

4/2- and 4/3-directional spool valve Hydraulically operated 4WH 10

DESCRIPTION

The 4WH valves in nominal size 10 are directional spool valves with hydraulic operation. They are used to control the start, stop and direction of the volume flow.

A wide variety of spool types and options for opening control are available in this valve series.

FEATURES

- Hydraulically operated directional spool valve
- Electro-hydraulic operation via pilot valve NG 6 or hydraulic operation via interconnecting plate
- Volume flow rates up to 150 l/min
- The pilot supply and/or drain can be internal or external, which can be achieved by changing the plugs
- Interface according to ISO 4401-05 and CETOP P05



Nominal size 10
up to 150 l/min
up to 320 bar

CONTENTS

Description	1
Features	1
Model code	2
Spool types / symbols	2
Function	3
Section view	3
Technical Data	4
Performance	4
Dimensions	5
Accessories	7

MODEL CODE

4WH E 10 D S01 /V /H

Type

4/2- or 4/3 - directional spool valve, hydraulically operated

Control type

- E = external pilot supply and drain
- EI = external pilot supply, internal pilot drain
- I = internal pilot supply and drain (not for symbol G and H)
- IE = internal pilot supply, external pilot drain
(preload tank line: pressure between pilot and drain must be more than minimum pilot pressure)

Nominal size

10

Spool symbol ¹⁾

see page 2

Series

- S01 = CETOP 4.2-4 P05-320 (Standard)
- S02 = ISO 4401-05-05-0-05

Sealing material

- N = NBR
- V = FKM (standard)

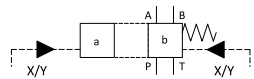
Options

- Not specified = without interconnecting plate (standard)
- H = with stroke limitation of main spool
- UPA = with interconnecting plate P-A; B-T
- UPB = with interconnecting plate P-B; A-T

¹⁾ Other models on request

SPOOL TYPES / SYMBOLS

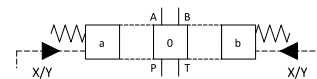
4/2-DIRECTIONAL SPOOL VALVES



Type	Basic symbol	With intermediate position
D		

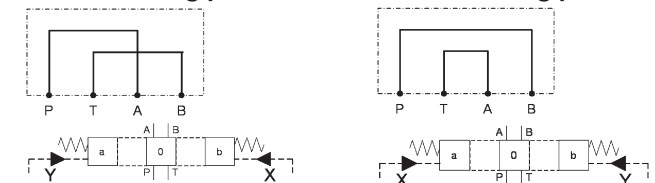
For valves with electrical operation see brochure 5.227.10 "4WEH 4/2 and 4/3 way spool valves in nominal size 10 to 32".

4/3-DIRECTIONAL SPOOL VALVES



Type	Basic symbol	With intermediate position
E		
G		
H		
J		
Q		

Interconnecting plate PATB Interconnecting plate PBTA



Spool position depends on interconnecting plate.

FUNCTION

The valves of the 4WH 10 type are directional spool valves, with hydraulic operation, which can control the start, stop and direction of the volume flow. They consist of the valve housing (1), the main control spool (2) and the return springs (3).

The fluid power supply of the valve is provided centrally via standard porting pattern.

Without pilot oil, the main control spool is centered in its middle position by the springs. The actuation of the main control spool (2) is caused by pressurisation. The required pilot oil is provided by port X and Y or is controlled by an additional pilot valve that is adopted to the main valve. The pilot pressure depends on rate of volume flow. The minimal pilot pressure of 5 bar is sufficient only for low rates of volume flow. Pilot pressure has to be increased up to 12 bar by increasing rates of volume flow.

