

# Bosch Rexroth 4WH10J4X/ hydraulic directional valve

Manufacturer: Bosch Rexroth

Manufacturer part number / published order designation: R900428004

Published model: 4WH10J4X/

## 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

Actual delivery presets and equipment-level suitability are not established by the factory material-number identity.

A single universal main-flow limit is withheld; the selected original size/spool performance envelope determines allowable flow at pressure.

## 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 Web Wh Re24751 2020

| Original pages | Compiled pages | Relevant content                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-6            | 2-7            | Manufacturer WH/WEH pilot-operated family overview and edition; Exact observed model pressure class, nominal-size, return and electrical type key; Actual pilot-supply/drain and electrical connection option key; Seal-material key and required internal/external pilot restrictions; Exact main-spool symbol reference; other symbols contextual; Three-position main-spool symbols and return/centering matrix; only matching configuration applies |
| 11             | 8              | Hydraulically operated WH main-spool function with spring centering; actual selected option applies                                                                                                                                                                                                                                                                                                                                                     |
| 13-17          | 9-13           | Pilot-supply/drain routing schematic and conversion restrictions; Size-specific pilot-supply/drain routing diagrams; no field conversion assumed; Separate working, tank and pilot-return pressure ratings; Size-specific pilot-pressure limits and switching-volume requirements; Required hydraulic-fluid compatibility and pilot-pressure footnotes                                                                                                  |
| 19             | 14             | NG10 exact spool pressure-drop and performance envelopes                                                                                                                                                                                                                                                                                                                                                                                                |
| 28             | 15             | Actual size10 main-body mounting and pilot interface drawing                                                                                                                                                                                                                                                                                                                                                                                            |
| 33-34          | 16-17          | Drawing legends, pilot-valve applicability and ISO mounting pattern; Matching nominal-size mounting screws, separately ordered                                                                                                                                                                                                                                                                                                                          |
| 39             | 18             | Project-planning constraints and applicable supplementary documents                                                                                                                                                                                                                                                                                                                                                                                     |

# Directional spool valves, pilot-operated, with hydraulic or electro-hydraulic actuation

## type WEH and WH



- ▶ Size 10 ... 32
- ▶ Component series 4X; 6X; 7X
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 1100 l/min

### Features

- ▶ 4/3-, 4/2- or 3/2-way version
- ▶ Types of actuation (internal or external pilot control):
  - Electro-hydraulic (type WEH)
  - Hydraulic (type WH)
- ▶ For subplate mounting
- ▶ Porting pattern according to ISO 4401
- ▶ Spring or pressure centering, spring end position or hydraulic end position
- ▶ Wet-pin DC or AC solenoids, optional
- ▶ Electrical connection as individual or central connection
- ▶ Optional versions:
  - Manual override
  - Switching time adjustment
  - Preload valve in channel P of the main valve
  - Stroke setting and/or spool position monitoring

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**Ordering code**

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|    |    |    |    |    |    |    | /  |    |    |    |    |    |    |    | /  |    |    |    |    |    | *  |

|    |               |                |
|----|---------------|----------------|
| 01 | Up to 280 bar | <b>no code</b> |
|    | Up to 350 bar | <b>H –</b>     |
| 02 | 3-way version | <b>3</b>       |
|    | 4-way version | <b>4</b>       |

**Types of actuation**

|    |                   |            |
|----|-------------------|------------|
| 03 | Electro-hydraulic | <b>WEH</b> |
|    | Hydraulic         | <b>WH</b>  |

**Size**

|    |                         |           |
|----|-------------------------|-----------|
| 04 | NG10                    | <b>10</b> |
|    | NG16                    | <b>16</b> |
|    | NG25 (version "W.H 22") | <b>22</b> |
|    | NG25 (version "W.H 25") | <b>25</b> |
|    | NG32                    | <b>32</b> |

**Control spool return in the main valve**

|    |                         |                |
|----|-------------------------|----------------|
| 05 | By means of springs     | <b>no code</b> |
|    | Hydraulic <sup>1)</sup> | <b>H</b>       |

|    |                               |  |
|----|-------------------------------|--|
| 06 | For symbols, see page 5 and 6 |  |
|----|-------------------------------|--|

|    |                                                                                                                                  |           |
|----|----------------------------------------------------------------------------------------------------------------------------------|-----------|
| 07 | Component series 40 ... 49 (40 ... 49: unchanged installation and connection dimension) – NG10                                   | <b>4X</b> |
|    | Component series 60 ... 69 (60 ... 69: unchanged installation and connection dimension) – NG25 ("W.H 25") and NG32               | <b>6X</b> |
|    | Component series 70...79 (70...79: unchanged installation and connection dimensions) – NG16 (from series 72) and NG25 ("W.H 22") | <b>7X</b> |

**Control spool return in the pilot control valve** with 2 spool positions and 2 solenoids

(Only possible with symbols A, B, C, D, K, Z and hydraulic control spool return in the main valve)

|    |                                                        |                |
|----|--------------------------------------------------------|----------------|
| 08 | <b>With</b> spring return                              | <b>no code</b> |
|    | <b>Without</b> spring return                           | <b>O</b>       |
|    | <b>Without</b> spring return with detent <sup>2)</sup> | <b>OF</b>      |

**Pilot control valve** <sup>(2)</sup>

|    |                                     |           |
|----|-------------------------------------|-----------|
| 09 | High-power valve (data sheet 23178) | <b>6E</b> |
|----|-------------------------------------|-----------|

|    |                                                                         |             |
|----|-------------------------------------------------------------------------|-------------|
| 10 | Direct voltage 24 V <sup>2)</sup>                                       | <b>G24</b>  |
|    | Alternating voltage 230 V 50/60 Hz <sup>2)</sup>                        | <b>W230</b> |
|    | For other voltages, frequencies and electric data, see data sheet 23178 |             |

|    |                                       |                |
|----|---------------------------------------|----------------|
| 11 | <b>Without</b> manual override        | <b>no code</b> |
|    | <b>With</b> manual override           | <b>N</b>       |
|    | <b>With</b> concealed manual override | <b>N9</b>      |

**Corrosion resistance** (outside)

|    |                                                                                |                |
|----|--------------------------------------------------------------------------------|----------------|
| 12 | None (valve housing primed)                                                    | <b>no code</b> |
|    | Improved corrosion protection (240 h salt spray test according to EN ISO 9227) | <b>J3</b>      |

## Ordering code

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|    |    |    |    |    |    |    | /  |    |    |    |    |    |    |    |    | /  |    |    |    |    | *  |

### Pilot oil flow

|                                                                                                                                                                                       |                                                                       |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------|
| 13                                                                                                                                                                                    | External pilot oil supply, external pilot oil return <sup>3)</sup>    | no code |
|                                                                                                                                                                                       | Internal pilot oil supply, external pilot oil return <sup>3; 4)</sup> | E       |
|                                                                                                                                                                                       | Internal pilot oil supply, internal pilot oil return <sup>4)</sup>    | ET      |
|                                                                                                                                                                                       | External pilot oil supply, internal pilot oil return <sup>3)</sup>    | T       |
| (for type WH... <b>only "no code"</b> ;<br>Version "ET" and "T" with 3-spool position valve, pressure-centered <b>only</b> possible if $p_{St} \geq 2 \times p_{tank} + p_{St min}$ ) |                                                                       |         |

