

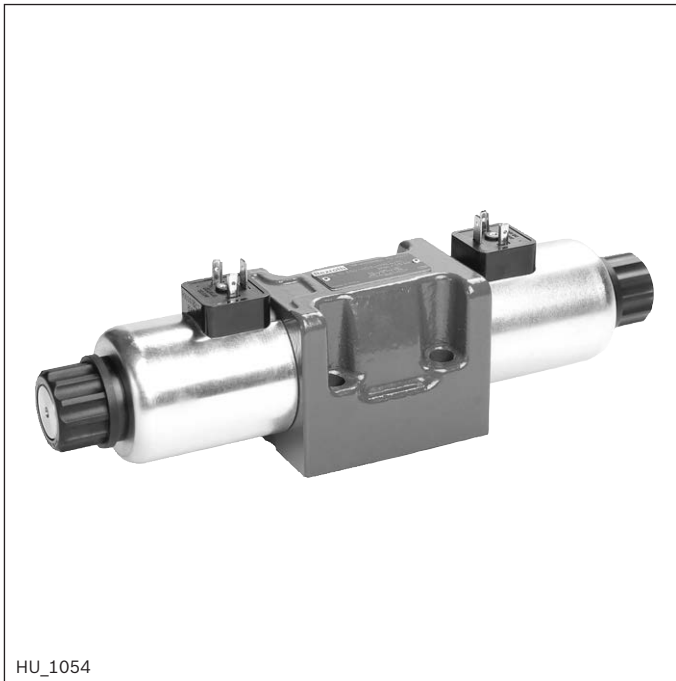
Directional spool valves, direct operated, with solenoid actuation

Type WE.../S

RE 23345

Edition: 2019-04

Replaces: 2019-02



- ▶ Size 10
- ▶ Component series 5X
- ▶ Maximum operating pressure 315 bar [4568 psi]
- ▶ Maximum flow 135 l/min [35.7 US gpm]

Features

- ▶ 4/3 or 4/2 directional design
- ▶ Standard solenoid
- ▶ Porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05
- ▶ 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
- ▶ Manual override

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Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13
	WE	10		5X	/		S	G24	N9	K4	/	*

01	3 main ports	3
	4 main ports	4
02	Directional valve	WE
03	Size 10	10
04	Symbols e.g. C, E, EA, EB, etc; possible version see page 3	e.g. C
05	Component series 50 ... 59 (50 ... 59: Unchanged installation and connection dimensions)	5X
06	With spring return	no code
	Without spring return with detent	OF
07	Wet-pin solenoid with detachable coil	S
08	Direct voltage 24 V	G24
	Connection to AC voltage mains via control with rectifier (see page 11)	
09	With concealed manual override (standard)	N9¹⁾

