

# Pressure relief valve, direct operated

## Type ZDBD and Z2DBD

**RE 25774**

Edition: 2016-03



- ▶ Size 10
- ▶ Component series 2X
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 120 l/min

### Features

- ▶ Sandwich plate valve
- ▶ Porting pattern according to ISO 4401-05-04-0-05
- ▶ 4 pressure ratings, optional
- ▶ 3 adjustment types, optional:
  - Spindle with hexagon
  - Rotary knob
  - Lockable rotary knob with scale
- ▶ 5 directions of action, optional
- ▶ Corrosion-protected design

### Contents

Features	1
Contents	1
Ordering code	2
Symbols	3
Function, section	4
Technical data	5, 6
Characteristic curves	7
Dimensions	8 ... 10
Accessories	11
Further information	11



**Ordering code**

01	02	03	04	05	06	07	08	09	10	11	12	13
<b>Z</b>		<b>DB</b>	<b>10</b>	<b>D</b>			<b>-</b>	<b>2X</b>	<b>/</b>			

01	Sandwich plate valve	<b>Z</b>
02	1 pressure valve cartridge (only with version "A", "B" and "P")	<b>no code</b>
	2 pressure valve cartridges (only with version "C" and "D")	<b>2</b>
03	Pressure relief valve	<b>DB</b>
04	Size 10	<b>10</b>
05	Direct operated	<b>D</b>

**Relief function from - to:**

06	P – T	<b>P</b>
	A – T	<b>A</b>
	B – T	<b>B</b>
	A – T and B – T	<b>C</b>
	A – B and B – A (for possible adjustment types/pressure ratings, see table below)	<b>D</b>

**Adjustment type**

07	Rotary knob	<b>1</b>
	Spindle with hexagon	<b>2</b>
	Lockable rotary knob with scale <sup>1)</sup>	<b>3</b>
08	Component series 20 ... 29 (20 ... 29: unchanged installation and connection dimensions)	<b>2X</b>

**Pressure rating**

09	Set pressure up to 50 bar	<b>50</b>
	Set pressure up to 100 bar	<b>100</b>
	Set pressure up to 200 bar	<b>200</b>
	Set pressure up to 350 bar	<b>350</b>

**Pressure measuring port G1/4**

10	<b>Without</b> pressure measuring port	<b>no code</b>
	<b>With</b> pressure measuring port in port P (version "P" only)	<b>MP</b>

**Corrosion resistance**

11	None	<b>no code</b>
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227); (only version "2")	<b>J3</b>

**Seal material**

12	NBR seals	<b>no code</b>
	FKM seals	<b>V</b>
	Observe compatibility of seals with hydraulic fluid used! (other seals upon request)	

**Pilot oil duct**

13	None	<b>no code</b>
	Via pilot oil bores X and Y	<b>SO30</b>

<sup>1)</sup> H-key with material no. **R900008158** is included in the scope of delivery.

**Version "DD"**

Adjustment type	Pressure rating			
	"50"	"100"	"200"	"350"
"1" and "2"	✓	✓	✓	–
"3"	✓	✓	–	–

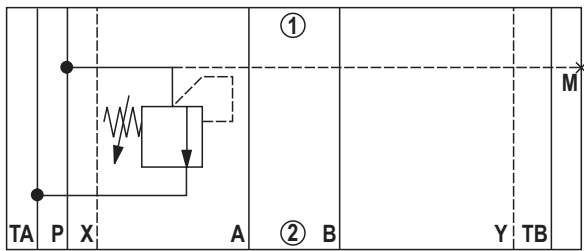
**Notices:**

- For valve types for use in explosive areas, refer to data sheet 07011.
- Preferred types and standard units are contained in the EPS (standard price list).

