

3/3, 4/2 and 4/3 directional poppet valve with solenoid actuation

RE 22035/06.10
Replaces: 12.08

1/16

Type SEC

Size 6
Component series 1X
Maximum operating pressure 420 bar [6100 psi]
Maximum flow 25 l/min [6.6 US gpm]



H7562

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Features

- Direct operated directional poppet valve with solenoid actuation
- Porting pattern according to ISO 4401-03-02-05 and NFPA T3.5.1 R2-D03
- Blocked connection tight
- Safe switching also with longer standstill periods under pressure
- Wet-pin DC voltage solenoids with detachable coil (AC voltage possible by means of a rectifier)
- Solenoid coil can be rotated by 90°
- Electrical connection as individual connection
- Central connection possible via double valve mating connector
- With concealed manual override, optional
- Classification according to DIN EN ISO 13849 category 1

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

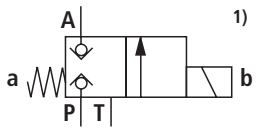
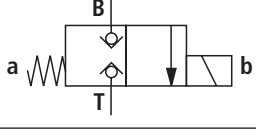
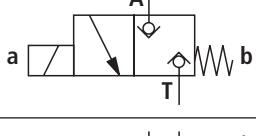
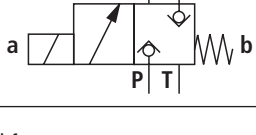
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Main ports		Further details in the plain text																																																								
2	= 2	no code = with locating hole ¹⁾ /62 = with locating hole and locating pin ISO 8752-3x8-St																																																								
3	= 3																																																									
4	= 4																																																									
Poppet valve																																																										
Size 6	= 6	Seal material no code = NBR seals V = FKM seals (other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!																																																								
Symbol e.g. E, etc. possible design see page 3		no code = without check valve insert, without throttle insert, without orifice insert P... = with check valve insert, with throttle insert, with orifice insert (for more information and selection table see page 11 to 15)																																																								
Component series 10 to 19 (10 to 19: Unchanged installation and connection dimensions)	= 1X	Electrical connection K4 ^{2; 3; 4)} = without mating connector, single connection with connector according to DIN EN 175301-803 K72L ²⁾ = without mating connector, single connection 4-pin with connector M12x1, integrated interference protection circuit, operating display LED K73L ²⁾ = without mating connector, single connection 4-pin with connector M12x1 (no connection pin 1 to pin 2), integrated interference protection circuit, operating display LED C4 ²⁾ = without mating connector, with connector AMP Junior-Timer																																																								
Solenoid with detachable coil	= C	Coil connection combinations:																																																								
DC voltage 12 V	= G12	<table border="1"> <thead> <tr> <th></th> <th>K4</th> <th>K72L</th> <th>K73L</th> <th>C4</th> </tr> </thead> <tbody> <tr> <td>G12</td> <td>✓</td> <td>-</td> <td>-</td> <td>✓</td> </tr> <tr> <td>G24</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>G26</td> <td>✓</td> <td>-</td> <td>-</td> <td>✓</td> </tr> <tr> <td>G48</td> <td>✓</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>G96</td> <td>✓</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>G110</td> <td>✓</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>G125</td> <td>✓</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>G205</td> <td>✓</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>G220</td> <td>✓</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>								K4	K72L	K73L	C4	G12	✓	-	-	✓	G24	✓	✓	✓	✓	G26	✓	-	-	✓	G48	✓	-	-	-	G96	✓	-	-	-	G110	✓	-	-	-	G125	✓	-	-	-	G205	✓	-	-	-	G220	✓	-	-	-
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DC voltage 205 V	= G205																																																									
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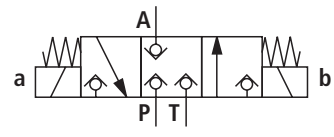
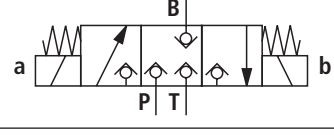
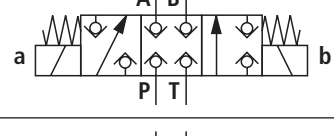
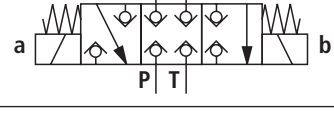
AC voltage mains (permissible voltage tolerance ±10 %)	Nominal voltage of the DC solenoid in case of operation with alternating voltage	Ordering code
110 V - 50/60 Hz	96 V	G96
120 V - 60 Hz	110 V	G110
230 V - 50/60 Hz	205 V	G205

- 1) Locating pin ISO 8752-3x8-St, Material no. **R900005694** (separate order)
- 2) Mating connectors, separate order, see page 11 and data sheet 08006.
- 3) For the connection to AC voltage mains, a DC voltage solenoid **must** be used, which is controlled via a rectifier (see table above).
With an individual connection, a mating connector with integrated rectifier can be used (separate order, see page 11 and data sheet 08006).
- 4) Double valve mating connector for central connection, separate order, see data sheet 08006.

Standard types and standard units are contained in the EPS (standard price list).

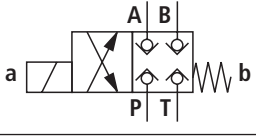
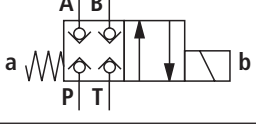
Spool symbols

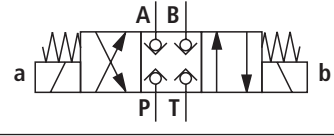
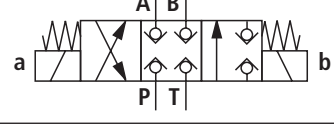
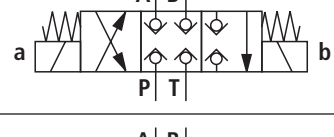
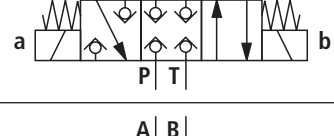
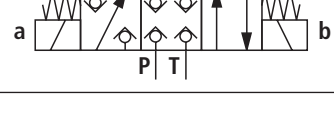
2/2 directional poppet valve	
Ordering code	Symbol
E61B	
E40B	
E69A	
E18A	

3/3 directional poppet valve	
Ordering code	Symbol
E35	
E100	
E13	
E22 ²⁾	

1) Port T must be connected for pressure compensation.

2) Port P doesn't have to be connected.

4/2 directional poppet valve	
Ordering code	Symbol
EA	
EB	

4/3 directional poppet valve	
Ordering code	Symbol
E	
E61	
E40	
E89	
E18	

Function, section

General

The directional valve Type SEC is a directional poppet valve with solenoid actuation. It controls start, stop and direction of the flow and basically comprises a housing (1), the solenoid (2) as well as the hardened valve system (3).

The manual override allows for the switching of the valve without solenoid energization.

