

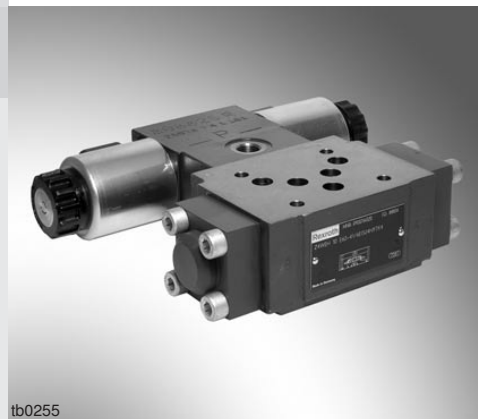
# 4/2 and 4/3 directional shut-off valves, internally pilot operated, externally pilot operated

**RE 24753/08.08**  
Replaces: 04.93

1/12

## Types Z4WEH and Z4WH

Size 10  
Component series 4X  
Maximum operating pressure 315 bar  
Maximum flow 160 l/min



tb0255

## Table of contents

| Content                               | Page   |
|---------------------------------------|--------|
| Features                              | 1      |
| Ordering code                         | 2, 3   |
| Mating connectors                     | 3      |
| Symbols                               | 4, 5   |
| Function, section                     | 6, 7   |
| Technical data                        | 8      |
| Characteristic curves                 | 9      |
| Unit dimensions                       | 10, 11 |
| Stroke adjustment, attachment options | 12     |

## Features

- Directional spool valve, pilot operated
- 2 types of actuation:
  - Electrohydraulic (type WEH)
  - Hydraulic (type WH)
- Function as shut-off through-valve or shut-off/through valve/short-circuit valve
- Free flow in P and T in every spool position
- Porting pattern to ISO 4401-05-04-0-05
- Wet-pin DC or AC voltage solenoids, optional
- Manual override, optional
- Electrical connection as individual or central connection, see RE 23178 and RE 08010
- Switching time adjustment, optional
- Stroke adjustment of main spool, optional
- Inductive position switch and proximity sensors (contactless), see RE 24830

Information on available spare parts:  
[www.boschrexroth.com/spc](http://www.boschrexroth.com/spc)

## Ordering code

|                                                                                                                                       |                                |  |           |             |  |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--|-----------|-------------|--|--|--|--|--|--|
|                                                                                                                                       | <b>Z4</b>                      |  | <b>10</b> | <b>-4X/</b> |  |  |  |  |  |  |
| <b>Types of actuation</b><br>Electrohydraulic<br>Hydraulic                                                                            | <b>= WEH</b><br><b>= WH</b>    |  |           |             |  |  |  |  |  |  |
| <b>Size</b><br>NG10                                                                                                                   | <b>= 10</b>                    |  |           |             |  |  |  |  |  |  |
| <b>Spool symbols</b> , see pages 4 and 5<br>Component series 40 to 49<br>(40 to 49: unchanged installation and connection dimensions) | <b>= 4X</b>                    |  |           |             |  |  |  |  |  |  |
| <b>Pilot valve</b><br>High-performance valve (RE 23178)                                                                               | <b>= 6E <sup>1)</sup></b>      |  |           |             |  |  |  |  |  |  |
| DC voltage 24 V                                                                                                                       | <b>= G24 <sup>1)</sup></b>     |  |           |             |  |  |  |  |  |  |
| AC voltage 230 V 50/60 Hz                                                                                                             | <b>= W230 <sup>1)</sup></b>    |  |           |             |  |  |  |  |  |  |
| DC voltage 205 V 50/60 Hz                                                                                                             | <b>= G205 <sup>1; 2)</sup></b> |  |           |             |  |  |  |  |  |  |
| For further voltages, frequencies and electrical data, see data sheet RE 23178                                                        |                                |  |           |             |  |  |  |  |  |  |
| <b>Without</b> manual override                                                                                                        | <b>= No code</b>               |  |           |             |  |  |  |  |  |  |
| <b>With</b> manual override                                                                                                           | <b>= N <sup>1)</sup></b>       |  |           |             |  |  |  |  |  |  |
| <b>With</b> concealed manual override (standard)                                                                                      | <b>= N9 <sup>1)</sup></b>      |  |           |             |  |  |  |  |  |  |
| External pilot oil supply, external pilot oil drain                                                                                   | <b>= No code</b>               |  |           |             |  |  |  |  |  |  |
| Internal pilot oil supply, internal pilot oil drain (standard)                                                                        | <b>= ET</b>                    |  |           |             |  |  |  |  |  |  |
| External pilot oil supply, internal pilot oil drain<br>(with type Z4WH... <b>only</b> "No code" possible!)                            | <b>= T</b>                     |  |           |             |  |  |  |  |  |  |
| <b>Without</b> switching time adjustment                                                                                              | <b>= No code</b>               |  |           |             |  |  |  |  |  |  |
| Switching time adjustment as meter-in control                                                                                         | <b>= S</b>                     |  |           |             |  |  |  |  |  |  |
| Switching time adjustment as meter-out control                                                                                        | <b>= S2</b>                    |  |           |             |  |  |  |  |  |  |