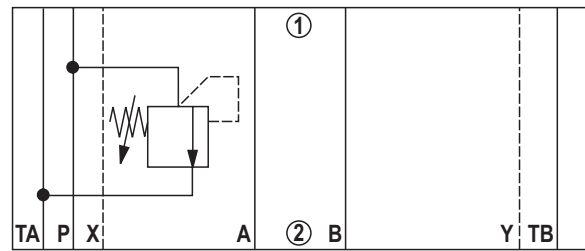


**Symbols** (① = component side, ② = plate side)

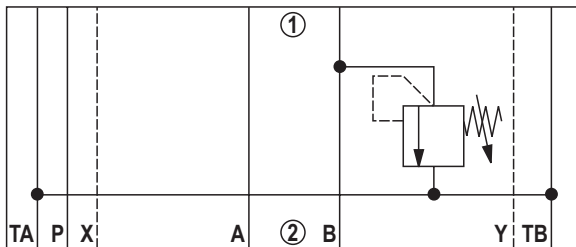
**Version "P"** (example with "MP")



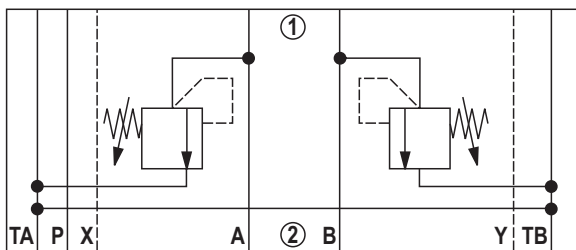
**Version "A"**



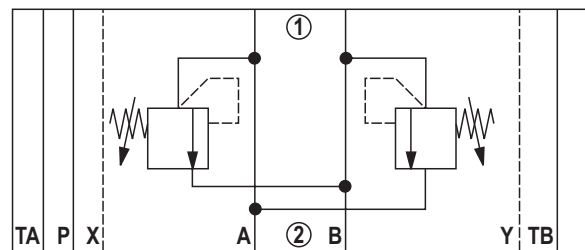
**Version "B"**



**Version "C"**



**Version "D"**



**Notice:**

- Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.
- Version "SO30" is shown. The standard version does not have ports X and Y.



## Function, section

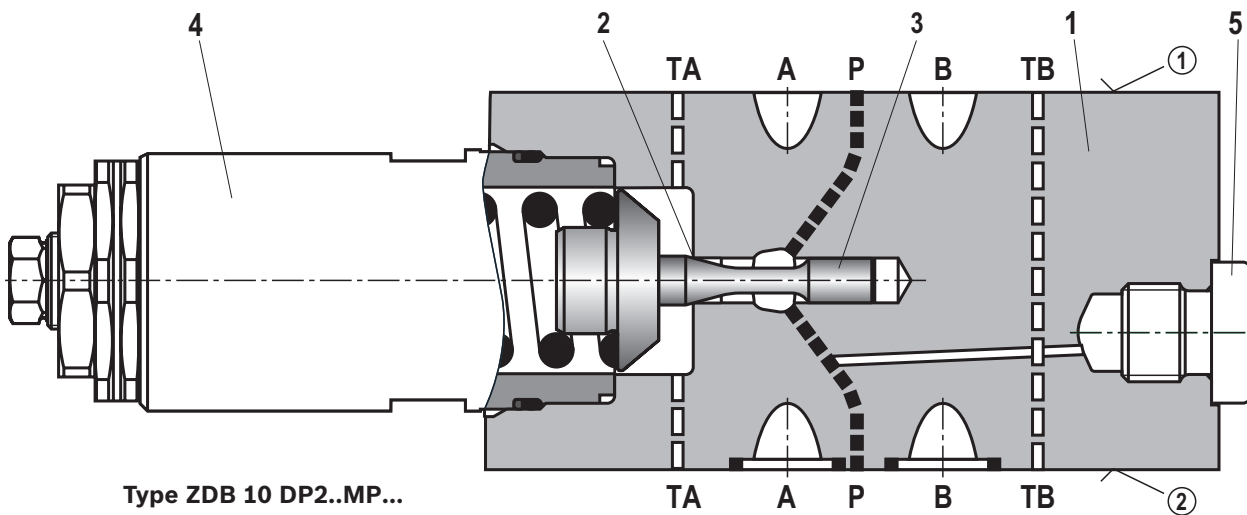
Pressure valves of type ZDB10D and Z2DB10D are direct operated pressure relief valves in sandwich plate design. The valves basically consist of housing (1) with seat (2) and control spool (3). The system pressure is set via the adjustment type (4).

