

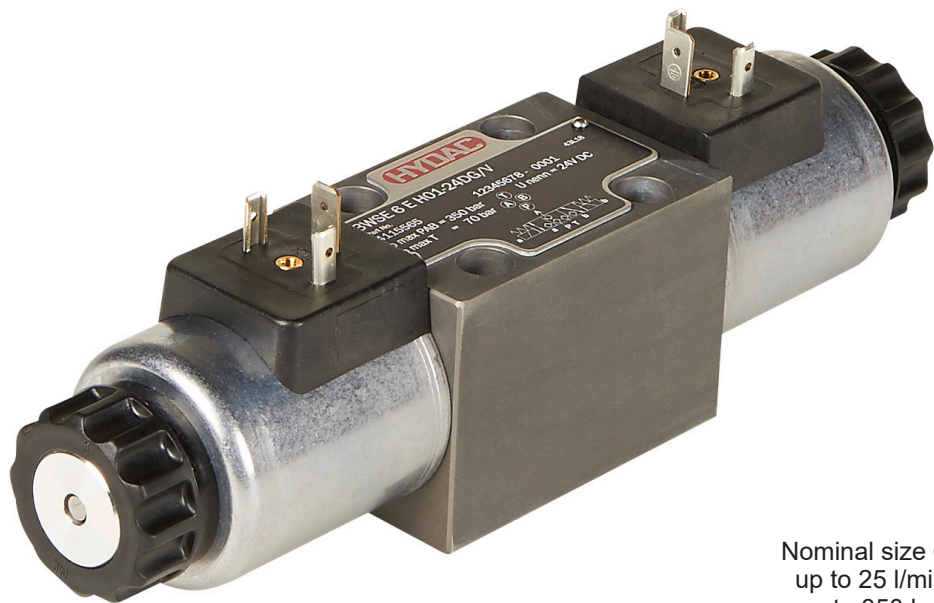
## 2/2, 3/2, 3/3, 3/4, 4/2, 4/3 and 4/4 Directional Poppet Valve solenoid-operated, direct-acting WSE 6

### DESCRIPTION

HYDAC 2/2, 3/2, 3/3, 3/4, 4/2, 4/3 and 4/4 directional poppet valves of WSE 6 series were directional valves for oil hydraulic systems, which are used to open and close flow paths. The valve operates by oil-immersed solenoid. During this process, the solenoid pushes the valve's control spool into the respective position to obtain the desired flow path.

### FEATURES

- Patented function principle
- Pressure-equalised design
- Seat-tight closing
- Hardened poppet-seat elements (piston)
- Interface according to DIN 24340 Form A6, ISO 4401-03
- Removable high-performance solenoid coil, no need to open the hydraulic system during replacement



Nominal size 6  
up to 25 l/min  
up to 350 bar

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## MODEL CODE

<b>Ports</b> 2, 3 or 4	4	WSE	6	E	H01	-	24	D	G	/V	/	/	/	/
<b>Type</b> Directional poppet valve, direct-acting														
<b>Nominal size</b> 6														
<b>Spool symbol</b> See page 3														
<b>Series</b> H01 = specified by the manufacturer														
<b>Rated voltage of the solenoid coil <sup>1)</sup></b> 24 = 24 V DC														
<b>Type of voltage</b> D = DC voltage														
<b>Electrical connection</b> (for details, see page 7) G = device connector, DIN EN 175301-803 L = single leads L02 = single leads with suppressor diode N = device connector, Deutsch N01 = device connector, Deutsch with suppressor diode O = device connector, M12 U = device connector, Junior Timer U01 = device connector, Junior Timer with suppressor diode														
<b>Sealing material <sup>1)</sup></b> /V = FKM (standard)														
<b>Manual override</b> Not specified = with concealed manual override (standard) /M2 = with covered manual override														
<b>Orifice insert</b> Not specified = no orifice insert /YXX: Y = port P, A, B, T XX = diameter (e.g. 14 = 1.4 mm) preferred series: 0.5 mm; 0.7 mm; 1 mm; 1.4 mm; 2 mm														
<b>Check valve</b> Not specified = no check valve /RV = check valve in port P with a cracking pressure of 0.6 bar														

