

DATA SHEET - OPERATION MANUAL

APPLICATION

Directional control valves hydraulically operated type **WHG6...**, **WHP6...** are intended for change in direction of fluid flow in a hydraulic 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*. There are available versions with various methods of pilot oil connection:

- hydraulically operated type **WHG6...** - threaded connection of pilot oil
- hydraulically operated type **WHP6...** - subplate connection of pilot oil

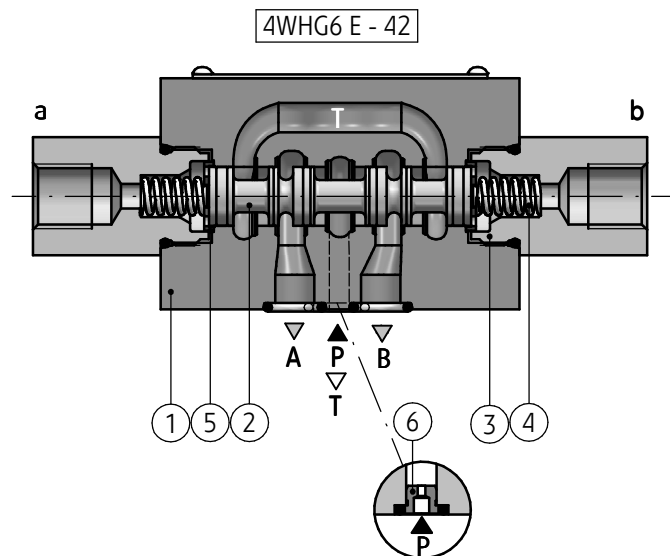
These directional spool valves are used for subplate mounting in any position in a hydraulic system.



DESCRIPTION OF OPERATION

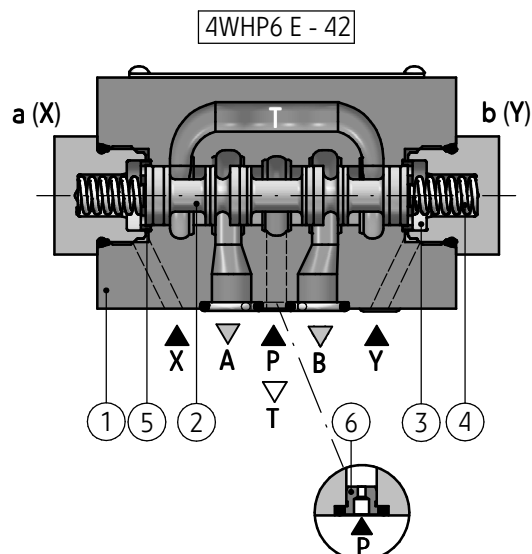
Directional control valve hydraulically operated with threaded pilot oil connection type WHG6..

The spool (2) is shifted after pilot fluid is supplied to the caps connection (3). Return of spool (2) and its centring in zero position (3-position directional control valves) or setting of end positions (2-position directional control valves) follows by means of the springs (4) and centring plates (5) - version WHG6.../... , hydraulically (oil pressure) - version WHG6.../O... or by means of detent - version WHG6.../OF.... In version WHG6.../O... spool position (2) is not set in case of the lack of control pressure. The valve can be equipped with throttle insert (6) mounted in P port version WHG6.../...B.



Directional control valve hydraulically operated with subplate pilot oil connection type WHP6..

The spool (2) is shifted after pilot fluid is supplied to the chambers of caps (3) through ports X and Y from subplate connection. Return of spool (2) and its centring in zero position (3-position directional control valves) or setting of end positions (2-position directional control valves) follows by means of the springs (4) and centring plates (5) - version WHP.../... , hydraulically (oil pressure) - version WHP6.../O... or by means of detent - version WHP6.../OF.... In version WHP6.../O... spool position (2) is not set in case of the lack of control pressure. The valve can be equipped with throttle insert (6) mounted in P port - version WHP6.../...B.



