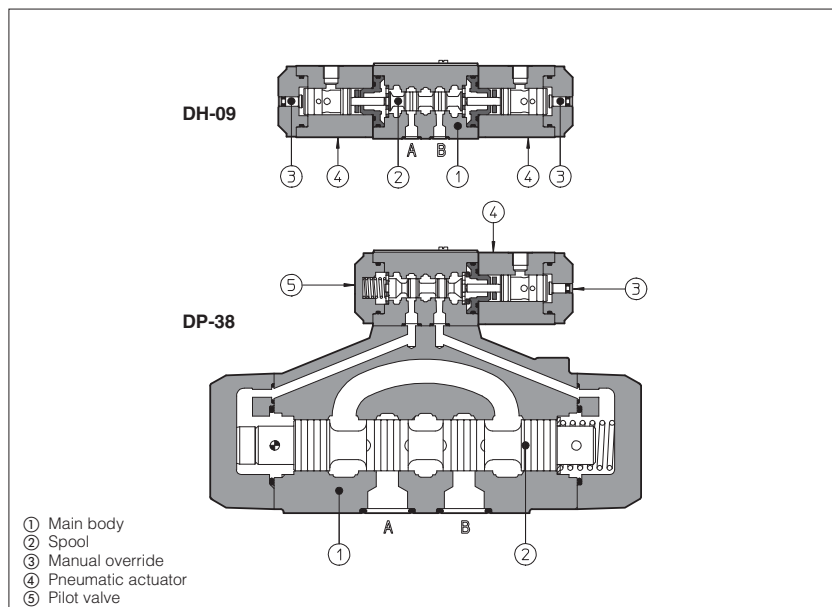


Pneumatic operated directional valves

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.
 DP-2 = ISO 4401 size 16 interface: flow up to 300 l/min.
 DP-3 = ISO 4401 size 25 interface: flow up to 650 l/min.
 DP-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

DH-0

8

1

3

/A

/*

Directional control valve, size:
DH-0 = 06
DK-1 = 10
DPH-2 = 16
DPH-3 = 25
DPH-6 = 32

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

Valve configuration, see section 4
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

Synthetic fluids:
WG = water-glycol
PE = phosphate ester

Series number

Options:

only for valve with single actuator:

/A = actuator device mounted on side of port B

only for DP:

/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

Spool type, see section 5

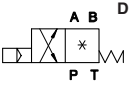
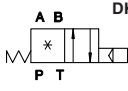
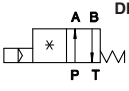
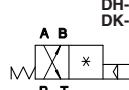
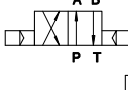
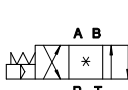
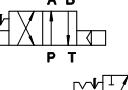
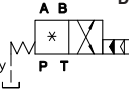
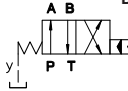
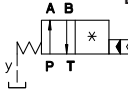
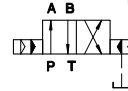
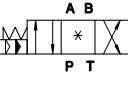
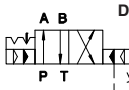
2 HYDRAULIC CHARACTERISTICS

Valve model	DH-0	DK-1	DPH-2	DPH-3	DPH-6
Max recommended flow [l/min]	50	160	300	650	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 A of the pilot valve 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, 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

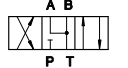
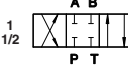
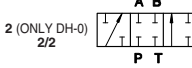
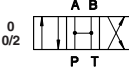
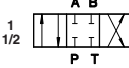
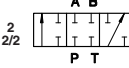
Assembly position / location	Any position except for valves type DH-090, DK-190, DP-*90 (without springs) that must be installed with their longitudinal axis horizontal. Drain port Y must always be connected directly to tank except for version /D (internal drain)
Subplate surface finishing	Roughness 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 ² /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* DK-187*
 DH-087*/A DK-187*/A	 DH-090*/2 DK-190*/2	 DH-091* DK-191*	 DH-095* DK-195*	
 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

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

DH-0	See note and diagrams on table E010 relating the DHO valve from which DH-0* are derivated
DK-1	See note and diagrams on table E025 relating the DKE, DKER valve from which DK-1* are derivated
DPH-2	See note and diagrams on table E080 relating the DPHO-2 valve from which DP-2* are derivated
DPH-3	See note and diagrams on table E080 relating the DPHO-3 valve from which DP-3* are derivated
DPH-6	See note and diagrams on table E080 relating the DPHO-6 valve from which DP-6* are derivated

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)

