)	-20 ... 80 (-4 ... 176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406
Group coils [1)]		C19B
Permissible rated voltage variation	%	AC, DC ±15
Max. switching frequency	1/h	15 000
Duty cycle	%	100
Service life	cycles	10^7
Enclosure type to EN 60529		IP 65; IP 67 see data sheet coils HA 8007
Valve tightening torque	Nm (lbf.ft)	30+2 (22.13+1.48)
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.21+0.74)
Weight	kg(lbs)	2S7 0,205 (0.452) 2S8 0,215 (0.474)
Mounting position		unrestricted
Valve body (data sheed HA 0018)		SB-A3

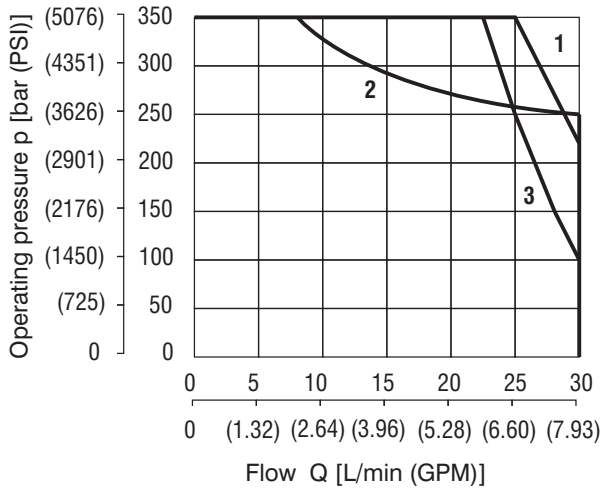
p-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Operating limits for hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

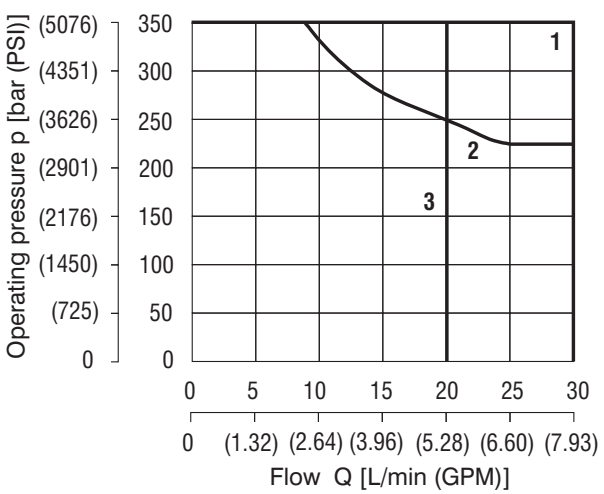
Designation 2S7
Oil 80 °C(176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V]

	Direction
1	2→1
2	2→3
3	1→2 3→2



Designation 2S8
Oil 80 °C(176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un -10% [V]

	Direction
1	1→2 3→2
2	2→3
3	2→1



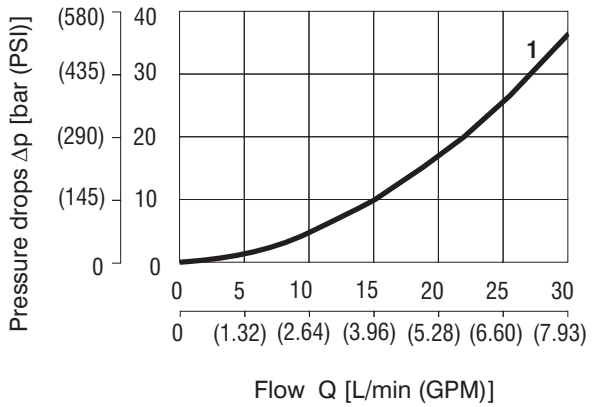
Δp-Q Characteristics

Measured at $\nu = 32\ mm^2/s$ (156 SUS)

Pressure drops related to flow rate.

Designation 2S7, Designation 2S8

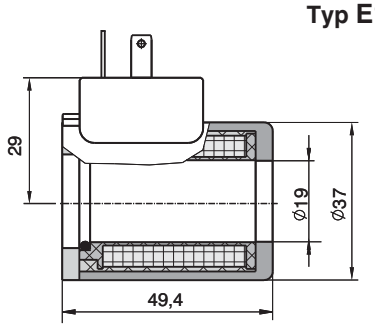
	Direction
1	1→2 2→1 2→3 3→2



Type of the Solenoid Coils

Dimensions in millimeters (inches)

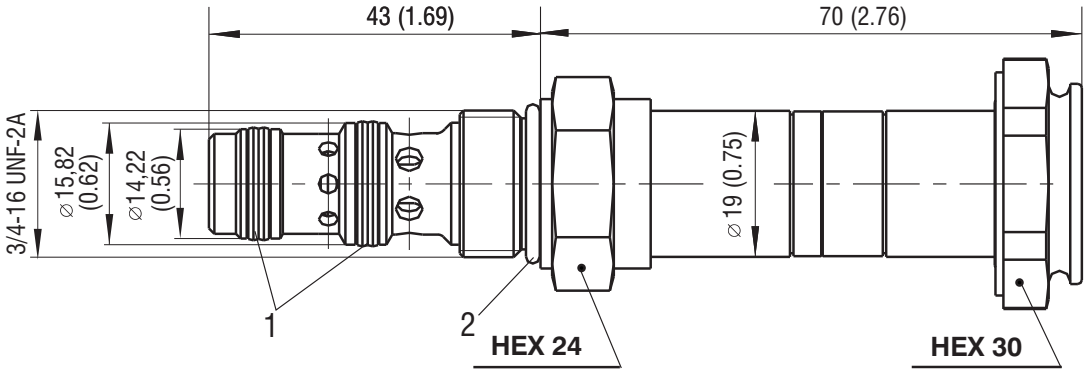
Note:
Example of most frequent coil types.
For complete range of coils with technical information about voltage, enclosure type, terminal box please refer to coil data sheet HA 8007.

