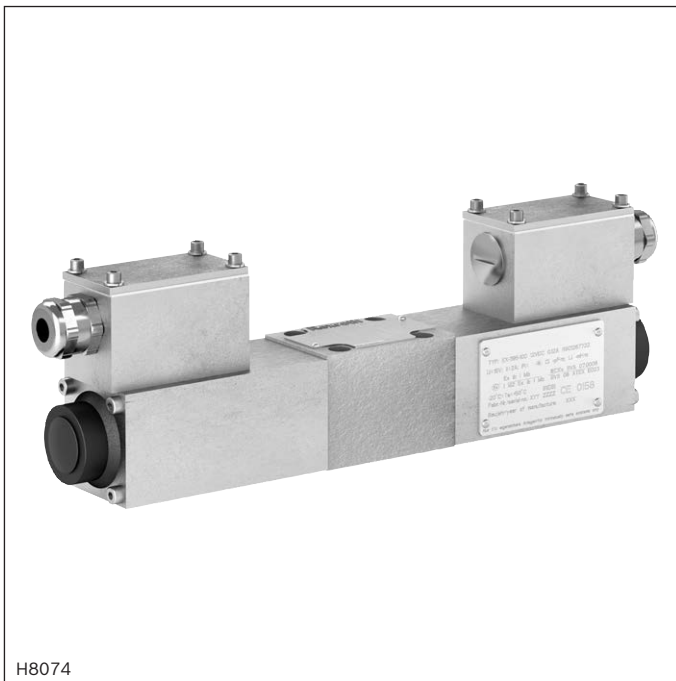


Directional spool valves, direct operated, with solenoid actuation

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



H8074

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



ATEX units For potentially explosive atmospheres



Information on explosion protection:


- ▶ Area of application in accordance with the Explosion Protection Directive 2014/34/EU: **I M2 (XM); II 2G (XH)**
- ▶ Type of protection of valve:
 - Ex h I Mb according to EN 80079-38
 - Ex h IIC T6 Gb according to EN 80079-36
- ▶ Type of protection of valve solenoid:
 - Ex ib I Mb / Ex ib IIC T6 Gb according to EN 60079-0
- ▶ Valve solenoid certified according to IECEx

Features

- ▶ 4/3, 4/2 or 3/2-way version
- ▶ For the 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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 **Notice:** The documentation version with which the product was supplied is valid.

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; possible versions, 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	XH
	"Intrinsically safe" for device group I	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 on electrical connections see page 13	
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)	

