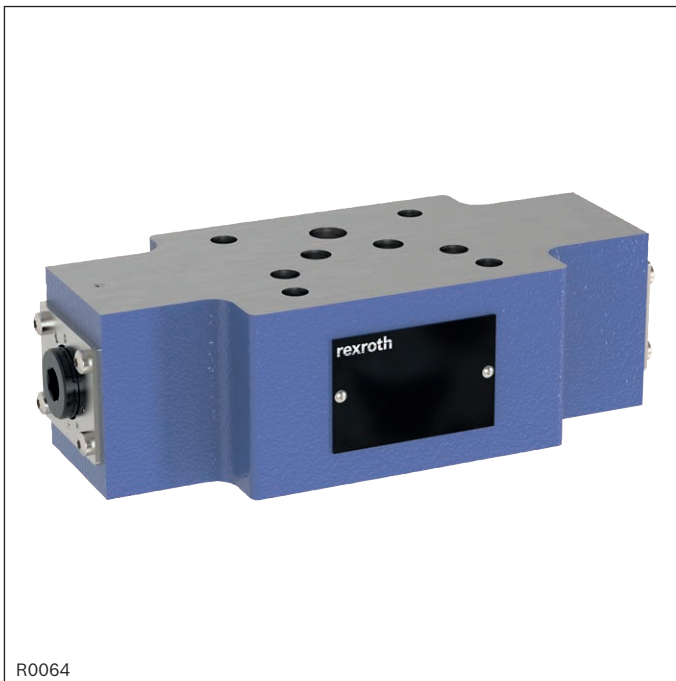


Throttle check valve

Type Z2FS



- ▶ Size 10
- ▶ Component series 3X
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 160 l/min

Features

- ▶ Sandwich plate design
- ▶ For use in vertical stackings
- ▶ Porting pattern according to ISO 4401-05-04-0-05
- ▶ For the main or pilot flow limitation of 2 actuator ports.
- ▶ 2 adjustment types, optional:
 - Lockable rotary knob with scale
 - Spindle with internal hexagon and scale
- ▶ For supply or discharge throttling
- ▶ Corrosion-protected design, optional

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Ordering code

01	02	03	04	05	06	07	08	09	10
Z2FS	10			-	3X	/			*

01	Twin throttle check valve, sandwich plate design	Z2FS
02	Size 10	10
03	Throttle check valve side A and B	- 1)
	Throttle check valve side A	A
	Throttle check valve side B	B

Adjustment type

04	Lockable rotary knob with scale	3 ²⁾
	Spindle with internal hexagon and scale	5
05	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	3X
06	With two throttle check valves, supply or discharge throttling (the valve can be rotated)	no code
	Supply throttling on side A (version "A...S")	S
	Supply throttling on side B (version "B...S")	
	Discharge throttling on side A (version "A...S2")	S2
	Discharge throttling on side B (version "B...S2")	