The valves are closed in their rest position and protect a hydraulic system and its components against excessive pressures.

These valves respond quickly, noiselessly and in a virtually leakage-free manner. Thanks to the seat design, they are resistant against oil contamination. The integrated damping of the control spool (3) ensures extremely stable behavior and a low pressure increase with increasing flow.

In the state as delivered, the valves are set to the minimum possible pressure. The system pressure applied to channel P acts on the control spool (3). If the system pressure increases above the set value, the control spool (3) opens and the hydraulic fluid flows from channel P in channel T. This limits the system pressure to the set value.

For version "MP", the set system pressure can be recorded and monitored using a pressure load cell at the measuring port (5) (refer to page 8 and 9)



Type ZDB 10 DP2..MP...

### Notice:

Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.



**Technical data**

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

general						
Weight	► Type ZDBD					
	– Version "1" and "2"	kg	2.8			
	– Version "3"	kg	2.9			
	► Type Z2DBD					
	– Version "1" and "2"	kg	3.2			
	– Version "3"	kg	3.3			
Installation position		Any				
Ambient temperature range		°C	–15 ... +80			
MTTF <sub>d</sub> values according to EN ISO 13849		Years	75 (for further details, see data sheet 08012)			
hydraulic						
Maximum operating pressure	► Version "P", "A", "B", "C"					
	– Port A, B, P	bar	350			
	– Port T	bar	200 (version "1" and "2"); 100 (version "3")			
	► Version "D"					
	– Port A and B	bar	200 (version "1" and "2"); 100 (version "3")			
	– Port P and T	bar	350			
Return flow pressure		Ideally depressurized to the tank <sup>1)</sup>				
Maximum set pressure	► Version "50"	bar	50			
	► Version "100"	bar	100			
	► Version "200"	bar	200			
	► Version "350"	bar	350			
Pressure rating		bar	50	100	200	350
Pressure differential per rotation <sup>2)</sup>		bar	7	14	27	46
Maximum flow		l/min	120			
Hydraulic fluid		See table page 6				
Hydraulic fluid temperature range		°C	–15 ... +80			
Viscosity range		mm <sup>2</sup> /s	10 ... 500 (preferably 50 ... 120)			
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)		Class 20/18/15 <sup>2)</sup>				

<sup>1)</sup> Counter pressure adds to the set pressure.

<sup>2)</sup> The information refers to calculated guidelines and is subject to tolerances. Completely unloaded valves may have an idle stroke of up to 2 rotations.

<sup>3)</sup> 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.

Available filters can be found at [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).



**Technical data**

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

Hydraulic fluid		Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils		HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable <sup>3)</sup>	► Insoluble in water	HETG	FKM	ISO 15380	90221
		HEES	FKM		
	► Soluble in water	HEPG	FKM	ISO 15380	
Flame-resistant	► Water-free	HFDU (glycol base)	FKM	ISO 12922	90222
		HFDU (ester base) <sup>3)</sup>	FKM		
	► Containing water <sup>3)</sup>	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	NBR	ISO 12922	90223

**Important information on hydraulic fluids:**

- For more 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 solenoid surface temperature.

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

- Maximum operating pressure 210 bar, otherwise increased cavitation erosion
- Life cycle as compared to operation with mineral oil HL, HLP 30 ... 100 %
- Maximum hydraulic fluid temperature 60 °C

- **Bio-degradable and flame-resistant:** If this hydraulic fluid is used, small amounts of dissolved zinc may get into the hydraulic system.

