



Directional spool valve type WH 16 hydraulically operated

**WK
460 240**

Size 16

35 MPa

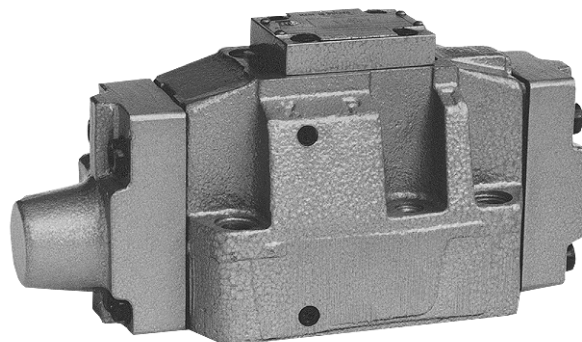
180 dm³/min

04.1999r.

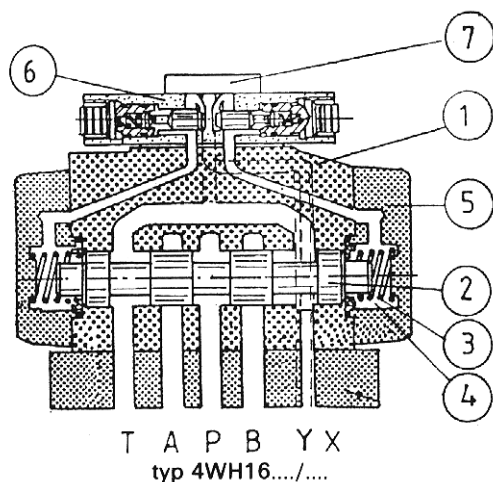
Directional control valves afford possibilities for controlling start, stop and direction of flow of a pressure fluid and thus accordingly start, stop and direction of movement of a user (cylinder or hydraulic motor).

The directional valves may be mounted in hydraulic systems in any desired position together with a subplate.

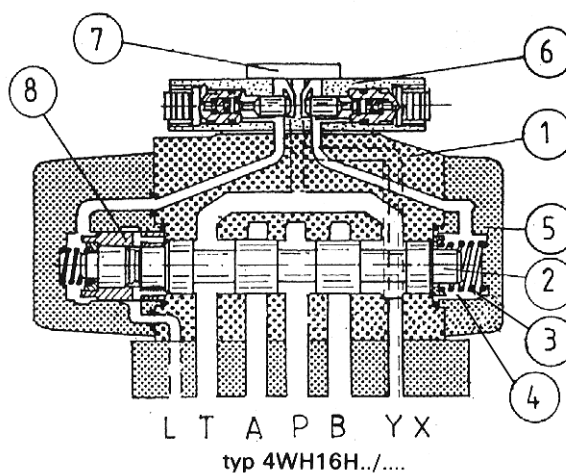
Sealing of mating faces is made by using O-rings which are included with the valve.



DESCRIPTION OF OPERATION



Type 4WH16.../...



Type 4WH16H.../...

The directional valve is switched by changing position of the control spool 2 which moving along its axis separates or connects ports A, B, P or T in the housing 1. The main spool is switched from „0" position when pilot pressure is supplied to one of spring chambers.

The both spring chambers are connected via the cover 7 with port X or Y.

The control spool of the main valve is either spring returned or hydraulically (pressure affecting both faces of the spool) returned to the neutral or start position. The return springs 3 are installed in the covers 5. The centering sleeve 8 serves centering functions.

