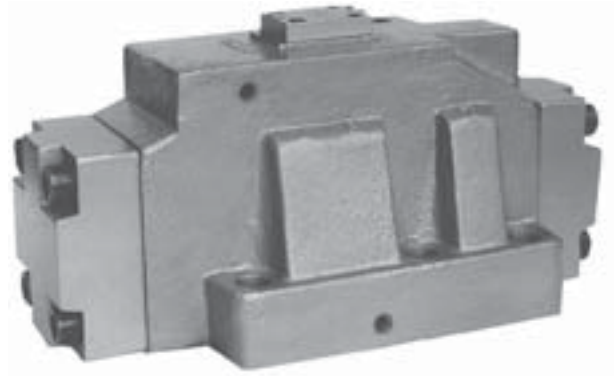
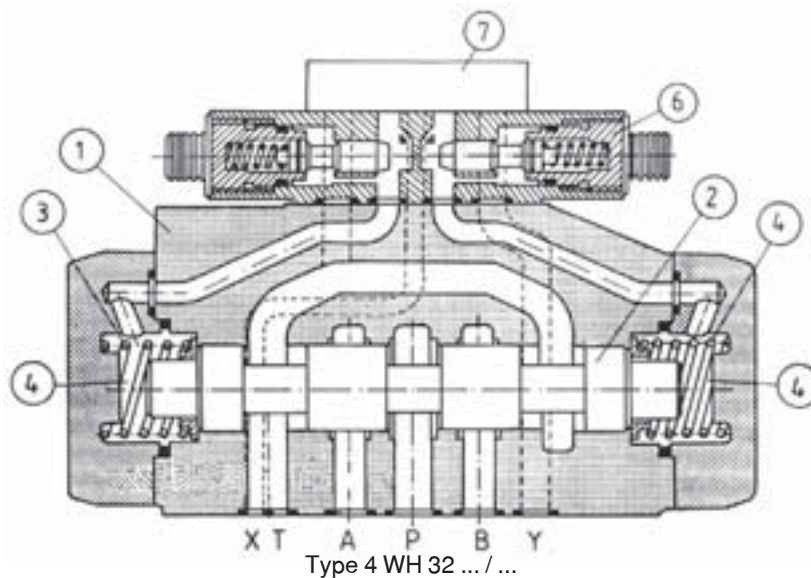


Directional spool valves are used to control the start, stop and direction of fluid flow and thus the direction of movement or holding position (cylinder or hydraulic motor) is determined. The valves can be installed in hydraulic circuit in any position together with a subplate.
The connecting surfaces are sealed with O-rings that are included with the valve.



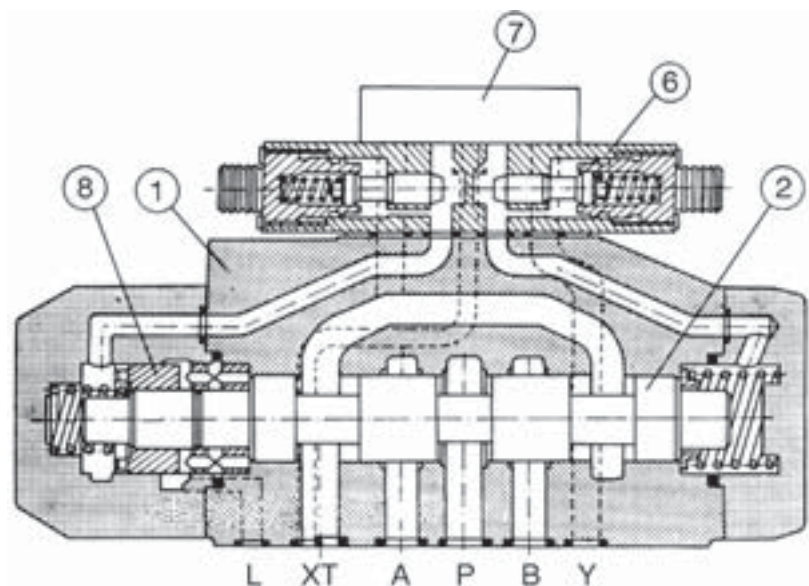
DESCRIPTION OF OPERATION



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 4. The both chambers are connected with port X or Y via a cover 7.

