



**Directional Control Valves  
Solenoid Operated**

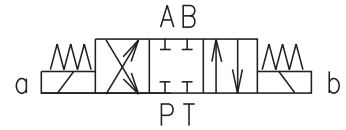
**RPE4-10**

**HA 4039  
10/2008**

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

Replaces  
HA 4039 11/2006

- 4/3, 4/2 way directional control valves
- Cylindrical DC solenoids with removable coils. Electrical connectors can be rotated in three positions 90° apart
- 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 RPE4-10 directional control valves consist of housing (1), control spool (5), centering springs (4) and operating solenoids (2, 3).

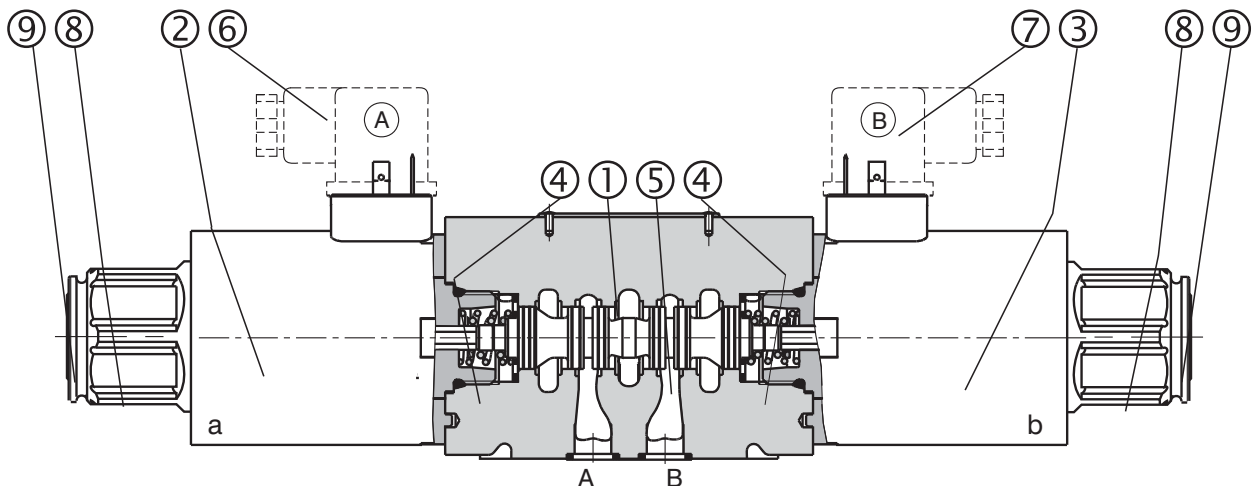
The three-position directional control valves are fitted with two solenoids and two springs. The two position directional control valves have one solenoid and one return spring.

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  
three positions

**2**  
**3**

**Functional symbols**

see the table functional symbols

**Rated supply voltage of solenoids**

(at the coil terminals)

12 V DC / 3.17 A  
24 V DC / 1.73 A  
205 V DC / 0.20 A  
230 V AC / 0.20 A / 50 (60) Hz  
120V AC / 60Hz\*

**01200**  
**02400**  
**20500**  
**23050**  
 **12060**

The AC coils correspond with E5 type.  
CSA Upon request 

**Type of the solenoid coil**

for the electrical connector, EN 175301-803  
with integrated rectifier and for the electrical connector  
EN 175301-803

**E1**  
**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

**no designation**  
**V**

**Seals**  
standard (NBR)  
Viton (FPM)

**no designation**  
**T2**  
**T3**

**Damping**  
without damping  
nozzle  
throttle screw

**no designation**  
**N2**

**Manual override**  
standard  
covered with rubber boot

**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	210, 50 for version <b>S1</b> , <b>S4</b> and 210 for version <b>S2</b>
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 <sup>2</sup> /s	20 ... 400
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406 (1999)
Maximum allowable voltage variation	%	AC: ±10                      DC: ±10
Maximum switching frequency	1/h	15 000
Switching time, ON; at v = 32 mm <sup>2</sup> /s	ms	AC: 50 ... 330                      DC: 50 ... 120
Switching time, OFF; at v = 32 mm <sup>2</sup> /s	ms	AC: 100 ... 300                      DC: 30 ... 90
Duty cycle	%	100
Service life	cycles	10 <sup>7</sup>
Enclosure type to EN 60529		IP 65
Weight - valve with 1 solenoid - valve with 2 solenoids	kg	3.9 5.4
Mounting position		optional

