



Directional spool valve type UREP10 electro-hydraulically operated

**WK
 421 610**

NS10

up to 31,5 MPa up to 150 dm³/min

05.2012

DATA SHEET - SERVICE MANUAL

APPLICATION

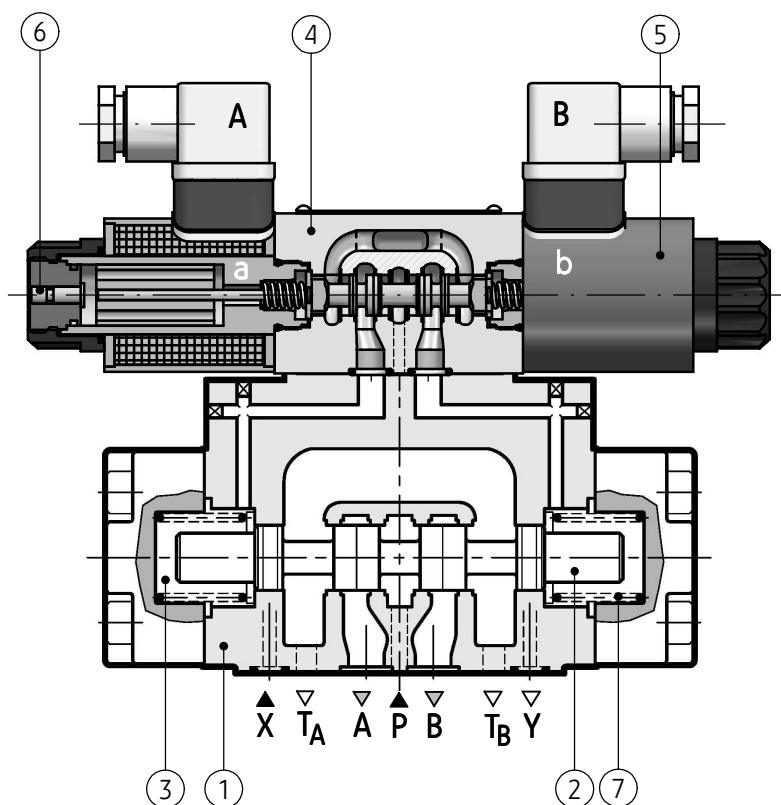
Directional spool valves type UREP10... electro-hydraulically operated are intended for change in direction of fluid flow in a system and thus it allows to change direction of movement of a receiver - mostly piston rod of a cylinder or hydraulic motor as well to use functions: *on* and *off*. These directional spool valves are used for subplate mounting in any position in a hydraulic system.

The directional spool valve type UREP10... is complied with the regulations of directive 2006/95/WE for the following voltages:

- 50 – 250 V for AC
- 75 – 250 V for DC

DESCRIPTION OF OPERATION

4UREP10 E 02/G24 N ET Z4

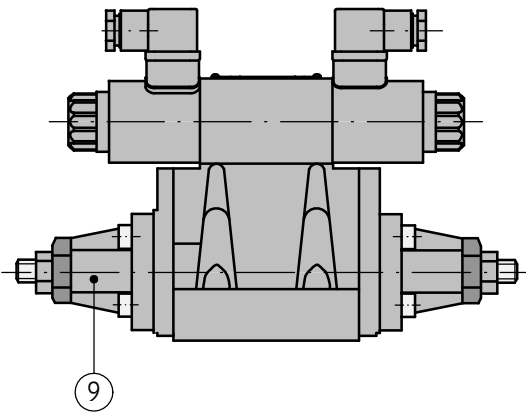


Main bore and annular ports **P, T, A, B** are made in the housing (1) and connected to its subplate connection. Directional valve is switched by shifting the spool (2) into one end position. Various control functions are dependent on the spool (2) which affects the change in configuration of connections among ports **P, T, A, B** in the housing (1). The spool (2) is shifted from its neutral

