

# Bosch Rexroth SL10GA1-4X/V pilot-operated check valve

Manufacturer: Bosch Rexroth  
Manufacturer part number / published order designation: R900450160  
Published model: SL10GA1-4X/V

## About this compilation

Prepared by Hydmaster from selected manufacturer documentation. Original technical pages follow without cropped drawings, rewritten data or altered units. This cover and index are Hydmaster editorial material, not a manufacturer-issued exact-execution datasheet.

Coverage: selected pages relevant to the identified size and configuration. Other options or neighbouring models retained on an original page apply only where explicitly identified.

## Execution notes and conditions

Original manufacturer technical edition 2024-02. Size-specific component pressure limit 350 bar; catalog control range 5-350 bar.

Required pilot pressure is load- and backpressure-dependent; use the actual decompression curve. Forward opening class is not pilot-opening pressure.

BSP working ports A/B, pilot port X and SL drain Y have separate functions. SV port Y is plugged.

## Source-page index

Source page numbers below are physical pages of each complete original PDF. The original printed page labels and technical content remain unchanged. Compiled page numbers count this cover/index.

### Source A: Bosch Rexroth Sv SI Re21468 2024 Original

| Original pages | Compiled pages | Relevant content                                                                                                                                                                                                                                                                                                                                                                                |
|----------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-4            | 2-5            | SV/SL manufacturer series overview and publication edition; Exact SL, size-code 10 (nominal size 10), G threaded-line connection, decompression A, spring code 1, Series 4X and FKM seal key; Actual SV or SL hydraulic symbol; built-on 6U alternatives are contextual; SL pilot drain, actual decompression execution and A-to-B / piloted B-to-A function; alternative section is contextual |
| 6-7            | 6-7            | Nominal size 10: original operating/control-pressure envelope, FKM temperatures, fluid, viscosity, control volumes and weight; Seal-specific hydraulic-fluid compatibility and operating restrictions                                                                                                                                                                                           |
| 10-11          | 8-9            | Threaded nominal size 10, opening-pressure code 1=1.5 bar: pressure-drop/flow curves at HLP46 40 ± 5 °C; other size panels are contextual; Pilot-pressure versus load-pressure curves for actual pre-opening execution; 350 bar NG10 and 315 bar NG20/32 limits distinguished                                                                                                                   |
| 13             | 10             | Actual SL threaded size 10, opening-pressure version 1: dimensions, BSP working ports A/B, pilot port X, Y external drain; alternative position-switch drawing is contextual                                                                                                                                                                                                                    |
| 16             | 11             | Dimension legend for the actual threaded installation and Y closed on SV; subplate mounting hardware and other circuit examples are contextual                                                                                                                                                                                                                                                  |

# Check valve, pilot operated

## Type SV and SL



- ▶ Size 10, 20, and 32
- ▶ Component series 4X
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 550 l/min

### Features

- ▶ For subplate mounting
- ▶ Porting pattern
  - ISO 5781-06-07-0-16 (NG10)
  - ISO 5781-08-10-0-16 (NG20)
  - ISO 5781-09-13-0-16 (NG32)
- ▶ For threaded connection
- ▶ 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

|                           |           |
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| Features                  | 1         |
| Ordering code             | 2         |
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Ordering code

|    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 |
| S  |    |    |    |    |    | -  | 4X | /  |    |    | -  |    |

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

Type of connection

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

Cracking pressure (see characteristic curves page 8)

|    |                                                                                                                                  |         |
|----|----------------------------------------------------------------------------------------------------------------------------------|---------|
| 06 | 1.5 bar (NG10) and 2.5 bar (NG20, NG32)                                                                                          | 1       |
|    | 3.0 bar (NG10) and 5.0 bar (NG20, NG32)                                                                                          | 2       |
|    | 6.0 bar (NG10), 7.5 bar (NG20) and 8.0 bar (NG32)                                                                                | 3       |
|    | 10.0 bar (NG10, NG20, NG32)                                                                                                      | 4       |
| 07 | Component series 40 ... 49 (40 ... 49: Unchanged installation and mounting dimensions)                                           | 4X      |
| 08 | Without attachment possibility for directional spool valve or directional seat valve                                             | No code |
|    | With attachment possibility for directional spool valve or directional seat valve (NG6)<br>(only version "SL" and NG20 and NG32) | 6U      |

Spool position monitoring (for more information, see page 17)

|    |                                          |         |
|----|------------------------------------------|---------|
| 09 | Without position switch                  | No code |
|    | With position switch (only version "B3") | QMG24   |