Coil example	Voltage	Connector	Type code
Typ E1  *Use the connector plug with rectifier!	12 VDC	EN 175301-803-A	C19B-01200E1-6NA
	24 VDC	EN 175301-803-A	C19B-02400E1-25,75NA
	12 VDC	AMP Junior Timer	C19B-01200E3-6NA
	24 VDC	AMP Junior Time	C19B-02400E3-25,75NA
	120 VAC	EN 175301-803-A with integrated rectifier	C19B-12060E5-494NA
	230 VAC	EN 175301-803-A with integrated rectifier	C19B-23050E5-1653NA
	120 VAC*	EN 175301-803-A	C19B-10600E1-494NA
	230 VAC*	EN 175301-803-A	C19B-20500E1-1653NA

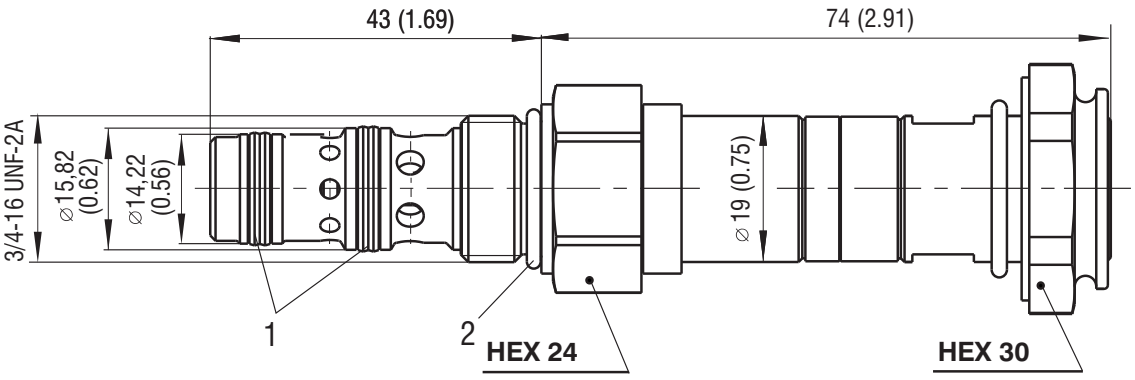
Valve Dimensions

Dimensions in millimeters (inches)

Designation 2S7



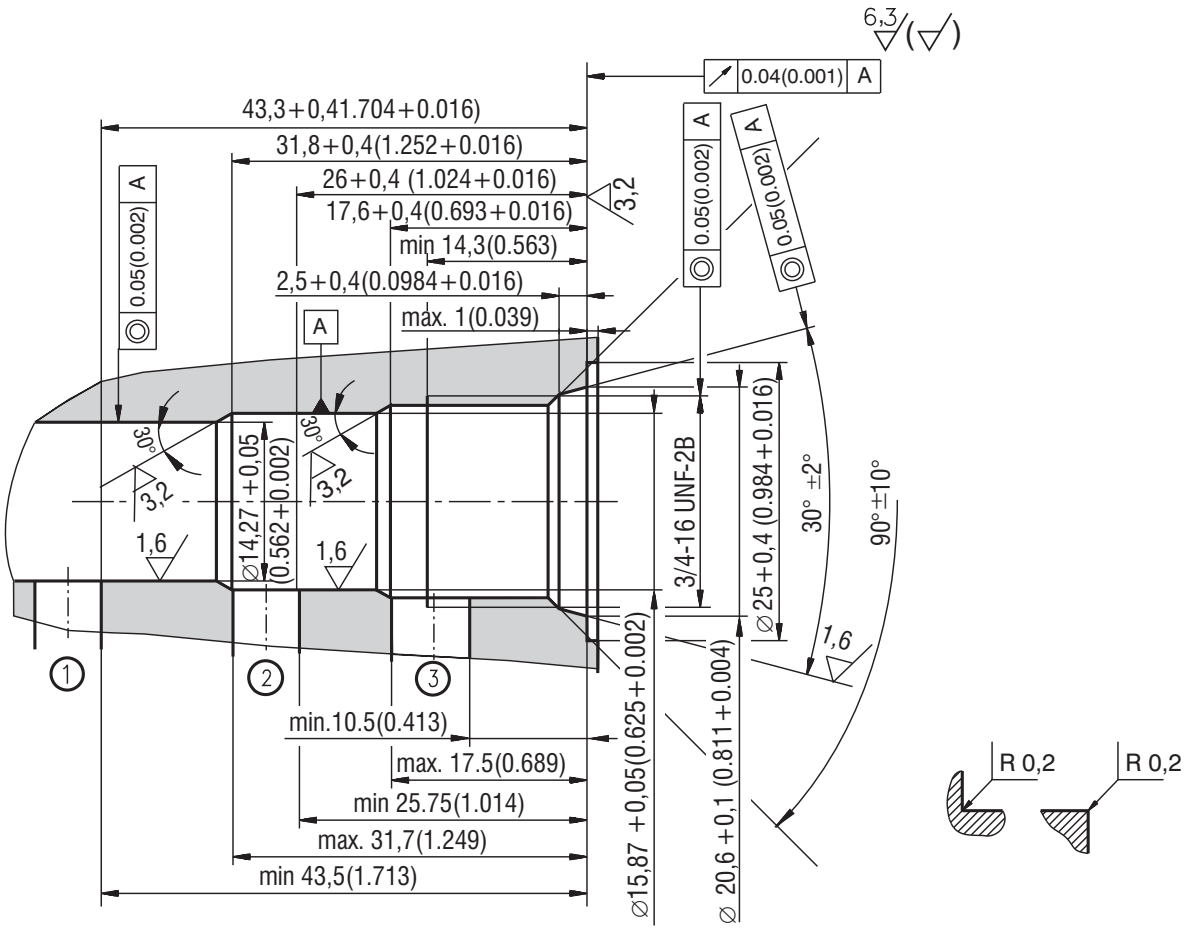
Designation 2S8



Seal kit - see Spare Parts
1. Dualseal - PU
2. O-ring

Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters (inches)