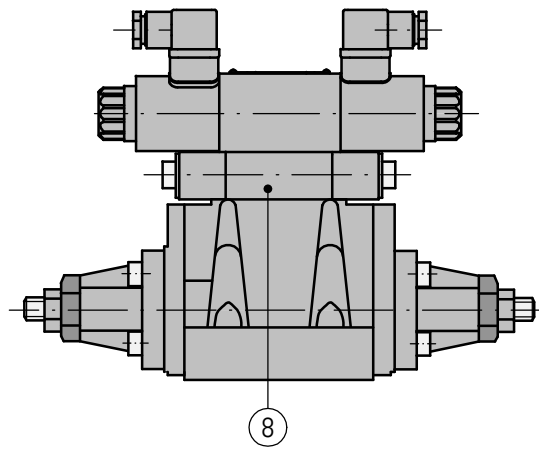
position by affecting pressure of hydraulic fluid supplied via pilot valve (4) into one chamber of caps (3). The pilot valve (4) – type **WE6...** is operated by means of solenoids (5). The spool (2) is centered in neutral position by means of springs (7). In case of failure, the pilot valve (4) may be shifted manually by means of manual overrides (6) – version UREP10.../...N.

DESCRIPTION OF OPERATION

...UREP10.../...10...



...UREP10.../...S...10...



Directional spool valves type **UREP10...** may be provided with the pilot choke adjustment (8) as well as with accessories such as: spool stroke limiter (9) or or both

optional accessories. Detailed information concerning depending on version of directional valve with accessories given on page 9-10.

TECHNICAL DATA

Hydraulic fluid	
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 +50 °C
Max operating pressure	
<u>Ports A, B, P</u>	31, 5 MPa
<u>Port T</u>	
• pilot fluid return Y- external	25 MPa
• pilot fluid return Y- internal	21 MPa
Max control pressure	21 MPa
Min control pressure	0,5 MPa

