

Pressure relief valve, pilot-operated

Type ZDB and Z2DB

RE 25761

Edition: 2016-12

Replaces: 05.11



- ▶ Size 10
- ▶ Component series 4X
- ▶ Maximum operating pressure 315bar [4600 psi]
- ▶ Maximum flow 100 l/min [26.4 US gpm]

Features

- ▶ Sandwich plate valve
- ▶ Porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05
- ▶ 4 pressure ratings
- ▶ 6 directions of action, optional
- ▶ 1 or 2 pressure valve cartridges
- ▶ 4 adjustment types for pressure adjustment, optionally
 - Rotary knob
 - Bushing with hexagon and protective cap
 - Lockable rotary knob with scale
 - Rotary knob with scale
- ▶ Improved corrosion protection

Contents

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

Ordering code

01	02	03	04	05	06	07	08	09	10	11
Z		DB	10			-	4X	/		*

01	Sandwich plate	Z
02	1 pressure valve cartridge (only with version "VA", "VB", "VT" and "VP")	no code
	2 pressure valve cartridges (only with version "VC" and "VD")	2
03	Pressure relief valve	DB
04	Size 10	10

Relief function from – to:

05	A – TA	VA
	P – TA	VP
	TB1 – TA2	VT
	B – TB	VB
	A – TA and B – TB	VC
	A – B and B – A	VD

Adjustment type for pressure adjustment

06	Rotary knob	1
	Bushing with hexagon and protective cap	2
	Lockable rotary knob with scale	3 ¹⁾
	Rotary knob with scale	7
07	Component series 40 ... 49 (40 ... 49: unchanged installation and mounting dimensions)	4X

Pressure rating

08	Set pressure up to 50 bar [725 psi]	50
	Set pressure up to 100 bar [1450 psi]	100
	Set pressure up to 200 bar [2900 psi]	200
	Set pressure up to 315 bar [4600 psi]	315

Corrosion resistance

09	None	no code
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227)	J3 ²⁾
	Improved corrosion protection (720 h salt spray test according to EN ISO 9227)	J5 ²⁾

Seal material

10	NBR seals	no code
	FKM seals	V
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	
11	Further details in the plain text	*

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

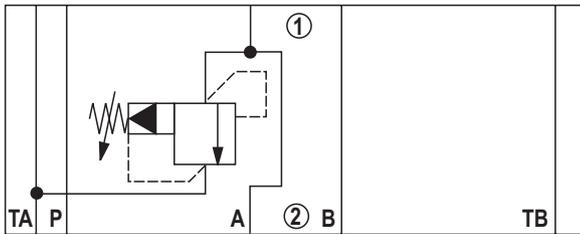
²⁾ Only with adjustment type "2", however without protective cap

Notes:

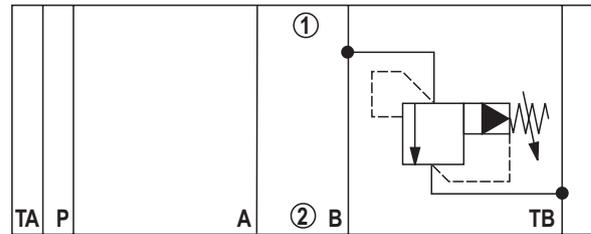
- ▶ To port X and Y bored according to ISO 4401-05-05-0-05 (e.g. for pilot-operated directional valve NG10), version "**SO30**" applies at the end of the ordering code.
- ▶ Preferred types and standard units are contained in the EPS (standard price list).

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

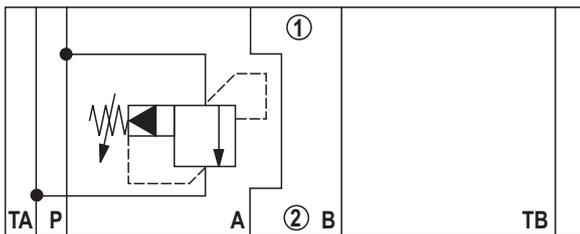
Type ZDB 10 VA...