Corrosion resistance

07	None	no code
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227); (only version "5" without scale)	J3

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

08	NBR seals	M
	FKM seals	V

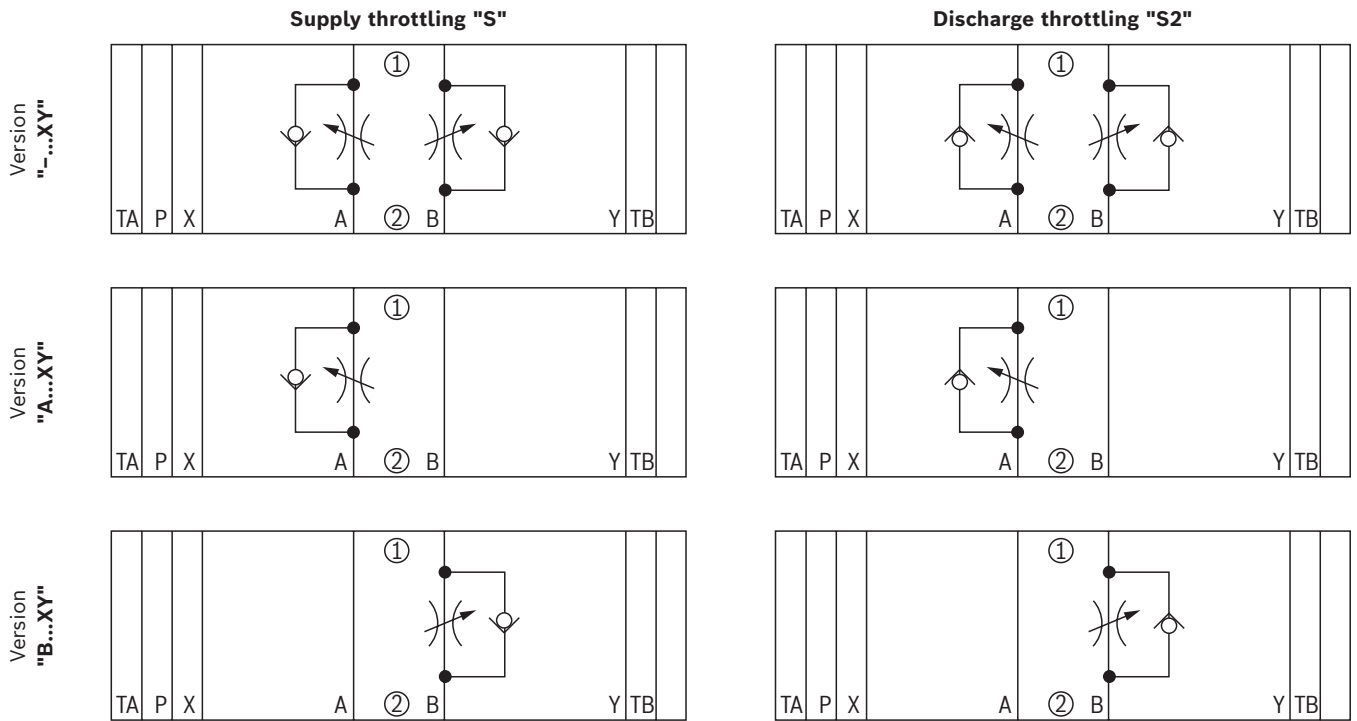
Pilot oil duct

09	None	no code
	Via channel X and Y	XY
10	Further details in the plain text	

1) Identical adjustment types on sides A and B

2) H-key with material no. **R900008158** is included in the scope of delivery.**Notice:** ◇ = Preferred type

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



Notice:

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

Function, section

The valve type Z2FS 10 is a throttle check valve in sandwich plate design. It is used for the main or pilot flow limitation of one or two actuator ports.

Two throttle check valves aligned symmetrically to each other limit flows in one direction and allow free return flow in the opposite direction.

In case of supply throttling, the hydraulic fluid is directed through channel A① via throttling point (1) formed by the control edge (2) and the throttle spool (3.1) to actuator A②. The throttle spool (3.1) can be axially adjusted via the spindle (4) for adjustment of the throttling point (1). Simultaneously, the hydraulic fluid in channel A① is directed via the bore (5) to the piston side (6). The active pressure and the spring force retain the throttle spool (3.1) in throttle position.

