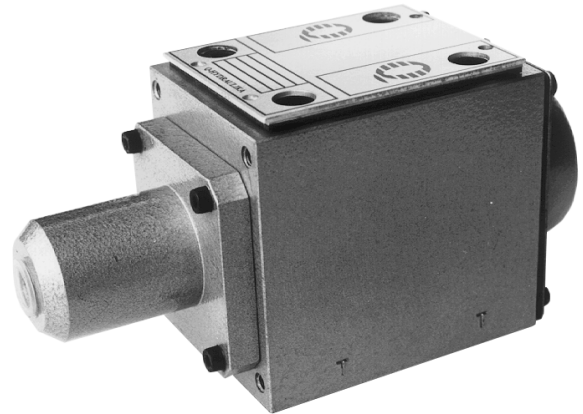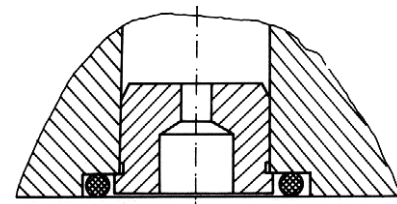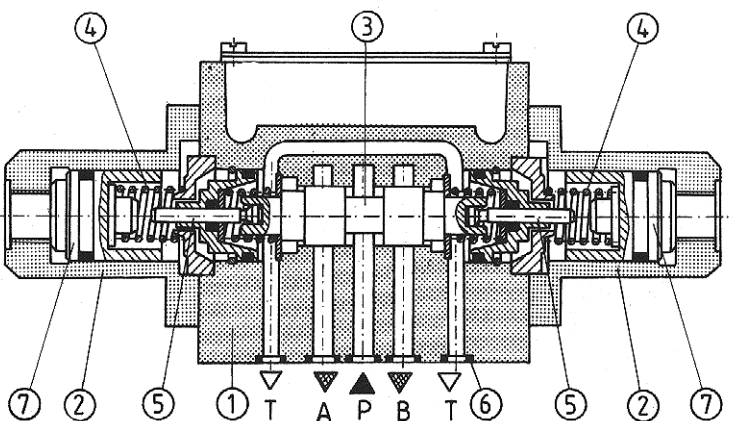|	**Directional spool valve type WH 10 hydraulically operated**	**WK 450 770**
Q	**Size 10** **31,5 MPa** **100 dm³/min**	04.1999г.

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

Throttle insert in port P

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 3 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. Movement of the control spool is caused by pressure supplied to the cover connection 2. This makes the pilot piston 7 to change its position and thus the lifter 5 fixed to the control spool to shift.

Return movement of the control spool and fixing its centre position are achieved by the centering springs 4.
The sealing rings 6 are installed between the valve and a subplate to prevent leakage.
The directional valves are available in several versions : three-position, two-position with return spring, two-position without return springs or two-position with detent.

TECHNAICAL DATA

| Hydraulic fluid	Mineral oil, phosphate ester		
Required filtration	up to 16 μm		
Recommended filtration	up to 10 μm		
Nominal fluid viscosity	37 mm² at temp. of 328 K		
Viscosity range	2.8 to 380 mm²/s		
Optimum working temperature (fluid in a tank)	313 - 328 K		
Fluid temperature range	243 - 343 K		
Maximum admissible operating pressure	Ports P, A, B		Port X
	31.5 MPa		15 MPa
Pilot pressure	min.0.5 MPa, max 6 MPa		
Flow section in position ,,0"	Spool type W		Spool type Q
	3 % of nominal section		6 % of nominal section
Pilot volume for valve operating	3.18 cm³		
Switching time	On		Off
	15 - 30 ms		15 - 30 ms
Weight	Two - position spring centred	Two - position .../O, .../OF	Three - position
	3.4 kg	3.8 kg	3.8 kg

