

# Directional spool valves, direct operated, with solenoid actuation

RE 23340

Edition: 2013-06 Replaces: 2012-06

### Type WE



- ▶ Size 10
- ► Component series 5X
- ► Maximum operating pressure 350 bar [5076 psi]
- ► Maximum flow 160 I/min [42.3 US gpm]



#### **Features**

- ▶ 4/3, 4/2 or 3/2 directional design
- ► High-power 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 or central connection
- ► Central connection possible via double mating connector
- ► Manual override, optional

#### **Contents**

Features	1
Ordering code	2, 3
Symbols	4, 5
Function, section	6, 7
Technical data	8 10
Characteristic curves	11
Performance limits	12, 13
Dimensions	14 17
Over-current fuse	18
Mating connectors	18
Project planning information	19
More information	19

#### **Ordering code**

01	02	03	04	05		06	07	80	09	10	11	12		13	14	15	16	17
	WE	10		5X	/		E						/					*

4 WE 10 e.g. C 5X no code D O OF E
10 e.g. C 5X no code D O OF
e.g. C  5X  no code  D  O  OF
5X no code D O OF
no code D O OF
D O OF
O OF E
OF E
E
G12
G24
G26
G96
G110 1)
G180
G205
G220
W100R 1)
W110R 1)
W120R 1)
W200R 1)
W230R 1)

09	Without manual override	no code
	With concealed manual override (standard)	N9 <sup>3)</sup>
	With concealed manual override and protective cap 5)	N8 <sup>3)</sup>
	With lockable manual override "mushroom button" (large)	N5 <sup>3; 4)</sup>
	With manual override "mushroom button" (large), not lockable	N6 <sup>3)</sup>

#### Corrosion resistance (outside)

10	None (valve housing primed)	no code
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227) (see also page 10)	J2

- 1) Only for version "central connection"
- 2) Only for version "individual connection"
- 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.
- 4) With tank pressures above 50 bar, it cannot be guaranteed that the valve remains in the position switched by the manual override "N5".
- $^{5)}\,\,$  Protective cap must be removed prior to actuation.

	AC voltage mains (admissible voltage tolerance ±10%)	Nominal voltage of the DC solenoid in case of operation with alternating voltage	Ordering code
	100 V - 50/60 Hz	96 V	G96
ľ	110 V - 50/60 Hz	96 V	G96
	200 V - 50/60 Hz	180 V	G180
	230 V - 50/60 Hz	205 V	G205

#### **Ordering code**

	WE	10		5Y	1		E						1					*
01	02	03	04	05		06	07	08	09	10	11	12		13	14	15	16	17

#### **Electrical connection**

L1	Individual connection									
	Without mating connector; connector according to DIN EN 175301-803	<b>K4</b> 6)								
Ì	Without mating connector; connector according to DIN EN 175301-803									
	<b>Without</b> mating connector, 4-pole with connector M12x1 according to IEC 60947-5-2, integrated interference protection circuit and status LED									
	Without mating connector; connector AMP Junior-Timer									
	Central connection									
Ì	Cable entry at the cover, with indicator light	DL								
	Central plug-in connection at the cover, with indicator light (without mating connector); connector according to DIN EN 175201-804	DK6L								
	Additional electrical connections and available voltages see page 10									

#### Switching time increase

12	Without switching time increase	no code	
	With switching time increase (only with symbol ".73"; not for version "D" with reinforced compression spring; more	A12	
	information upon request)		

Without throttle inse	rt		no code
With throttle insert 7;	8)		
Port		Throttle Ø in mm [inch]	
	0.8 [0.031]	1.0 [0.039]	1.2 [0.047]
Р	= B08	= B10	= B12
А	= H08	= H10	= H12
В	= R08	= R10	= R12
A and B	= N08	= N10	= N12
T 9)	= X08	= X10	= X12

#### Seal material

14	NBR seals	М
	FKM seals	V
	Seals for HFC hydraulic fluids	МН
	Low-temperature version	МТ
	Attention: Observe compatibility of seals with hydraulic fluid used!	