TECHNICAL DATA

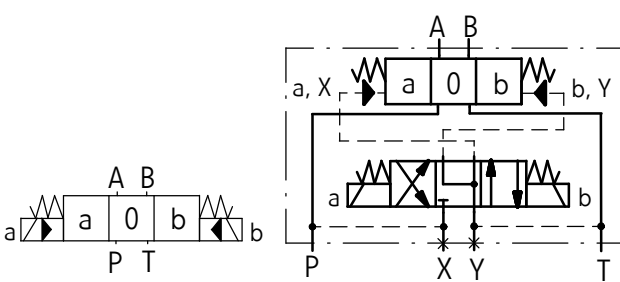
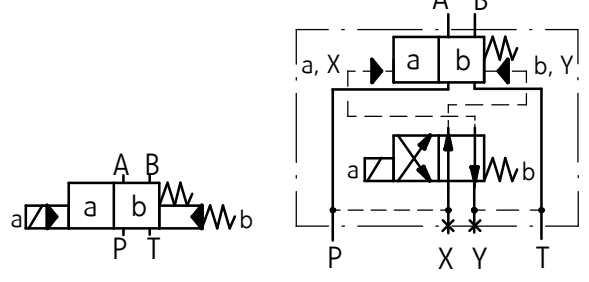
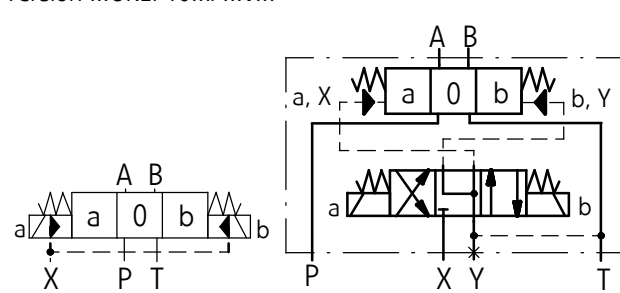
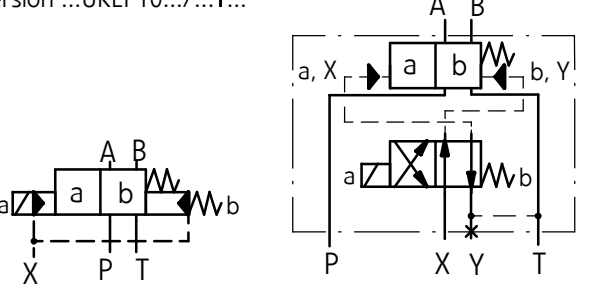
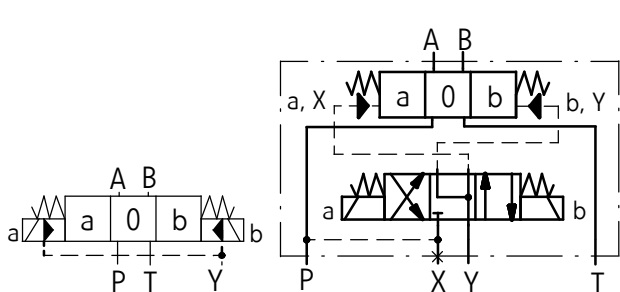
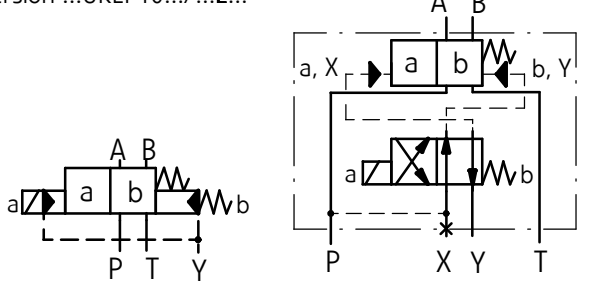
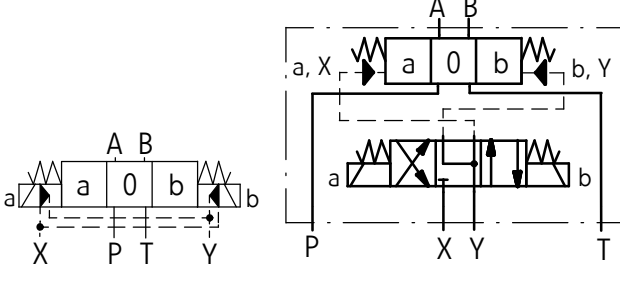
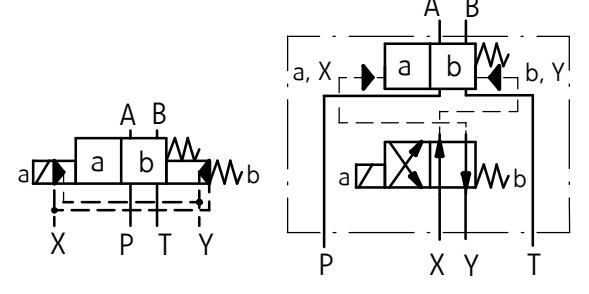
Total time of spool shifting from neutral to end position						
<ul style="list-style-type: none"> • 3-position directional valve (springs centered) at pilot pressure $p_{st} = 10 \text{ MPa}$ 		40 ms $\pm 10\%$				
<ul style="list-style-type: none"> • 2-position directional valve (spring positioned) at pilot pressure $p_{st} = 10 \text{ MPa}$ 		50 ms $\pm 10\%$				
Total time of spool shifting from end to neutral position						
<ul style="list-style-type: none"> • 3-position directional valve (springs centered) at pilot pressure $p_{st} = 10 \text{ MPa}$ 		50 ms $\pm 10\%$				
<ul style="list-style-type: none"> • 2-position directional valve (spring positioned) at pilot pressure $p_{st} = 10 \text{ MPa}$ 		60 ms $\pm 10\%$				
Pilot valve						
Type of pilot valve						
<ul style="list-style-type: none"> • for 3-position directional valve (springs centered) 		4WE6 J ...				
<ul style="list-style-type: none"> • for 2-position directional valve e (spring positioned) 		4WE6 Y ...				
Nominal supply voltage for solenoids		DC			AC (plug-in connector with rectifier)	
		12V	24V	110V	230V - 50Hz	110V - 50Hz
Supply voltage tolerance		$\pm 10\%$				
Power requirement (DC)		30 W				
Insulation		IP 65				
Temperature of solenoid coil		max 150 °C				
Weight		with z 1 solenoid			with 2 solenoids	
		6,4 kg			7 kg	

