

Pressure reducing valve, pilot operated

Type ZDR

RE 26861

Version: 2013-02

Replaces: 02.03



- ▶ Size 10
- ▶ Component series 3X
- ▶ Maximum operating pressure 315 bar
- ▶ Maximum flow 100 l/min

Features

- ▶ Sandwich plate valve
- ▶ Porting pattern according to ISO 4401-05-04-0-05
- ▶ 4 pressure ratings
- ▶ 4 adjustment types, optionally:
 - Rotary knob
 - Bushing with hexagon and protective cap
 - Lockable rotary knob with scale
 - Rotary knob with scale
- ▶ Check valve, optional (version "A" and "B")
- ▶ Pressure gauge connection

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Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13
Z	DR	10	V			-	3X	/		Y		*

01	Sandwich plate valve	Z
02	Pressure reducing valve	DR
03	Size 10	10
04	Pilot operated	V

Pressure reduction

05	In channel A2	A
	In channel B2	B
	In channel P1	P

Adjustment type

06	Rotary knob	4
	Bushing with hexagon and protective cap	5
	Lockable rotary knob with scale	6 ¹⁾
	Rotary knob with scale	7
07	Component series 30 ... 39 (30 ... 39: Unchanged installation and connection dimensions)	3X

Secondary pressure

08	Up to 50 bar	50
	Up to 100 bar	100
	Up to 200 bar	200
	Up to 315 bar	315
09	Pilot oil supply internal, pilot oil return external	Y
10	With check valve (only version "A" and "B")	no code
	Without check valve	M


Seal material

11	NBR seals	no code
	FKM seals	V
	Attention: Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	

Connection thread

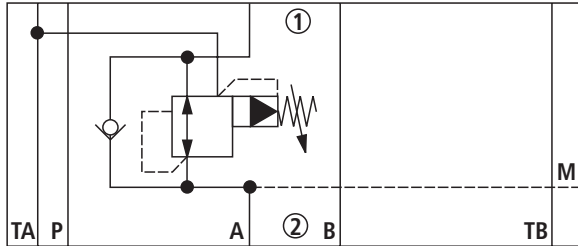
12	Pipe thread according to ISO 228/1	no code
	SAE thread	12
13	Further details in the plain text	

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

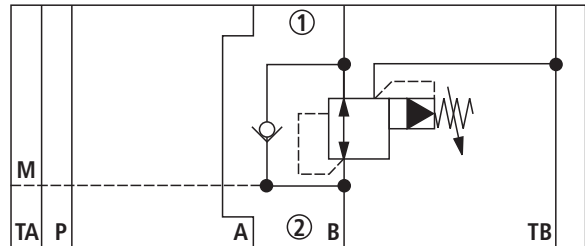
 **Notice!** Preferred types and standard units are contained in the EPS (standard price list).

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

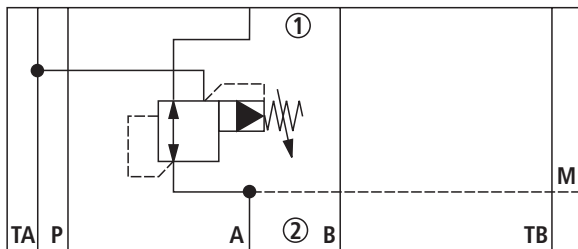
Pressure reduction in channel A② ("A")



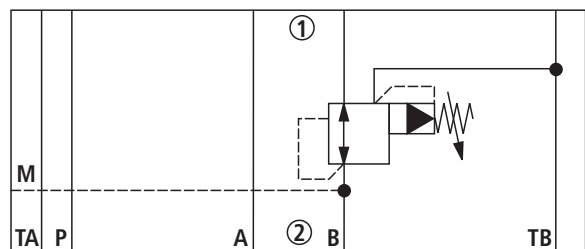
Pressure reduction in channel B② ("B")



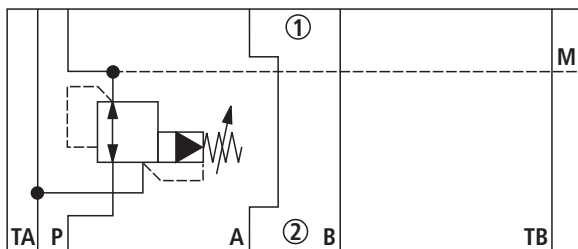
Pressure reduction in channel A② ("A...M")



Pressure reduction in channel B② ("B...M")



Pressure reduction in channel P① ("P...M")



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 ZDR 10 V are pilot operated pressure reducing valves in sandwich plate design. They are used for reducing a system pressure.

