

# Directional seat valves, direct operated, with solenoid actuation

## Type SEC

**RE 22028**

Edition: 2019-02

Replaces: 22035



- ▶ Size 6
- ▶ Component series 2X
- ▶ Maximum operating pressure 400 bar
- ▶ Maximum flow 25 l/min

### Features

- ▶ 3/3, 4/2 or 4/3-way version
- ▶ Porting pattern according to ISO 4401-03-02-0-05
- ▶ Safe switching also with longer standstill periods under pressure
- ▶ Wet-pin DC solenoids with detachable coil
- ▶ Solenoid coil can be rotated by 90°
- ▶ The coil can be changed without having to open the pressure-tight chamber
- ▶ Electrical connection as individual connection
- ▶ Central connection possible via double valve mating connector
- ▶ Corrosion-protected version (240 h salt spray test according to EN ISO 9227)

### Contents

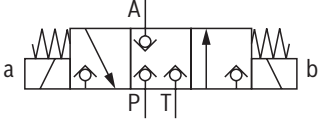
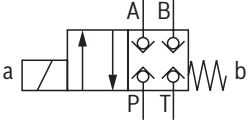
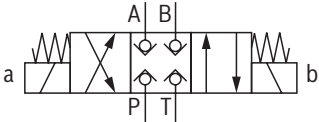
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Ordering code

01	02	03	04	05	06	07	08	09	10
	SEC	6		2X	/		N9		

01	3 main ports	3
	4 main ports	4
02	Seat valve	SEC
03	Size 6	6

Symbols

04		3 main ports	E35
		4 main ports	EB
			E

05	Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions)	2X
06	Direct voltage 12 V	G12 <sup>1)</sup>
	Direct voltage 24 V	G24
07	With concealed manual override	N9

Electrical connection

08	Individual connection	
	Connector 3-pole (2 + PE) according to DIN EN 175301-803	K4 <sup>2; 3)</sup>
09	Without check valve insert, without screw-in throttle	no code
	With check valve insert, with screw-in throttle (see page 8)	P <sup>4)</sup>

Seal material (observe compatibility of seals with hydraulic fluid used, see page 4)

10	NBR seals	no code
	FKM seals	V

<sup>1)</sup> Only with version "E".

<sup>2)</sup> Mating connectors, separate order, see page 8 and data sheet 08006.

<sup>3)</sup> Double valve mating connectors for central connection, separate order, see page 8 and data sheet 08006.

<sup>4)</sup> Only with version "E.G24".

## Function

Directional valves type SEC are solenoid-actuated directional seat valves. They control the start, stop and direction of a flow.

The directional valves basically consists of a housing, the electronic solenoids, as well as the hardened valve system.

It is to be ensured that the maximum flow indicated is not exceeded. If necessary, a screw-in throttle has to be used for flow limitation (see below).

Depending on the production tolerances, a pump or tank pre-opening of the valve occurs. For this reason, for valves of the same type, different pressure gradients can occur during the switching process.

One valve alone may not be used for holding loads or positions.

### Check valve insert

The check valve insert in P enables a free flow from P to A/B and closes the flow from A/B to P.

The check valve insert in T enables a free flow from A/B to T and closes the flow from T to A/B.