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.

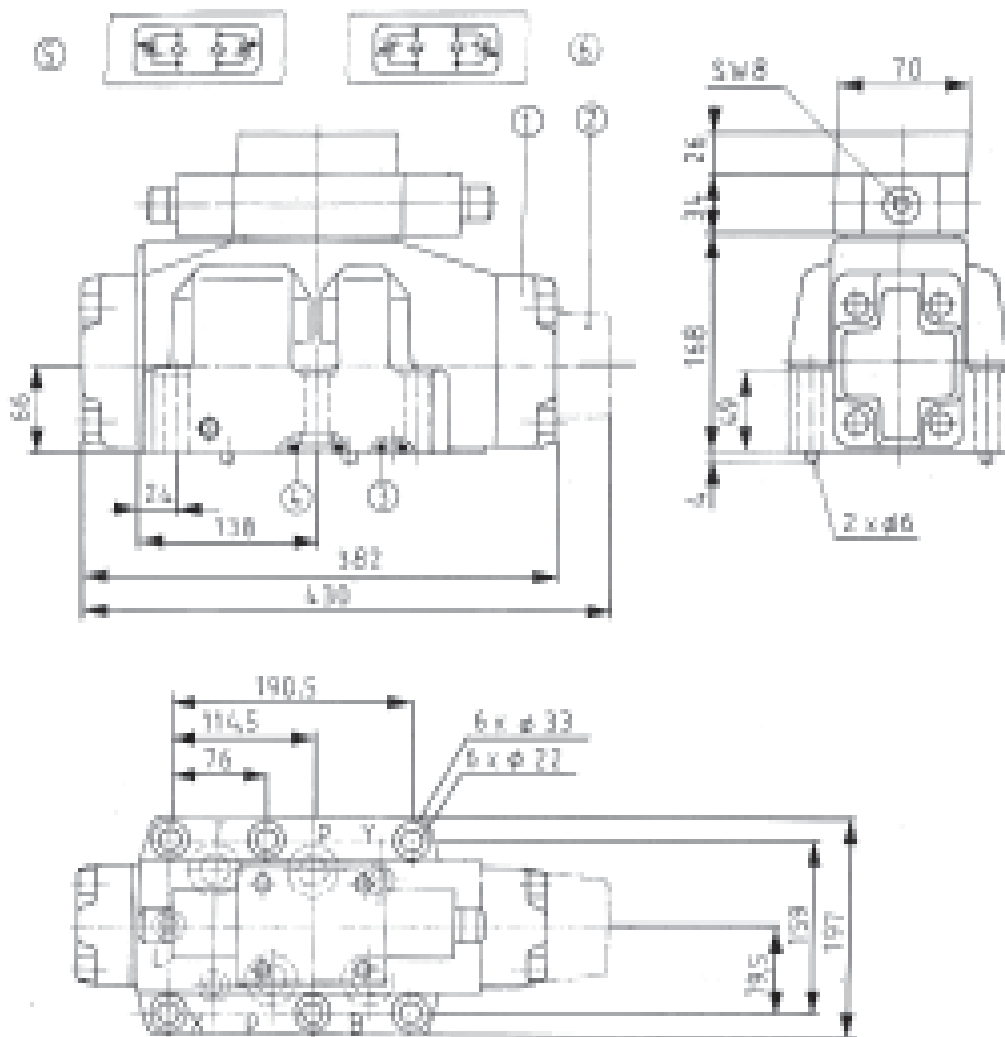


Type 4 WH 32H /

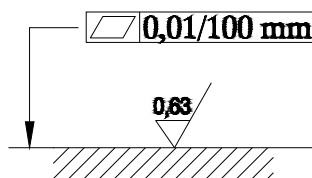
TECHNICAL DATA

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	49 kg
Maximum operating pressure - in ports A, B, P - in port T	35 MPa for H-WH 32 28 MPa for WH 32 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	35,35 cm^3 70,70 cm^3
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	17,25 cm^3 18,10 cm^3 35,35 cm^3 17,25 cm^3