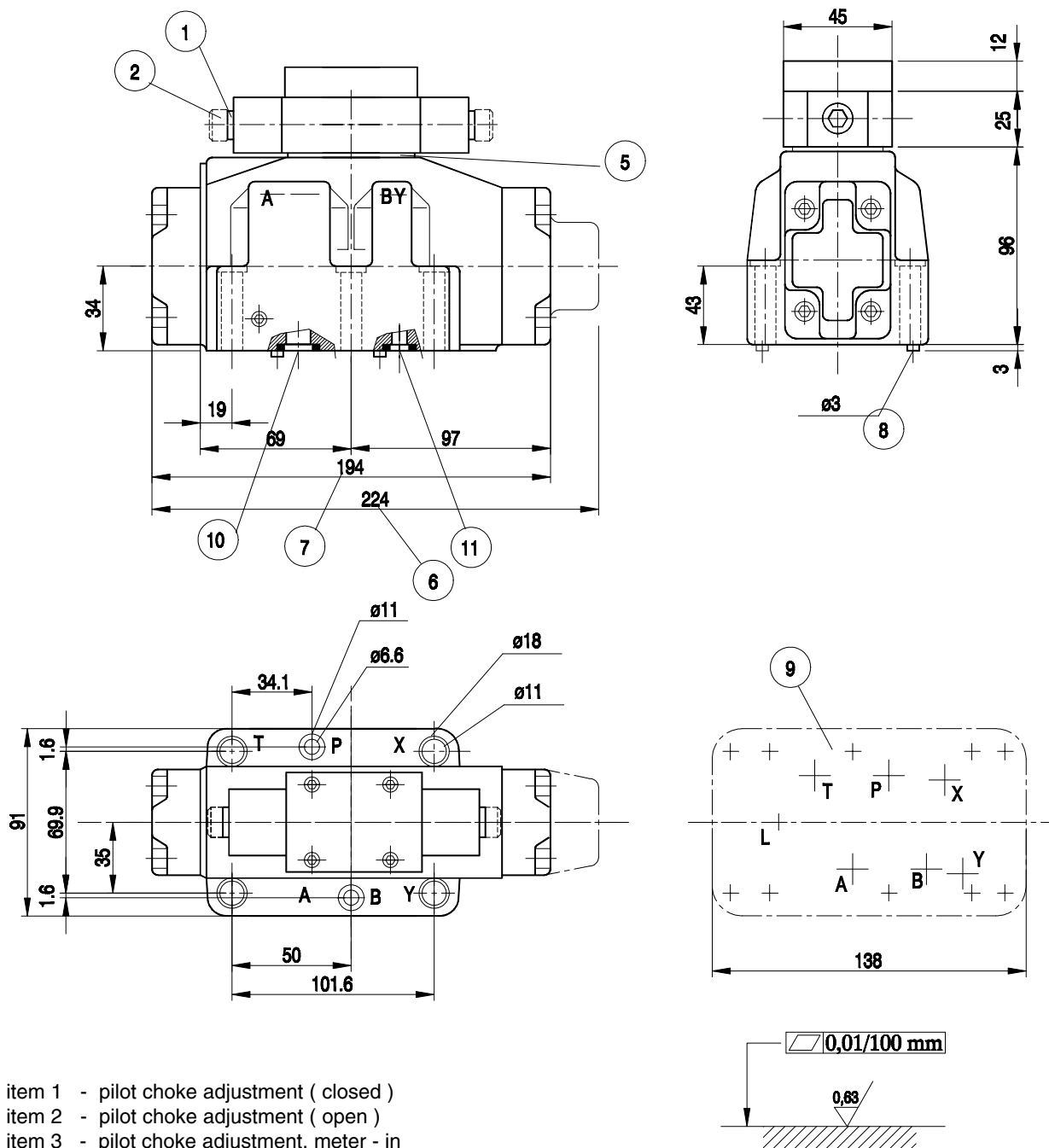
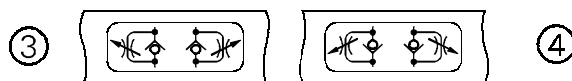
The directional valve may be equipped with the pilot choke adjustment 6.

TECHNICAL DATA

Hydraulic fluid	Mineral oil, phosphate ester
Required filtration	up to 16 µm
Recommended filtration	up to 10 µm
Nominal fluid viscosity	37 mm ² at temp. of 328 K
Viscosity range	2.8 to 380 mm ² /s
Optimum working temperature (fluid in a tank)	313 - 328 K
Fluid temperature range	243 - 343 K
Weight	7.5 kg
Maximum operating pressure - in ports A, B, P - in port T	35 MPa for H-WH16 28 MPa for WH 16 25 MPa
Maximum allowable pilot pressure	25 MPa
Minimum pilot pressure - three-position directional valve - two-position directional valve spring centered - two-position directional valve hydraulically centered	0.8 MPa 1.0 MPa 0.5 MPa
Pilot fluid volume for valve operation - three-position directional valve spring centered - two-position directional valve Three-position directional valve hydraulically centered - from neutral to operated position " a " - from operated position " a " to neutral - from neutral to operated position " b " - from operated position " b " to neutral	5.75 cm ³ 11.5 cm ³ 2.85 cm ³ 2.9 cm ³ 5.75 cm ³ 2.3 cm ³