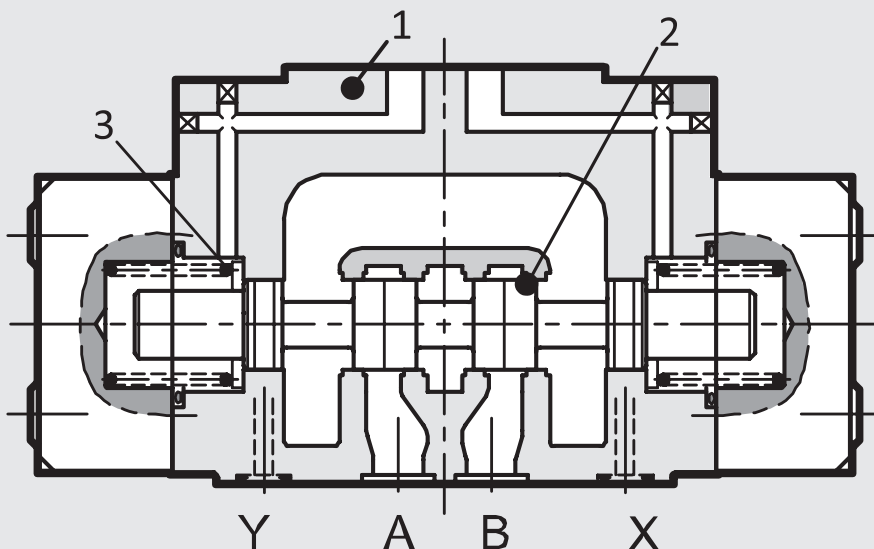
Pressure loading on one of the two front sides of the main control spool (2) with pilot pressure causes the desired switching position, whereby the required ports will be linked.

The spring, which is across from the pressurised control piston surface, causes the resetting of the piston into zero or initial position by relieving of pressure.

Two valve versions in nominal size 10 with different and non-compatible standard porting patterns are available for the hydraulic controlled valves of 4WH. The pilot pressure supplies X and Y are in different positions on the porting pattern. In the process, port X takes the pilot oil supply and port Y relieves the pressure of the pilot stage on the tank level of the pilot circuit. Port Y is used for pilot oil drain purposes and usually flows unpressurized (leakage port) into the tank.

S01 = CETOP 4.2-4 P05-320 (Standard)
S02 = ISO 4401-05-05-0-05

SECTION VIEW



Control types – Pilot oil supply and pilot oil drain

If the valve is used as a hydraulic actuated valve, the pilot oil supply and pilot oil drain will occur externally via port X and Y.

If the valve is used as main stage in a pilot-operated valve, there are four possible control types for each basic code. This can be seen in the model code.

The valve will be delivered correspondingly configured. Modification is possible afterwards. The glued threaded plugs will make disassembly more difficult.

- **Version "E"** – Pilot oil supply is external from a separate fluid power supply via port X. The pilot oil drain is also external via port Y.
- **Version "EI"** – Pilot oil supply is external from a separate fluid power supply via port X. The pilot oil drain is internal via port T.
- **Version "IE"** – Pilot oil supply is internal via port P. The pilot oil drain is external via port Y. Hint: Preload tank line - Pressure between pilot and drain must be more than minimum pilot pressure
- **Version "I"** – Pilot oil supply is internal via port P. The pilot oil drain is internal via port T. Hint: Not for symbol G and H.

TECHNICAL DATA

General specifications	
MTTF _d :	150 - 1200 years, according to DIN EN ISO 13849-1:2016; Table C.1, Confirmation from ISO 13849-2:2013; Tables C.1 and C.2
Ambient temperature range: [°C]	-20 to +50
Installation position:	No orientation restrictions
Weight: [kg]	5.0
Material:	Valve casing: Cast iron Type plate: Aluminium
Surface coating:	Valve casing: Phosphate plated
Hydraulic specifications	
Operating pressure: [bar]	Port A, B, P: p _{max} = 320 Port T: p _{max} = 210
Pilot pressure min: [bar]	5 to 12 ²
Pilot pressure max: [bar]	210
Nominal flow: [l/min]	150
Operating fluid:	Hydraulic oil to DIN 51524 Part 1, 2 and 3
Media operating temperature range: [°C]	-20 to +80
Viscosity range: [mm ² /s]	10 to 400
Permitted contamination level of operating fluid:	Class 20/18/15 according to ISO 4406
Sealing material:	FKM (Standard), NBR