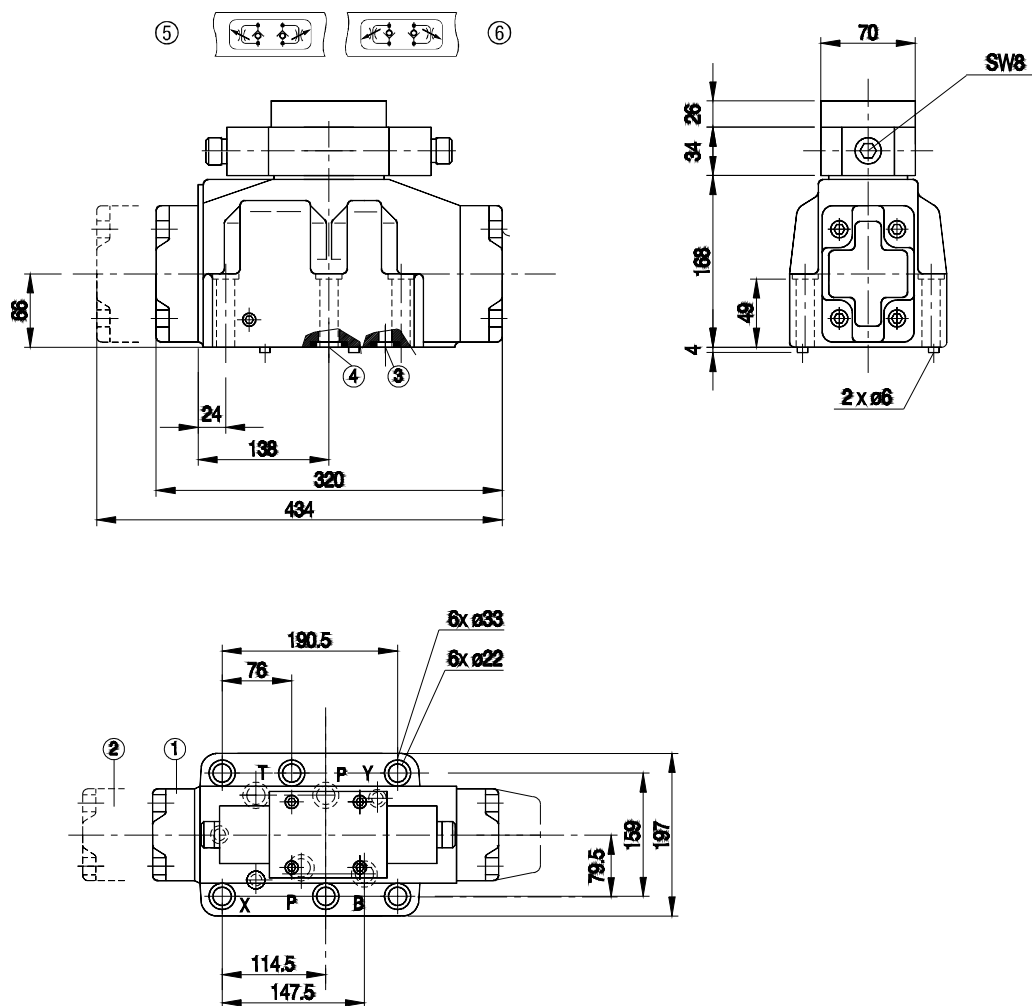
OVERALL DIMENSIONS



- item 1 - 2-position valve hydraulically centered
- item 2 - 2-position valve spring centered
- item 3 - o-ring 19.2×3 - 3 pieces (L, X, Y)
- item 4 - o-ring 27×3 - 4 pieces (A, B, P, T)
- item 5 - pilot choke adjustment, meter - out
- item 6 - pilot choke adjustment, meter - in
- item 7 - mounting face of valve



