Hand & mechanical directional valves
ISO 4401 sizes 06, 10, 16 and 25

Hand & mechanical operated directional valves are spool type, three or four way, two or three position valves, available with following actuator types:
- mechanical actuator: general purpose execution for connection to customer device for the valve’s remote operation
- hand-lever
- cam (only for DH and DK).

Valve sizes and max flow:

- **DH-0** = size 06, flow up to 50 l/min
- **DK-10** (11) = size 10, flow up to 100 l/min
- **DK-12** = size 10, flow up to 140 l/min
- **DP-2** = size 16, flow up to 300 l/min
- **DP-4** = size 25, flow up to 700 l/min

Max pressure:
- 350 bar for DH-0, DP-2, DP-4
- 315 bar for DK-1*

Seals material:
- **NBR**
- **FKM**

Options:

- /A = actuator device mounted on side of port B
- /I = in rest position the lever is inclined towards the valve body
- /E = in rest position the lever is inclined in opposite side
- /Y = external drain

Spool type, see section [3]

---

1 MODEL CODE

<table>
<thead>
<tr>
<th>DH-0</th>
<th>1</th>
<th>1</th>
<th>3</th>
<th>C</th>
<th>A</th>
<th>**</th>
<th>*</th>
</tr>
</thead>
</table>

Directional control valve, size:
- **DH-0** = 06
- **DK-1** = 10
- **DP-2** = 16
- **DP-4** = 25

Type of actuator:
- 0 = mechanical, without lever
- 1 = hand-lever
- 2 = cam (only for DH-0 and DK-1)

Valve configuration, see sections [2] and [3]
- 0 = free, without springs
- 1 = spring centered, without detent
- 2 = return to internal position
- 3 = return to external position
- 4 = 3 position, with detent
- 5 = 2 external positions, with detent
- 6 = centre plus external positions, with detent
- 7 = return to external position from the centre position
- 8 = return to the centre position from the external position

2 RANGE OF VALVE’S MODELS

<table>
<thead>
<tr>
<th>VALVE TYPE</th>
<th>SIZE</th>
<th>VALVE CONFIGURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH-00</td>
<td>06</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DH-01</td>
<td>06</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DH-02</td>
<td>10</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DK-10</td>
<td>16</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DK-11</td>
<td>16</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DK-12</td>
<td>16</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DP-20</td>
<td>16</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DP-21</td>
<td>16</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DP-40</td>
<td>25</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>DP-41</td>
<td>25</td>
<td>0 1 2 3 4 5 6 7 8</td>
</tr>
</tbody>
</table>
CONFIGURATIONS and SPOOLS

DH-00*, DH-01*, and DK-10*, DK-11* - mechanical and hand lever actuator

DH-000*    DK-100*    DH-010*    DK-110*

Spools

DH-001*    DK-101*    DH-011*    DK-111*

DH-002*    DK-102*    DH-012*    DK-112*

DH-003*    DK-103*    DH-013*    DK-113*

DH-004*    DK-104*    DH-014*    DK-114*

DH-005*    DK-105*    DH-015*    DK-115*

NOTE
- Spools type 0/2, 1/2, 2/2 are only used for valves type DH-023*/2 and DK-123*/2;
**GENERAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Assembly position</th>
<th>Any position except for configuration 7 (without spring) that must be installed with horizontal axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subplate surface finishing to ISO 4401</td>
<td>Acceptable roughness index, Ra ≤ 0.8 recommended Ra 0.4 - flatness ratio 0.01/100</td>
</tr>
<tr>
<td>MTTFd valves according to EN ISO 13849</td>
<td>150 years, see technical table P007</td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>Standard = -30°C ÷ +70°C  /PE option = -20°C ÷ +70°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>Standard = -30°C ÷ +80°C  /PE option = -20°C ÷ +80°C</td>
</tr>
<tr>
<td>Flow direction</td>
<td>As shown in the symbols of tables 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DH P, A, B = 350 bar T = 160 bar</td>
</tr>
<tr>
<td>DK P, A, B = 315 bar T = 160 bar</td>
</tr>
<tr>
<td>DP P, A, X = 350 bar T = 250 bar for external drain (standard); Ports Y = 0 bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK-10, DK-11</td>
</tr>
<tr>
<td>DK-12</td>
</tr>
<tr>
<td>DP-2</td>
</tr>
<tr>
<td>DP-4</td>
</tr>
</tbody>
</table>

**SEALS AND HYDRAULIC FLUIDS** - For other fluids not included in above table, consult our technical office

<table>
<thead>
<tr>
<th>Seals, recommended fluid temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR seals = (standard) -30°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C  FKM seals = (/PE option) -20°C ÷ +80°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended viscosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>15+ 100 mm²/s - max allowed range 15 = 380 mm²/s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max fluid contamination level</th>
</tr>
</thead>
<tbody>
<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>
</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, 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</td>
<td>HFC</td>
<td>ISO 12922</td>
</tr>
</tbody>
</table>
DIMENSIONS OF HAND & MECHANICAL OPERATED VALVES ISO 4401 SIZE 06 [mm]

DH-00**

Mass: 1.2 Kg

ISO 4401: 2005
Mounting surface: 4401-03-02-0-05 (see table P005)
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

Working stroke: 2.5 mm; extra-stroke: 0.5 mm max.

DIMENSIONS OF HAND & MECHANICAL OPERATED VALVES ISO 4401 SIZE 10 [mm]

DK-10**

Mass: 2.5 Kg

ISO 4401: 2005
Mounting surface: 4401-05-05-0-05 (see table P005)
(Without X port, Y port optional)
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

Working stroke: 4 mm; extra-stroke: 0.5 mm max.
DIMENSIONS OF HAND & MECHANICAL OPERATED VALVES ISO 4401 SIZE 16 [mm]

DP-21

ISO 4401: 2005
Mounting surface: 4401-07-07-0-05 (see table P005)
Fastening bolts:
4 socket head screws M10x50 class 12.9, Tightening torque = 70 Nm
2 socket head screws M8x40 class 12.9, Tightening torque = 15 Nm
Diameter of ports A, B, P, T: Ø = 20 mm
Diameter of ports X, Y: Ø = 7 mm
Seals: 4 OR 130, 3 OR 109/70

Mass: 9.7 Kg

DP-20

ISO 4401: 2005
Mounting surface: 4401-08-08-0-05 (see table P005)
Fastening bolts:
6 socket head screws M12x50 class 12.9, Tightening torque = 125 Nm
Diameter of ports A, B, P, T: Ø = 24 mm
Diameter of ports X, Y: Ø = 7 mm
Seals: 4 OR 4112, 3 OR 3056

Mass: 10 Kg

DIMENSIONS OF HAND & MECHANICAL OPERATED VALVES ISO 4401 SIZE 25 [mm]

DP-41

ISO 4401: 2005
Mounting surface: 4401-08-08-0-05 (see table P005)
Fastening bolts:
6 socket head screws M12x50 class 12.9, Tightening torque = 125 Nm
Diameter of ports A, B, P, T: Ø = 24 mm
Diameter of ports X, Y: Ø = 7 mm
Seals: 4 OR 4112, 3 OR 3056

Mass: 15.5 Kg

DP-40

ISO 4401: 2005
Mounting surface: 4401-08-08-0-05 (see table P005)
Fastening bolts:
6 socket head screws M12x50 class 12.9, Tightening torque = 125 Nm
Diameter of ports A, B, P, T: Ø = 24 mm
Diameter of ports X, Y: Ø = 7 mm
Seals: 4 OR 4112, 3 OR 3056

Mass: 15.2 Kg