<sup>3)</sup> Not recommended for corrosion-protected version "J3" (contains zinc)

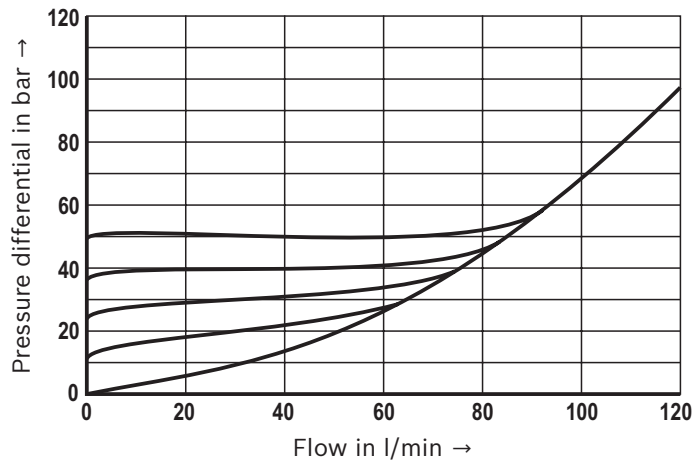


## Characteristic curves

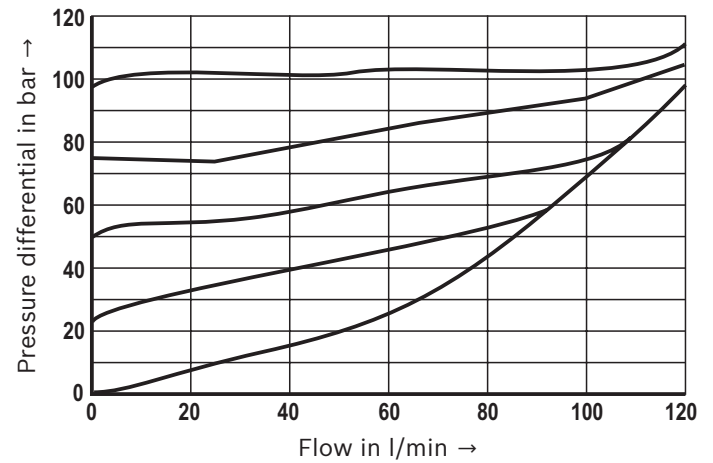
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ )