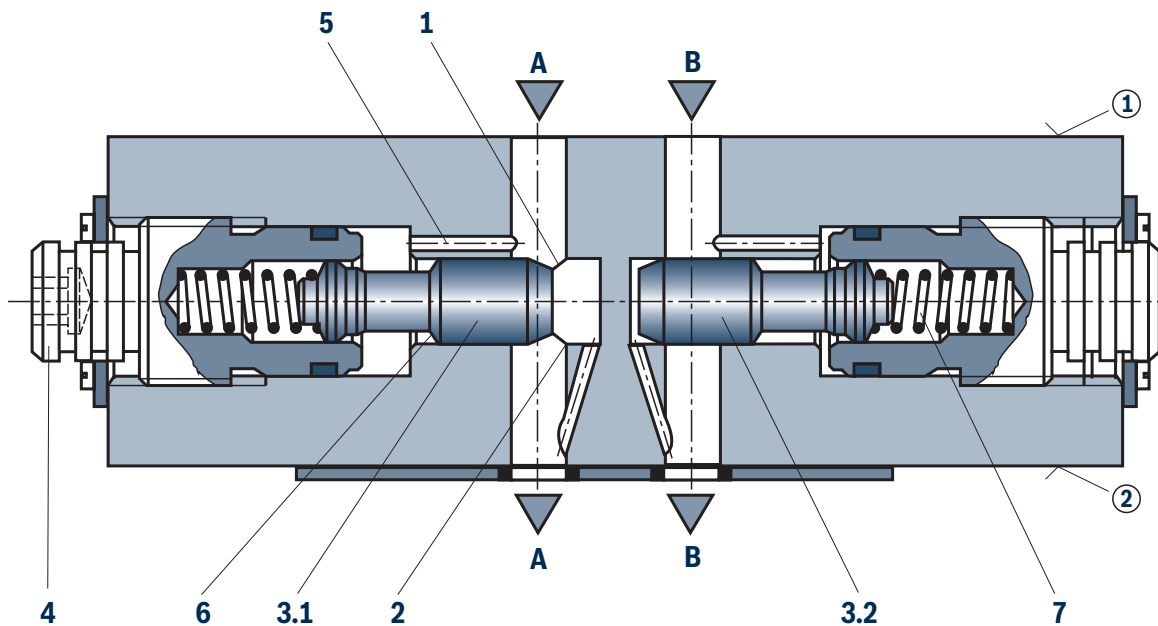
The hydraulic fluid return flow from actuator B② displaces the throttle spool (3.2) against the spring (7) and enables the unobstructed flow as check valve. Depending on the installation position, the throttling effect may occur in supply or discharge.

Main flow limitation

For actuator velocity adjustment (main flow limitation), the throttle check valve is installed between the directional valve and the subplate.

Pilot flow limitation

With pilot-operated directional valves, the throttle check valve can be applied for switching time adjustment (pilot flow limitation). In this case, it is installed between the pilot control valve and the main valve.



Supply throttling

Technical data

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

general		
Type of connection		Sandwich plate design
Porting pattern		ISO 4401-05-04-0-05
Weight	kg	Approx. 3.1
Installation position		Any
Ambient temperature range	°C	-20 ... +80 (NBR seals) -15 ... +80 (FKM seals)
MTTF _D values according to EN ISO 13849	years	150 (for more information see data sheet 08012)

hydraulic		
Maximum operating pressure	bar	350
Hydraulic fluid		See table below
Hydraulic fluid temperature range	°C	-20 ... +80 (NBR seals) -15 ... +80 (FKM seals)
Viscosity range	mm ² /s	10 ... 800
Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c)		Class 20/18/15 ¹⁾
Maximum flow	l/min	160
Cracking pressure	bar	0.6

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP, HLPD, HVLP, HVLPD	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, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	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 the 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.

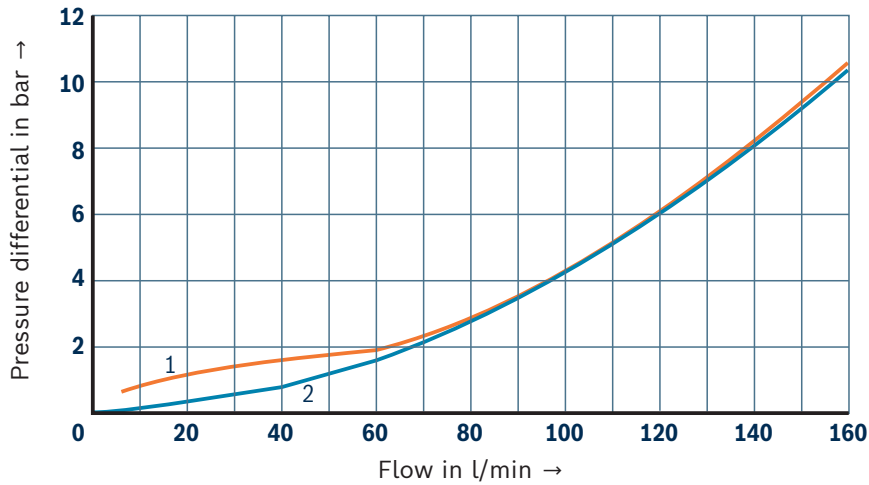
¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