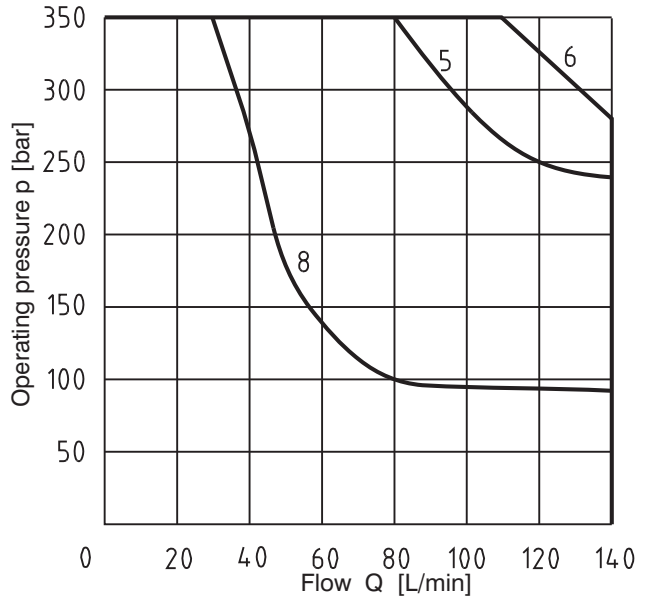
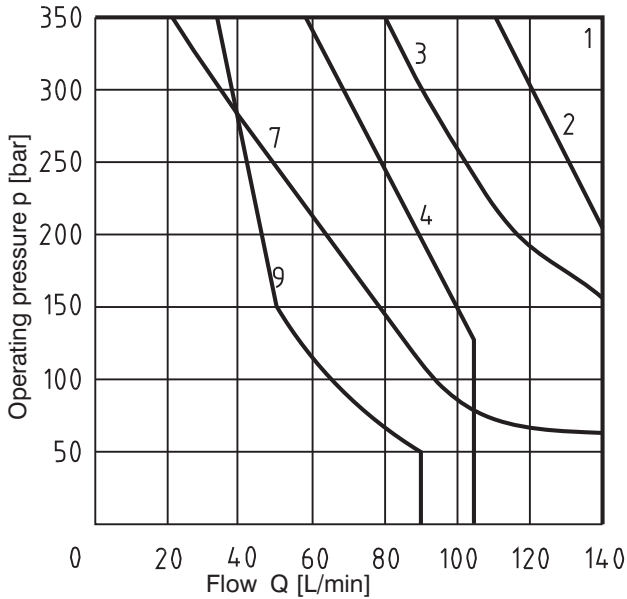
### Functional Symbols