### $\Delta p$ - $q_v$ characteristic curves

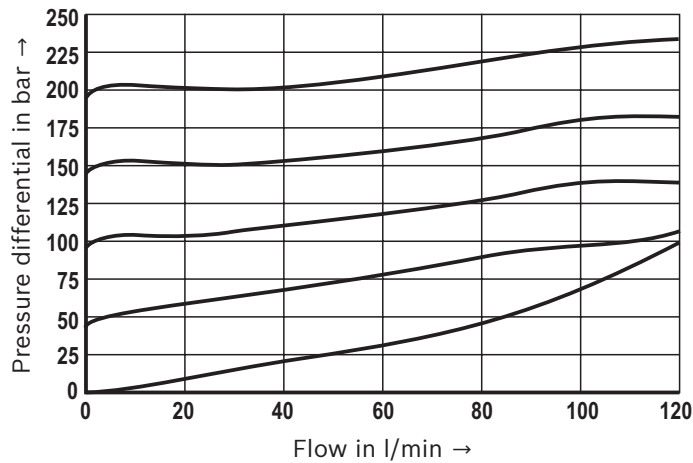
Pressure rating 50 bar



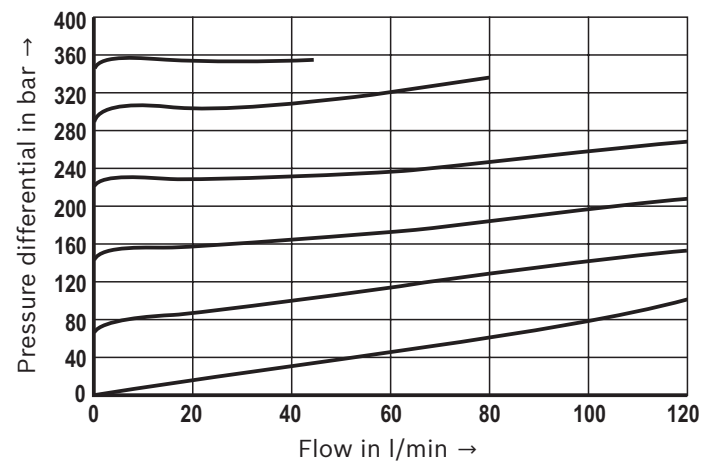
Pressure rating 100 bar



Pressure rating 200 bar

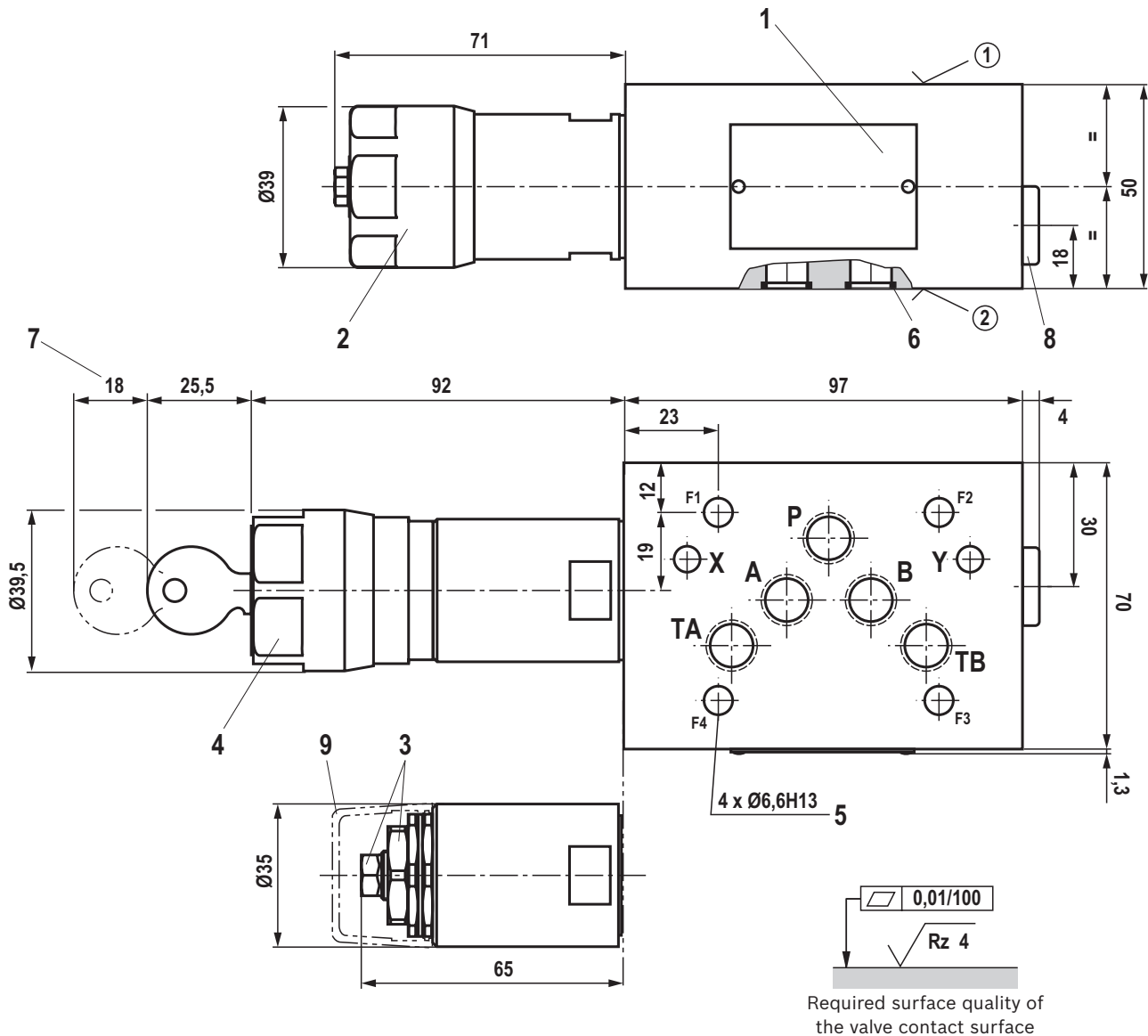


Pressure rating 350 bar





**Dimensions:** Version "P" and "A"  
(dimensions in mm)



- ① component side – Porting pattern according to ISO 4401-05-04-0-05 (standard version) or ISO 4401-05-05-0-05 ("SO30" version)