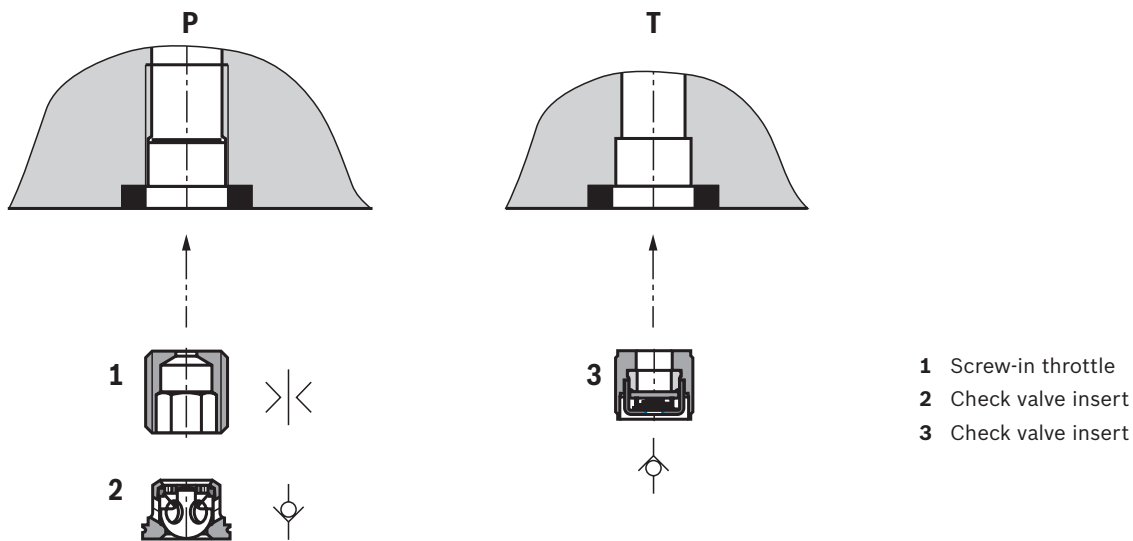
### Screw-in throttle

The use of a screw-in throttle is required if, due to prevailing operating conditions, flows which exceed the performance limit of the valve can occur during the switching processes.

Examples:

- Accumulator operation,
- Use as pilot control valve with internal pilot fluid tapping.

For available screw-in throttles and check valve insert, refer to page 8.



## Technical data

(for applications outside these values, please consult us!)

General			
Weight	► 3/3 directional seat valve	kg	2.4
	► 4/2 directional seat valve	kg	2.1
	► 4/3 directional seat valve	kg	2.4
Installation position			any
Ambient temperature range		°C	-40 ... +80 (NBR seals) -20 ... +50 (FKM seals)

Hydraulic			
Maximum operating pressure	► Port A, B, P	bar	400
	► Port T	bar	$p_T < p_P$ , $p_T < p_A$ , $p_T < p_B$ ; however, max. 50 (energized)
Maximum flow		l/min	20 <sup>1)</sup>
Hydraulic fluid			see table below
Hydraulic fluid temperature range		°C	-25 ... +80 (NBR seals)
			-20 ... +80 (FKM seals)
Viscosity range		mm <sup>2</sup> /s	4 ... 500
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>2)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable	► Insoluble in water	HETG	ISO 15380	90221
		HEES		
	► Soluble in water	HEPG	ISO 15380	
Flame-resistant	► Containing water	HFC (Fuchs: Renolin ZAF DT 46, Renolin ZAF 46 D VW; Shell: D971; Castrol: E4-HZZ 46 Hyspin)	ISO 12922	90223



### Important information on hydraulic fluids:

- For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.
- **Bio-degradable and flame-resistant – containing water:**  
If components with galvanic zinc coating (e.g. version "J3" or "J5") or parts containing zinc are used, small amounts of dissolved zinc may get into the hydraulic system and cause accelerated aging of the hydraulic fluid. Zinc soap may form as a chemical reaction product, which may clog filters, nozzles and solenoid valves - particularly in connection with local heat input.

### ► Flame-resistant – containing water:

- Due to increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended - if possible specific to the installation - to back up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.
- Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, a maximum duty cycle of 50% in continuous operation has to be set for on/off valves (measuring period 300 s). If this is not possible due to the function, an energy-reducing control of these components is recommended, e.g. via a PWM plug-in amplifier.

<sup>1)</sup> 25 l/min at a system pressure of up to 280 bar

<sup>2)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

For the selection of filters, see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

## Technical data

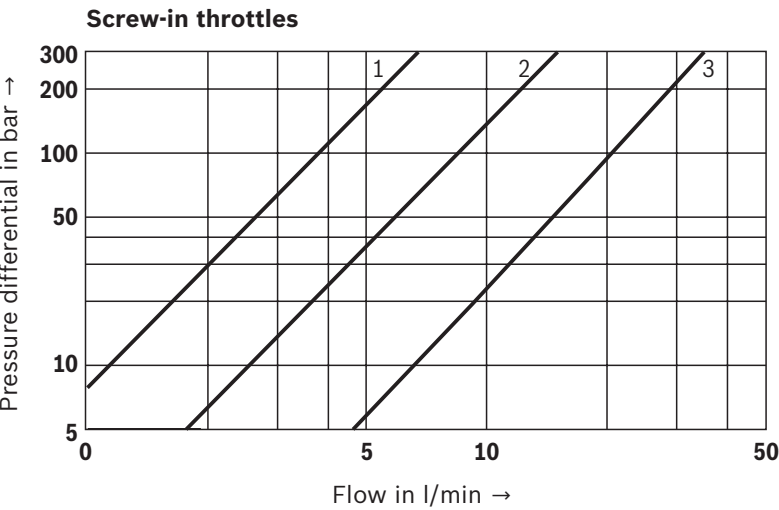
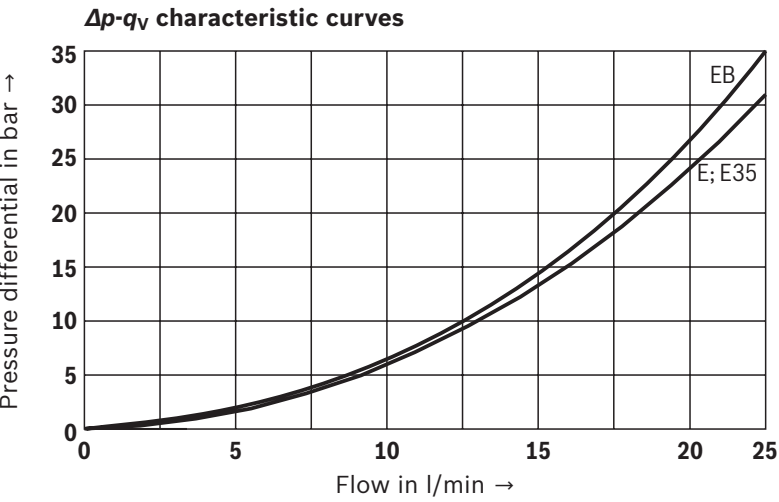
(for applications outside these values, please consult us!)