<sup>1)</sup> Other models on request

SPOOL TYPES / SYMBOLS

2/2-DIRECTIONAL POPPET VALVES

Type	Symbol
E2	
BE2	
E4	
BE4	

3/2-, 3/3- AND 3/4-DIRECTIONAL POPPET VALVES

Type	Symbol with intermediate position
X	
C	
Y-OF	
E	
E+H	

To reach the fourth switching position, actuate both solenoids simultaneously.

4/2-, 4/3- AND 4/4-DIRECTIONAL POPPET VALVES

Type	Symbol with intermediate position
X	
C	
E	
H	
U	
E+H	
J+M	
J+M-2RV	
M+J-2RV	
Z+X-2RV	

To reach the fourth switching position, actuate both solenoids simultaneously.

## FUNCTION

The solenoid-operated directional poppet valves of type WSE 6 are used to control a flow. The valve design is patented and consists of a valve casing (1) and depending on the type, one or more poppet-seat elements (2). Depending on the type, the valve is equipped with one or more return springs (3) and with one or two pole tubes (4) and solenoid coils (5) each. The hydraulic control of the valve is carried out through the actuation of the valve spool by the use of solenoids (5).

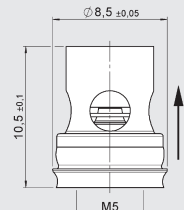
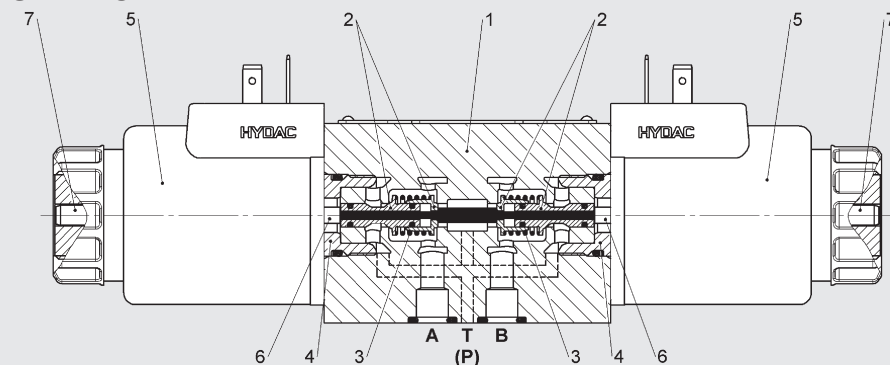
A solenoid is a converter, which converts electrical energy into mechanical energy. The energized solenoid causes the oil-immersed magnetic piston to make a linear stroke movement. It uses the guide rod (6) to move the poppet-seat elements into the desired position. This causes the nominal flow directions between the respective ports to be released or seat-tight closed.

The modular principle of the key components enables a large variety of switching configurations. Consequently these valves can be used as a leak-free alternative to spool valves. The special grounded poppet-seat elements are pressure-equalised and with it double-tight, i.e. pressure reversals (within the permitted port pressures) do not result in undesired opening.

To obtain the valves' optimum switching capacity, the pressure-tight chamber of the pole tube should always be filled with oil. The poppet-seat element is pushed back into the starting position by the appropriate return spring after de-energization of solenoid.

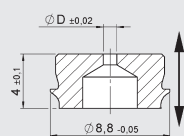
The manual override (7) enables valve operation without energising the solenoid.

## SECTION VIEW



### Non-return valve

Closes port P to prevent reverse oil flow.



### Orifice insert

Used to reduce nominal flows that are too high and outside of the valve's operating limits.

