

# Check valve, pilot operated

## Type Z2S



- ▶ Size 6
- ▶ Component series 6X
- ▶ 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 leakage-free blocking of one or two actuator ports, optional
- ▶ Various cracking pressures, optional
- ▶ With pre-opening, optional
- ▶ Corrosion-protected design optional

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**Ordering code**

|            |          |    |    |          |           |          |    |    |          |
|------------|----------|----|----|----------|-----------|----------|----|----|----------|
| 01         | 02       | 03 | 04 | 05       | 06        | 07       | 08 | 09 | 10       |
| <b>Z2S</b> | <b>6</b> |    |    | <b>-</b> | <b>6X</b> | <b>/</b> |    |    | <b>*</b> |

|    |                                    |            |
|----|------------------------------------|------------|
| 01 | Check valve, sandwich plate design | <b>Z2S</b> |
|----|------------------------------------|------------|

|    |        |          |
|----|--------|----------|
| 02 | Size 6 | <b>6</b> |
|----|--------|----------|

**Leakage-free blocking**

|    |                    |          |
|----|--------------------|----------|
| 03 | In channel A and B | <b>-</b> |
|    | In channel A       | <b>A</b> |
|    | In channel B       | <b>B</b> |

**Cracking pressure**

|    |         |          |
|----|---------|----------|
| 04 | 1.5 bar | <b>1</b> |
|    | 3 bar   | <b>2</b> |
|    | 6 bar   | <b>3</b> |
|    | 10 bar  | <b>4</b> |

|    |                                                                                          |           |
|----|------------------------------------------------------------------------------------------|-----------|
| 05 | Component series 60 ... 69 (60 ... 69: unchanged installation and connection dimensions) | <b>6X</b> |
|----|------------------------------------------------------------------------------------------|-----------|

**Seal material** (observe compatibility of seals with hydraulic fluid used, see page 6)

|    |           |                |
|----|-----------|----------------|
| 06 | NBR seals | <b>no code</b> |
|    | FKM seals | <b>V</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>      |

**Locating hole**

|    |                              |                         |
|----|------------------------------|-------------------------|
| 08 | <b>Without</b> locating hole | <b>no code</b>          |
|    | <b>With</b> locating hole    | <b>/60<sup>1)</sup></b> |

**Special versions**

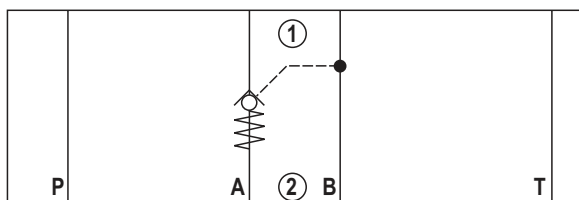
|    |                                                              |                |
|----|--------------------------------------------------------------|----------------|
| 09 | <b>Without</b> special version                               | <b>no code</b> |
|    | Control open by external port G1/4 (only version "A" or "B") | <b>SO40</b>    |
|    | With pre-opening                                             | <b>SO55</b>    |
|    | Control spool unloaded to port T                             | <b>SO60</b>    |
|    | With pre-opening and control open from channel P             | <b>SO150</b>   |
|    | Symbols (examples) see page 3                                |                |

|    |                                   |  |
|----|-----------------------------------|--|
| 10 | Further details in the plain text |  |
|----|-----------------------------------|--|

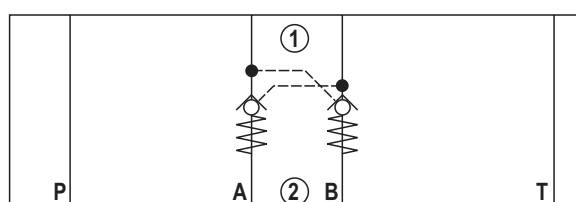
<sup>1)</sup> Locking pin ISO 8752-3x8-St, material no. **R900005694**  
(separate order)