TECHNICAL DATA

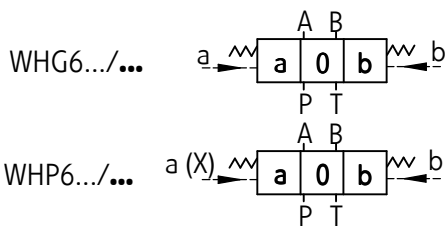
Hydraulic fluid	mineral oil		
Required fluid cleanliness class	ISO 4406 class 20/18/15		
Nominal fluid viscosity	37 mm ² /s at temperature 55 °C		
Viscosity range	2,8 up to 380 mm ² /s		
Fluid temperature range (in a tank)	recommended	40 °C up to 55 °C	
	max	-20 °C up to +70 °C	
Ambient temperature range	- 20 °C up to +70 °C		
Directional valve parameters	type WHG6		type WHP6
Maximum operating pressure	ports P, A, B	35 MPa	ports P, A, B 35 MPa
	port T	21 MPa	port T 21 MPa
Control pressure	min. 2,0 MPa		min. 2,0 MPa
	max. 20 MPa		max. 20 MPa
Weight	1,1 kg	1,0 kg	

INSTALLATION AND OPERATION REQUIREMENTS

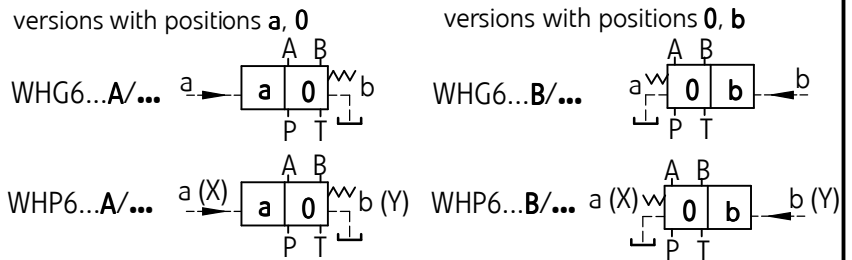
- | | |
|--|--|
| <ol style="list-style-type: none"> Only fully functional and operational directional valve can be used. During the operation one must maintain the recommended fluid viscosity acc. to requirements defined in this Data Sheet - Operation Manual. In order to provide failure-free and safe operation of the directional valve, one should systematically check: <ul style="list-style-type: none"> proper working of the valve cleanliness of the hydraulic fluid Due to heating of the directional valve body to high temperature, the directional valve should be placed in such a way to eliminate the risk of | <ol style="list-style-type: none"> accidental contact with the directional valve body during operation or one should provide suitable covers compliant with the requirements of European standards: PN - EN ISO 13732 - 1 and PN - EN 4413. In order to provide tightness of the valve connection to the hydraulic system, one should keep the dimensions of the sealing rings, tightening torques and directional valve operation parameters specified in this Data Sheet - Operation Manual. A person operating the valve must be thoroughly familiar with the content of this Data Sheet - Operation Manual. |
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DIAGRAMS

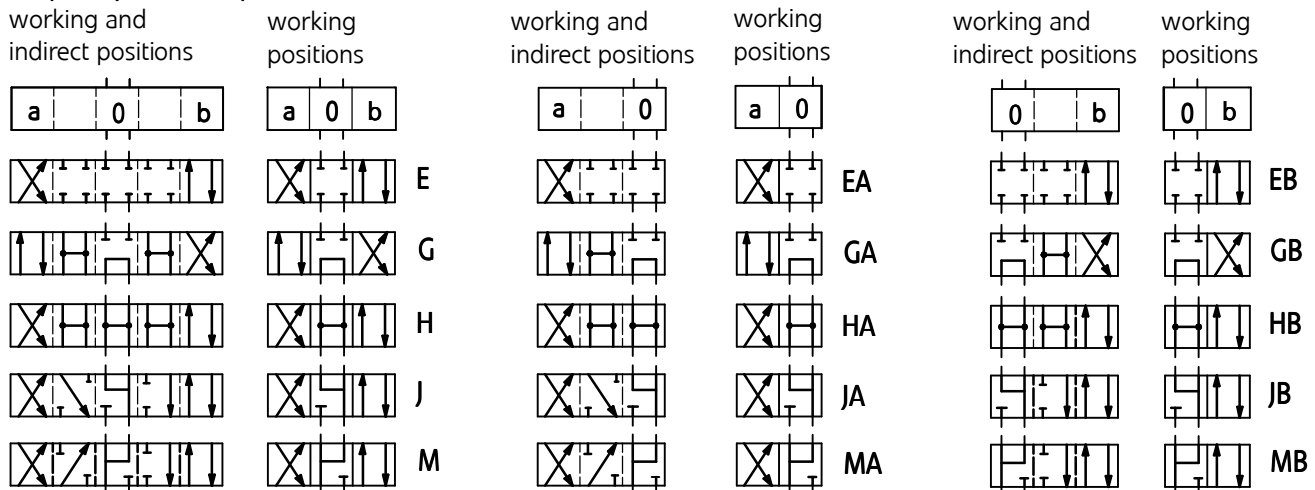
Graphic symbols of 3-position directional control valves