<sup>1)</sup> Only with electrohydraulic actuation, version "WEH"

<sup>2)</sup> For connection to the AC voltage mains, a DC voltage solenoid **must** be used, which is to be controlled via a rectifier (see table on the right-hand side).

In the case of individual connection, a mating connector with integrated rectifier can be used (separate order, see page 3).

<sup>3)</sup> Mating connectors, separate order, see page 3.

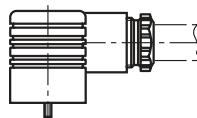
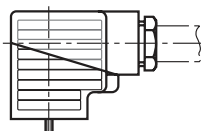
<sup>4)</sup> On version "D3", a throttle insert "B08" must be installed in port P of the pilot valve!

| AC voltage mains<br>(permissible voltage<br>tolerance $\pm 10\%$ ) | Nominal voltage of the<br>DC voltage solenoid<br>when operated<br>with AC voltage | Ordering<br>code |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------|
| 110 V - 50/60 Hz<br>120 V - 60 Hz                                  | 96 V                                                                              | <b>G96</b>       |
| 230 V - 50/60 Hz                                                   | 205 V                                                                             | <b>G205</b>      |

Standard types and components are shown in  
the EPS (standard price list).

| K4                                                                                                                                                                                                                                   |  |  |  |  |  |  | * |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|---|
| Further details in clear text                                                                                                                                                                                                        |  |  |  |  |  |  |   |
| <b>Seal material</b><br>NBR seals<br>FKM seals<br>(other seals on request)<br><b>⚠ Attention!</b><br>Observe compatibility of seals with hydraulic fluid used!                                                                       |  |  |  |  |  |  |   |
| <b>No code =</b><br><b>V =</b>                                                                                                                                                                                                       |  |  |  |  |  |  |   |
| <b>No code =</b><br><b>D3<sup>1; 4)</sup> =</b>                                                                                                                                                                                      |  |  |  |  |  |  |   |
| <b>Without pressure reducing valve</b><br><b>With pressure reducing valve (to be used, if pilot pressure &gt; 250 bar)</b>                                                                                                           |  |  |  |  |  |  |   |
| <b>Throttle insert<sup>1)</sup></b><br>Without throttle insert<br>Throttle Ø 0.8 mm<br>Throttle Ø 1.0 mm                                                                                                                             |  |  |  |  |  |  |   |
| <b>Stroke adjustment</b><br>Without stroke adjustment<br>Stroke adjustment on sides A and B<br>Stroke adjustment on side A<br>Stroke adjustment on side B<br>For further details, see page 12                                        |  |  |  |  |  |  |   |
| <b>No code =</b><br><b>B08 =</b><br><b>B10 =</b>                                                                                                                                                                                     |  |  |  |  |  |  |   |
| <b>No code =</b><br><b>10 =</b><br><b>11 =</b><br><b>12 =</b>                                                                                                                                                                        |  |  |  |  |  |  |   |
| <b>Without slash =</b><br><b>/ =</b>                                                                                                                                                                                                 |  |  |  |  |  |  |   |
| <b>No code =</b><br><b>QMAG24 =</b><br><b>QMBG24 =</b><br><b>QMABG24 =</b><br><b>QM0G24 =</b>                                                                                                                                        |  |  |  |  |  |  |   |
| <b>Spool position monitoring</b><br>Without position switch<br>Monitored spool position "a"<br>Monitored spool position "b"<br>Monitored spool positions "a" and "b"<br>Monitored rest position<br>For further details, see RE 24830 |  |  |  |  |  |  |   |
| <b>Electrical connection<sup>1)</sup></b><br><b>K4<sup>3)</sup> =</b> Without mating connector, individual connection with component plug to DIN EN 175301-803<br>For further electrical connections, see RE 23178 and RE 08010      |  |  |  |  |  |  |   |

