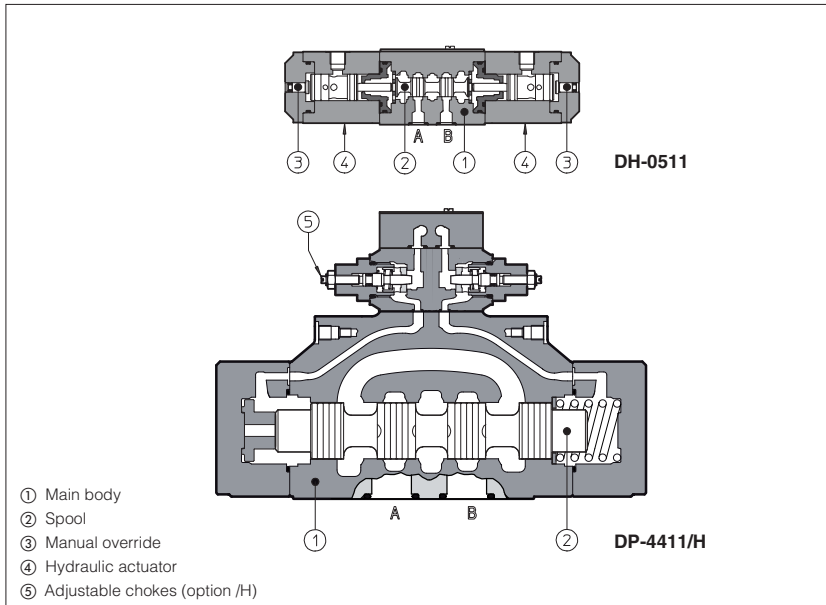


# Hydraulic operated directional valves

ISO 4401 size 06, 10, 16, 25 and 32



Hydraulic operated directional valves are spool type, three or four way, two or three position, designed to operate in oil hydraulic systems. Available with single or double hydraulic actuator.

- DH-0 = ISO 4401 size 06, flow up to 50 l/min
- DK-1 = ISO 4401 size 10, flow up to 160 l/min
- DP-1 = ISO 4401 size 10, flow up to 160 l/min
- DP-2 = ISO 4401 size 16, flow up to 300 l/min
- DP-3 = ISO 4401 size 25, flow up to 600 l/min
- DP-4 = ISO 4401 size 25, flow up to 700 l/min
- DP-6 = ISO 4401 size 32, flow up to 1000 l/min

Max pressure:  
350 bar for DH-0, DP-1, DP-2, DP-3, DP-6  
315 bar for DK-1

## 1 MODEL CODE

|  |   |   |          |   |               |   |
|--|---|---|----------|---|---------------|---|
| <b>DH-0</b>  | <b>4</b>  | <b>1</b>  | <b>3</b> | <b>/A</b>   | <b>**</b>     | <b>/*</b>   |
| Directional control valve, size:<br><b>DH-0</b> = 06<br><b>DK-1</b> = 10<br><b>DP-1</b> = 10<br><b>DP-2</b> = 16<br><b>DP-3</b> = 25<br><b>DP-4</b> = 25 (high flow)<br><b>DP-6</b> = 32 | Type of actuator:<br><b>4</b> = single actuator<br><b>5</b> = double actuator | Valve configuration, see section 4<br><b>0</b> = free, without springs<br><b>1</b> = spring centered, without detent<br><b>3</b> = spring offset external position<br><b>5</b> = 2 external positions, with detent (only for DH and DK)<br><b>7</b> = center and external positions |          | Options:<br>only for DH-04 and DK-14, see section 4:<br><b>/A</b> = actuator device mounted on side of port B<br>only for DP:<br><b>/H</b> = adjustable chokes for controlling the main spool shifting time (meter-out to the pilot chambers of the main valve)<br><b>/H9</b> = adjustable chokes for controlling the main spool shifting time (meter-in to the pilot chambers of the main valve)<br><b>/R</b> = with check valve on port P<br><b>/S</b> = main spool stroke adjustment (not available for DP-1*) | Series number | Seals material:<br>omit for NBR (mineral oil & water glycol)<br><b>PE</b> = FPM |
|  |   |   |          | Spool type, see section 5   |               |   |