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

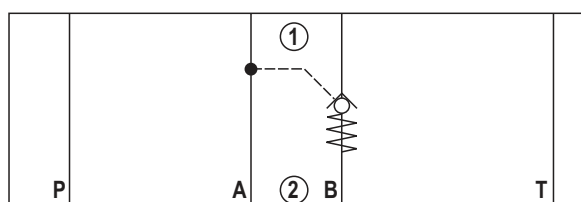
**Type Z2S 6 A...**



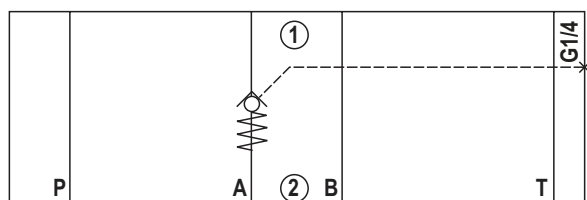
**Type Z2S 6 - ... and Z2S 6 -...SO55**



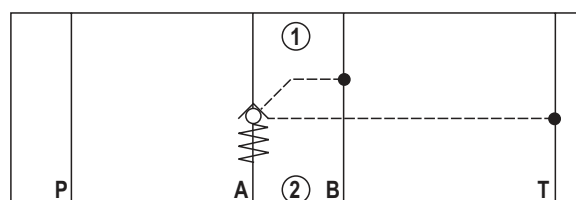
**Type Z2S 6 B...**



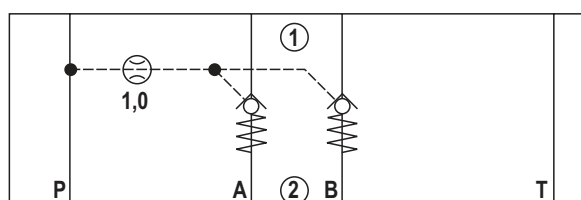
**Type Z2S 6 A...SO40**



**Type Z2S 6 A...SO60**



**Type Z2S 6 -...SO150**



## Function, sections, circuit example

The isolator valve type Z2S is a releasable check valve in sandwich plate design.

It is used for the leakage-free blocking of one or two actuator ports, even for long standstill times.

In direction A① to A② or B① to B②, there is a free flow; in the opposite direction, the flow is blocked.

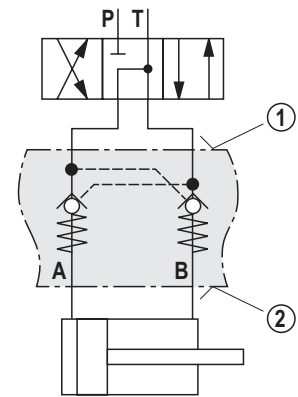
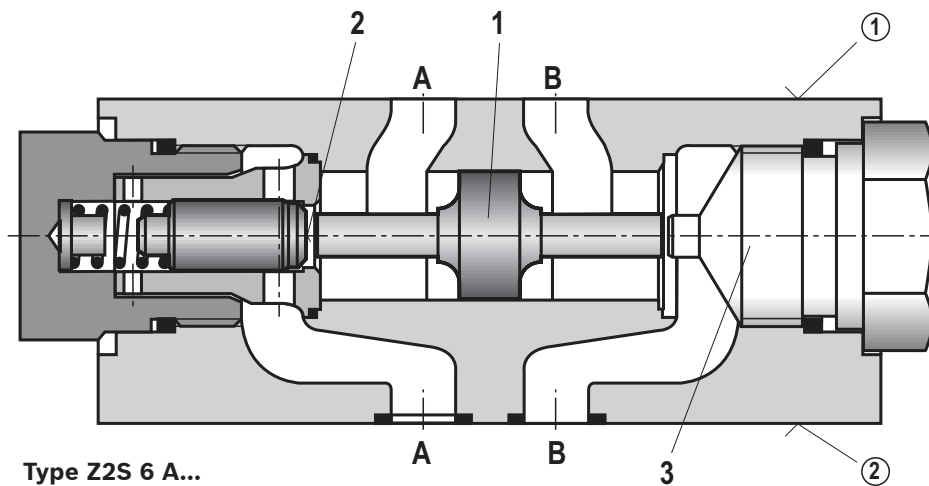
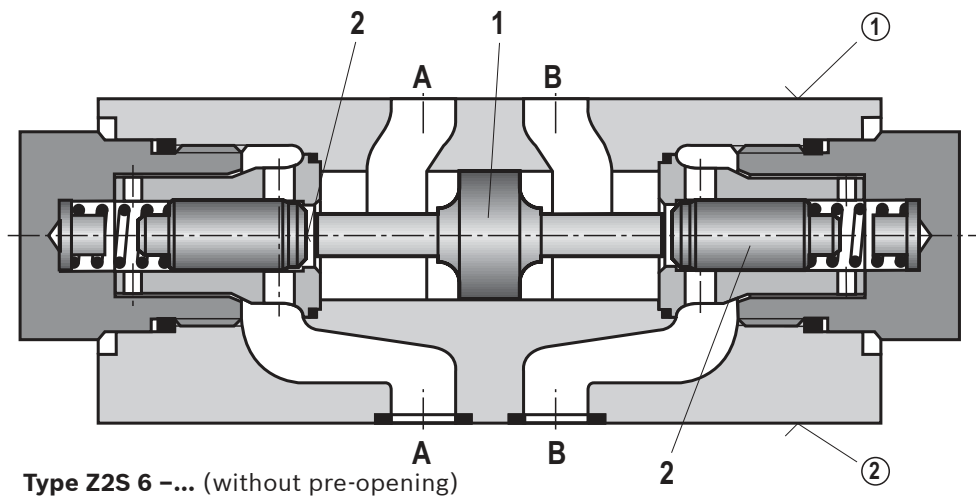
If, for example, there is a flow through the valve in direction A① to A②, control spool (1) is moved in direction B side and pushes the poppet (2) off its seat.