Electrical connection

10	Individual connection	
	Without mating connector; connector according to DIN EN 175301-803	K4²⁾

Switching time increase

11	Without switching time increase	no code
	With switching time increase	A12

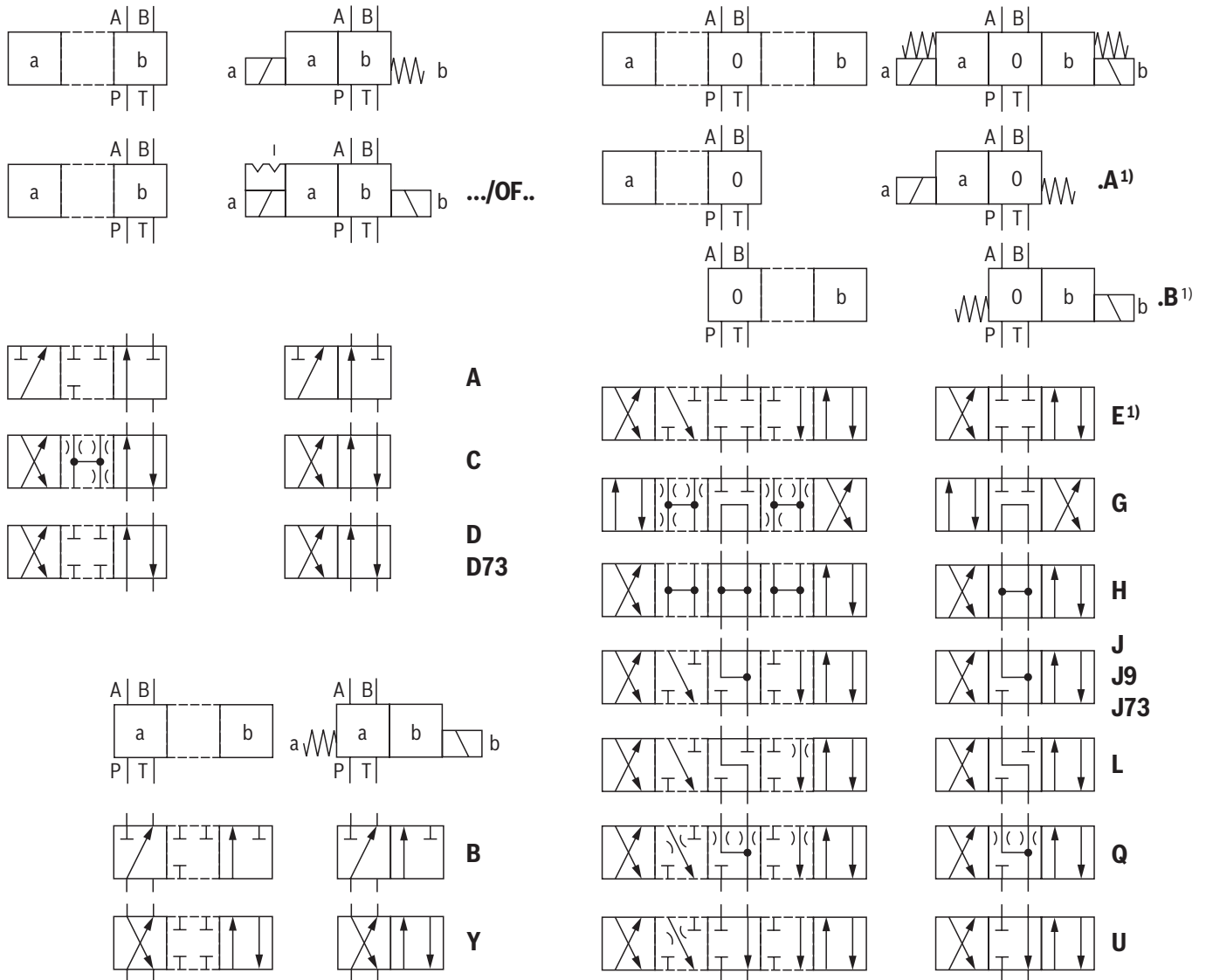
Seal material

12	NBR seals	M
	FKM seals	V
13	Further details in the plain text	*

¹⁾ The manual override cannot be allocated a safety function.
The manual override units may only be used up to a tank pressure of 50 bar.

²⁾ Mating connector, separate order, see page 11 and data sheet 08006.

Symbols



1) Example:

- Spool E with spool position "a" ordering code **..EA..**
- Spool E with spool position "b" ordering code **..EB..**

Notice:

- Representation according to DIN ISO 1219-1.
Hydraulic interim positions are shown by dashes.
- Other symbols upon request.

Function, section

The directional valve type WE is a solenoid-actuated directional spool valve that can be used as electro-magnetic component. It controls the start, stop and direction of a flow.

The directional valve basically consists of housing (1), one or two electronic solenoids (2), the control spool (3), and the return springs (4).

