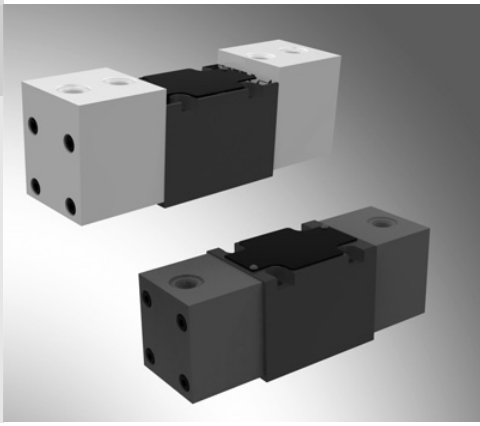
Rexroth
Bosch Group

4/3, 4/2 and 3/2 directional valve with fluidic actuation

RE 22282-XC-B2/07.09

Type WP 6...XC, WH 6...XC



Size 6
Component series 6X (WP), 5X (WH)
Maximum operating pressure 315 bar
Maximum flow 60 l/min

ATEX devices
For explosive areas

Part II Technical data sheet

Explosion protection information:

Area of application according to explosion protection directive and ignition protection type

- Area of application according to directive 94/9/EC **IM2, II2G, II2D, II3G, II3D**
- Ignition protection type of the valve: c (EN 13463-5:2004-03)

What you should know about these operating instructions

These operating instructions apply to Rexroth valves in explosion-proof design and consist of the following three parts:

Part I	General information RE 07010-X-B1	**RE 22282-XC-B0**
Part II	Technical data sheet RE 22282-XC-B2	
Part III	Product-specific instructions RE 22282-XC-B3	

Further information regarding the correct handling of hydraulic products of Rexroth is contained in our publication *“General product information on hydraulic products” RE 07008.*

Table of contents

Features

- Direct operated directional spool valve for the intended use in explosive atmospheres
- Actuating elements:
  - Pneumatic (WP)
  - Hydraulic (WH)
- Porting pattern according to DIN 24340 form A (without locating hole)
- Porting pattern according to ISO 4401-03-02-0-05 (with locating hole)

Ordering code and scope of delivery

	W			6		/		XC	/		

3 main connections **= 3**
4 main connections **= 4**

Directional valve **= W**

Type of actuation
Pneumatic **= P**
Hydraulic **= H**

Connections radial **= No code**

Size 6 **= 6**

Spool symbols e.g. C, E, EA, EB, etc.
Possible designs see page 3

Type WP
Component series 60 to 69 **= 6X**
(60 to 69: unchanged installation and connection dimensions)

Type WH
Component series 50 to 59 **= 5X**
(50 to 59: unchanged installation and connection dimensions)

with spring return **= No code**
without spring return **= O**
without spring return, with detent **= OF**

without manual override **= No code**
with manual override **= N** [1]

No code = without locating hole
/60 [3] **=** with locating hole
/62 = **with** grooved pin

Seal material
No code = NBR seals
V = FKM seals
Note:
Observe compatibility of seals with hydraulic fluid used!

No code = without throttle insert
B08 [2] **=** Throttle Ø 0.8 mm
B10 [2] **=** Throttle Ø 1.0 mm
B12 [2] **=** Throttle Ø 1.2 mm

XC = Valve in explosion-proof design, for details see explosion protection information page 6

[1] Only with pneumatic actuation “P”

[2] Application in case of flow > performance limit of the valve, effective in channel P.

[3] Grooved pin ISO 8741-3x8-St-A2C, Material no. **R900005076** (separate order)

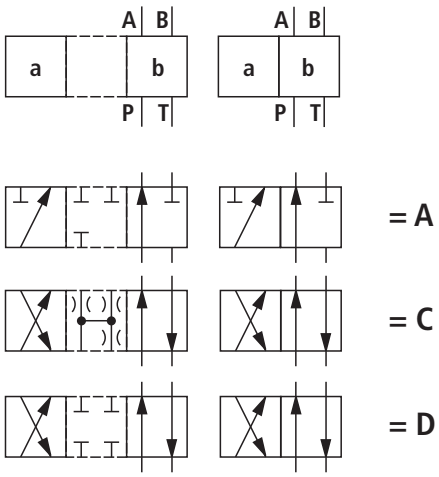
	Spool positions		Spool positions	
	2 pos.	3 pos.	Type WP	Type WH
No code	•	•	•	•
O	•		•	•
OF	•		•	•