Seal material (observe compatibility of seals with hydraulic fluid used, see page 7)

|    |           |   |
|----|-----------|---|
| 10 | NBR seals | M |
|    | FKM seals | V |

Corrosion resistance

|    |                                                                                |         |
|----|--------------------------------------------------------------------------------|---------|
| 11 | None                                                                           | No code |
|    | Improved corrosion protection (240 h salt spray test according to EN ISO 9227) | J3      |

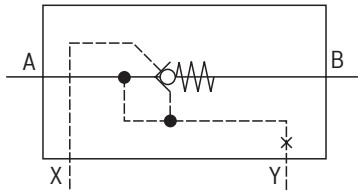
Connection thread (versions with threaded connection "G" only)

|    |                                                   |         |
|----|---------------------------------------------------|---------|
| 12 | Pipe thread "G" according to ISO 228-1            | No code |
|    | Pipe thread "UNF/UN" according to ANSI/ASME B 1.1 | /12     |
| 13 | Further details in the plain text                 | *       |

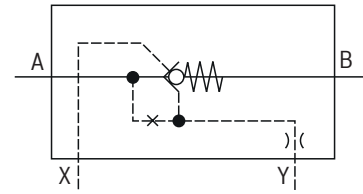

**Notice:** ♦ = Preferred type

## Symbols

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

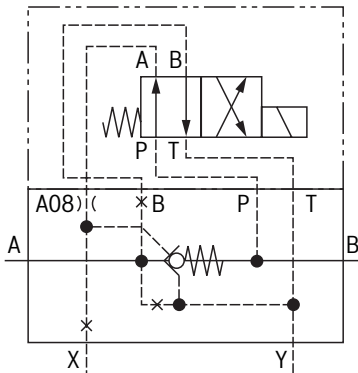


**Version "SL"** (external pilot oil return)

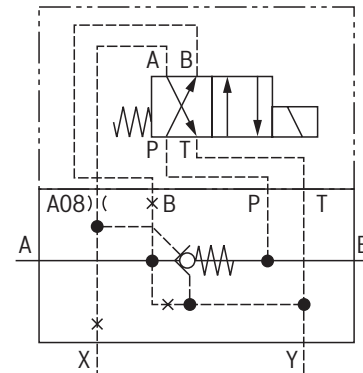


### Version "SL ...6U"

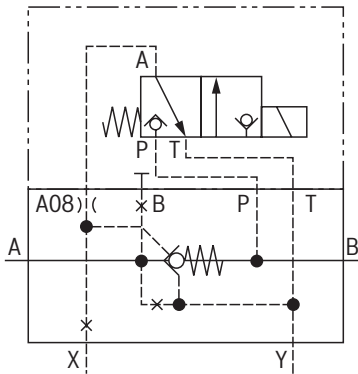
With directional spool valve type 4WE 6 D...



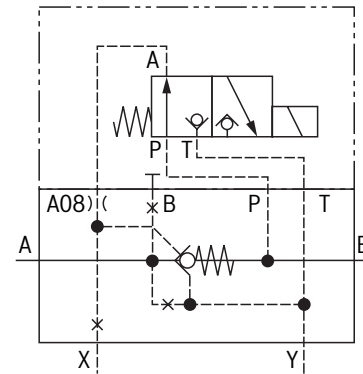
With directional spool valve type 4WE 6 Y...



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



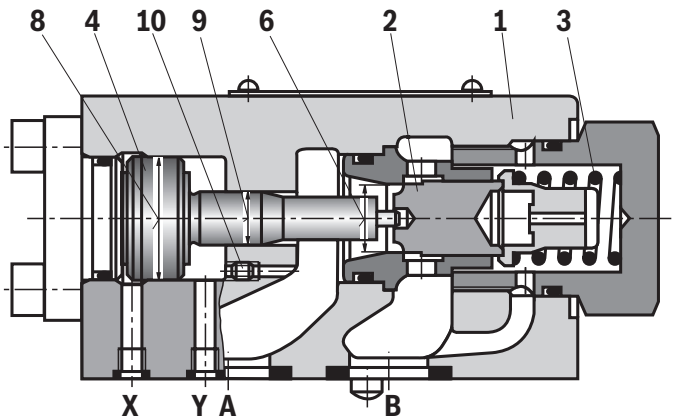
With directional seat valve type M-3SEW 6 U...