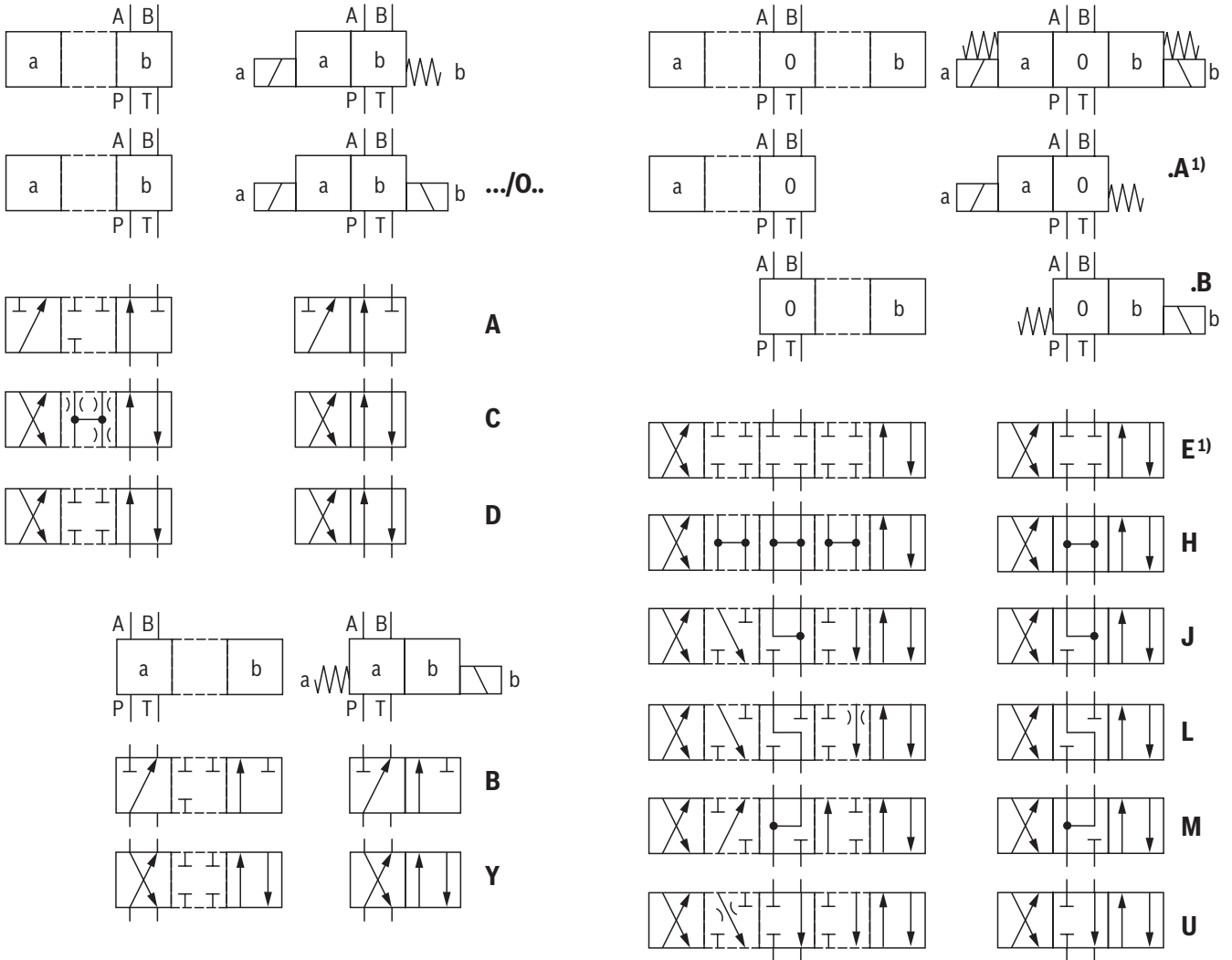
Seal material (observe compatibility of seals with the hydraulic fluid used, see page 5)

13	NBR seals	no code
	FKM seals	V

 **Notices:**

The manual override cannot be allocated a safety function and must 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 spool position "a" ordering code **..EA..**

Notices:

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

Function, section

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

For unobjectionable functioning, the hydraulic system has to be bled properly.

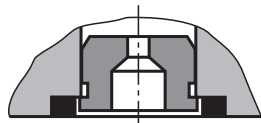
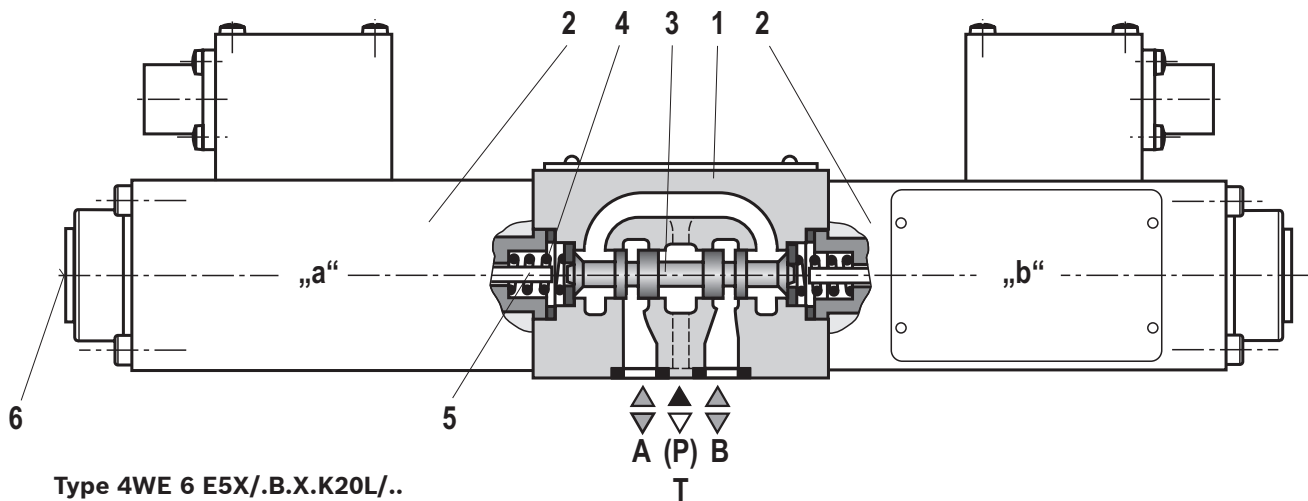
The force of solenoid (2) acts via plunger (5) on control spool (3) and pushes the latter from its rest position to the required end position. In this way, the required direction of flow according to the selected symbol is released. After solenoid (2) was de-excited, the return spring (4) pushes control spool (3) back to its rest position. A manual override (6) allows the 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.