## Mating connectors to DIN EN 175301-803

|                                                         |       |                                                                                     |                                                                                      |                                |                                                                      |            |
|---------------------------------------------------------|-------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------|------------|
| For details and further mating connectors, see RE 08006 |       |  |  |                                |                                                                      |            |
| Valve side                                              | Color | Material no.                                                                        |                                                                                      |                                |                                                                      |            |
|                                                         |       | Without circuitry                                                                   | With indicator lamp<br>12 ... 240 V                                                  | With rectifier<br>12 ... 240 V | With indicator lamp and<br>Zener-diode suppressor<br>circuit<br>24 V |            |
|                                                         |       | a                                                                                   | Gray                                                                                 | R901017010                     | –                                                                    | –          |
|                                                         |       | b                                                                                   | Black                                                                                | R901017011                     | –                                                                    | –          |
|                                                         |       | a/b                                                                                 | Black                                                                                | –                              | R901017022                                                           | R901017025 |

**Symbols:** Type Z4WEH (① = component side, ② = plate side)

| Ordering code     | Version "ET" | Version "T" |
|-------------------|--------------|-------------|
| E62               |              |             |
| E63               |              |             |
| E68               |              |             |
| E50 <sup>1)</sup> |              |             |
| E51               |              |             |
| E52 <sup>2)</sup> |              |             |

<sup>1)</sup> Opening cross-section in spool position "a" (A2 → B2)  
= 50 mm<sup>2</sup>

<sup>2)</sup> Opening cross-section in spool position "b" (A2 → B2)  
= 35 mm<sup>2</sup>

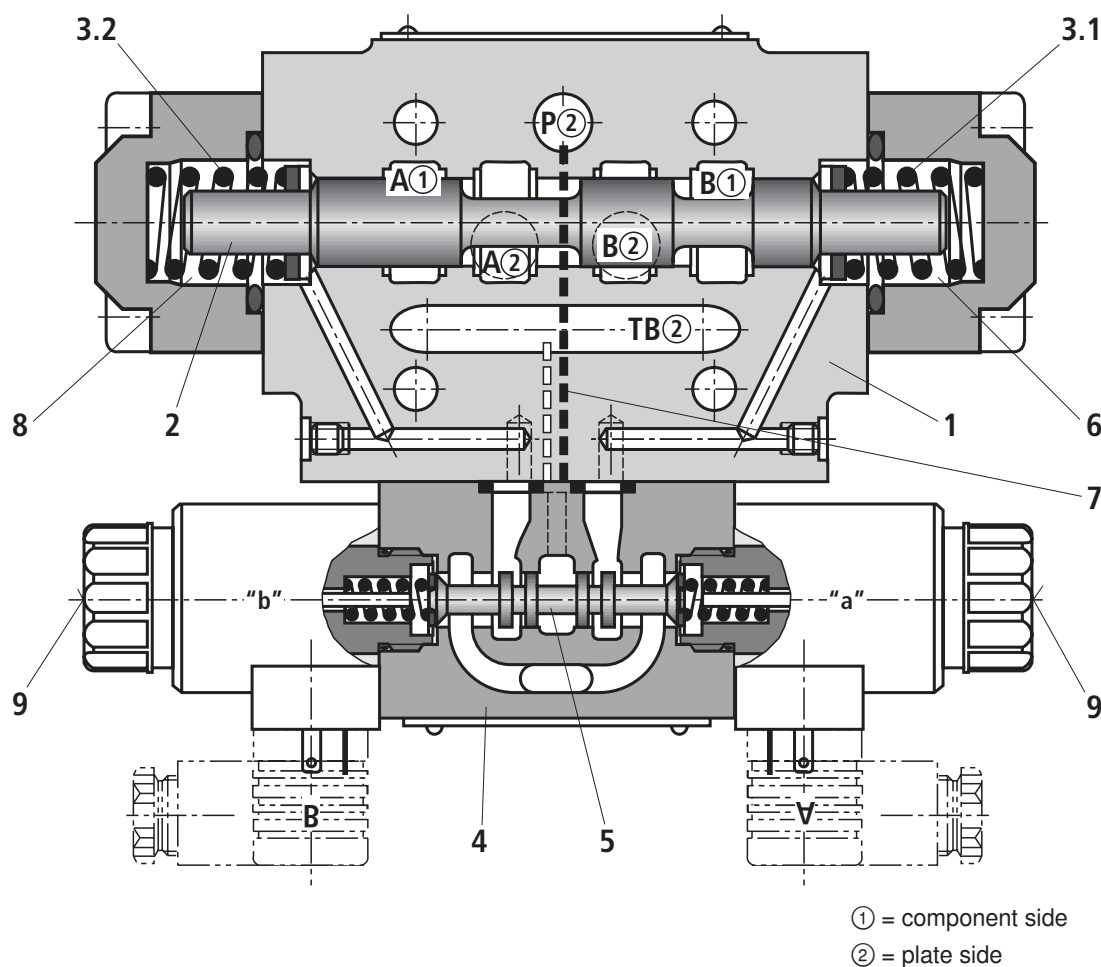
**Symbols:** Type Z4WH (① = component side, ② = plate side)

