

# Check valve, pilot operated

## Type SV and SL

**RE 21468**

Edition: 2017-03

Replaces: 2017-01



- ▶ Size 10, 20, and 32
- ▶ Component series 4X
- ▶ Maximum operating pressure 315 bar
- ▶ Maximum flow 550 l/min



### Features

- ▶ For subplate mounting
- ▶ Porting pattern according to ISO 5781-06-07-0-00 (NG10), ISO 5781-08-10-0-00 (NG20), ISO 5781-10-13-0-00 (NG32)
- ▶ For threaded connection
- ▶ For the leakage-free blocking of one actuator port
- ▶ Attachment possibility for directional spool valve or directional seat valve, optional
- ▶ With internal or external pilot oil return, optional
- ▶ Version with pre-opening for dampened release, optional
- ▶ Various cracking pressures, optional
- ▶ Check valve cartridge separately available
- ▶ Corrosion-resistant housing design, optional

### Contents

|                                   |           |
|-----------------------------------|-----------|
| Features                          | 1         |
| Ordering code                     | 2, 3      |
| Symbols                           | 4         |
| Function, section                 | 5, 6      |
| Technical data                    | 7         |
| Characteristic curves             | 8, 9      |
| Calculation of the pilot pressure | 10        |
| Dimensions                        | 11 ... 15 |
| Circuit examples                  | 15        |
| Inductive position switch         | 16        |
| Mating connectors                 | 17        |
| Further information               | 18        |

**Ordering code**

|          |    |    |    |    |    |    |           |    |    |    |    |    |    |    |    |    |    |    |    |   |
|----------|----|----|----|----|----|----|-----------|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 01       | 02 | 03 | 04 | 05 | 06 | 07 | 08        | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |   |
| <b>S</b> |    |    |    |    |    | -  | <b>4X</b> | /  |    |    | -  |    |    |    |    |    |    |    |    | * |

|    |                           |           |
|----|---------------------------|-----------|
| 01 | Check valve               | <b>S</b>  |
| 02 | Internal pilot oil return | <b>V</b>  |
|    | External pilot oil return | <b>L</b>  |
| 03 | Size 10                   | <b>10</b> |
|    | Size 20                   | <b>20</b> |
|    | Size 32                   | <b>30</b> |

**Type of connection**

|    |                            |          |
|----|----------------------------|----------|
| 04 | Subplate mounting          | <b>P</b> |
|    | Threaded connection        | <b>G</b> |
| 05 | <b>With</b> pre-opening    | <b>A</b> |
|    | <b>Without</b> pre-opening | <b>B</b> |

**Cracking pressure**

|    |  |                        |
|----|--|------------------------|
| 06 | See characteristic curves (A → B), page 8 and 9  | <b>1</b>               |
|    |  | <b>2</b>               |
|    |  | <b>3</b>               |
|    |  | <b>4</b>               |
| 07 | Component series 40 ... 49 (40 ... 49: unchanged installation and mounting dimensions) | <b>4X</b>              |
| 08 | <b>Without</b> attachment possibility for directional spool or seat valve              | <b>no code</b>         |
|    | <b>With</b> attachment possibility for directional spool or seat valve (NG6)           | <b>6U<sup>1)</sup></b> |

**Spool position monitoring**

|    |                                  |                |
|----|----------------------------------|----------------|
| 09 | <b>Without</b> position switch   | <b>no code</b> |
|    | <b>With</b> position switch      | <b>QMG24</b>   |
|    | For more information see page 16 |                |

**Orifice fitting channel A** (version "6U" only)

|    |   |            |
|----|---|------------|
| 10 | Orifice Ø0.8 mm in channel A (standard) | <b>A08</b> |
|    | Orifice Ø** in channel A <sup>2)</sup>  | <b>A**</b> |

**Orifice fitting channel B** (version "6U" only)

|    |  |            |
|----|--|------------|
| 11 | Channel B closed (standard)            | <b>B99</b> |
|    | Orifice Ø** in channel B <sup>2)</sup> | <b>B**</b> |

**Orifice fitting channel T** (version "6U" only)

|    |  |            |
|----|--|------------|
| 12 | <b>Without</b> orifice (standard)      | <b>T00</b> |
|    | Orifice Ø** in channel T <sup>2)</sup> | <b>T**</b> |

**Orifice fitting channel P** (version "6U" only)

|    |  |            |
|----|--|------------|
| 13 | <b>Without</b> orifice (standard)      | <b>P00</b> |
|    | Orifice Ø** in channel P <sup>2)</sup> | <b>P**</b> |

**Orifice fitting channel X** (version "6U" only)

|    |  |            |
|----|--|------------|
| 14 | Channel X closed (standard)            | <b>X99</b> |
|    | Orifice Ø** in channel X <sup>2)</sup> | <b>X**</b> |

**Orifice fitting channel Y**

|    |   |            |
|----|---|------------|
| 15 | Channel Y closed (standard, version "SV" only)              | <b>Y99</b> |
|    | Channel Y open (standard, versions "SL" and "SL...6U" only) | <b>Y00</b> |
|    | Orifice Ø** in channel XY <sup>2)</sup>                     | <b>Y**</b> |

**Ordering code**

|          |    |    |    |    |    |    |           |    |    |    |    |    |    |    |    |    |    |    |    |   |
|----------|----|----|----|----|----|----|-----------|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 01       | 02 | 03 | 04 | 05 | 06 | 07 | 08        | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |   |
| <b>S</b> |    |    |    |    |    | -  | <b>4X</b> | /  |    |    |    |    |    |    |    |    |    |    |    | * |

**Seal material**

|    |  |          |
|----|--|----------|
| 16 | NBR seals  | <b>N</b> |
|    | FKM seals  | <b>V</b> |
|    | Observe compatibility of seals with hydraulic fluid used. (Other seals upon request) |          |


**Corrosion resistance**

|    |  |                |
|----|--|----------------|
| 17 | None   | <b>no code</b> |
|    | Improved corrosion protection (240 h salt spray test according to EN ISO 9227) | <b>J3</b>      |
| 18 | Standard   | <b>no code</b> |
|    | Pilot pressure $p_{\text{pilot}}$ from channel X                               | <b>SO168</b>   |
|    | Control open spool with shaft sealing (between channel X-Y and Y-A)            | <b>SO286</b>   |

**Connection thread** (versions with threaded connection "G" only)

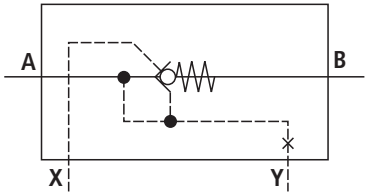
|    |   |                |
|----|---|----------------|
| 19 | Pipe thread "G" according to ISO 228-1            | <b>no code</b> |
|    | Pipe thread "UNF/UN" according to ANSI/ASME B 1.1 | <b>/12</b>     |
| 20 | Further details in the plain text                 | <b>*</b>       |

- 1) Version "SL" and sizes 20 and 32 only.
- 2) Order example:  
\*\* = dimension in mm x 10 – e.g. orifice Ø1.2 mm in channel  
T = "**T12**"

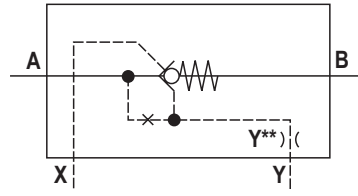
 **Notice:** Preferred types and standard units are contained in the EPS (standard price list).