Notices:

- ▶ The valve 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.
- ▶ Please observe possible pressure conversion in the event of a differential cylinder. If pressure is led to the chamber on the piston side and the outflow of hydraulic fluid is blocked from the chamber on the rod side, it might lead to a pressure intensification and inadmissible high pressure on the rod side. This may damage cylinders, supply lines and connected valves.



Throttle insert

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

Technical data

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

General	
Installation position	any
Ambient temperature range	°C -20 ... +50
Storage temperature range	°C +5 ... +40
Maximum storage time	Years 1
Maximum admissible acceleration a_{max}	g 10
Weight	kg 2.6 (with 1 solenoid); 4.2 (with 2 solenoids)
Surface protection	▶ Valve body ▶ Solenoid
	Galvanized Galvanized
Maximum surface temperature	°C See information on explosion protection, page 6

Hydraulic	
Maximum operating pressure	▶ Port P, A, B ▶ Port T
	bar 210 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 ... +50 (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 HEES	FKM FKM	ISO 15380 90221
	▶ Soluble in water	HEPG	FKM	ISO 15380
Flame-resistant	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR ISO 12922	90223

**Important information on hydraulic fluids:**

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

▶ Flame-resistant – containing water:

- Due to increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended - if possible specific to the installation - to back up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

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

Technical data

(for applications outside these values, 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)		
Ordering code for voltage		"G12-12"	"G12-13"	"G12-19"
Rated current	mA	120	130	190
Coil resistance with solenoid temperature 20 °C	Ω	89		59
Minimum current for achieving the hydraulic switching power	mA	88	96	143
Switching time according to ISO 6403 ¹⁾	▶ on	145		105
	▶ off	80		100
Maximum switch-off voltage peaks solenoid ²⁾	V	-3		
Protection class according to EN 60529 ³⁾		IP 65 (with correctly installed electrical connection)		

Information on explosion protection					
Ordering code for voltage		"G12-12"	"G12-13"	"G12-19"	
Ordering code for explosion protection		"XM"	"XH"	"XH"	"XM"
Area of application according to Directive 2014/34/EU		I M2	II 2G	II 2G	I M2
Type of protection of valve according to EN 80079-36 and EN 80079-38 ⁴⁾		Ex h I Mb	Ex h IIC T6 Gb	Ex h IIC T6 Gb	Ex h I Mb
Type of protection valve solenoid according to EN 60079-0		Ex ib I Mb	Ex ib IIC T6 Gb	Ex ib IIC T6 Gb	Ex ib I Mb
Maximum surface temperature ³⁾	°C	80		80	88
Temperature class		-	T6	T6	-
Type examination certificate of valve solenoid		BVS 08 ATEX E 023			
"IECEx Certificate of Conformity" of valve solenoid		IECEx BVS 07.0008			

- 1) The switching times were measured 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 will change depending on the operating time and application conditions.
- 2) Switching off the valve solenoid results in a voltage peak due to the inductive effect. The valve solenoid already contains an interference protection circuit dampening this voltage peak. However, additional external switching measures have to be taken, if required, in order to avoid connected electric circuits being influenced by the residual voltage peak.
- 3) Surface temperature > 50 °C, provide contact protection.
- 4) Ex h: structural safety c according to EN 80079-37.

 **Special application conditions for safe application:**

- ▶ Connection lines must be installed in a strain-relieved way. The first mounting point must be within 150 mm of the valve solenoid.
- ▶ In case of valves with two solenoids, maximum one of the solenoids may be energized at a time.
- ▶ The maximum temperature of the surface of the valve jacket is 80 °C. This has to be considered when selecting the connection cable and/or contact of the connection cable with the surface of the jacket is to be prevented.