#### Control spool play

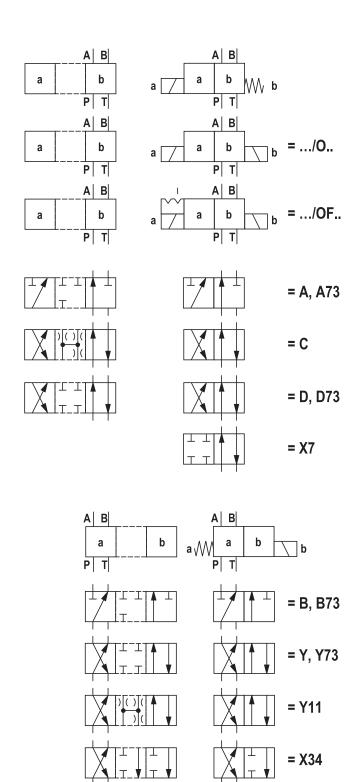
15	Standard	no code
	Limited (for little leakage)	Т06
	Increased (for extended temperature range, higher leakage)	T12
16	Approval according to CSA C22.2 No. 139-10	CSA
	Porting pattern according to ANSI B93.9 (if solenoid "a" is energized, channel P is connected to A)	AN

- 6) Mating connector, separate order, see page 18 and data sheet 08006.
- 7) When the admissible valve performance limits are exceeded, installation of throttle inserts is to be intended (performance limits see page 12 and 13).
- 8) Not with low-temperature version "MT".

17 Further details in the plain text

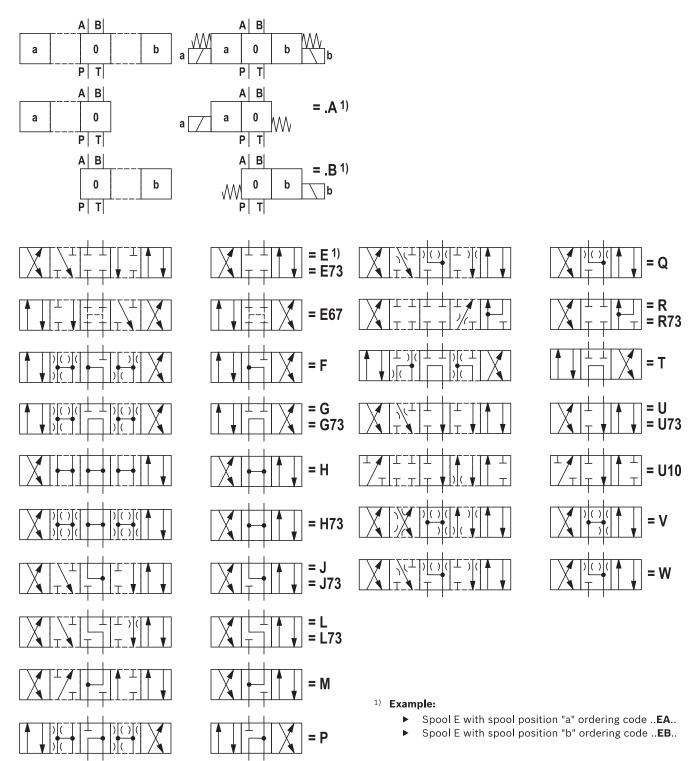
9) If throttle inserts are used in channel T, the pressure in the working ports and for connection to the tank chambers must not exceed 210 bar.

#### **Symbols**



Notice!
Representation according to DIN ISO 1219-1. Hydraulic interim positions are shown by dashes.

#### **Symbols**



#### Motice!

- ► 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.

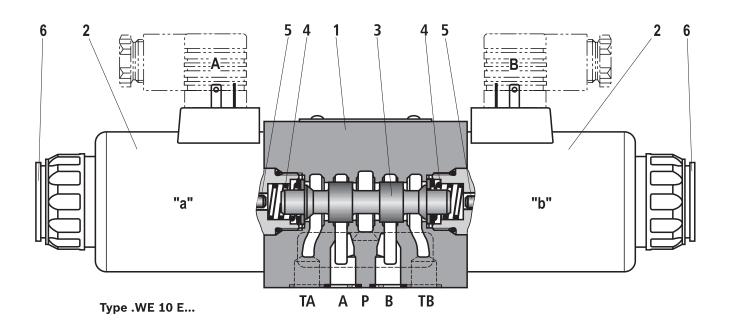
The directional valve basically consists of housing (1), one or two electronic solenoids (2), the control spool (3), and the return springs (4).

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) (except for version "O").

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 (except for valve with "OF" detent and valve without spring type "O"). A manual override (6) allows the valve to be switched manually without solenoid energization.

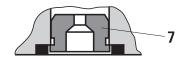
To ensure proper functioning, care must be taken that the pressure chamber of the solenoid is filled with oil.

More functions see page 7.



#### Throttle insert "B.."

Using a throttle insert (7) in channels P, A, B or T, the flow resistance at the valve can be increased. Its use is required when, due to prevailing operating conditions, flows occur during the switching processes which exceed the performance limit of the valve.