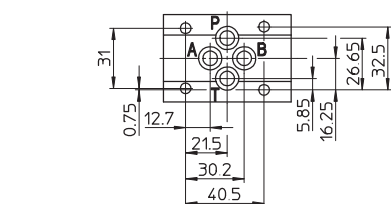
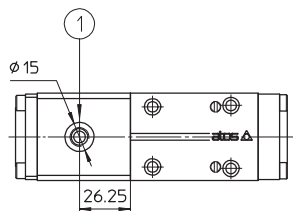
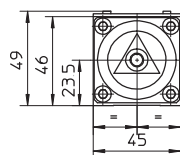
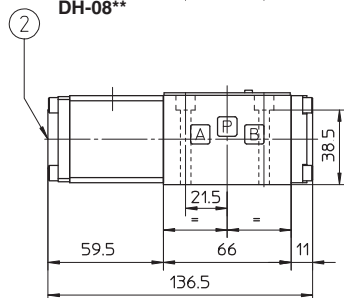
Seals: 4 OR 108

P = PRESSURE PORT

A, B = USE PORT

T = TANK PORT

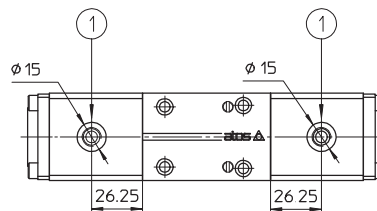
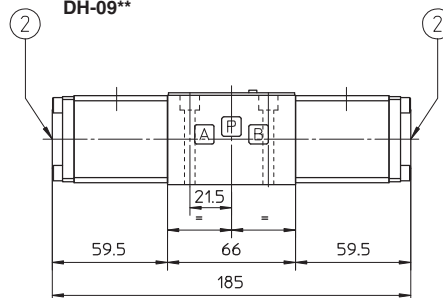
For the max pressures on ports, see section 2


DH-08**


Mass: 1,2 Kg

1 Pilot pressure port G18/''

2 Manual override

DH-09**


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)

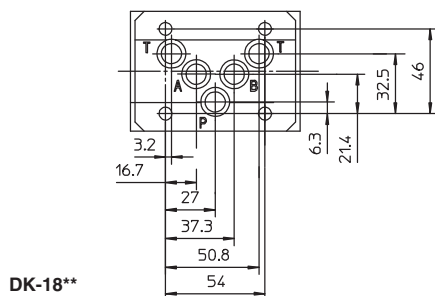
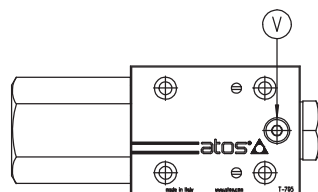
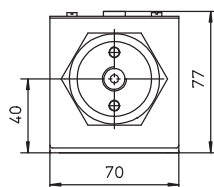
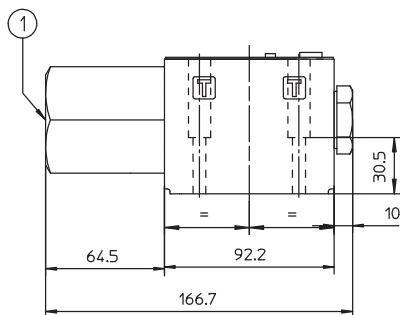
Seals: 5 OR 2050

P = PRESSURE PORT

A, B = USE PORT

T = TANK PORT

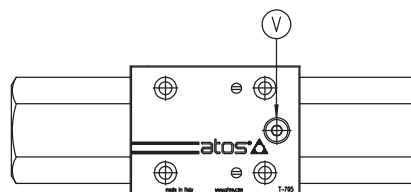
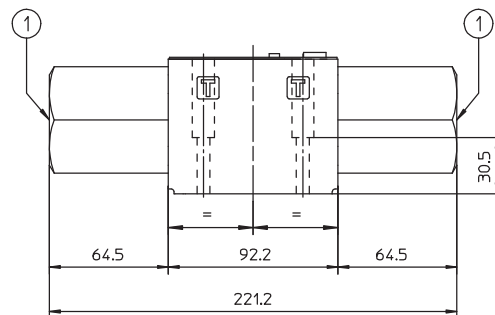
For the max pressures on ports, see section 2


DK-18**


Mass: 3,4 Kg

1 Pilot pressure port G1/4''

V Air bleed

DK-19**


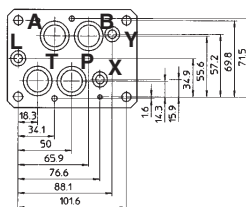
Mass: 4,2 Kg

Mounting subplates: see tab. E025

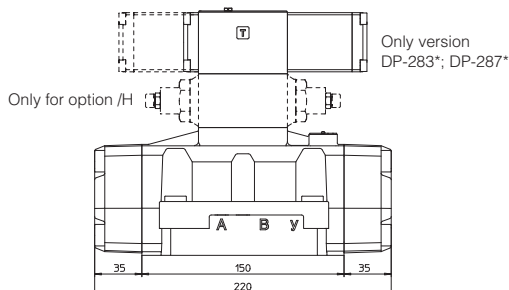
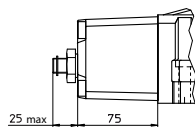
DPH-2