- ② plate side – Porting pattern according to ISO 4401-05-04-0-05 (standard version) or ISO 4401-05-05-0-05 ("SO30" version)

- 8 Measuring port G1/4 (internal hexagon, wrench size 6, tightening torque  $M_A = 30 \text{ Nm} \pm 10 \%$ )
- 9 Protective cap (separate order, see page 11)

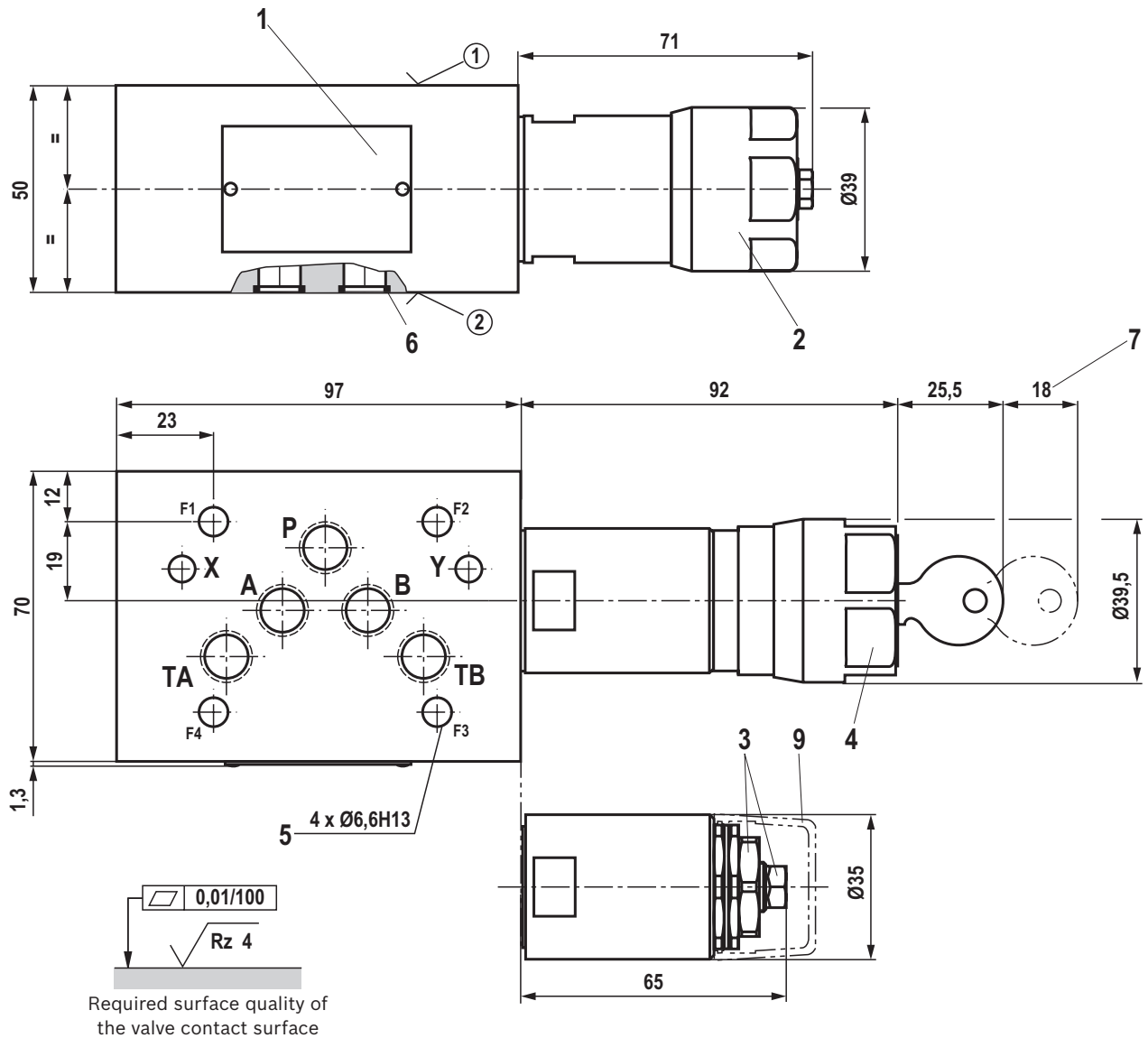
**Valve mounting screws** (separate order)  
**4 hexagon socket head cap screws ISO 4762 - M6 - 10.9**

