4/2 servo solenoid valves with positive overlap and position feedback (Lvdt AC/AC)

Type 4WRP..EA..

Size 6, 10
Unit series 1X
Maximum working pressure of P, A, B 315 bar, T 250 bar
Nominal flow rate 8...28 l/min (NG6), 16...63 l/min (NG10)

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Features

- Directly operated NG6 and NG10 valves with positive overlap and external valve electronics
- Actuated on one side, symbol E
- Control solenoid with position feedback (Lvdt AC/AC)
- Suitable for use in electrohydraulic controls in production plants
- For subplate attachment, mounting hole configuration NG6 to ISO 4401-03-02-0-94 and NG10 with additional “L” port to ISO 4401-05-06-0-94
- External trigger electronics (order separately), see catalog section RE 30052 and RE 30054
- Subplates as per catalog section, NG6 RE 45053, NG10 RE 45055 (order separately)
- Solenoid and position transducer plug-in connectors included in scope of delivery

Variants on request

- For standard applications
- Special symbols and characteristic curves
Ordering data

For external trigger electronics = no code
Size 6 = 6
Size 10 = 10

Symbols
4/2-way version
NG6 NG10

Side of inductive position transducer
(Standard) = A

Type 4WRP10
Mounting hole configuration with additional "L" port

Electrical connection
Z4 = with plug to DIN 43560-AM2

Voltage supply of trigger electronics
G24 = +24 V DC

Flow characteristic
S = Progressive

Nominal flow rate at 10 bar valve pressure difference
(5 bar per metering notch)
Size 6
08 = 8 l/min
16 = 16 l/min
Size 10
16 = 16 l/min
32 = 32 l/min
28 = 28 l/min
63 = 63 l/min

Preferred types

<table>
<thead>
<tr>
<th>Type 4WRP6</th>
<th>Material No.</th>
<th>Type 4WRP10</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WRP6EA08S–1X/G24Z/M755 *)</td>
<td>0 811 403 100</td>
<td>4WRP10EA16S–1X/G24Z/M</td>
<td>0 811 403 003</td>
</tr>
<tr>
<td>4WRP6EA16S–1X/G24Z/M755 *)</td>
<td>0 811 403 101</td>
<td>4WRP10EA32S–1X/G24Z/M</td>
<td>0 811 403 002</td>
</tr>
<tr>
<td>4WRP6EA28S–1X/G24Z/M</td>
<td>0 811 403 126</td>
<td>4WRP10EA63S–1X/G24Z/M</td>
<td>0 811 403 001</td>
</tr>
</tbody>
</table>

*) Progressive characteristic curve, with triangular notch (standard = semicircular notch)
Function, sectional diagram

Type 4WRP6E..

Position feedback
(Lvdt AC/AC)    Control solenoid with position transducer    Valve body

Symbols

Position transducer: A-side

Accessories

<table>
<thead>
<tr>
<th>Fastening bolts</th>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 910 151 166</td>
<td>(4x) ISO 4762-M5x30-10.9</td>
</tr>
<tr>
<td>0 811 405 098</td>
<td>VT-VRPA1-527-10/V0/QV, see RE 30052</td>
</tr>
<tr>
<td>0 811 405 103</td>
<td>VT-VRPA1-527-10/V0/QV-RTP, see RE 30054</td>
</tr>
<tr>
<td>0 811 405 177</td>
<td>VT-VRPA1-527-10/V0/QV-RTS, see RE 30056</td>
</tr>
<tr>
<td>0811 405 098</td>
<td>Plug-in connector 2P+PE (M16x1.5) and 3P (Pg7)</td>
</tr>
</tbody>
</table>

Testing and service equipment

- Test box type VT-PE-TB1, see RE 30063
- Test adapter type VT-PA-3, see RE 30070
Function, sectional diagram

Type 4WRP10E..

Position feedback (Lvdt AC/AC)

Control solenoid with position transducer

Additional drain port \( p_{\text{max}} \leq 2 \text{ bar} \)

Valve body

Symbols

Position transducer: A-side

\[
\begin{array}{c}
\text{A} \\
\text{B} \\
\text{a} \\
\text{0} \\
\text{P} \\
\text{T}
\end{array}
\]

..E..

Accessories

<table>
<thead>
<tr>
<th>(4x) ISO 4762-M6x35-10.9</th>
<th>Fastening bolts</th>
<th>2 910 151 207</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT-VRPA1-537-10/V0/QV, see RE 30052</td>
<td>0 811 405 099</td>
<td></td>
</tr>
<tr>
<td>VT-VRPA1-537-10/V0/QV-RTP, see RE 30054</td>
<td>0 811 405 104</td>
<td></td>
</tr>
<tr>
<td>VT-VRPA1-537-10/V0/QV-RTS, see RE 30056</td>
<td>0 811 405 178</td>
<td></td>
</tr>
<tr>
<td>Plug-in connector 2P+PE (M16x1.5) and 3P (Pg7) included in scope of delivery, see also RE 08008</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Testing and service equipment

- Test box type VT-PE-TB1, see RE 30063
- Test adapter type VT-PA-3, see RE 30070
### Technical data (type 4WRP6EA..)

