

## Throttle check valve

### Type Z2FS



- ▶ Size 6
- ▶ Component series 4X
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 80 l/min

#### Features

- ▶ Sandwich plate valve for use in vertical stackings
- ▶ Porting pattern according to ISO 4401-03-02-0-05 and NFPA T3.5.1 R2-2002 D03 (**with** or **without** locating hole)
- ▶ For the main or pilot flow limitation of 2 actuator ports
- ▶ For supply or discharge throttling
- ▶ 3 adjustment types:
  - Setscrew with lock nut and protective cap
  - Lockable rotary knob with scale
  - Spindle with internal hexagon and scale
- ▶ Corrosion-protected design optional

#### Contents

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**Ordering code**

|             |          |    |    |          |           |          |    |    |          |
|-------------|----------|----|----|----------|-----------|----------|----|----|----------|
| 01          | 02       | 03 | 04 | 05       | 06        | 07       | 08 | 09 | 10       |
| <b>Z2FS</b> | <b>6</b> |    |    | <b>-</b> | <b>4X</b> | <b>/</b> |    |    | <b>*</b> |

|    |                                   |                 |
|----|-----------------------------------|-----------------|
| 01 | Throttle check valve              | <b>Z2FS</b>     |
| 02 | Size 6                            | <b>6</b>        |
| 03 | Throttle check valve side A and B | – <sup>1)</sup> |
|    | Throttle check valve side A       | <b>A</b>        |
|    | Throttle check valve side B       | <b>B</b>        |

**Adjustment type**

|    |                                                                                           |                        |
|----|-------------------------------------------------------------------------------------------|------------------------|
| 04 | Setscrew with lock nut and protective cap (versions "J3" and "J5" without protective cap) | <b>2</b>               |
|    | Lockable rotary knob with scale                                                           | <b>3</b> <sup>2)</sup> |
|    | Spindle with internal hexagon and scale                                                   | <b>5</b>               |
| 05 | Component series 40 ... 49 (40 ... 49: unchanged installation and mounting dimensions)    | <b>4X</b>              |
| 06 | <b>With</b> fine adjustment                                                               | <b>1Q</b>              |
|    | Standard version                                                                          | <b>2Q</b>              |

**Corrosion resistance** (outside)

|    |                                                                                |                         |
|----|--------------------------------------------------------------------------------|-------------------------|
| 07 | None (valve housing primed)                                                    | <b>no code</b>          |
|    | Improved corrosion protection (240 h salt spray test according to EN ISO 9227) | <b>J3</b> <sup>3)</sup> |
|    | High corrosion protection (720 h salt spray test according to EN ISO 9227)     | <b>J5</b> <sup>3)</sup> |

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

|    |                                   |                          |
|----|-----------------------------------|--------------------------|
| 08 | NBR seals                         | <b>no code</b>           |
|    | FKM seals                         | <b>V</b>                 |
| 09 | <b>Without</b> locating hole      | <b>no code</b>           |
|    | <b>With</b> locating hole         | <b>/60</b> <sup>4)</sup> |
| 10 | Further details in the plain text | <b>*</b>                 |

<sup>1)</sup> Identical adjustment types on sides A and B

<sup>2)</sup> H-key with material no. **R900008158** is included in the scope of delivery.