Basic principle

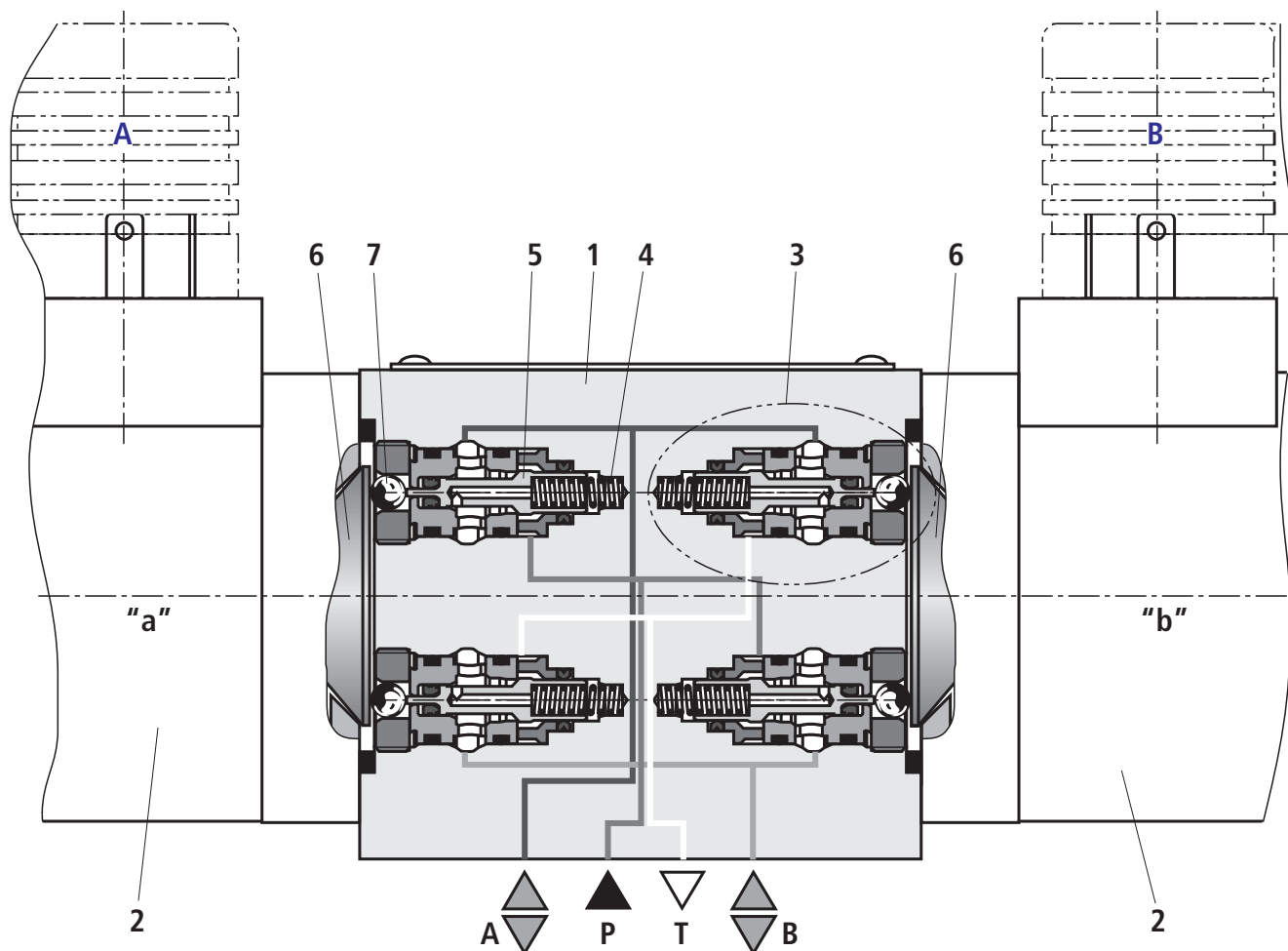
In the initial position, the control spool (5) is pushed onto the seat by the spring (4). The force of the solenoid (2) acts via an actuating element (6) and the ball (7) on the control spool (5). Depending on the spool, up to four valve systems (3) are installed in the housing that can be connected in different ways.

Attention!

It has to be made sure that the specified maximum flow is not exceeded! An orifice insert must be used for limiting the flow, if necessary (see page 11).

Depending on the production tolerances, a pump or tank pre-opening of the valve results. That is why different pressure courses may result during the switching process in valves of the same type.

One valve alone must never be used for holding loads or for positioning.



Technical data (For applications outside these parameters, please consult us!)**general**

Weight	- 3/3 directional poppet valve	kg [lbs]	2.14 [4.72]
	- 4/2 directional poppet valve	kg [lbs]	1.8 [3.97]
	- 4/3 directional poppet valve	kg [lbs]	2.14 [4.72]
Installation position			Any
Ambient temperature range		°C [°F]	-30 to +50 [-22 to +122] (NBR seals) -20 to +50 [-4 to +122] (FKM seals)
Vibration test according to IEC 68-2-36			10 g RMS, 20 to 2000 Hz, test time 60 min per axis

hydraulic

Maximum operating pressure	- Port A, B, P	bar [psi]	420 [6100]
	- Port T	bar [psi]	$p_T < p_P$, however max. 100 [1450] (energized) $p_T < 20$ [290], if $p_A / p_B = 0$ (de-energized)
Maximum flow		l/min [US gpm]	25 [6.6]
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524 ¹⁾ ; fast biodegradable hydraulic fluids according to VDMA 24568 (see also data sheet 90221); HETG (rape seed oil) ¹⁾ ; HEPG (polyglycols) ²⁾ ; HEES (synthetic esters) ²⁾ ; other hydraulic fluids upon request
Hydraulic fluid temperature range		°C [°F]	-30 to +80 [-22 to +176] (NBR seals) -20 to +80 [-4 to +176] (FKM seals)
Viscosity range		mm ² /s [SUS]	2.8 to 500 [35 to 2320]
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ³⁾

¹⁾ Suitable for NBR and FKM seals

²⁾ Only suitable for FKM seals

³⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of filters see www.boschrexroth.com/filter.

Technical data (For applications outside these parameters, please consult us!)**electrical**

Type of voltage		Direct voltage	Alternating voltage
Available voltages (special voltages upon request)	V	12, 24, 26, 48, 96, 110, 125, 205, 220	Only possible with rectifier ⁴⁾
Voltage tolerance (nominal voltage)	%	±10	
Power consumption	W	30	
Duty cycle (ED)	%	100	
Switching time according to ISO 6403 ⁵⁾	– ON	ms	max. 70
	– OFF	ms	max. 45
Maximum switching frequency	1/h	3600	
Protection class according to DIN EN 60529	– Version “K4”, “K72L”, “K73L”		IP 65 (with mating connector mounted and locked)
	– Version “C4”		IP 66 (with mating connector mounted and locked)
Maximum coil temperature ⁶⁾	°C [°F]	120 [248]	

⁴⁾ – Mating connectors with rectifier see page 11

- Possible voltages see page 2
- Rectifiers from the customer must comply with the relevant standards as well as the coil performance data!

⁵⁾ The switching times are measured according to ISO 6403 with HLP46, $\vartheta_{\text{Oil}} = 40 \text{ °C} \pm 5 \text{ °C}$ [$104 \text{ °F} \pm 9 \text{ °F}$] and refer to a pressure change of 5 %. With other oil temperatures, deviations are possible!