²⁾ Not recommended for corrosion-protected version „J3“

Characteristic curves

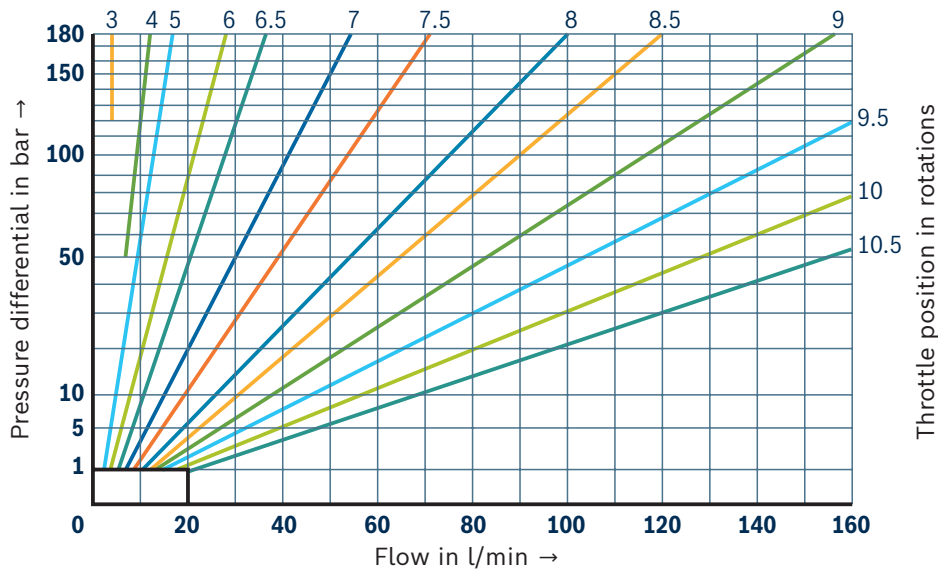
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ } ^\circ\text{C}$)

Δp - q_v characteristic curves (via check valve)