#### **Function**, section

**Without spring return "O"** (only possible with symbols A, C and D)

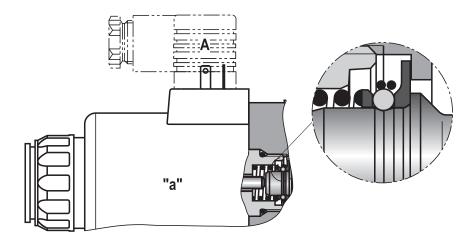
This version is a directional valve with 2 spool positions and 2 electronic solenoids **without** detent. The valve without spring return at the control spool (3) has no defined basic position in the de-energized state.

### Without spring return with "OF" detent (only possible with symbols A, C and D)

This version is a directional valve with 2 spool positions and 2 electronic solenoids **with** detent. The detents are used to fix the control spool (3) in the relevant spool position. During operation, continuous application of current to the electronic solenoid can therefore be omitted, which contributes to energy-efficient operation.

#### M Notice!

Pressure peaks in the tank line to two or several valves can result in unintended control spool movements for valves with detent! We therefore recommend that separate return lines be provided or a check valve installed in the tank line.



Type .WE 10 ../OF...

#### **Technical data**

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

general		·			
Weight			Individual connection	Central connection	
	– Valve with one solenoid	kg [lbs]	3.9 [8.6]	4.0 [8.8]	
	– Valve with two solenoids	kg [lbs]	5.5 [12.1]	5.6 [12.3]	
Installation position			Any 1)		
Ambient temperature range	- Standard version	°C [°F]	-20 +70 [-4 +158] (NBR seals -15 +70 [+5 +158] (FKM seals	) )	
	- Version for HFC hydraulic fluid	°C [°F]	-20 +50 [-4 +122]		
	- Low-temperature version <sup>2)</sup>	°C [F]	-40 +50 [-40 +122]		
Storage temperature range		°C [F]	-20 +50 [-4 +122]		
MTTF <sub>d</sub> values according to EN ISO 13849 Years			s 300 (for further details see data sheet 08012)		

hydraulic			
Maximum operating pressure 2)	– Port A, B, P	bar [psi]	350 [5076]
	- Port T	bar [psi]	210 [3050] Tank pressure (standard) With symbols A and B, port T must be used as leakage oil connection if the operating pressure exceeds the maximum admissible tank pressure.
Maximum flow		l/min [USgpm]	160 [42.3]
Hydraulic fluid			See table below
Hydraulic fluid temperature ran (at the valve working ports)	ge	°C [°F]	-20 +80 [-4 +176] (NBR seals) -15 +80 [+5 +176] (FKM seals) -20 +50 [-4 +122] (HFC hydraulic fluid) -40 +50 [-40 +122] (low-temperature version)
Viscosity range		mm²/s [SUS]	2.8 500 [35 2320]
Maximum admissible degree of a fluid - cleanliness class accordin		nydraulic	Class 20/18/15 <sup>3)</sup>

Hydraulic fluid		Classification	Suitable sealing materials	Standards	
Mineral oils		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	
	in a dividia in contan	HETG	NBR, FKM	- VDMA 24568	
Bio-degradable	-insoluble in water	HEES	FKM		
	- soluble in water	HEPG	FKM	VDMA 24568	
	– water-free	HFDU, HFDR	FKM	ISO 12922	
Flame-resistant	- containing water	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	NBR, HNBR	ISO 12922	

#### Important information on hydraulic fluids!

- ▶ For more information and data on the use of other hydraulic fluids, refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!
- ► The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.

#### ► Flame-resistant – containing water:

- Maximum pressure difference per control edge 50 bar
- Pressure pre-loading at the tank port >20% of the pressure differential, otherwise increased cavitation
- Life cycle as compared to operation with mineral oil HL, HLP 50 to 100%
- ▶ Bio-degradable: When using bio-degradable hydraulic fluids that are also zinc-solving, zinc may accumulate in the fluid (per pole tube 700 mg zinc).
- 1) With suspended installation, higher sensitivity to contamination. Horizontal installation is recommended.
- 2) For use at low temperatures, see project planning information page 19.
- 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 the filters, see www.boschrexroth.com/filter.