#### General

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Spool type valve</td>
</tr>
<tr>
<td>Actuation</td>
<td>Proportional solenoid with position control, external amplifier</td>
</tr>
<tr>
<td>Connection type</td>
<td>Subplate, mounting hole configuration NG6 (ISO 4401-03-02-0-94)</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Optional</td>
</tr>
<tr>
<td>Ambient temperature range °C</td>
<td>–20...+50</td>
</tr>
<tr>
<td>Weight kg</td>
<td>2.2</td>
</tr>
<tr>
<td>Vibration resistance, test condition</td>
<td>Max. 25 g, shaken in 3 dimensions (24 h)</td>
</tr>
</tbody>
</table>

#### Hydraulic (measured with HLP 46, \( \theta_{oil} = 40^\circ C \pm 5^\circ C \))

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure fluid</td>
<td>Hydraulic oil to DIN 51524..535, other fluids after prior consultation</td>
</tr>
<tr>
<td>Viscosity range mm(^2)/s</td>
<td>recommended 20...100, max. permitted 10...800</td>
</tr>
<tr>
<td>Pressure fluid temperature range °C</td>
<td>–20...+80</td>
</tr>
<tr>
<td>Maximum permissible degree of contamination of pressure fluid</td>
<td>Class 18/16/13</td>
</tr>
<tr>
<td>Purity class to ISO 4406 (c)</td>
<td>1)</td>
</tr>
<tr>
<td>Direction of flow</td>
<td>See symbol</td>
</tr>
<tr>
<td>Nominal flow at ( \Delta P = 5 ) bar per notch ( \Delta P = 100 ) bar</td>
<td>8, 16, 28</td>
</tr>
<tr>
<td>Max. working pressure bar</td>
<td>Port P, A, B: 315</td>
</tr>
<tr>
<td>Max. pressure bar</td>
<td>Port T: 250</td>
</tr>
<tr>
<td>Leakage per metering edge ( I_m = 0 ) ( \Delta P = 100 ) bar</td>
<td>( \leq 80 ) cm(^3)/min</td>
</tr>
</tbody>
</table>

#### Electrical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclic duration factor %</td>
<td>100</td>
</tr>
<tr>
<td>Power supply</td>
<td>24 ( V_{nom} ) (external amplifier)</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 65 to DIN 40050 and IEC 14434/5</td>
</tr>
<tr>
<td>Solenoid connection</td>
<td>Unit plug DIN 43650/ISO 4400, M16x1.5 (2P+PE)</td>
</tr>
<tr>
<td>Position transducer connection</td>
<td>Unit plug Pg7 (4P)</td>
</tr>
<tr>
<td>Max. solenoid current A</td>
<td>2.7</td>
</tr>
<tr>
<td>Coil resistance ( R_{coil} ) Ω</td>
<td>3</td>
</tr>
<tr>
<td>Max. power consumption at 100% load and operating temperature VA</td>
<td>40</td>
</tr>
</tbody>
</table>

#### Static/Dynamic\(^2\)\(^3\)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteresis %</td>
<td>( \leq 0.3 )</td>
</tr>
<tr>
<td>Range of inversion %</td>
<td>( \leq 0.2 )</td>
</tr>
<tr>
<td>Manufacturing tolerance for ( Q_{max} ) %</td>
<td>( \approx 10 )</td>
</tr>
<tr>
<td>Response time 100% signal change ms</td>
<td>( \approx 12 )</td>
</tr>
<tr>
<td>10% signal change ms</td>
<td>( \approx 7 )</td>
</tr>
</tbody>
</table>

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 catalog sections RE 50070, RE 50076 and RE 50081.

2) Flow rate at a different \( \Delta P \): \( q_x = q_{nom} \times \sqrt{\frac{\Delta P_x}{5}} \)

3) All specifications achieved in conjunction with proportional amplifier: 0 811 405 098
**Technical data (type 4WRP10EA..)**

### General
- **Construction**: Spool type valve
- **Actuation**: Proportional solenoid with position control, external amplifier
- **Connection type**: Subplate, mounting hole configuration NG10 (ISO 4401-05-06-0-94)
- **Mounting position**: Optional
- **Ambient temperature range**: °C –20...+50
- **Weight**: kg 7.0
- **Vibration resistance, test condition**: Max. 25 g, shaken in 3 dimensions (24 h)

### Hydraulic (measured with HLP 46, $\theta_{\text{oil}} = 40^\circ\text{C} \pm 5^\circ\text{C}$)
- **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)**: Class 18/16/13 ¹)
- **Direction of flow**: See symbol
- **Nominal flow at $\Delta p = 5$ bar per notch** ²)
  - l/min 16 32 63
- **Max. working pressure**
  - bar Port P, A, B: 315
- **Max. pressure**
  - bar Port T: 250
  - bar Port L: 2
- **Leakage per metering edge ($\Delta p = 100$ bar)** $I_m = 0$ € 80 cm³/min

