



Solenoid Operated Directional Control Valves

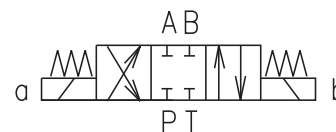
RPE3-06

**HA 4010
10/2008**

Size 06 • p_{max} up to 320 bar • Q_{max} up to 80 L/min

Replaces
HA 4010 11/2006

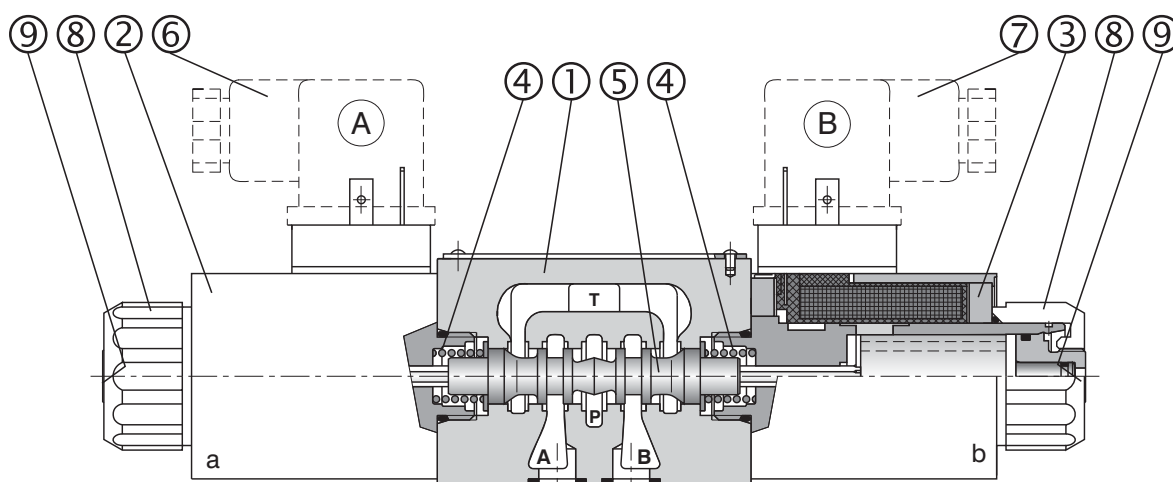
- 4/3, 4/2 way directional control valves
- Solenoids can be turned around their axis to any position
- Four-land spool - reduced functional dependence on fluid viscosity
- Push button manual override
- Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H
- Subplates see data sheet HA 0002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

is integrated directly into the connectors A, B (6, 7) or inside the coil. 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 basic surface treatment of the valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



Ordering Code

RPE3-06 /

Solenoid Operated Directional Control Valve




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 / 2.72 A  **01200**
- 24 V DC / 1.29 A  **02400**
- 205 V DC / 0.15 A **20500**
- 24 V AC / 1.54 A / 50 (60) Hz **02450**
- 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**

Sensing of the end position

- no designation without sensor
- S1** normally-open sensor to 50bar
- S2** normally-open sensor to 210bar
- S4** normally-closed sensor to 50bar

Seals

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

Orifice in P port

- no designation without orifice
- D1** Ø1.0 mm
- D2** Ø1.5 mm
- D3** Ø2.0 mm
- D4** Ø2.2 mm
- D5** Ø2.5 mm

Spool speed control orifice

- no designation without damping
- T1** orifice Ø0.7 mm in solenoid

Manual override

- no designation standard
- N1** covered with retaining nut
- N2** covered with rubber boot
- N3** with detent assembly

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		
Nominal size	mm	06
Maximum flow	L/min	see p-Q characteristics
Max. operating pressure at porte P, A, B	bar	320
Max. operating pressure at port T	bar	210, 50 for version S1 , S2 and 210 for version S4
Pressure drop	bar	see Δp-Q characteristics
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524
Fluid temperature range for NBR/FPM seals	°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 (1999)
Max. allowable voltage variation	%	DC: ±10 AC: ±10
Max. switching frequency	1/h	15 000
Switching time, on: at v=32 mm ² /s	ms	DC: 30 ... 50 AC: 30 ... 40
Switching time, off: at v=32 mm ² /s	ms	DC: 10 ... 50 AC: 30 ... 70
Duty cycle	%	100
Service life	cycles	10 ⁷
Enclosure type to EN 60 529		IP 65
Weight - valve with 1 solenoid	kg	1.6
- valve with 2 solenoids		2.2
Mounting position		optional