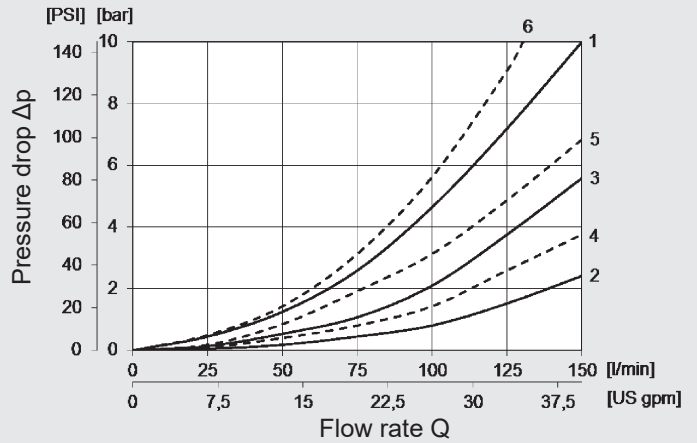
¹ see "Conditions and Instructions for Valves" in brochure 53.000

² Pilot pressure depends on rate of delivery flow. The minimal pilot pressure is sufficient only for low rates of delivery flow. If the rate of delivery flow increases, it is necessary to increase the pilot pressure up to the specified maximum value.

PERFORMANCE

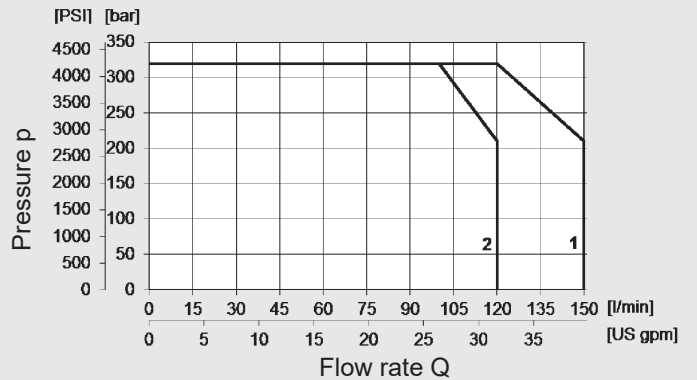
Pressure drop

measured at $v = 36 \text{ mm}^2/\text{s}$, $T = 50 \text{ °C}$



Performance limits

measured at $v = 36 \text{ mm}^2/\text{s}$, $T = 50 \text{ °C}$



Performance assignment to the associated spools:

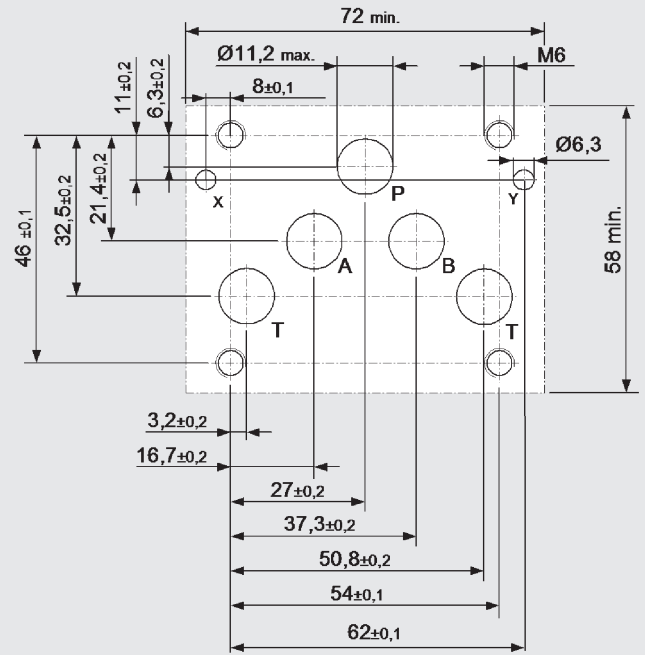
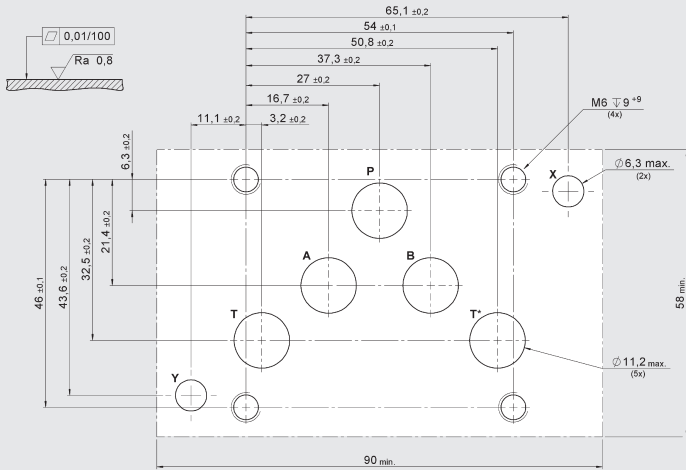
Spool	Switching position	Pressure drop					Performance limits
		P→A	P→B	A→T	B→T	P→T	
D	not operated	1			3		1
	operated		1	4			
E	not operated						1
	operated	1	1	2	3		
G	not operated					6	2
	operated	6	6	3	5		
H	not operated					6*	1
	operated	5	5	2	4		
J	not operated			1●	1○		1
	operated	1	1	2	4		
Q	not operated						1
	operated	1	1	2	2		