Hydraulic fluid can now flow from B② to B①.

In order to allow the poppets to be safely closed (2), the control spool (1) must be hydraulically unloaded (see circuit example).

### Pre-opening

- The two-stage set-up with an increased control open ratio means even low pilot pressure can be unloaded securely.
- Avoidance of switching shocks due to dampened decompression of the pressure volume on the actuator side.



Circuit example, schematic

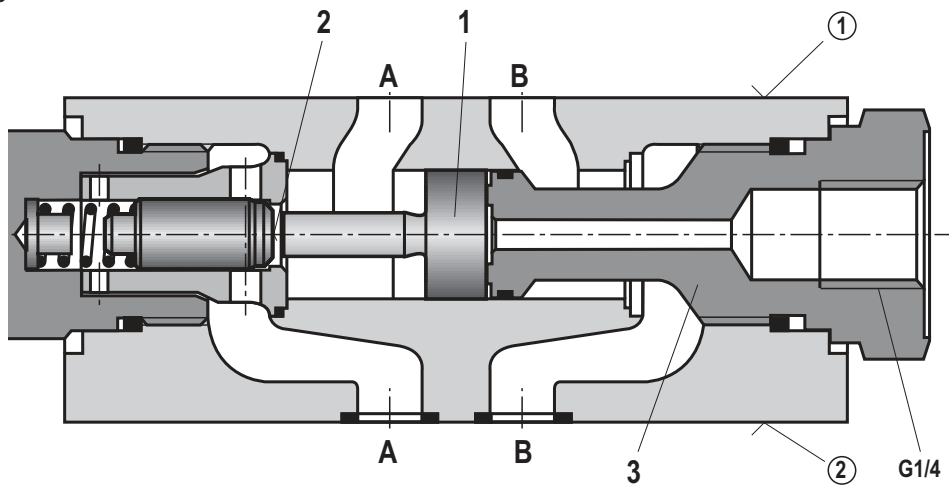
- ① = component side  
② = plate side

- 1** Control spool, area  $A_2$   
**2** Poppet, area  $A_1$   
**3** Stop

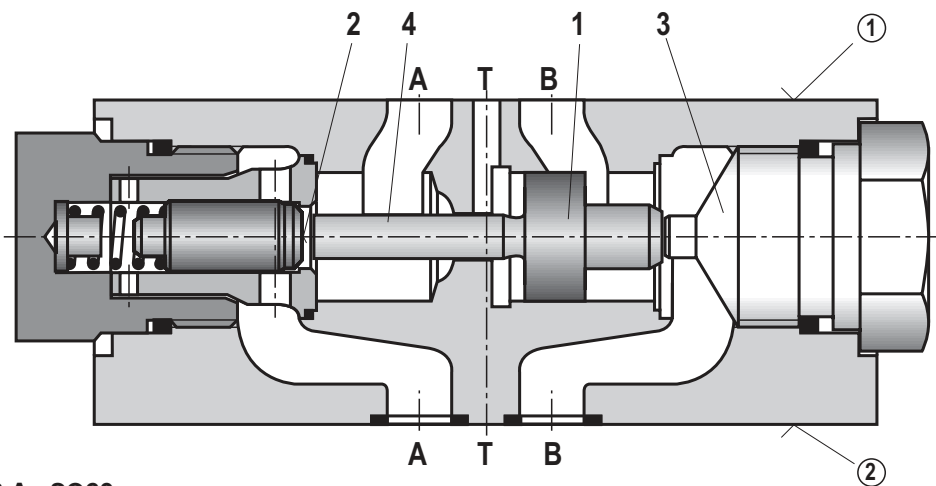
### Notice:

In valves without pre-opening, sudden unloading of pent-up pressure volume may occur. Resulting switching shocks may lead to premature wear on installed components, as well as noise formation.

