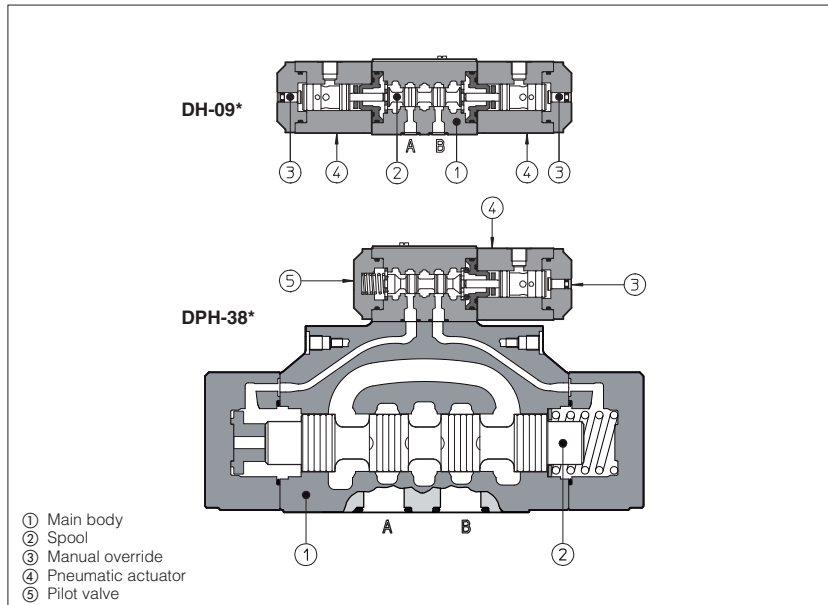


# Pneumatic operated directional valves

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



Pneumatic operated directional valves are spool type ②, three or four way, two or three position, designed to operate in oil hydraulic systems. Available with single or double pneumatic actuator ④ with manual override.

DH-0 = ISO 4401 size 06 interface: flow up to 50 l/min.

DK-1 = ISO 4401 size 10 interface: flow up to 160 l/min.

DPH-2 = ISO 4401 size 16 interface: flow up to 300 l/min.

DPH-3 = ISO 4401 size 25 interface: flow up to 700 l/min.

DPH-6 = ISO 4401 size 32 interface: flow up to 1000 l/min.

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

## 1 MODEL CODE

<b>DH-0</b>	<b>8</b>	<b>1</b>	<b>3</b>	<b>/A</b>	<b>**</b>	<b>/*</b>
Directional control valve, size: <b>DH-0</b> = 06 <b>DK-1</b> = 10 <b>DPH-2</b> = 16 <b>DPH-3</b> = 25 <b>DPH-6</b> = 32					Synthetic fluids: <b>WG</b> = water-glycol <b>PE</b> = phosphate ester  Series number	
Type of actuator: <b>8</b> = single actuator <b>9</b> = double actuator				Options: only for valve with single actuator: <b>/A</b> = 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 DP: <b>/D</b> = internal drain <b>/E</b> = external pressure <b>/H</b> = adjustable chokes for controlling the main spool shifting time (meter-out to the pilot chambers of the main valve) <b>/H9</b> = adjustable chokes for controlling the main spool shifting time (meter-in to the pilot chambers of the main valve) <b>/R</b> = pilot pressure generator on port P at 4 bar <b>/S</b> = main spool stroke adjustment		
Valve configuration, see section 4 <b>0</b> = free, without springs <b>1</b> = spring centered, without detent <b>3</b> = spring offset external position <b>5</b> = 2 external positions, with detent <b>7</b> = center and external positions				Spool type, see section 5		

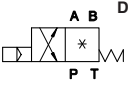
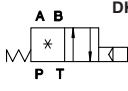


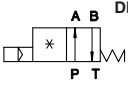
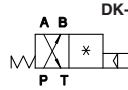
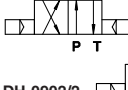
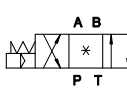

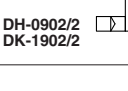
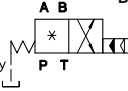
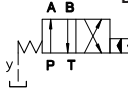
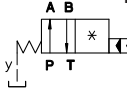
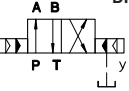
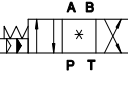
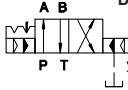
## 2 HYDRAULIC CHARACTERISTICS