The pressure valves basically consist of pilot control valve (1) and housing (2). The secondary pressure is set via the adjustment type (4).

Pressure reduction in channel P① ("P")

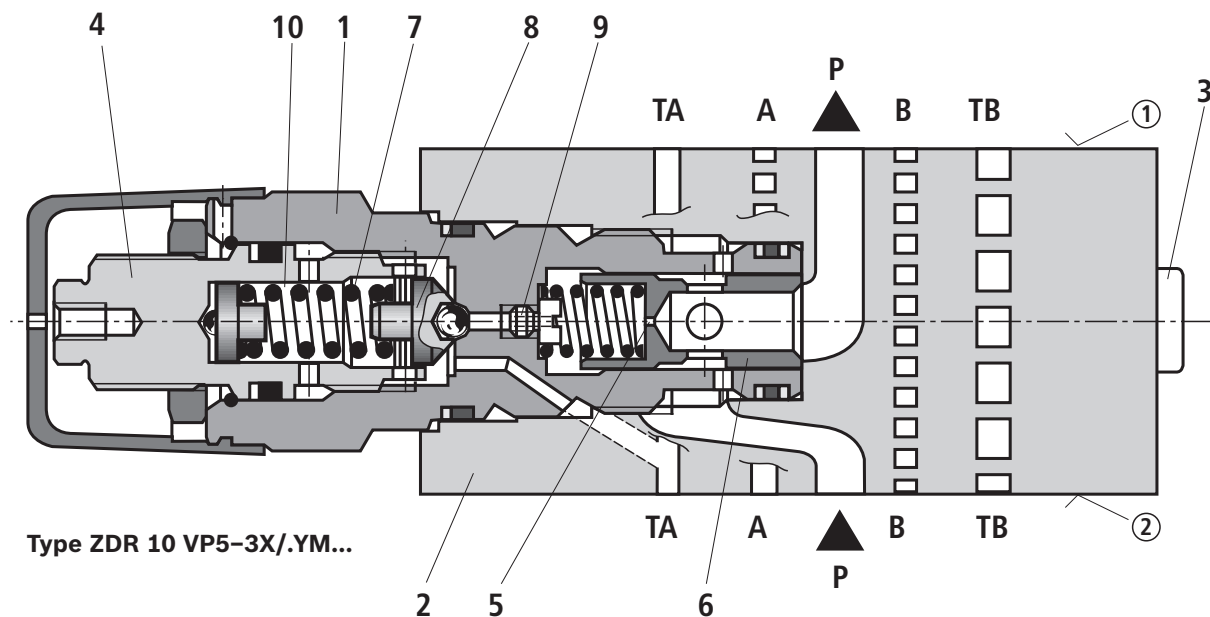
In the initial position the valves are open. Hydraulic fluid can flow from channel P② to channel P① without restrictions. The pressure in channel P① acts simultaneously at the main spool (6), via the bore (5) at the spring-loaded inside of the main spool (6) and via the nozzle (9) on the pilot poppet (8).

If the pressure in channel P② exceeds the value set at the compression spring (7), the pilot poppet (8) opens. Hydraulic fluid flows from the spring-loaded inside of the main spool (6) via the nozzle (9) and the pilot poppet (8) into the spring chamber (10). The main spool (6) assumes its control position and keeps the value in channel P① set at the compression spring (7) constant. The pilot oil return from the spring chamber (10) is effected via port TA.

Pressure reduction in channel A② and B② ("A" and "B")

For free flow back from channel A② to A① / B② to B①, a check valve can be installed as option (not possible with version "P").

A pressure gauge connection (3) allows for the control of the secondary pressure.