⁶⁾ Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

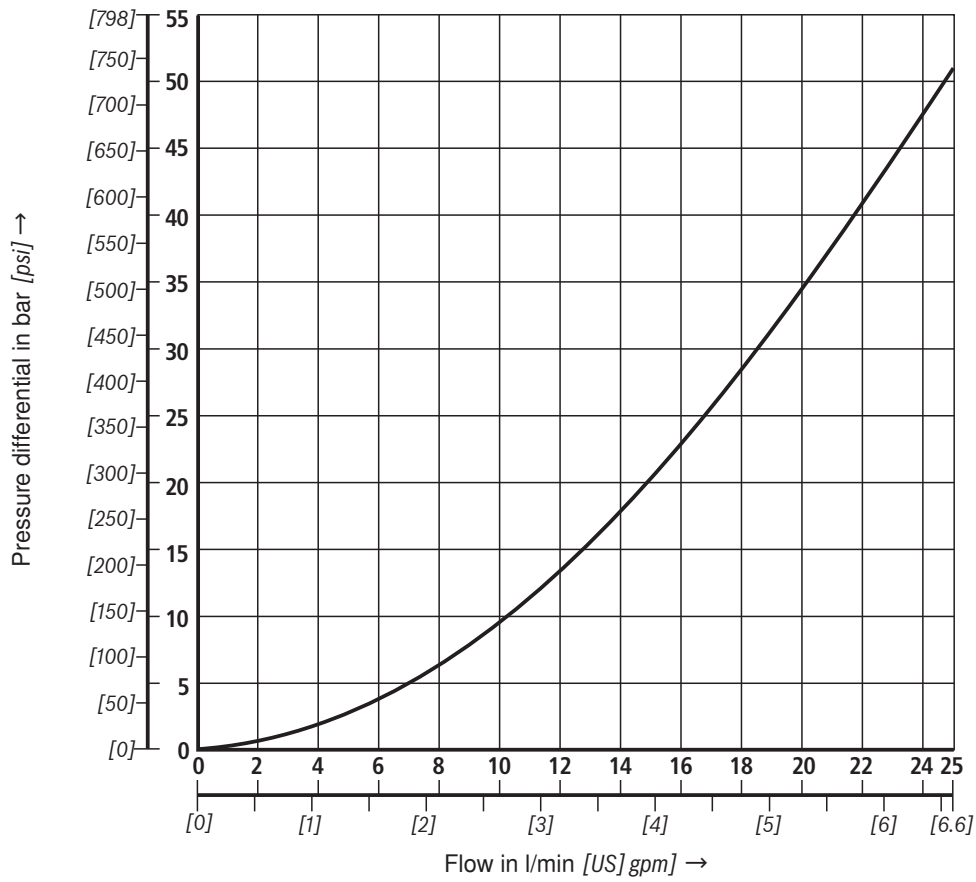
When establishing the electrical connection, the protective earthing conductor (PE $\frac{\perp}{\perp}$) has to be connected properly.

Notes!

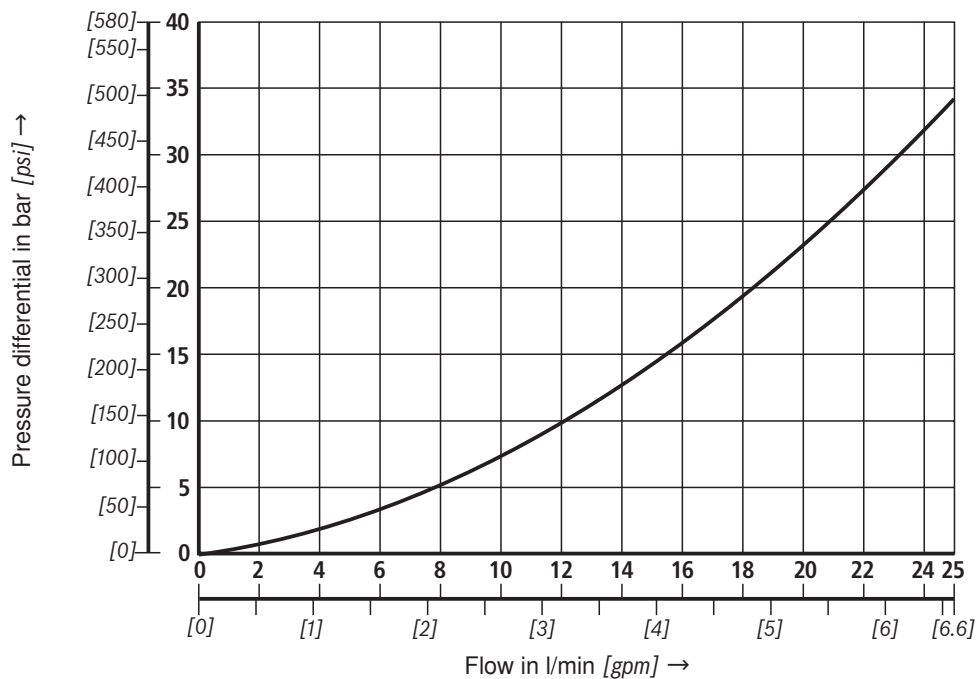
- Operation of the manual override is only possible up to a tank pressure of ca. 50 bar [725 psi]. Avoid damage to the bore for the manual override! (Special tool for actuation, separate order, Material no. **R900024943**). The simultaneous operation of both solenoids with 100 % duty cycle is not possible. If both solenoids are operated, a maximum duty cycle of 10 % is admissible.
- The solenoids shut-off generates voltage peaks that can be reduced by using suitable diodes.
- Assembly, commissioning and maintenance see data sheet 07300
- In set-up mode, an H position can be achieved by actuating both coils (only with 4/3 directional poppet valve with spool symbol “E”). In order to avoid overheating of the coil, the duty cycle must in intermittent operation S3 (according to VDE 0580) not exceed 10 % or 50 % with a game duration of 5 minutes or 70 seconds respectively!
- Operation with reduced power:
After interconnection and achieving of the spool position (ca. 200 ms), the electrical power can be reduced to 8 W (e.g. by means of PWM technology).

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C} [104^\circ\text{F} \pm 9^\circ\text{F}]$)

Δp - q_v characteristic curves



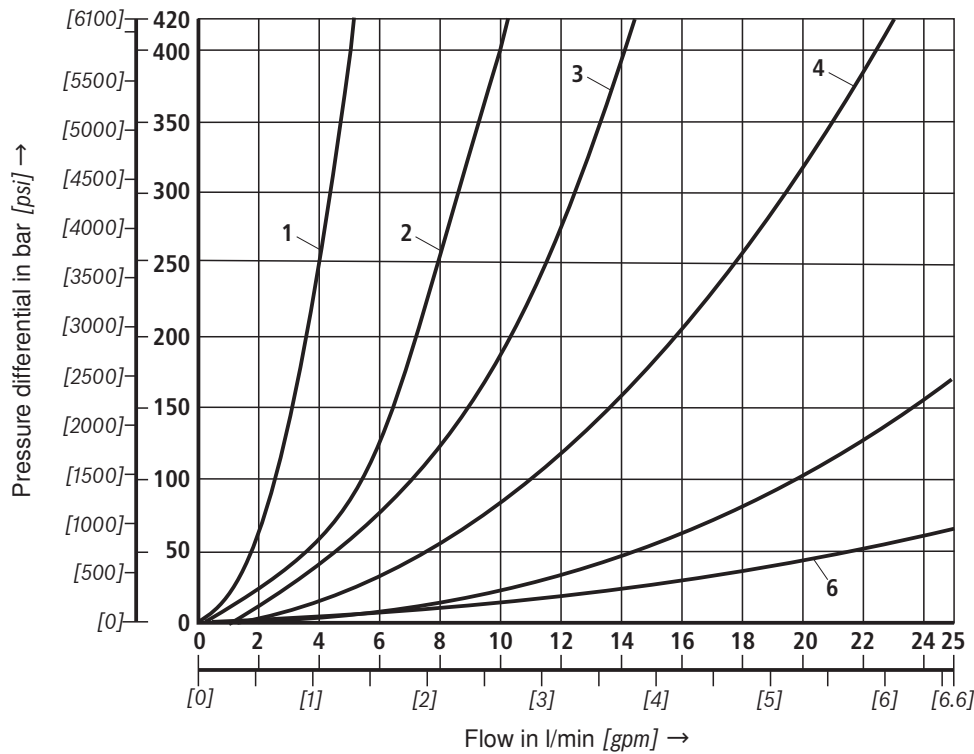
Δp - q_v characteristic curves
Check valve insert



Note!
Check valve inserts generally create pressure drops.