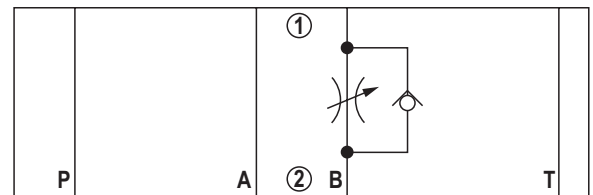
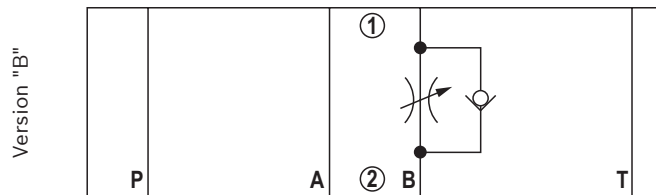
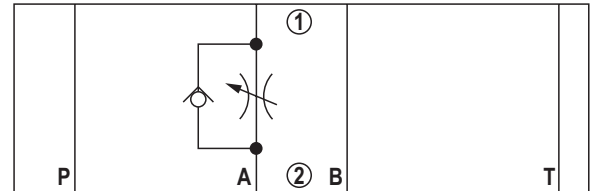
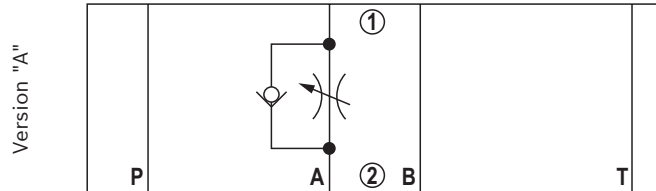
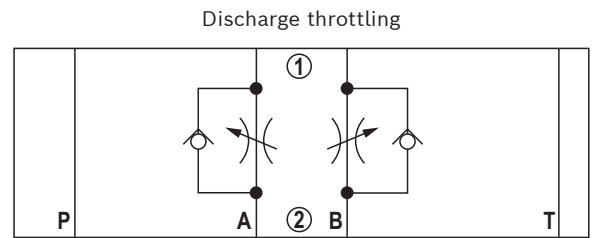
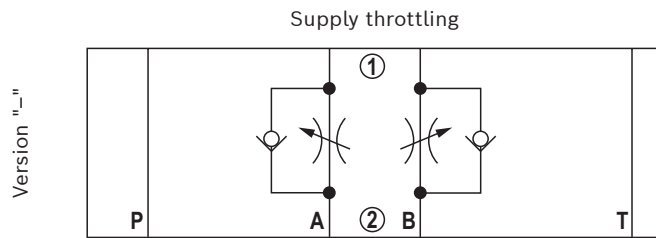
<sup>3)</sup> Only adjustment types "2" and "/60"

<sup>4)</sup> Locking pin ISO 8752-3x8-St, material no. **R90005694** (separate order)

**Notes:**

- For valve types for use in potentially explosive atmospheres, 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)



**Notice:**

Modification from supply to discharge throttling is realized by horizontal rotation of the device

## Function, section

The valve type Z2FS 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 via channel A① via throttling point (1) formed by the valve seat (2) and the throttle spool (3) to actuator A②. The throttle spool (3) can be axially adjusted via the set-screw (4) for adjustment of the throttling point (1).

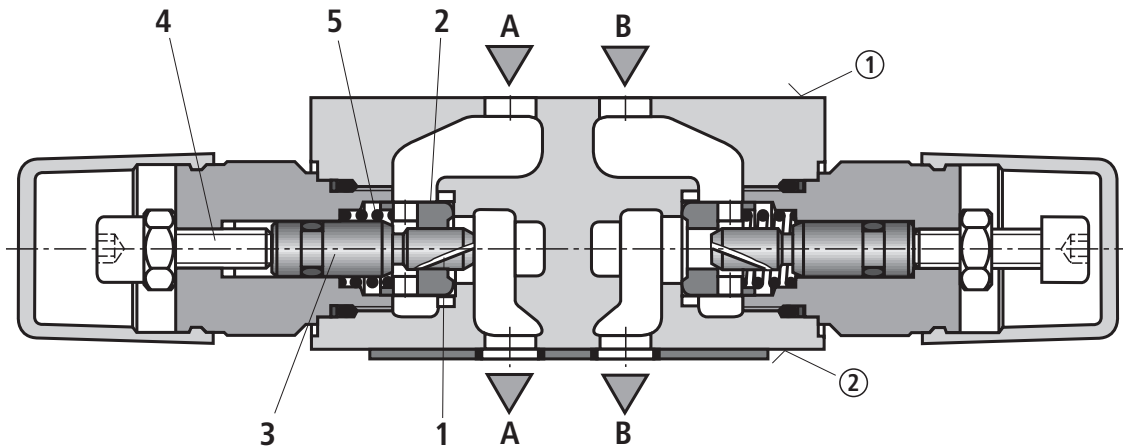
The hydraulic fluid return flow from actuator A② displaces the valve seat (2) against the spring (5) in the direction of the throttle spool (3) and enables the unobstructed flow as check valve. Depending on the installation position, the throttling effect may occur in supply or discharge.