### Switching time adjustment

|    |                                                |         |
|----|------------------------------------------------|---------|
| 14 | <b>Without</b> switching time adjustment       | no code |
|    | Switching time adjustment as supply control    | S       |
|    | Switching time adjustment as discharge control | S2      |

### Electrical connection <sup>2)</sup>

|                                                                    |                                                              |                  |
|--------------------------------------------------------------------|--------------------------------------------------------------|------------------|
| 15                                                                 | <b>Individual connection</b>                                 |                  |
|                                                                    | <b>Without</b> mating connector; connector DIN EN 175301-803 | K4 <sup>5)</sup> |
| For further electrical connections, see data sheet 23178 and 08010 |                                                              |                  |

### Spool position monitoring

|                                            |                                      |         |
|--------------------------------------------|--------------------------------------|---------|
| 16                                         | <b>Without</b> position switch       | no code |
|                                            | Monitored spool position "a"         | QMAG24  |
|                                            | Monitored spool position "b"         | QMBG24  |
|                                            | Monitored spool position "a" and "b" | QMABG24 |
|                                            | Monitored rest position              | QM0G24  |
| For more information, see data sheet 24830 |                                      |         |

### Stroke setting

|    |                                       |  |
|----|---------------------------------------|--|
| 17 | For ordering code, see page 35 and 36 |  |
|----|---------------------------------------|--|

### Throttle insert <sup>2)</sup>

|    |                                |         |
|----|--------------------------------|---------|
| 18 | <b>Without</b> throttle insert | no code |
|    | Throttle Ø 0.8 mm              | B08     |
|    | Throttle Ø 1.0 mm              | B10     |
|    | Throttle Ø 1.2 mm              | B12     |
|    | Throttle Ø 1.5 mm              | B15     |
|    | Throttle Ø 2.0 mm              | B20     |
|    | Throttle Ø 2.5 mm              | B25     |

$p_{St}$  = pilot pressure  
 $p_{St min}$  = minimum pilot pressure  
 $p_{Tank}$  = tank pressure  
 $p_{\delta}$  = cracking pressure

## Ordering code

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|    |    |    |    |    |    |    | /  |    |    |    |    |    |    |    |    | /  |    |    |    |    | *  |

### Preload valve (not for NG10) <sup>2)</sup>

|    |                                       |                  |
|----|---------------------------------------|------------------|
| 19 | Without preload valve                 | no code          |
|    | With preload valve ( $p_o = 4.5$ bar) | P4,5             |
| 20 | Without pressure reducing valve       | no code          |
|    | With pressure reducing valve          | D3 <sup>6)</sup> |

### Seal material (observe compatibility of seals with hydraulic fluid used, see page 17)

|    |                                                                                     |         |
|----|-------------------------------------------------------------------------------------|---------|
| 21 | NBR seals                                                                           | no code |
|    | FKM seals                                                                           | V       |
|    | Recommended for operation with HFC hydraulic fluids together with high temperatures | MH      |
|    | Low-temperature version (only with version "Without manual override")               | MT      |
| 22 | For further information, see the plain text                                         | *       |

1) ► 2 switching positions (hydraulic end position): only symbols C, D, K, Z, Y

► 3 switching positions (hydraulically centered): only NG16, NG25 ("4W.H 25") and NG32

2) With electro-hydraulic actuation only (type WEH)

3) Pilot oil supply X or return Y **external**:

- The maximum admissible operating parameters of the pilot control valve must be observed (see data sheet 23178).
- Minimum pilot pressure: please observe page 16.
- Maximum pilot pressure: please observe page 16.

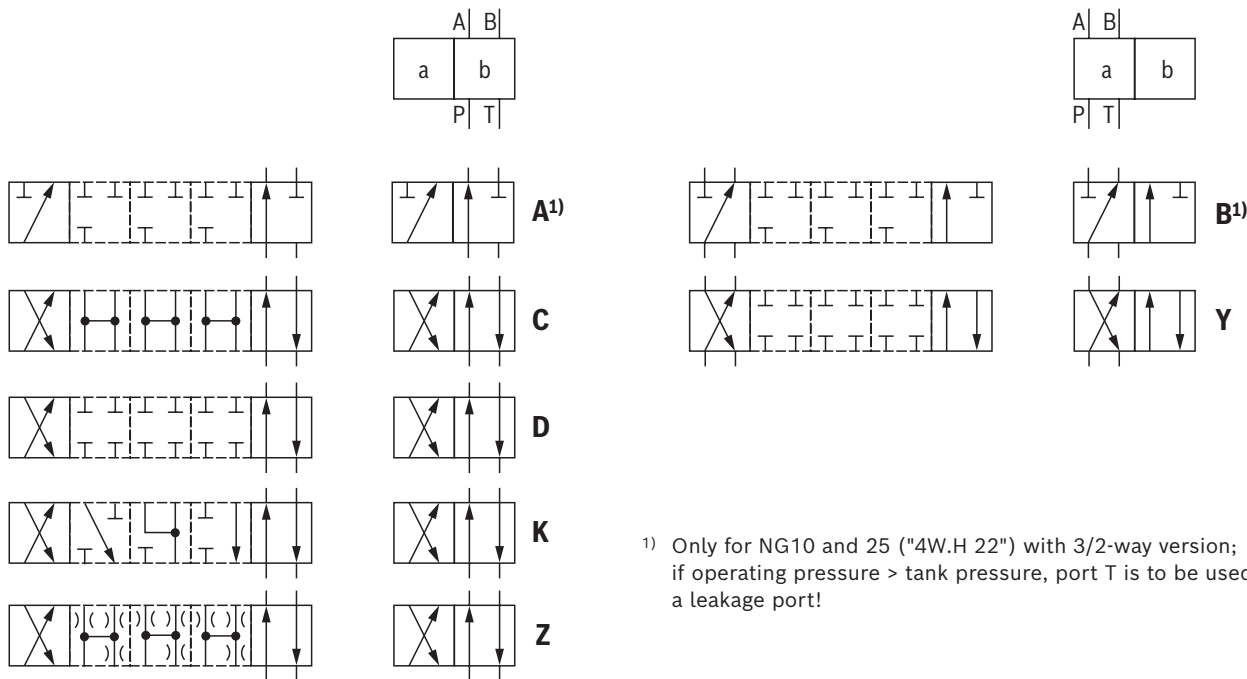
4) Pilot oil supply **internal** (version "ET" and "E"):

- Minimum pilot pressure: please observe page 16.
- Maximum pilot pressure: please observe page 16.  
With a higher pilot pressure, use of a **pressure reducing valve "D3"** is required (if it is not used, pilot pressure = operating pressure at the port).
- In order to prevent inadmissibly high pressure peaks, a **"B10" throttle insert** has to be provided in port P of the pilot control valve (see page 14).
- In connection with version "H", the **pressure reducing valve "D3"** is also required.