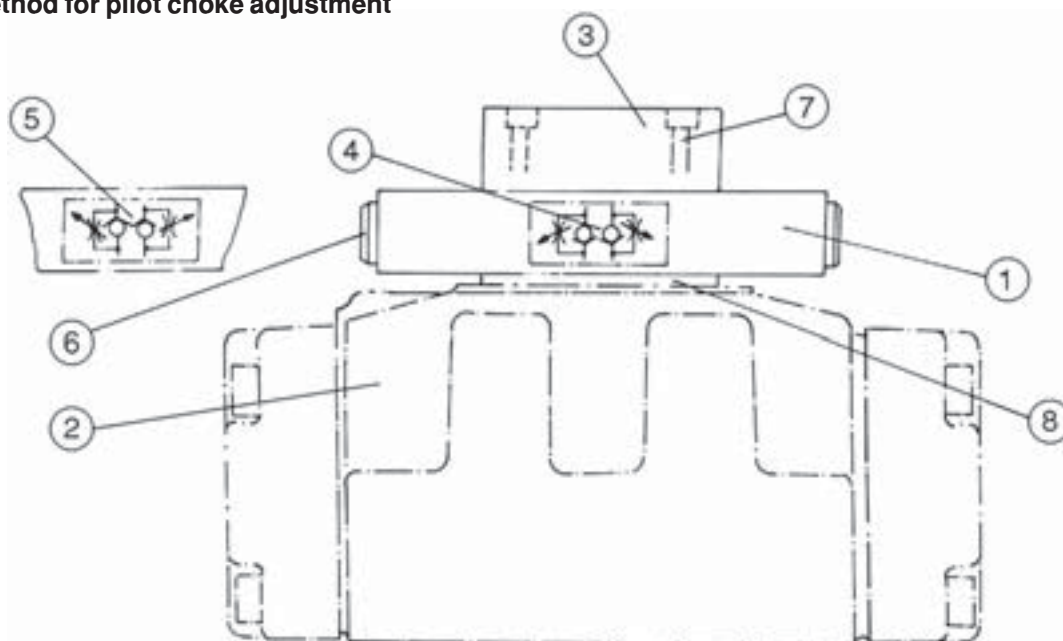
Admissible surface roughness and flatness deviation for a subplate face.



- item 1 - 3-position valve spring centered
 item 2 - 3-position valve hydraulically centered
 item 3 - o-ring 19.2 × 3 - 3 pieces (L, X, Y)

- item 4 - o-ring 42 × 3 - 4 pieces (A, B, P, T)
 item 5 - pilot choke adjustment, meter - out
 item 6 - pilot choke adjustment, meter-in