#### **Technical data**

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

electric						
Voltage type				Direct voltage	Alternating voltage	
Nominal voltage according to VDE 0580 V (ordering code see page 2 and 10)			12, 24, 26, 96, 110, 180, 205, 220	With central connection or possible via rectifier 4)		
Voltage tolerance (nomi	nal voltage	•)	%	±10		
Nominal power accordin	ng to VDE (	0580	W	40		
Duty cycle			%	100 (S1 according to VDE 0580)		
Switching time 5)	-ON	Pressure change 5%	ms	60 104 <sup>6)</sup>		
		Pressure change 95%	ms	90 165 <sup>6)</sup>		
	OFF Pressure change 5%		ms	12 50	230 330	
		Pressure change 95%	ms	48 104	250 360	
Switching time accord-	-ON			45 60		
ing to ISO 6403 7)	-OFF			20 30	250 360	
Maximum switching free	quency		1/h	15000	7200	
Protection class accordi	ing to DIN	EN 60529		See page 10		
Protection class accordi	ing to VDE	0580		See page 10		
Maximum surface tempe	erature of t	the coil <sup>8)</sup>	°C [°F]	140 [284]		
Insulation class VDE 0580			F			
Electrical protection			Every solenoid must be protected fuse with tripping characteristic must be installed on a surface the tial bonding.	K (inductive loads). The valve		

- <sup>4)</sup> ► Mating connectors with rectifier see page 18
  - ▶ Possible voltages see page 2
  - ► Rectifiers must comply with the relevant standards as well as the coil performance data!
  - ▶ With a central connection, the rectifier is on the board
- 5) Measured with flow, 80% performance limit and horizontal installation position.
- 6) Not with symbols A, B and .73.
- 7) Measured without flow
- 8) Possible surface temperature >50 °C, provide contact protection!

#### Merice!

- ▶ 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].
- ▶ Valves with individual connection and supply voltage 12 V or 24 V can be operated with twice the voltage for reducing the switching time. For this purpose, the voltage has to be reduced to the nominal valve voltage after 100 ms by means of pulse width modulation. The maximum admissible switching frequency is 3 1/s.
- ▶ Due to possible overload of the board, valves with central connection must not be operated with twice the voltage.
- ► If the standard environmental conditions according to VDE 0580 cannot be provided, the valve must be especially protected!

Electrical connections see page 10.

#### **Technical data**

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

#### **Electrical connections and available voltages**

				Ordering code (voltage)							Protection class according to VDE 0580
Ordering code connector		G12	G24	G26	965	G110	G180	G205	G220	Protection accordin DIN EN 60	Protection c according VDE 058(
Without mating connector, individual connection; connector according to DIN EN 175301-803	K4	9)	9)	10)	9)	_	1	9)	1	IP65	I
	K4K	1	1	1	10)	_	_	10)	10)	IP65, IP67	I
Without mating connector, 4-pole with connector M12x1 according to IEC 60947-5-2, integrated interference protection circuit and status LED	K72L	_	1	-	_	_	-	_	_	IP65	12)
Without mating connector; connector AMP Junior-Timer	C4Z	-	-	1	-	-	1	-	-	IP66	12)
Without mating connector; threaded connection 1/2"-14 NPT	DAL	9)	<b>4</b> 9)	-	<b>√</b> 9)	_	-	9)	<b>4</b> 9)	IP65	I
Central plug-in connection at the cover, with indicator light (without mating connector) with connector according to DIN EN 175201-804	DK6L	9)	<b>√</b> 9)	-	<b>√</b> 9)	1	-	9)	<b>4</b> 9)	IP65	I
Cable gland at the cover, with indicator light (terminal area 6 12 mm [0.23 0.47 inch])	DL <sup>11)</sup>	9)	<b>√</b> 9)	-	<b>√</b> 9)	1	_	9)	<b>4</b> 9)	IP65	I
Cable gland at the cover, with indicator light and cable bridge at the ground connection	DJL <sup>11)</sup>	_	<b>4</b> 9)	-	_	<b>4</b> 9)	_	_	_	IP65	I
Mini-change connector, 5-pin	DK25L	-	<b>4</b> 9)	_	9)	_	_	_	_	IP65	I

<sup>8)</sup> Only with correctly mounted valve with a mating connector suitable for the protection class.

- 9) "Recognized component" according to UL 429.
- <sup>10)</sup> Upon request.
- <sup>11)</sup> Possible with version "J2".
- 12) With protection class II, a protective extra-low voltage with isolation transformer (PELV, SELV) is to be provided.
- 13) Only with professionally designed connection with appropriate sealing to the central connection.