5) Mating connectors, separate order, see data sheet 23178

6) In connection with the **"B10"** throttle insert only

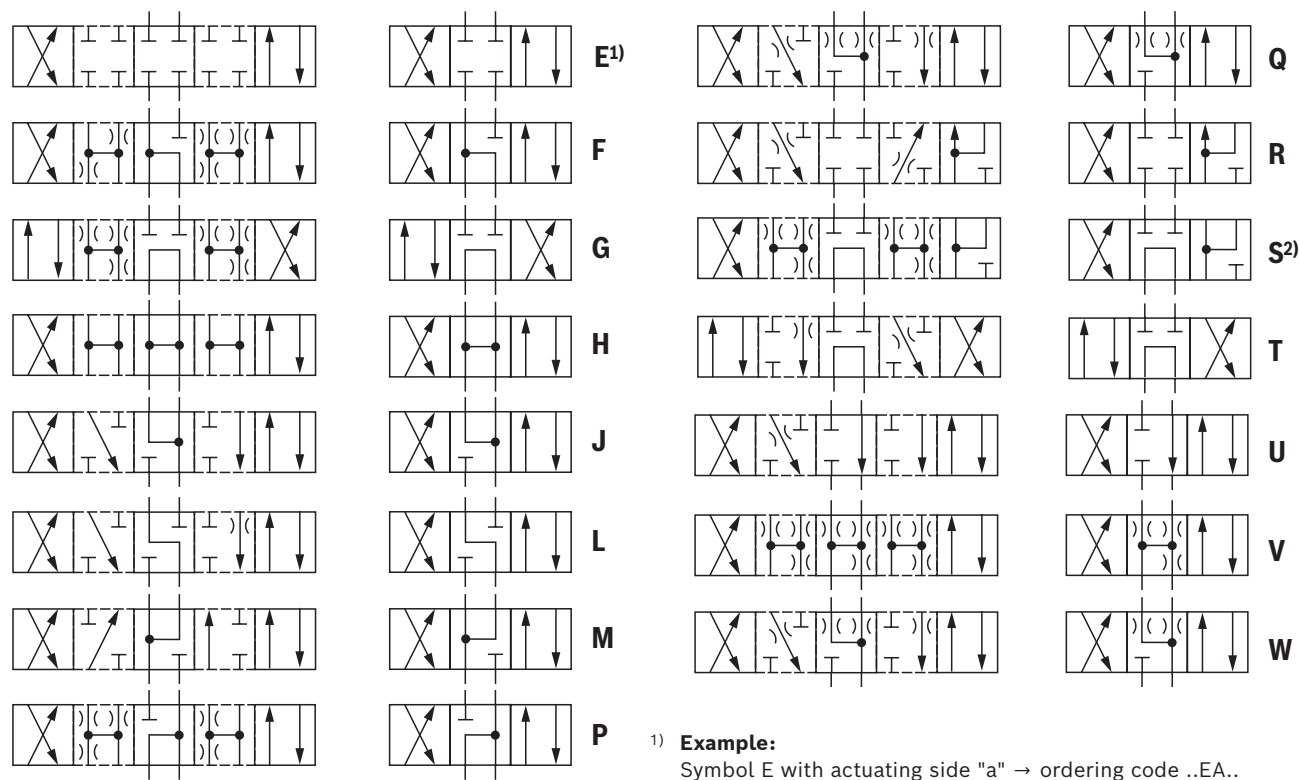
**Symbols:** 2 spool positions



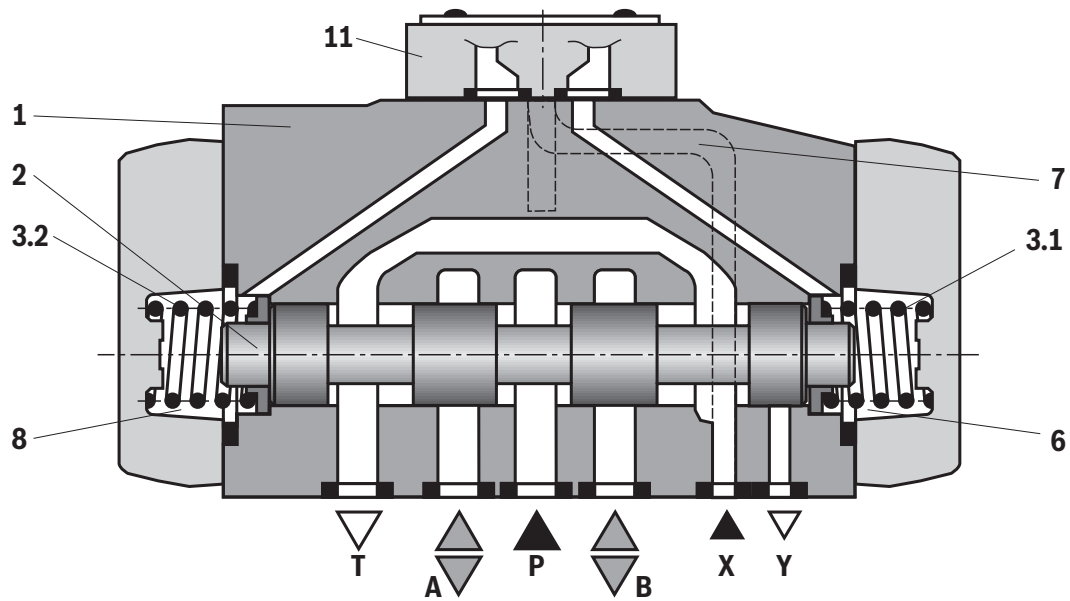
1) Only for NG10 and 25 ("4W.H 22") with 3/2-way version; if operating pressure > tank pressure, port T is to be used as a leakage port!

| Ordering code                   |                      | Type of actuation   |                              |  |
|---------------------------------|----------------------|---------------------|------------------------------|--|
| Symbol                          | Control spool return | Type WH (hydraulic) | Type WEH (electro-hydraulic) |  |
| A <sup>1)</sup> ,<br>C, D, K, Z | ../..                |                     |                              |  |
|                                 | ..H../..             |                     |                              |  |
|                                 | ..H../O              |                     |                              |  |
|                                 | ..H../OF             |                     |                              |  |
| B <sup>1)</sup> , Y             | ../..                |                     |                              |  |
|                                 | ..H../..             |                     |                              |  |

**Symbols:** 3 spool positions



| Ordering code                               |                |                      | Type of actuation   |                              |
|---------------------------------------------|----------------|----------------------|---------------------|------------------------------|
| Symbol                                      | Actuating side | Control spool return | Type WH (hydraulic) | Type WEH (electro-hydraulic) |
| E, F, G, H, J, L, M, P, Q, R, S, T, U, V, W |                | ../..                |                     |                              |
|                                             | .A             |                      |                     |                              |
|                                             | .B             |                      |                     |                              |
|                                             |                | ..H../..             |                     |                              |
|                                             |                | H.A                  |                     |                              |
|                                             |                | H.B                  |                     |                              |

**Function, section: Type WH****Directional valves type WH...**

Valve type WH is a directional spool valve with hydraulic actuation. It controls the start, stop and direction of a flow.