Valve model	DH-0	DK-1	DPH-2	DPH-3	DPH-6
Max recommended flow [l/min]	50	160	300	700	1000
Max pressure on port P, A, B (also X for DP) [bar]	350	315	350		
Max pressure on port T [bar]	100	210	250		
Max pressure on port L and Y [bar]	– null pressure				
Min. recommended oil pressure on piloting line [bar]	–		4; max recommended: 250  Pilot pressure can be internal or external (/E) through port X. The device /R generates an additional pressure drop, in order to ensure the minimum pilot pressure, for correct operation of the valves with internal pilot		
Min/Max pneumatic pressure [bar]	2/12		2/12		
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.		By activating the actuator on side B of the pilot valve the hydraulic connections are P→A, B→T, except for spool type 4 and 5 where the connections are P→B, A→T. By activating the actuator on side A of the pilot valve, opposite connections are performed. In the spring centered versions the spool is centered by the spring action when both the pilot chambers are unloaded.		

### 3 MAIN CHARACTERISTICS OF PNEUMATIC OPERATED DIRECTIONAL VALVES



















Assembly position / location	Any position except for valves type DH-090, DK-190, DP-*90 (without springs) that must be installed with their longitudinal axis horizontal. Drain port Y must always be connected directly to tank except for version /D (internal drain)
Subplate surface finishing	Roughness index $\sqrt{0.4}$ , 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 19/16, achieved with in line filters at 25 µm value and $\beta_{25} \geq 75$ (recommended)
Fluid temperature	-20°C +60°C (standard and /WG seals) -20°C +80°C (/PE seals)

### 4 VALVE CONFIGURATION

 DH-081* DK-181*	 DH-081*/A DK-181*/A	 DH-083*/2 DK-183*/2	 DH-083*/2/A DK-183*/2/A	 DH-087*/A DK-187*/A
 DH-087*/A DK-187*/A	 DH-090*/2 DK-190*/2	 DH-091* DK-191*	 DH-095* DK-195*	 DH-092*/2 DK-1902*/2
 DP-281* DP-381* DP-681*	 DP-283* DP-383* DP-683*	 DP-287* DP-387* DP-687*	 DP-290* DP-390* DP-690*	 DP-291* DP-391* DP-691*
 DP-295* DP-395* DP-695*				

Where the symbol doesn't show the hydraulic connection (\*), it depends by the central configuration of the spool, see table 5.

### 5 SPOOLS - for intermediate passages, see tab. E001

<b>DH-0</b> <b>DK-1</b>	0 0/2		3		6		<b>DP-2</b> <b>DP-3</b> <b>DP-6</b>	0 0/2		3		6	
	1 1/2		4		7			1 1/2		4		7	
	2 (ONLY DH-0) 2/2		5		8			2 2/2		5		8	

#### 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;
- Spool type 1, 3, 8 and 1/2 (only 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.

### 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>DPH-2</b>	See note and diagrams on table E085 relating the DPH*-2 valve from which DP-2* are derived
<b>DPH-3</b>	See note and diagrams on table E085 relating the DPH*-3 valve from which DP-3* are derived
<b>DPH-6</b>	See note and diagrams on table E085 relating the DPH*-6 valve from which DP-6* are derived

**ISO 4401: 2005**

**Mounting surface: 4401-03-02-0-05**

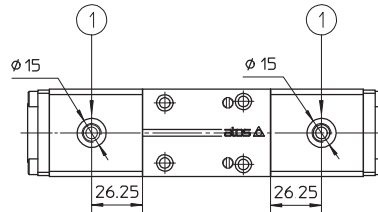
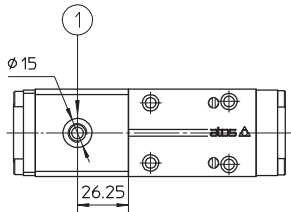
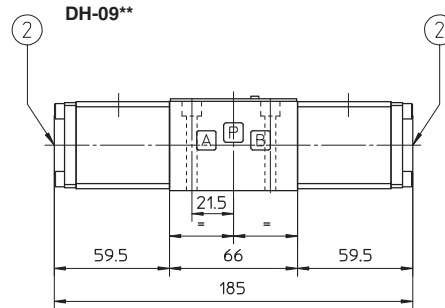
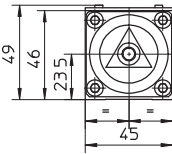
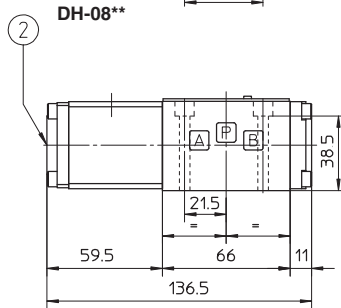
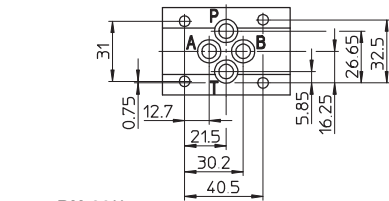
Fastening bolts: 4 socket head screws M5x50 class 12.9  
 Tightening torque = 8 Nm  
 Diameter of ports A, B, P, T:  $\varnothing = 7,5$  mm (max)  
 Seals: 4 OR 108