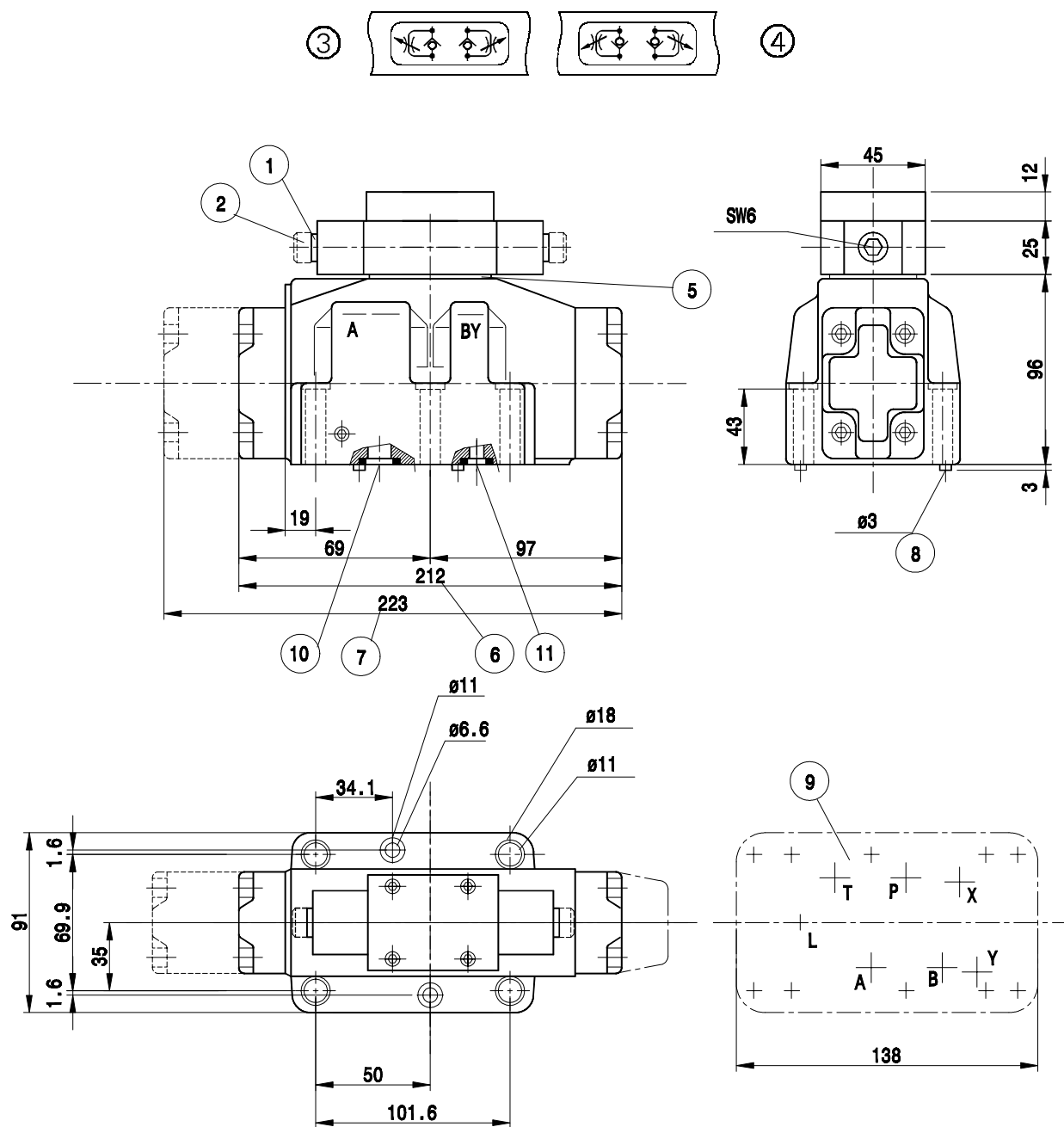
OVERALL DIMENSIONS

Two-position types



- item 1 - pilot choke adjustment (closed)
- item 2 - pilot choke adjustment (open)
- item 3 - pilot choke adjustment, meter - in
- item 4 - pilot choke adjustment, meter-out
- item 5 - plate fixing o-rings
- item 6 - dimension for 2-position valve
- item 7 - dimension for 3-position valve spring centered
- item 8 - 2 locating pins $\varnothing 3$
- item 9 - porting pattern
- item 10 - o-ring 22.3×2.4 - 4 pieces (A, B, P, T)
- item 11 - o-ring 10×2 - 3 pieces (L, X, Y)

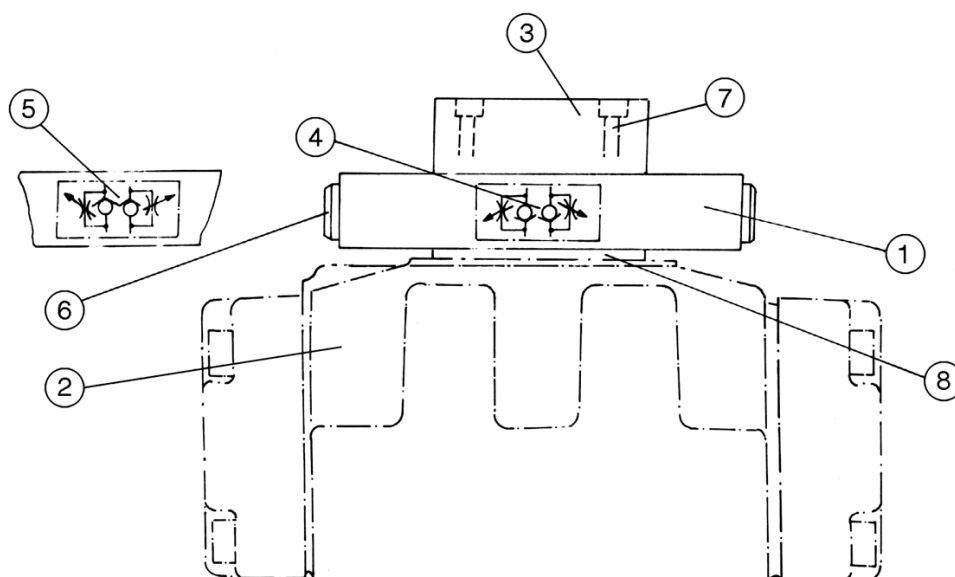
Admissible surface roughness and flatness deviation for a subplate face.