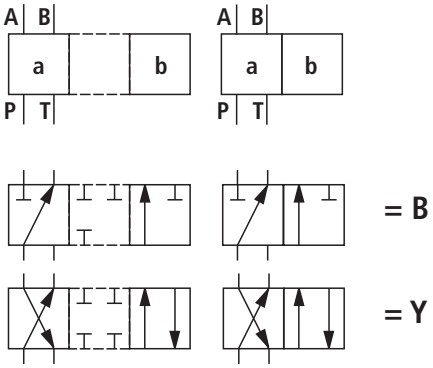
• = Available

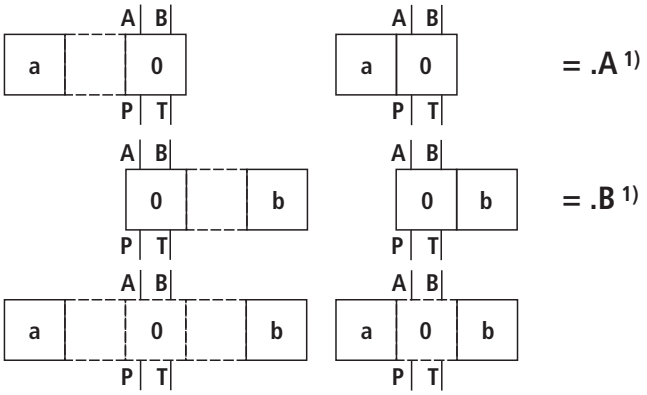
Included in the scope of delivery:

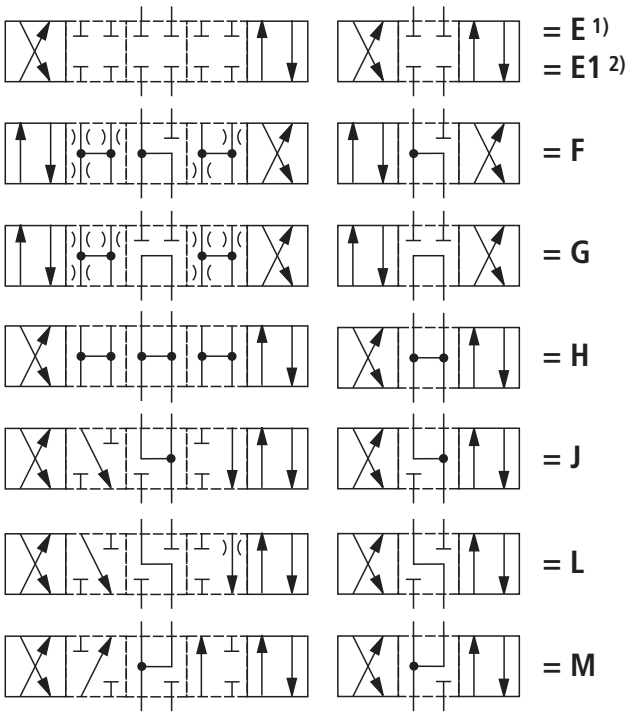
Valve operating instructions with declaration of conformity in part III

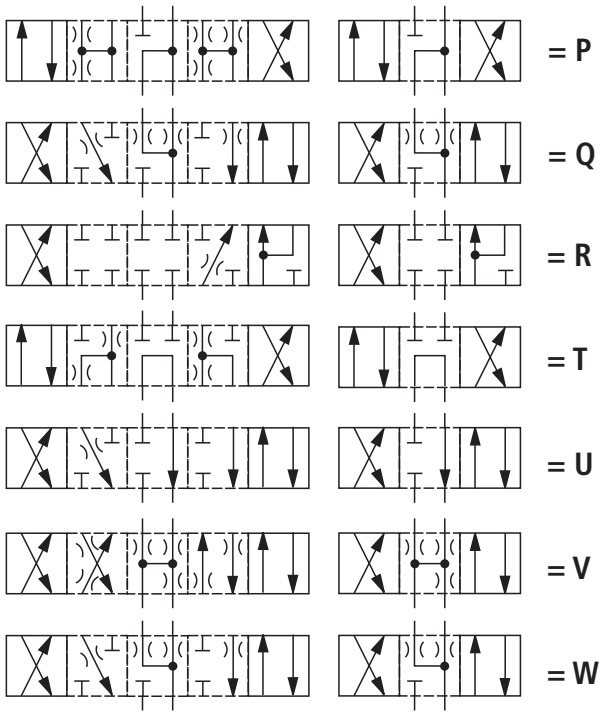
Spool symbols









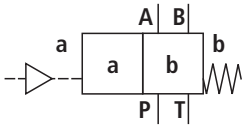
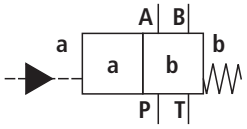
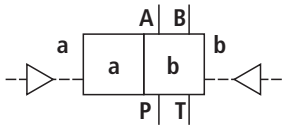
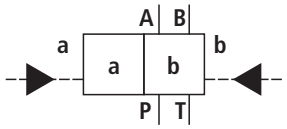
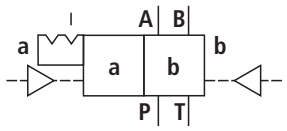
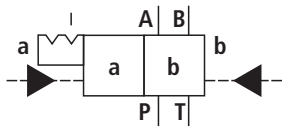
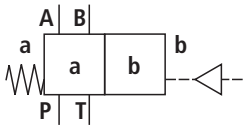
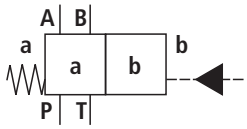
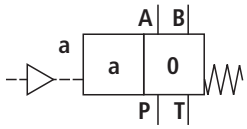
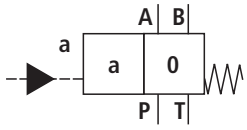
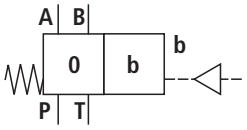
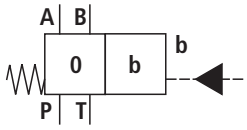
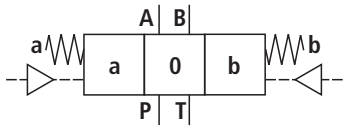
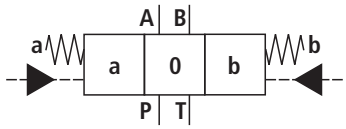


