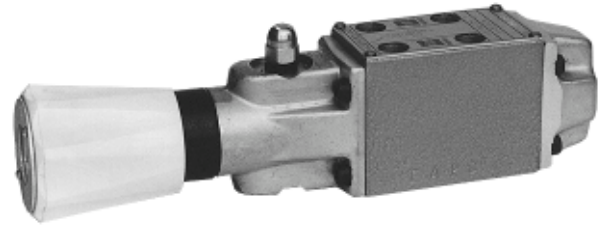
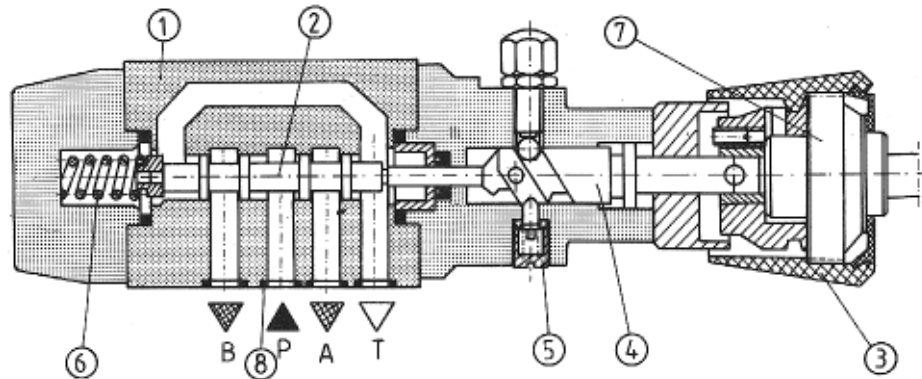


Directional spool valves are used to control the direction of fluid flow and thus the direction of movement or holding position of a user (cylinder or hydraulic motor).



DESCRIPTION OF OPERATION



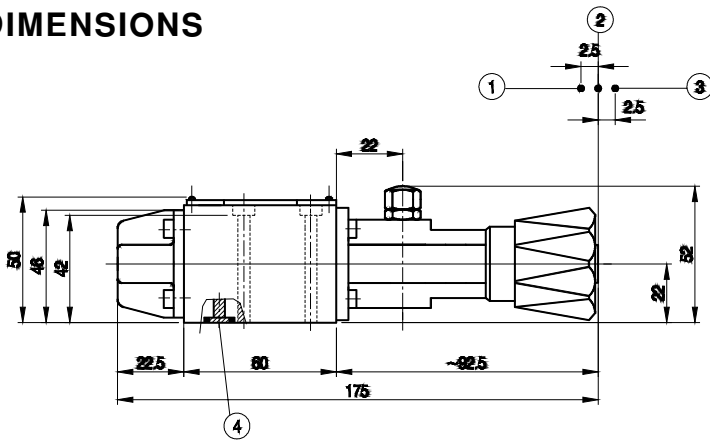
Annular ports are made around the longitudinal bore in the housing 1. The annular ports cut through the longitudinal bore forming control lands in the housing. The moveable control spool 2 is placed in the main port. If the spool is shifted, it connects or separates the ports in the housing. Various control functions result directly from shape of the control spool.

The shift of the spool follows a change of the rotary motion of the spindle 4 for the plane motion. The directional valve operation is made by turn of the hand knob which may be locked 7. The spool position can be fixed by the detent 5. The spring 6 permanently affecting the spool is used to cancel clearances in the system. Sealing of the directional valve to a subplate is achieved by means of suitable rings 8.

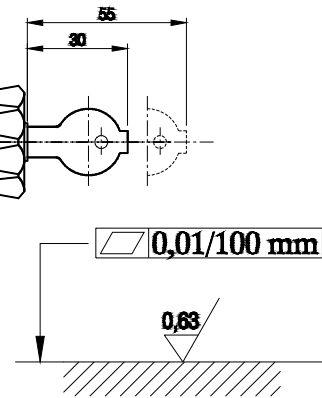
TECHNICAL DATA

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	
Maximum operating pressure	Port P, A, B	Port T
	31.5 MPa	6 MPa
Flow section in position „0”	Spool type W	Spool type Q
	3 % of nominal section	6 % of nominal section
Torque for rotary knob	12 - 14 Ncm	
Weight	1.3 kg	

