Pressure reducing valve, pilot operated

Type ZDR

Features

▶ Sandwich plate valve
▶ Porting pattern according to ISO 4401-05-04-0-05
▶ 4 pressure ratings
▶ 4 adjustment types, optionally:
  - Rotary knob
  - Bushing with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
▶ Check valve, optional (version "A" and "B")
▶ Pressure gauge connection

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### Ordering code

<table>
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<tr>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
<th>06</th>
<th>07</th>
<th>08</th>
<th>09</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>DR</td>
<td>10</td>
<td>V</td>
<td>-</td>
<td>3X</td>
<td>/</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **01** Sandwich plate valve
- **02** Pressure reducing valve
- **03** Size 10
- **04** Pilot operated

**Pressure reduction**

- **05** In channel A2
- **06** In channel B2
- **07** In channel P1

**Adjustment type**

- **06** Rotary knob
  - Bushing with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale

**Secondary pressure**

- **08** Up to 50 bar
- **09** Pilot oil supply internal, pilot oil return external
- **10** With check valve (only version "A" and "B")
- **11** Without check valve

**Seal material**

- **11** NBR seals
- **12** FKM seals

**Connection thread**

- **12** Pipe thread according to ISO 228/1
- **13** SAE thread

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1) H-key with the material no. **R900008158** is included in the scope of delivery.

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**Notice!** Preferred types and standard units are contained in the EPS (standard price list).
Symbols (① = component side, ② = plate side)

Pressure reduction in channel A② ("A")

Pressure reduction in channel B② ("B")

Pressure reduction in channel A② ("A…M")

Pressure reduction in channel B② ("B…M")

Pressure reduction in channel P① ("P…M")

Notice!

Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.
Function, section

Pressure valves of type ZDR 10 V are pilot operated pressure reducing valves in sandwich plate design. They are used for reducing a system pressure.

The pressure valves basically consist of pilot control valve (1) and housing (2). The secondary pressure is set via the adjustment type (4).

Pressure reduction in channel P¹ ("P")
In the initial position the valves are open. Hydraulic fluid can flow from channel P² to channel P¹ without restrictions. The pressure in channel P¹ acts simultaneously at the main spool (6), via the bore (5) at the spring-loaded inside of the main spool (6) and via the nozzle (9) on the pilot poppet (8).

If the pressure in channel P² exceeds the value set at the compression spring (7), the pilot poppet (8) opens. Hydraulic fluid flows from the spring-loaded inside of the main spool (6) via the nozzle (9) and the pilot poppet (8) into the spring chamber (10). The main spool (6) assumes its control position and keeps the value in channel P¹ set at the compression spring (7) constant. The pilot oil return from the spring chamber (10) is effected via port TA.

Pressure reduction in channel A² and B² ("A" and "B")
For free flow back from channel A² to A¹ / B² to B¹, a check valve can be installed as option (not possible with version "P").
A pressure gauge connection (3) allows for the control of the secondary pressure.
### Technical data
(for applications outside these parameters, please consult us!)

#### general

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Version &quot;A&quot; and &quot;P&quot;</td>
<td>kg</td>
<td>Approx. 2.3</td>
</tr>
<tr>
<td>– Version &quot;B&quot;</td>
<td>kg</td>
<td>Approx. 2.7</td>
</tr>
<tr>
<td><strong>Ambient and storage temperature range</strong></td>
<td>℃</td>
<td>–30 ... +80 (NBR seals)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>–20 ... +80 (FKM seals)</td>
</tr>
</tbody>
</table>

#### hydraulic

<table>
<thead>
<tr>
<th><strong>Maximum set pressure</strong></th>
<th>bar</th>
<th>50; 100; 200; 315</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum inlet pressure</strong></td>
<td>– Port A①, B①, P②</td>
<td>bar 315</td>
</tr>
<tr>
<td><strong>Maximum secondary pressure</strong></td>
<td>– Port A②, B②, P①</td>
<td>bar 315</td>
</tr>
<tr>
<td><strong>Maximum counter pressure</strong></td>
<td>– Port TA, TB</td>
<td>bar 160</td>
</tr>
<tr>
<td><strong>Maximum flow</strong></td>
<td>l/min</td>
<td>100</td>
</tr>
<tr>
<td><strong>Hydraulic fluid temperature range</strong></td>
<td>℃</td>
<td>–30 ... +80 (NBR seals)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>–20 ... +80 (FKM seals)</td>
</tr>
<tr>
<td><strong>Viscosity range</strong></td>
<td>mm²/s</td>
<td>10 ... 800</td>
</tr>
<tr>
<td><strong>Maximum permitted degree of contamination of the hydraulic fluid</strong></td>
<td>cleanliness class according to ISO 4406 (c)</td>
<td>Class 20/18/15 ¹</td>
</tr>
</tbody>
</table>