<b>Electric</b>			
Voltage type		Direct voltage	
Available voltages (Special voltages available upon request)	V	12, 24	
Voltage tolerance (nominal voltage)	%	±10	
Power consumption	W	30	
Duty cycle (ED)	%	100	
Switching time	► ON	ms	max. 60
	► OFF	ms	max. 60
Maximum switching frequency	1/h	2000	
Protection class according to DIN EN 60529		IP65 (with mating connector mounted and locked)	
Maximum coil temperature	°C	120	

### **Notices:**

- Actuation of the manual override is only possible up to a tank pressure of approx. 50 bar. Avoid damage to the bore of the manual override. Do not use sharp-edged objects.
- The shut-off of the solenoids creates voltage peaks, which can be reduced by the use of suitable diodes.
- For the assembly, commissioning and maintenance, see data sheet 07300
- In the set-up mode, a H position can be achieved by controlling both coils (only with the 4/3 directional seat valve with symbol "E"). In order to avoid an overheating of the coils, (according to VDE 0580) in the intermittent operation S3, a duty cycle of 10% may not be exceeded with a play time of 5 minutes or 50% at 70 seconds!

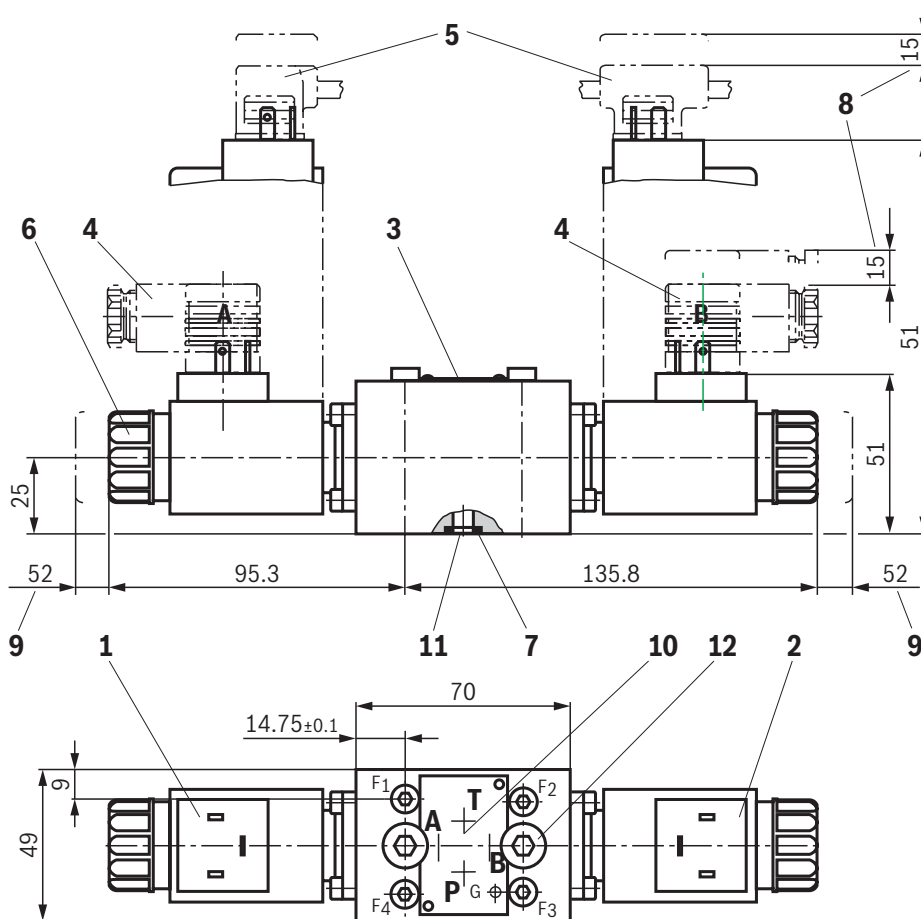
**Characteristic curves**  
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ )