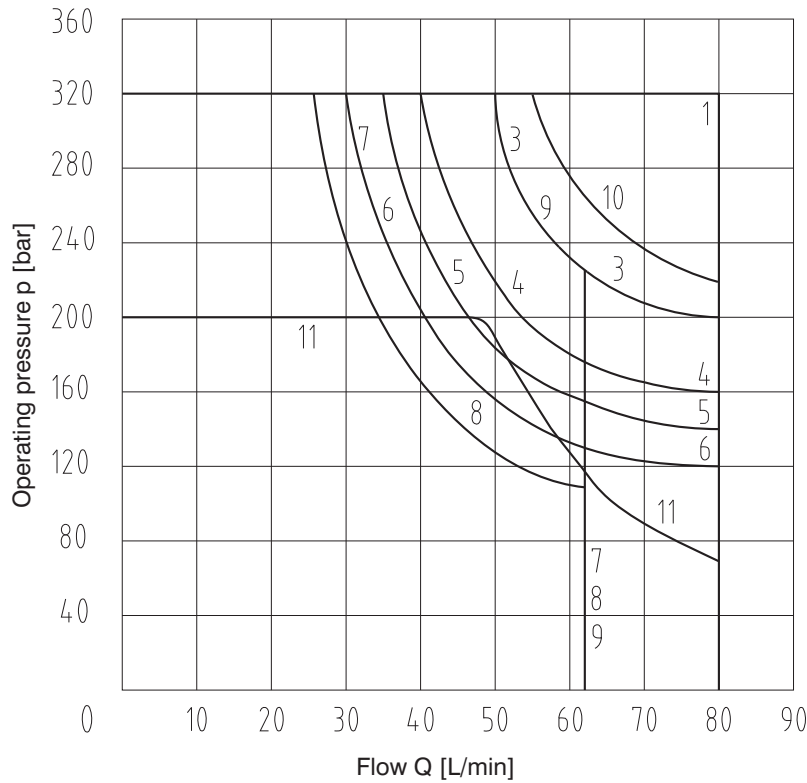
Functional Symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
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 $v = 32 \text{ mm}^2/\text{s}$

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

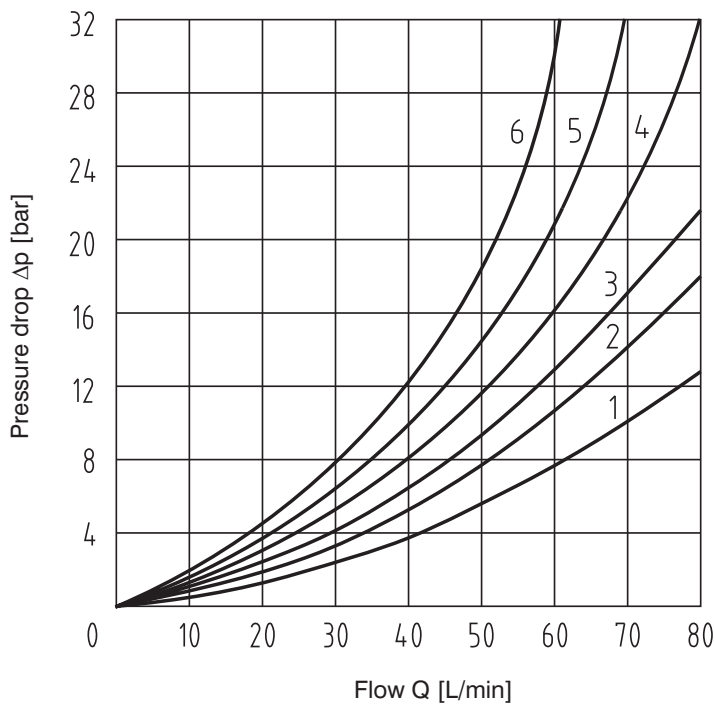


Z11	1
C11	7
H11	4
P11	1
Y11	3
L21	6
B11	9
Y41	7
Z21	1
C41	6
F11	6
R11	4
R21	5
A51	6
P51	1
Y51	3
C51	7
Z51	1
Z71	8
Z81	8
Z91	8
R31	6
H51	8
F51	8
X11	4
K11	8
N11	8
X25	11
J15	1
J75	10