Graphic symbols of 2-position directional control valves



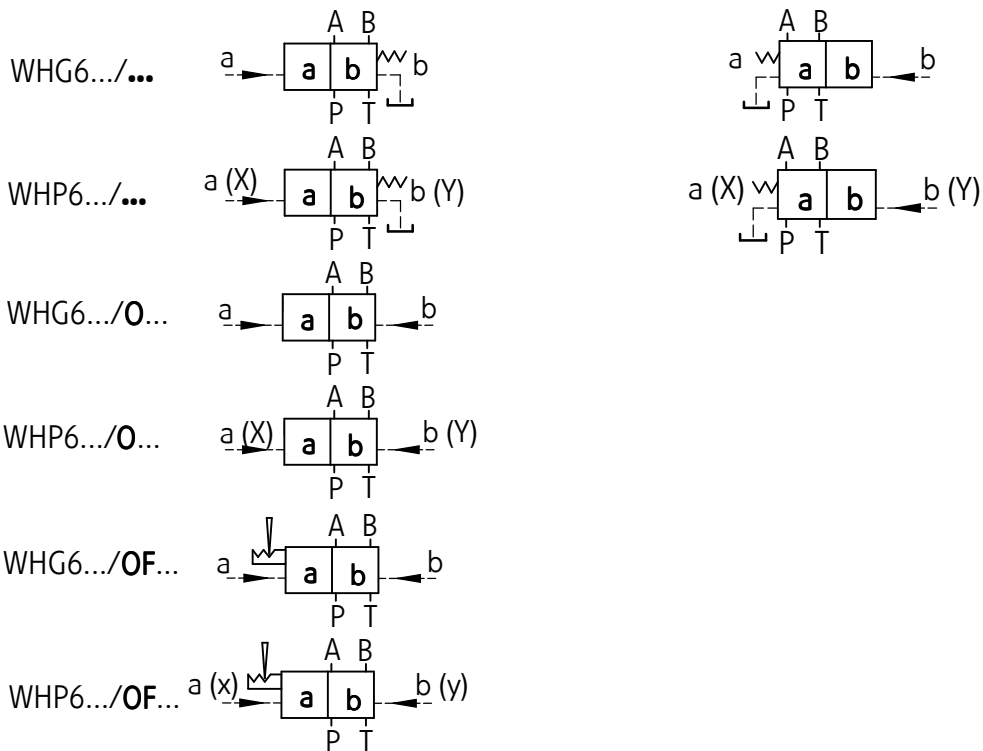
Graphic symbols of spools



DIAGRAMS

Graphic symbols of 2-position directional control valves

versions with positions a, b



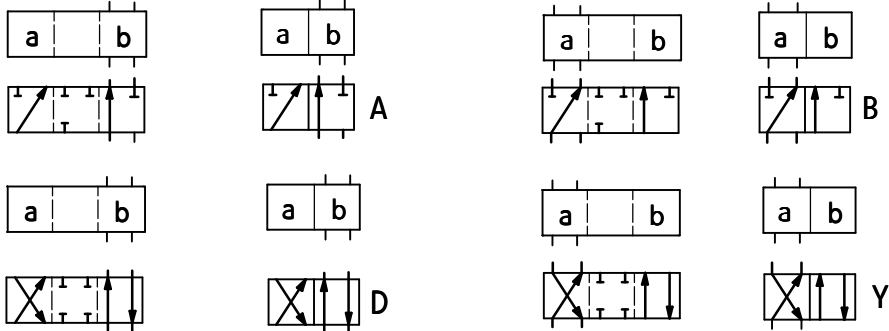
Graphic symbols of spools

working and indirect positions

working positions

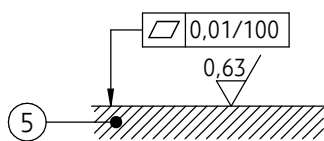
