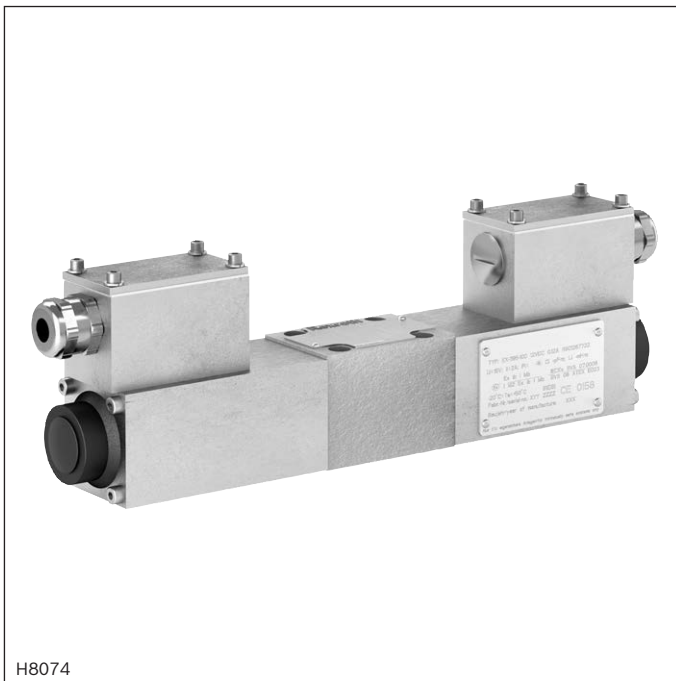


Directional spool valves, direct operated, with solenoid actuation

Type WE ...XH and WE ...XM

RE 23177-XH
 Edition: 2016-04
 Replaces: 11.12



H8074

- ▶ Size 6
- ▶ Component series 5X
- ▶ Maximum operating pressure 210 bar
- ▶ Maximum flow 20 l/min



ATEX units

For potentially explosive areas



Information on the explosion protection:

- ▶ Area of application in accordance with the Explosion Protection Directive 2014/34/EU: **I M2; II 2G**
- ▶ Type of protection of the valve solenoids: Ex ib I Mb / Ex ib IIC T6 Gb according to EN 60079-0 / EN 60079-11

Features

- ▶ 4/3-, 4/2- or 3/2-way version
- ▶ For intended use in potentially explosive atmosphere
- ▶ Porting pattern according to ISO 4401-03-02-0-05
- ▶ Wet-pin DC solenoids
- ▶ Electrical connection optionally with:
 - Single connection with cable gland
 - 2 m connection line
 - Connector
- ▶ With manual override

Contents

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Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13
	WE	6		5X	/		B		N		/	

01	3 main ports	3
	4 main ports	4
02	Directional valve	WE
03	Size 6	6
04	Symbols e.g. C, E, EA, EB, etc; possible version, see page 3	
05	Component series 50 ... 59 (50 ... 59: unchanged installation and connection dimensions)	5X
06	With spring return	no code
	Without spring return	O
07	High-power solenoid, wet (wet-pin)	B

Voltage (direct voltage 12 V)

08	Nominal power supply 120 mA	G12-12
	Nominal power supply 130 mA	G12-13
	Nominal power supply 190 mA	G12-19
	Depending on the electrical connection, see page 7	
09	With manual override	N

Explosion protection

10	"Intrinsically safe" for device group II (all, except for mining)	XH
	"Intrinsically safe" for device group I (mining)	XM
	For details, see information on the explosion protection page 6 and 7	

Electrical connection

11	Individual connection	
	Solenoid with 2 m connection line	CKL
	Solenoid with terminal box and cable gland	Z2
	Solenoid with connector	K20L
	For details of electrical connections, see page 11	
12	Without throttle insert	no code
	Throttle Ø 0.8 mm	B08
	Throttle Ø 1.0 mm	B10
	Throttle Ø 1.2 mm	B12
	Use with flows which exceed the performance limit of the valve (see page 4)	