Δp -Q Characteristics

Measured at $v = 32 \text{ mm}^2/\text{s}$

Pressure drop Δp related to flow rate.

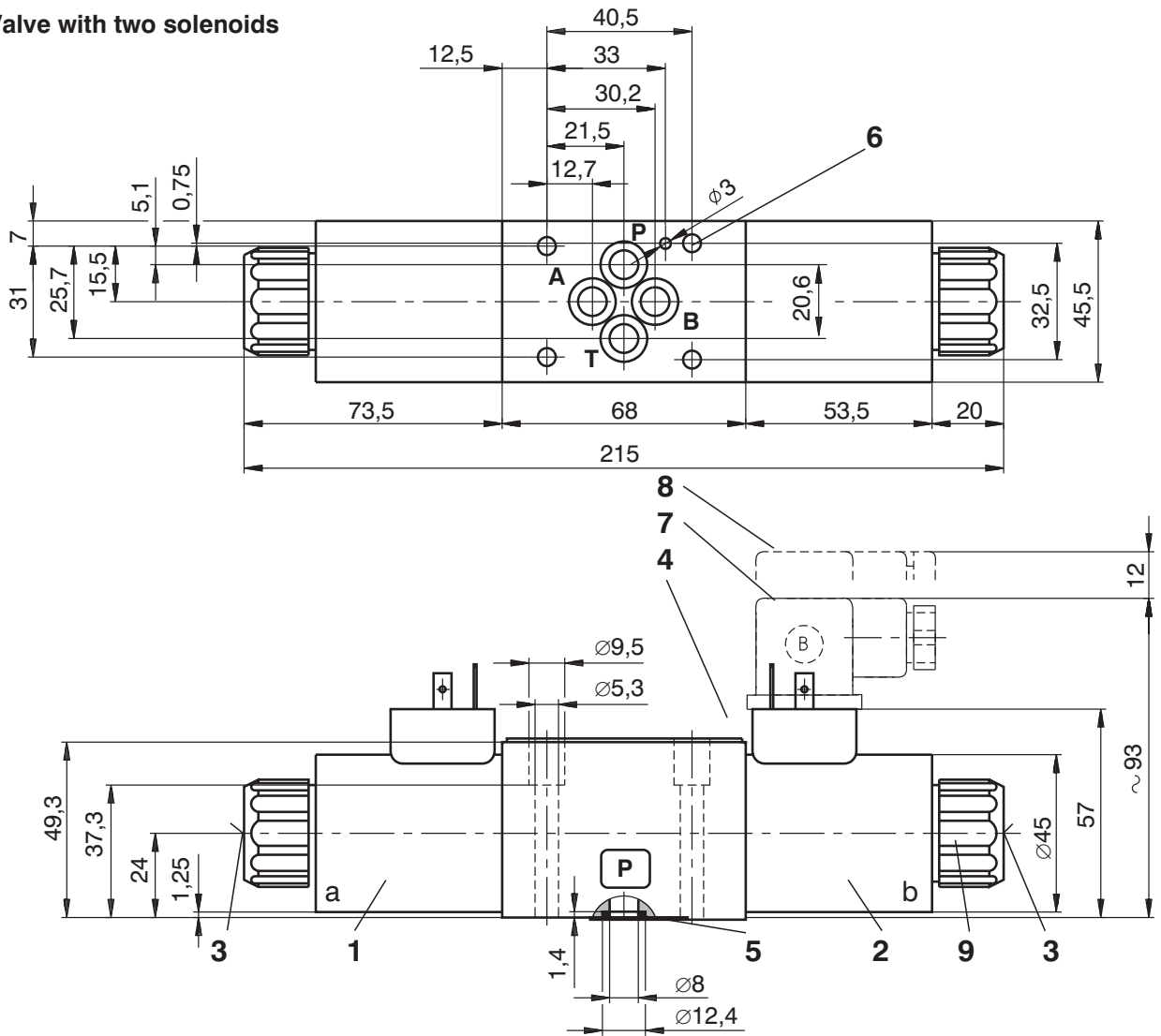


	P-A	P-B	A-T	B-T	P-T
Z11	2	2	3	3	
C11	5	5	5	6	3
H11	2	2	2	3	3
P11	1	1	3	3	
Y11	2	2	2	2	
L21	2	2	3	3	
B11	2	2	3	3	
Y41	3	3	3	3	
Z21		2	3		
C41	4	4			5
F11	1	2		3	3
R11	2	2	3	3	
R21	2	2	3	3	
A51	2	2			
P51		1	3		
Y51		2	2		
C51	2			3	4
Z51		2	3		
Z71	3	3			
Z81			3	3	
Z91	3			3	3
R31	2			3	
H51		2	3		
F51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

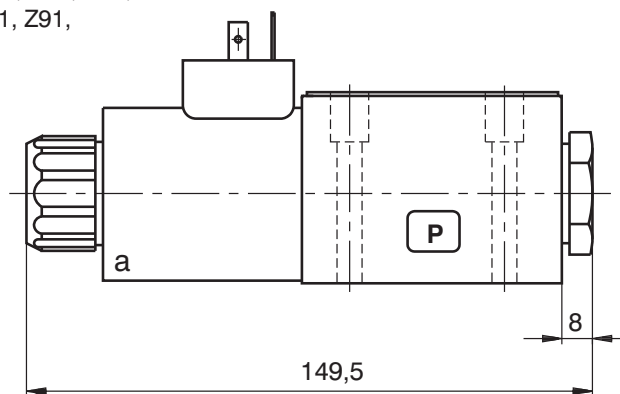
Dimensions in millimetres

Valve with two solenoids



Valve with one solenoid "a"

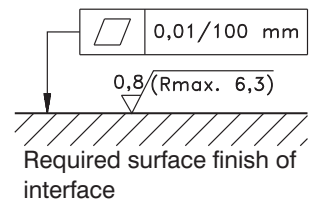
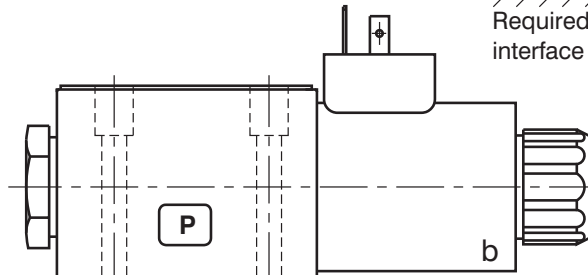
Spool symbols R11, R21, A51, P51, Y51, Z51, C51, Z71, Z81, Z91, R31, H51, F51, X25



- 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 connector, EN 1745301-803
- 8 Space required to remove connector