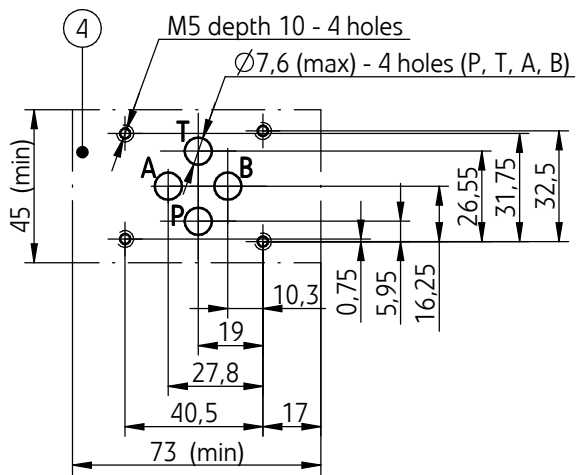
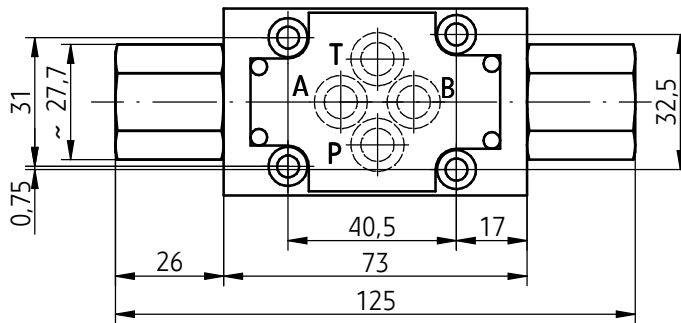
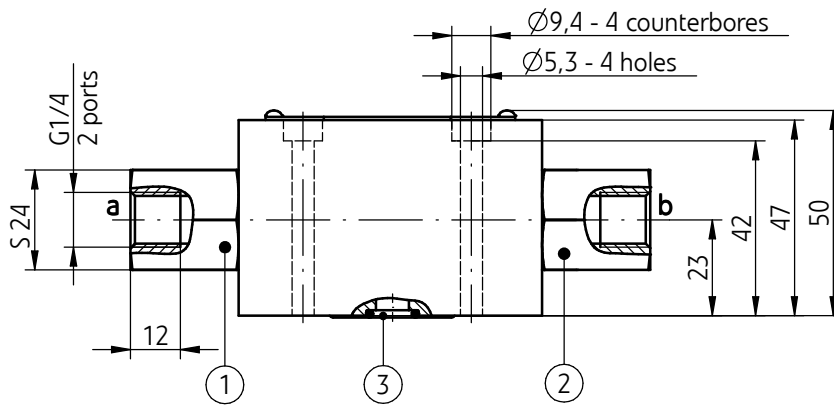
working and indirect positions

working positions



OVERALL AND CONNECTION DIMENSIONS

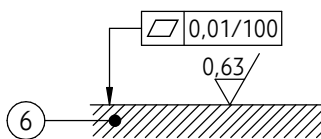
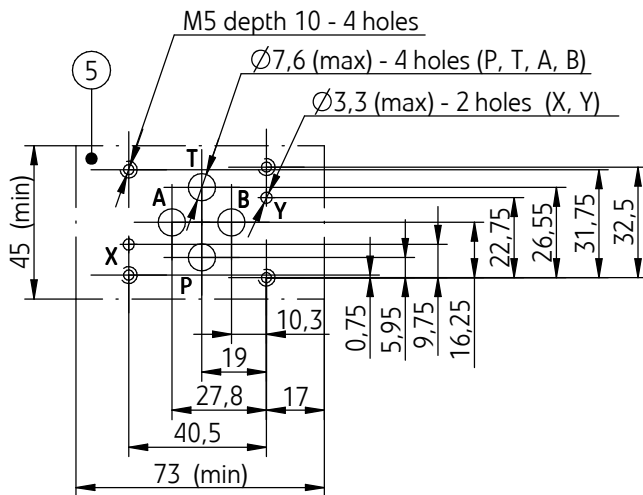
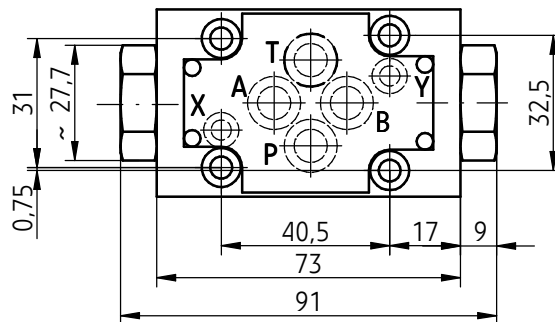
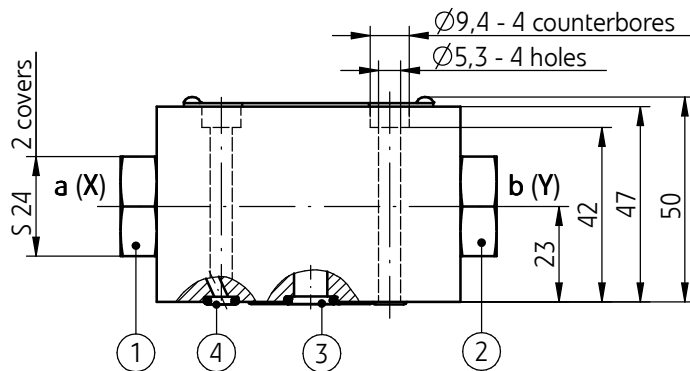
type WHG6...