### Main flow limitation (version "2Q")

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

### Pilot flow limitation (version "1Q")

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.



**Type Z2FS 6 -2...** (supply throttling)

① = component side

② = plate side

## Technical data

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

| General                                                                                                        |                      |                            |                                                                                                                |              |            |
|----------------------------------------------------------------------------------------------------------------|----------------------|----------------------------|----------------------------------------------------------------------------------------------------------------|--------------|------------|
|                                                                                                                |                      |                            | Z2FS6A./...Z2FS6B./...                                                                                         | Z2FS6.-./... |            |
| Weight                                                                                                         | ► Version "2"        | kg                         | 0.9                                                                                                            | 1.0          |            |
|                                                                                                                | ► Version "3"        | kg                         | 1.1                                                                                                            | 1.4          |            |
|                                                                                                                | ► Version "5"        | kg                         | 1.0                                                                                                            | 1.2          |            |
| Installation position                                                                                          |                      |                            | any                                                                                                            |              |            |
| Ambient temperature range                                                                                      |                      |                            | °C<br>–30 ... +80 (NBR seals)<br>–20 ... +80 (FKM seals)                                                       |              |            |
| Storage temperature range                                                                                      |                      |                            | see operating instructions 07600-B                                                                             |              |            |
| Hydraulic                                                                                                      |                      |                            |                                                                                                                |              |            |
| Maximum operating pressure                                                                                     |                      |                            | bar                                                                                                            | 350          |            |
| Maximum flow                                                                                                   |                      |                            | l/min                                                                                                          | 80           |            |
| Maximum leakage (at $\Delta p$ 350 bar)                                                                        |                      |                            | l/min                                                                                                          | < 1          |            |
| Hydraulic fluid                                                                                                |                      |                            | see table below                                                                                                |              |            |
| Hydraulic fluid temperature range                                                                              |                      |                            | °C<br>–30 ... +80 (NBR seals)<br>–20 ... +80 (FKM seals)                                                       |              |            |
| Viscosity range                                                                                                |                      |                            | mm <sup>2</sup> /s                                                                                             | 10 ... 800   |            |
| Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c) |                      |                            | Class 20/18/15 <sup>1)</sup>                                                                                   |              |            |
|                                                                                                                |                      |                            |                                                                                                                |              |            |
| Hydraulic fluid                                                                                                |                      | Classification             | Suitable sealing materials                                                                                     | Standards    | Data sheet |
| Mineral oils                                                                                                   |                      | HL, HLP, HLPD, HVLP, HVLDP | NBR, FKM                                                                                                       | DIN 51524    | 90220      |
| Bio-degradable                                                                                                 | ► 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)          | FKM                                                                                                            |              |            |
|                                                                                                                |                      | HFDR                       | FKM                                                                                                            |              |            |
|                                                                                                                |                      | ► Containing water         | HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046) | NBR          | ISO 12922  |



Important information on hydraulic fluids:

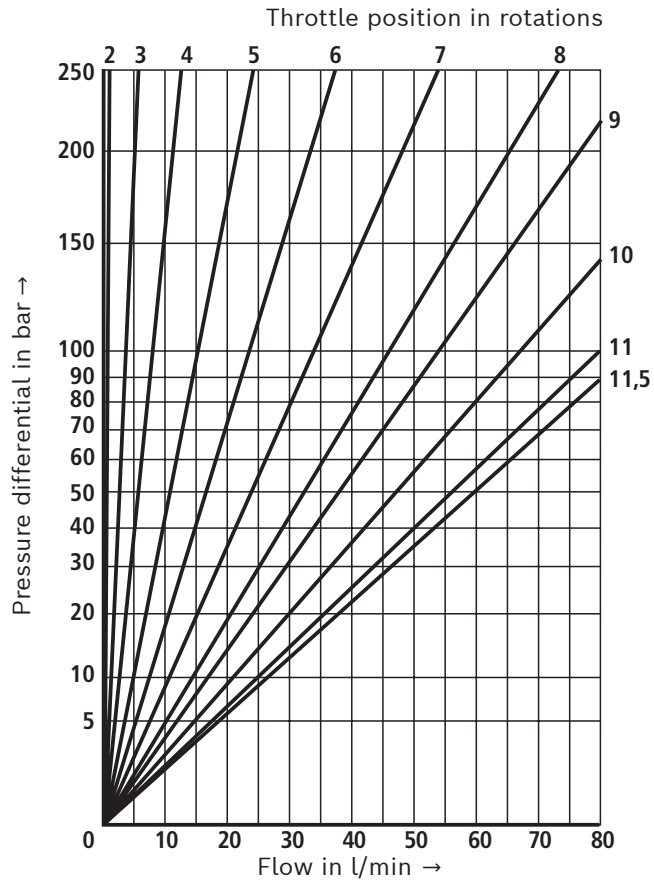
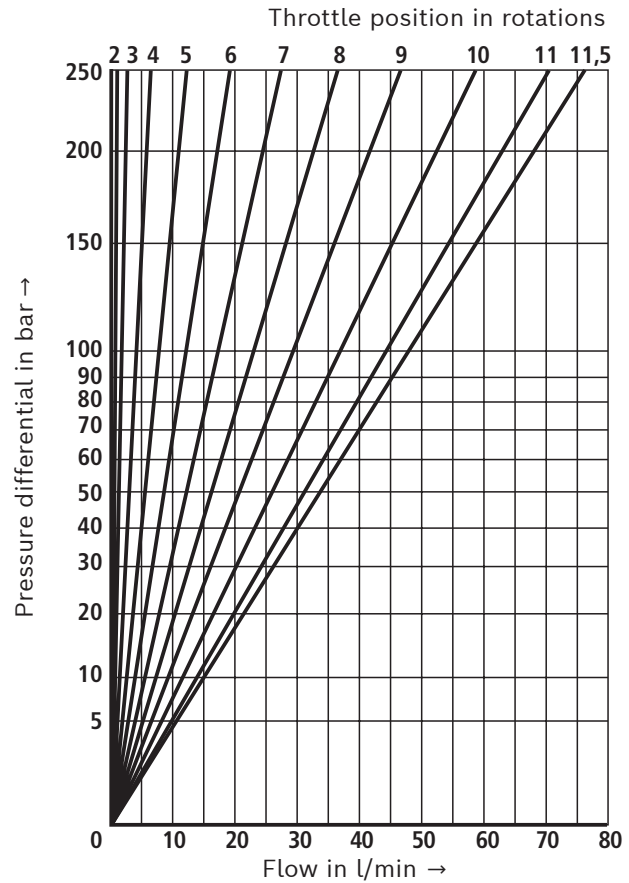
- For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- The ignition temperature of the hydraulic 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:

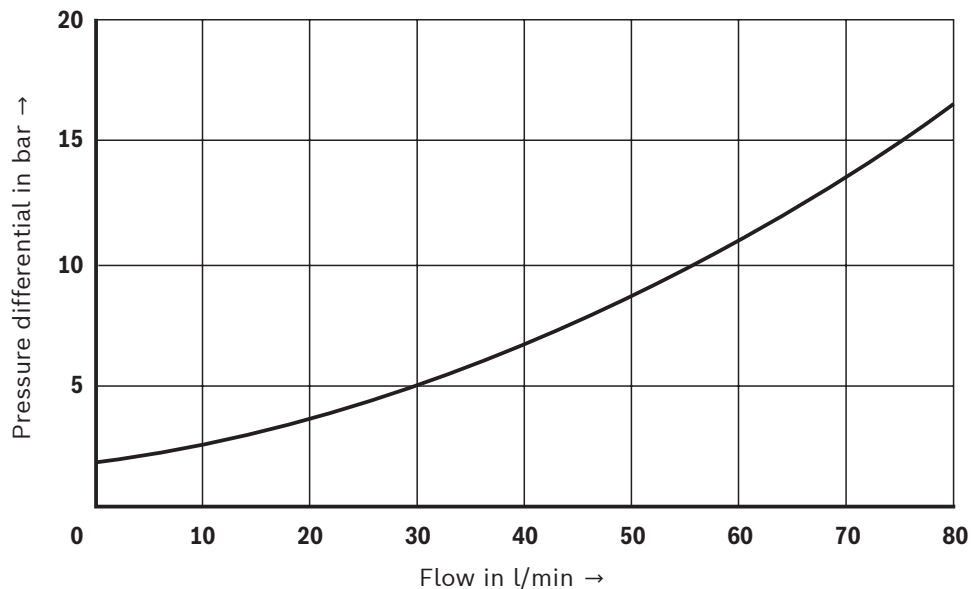
Due to the increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended - if possible specific to the installation - to back up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.

<sup>1)</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.

For the selection of filters, see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

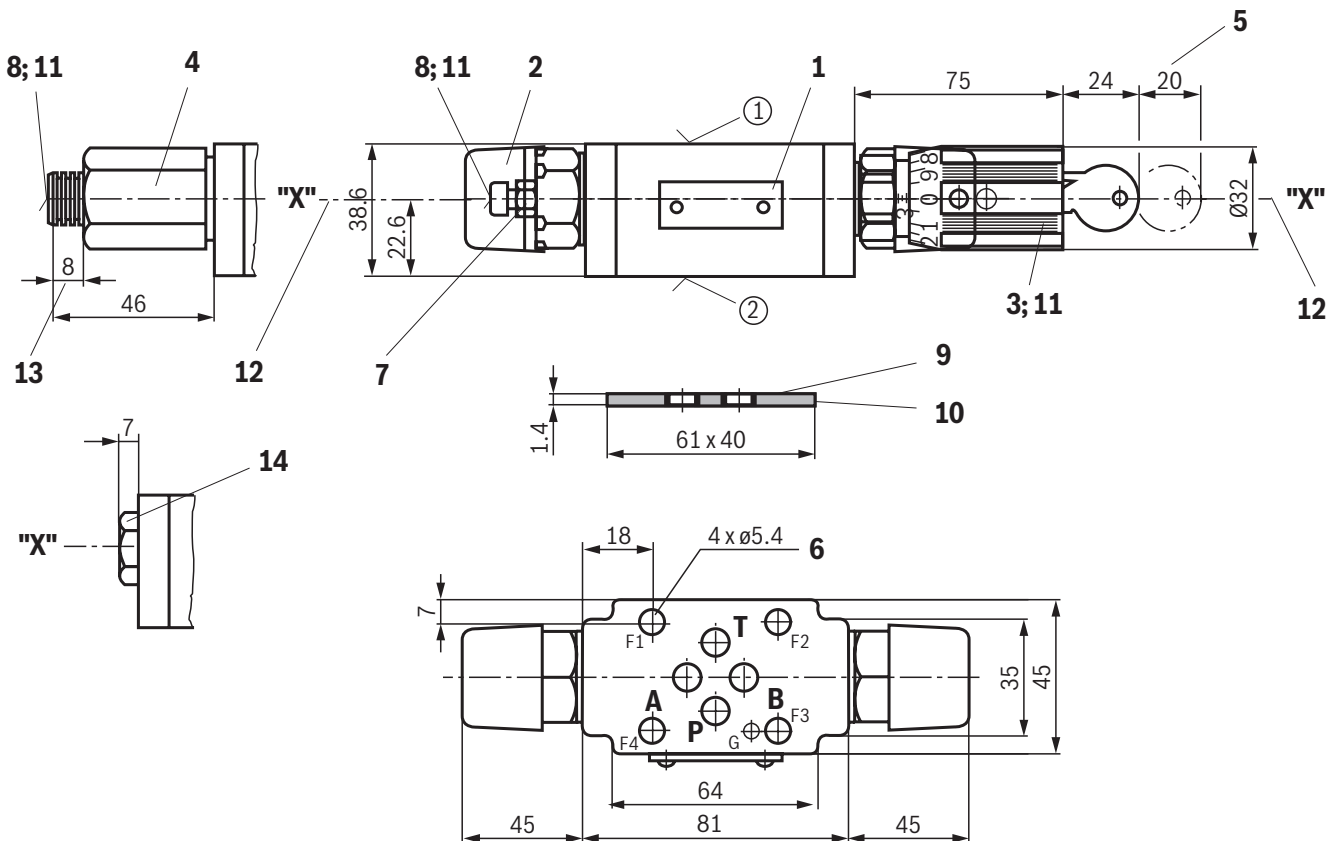
**Characteristic curves**(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ , averages) **$\Delta p$ - $q_v$  characteristic curves** (version "2Q") **$\Delta p$ - $q_v$  characteristic curves** (version "1Q") **$\Delta p$ - $q_v$  characteristic curves**