- 9 Retaining nut of the solenoid

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.

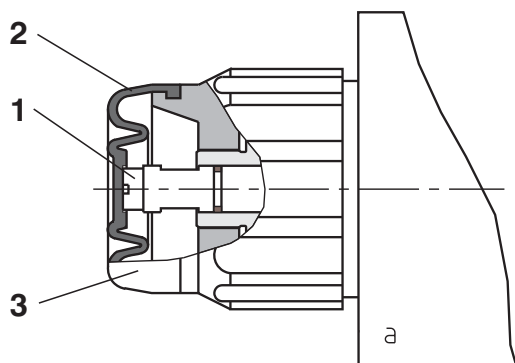
Manual Override

STANDARD		CLOSED NUT	
<p>no designation Dimensions</p> <p>Standard model of the manual override. Standard retaining nut of the solenoid.</p>	<p>Type N1 Dimensions</p> <p>Manual override with retaining nut. Can be used after removing nut.</p>		
RUBBER BOOT		DETENT ASSEMBLY	
<p>Type N2 Dimensions</p> <p>Manual override protected by rubber boot.</p>	<p>Type N3 Dimensions</p> <p>Manual override holds the spool in the shifted position.</p>		

Spool Speed Control Orifice

T1 - Dimension

Description



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 use 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 $\nu = 32 \text{ mm}^2/\text{s}$ and nominal voltage. They are dependent upon working pressure and flow rate of the directional control valve.