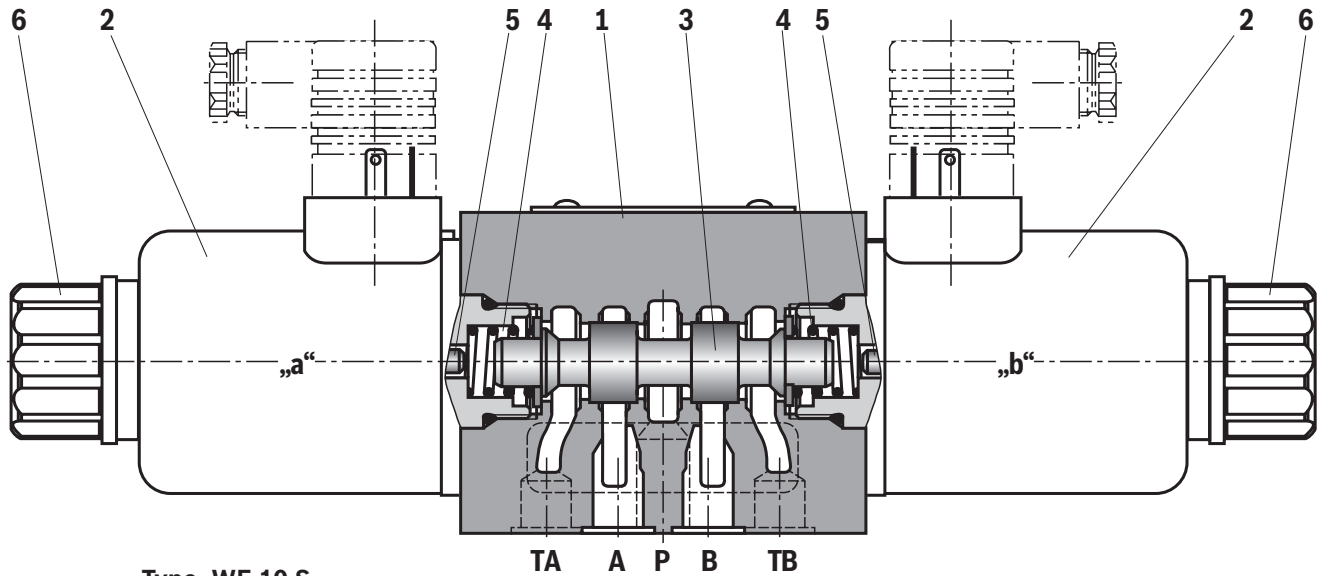
In the de-energized condition, the control spool (3) is held in the central position or in the initial position by the return springs (4).

In case of energization of the wet-pin electronic solenoid (2), the control spool (3) moves out of its rest position into the required end position. In this way, the required direction of flow according to the selected symbol is released.

After the electronic solenoid (2) has been switched off, the control spool (3) is pushed back into the central position or in the initial position.

A manual override (6) allows the valve to be switched manually without solenoid energization.

To ensure proper functioning, care must be taken that the pressure chamber of the solenoid is filled with oil.



Technical data

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

general			
Weight	► Valve with one solenoid	kg [lbs]	3.79 [8.37]
	► Valve with two solenoids	kg [lbs]	5.09 [11.23]
Installation position			Any ¹⁾
Ambient temperature range		°C [°F]	-20 ... +50 [-4 ... +122] (NBR seals) -15 ... +50 [+5 ... +122] (FKM seals)
Storage temperature range		°C [°F]	-20 ... +50 [-4 ... +122]

hydraulic			
Maximum operating pressure	► Port A, B, P	bar [psi]	315 [4568]
	► Port T	bar [psi]	210 [3050]; Tank pressure (standard)
Maximum flow		l/min [US gpm]	135 [35.7]
Hydraulic fluid			See table below
Hydraulic fluid temperature range (at the valve working ports)		°C [°F]	-20 ... +80 [-4 ... +176] (NBR seals) -15 ... +80 [+5 ... +176] (FKM seals)
Viscosity range		mm ² /s [cSt]	2.8 ... 500 [35 ... 2320]
Maximum admissible degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ²⁾

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP, HLPD, HVLP, HVLDP	NBR, FKM	DIN 51524	90220



Important notices 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.