### Electrical
- **Cyclic duration factor**: % 100
- **Power supply**: 24 V nom. (external amplifier)
- **Degree of protection**: IP 65 to DIN 40050 and IEC 14434/5
- **Solenoid connection**: Unit plug DIN 43650/ISO 4400, M16x1.5 (2P+PE)
- **Position transducer connection**: Unit plug Pg7 (4P)
- **Max. solenoid current**: A 3.7
- **Coil resistance $R_{20}$**: Ω 2.5
- **Max. power consumption at 100% load and operating temperature**: VA 60

### Static/Dynamic ³)
- **Hysteresis**: % € 0.3
- **Range of inversion**: % € 0.2
- **Manufacturing tolerance for $Q_{\text{max}}$**: % € 10
- **Response time 100% signal change**: ms € 25
- **10% signal change**: ms € 15

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 catalog sections RE 50070, RE 50076 and RE 50081.

²) Flow rate at a different $\Delta p$ $q_x = q_{\text{nom}} \cdot \sqrt{\frac{\Delta p_x}{5}}$

³) All specifications achieved in conjunction with proportional amplifier: 0 811 405 099
Valve with external trigger electronics (standard without ramps, RE 30052)

Circuit diagram/pin assignment

Versions of trigger electronics:
- With ramps, see page 8 and RE 30054
Valve with external trigger electronics (with ramps, RE 30054)

Circuit diagram/pin assignment

Versions of trigger electronics:
- With ramps, see page 7 and RE 30052
Characteristic curves type 4WRP6.. (measured with HLP 46, θ_{oil} = 40°C ± 5°C)

Flow rate/Signal function (at Δp = 5 bar per notch)

\[ Q_{\text{nom}} = 8 \text{ l/min} \]

\[ p_{\text{max}} = 250 \text{ bar}, T \quad x \]
\[ p_{\text{max}} = 315 \text{ bar}, T \quad \uparrow \]

\[ Q_{\text{nom}} = 16 \text{ l/min} \]

\[ p_{\text{max}} = 250 \text{ bar}, T \quad x \]
\[ p_{\text{max}} = 315 \text{ bar}, T \quad \uparrow \]

\[ Q_{\text{nom}} = 28 \text{ l/min} \]

\[ p_{\text{max}} = 250 \text{ bar}, T \quad x \]
\[ p_{\text{max}} = 315 \text{ bar}, T \quad \uparrow \]

Valve amplifier

1) Zero adjustment
2) Sensitivity adjustment
Characteristic curves type 4WRP10E.. (measured with HLP 46, \( \theta_{oil} = 40^\circ C \pm 5^\circ C \))

Flow rate/Signal function (at \( \Delta p = 5 \) bar per notch)

\[ Q_{nom} = 16 \, l/min \]

\[ p_{max} = 315 \, bar \]

\[ Q_{nom} = 32 \, l/min \]

\[ p_{max} = 315 \, bar \]

\[ Q_{nom} = 63 \, l/min \]

\[ p_{max} = 315 \, bar \]

Valve amplifier

1) Zero adjustment

2) Sensitivity adjustment
Operating limits (measured with HLP 46, $\theta_{oil} = 40^\circ C \pm 5^\circ C$)

Type 4WRP6EA..

\[Q_N\ 16\quad\text{single flow}\]
\[Q_N\ 28\quad\text{double flow}\]

Type 4WRP10EA..

\[\Delta p\ \text{bar}\]

Doubled flow rate
\[p_{max} = 250\ \text{bar}\]
Unit dimensions type 4WRP6E.. (nominal dimensions in mm)

Mounting hole configuration: NG6 (ISO 4401-03-02-0-94)
For subplates, see catalog section RE 45053

1) Deviates from standard
2) Thread depth:
   - Ferrous metal 1.5 x Ø
   - Non-ferrous 2 x Ø

<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>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>21.5</td>
<td>12.5</td>
<td>21.5</td>
<td>30.2</td>
<td>0</td>
<td>40.5</td>
<td>40.5</td>
<td>0</td>
</tr>
<tr>
<td>Y</td>
<td>25.9</td>
<td>15.5</td>
<td>5.1</td>
<td>15.5</td>
<td>0</td>
<td>–0.75</td>
<td>31.75</td>
<td>31</td>
</tr>
<tr>
<td>O</td>
<td>8¹</td>
<td>8¹</td>
<td>8¹</td>
<td>8¹</td>
<td>M5²</td>
<td>M5²</td>
<td>M5²</td>
<td>M5²</td>
</tr>
</tbody>
</table>
Unit dimensions type 4WRP10E.. (nominal dimensions in mm)

Mounting hole configuration: NG10 (ISO 4401-05-06-0-94)
Fur subplates, see catalog section RE 45055

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