Orifice in P-Port

Type

$\varnothing D$ (mm)

Dimensions

Description

D1

1.0

D2

1.5

D3

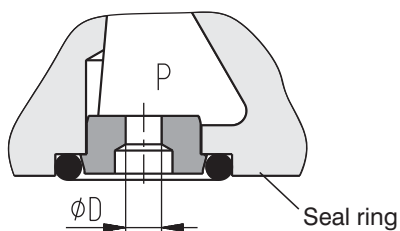
2.0

D4

2.2

D5

2.5



P-Port orifices limit the flow into the directional control valve.

Attention:

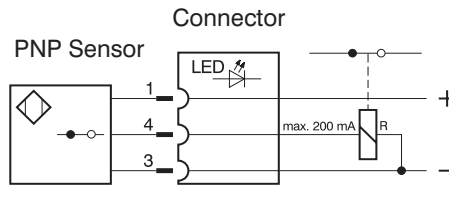
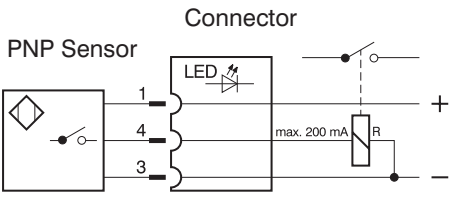
When the orifice in P port is additionally mounted the standard used square ring NBR is replaced with O-ring from Viton.

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

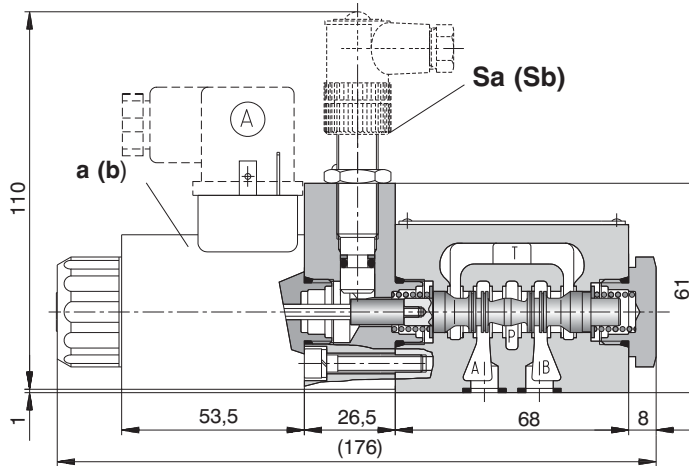
		S1, S4	S2
Rated power supply voltage	V		24 DC
Power supply voltage range	V		10 ... 30 DC
Rated current	mA		200
Enclosure type of sensor to EN 60529			IP 67
Max. operating pressure	bar	50	210
Switching frequency	Hz		1000
Ambient temperature range	°C		-25 ... +80

Technical Data of the Connector

Power supply voltage range	V	10 ... 30 DC
Ambient temperature range	°C	-25 ... +80
Indication		yellow LED

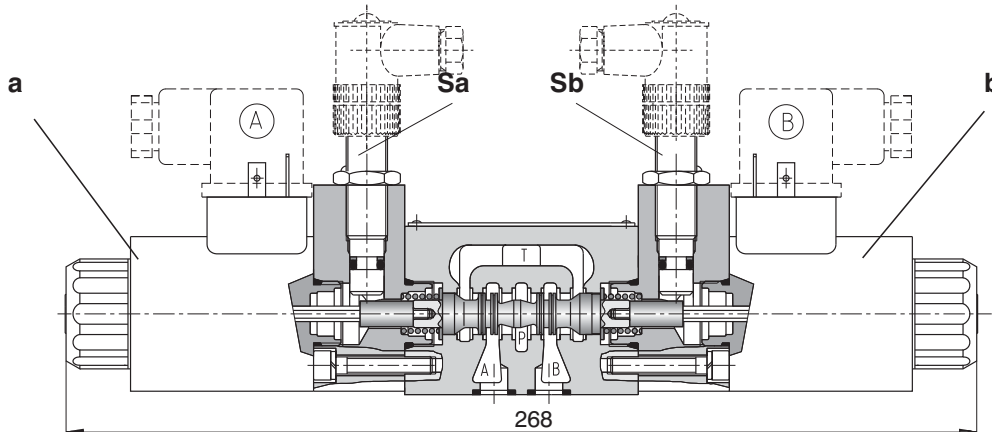
Two-Position Directional Control Valve Dimensions in millimeters