Technical data

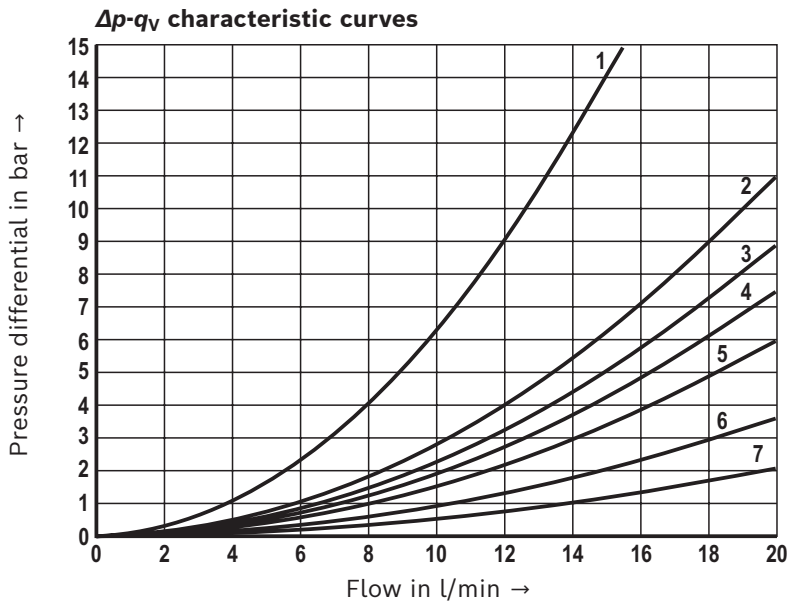
(for applications outside these values, please consult us!)

Information on explosion protection					
Safety-related maximum values of the solenoids depending on the device group and the type of electrical connection					
Device group		I		II	
Ordering code for explosion protection		"XM"		"XH"	
Ordering code for voltage		"G12-12"	"G12-19"	"G12-12"	"G12-13"
Electrical connection CKL					
▶ Maximum voltage U_i	VDC	–	15	–	27
▶ Maximum current I_i	A	–	2	–	2
▶ Maximum input power P	W	–	–	–	3
▶ Effective inner inductivity L_i ⁶⁾	nH/m	–	820	–	820
▶ Effective inner capacity C_i ⁶⁾	pF/m	–	145	–	145
▶ Ambient temperature range	°C	–	–20 ... +50	–	–20 ... +50
Electrical connection Z2					
▶ Maximum voltage U_i	VDC	15	–	27	–
▶ Maximum current I_i	A	2	–	2	–
▶ Maximum input power P	W	–	–	3	–
▶ Effective inner inductivity L_i	nH	⁵⁾	–	⁵⁾	–
▶ Effective inner capacity C_i	pF	⁵⁾	–	⁵⁾	–
▶ Ambient temperature range	°C	–20 ... +50	–	–20 ... +50	–
Electrical connection K20L					
▶ Maximum voltage U_i	VDC	–	15	–	–
▶ Maximum current I_i	A	–	2	–	–
▶ Effective inner inductivity L_i	nH	–	⁵⁾	–	–
▶ Effective inner capacity C_i	pF	–	⁵⁾	–	–
▶ Ambient temperature range	°C	–	–20 ... +50	–	–

⁵⁾ Neglectable⁶⁾ Per meter of cable length

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	2	2	-	-
C	5	5	5	5
D,Y	1	1	3	3
E	2	2	6	6
H	7	7	6	6
J	2	2	6	6
L	2	2	6	4
M	7	7	3	4
U	2	2	4	6

Performance limits

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

Notice:

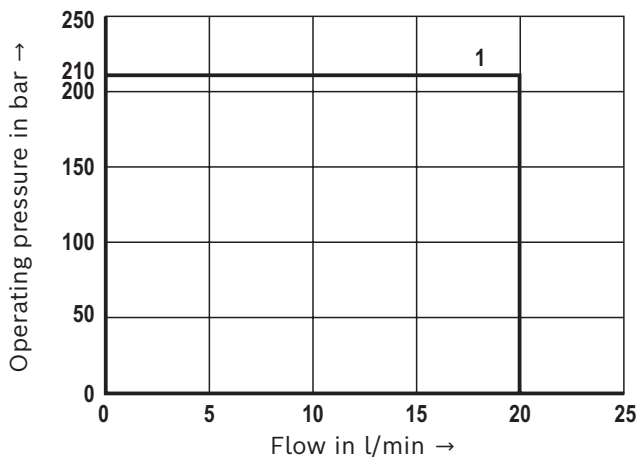
The specified performance limits are valid for use with two directions of flow (e.g. from P → A and simultaneous return flow from B to T).