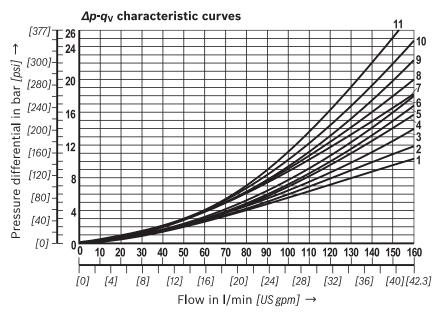
When establishing the electrical connection, the protective earthing conductor (PE  $\frac{1}{-}$ ) has to be connected correctly.

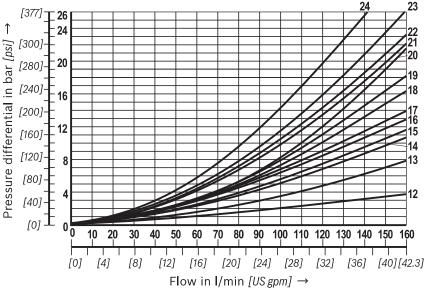


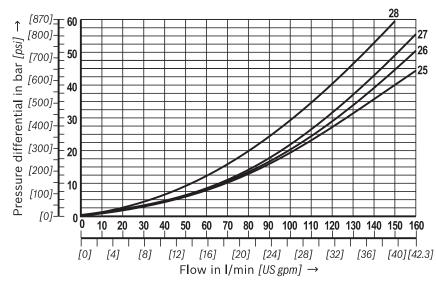
- ► The plug-in connectors used are not intended to be plugged in or disconnected during normal operation under load.
- ► Operation of the valves only admissible with appropriate and locked mating connector.

#### **Characteristic curves**

(measured with HLP46,  $\vartheta_{oil}$  = 40 ± 5 °C [104 ± 9 °F])







		Direction	n of flow				
Symbol	P – A	P – B	A – T	B – T			
A; B	6	6	-	-			
A73, B73	23	23	_	-			
С	1	2	5	7			
D	2	2	5	7			
D73	25	26	26	27			
E	17	16	19	21			
E67	4	4	11	24			
E73	17	18	21	21			
F	2	3	22	23			
G	4	4	24	24			
G73	18	18	24	24			
Н	14	14	20	21			
H73	14	14	6	9			
J	3	3	9	11			
J73	22	21	23	24			
L	3	3	9	9			
L73	22	10	11	24			
М	14	14	6	8			
P	17	14	20	23			
Q	16	17	4	8			
R	18	21	18	24			
R73	24	24	23	24			
Т	18	4	10	24			
U	3	3	6	11			
U10		Upon r	equest				
U73	22	22	23	24			
v	17	17	18	20			
W		Upon r	equest				
X7		Upon r	equest				
X34		Upon r	equest				
Υ	17	16	18	21			
Y11	3	2	4	9			
Y73	26	26	26	28			

#### Central position:

	Direction of flow						
Symbol	P – A	P – B	B – T	A – T	P – T		
н	12	12	13	13	15		

### **Performance limits**

(measured with HLP46,  $\vartheta_{oil}$  = 40 ± 5 °C [104 ± 9 °F])

#### Motice!

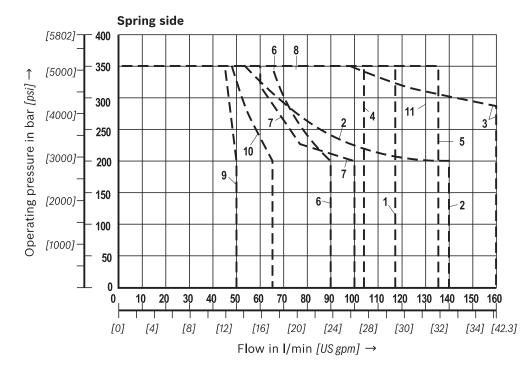
The specified performance limits are valid for use with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).

Due to the flow forces acting within the valves, the admissible performance limit may be considerably lower

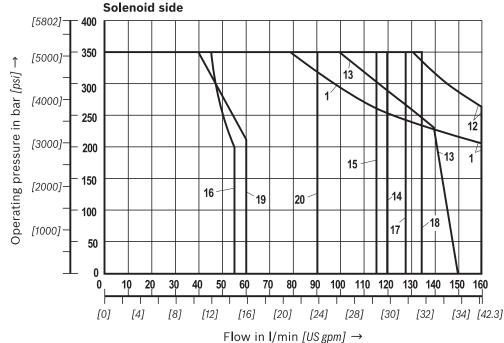
with only one direction of flow (e.g. from P to A while port B is blocked).

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.