The directional valve basically consists of the valve housing (1), the main control spool (2), one or two return springs (3.1) and (3.2) at valves with spring return or spring centering as well as the diversion plate (11).

The main control spool (2) is actuated directly by pressurization.

The main control spool (2) is held in zero or initial position by springs or pressurization. Pilot oil supply and return are external (see page 13).

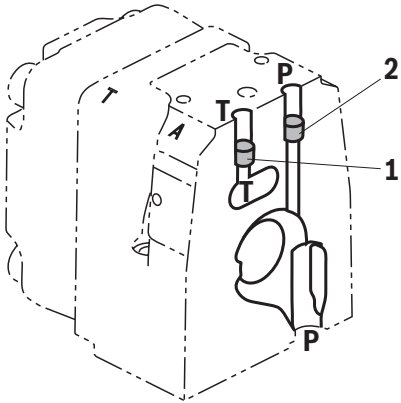
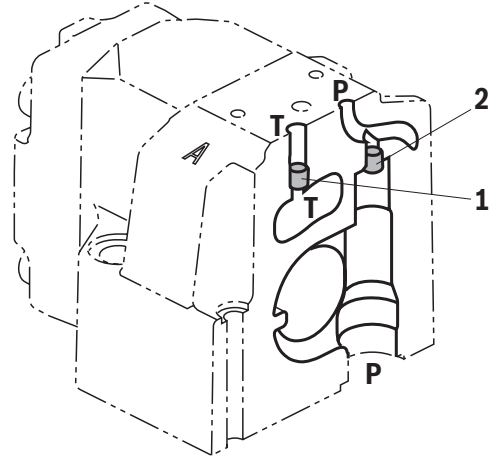
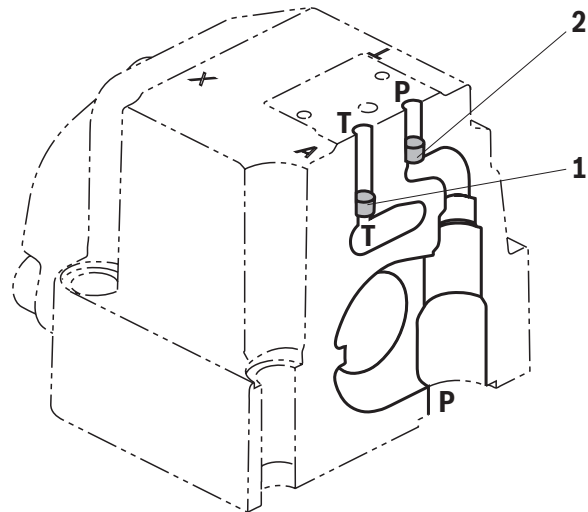
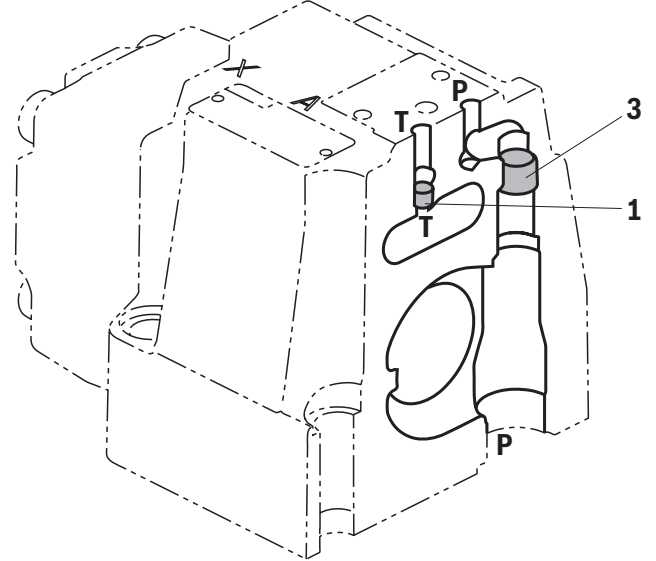
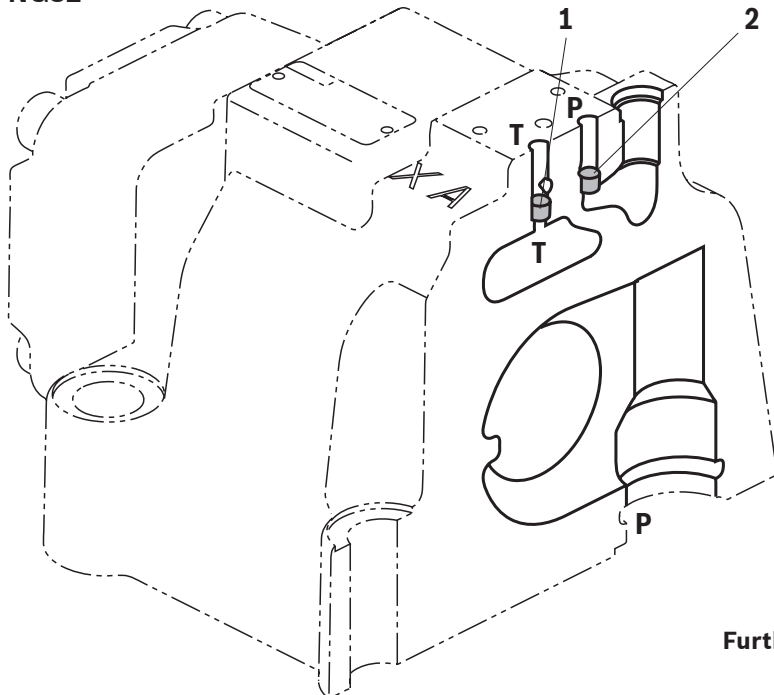
**4/3 directional valve with spring centering of the control spool**

With this version, the main control spool (2) is held in zero position by two return springs (3.1) and (3.2). Via the diversion plate (11), the spring chamber (6) is connected to port Y, the spring chamber (8) to port X.

With pilot pressure loading of one of the two front sides of the main control spool (2), the spool is moved to the spool position. In the valve, the required ports are connected in this way.

The spring on the opposite side returns the spool to the zero or initial position at pressure relief of the pressurized control spool area.

**For pilot oil supply, see page 13 and 14.**

**Pilot oil supply** (schematic illustration)**NG10****NG16****NG25 ("W.H 22")****NG25 ("W.H 25")****NG32**

- 1** Plug screw M6 according to DIN 906, wrench size 3  
– pilot oil return
- 2** Plug screw M6 according to DIN 906, wrench size 3  
– pilot oil supply
- 3** Plug screw M12 x 1.5 according DIN 906, wrench size 6  
– pilot oil supply

**Pilot oil supply**

external: **2, 3** closed  
internal: **2, 3** open

**Pilot oil return**

external: **1** closed  
internal: **1** open

**Further explanations on page 14.**

## Pilot oil supply

### Type WH...

The pilot oil supply and return is implemented **externally** via channel X and Y.

### Type WEH...

The pilot oil supply is implemented **externally** - via channel X - from a separate pressure supply.

