Pressure relief valve, pilot-operated

Type ZDB and Z2DB

Features

- Sandwich plate valve
- Porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05
- 4 pressure ratings
- 6 directions of action, optional
- 1 or 2 pressure valve cartridges
- 4 adjustment types for pressure adjustment, optionally
  - Rotary knob
  - Bushing with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Improved corrosion protection

Contents

- Size 10
- Component series 4X
- Maximum operating pressure 315bar [4600 psi]
- Maximum flow 100 l/min [26.4 US gpm]
### Ordering code

<table>
<thead>
<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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sandwich plate</td>
<td>DB</td>
<td>10</td>
<td>-</td>
<td>4X</td>
<td>/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. H-key with material no. R900008158 is included in the scope of delivery.
2. Only with adjustment type "2", however without protective cap.

### Relief function from – to:

<table>
<thead>
<tr>
<th>05</th>
<th>06</th>
<th>07</th>
<th>08</th>
<th>09</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
</table>

### Adjustment type for pressure adjustment

<table>
<thead>
<tr>
<th>06</th>
<th>07</th>
<th>08</th>
<th>09</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary knob</td>
<td>Component series 40 ... 49 (40 ... 49: unchanged installation and mounting dimensions)</td>
<td>Set pressure up to 50 bar [725 psi]</td>
<td>Set pressure up to 100 bar [1450 psi]</td>
<td>Set pressure up to 200 bar [2900 psi]</td>
<td>Set pressure up to 315 bar [4600 psi]</td>
</tr>
<tr>
<td>1</td>
<td>4X</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>315</td>
</tr>
</tbody>
</table>

### Pressure rating

### Corrosion resistance

<table>
<thead>
<tr>
<th>09</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>NBR seals</td>
<td>Further details in the plain text</td>
</tr>
<tr>
<td>no code</td>
<td>no code</td>
<td>*</td>
</tr>
</tbody>
</table>

### Notes:

- To port X and Y bored according to ISO 4401-05-05-0-05 (e.g. for pilot-operated directional valve NG10), version "SO30" applies at the end of the ordering code.
- Preferred types and standard units are contained in the EPS (standard price list).
Symbols (① = component side, ② = plate side)

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 ZDB and Z2DB are pilot-operated pressure relief valves in sandwich plate design. They are used for limiting a system pressure.

The valves basically consist of the housing (7) and one or two pressure valve cartridges. The system pressure can be set via the adjustment type (4).

In the initial position the valves are closed. The pressure in channel A acts on the spool (1). At the same time, pressure is applied to the spring-loaded side of the spool (1) via nozzle (2) and to the pilot poppet (6) via nozzle (3). If the pressure in channel A exceeds the value set at the spring (5), the pilot poppet (6) opens. Hydraulic fluid flows from the spring-loaded side of the spool (1), nozzle (3) and channel (8) into channel T (TA). The resulting pressure drop moves the spool (1) and opens the connection from A to T (TA). In channel A, the pressure set at the spring (5) settles.
**Technical data**

(For applications outside these parameters, please consult us!)

### General

| Weight | Type ZDB | kg [lbs] | Approx. 2.4 [5.3] |
| Type Z2DB | kg [lbs] | Approx. 2.6 [5.7] |

| Installation position | Any |
| Ambient temperature range | °C | -20 ... +80 [-4 ... +176] |

### Hydraulic

| Maximum operating pressure | bar [psig] | 315 [4600] |
| Maximum set pressure | bar [psig] | 50 [725]; 100 [1450]; 200 [2900]; 315 [4600] |
| Hydraulic fluid | See table below |
| Hydraulic fluid temperature range | °C [°F] | -20 ... +80 [-4 ... +176] |
| Viscosity range | mm²/s [SUS] | 10 ... 800 [60 ... 3710] |
| Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c) | Class 20/18/15 1) |

### Hydraulic fluid

<table>
<thead>
<tr>
<th>Classification</th>
<th>Suitable sealing materials</th>
<th>Standards</th>
<th>Data sheet</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 2)</td>
<td>Insoluble in water</td>
<td>HETG</td>
<td>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 (glycol base)</td>
<td>FKM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HFDU (ester base) 2)</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>
</tbody>
</table>

1) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

For the selection of the filters, see www.boschrexroth.com/filter.

2) Not recommended for corrosion-protected versions "J3" and "J5" (contains zinc)

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For the selection of the filters, see www.boschrexroth.com/filter.

2) Not recommended for corrosion-protected versions "J3" and "J5" (contains zinc)
**Characteristic curves**
(measured with HLP46, $\theta_{\text{oil}} = 40 \pm 5^\circ \text{C}$)

**Notice:**
The characteristic curves apply to the pressure at the valve output $p = 0$ bar across the entire flow range.

1. VD (A to B)
2. VA
3. VB, VC, VT
4. VP, VD (B to A)
**Dimensions:** Type ZDB 10 VA, VP and VT (dimensions in mm [inch])

**Notes:**
- To port X and Y bored according to ISO 4401-05-05-0-05 (e.g. for pilot-operated directional valve NG10), version "SO30" applies at the end of the ordering code.
- Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.