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C} [104 \text{ }^\circ\text{F} \pm 9 \text{ }^\circ\text{F}]$)

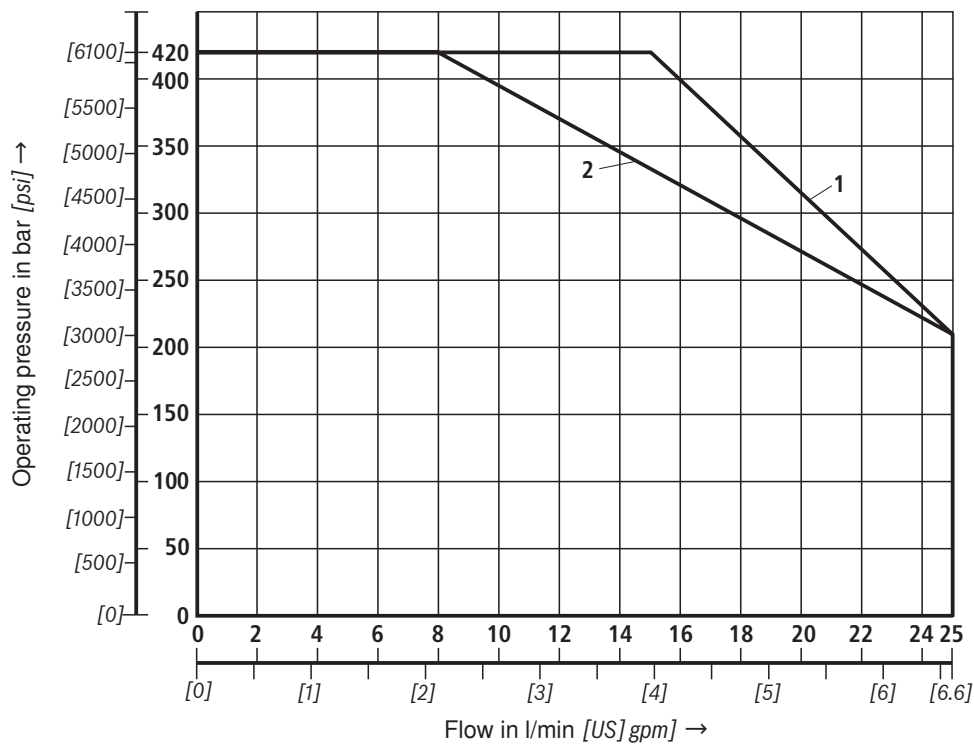
Δp - q_v characteristic curves
Orifice inserts, throttle inserts



Characteristic curve	\varnothing in mm [inch]
1	0.7
2	1.0
3	1.2
4	1.5
5	2.0
6	2.5

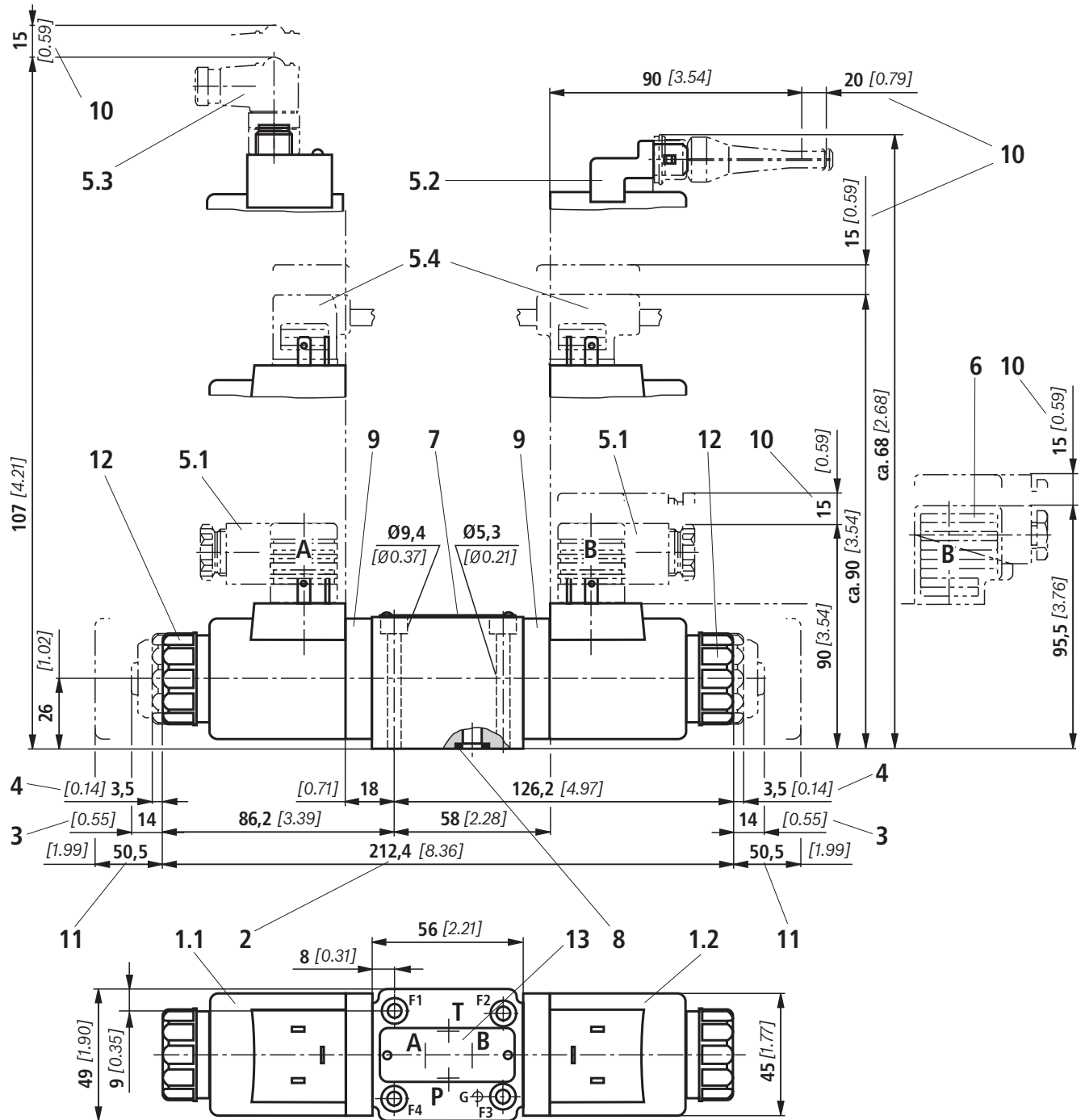
Note!
Orifice and throttle inserts generally create pressure drops.

Performance limits (measured with HLP46, $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C} [104 \text{ }^\circ\text{F} \pm 9 \text{ }^\circ\text{F}]$)



Characteristic curve	Spool symbols
1	E35, E100, E18A, E40B, E69A, E61B, E22, E13
2	E, E61, E89, E40, E18, EA, EB

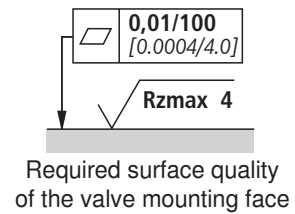
Unit dimensions (dimensions in mm [inch])



Item explanations and valve mounting screws see page 10.

Attention!

Maximum diameter for more far reaching connection bores in the block (A, B, P, and T) 6.8 mm [0.268 inch]! With larger diameters, there is the risk that the additional elements (component inserts) do not stay in the intended position.