ASSEMBLY AND APPLICATION REQUIREMENTS

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Only valve working properly and suitably installed may be connected to an electric system. Only skilled workers are allowed to connect and disconnect electric system. 2. Ground connection (⏏) must be connected with protective earth wire ($\text{PE } \text{⏏}$) in supply system according to appropriate instructions. 3. It is forbidden to apply directional spool valve if the supply cable in the gland of plug-in-connector is not properly tightened. | <ol style="list-style-type: none"> 4. It is forbidden to apply directional spool valve if the plug-in-connector is not properly tightened to the solenoid socket and is not secured by screwing bolt tightly. 5. Due to heating solenoid coils, directional spool valves should be placed in order to eliminate the possibility of incidental touch while using, or, they should be equipped with the coil covers (in accordance with the European standards PN - EN ISO 13732-1 and PN - EN 982). |
|---|--|

SCHEMES

Simplified and detailed hydraulic schemes for directional valves with various pilot supply (X) and pilot drain (Y)

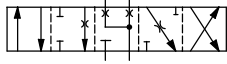
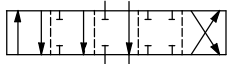
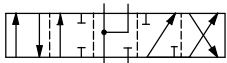
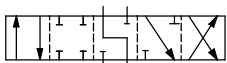
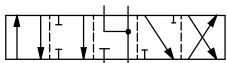
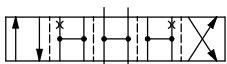
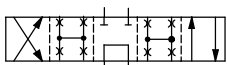
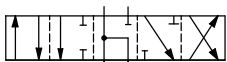
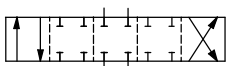
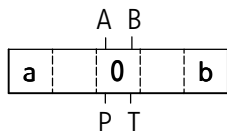
<p>3-position directional valves with springs centered spool at 0 position (spool schemes: E, F, G, H, J, L, M, U, W)</p>	<p>2-position directional valves with spring positioned spool (spool schemes: C, D)</p>
<p>internal supply X ; internal drain Y version ...UREP10.../...ET...</p> 	<p>internal supply X ; internal drain Y version ...UREP10.../...ET...</p> 
<p>external supply X ; internal drain Y version ...UREP10.../...T...</p> 	<p>external supply X ; internal drain Y version ...UREP10.../...T...</p> 
<p>internal supply X ; external drain Y version ...UREP10.../...E...</p> 	<p>internal supply X ; external drain Y version ...UREP10.../...E...</p> 
<p>external supply X ; external drain Y version ...UREP10.../...</p> 	<p>external supply X ; external drain Y version ...UREP10.../...</p> 

SCHEMES

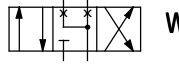
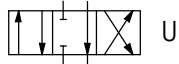
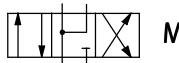
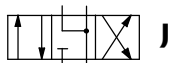
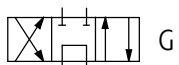
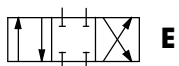
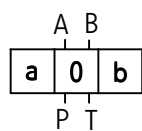
Graphic symbols for spools

3-position

working and indirect positions

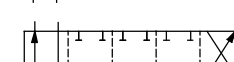
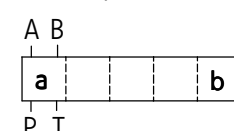


working positions

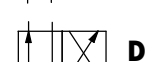
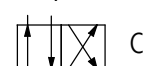
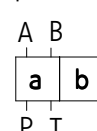


