Servo solenoid valves with electrical position feedback (Lvdt DC/DC ±10 V)

Type 5WRP 10

Size 10
Unit series 2X
Maximum working pressure P1, P2, A, B 210 bar, T 50 bar
Nominal flow rate 70 l/min (Δp 11 bar)

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Features

- Directly operated servo solenoid valve NG10, with p/Q 5/3 directional control symbol in servo quality
- Actuated on one side, A-T fail-safe position when switched off
- Control solenoid with integral position feedback and electronics for position transducer (Lvdt DC/DC)
- Suitable for electrohydraulic controllers in production and testing systems
- For subplate attachment, mounting hole configuration to ISO 4401-05-04-0-94
- Subplates as per catalogue section RE 45055 (order separately)
- Line sockets to DIN 43563-AM2
  Solenoid 2P+PE/M16 x 1,5, position transducer 4P/Pg7 in scope of delivery, see catalogue section RE 08008
- External trigger electronics (order separately)
  - Electric amplifier for standard curve "L"
    0 811 405 062, see catalogue section RE 30041
  - Electric amplifier with p/Q compensator 0 811 405 154, see catalogue section RE 30058

Important

The 5 hydraulic connections are required for the function “Dual flow-through”, P1 → A and P2 → B, see hole pattern on page 8. With external trigger electronics (“standard”), closed-loop control of p/Q is achieved with an external pressure compensator (accessory).
Ordering data and scope of delivery

For external trigger electronics = no desig.
Without sleeve = no designation
Size 10 = 10

Symbols
5/3-way version

Side of inductive position transducer

(Standard) = B

Further information in plain text
M = NBR seals, suitable for mineral oils (HL, HLP) to DIN 51524
Electrical connection
Z4 = with line socket, with plug to DIN 43563-AM2
Line socket included in scope of delivery
Voltage supply of trigger electronics
G24 = +24 V DC
2X = Unit series 20 to 29
(installation and connection dimensions unchanged)
Flow characteristic
L = Linear
Nominal flow rate at 11 bar valve pressure difference (11 bar/metering notch)
Size 10
70 = 70 l/min

Preferred types (available at short notice)

<table>
<thead>
<tr>
<th>Type 5WRP10</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>5WRP 10 FB70L–2X/G24 Z4 / M 0 811 402 113</td>
</tr>
</tbody>
</table>

Accessory, pressure compensator

<table>
<thead>
<tr>
<th>See pressure compensator on pages 9 and 10</th>
<th>kg</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0811 401 219</td>
<td></td>
</tr>
</tbody>
</table>
Function, sectional diagram

Servo solenoid valve 5WRP 10

Symbol

Accessories, not included in scope of delivery

<table>
<thead>
<tr>
<th>(4x) M6x40 DIN 912–10.9</th>
<th>Fastening screws</th>
<th>2910151209</th>
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<tbody>
<tr>
<td>VT-VRPA1-537-10/V0, see RE 30041</td>
<td>0811405062</td>
<td></td>
</tr>
<tr>
<td>VT-VARAP1-537-20/V0/5/3V, see RE 30058</td>
<td>0811405154</td>
<td></td>
</tr>
</tbody>
</table>

Line sockets 2P+PE (M16x1.5) and 4P (Pg7) included in scope of delivery, see also RE 08008

Testing and service equipment

- Test box type VT-PE-TB2, see RE 30064
- Test adapter type VT-PA-3, see RE 30070
### Technical data

#### General
- **Construction**: Spool type valve, operated directly
- **Actuation**: Proportional solenoid with position control, external amplifier
- **Type of mounting**: Subplate, mounting hole configuration NG10 (ISO 4401-05-04-0-94)
- **Installation position**: Optional
- **Ambient temperature range**: °C –20…+50
- **Weight**: kg 6.8
- **Vibration resistance, test condition**: Max. 25 g, shaken in 3 dimensions (24 h)

#### Hydraulic (measured with HLP 46, \(\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}\))
- **Pressure fluid**: Hydraulic oil to DIN 51524…535, other fluids after prior consultation
- **Viscosity range**
  - **recommended**: mm²/s 20…100
  - **max. permitted**: mm²/s 10…800
- **Pressure fluid temperature range**: °C –20…+80
- **Maximum permissible degree of contamination of pressure fluid**
- **Purity class to ISO 4406 (c)**
- **Flow direction**: See symbol
- **Nominal flow at \(\Delta p\)**
  - \(P_1 \rightarrow A\)
  - \(P_1 \rightarrow A + P_2 \rightarrow B\)
  - \(A \rightarrow T\)
- **Max. working pressure**: bar Port \(P_1, P_2, A, B\): 210
- **Max. pressure**: bar Port \(T\): 50
- **Operating limits at \(\Delta p\)**
- **Leakage at 100 bar**: cm³/min \(<1.200\)

#### Electrical
- **Cyclic duration factor**: % 100
- **Power supply**: 24 V nom (external amplifier)
- **Degree of protection**: IP 65 to DIN 40050
- **Solenoid connector**: Connector DIN 43650/ISO 4400 M16x1.5 (2P+PE)
- **Position transducer connector**: Connector Pg7 (4P)
- **Max. solenoid current**: A 3.7
- **Coil resistance \(R_{coil}\)**: Ω 2.4
- **Max. power consumption at 100% load and operational temperature**: VA 60
- **Position transducer DC/DC technology**
  - **Supply**: +15 V/35 mA
  - **−15 V/25 mA**
  - **Signal**: 0…±10 V (\(R_c \geq 10\ \text{kΩ}\))

#### Static/Dynamic
- **Hysteresis**: % \(\leq 0.3\)
- **Manufacturing tolerance for \(q_{\text{max}}\)**
  - % \(< 10\)
- **Response time for signal change 0…100%**: ms \(< 25\)
- **Thermal drift**: Zero point displacement \(<1\%\) at \(\Delta T = 40^\circ\text{C}\)

All characteristics in connection with electric amplifier 0 811 405 062.