Characteristic curve	Symbol
1	L
2	А
3	В
4	Υ
5	E73, Q
6	F
7	G73
8	M; V
9	Р
10	A73
11	H73



Characteristic curve	Symbol
1	L
12	A/O
13	J
14	Н
15	D73
16	B73
17	Y11
18	C; D; E73
19	E67
20	G

#### **Performance limits**

(measured with HLP46,  $\vartheta_{oil}$  = 40 ± 5 °C [104 ± 9 °F])

#### Motice!

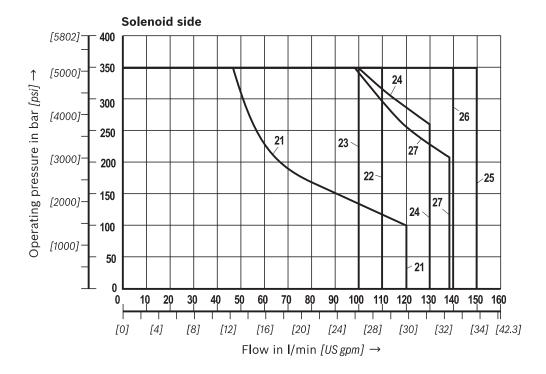
The specified performance limits are valid for use with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).

Due to the flow forces acting within the valves, the admissible performance limit may be considerably lower

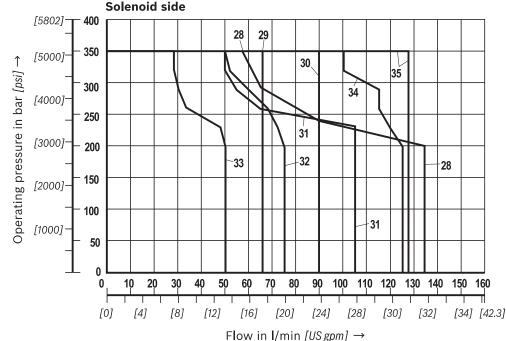
with only one direction of flow (e.g. from P to A while port B is blocked).

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

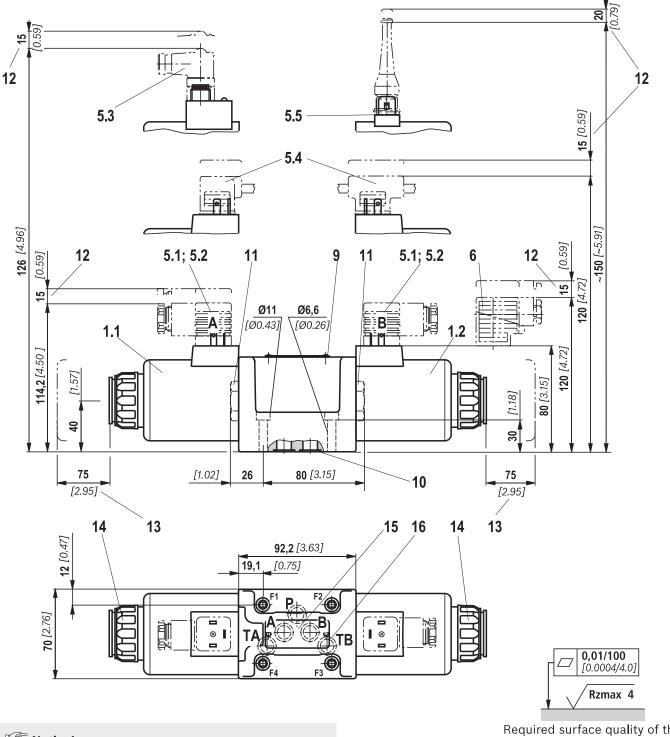


Characteristic	Symbol
curve	
21	A; B
22	G73
23	F; L73
24	Е
25	C/O; D/O
26	J73
27	U



Characteristic curve	Symbol
28	Q
29	V
30	Р
31	R
32	R73
33	Т
34	U73
35	Y73

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



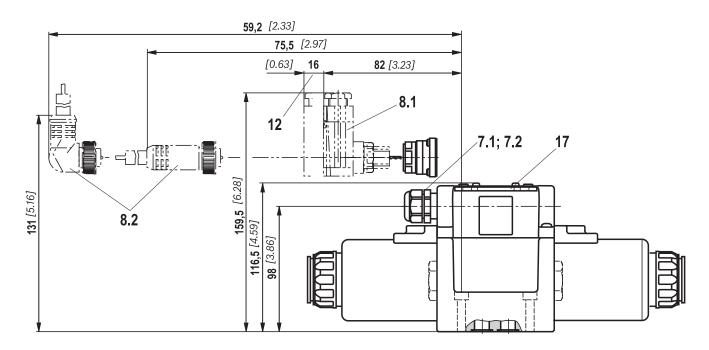
### Motice!