OVERALL AND MOUNTING DIMENSIONS
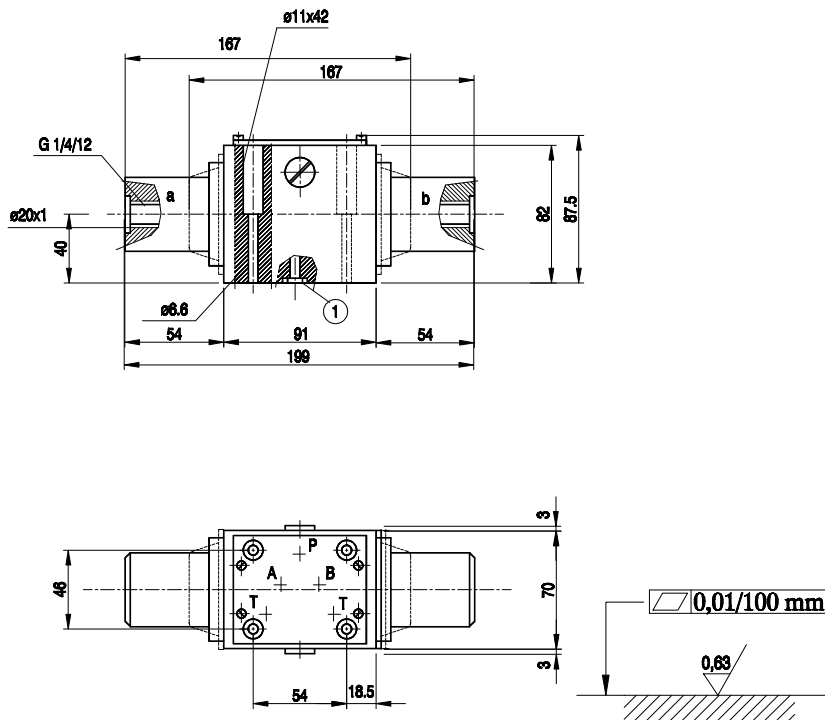
1 - „O-ring" — 12 x 2 pcs.5

Admissible surface roughness and flatness deviation for a subplate face.

PERFORMANCE CURVES : measured at $\nu = 41$ mm²/s and T = 323 K

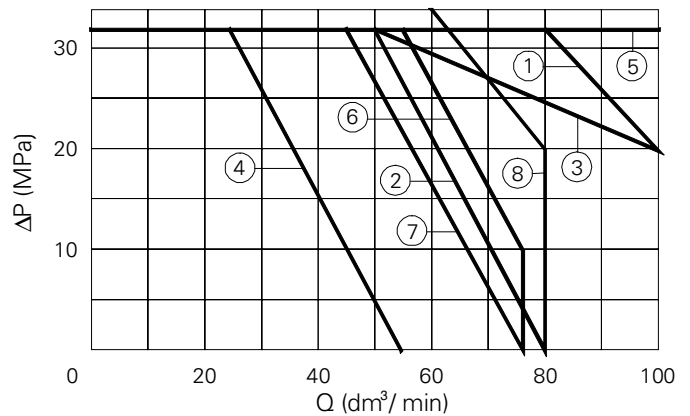Flow resistance for various spool types
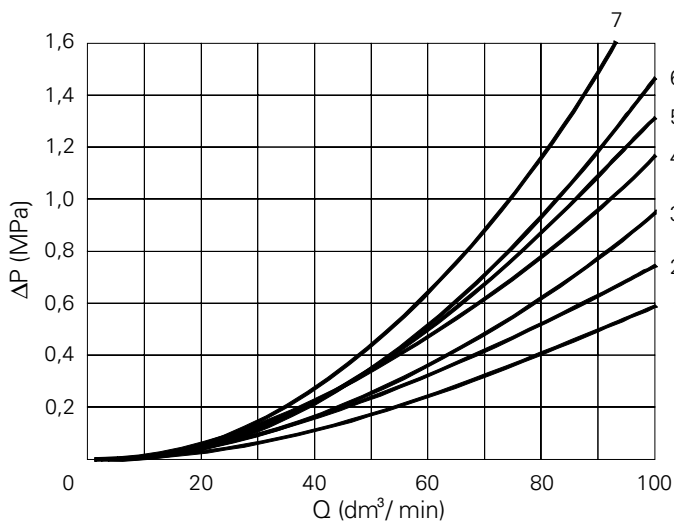
Spool type	Flow direction					
	P-A	P-B	A-T	B-T	P-T	A-B
A	2	2	-	-	-	-
B	2	2	-	-	-	-
C	2	2	3	3	-	-
D	2	2	3	3	-	-
E	2	2	4	4	-	-
F	2	3	3	5	-	-
G	3	3	4	6	4	-
H	1	1	4	5	-	-
J	2	2	3	3	-	-
L	2	2	3	5	-	-
M	1	1	5	5	-	-
P	3	2	5	3	-	-
Q	2	2	4	4	-	-
R	2	4	3	-	-	7
T	3	5	5	6	4	-
U	2	2	3	5	-	-
V	2	2	4	4	-	-
W	2	2	5	5	-	-
Y	2	2	3	3	-	-