Seal kit

Dualseal - PU	O-ring - NBR	O-ring - Viton	Ordering number
11,87 x 14,27 x 3,1 (1ks)	17 x 1,8 (1 ks)	-	15661700
13,4 x 15,87 x 3,1 (1ks)			
11,87 x 14,27 x 3,1 (1ks)	-	17,17 x 1,78 (1 ks)	20777200
13,4 x 15,87 x 3,1 (1ks)			

Type of nut

Kit Standard nut	Nut +O-ring	20777000
Kit Nut M2	Nut +O-ring + Rubber cap + Pin	20777600

Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.
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2/2 Hand Operated Directional Control Valves Poppet Type

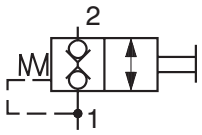
SD1M-A2/S

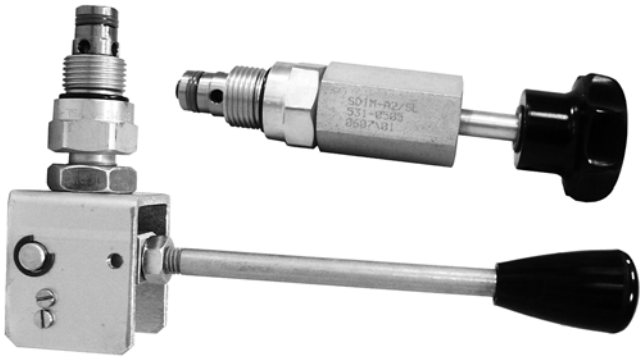
3/4-16 UNF • p_{max} 250 bar (3626 PSI) • Q_{max} 20 L/min (5.3 GPM)

HA 4051
7/2012

Replaces
HA 4060 10/2007

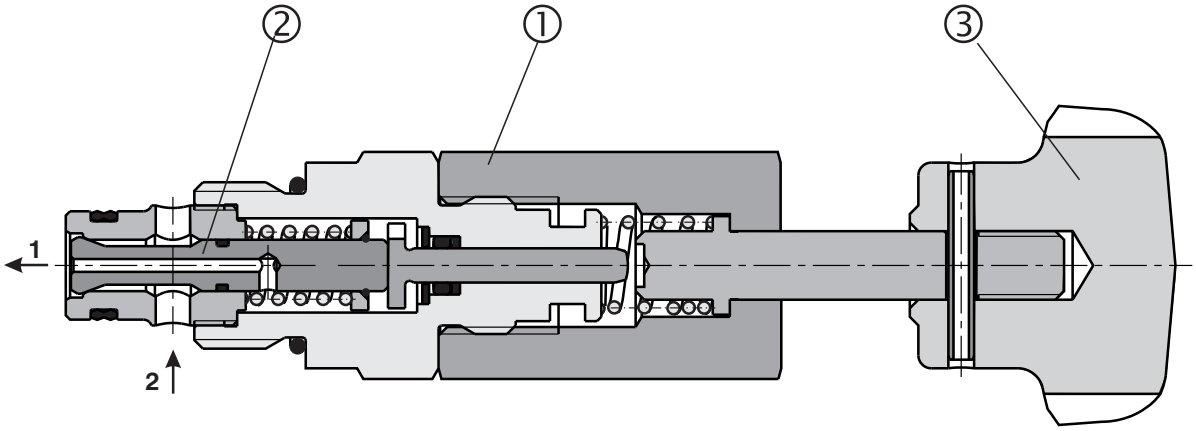
- ❑ **Poppet design - leakfree closure**
- ❑ **Simple design**
- ❑ **2 models**





Functional Description

The 2/2 poppet type directional control valves are designed to check and open flow of the hydraulic fluid. Additionally, they can also provide flow throttling.
The valve consists of the housing (1), the poppet (2) and the actuating section (3).
Opening and closing of the valve is handled by a poppet. The poppet is pushed onto the seat by a spring, thus providing leakfree closure of the valve. The poppet can be operated by a push hand knob or a hand lever. The model with the hand knob (3) has 2 operating positions. After releasing the hand knob, the spring returns the valve into its closed position. The model with a hand lever in fact also has only two operating positions, but the hand lever can be set to 3. position. These are as follows:
Position **0** , middle hand lever position - the valve is closed by means of the return spring.
Position **I.** opens the valve against the return spring.
Position **II.** actuates a contact (with the model with micro switch), e.g. in order to turn on the pump motor by means of a switching relay. With the model without microswitch, this position also exists, but it does not have any function.
Caution! The preferential flow direction is 2 → 1 because of smaller operating forces.
The basic surface treatment of the valve is zinc coating.



Ordering Code

SD1M-A2/SL □ □

2 Way Poppet Type Valve
Hand Operated - 3/4-16 UNF

Description
Normally closed

Seals
no designation Standard (NBR)
V Viton (FPM)

Model
1 with hand knob
2 with hand lever without microswitch
3 with hand lever with microswitch