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



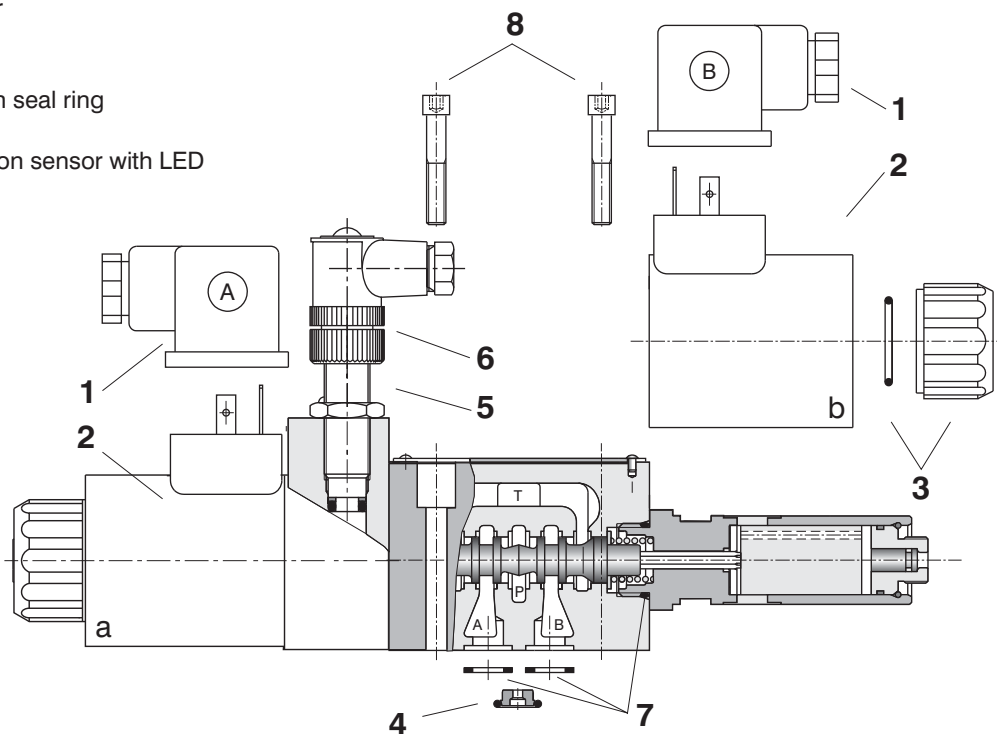
Three-Position Directional Control Valve Dimensions in millimeters

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 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	E3	E4	E5
	Ordering number				
01200	944-0012	944-0013	936-4306	936-4305	
01200	944-0001	-	-	-	
02400	944-0024	944-0025	936-4327	936-4325	
02400	944-0002				
20500	944-0014				
23050					936-2385
23050					944-0004

Solenoid retaining nut with seal

Type of the nut	Seal ring	Ordering number
Standard nut	22 x 2	484-9951
Closed nut		484-9952
Nut with rubber boot		484-9953
Nut with detent assembly		484-9954

Orifice in P port

Type	ØD (mm)	Seal ring	Ordering number
D1	1.0	9.25 x 1.75	484-9973
D2	1.5		484-9974
D3	2.0		484-9975
D4	2.2		484-9977
D5	2.5		484-9976

