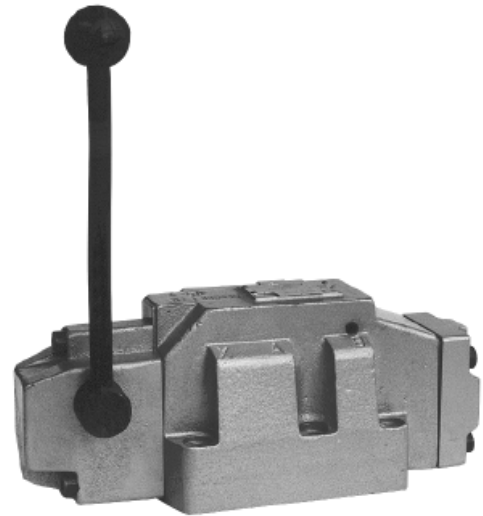
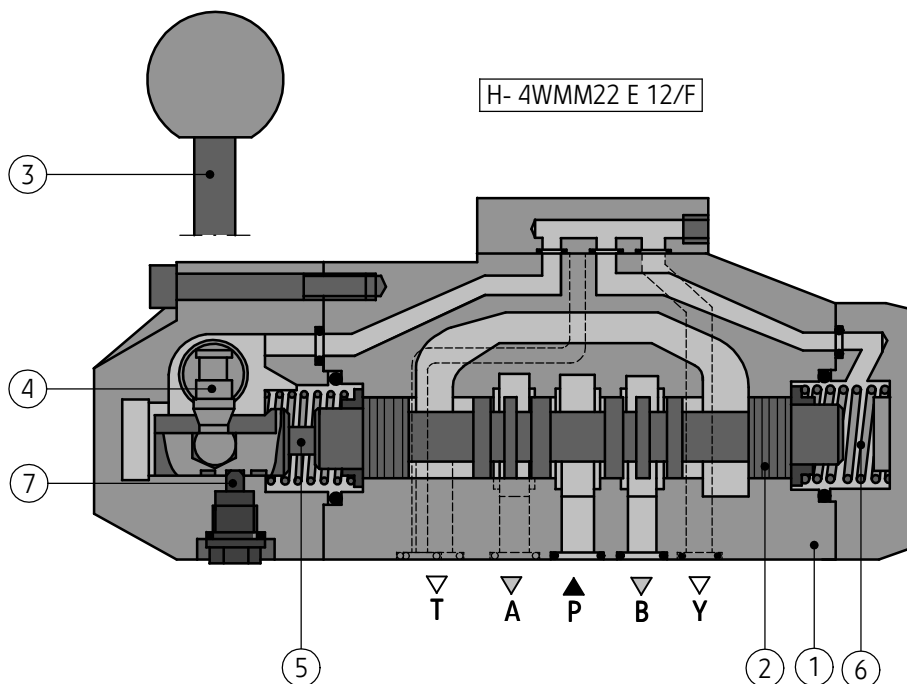


APPLICATION

Directional spool valves type **WMM22...** hand lever operated are intended for change in direction of fluid flow in a system and thus it allows to change direction of movement of a receiver - mostly piston rod of a cylinder or hydraulic motor as well to use functions: *on* and *off*. These directional spool valves are used for subplate mounting in any position in a hydraulic system.



DESCRIPTION OF OPERATION



Annular ports are made around the longitudinal bore in the housing (1) and connected to its cavity. Directional valve is switched by shifting the spool (2) into one end position. Various control functions result directly from the shape of the spool (2) which affects the change in configuration of the connections between ports **P**, **T**, **A** and **B** in the housing (1). Mating surfaces between the valve and a subplate are sealed with rings. Movement of the spool (2) is caused by a

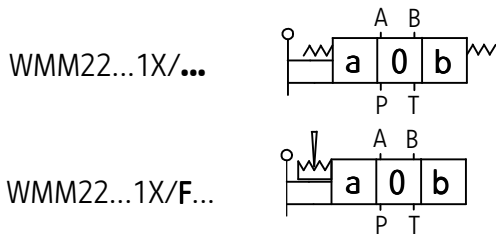
change in position of the hand lever (3) by means of the pin (4) and the plunger (5). The spool return into rest position is caused by the springs (6) – versions **WMM22.../...** or by spool positioning which is possible by using detent (7) – versions **WMM22.../F**. 3-position directional spool valve can be equipped with the limit switch of spool position control: normally-closed – version **WMM22/...19**, normally-open – version **WMM22/...23**.