* A-B blocked ● B blocked ○ A blocked

DIMENSIONS

Interface according to CETOP 4.2-4 P05-320

Interface according to ISO 4401-05-05-0-05 (CETOP R5)

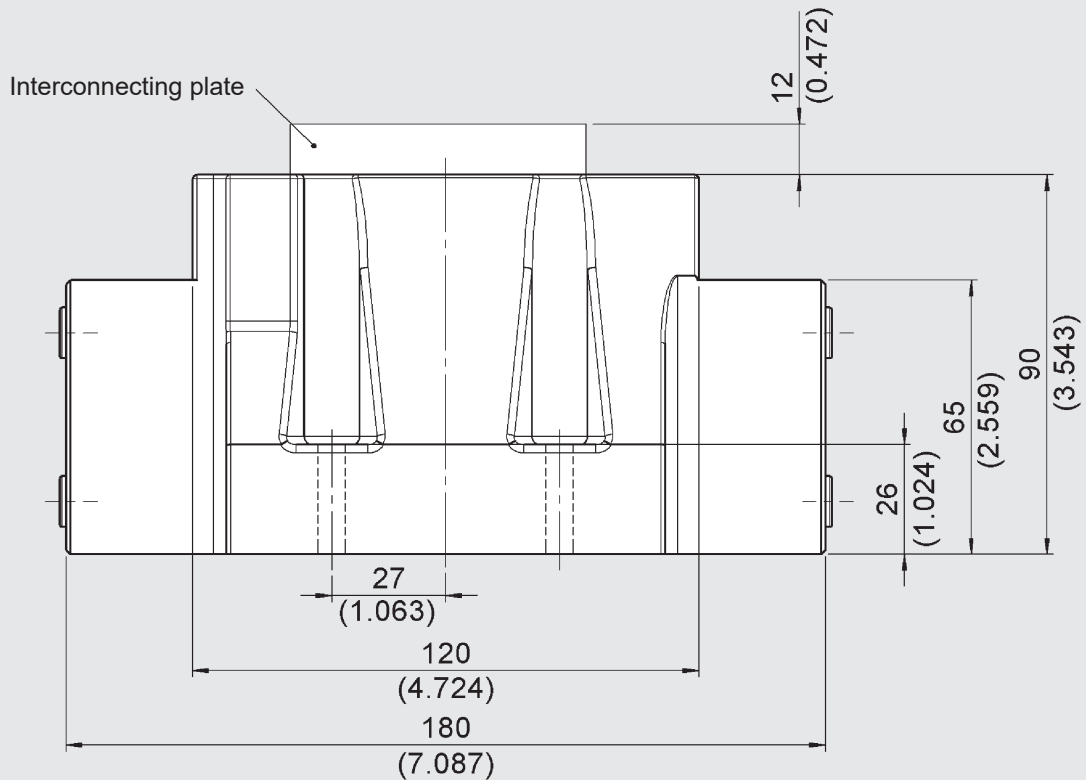
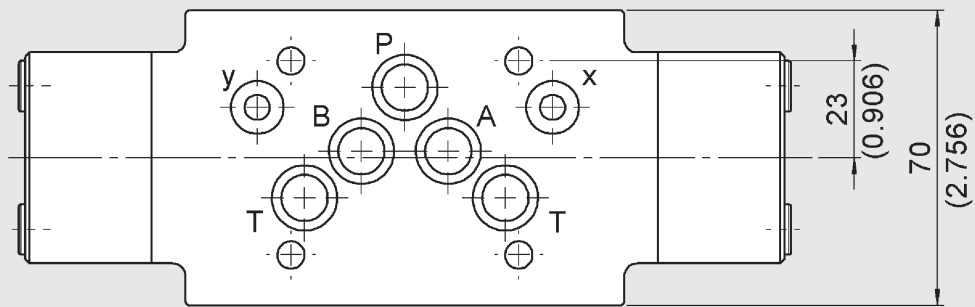