1) **Example:**
- Spool E with spool position “a” → ordering code ..**EA**..
- Spool E with spool position “b” → ordering code ..**EB**..

2) Symbol E1-: P → A/B pre-opening

Be careful because of the pressure intensification with single-rod cylinders!

Types of actuation

Ordering code			Type of actuation	
Spool symbol	**Actuation side**	**Spool return**	**P** (pneumatic)	**H** (hydraulic)
A, C, D				
		../O..		
		../OF..		
B, Y				
E, E1, F G, H J, L M, P Q, R T, U V, W	**"a" [1] = .A**			
	"b" [1] = .B			
				

[1] See spool symbols page 3.

Function, section

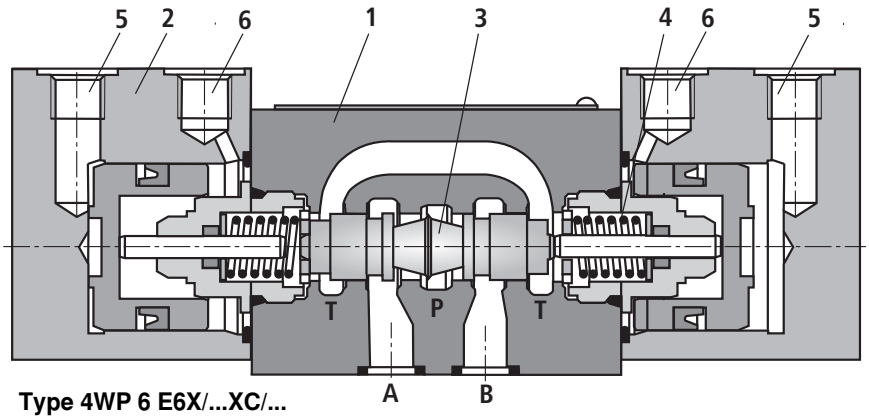
General

Valves of type WP 6...XC and WH 6...XC are fluidically actuated directional spool valves. They control the start, stop and direction of a flow.

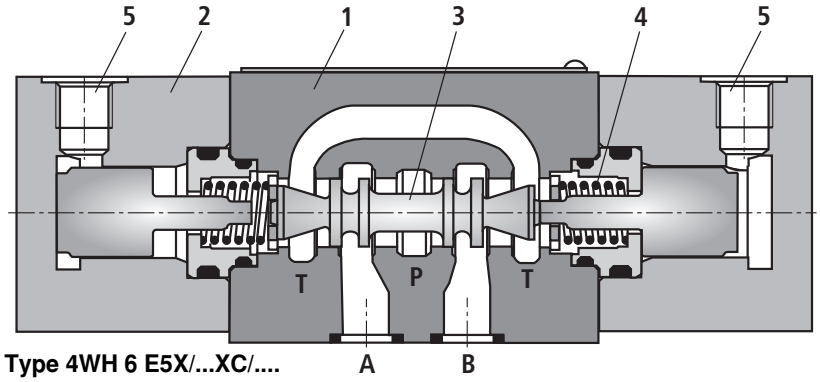
The directional valves basically consist of housing (1), one or two actuating elements (2) (hydraulic, pneumatic actuating cylinder), the control spool (3), and one or two return springs (4). The control connections are arranged radially (type 4WP) (5). The bleeding connections (6) must be established and led to a place outside the explosive area.

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

By means of the actuating elements, the control spool (3) is pushed in the desired spool position.



Type 4WP 6 E6X/...XC/...

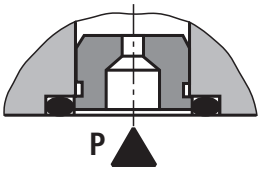


Type 4WH 6 E5X/...XC/....

Throttle insert

The use of a throttle insert is required when due to prevailing operating conditions, flows can occur during the switching processes that are higher than the performance limit of the valve.

It is inserted in channel P of the directional valve.