| Ordering code     | Version<br>"No code" |
|-------------------|----------------------|
| E62               |                      |
| E63               |                      |
| E68               |                      |
| E50 <sup>1)</sup> |                      |
| E51               |                      |
| E52 <sup>2)</sup> |                      |

<sup>1)</sup> Opening cross-section in spool position "a" (A2 → B2)  
= 50 mm<sup>2</sup>

<sup>2)</sup> Opening cross-section in spool position "b" (A2 → B2)  
= 35 mm<sup>2</sup>

## Function, section: Type Z4WEH



Valves of type Z4WEH are directional spool valves with electrohydraulic actuation. They control the start and stop of a flow.

These directional valves basically consist of the main valve with housing (1), main control spool (2), one or two return springs (3.1 and 3.2), and pilot valve (4).

Main control spool (2) in the main valve is held by the springs in the zero or initial position. In the initial position, the two spring chambers (6) and (8) are connected pressureless to tank via pilot valve (4). The pilot valve is supplied with pilot oil via pilot channel (7). The pilot oil supply can be provided internally or externally (externally via port X in the sandwich plate, see page 10).

When the pilot valve is operated, e.g. solenoid "a", pilot spool (5) is pushed to the left, and consequently spring chamber (8) is pressurized to pilot pressure. Spring chamber (6) remains pressureless.

The pilot pressure acts on the left side of main control spool (2) and pushes it against spring (3.1). As a result of this, the connections on the component side and on the plate side are opened according to the relevant symbols.

When the solenoid is de-energized, pilot spool (5) returns to the initial position. Pressure chamber (8) is unloaded to the tank.

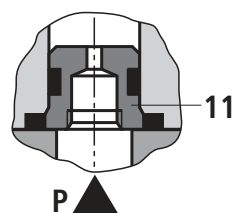
The pilot oil is drained from spring chamber (8) internally via pilot valve (4) into channel T (Y).

An optional manual override (9) allows pilot spool (5) to be moved without energization of the solenoid.