Unit dimensions: Item explanations

- 1.1 Solenoid "a"
- 1.2 Solenoid "b"
 - 2 Dimension for solenoid **with concealed** manual override "N9"
 - 3 Dimension for solenoid **with** manual override "N9"
 - 4 Dimension for solenoid **without** manual override
- 5.1 Mating connector **without** circuitry for connector "K4" (separate order, see page 11 and data sheet 08006)
- 5.2 Mating connector (AMP Junior Timer) with connector "C4" (separate order, see data sheet 08006)
- 5.3 Mating connector angled with M12x1 plug-in connection with operating display LED "K72L" and "K73L" (separate order, see data sheet 08006)
- 5.4 Double valve mating connector **without/with** circuitry for connector "K4" (separate order, see data sheet 08006)
 - 6 Mating connector **with** circuitry for connector "K4" (separate order, see page 11 and data sheet 08006)
- 7 Name plate
- 8 Identical seal rings for ports A, B, P, T
- 9 Intermediate flange
- 10 Space required for removing the mating connector
- 11 Space required for removing the coil
- 12 Lock nut, tightening torque $M_A = 4^{+1} \text{ Nm } [2.95^{+0.74} \text{ ft-lbs}]$
- 13 Porting pattern according to ISO 4401-03-02-0-05 and NFPA T3.5.1 R2-D03 (**with** locating hole for locating pin ISO 8752-3x8-St; see ordering code page 2)

Valve mounting screws (separate order)

- Clamping length 42 mm:

4 hexagon socket head cap screws metric ISO 4762 - M5 x 50 - 10.9-fZn-240h-L

(friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14);

Tightening torque $M_A = 7 \text{ Nm } [5.2 \text{ ft-lbs}] \pm 10 \%$,

Material no. **R913000064**

or

4 hexagon socket head cap screws

ISO 4762 - M5 x 50 - 10.9 (own procurement)

(friction coefficient $\mu_{\text{total}} = 0.12$ to 0.17);

Tightening torque $M_A = 8.1 \text{ Nm } [6 \text{ ft-lbs}] \pm 10 \%$

4 hexagon socket head cap screws UNC

10-24 UNC x 2" ASTM-A574

(friction coefficient $\mu_{\text{total}} = 0.19$ to 0.24);

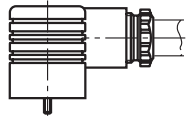
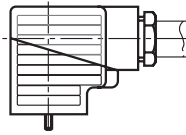
Tightening torque $M_A = 11 \text{ Nm } [8.2 \text{ ft-lbs}] \pm 15 \%$,

(friction coefficient $\mu_{\text{total}} = 0.12$ to 0.17);

Tightening torque $M_A = 8 \text{ Nm } [5.9 \text{ ft-lbs}] \pm 10 \%$,

Material no. **R978800693**

Mating connectors according to DIN EN 175301-803

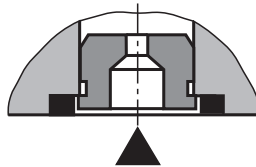
For details and more mating connectors see data sheet 08006					
Valve side	Color	Material no.			
		without circuitry	with indicator light 12 ... 240 V	with rectifier 12 ... 240 V	with indicator light and Zener diode suppression circuit 24 V
a	Gray	R901017010	–	–	–
b	Black	R901017011	–	–	–
a/b	Black	–	R901017022	R901017025	R901017026

Orifice insert

The use of an orifice insert is required when due to prevailing operating conditions, flows can occur during the switching processes, which exceed the performance limit of the valve.

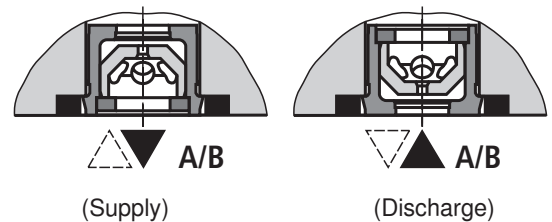
Examples:

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



Throttle insert

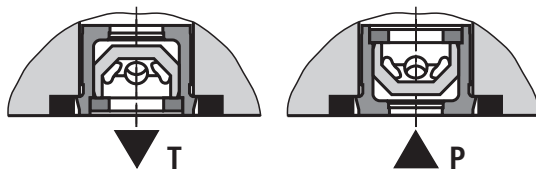
The throttle insert is used to control the consumption rate (e.g. for workpiece clamping). Depending on the single case, supply or discharge control is possible.



Check valve insert

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

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



Project planning information

– Classification according to DIN EN 13849

Due to the evaluation according to table C.1 and C.2 of DIN EN ISO 13849-2:2000-12, the valve can be classified in category 1.

- Machine directive 2006/42/EC is to be observed.
- Please also observe the data sheets 07008 and 07300.

– Estimates of the MTTF_d value according to DIN EN ISO 13849-1:2007-02

Due to the evaluation according to attachment C.3 of DIN EN ISO 13849-1, an MTTF_d of 150 years can be indicated for the valve.

- Due to casting tolerances, a manifold with a depth gauge of 55 mm is to be used in case manifolds are used.

Selection table: Orifice insert, throttle insert and check valve insert**Order example:**

- Orifice insert \varnothing 0.6 mm [\varnothing 0.0236 inch] in channel P
 - Orifice insert \varnothing 0.6 mm [\varnothing 0.0236 inch] in channel A
 - Check valve in channel T
- Ordering code "P069"

Ordering code	Orifice insert in channel P	Orifice insert in channel A	Orifice insert in channel B	Throttle insert (discharge) in channel A	Throttle insert (discharge) in channel B	Throttle insert (supply) in channel A	Throttle insert (supply) in channel B	Check valve in channel P	Check valve in channel T
P001	0.6	-	-	-	-	-	-	-	-
P002	0.7	-	-	-	-	-	-	-	-
P003	0.8	-	-	-	-	-	-	-	-
P004	1.0	-	-	-	-	-	-	-	-
P005	1.2	-	-	-	-	-	-	-	-
P006	1.5	-	-	-	-	-	-	-	-
P007	1.8	-	-	-	-	-	-	-	-
P008	2.0	-	-	-	-	-	-	-	-
P009	2.2	-	-	-	-	-	-	-	-
P010	3.0	-	-	-	-	-	-	-	-
P011	3.5	-	-	-	-	-	-	-	-
P012	-	-	-	-	-	-	-	✓	-
P013	-	-	-	-	-	-	-	✓	✓
P014	0.6	-	-	-	-	-	-	-	✓
P015	0.7	-	-	-	-	-	-	-	✓
P016	0.8	-	-	-	-	-	-	-	✓
P017	1.0	-	-	-	-	-	-	-	✓
P018	1.2	-	-	-	-	-	-	-	✓
P019	1.5	-	-	-	-	-	-	-	✓
P020	1.8	-	-	-	-	-	-	-	✓
P021	2.0	-	-	-	-	-	-	-	✓
P022	2.2	-	-	-	-	-	-	-	✓
P023	3.0	-	-	-	-	-	-	-	✓
P024	3.5	-	-	-	-	-	-	-	✓
P025	-	0.6	-	-	-	-	-	-	-
P026	-	0.7	-	-	-	-	-	-	-
P027	-	0.8	-	-	-	-	-	-	-
P028	-	1.0	-	-	-	-	-	-	-
P029	-	1.2	-	-	-	-	-	-	-
P030	-	1.5	-	-	-	-	-	-	-
P031	-	1.8	-	-	-	-	-	-	-
P032	-	2.0	-	-	-	-	-	-	-
P033	-	2.2	-	-	-	-	-	-	-
P034	-	3.0	-	-	-	-	-	-	-
P035	-	3.5	-	-	-	-	-	-	-
P036	-	-	0.6	-	-	-	-	-	-
P037	-	-	0.7	-	-	-	-	-	-
P038	-	-	0.8	-	-	-	-	-	-
P039	-	-	1.0	-	-	-	-	-	-
P040	-	-	1.2	-	-	-	-	-	-
P041	-	-	1.5	-	-	-	-	-	-