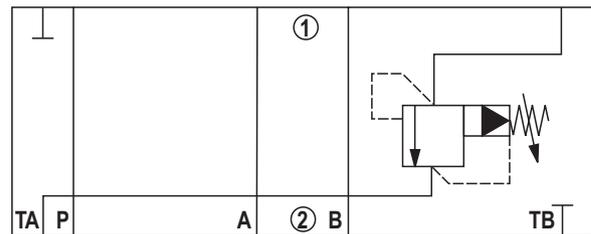
Type ZDB 10 VB...



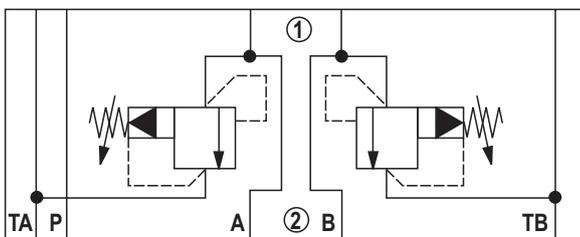
Type ZDB 10 VP...



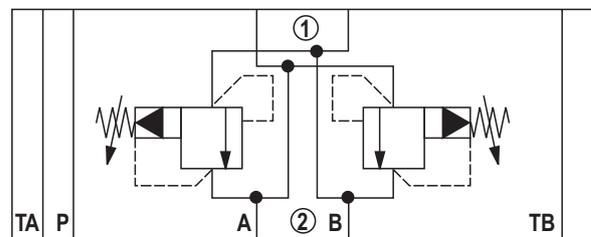
Type ZDB 10 VT...



Type Z2DB 10 VC...



Type Z2DB 10 VD...



 **Notice:**

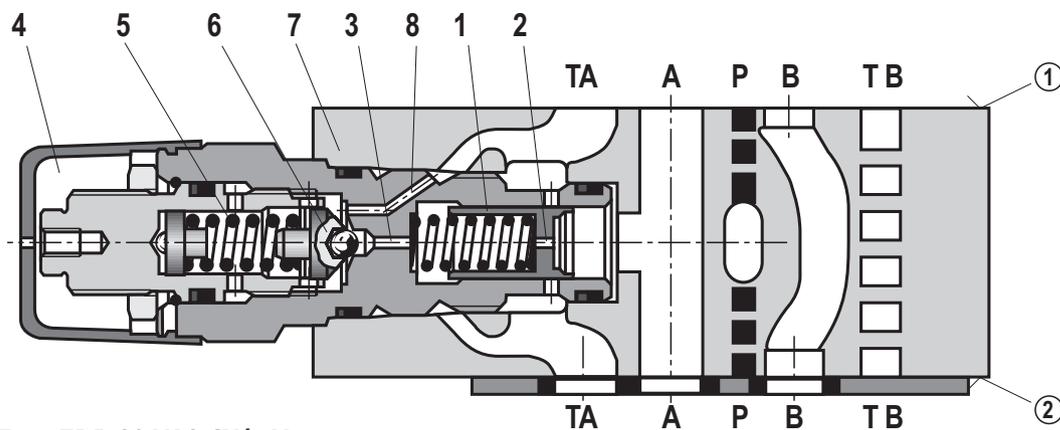
Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.

Function, section

Pressure valves of type ZDB and Z2DB are pilot-operated pressure relief valves in sandwich plate design. They are used for limiting a system pressure.

The valves basically consist of the housing (7) and one or two pressure valve cartridges. The system pressure can be set via the adjustment type (4).

In the initial position the valves are closed. The pressure in channel A acts on the spool (1). At the same time, pressure is applied to the spring-loaded side of the spool (1) via nozzle (2) and to the pilot poppet (6) via nozzle (3). If the pressure in channel A exceeds the value set at the spring (5), the pilot poppet (6) opens. Hydraulic fluid flows from the spring-loaded side of the spool (1), nozzle (3) and channel (8) into channel T (TA). The resulting pressure drop moves the spool (1) and opens the connection from A to T (TA). In channel A, the pressure set at the spring (5) settles.