## 2 HYDRAULIC CHARACTERISTICS

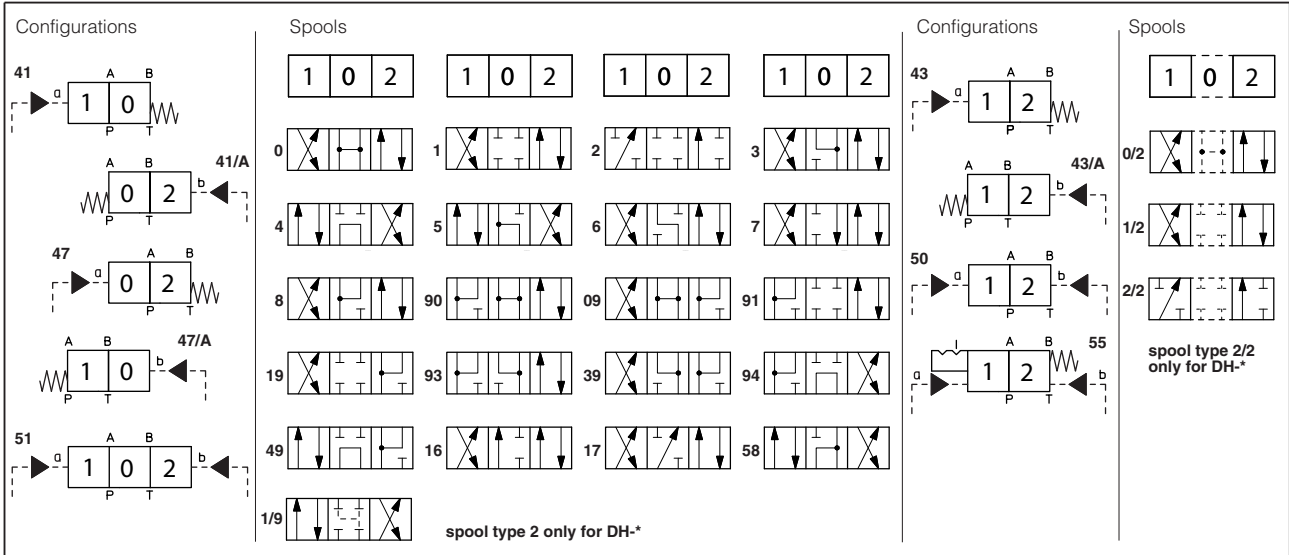
| Valve model                                     | DH-0   | DK-1 | DP-1  | DP-2 | DP-3 | DP-4 | DP-6 |
|---|--|------|---|------|------|------|------|
| Max recommended flow [l/min]                    | 50   | 160  | 160   | 300  | 600  | 700  | 1000 |
| Max pressure on port P, A, B [bar]              | 350  | 315  | 350   |      |      |      |      |
| Max pressure on port T (also X, Y for DP) [bar] | see note (1)   |      |   | 250  |      |      |      |
| Minimum pilot pressure [bar]                    | 3 (min) 5 (suggested)  |      |   | 4    |      |      |      |
| Max recommended pressure on piloting line [bar] | 70   |      |   | 250  |      |      |      |
| Operation                                       | Acting the actuator on port A, the hydraulic connections are P→B, A→T, except for spool type 4 and 5 where the connections are P→A, B→T. |      | The spool displacement is achieved by hydraulic pressure on one of the pilot chambers, while the other is unloaded. When pressurizing port X, the port Y has to be directly connected to the tank at null pressure and viceversa. By pressurizing port X, the hydraulic connections are P→A, B→T, except for spool type 4 and 5 where the connections are P→B, A→T. In the spring centered versions the spool is centered by the spring action when both the pilot chambers are unloaded. |      |      |      |      |

1) The max pressure on port T has to be not over 50% of pilot pressure.

### 3 MAIN CHARACTERISTICS OF HYDRAULIC OPERATED DIRECTIONAL VALVES

|                              |   |
|------------------------------|---|
| Assembly position / location | Any position except for valves type DH-050, DK-150, DP-*50 (without springs) that must be installed with their longitudinal axis horizontal |
| Subplate surface finishing   | Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)   |
| Ambient temperature          | -20°C to + 70°C   |
| Fluid                        | Hydraulic oil as per DIN 51524...535, for other fluids see section I  |
| Recommended viscosity        | 15 ÷ 100 mm <sup>2</sup> /s at 40°C (ISO VG 15 ÷ 100)   |
| Fluid contamination class    | ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 μm (β <sub>25</sub> ≥ 75 recommended)                                      |
| Fluid temperature            | -20°C +60°C (standard seals) -20°C +80°C (/PE seals)  |