- item 1 - pilot choke adjustment (closed)
- item 2 - pilot choke adjustment (open)
- item 3 - pilot choke adjustment, meter - in
- item 4 - pilot choke adjustment, meter-out
- item 5 - plate fixing o-rings
- item 6 - dimension for 3-position valve hydraulically centered

- item 7 - dimension for 3-position valve spring centered
- item 8 - 2 locating pins $\varnothing 3$
- item 9 - porting pattern
- item 10 - o-ring 22.3×2.4 - 4 pieces (A, B, P, T)
- item 11 - o-ring 10×2 - 3 pieces (L, X, Y)

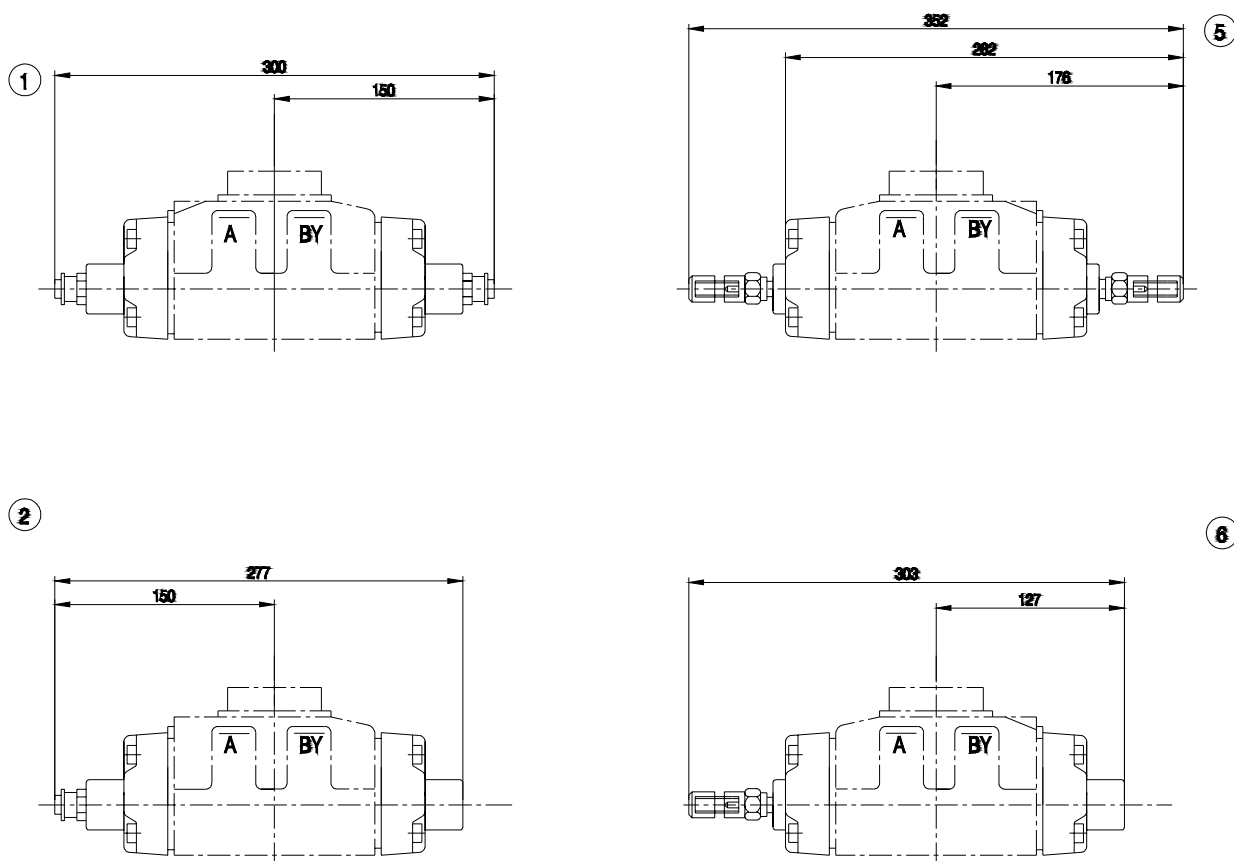
Installation method for pilot choke adjustment

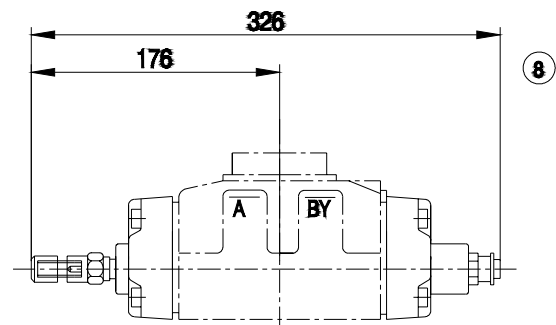
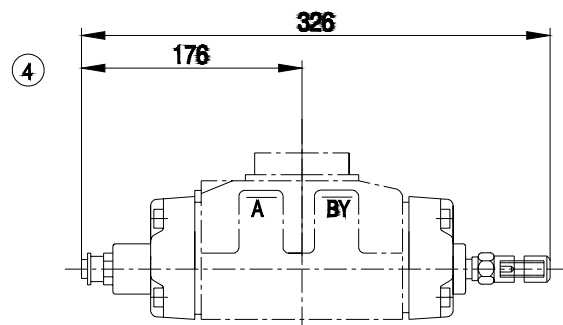
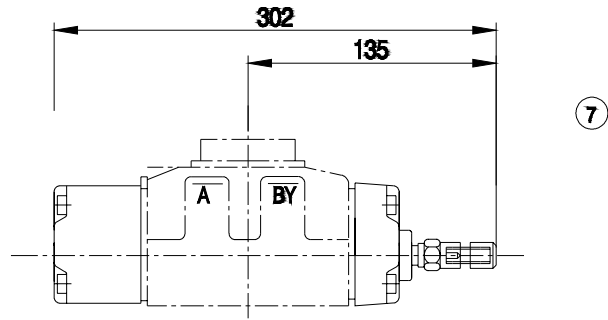
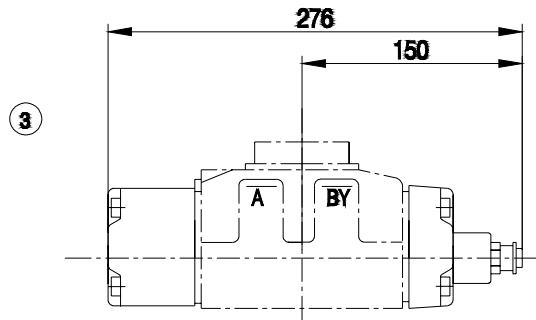