## TECHNICAL DATA <sup>1)</sup>

General performance data			
MTTF <sub>d</sub> :		According to EN ISO 13849-1:2016 Table C1	
Ambient temperature:		[°C]	-20 to +60
Installation position:		No orientation restrictions	
Weight:		[kg]	1.7 with one solenoid; 2.2 with two solenoids
Material:		Valve casing:	Steel
		Pole tube:	Steel
		Coil casing:	Steel
		Name plate:	Aluminium
Surface coating:		Valve casing:	Phosphate plated
		Pole tube:	Zn-coating
		Coil casing:	ZnNi-coating
Hydraulic specifications			
Operating pressure:		[bar]	Port A, B, P: p <sub>max</sub> = 350 Port T: p <sub>max</sub> = 70
Nominal flow:		[l/min]	25
Operating fluid:		Hydraulic oil to DIN 51524 Part 1, 2 and 3	
Media operating temperature range:		[°C]	-20 to +80
Viscosity range:		[mm²/s]	10 to 500
Permitted contamination level of operating fluid:		Class 20/18/15 according to ISO 4406	
Max. switching frequency:		[1/h]	3,600
Manual override:		Up to approx. 50 bar tank pressure available	
Sealing material:		FKM	
Electrical specifications			
Switching time:		[ms]	See table, page 4
Type of voltage:		DC	
Rated voltage:		[V]	24
Voltage tolerance:		[%]	±10
Nominal power:		[W]	30
Duty cycle:		[%]	100
Max. surface temperature of the coil:		[°C]	150
Protection class according to DIN EN 60529:		with electrical connection “G” IP65 <sup>2)</sup>	

<sup>1)</sup> see "Conditions and Instructions for Valves" in brochure 53.000

<sup>2)</sup> if installed correctly

## PERFORMANCE

### Pressure drop

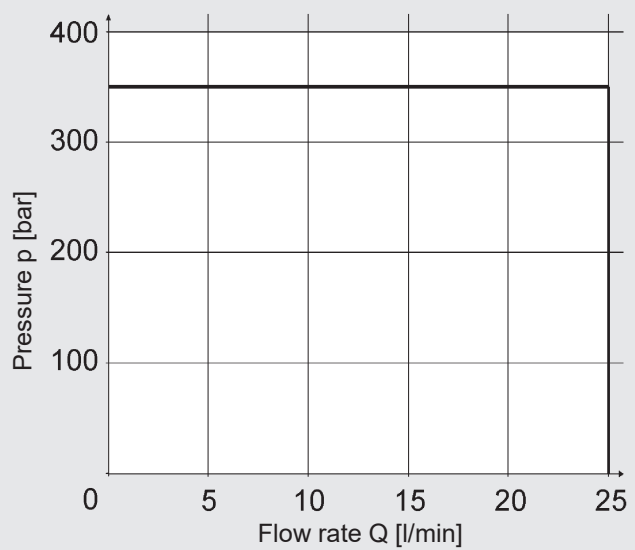
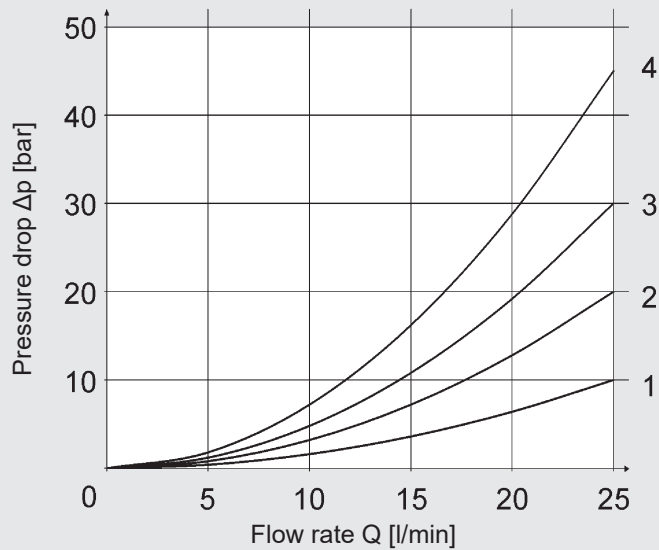
measured at  $v = 30 \text{ mm}^2/\text{s}$