Connector of position sensor

Type designation	Model	Max. input voltage	Ordering number
K02	connector of position sensor with LED	10...30 V DC	936-9940
S1	normally-open sensor	10...30 V DC	405111129213
S2	normally-open sensor	10...30 V DC	18838900
S4	normally-closed sensor	10...30 V DC	20725300

Seal kit

Type	Dimensions, number		Ordering number
Standard - NBR70	9.25 x 1.68 (4 pcs.)	17 x 1.8 (2 pcs.)	484-9961
Viton	9.25 x 1.78 (4 pcs.)	17.17 x 1.78 (2 pcs.)	484-9971

Mounting bolts			
Dimensions, number	Tightening torque		Ordering number
M5 x 45 DIN 912-10.9 (4 pcs.)	8.9 Nm		484-9958
Electrical connector, EN 1745301-803			
Type designation	Connector A grey	Connector B black	
	Ordering number		
K1	936-9902	936-9901	
K5	936-9906	936-9905	
K2	936-9908	936-9907	
K3	936-9904	936-9903	
Electrical Connector, EN 1745301-803			
Designation	Type	Model	Max. input voltage
K1	Connector B (black)	without rectifier - M16x1.5 (bushing bore \varnothing 6-8 mm)	230 V AC/DC
	Connector A (grey)		
K5	Connector B (black)	without rectifier - M16x1.5 (bushing bore \varnothing 4-6 mm)	230 V AC/DC
	Connector A (grey)		
K2	Connector B (black)	without rectifier with LED and quenching diode - M16x1.5 (bushing bore \varnothing 6-8)	12...24 V DC
	Connector A (grey)		
K3	Connector B (black)	with rectifier - M16x1.5 (bushing bore \varnothing 6-8 mm)	230 V AC
	Connector A (grey)		
K4	Connector B (black)	with rectifier with LED and quenching diode - M16x1.5 (bushing bore \varnothing 6-8 mm)	230 V AC
	Connector A (grey)		
Recommended solenoid coils used with electrical connector with rectifiers - type designation K3, K4			
Rated supply source voltage (permissible rated voltage variation $\pm 10\%$)		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	484-0703	RPE3-063Y11/02400E1	484-0785
RPE3-063Z11/01200E1	484-0677	RPE3-062R11/02400E1	484-0788
RPE3-062Z51/01200E1	484-0699	RPE3-062R21/02400E1	484-0793
RPE3-063C11/01200E1	484-0678	RPE3-062A51/02400E1	484-0789
RPE3-062C51/01200E1	484-0700	RPE3-062Y51/02400E1	484-0801
RPE3-063H11/01200E1	484-0679	RPE3-062J15/02400E1	484-0790
RPE3-063Y11/01200E1	484-0681	RPE3-062Z11/23050E5	484-1107
RPE3-062R11/01200E1	484-0684	RPE3-063Z11/23050E5	484-1034
RPE3-062R21/01200E1	484-0689	RPE3-062Z51/23050E5	484-1115
RPE3-062A51/01200E1	484-0685	RPE3-063C11/23050E5	484-1042
RPE3-062Y51/01200E1	484-0697	RPE3-062C51/23050E5	484-1066
RPE3-062J15/01200E1	484-0686	RPE3-063H11/23050E5	484-1043
RPE3-062Z11/02400E1	484-0807	RPE3-063Y11/23050E5	484-1044
RPE3-063Z11/02400E1	484-0781	RPE3-062R11/23050E5	484-1047
RPE3-062Z51/02400E1	484-0803	RPE3-062R21/23050E5	484-1113
RPE3-063C11/02400E1	484-0782	RPE3-062A51/23050E5	484-1048
RPE3-062C51/02400E1	484-0804	RPE3-062Y51/23050E5	484-1249
RPE3-063H11/02400E1	484-0783	RPE3-062J15/23050E5	484-1035
Caution!			
<ul style="list-style-type: none"> 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. Switching time for directional valves with detent assembly (impulse control) should not be shorter than 60 ms. With directional valves with cushioned spool shifting, the switching time must correspond with the shifting time. Other for spool symbols on request. The packing foil is recyclable. The protective plate can be returned to manufacturer. Mounting bolts 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. 			
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