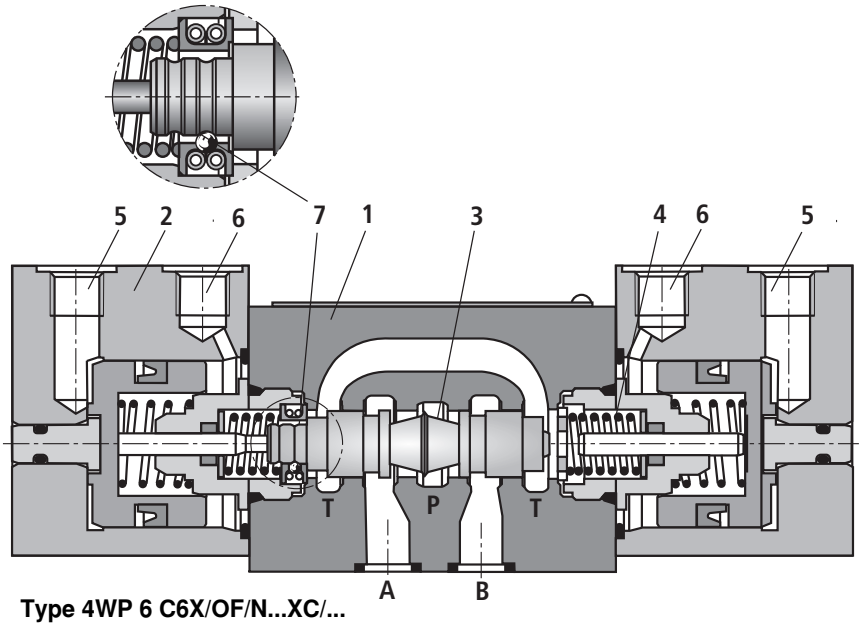


Without spring return, with detent, version ..OF/..

Directional valves with hydraulic or pneumatic actuation are also available as 2-spool position valve with detent (7). When using actuating elements with detent, each spool position can be fixed.

Without spring return, version ..O/..

When using actuating elements without spring return and without detent, there is no defined spool position in the de-energized condition.



Type 4WP 6 C6X/OF/N...XC/...

Technical data

general

Valve type			WP	WH
Weight	– Valve with one actuating cylinder	kg	approx. 1.8	approx. 2.0
	– Valve with two actuating cylinders	kg	approx. 2.0	approx. 2.2
Installation position			Any [1]	
Ambient temperature range		°C	–30 ... +80 (NBR seals) –20 ... +80 (FKM seals)	

hydraulic

Maximum operating pressure	– Port A, B, P	bar	315	
	– Port T	bar	160 With symbols A or B, port T must be used as leakage port if the operating pressure exceeds the admissible tank pressure. **2 bar minimum pre-load pressure required.**	
Maximum flow		l/min	60	
Flow cross-section (Spool position 0)	– with spool symbol Q		6 % of nominal cross-section	
	– with spool symbol W		3 % of nominal cross-section	
Minimum control pressure [8]		bar	4 (see characteristic curve page 7)	6 to 10 > tank pressure [2]
Maximum control pressure [8]		bar	10	200
Control volume		cm^3	4.24	1.23
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524 [3]; quickly bio-degradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil) [3]; HEPG (polyglycols) [4]; HEES (synthetic esters) [4]; HFC according to ISO 12922 [5]; other hydraulic fluids upon request	
Hydraulic fluid temperature range		°C	–30 ... +80 (NBR seals) –20 ... +80 (FKM seals)	
Viscosity range		mm^2/s	2.8 to 500	
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 [6]	
Maximum switching frequency		1/h	7,200	

Explosion protection information

Area of application according to directive 94/9/EC		IM2; II2G; II2D; II3G; II3D
Ignition protection type Valve		c (EN 13463-5:2004-03)
Maximum surface temperature [7] Temperature class [7]	°C	100 T4
Special conditions for a safe use		
Ambient temperature range	°C	–20 ... +80

[1] With version **../O..** (A, C, and D): horizontal

[2] Performance limits depending on the minimum control pressure, see page 9

[3] Suitable for NBR **and** FKM seals

[4] Suitable **only** for FKM seals

[5] Suitable **only** for NBR seals

[6] 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 data sheets RE 50070, RE 50076, RE 50081.

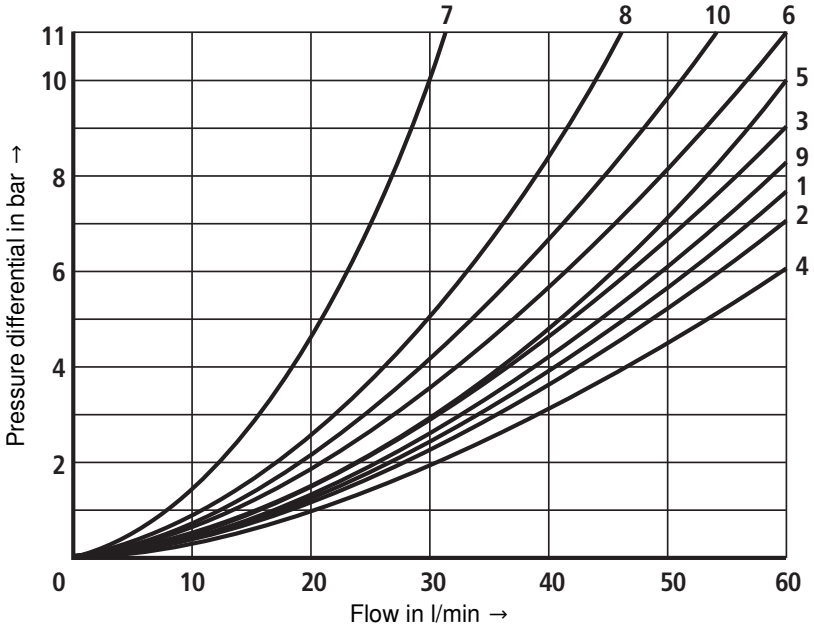
[7] The specified max. temperature or temperature class refers to the max. permitted fluid and ambient temperature. A max. pressure drop across the valve results in a surface temperature 20 K above the fluid temperature, i.e. application in T6 is possible if the fluid and ambient temperature is max. 60 °C.