Type ZDB 10 VA2-4X/...V

- ① = component side
- ② = plate side

Technical data

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

general			
Weight	▶ Type ZDB	kg [lbs]	Approx. 2.4 [5.3]
	▶ Type Z2DB	kg [lbs]	Approx. 2.6 [5.7]
Installation position			Any
Ambient temperature range			°C -20 ... +80 [-4 ... +176]

hydraulic			
Maximum operating pressure	bar [psi]	315 [4600]	
Maximum set pressure	bar [psi]	50 [725]; 100 [1450]; 200 [2900]; 315 [4600]	
Maximum flow	l/min [US gpm]	100 [26.4]	
Hydraulic fluid			See table below
Hydraulic fluid temperature range			°C [°F] -20 ... +80 [-4 ... +176]
Viscosity range			mm ² /s [SUS] 10 ... 800 [60 ... 3710]
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	NBR, FKM	DIN 51524	90220
Bio-degradable ²⁾	▶ Insoluble in water	HETG	ISO 15380	90221
		HEES		
	▶ Soluble in water	HEPG	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	ISO 12922	90222
		HFDU (ester base) ²⁾		
		HFDR		
	▶ 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.).
- ▶ The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum solenoid surface temperature.

▶ Flame-resistant – containing water:

- Maximum pressure differential 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.

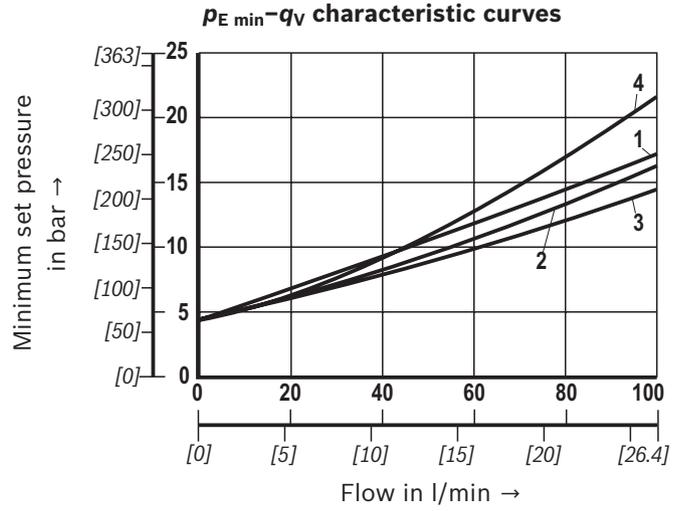
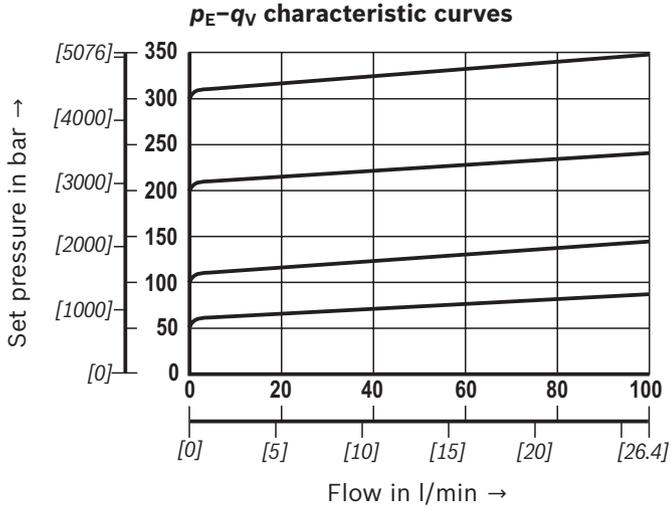
¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

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

²⁾ Not recommended for corrosion-protected versions "J3" and "J5" (contains zinc)