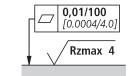
- ▶ Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.
- The dimensions are nominal dimensions which are subject to tolerances.

Required surface quality of the valve contact surface

Dimensions for manual overrides see page 16. Item explanations, valve mounting screws and subplates see page 17.

## **Dimensions:** Central connection (dimensions in mm [inch])





Required surface quality of the valve contact surface

#### Special points with version "DAL" and "DL"

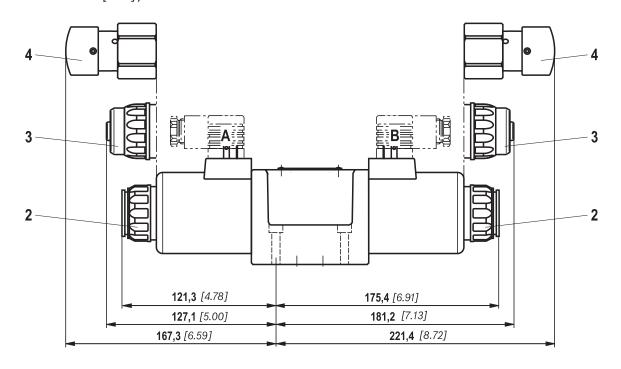
- ➤ Version "DL" is only suitable for permanently installed cables. Lines must be routed in a pull-relieved manner!
- ▶ Minimum line cross-section 0.75 mm²
- ▶ With a maximum line cross-section of 1.5 mm² the wire end ferrules must be crimped to a maximum cross-section of 1.5 x 2 using appropriate tools to ensure they fit into the printed circuit board terminals.
- ▶ Before crimping, at least 11 mm [0.43 inch] of the cables have to be stripped.
- ► For the line cross-section, wire end ferrules according to DIN 46228-1 with a minimum length of 10 mm [0.39 inch] are to be used.
- ► For the earthing connection, ring cable lugs according to DIN 46234-4-1 are to be used, tightening torque *M*<sub>A</sub> = 1.75 Nm [1.29 ft-lbs] ± 10%

#### Motice!

The dimensions are nominal dimensions which are subject to tolerances.

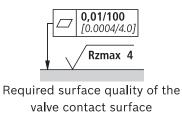
**Dimensions for manual overrides** see page 16. **Item explanations, valve mounting screws** and **subplates** see page 17.

## **Dimensions:** Manual overrides (dimensions in mm [inch])





The dimensions are nominal dimensions which are subject to tolerances.



Item explanations, valve mounting screws and subplates see page 17.

#### **Dimensions**

- 1.1 Solenoid "a"
- 1.2 Solenoid "b"
  - 2 Version without and with concealed manual override "N9" (standard)
  - 3 Version with concealed manual override and protective cap "N8". (The protective cap must be removed prior to actuation.)
  - 4 Version with manual override "N5" and "N6"
- **5.1** Mating connector **without** circuitry for connector "K4" (separate order, see page 18 and data sheet 08006)
- **5.2** Mating connector **without** circuitry for connector "K4K" (separate order, see data sheet 08006)
- **5.3** Mating connector angled with M12x1 plug-in connection and status LED for connector "K72L" (separate order, see data sheet 08006)
- **5.4** Double mating connector **without/with** circuitry for connector "K4" (separate order, see data sheet 08006)
- **5.5** Mating connector (AMP Junior Timer) for connector "C4Z" (separate order, see data sheet 08006)
  - 6 Mating connector with circuitry for connector "K4" (separate order, see page 18 and data sheet 08006)
- 7.1 Cable gland Pg 16 "DL" (terminal area 6 ... 12 mm [0.24 ... 0.47 inch]); lock nut, tightening torque
   M<sub>A</sub> = 3.3 Nm [2.43 ft-lbs] ± 10%
- **7.2** Central connection box "DAL" 1/2" NPT, tightening torque  $M_A$  = 5 Nm [3.69 ft-lbs] ± 10 %; sealing by sealant
- **8.1** Mating connector for connector "DK6L" (separate order, see data sheet 08006)
- **8.2** Mini-change connector, 5-pin for connector "DK25L" (separate order, material no. **R900057631**)
  - 9 Name plate
- 10 Identical seal rings for ports A, B, P, TA, TB
- 11 Plug screw for valves with one solenoid
- 12 Space required to remove the mating connector/ angled socket
- 13 Space required to remove the coil
- **14** Mounting nut, tightening torque  $M_A = 14.5\pm1.5$  Nm  $[10.69\pm1.1 ft-lbs]$
- **15** Porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05
- 16 Connection TB can only be used in connection with separately produced bore.
- 17 Cover

**Attention!** The valve may only be operated with properly mounted cover! Tightening torque of the cover screws  $M_A = 1.0 \text{ Nm } [0.74 \text{ ft-lbs}] \pm 10\%.$ 

Prior to opening the frame, it must be ensured that the valve has no voltage!