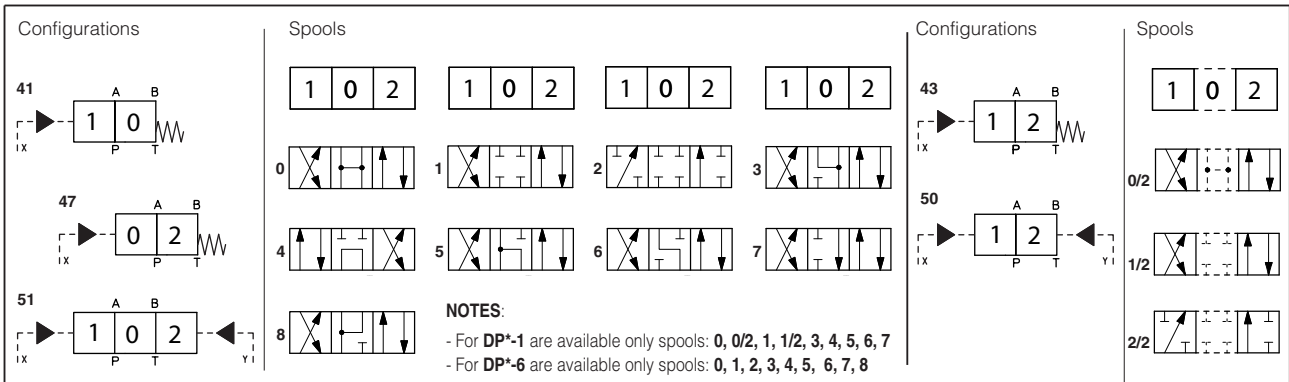
### 4 CONFIGURATIONS and SPOOLS valves type DH-\*, DK-\*



#### NOTES

- Spools type 0 and 3 are also available as 0/1 and 3/1, where in centre position oil passage from ports to tank are restricted;
- Spools type 1,4 and 5 are also available as 1/1, 4/8 and 5/1. They are properly shaped to reduce water-hammer shocks during the switching;
- Spool type 1, 3, 8 and 1/2 for DH-0 and DK-1 are available as 1P, 3P, 8P (only for DH-0), and 1/2P to limit valve leakage.
- On request, other type of spools are available.

### 5 CONFIGURATIONS and SPOOLS valves type DP-\*



#### NOTES

- Spools type 0 and 3 are also available as 0/1 and 3/1, where in centre position oil passage from ports to tank are restricted;
- Spools type 1,4 and 5 are also available as 1/1, 4/8 and 5/1 (not available for DP-6). They are properly shaped to reduce water-hammer shocks during the switching;
- On request, other type of spools are available.

### 6 Q/Δp DIAGRAMS

|             |   |
|-------------|---|
| <b>DH-0</b> | See note and diagrams on table E010 relating the DH* valve from which DH-0* are derived       |
| <b>DK-1</b> | See note and diagrams on table E025 relating the DKE, DKER valve from which DK-1* are derived |
| <b>DP-1</b> | See note and diagrams on table E085 relating the DPH*-1 valve from which DP-1* are derived    |
| <b>DP-2</b> | See note and diagrams on table E085 relating the DPH*-2 valve from which DP-2* are derived    |
| <b>DP-3</b> | See note and diagrams on table E085 relating the DPH*-3 valve from which DP-3* are derived    |
| <b>DP-4</b> | See note and diagrams on table E085 relating the DPH*-4 valve from which DP-4* are derived    |
| <b>DP-6</b> | See note and diagrams on table E085 relating the DPH*-6 valve from which DP-6* are derived    |