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

### 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. 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.

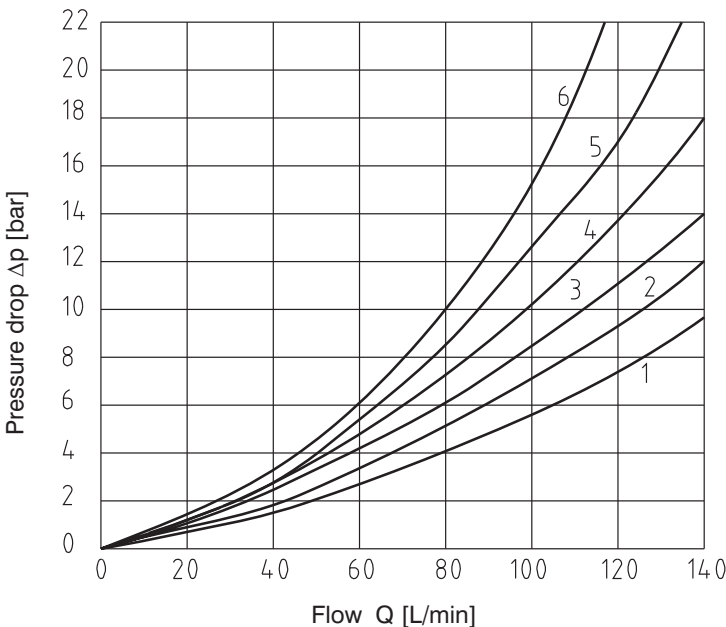


Z11	Z51	H11	H51	P11	P51	Y11	Y51	C11	C51	R11	X11	B11	B51	L21	R21	J15	J75	A51	C21
1	1	1	1	1	1	5	5	3	3	2	2	4	4	7	2	6	6	8	9

### $\Delta p$ -Q Characteristics

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

Pressure drop  $\Delta p$  related to flow rate.

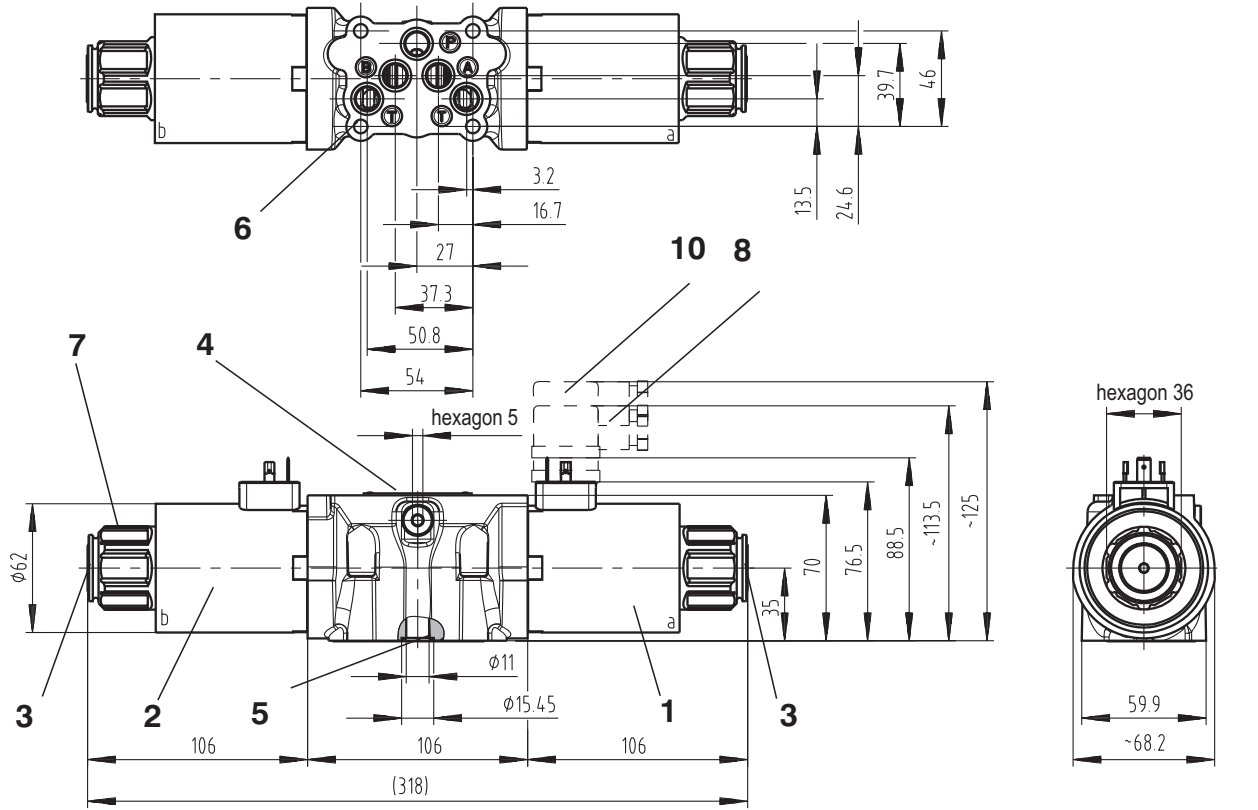


	P-A	P-B	A-T	B-T	P-T
Z11	1	1	2	2	
Z51		1	2		
H11	1	1	2	2	1
H51		1	2		1
P11	1	1	2	2	
P51		1	2		
Y11	1	1	2	2	
Y51		1	2		
C11	4	3	4	5	1
C51	4			5	1
R11	1	1	2	2	
X11	1	1	2	2	
B11	1	1	2	2	
B51		1	2		
L21	1	1	1	2	2
R21	1	1	1	3	
J15	1	1	2	3	
J75	1	1			
A51	1	1			
C21	6	6	6	6	4