## Symbols

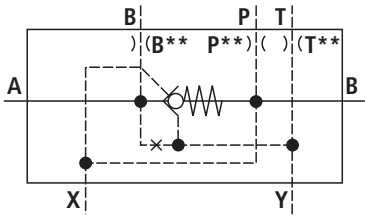
**Version "SV"** (internal pilot oil return)



**Version "SL"** (external pilot oil return)

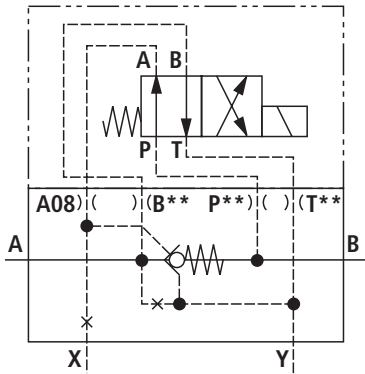


**Version "SO168"**

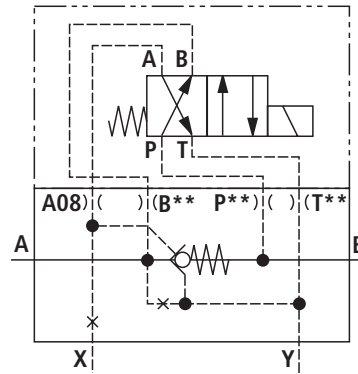


**Version "SL ...6U"**

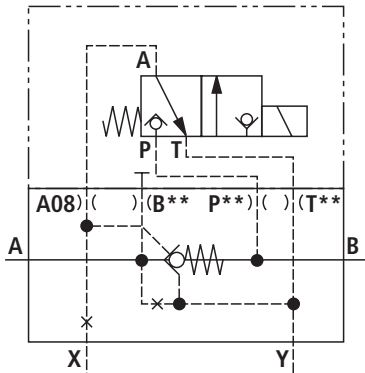
With directional spool valve type 4WE 6 D...



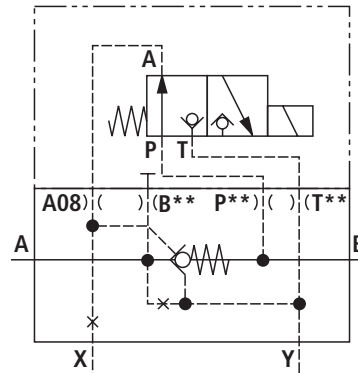
With directional spool valve type 4WE 6 Y...



With directional seat valve type M-3SEW 6 C...



With directional seat valve type M-3SEW 6 U...



## Function, section

The isolator valve type SV/SL is a pilot operated check valve for subplate mounting or threaded connection. It is used for the leakage-free blocking of one actuator port, also in case of longer standstill times.

The valve basically consists of a housing (1), a seat poppet (2), a compression spring (3), a control spool (4) as well as of an optional pre-opening as ball seat valve (5). The seat valve can be flown through from A to B without external pilot pressure. In the opposite direction, the seat valve closes hydraulically tight.

Condition:  $p_A > p_B + \text{cracking pressure (compression spring)}$ .

A sufficiently high pilot pressure at port X moves the control spool (4) in the direction of the ball seat valve (5) (version "A") and pushes the seat poppet (2) out of its seat. This allows for a free flow in both directions (active keeping open).

In order to ensure that the seat valve actively opens, the pressure ratios on both sides of the control spool (4) are just as important as the area ratios at the control spool (4) or seat poppet (2).

This results in the following available options for the types

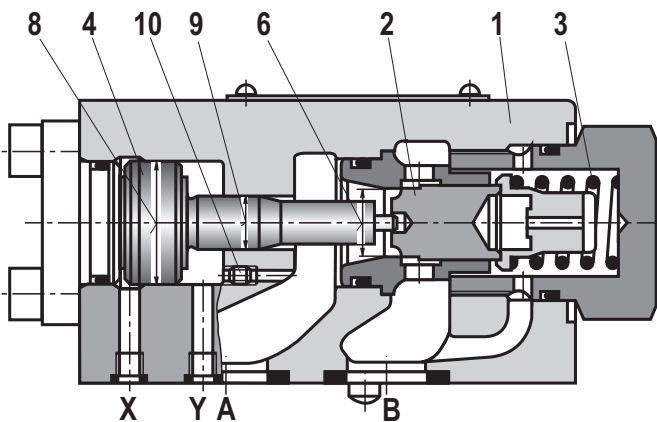
- ▶ SV (large annulus area  $A_3$  (8) connected with  $p_A$ ) or
  - ▶ SL (small annulus area  $A_4$  (9))
- as well as for the versions with pre-opening "A" and without pre-opening "B".

### Version "A" (with pre-opening)

This valve is provided with an additional pre-opening. By pressurization at the X port, the control spool (4) is moved to the right. As a result, the ball (5) is pushed off the seat first and the seat poppet (2) afterwards.

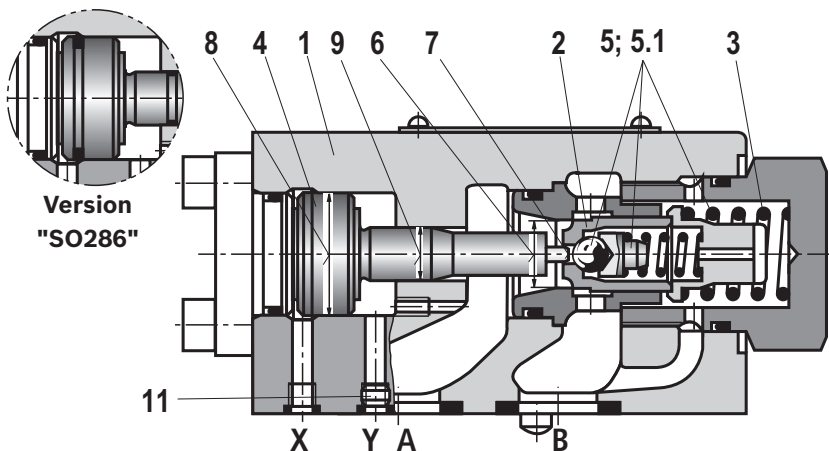
### Notices:

- ▶ Version "A":
  - 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.
- ▶ Version "B":
  - In case of valves without pre-opening, the included pressure volume may be unloaded suddenly. Resulting switching shocks may lead to premature wear on installed components, as well as noise formation.



**Type SL..PB.-4X/...** (with pilot oil return, without pre-opening)

The modification of type SV to type SL is possible by exchange of plugs (10) and (11). One of the both plugs must always be installed.



**Type SV 10 PA.-4X/...** (without pilot oil return, with pre-opening)

| NG | Plug (10) | Plug (11) |
|----|-----------|-----------|
| 10 | M3        | M6        |
| 20 | M4        | M6        |
| 32 | M4        | M6        |

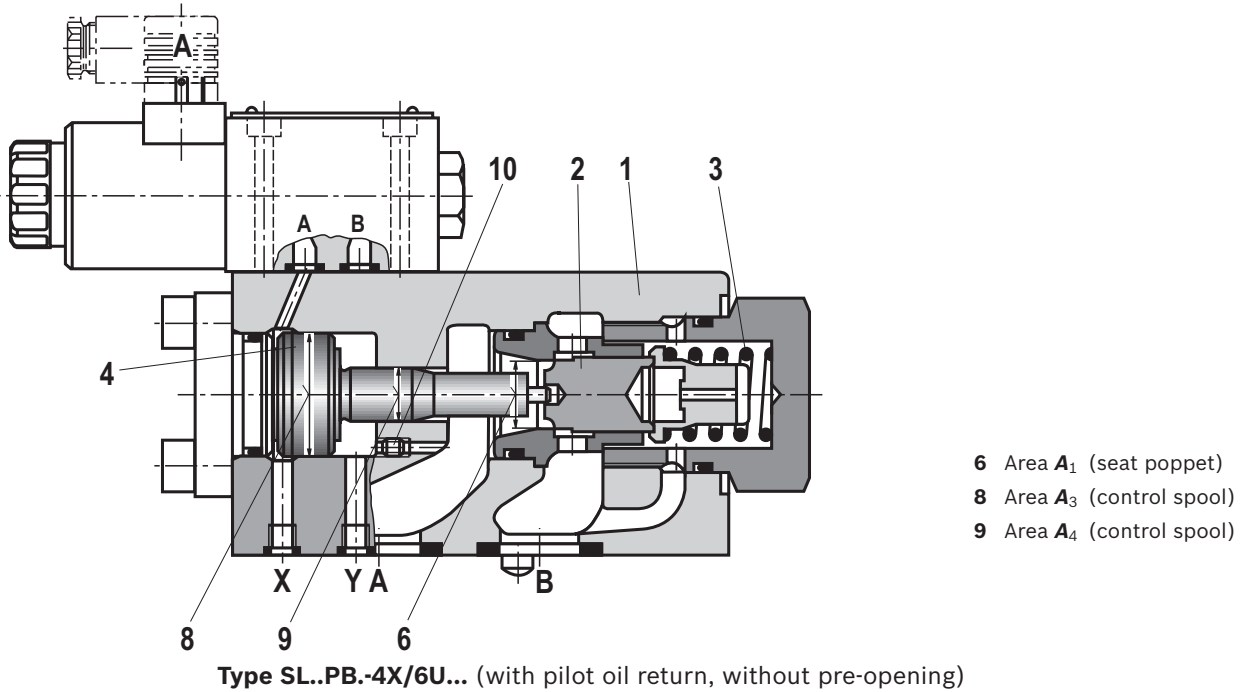
- 6 Area  $A_1$  (seat poppet)
- 7 Area  $A_2$  (ball)
- 8 Area  $A_3$  (control spool)
- 9 Area  $A_4$  (control spool)

**Function, section:** Version "6U" (with built-on directional valve)

At direct operated, pilot operated check valves type SL with built-on directional valve, the control spool (4) may be controlled directly via the directional valve to open the seat poppet (2) against the system pressure, i.e. the blocking direction.

