Pneumatic operated directional valves
ISO 4401 sizes 06, 10, 16, 25 and 32

Pneumatic operated directional valves are spool type (3), three or four way, two or three position, designed to operate in oil hydraulic systems. Available with single or double pneumatic actuator (8) with manual override.

Valve sizes and max flow:
- **DH-0**: size 06, flow up to 50 l/min
- **DK-1**: size 10, flow up to 160 l/min
- **DPH-2**: size 16, flow up to 300 l/min
- **DPH-4**: size 25, flow up to 700 l/min
- **DPH-6**: size 32, flow up to 1000 l/min

Max pressure:
- 350 bar for DH-0, DPH-2, DPH-4, DPH-6
- 315 bar for DK-1

**Options:**
- only for valve with single actuator:
  - /A: Actuator device mounted on side of port B (for DH and DK). Actuator device mounted on side of port A of main body (for DPH)
- only for DPH:
  - /D: internal drain
  - /E: external pressure
  - /H: adjustable chokes for controlling the main spool shifting time (meter-out to the pilot chambers of the main valve)
  - /H9: adjustable chokes for controlling the main spool shifting time (meter-in to the pilot chambers of the main valve)
  - /R: pilot pressure generator on port P at 4 bar
  - /S: main spool stroke adjustment

**Seals material, see section 3:**
- /N = NBR
- /PE = FKM

**Model Code**

<table>
<thead>
<tr>
<th>DH-0</th>
<th>8</th>
<th>1</th>
<th>3</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Directional control valve, size:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DH-0 = 06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DK-1 = 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPH-2 = 16</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>DPH-4 = 25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPH-6 = 32</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Type of actuator:**
- 8 = single actuator
- 9 = double actuator

**Valve configuration, see sections 4 and 5:**
- 0 = free, without springs
- 1 = spring centered, without detent
- 3 = spring offset external position
- 5 = 2 external positions, with detent
- 7 = center and external positions

**Spool type, see sections 4 and 5:**

### Hydraulic Characteristics

<table>
<thead>
<tr>
<th>Valve model</th>
<th>DH-0</th>
<th>DK-1</th>
<th>DPH-2</th>
<th>DPH-4</th>
<th>DPH-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max recommended flow (l/min)</td>
<td>50</td>
<td>160</td>
<td>300</td>
<td>700</td>
<td>1000</td>
</tr>
<tr>
<td>Max pressure on port P, A, B (also X for DP) (bar)</td>
<td>350</td>
<td>315</td>
<td>350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max pressure on port T (bar)</td>
<td></td>
<td>210</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max pressure on port L and Y (bar)</td>
<td></td>
<td></td>
<td></td>
<td>null pressure</td>
<td></td>
</tr>
<tr>
<td>Recommended oil pressure on piloting line (bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended pneumatic pressure ((1)) (bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table E255-3/E**

- **Series number:**
- **Seals material, see section 3:**
  - /N = NBR
  - /PE = FKM

**Seals material, see section 3:**
- /N = NBR
- /PE = FKM

**Options:**
- only for valve with single actuator:
  - /A: Actuator device mounted on side of port B (for DH and DK).
  - Actuator device mounted on side of port A of main body (for DPH)
- only for DPH:
  - /D: internal drain
  - /E: external pressure
  - /H: adjustable chokes for controlling the main spool shifting time (meter-out to the pilot chambers of the main valve)
  - /H9: adjustable chokes for controlling the main spool shifting time (meter-in to the pilot chambers of the main valve)
  - /R: pilot pressure generator on port P at 4 bar
  - /S: main spool stroke adjustment

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(1) Filtered and lubricated air

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3 MAIN CHARACTERISTICS, SEALS AND FLUIDS - for other fluids not included in below table, consult our technical office