- 1 Ø0.8
- 2 Ø1.2
- 3 Ø2.0

## Dimensions

(dimensions in mm)



Required surface quality of the valve contact surface

- 1 Solenoid "a"
- 2 Solenoid "b"
- 3 Name plate
- 4 Mating connector **without/with** circuitry for connector "K4" (separate order, see page 8 and data sheet 08006)
- 5 Double valve mating connector **without/with** circuitry for connector "K4" (separate order, see page 8 and data sheet 08006)
- 6 Mounting nut, tightening torque  $M_A = 5^{+1}$  Nm
- 7 Identical seal rings for ports A, B, P, T
- 8 Space required to remove the mating connector
- 9 Space required to remove the coil
- 10 Porting pattern according to ISO 4401-03-02-0-05
- 11 Accessories, (separate order, see page 8)
- 12 Optional G1/8 port for pressure switches in actuator lines A and B; tightening torque  $M_A = 13$  Nm



### Notices:

Maximum diameter for additional connection bores in block (A, B, P, and T) 6.8 mm.  
With larger diameters, there is a risk that the additional elements (plug-in components) may not remain in the position intended.

### Valve mounting screws (included in the scope of delivery)

Size	Quantity	Hexagon socket head cap screws	Material number
6	4	ISO 4762 - M5 x 55 - 12.9 Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 9.3 \text{ Nm} \pm 10 \%$	R913051416

**Accessories** (separate order)**Mating connectors and cable sets**

Item <sup>1)</sup>	Designation	Version	Short designation	Material number	Data sheet
<b>4</b>	Mating connector; for valves with "K4" connector, 2-pole + PE, design A	Without circuitry, M16 x 1.5, 12 ... 240 V, "a"	Z4	<b>R901017010</b>	08006
		Without circuitry, M16 x 1.5, 12 ... 240 V, "b"		<b>R901017011</b>	
		With indicator light, M16 x 1.5, 12 ... 240 V	Z5L	<b>R901017022</b>	
		With indicator light and Z-diode-suppressor, M16 x 1.5, 24 V	Z5L1	<b>R901017026</b>	
<b>5</b>	Cable sets; For valves with two solenoids (double mating connectors) and connector "K4", 2-pole + PE	Without circuitry, M12 x 1, 24 V ± 10%	Z60	<b>R901207820</b>	
		With indicator light, M12 x 1, 24 V ± 10%	Z60L	<b>R901207819</b>	
		With indicator light and Z-diode-suppressor, M12 x 1, 24 V ± 10%	Z60L8	<b>R901205511</b>	
		With free line end, 3 m, 12 ... 240 V	Z61	<b>R901207821</b>	
		With free line end, 5 m, 12 ... 240 V		<b>R901207822</b>	
		With free line end, with indicator light, shielded 3 m, 24 V	Z61L	<b>R901286065</b>	
<b>4</b>	Line connector; for valves with "K4" connector, 2-pole + PE, design A	With indicator light, adapter according to DESINA; M12 x 1	MSUD 41461	<b>R901495238</b>	–

<sup>1)</sup> See dimensions page 7.

**Accessories** (separate order)

Item <sup>1)</sup>	Quantity	Consisting of	Channel	Material number
<b>11</b>	1	Screw-in throttle Ø0.8	P	<b>R961013102</b>
	1	Screw-in throttle Ø1.2	P	
	1	Screw-in throttle Ø2.0	P	
	1	Check valve insert	P	
	1	Check valve insert	T	

**Further information**

- |  |                  |
|--|------------------|
| ► Hydraulic fluids on mineral oil basis                                      | Data sheet 90220 |
| ► Environmentally compatible hydraulic fluids                                | Data sheet 90221 |
| ► Flame-resistant, water-free hydraulic fluids                               | Data sheet 90222 |
| ► Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC) | Data sheet 90223 |
| ► Mating connectors and cable sets for valves and sensors                    | Data sheet 08006 |
| ► Hydraulic valves for industrial applications                               |                  |
| ► Selection of filters   |                  |
| ► Information on available spare parts                                       |                  |