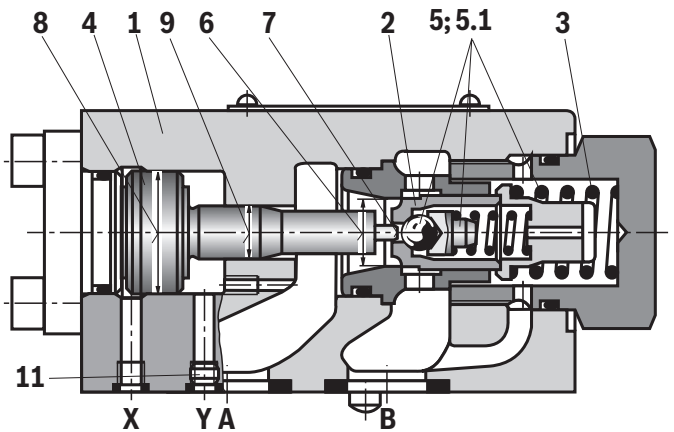
Function, section

The check valves type SV and SL are releasable check valves for subplate mounting or threaded connection. They are used for the leakage-free blocking of an actuator port, also in case of longer standstill times. The valves basically consist 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 flow can pass through the seat valve without external pilot pressure in the direction A→B (condition:  $p_A > p_B$  + cracking pressure (compression spring)). In the opposite direction, the seat valve closes hydraulically tight.

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).



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



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

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 followed by the seat poppet (2).

Notice:

- 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.

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

| 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)

**Technical data**

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

| General                                            |                                        |                                                    |                     |                     |
|----------------------------------------------------|----------------------------------------|----------------------------------------------------|---------------------|---------------------|
| Sizes                                              | NG                                     | 10                                                 | 20                  | 32                  |
| Type of connection                                 | Subplate mounting; threaded connection |                                                    |                     |                     |
| Porting pattern                                    |                                        | ISO 5781-06-07-0-16                                | ISO 5781-08-10-0-16 | ISO 5781-09-13-0-16 |
| Weight                                             | ► Subplate mounting "P"                | kg                                                 | 1.8                 | 4.7                 |
|                                                    | ► Threaded connection "G"              | kg                                                 | 2.1                 | 5.4                 |
| Installation position                              | Any                                    |                                                    |                     |                     |
| Ambient temperature range                          | °C                                     | -20 ... +80 (NBR seals)<br>-15 ... +80 (FKM seals) |                     |                     |
| Storage temperature range                          | °C                                     | +5 ... +40                                         |                     |                     |
| MTTF <sub>D</sub> values according to EN ISO 13849 | Years                                  | 150 (for further details see data sheet 08012)     |                     |                     |
| Conformity                                         | ► RoHS Directive                       | 2011/65/EU <sup>1)</sup>                           |                     |                     |

| Hydraulic                                                                                                      |                              |       |                                                    |           |
|----------------------------------------------------------------------------------------------------------------|------------------------------|-------|----------------------------------------------------|-----------|
| Maximum operating pressure                                                                                     | ► Subplate mounting "P"      | bar   | 350                                                | 315       |
|                                                                                                                | ► Threaded connection "G"    | bar   | 350                                                | 315       |
| Hydraulic fluid                                                                                                |                              |       | See table below                                    |           |
| Hydraulic fluid temperature range                                                                              |                              | °C    | -20 ... +80 (NBR seals)<br>-15 ... +80 (FKM seals) |           |
| Viscosity range                                                                                                |                              | mm²/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>2)</sup>                       |           |
| Maximum flow                                                                                                   |                              | l/min | See characteristic curves on page 8 and 10         |           |
| Pilot volume                                                                                                   | ► Port X                     | cm³   | 2.5                                                | 10.8      |
|                                                                                                                | ► Port Y (version "L" only)  | cm³   | 2.0                                                | 9.6       |
| Pilot pressure                                                                                                 | ► Subplate mounting "P"      | bar   | 5 ... 350                                          | 5 ... 315 |
|                                                                                                                | ► Threaded connection "G"    | bar   | 5 ... 350                                          | 5 ... 315 |
| Direction of flow                                                                                              |                              |       | Free from A → B, from B → A by opening             |           |
| Control areas<br>(areas according to sectional drawing on pages 4 and 5)                                       | ► Area <b>A</b> <sub>1</sub> | cm²   | 1.33                                               | 3.46      |
|                                                                                                                | ► Area <b>A</b> <sub>2</sub> | cm²   | 0.33                                               | 0.7       |
|                                                                                                                | ► Area <b>A</b> <sub>3</sub> | cm²   | 3.8                                                | 10.17     |
|                                                                                                                | ► Area <b>A</b> <sub>4</sub> | cm²   | 0.79                                               | 1.13      |

<sup>1)</sup> The product fulfills the substance requirements of the RoHS Directive 2011/65/EU.