**Notice:**

When ordering the directional valve, please observe the different position of port A at versions "P" and "G" (porting pattern rotated by 180° at version "G", see pages 13 and 14).



**Technical data**

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

| <b>general</b>                         |                       |  |     |     |
|--|-----------------------|--|-----|-----|
| Sizes                                  | NG                    | 10   | 20  | 32  |
| Weight                                 | ▶ Subplate mounting   | kg   | 1.8 | 4.7 |
|  | ▶ Threaded connection | kg   | 2.1 | 5.4 |
| Installation position                  | Any                   |  |     |     |
| Ambient temperature range              | °C                    | -30 ... +80 (NBR seals)<br>-20 ... +80 (FKM seals)                                       |     |     |
| MTTFd values according to EN ISO 13849 | Years                 | 150 (for further details, see data sheet 08012)  |     |     |
| Maximum storage time                   | Months                | 12 (if the storage conditions are observed; refer to the operating instructions 07600-B) |     |     |

| <b>hydraulic</b>  |  |  |      |       |
|---|--|--|------|-------|
| Maximum operating pressure  | bar                                    | 315  |      |       |
| Maximum flow  | l/min                                  | See characteristic curves on page 8 and 9          |      |       |
| Pilot pressure  | bar                                    | 5 ... 315  |      |       |
| Hydraulic fluid   | see table below                        |  |      |       |
| Hydraulic fluid temperature range   | °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 hydraulic fluid cleanliness class according to ISO 4406 (c) | Class 20/18/15 <sup>1)</sup>           |  |      |       |
| Direction of flow   | Free from A → B, from B → A by opening |  |      |       |
| Pilot volume  | ▶ Port X                               | cm <sup>3</sup>                                    | 2.5  | 10.8  |
|   | ▶ Port Y (version "L" only)            | cm <sup>3</sup>                                    | 2.0  | 9.6   |
| Control areas<br>(areas according to sectional drawing on pages 5 and 6)                                      | ▶ Area <b>A</b> <sub>1</sub>           | cm <sup>2</sup>                                    | 1.33 | 3.46  |
|   | ▶ Area <b>A</b> <sub>2</sub>           | cm <sup>2</sup>                                    | 0.33 | 0.7   |
|   | ▶ Area <b>A</b> <sub>3</sub>           | cm <sup>2</sup>                                    | 3.8  | 10.17 |
|   | ▶ Area <b>A</b> <sub>4</sub>           | cm <sup>2</sup>                                    | 0.79 | 1.13  |

| Hydraulic fluid | Classification             | Suitable 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)                                   |           |            |
|                 | ▶ 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 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

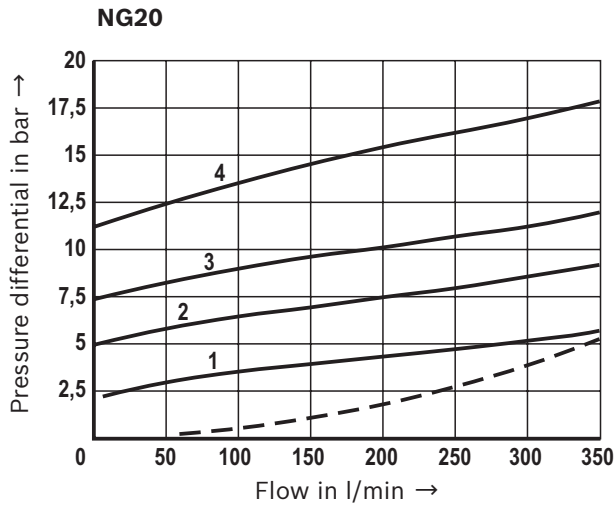
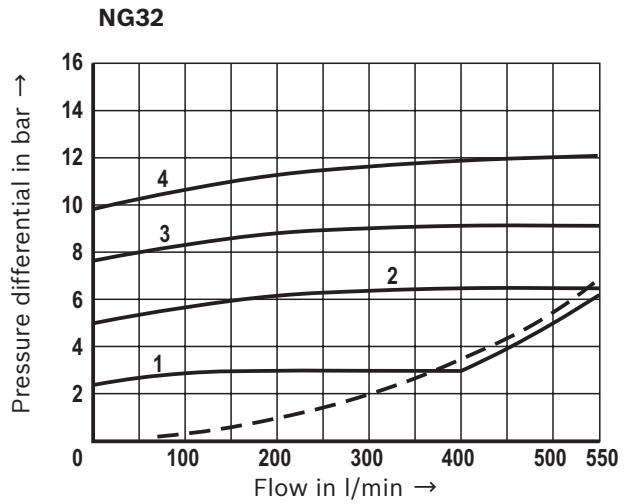
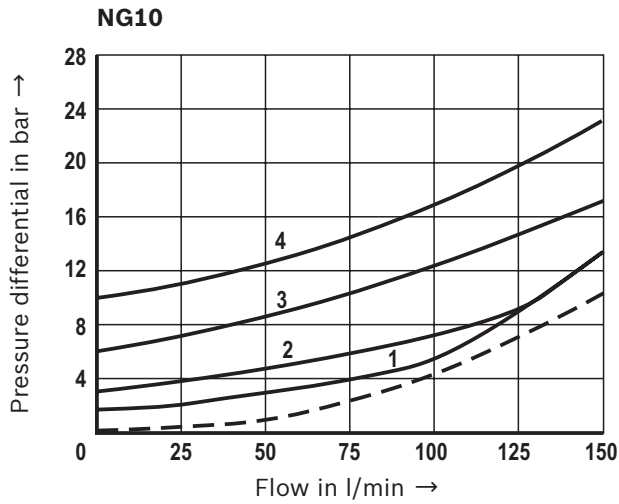
- ▶ **Bio-degradable and flame-resistant:** If this hydraulic fluid is used, small amounts of dissolved zinc may get into the hydraulic system.

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

**$\Delta p$ - $q_v$  characteristic curves**



**Cracking pressure** in bar

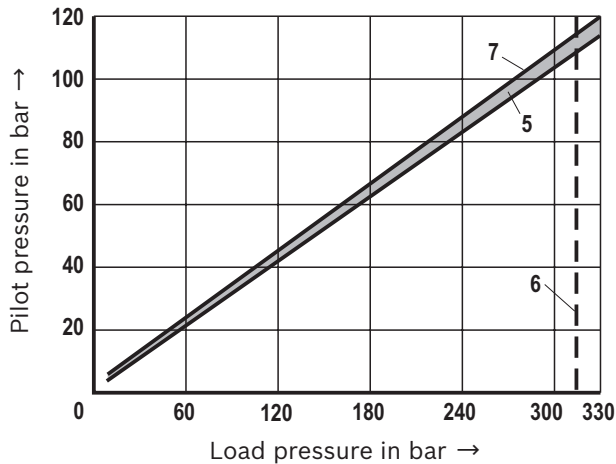
|   | NG10 | NG20 | NG32 |
|---|------|------|------|
| 1 | 1.5  | 2.5  | 2.5  |
| 2 | 3    | 5    | 5    |
| 3 | 6    | 7.5  | 8    |
| 4 | 10   | 10   | 10   |