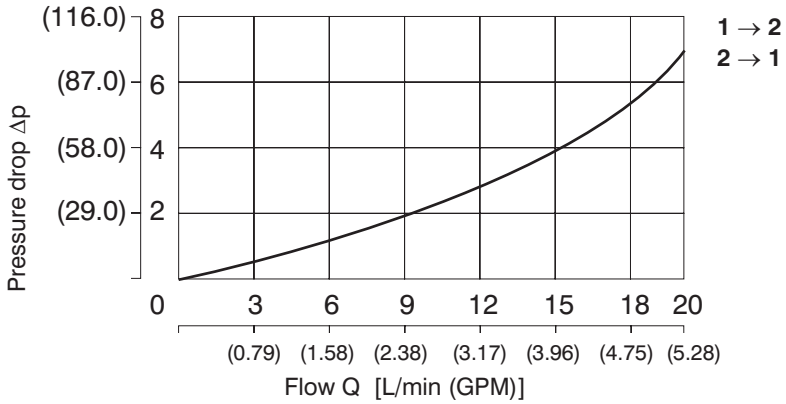
Technical Data

Valve size		A2
Nominal size	mm (US)	3/4-16 UNF-2A (according to ISO 17209)
Maximum flow	L/min (GPM)	20 (5.28)
Max. operating pressure	bar (PSI)	250 (3625.9)
Pressure drop	bar (PSI)	see Δp characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range - NBR	°C (°F)	-30 ... +100 (-22... +212)
Fluid temperature range - Viton	°C (°F)	-20 ... +120 (-4 ... +248)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406
Weight - model 1 model 2 model 3	kg (lbs)	0.274 (0.604) 0.381 (0.840) 0.383 (0.844)
Service life	cycles	10^6
Mounting position		unrestricted
Valve body (data sheet HA 0018)		SB-A2
Microswitch		D2SW-3D
Enclosure type of microswitch to EN 60529		IP 67
Microswitch data		2A - 250 V ~ 0,1A - 30 V =

Δp-Q Characteristics

Measured at ν = 32 mm^2/s (156 SUS)

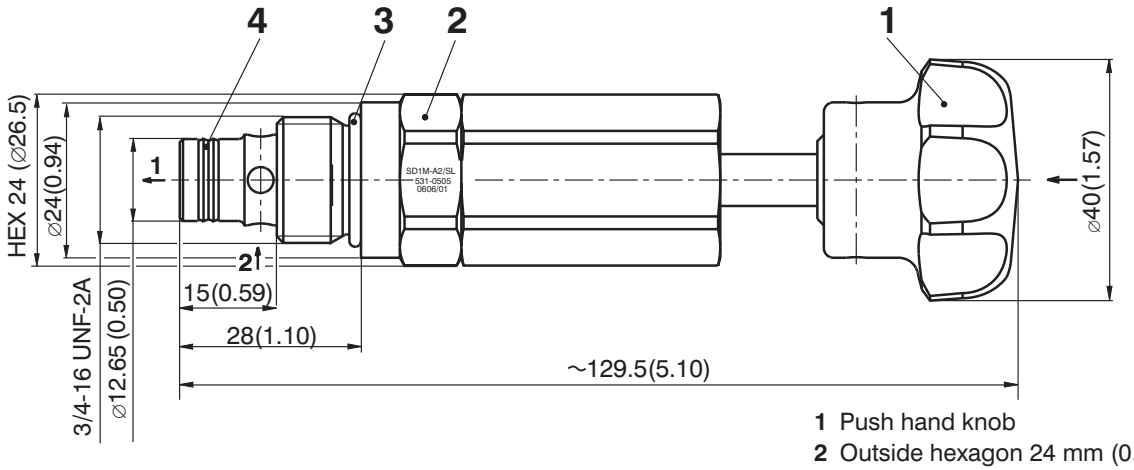
Pressure drop Δp related to flow rate.



Valve Dimensions

Dimensions in millimeters (inches)

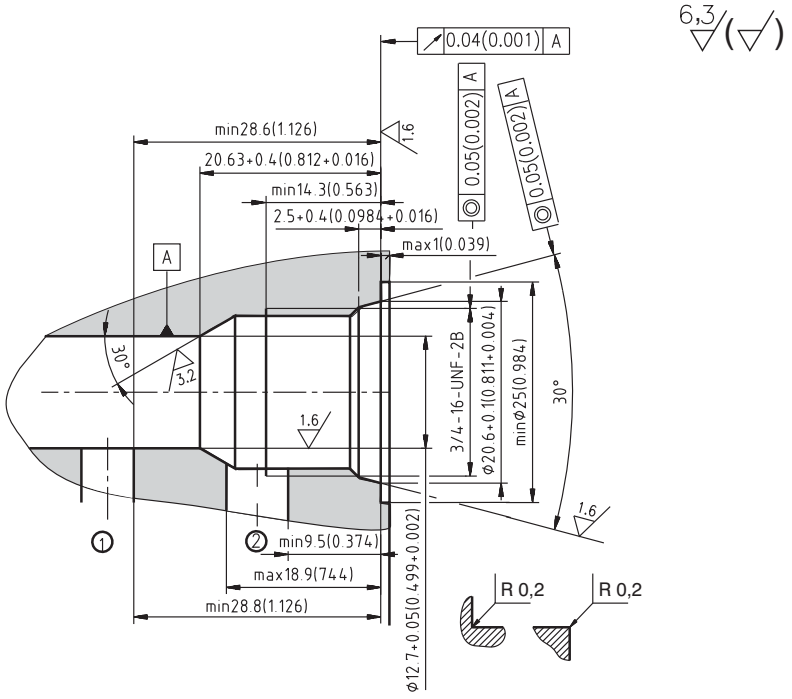
Typ: SD1M-A2/SL1



1 Push hand knob
2 Outside hexagon 24 mm (0.94 inch)
Tightening torque 30 Nm (22.1 lbs)
3 Seal: O-ring 17 x 1,8
(supplied with valve)
4 Seal:
Dualseal 10,3 x 12,7 x 3,1
(supplied with valve)

Cavity

Dimensions in millimeters (inches)