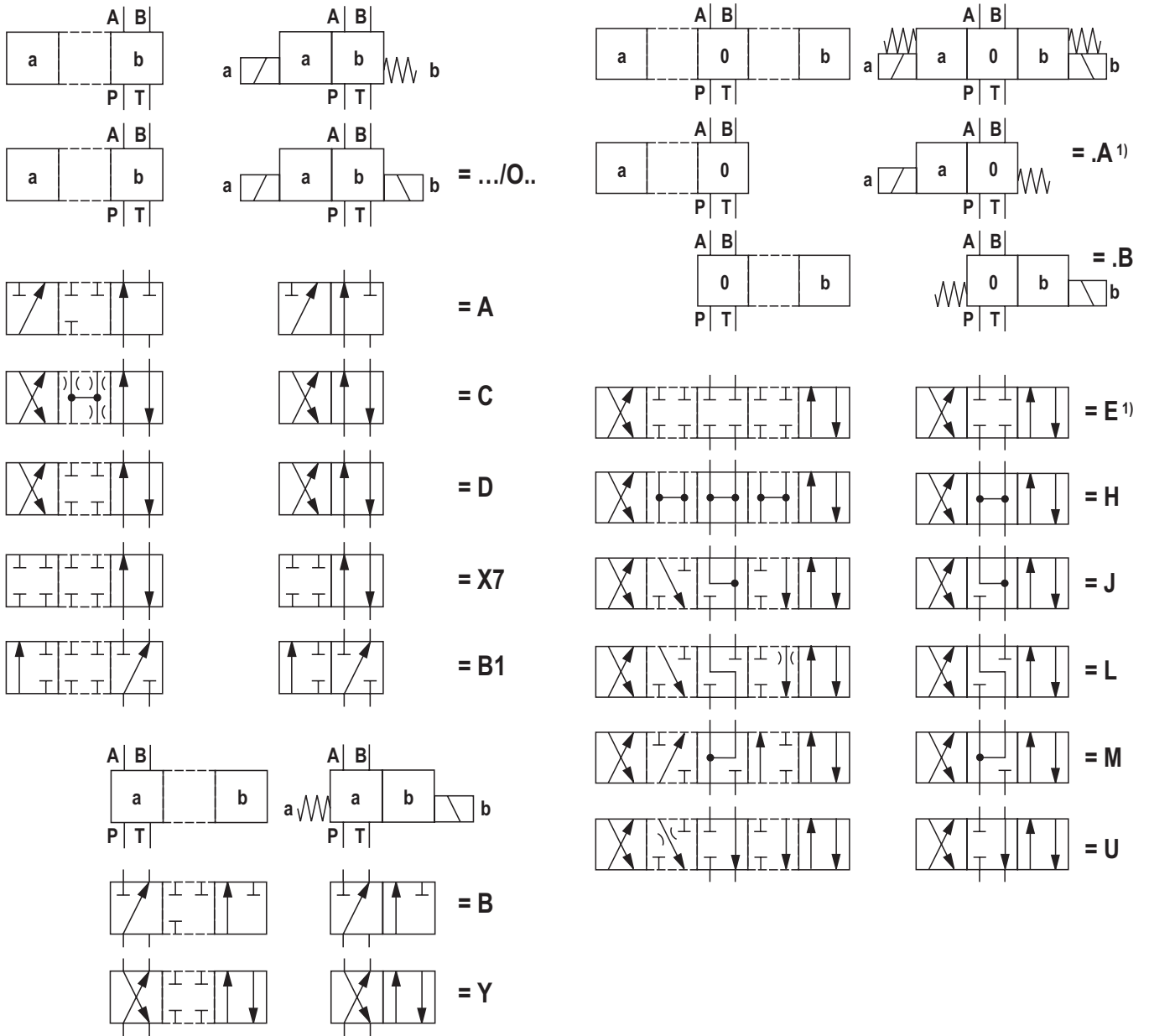
Seal material

13	NBR seals	no code
	FKM seals	V
	Observe compatibility of seals with hydraulic fluid used. (Other seals upon request)	

Notices:

- ▶ The manual override cannot be allocated a safety function and may only be used up to a tank pressure of 50 bar.
- ▶ For possible combinations for the ordering code "Solenoid", "Electrical connection" and "Explosion protection" see page 7.

