4/2 and 4/3 proportional directional valves, direct operated, with electrical position feedback, without/with integrated electronics (OBE)

Type 4WRE and 4WREE

Size 6 and 10
Component series 2X
Maximum operating pressure 315 bar
Maximum flow: 80 l/min (size 6)
180 l/min (size 10)

Table of contents

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>1</td>
</tr>
<tr>
<td>Ordering code</td>
<td>2</td>
</tr>
<tr>
<td>Symbols</td>
<td>3</td>
</tr>
<tr>
<td>Function, section</td>
<td>4, 5</td>
</tr>
<tr>
<td>Technical data</td>
<td>6, 7</td>
</tr>
<tr>
<td>Electrical connection, mating connectors</td>
<td>8, 9</td>
</tr>
<tr>
<td>Block diagram of the integrated electronics (OBE) for type 4WREE</td>
<td>10</td>
</tr>
<tr>
<td>Characteristic curves</td>
<td>11 to 17</td>
</tr>
<tr>
<td>Unit dimensions</td>
<td>18 to 22</td>
</tr>
</tbody>
</table>

Features

- Direct operated proportional directional valve with electrical position feedback and integrated electronics (OBE) with type 4WREE
- Control of flow direction and size
- Operation by means of proportional solenoids with central thread and detachable coil
- For subplate mounting: Porting pattern according to ISO 4401
- Spring-centered control spool
- Control electronics
  - Type 4WREE: integrated electronics (OBE) with voltage or current input (A1 and/or F1)
  - Type 4WRE (4/3 version), separate order:
    - digital and analog amplifier in Euro-card format
    - analog amplifier in modular design
  - Type 4WRE…A (4/2 version), separate order:
    - analog amplifier in modular design

Information on available spare parts: www.boschrexroth.com/spc
Ordering code

<table>
<thead>
<tr>
<th>4WRE</th>
<th>2X/G24</th>
<th>V *</th>
</tr>
</thead>
</table>

Without integrated electronics (OBE) = no code
With integrated electronics (OBE) = E

Size 6 = 6
Size 10 = 10

Control spool symbols

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>T</td>
</tr>
</tbody>
</table>

= E1–
= V1–
= W1–
= EA
= WA

Supply voltage

G24 = Direct voltage 24 V
2X = 20 to 29 (20 to 29: unchanged installation and connection dimensions)

Rated flow at valve pressure differential $\Delta p = 10$ bar

Size 6

<table>
<thead>
<tr>
<th>Flow Rate</th>
<th>4 l/min</th>
<th>8 l/min</th>
<th>16 l/min</th>
<th>32 l/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 10</td>
<td>25 l/min</td>
<td>50 l/min</td>
<td>75 l/min</td>
<td></td>
</tr>
</tbody>
</table>

1) Design SO660 with NBR seals at the valve connection surface

Electronic interface

A1 = Command value ±10 V
F1 = Command value 4 to 20 mA
no code = Type 4WRE

Electrical connection

Type 4WRE:

K4 = Without mating connector,
with connector according to DIN EN 175301-803
Mating connector (solenoid, position transducer), separate order, see page 8

Type 4WREE:

K31 = Without mating connector,
with connector according to DIN EN 175201-804
Mating connector – separate order, see page 9

Seal material

V = FKM seals

With symbol E1–, V1– and W1–:

P $\rightarrow$ A: $q_{V\text{max}}$
B $\rightarrow$ T: $q_{V}/2$
P $\rightarrow$ B: $q_{V}/2$
A $\rightarrow$ T: $q_{V\text{max}}$

Notice:

In the zero position, spools W and WA have a connection from A to T and B to T with approx. 3 % of the relevant nominal cross-section.
Symbols

Proportional directional valve without integrated electronics
Type 4WRE...

Proportional directional valve with integrated electronics
Type 4WREE...

Type 4WRE...A...

Type 4WREE...A...
Function, section

**Type 4WRE ...-2X/...**
The 4/2 and 4/3 proportional directional valves are designed as direct operated devices in plate design. Operation is effected by proportional solenoids with central thread and detachable coil. The solenoids are controlled by external electronics.