Characteristic curves

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

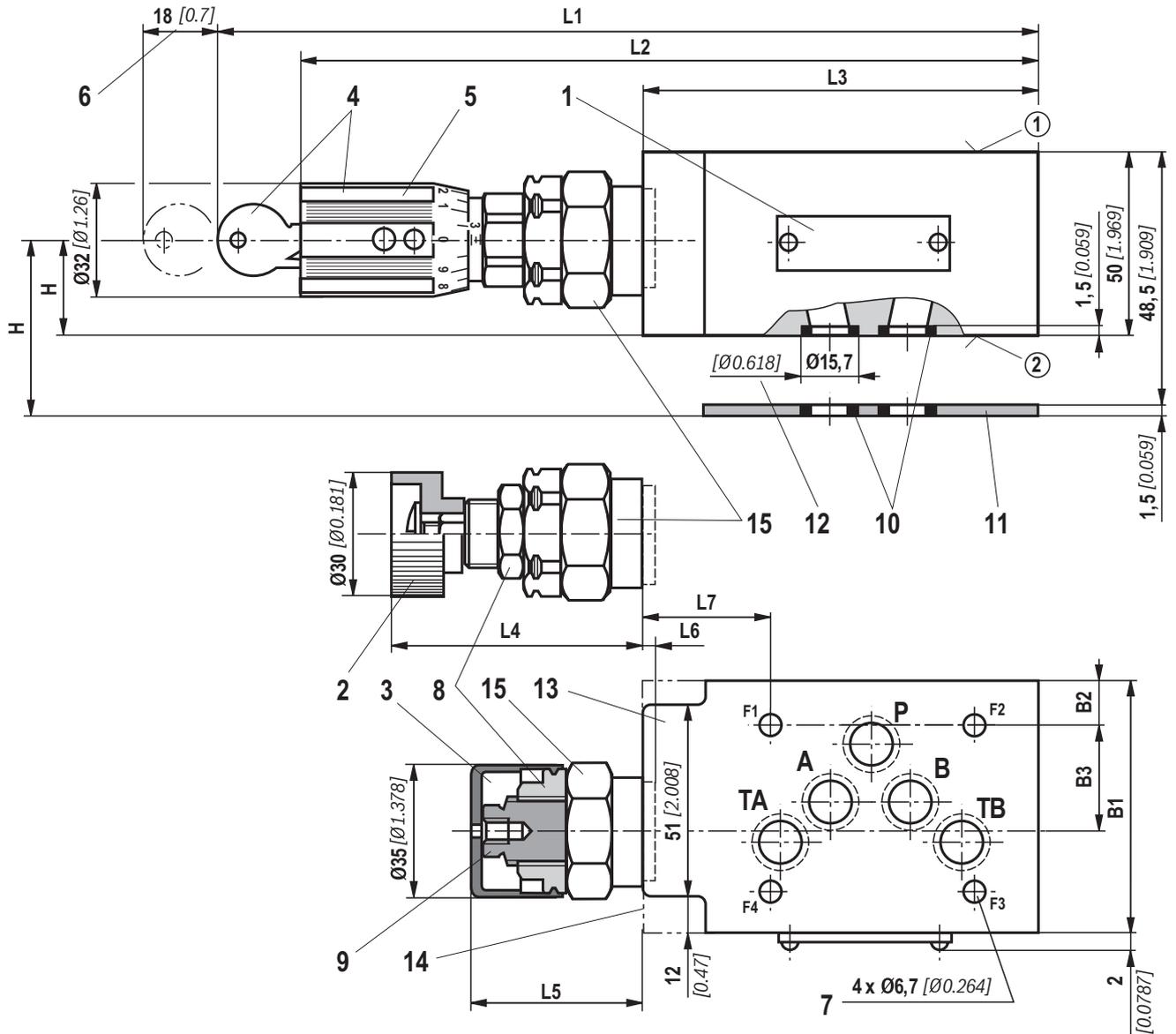


Notice:

The characteristic curves apply to the pressure at the valve output $p = 0$ bar across the entire flow range.

- 1 VD (A to B)
- 2 VA
- 3 VB, VC, VT
- 4 VP, VD (B to A)

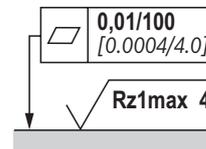
Dimensions: Type ZDB 10 VA, VP and VT
(dimensions in mm [inch])



Item explanations and valve mounting screws see page 10.