—  
A  $\rightarrow$  B

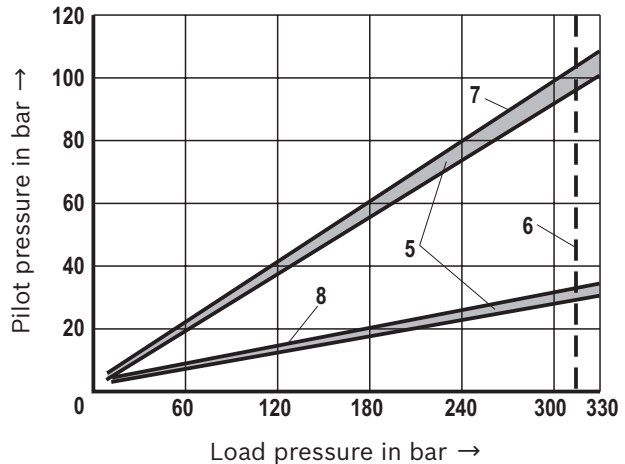
- - -  
B  $\rightarrow$  A

**Pilot pressure/load pressure characteristic curves**

**without** pre-opening



**with** pre-opening



5 Scatter range

6 Limit value

7 Valve poppet

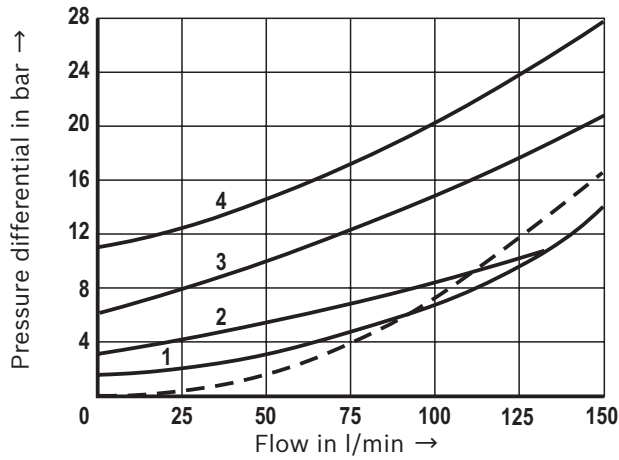
8 Pre-opening



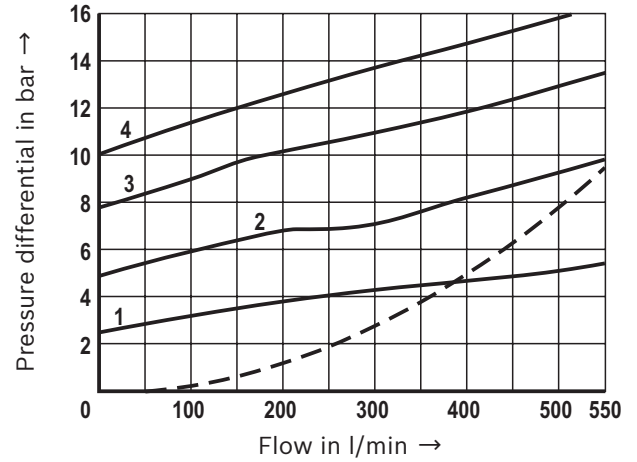
**Characteristic curves:** Threaded connection  
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )

**$\Delta p$ - $q_v$  characteristic curves**

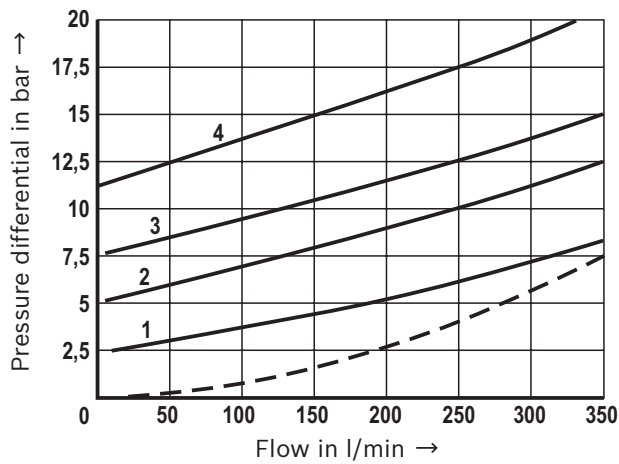
**NG10**



**NG32**



**NG20**



**Cracking pressure in bar**

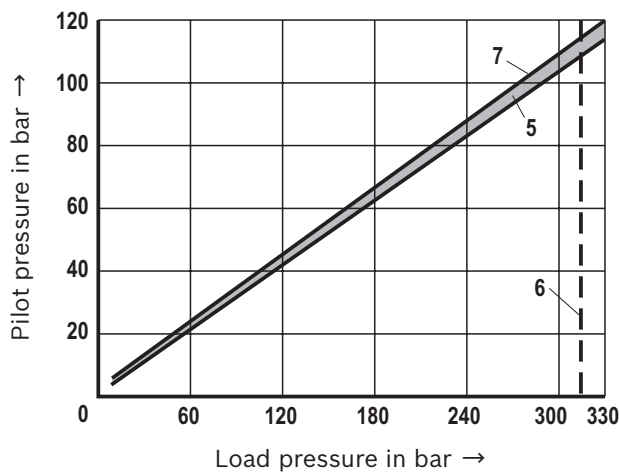
|          | <b>NG10</b> | <b>NG20</b> | <b>NG32</b> |
|----------|-------------|-------------|-------------|
| <b>1</b> | 1.5         | 2.5         | 2.5         |
| <b>2</b> | 3           | 5           | 5           |
| <b>3</b> | 6           | 7.5         | 8           |
| <b>4</b> | 10          | 10          | 10          |

—  
A → B

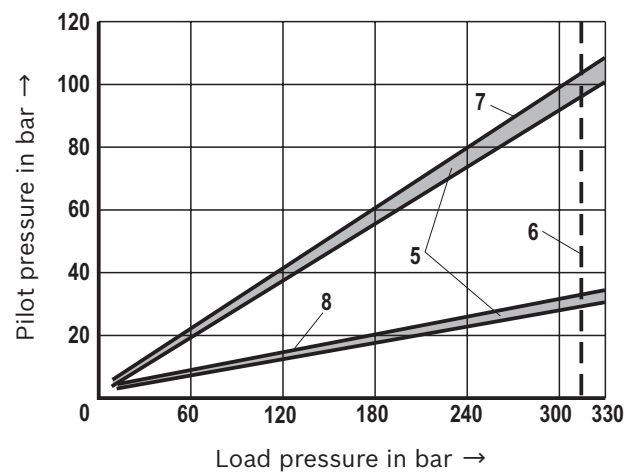
- - -  
B → A

**Pilot pressure/load pressure characteristic curves**

**without pre-opening**



**with pre-opening**



**5** Scatter range

**6** Limit value

**7** Valve poppet

**8** Pre-opening

## Calculation of the pilot pressure $p_{\text{pilot}}$ depending on $p_A$ and $p_B$

### Version "A" (with pre-opening)

Balance of forces:

► Detailed formula

$$p_A \cdot A_1 + p_{\text{pilot}} \cdot A_3 - p_B \cdot A_2 - p_F \cdot A_1 - p_A \cdot A_4 - p_A^* \cdot (A_2 - A_4) = 0$$

$$\rightarrow p_{\text{pilot}} = p_B \cdot \frac{A_2}{A_3} + p_F \cdot \frac{A_1}{A_3} + p_A \cdot \frac{A_4 - A_1}{A_3} + p_A^* \cdot \frac{A_2 - A_4}{A_3}$$

► Simplified formula (Assumption  $p_A = 0$ )

$$p_{\text{pilot}} \approx \frac{1}{3} \cdot p_F + \frac{1}{13} \cdot p_B$$

### Version "B" (without pre-opening)

Balance of forces:

► Detailed formula

$$p_A \cdot A_1 + p_{\text{pilot}} \cdot A_3 - p_B \cdot A_1 - p_F \cdot A_1 - p_A \cdot A_4 - p_A^* \cdot (A_2 - A_4) = 0$$

$$\rightarrow p_{\text{pilot}} = p_B \cdot \frac{A_1}{A_3} + p_F \cdot \frac{A_1}{A_3} + p_A \cdot \frac{A_4 - A_1}{A_3} + p_A^* \cdot \frac{A_2 - A_4}{A_3}$$