<table>
<thead>
<tr>
<th>Assembly position / location</th>
<th>Any position for all valves except for type ~90 (without springs) that must be installed with horizontal axis if operated by impulses.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subplate surface finishing</td>
<td>Roughness index Ra 0.4 - flatness ratio 0.01/100 (ISO 1101)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Standard execution = -20°C ÷ +70°C, /PE option = -20°C ÷ +50°C</td>
</tr>
<tr>
<td>Seals, recommended fluid temperature</td>
<td>NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C</td>
</tr>
<tr>
<td>Recommended viscosity</td>
<td>15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s</td>
</tr>
<tr>
<td>ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at <a href="http://www.atos.com">www.atos.com</a> or KTF catalog</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydraulic fluid</th>
<th>Suitable seals type</th>
<th>Classification</th>
<th>Ref. Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral oils</td>
<td>NBR, FKM</td>
<td>HL, HLP, HLPD, HVLP, HVL, HVLPD</td>
<td>DIN 51524</td>
</tr>
<tr>
<td>Flame resistant without water</td>
<td>FKM</td>
<td>HFDU, HFDR</td>
<td>ISO 12922</td>
</tr>
<tr>
<td>Flame resistant with water</td>
<td>NBR, FKM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4 CONFIGURATIONS and SPOOLS of valves type DH*, DK* - sumps type 0 and 3 are also available as 0/1 and 3/1 with restricted oil passages in central position, from user ports to tank.
- sumps type 1, 4 and 5 are also available as 1/1, 4/8 (only for DH-0) and 5/1. They are properly shaped to reduce water-hammer shocks during the switching.
- sumps type 1, 1/2, 3, 8 are available as 1P, 1/2P, 3P, 8P (only for DH-0) to limit valve internal leakages.

5 CONFIGURATIONS and SPOOLS of valves type DPH* - sumps type 8 and 3 are also available as 0/1 and 3/1 with restricted oil passages in central position, from user ports to tank.
- sumps type 1, 4, and 5 are also available as 1/1, 4/8 and 5/1 are properly shaped to reduce water-hammer shocks during the switching.

NOTES on seals and fluid types:
- NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C
- FKM seals (/PE option) = -20°C ÷ +80°C

Recommended viscosity:
- 15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s

Max fluid contamination level:
- ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog

Assembly position / location:
- Any position for all valves except for type ~90 (without springs) that must be installed with horizontal axis if operated by impulses.

Subplate surface finishing:
- Roughness index Ra 0.4 - flatness ratio 0.01/100 (ISO 1101)

Compliance:
- RoHS Directive 2011/65/EU as last update by 2015/65/EU
- REACH Regulation (EC) n°1907/2006

Ambient temperature:
- Standard execution = -20°C ÷ +70°C, /PE option = -20°C ÷ +50°C

Seals, recommended fluid temperature:
- NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C
- FKM seals (/PE option) = -20°C ÷ +80°C

Recommended viscosity:
- 15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s

Max fluid contamination level:
- ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog
7 INSTALLATION DIMENSIONS of VALVES type DH and DK [mm]

ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
Fastening bolts: 4 socket head screws M5x50 class 12.9
Tightening torque = 8 Nm
Diameter of ports A, B, P, T: Ø = 7.5 mm (max)
Seals: 4 OR 108

![DH-08 Diagram](image1.png)

Mass: 1.2 Kg
Mounting subplates: see tab. E010

![DH-09 Diagram](image2.png)

Mass: 1.6 Kg

ISO 4401: 2005
Mounting surface: 4401-05-04-0-05
Fastening bolts: 4 socket head screws M6x40 class 12.9
Tightening torque = 15 Nm
Diameter of ports A, B, P, T: Ø = 11.2 mm (max)
Seals: 5 OR 2050

![DK-18 Diagram](image3.png)

Mass: 3.4 Kg
Mounting subplates: see tab. E025

![DK-19 Diagram](image4.png)

Mass: 4.2 Kg
DPH-2
ISO 4401: 2005
Mounting surface: 4401-07-07-0-05

Fastening bolts:
4 socket head screws M10x50 class 12.9
Tightening torque = 70 Nm
2 socket head screws M8x45 class 12.9
Tightening torque = 15 Nm
Diameter of ports A, B, P, T: Ø = 20
Diameter of ports X, Y: Ø = 7 mm
Seals: 4 OR 130, 2 OR 2043

Stroke adjustment device for option /S

Mass: 18 Kg

DPH-4
ISO 4401: 2005
Mounting surface: 4401-08-08-0-05

Fastening bolts:
6 socket head screws M12x60 class 12.9
Tightening torque = 125 Nm
Diameter of ports A, B, P, T: Ø = 24
Diameter of ports X, Y: Ø = 7 mm
Seals: 4 OR 4112, 2 OR 3056

Stroke adjustment device for option /S

Mass: 18 Kg

DPH-6
ISO 4401: 2005
Mounting surface: 4401-10-09-0-05

Fastening bolts:
6 socket head screws M20x80 class 12.9
Tightening torque = 600 Nm
Diameter of ports A, B, P, T: Ø = 34 mm
Diameter of ports X, Y: Ø = 7 mm
Seals: 4 OR 144, 2 OR 3056

Stroke adjustment device for option /S

Only for option /H

Mass: 39.5 Kg