<table>
<thead>
<tr>
<th>Type</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>H</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA, VP</td>
<td>69</td>
<td>11.5</td>
<td>20.7</td>
<td>26</td>
<td>227</td>
<td>203</td>
<td>117</td>
<td>57.6</td>
<td>50.3</td>
<td>4</td>
<td>45.5</td>
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<tr>
<td></td>
<td>[2.72]</td>
<td>[0.45]</td>
<td>[0.82]</td>
<td>[1.02]</td>
<td>[8.94]</td>
<td>[7.99]</td>
<td>[4.61]</td>
<td>[2.27]</td>
<td>[1.98]</td>
<td>[0.16]</td>
<td>[1.79]</td>
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<tr>
<td>VT</td>
<td>70</td>
<td>12</td>
<td>27</td>
<td>25</td>
<td>218</td>
<td>194</td>
<td>105</td>
<td>60.9</td>
<td>53.6</td>
<td>0.7</td>
<td>32.5</td>
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<tr>
<td></td>
<td>[2.76]</td>
<td>[0.47]</td>
<td>[1.06]</td>
<td>[0.98]</td>
<td>[8.58]</td>
<td>[7.64]</td>
<td>[4.13]</td>
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<td>[2.11]</td>
<td>[0.027]</td>
<td>[1.28]</td>
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**Notes:**
- Required surface quality of the valve contact surface
- Rz1max 4
- 0.01/100 [0.0004/4.0]
- Item explanations and valve mounting screws see page 10.

RD 25761, edition: 2016-12, Bosch Rexroth AG
Dimensions: Type ZDB 10 VB
(dimensions in mm [inch])

Notes:

- To port X and Y bored according to ISO 4401-05-05-0-05 (e.g. for pilot-operated directional valve NG10), version "SO30" applies at the end of the ordering code.
- Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.
Dimensions: Type ZDB 10 VC and VD (dimensions in mm [inch])

Item explanations and valve mounting screws see page 10.

Notes:
- To port X and Y bored according to ISO 4401-05-05-0-05 (e.g. for pilot-operated directional valve NG10), version "SO30" applies at the end of the ordering code.
- Deviating from ISO 4401, port T is in this data sheet called TA, port T1 is called TB.

<table>
<thead>
<tr>
<th>Type</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
<th>L6</th>
<th>L7</th>
<th>L8</th>
<th>L9</th>
<th>L10</th>
<th>L11</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC</td>
<td>123</td>
<td>111</td>
<td>112</td>
<td>89</td>
<td>90</td>
<td>59</td>
<td>60</td>
<td>52</td>
<td>53</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>[4.84]</td>
<td>[4.37]</td>
<td>[4.40]</td>
<td>[3.50]</td>
<td>[3.54]</td>
<td>[2.32]</td>
<td>[2.36]</td>
<td>[2.05]</td>
<td>[2.09]</td>
<td>[0.08]</td>
<td>[0.04]</td>
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<tr>
<td>VD</td>
<td>132</td>
<td>107</td>
<td>112</td>
<td>85</td>
<td>90</td>
<td>56</td>
<td>56</td>
<td>49</td>
<td>49</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>[5.20]</td>
<td>[4.20]</td>
<td>[4.40]</td>
<td>[3.30]</td>
<td>[3.54]</td>
<td>[2.20]</td>
<td>[2.20]</td>
<td>[1.93]</td>
<td>[1.93]</td>
<td>[0.24]</td>
<td>[0.24]</td>
</tr>
</tbody>
</table>
Dimensions

1. Name plate
2. Adjustment type "1"
3. Adjustment type "2" (with version "J3" and "J5" without protective cap)
4. Adjustment type "3"
5. Adjustment type "7"
6. Dimensions required to remove the key
7. Valve mounting bores
8. Lock nut SW24, tightening torque $M_a = 10^{\circ} \text{Nm}$
9. Hexagon SW10
10. Identical seal rings for ports A, B, P, TA, TB (plate side)
11. Sealing plate 80 x 70 x 1.5 [2.76 x 3.15 x 0.06] (only with version "VA" and "VP")
12. Countersinks (only with version "VT")
13. Versions "VA" and "VP"
14. Version "VT"
15. Hexagon SW30, tightening torque $M_a = 50 \text{Nm} \ [36.8 \text{ ft-lbs}]

1. component side – porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05
2. plate side – porting pattern according to ISO 4401-05-04-0-05 and NFPA T3.5.1 R2-2002 D05

Valve mounting screws (separate order)

- Version "J3"
  4 hexagon socket head cap screws
  ISO 4762 - M6 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B
  Friction coefficient $\mu_{\text{total}} = 0.09 \ldots 0.14$

- Version "J5"
  4 hexagon socket head cap screws
  ISO 4762 - M6 - 10.9-CM-Fe-ZnNi-8-Cn-T0-H-B
  Friction coefficient $\mu_{\text{total}} = 0.09 \ldots 0.14$

- Without corrosion protection
  4 hexagon socket head cap screws
  ISO 4762 - M6 - 10.9
  With friction coefficient $\mu_{\text{total}} = 0.12 \ldots 0.17$

Notice:
Length and tightening torque of the valve mounting screws must be calculated according to the components mounted under and over the sandwich plate valve.

Accessories (separate order)

<table>
<thead>
<tr>
<th>Denomination</th>
<th>Material no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective cap</td>
<td>R900135501</td>
</tr>
</tbody>
</table>

Further information

- Pressure relief valve, pilot-operated
- Hydraulic fluids on mineral oil basis
- Environmentally compatible hydraulic fluids
- Flame-resistant, water-free hydraulic fluids
- Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC)
- Use of non-electrical hydraulic components in an explosive environment (ATEX)
- Hydraulic valves for industrial applications
- Selection of the filters

Data sheet 25731
Data sheet 90220
Data sheet 90221
Data sheet 90222
Data sheet 90223
Data sheet 07011
Operating instructions 07600-B
www.boschrexroth.com/filter

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Notes
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