TECHNICAL DATA

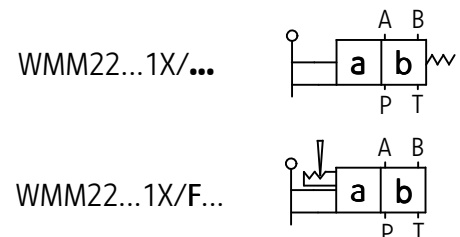
Hydraulic fluid	mineral oil			
Required filtration	up to 16 µm			
Recommended filtration	up to 10 µm			
Nominal fluid viscosity	37 mm ² /s at temperature 55 °C			
Viscosity range	2,8 up to 380 mm ² /s			
Fluid temperature range (in a tank)	recommended	40 °C up to 55 °C		
	max	-20 °C up to +70 °C		
Ambient temperature range	-20 °C up to +70 °C			
Maximum operating pressure	ports P, A, B	35 MPa		
	port T	25 MPa		
Flow section in central position schemes on page 3	spool	Q	V	W
	flow section	16 % of nominal flow	16 % of nominal flow	3 % of nominal flow
Operating force	with springs	approx. 110 N		
	with detent	approx. 85 N		
Weight	13 kg			

SCHEMES

Graphic symbols for 3-position directional control valves



Graphic symbols for 2-position directional control valves



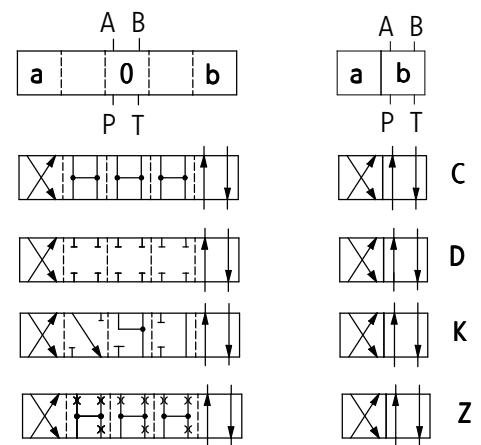
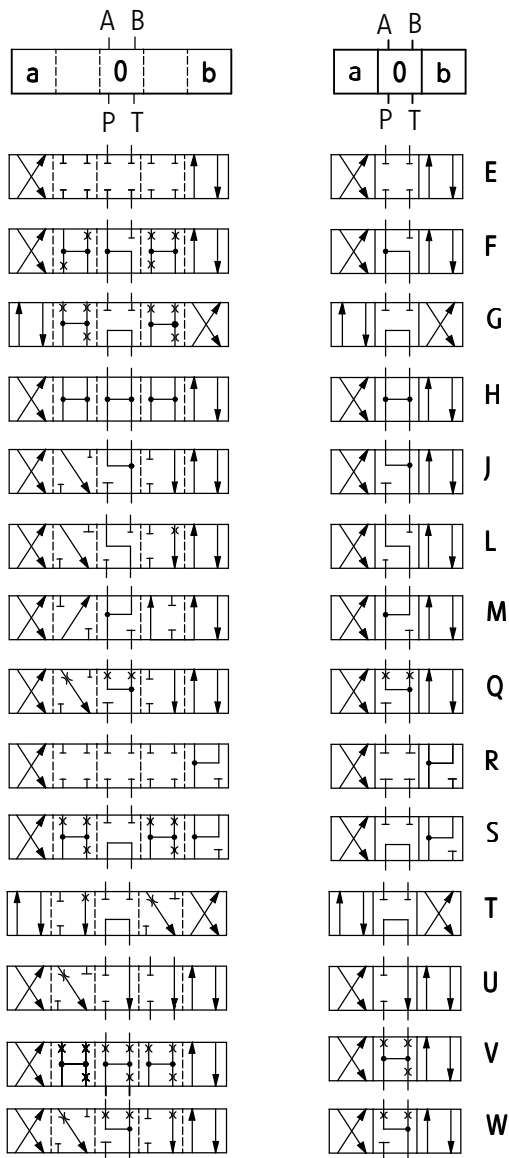
Graphic symbols for spools