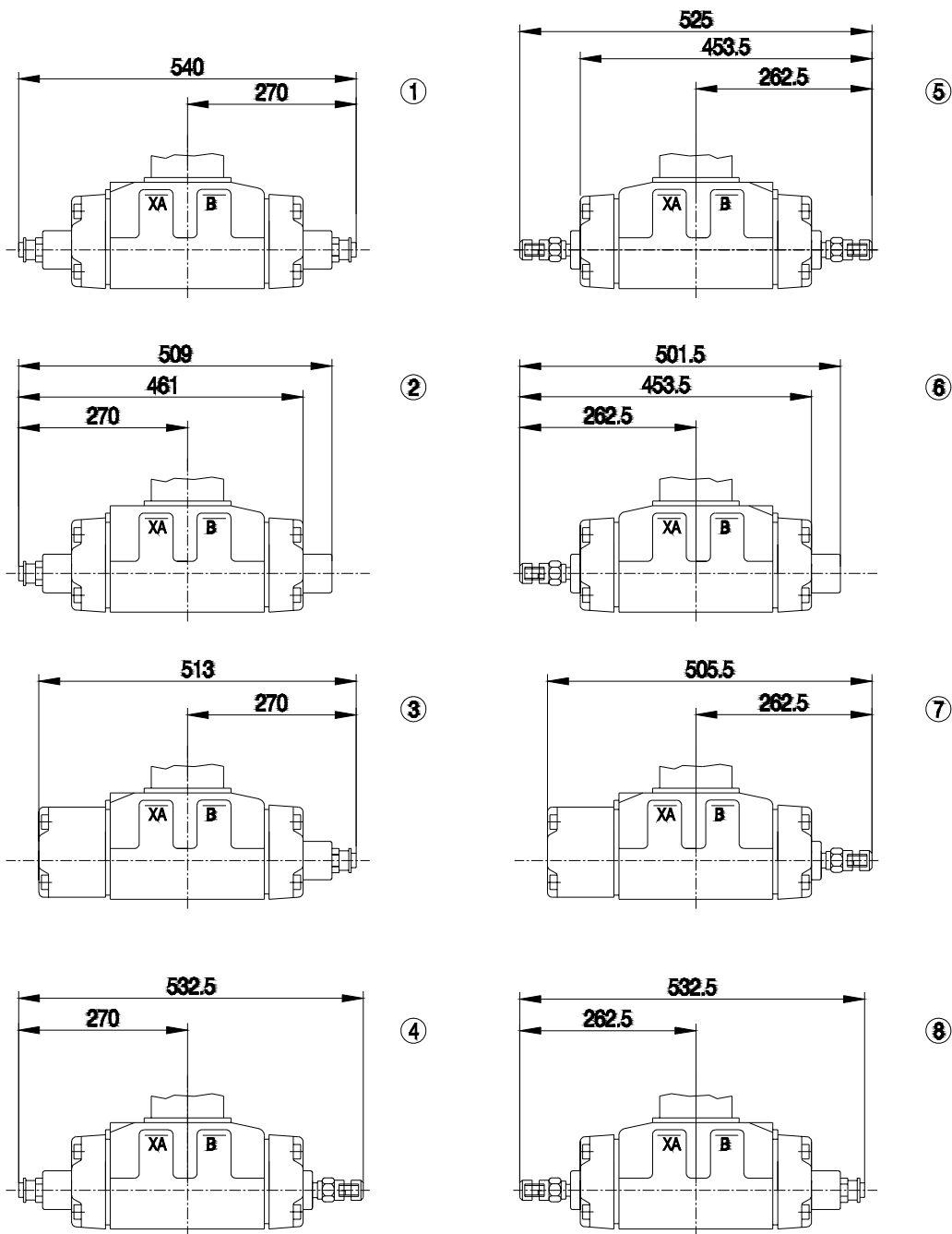
Installation method for pilot choke adjustment



Rotation of the adjusting screw SW 8 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 M6 × 60 - 10.9 (DIN 912) with tightening torque of 14 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 - main valve
- item 2 - pilot choke adjustment
- item 3 - cover
- item 4 - mounting bolt
- item 5 - adjustment on outlet or inlet
- item 6 - plate with socket for o-rings

OVERALL DIMENSIONS FOR DIRECTIONAL VALVE WITH ACCESSORIES

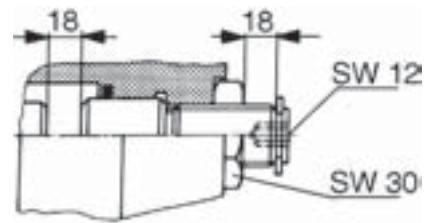


Optional auxiliary equipment

- 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

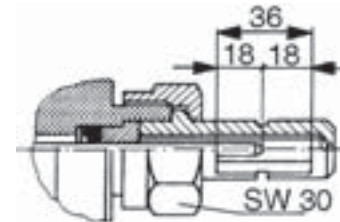
Main spool stroke adjustment

Adjustment of the stroke of the main spool is by loosening the locknut SW 36 and rotating the pin SW 12. 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.