Ordering code	Orifice insert in channel P	Orifice insert in channel A	Orifice insert in channel B	Throttle insert (discharge) in channel A	Throttle insert (discharge) in channel B	Throttle insert (supply) in channel A	Throttle insert (supply) in channel B	Check valve in channel P	Check valve in channel T
P042	-	-	1.8	-	-	-	-	-	-
P043	-	-	2.0	-	-	-	-	-	-
P044	-	-	2.2	-	-	-	-	-	-
P045	-	-	3.0	-	-	-	-	-	-
P046	-	-	3.5	-	-	-	-	-	-
P047	-	0.6	0.6	-	-	-	-	-	-
P048	-	0.7	0.7	-	-	-	-	-	-
P049	-	0.8	0.8	-	-	-	-	-	-
P050	-	1.0	1.0	-	-	-	-	-	-
P051	-	1.2	1.2	-	-	-	-	-	-
P052	-	1.5	1.5	-	-	-	-	-	-
P053	-	1.8	1.8	-	-	-	-	-	-
P054	-	2.0	2.0	-	-	-	-	-	-
P055	-	2.2	2.2	-	-	-	-	-	-
P056	-	3.0	3.0	-	-	-	-	-	-
P057	-	3.5	3.5	-	-	-	-	-	-
P058	0.6	0.6	-	-	-	-	-	-	-
P059	0.7	0.7	-	-	-	-	-	-	-
P060	0.8	0.8	-	-	-	-	-	-	-
P061	1.0	1.0	-	-	-	-	-	-	-
P062	1.2	1.2	-	-	-	-	-	-	-
P063	1.5	1.5	-	-	-	-	-	-	-
P064	1.8	1.8	-	-	-	-	-	-	-
P065	2.0	2.0	-	-	-	-	-	-	-
P066	2.2	2.2	-	-	-	-	-	-	-
P067	3.0	3.0	-	-	-	-	-	-	-
P068	3.5	3.5	-	-	-	-	-	-	-
P069	0.6	0.6	-	-	-	-	-	-	✓
P070	0.7	0.7	-	-	-	-	-	-	✓
P071	0.8	0.8	-	-	-	-	-	-	✓
P072	1.0	1.0	-	-	-	-	-	-	✓
P073	1.2	1.2	-	-	-	-	-	-	✓
P074	1.5	1.5	-	-	-	-	-	-	✓
P075	1.8	1.8	-	-	-	-	-	-	✓
P076	2.0	2.0	-	-	-	-	-	-	✓
P077	2.2	2.2	-	-	-	-	-	-	✓
P078	3.0	3.0	-	-	-	-	-	-	✓
P079	3.5	3.5	-	-	-	-	-	-	✓
P080	0.6	-	0.6	-	-	-	-	-	-
P081	0.7	-	0.7	-	-	-	-	-	-
P082	0.8	-	0.8	-	-	-	-	-	-
P083	1.0	-	1.0	-	-	-	-	-	-
P084	1.2	-	1.2	-	-	-	-	-	-
P085	1.5	-	1.5	-	-	-	-	-	-
P086	1.8	-	1.8	-	-	-	-	-	-
P087	2.0	-	2.0	-	-	-	-	-	-
P088	2.2	-	2.2	-	-	-	-	-	-

Selection table: Orifice insert, throttle insert and check valve insert

Ordering code	Orifice insert in channel P	Orifice insert in channel A	Orifice insert in channel B	Throttle insert (discharge) in channel A	Throttle insert (discharge) in channel B	Throttle insert (supply) in channel A	Throttle insert (supply) in channel B	Check valve in channel P	Check valve in channel T
P089	3.0	-	3.0	-	-	-	-	-	-
P090	3.5	-	3.5	-	-	-	-	-	-
P091	0.6	-	0.6	-	-	-	-	-	✓
P092	0.7	-	0.7	-	-	-	-	-	✓
P093	0.8	-	0.8	-	-	-	-	-	✓
P094	1.0	-	1.0	-	-	-	-	-	✓
P095	1.2	-	1.2	-	-	-	-	-	✓
P096	1.5	-	1.5	-	-	-	-	-	✓
P097	1.8	-	1.8	-	-	-	-	-	✓
P098	2.0	-	2.0	-	-	-	-	-	✓
P099	2.2	-	2.2	-	-	-	-	-	✓
P100	3.0	-	3.0	-	-	-	-	-	✓
P101	3.5	-	3.5	-	-	-	-	-	✓
P102	-	-	-	0.7	-	-	-	-	-
P103	-	-	-	-	0.7	-	-	-	-
P104	-	-	-	-	-	0.7	-	-	-
P105	-	-	-	-	-	-	0.7	-	-
P106	-	-	-	0.7	0.7	-	-	-	-
P107	-	-	-	-	-	0.7	0.7	-	-
P108	-	-	-	0.7	-	-	-	✓	-
P109	-	-	-	-	0.7	-	-	✓	-
P110	-	-	-	-	-	0.7	-	✓	-
P111	-	-	-	-	-	-	0.7	✓	-
P112	-	-	-	0.7	0.7	-	-	✓	-
P113	-	-	-	-	-	0.7	0.7	✓	-
P114	-	-	-	0.7	-	-	-	✓	✓
P115	-	-	-	-	0.7	-	-	✓	✓
P116	-	-	-	-	-	0.7	-	✓	✓
P117	-	-	-	-	-	-	0.7	✓	✓
P118	-	-	-	0.7	0.7	-	-	✓	✓
P119	-	-	-	-	-	0.7	0.7	✓	✓
P120	-	-	-	1.0	-	-	-	-	-
P121	-	-	-	-	1.0	-	-	-	-
P122	-	-	-	-	-	1.0	-	-	-
P123	-	-	-	-	-	-	1.0	-	-
P124	-	-	-	1.0	1.0	-	-	-	-
P125	-	-	-	-	-	1.0	1.0	-	-
P126	-	-	-	1.0	-	-	-	✓	-
P127	-	-	-	-	1.0	-	-	✓	-
P128	-	-	-	-	-	1.0	-	✓	-
P129	-	-	-	-	-	-	1.0	✓	-
P130	-	-	-	1.0	1.0	-	-	✓	-
P131	-	-	-	-	-	1.0	1.0	✓	-
P132	-	-	-	1.0	-	-	-	✓	✓
P133	-	-	-	-	1.0	-	-	✓	✓
P134	-	-	-	-	-	1.0	-	✓	✓
P135	-	-	-	-	-	-	1.0	✓	✓