► Simplified formula (Assumption  $p_A = 0$ )

$$p_{\text{pilot}} \approx \frac{1}{3} \cdot p_F + \frac{1}{3} \cdot p_B$$

$p_A^*$  Depending on the type (for type SL:  $p_A^* = 0$ )

$p_{\text{pilot}}$  Pilot pressure

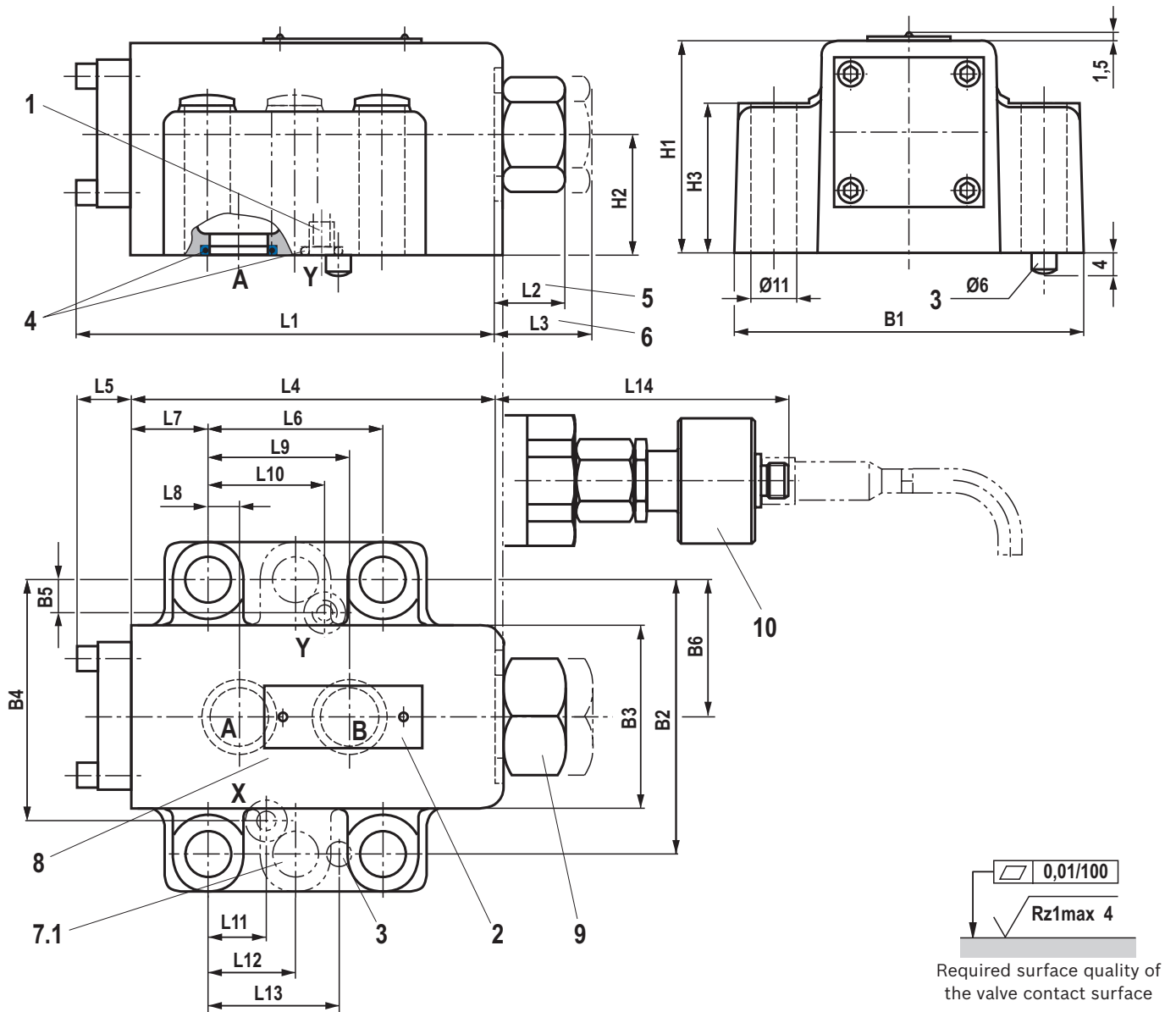
$p_A$  Working pressure in A

$p_B$  Working pressure in B

$p_F$  Cracking pressure (spring)

$A_1 - A_4$  For areas, see sectional drawing on page 5;  
Control area ratios, see page 7