The pilot oil return is implemented **externally** - via channel Y - into the tank.

### Type WEH...E...

The pilot oil supply is implemented **internally** from channel P of the main valve. (see page 15, footnotes <sup>5)</sup> and <sup>6)</sup>)

The pilot oil return is implemented **externally** - via channel Y - into the tank. In the subplate, port X is closed.

### Type WEH...ET...

The pilot oil supply is implemented **internally** from channel P of the main valve.

The pilot oil return is implemented **internally** - via channel T - into the tank. In the subplate, ports X and Y are closed.

### Type WEH...T...

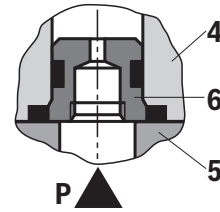
The pilot oil supply is implemented **externally** - via channel X - from a separate pressure supply.

The pilot oil return is implemented **internally** - via channel T - into the tank. In the subplate, port Y is closed.

### Throttle insert

Use of the throttle insert (5) is necessary if the pilot oil supply in channel P of the pilot control valve is to be limited (see below).

The throttle insert (5) is inserted in channel P of the pilot control valve.



### Notices:

**The modification of the pilot oil supply may only be performed by authorized specialists or at the factory.**

- Pilot oil supply X or return Y **external**:
  - The maximum admissible operating parameters of the pilot control valve must be observed (see data sheet 23178).
  - Maximum pilot pressure: please observe page 16.
- Pilot oil supply **internal** (version "ET" and "E"):
  - Minimum pilot pressure: please observe page 15.
  - In order to prevent inadmissibly high pressure peaks, a **"B10" throttle insert** has to be provided in port P of the pilot control valve (see above).
  - In connection with version "H", the **pressure reducing valve "D3"** (see page 37) is also required.

- 3** Pilot control valve
- 4** Main valve
- 5** Throttle insert

## Technical data

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

| General                                            |                                               |       |                                                                                                                                                                                                   |     |                |                |      |
|----------------------------------------------------|-----------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------|----------------|------|
| Sizes                                              |                                               | NG    | 10                                                                                                                                                                                                | 16  | 25<br>"W.H 22" | 25<br>"W.H 25" | 32   |
| Weight,<br>approx.                                 | ▶ Valve with one solenoid                     | kg    | 6.4                                                                                                                                                                                               | 8.5 | 11.5           | 17.6           | 17.6 |
|                                                    | ▶ Valve with two solenoids, spring-centered   | kg    | 6.8                                                                                                                                                                                               | 8.9 | 11.9           | 19.0           | 41.0 |
|                                                    | ▶ Valve with two solenoids, pressure-centered | kg    | 6.8                                                                                                                                                                                               | 8.9 | 11.9           | 19.0           | 41.0 |
|                                                    | ▶ Valve with hydraulic actuation (type WH...) | kg    | 5.5                                                                                                                                                                                               | 7.3 | 10.5           | 16.5           | 39.5 |
|                                                    | ▶ Switching time adjustment "S" and "S2"      | kg    | 0.8                                                                                                                                                                                               | 0.8 | 0.8            | 0.8            | 0.8  |
|                                                    | ▶ Pressure reducing valve "D3"                | kg    | 0.4                                                                                                                                                                                               | 0.4 | 0.4            | 0.4            | 0.4  |
| Installation position                              |                                               |       | With suspended installation, higher sensitivity to contamination, horizontal is recommended. For valves with hydraulic control spool return "H" and symbol C, D, K, Z, Y, horizontal is required. |     |                |                |      |
| Ambient<br>temperature range                       | ▶ Standard version                            | °C    | -20 ... +50 (NBR seals)<br>-15 ... +50 (FKM seals)                                                                                                                                                |     |                |                |      |
|                                                    | ▶ Version for HFC hydraulic fluid             | °C    | -20 ... +50                                                                                                                                                                                       |     |                |                |      |
| Storage temperature range                          |                                               | °C    | +5 ... +40                                                                                                                                                                                        |     |                |                |      |
| Surface protection (valve body)                    |                                               |       | Coating, layer thickness max. 100 µm                                                                                                                                                              |     |                |                |      |
| MTTF <sub>d</sub> values according to EN ISO 13849 |                                               | years | 100 (type WEH), 150 (type WH)<br>(For further details, see data sheet 08012)                                                                                                                      |     |                |                |      |

| Hydraulic                                                                                                         |                                           |                    |                                                                                         |                                            |     |     |     |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------|-----------------------------------------------------------------------------------------|--------------------------------------------|-----|-----|-----|
| Maximum operating pressure                                                                                        |                                           |                    |                                                                                         |                                            |     |     |     |
| ▶ Port P, A, B                                                                                                    | Type W.H                                  | bar                | 280                                                                                     | 280                                        | 280 | 280 | 280 |
|                                                                                                                   | Type H-W.H                                | bar                | 350                                                                                     | 350                                        | 350 | 350 | 350 |
| ▶ Port T                                                                                                          | Pilot oil return Y external               | Type W.H           | bar                                                                                     | 280                                        | 250 | 250 | 250 |
|                                                                                                                   |                                           | Type H-W.H         |                                                                                         | 315                                        | 250 | 250 | 250 |
| ▶ Port Y                                                                                                          | Pilot oil return Y internal <sup>1)</sup> | Type H-WEH, WEH    | bar                                                                                     | 210 with DC voltage<br>160 with AC voltage |     |     |     |
|                                                                                                                   | Pilot oil return external                 | Type H-WEH, WEH    | bar                                                                                     | 210 with DC voltage<br>160 with AC voltage |     |     |     |
|                                                                                                                   |                                           | Type WH, H-WH      | bar                                                                                     | 250                                        | 250 | 210 | 250 |
| Hydraulic fluid                                                                                                   |                                           |                    | see table page 17                                                                       |                                            |     |     |     |
| Hydraulic fluid temperature range<br>(at the valve working ports) <sup>3)</sup>                                   |                                           | °C                 | -20 ... +80 (NBR seals)<br>-15 ... +80 (FKM seals)<br>-20 ... +50 (HFC hydraulic fluid) |                                            |     |     |     |
| Viscosity range                                                                                                   |                                           | mm <sup>2</sup> /s | 2.8 ... 500                                                                             |                                            |     |     |     |
| Maximum admissible degree of contamination of the hydraulic fluid,<br>cleanliness class according to ISO 4406 (c) |                                           |                    | Class 20/18/15 <sup>2)</sup>                                                            |                                            |     |     |     |

<sup>1)</sup> As a 3-spool position valve, pressure-centered only possible if

$$p_{St} \geq 2 \times p_{tank} + p_{St \min}$$

<sup>2)</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 selecting the filters, see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

<sup>3)</sup> If type WH is used in potentially explosion-proof areas, see data sheet 07011.