Rotation of the adjusting screw SW 6 to the right increases and to the left decreases switching time of the valve. The pilot choke adjustment is fixed by means of 4 bolts $M5 \times 40$ - 10.9 (DIN 912) with tightening torque of 5 Nm. The change of adjustment on inlet for adjustment on outlet is made by rotating the pilot choke adjustment round its longitudinal axis.

- item 1 - pilot choke adjustment
- item 2 - main valve
- item 3 - cover
- item 4 - adjustment on inlet
- item 5 - adjustment on outlet
- item 6 - adjusting screw
- item 7 - locating pins
- item 8 - plate with socket for o-rings

OVERALL DIMENSIONS FOR DIRECTIONAL VALVE WITH ACCESSORIES





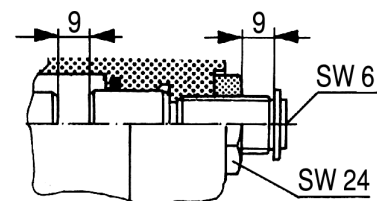
Optional auxiliary equipment

- item 1 - 2-position directional valve, hydraulically centered and 3-position directional valve spring centered, optional accessories 10, 11, 12
- item 2 - 2-position directional valve (spool schemes C - D - K - Z), optional accessory 11
- item 3 - 3-position directional valve hydraulically centered, optional accessory 12
- item 4 - 2-position directional valve hydraulically centered and 3-position directional valve spring centered, optional accessory 16

- item 5 - 2 - position directional valve and 3 - position directional valve spring centered, optional accessories 13, 14, 15
- item 6 - 2 - position directional valves (spool schemes C - D - K - Z), optional accessory 14
- item 7 - 3- position directional valve, hydraulically centered, optional accessory 15
- item 8 - 2-position directional valve hydraulically centered, 3-position directional valve spring centered, optional accessory 17

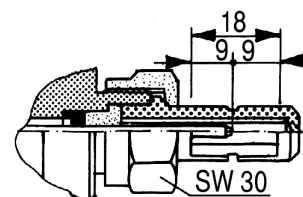
Main spool stroke adjustment

Adjustment of the stroke of the main spool is by loosening the locknut SW 24 and rotating the pin SW 6. The rotation to the right reduces the stroke of the spool (1 turn = 1.5 mm). While adjusting the stroke the control chamber must be at 0 pressure.