OVERALL AND MOUNTING DIMENSIONS



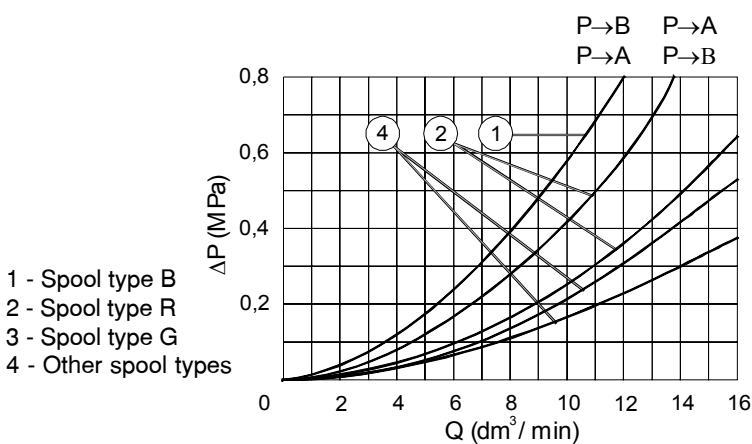
- 1 - Position „a” for two- and three - position directional valves
- 2 - Position „0” for three-position directional valves and position „b” for two - position directional valves
- 3 - Position „b” for two- or three-position directional valves
- 4 - O-ring 7 × 1.5 - 4 pieces



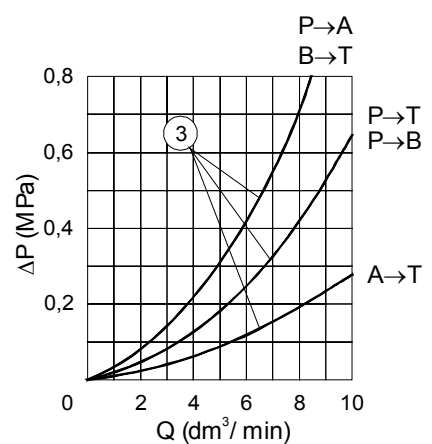
Admissible surface roughness and flatness deviation for a subplate face

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

Pressure drop related to flow for various spool types



- 1 - Spool type B
- 2 - Spool type R
- 3 - Spool type G
- 4 - Other spool types

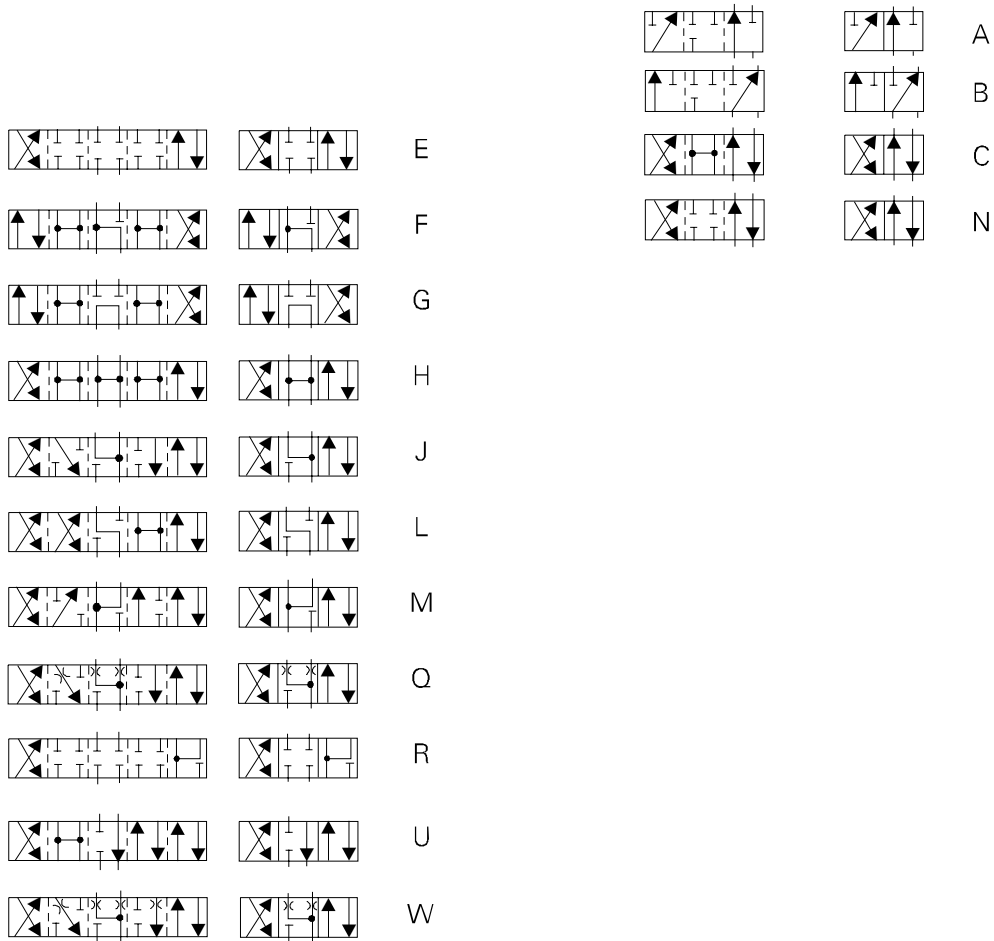


SCHEMES

Scheme for two - and three - position directional control valve, hand rotary knob operated