**P** = PRESSURE PORT

**A, B** = USE PORT

**T** = TANK PORT

For the max pressures on ports, see section 2



Mass: 1,2 Kg

- ① Pilot pressure port G18/8"
- ② Manual override

Mass: 1,6 Kg

Mounting subplates: see tab. E010

**ISO 4401: 2005**

**Mounting surface: 4401-05-04-0-05**

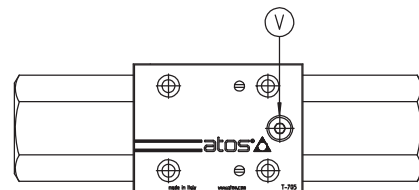
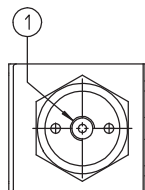
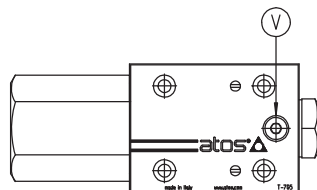
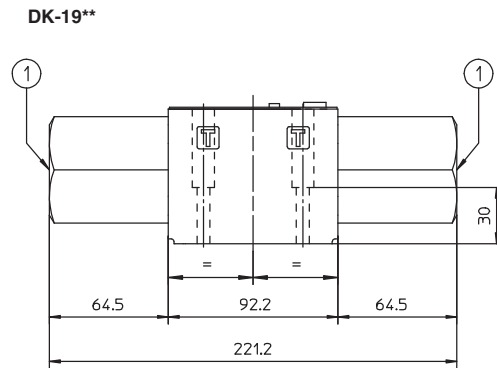
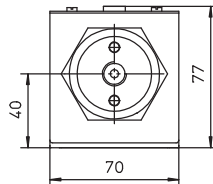
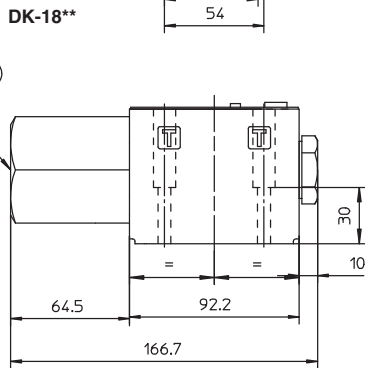
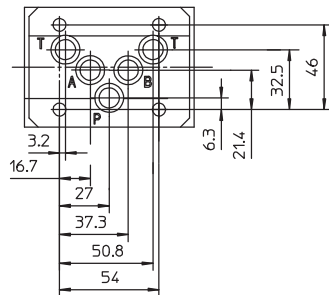
Fastening bolts: 4 socket head screws M6x40 class 12.9  
 Tightening torque = 15 Nm  
 Diameter of ports A, B, P, T:  $\varnothing = 11,2$  mm (max)  
 Seals: 5 OR 2050

**P** = PRESSURE PORT

**A, B** = USE PORT

**T** = TANK PORT

For the max pressures on ports, see section 2



Mass: 3,4 Kg

- ① Pilot pressure port G1/4"
- Ⓥ Air bleed

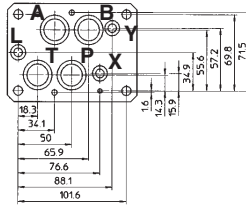
Mass: 4,2 Kg

Mounting subplates: see tab. E025

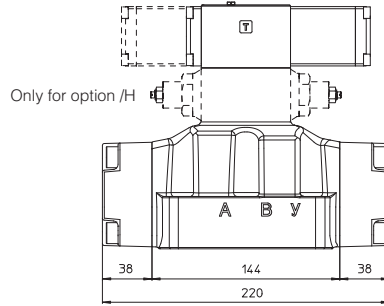
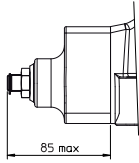
**DPH-2**