#### Hydraulic fluid

<table>
<thead>
<tr>
<th><strong>Hydraulic fluid</strong></th>
<th><strong>Classification</strong></th>
<th><strong>Suitable seal materials</strong></th>
<th><strong>Standards</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral oils</td>
<td>HL, HLP</td>
<td>NBR, FKM</td>
<td>DIN 51524</td>
</tr>
<tr>
<td>Bio-degradable</td>
<td>– insoluble in water</td>
<td>HETG</td>
<td>NBR, FKM</td>
</tr>
<tr>
<td></td>
<td>– soluble in water</td>
<td>HEES</td>
<td>FKM</td>
</tr>
<tr>
<td>Flame-resistant</td>
<td>– water-free</td>
<td>HFDU</td>
<td>FKM</td>
</tr>
<tr>
<td></td>
<td>– containing water</td>
<td>HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)</td>
<td>NBR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VDMA 24568</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, life cycle, maintenance intervals, etc.)!¹

### Flame-resistant – containing water:
- Maximum pressure differential per control edge 210 bar, otherwise, increased cavitation
- Life cycle as compared to operation with mineral oil HL, HLP 30 to 100 %
- Maximum hydraulic fluid temperature 60 °C

¹ 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 life cycle of the components.
For the selection of the filters see www.boschrexroth.com/filter.
Characteristic curves
(measured with HLP46, \(T_{\text{oil}} = 40 \pm 5 \, ^\circ\text{C}\))

**\(p_A\cdot q_V\) characteristic curves**

- Secondary pressure in bar →
- Flow in l/min →

**\(\Delta p\cdot q_V\) characteristic curves (up to 50 bar)**

- Secondary pressure in bar ↑
- Flow in l/min →

**\(\Delta p_{\text{min}}\cdot q_V\) characteristic curves**

- Minimum pressure differential in bar ↑
- Flow in l/min →

**\(q_V\) at \(q_V\) characteristic curves with \(\Delta p = p_E - p_A\)**

- Pilot flow in l/min ↑
- Flow in l/min →

1. P\(\oplus\) to P\(\oplus\) (version "P")
2. A\(\ominus\) to A\(\ominus\) (version "A")
3. B\(\ominus\) to B\(\ominus\) (version "B")
4. A\(\ominus\) to A\(\ominus\) (version "A")
5. B\(\ominus\) to B\(\ominus\) (version "B")
6. \(\Delta p = 50\) bar
7. \(\Delta p = 250\) bar
8. Actuator resistance system-dependent
9. Lowest adjustable secondary pressure \(p_A\) for all pressure ratings
**Dimensions:** Version "A" and "P"  
(dimensions in mm)

1. **Plate side** – porting pattern according to ISO 4401-05-04-0-05  
2. **Component side** – porting pattern according to ISO 4401-05-04-0-05

### Valve mounting screws (separate order)
4 hexagon socket head cap screws ISO 4762 - M6 - 10.9-flZn-240h-L
Friction coefficient $\mu_{\text{total}} = 0.09$ to $0.14$,  
tightening torque $M_A = 12 \text{ Nm} \pm 10\%$

**Notice!**
- Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.  
- Bored for port X and Y (e. g. for pilot operated directional valve size 10), version **SO30** is applicable!  
- The device dimensions are nominal dimensions which are subject to tolerances.
### Dimensions: Version "B"
(dimensions in mm)

![Diagram of Pressure Reducing Valve]

1. Plate side – porting pattern according to ISO 4401-05-04-0-05
2. Component side – porting pattern according to ISO 4401-05-04-0-05

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name plate</td>
</tr>
<tr>
<td>2</td>
<td>Adjustment type &quot;4&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Adjustment type &quot;5&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Adjustment type &quot;6&quot;</td>
</tr>
<tr>
<td>5</td>
<td>Adjustment type &quot;7&quot;</td>
</tr>
<tr>
<td>6</td>
<td>Dimensions required to remove the key</td>
</tr>
<tr>
<td>7</td>
<td>Valve mounting bores</td>
</tr>
<tr>
<td>8</td>
<td>Lock nut SW24</td>
</tr>
<tr>
<td>9</td>
<td>Hexagon SW10</td>
</tr>
<tr>
<td>10</td>
<td>Identical seal rings for ports A①, B①, P①, TA①, TB① (plate side)</td>
</tr>
<tr>
<td>11</td>
<td>Pressure gauge connection G1/8; 8.5 deep; internal hexagon SW5</td>
</tr>
<tr>
<td>12</td>
<td>Hexagon SW30, tightening torque ( M_A = 50 \text{ Nm} )</td>
</tr>
</tbody>
</table>

#### Valve mounting screws (separate order)
- 4 hexagon socket head cap screws ISO 4762 · M6 · 10.9-flZn-240h-L
- Friction coefficient \( \mu_{\text{total}} = 0.09 \) to 0.14,
- tightening torque \( M_A = 12 \text{ Nm} \pm 10\% \)

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**Notice!**
- Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.
- Bored for port X and Y (e.g. for pilot operated directional valve size 10), version SO30 is applicable!
- The device dimensions are nominal dimensions which are subject to tolerances.
More information

- Subplates Data sheet 45054
- Hydraulic fluids on mineral oil basis Data sheet 90220
- Reliability characteristics according to EN ISO 13849 Data sheet 08012
- General product information on hydraulic products Data sheet 07008
- Installation, commissioning and maintenance of industrial valves Data sheet 07300
- Selection of the filters www.boschrexroth.com/filter
Notes
Notes