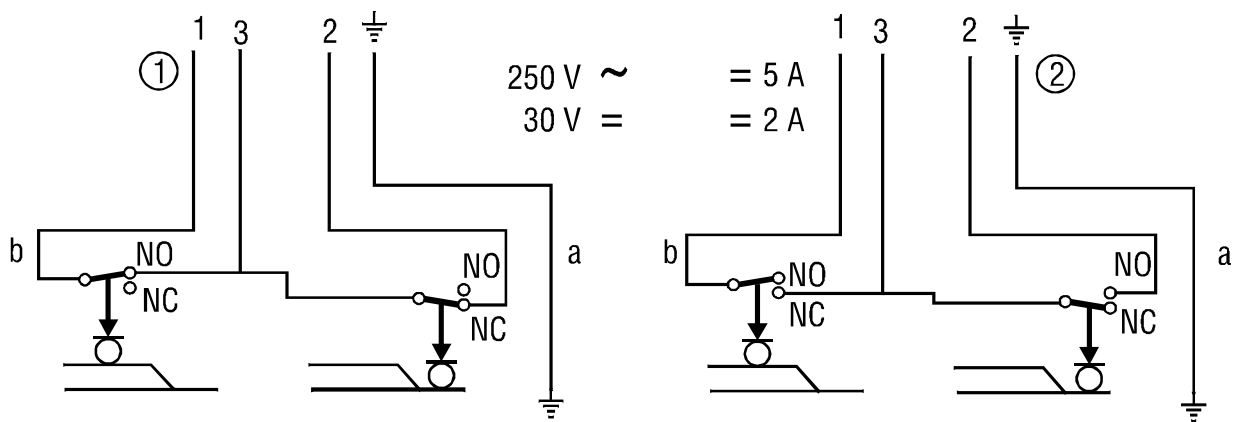
End position monitor

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.