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

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

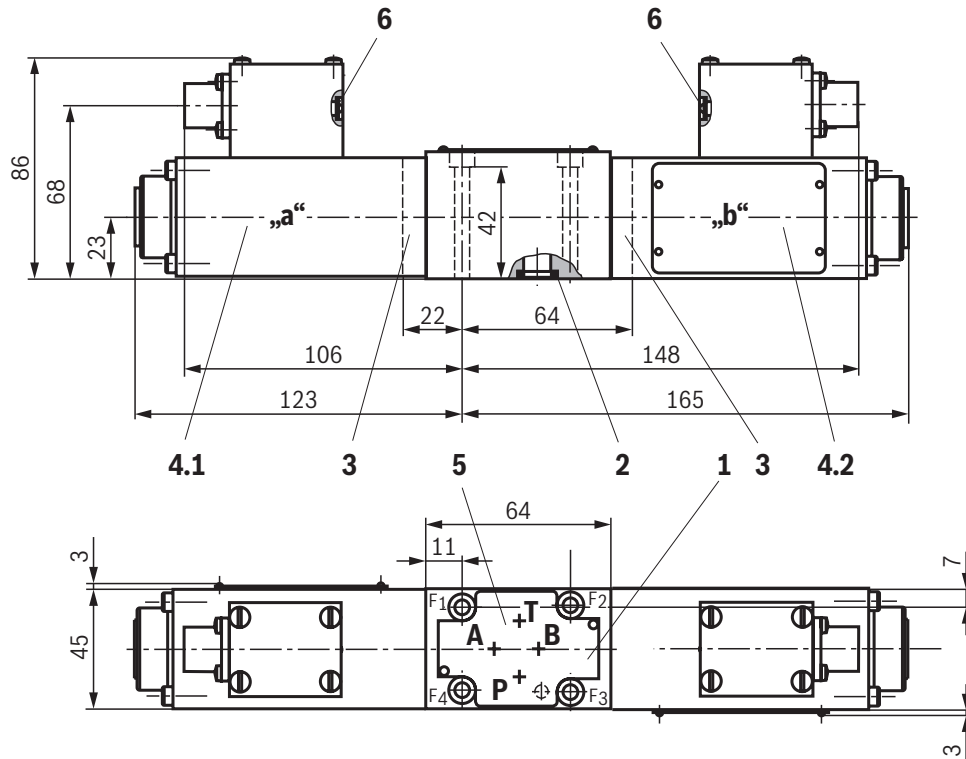
In such cases, please consult us.

The performance limits were determined measured with 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	

Dimensions: Version "K20L"
(dimensions in mm)



Required surface quality of the valve contact surface

- 1 Name plate of valve
- 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

Valve mounting screws (separate order)

Only use valve mounting screws with the subsequently listed thread diameters and strength properties:

4 hexagon socket head cap screws

ISO 4762 - M5 x 50 - 10.9

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

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

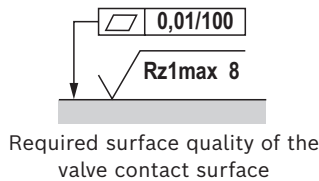
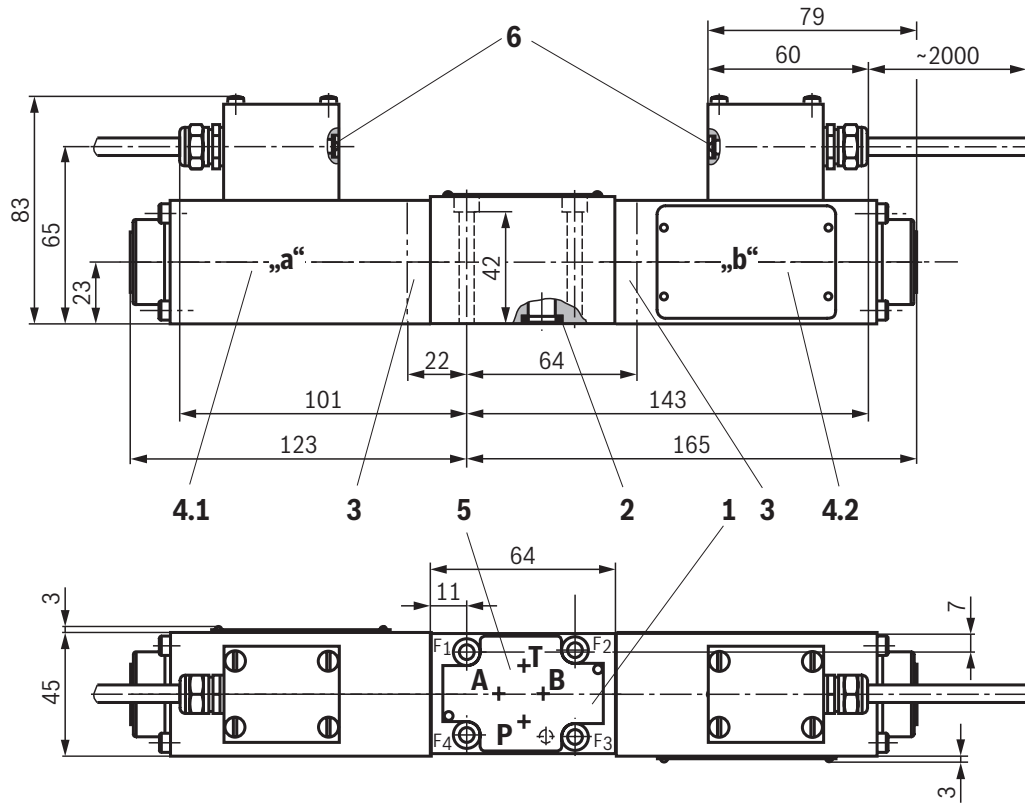
Material no. **R913043758**

Subplates (separate order) with porting pattern according to ISO 4401-03-02-0-05, see data sheet 45100.

Notices:

- ▶ 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 free from magnesium and galvanized.
- ▶ The dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Version "CKL"
(dimensions in mm)



- 1 Name plate of valve
- 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

Valve mounting screws (separate order)

Only use valve mounting screws with the subsequently listed thread diameters and strength properties:

4 hexagon socket head cap screws

ISO 4762 - M5 x 50 - 10.9

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

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

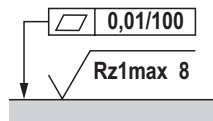
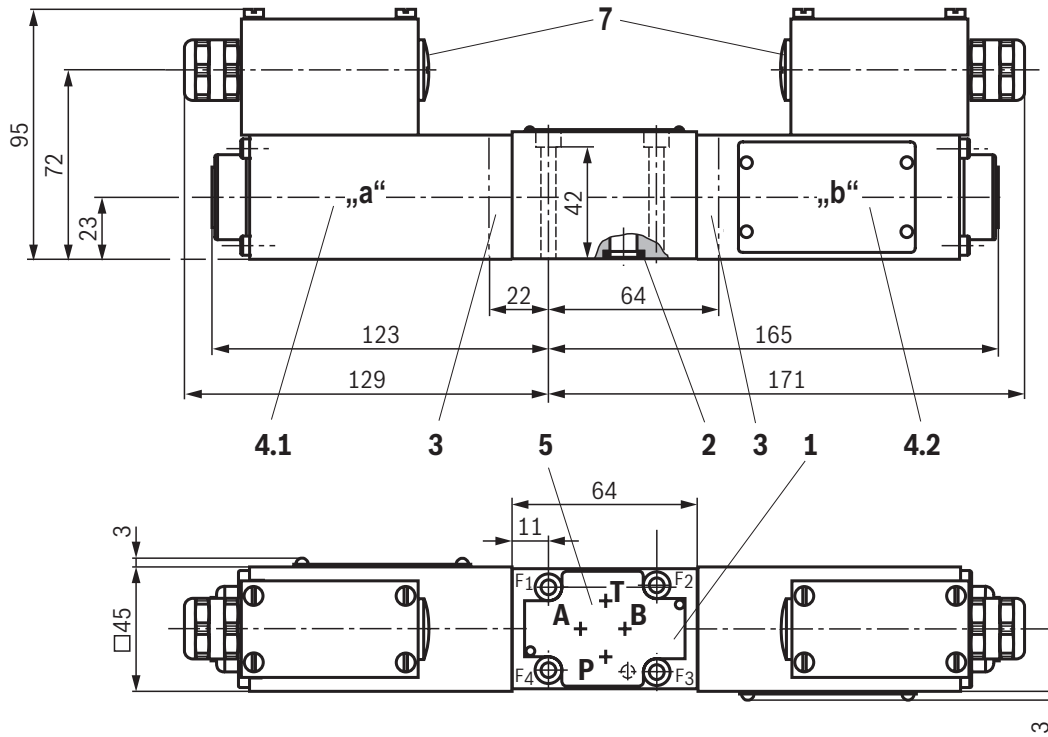
Material no. **R913043758**

Subplates (separate order) with porting pattern according to ISO 4401-03-02-0-05, see data sheet 45100.