Flow limits

1 - Spool types C, D, E, M, V, Y
2 - Non applicable to WH 10
3 - Spool types J, L, Q, U, W
4 - Spool types A, B
5 - Spool types C/O, C/OF, D/O, D/OF
6 - Spool type H
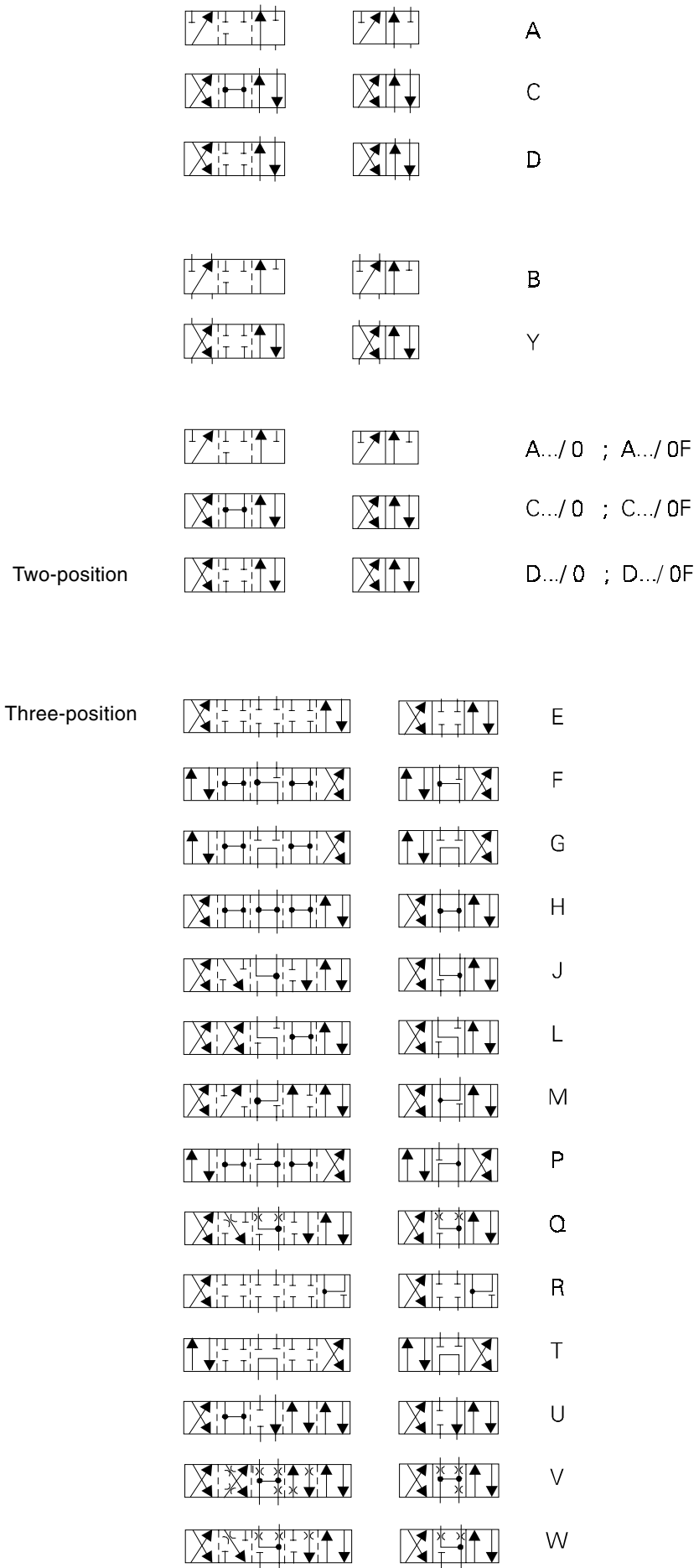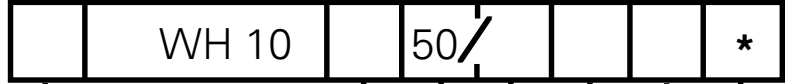7 - Spool type A/O
8 - Spool type F, G, P, R, T

SCHEMES
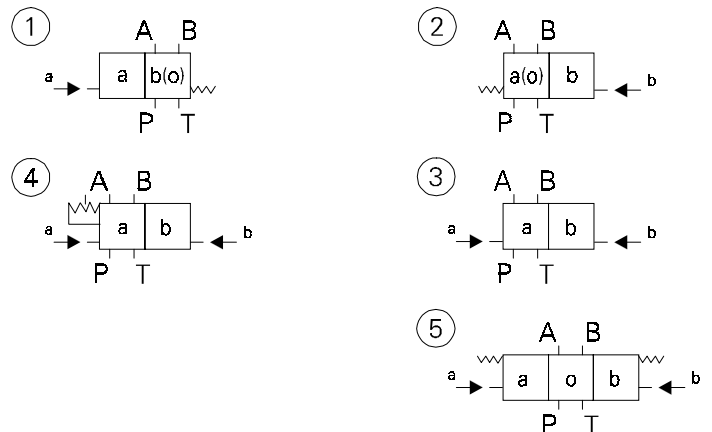
1 - Three - position directional valve
2 - Two - position directional valve, spring centered
3 - Two - position directional valve without return springs
4 - Two - position directional valve with detent