# Valve Dimensions

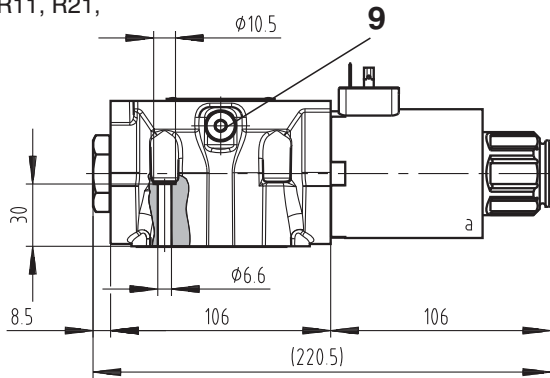
Dimensions in millimetres

## Valve with two solenoids



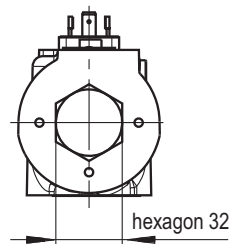
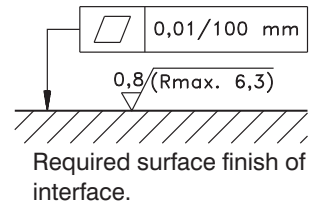
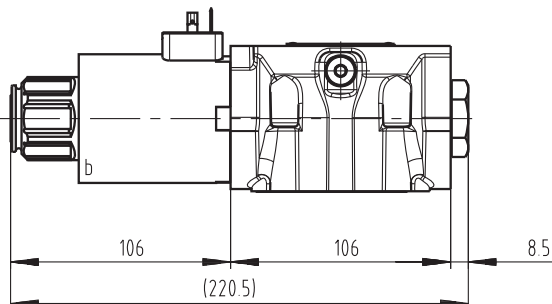
## Valve with one solenoid "a"

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



## Valve with one solenoid "b"

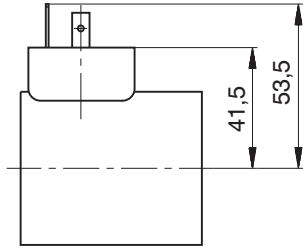
Functional symbols C11, H11



- 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 required to remove connector

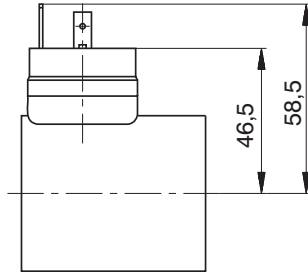
## Type of the Solenoid Coil

E1



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

E5



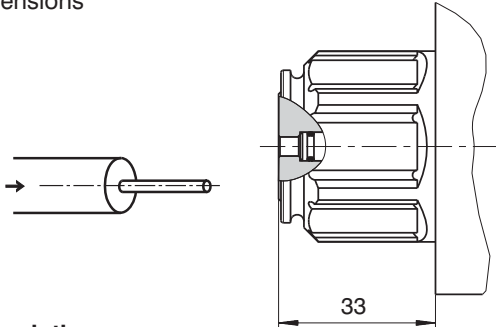
Solenoid coil with integrated rectifier and terminal for electrical connector, EN 175301-803