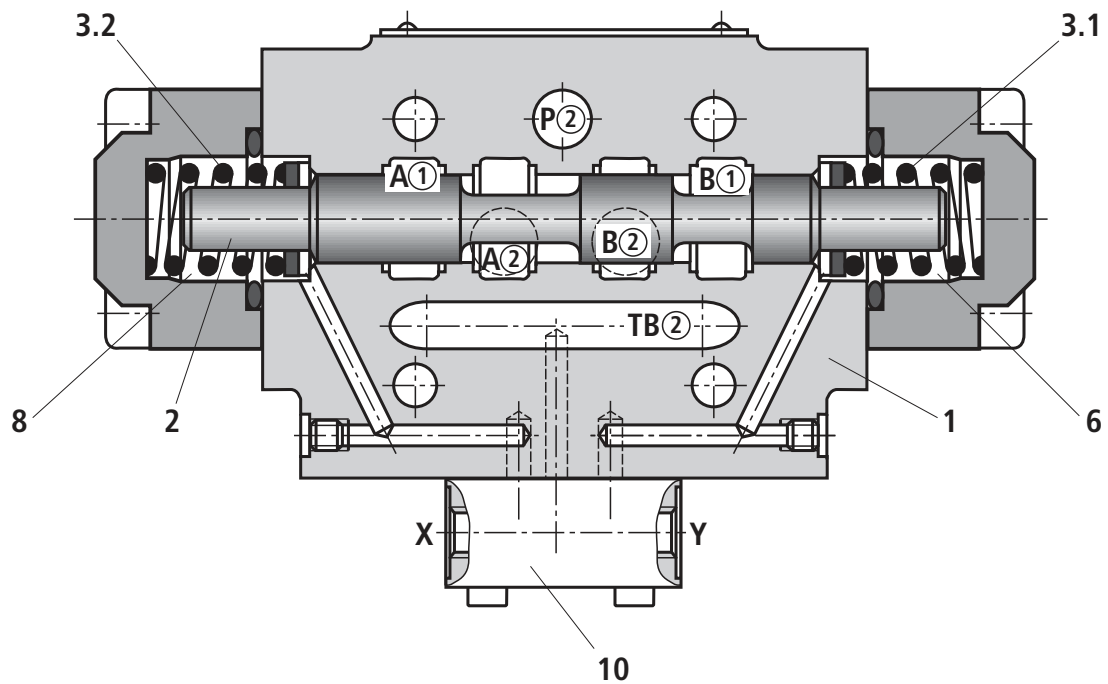
### Throttle insert

The use of throttle insert (11) is required, if the pilot oil supply in channel P of the pilot valve is to be limited.

Throttle insert (11) is to be installed in channel P of the pilot valve.



## Function, section: Type Z4WH



Valves of type Z4WH are directional spool valves with hydraulic actuation. They control the start and stop of a flow.

These directional valves basically consist of valve housing (1), main control spool (2), one or two return springs (3.1) and (3.2) in the case of valves with spring return or spring centering, as well as pilot oil subplate (10).

Main control spool (2) is operated directly by pressurization.

Main control spool (2) is held by springs in the zero or initial position. The pilot oil is supplied and drained externally (see page 12).

**Technical data** (for applications outside these parameters, please consult us!)**General**

|                           |                                                |    |                                                  |
|---------------------------|------------------------------------------------|----|--------------------------------------------------|
| Weight                    | – Valve with 1 solenoid                        | kg | 4.2                                              |
|                           | – Valve with 2 solenoids                       | kg | 4.6                                              |
|                           | – Valve with hydraulic actuation (type 4WH...) | kg | 3.5                                              |
|                           | – Switching time adjustment                    | kg | 0.8                                              |
|                           | – Pressure reducing valve                      | kg | 0.4                                              |
|                           | – Plate for version "T"                        | kg | 0.5                                              |
| Installation position     |                                                |    | Optional                                         |
| Ambient temperature range |                                                | °C | –30 to +50 (NBR seals)<br>–20 to +50 (FKM seals) |