**Dimensions:** Subplate mounting  
(dimensions in mm)

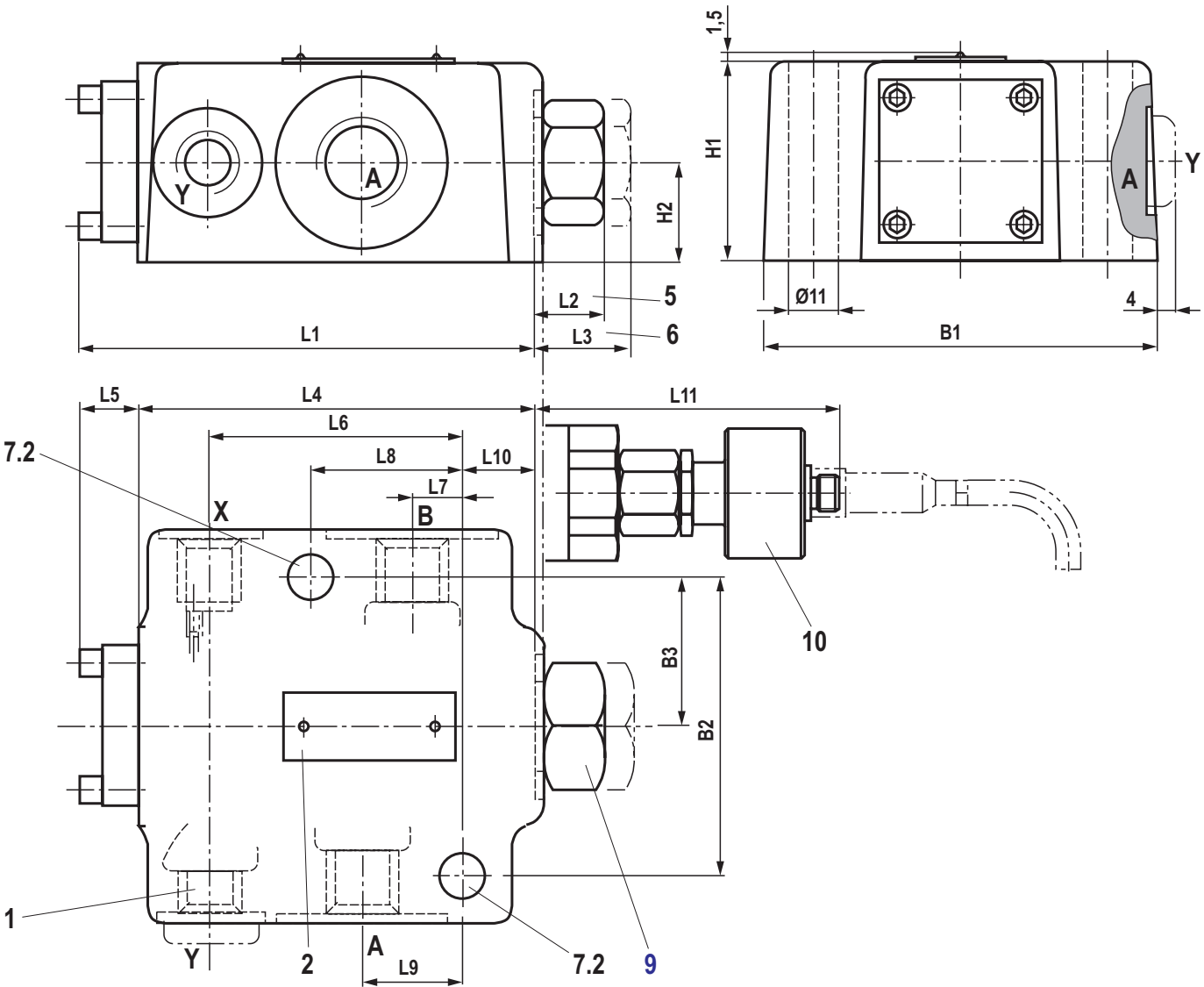


| Type | NG | L1    | L2   | L3   | L4   | L5   | L6   | L7   | L8   | L9   | L10  | L11  | L12  | L13  | L14  |
|------|----|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| SV   | 10 | 100.8 | 15.5 | 15.5 | 87.8 | 13   | 42.9 | 18.5 | 7.2  | 35.8 | -    | 21.5 | -    | 31.8 | 105  |
|      | 20 | 135   | 17.7 | 47.7 | 117  | 18   | 60.3 | 27.5 | 11.1 | 49.2 | -    | 20.6 | -    | 44.5 | 96.5 |
|      | 32 | 156.1 | 36.1 | 46.1 | 134  | 22.1 | 84.2 | 39   | 16.7 | 67.5 | -    | 24.6 | 42.1 | 62.7 | 117  |
| SL   | 10 | 100.8 | 15.5 | 15.5 | 87.8 | 13   | 42.9 | 18.5 | 7.2  | 35.8 | 21.5 | 21.5 | -    | 31.8 | 105  |
|      | 20 | 135   | 17.7 | 47.7 | 117  | 18   | 60.3 | 27.5 | 11.1 | 49.2 | 39.5 | 20.6 | -    | 44.5 | 96.5 |
|      | 32 | 156.1 | 36.1 | 46.1 | 134  | 22.1 | 84.2 | 39   | 16.7 | 67.5 | 59.5 | 24.6 | 42.1 | 62.7 | 117  |

| Type | NG | B1  | B2   | B3 | B4   | B5  | H1 | H2   | H3 | B6   |
|------|----|-----|------|----|------|-----|----|------|----|------|
| SV   | 10 | 84  | 66.7 | 44 | 58.8 | -   | 51 | 29   | 36 | 33.3 |
|      | 20 | 100 | 79.4 | 67 | 73   | -   | 81 | 45   | 55 | 39.7 |
|      | 32 | 118 | 96.8 | 75 | 92.8 | -   | 85 | 42.5 | 70 | 48.4 |
| SL   | 10 | 84  | 66.7 | 44 | 58.8 | 7.9 | 51 | 29   | 36 | 33.3 |
|      | 20 | 100 | 79.4 | 67 | 73   | 6.4 | 81 | 45   | 55 | 39.7 |
|      | 32 | 118 | 96.8 | 75 | 92.8 | 3.8 | 85 | 42.5 | 70 | 48.4 |

For item explanations, valve mounting screws and subplates see page 15.

**Dimensions:** Threaded connection  
(dimensions in mm)



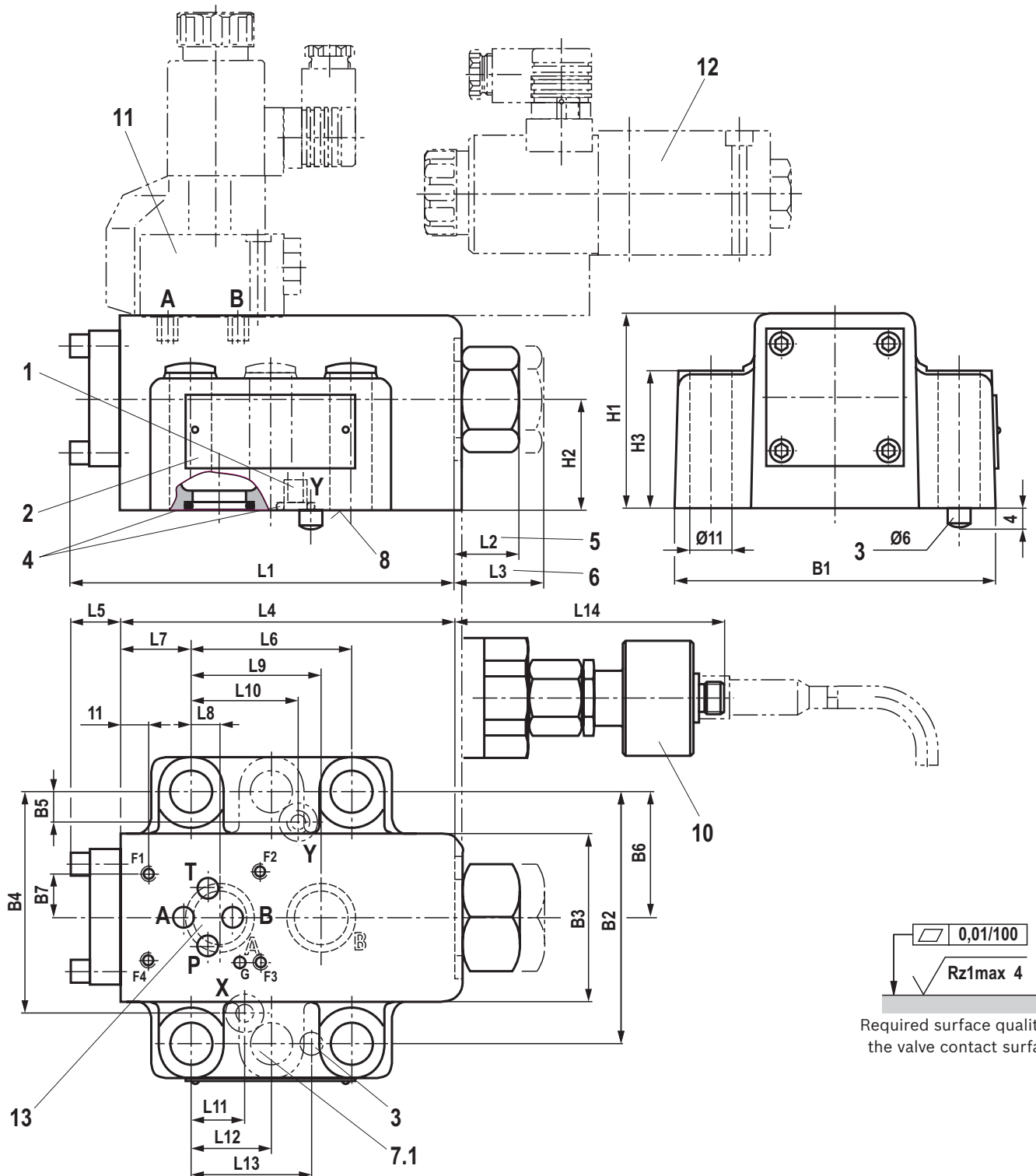
**Connections**

| NG | A, B   |              | X, Y |             |
|----|--------|--------------|------|-------------|
|    | "G"    | "UNF/UN"     | "G"  | "UNF/UN"    |
| 10 | G1/2   | 3/4-16 UNF   | G1/4 | 7/16-20 UNF |
| 20 | G1     | 1 5/16-12 UN |      |             |
| 32 | G1 1/2 | 1 7/8-12 UN  |      |             |

| Type | NG | L1    | L2   | L3   | L4   | L5   | L6   | L7   | L8   | L9   | L10  | L11  | B1  | B2   | B3   | H1 | H2   |
|------|----|-------|------|------|------|------|------|------|------|------|------|------|-----|------|------|----|------|
| SV   | 10 | 100.8 | 15.5 | 15.5 | 87.8 | 13   | 56.5 | 10.5 | 33.5 | 22.5 | 17.3 | 105  | 87  | 66.7 | 33.4 | 44 | 22   |
|      | 20 | 133   | 17.7 | 47.7 | 115  | 18   | 74.5 | 17   | 50.5 | 36   | 27   | 96.5 | 105 | 79.4 | 39.7 | 68 | 34   |
|      | 32 | 156.1 | 35.7 | 45.7 | 134  | 22.1 | 101  | 24   | 84   | 49   | 18   | 117  | 130 | 96.8 | 48.4 | 85 | 42.5 |
| SL   | 10 | 100.8 | 15.5 | 15.5 | 87.8 | 13   | 56.5 | 10.5 | 33.5 | 22.5 | 17.3 | 105  | 87  | 66.7 | 33.4 | 44 | 22   |
|      | 20 | 133   | 17.7 | 47.7 | 115  | 18   | 74.5 | 17   | 50.5 | 36   | 27   | 96.5 | 105 | 79.4 | 39.7 | 68 | 34   |
|      | 32 | 156.1 | 35.7 | 45.7 | 134  | 22.1 | 101  | 24   | 84   | 49   | 18   | 117  | 130 | 96.8 | 48.4 | 85 | 42.5 |

For item explanations, valve mounting screws and connection adapters see page 15.