Notes:

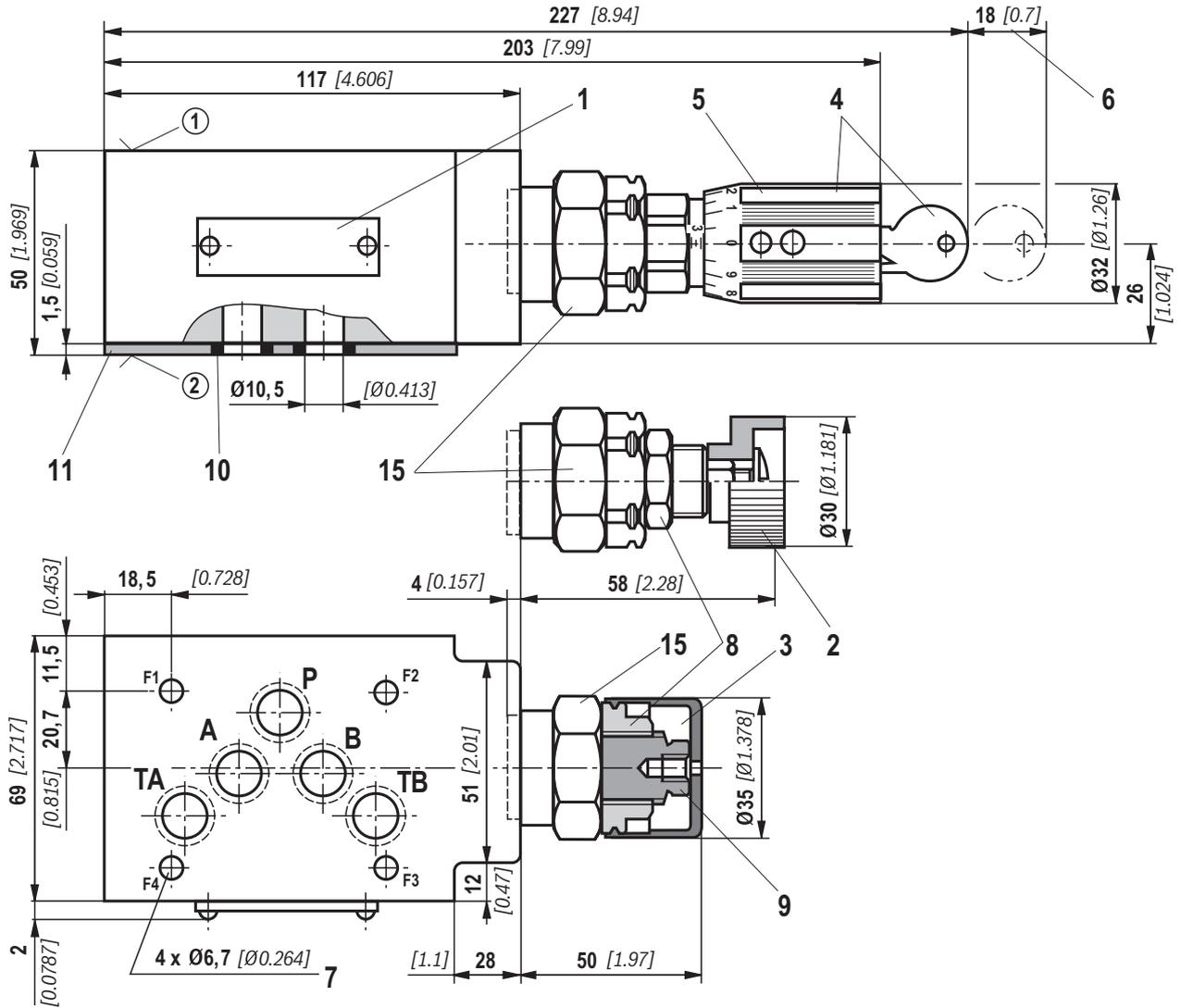
- ▶ To port X and Y bored according to ISO 4401-05-05-0-05 (e.g. for pilot-operated directional valve NG10), version "SO30" applies at the end of the ordering code.
- ▶ Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.