**Technical data**

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

| Hydraulic                                                                                                               |               |        |        |                |                |        |      |
|-------------------------------------------------------------------------------------------------------------------------|---------------|--------|--------|----------------|----------------|--------|------|
| Size                                                                                                                    | NG            | 10     | 16     | 25<br>"W.H 22" | 25<br>"W.H 25" | 32     |      |
| Maximum pilot pressure 4)                                                                                               | bar           | 250    | 250    | 210            | 250            | 250    |      |
| Minimum pilot pressure                                                                                                  |               |        |        |                |                |        |      |
| ▶ Pilot oil supply X external (all symbols),<br>Pilot oil supply X internal (only symbols D, K, E, J, L, M, Q, R, U, W) |               |        |        |                |                |        |      |
| 3-spool position valve,<br>spring-centered                                                                              | Type H-W.H... | bar    | 12     | 14             | 12.5           | 13     | 8.5  |
|                                                                                                                         | Type W.H...   | bar    | 12     | 14             | 10.5           | 13     | 8.5  |
| 3-spool position valve, pressure-centered                                                                               |               | bar    | –      | 16             | –              | 18     | 8.5  |
| 2-spool position valve with spring end position                                                                         | Type H-W.H... | bar    | 10     | 14             | 14             | 13     | 10   |
|                                                                                                                         | Type W.H...   | bar    | 10     | 14             | 11             | 13     | 10   |
| 2-spool position valve with hydraulic end position                                                                      |               | bar    | 7      | 14             | 8              | 8      | 5    |
| ▶ Pilot oil supply X internal (only type WEH)<br>(with symbols C, F, G, H, P, T, V, Z, S 5))                            | bar           | 7.5 6) | 4.5 7) | 4.5 7)         | 4.5 7)         | 4.5 7) |      |
| Free flow cross-sections in zero position with symbols Q, V and W                                                       |               |        |        |                |                |        |      |
| ▶ Symbol <b>Q</b>                                                                                                       | A – T; B – T  | mm²    | 13     | 32             | 78             | 83     | 78   |
| ▶ Symbol <b>V</b>                                                                                                       | P – A; P – B  | mm²    | 13     | 32             | 73             | 83     | 73   |
|                                                                                                                         | A – T; B – T  | mm²    | 13     | 32             | 84             | 83     | 84   |
| ▶ Symbol <b>W</b>                                                                                                       | A – T; B – T  | mm²    | 2.4    | 6              | 10             | 14     | 20   |
| Pilot volume for switching process                                                                                      |               |        |        |                |                |        |      |
| ▶ 3-spool position valve, spring-centered                                                                               |               | cm³    | 2.04   | 5.72           | 7.64           | 14.2   | 29.4 |
| ▶ 2-spool position valve                                                                                                |               | cm³    | 4.08   | 11.45          | 15.28          | 28.4   | 58.8 |
| ▶ 3-spool position valve, pressure-centered                                                                             |               |        |        |                |                |        |      |
| from zero position in switching position "a"                                                                            | Type WH       | cm³    | –      | 2.83           | –              | 7.15   | 14.4 |
|                                                                                                                         | Type WEH      | cm³    | –      | 2.83           | –              | 7.15   | 14.4 |
| from switching position "a" in zero position                                                                            | Type WH       | cm³    | –      | 5.72           | –              | 14.18  | 29.4 |
|                                                                                                                         | Type WEH      | cm³    | –      | 2.9            | –              | 7.0    | 15.1 |
| from zero position in switching position "b"                                                                            | Type WH       | cm³    | –      | 5.72           | –              | 14.18  | 29.4 |
|                                                                                                                         | Type WEH      | cm³    | –      | 5.72           | –              | 14.15  | 29.4 |
| from switching position "b" in zero position                                                                            | Type WH       | cm³    | –      | 8.55           | –              | 19.88  | 43.8 |
|                                                                                                                         | Type WEH      | cm³    | –      | 2.83           | –              | 5.73   | 14.4 |
| Pilot flow for shortest switching time, approx.                                                                         | l/min         | 35     | 35     | 35             | 35             | 45     |      |

## 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, HVLDP | 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 notices 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 this hydraulic fluid is used, small amounts of dissolved zinc may get into the hydraulic system.

### ► Flame-resistant – containing water:

- Due to 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.
- Dependent on the hydraulic fluid used, the maximum ambient and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, a maximum duty cycle of 50% in continuous operation has to be set for on/off valves (measuring period 300 s). If this is impossible due to the function, an energy-reducing control of these components is recommended, e.g. via a PWM plug-in amplifier.

#### 4) ► Internal pilot oil supply:

- With a higher pilot pressure, use of a **pressure reducing valve "D3"** is required (if it is not used, pilot pressure = operating pressure at the port).
- In connection with version "H-", the **pressure reducing valve "D3"** is also required.

#### ► External pilot oil supply:

- Compliance with the maximum pilot pressure must be ensured by appropriate measures (e.g. protection of the separate pilot oil circuit by using a pressure relief valve).

#### 5) Symbol S only for NG16

#### 6) For symbols C, F, G, H, P, T, V, Z, an internal pilot oil supply is only possible if the flow from P to T in the central position (for 3-spool position valve) or while crossing the central position (for 2-spool position valve) is so large that the pressure differential of P to T reaches a value of at least 7.5 bar.

For a pressure differential below 7.5 bar, a check valve with a cracking pressure of 7.5 bar is to be provided in the return line to the tank. An external pilot oil supply Y is required.

#### 7) Pilot oil supply X internal is only possible for a pressure at P of minimum 4.5 bar.

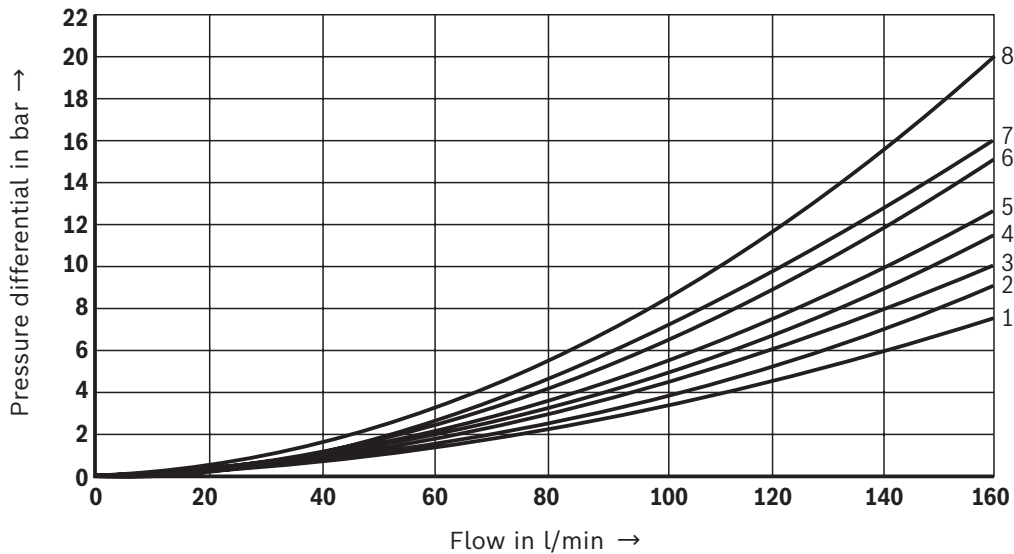
For symbols with negative overlap F, G, H, P, T, V, (S only NG16), a certain flow from P to T in the central position is necessary for this purpose (see "characteristic curves").