- 1 Throttle closed
- 2 Throttle open

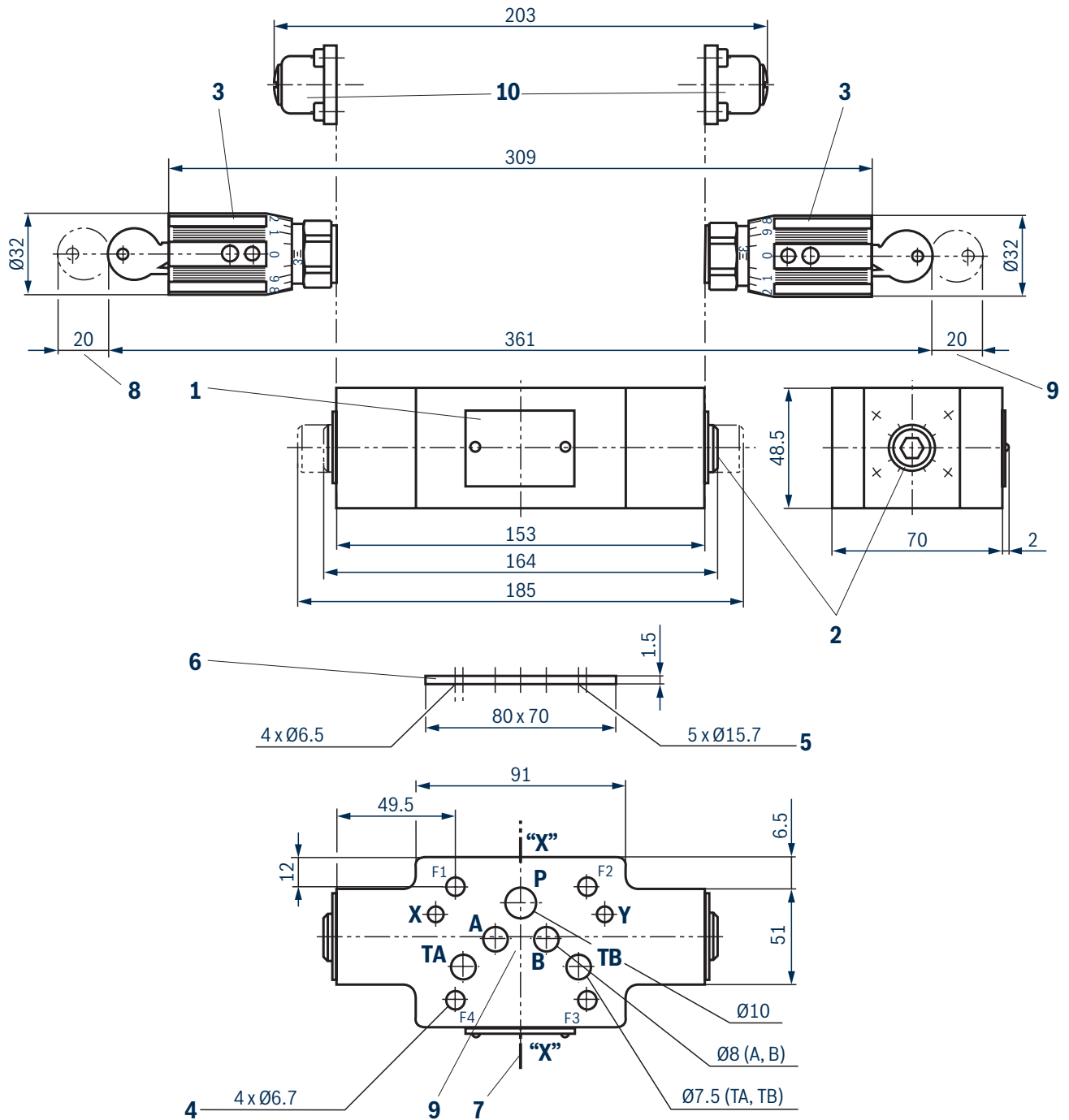
Δp - q_v characteristic curves (Throttle position constant)



Notes:

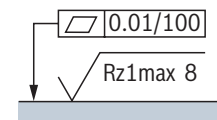
- ▶ At inlet pressure 200 bar and throttle closed, maximum Leakage 0.12 l/min.
- ▶ Typical characteristic curves which are subject to tolerance variations.

Dimensions: Version "-"
(dimensions in mm)



Notes:

- ▶ 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 „XY“ is shown. The standard version does not have ports X and Y.