working and indirect positions

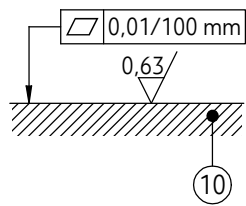
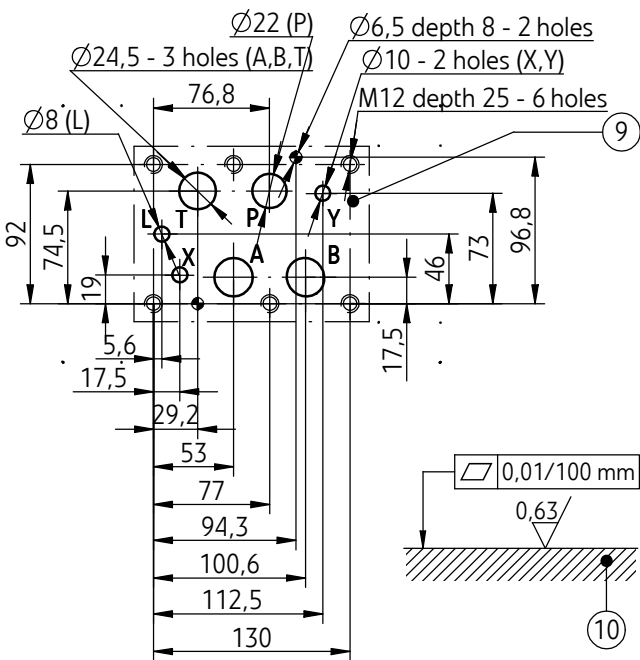
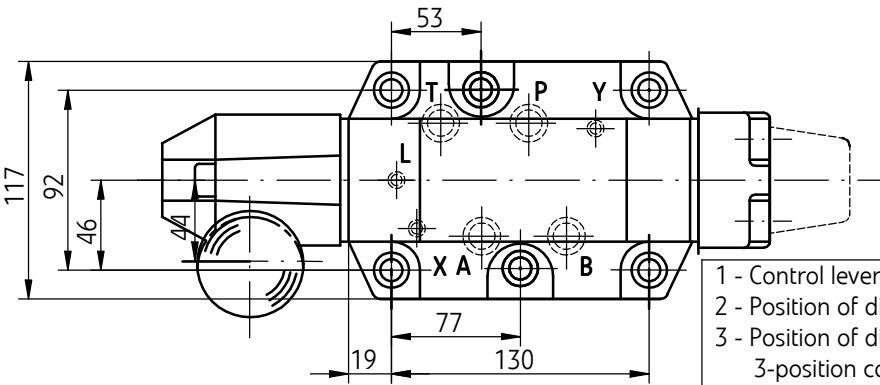
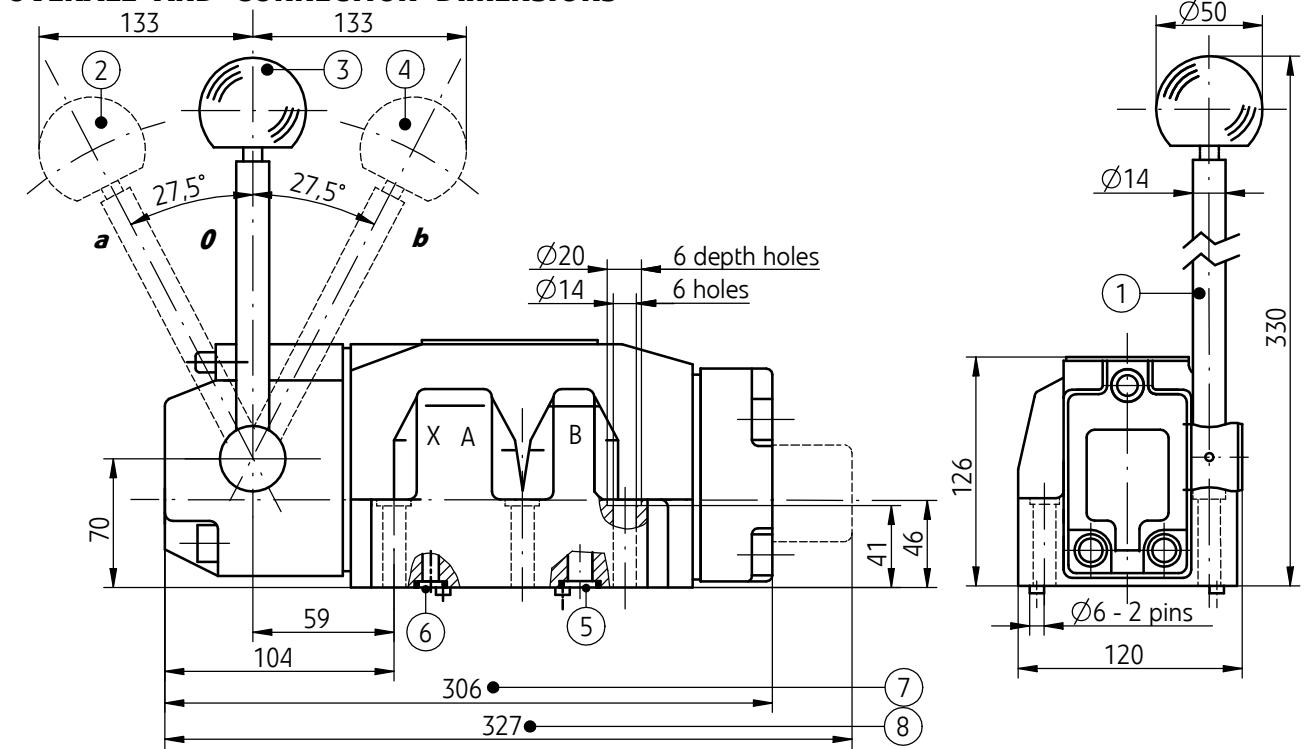
working positions