Mounting screws:

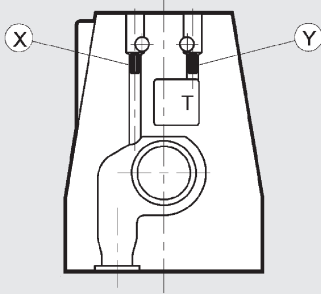
(not included in delivery)

4 screws M6x35 ISO 4762

Tightening torque: 12 Nm (screws A 10.9)



Plug

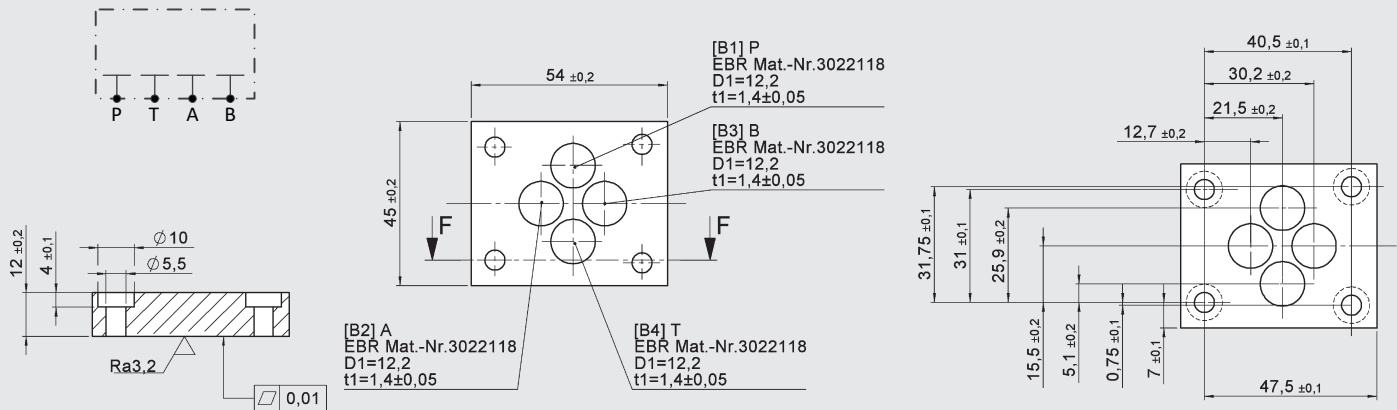


X: M5x6
for external pilot oil supply
Y: M5x6
for external pilot oil drain

Control type		Installation		Control type
		X	Y	
E	Pilot oil drain and supply external	•	•	hydraulically or pilot valve
EI	Pilot oil supply external, pilot oil drain internal	•	–	pilot valve
I	Pilot oil drain and supply internal	–	–	pilot valve
IE	Pilot oil supply internal, pilot oil drain external	–	•	pilot valve