Required surface quality of the valve contact surface

Type	B1	B2	B3	H	L1	L2	L3	L4	L5	L6	L7
VA, VP	69 [2.72]	11.5 [0.45]	20.7 [0.82]	26 [1.02]	227 [8.94]	203 [7.99]	117 [4.61]	57.6 [2.27]	50.3 [1.98]	4 [0.16]	45.5 [1.79]
VT	70 [2.76]	12 [0.47]	27 [1.06]	25 [0.98]	218 [8.58]	194 [7.64]	105 [4.13]	60.9 [2.40]	53.6 [2.11]	0.7 [0,027]	32.5 [1.28]

Dimensions: Type ZDB 10 VB
(dimensions in mm [inch])



Item explanations and valve mounting screws see page 10.

Notes:

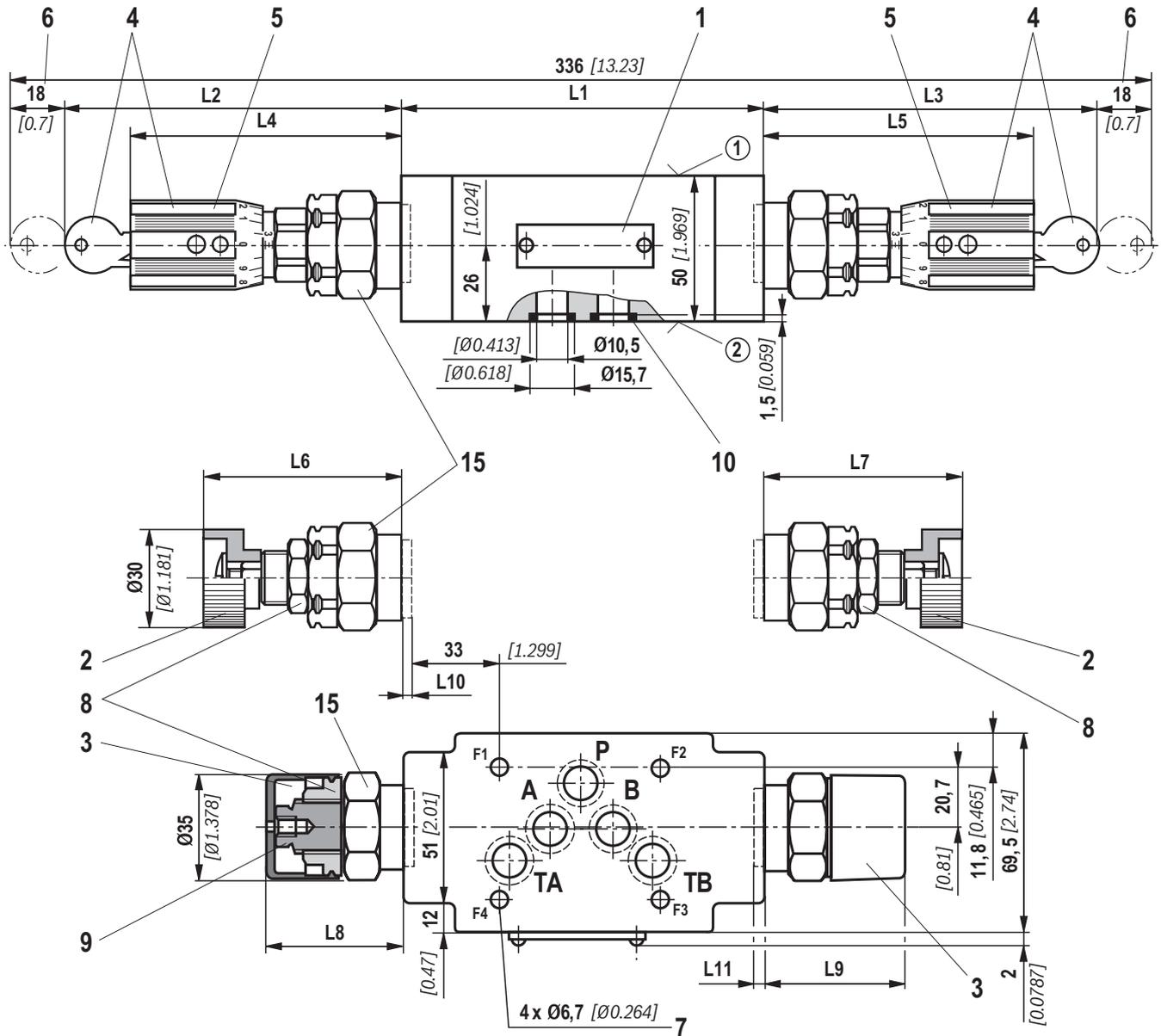
- ▶ To port X and Y bored according to ISO 4401-05-05-0-05 (e.g. for pilot-operated directional valve NG10), version "SO30" applies at the end of the ordering code.
- ▶ Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.