**Set-up:**
The valve basically consists of:
- Housing (1) with connection surface
- Control spool (2) with compression springs (3 and 4) and spring plate (5 and 6)
- Solenoids (7 and 8) with central thread
- Position transducer (9)

---

**Function:**
- With de-energized solenoids (7 and 8), central position of the control spool (2) by compression springs (3 and 4) between spring plates (5 and 6)
- Direct operation of the control spool (2) by controlling a proportional solenoid, e.g. solenoid “b” (8)
  → Displacement of the control spool (2) to the left proportional to the electric input signal
  → Connection from P to A and B to T via orifice-type cross-sections with progressive flow characteristic
- Switching off of the solenoid (8)
  → The compression spring (3) brings the control spool (2) back into the central position

In the de-energized condition, the control spool (2) is held in a mechanical central position by the return springs. With control spool symbol “V”, this position does not correspond to the hydraulic central position! When the electric valve control loop is closed, the control spool is positioned in the hydraulic central position.

---

**Important note!**
The PG fitting (11) must not be opened. Mechanical adjustment of the adjustment nut located below is prohibited and damages the valve!

---

**Valve with 2 spool positions:** (Type 4WRE...A...)
The function of this valve design basically corresponds to the valve with three spool positions. The 2 spool position valves are, however, only equipped with solenoid “a” (7). Instead of the 2nd proportional solenoid, there is a plug screw (10).

---

**Notice!**
Due to the design principle, internal leakage is inherent to the valves, which may increase over the life cycle.

---

**Notice!**
The tank line must not be allowed to run empty. With corresponding installation conditions, a pre-charge valve (pre-charging pressure approx. 2 bar) is to be installed.
Function, section

**Type 4WREE ...-2X/...**

The 4/2 and 4/3 proportional directional valves are designed as direct operated devices in plate design. Operation is effected by proportional solenoids with central thread and detachable coil. The solenoids are controlled by the internal electronics.

**Set-up:**

The valve basically consists of:
- Housing (1) with connection surface
- Control spool (2) with compression springs (3 and 4) and spring plate (5 and 6)
- Solenoids (7 and 8) with central thread
- Position transducer (9)
- Integrated electronics (13)
- Electric zero point adjustment (12) accessible via Pg7

**Important note!**
The PG fitting (11) must not be opened. Mechanical adjustment of the adjustment nut located below is prohibited and damages the valve!

**Valve with 2 spool positions:** (Type 4WREE ...A...)

The function of this valve design basically corresponds to the valve with three spool positions. The 2 spool position valves are, however, only equipped with solenoid "a" (7). Instead of the 2nd proportional solenoid, there is a plug screw (10).

**Function:**
- With de-energized solenoids (7 and 8), central position of the control spool (2) by compression springs (3 and 4) between spring plates (5 and 6)
- Direct operation of the control spool (2) by controlling a proportional solenoid, e.g. solenoid "b" (8)
  - Displacement of the control spool (2) to the left proportional to the electric input signal
  - Connection from P to A and B to T via orifice-type cross-sections with progressive flow characteristic
- Switching off of the solenoid (8)
  - The compression spring (3) brings the control spool (2) back into the central position

In the de-energized condition, the control spool (2) is held in a mechanical central position by the return springs. With control spool symbol "V", this position does not correspond to the hydraulic central position! When the electric valve control loop is closed, the control spool is positioned in the hydraulic central position.

**Notice!**
Due to the design principle, internal leakage is inherent to the valves, which may increase over the life cycle.

**Notice!**
The tank line must not be allowed to run empty. With corresponding installation conditions, a pre-charge valve (pre-charging pressure approx. 2 bar) is to be installed.
### Technical data (For applications outside these parameters please consult us!)

#### general

<table>
<thead>
<tr>
<th></th>
<th>Size</th>
<th>6</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
<td>Type 4WRE kg</td>
<td>2.2</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>Type 4WREE kg</td>
<td>2.4</td>
<td>6.5</td>
</tr>
</tbody>
</table>

| **Installation position** | Any, preferably horizontal |
| **Ambient temperature range** | – Type 4WRE °C | –20 to +70 |
|                            | – Type 4WREE °C | –20 to +50 |

| **Storage temperature range** | °C | –20 to +80 |
| **MTTF_d values according to EN ISO 13849** | Years | 150 ¹) (for more information see data sheet 08012) |