For symbols C, HC, Z, HZ, a flow of >160 l/min is required during passing over the central position for NG16, for NG22, 25 and 32 a flow of >180 l/min.

If the required flows are not reached, a preload valve has to be used. When using a preload valve, the pressure differential of the preload valve of the corresponding size (see page 38) is to be added to the corresponding pressure differential in case of direction of flow P ("see characteristic curves").

**Characteristic curves: NG10**  
(measured with HLP46,  $\vartheta_{\text{oil}} = 40 \pm 5 \text{ }^{\circ}\text{C}$ )

$\Delta p$ - $q_V$  characteristic curves



| Symbol              | Spool position |       |                     |                     | Zero position |       |       |
|---------------------|----------------|-------|---------------------|---------------------|---------------|-------|-------|
|                     | P - A          | P - B | A - T <sup>1)</sup> | B - T <sup>1)</sup> | A - T         | B - T | P - T |
| E, Y, D, Q, V, W, Z | 1              | 1     | 3                   | 5                   |               |       |       |
| F                   | 1              | 3     | 1                   | 4                   | 3             | –     | 6     |
| G, T                | 4              | 2     | 4                   | 7                   | –             | –     | 8     |
| H, C                | 3              | 3     | 1                   | 7                   | 1             | 5     | 5     |
| J, K                | 1              | 2     | 1                   | 6                   |               |       |       |
| L                   | 2              | 2     | 1                   | 4                   | 2             | –     | –     |
| M                   | 3              | 3     | 2                   | 5                   |               |       |       |
| P                   | 3              | 1     | 2                   | 7                   | –             | 5     | 7     |
| R                   | 1              | 2     | 3                   | –                   |               |       |       |
| U                   | 2              | 2     | 3                   | 6                   | –             | 6     | –     |
| A, B                | 1              | 1     | –                   | –                   |               |       |       |

<sup>1)</sup> The pressure differential refers to the use of port T. If port T1 is used in addition, the pressure differential may be lower. If only port T1 is used, the relations A - T and B - T may be reversed.

**Performance limits: NG10**  
(measured with HLP46,  $\vartheta_{\text{oil}} = 40 \pm 5 \text{ }^{\circ}\text{C}$ )

**2-spool position valves –  $q_{V \text{ max}}$  in l/min**

| Symbol                                                                                                               | Operating pressure $p_{\text{max}}$ in bar |     |     |     |     |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----|-----|-----|-----|
|                                                                                                                      | 70                                         | 140 | 210 | 280 | 350 |
| <b>X external – spring end position in the main valve<sup>1)</sup></b><br>(at $p_{\text{St min}} = 12 \text{ bar}$ ) |                                            |     |     |     |     |
| C, D, K, Y, Z                                                                                                        | 160                                        | 160 | 160 | 160 | 160 |
| <b>X external – hydraulic end position in the main valve</b>                                                         |                                            |     |     |     |     |
| HC, HD, HK, HZ, HY                                                                                                   | 160                                        | 160 | 160 | 160 | 160 |

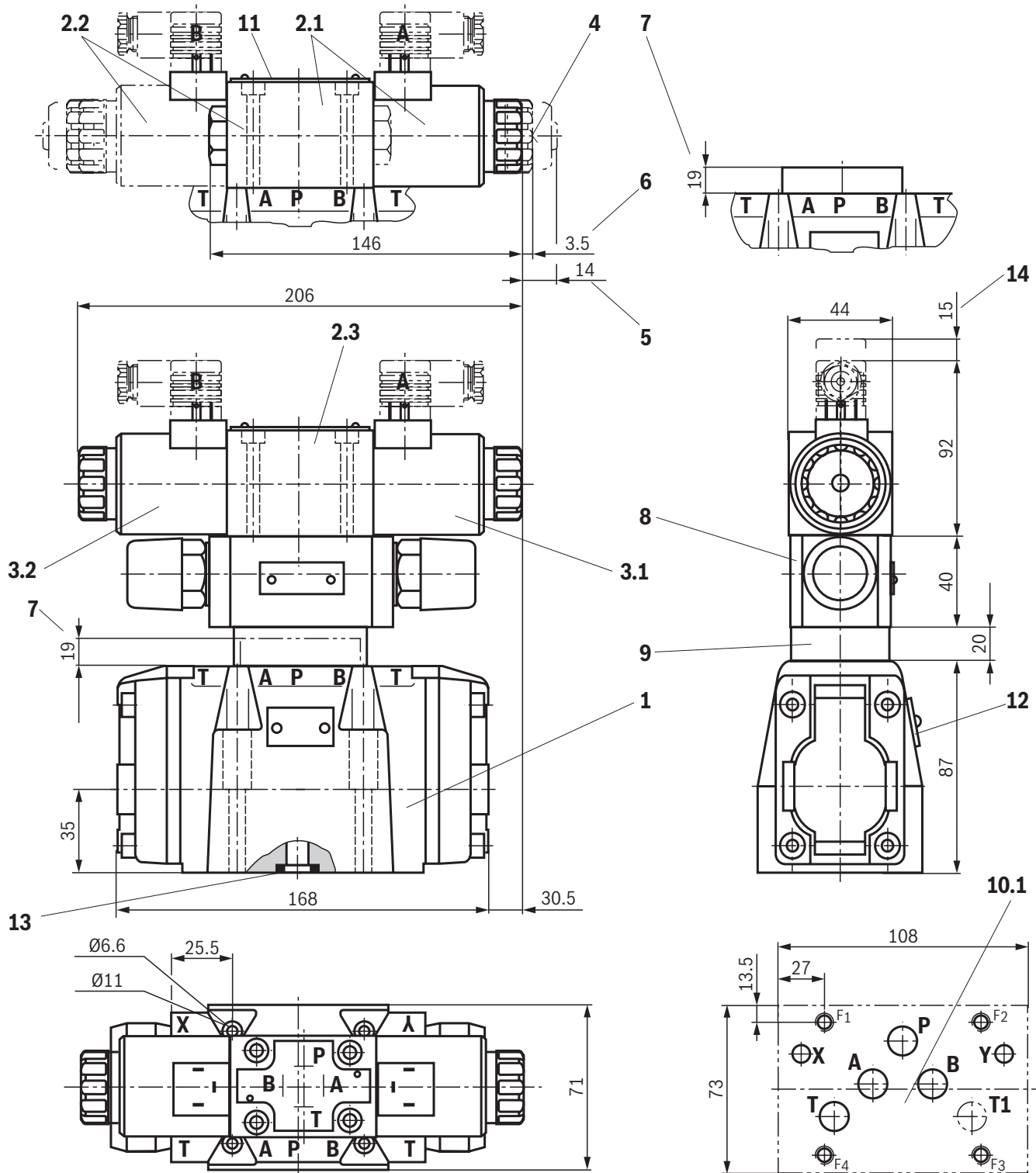
**3-spool position valves –  $q_{V \text{ max}}$  in l/min**

| Symbol                              | Operating pressure $p_{\text{max}}$ in bar |     |     |     |     |
|-------------------------------------|--------------------------------------------|-----|-----|-----|-----|
|                                     | 70                                         | 140 | 210 | 280 | 350 |
| <b>X external – spring-centered</b> |                                            |     |     |     |     |
| E, J, L, M, Q, U, V, W, R           | 160                                        | 160 | 160 | 160 | 160 |
| F, P                                | 160                                        | 120 | 100 | 90  | 90  |
| G, T                                | 160                                        | 160 | 160 | 130 | 120 |
| H                                   | 160                                        | 160 | 120 | 110 | 100 |

<sup>1)</sup> If the pilot pressure fails, the function of the return spring is no longer guaranteed with the specified flow values.