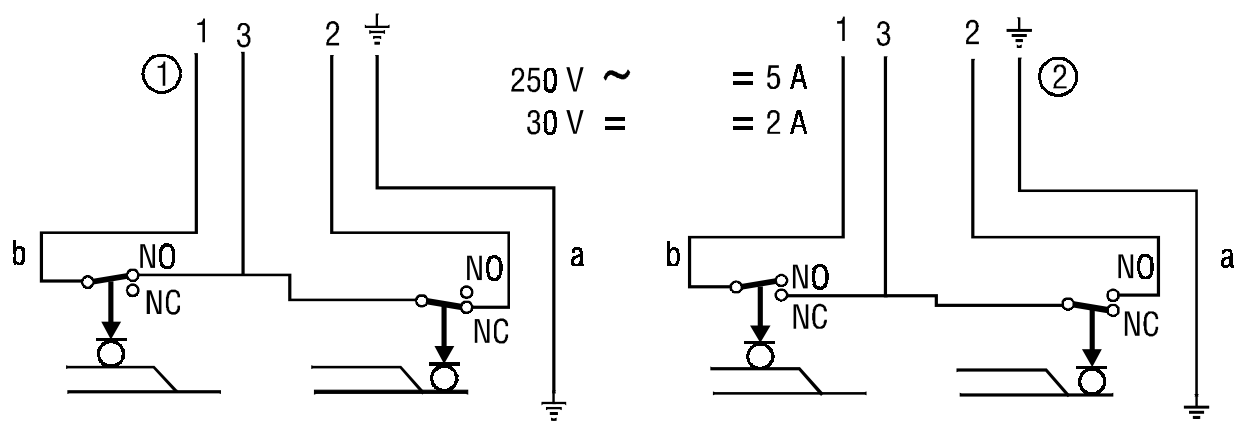


End position monitor

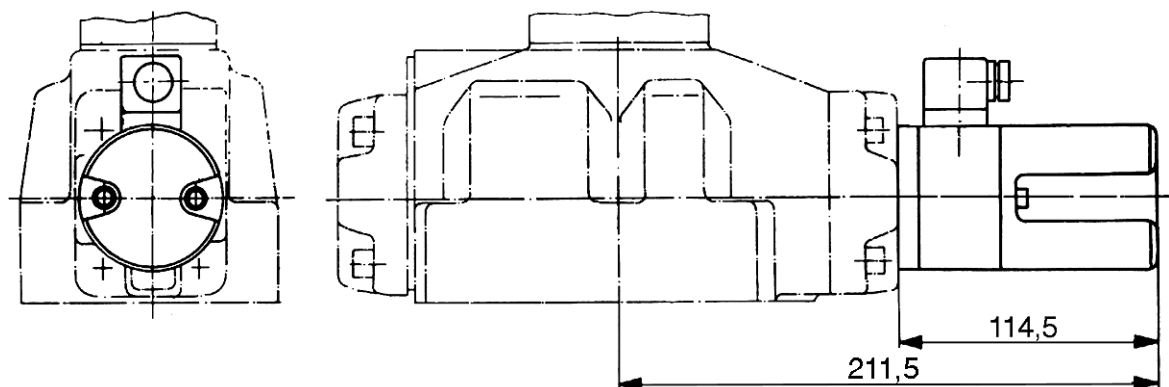
By loosening the clamp nut SW 30, the sleeve with viewing window may be rotated through 360° and set up in any position. While loosening the nut, the control chamber must be at 0 pressure.



Electrical scheme for limit switch



item 1 - scheme for limit switch normally closed
item 2 - scheme for limit switch normally open

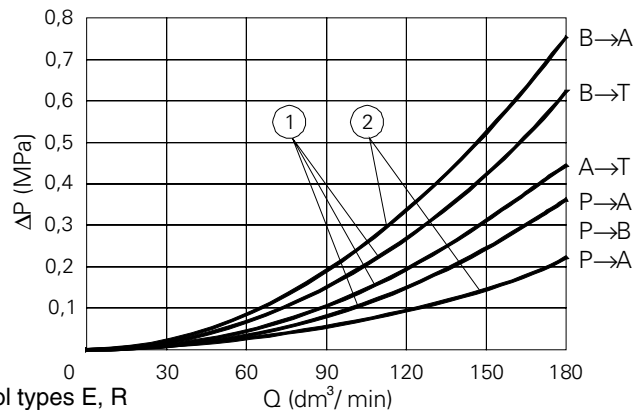
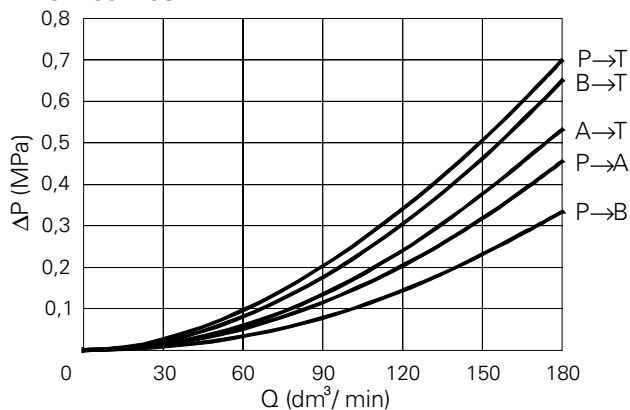


Installation of limit switch (optional accessory)

- 2-position directional valve and 3-position directional valve,
spring centered, optional limit switch 18, 22
- 2-position directional valve hydraulically centered and 3-position directional valve, optional limit switch 19, 23
- 2-position directional valve hydraulically centered and 3-position spring centered, optional limit switch 20, 21, 24, 25.

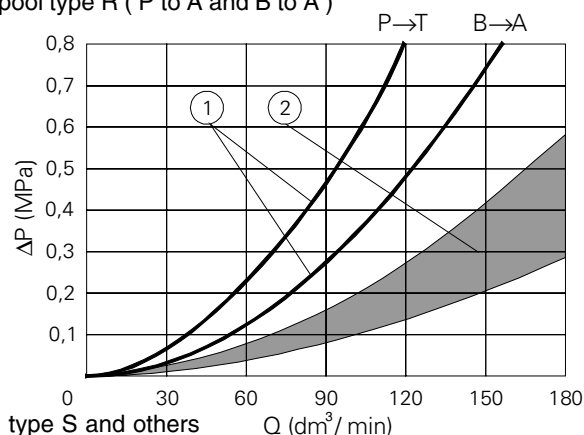
PERFORMANCE CURVES measured at $v = 41 \text{ mm}^2/\text{s}$ and $T = 323 \text{ K}$

Flow curves



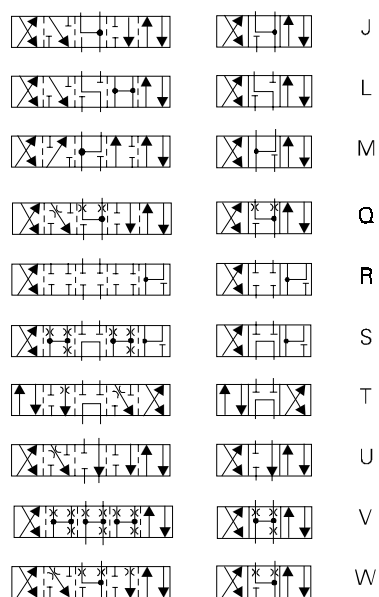
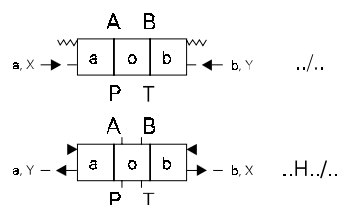
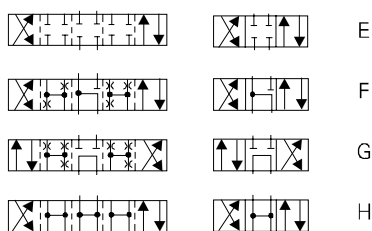
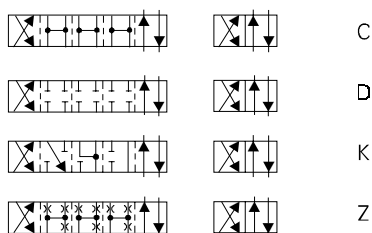
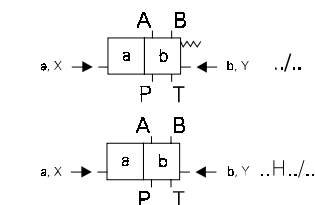
Flow limits