Spare Parts

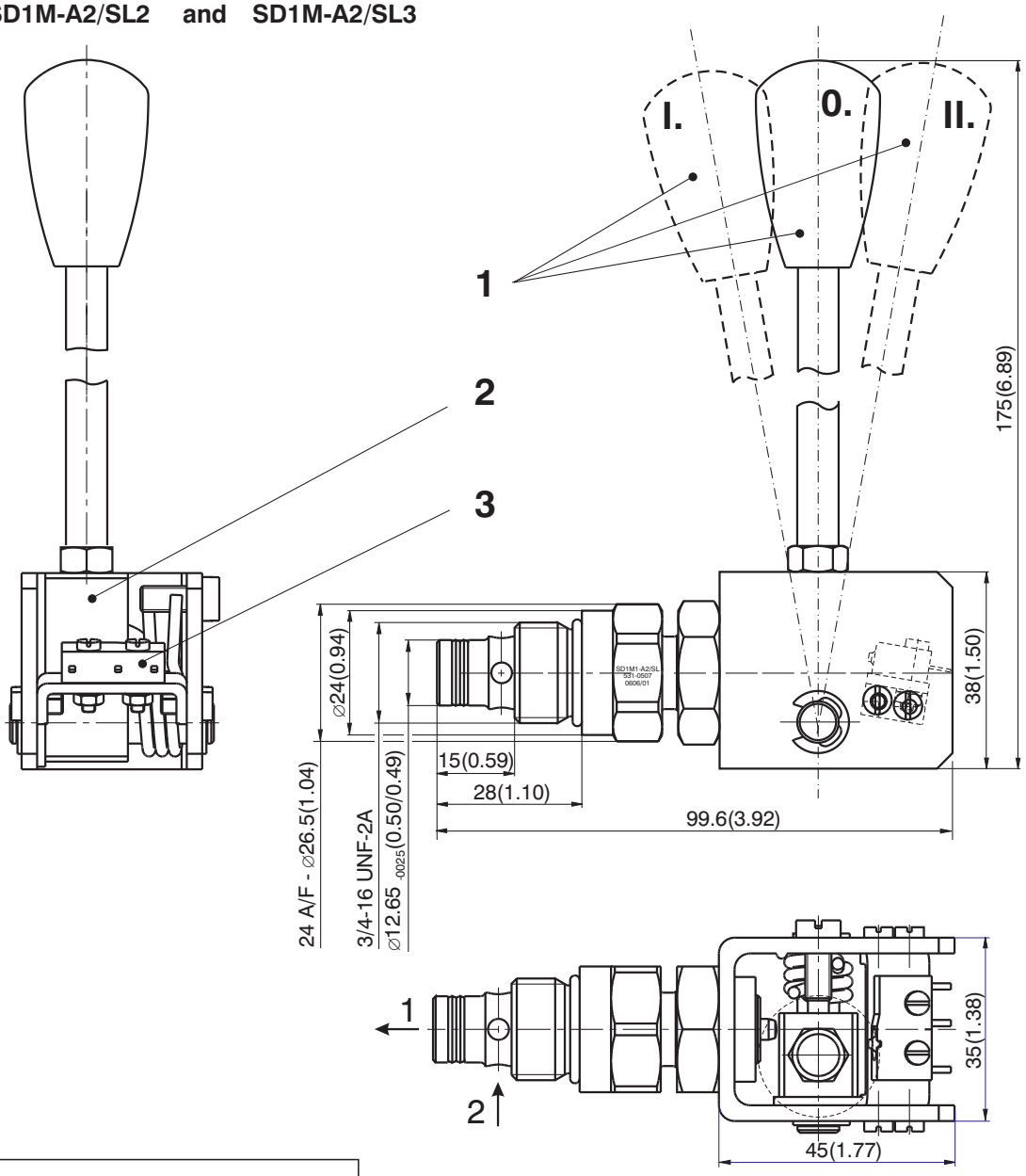
Seal kit

Type	Dimensions, quantity		Ordering number
	O-Ring	Dualseal - PU	
Standard - NBR	17 x 1,8 (1ks)	10,3 x 12,7 x 3,1 (1ks)	22752500
Viton	17,17x1,78 (1ks)	10,3 x 12,7 x 3,1 (1ks)	22752600

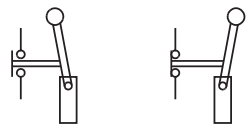
Valve Dimensions

Dimensions in millimeters (inches)

Typ: SD1M-A2/SL2 and SD1M-A2/SL3



Electric circuit



Position 0, I. Position II.

1 Hand lever
- **0** middle arrested position
- **I.** first position - opens the valve
- **II.** second position - closes the contact of the microswitch

2 Segment of the hand lever

3 Microswitch -only with SD1M-A2/SL3

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2/2 Way Solenoid Operated Directional Control Valves Spool Type

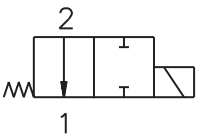
SD2E-A2

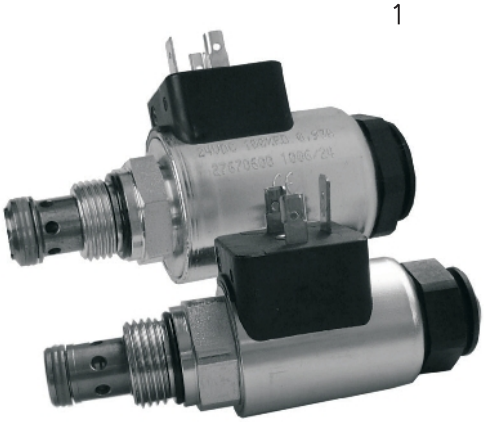
3/4-16 UNF • p_{max} 350 bar (5076 PSI) • Q_{max} 30 L/min (7.9 GPM)

HA 4040 07/2014

Replaces HA 4040 07/2013

- ❑ **Hardened and precision working parts**
- ❑ **High flow capacity**
- ❑ **High transmitted hydraulic power**
- ❑ **Wide range of manual overrides available**
- ❑ **All ports may be fully pressurized**
- ❑ **Variety of optional spools connections available**
- ❑ **Coil interchangeability with all series SD*- A* valves**





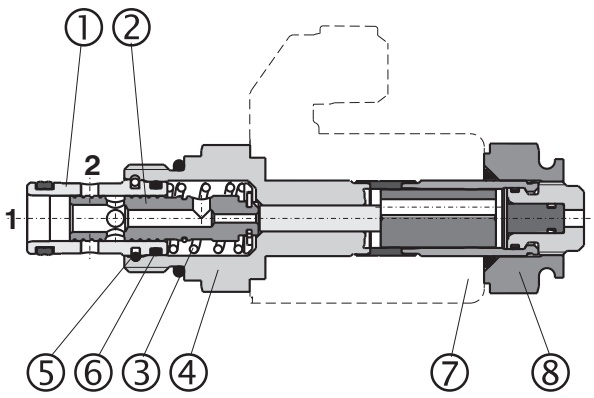
Functional Description

The directly operated 2/2 way solenoid actuated spool valve controls in the first line the start and stop function of the oil flow. The valve consists of the valve body (1), control spool (2), return spring (3), cartridge with actuating system (4) and of the solenoid coil (7) that is mounted on the actuating system. The valve bushing is screwed into the cartridge part (4).