## Function, sections

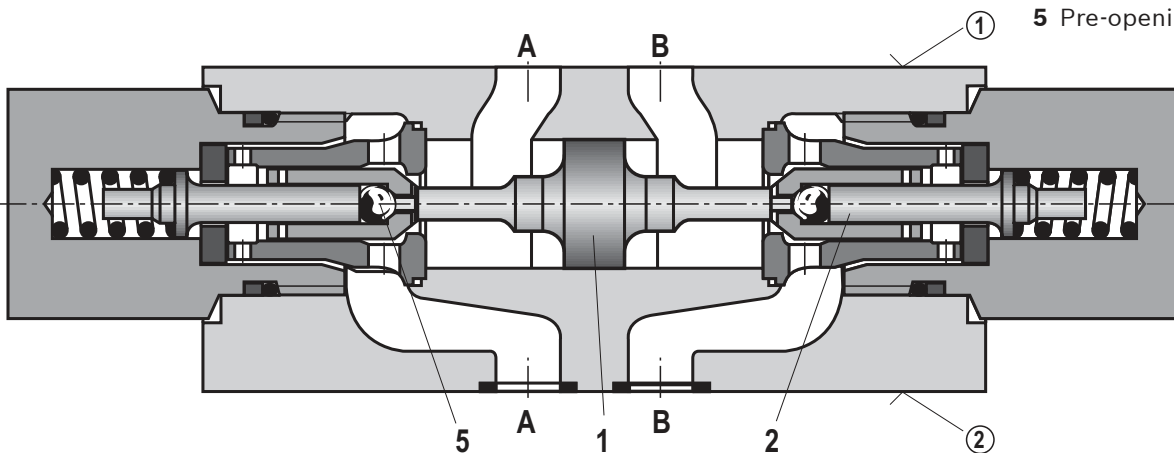


Type Z2S 6 A...SO40



Type Z2S 6 A...SO60

- 1 Control spool, area  $A_2$
- 2 Poppet, area  $A_1$
- 3 Stop
- 4 Control spool, area  $A_4$
- 5 Pre-opening, area  $A_3$

Type Z2S 6 -...SO55  
(with pre-opening)

- ① = component side
- ② = plate side

## Technical data

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

| General                                                                                                           |                       |                                                                        |
|-------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------|
| Weight                                                                                                            | kg                    | approx. 0.8                                                            |
| Installation position                                                                                             |                       | any                                                                    |
| Ambient temperature range                                                                                         | °C                    | -30 ... +80 (NBR seals)<br>-20 ... +80 (FKM seals)                     |
| Storage temperature range                                                                                         |                       | see operating instructions 07600-B                                     |
| MTTF <sub>D</sub> values according to EN ISO 13849                                                                | years                 | 150 ... 1200 (for more information see data sheet 08012)               |
| Hydraulic                                                                                                         |                       |                                                                        |
| Maximum operating pressure                                                                                        | bar                   | 350                                                                    |
| Cracking pressure in free direction                                                                               |                       | see characteristic curves page 7                                       |
| Maximum flow                                                                                                      | l/min                 | 80                                                                     |
| Direction of flow                                                                                                 |                       | see symbols page 3                                                     |
| Hydraulic fluid                                                                                                   |                       | see table below                                                        |
| Hydraulic fluid temperature range<br>(at the valve working ports)                                                 | °C                    | -30 ... +80 (NBR seals)<br>-20 ... +80 (FKM seals)                     |
| Viscosity range                                                                                                   | mm <sup>2</sup> /s    | 2,8 ... 500                                                            |
| Maximum admissible degree of contamination of the<br>hydraulic fluid, cleanliness class according to ISO 4406 (c) |                       | Class 20/18/15 <sup>1)</sup>                                           |
| Area ratio                                                                                                        | ► Without pre-opening | A <sub>1</sub> /A <sub>2</sub> ~ 1/3.5 (see sectional drawing page 4)  |
|                                                                                                                   | ► With pre-opening    | A <sub>3</sub> /A <sub>2</sub> ~ 1/12.5 (see sectional drawing page 5) |
|                                                                                                                   | ► Version "SO60"      | A <sub>1</sub> /A <sub>4</sub> ~ 1/7 (see sectional drawing page 5)    |

| Hydraulic fluid | Classification             | Suitable<br>sealing materials                                                                                                | Standards | Data sheet |
|-----------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------|------------|
| Mineral oils    | HL, HLP, HLPD, HVLP, HVLPD | NBR, FKM                                                                                                                     | DIN 51524 | 90220      |
| Bio-degradable  | ► 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)                                                                                                            |           |            |
|                 |                            | HFDR                                                                                                                         |           |            |
|                 | ► Containing water         | HFC (Fuchs: Hydrotherm 46M,<br>Renosafe 500;<br>Petrofer: Ultra Safe 620; Hough-<br>ton: Safe 620;<br>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.