$T = 45^\circ\text{C}$

### Performance limits

Switch-on current  $I_{\text{ON}} \leq 0.7 \times I_N$

Switch-off current  $I_{\text{OFF}} \geq 0.07 \times I_N$



### Performance assignment to the associated spools:

Ports	Symbol	Pressure drop												Switching times		
		a				b			0 (+)					On [ms]		Off [ms]
		P-A	P-T	A-T	B-T	P-A	P-B	A-T	P-A	P-B	P-T	A-T	B-T	0.7 x I <sub>N</sub>	1.0 x I <sub>N</sub>	
2	E2	2												110	50	25
2	BE2								1					110	50	25
2	E4		2											60	40	25
2	BE4										1			60	40	25
3	X	2										1		60	40	25
3	C			2					1					110	50	25
3	Y-OF	3						2						60	40	–
3	E	2						1						60	40	25
3	E+H	2						1	(2)		(3)	(1)		60	40	25
4	X	2			1					2		1		110	50	25
4	C						2	1	2				1	110	50	25
4	E	2			1		2	1						90	45	25
4	H	2			1		2	1	3	3	2	3	3	60	40	25
4	U	2			2		4	2					4	110 (a) 90 (b)	50 (a) 45 (b)	25
4	E+H	2			1		2	1	(2)	(2)	(1)	(1)	(1)	90	45	25
4	J+M	2			1		2	1	(2)	(2)		1	1	60	40	25
4	J+M-2RV	4			1		4	1	(4)	(4)		1	1	60	40	25
4	M+J-2RV	4			1		4	1	4	4		(1)	(1)	110	50	25
4	Z+X-2RV			2	1	3	4		3	(4)		(2)	1	110 (a) 60 (b)	50 (a) 40 (b)	25

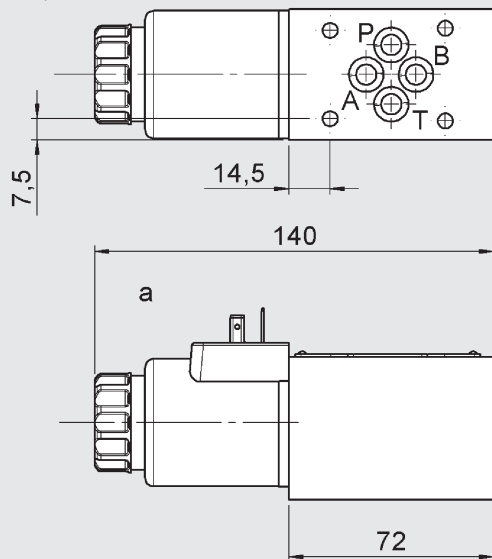
The performance limits were determined with solenoids at operating temperature and 10% low voltage.

The specified performance limits are applicable for operation with two directions of flow. The performance capacities may be lower when there is only one flow direction.