- ¹⁾ With suspended installation, higher sensitivity to contamination. Horizontal installation is recommended.
- ²⁾ 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 the filters, see www.boschrexroth.com/filter.

Technical data

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

electric				
Voltage type			Direct voltage	
Nominal voltage according to VDE 0580			V	24
Voltage tolerance (nominal voltage)			%	±10
Nominal power according to VDE 0580			W	39
Duty cycle			%	100 (S1 according to VDE 0580)
Switching time ³⁾	► ON	Pressure change 5%	ms	54 ... 138
		Pressure change 95%	ms	98 ... 201
	► OFF	Pressure change 5%	ms	15 ... 126
		Pressure change 95%	ms	38 ... 173
Switching time according to ISO 6403 ⁴⁾	► ON		ms	45 ... 60
	► OFF		ms	20 ... 30
Maximum switching frequency			1/h	15000
Protection class according to DIN EN 60529				IP65
Maximum surface temperature of the coil ⁵⁾			°C [°F]	120 [248]
Insulation class VDE 0580				F
Protection class according to VDE 0580				I
Electrical protection			Every solenoid must be protected individually, using a suitable fuse with tripping characteristic K (inductive loads). The valve must be installed on a surface that is included in the equipotential bonding.	

³⁾ Measured with flow, 80% performance limit and horizontal installation position.

⁴⁾ Measured without flow

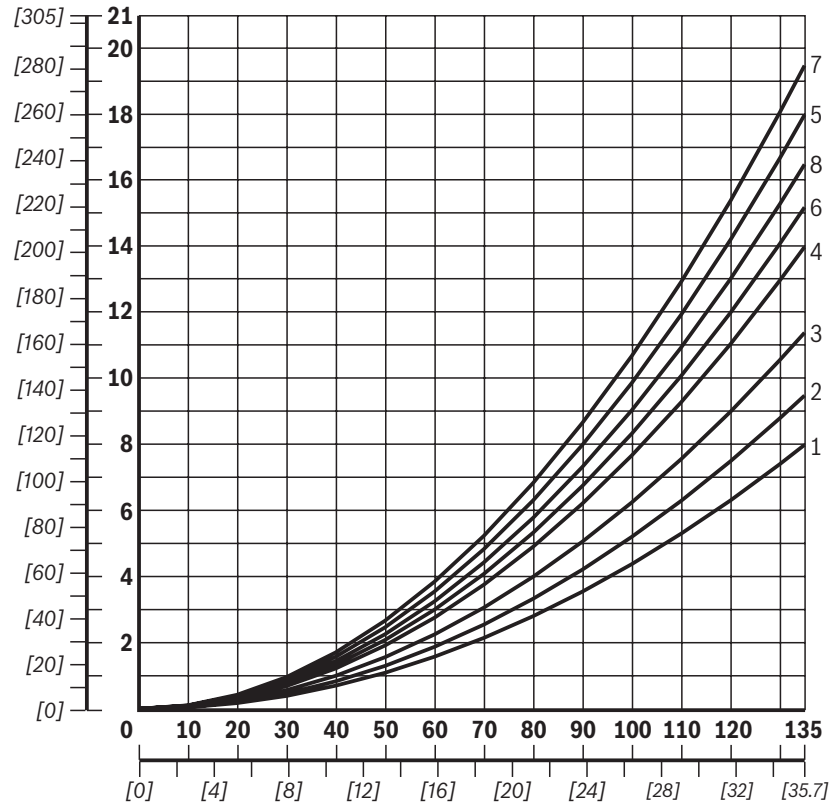
⁵⁾ Possible surface temperature >50 °C, provide contact protection!