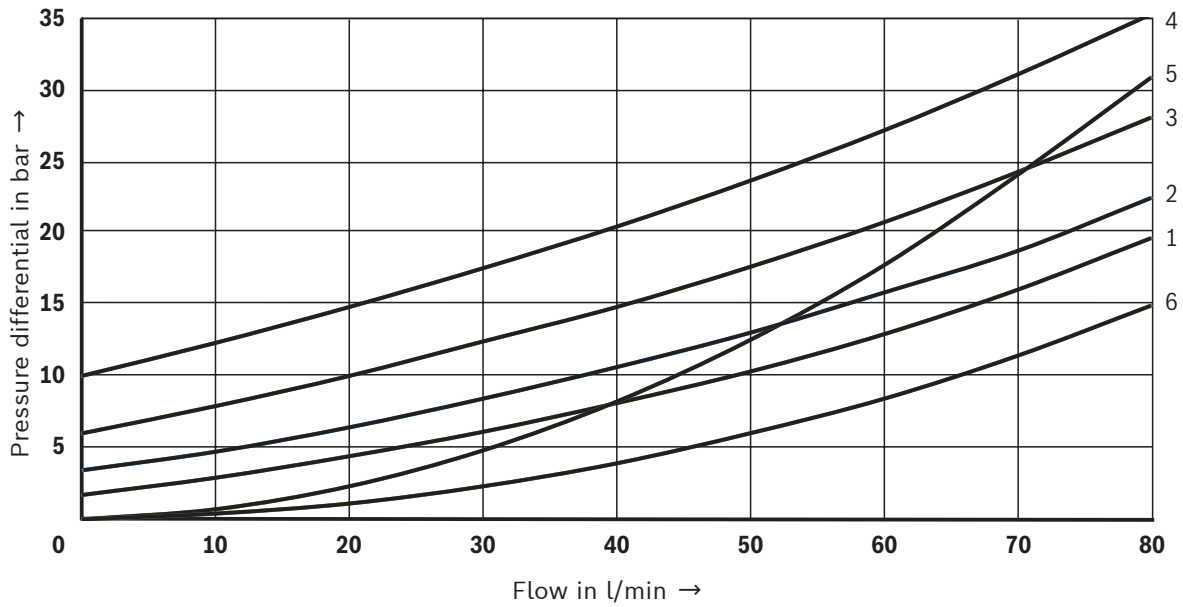
<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

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

## Characteristic curves

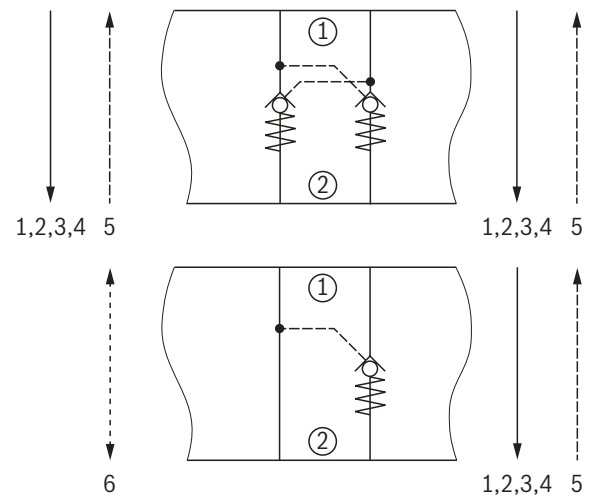
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$ , averages)