#### hydraulic (measured with HLP46, ϑ_oil = 40 °C ± 5 °C and p = 100 bar)

| **Maximum operating pressure** | – Port A, B, P bar | 315 |
|                                | – Port T bar       | 210 |
| **Rated flow** q_V rated with Δp = 10 bar | l/min | 4, 8, 16, 32, 25, 50, 75 |
| **Recommended maximum flow** | l/min | 80, 180 |

| **Hydraulic fluid** | See table below |
| **Hydraulic fluid temperature range** | °C | –20 to +80 (preferably +40 to +50) |
| **Viscosity range** | mm²/s | 20 to 380 (preferably 30 to 46) |

| **Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)** | Class 20/18/15 ²) |
| **Hysteresis** | % | ≤ 0.1 |
| **Range of inversion** | % | ≤ 0.05 |
| **Response sensitivity** | % | ≤ 0.05 |
| **Zero shift upon change of hydraulic fluid temperature and operating pressure** | %/10 K | ≤ 0.15 |
|                           | %/100 bar | ≤ 0.1 |

---

¹) With control spool types E, E1, EA, W, W1, WA; in longitudinal control spool direction, there is sufficient positive overlap without shock/vibration load; observe the installation orientation with regard to the main direction of acceleration.

²) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components. For the selection of the filters see www.boschrexroth.com/filter

### Hydraulic fluid

<table>
<thead>
<tr>
<th>Classification</th>
<th>Suitable sealing materials</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral oils and related hydrocarbons</td>
<td>HL, HLP</td>
<td>NBR, FKM</td>
</tr>
<tr>
<td>Flame-resistant</td>
<td>Containing water</td>
<td>HFC (Fuchs HYDROTHERM 46M, Petrofer Ultra Safe 620)</td>
</tr>
</tbody>
</table>

---

**Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.
- **Flame-resistant – water-containing:** Maximum pressure differential per control edge 175 bar. Pressure pre-loading at the tank port > 20 % of the pressure differential; otherwise, increased cavitation. Life cycle as compared to operation with mineral oil HL, HLP 50 % to 100 %.
### Technical data
(For applications outside these parameters please consult us!)

#### Electric

<table>
<thead>
<tr>
<th>Size</th>
<th>Voltage type</th>
<th>Solenoid coil resistance</th>
<th>Duty cycle</th>
<th>Maximum coil temperature</th>
<th>Electrical connection</th>
<th>Protection class of the valve according to EN 60529</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Direct voltage</td>
<td>Cold value at 20 °C Ω 2.65</td>
<td>% 100</td>
<td>up to 150</td>
<td>With connector according to DIN EN 175301-803 and ISO 4400</td>
<td>IP65 with mating connector mounted and locked</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Maximum hot value Ω 4.05</td>
<td></td>
<td></td>
<td>Mating connector according to DIN EN 175301-803 and ISO 4400</td>
<td></td>
</tr>
</tbody>
</table>

- **Voltage type**: Direct voltage
- **Solenoid coil resistance**
  - Cold value at 20 °C Ω 2.65
  - Maximum hot value Ω 4.05
- **Duty cycle**: % 100
- **Maximum coil temperature**: up to 150
- **Electrical connection** see page 8 and 9
  - Type 4WRE
  - Type 4WREE
- **Protection class of the valve according to EN 60529**: IP65 with mating connector mounted and locked