**Subplates** according to data sheet 45054 (separate order) G 66/01 (G3/8) G 67/01 (G1/2) G 534/01 (G3/4) G 66/12 (SAE-6; 9/16-18) <sup>1)</sup> G 67/12 (SAE-8; 3/4-16) <sup>1)</sup> G 534/12 (SAE-12; 1-1/16-12) <sup>1)</sup>

1) Upon request

Valve mounting screws (separate order)
4 metric hexagon socket head cap screws
ISO 4762 - M6 x 40 - 10.9-flZn-240h-L

(friction coefficient  $\mu_{\rm total}$  = 0.09 to 0.14); tightening torque  $M_{\rm A}$  = 12.5 Nm [9.2 ft-lbs] ± 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  $M_{\text{A}}$  = 15.5 Nm [11.4 ft-lbs] ± 10%

### 4 UNC hexagon socket head cap screws 1/4-20 UNC x 1-1/2" ASTM-A574

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

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

#### Over-current fuse and switch-off voltage peaks

#### Maximum admissible overvoltages according to DIN EN 60664-1:2008-01 (VDE 0110-1) (overvoltage category II):

	Nominal voltage	Rated current	Maximum switch-off overvoltage to be
Electrical connection	in V	in A	<b>energized</b> in V
K4, K4K, DAL, D6KL, DL	12	3.72	500
K4, K4K, K72L, DAL, D6KL, DL, DJL, DK25L	24	1.74	500
K4, C4Z	26	1.70	500
K4, DAL, D6KL, DL, DK25L	96	0.47	776
D6KL, DL, DJL	110	0.41	940
K4, C4Z	180	0.28	1700
K4, DAL, D6KL, DL	205	0.22	1867
K4, DAL, D6KL, DL	220	0.21	1967

#### Motice!

When solenoid coils are switched off, voltage peaks result which may cause faults or damage in the connected control electronics. We therefore recommend limiting them to  $2\ x$  nominal voltage by means of a interference protection circuit. It must be noted that a diode switched in an antiparallel form extends the switching off time.

#### Mating connectors according to DIN EN 175301-803

For details and more mating connectors see data sheet 08006						
	e e			Material no.		
Port	Valve side	Color	Without circuitry	With indicator light 12 240 V	With rectifier 12 240 V	With indicator light and Zener diode suppression circuit 24 V
M16 x 1.5	а	Gray	R901017010	-	_	-
	a/b	Black	R901017011	R901017022	R901017025	R901017026
1/2" NPT (Pg16)	a	Red/brown	R900004823	-	-	-
	a/b	Black	R900011039	R900057453	R900842566	-
Details see data sheet 30362			Material number  Type VT SSRAL RWM 17/1/002/5 00			
			Type VT-SSBA1-PWM-1X/V001/5,00 as fast switching amplifier		Type VT-SSBA1-PWM-1X/V002/5,00 for energy reduction	
M16 x 1.5	a/b	Black	R901265633		R901290194	

#### **Project planning information:**

Temperature range and maximum operating pressure in case of use at low temperatures

Port	Pressure	<b>Temperature range</b> in °C [°F]
-P, A, B, T	Static 100 bar [1450 psi]	-4035 [-4031]
– P, A, B	Dynamic from 100 bar [1450 psi] to 350 bar [5076 psi] in linear form as function of the temperature	-3530 <i>[-3122]</i>
-T	Dynamic from 100 bar [1450 psi] to 210 bar [3050 psi] in linear form as function of the temperature	-3530 [-3122]
– P, A, B, T	Maximum operating pressure	-30 +50 [-22 122]

#### Motice!

With valves for low temperatures, the "T12" control spool play is to be preferably selected.

#### **More information**

► Subplates	Data sheet 45054
► Mineral oil-based hydraulic fluids	Data sheet 90220
► Reliability characteristics according to EN ISO 13849	Data sheet 08012
<ul> <li>General product information on hydraulic products</li> </ul>	Data sheet 07008
► Installation, commissioning and maintenance of industrial valves	Data sheet 07300
► Hydraulic valves for industrial applications	Data sheet 07600-B
► Selection of the filters	www.boschrexroth.com/filter

#### **Notes**

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