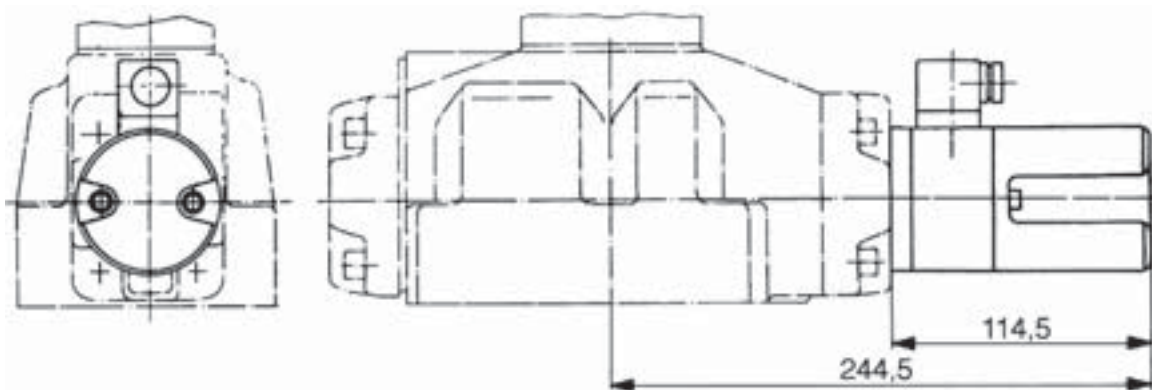
Limit switch

Electrical scheme for limit switch



item 1 - scheme for limit switch normally closed

item 2 - scheme for limit switch normally open

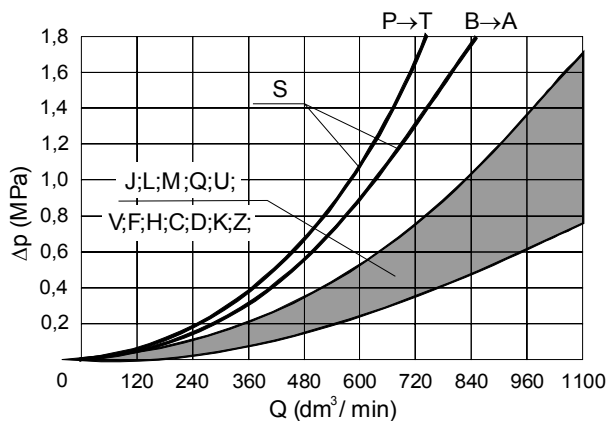
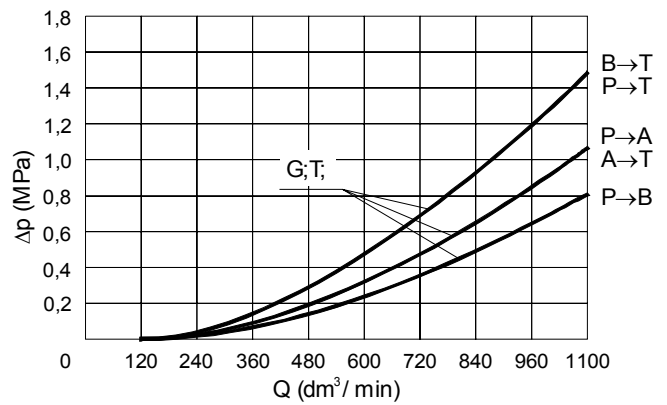
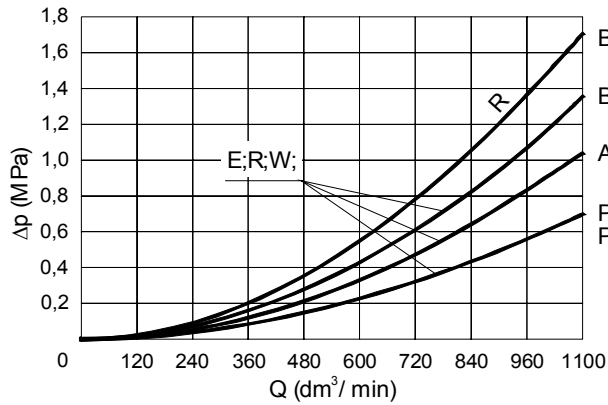


Installation of limit switch (optional accessory)

- 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 $T = 323 \text{ K}$



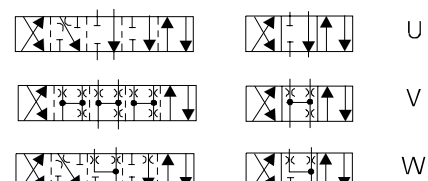
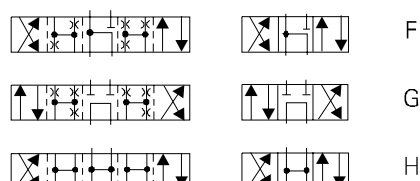
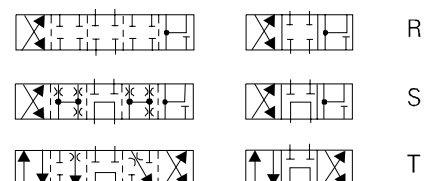
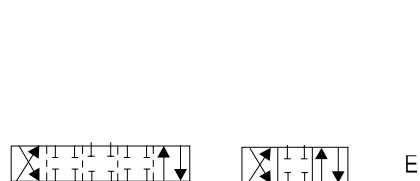
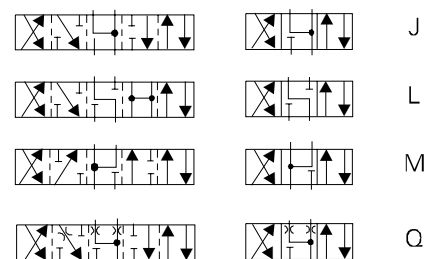
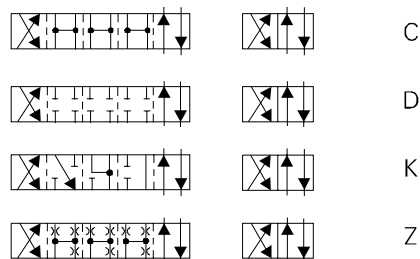
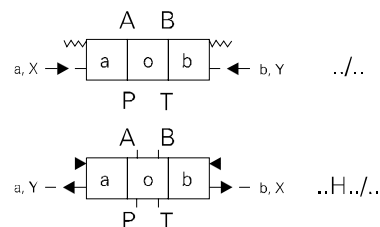
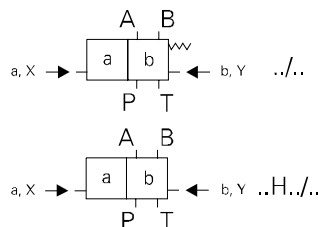
2- and 3-position valves spring centered					
Flow dm^2/min for spools	Pressure MPa				
	7	14	21	28	35
E, J, L, M, Q, R, U, V, W, C, D, K, Z	110	105	860	750	680
F, G, H, S, T	820	630	510	450	400

