



2.9

4/3, 4/2 and 3/2 directional valve with fluidic operation

Type WHD10...L3X

Size 10
Up to 315bar
Up to 120L/min



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Features

- Direct operated directional spool valve
- Types of actuation:
 - Hydraulic (WHD)
- Sub-plate mounting
- Porting pattern to DIN 24 340 Form A, and ISO 4401

Function

Valves of type WHD are directional spool valves with fluid logics actuation. They control the start, stop and direction of a flow.

The directional valves basically consist of housing (1), one or two actuation elements (2) (hydraulic, pneumatic actuation cylinder), one or two return springs (3) and control piston (4).

Type WHD.../

In the initial state, the main spool (2) remain in the intermediary civilian under the action of two return springs (3), into the external model oil through the a port into the oil to promote the left of the piston (4) to the right, remove the signal Oil, the main spool (2) back to the middle position under the right spring force back to the middle position. If external oil from the b port, the oil push the right side of the piston (4) left, thus driving the main spool (2) left, remove the signal oil, the main spool (2) back to the middle position under the left spring force.

Without spring return, Type ..O/.. (Only for Spool Symbol A,C,D)

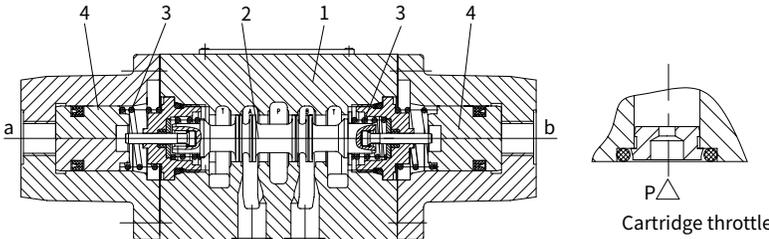
If using actuation elements without return springs and without detent, a defined spool position is not given in the de-energized condition.

Without spring return with detent, Type ..OF/.. (Only for Spool Symbol A,C,D)

Directional valves with hydraulic or pneumatic actuation are also available as 2-spool position valve with detent. If using actuation elements with detent, every spool position can be locked.

Cartridge throttle

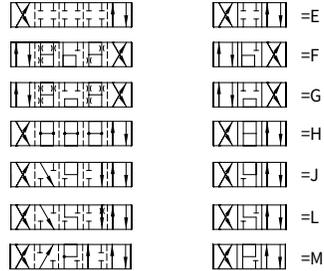
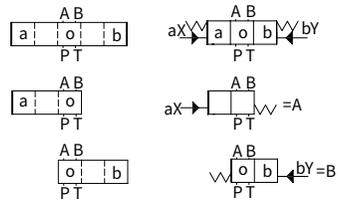
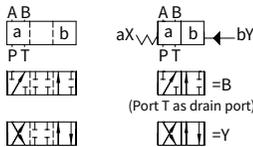
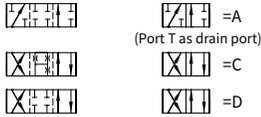
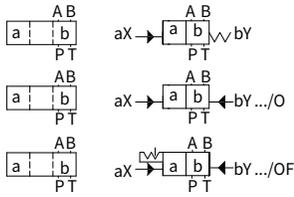
The use of a throttle insert is required when due to prevailing operating conditions, flows can occur during the switching processes, which exceed the performance limit of the valve. It is inserted in channel P of the directional valve.



Ordering code

		L3X / /		*	
3 ways (For spool A and B)	= 3	Further details in clear text			
4 ways	= 4	No code = NBR seals			
Hydraulic	=WHD	V = FKM seals			
Nominal size 10	=10	No code = Without cartridge throttle			
Symbols e.g. C, E etc. see next page		B08 = Throttle- Φ0.8 mm			
Series L30 to L39		B10 = Throttle- Φ1.0 mm			
(L30 to L39: unchanged installation and connection dimensions)		B12 = Throttle- Φ1.2 mm			
		No code= Return spring			
		O = Without return spring			
		OF = With Return spring and detent			

Symbols



Example:

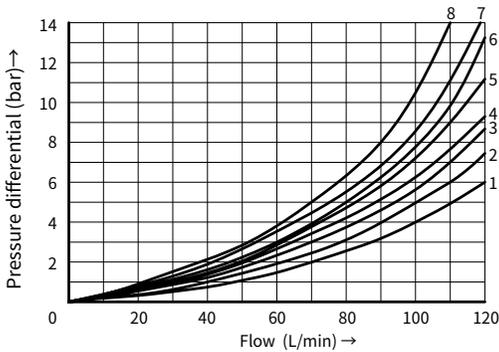
If solenoid is fixed at position 'a',
the ordering code is ...EA

Technical data

Valve type		WHD	
Weight	1 operating cylinder	kg	3.0
	2 operating cylinder	kg	3.3
Fluid temperature range		°C	
		-30 to +80 (NBR seal)	
Max. operating pressure		bar	
		-20 to +80 (FKM seal)	
Max. operating pressure	Port A,B,P	bar	315
	Port T	bar	160
Max. flow-rate		L/min	120
Flow cross section (switching neutral position)	Type V	mm ²	For type V 11(A/B to T) 10.3(P to A/B)
	Type W	mm ²	For type W 2.5(A/B to T)
	Type Q	mm ²	For type Q 5.5(A/B to T)
Control pressure		bar	5~ 160
Fluid		Mineral oil, Phosphate ester	
Viscosity range		mm ² /s	2.8 to 500
Degree of contamination		Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406	