Symbols



¹⁾ **Example:**
Symbol E with switching position "a" ordering code ..EA..

Notices:

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

Function, section

Directional valves of type WE are solenoid-actuated directional spool valves. They control start, stop and direction of a fluid flow.

The directional valves basically consist of housing (1), one or two solenoids (2), control spool (3), and one or two return springs (4).

In the de-energized condition, control spool (3) is held in the central position or in the initial position by the return springs (4) (except for impulse spool). The control spool (3) is actuated by wet-pin solenoids (2).

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

The force of solenoid (2) acts via plunger (5) on control spool (3) and pushes the latter from its rest position to the required end position. This enables the necessary direction of flow from P → A and B → T or P → B and A → T. After solenoid (2) was de-excited, the return spring (4) pushes control spool (3) back to its rest position.

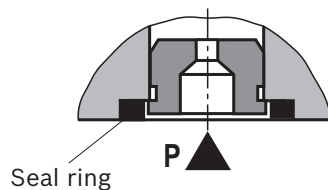
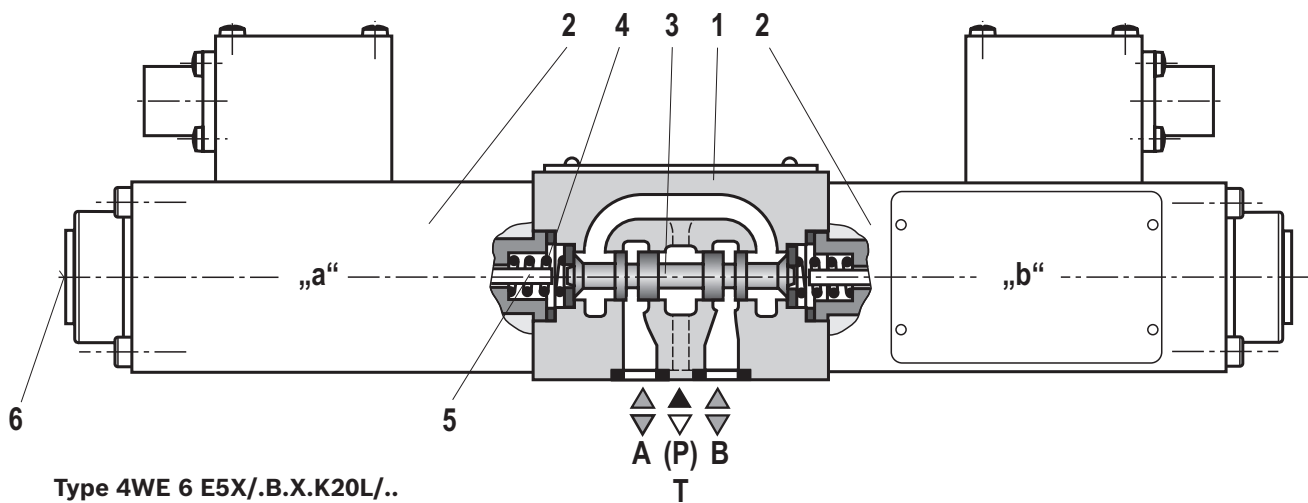
A manual override (6) allows control spool (3) to be moved without solenoid energization.

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

This version is a directional valve with two spool positions and two solenoids without detent. In the de-energized condition, there is no defined spool position.

Notice:

The tank line must not be allowed to run empty. With corresponding installation conditions, a preload valve (preload pressure approx. 2 bar) must be installed. For design reasons, internal leakage is inherent to the valves, which may increase over the life cycle.