**Dimensions:** Version "6U", subplate mounting  
(dimensions in mm)



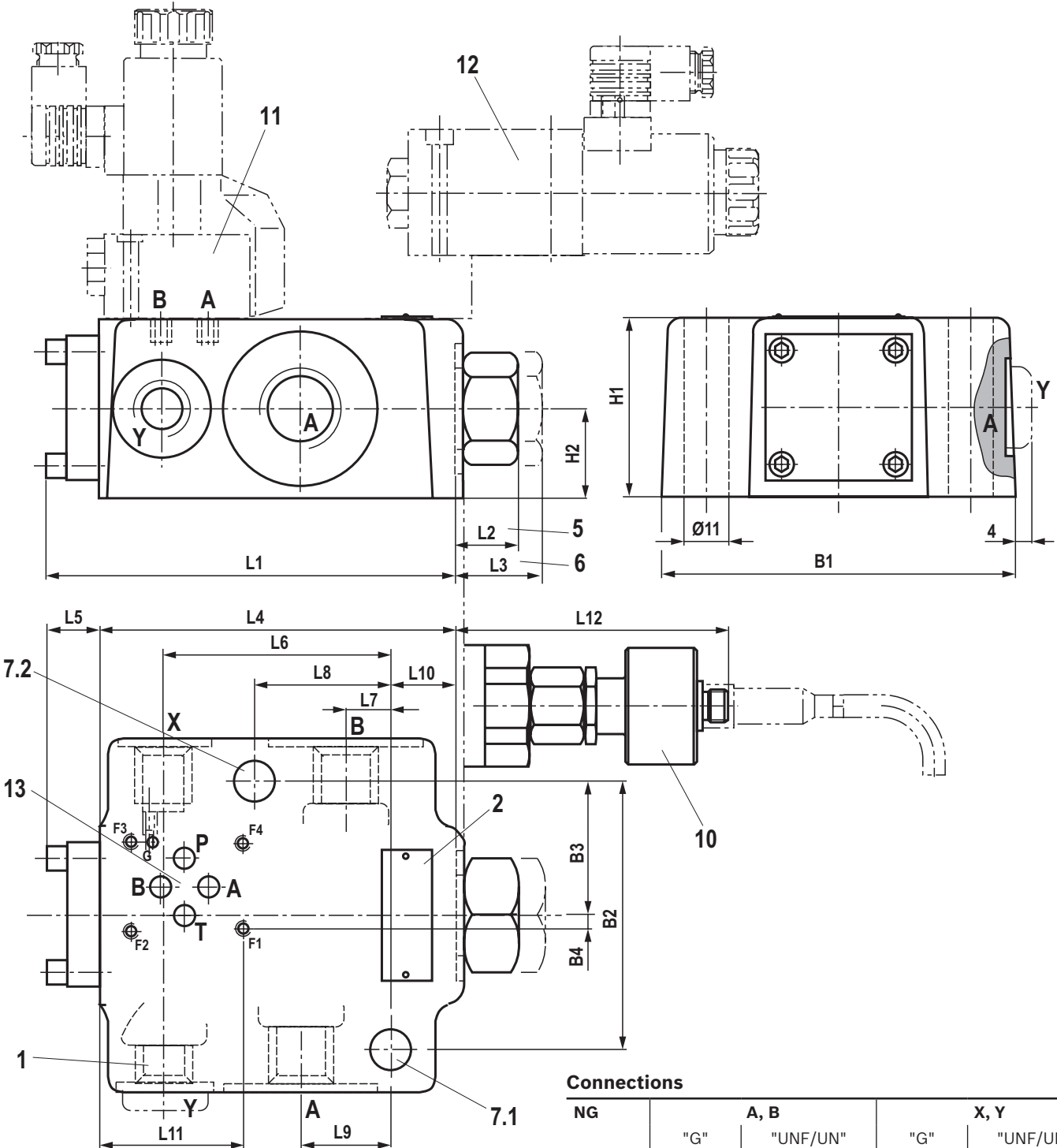
Required surface quality of the valve contact surface

| NG | L1    | L2   | L3   | L4  | L5   | L6   | L7   | L8   | L9   | L10  | L11  | L12  |
|----|-------|------|------|-----|------|------|------|------|------|------|------|------|
| 20 | 135   | 17.7 | 47.7 | 117 | 18   | 60.3 | 27.5 | 11.1 | 49.2 | 39.7 | 20.6 | -    |
| 32 | 156.1 | 36.1 | 46.1 | 134 | 22.1 | 84.2 | 39   | 16.7 | 67.5 | -    | 24.6 | 42.1 |

| NG | L13  | L14  | B1  | B2   | B3 | B4   | B5  | B6   | B7 | H1 | H2   | H3 |
|----|------|------|-----|------|----|------|-----|------|----|----|------|----|
| 20 | 44.5 | 96.5 | 100 | 79.4 | 61 | 73   | 6.4 | 39.7 | 11 | 81 | 45   | 55 |
| 32 | 62.7 | 117  | 118 | 96.8 | 75 | 92.8 | -   | 48.4 | 11 | 85 | 42.5 | 70 |

For item explanations, valve mounting screws and subplates see page 15.

**Dimensions:** Version "6U", threaded connection  
(dimensions in mm)



**Connections**

| NG | A, B   |              | X, Y |             |
|----|--------|--------------|------|-------------|
|    | "G"    | "UNF/UN"     | "G"  | "UNF/UN"    |
| 20 | G1     | 1 5/16-12 UN | G1/4 | 7/16-20 UNF |
| 32 | G1 1/2 | 1 7/8-12 UN  |      |             |

| NG | L1    | L2   | L3   | L4  | L5   | L6   | L7 | L8   | L9 | L10 | L11 | L12  | B1  | B2   | B3   | B4   | H1 | H2   |
|----|-------|------|------|-----|------|------|----|------|----|-----|-----|------|-----|------|------|------|----|------|
| 20 | 133   | 17.7 | 47.7 | 115 | 18   | 74.5 | 17 | 50.5 | 36 | 27  | 53  | 96.5 | 105 | 79.4 | 39.7 | 8.25 | 68 | 34   |
| 32 | 156.1 | 35.7 | 45.7 | 134 | 22.1 | 101  | 24 | 84   | 49 | 18  | 59  | 117  | 130 | 96.8 | 48.4 | 3.25 | 85 | 42.5 |

For item explanations, valve mounting screws and connection adapters see page 15.

## Dimensions

- 1 Port Y at version "SL" (closed at version "SV")
- 2 Name plate
- 3 Locking pin
- 4 Identical seal rings for ports
  - ▶ A and B
  - ▶ X and Y
- 5 Valve with cracking pressure version "1" and "2" (dimension L2)
- 6 Valve with cracking pressure version "3" and "4" (dimension L3)
- 7.1 6 valve mounting bores at NG32
- 7.2 2 valve mounting bores
- 8 Porting pattern according to ISO 5781
- 9 Version without position switch  
Tightening torque  $M_A = 40 \text{ Nm}$  (NG10), screwed in  
- medium-strength thread locker;  
Tightening torque  $M_A = 70 \text{ Nm}$  (NG20 and 30), screwed in  
- medium-strength thread locker;
- 10 Version with position switch "QMG24"  
(circuitry see page 16)
- 11 Directional seat valve type M-3SEW 6 ... (data sheet 22058)
- 12 Directional spool valve type 4WE 6 ... (data sheet 23178)
- 13 Porting pattern according to ISO 4401-03-02-0-05

**Subplates** (separate order) with porting pattern according to ISO 5781-06-07-0-00 (NG10), ISO 5781-08-10-0-00 (NG20), ISO 5781-10-13-0-00 (NG32) see data sheet 45100.