- 1 - Cover with control port **a**
- 2 - Cover with control port **b**
- 3 - Sealing ring **o-ring 9,2 x 1,8** - pcs 4/set
- 4 - Porting pattern of the subplate surface compliant with **ISO 4401** standard designation **ISO 4401-03-02-0-94** (CETOP 03); fixing screws **M5 x 50 -10.9** acc. to **PN - EN ISO 4762** pcs 4/set; tightening torque **Md = 9 Nm**
- 5 - Subplate surface required

OVERALL AND CONNECTION DIMENSIONS

type WHP6...



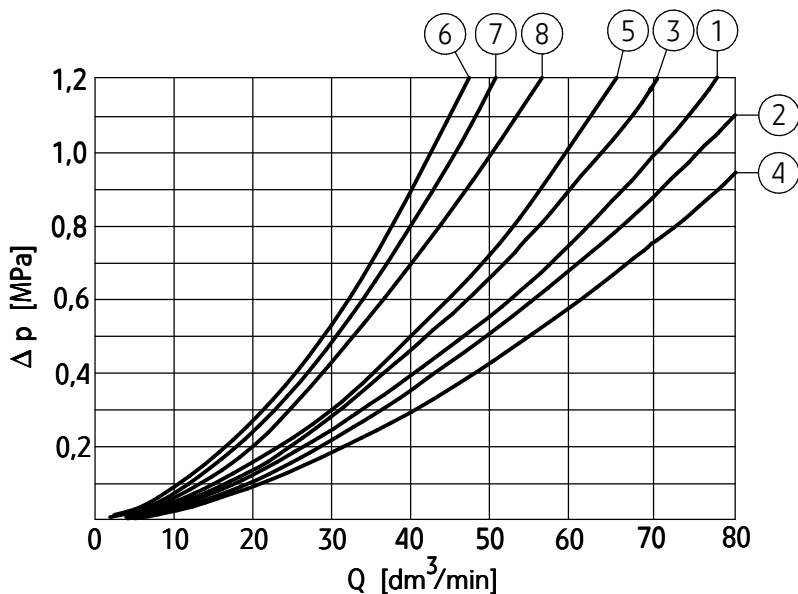
- 1 - Cover with chamber of control connection X (side a)
- 2 - Cover with chamber of control connection Y (side b)
- 3 - Sealing ring o-ring 9,2 x 1,8 - pcs 4/set
- 4 - Sealing ring o-ring 4,87 x 1,8 - pcs 2/set
- 5 - Porting pattern of the subplate surface compliant with ISO 4401 standard designation ISO 4401-03-02-0-94 (CETOP 03); fixing screws M5 x 50 -10.9 acc. to PN - EN ISO 4762 pcs 4/set; tightening torque Md = 9 Nm
- 6 - Subplate surface required

PERFORMANCE CURVES

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

Flow resistance curves

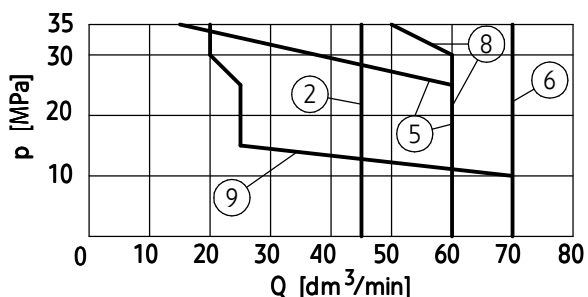
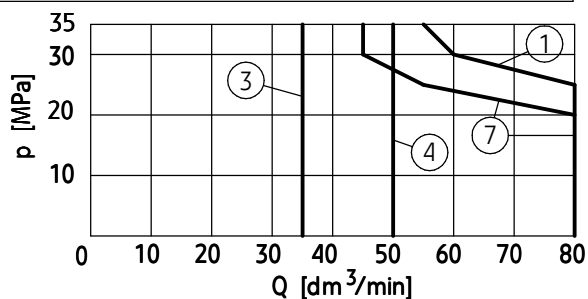
characteristic curves $\Delta p(Q)$ for directional valves type WHG6..., WHP6... in versions with various spool types