Throttle insert "...B"

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

Technical data

(For application outside these parameters, please consult us!)

general		
Installation position	Any	
Ambient temperature range	°C -20 ... +50	
Storage temperature range	°C +5 ... +40	
Maximum storage time	Years 1	
Admissible vibration load	20 ... 2000 Hz amplitude 0.05 g ² /Hz (10 g RMS)	
Weight	kg 2.6 (with 1 solenoid); 4.2 (with 2 solenoids)	
Surface protection	▶ Valve body	Galvanized
	▶ Solenoid	Galvanized

hydraulic		
Maximum surface temperature	°C	See information on the explosion protection, page 6
Maximum operating pressure	▶ Port A, B, P	bar 210
	▶ Port T	bar 100 With symbols A and B, port T must be used as leakage oil connection if the operating pressure exceeds the admissible tank pressure.
Maximum flow	l/min	20
Hydraulic fluid		See table below
Hydraulic fluid temperature range	°C	-20 ... +80 (NBR seals) -15 ... +50 (FKM seals)
Viscosity range	mm ² /s	2.8 ... 500
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)		Class 20/18/15 ¹⁾

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP, HLPD	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 Hydrotherm 46M, Petrofer Ultra Safe 620)	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.)!
- ▶ Ignition temperature > 130 °C

▶ Flame-resistant – containing water:

- Maximum pressure differential 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 ... 100 %

¹⁾ 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 life cycle of the components.
For the selection of the filters, see www.boschrexroth.com/filter.

Technical data

(For application outside these parameters, please consult us!)

electric			
Nominal voltage	V	12	
Voltage type		Direct voltage (DC)	
Admissible residual ripple	%	< 5	
Voltage tolerance	%	±10	
Duty cycle / operating mode according to VDE 0580		100 % / S1 (DB)	
Information on the rated current in the ordering code		G12-12	G12-13
Rated current	mA	120	130
Coil resistance with solenoid temperature 20 °C	Ω	89	59
Minimum current for achieving the hydraulic switching power	mA	88	96
Switching times according to ISO 6403 ¹⁾	▶ on	145	
	▶ off	80	
Switch-off voltage peak Solenoid	V	Max. -3	
Protection class according to EN 60529 ²⁾		IP 65 (with correctly installed electrical connection)	

Information on the explosion protection					
Ordering code for solenoid	"G12-12"		"G12-13"		"G12-19"
Ordering code for explosion protection	"XM"	"XH"	"XM"	"XH"	"XM"
Area of application according to directive 2014/34/EU	I M2	II 2G	I M2	II 2G	I M2
Type of protection valve solenoid according to EN 60079-0 / EN 60079-11	Ex ib I Mb	Ex ib IIC T6 Gb	Ex ib I Mb	Ex ib IIC T6 Gb	Ex ib I Mb
Maximum surface temperature ²⁾	80		80		80
Temperature class	-	T6	-	T6	-
Type examination certificate Solenoid	BVS 08 ATEX E 023				
"IEC Certificate of Conformity" solenoid	IECEX BVS 07.0008				
Type of protection valve	c (EN 13463-5)				
Special application conditions for safe application	In case of valves with two solenoids, maximally one of the solenoids may be energized at a time.				

¹⁾ The switching times were determined at a hydraulic fluid temperature of 40 °C and a viscosity of 46 cSt. Deviating hydraulic fluid temperatures can result in different switching times! Switching times change dependent on operating time and application conditions.

²⁾ Surface temperature > 50 °C, provide contact protection

Technical data

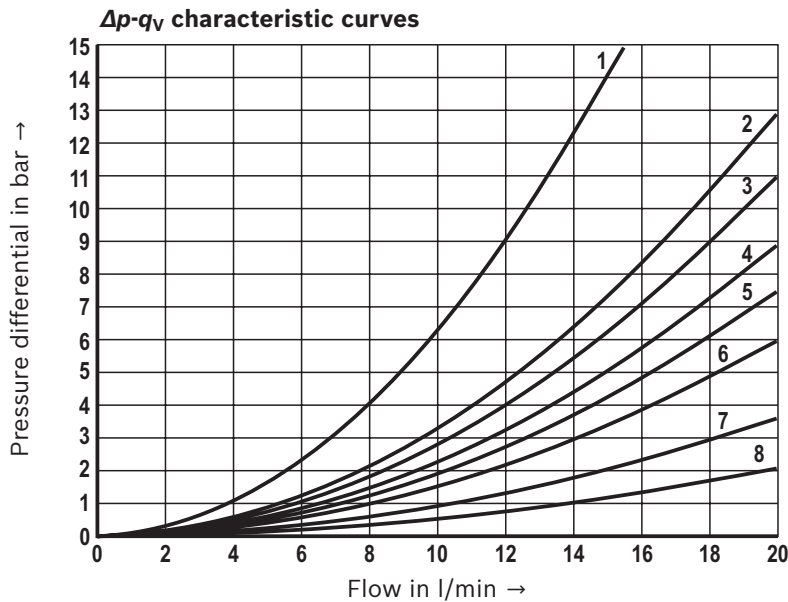
(For application outside these parameters, please consult us!)