Notice:

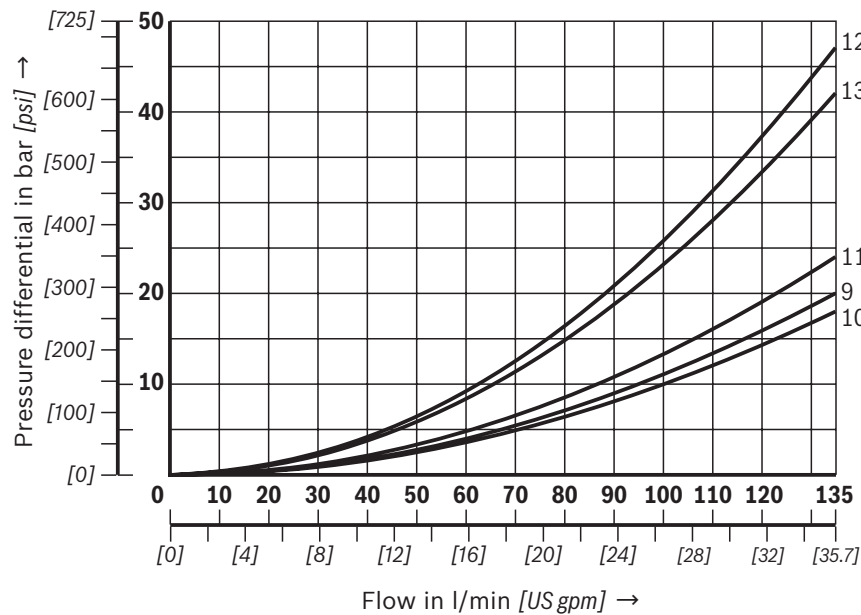
- The solenoid coils must not be painted.
- Actuation of the manual override is only possible up to a tank pressure of approx. 50 bar [725 psi]. Avoid damage to the bore of the manual override! (Special tool for the operation, separate order, material no. **R900024943**). When the manual override is blocked, actuation of the opposite solenoid must be ruled out!
- The simultaneous actuation of 2 solenoids of one valve must be ruled out!
- Use cables that are approved for a working temperature above 105 °C [221 °F].
- If the standard environmental conditions according to VDE 0580 cannot be provided, the valve must be especially protected!

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

Δp - q_v characteristic curves




Symbol	Direction of flow			
	P - A	P - B	A - T	B - T
A	6	4	-	-
B	6	4	-	-
C	1	2	3	3
D	1	3	3	3
D/OF	2	3	3	4
E	2	2	4	5
G	7	7	5	3
H	1	1	3	4
J	2	2	4	5
J9	2	2	8	4
L	2	2	4	5
Q	3	3	4	4
U	2	2	4	5
Y	2	1	1	4



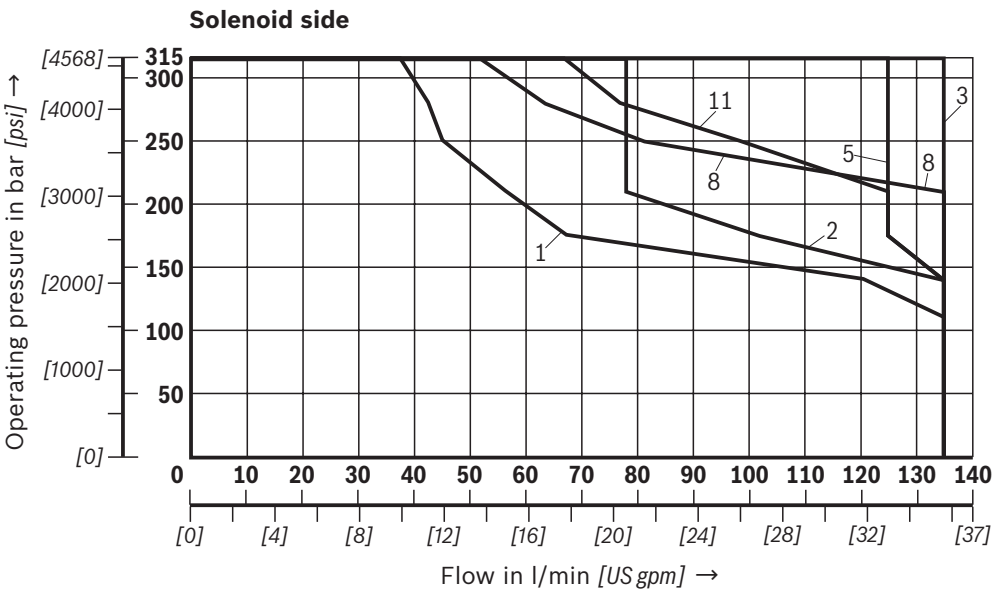
Symbol	Direction of flow			
	P - A	P - B	A - T	B - T
D73	12	13	13	12
J73	9	10	9	11