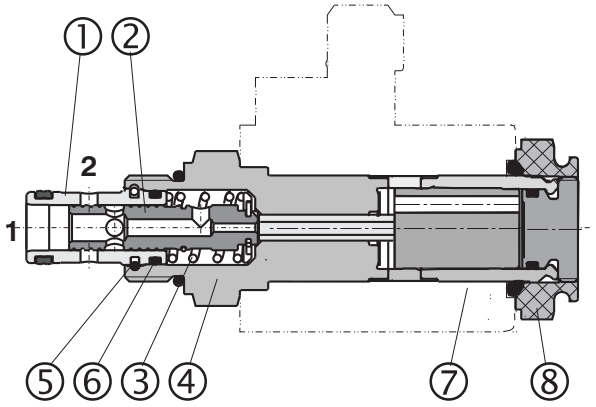
The valve bushing is fixed in the cartridge by a wire ring (5) and sealed with the seal ring (6). Separation of the valve bushing and the cartridge prevent transmitting the stresses, which could be caused by too high tightening torques. The DC solenoid coils can be delivered for 12 V and 24 V supply voltages. For AC applications 120 V/ 60 Hz or 230 V/ 50 Hz, the suitable rectifiers for the Light line solenoid coils are available, with them being mounted in an additional terminal box. With the high power solenoid coils in AC variants, the rectifiers are integrated directly in the connector. By loosening the fixing nut (8), the solenoid coil can be replaced or turned in the range of 360°. The valve body is zinc coated.

Note:
The valves are supplied without solenoids coils. The solenoid coil, the terminal box and the housing body for line mounting have to be ordered separately.

Light line



High performance



Ordering Code

SD2E-A2 / □ □ □ □

2/2 Way Solenoid Operated Directional Control Valve Spool

Light line **L**
High performance **H**

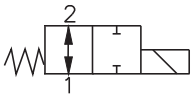
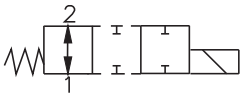
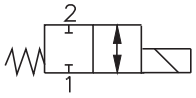
Description
Refer to the table with functional symbols

Seals
No designation NBR
V FPM (Viton)

Manual override
No designation standard
M5 socket head screw
M9 without manual override

Solenoid coil, terminal box and body for line mounting have to be ordered separately. For selection of solenoid coil and terminal box type use catalogue HA 8007. For selection of valve body for in-line mounting use catalogue HA0018.

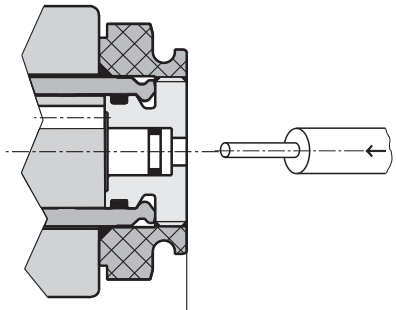
Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
2111			2112		

Manual Override

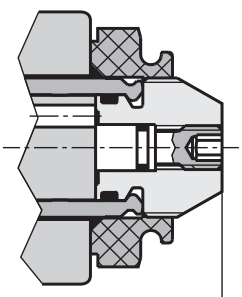
Dimensions in millimeters (inches)

No designation - Standard



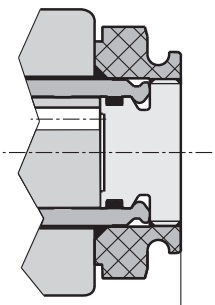
Light line ~70.2(2.63)
High performance ~70,0 (2.76)

Designation **M5** - with socket head 2.5 (0.098)



Light line ~77,2(3.04)
High performance ~77,5(3.05)

Designation **M9** - without manual override



Light line ~67,2 (2.65)
High performance ~70,0 (2.76)

Technical Data

		Light line	High performance
Cartridge thread		3/4-16 UNF-2B	
Maximum flow	L/min (GPM)	20 (5.3)	30 (7.9)
Max. operating pressure	bar (PSI)	250 (3626)	350 (5076)
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Coil groups [1]		C14B	C19B
Fluid temperature range	°C (°F)	-20 ... 60 (-4 ... 140)	-20 ... 80 (-4 ...176)
Ambient temperature, max.	°C (°F)	-20 ... 50 (-4 ...122)	-20 ... 80 (-4 ... 176)
Viscosity range	mm^2/s (SUS)	10 ... 500 (49 ... 2450)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406 (2006)	
Permissible rated voltage variation	%	AC,DC ±10	AC,DC ±15
Max. switching frequency	1/h	15 000	
Duty cycle	%	100	
Enclosure type to EN 60529 [1]		IP 67 (IP 65)	
Service life	cycles	10^7	
Valve tightening torque	Nm (lbf.ft)	30+2 (22.127+1.475)	
Plastic nut tightening torque	Nm (lbf.ft)	3+1 (2.213+0.738)	3+1 (2.213+0.738)
Weight	kg(lbs)	0,10 (0.22)	0,20 (0.44)
Mounting position		unrestricted	