Information on the explosion protection							
Safety-related maximum values of the solenoids dependent on the device group and the type of the electrical connection							
Device group		I (mining)			II (all, except for mining)		
Ordering code for explosion protection		"XM"			"XH"		
Ordering code for solenoid		"G12-12"	"G12-13"	"G12-19"	"G12-12"	"G12-13"	"G12-19"
Electrical connection CKL							
▶ Maximum voltage U_i	V DC	–	15	15	–	27	–
▶ Maximum current I_i	A	–	2	2	–	2	–
▶ Maximum input power P	W	–	–	–	–	3	–
▶ Effective inner inductivity L_i ¹⁾	nH/m	–	820	820	–	820	–
▶ Effective inner capacity C_i ¹⁾	pF/m	–	145	145	–	145	–
▶ Ambient temperature range	°C	–	–20 ... +50	–20 ... +50	–	–20 ... +50	–
Electrical connection Z2							
▶ Maximum voltage U_i	V DC	15	–	–	27	–	–
▶ Maximum current I_i	A	2	–	–	2	–	–
▶ Effective inner inductivity L_i	nH	⁴⁾	–	–	⁴⁾	–	–
▶ Effective inner capacity C_i	pF	⁴⁾	–	–	⁴⁾	–	–
▶ Ambient temperature range	°C	–20 ... +50	–	–	–20 ... +50	–	–
Electrical connection K20L							
▶ Maximum voltage U_i	V DC	–	–	15	–	–	–
▶ Maximum current I_i	A	–	–	2	–	–	–
▶ Effective inner inductivity L_i	nH	–	–	⁴⁾	–	–	–
▶ Effective inner capacity C_i	pF	–	–	⁴⁾	–	–	–
▶ Ambient temperature range	°C	–	–	–20 ... +50	–	–	–

⁴⁾ Neglectable

Characteristic curves

(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$, $p = 100 \text{ bar}$)



Symbol	Direction of flow			
	P - A	P - B	A - T	B - T
A, B	3	3	-	-
C	6	6	6	6
D, Y	1	1	4	4
E	3	3	7	7
H	8	8	7	7
J	3	3	7	7
L	3	3	7	5
M	8	8	4	5
U	3	3	5	7
B1	2	2	-	-
X7	3	-	-	3

Performance limits

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

Notice:

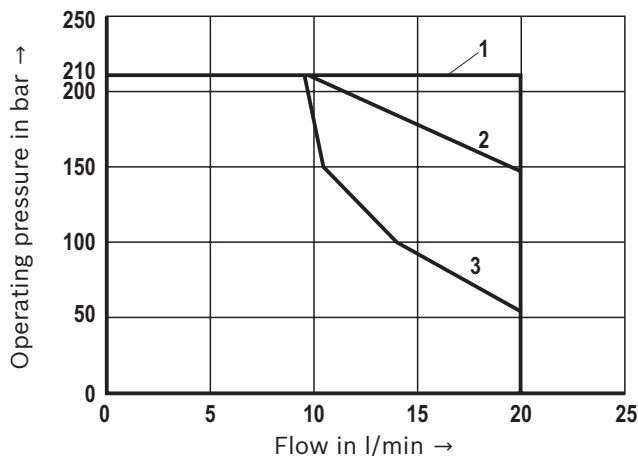
The specified performance limits are valid for use with two directions of flow (e.g. from P → A and simultaneous return flow from B to T).

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 → A while port B is blocked)!