Notices:

- ▶ 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 free from magnesium and galvanized.
- ▶ The dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Version "Z2"
(dimensions in mm)



Required surface quality of the valve contact surface

- 1 Name plate of valve
- 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)
- 7 Plug screw

Valve mounting screws (separate order)

Only use valve mounting screws with the subsequently listed thread diameters and strength properties:

4 hexagon socket head cap screws

ISO 4762 - M5 x 50 - 10.9

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

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

Material no. **R913043758**

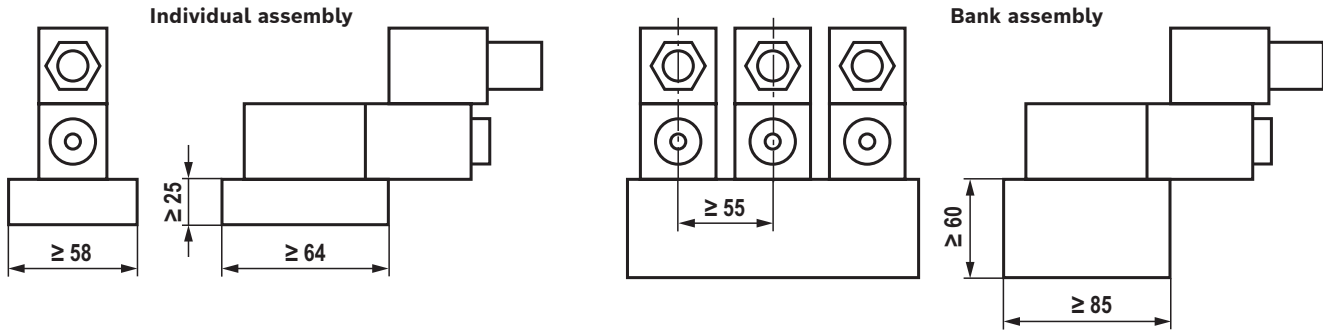
Subplates (separate order) with porting pattern according to ISO 4401-03-02-0-05, see data sheet 45100.

Notices:

- ▶ 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 free from magnesium and galvanized.
- ▶ The dimensions are nominal dimensions which are subject to tolerances.

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	≥ 36.2 W/mK	
Minimum distance between the longitudinal valve axes	≥ 55	



Notice:

Observe the "Special application conditions for safe application" on page 6.

Electrical connection

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

Ordering code for 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 indication via light emitting diode (LED), red 		G12-13 (130 mA) G12-19 (190 mA)
	Connection line, two-core		
	<ul style="list-style-type: none"> ▶ Line cross-section mm² ▶ Line diameter mm ▶ Length m 	0.75 finely stranded approx. 5.6 2	
Z2	<ul style="list-style-type: none"> ▶ Electrical connection via 2-pole terminal in terminal box ▶ With cable gland ▶ Without operating indication 		G12-12 (120 mA)
	Cable gland		
	<ul style="list-style-type: none"> ▶ Threaded connection ▶ Line diameter mm ▶ Sealing 	M20 x 1.5 6.5 ... 9.5 Outer sheath sealing	
	Cable		
	<ul style="list-style-type: none"> ▶ Temperature rating °C 	≤-20 ... ≥+80	
	Connection terminal of solenoid		
	<ul style="list-style-type: none"> ▶ Line cross-section mm² 	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 ▶ Operating indication via light emitting diode (LED), red ▶ Suitable mating connector, type 845-11-8522-001 ¹⁾ 		G12-19 (190 mA)
	Cable		
	<ul style="list-style-type: none"> ▶ Temperature rating °C 	≤-20 ... ≥+80	

¹⁾ Separate order, Souriau company

Notice:

Only use finely stranded conductors with pressed-on wire end ferrules.

Further information

- | | |
|--|--|
| ▶ Subplates | Data sheet 45100 |
| ▶ Use of non-electrical hydraulic components in a 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 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 |

Notes

Notes

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