(via check valve; throttle closed)



## Dimensions

(dimensions in mm)



### Notice:

The dimensions are nominal dimensions which are subject to tolerances.

0,01/100

Rzmax 4

Required surface quality of the valve contact surface

- ① component side – porting pattern according to ISO 4401-03-02-0-05 and NFPA T3.5.1 R2-2002 D03 (with locating hole Ø4 x 4 mm deep; version "/60" or without locating hole)
- ② plate side – porting pattern according to ISO 4401-03-02-0-05 and NFPA T3.5.1 R2-2002 D03 (with locating hole Ø3 x 5 mm deep for locking pin ISO 8752-3x8-St; version "/60" or without locating hole)

- 11 For all adjustment types:  
Left rotation = higher flow  
Right rotation = lower flow
- 12 Modification from supply to discharge throttling is realized by rotation of the device around axis "X" – "X"
- 13 Stroke
- 14 Plug screw SW22

- 1 Name plate
- 2 Adjustment type "2"
- 3 Adjustment type "3"
- 4 Adjustment type "5"
- 5 Space required to remove the key
- 6 Valve mounting bores
- 7 Lock nut SW10
- 8 Setscrew/spindle for flow cross-section adjustment (internal hexagon SW5)
- 9 Identical seal rings for ports A, B, P, and T
- 10 Seal ring plate

### Valve mounting screws (separate order)

#### 4 hexagon socket head cap screws

ISO 4762 - M5 - 10.9

#### 4 hexagon socket head cap screws

N10-24 UNC ASTM - A574



### 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.
- The dimensions are nominal dimensions which are subject to tolerances.

**Accessories** (separate order)

| Denomination   | Material no. |
|----------------|--------------|
| Protective cap | R900692658   |
| Locking pin    | R90005694    |

**Further information**

- ▶ 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
- ▶ Use of non-electrical hydraulic components in explosive atmospheres (ATEX) Data sheet 07011
- ▶ Selection of filters
- ▶ Information on available spare parts