## DIMENSIONS

### With one solenoid

2/2, 3/2



Side view

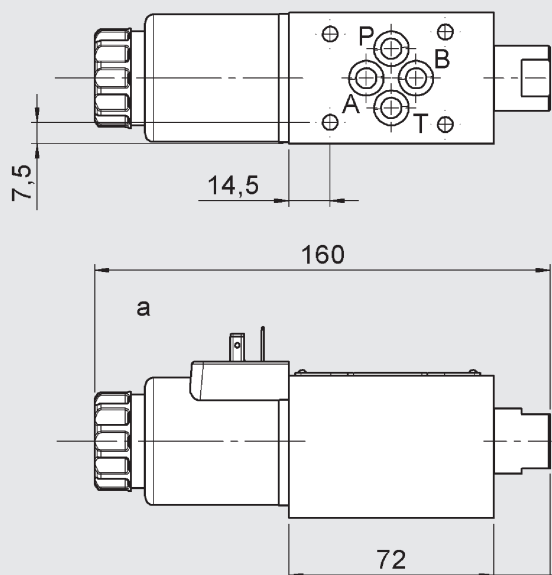
Clamping length  
to ISO 7790

4x Ø5,3

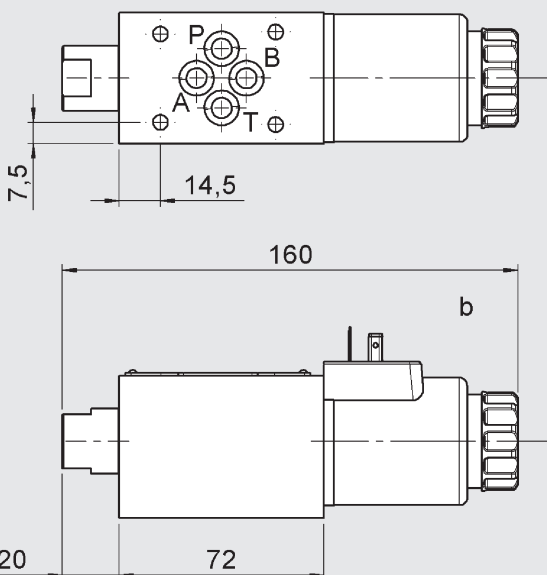
### With one solenoid

4/2

Type 4/2-X

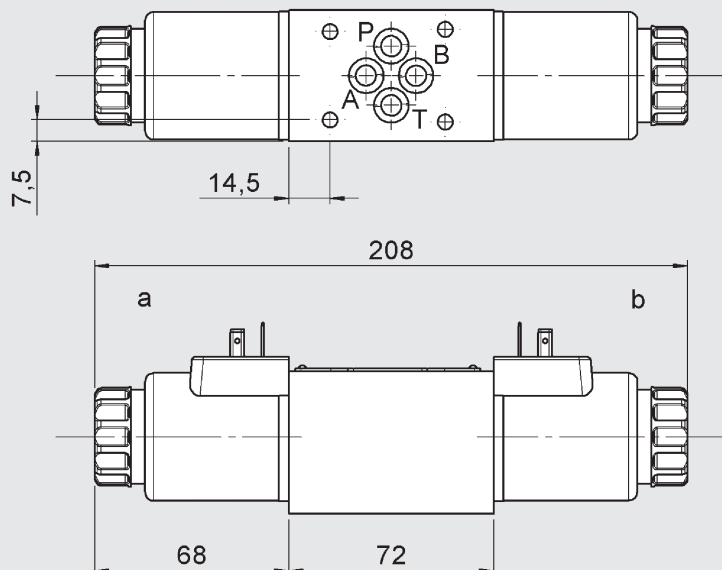


Type 4/2-C



### With two solenoids

3/3, 3/4, 4/3, 4/4



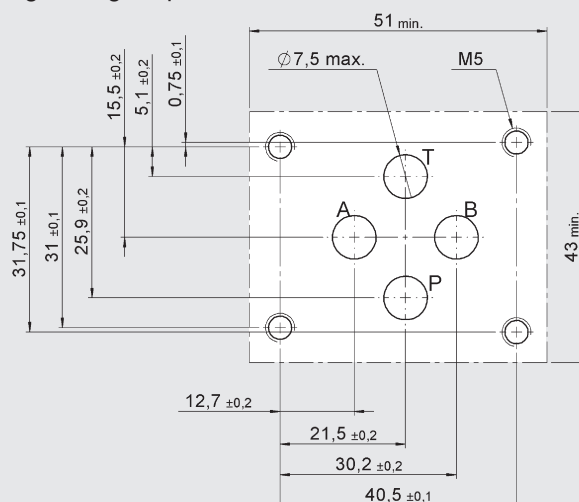
Interface according to ISO 4401-03-02-0-05 (CETOP 3)