2-position

working and indirect positions



working positions



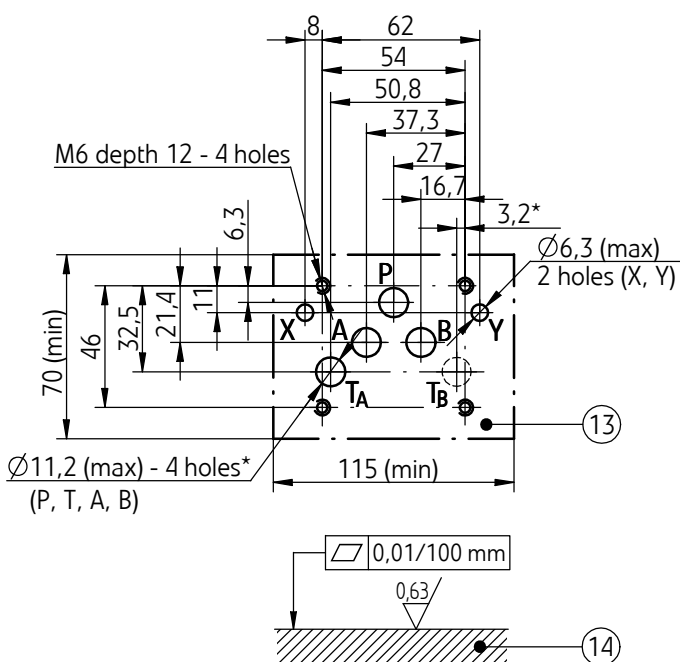
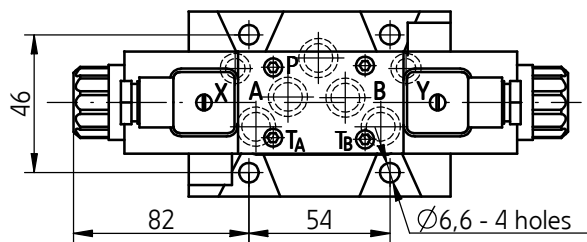
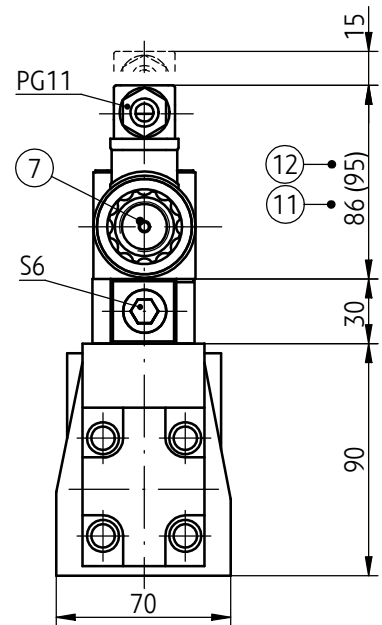
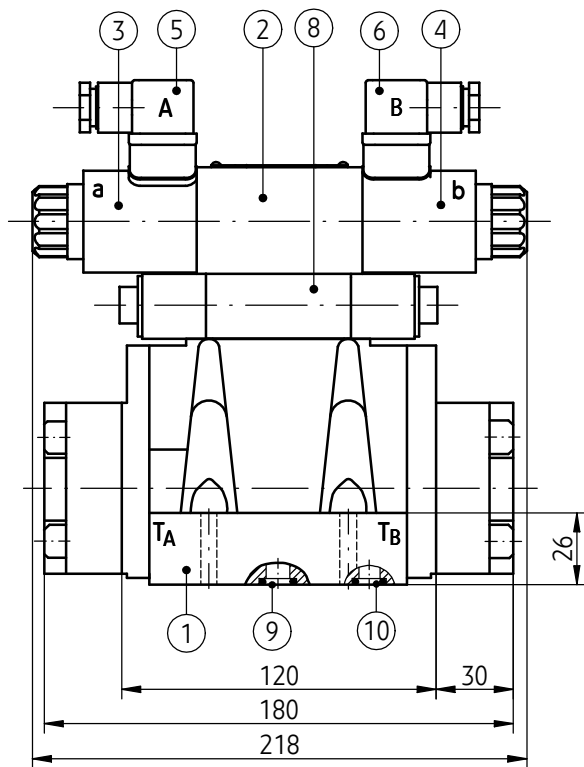
NOTES:

For **3-position directional control valves**, the position of directional control valve is executed by individual spools acc. to schemes of connections, constituting **reflection of schemes** presented above is obtained by **alternative connection of plugs** for suitable solenoid coils of preliminary directional valve.

The spools type in bold are preferred versions in short delivery time.