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

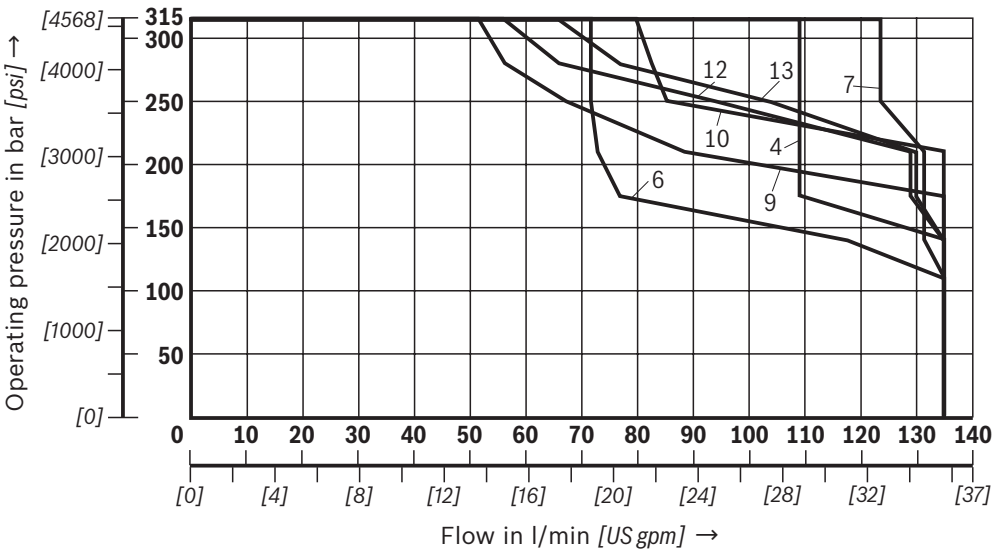
 **Notice:**
The specified performance limits are valid for use with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).
Due to the flow forces acting within the valves, the admissible performance limit may be considerably lower

with only one direction of flow (e.g. from P to A while port B is blocked).
In such cases, please consult us!