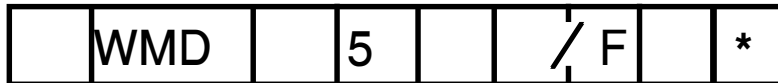


Schemes for control spools



HOW TO ORDER

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



Number of service ports
 3 = 3
 4 = 4

Rotary knob
 normal = with no designation
 lockable = A

Control spool type
 See schemes above

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

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

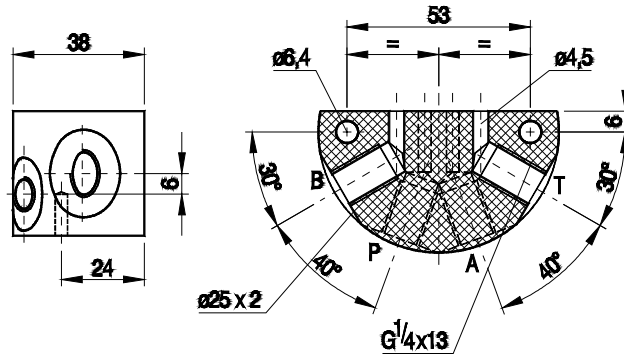
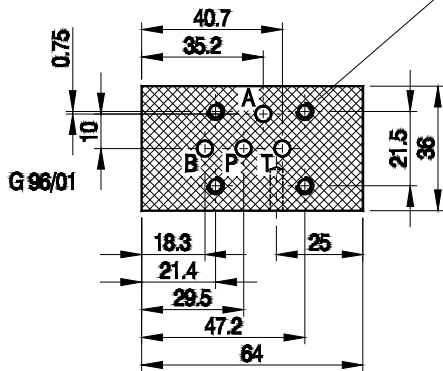
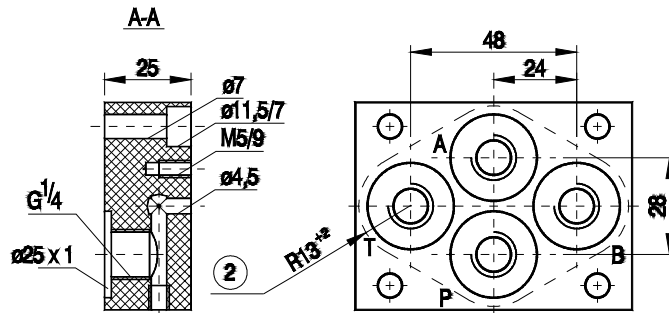
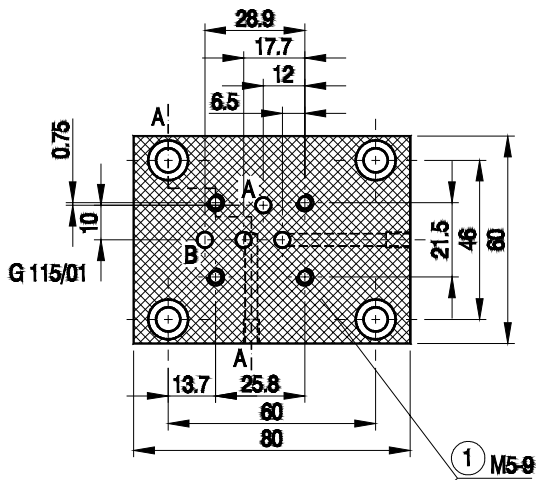
Control spool positioning
 Spring centering = with no designation
 With detent = OF

Series number
 2.4 = 2.4
 (2.0 - 2.9) - Installation and connection dimensions unchanged

Coding example : 4WMDA5E 2.4/F

MOUNTING DIMENSIONS FOR SUBPLATE

- 1 - Mounting face
- 2 - Recess in subplate face



Note : Subplate and mounting bolts must be ordered separately

Subplate weight - approx. 0.7 kg

Bolts mounting valve to subplate	Torque
4 × M5 × 50 -10.9 per PN-74/M-82302 (DIN 912)	9 Nm

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