7 DIMENSIONS OF HYDRAULIC OPERATED VALVES ISO 4401 size 06 and 10 [mm]

**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

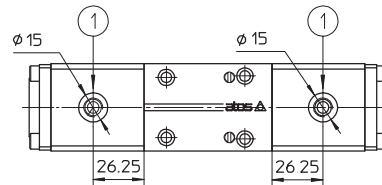
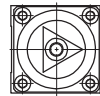
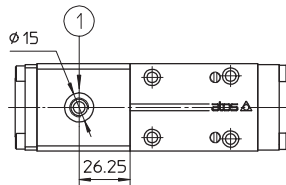
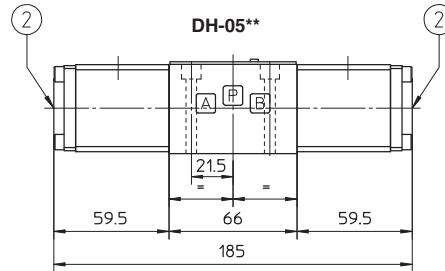
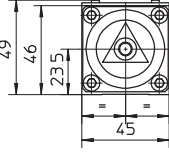
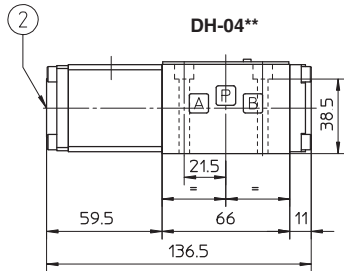
Diameter of ports A, B, P, T:  $\varnothing = 7,5$  mm (max)

Seals: 4 OR 108

① Pilot pressure port G1/8"

② Manual override

**Mounting subplates: see tab. E010**



Mass: 1,2 Kg

Mass: 1,6 Kg

**ISO 4401: 2005**

**Mounting surface: 4401-05-05-0-05 (see table P005)**

**(without X port)**

Fastening bolts: 4 socket head screws M6x40 class 12.9

Tightening torque = 15 Nm

Diameter of ports A, B, P, T:  $\varnothing = 11,2$  mm (max)

Diameter of port Y:  $\varnothing = 5$  mm

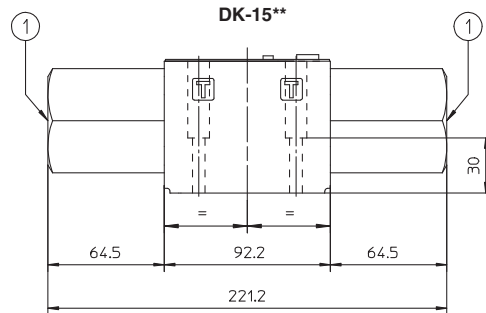
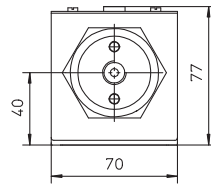
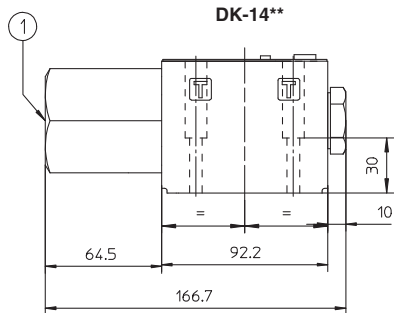
Seals: 5 OR 2050, 1 OR 108

① Pilot pressure port G1/4"

④ Air bleed

**Mounting subplates: see tab. E025 (only version /Y)**

**Note:** Line Y must be always present and no counter pressure are allowed on this line.



Mass: 3,4 Kg

Mass: 4,2 Kg

**DP-1**

**ISO 4401: 2005**

**Mounting surface: 4401-05-05-0-05 (see table P005)**

Fastening bolts:

4 socket head screws M6x40 class 12.9

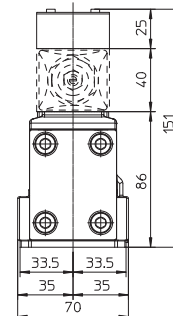
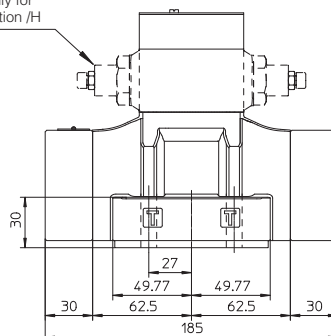
Tightening torque = 15 Nm

Diameter of ports A, B, P, T :  $\varnothing = 11$

Diameter of ports X,Y:  $\varnothing = 5$  mm

Seals: 5 OR 2050, 2 OR 108

Only for option /H



**DP-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 M6x45 class 12.9

Tightening torque = 15 Nm

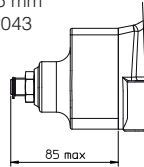
Diameter of ports A, B, P, T:  $\varnothing = 20$

Diameter of ports X, Y:  $\varnothing = 7$  mm

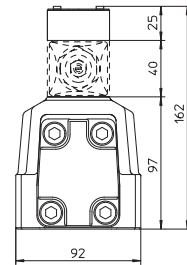
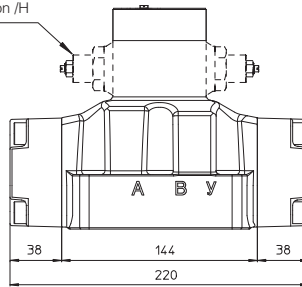
Diameter of port L:  $\varnothing = 5$  mm