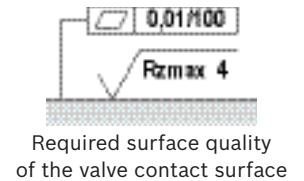
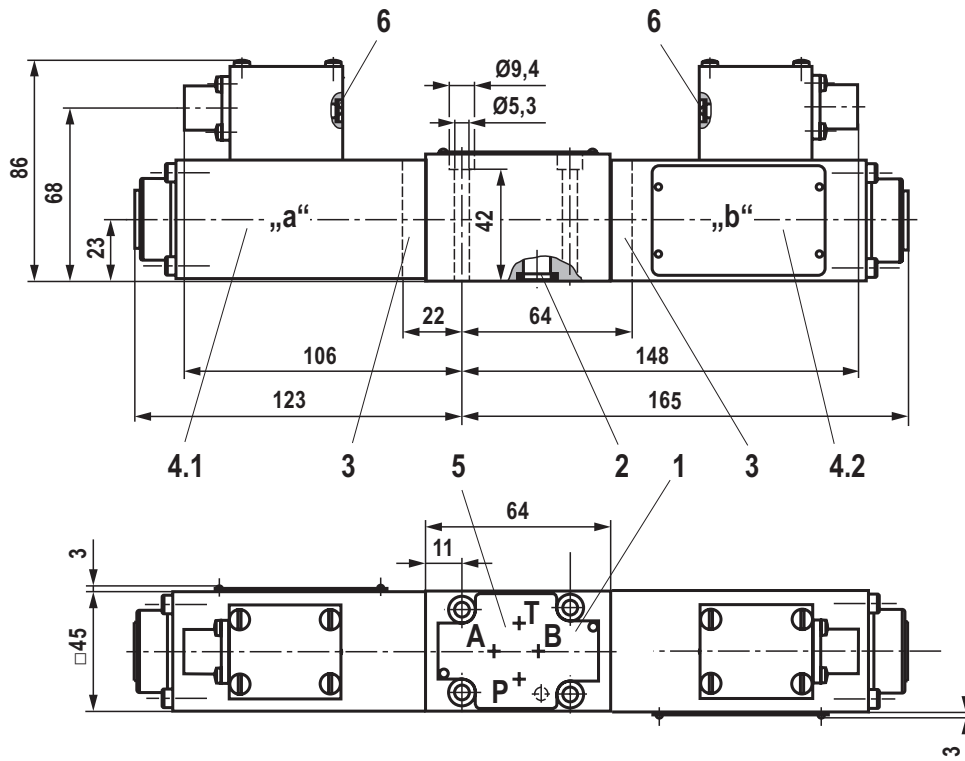
In such cases, please consult us!

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



Characteristic curve	DC solenoid
	Symbol
1	D, Y, A, B, C, E, H, J, L, M, U
2	X7
3	B1

Dimensions: Version "K20L"
(dimensions in mm)



- 1 Name plate
- 2 Identical seal rings for ports A, B, P, T
- 3 Cover for valves with one solenoid
- 4.1 Solenoid "a"
- 4.2 Solenoid "b"
- 5 Porting pattern according to ISO 4401-03-02-0-05 (with locating hole for locking pin ISO 8752-3x8-St, material no. **R900005694**, separate order)
- 6 Red LED for displaying the operating state
- 7 Plug screw (only version "Z2", see also page 10)

Valve mounting screws (separate order)

For reasons of stability, exclusively use the following valve mounting screws:

4 hexagon socket head cap screws

ISO 4762 - M5 x 50 - 10.9-fIZnnc-L-240h-C

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

tightening torque $M_A = 7 \text{ Nm} \pm 10 \%$,

material no. **R913000064**

Subplates (separate order) with porting pattern according to

ISO 4401-03-02-0-05, see data sheet 45100.