Ordering code	Orifice insert in channel P	Orifice insert in channel A	Orifice insert in channel B	Throttle insert (discharge) in channel A	Throttle insert (discharge) in channel B	Throttle insert (supply) in channel A	Throttle insert (supply) in channel B	Check valve in channel P	Check valve in channel T
P136	-	-	-	1.0	1.0	-	-	✓	✓
P137	-	-	-	-	-	1.0	1.0	✓	✓
P138	-	-	-	1.2	-	-	-	-	-
P139	-	-	-	-	1.2	-	-	-	-
P140	-	-	-	-	-	1.2	-	-	-
P141	-	-	-	-	-	-	1.2	-	-
P142	-	-	-	1.2	1.2	-	-	-	-
P143	-	-	-	-	-	1.2	1.2	-	-
P144	-	-	-	1.2	-	-	-	✓	-
P145	-	-	-	-	1.2	-	-	✓	-
P146	-	-	-	-	-	1.2	-	✓	-
P147	-	-	-	-	-	-	1.2	✓	-
P148	-	-	-	1.2	1.2	-	-	✓	-
P149	-	-	-	-	-	1.2	1.2	✓	-
P150	-	-	-	1.2	-	-	-	✓	✓
P151	-	-	-	-	1.2	-	-	✓	✓
P152	-	-	-	-	-	1.2	-	✓	✓
P153	-	-	-	-	-	-	1.2	✓	✓
P154	-	-	-	1.2	1.2	-	-	✓	✓
P155	-	-	-	-	-	1.2	1.2	✓	✓
P156	-	-	-	1.5	-	-	-	-	-
P157	-	-	-	-	1.5	-	-	-	-
P158	-	-	-	-	-	1.5	-	-	-
P159	-	-	-	-	-	-	1.5	-	-
P160	-	-	-	1.5	1.5	-	-	-	-
P161	-	-	-	-	-	1.5	1.5	-	-
P162	-	-	-	1.5	-	-	-	✓	-
P163	-	-	-	-	1.5	-	-	✓	-
P164	-	-	-	-	-	1.5	-	✓	-
P165	-	-	-	-	-	-	1.5	✓	-
P166	-	-	-	1.5	1.5	-	-	✓	-
P167	-	-	-	-	-	1.5	1.5	✓	-
P168	-	-	-	1.5	-	-	-	✓	✓
P169	-	-	-	-	1.5	-	-	✓	✓
P170	-	-	-	-	-	1.5	-	✓	✓
P171	-	-	-	-	-	-	1.5	✓	✓
P172	-	-	-	1.5	1.5	-	-	✓	✓
P173	-	-	-	-	-	1.5	1.5	✓	✓
P174	-	-	-	2.0	-	-	-	-	-
P175	-	-	-	-	2.0	-	-	-	-
P176	-	-	-	-	-	2.0	-	-	-
P177	-	-	-	-	-	-	2.0	-	-
P178	-	-	-	2.0	2.0	-	-	-	-
P179	-	-	-	-	-	2.0	2.0	-	-
P180	-	-	-	2.0	-	-	-	✓	-
P181	-	-	-	-	2.0	-	-	✓	-
P182	-	-	-	-	-	2.0	-	✓	-

Selection table: Orifice insert, throttle insert and check valve insert

Ordering code	Orifice insert in channel P	Orifice insert in channel A	Orifice insert in channel B	Throttle insert (discharge) in channel A	Throttle insert (discharge) in channel B	Throttle insert (supply) in channel A	Throttle insert (supply) in channel B	Check valve in channel P	Check valve in channel T
P183	-	-	-	-	-	-	2.0	✓	-
P184	-	-	-	2.0	2.0	-	-	✓	-
P185	-	-	-	-	-	2.0	2.0	✓	-
P186	-	-	-	2.0	-	-	-	✓	✓
P187	-	-	-	-	2.0	-	-	✓	✓
P188	-	-	-	-	-	2.0	-	✓	✓
P189	-	-	-	-	-	-	2.0	✓	✓
P190	-	-	-	2.0	2.0	-	-	✓	✓
P191	-	-	-	-	-	2.0	2.0	✓	✓
P192	-	-	-	2.5	-	-	-	-	-
P193	-	-	-	-	2.5	-	-	-	-
P194	-	-	-	-	-	2.5	-	-	-
P195	-	-	-	-	-	-	2.5	-	-
P196	-	-	-	2.5	2.5	-	-	-	-
P197	-	-	-	-	-	2.5	2.5	-	-
P198	-	-	-	2.5	-	-	-	✓	-
P199	-	-	-	-	2.5	-	-	✓	-
P200	-	-	-	-	-	2.5	-	✓	-
P201	-	-	-	-	-	-	2.5	✓	-
P202	-	-	-	2.5	2.5	-	-	✓	-
P203	-	-	-	-	-	2.5	2.5	✓	-
P204	-	-	-	2.5	-	-	-	✓	✓
P205	-	-	-	-	2.5	-	-	✓	✓
P206	-	-	-	-	-	2.5	-	✓	✓
P207	-	-	-	-	-	-	2.5	✓	✓
P208	-	-	-	2.5	2.5	-	-	✓	✓
P209	-	-	-	-	-	2.5	2.5	✓	✓
P210	-	-	-	0.7	1.0	-	-	-	-
P211	-	-	-	0.7	1.2	-	-	-	-
P212	-	-	-	0.7	1.5	-	-	-	-
P213	-	-	-	0.7	2.0	-	-	-	-
P214	-	-	-	0.7	2.5	-	-	-	-
P215	-	-	-	0.7	1.0	-	-	✓	-
P216	-	-	-	0.7	1.2	-	-	✓	-
P217	-	-	-	0.7	1.5	-	-	✓	-
P218	-	-	-	0.7	2.0	-	-	✓	-
P219	-	-	-	0.7	2.5	-	-	✓	-
P220	-	-	-	0.7	1.0	-	-	✓	✓
P221	-	-	-	0.7	1.2	-	-	✓	✓
P222	-	-	-	0.7	1.5	-	-	✓	✓
P223	-	-	-	0.7	2.0	-	-	✓	✓
P224	-	-	-	0.7	2.5	-	-	✓	✓
P225	-	-	-	-	-	0.7	1.0	-	-
P226	-	-	-	-	-	0.7	1.2	-	-
P227	-	-	-	-	-	0.7	1.5	-	-
P228	-	-	-	-	-	0.7	2.0	-	-
P229	-	-	-	-	-	0.7	2.5	-	-

Ordering code	Orifice insert in channel P	Orifice insert in channel A	Orifice insert in channel B	Throttle insert (discharge) in channel A	Throttle insert (discharge) in channel B	Throttle insert (supply) in channel A	Throttle insert (supply) in channel B	Check valve in channel P	Check valve in channel T
P230	-	-	-	-	-	0.7	1.0	✓	-
P231	-	-	-	-	-	0.7	1.2	✓	-
P232	-	-	-	-	-	0.7	1.5	✓	-
P233	-	-	-	-	-	0.7	2.0	✓	-
P234	-	-	-	-	-	0.7	2.5	✓	-
P235	-	-	-	-	-	0.7	1.0	✓	✓
P236	-	-	-	-	-	0.7	1.2	✓	✓
P237	-	-	-	-	-	0.7	1.5	✓	✓
P238	-	-	-	-	-	0.7	2.0	✓	✓
P239	-	-	-	-	-	0.7	2.5	✓	✓
P240	-	-	-	1.0	1.2	-	-	-	-
P241	-	-	-	1.0	1.5	-	-	-	-
P242	-	-	-	1.0	2.0	-	-	-	-
P243	-	-	-	1.0	2.5	-	-	-	-
P244	-	-	-	1.0	1.2	-	-	✓	-
P245	-	-	-	1.0	1.5	-	-	✓	-
P246	-	-	-	1.0	2.0	-	-	✓	-
P247	-	-	-	1.0	2.5	-	-	✓	-
P248	-	-	-	1.0	1.2	-	-	✓	✓
P249	-	-	-	1.0	1.5	-	-	✓	✓
P250	-	-	-	1.0	2.0	-	-	✓	✓
P251	-	-	-	1.0	2.5	-	-	✓	✓
P252	-	-	-	-	-	1.0	1.2	-	-
P253	-	-	-	-	-	1.0	1.5	-	-
P254	-	-	-	-	-	1.0	2.0	-	-
P255	-	-	-	-	-	1.0	2.5	-	-
P256	-	-	-	-	-	1.0	1.2	✓	-
P257	-	-	-	-	-	1.0	1.5	✓	-
P258	-	-	-	-	-	1.0	2.0	✓	-
P259	-	-	-	-	-	1.0	2.5	✓	-
P260	-	-	-	-	-	1.0	1.2	✓	✓
P261	-	-	-	-	-	1.0	1.5	✓	✓
P262	-	-	-	-	-	1.0	2.0	✓	✓
P263	-	-	-	-	-	1.0	2.5	✓	✓
P264	-	-	-	1.2	1.0	-	-	-	-
P265	-	-	-	1.2	1.5	-	-	-	-
P266	-	-	-	1.2	2.0	-	-	-	-
P267	-	-	-	1.2	2.5	-	-	-	-
P268	-	-	-	1.2	1.0	-	-	✓	-
P269	-	-	-	1.2	1.5	-	-	✓	-
P270	-	-	-	1.2	2.0	-	-	✓	-
P271	-	-	-	1.2	2.5	-	-	✓	-
P272	-	-	-	1.2	1.0	-	-	✓	✓
P273	-	-	-	1.2	1.5	-	-	✓	✓
P274	-	-	-	1.2	2.0	-	-	✓	✓
P275	-	-	-	1.2	2.5	-	-	✓	✓
P276	-	-	-	-	-	1.2	1.0	-	-