- ① = component side
- ② = plate side

Technical data

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

general			
Weight	– Version "A" and "P"	kg	Approx. 2.3
	– Version "B"	kg	Approx. 2.7
Ambient and storage temperature range		°C	–30 ... +80 (NBR seals) –20 ... +80 (FKM seals)

hydraulic			
Maximum set pressure		bar	50; 100; 200; 315
Maximum inlet pressure	– Port A①, B①, P②	bar	315
Maximum secondary pressure	– Port A②, B②, P①	bar	315
Maximum counter pressure	– Port TA, TB	bar	160
Maximum flow		l/min	100
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–30 ... +80 (NBR seals)
			–20 ... +80 (FKM seals)
Viscosity range		mm²/s	10 ... 800
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾

Hydraulic fluid		Classification	Suitable seal materials	Standards
Mineral oils		HL, HLP	NBR, FKM	DIN 51524
Bio-degradable	– insoluble in water	HETG	NBR, FKM	VDMA 24568
		HEES	FKM	
	– soluble in water	HEPG	FKM	VDMA 24568
		HFDU	FKM	
Flame-resistant	– water-free	HFDU	FKM	ISO 12922
	– containing water	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	NBR	ISO 12922

**Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

► Flame-resistant – containing water:

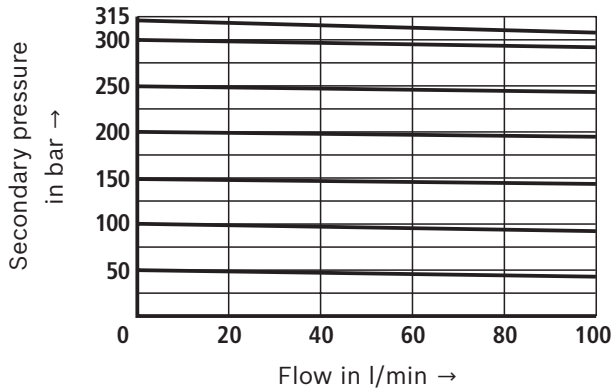
- Maximum pressure differential per control edge 210 bar, otherwise, increased cavitation
- Life cycle as compared to operation with mineral oil HL, HLP 30 to 100 %
- Maximum hydraulic fluid temperature 60 °C

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.

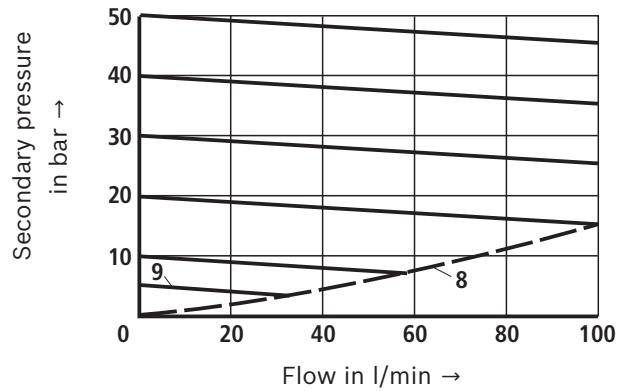
Characteristic curves

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

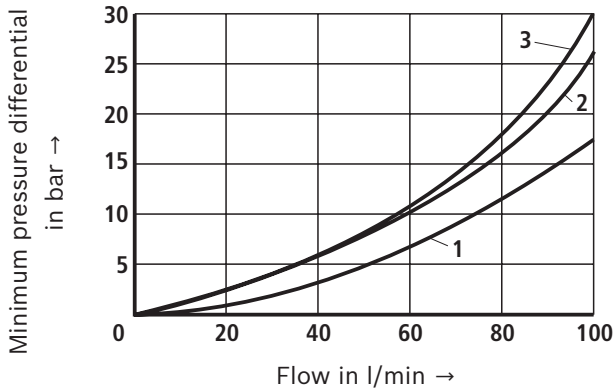
p_A - q_V characteristic curves



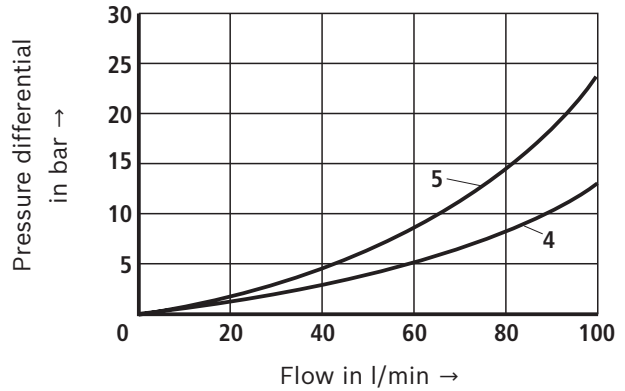
p_A - q_V characteristic curves (up to 50 bar)