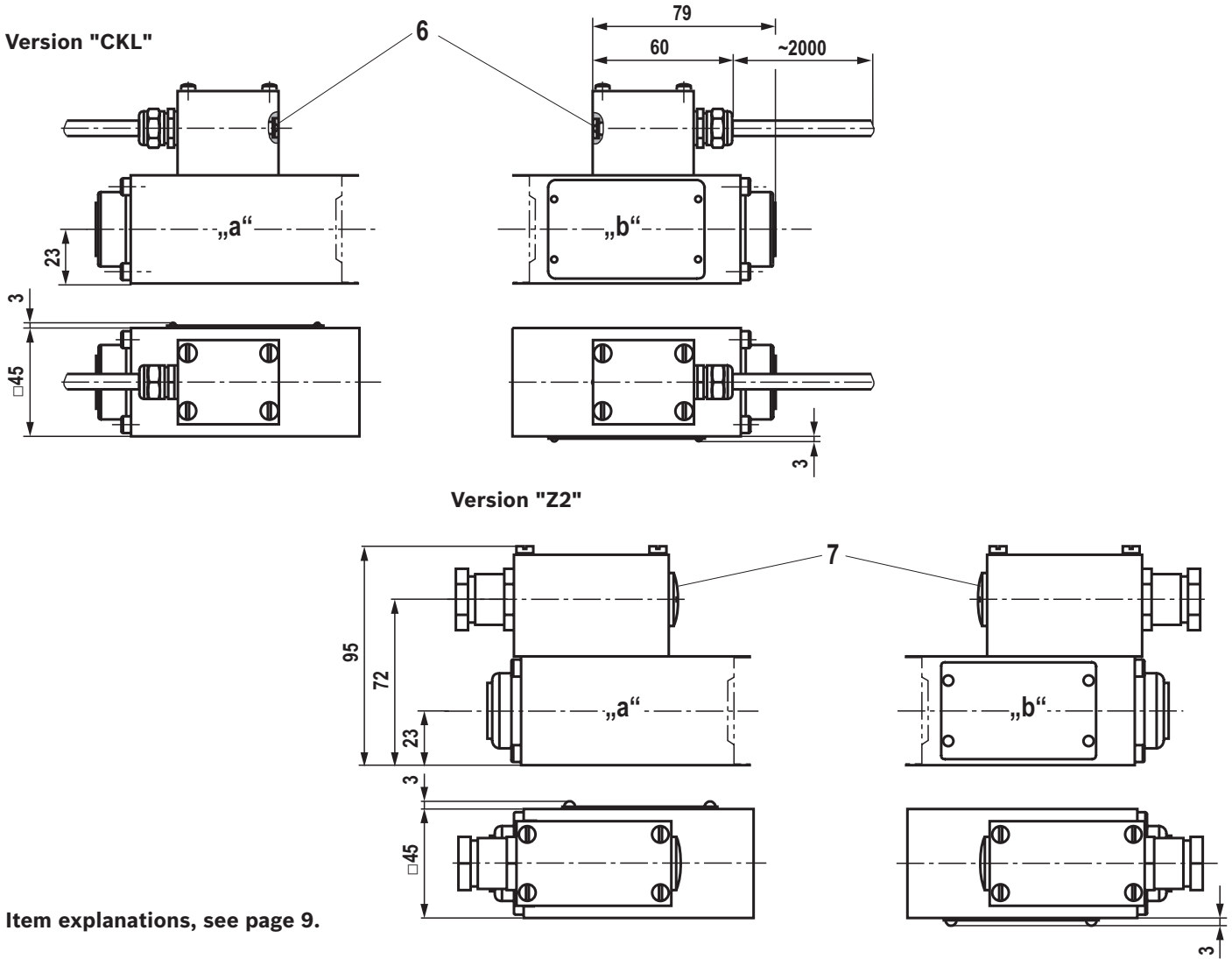


Notice:

Subplates are no components in the sense of directive 2014/34/EU and can be used after the manufacturer of the overall system has conducted an assessment of the risk of ignition.

The "G...J3" versions are free from aluminum and/or magnesium and galvanized.