WK 450 770

Schemes for control spools

			A
			C
			D
			B
			Y
			A.../ 0 ; A.../ 0F
			C.../ 0 ; C.../ 0F
Two-position			D.../ 0 ; D.../ 0F
Three-position			E
			F
			G
			H
			J
			L
			M
			P
			Q
			R
			T
			U
			V
			W

HOW TO ORDER

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

```
           ┌────┬──────┬────┬────┬────┬────┬────┐
           │    │ WH 10│    │ 50╱│    │    │ *  │
           └────┴──────┴────┴────┴────┴────┴────┘
```

Number of service ports
3   = 3
4   = 4

Control spool type
See schemes on page 4

Series number:
50   = 50
(50 - 59) - Installation and connection
dimensions unchanged

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

Throttle insert
Without throttle insert   = with no code
Throttle insert ⌀ 0.8 mm   = B08
Throttle insert ⌀ 1.0 mm   = B10
Throttle insert ⌀ 1.2 mm   = B12
Throttle insert ⌀ 3.0 mm   = B30

Control spool positioning
Spring centering   = with no designation
Without return springs   = O
Without return springs, with detent   = OF

Coding example : 4 WH 10E 50/B10

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MOUNTING DIMENSIONS FOR SUBPLATE
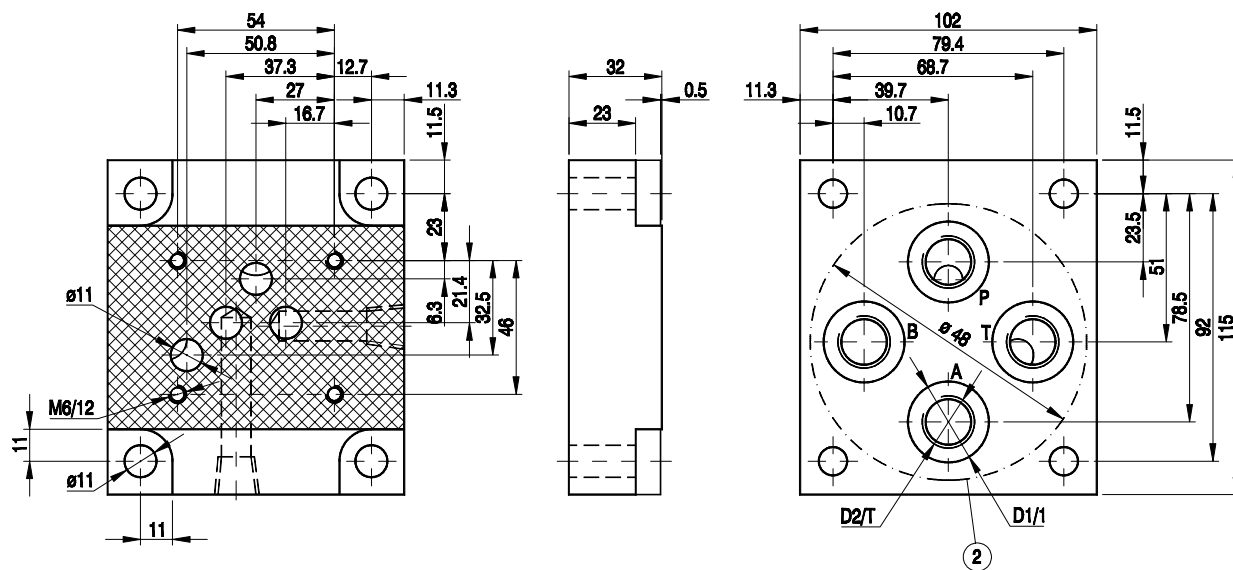
Subplate type	D1	D2	T	Weight	Mounting bolts	Md
G 89/01	25	G 1/4	12			
G 66/01	28	G 3/8	12	2.3 kg	4 x M6 x 50 - 10.9 PN-87/M-82302 (DIN 912)	15 Nm
G 67/01	34	G 1/2	14			
G 67/02	36	M22x1.5	17			

Note : Subplate and mounting bolts must be ordered separately

WK 450 770