**Hydraulic**

|                                                                                                     |                                          |                    |                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------|------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum operating pressure                                                                          | – Ports A and B                          | bar                | 315                                                                                                                                                                                                                                                                          |
|                                                                                                     | – Port P                                 |                    |                                                                                                                                                                                                                                                                              |
|                                                                                                     | External pilot oil supply                | bar                | 315                                                                                                                                                                                                                                                                          |
|                                                                                                     | Internal pilot oil supply                | bar                | 250 (without pressure reducing valve)<br>315 (with pressure reducing valve)                                                                                                                                                                                                  |
|                                                                                                     | – Port T (Pilot oil drain only internal) | bar                | 210 (with DC solenoid)<br>160 (with AC solenoid)                                                                                                                                                                                                                             |
| Minimum pilot pressure                                                                              |                                          | bar                | 12                                                                                                                                                                                                                                                                           |
| Maximum flow                                                                                        |                                          | l/min              | 160                                                                                                                                                                                                                                                                          |
| Pilot volume for operation                                                                          |                                          | cm <sup>3</sup>    | 1.3                                                                                                                                                                                                                                                                          |
| Hydraulic fluid <sup>1)</sup>                                                                       |                                          |                    | Mineral oil (HL, HLP) to DIN 51524 <sup>2)</sup> ; fast bio-degradable hydraulic fluids to VDMA 24568 (see also RE 90221); HETG (rape seed oil) <sup>2)</sup> ; HEPG (polyglycols) <sup>3)</sup> ; HEES (synthetic esters) <sup>3)</sup> ; other hydraulic fluids on request |
| Hydraulic fluid temperature range                                                                   |                                          | °C                 | –30 to +80 (NBR seals)<br>–20 to +80 (FKM seals)                                                                                                                                                                                                                             |
| Viscosity range                                                                                     |                                          | mm <sup>2</sup> /s | 2.8 to 500                                                                                                                                                                                                                                                                   |
| Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c) |                                          |                    | Class 20/18/15 <sup>4)</sup>                                                                                                                                                                                                                                                 |

**Electrical**

|                            |                   |     |    |    |     |    |     |    |
|----------------------------|-------------------|-----|----|----|-----|----|-----|----|
| Switching time to ISO 6403 | at pilot pressure | bar | 70 |    | 140 |    | 210 |    |
|                            |                   |     | ~  | =  | ~   | =  | ~   | =  |
|                            | – ON              | ms  | 30 | 65 | 25  | 60 | 20  | 55 |
| – OFF                      |                   | ms  | 30 |    |     |    |     |    |

<sup>1)</sup> The ignition temperature of the process and operating medium used must be higher than the maximum solenoid surface temperature.

<sup>2)</sup> Suitable for NBR and FKM seals

<sup>3)</sup> Suitable only for FKM seals

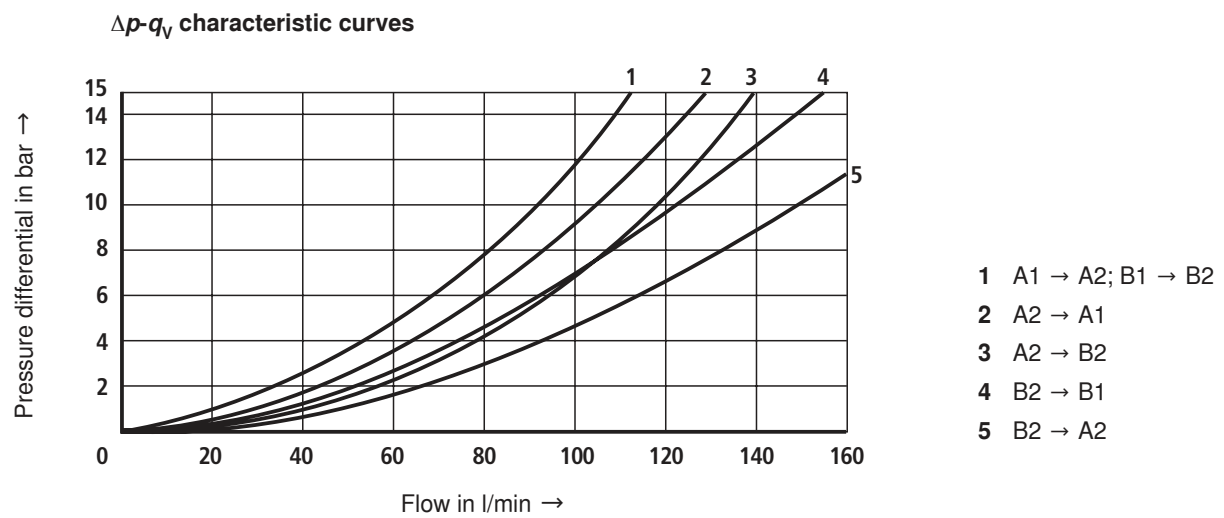
<sup>4)</sup> The cleanliness classes specified for components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, prolongs the service life of components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