Note:
The ignition temperature of the hydraulic fluid used must be 50 K higher than the surface temperature of the valve.

[8] With type WP: Control air must be free from oil to the largest possible extent or the oil content in the control air must be clearly below the explosion limit.

Characteristic curves (measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C)

Δp-q_V characteristic curves



Spool symbols	Flow direction			
	P–A	P–B	A–T	B–T
A	3	3	–	–
B	3	3	–	–
C	1	1	3	1
D	5	5	3	3
E	3	3	1	1
F	1	3	1	1
G	6	6	9	9
H	2	4	2	2
J	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
Q	1	1	2	1
R	5	5	4	–
T	10	10	9	9
U	3	3	9	4
V	1	2	1	1
W	1	1	2	2
Y	5	5	3	3

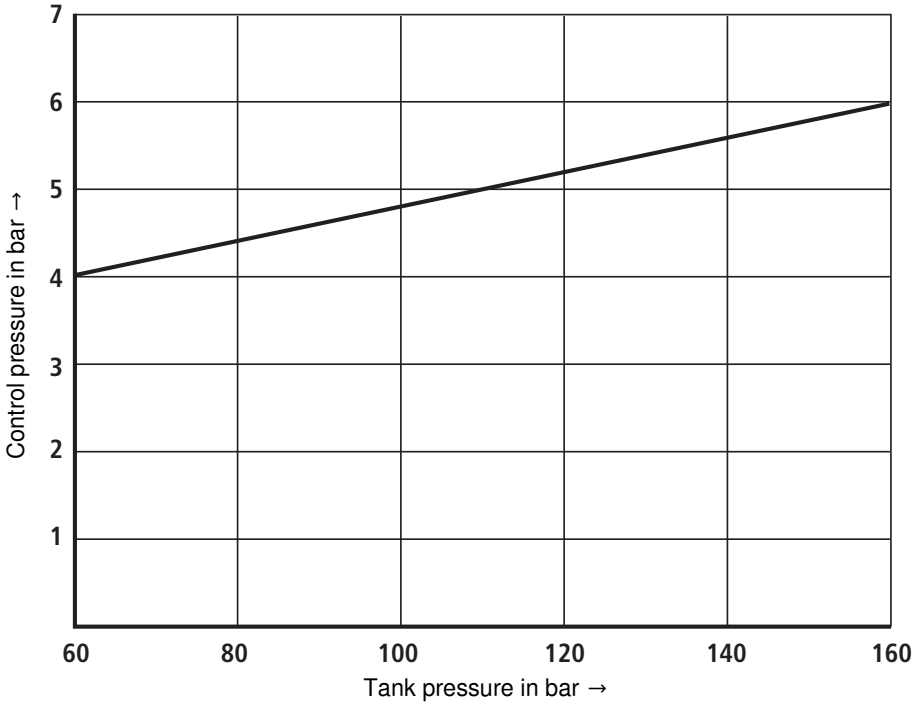
More characteristic curves:

7 Spool symbol “R” in spool position “b” (B → A)

8 Spool symbols “G” and “T” in central position (P → T)

9 Spool symbol “H” in central position P → T)

Minimum control pressure depending on the tank pressure



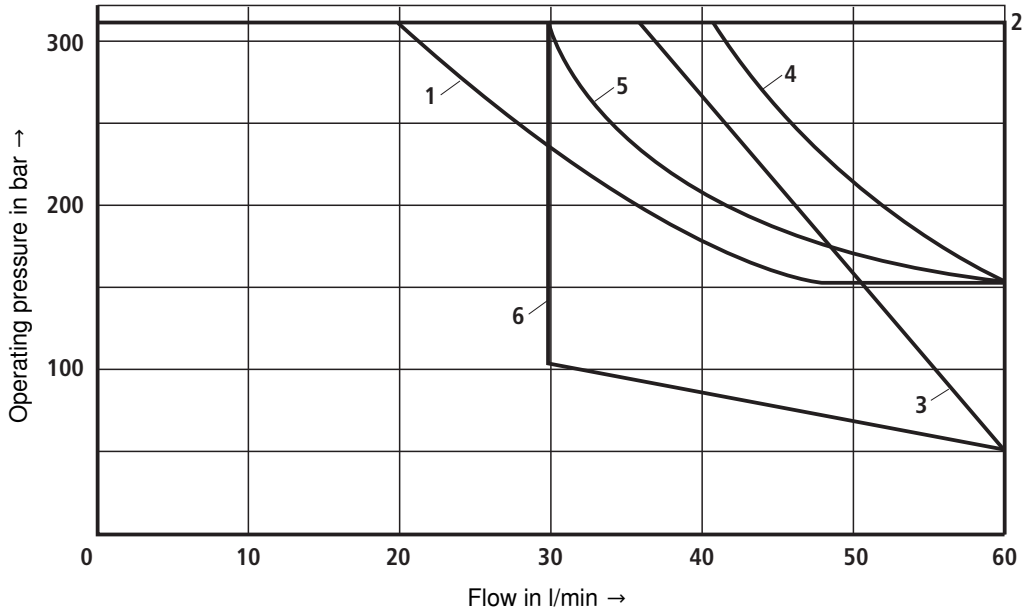
With a higher tank pressure, the minimum control pressure must be increased according to this diagram.

Performance limits: Type WP 6...XC (measured with HLP46, ϑ_{oil} = 40°C ± 5°C)

Due to the adhesive effect, the switching function of the valves depends on the filtration. For achieving the specified, admissible flow values, full flow filtration with 25 μm is recommended. The flow forces acting within the values also influence the flow performance.

With 4-directional valves, the specified flow data thus applies for the normal use with 2 flow directions (e.g. from P to A and simultaneous return flow from B to T).

If there is only one direction of flow, the admissible flow may be considerably lower in critical cases (e.g. when using a 4-directional valve as 3-directional valve by blocking port A or B).



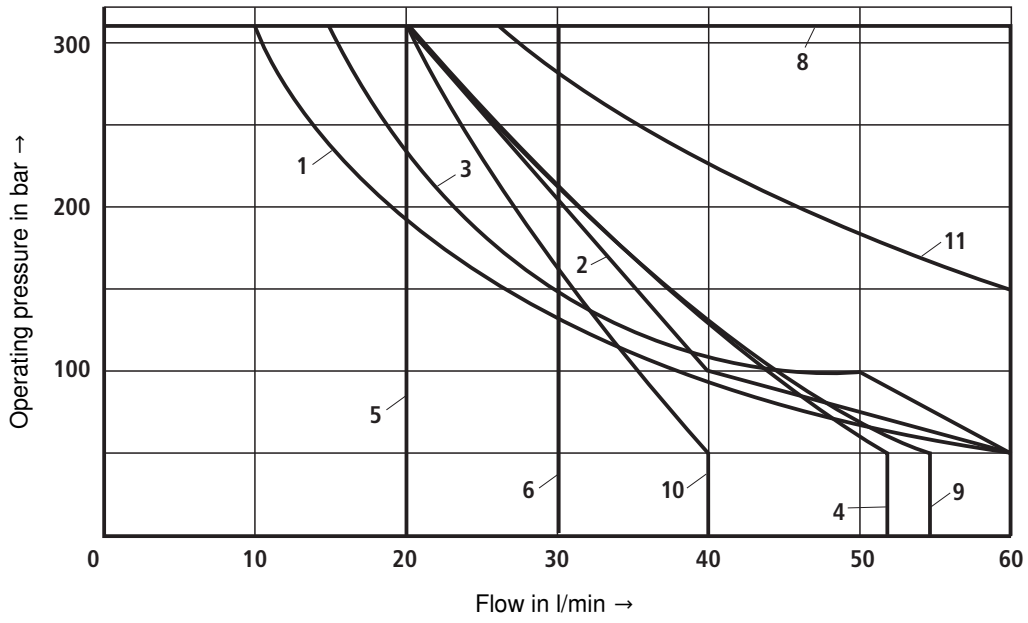
Characteristic curve	Spool symbol
1	A, B
2	A/O, C, C/O, D, D/O, E, E1-, G, H, J, L, M, Q, U, W, and Y
3	F, P
4	R
5	T
6	V

Performance limits: Type WH 6...XC (measured with HLP46, ϑ_{oil} = 40°C ± 5°C)

Due to the adhesive effect, the switching function of the valves depends on the filtration. For achieving the specified, admissible flow values, full flow filtration with 25 μm is recommended. The flow forces acting within the values also influence the flow performance.

With 4-directional valves, the specified flow data thus applies for the normal use with 2 flow directions (e.g. from P to A and simultaneous return flow from B to T).