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 (L port optional)

Fastening bolts:

4 socket head screws M10x50 class 12.9

Tightening torque = 70 Nm

2 socket head screws M6x40 class 12.9

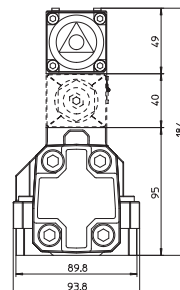
Tightening torque = 15 Nm

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, 3 OR 109/70

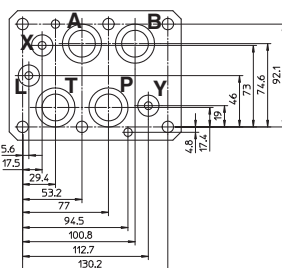


Mass: 11,5 Kg

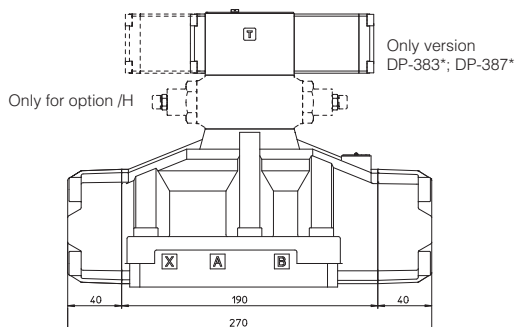
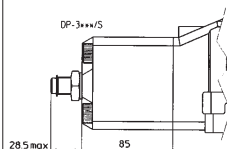
DPH-3

P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT
X = EXTERNAL OIL PILOT PORT not used
Y = DRAIN PORT
L = DRAIN PORT FOR HYDRAULIC CENTERING DEVICE used only for /M versions

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 (L port optional)

Fastening bolts:

6 socket head screws M12x50 class 12.9

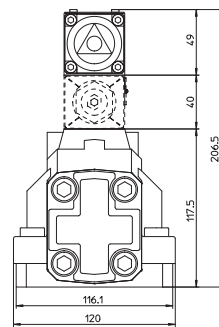
Tightening torque = 125 Nm

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

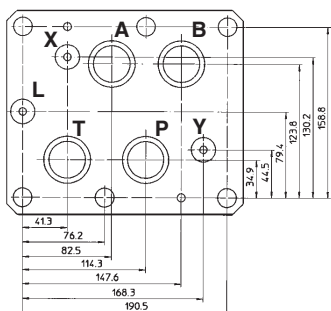


Mass: 16,7 Kg

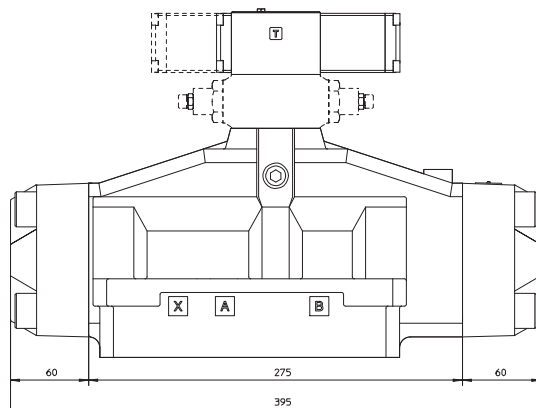
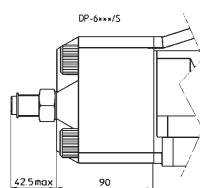
DPH-6

P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT
X = EXTERNAL OIL PILOT PORT not used
Y = DRAIN PORT
L = DRAIN PORT FOR HYDRAULIC CENTERING DEVICE used only for /M versions

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 (port L optional)

Fastening bolts:

6 socket head screws M20x80 class 12.9

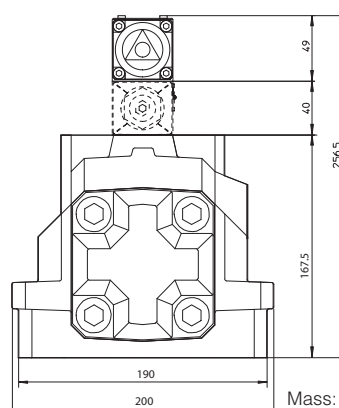
Tightening torque = 600 Nm

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 4137, 3 OR 3081



Mass: 39,5 Kg