<sup>2)</sup> 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.

## Technical data

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

| 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)                                                                                              |           |            |
|                 |                            | 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:

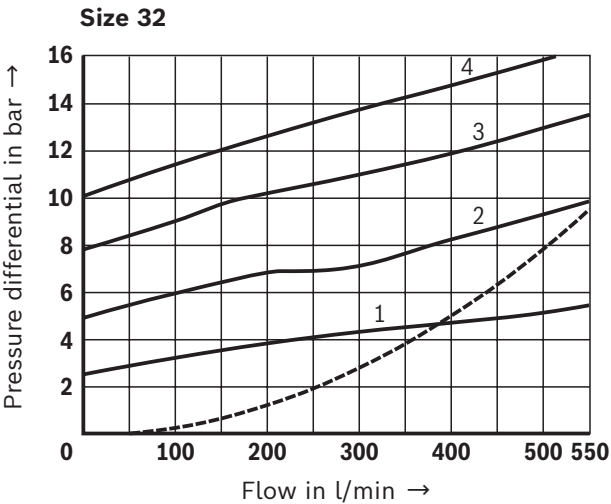
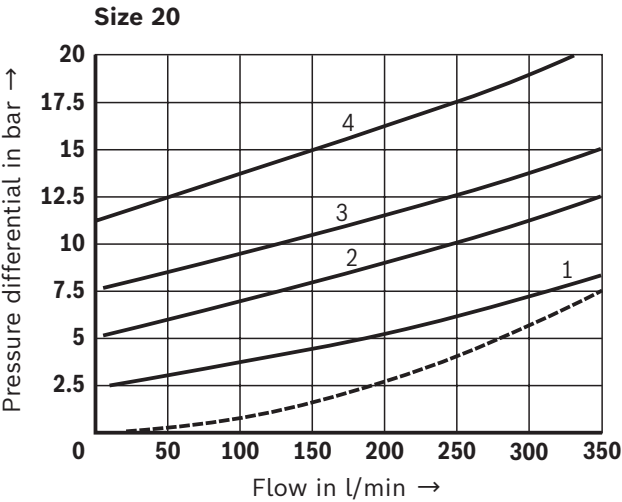
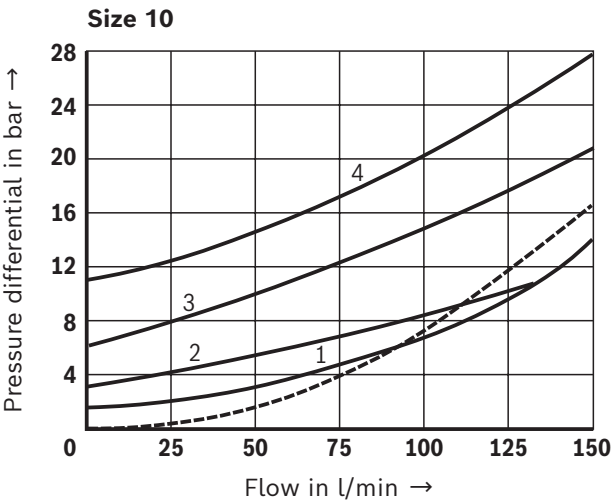
- For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- The ignition temperature of the hydraulic 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 considering conditions specific to the installation – to back up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.

**Characteristic curves:** Threaded connection  
(measured with HLP46,  $\vartheta_{oil} = 40\pm5\text{ }^{\circ}\text{C}$ )