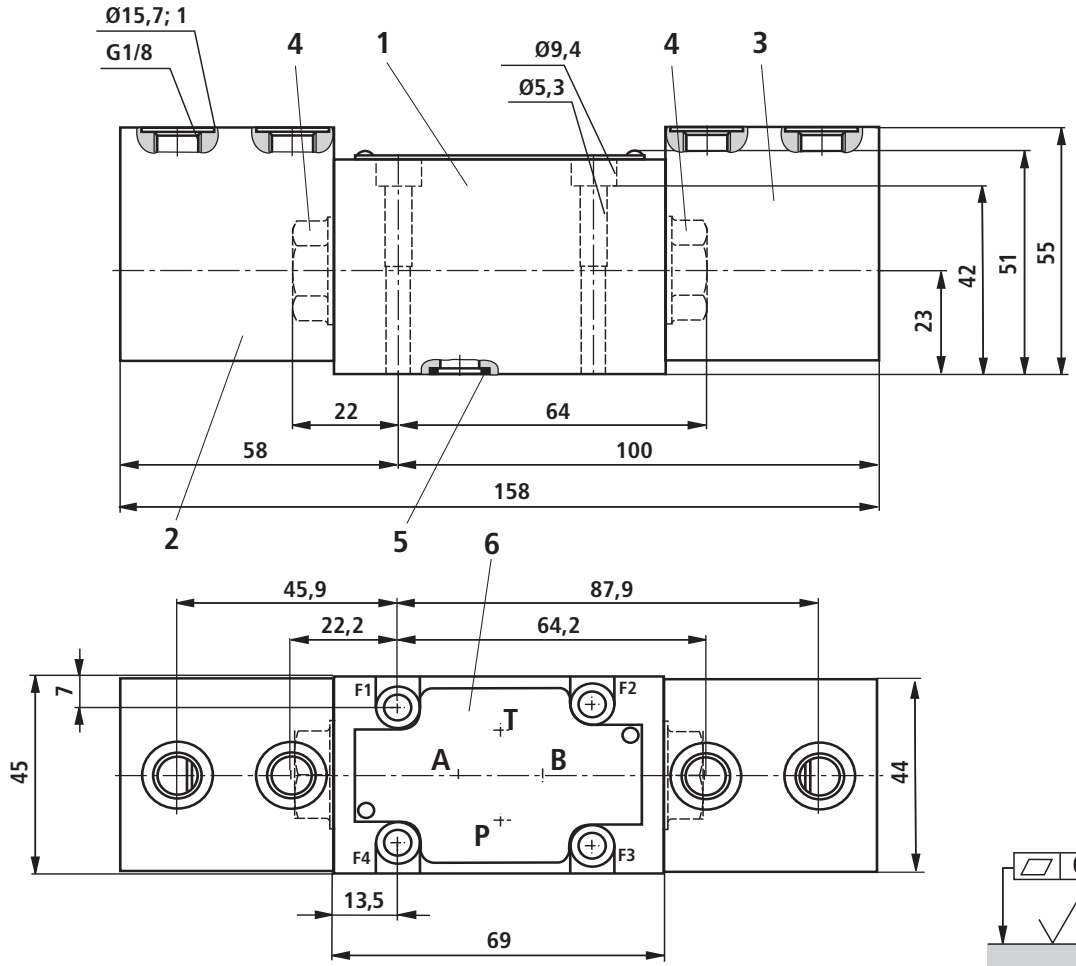
If there is only one direction of flow, the admissible flow may be considerably lower in critical cases (e.g. when using a 4-directional valve as 3-directional valve by blocking port A or B).

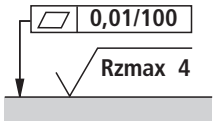


Control pressure 6 bar > tank pressure		
Spring return	**Characteristic curve**	**Spool symbol**
"No code" (with spring return)	1	A, B
	2	C, D, Y
	3	E, J, L, U, M, Q, V, W, E1-
	4	F, P
	5	T
	6	G, H
	7	R
../O..	8	A, C, D
../OF..		

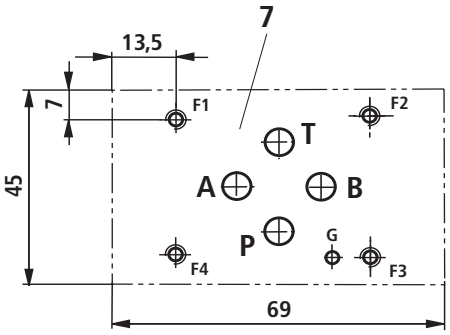
Control pressure 10 bar > tank pressure		
Spring return	**Characteristic curve**	**Spool symbol**
"No code" (with spring return)	1	A, B
	8	C, D, Y, E, G, H, J, L, U, M, Q, V, W, E1-
	9	F, P
	10	R
	11	T
../O..	8	A, C, D
../OF..		