working and indirect positions

working positions



OVERALL AND CONNECTION DIMENSIONS



- 1 - Control lever
- 2 - Position of directional control valve *a*
- 3 - Position of directional control valve *0* - only for 3-position control valves
- 4 - Position of directional control valve *b*
- 5 - **O-ring 27 x 3** - 4 pcs/kit (P, T, A, B)
- 6 - **O-ring 19,2 x 3** - 3 pcs/kit (X, Y, L)
- 7 - Dimension for:
 - **3-position directional control valve, springs centered**
 - **3-position directional control valve, with detent** (spool schemes: E, F, G, H, J, L, M, P, Q, R, T, U, V, W on page 3)
 - **2-position directional control valve, with detent** (spool schemes: C, D, K, Z on page 3)
- 8 - Dimension for:
 - **2-position directional control valve, springs centered** (spool schemes: C, D, K, Z on page 3)
- 9 - Porting pattern - configuration of connections for subplate face in accordance with the following standards:
 - **CETOP RP121H** - identified by **CETOP 4.2-4-08-320** (nominal size **CETOP 08**)
 - **ISO 4401** - identified by **ISO 4401- 08-07-0-94**
- mounting bolts **M12 x 60 -10.9** in accordance with **PN -EN ISO 4762-** 6 pcs/kit
tightening torque **Md = 105 Nm**
- 10 - Subplate surface required