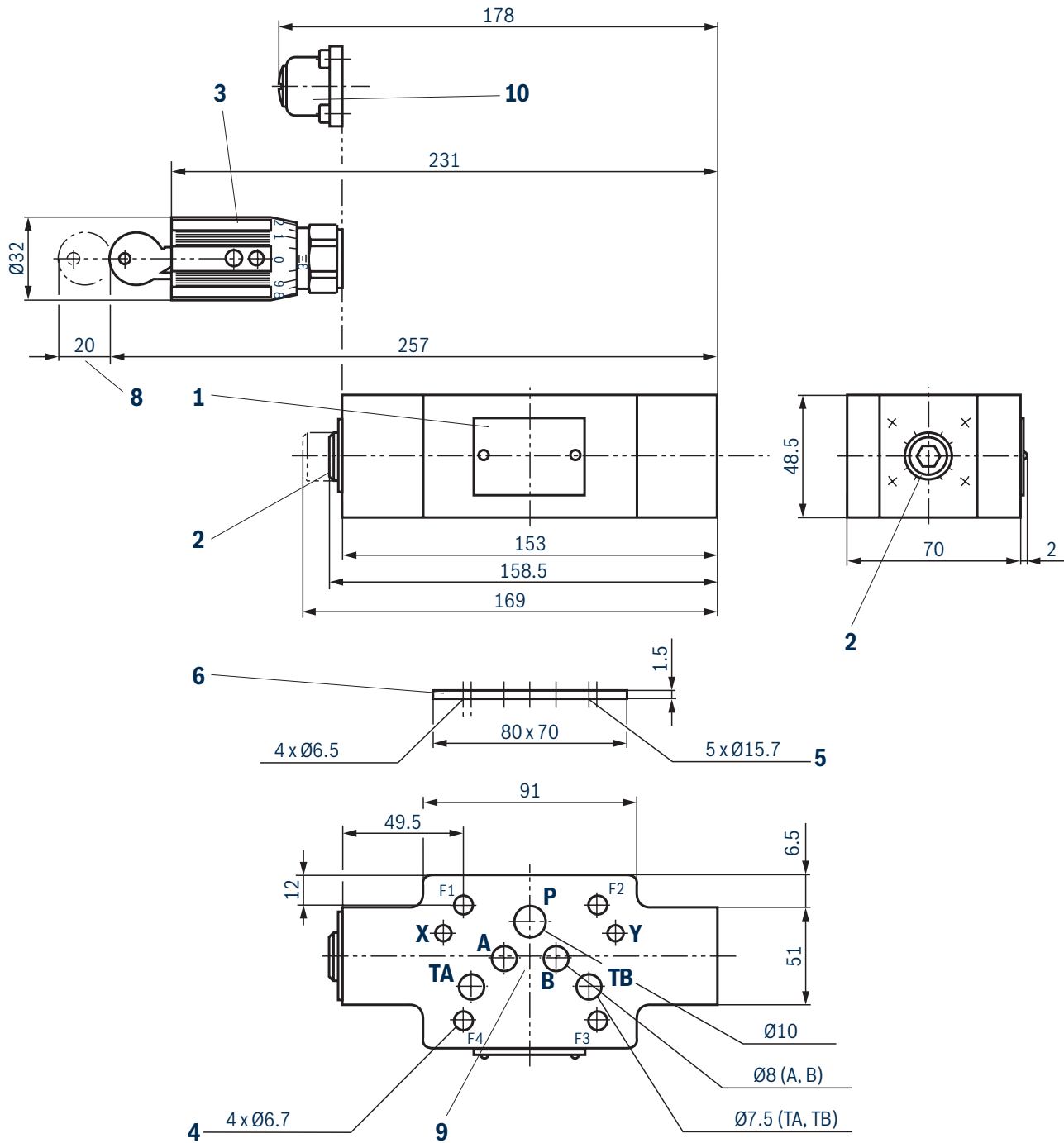


Required surface quality of the valve contact surface

Item explanations and valve mounting screws

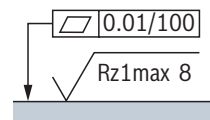
see page 10.

Dimensions: Version "A"
(dimensions in mm)



Notes:

- ▶ 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 „XY“ is shown. The standard version does not have ports X and Y.