1) The purity classes stated for the components must be complied with in hydraulic systems.

Effective filtration prevents problems and also extends the service life of components.

For a selection of filters, see catalogue sections RE 50070, RE 50076 and RE 50081.

\[q_{\text{nom}} = q_{\text{nom}} \cdot \sqrt{\frac{\Delta p}{11}}\]
Valve with external trigger electronics (standard linear curve: L)

Block diagram/pin assignment

Versions of trigger electronics:
- With integrated $p/Q$ compensator,
  see RE 30058
Valve with external trigger electronics (with \( p/Q \) compensator and linear amplifier)

Block diagram/pin assignment

Versions of trigger electronics: – with standard linear curve, see RE 30041
Performance curves (measured with HLP 46, $\theta_{\text{oil}} = 40^\circ\text{C} \pm 5^\circ\text{C}$)

<table>
<thead>
<tr>
<th>Flow rate/Signal function</th>
<th>Operating limits</th>
</tr>
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<tbody>
<tr>
<td>$Q$ [L/min]</td>
<td>$\Delta P$ [bar]</td>
</tr>
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</table>

**Pressure gain**

**Bode diagram**
**Unit dimensions** (nominal dimensions in mm)

**Mounting hole configuration: NG10** (ISO 4401-05-04-0-94)
For subplates, see catalogue section RE 45055

1) Deviates from standard
2) Thread depth:
   - Ferrous metal 1.5xØ*
   - Non-ferrous 2 x Ø
   - * (NG10 min. 10.5 mm)

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>A</th>
<th>T</th>
<th>B</th>
<th>F₁</th>
<th>F₂</th>
<th>F₃</th>
<th>F₄</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>27</td>
<td>16.7</td>
<td>3.2</td>
<td>37.3</td>
<td>54</td>
<td>54</td>
<td>0</td>
<td>0</td>
<td>50.8</td>
</tr>
<tr>
<td>Y</td>
<td>6.3</td>
<td>21.4</td>
<td>32.5</td>
<td>21.4</td>
<td>0</td>
<td>0</td>
<td>46</td>
<td>46</td>
<td>32.5</td>
</tr>
<tr>
<td>Ø</td>
<td>10.5</td>
<td>10.5</td>
<td>10.5</td>
<td>10.5</td>
<td>M6</td>
<td>M6</td>
<td>M6</td>
<td>M6</td>
<td>10.5</td>
</tr>
</tbody>
</table>
**Pressure compensator**

**Size 10**

![Image of pressure compensator](image)

**Application**

A combination of flow rate control and pressure compensation. The flow rate $Q$ is determined by the throttle cross-sections $P_1, R, A$ and $P_2, R, B$. Either a single or a double flow may be selected. In many applications, the valve is combined with a variable-displacement pump. The pressure/flow compensator keeps the pressure drops through the valve at a constant level (see Fig. 1 on page 10). The same function is achieved in constant-displacement pumps, too, by means of a pressure compensator. Here, $Q_{\text{max}}$ is determined by the control springs of the pressure compensator (see Fig. 2 on page 10).

The pressure $p$ is measured by an external pressure sensor and transmitted to an electronic pressure compensator as an actual value. Just as the build-up of pressure in the consumer takes place and approaches the setpoint value, the valve function is determined by the pressure compensator. Even in situations where the pressure is decreasing, the valve can regulate the oil as necessary via the A-T metering notch. Pressure compensation can be achieved both by means of electronics provided by the customer and using a Rexroth pressure compensator.

**Important**

You will find more detailed information in the RE data sheets:
- Pressure sensors RE 30271
- $p/Q$ regulator RE 30058

<table>
<thead>
<tr>
<th>Symbol</th>
<th>$p_{\text{max.}}$</th>
<th>$\Delta p$</th>
<th>$Q_{\text{nom}}$</th>
<th>$p/Q$-NG10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[bar]</td>
<td>[bar]</td>
<td>[l/min]</td>
<td>[kg]</td>
</tr>
<tr>
<td>$p/Q$-NG10</td>
<td>210</td>
<td>8</td>
<td>120</td>
<td>6.0</td>
</tr>
</tbody>
</table>

| $M6 \times 115$ DIN 912–10.9 |  |
| $M6 \times 120$ DIN 912–10.9 | 2910151227 |
Application

Figure 1: with variable-displacement pump

Figure 2: with pressure compensator 0 811 401 219

Unit dimensions (nominal dimensions in mm)

Required surface quality of mating component