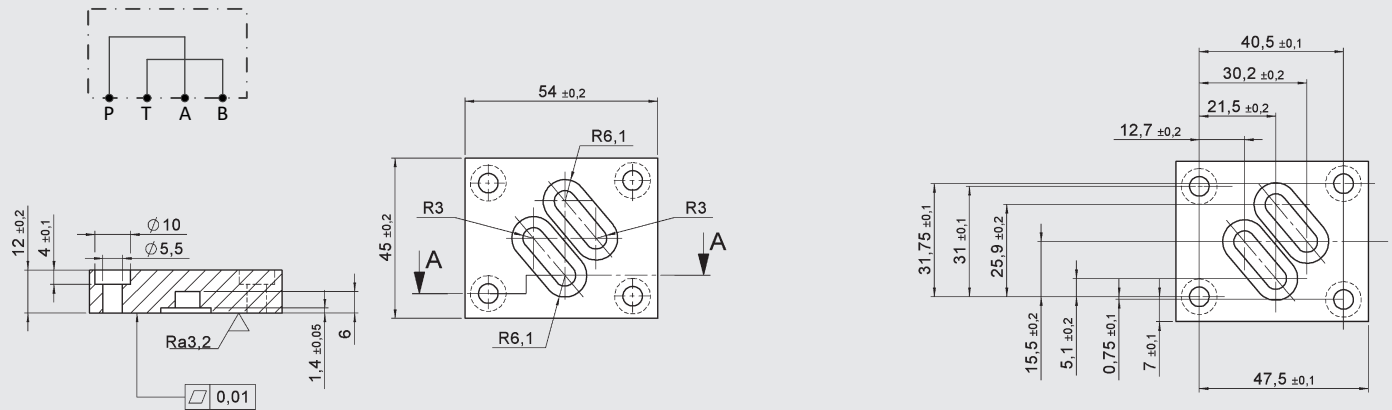
Plates

Check plate

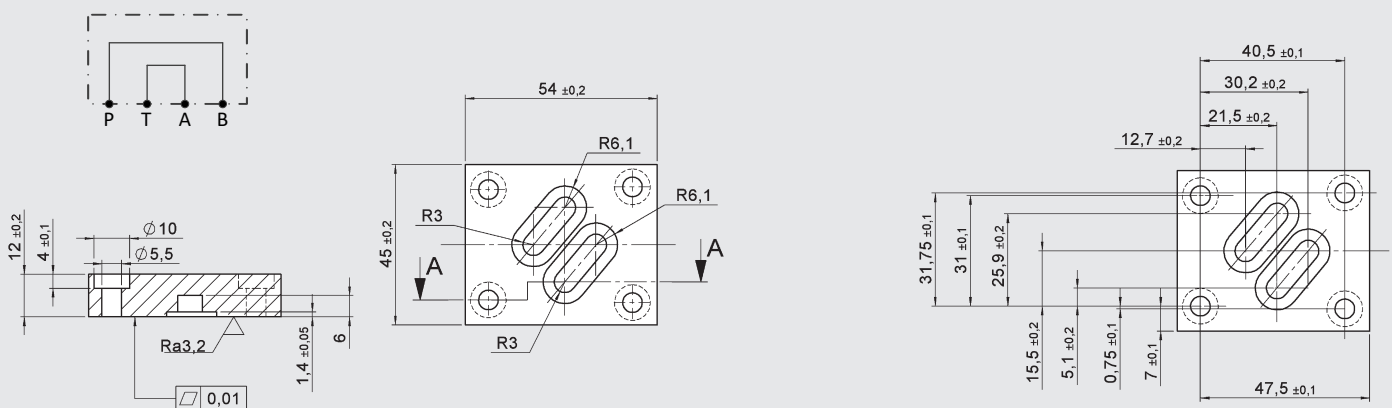


Interconnecting plates

PATB



PBTA



ACCESSORIES

	Designation	Part no.
Seal kits (7-part set)	12.42 x 1.78 -NBR -90 Sh (5 pieces)	3524475
	9.25 x 1.78 -NBR -90 Sh (2 pieces)	
	12.42 x 1.78 -FKM -90 Sh (5 pieces)	3524523
	9.25 x 1.78 -FKM -90 Sh (2 pieces)	
Mounting screws (4 pcs)	DIN EN ISO 4762-M6x35-10.9	3524691
Plug	M5x6 -45H	4452918
Plates	Check plate -NBR	3611576
	Check plate -FKM	3611580
	Interconnecting plate PATB -NBR	3581660
	Interconnecting plate PATB -FKM	3581661
	Interconnecting plate PBTA -NBR	3581662
	Interconnecting plate PBTA -FKM	3581663

NOTE

The information in this brochure relates to the operating conditions and fields of application described. For applications not described, please contact the relevant technical department. All technical details are subject to change without notice.

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