#### Control electronics

<table>
<thead>
<tr>
<th>Type 4WRE...A...</th>
<th>Amplifier in euro-card format 2)</th>
<th>Module amplifier 2)</th>
<th>Type 4WREE</th>
<th>analog command value module</th>
<th>analog command value module</th>
<th>analog command value card</th>
<th>digital command value card</th>
<th>Supply voltage</th>
<th>Current consumption of the amplifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/3 version</td>
<td>VT-VRPD-2-2X/V0/0 according to RE 30126</td>
<td>VT-MRPA2-1 according to data sheet 30219</td>
<td>VT-MRPA2-1 according to data sheet 30219</td>
<td>VT-SWMA-1-1X/... according to data sheet 29902</td>
<td>VT-SWMAK-1-1X/... according to data sheet 29903</td>
<td>VT-SWKA-1-1X/... according to data sheet 30255</td>
<td>VT-HACD -1-1X/... according to data sheet 30143</td>
<td>Nominal voltage VDC 24</td>
<td>I&lt;sub&gt;max&lt;/sub&gt; A &lt; 2</td>
</tr>
<tr>
<td>4/2 version</td>
<td>VT-VRPA2-1-1X/V0 according to data sheet 30119</td>
<td>VT-MRPA2-2 according to data sheet 30219</td>
<td>VT-MRPA2-2 according to data sheet 30219</td>
<td>VT-SWMA-1-1X/... according to data sheet 29902</td>
<td>VT-SWMAK-1-1X/... according to data sheet 29903</td>
<td>VT-SWKA-1-1X/... according to data sheet 30255</td>
<td>VT-HACD -1-1X/... according to data sheet 30143</td>
<td>lower limit value V 19.4</td>
<td>Pulse current A 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>upper limit value V 35</td>
<td></td>
</tr>
</tbody>
</table>

1) Due to the temperatures occurring at the surfaces of the solenoid coils, the European standards ISO 13732-1 and EN ISO 4413 need to be adhered to!

2) Separate order

**Notice:** For information on the environmental simulation testing for the areas EMC (electromagnetic compatibility), climate and mechanical load see data sheet 29061-U (declaration on environmental compatibility).
**Electrical connection, mating connectors** *(dimensions in mm)*

**Type 4WRE (without integrated electronics)**

Connection to connector

<table>
<thead>
<tr>
<th>PE</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>

Connection to mating connector

<table>
<thead>
<tr>
<th>PE</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
</table>

to the amplifier
to the amplifier

Mating connector CECC 75 301-803-A002FA-H3D08-G according to DIN EN 175301-803 and ISO 4400

Solenoid a, color gray separate order under the Material no. R901017010

Solenoid b, color black separate order under the Material no. R901017011

1 Mounting screw M3

Tightening torque $M_A = 0.5 \text{Nm} + 0.1 \text{Nm}$

---

**Inductive position transducer**

Coil connection

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>

Connection to plug-in connector

Ground signal

Supply signal
to the amplifier
to the amplifier

Mating connector 4-pole Pg7-G4W1F separate order under the Material no. R900023126

Connection cable:

Recommendation:

up to 50 m cable length type LiYCY 4 x 0.25 mm²

Connect shield to PE only on the supply side.
Electrical connection, mating connectors (dimensions in mm)

Type 4WREE (with integrated electronics (OBE))

Mating connector according to DIN EN 175201-804
separate order under the Material no. R900021267 (plastic version)
Angular design – separate order under the Material no. R900217845
Pin assignment see also block diagram page 10

Mating connector according to DIN EN 175201-804
separate order under the Material no. R900223890 (metal version)

<table>
<thead>
<tr>
<th>Device connector allocation</th>
<th>Contact</th>
<th>Signal with A1 interface</th>
<th>Signal with F1 interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>A</td>
<td>24 VDC ($u(t) = 19.4$ to $35 \text{ V}$); $I_{\text{max}} = 2 \text{ A}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>0 V</td>
<td></td>
</tr>
<tr>
<td>Reference potential actual value</td>
<td>C</td>
<td>Reference contact $F$; $R_e &gt; 50 \text{ k\Omega}$</td>
<td>Reference contact $F$; $R_e &lt; 10 \text{ \Omega}$</td>
</tr>
<tr>
<td>Differential amplifier input</td>
<td>D</td>
<td>±10 V command value; $R_e &gt; 50 \text{ k\Omega}$</td>
<td>4 to 20 mA command value; $R_e &gt; 100 \text{ \Omega}$</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Reference potential command value</td>
<td></td>
</tr>
<tr>
<td>Measuring output (actual value)</td>
<td>F</td>
<td>±10 V actual value (limit load $5 \text{ mA}$)</td>
<td>4 to 20 mA actual value, load resistance max. $300 \text{ \Omega}$</td>
</tr>
<tr>
<td></td>
<td>PE</td>
<td>Connected to cooling element and valve housing</td>
<td></td>
</tr>
</tbody>
</table>

Command value: Positive command value 0 to +10 V (or 12 to 20 mA) at D and reference potential at E result in flow from $P \rightarrow A$ and $B \rightarrow T$.
Negative command value 0 to –10 V (or 12 to 4 mA) at D and reference potential at E result in flow from $P \rightarrow B$ and $A \rightarrow T$.
For valves with 1 solenoid on side a (e. g. variant EA and WA), a positive command value 0 to +10 V (or 4 to 20 mA) at D and reference potential at E result in flow from $P \rightarrow B$ and $A \rightarrow T$.