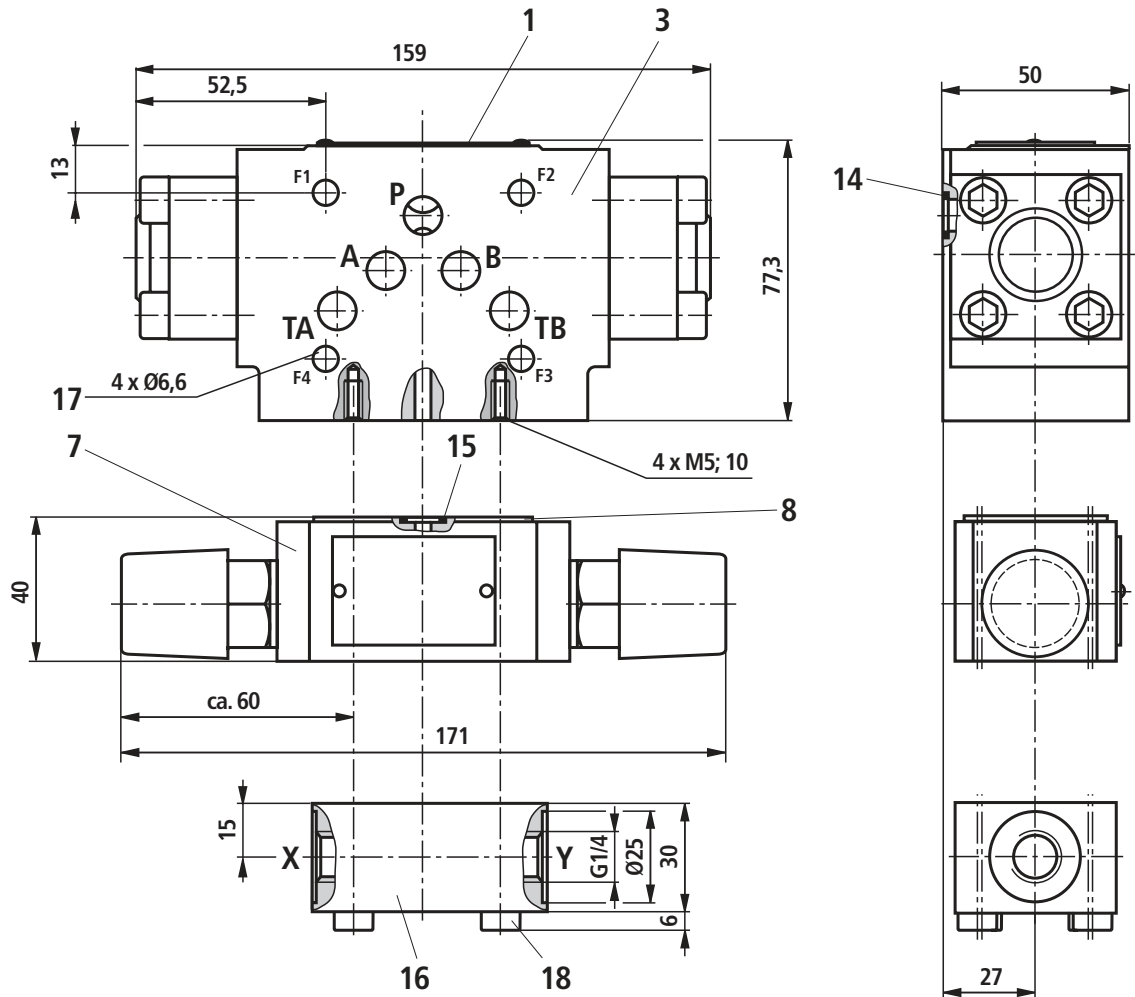
**Notes!**

- The manual override can only be actuated up to a tank pressure of ca. 50 bar. Avoid damage to the bore for the manual override! (Special tool for operation, separate order, Material no. **R900024943**). When the manual override is blocked, operation of the solenoids must be ruled out!
- The simultaneous operation of the solenoids must be ruled out!