For important notices, see page 27.

# **Dimensions:** NG10 (dimensions in mm)



Required surface quality of the valve contact surface

0,01/100  
Rzmax 4

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

For item explanations and subplates, see page 33.  
Valve mounting screws, see page 34.

## Dimensions

- 1 Main valve
- 2 Pilot control valve type 4WE 6 ... (data sheet 23178):
  - 2.1 ► Pilot control valve type 4WE 6 D... (1 solenoid) for main valves with Symbols C, D, K, Z  
Symbols HC, HD, HK, HZ
    - Pilot control valve type 4WE 6 JA... (1 solenoid "a") for main valves with symbols EA, FA, etc.,  
Spring return
    - Pilot control valve type 4WE 6 MA... (1 solenoid "a") for main valves with symbols HEA, HFA, etc.,  
hydraulic control spool return
  - 2.2 ► Pilot control valve type 4WE 6 Y... (1 solenoid "a") for main valves with Symbol Y  
Symbol HY
    - Pilot control valve type 4WE 6 JB... (1 solenoid "b") for main valves with symbols EB, FB, etc.,  
Spring return
    - Pilot control valve type 4WE 6 MB... (1 solenoid "b") for main valves with symbols HEB, HFB, etc., hydraulic control spool return
  - 2.3 ► Pilot control valve type 4WE 6 J... (2 solenoids) for main valves with 3 spool positions, spring-centered
    - Pilot control valve type 4WE 6 M... (2 solenoids) for main valves with 3 spool positions,  
pressure-centered
- 3.1 Solenoid "a"
- 3.2 Solenoid "b"
- 4 Manual override, "N", optional
  - Actuation of the manual override is only possible up to a tank pressure of approx. 50 bar. Avoid damage to the bore of the manual override. (Special tool for the operation, separate order, material no. **R900024943**). When the manual override is blocked, the operation of the solenoid must be prevented.
  - Simultaneous actuation of the solenoids must be prevented.
- 5 Solenoid **without** manual override
- 6 Solenoid **with** manual override
- 7 Height of the diversion plate with hydraulic actuation (type WH...)
- 8 Switching time adjustment (wrench size 6), optional
- 9 Pressure reducing valve, optional
- 10.1 Machined valve contact surface; porting pattern according to ISO 4401-05-05-0-05
- 10.2 Machined valve contact surface; porting pattern according to ISO 4401-07-07-0-05
- 10.3 Machined valve contact surface; porting pattern according to ISO 4401-08-08-0-05
- 10.4 Machined valve contact surface; porting pattern according to ISO 4401-10-09-0-05
- 11 Name plate pilot control valve
- 12 Name plate complete valve
- 13 Seal rings
- 14 Space required for removing the mating connector
- 15 2-spool position valves with spring end position in the main valve (symbols A, C, D, K, Z)
- 16 2-spool position valves with spring end position in the main valve (symbols B, Y)
- 17 3-spool position valves, spring-centered;  
2-spool position valves with hydraulic end position in the main valve
- 18 3-spool position valves, pressure-centered
- 19 Locking pin

**Subplates** (separate order) with porting pattern according to ISO 4401, see data sheet 45100.

**Valve mounting screws, see page 34.**

## Dimensions

### Valve mounting screws (separate order)

| Size | Quantity | Hexagon socket head cap screws                                                                                                                                       | Material number                            |
|------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| 10   | 4        | ISO 4762 - M6 x 45 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B<br>Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 12.5 \text{ Nm} \pm 10\%$ | R913043777                                 |
|      | or       |                                                                                                                                                                      |                                            |
|      | 4        | 1/4-20 UNC x 1 3/4" ASTM-A574                                                                                                                                        | Not included in the Rexroth delivery range |
| 16   | 4        | ISO 4762 - M10 x 60 - 10.9-fLZn/nc/480h/C<br>Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 58 \text{ Nm} \pm 10\%$          | R913014770                                 |
|      | 2        | ISO 4762 - M6 x 60 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B<br>Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 12.5 \text{ Nm} \pm 10\%$ | R913043410                                 |
|      | or       |                                                                                                                                                                      |                                            |
|      | 4        | Hexagon socket head cap screws UNC 3/8-16 UNC x 2 1/4" - ASTM-A574                                                                                                   | Not included in the Rexroth delivery range |
|      | 2        | Hexagon socket head cap screws UNC 1/4-20 UNC x 2 1/4" - ASTM-A574                                                                                                   |                                            |
| 25   | 6        | ISO 4762 - M12 x 60 - 10.9-fLZn/nc/480h/C<br>Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; Tightening torque $M_A = 100 \text{ Nm} \pm 10\%$         | R913015613                                 |
|      | or       |                                                                                                                                                                      |                                            |
|      | 6        | UNC 1/2-13 UNC x 2 1/2" ASTM-A574                                                                                                                                    | Not included in the Rexroth delivery range |
| 32   | 6        | ISO 4762 - M20 x 80 - 10.9-fLZn/nc/480h/C<br>Friction coefficient $\mu_{\text{total}} = 0.09 \dots 0.14$ ; tightening torque $M_A = 340 \text{ Nm} \pm 10\%$         | R913008472                                 |
|      | or       |                                                                                                                                                                      |                                            |
|      | 6        | UNC 3/4-10 UNC x 3 1/4" - ASTM-A574                                                                                                                                  | Not included in the Rexroth delivery range |

## Project planning information

The stipulations of the Machinery Directive 2006/42/EC are to be adhered to.

Please also note data sheet 08012 with information on MTTF<sub>D</sub> values and shock and vibration loads.

## Further information

|                                                                                            |                                                                              |
|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| ▶ Directional spool valve                                                                  | Data sheet 23178                                                             |
| ▶ Subplates                                                                                | Data sheet 45100                                                             |
| ▶ Inductive position switch and proximity sensors (contactless)                            | Data sheet 24830                                                             |
| ▶ 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                                               |
| ▶ General product information on hydraulic products                                        | Data sheet 07008                                                             |
| ▶ Assembly, commissioning and maintenance of industrial valves                             | Data sheet 07300                                                             |
| ▶ Mating connectors and cable sets for valves and sensors                                  | Data sheet 08006                                                             |
| ▶ Directional spool and seat valves with electrical actuation and M12x1 plug-in connection | Data sheet 08010                                                             |
| ▶ Use of non-electrical hydraulic components in an explosive environment (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>       |