Actual value: Actual value 0 to +10 V (or 12 to 20 mA) at F and reference potential at C result in flow from $P \rightarrow A$ and $B \rightarrow T$, actual value 0 to –10 V (or 4 to 12 mA) result in flow from $P \rightarrow B$ and $A \rightarrow T$.
With valves with 1 solenoid, a positive actual value 0 to +10 V (or 4 to 20 mA) at F and reference potential at C result in flow from $P \rightarrow B$ and $A \rightarrow T$.

Connection cable: Recommendation: – up to 25 m cable length type LiYCY 7 x 0.75 mm²
– up to 50 m cable length type LiYCY 7 x 1.0 mm²
External diameter see sketch of mating connector
Connect shield to PE only on the supply side.
Integrated electronics (OBE) type 4WREE

Notice: Electric signals taken out via control electronics (e.g. actual value) must not be used for switching off safety-relevant machine functions!

1) The protective earthing conductor (PE) is connected to cooling element and valve housing!
2) Ramp can be set from 0 to 2.5 s from the outside, identical for \( T_{up} \) and \( T_{down} \)
3) Zero point can be set from the outside
Characteristic curves: Type 4WREE (measured with HLP46, $s_{\text{Oil}} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C}$)  Size 6 and 10

Pressure signal characteristic curve (control spool V), $p_s = 100$ bar

Size 6

![Characteristic curve for Size 6](image)

Size 10

![Characteristic curve for Size 10](image)
Characteristic curves: Type 4WREE (measured with HLP46, $T_{\text{Oil}} = 40 \, ^{\circ}\text{C} \pm 5 \, ^{\circ}\text{C}$)  **Size 6 and 10**

Zero flow with central control spool position

**Type 4WREE 6 V32**

**Type 4WREE 10 V75**

Characteristic curves: Type 4WREE (measured with HLP46, $T_{\text{Oil}} = 40 \, ^{\circ}\text{C} \pm 5 \, ^{\circ}\text{C}$ and $p = 100$ bar)  **Size 6**

4 l/min rated flow with 10 bar valve pressure differential

1 $\Delta p = 10$ bar constant
2 $\Delta p = 20$ bar constant
3 $\Delta p = 30$ bar constant
4 $\Delta p = 50$ bar constant
5 $\Delta p = 100$ bar constant
**Characteristic curves: Type 4WREE** (measured with HLP46, \( \theta_{oil} = 40 \, ^{\circ}\text{C} \pm 5 \, ^{\circ}\text{C} \) and \( p = 100 \) bar)  

**Size 6**

### 8 l/min rated flow with 10 bar valve pressure differential

![Graph showing characteristic curves for 8 l/min flow]

- \( \Delta p = 10 \) bar constant
- \( \Delta p = 20 \) bar constant
- \( \Delta p = 30 \) bar constant
- \( \Delta p = 50 \) bar constant
- \( \Delta p = 100 \) bar constant

### 16 l/min rated flow with 10 bar valve pressure differential

![Graph showing characteristic curves for 16 l/min flow]

- \( \Delta p = 10 \) bar constant
- \( \Delta p = 20 \) bar constant
- \( \Delta p = 30 \) bar constant
- \( \Delta p = 50 \) bar constant
- \( \Delta p = 100 \) bar constant

### 32 l/min rated flow with 10 bar valve pressure differential

![Graph showing characteristic curves for 32 l/min flow]

- \( \Delta p = 10 \) bar constant
- \( \Delta p = 20 \) bar constant
- \( \Delta p = 30 \) bar constant
- \( \Delta p = 50 \) bar constant
- \( \Delta p = 100 \) bar constant

**Notice:**

Observe the performance limits on page 15!