0,01/100
[0.0004/4.0]

Rz1max 4

Required surface quality of the valve contact surface

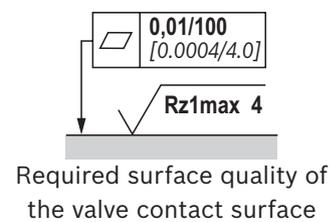
Dimensions: Type ZDB 10 VC and VD
(dimensions in mm [inch])



Item explanations and valve mounting screws see page 10.

Notes:

- ▶ To port X and Y bored according to ISO 4401-05-05-0-05 (e.g. for pilot-operated directional valve NG10), version "SO30" applies at the end of the ordering code.
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Type	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
VC	123 [4.84]	111 [4.37]	112 [4.40]	89 [3.50]	90 [3.54]	59 [2.32]	60 [2.36]	52 [2.05]	53 [2.09]	2 [0.08]	1 [0.04]
VD	132 [5.20]	107 [4.20]	112 [4.40]	85 [3.30]	90 [3.54]	56 [2.20]	56 [2.20]	49 [1.93]	49 [1.93]	6 [0.24]	6 [0.24]

Dimensions

- 1 Name plate
 - 2 Adjustment type "1"
 - 3 Adjustment type "2" (with version "J3" and "J5" without protective cap)
 - 4 Adjustment type "3"
 - 5 Adjustment type "7"
 - 6 Dimensions required to remove the key
 - 7 Valve mounting bores
 - 8 Lock nut SW24, tightening torque $M_A = 10^{+5}$ Nm
 - 9 Hexagon SW10
 - 10 Identical seal rings for ports A, B, P, TA, TB (plate side)
 - 11 Sealing plate 80 x 70 x 1.5 [2.76 x 3.15 x 0.06] (only with version "VA" and "VP")
 - 12 Countersinks (only with version "VT")
 - 13 Versions "VA" and "VP"
 - 14 Version "VT"
 - 15 Hexagon SW30, tightening torque $M_A = 50$ Nm [36.8 ft-lbs]
- ① component side – porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05
 - ② plate side – porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05

Valve mounting screws (separate order)

- ▶ Version "J3"
 - 4 hexagon socket head cap screws**
 - ISO 4762 - M6 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B**
 - friction coefficient $\mu_{total} = 0.09 \dots 0.14$
- ▶ Version "J5"
 - 4 hexagon socket head cap screws**
 - ISO 4762 - M6 - 10.9-CM-Fe-ZnNi-8-Cn-T0-H-B**
 - friction coefficient $\mu_{total} = 0.09 \dots 0.14$
- ▶ Without corrosion protection
 - 4 hexagon socket head cap screws**
 - ISO 4762 - M6 - 10.9**
 - with friction coefficient $\mu_{total} = 0.12 \dots 0.17$



Notice:

Length and tightening torque of the valve mounting screws must be calculated according to the components mounted under and over the sandwich plate valve.

Accessories (separate order)

Denomination	Material no.
Protective cap	R900135501

Further information

- ▶ Pressure relief valve, pilot-operated
- ▶ Hydraulic fluids on mineral oil basis
- ▶ Environmentally compatible hydraulic fluids
- ▶ Flame-resistant, water-free hydraulic fluids
- ▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC)
- ▶ Use of non-electrical hydraulic components in an explosive environment (ATEX)
- ▶ Hydraulic valves for industrial applications
- ▶ Selection of the filters

Data sheet 25731
 Data sheet 90220
 Data sheet 90221
 Data sheet 90222
 Data sheet 90223
 Data sheet 07011
 Operating instructions 07600-B
www.boschrexroth.com/filter

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

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Notes

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

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