$\Delta p$ - $q_v$  characteristic curves



— A→B  
- - - B→A

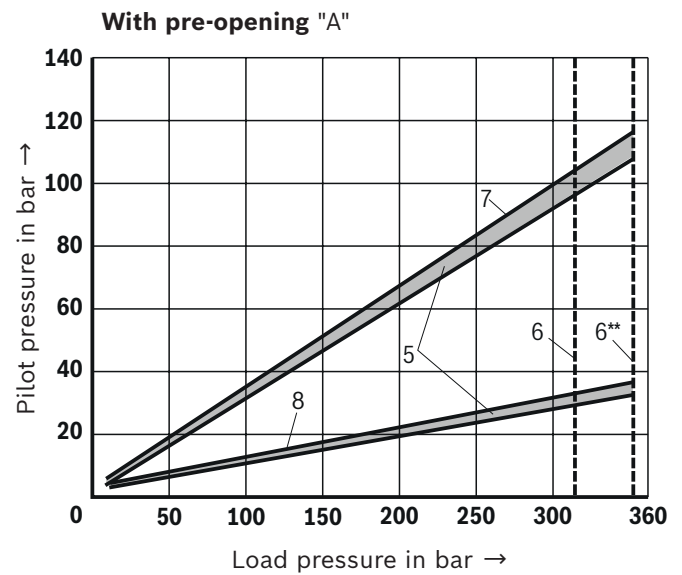
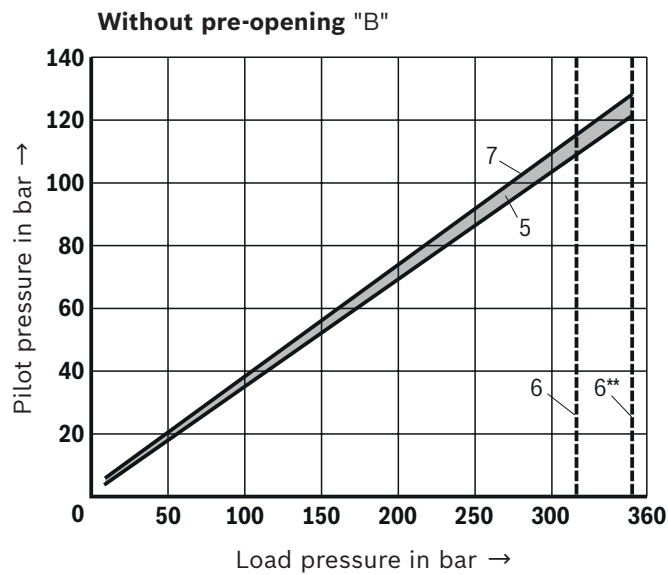
Cracking pressure in bar

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

**Notice:** Typical characteristic curves which are subject to tolerance variations.

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

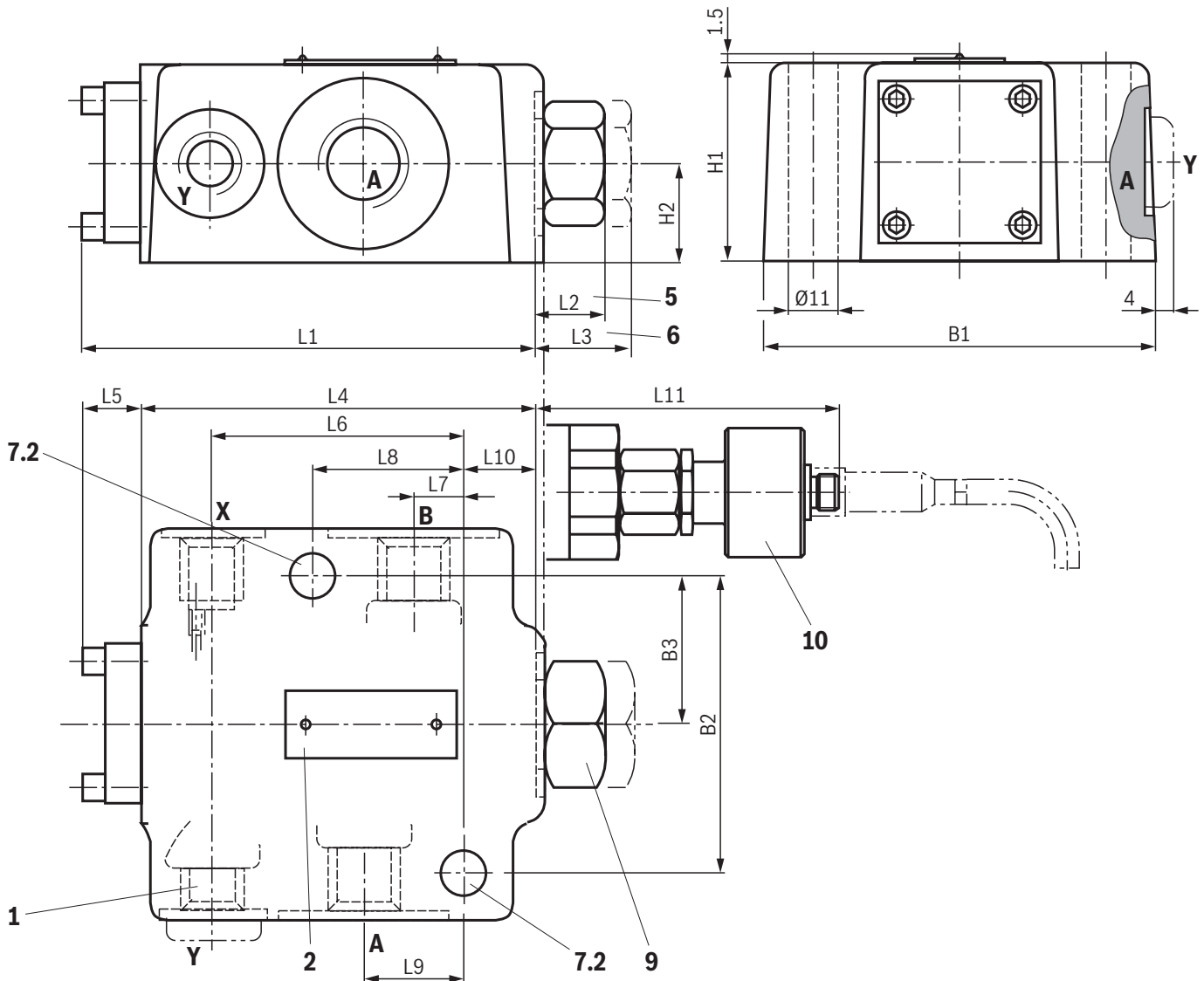
#### Pilot pressure/load pressure characteristic curves