Note:

The flow limits refer to typical application of 4-way directional control valve i.e. with using two lines e.g. P to A and B to T at the same time. In case of using 4-way directional control valve with one flow line e.g. P to A (B plugged) or A to T (B plugged) actual flow limits are considerably lower.

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	32			/			*
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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 7

Series number

11 = 11
(10 - 19) - 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

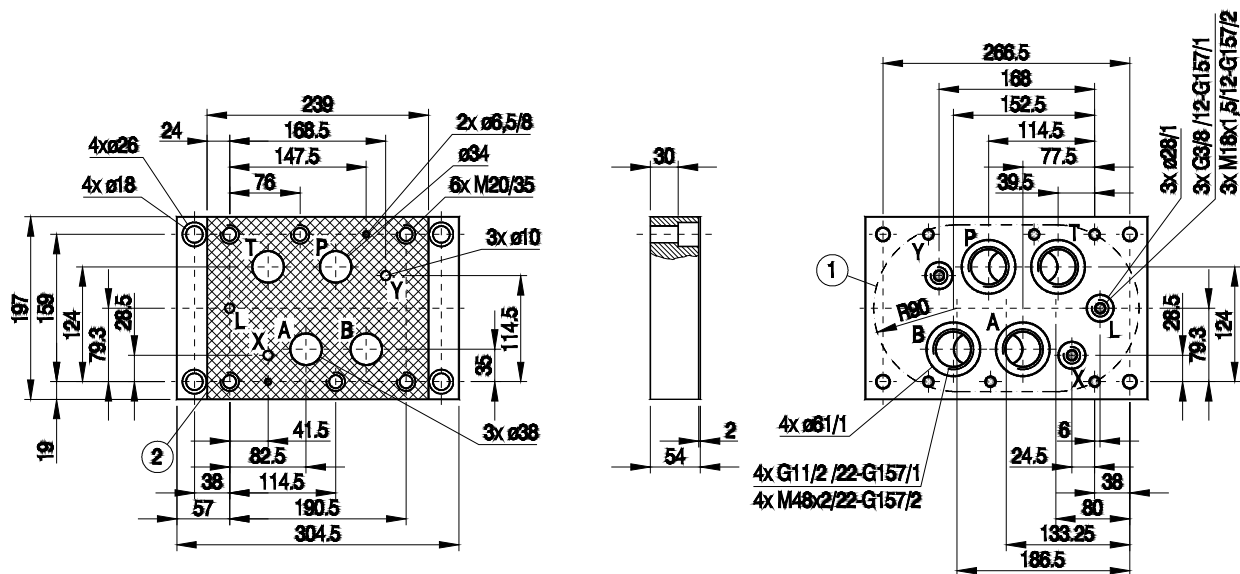
Additional requirements in clear text (to be agreed with the manufacturer)

Coding example : H-4 WH 32 E 50/S

MOUNTING DIMENSIONS FOR SUBPLATE

G 157/01

G 157/02



- 1 - Recess in subplate face
- 2 - Mounting face of directional valve

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

Bolts fixing directional valve
6 pcs M20 \times 80 - 10.9 per PN/M - 82302 (DIN 912 - 10.9)

Weight approx. 20 kg

PONAR WADOWICE S.A.
ul. Wojska Polskiego 29
34-100 Wadowice
tel. 033/ 823 39 43, 823 30 41
fax 033/ 873 48 80
e-mail: ponar@ponar-wadowice.pl