## Manual Override

Standard

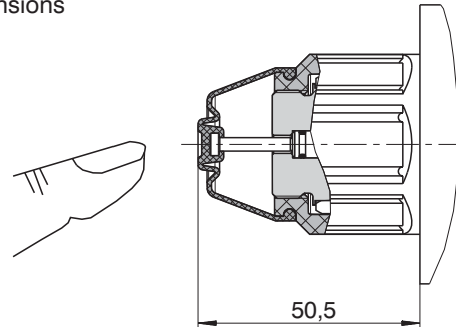
Rubber boot

Without designation  
Dimensions



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

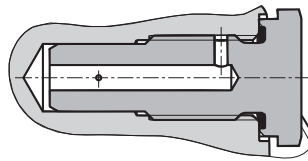
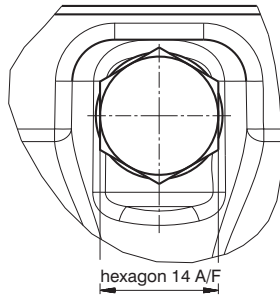
Designation **N2**  
Dimensions



**Description:**  
Manual override protected by rubber boot.

## Soft Shifting Spool Options Delay Time

T2 - Nozzle  $\varnothing 0,6$

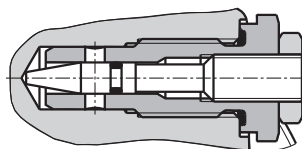
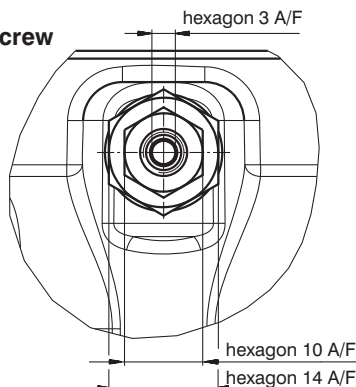


The orifice extends the valve shifting time.

**Switching times**

Switching time, on and off	ms	120 ... 350
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T3 - Throttle Screw



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

**Switching times**

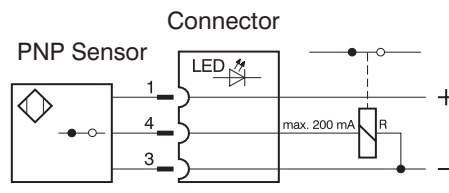
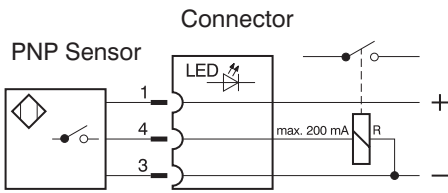
Switching time, on and off	ms	30 ... 2000
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# Spool Ship Position Sensor