\( \Delta p \) = Valve pressure differential (inlet pressure \( p_i \) minus load pressure \( p_L \) minus return flow pressure \( p_T \))

**Maximum admissible flow**

- \( P \rightarrow A / B \rightarrow T \)
- \( P \rightarrow B / A \rightarrow T \)
Characteristic curves: Type 4WREE (measured with HLP46, \(T_{\text{Oil}} = 40^\circ \text{C} \pm 5^\circ \text{C}\) and \(p = 100\) bar)  Size 10

1. \(\Delta p = 10\) bar constant
2. \(\Delta p = 20\) bar constant
3. \(\Delta p = 30\) bar constant
4. \(\Delta p = 50\) bar constant
5. \(\Delta p = 100\) bar constant

\(\Delta p\) = Valve pressure differential (inlet pressure \(p_p\) minus load pressure \(p_L\), minus return flow pressure \(p_T\))
Transition function with stepped electric input signals: Type 4WREE
(measured with HLP46, $\vartheta_{\text{Oil}} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C}$ and $p_s = 10 \, \text{bar}$)

Size 6

4/3 valve version
Control spool E

Frequency response characteristic curves: Type 4WREE
(measured with HLP46, $\vartheta_{\text{Oil}} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C}$, $p_s = 10 \, \text{bar}$)

Size 6

4/3 valve version
Control spool V
Transition function with stepped electric input signals: Type 4WREE
(measured with HLP46, $\theta_{\text{Oil}} = 40 ^\circ\text{C} \pm 5 ^\circ\text{C}$ and $p_s = 10$ bar)

<table>
<thead>
<tr>
<th>4/3 valve version</th>
<th>Control spool E</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Signal change in %</th>
<th>Time in ms →</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–25 %</td>
<td>0–25 %</td>
</tr>
<tr>
<td>0–50 %</td>
<td>0–50 %</td>
</tr>
<tr>
<td>0–75 %</td>
<td>0–75 %</td>
</tr>
<tr>
<td>100 %</td>
<td>100 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency response characteristic curves: Type 4WREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(measured with HLP46, $\theta_{\text{Oil}} = 40 ^\circ\text{C} \pm 5 ^\circ\text{C}$, $p_s = 10$ bar)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4/3 valve version</th>
<th>Control spool V</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Amplitude ratio in dB</th>
<th>Frequency in Hz →</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 %</td>
<td>1 Hz</td>
</tr>
<tr>
<td>-10 %</td>
<td>10 Hz</td>
</tr>
<tr>
<td>-15 %</td>
<td>20 Hz</td>
</tr>
<tr>
<td>-20 %</td>
<td>30 Hz</td>
</tr>
<tr>
<td>-25 %</td>
<td>40 Hz</td>
</tr>
<tr>
<td>-30 %</td>
<td>50 Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase angle in °</th>
<th>Frequency in Hz →</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 °</td>
<td>1 Hz</td>
</tr>
<tr>
<td>-3 °</td>
<td>10 Hz</td>
</tr>
<tr>
<td>-6 °</td>
<td>20 Hz</td>
</tr>
<tr>
<td>-9 °</td>
<td>30 Hz</td>
</tr>
<tr>
<td>-12 °</td>
<td>40 Hz</td>
</tr>
<tr>
<td>-15 °</td>
<td>50 Hz</td>
</tr>
<tr>
<td>-270 °</td>
<td>100 Hz</td>
</tr>
<tr>
<td>-225 °</td>
<td>150 Hz</td>
</tr>
<tr>
<td>-180 °</td>
<td>200 Hz</td>
</tr>
</tbody>
</table>

- Signal ±10 %
- Signal ±25 %
- Signal ±100 %
Flow: Type 4WREE (measured with HLP46, $\theta_{\text{Oil}} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C}$)

Load function with maximum valve opening
Rated flow 4, 8, 16 and 32 l/min
Control spool V

Observe the maximum admissible flow of 80 l/min!