**Notices:**

- Length and tightening torque of the valve mounting screws must be calculated according to the components mounted below and above the sandwich plate valve.
- Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.
- The dimensions are nominal dimensions which are subject to tolerances.
- Version "SO30" is shown. The standard version does not have ports X and Y.



**Dimensions:** Version "B"  
(dimensions in mm)



- ① component side – Porting pattern according to ISO 4401-05-04-0-05 (standard version) or ISO 4401-05-05-0-05 ("SO30" version)
- ② plate side – Porting pattern according to ISO 4401-05-04-0-05 (standard version) or ISO 4401-05-05-0-05 ("SO30" version)

- 7 Space required to remove the key
- 9 Protective cap (separate order, see page 11)

**Valve mounting screws** (separate order)  
**4 hexagon socket head cap screws ISO 4762 - M6 - 10.9**

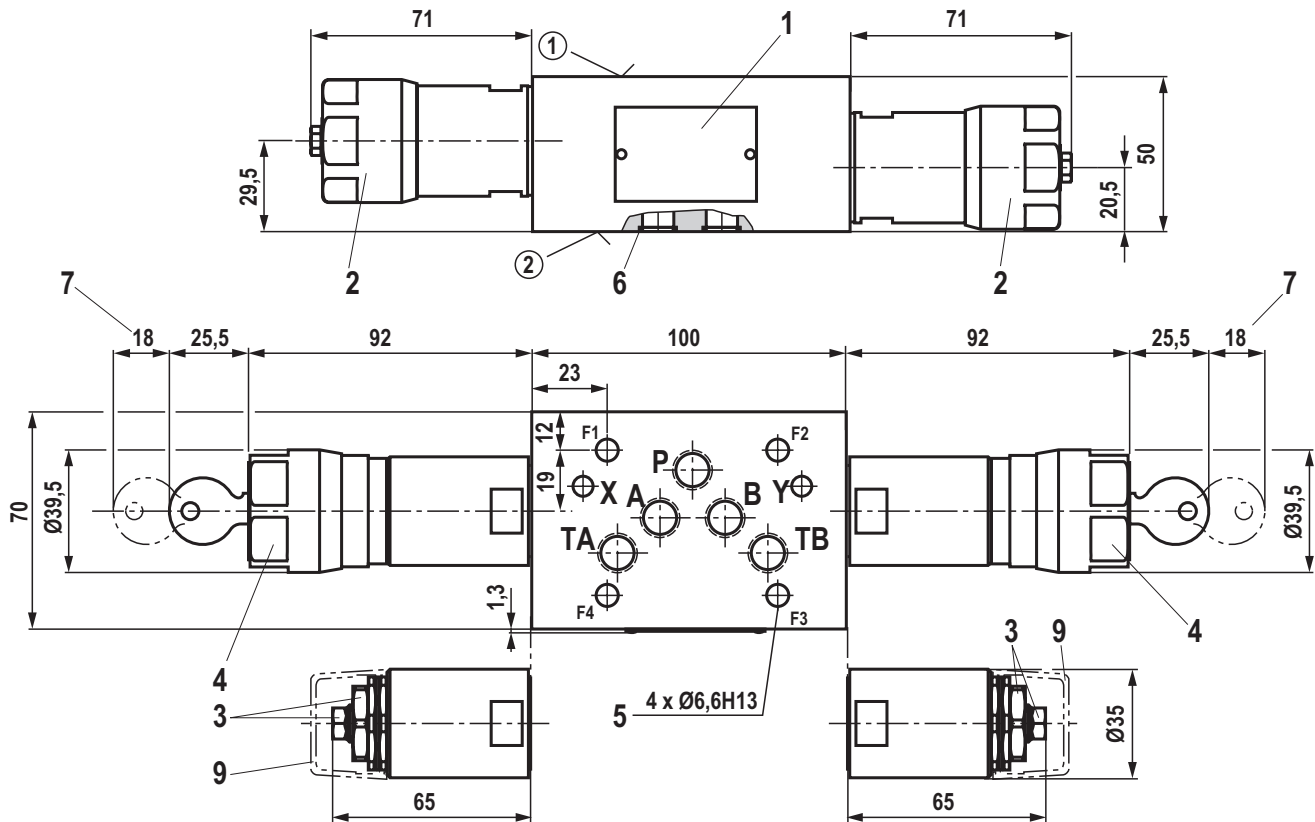
- 1 Name plate
- 2 Adjustment type "1"
- 3 Adjustment type "2" (spindle with external hexagon, wrench size 10, and lock nut, wrench size 24)
- 4 Adjustment type "3"
- 5 Valve mounting bores
- 6 Identical seal rings for ports A, B, P, TA, TB (plate side)