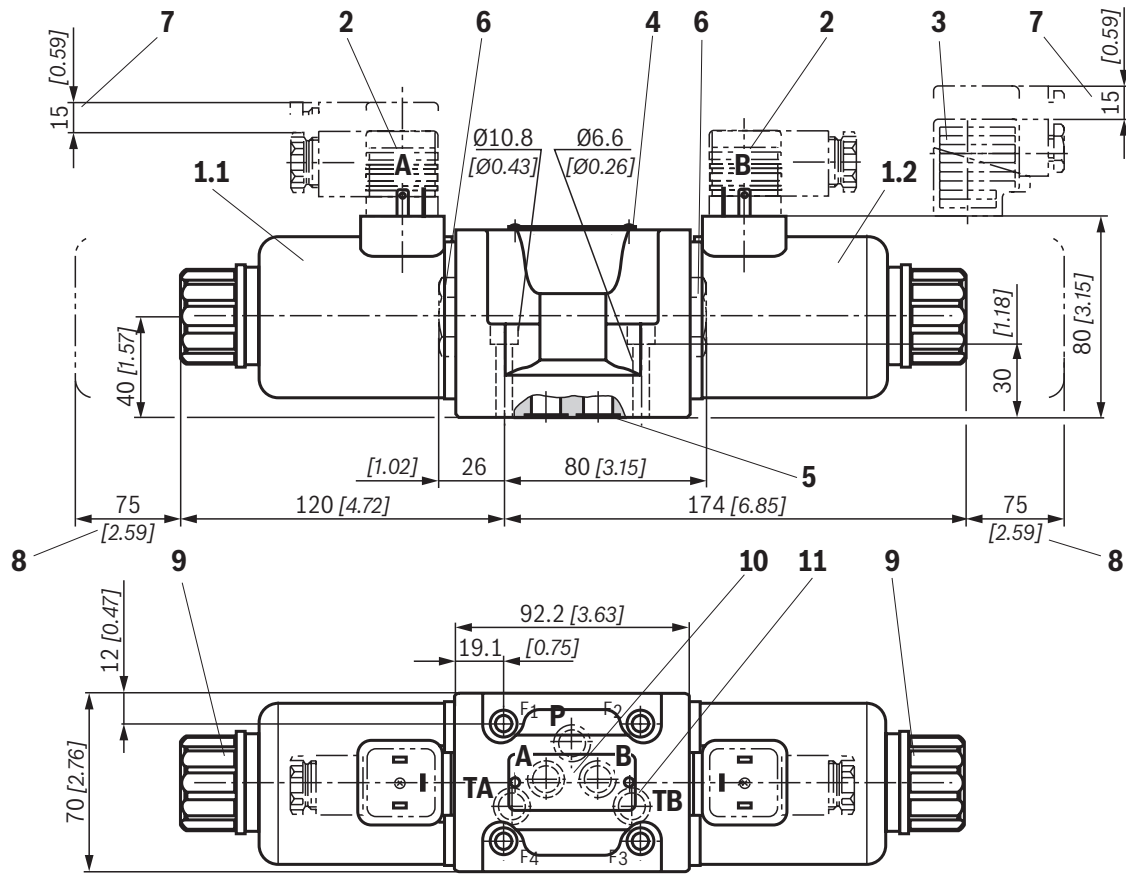
The performance limits were determined when the solenoids were at operating temperature, at 10% undervoltage and without tank preloading.



Symbol	Characteristic curve
A	1
B	2
D; Y; C D/OF	3
D73	4
E	5
G	6
H	7
J	8
J9	9
J73	10
L	11
Q	12
U	13



Dimensions: Individual connection
(dimensions in mm [inch])



Notice:

- Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.
- The dimensions are nominal dimensions which are subject to tolerances.

0,01/100
[0.0004/4.0]

Rzmax 4

Required surface quality of the
valve contact surface

Item explanations, valve mounting screws and subplates
see page 10.

Dimensions

- 1.1** Solenoid "a"
- 1.2** Solenoid "b"
- 2** Mating connector **without** circuitry (separate order, see page 11 and data sheet 08006)
- 3** Mating connector **with** circuitry (separate order, see page 11 and data sheet 08006)
- 4** Name plate
- 5** Identical seal rings for ports A, B, P, TA, TB
- 6** Plug screw for valves with one solenoid
- 7** Space required to remove mating connector/angled mating connector
- 8** Space required to remove coil
- 9** Mounting nut, tightening torque $M_A = 9 \pm 1 \text{ Nm}$ $[6.64 \pm 0.74 \text{ ft-lbs}]$
- 10** Porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05
- 11** Connection TB can only be used in connection with separately produced bore.