Characteristic curves

(Measured at $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$, using HLP46)



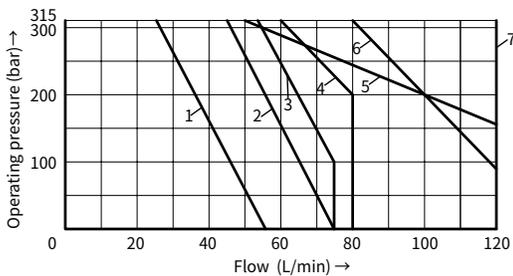
- 8 Symbols "G" and "T" in neutral position (P → T)
- 8 Symbol "R" in position b (A → B)

Spool symbol	Flow direction			
	P to A	P to B	A to T	B to T
A	4	3	-	-
B	3	4	-	-
C	3	3	4	4
D	3	3	5	5
E	2	2	4	4
F	1	2	3	4
G,T	4	4	7	7
H	1	1	5	5
J	2	2	3	3
L	3	3	2	4
M	1	1	4	4
P	3	1	5	5
Q	2	2	2	2
R	3	4	3	-
U	3	3	5	2
V	2	2	3	3
W	3	3	3	3
Y	4	4	6	6

Operating limitation

Because of the adhesive effect, the switching function of the valves depends on the filtration. In order to achieve the specified admissible flow values, we recommend full flow filtration with 25 μm . The flow forces acting within the valves also affect the flow performance. With 4 way valves the specified flow data thus apply to normal operation with 2 volume flow directions (e.g. from P to A and at the same time return flow from B to T) (see table).

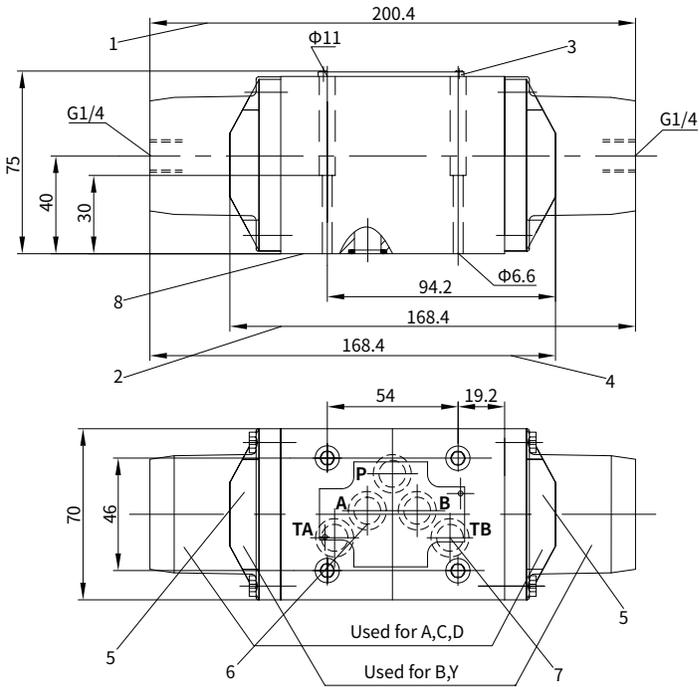
If only one flow direction is available, in critical cases, the admissible flow can be significantly smaller (e.g. when using a 4 way valve as 3 way valve, due to blocked connection A or B).



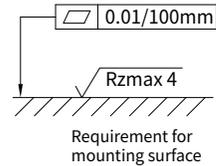
Curve	Spool symbol
1	A,B
2	A/O
3	H
4	F,G,P,R,T
5	J,L,Q,U,W
6	C,D,E,M,Y,Y
7	C/O,C/OF D/O,D/OF

Unit dimensions

(Dimensions in mm)



- 1 Used for 3-position valve or, 2-position */O, */OF
- 2 Used for 2-position valve B, Y, EB...
- 3 Name plate
- 4 2-position valve A, C, D, EA...
- 5 Valve with an actuator (2-position valve)
- 6 R-ring 13×1.6×2 or O-ring 12×2 (for ports A, B, P, T). R-rings and O-rings on the same installation surface must not be mixed.
- 7 Port TB used for special manifold



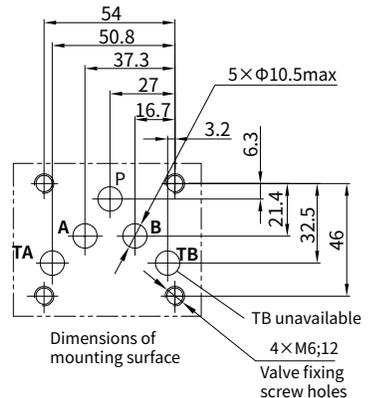
Valve mounting screws:

Internal hexagon screw M6×40 GB/T 70.1-10.9,
Tightening torque $M_A = 15.5\text{Nm}$

It must be ordered separately if connection plate is needed.

Type :

- G 66/01 (G 3/8), G 66/02(M18×1.5)
- G 67/01 (G 1/2), G 67/02(M22×1.5)
- G 534/01 (G 3/4), G 534/02(M27×2)



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