**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**

		<b>S1, S4</b>	<b>S2</b>
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

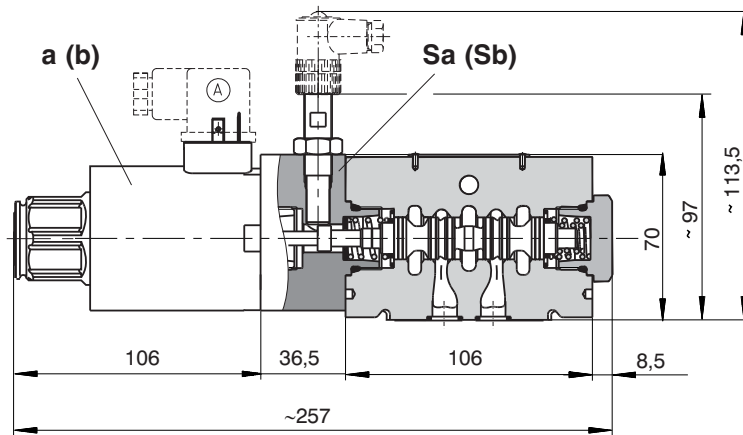
**Technical Data of the Connector**

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

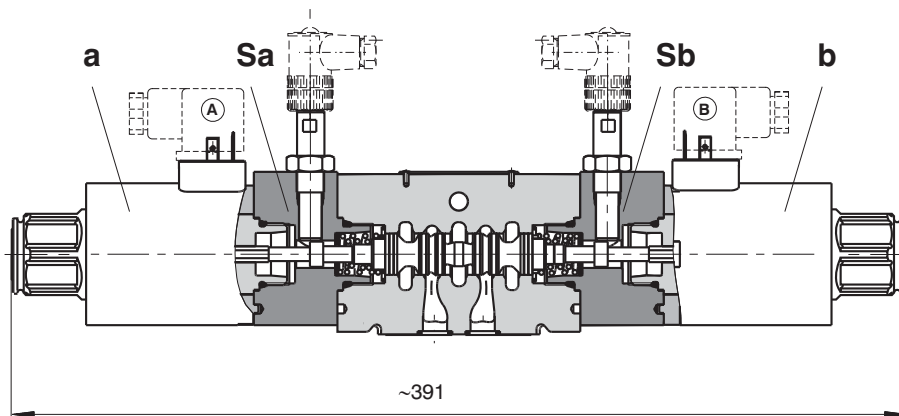
Signal of solenoid a (b)		Signal of sensor Sa (Sb)		LED	
		S1, S2 - normally-open	S4 - normally-closed	S1, S2	S4
0		1	0	ON	OFF
1		0	1	OFF	ON



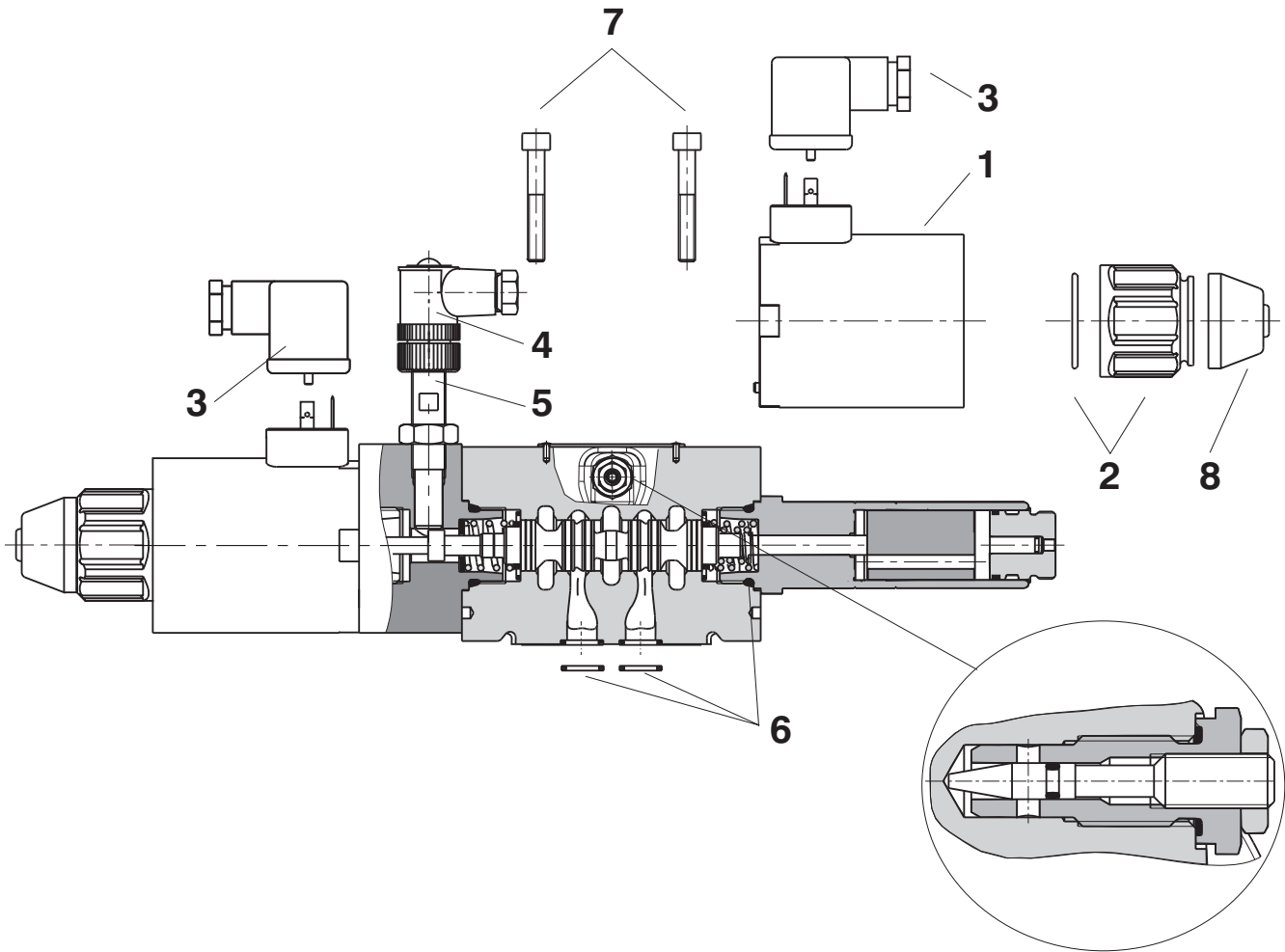
**Three-Position Directional Control Valve**