**Valve mounting screws** (separate order)

- ▶ **NG10**  
4 x ISO 4762 - M10 x 50 - 10.9
- ▶ **NG20**  
4 x ISO 4762 - M10 x 70 - 10.9
- ▶ **NG32**  
6 x ISO 4762 - M10 x 85 - 10.9

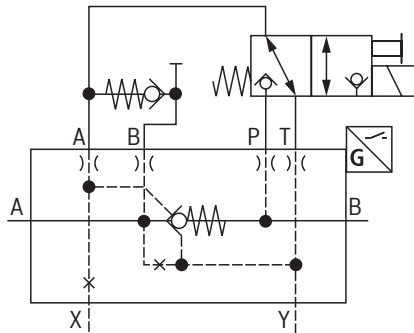
(at friction coefficient  $\mu_{\text{total}} = 0.14$ );  
tightening torque  $M_A = 75 \text{ Nm} \pm 10\%$   
(please adjust for different surface)

### Connection adapter / reducing pieces

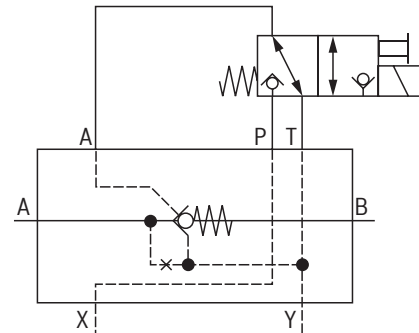
| Material number | Male thread | Internal thread | Seal<br>(separate order) |            |
|-----------------|-------------|-----------------|--------------------------|------------|
|                 |             |                 | NBR                      | FKM        |
| R900173685      | G1          | G3/4            | R900012475               | R900012509 |
| R900173689      | G1 1/2      | G1 1/4          | R900012477               | R900012511 |

## Circuit examples

Function: "Load locking"; inlet side unloading

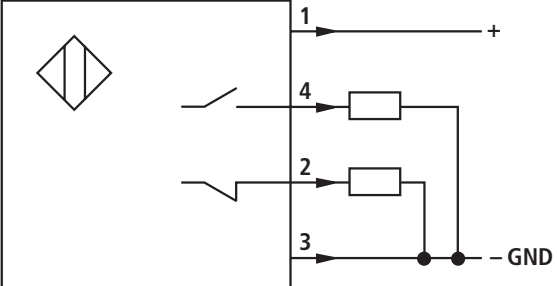
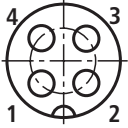


Function: Unlocking with external pilot pressure  
(version "SO168")

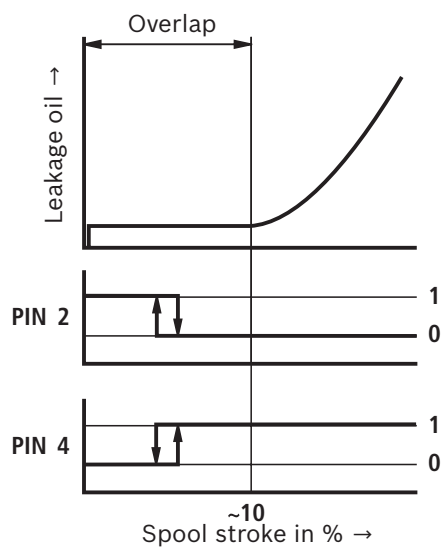


## Inductive position switch type QM: Electrical connection

The electric connection is realized via a 4-pole mating connector (separate order, see page 17) with connection thread M12 x 1.

|  |  |          |       |          |                          |          |          |          |                          |
|--|--|----------|-------|----------|--------------------------|----------|----------|----------|--------------------------|
| <b>Connection voltage:</b>   | 24 V +30%/-15%, direct voltage   |          |       |          |                          |          |          |          |                          |
| <b>Admissible residual ripple:</b>   | ≤ 10%  |          |       |          |                          |          |          |          |                          |
| <b>Load capacity:</b>  | Maximum 400 mA   |          |       |          |                          |          |          |          |                          |
| <b>Switching outputs:</b>  | PNP transistor outputs, load between switching outputs and GND   |          |       |          |                          |          |          |          |                          |
|   |  |          |       |          |                          |          |          |          |                          |
| <b>Pinout:</b>   | <table border="1"> <tr> <td><b>1</b></td> <td>+24 V</td> </tr> <tr> <td><b>2</b></td> <td>Switching output: 400 mA</td> </tr> <tr> <td><b>3</b></td> <td>0 V, GND</td> </tr> <tr> <td><b>4</b></td> <td>Switching output: 400 mA</td> </tr> </table> | <b>1</b> | +24 V | <b>2</b> | Switching output: 400 mA | <b>3</b> | 0 V, GND | <b>4</b> | Switching output: 400 mA |
| <b>1</b>   | +24 V  |          |       |          |                          |          |          |          |                          |
| <b>2</b>   | Switching output: 400 mA   |          |       |          |                          |          |          |          |                          |
| <b>3</b>   | 0 V, GND   |          |       |          |                          |          |          |          |                          |
| <b>4</b>   | Switching output: 400 mA   |          |       |          |                          |          |          |          |                          |
|  |  |          |       |          |                          |          |          |          |                          |

## Inductive position switch type QM: Switching logics

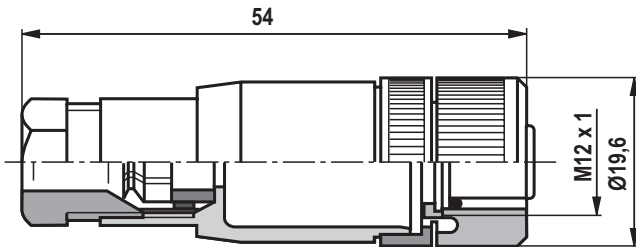




## Mating connectors (dimensions in mm)

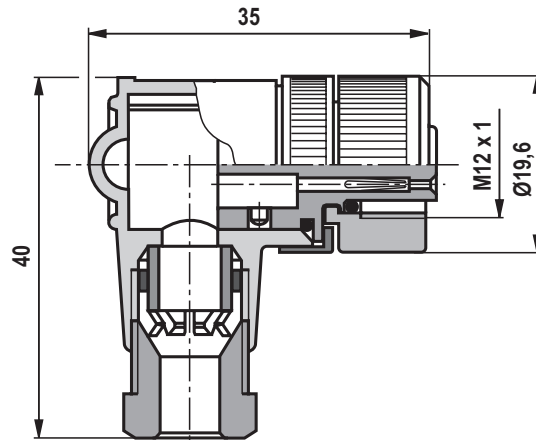
Mating connector suitable for K24 4-pole, M12 x 1 with screw connection, cable gland Pg 9.

Material no. **R900031155**



Mating connector suitable for K24 4-pole, M12 x 1 with screw connection, cable gland Pg 9, angled. Housing rotatable by 4 x 90° in relation to the contact insert.

Material no. **R900082899**



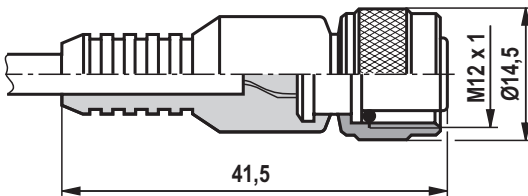
Mating connector suitable for K24-3m 4-pole, M12 x 1 with potted-in PVC cable, 3 m long.

Line cross-section: 4 x 0.34 mm<sup>2</sup>

Core marking:

|   |       |
|---|-------|
| 1 | brown |
| 2 | white |
| 3 | blue  |
| 4 | black |

Material no. **R900064381**



For further information refer to data sheet 08006.

## Further information

- ▶ Check valves, pilot operated (NG6) Data sheet 21460
- ▶ Check valves, pilot operated (NG52) Data sheet 21482
- ▶ Directional spool valve Data sheet 23178
- ▶ Directional seat valve Data sheet 22058
- ▶ Subplates Data sheet 45062
- ▶ 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
- ▶ Reliability characteristics according to EN ISO 13849 Data sheet 08012
- ▶ Hexagon socket head cap screw, metric/UNC Data sheet 08936
- ▶ Hydraulic valves for industrial applications Operating instructions 07600-B
- ▶ Selection of filters [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)
- ▶ Information on available spare parts [www.boschrexroth.com/spc](http://www.boschrexroth.com/spc)

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## Notes



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