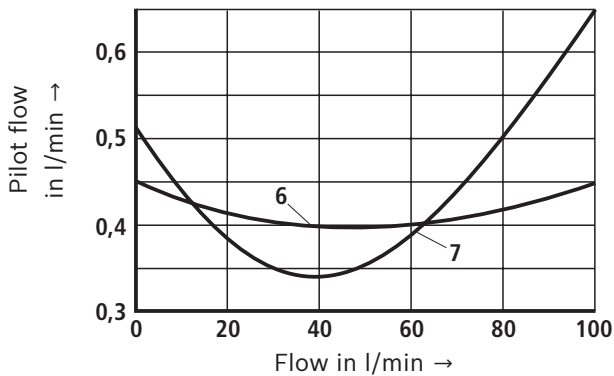
Δp_{min} - q_V characteristic curves



Δp - q_V characteristic curves

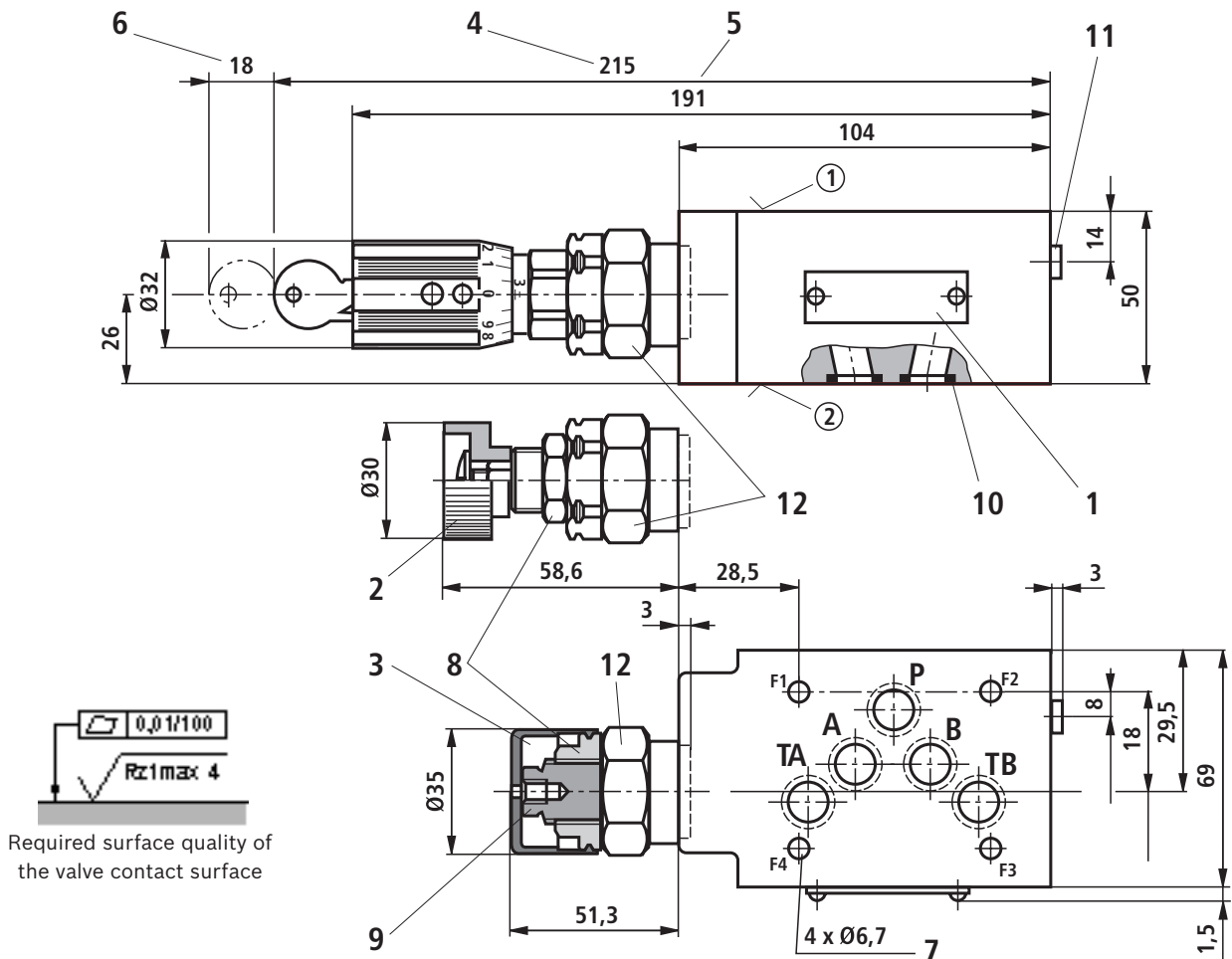


q_{VS} - q_V characteristic curves with Δp ($p_E - p_A$)



- 1 P② to P① (version "P")
- 2 A① to A② (version "A")
- 3 B① to B② (version "B")
- 4 A② to A① (version "A")
- 5 B② to B① (version "B")
- 6 $\Delta p = 50 \text{ bar}$
- 7 $\Delta p = 250 \text{ bar}$
- 8 Actuator resistance system-dependent
- 9 Lowest adjustable secondary pressure p_A for all pressure ratings

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



- ① Plate side – porting pattern according to ISO 4401-05-04-0-05
- ② Component side – porting pattern according to ISO 4401-05-04-0-05

- 1 Name plate
- 2 Adjustment type "4"
- 3 Adjustment type "5"
- 4 Adjustment type "6"
- 5 Adjustment type "7"
- 6 Dimensions required to remove the key
- 7 Valve mounting bores
- 8 Lock nut SW24
- 9 Hexagon SW10
- 10 Identical seal rings for ports A②, B②, P②, TA②, TB② (plate side)
- 11 Pressure gauge connection G1/8; 8.5 deep; internal hexagon SW5
- 12 Hexagon SW30, tightening torque $M_A = 50 \text{ Nm}$