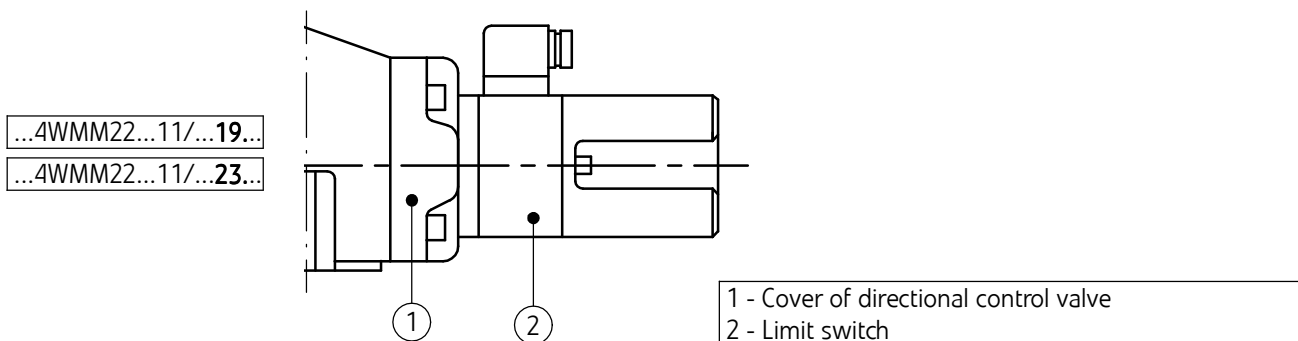
ACCESSORIES

Limit switch

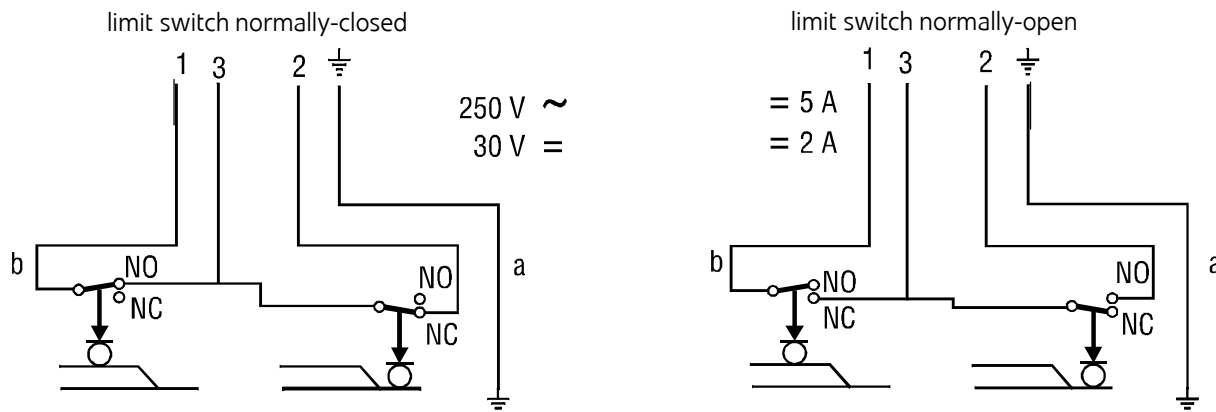
(applicable only to 3-position directional control valves)

Versions with limit switch:

- limit switch normally-closed - version ...4WMM22...11/...19...
- limit switch normally-closed - version ...4WMM22...11/...23...