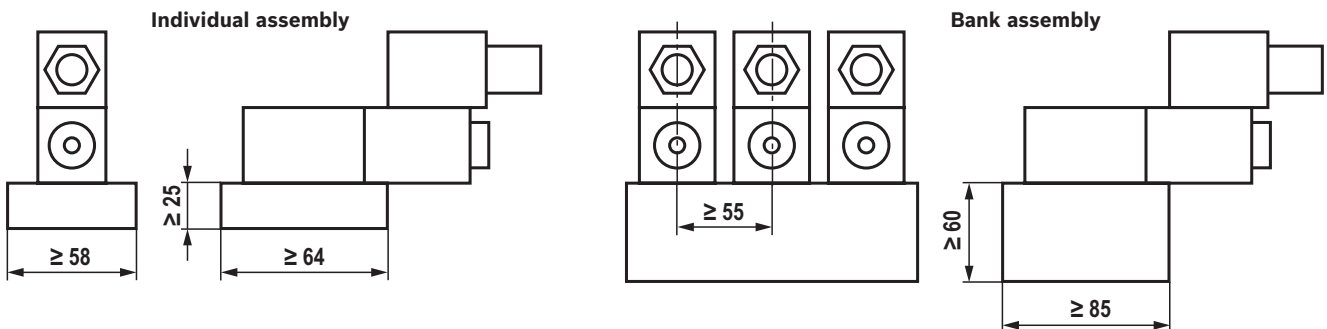
Dimensions: Versions "CKL" and "Z2"
(dimensions in mm)



Item explanations, see page 9.

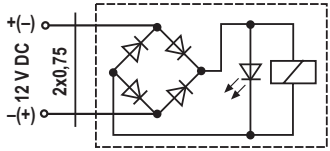
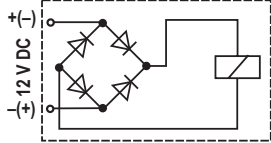
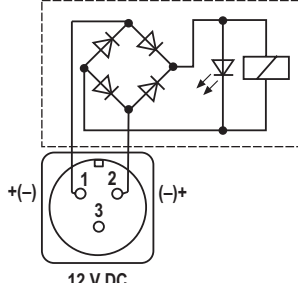
Installation conditions
(dimensions in mm)

	Individual assembly	Bank assembly
Subplate dimensions	Minimum dimensions Length ≥ 64 , width ≥ 58 , height ≥ 25	Minimum cross-section Height ≥ 60 , width ≥ 85
Thermal conductivity of the subplate	≥ 38 W/mK (EN-GJS-500-7)	
Minimum distance between the longitudinal valve axes	≥ 55 mm	



Electrical connection

The type-examination tested valve solenoid of the valve is equipped with an electrical connection according to the following table. The electrical connection of the solenoid is polarity-independent.

Ordering code electrical connection	Type of connection, description	Circuit diagram	Ordering code solenoid, availability
CKL	<ul style="list-style-type: none"> ▶ Electrical connection via non-exchangeable, two-core connection line, blue ▶ Operating display via light emitting diode (LED), red 		G12-13 (130 mA) G12-19 (190 mA)
	Connection line, two-core		
	Line cross-section mm ²	0.75 finely stranded	
	Line diameter mm	Approx. 5.6	
Length m	2		
Z2	<ul style="list-style-type: none"> ▶ Electrical connection via 2-pole terminal in terminal box ▶ With cable gland ▶ Without operating display 		G12-12 (120 mA)
	Cable gland		
	Threaded connection	M20x1.5	
	Line diameter mm	6.5 ... 9.5 ¹⁾	
Sealing	Outer sheath sealing		
Connection terminal Solenoid			
For line cross-section mm ²	0.75 ... 1.5		
K20L	<ul style="list-style-type: none"> ▶ Electrical connection via connector, 3-pole with pin contacts, type 845-11-1125-001, FCI/Souriau ▶ Operating display via light emitting diode (LED), red ▶ Suitable mating connector, type 845-11-8522-001, FCI/Souriau (separate order) 		G12-19 (190 mA)

¹⁾ Larger diameters upon request

Further information

- | | |
|---|--|
| ▶ Subplates | Data sheet 45100 |
| ▶ Use of non-electrical hydraulic components in an potentially explosive environment (ATEX) | Data sheet 07011 |
| ▶ 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 |
| ▶ Directional spool valves, direct operated, with solenoid actuation | Operating instructions 23177-XH-B |
| ▶ Selection of filters | www.boschrexroth.com/filter |
| ▶ Information on available spare parts | www.boschrexroth.com/spc |

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