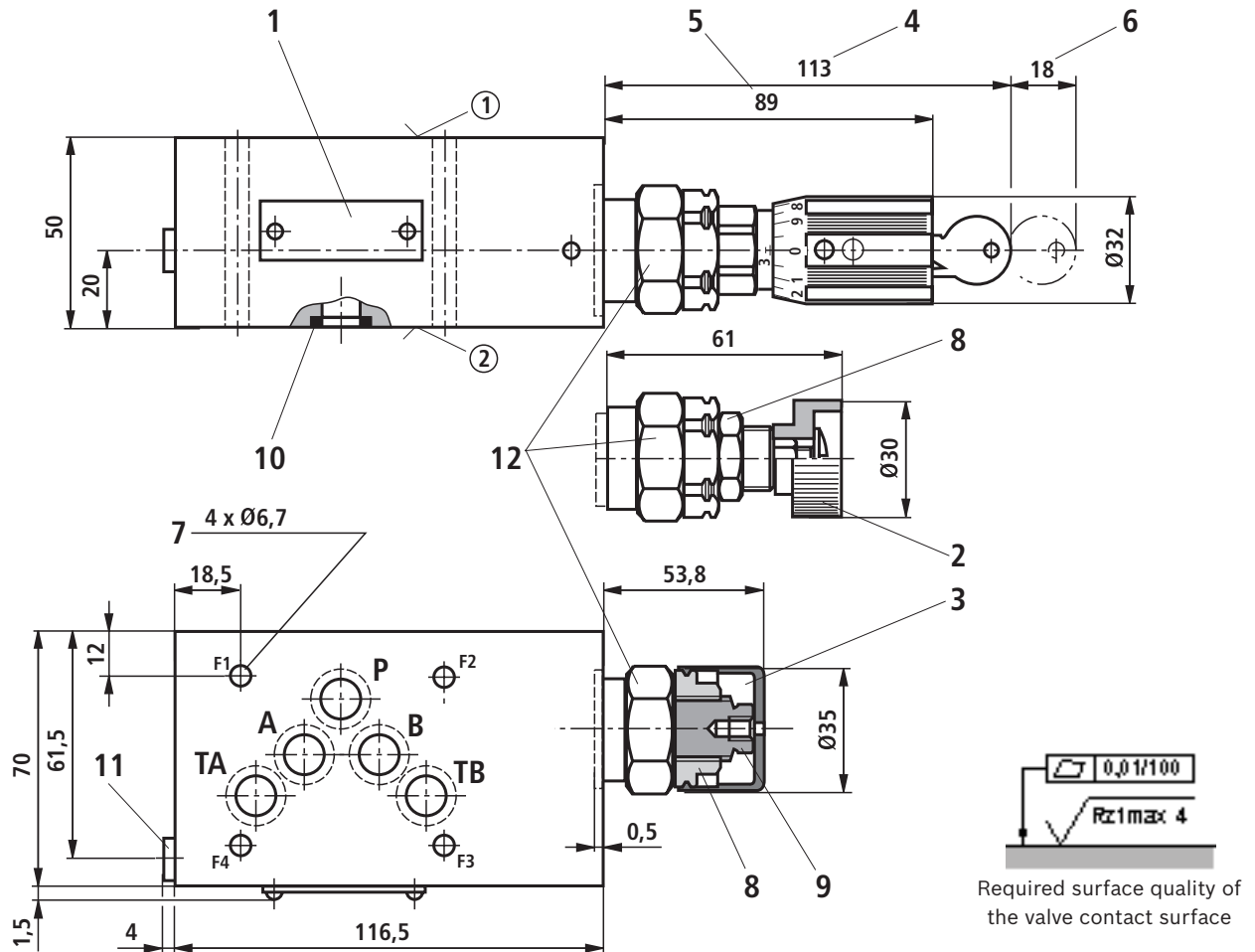
Valve mounting screws (separate order)

4 hexagon socket head cap screws ISO 4762 - M6 - 10.9-fIZn-240h-L

Friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14 ,
tightening torque $M_A = 12 \text{ Nm} \pm 10 \%$

Notice!

- Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.
- Bored for port X and Y (e. g. for pilot operated directional valve size 10), version **SO30** is applicable!
- The device dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Version "B"
 (dimensions in mm)


- ① Plate side – porting pattern according to ISO 4401-05-04-0-05
 ② Component side – porting pattern according to ISO 4401-05-04-0-05

- 1 Name plate
 2 Adjustment type "4"
 3 Adjustment type "5"
 4 Adjustment type "6"
 5 Adjustment type "7"
 6 Dimensions required to remove the key
 7 Valve mounting bores
 8 Lock nut SW24
 9 Hexagon SW10
 10 Identical seal rings for ports A②, B②, P②, TA②, TB② (plate side)
 11 Pressure gauge connection G1/8; 8.5 deep; internal hexagon SW5
 12 Hexagon SW30, tightening torque $M_A = 50 \text{ Nm}$

Valve mounting screws (separate order)

4 hexagon socket head cap screws ISO 4762 - M6 - 10.9-fIZn-240h-L

Friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14 ,
 tightening torque $M_A = 12 \text{ Nm} \pm 10 \%$

Notice!

- ▶ Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.
- ▶ Bored for port X and Y (e. g. for pilot operated directional valve size 10), version **SO30** is applicable!
- ▶ The device dimensions are nominal dimensions which are subject to tolerances.

More information

- | | |
|--|------------------|
| ▶ Subplates | Data sheet 45054 |
| ▶ Hydraulic fluids on mineral oil basis | Data sheet 90220 |
| ▶ Reliability characteristics according to EN ISO 13849 | Data sheet 08012 |
| ▶ General product information on hydraulic products | Data sheet 07008 |
| ▶ Installation, commissioning and maintenance of industrial valves | Data sheet 07300 |
| ▶ Selection of the filters | |