2 and 3-position valves, spring centered					
Spool types	Pressure (MPa)				
	7	14	21	28	35
E, J, L, M, Q, R, U, V, W, C, D, K, Z	240	240	205	180	170
F	200	145	115	100	90
G, H, S, T	220	160	130	110	100



SCHEMES

Spool schemes



Flow section in position „0“ for spool type W - 3%, Q, V - 16%

HOW TO ORDER

Orders coded in the way showed below should be forwarded to the manufacturer.

- 4 WH 16			/			*
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Version

High pressure up to 35 MPa = H
Normal pressure up to 28 MPa = no code

Spool positioning

Spring centering = with no designation
Hydraulic off-set = H

Control spool type

See spool schemes on page 8

Series number

40 = 40
(40 - 49) - installation and connection dimensions unchanged

Pilot choke adjustment

Without pilot choke adjustment = no designation
Adjustment, meter-in = S
Adjustment, meter-out = S2

Accessories

Without accessories	= no designation
Stroke limiter on valve ends A and B	= 10
Stroke limiter on valve end A	= 11
Stroke limiter on valve end B	= 12
End position monitor on valve ends A and B	= 13
End position monitor on valve end A	= 14
End position monitor on valve end B	= 15
Stroke limiter on valve end A and end position monitor on valve end B	= 16
Stroke limiter on valve end B and end position monitor on valve end A	= 17
Limit switch on end A normally closed	= 18
Limit switch on end B normally closed	= 19
Stroke limiter on valve end A, limit switch on valve end B normally closed	= 20
Stroke limiter on valve end B, limit switch on valve end A normally closed	= 21
Limit switch on valve end A normally open	= 22
Limit switch on valve end B normally open	= 23
Stroke limiter on valve end A, limit switch on valve end B normally open	= 24
Stroke limiter on valve end B, limit switch on valve end A normally open	= 25

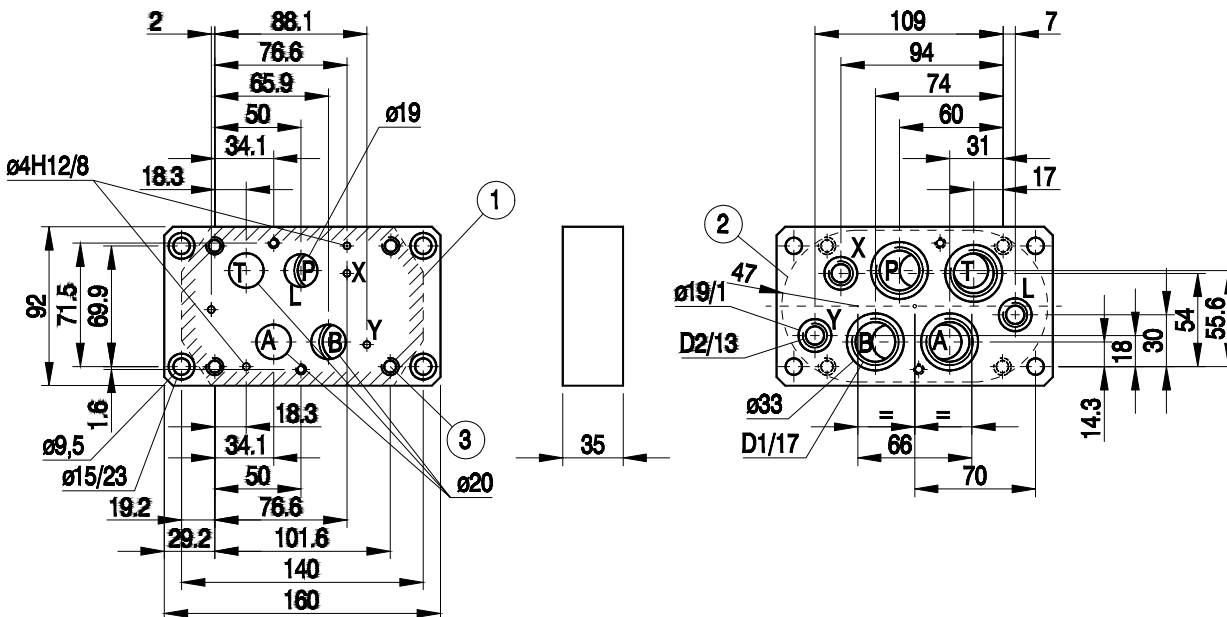
Sealing

For fluids on mineral oil base = with no designation
For fluids on phosphate ester base = V