**Notices:**

- Length and tightening torque of the valve mounting screws must be calculated according to the components mounted below and above the sandwich plate valve.
- Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.
- The dimensions are nominal dimensions which are subject to tolerances.
- Version "SO30" is shown. The standard version does not have ports X and Y.



**Dimensions:** Version "C" and "D"  
(dimensions in mm)



0,01/100

Rz 4

Required surface quality of  
the valve contact surface

- ① component side – Porting pattern according to ISO 4401-05-04-0-05 (standard version) or ISO 4401-05-05-0-05 ("SO30" version)
- ② plate side – Porting pattern according to ISO 4401-05-04-0-05 (standard version) or ISO 4401-05-05-0-05 ("SO30" version)

- 1 Name plate
- 2 Adjustment type "1"
- 3 Adjustment type "2" (spindle with external hexagon, wrench size 10, and lock nut, wrench size 24)
- 4 Adjustment type "3"
- 5 Valve mounting bores
- 6 Identical seal rings for ports A, B, P, TA, TB (plate side)
- 7 Space required to remove the key

- 9 Protective cap (separate order, see page 11)
- Valve mounting screws** (separate order)
- 4 hexagon socket head cap screws ISO 4762 - M6 - 10.9**



**Notices:**

- Length and tightening torque of the valve mounting screws must be calculated according to the components mounted below and above the sandwich plate valve.
- Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.
- The dimensions are nominal dimensions which are subject to tolerances.
- Version "SO30" is shown. The standard version does not have ports X and Y.



**Accessories** (separate order)

Denomination	Material no.
Protective cap	R900131744

**Further information**

- |  |                                |
|--|--------------------------------|
| ▶ Subplates  | Data sheet 45100               |
| ▶ 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               |
| ▶ Hydraulic valves for industrial applications                               | Operating instructions 07600-B |
| ▶ General product information on hydraulic products                          | Data sheet 07008               |
| ▶ Assembly, commissioning and maintenance of industrial valves               | Data sheet 07300               |
| ▶ Use of non-electrical hydraulic components in explosive atmospheres (ATEX) | Data sheet 07011               |
| ▶ Pressure transducers for hydraulic applications                            | Data sheet 30272               |
| ▶ Selection of the filters   |                                |
| ▶ Information on available spare parts                                       |                                |