Selection table: Orifice insert, throttle insert and check valve insert

Ordering code	Orifice insert in channel P	Orifice insert in channel A	Orifice insert in channel B	Throttle insert (discharge) in channel A	Throttle insert (discharge) in channel B	Throttle insert (supply) in channel A	Throttle insert (supply) in channel B	Check valve in channel P	Check valve in channel T
P277	-	-	-	-	-	1.2	1.5	-	-
P278	-	-	-	-	-	1.2	2.0	-	-
P279	-	-	-	-	-	1.2	2.5	-	-
P280	-	-	-	-	-	1.2	1.0	✓	-
P281	-	-	-	-	-	1.2	1.5	✓	-
P282	-	-	-	-	-	1.2	2.0	✓	-
P283	-	-	-	-	-	1.2	2.5	✓	-
P284	-	-	-	-	-	1.2	1.0	✓	✓
P285	-	-	-	-	-	1.2	1.5	✓	✓
P286	-	-	-	-	-	1.2	2.0	✓	✓
P287	-	-	-	-	-	1.2	2.5	✓	✓
P288	-	-	-	1.5	0.7	-	-	-	-
P289	-	-	-	1.5	1.0	-	-	-	-
P290	-	-	-	1.5	2.0	-	-	-	-
P291	-	-	-	1.5	2.5	-	-	-	-
P292	-	-	-	1.5	0.7	-	-	✓	-
P293	-	-	-	1.5	1.2	-	-	✓	-
P294	-	-	-	1.5	2.0	-	-	✓	-
P295	-	-	-	1.5	2.5	-	-	✓	-
P296	-	-	-	1.5	0.7	-	-	✓	✓
P297	-	-	-	1.5	1.2	-	-	✓	✓
P298	-	-	-	1.5	2.0	-	-	✓	✓
P299	-	-	-	1.5	2.5	-	-	✓	✓
P300	-	-	-	-	-	1.5	0.7	-	-
P301	-	-	-	-	-	1.5	1.0	-	-
P302	-	-	-	-	-	1.5	2.0	-	-
P303	-	-	-	-	-	1.5	2.5	-	-
P304	-	-	-	-	-	1.5	0.7	✓	-
P305	-	-	-	-	-	1.5	1.2	✓	-
P306	-	-	-	-	-	1.5	2.0	✓	-
P307	-	-	-	-	-	1.5	2.5	✓	-
P308	-	-	-	-	-	1.5	0.7	✓	✓
P309	-	-	-	-	-	1.5	1.2	✓	✓
P310	-	-	-	-	-	1.5	2.0	✓	✓
P311	-	-	-	-	-	1.5	2.5	✓	✓
P312	-	-	-	2.0	0.7	-	-	-	-
P313	-	-	-	2.0	1.0	-	-	-	-
P314	-	-	-	2.0	1.5	-	-	-	-
P315	-	-	-	2.0	2.5	-	-	-	-
P316	-	-	-	2.0	0.7	-	-	✓	-
P317	-	-	-	2.0	1.2	-	-	✓	-
P318	-	-	-	2.0	1.5	-	-	✓	-
P319	-	-	-	2.0	2.5	-	-	✓	-
P320	-	-	-	2.0	0.7	-	-	✓	✓
P321	-	-	-	2.0	1.2	-	-	✓	✓
P322	-	-	-	2.0	1.5	-	-	✓	✓
P323	-	-	-	2.0	2.5	-	-	✓	✓

Ordering code	Orifice insert in channel P	Orifice insert in channel A	Orifice insert in channel B	Throttle insert (discharge) in channel A	Throttle insert (discharge) in channel B	Throttle insert (supply) in channel A	Throttle insert (supply) in channel B	Check valve in channel P	Check valve in channel T
P324	-	-	-	-	-	2.0	0.7	-	-
P325	-	-	-	-	-	2.0	1.0	-	-
P326	-	-	-	-	-	2.0	1.5	-	-
P327	-	-	-	-	-	2.0	2.5	-	-
P328	-	-	-	-	-	2.0	0.7	✓	-
P329	-	-	-	-	-	2.0	1.2	✓	-
P330	-	-	-	-	-	2.0	1.5	✓	-
P331	-	-	-	-	-	2.0	2.5	✓	-
P332	-	-	-	-	-	2.0	0.7	✓	✓
P333	-	-	-	-	-	2.0	1.2	✓	✓
P334	-	-	-	-	-	2.0	1.5	✓	✓
P335	-	-	-	-	-	2.0	2.5	✓	✓
P336	-	-	-	2.5	0.7	-	-	-	-
P337	-	-	-	2.5	1.0	-	-	-	-
P338	-	-	-	2.5	1.5	-	-	-	-
P339	-	-	-	2.5	2.0	-	-	-	-
P340	-	-	-	2.5	0.7	-	-	✓	-
P341	-	-	-	2.5	1.2	-	-	✓	-
P342	-	-	-	2.5	1.5	-	-	✓	-
P343	-	-	-	2.5	2.0	-	-	✓	-
P344	-	-	-	2.5	0.7	-	-	✓	✓
P345	-	-	-	2.5	1.2	-	-	✓	✓
P346	-	-	-	2.5	1.5	-	-	✓	✓
P347	-	-	-	2.5	2.0	-	-	✓	✓
P348	-	-	-	-	-	2.5	0.7	-	-
P349	-	-	-	-	-	2.5	1.0	-	-
P350	-	-	-	-	-	2.5	1.5	-	-
P351	-	-	-	-	-	2.5	2.0	-	-
P352	-	-	-	-	-	2.5	0.7	✓	-
P353	-	-	-	-	-	2.5	1.2	✓	-
P354	-	-	-	-	-	2.5	1.5	✓	-
P355	-	-	-	-	-	2.5	2.0	✓	-
P356	-	-	-	-	-	2.5	0.7	✓	✓
P357	-	-	-	-	-	2.5	1.2	✓	✓
P358	-	-	-	-	-	2.5	1.5	✓	✓
P359	-	-	-	-	-	2.5	2.0	✓	✓

Notes

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