Valve mounting screws (separate order)

4 metric hexagon socket head cap screws

ISO 4762 - M6 x 40 - 10.9-flZn-240h-L

(friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14);
tightening torque $M_A = 12.5 \text{ Nm}$ $[9.2 \text{ ft-lbs}] \pm 10\%$,
material no. **R913000058**

or

4 hexagon socket head cap screws

ISO 4762 - M6 x 40 - 10.9 (self procurement)

(friction coefficient $\mu_{\text{total}} = 0.12$ to 0.17);
tightening torque $M_A = 15.5 \text{ Nm}$ $[11.4 \text{ ft-lbs}] \pm 10\%$

4 UNC hexagon socket head cap screws

1/4-20 UNC x 1-1/2" ASTM-A574

(friction coefficient) $\mu_{\text{total}} = 0.19$ to 0.24);
tightening torque $M_A = 25 \text{ Nm}$ $[18.4 \text{ ft-lbs}] \pm 15\%$,
(friction coefficient $\mu_{\text{total}} = 0.12$ to 0.17);
tightening torque $M_A = 19 \text{ Nm}$ $[14.0 \text{ ft-lbs}] \pm 10\%$,
material no. **R978800710**

With different friction coefficients, the tightening torques are to be adjusted accordingly.

Over-current fuse and switch-off voltage peaks

Electrical connection	Voltage data in the valve type code	Nominal voltage valve solenoid in V DC	Rated current valve solenoid in A	Rated current external miniature fuse: Medium time-lag (M) according to DIN 41571 and EN/IEC 60127 in mA	Rated voltage of external miniature fuse: Medium time-lag (M) according to DIN 41571 and EN/IEC 60127 in V
K4	G24	24	1.07	1.25	250

Notice:

Corresponding to the rated current, a fuse according to DIN 41571 and EN / IEC 60127 has to be connected ahead of every valve solenoid (max. $3 \times I_{\text{rated}}$).
The shut-off threshold of the fuse has to match the prospective short-circuit current of the supply source.
The prospective short-circuit current of the supply source may amount to a maximum of 1500 A.

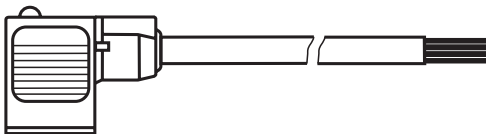
Accessories (separate order)

Mating connectors and cable sets

Item ¹⁾	Designation	Version	Short designation	Material number	Data sheet
2, 3	Mating connector; for valves with "K4" connector, 2-pole + PE, design A	Without circuitry, M16 x 1.5, 12 ... 240 V, "a"	Z4	R901017010	08006
		Without circuitry, M16 x 1.5, 12 ... 240 V, "b"		R901017011	
		Without circuitry, NPT 1/2", 12 ... 240 V, "a"	Z45	R900004823	
		Without circuitry, NPT 1/2", 12 ... 240 V, "b"		R900011039	
		With indicator light, M16 x 1.5, 12 ... 240 V	Z5L	R901017022	
		With indicator light, NPT 1/2", 12 ... 240 V	Z55L	R900057453	
		With indicator light and Z-diode-suppressor, M16 x 1.5, 24 V	Z5L1	R901017026	

¹⁾ See dimensions page 9.

Energy savings and fast switching

Details see data sheet 30362			
		Material number	
		Type VT-SSBA1-PWM-1X/V001/5 as fast switching amplifier (switching time reduction by approx. 50%)	Type VT-SSBA1-PWM-1X/V002/5 for energy reduction (energy savings of approx. 40%)
a/b	black	R901265633	R901290194

More information

- ▶ Subplates
- ▶ Mineral oil-based hydraulic fluids
- ▶ Reliability characteristics according to EN ISO 13849
- ▶ Hex socket head cap screws metric/UNC
- ▶ Hydraulic valves for industrial applications
- ▶ Selection of the filters

Data sheet 45100

Data sheet 90220

Data sheet 08012

Data sheet 08936

Data sheet 07600-B

www.boschrexroth.com/filter

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