Seals: 4 OR 130, 2 OR 2043

**Stroke adjustment device for option /S**



Only for option /H



Mass: 10 Kg

**DP-3**

**ISO 4401: 2005**

**Mounting surface: 4401-08-08-0-05**

Fastening bolts:

6 socket head screws M12x50 class 12.9

Tightening torque = 125 Nm

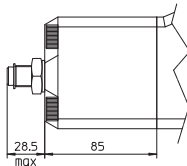
Diameter of ports A, B, P, T:  $\varnothing = 24$

Diameter of ports X, Y:  $\varnothing = 7$  mm

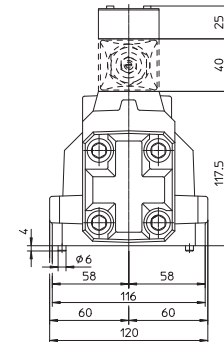
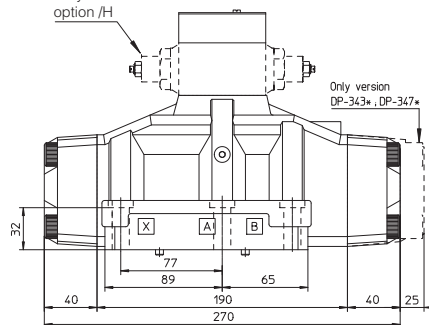
Diameter of port L:  $\varnothing = 5$  mm

Seals: 4 OR 4112, 3 OR 3056

**Stroke adjustment device for option /S**



Only for option /H



Mass: 15,2 Kg

**DP-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

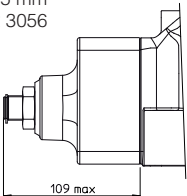
Diameter of ports A, B, P, T:  $\varnothing = 24$

Diameter of ports X, Y:  $\varnothing = 7$  mm

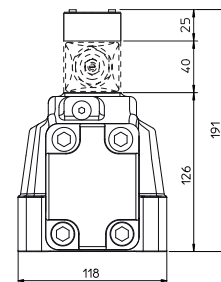
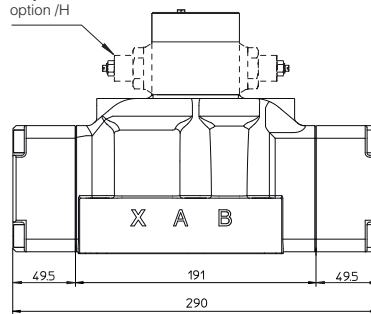
Diameter of port L:  $\varnothing = 5$  mm

Seals: 4 OR 4112, 2 OR 3056

**Stroke adjustment device for option /S**



Only for option /H



Mass: 16,5 Kg

**DP-6**

**ISO 4401: 2005**

**Mounting surface: 4401-10-09-0-05**

**(port L optional)**

Fastening bolts:

6 socket head screws M20x80 class 12.9

Tightening torque = 600 Nm

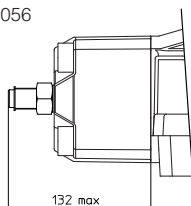
Diameter of ports A, B, P, T:  $\varnothing = 34$  mm

Diameter of ports X, Y:  $\varnothing = 7$  mm

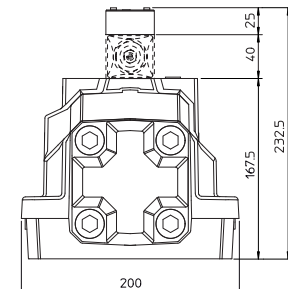
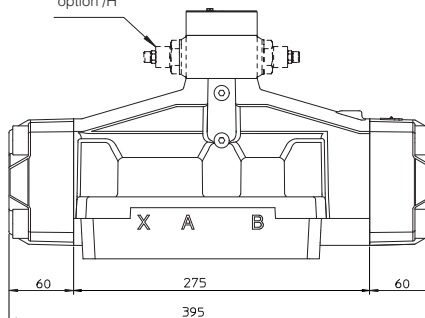
Diameter of port L:  $\varnothing = 5$  mm

Seals: 4 OR 144, 2 OR 3056

**Stroke adjustment device for option /S**



Only for option /H



Mass: 38 Kg

Mounting subplates: see tab. K280