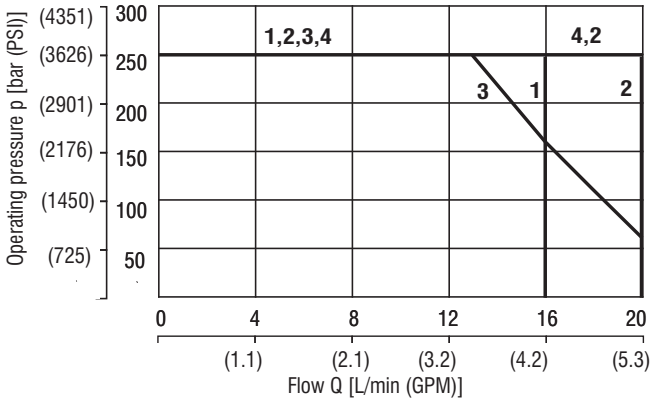
[1] see data sheet coils HA 8007

p-Q Characteristics

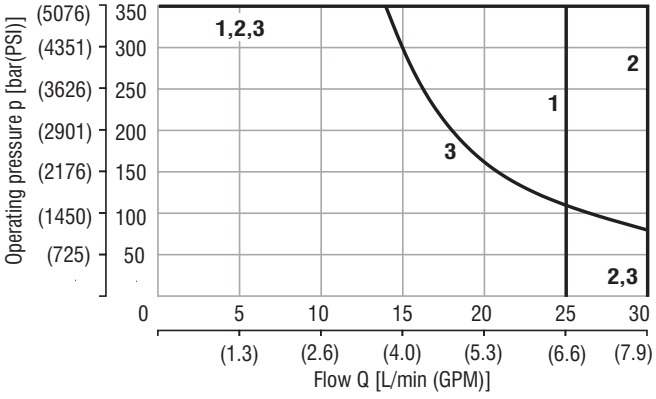
Measured at ν = 32 mm^2/s (156 SUS)

Operating limits for hydraulic power transferred by the directional valve. For respective spool type - see functional symbols.

Light line
Oil 60 °C(140 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un-10% [V] 24VDC]



High performance
Oil 80 °C (176 °F) / Ambient temperature 50 °C (122 °F)
Voltage Un-10% [V] 24VDC



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

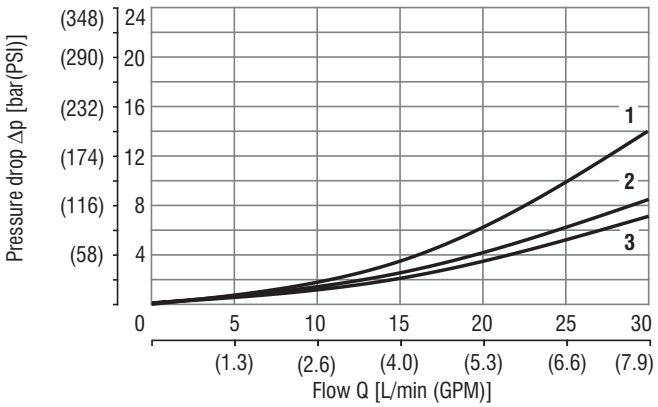
	Connection	Direction
1	2I12	2→1
2	2I12	1→2
2	2I11	2→1
3	2I11	1→2

Δp-Q Characteristics

Measured at ν = 32 mm^2/ s (156 SUS)

Pressure drops related to flow rate.

Light line + High performance

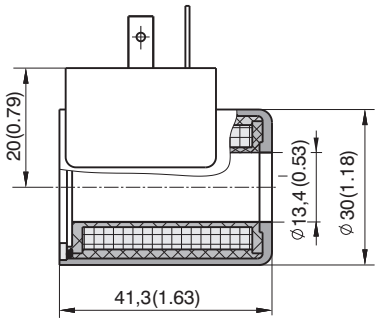


	Connection	Direction
1	2l12	1→2
1	2l12	2→1
2	2l11	1→2
3	2l11	2→1

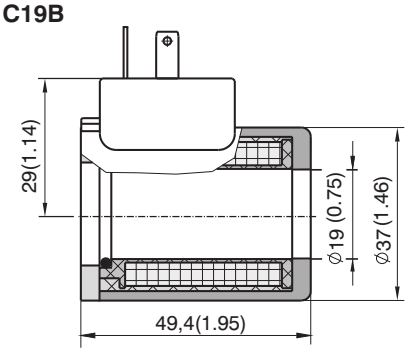
Type of the Solenoid Coils

Dimensions in millimeters (inches)

Coil for Light line
C14B



Coil for High performance
C19B



Note:
Example of most frequent coil types.
For complete range of SD2E-A2 valve coils with technical informatik about voltage, enclosure type, terminal box please offer to coil data sheet HA 8007.

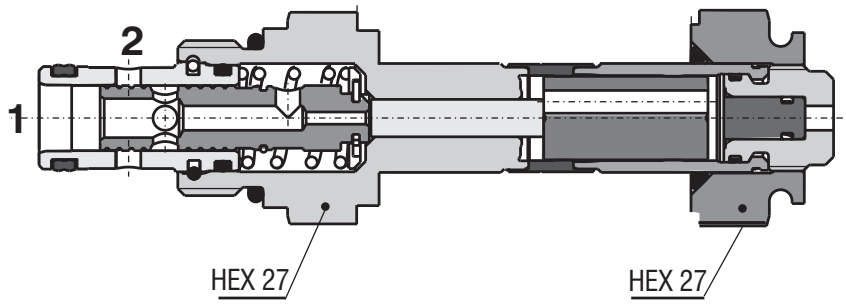
Solenoid	Connector	Light line SD2E-A2 / **L...** Type code	High performance SD2E-A2 / **H...** Type code
12 VDC	EN 175301-803-A	C14B-01200E1-6,55NA	C19B-01200E1-7,1NA
24 VDC	EN 175301-803-A	C14B-02400E1-26,2NA	C19B-02400E1-28,8NA
12 VDC	AMP-Junior-Timer	C14B-01200E3A-6,55NA	C19B-01200E3-7,1NA
24 VDC	AMP-Junior-Timer	C14B-02400E3A-26,2NA	C19B-02400E3-28,8NA
120 VAC	EN 175301-803-A with integrated rectifier	-	C19B-12060E5-527NA
230 VAC	EN 175301-803-A with integrated rectifier	-	C19B-23050E5-2065NA
120 VAC*	EN 175301-803-A (with rectifier)	C14B-10600E1-536NA	C19B-10600E1-527NA
230 VAC*	EN 175301-803-A (with rectifier)	C14B-20500E1-2476NA	C19B-20500E1-2065NA