$\Delta p$ - $q_v$  characteristic curves

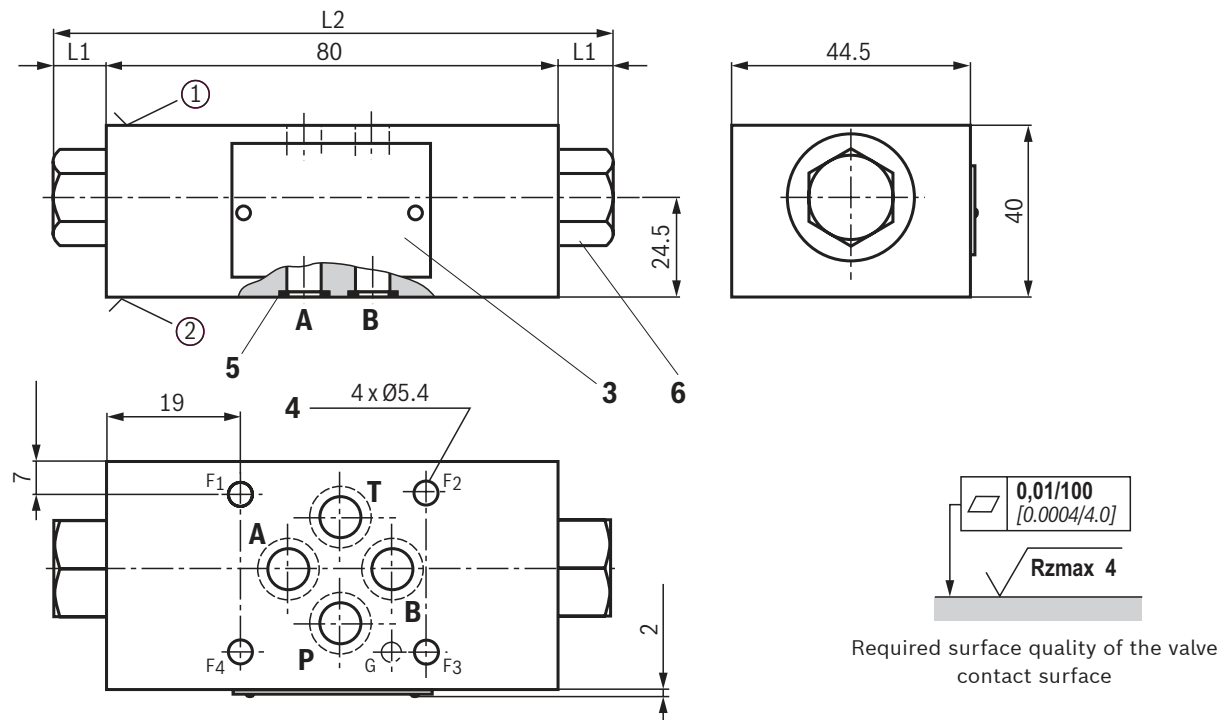


### Cracking pressure:

- 1 1.5 bar
- 2 3 bar
- 3 6 bar
- 4 10 bar
- 5 Check valve controlled open via control spool
- 6 Free flow (without check valve use), version "A" and "B"



Dimensions  
 (dimensions in mm)



**Notice:**  
 The dimensions are nominal dimensions which are subject to tolerances.

|    | "no code"<br>"SO40"<br>"SO60" | "A"                |                    | "B"                |    | "SO150" |                    |
|----|-------------------------------|--------------------|--------------------|--------------------|----|---------|--------------------|
| L1 | 11                            | 21.5 <sup>1)</sup> | 21.5 <sup>1)</sup> | 21.5 <sup>1)</sup> | 11 | 11      | 21.5 <sup>1)</sup> |
| L2 | 102                           | 123                |                    | 112.5              |    | 123     |                    |

<sup>1)</sup> Maximum dimension on the side of the check valve cartridge

- 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 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 for locking pin ISO 8752-3x8-St, design "/60" or **without** locating hole)
- 3 Name plate
- 4 Through hole for valve mounting
- 5 Identical seal rings for ports A, B, P, T
- 6 Plug screw SW22

**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**

**Notice:**  
 The length of the valve mounting screws of the sandwich plate valve must be selected according to the components mounted under and over the isolator valve.  
 Depending on the application, screw type and tightening torque must be adjusted to the circumstances.  
 Please ask Rexroth for screws with the required length.



## 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                                                             |
| ► Hexagon socket head cap screw, metric/UNC                                  | Data sheet 08936                                                             |
| ► Hydraulic valves for industrial applications                               | Data sheet 07600-B                                                           |
| ► Use of non-electrical hydraulic components in explosive atmospheres (ATEX) | Data sheet 07011                                                             |
| ► Selection of filters                                                       | <a href="http://www.boschrexroth.com/filter">www.boschrexroth.com/filter</a> |
| ► Information on available spare parts                                       | <a href="http://www.boschrexroth.com/spc">www.boschrexroth.com/spc</a>       |

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