Electrical scheme for limit switch

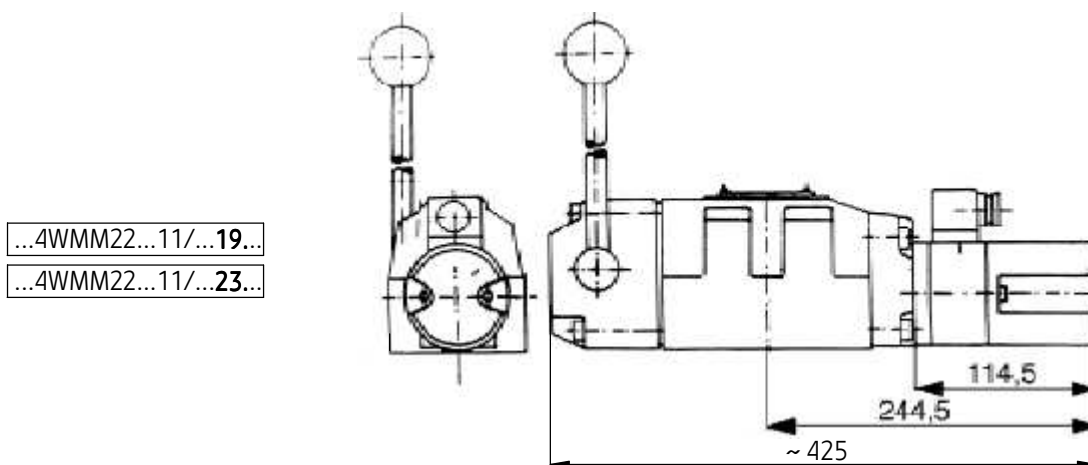


OVERALL AND CONNECTION DIMENSIONS

Versions with limit switch

3-position directional control valves - versions:

- 4WMM22...11/...19...
- 4WMM22...11/...23...



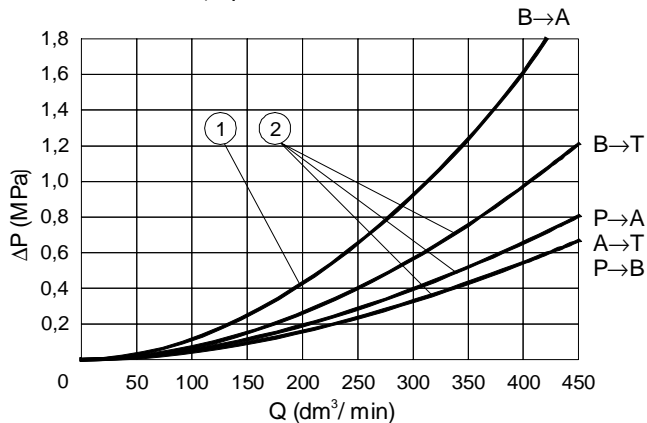
PERFORMANCE CURVES

measured at viscosity $\nu = 41 \text{ mm}^2/\text{s}$ and temperature $t = 50^\circ\text{C}$

Flow curves

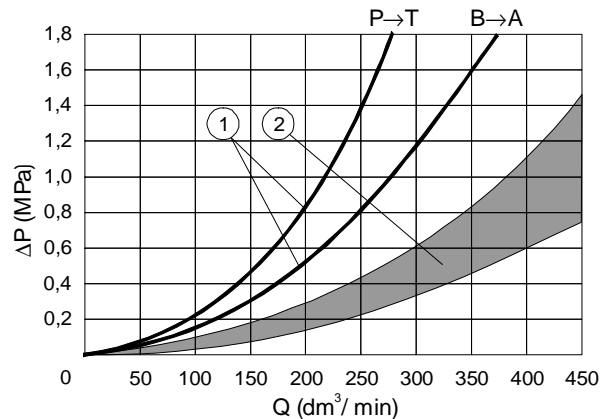
Flow curves $\Delta p(Q)$ for ...WMM22...
with spools **E** and **R**

- 1 - spool **R** - flow direction **B** → **A**
2 - tłoczki: **E, R, W**

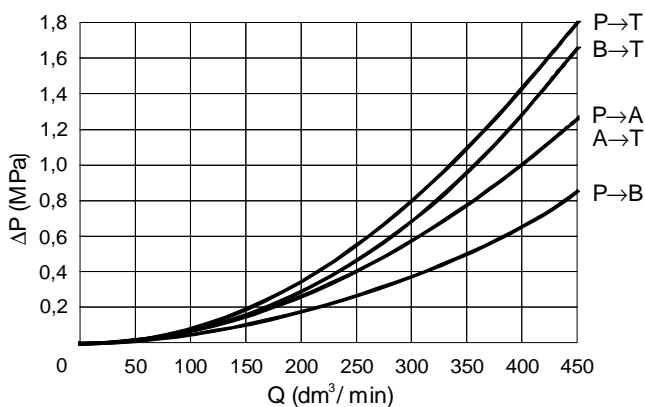


Flow curves $\Delta p(Q)$ for ...WMM22...
with spools: **F, H, J, L, M, Q, S, U, V, W, C, D, K, Z**