### Mounting screws:

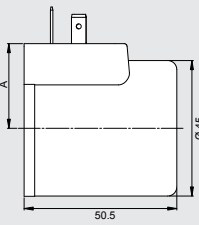
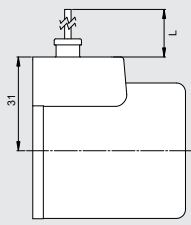
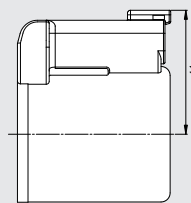
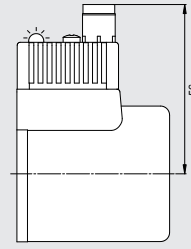
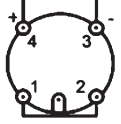
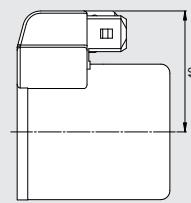
(not included in delivery)

DIN EN ISO 4762 – M5 x 50 – 10.9

Tightening torque: 6 Nm - 7 Nm

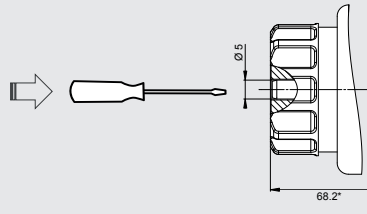
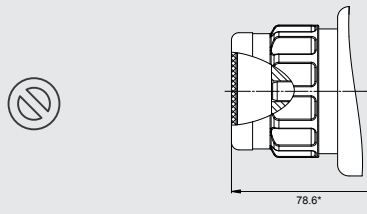


## ELECTRICAL CONNECTIONS

<b>G</b> Device connector DIN EN 175301-803 A		<ul style="list-style-type: none"> <li>● IP65</li> <li>● A = 28 mm for DC (DG)</li> </ul>
<b>L</b> 2 strands		<ul style="list-style-type: none"> <li>● IP65</li> <li>● Standard strands length L = 457 mm</li> <li>● Optional with suppressor diode</li> </ul>
<b>N</b> Device connector, Deutsch (DT04-2P)		<ul style="list-style-type: none"> <li>● IP65 / IP67</li> <li>● Optional with suppressor diode</li> </ul>
<b>O</b> Device connector M12		<ul style="list-style-type: none"> <li>● IP65</li> <li>● With yellow LED as operation indicator</li> <li>● Pin assignment</li> </ul> 
<b>U</b> Device connector Junior Timer (axial)		<ul style="list-style-type: none"> <li>● IP65</li> <li>● Optional with suppressor diode</li> </ul>

Other models on request

## MANUAL OVERRIDES

<b>Standard</b> with concealed manual override		Operation with tool
<b>M2</b> with covered manual override		Manual override covered, operation only possible after disassembly of cap

\* Dimensions up to valve casing

In case of emergency, the valve can also be operated manually. There are different forms of manual override available.

The tank pressure should not exceed 50 bar. If the tank pressure is higher, the force required to operate the manual override increases accordingly.

For valves with two solenoids, simultaneous operation of both manual overrides is not permitted (with the exception of valves with four switching positions).

## ACCESSORIES

	Designation	Part no.
Seal kits (4-part set)	9.25 x 1.78 80 Sh FKM	3120269
Mounting screws (4 pcs)	DIN EN ISO 4762 - M5 x 50 - 10.9	4312231
Solenoid coils	COIL 24DG -50-2345 -S	4244171
	COIL 24DN -50-2345 -S	4244172
	COIL 24DO -50-2345 -S	4250885
	COIL 24DU -50-2345 -S	4250892
Seal kit for solenoid coil	Nut open, O-ring	4317299
	Nut with cap, O-ring	4317302
Connector	Z4 standard 2-pole without PE	394287
	Z4L incl. LED	394285
Orifice insert	Orifice for WSE 6 H01	4371106
Ckeck valve	NRV for WSE 6 H01	4371006

### Note

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