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





**Unit dimensions:** Type Z4WH10 (dimensions in mm)

- 1 Nameplate of complete valve
  - 2 Nameplate of pilot valve
  - 3 Main valve
  - 4 Sandwich plate for external pilot control (to be used at operating pressure > 210 bar)
  - 5 Pressure reducing valve "D3"  
(must be used in the case of pilot pressures above 250 bar; only with version "Z4WEH")
- Material no.:**  
 NBR seals: **R900323180**  
 FKM seals: **R900323664**
- 6 Space required to remove mating connector
  - 7 Switching time adjustment (for throttle check valve, see data sheet RE 27506); depending on the installation position, meter-in or meter-out control (illustration: meter-in control)
  - 8 R-ring plate
  - 9 Pilot valve (see data sheet RE 23178)
    - Type 4WE 6 J.. for symbol E62
    - Type 4WE 6 Y.. for symbol E50, E51, E52, E63, E68
 Dimensions ( ) for valve with AC solenoid

- 10 Dimension for valve without manual override
- 11 Dimension for valve with manual override "N"; dimensions ( ) for valve with AC solenoid
- 12 Dimension for valve with concealed manual override "N9"; dimensions ( ) for valve with AC solenoid without manual override
- 13 Solenoids "a" and "b" (can be rotated 90°)
- 14 Identical seal rings for ports A, B, P, TA and TB
- 15 Identical seal rings for ports A, B, P and T
- 16 Pilot oil subplate
- 17 Valve mounting bores
  - Valve mounting screws** (separate order)
  - 4 hexagon socket head cap screws ISO 4762 - M6 - 10.9**
- 18 **Valve mounting screws** (separate order)
  - 4 hexagon socket head cap screws ISO 4762 - M5 - 10.9**

**Note!**

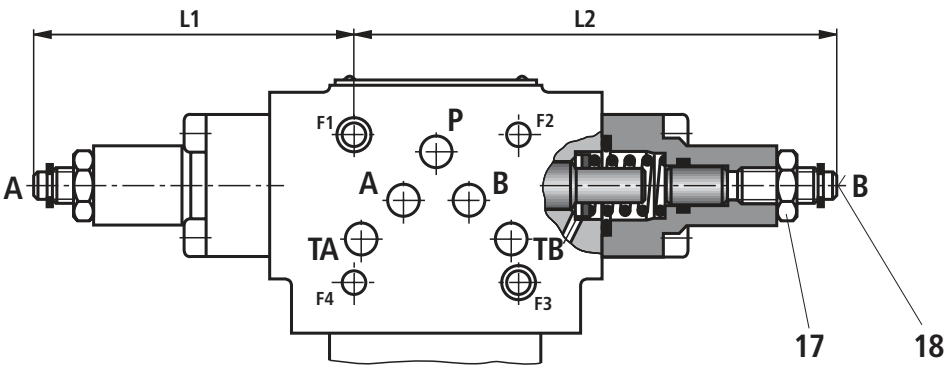
The length and tightening torque of the valve mounting screws must be calculated taking account of the components mounted.

Stroke adjustment, attachment options (dimensions in mm)

| Attachment options                 | Ordering code | L1 | L2  |
|------------------------------------|---------------|----|-----|
| Stroke adjustment on sides A and B | 10            | 95 | 149 |
| Stroke adjustment on side A        | 11            | 95 |     |
| Stroke adjustment on side B        | 12            |    | 149 |

The stroke adjustment feature limits the stroke of the main spool. The spool stroke can be reduced by loosening locknut (17) and turning adjustment spindle (18) clockwise. The control chamber must be pressureless during this process.

Stroke 6 mm (1 turn = 1 mm stroke)



- 17 Locknut 27 A/F
- 18 Adjustment spindle, hexagon socket 5 A/F