spool symbol	performance diagram number			
	flow direction			
shifted positions diagrams according to pages 2, 3	P → A	P → B	A → T	B → T
	A, B	3	3	-
D, Y	5	5	3	3
E	3	3	1	1
G	7	7	6	6
H	2	4	2	2
J	1	1	2	1
M	2	4	3	3
central position diagram according to page 2	flow direction			
	P → A P → B	P → T	A → T B → T	B → A
G	-	8	-	-

Operating limits

characteristic curves $p - Q$ for directional valves type WHG6..., WHP6... in versions with various spool types



spool symbol - diagrams according to pages 2, 3	performance diagram number
E	1
D/OF	2
D/O	3
D, Y	4
A, B	5
J	6
G	7
M	8
H	9

NOTE:

Above operating limits are reached by minimal operating pressure $p = 2 \text{ MPa}$ and symmetrical flow through all ports i.e. if the oil flows from port P to port A, then the same oil amount flows from port B to port T. Degree of asymmetry has negative impact on the parameters.

HOW TO ORDER

		6	+	/			*
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Number of flow ways

3 - way (only versions with spools A and B) = **3**

4 - way (versions with remaining spools) = **4**

Directional valve type

threaded pilot oil connection = **WHG**

subplate pilot oil connection = **WHP**

Nominal size (NS)

NS6 = **6**

Spool symbol

spool diagrams - according to **pages 2, 3**

Series number

(40-49) - connection and installation dimensions unchanged = 4X

series 42 = **42**

Spool centering/positioning

spring centering = **no designation**

without return springs = 0

without return springs with detent = OF

Throttle insert (mounted in port P)

without throttle insert = **no designation**

throttle insert ϕ 0,8 = B 08

throttle insert ϕ 1,0 = B 10

throttle insert ϕ 1,2 = B 12

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 valves should be ordered according to the above coding.

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

Coding example: 4WHG6 E - 42

SUBPLATES AND FIXING SCREWS

Subplates must be ordered according to catalogue sheet **WK 496 480**. Subplate symbols:

G 341/01 - threaded connections G 1/4

G 342/01 - threaded connections **G 3/8**

G 502/01 - threaded connections G 1/2

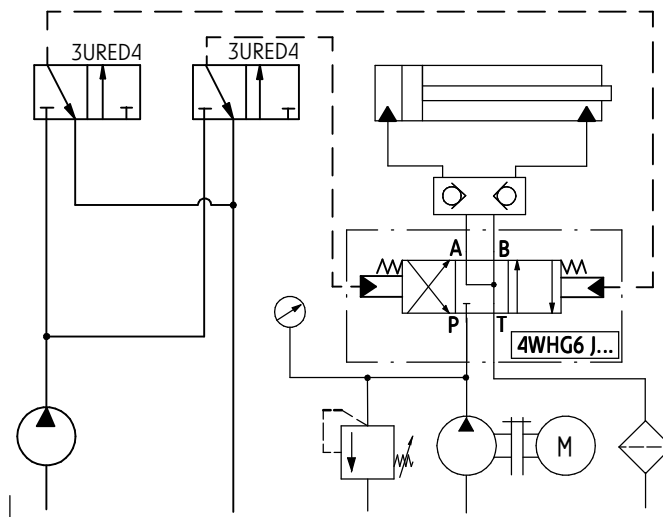
G 341/02 - threaded connections M14 x 1,5

G 342/02 - threaded connections M16 x 1,5

The subplate symbol in bold is the preferred version available in short delivery time.

Subplates and fixing screws **M5 x 50 - 10,9** according to **PN - EN ISO 4762** - pcs 4/set must be ordered separately.
Tightening torque **Md = 9 Nm**

EXAMPLE OF APPLICATION IN A HYDRAULIC SYSTEM



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