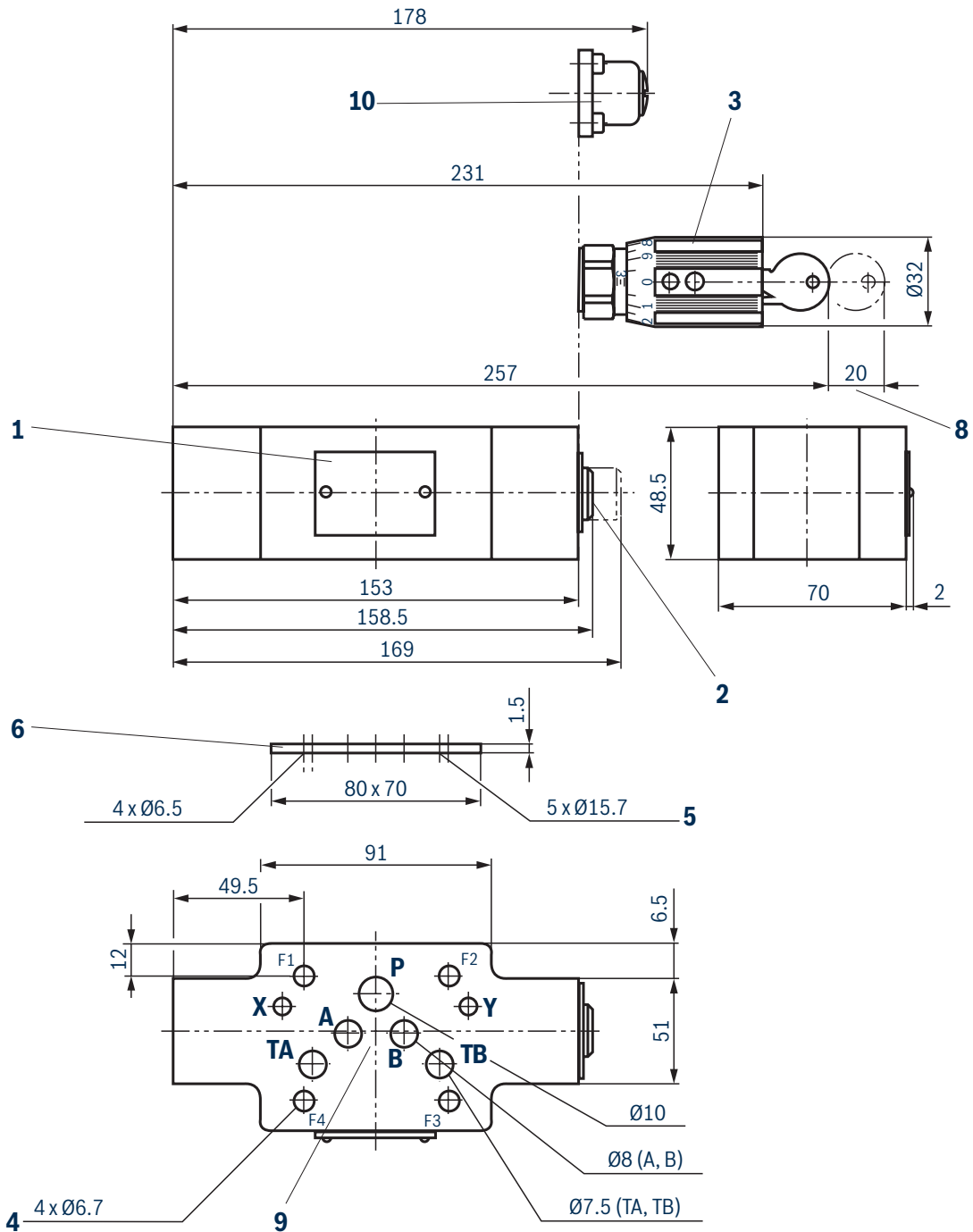


Required surface quality of the valve contact surface

Item explanations and valve mounting screws

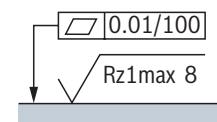
see page 10.

Dimensions: Version "B"
(dimensions in mm)



Notes:

- ▶ 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 „XY“ is shown. The standard version does not have ports X and Y.



Required surface quality of the valve contact surface

Item explanations and valve mounting screws


see page 10.

Dimensions

- 1 Name plate
- 2 Adjustment type "5" – spindle for changing the flow cross-section (internal hexagon SW8)
 - ▶ Left rotation = higher flow
 - ▶ Right rotation = lower flow
- 3 Adjustment type "3"
- 4 4 through holes for valve mounting
- 5 Identical seal rings for ports A, B, P, TA, TB
- 6 R-ring plate
- 7 Modification from supply to discharge throttling is realized by rotation of the device around axis "X"–"X" (only with version "-")
- 8 Space required to remove the key
- 9 Porting pattern according to ISO 4401-05-04-0-05
- 10 Version "J3"
To adjust the valve, disassemble the slotted screw. Further procedure see position 2 (adjustment type "5"). After setting of the valve, assemble the slotted screw.

Valve mounting screws (separate order)

4 hexagon socket head cap screws ISO 4762 - M6 - 10.9

 **Notes:**

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

Further information

- ▶ 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)
 - ▶ Reliability characteristics according to EN ISO 13849
 - ▶ Hydraulic valves for industrial applications
 - ▶ Information on available spare parts
- Data sheet 90220
Data sheet 90221
Data sheet 90222
Data sheet 90223
Data sheet 08012
Operating instructions 07600-B
www.boschrexroth.com/spc

Notes

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