Dimensions in millimeters

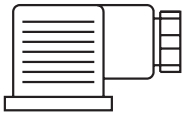
Signal of solenoid		Signal of sensor Sa (Sb)				LED			
		S1, S2 - normally-open		S4 - normally-closed		S1, S2		S4	
a	b	Sa	Sb	Sa	Sb	Sa - LED	Sb - LED	Sa - LED	Sb - LED
0	0	1	1	0	0	ON	ON	OFF	OFF
1	0	0	1	1	0	OFF	ON	ON	OFF



# 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

<b>Solenoid coil</b>				
Type designation of the coil voltage	Type of the coil			
	E1	E5		
	Ordering number			
01200	936-4610			
02400	936-4627			
20500	936-4685			
23050		936-3485		
12060		936-3480		
<b>Solenoid retaining nut with seal</b>				
Type of the nut	Seal ring	Ordering number		
Standard nut	30 x 2	489-9900		
Rubber cap with manual override		489-9901		
<b>Connector of position sensor</b>				
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-clsd sensor	10...30 V DC	20725300	
<b>Seal kit</b>				
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.)	489-9902	
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.)	489-9903	
<b>Mounting bolts</b>				
Dimensions	Tightening torque	Ordering number		
M6 x 40 DIN 912-10.9 (4 pcs.)	14+2 Nm	485-9964		
<b>Soft Shift Conversion Kit</b>				
T2	10 Nm	489-9905		
T3	10 Nm	489-9906		
<b>Electrical connector, EN 175301-803</b>				
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		
K4	936-9910	936-9909		
<b>Electrical Connector, EN 175301-803</b>				
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 mm)	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	
<b>Recommended solenoid coils used with electrical connector with rectifiers - type designation K3, K4</b>				
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

Type	Ordering number	Type	Ordering number
RPE4-103Z11	489-0001	RPE4-103Z11/02400E1	489-0009
RPE4-102Z51	489-0024	RPE4-102Z51/02400E1	489-0027
RPE4-103C11	489-0002	RPE4-103C11/02400E1	489-0010
RPE4-102C51	489-0025	RPE4-102C51/02400E1	489-0028
RPE4-103H11	489-0004	RPE4-103H11/02400E1	489-0029
RPE4-103Y11	489-0003	RPE4-103Y11/02400E1	489-0030
RPE4-102R11	489-0005	RPE4-102R11/02400E1	489-0013
RPE4-102R21	489-0006	RPE4-102R21/02400E1	489-0031
RPE4-102Y51	489-0026	RPE4-102Y51/02400E1	489-0032
RPE4-103Z11/01200E1	489-0021	RPE4-103Z11/23050E5	489-0033
RPE4-102Z51/01200E1	489-0015	RPE4-102Z51/23050E5	489-0034
RPE4-103C11/01200E1	489-0022	RPE4-103C11/23050E5	489-0035
RPE4-102C51/01200E1	489-0019	RPE4-102C51/23050E5	489-0036
RPE4-103H11/01200E1	489-0014	RPE4-103H11/23050E5	489-0020
RPE4-103Y11/01200E1	489-0011	RPE4-103Y11/23050E5	489-0037
RPE4-102R11/01200E1	489-0023	RPE4-102R11/23050E5	489-0038
RPE4-102R21/01200E1	489-0016	RPE4-102R21/23050E5	489-0039
RPE4-102Y51/01200E1	489-0018	RPE4-102Z51/23050E5	489-0040

## 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.

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