Unit dimensions: Type WP 6...XC (dimensions in mm)





Required surface quality of the valve mounting face



1 Valve with 2 spool positions and 2 actuating cylinders
Valve with 3 spool positions and 2 actuating cylinders

2 Actuating cylinder “a”

3 Actuating cylinder “b”

4 Plug screw for valve with one actuating cylinder (2 spool positions)

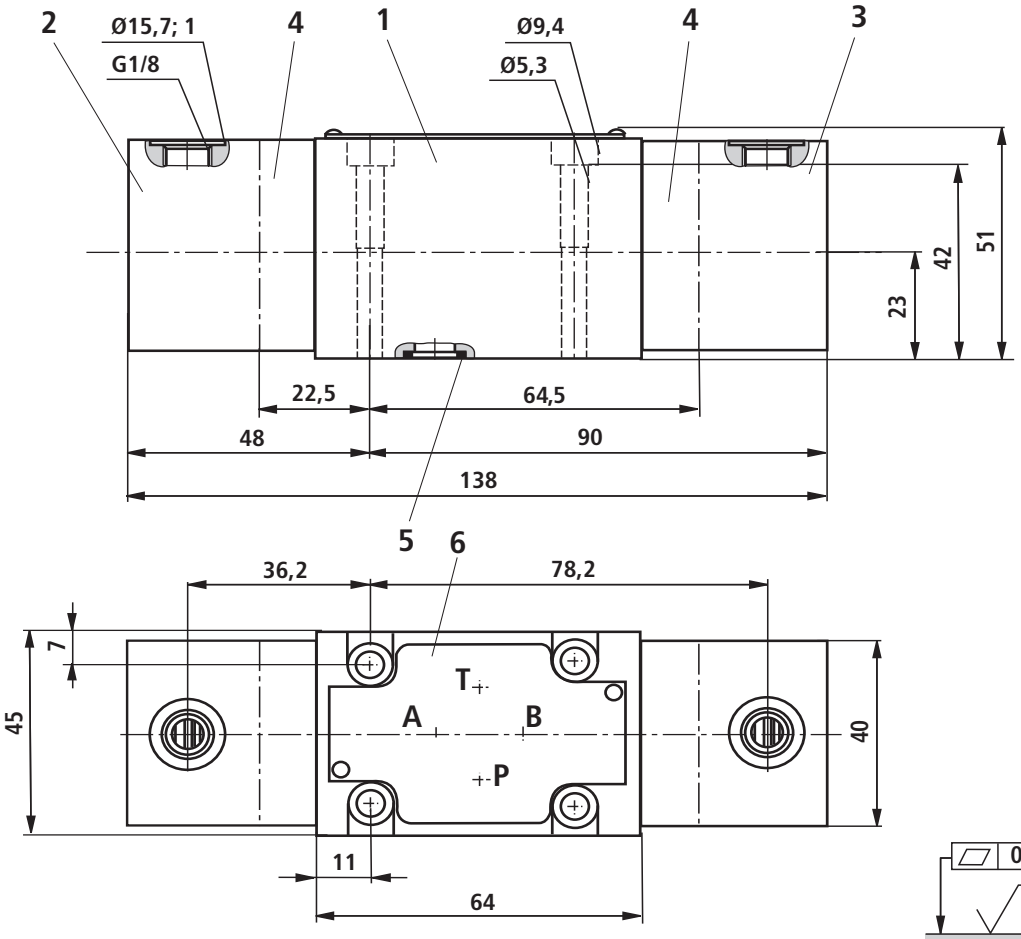
5 Identical seal rings for ports A, B, P, T

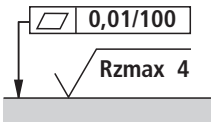
6 Nameplate

7 Porting pattern according to DIN 24340 form A (**without** locating hole), or ISO 4401-03-02-0-05 (**with** locating hole)

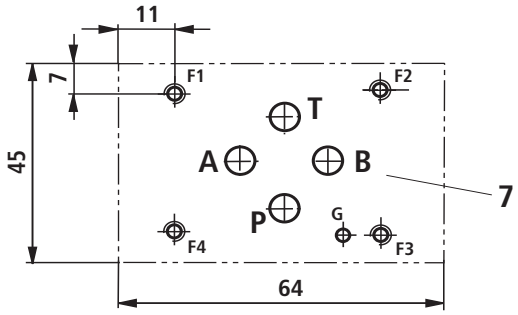
Valve mounting screws
For reasons of stability, only the following valve mounting screws may be used:
4 hexagon socket head cap screws
ISO 4762-M5x50-10.9-flZn-240h-L
(friction coefficient 0.09–0.14 according to VDA 235-101)
Material no. R913000064
(must be ordered separately)

Unit dimensions: Type WH 6...XC (dimensions in mm)





Required surface quality of the valve mounting face



1 Valve with 2 spool positions and 2 actuating cylinders
Valve with 3 spool positions and 2 actuating cylinders

2 Actuating cylinder “a”

3 Actuating cylinder “b”

4 Cover for valve with one actuating cylinder (2 spool positions)

5 Identical seal rings for ports A, B, P, T

6 Nameplate

7 Porting pattern according to DIN 24340 form A (**without** locating hole), or ISO 4401-03-02-0-05 (**with** locating hole)

Valve mounting screws
For reasons of stability, only the following valve mounting screws may be used:
4 hexagon socket head cap screws
ISO 4762-M5x50-10.9-flZn-240h-L
(friction coefficient 0.09–0.14 according to VDA 235-101)
Material no. R913000064
(must be ordered separately)

Notes

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52 / 18-0
Fax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de