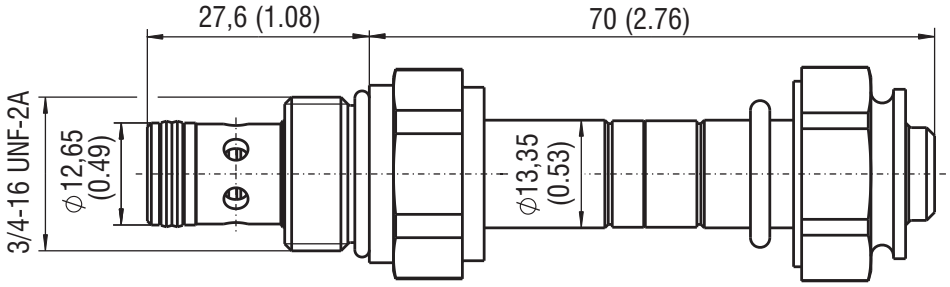
*Use the terminal box with rectifier!

Valve Dimensions

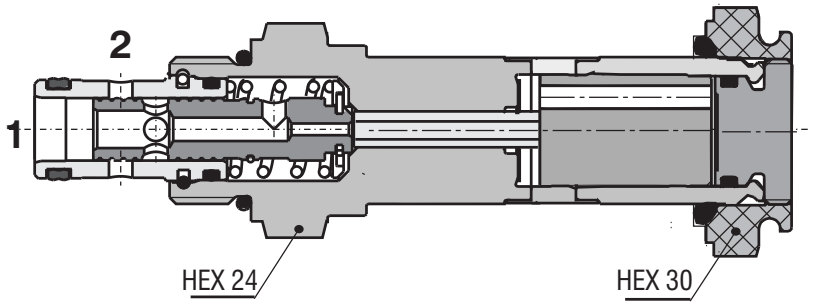
Dimensions in millimeters (inches)

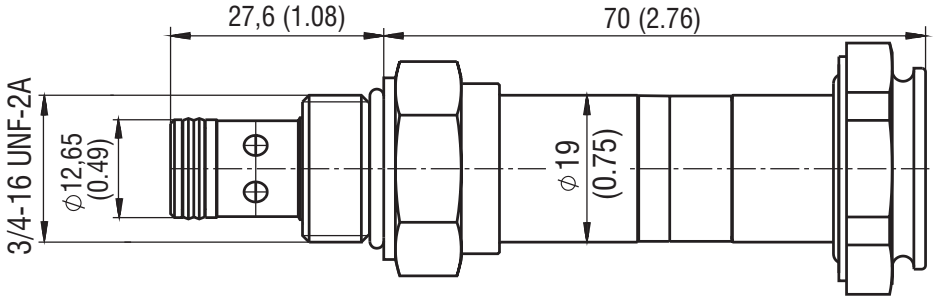
Light line





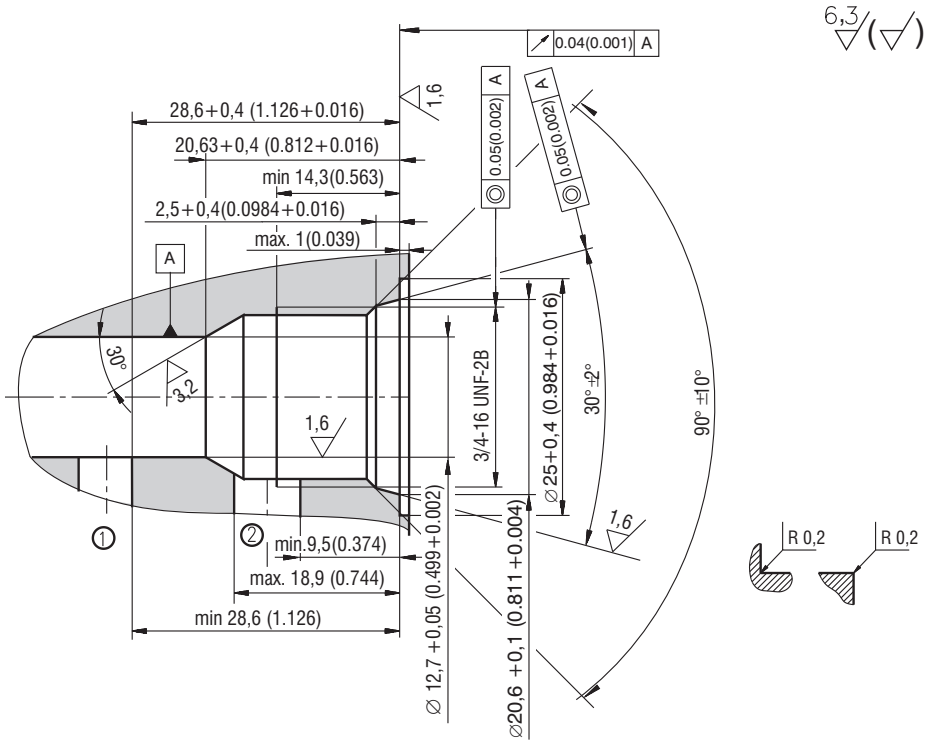
High performance





Cavity

Dimensions in millimeters (inches)



Spare Parts

Dimensions in millimeters

Light line and High performance			**Ordering number**
Dualseal - PU	**O-ring - NBR**	**O-ring - Viton**	
10,3 x 12,7 x 3,1 (1pc.)	17 x 1,8 (1pc.)	-	20776700
10,3 x 12,7 x 3,1 (1pc.)	-	17,17 x 1,78 (1pc.)	17014300
Solenoid retaining nut with seal for Light line			
Type of nut		**O-ring - Viton**	
Standard nut		12,3 x 2,4 (1pc.)	20776900
Solenoid retaining nut with seal for High performance			
Type of nut		**O-ring - Viton**	
Standard nut		20 x 2,5 (1pc.)	20777000

Caution!

- The packing foil is recyclable.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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