- 1 - tłoczek **S**
2 - tłoczki: **F, H, J, L, M, Q, U, V, W, C, D, K, Z**



Flow curves $\Delta p(Q)$ for ...WMM22...
with spools **G** and **T**



Flow limits

2 and 3-position directional control valves, springs centered

spool type	pressure p [MPa]				
	7	14	21	28	35
	flow Q [dm ³ /min]				
E, J, L, M, Q, R, U, V, W	450	450	370	320	300
G, H, S, T, F, C, D, K, Z	265	190	155	135	120

2 and 3-position directional control valves with detent

spool type	pressure p [MPa]				
	7	14	21	28	35
	flow Q [dm ³ /min]				
all spool types	450	450	370	320	320

NOTE:

Above flow limits are related to standard application of 4-way directional control valve using two flow directions, e.g. **P** to **A** and simultaneously **B** to **T**. When 4-way directional control valve with only one flow direction is used, e.g. **P** to **A** (**B** plugged) or **A** to **T** (**B** plugged), then the actual flow limits are considerably lower.

HOW TO ORDER

H	4	WMM	22		/				*
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Version
high pressure up to 35 MPa = **H**

Number of service ports
4 = **4**

Nominal size (NS)
NS22 = **22**

Spool type
spool schemes - on page 3

Series number
 (10-19) - installation and connection dimensions unchanged = 1X
series 12 = **12**

Spool positioning
spring centered = no designation
 with detent = F

Accessories
 (applicable only to 3-position directional spool valves)
without limit switch = no designation
 limit switch - normally-closed = 19
 limit switch - normally-open = 23

Sealing
NBR (for fluids on mineral oil base) = no designation
FKM (for fluids on phosphate ester base) = V

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

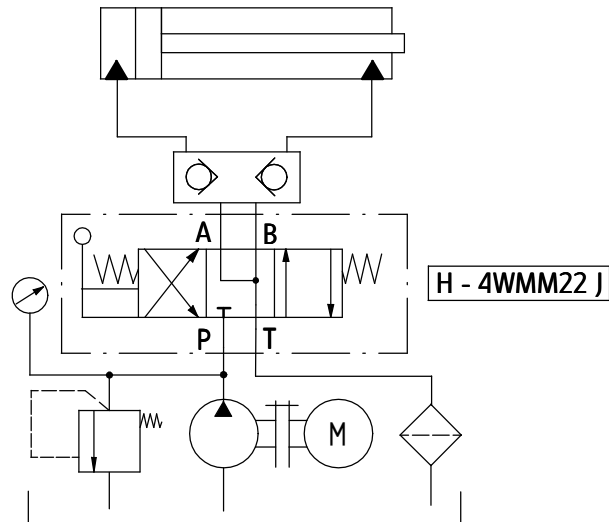
NOTES:

The directional spool valve should be ordered according to the above coding.

The symbols in bold are preferred versions in short delivery time.

Coding example: H -4 WMM22 E12/F

EXAMPLE OF APPLICATION IN HYDRAULIC SYSTEM



SUBPLATES AND MOUNTING BOLTS

Subplates for directional spool valve type **WMM22...** should be ordered according to data sheet **WK 491 800**.
Subplate types:

G151/01 - threaded connections	P, T, A, B - G 1
	X, Y, L - G1/4
G151/02 - threaded connections	P, T, A, B - M33 x 2
	X, Y, L - M14 x 1,5
G154/01 - threaded connections	P, T, A, B - G 1 1/4
	X, Y, L - G1/4
G154/02 - threaded connections	P, T, A, B - M42 x 2
	X, Y, L - M14 x 1,5
G156/01 - threaded connections	P, T, A, B - G 1 1/2
	X, Y, L - G1/4
G156/02 - threaded connections	P, T, A, B - M48 x 2
	X, Y, L - M14 x 1,5

Subplates and bolts mounting directional control valve **M12 x 60 - 10,9** in accordance with **PN - EN ISO 4762** 6 pcs/kit should be ordered separately.
Tightening torque for bolts **Md = 105 Nm**

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