Flow: Type 4WREE (measured with HLP46, $\theta_{\text{Oil}} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C}$)

Load function with maximum valve opening
Rated flow 25, 50 and 75 l/min
Control spool V

Observe the maximum admissible flow of 180 l/min!
Unit dimensions: Type 4WRE (dimensions in mm)

1 Valve housing
2 Proportional solenoid “a” with inductive position transducer
3 Proportional solenoid “b”
4 Mating connector “A”, color gray, separate order – see page 8
5 Mating connector “B”, color black, separate order – see page 8
6 Mating connector for inductive position transducer, separate order – see page 8
7 Plug screw for valve with one solenoid (2 spool positions, version EA or WA)
8 Identical seal rings for ports A, B, P, and T
9 Space required to remove the mating connector
10 Name plate
11 Machined valve mounting face, porting pattern according to ISO 4401-03-02-0-05 (with locating hole)
   Deviating from the standard:
   - without locating hole “G”
   - Ports P, A, B and T with Ø 8 mm

Subplates and valve mounting screws see page 22
Unit dimensions: Type 4WREE (dimensions in mm)  

1 Valve housing  
2 Proportional solenoid “a” with inductive position transducer  
3 Proportional solenoid “b”  
7 Plug screw for valve with one solenoid  
(2 spool positions, version EA or WA)  
8 Identical seal rings for ports A, B, P, and T  
10 Name plate  
11 Machined valve mounting face,  
porting pattern according to ISO 4401-03-02-0-05  
(with locating hole)  
Deviating from the standard:  
- without locating hole “G”  
- Ports P, A, B and T with Ø 8 mm  
12 Integrated electronics (OBE)  
13 Mating connector,  
separate order – see page 9  

Subplates and valve mounting screws see page 22
Unit dimensions: Type 4WRE (dimensions in mm)

1 Valve housing
2 Proportional solenoid “a” with inductive position transducer
3 Proportional solenoid “b”
4 Mating connector “A”, color gray, separate order – see page 8
5 Mating connector “B”, color black, separate order – see page 8
6 Mating connector for inductive position transducer, separate order – see page 8
7 Plug screw for valve with one solenoid (2 spool positions, version EA or WA)
8 Identical seal rings for ports A, B, P, T and T1
9 Space required to remove the mating connector
10 Name plate
11 Machined valve contact surface, porting pattern according to ISO 4401-05-04-0-05 differing from the standard: Connection T1 Ø 11.2 mm

General tolerances according to ISO 2768-mK

Subplates and valve mounting screws see page 22
Unit dimensions: Type 4WREE (dimensions in mm) size 10

1 Valve housing
2 Proportional solenoid "a" with inductive position transducer
3 Proportional solenoid "b"
7 Plug screw for valve with one solenoid (2 spool positions, version EA or WA)
8 Identical seal rings for ports A, B, P, T and T1
10 Name plate
11 Machined valve contact surface, porting pattern according to ISO 4401-05-04-0-05 differing from the standard: Connection T1 Ø 11.2 mm
12 Integrated electronics (OBE)
13 Mating connector, separate order – see page 9

Required surface quality of the valve mounting face
General tolerances according to ISO 2768-mK

Subplates and valve mounting screws see page 22
## Unit dimensions

<table>
<thead>
<tr>
<th>Hexagon socket head cap screws</th>
<th>Material number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 6 4x ISO 4762 - M5 x 50 - 10.9-flZn-240h-L</td>
<td>R913000064</td>
</tr>
<tr>
<td>Tightening torque $M_A = 7 , \text{Nm} \pm 10%$</td>
<td></td>
</tr>
<tr>
<td>or 4x ISO 4762 - M5 x 50 - 10.9</td>
<td></td>
</tr>
<tr>
<td>Tightening torque $M_A = 8.9 , \text{Nm} \pm 10%$</td>
<td></td>
</tr>
<tr>
<td>Size 10 4x ISO 4762 - M6 x 40 - 10.9-flZn-240h-L</td>
<td>R913000058</td>
</tr>
<tr>
<td>Tightening torque $M_A = 12.5 , \text{Nm} \pm 10%$</td>
<td></td>
</tr>
<tr>
<td>or 4x ISO 4762 - M6 x 40 - 10.9</td>
<td></td>
</tr>
<tr>
<td>Tightening torque $M_A = 15.5 , \text{Nm} \pm 10%$</td>
<td></td>
</tr>
</tbody>
</table>

**Notice:** This tightening torque of the hexagon socket head cap screws refers to the maximum operating pressure!

<table>
<thead>
<tr>
<th>Subplates</th>
<th>Data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 6</td>
<td>45052</td>
</tr>
<tr>
<td>Size 10</td>
<td>45054</td>
</tr>
</tbody>
</table>