- P = PRESSURE PORT
- A, B = USE PORT
- T = TANK PORT
- X = EXTERNAL OIL PILOT PORT not used
- Y = DRAIN PORT

For the max pressures on ports, see section 2



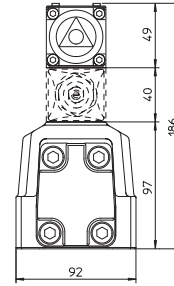
**Stroke adjustment device for option /S**



**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  
 Seals: 4 OR 130, 2 OR 2043

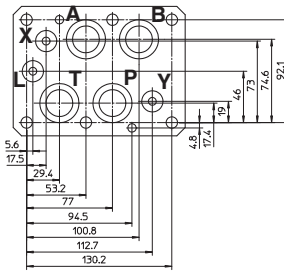


Mass: 11,5 Kg

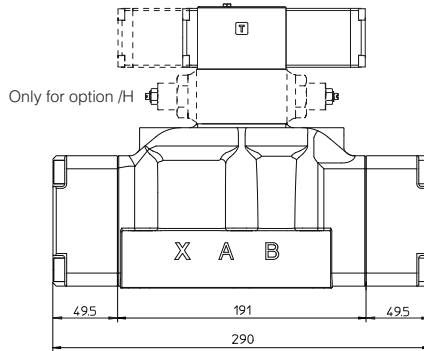
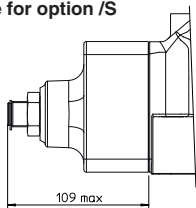
**DPH-3**

- P = PRESSURE PORT
- A, B = USE PORT
- T = TANK PORT
- X = EXTERNAL OIL PILOT PORT not used
- Y = DRAIN PORT

For the max pressures on ports, see section 2



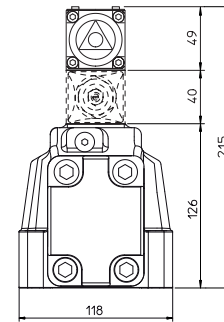
**Stroke adjustment device for option /S**



**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  
 Seals: 4 OR 4112, 2 OR 3056

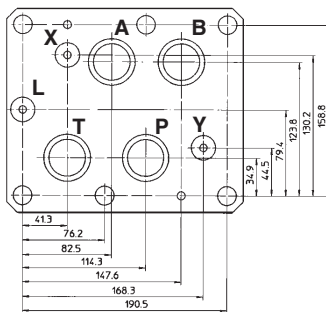


Mass: 16,7 Kg

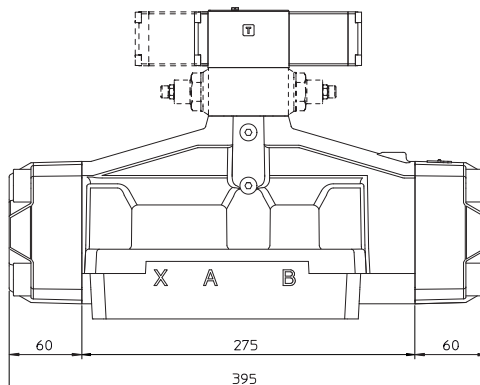
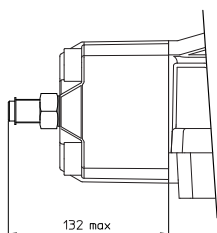
**DPH-6**

- P = PRESSURE PORT
- A, B = USE PORT
- T = TANK PORT
- X = EXTERNAL OIL PILOT PORT not used
- Y = DRAIN PORT

For the max pressures on ports, see section 2



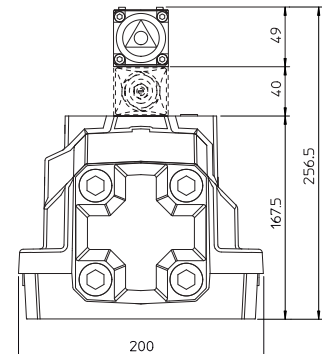
**Stroke adjustment device for option /S**



**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 :  $\varnothing = 34$  mm  
 Diameter of ports X, Y :  $\varnothing = 7$  mm  
 Seals: 4 OR 144, 2 OR 3056



Mass: 39,5 Kg