Additional requirements in clear text (to be agreed with the manufacturer)

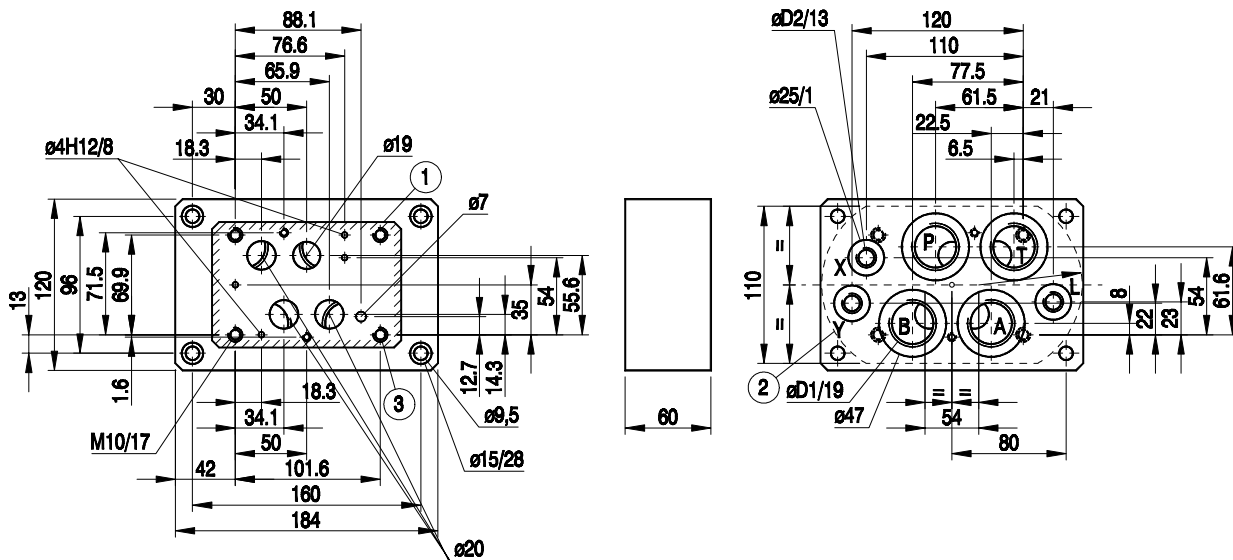
Coding example : H-4 WH 16E 40/S

MOUNTING DIMENSIONS FOR SUBPLATE



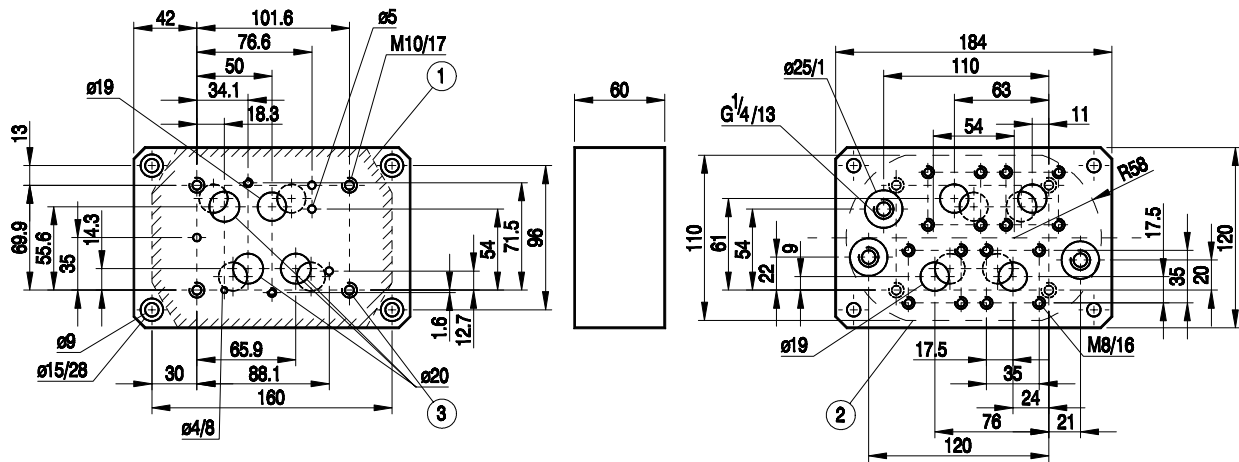
Weight approx. 2.8 kg

Subplate type	D1	D2
G 172/01	G3/4	G1/4
G 172/02	M27 x 2	M14 x 1.5



Subplate type	D1	D2
G 174/01	G1	G1/4
G 174/02	M33 x 2	M14 x 1.5

Subplate G 174/08



- 1 - Mounting face of directional valve
- 2 - Recess in subplate face
- 3 - Threads fixing directional valve

Weight approx. 5.5 kg

Bolts fixing directional valve

4 pcs M10 × 60 - 10.9 per PN/M - 82302 (DIN 912 - 10.9)

Md = 62 Nm

2 pcs M6 × 60 - 10.9 per PN/M - 82302 (DIN 912 - 10.9)

Md = 12.5 Nm

Port L for directional valve with hydraulic off-set only.
Mounting bolts and subplate must be ordered separately.

NOTES :



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