- 5 Pilot pressure range
- 6 Limit value 315 bar
- 6\*\* Limit value 350 bar
- 7 Valve poppet
- 8 Pre-opening

 **Notice:** Typical characteristic curves which are subject to tolerance variations.

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



**Connections**

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

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

| 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 | 100  | 87  | 66.7 | 33.4 | 44 | 22   |
|      | 20 | 133   | 17.7 | 47.7 | 115  | 18   | 74.5 | 17   | 50.5 | 36   | 27   | 89.5 | 105 | 79.4 | 39.7 | 68 | 34   |
|      | 32 | 156.1 | 36.1 | 46.1 | 134  | 22.1 | 101  | 24   | 84   | 49   | 18   | 112  | 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 | 100  | 87  | 66.7 | 33.4 | 44 | 22   |
|      | 20 | 133   | 17.7 | 47.7 | 115  | 18   | 74.5 | 17   | 50.5 | 36   | 27   | 89.5 | 105 | 79.4 | 39.7 | 68 | 34   |
|      | 32 | 156.1 | 36.1 | 46.1 | 134  | 22.1 | 101  | 24   | 84   | 49   | 18   | 112  | 130 | 96.8 | 48.4 | 85 | 42.5 |

For item explanations, valve mounting screws and connection adapters see page 16.

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"
6 Valve with cracking pressure version "3" and "4"
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
10 Version with position switch "QMG24" (circuitry see page 17)
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

Valve mounting screws (separate order)

| Size | Quantity | Hexagon socket head cap screws                                                                                                                      | Material number |
|------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 10   | 4        | ISO 4762 - M10 x 50 - 10.9 - fLZn/nc/480h/C<br>Friction coefficient $\mu_{\text{total}}$ = 0.09 ... 0.14; tightening torque $M_A$ = 58 Nm $\pm$ 10% | R913015580      |
| 20   | 4        | ISO 4762 - M10 x 70 - 10.9 - fLZn/nc/480h/C<br>Friction coefficient $\mu_{\text{total}}$ = 0.09 ... 0.14; tightening torque $M_A$ = 58 Nm $\pm$ 10% | R913014772      |
| 32   | 6        | ISO 4762 - M10 x 85 - 10.9 - fLZn/nc/480h/C<br>Friction coefficient $\mu_{\text{total}}$ = 0.09 ... 0.14; tightening torque $M_A$ = 58 Nm $\pm$ 10% | R913015584      |


**Notice:**

The specified tightening torques were calculated with the total friction coefficient  $\mu$  = 0.09 ... 0.14; adapt to modified surfaces.

Subplates (separate order) see data sheet 45100.

Circuit example

Function: "load locking"; inlet side unloading