OVERALL AND CONNECTION DIMENSIONS

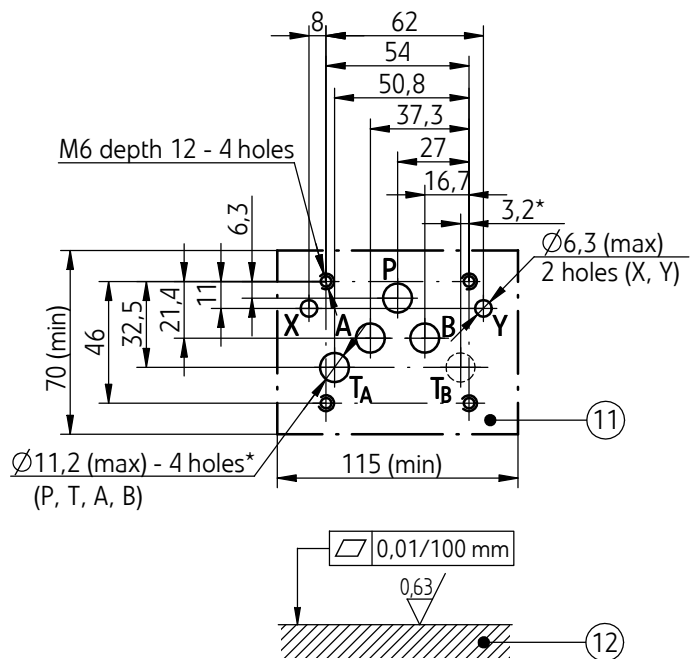
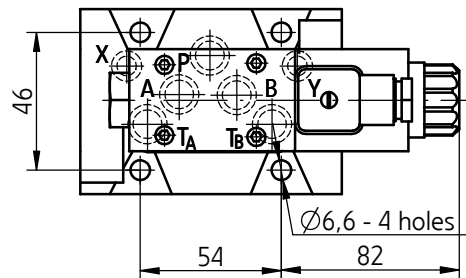
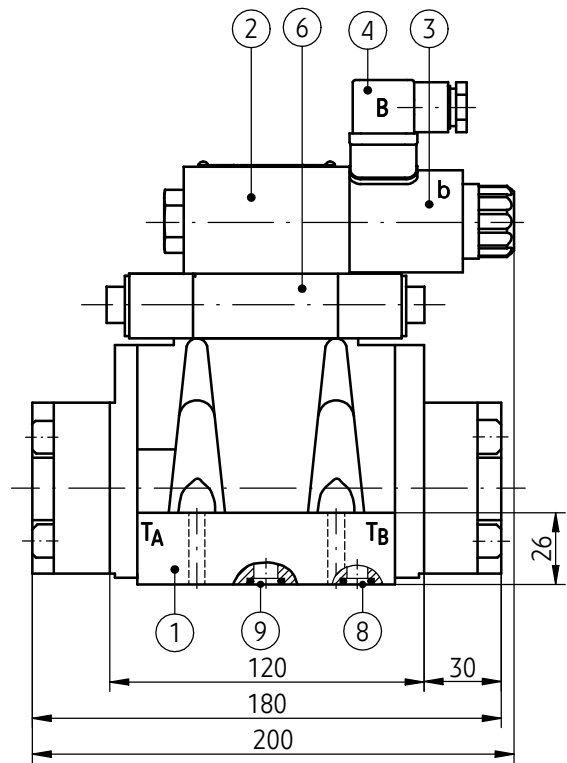
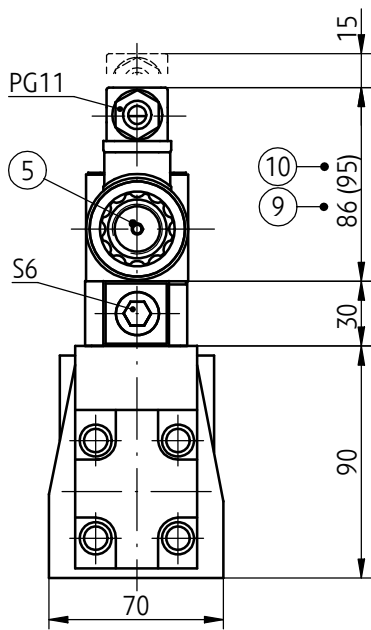
3-position versions springs centered



- 1 - **3-position** main directional valve (spool schemes: E, F, G, H, J, L, M, U, W - on page 5)
 - 2 - **3-position** directional valve (pilot valve) type **WE6**...
 - 3 - Solenoid **a**
 - 4 - Solenoid **b**
 - 5 - Plug-in-connector **A** - ISO 4400 (DIN 43650 - A)
 - 6 - Plug-in-connector **B** - ISO 4400 (DIN 43650 - A)
 - 7 - Manual override
 - 8 - Pilot choke adjustment (optional accessories)
 - 9 - Sealing ring **o-ring 12,42 x 1,78** - 5 pcs/kit (P, TA, TB, A, B)
 - 10 - Sealing ring **o-ring 9,25 x 1,78** - 2 pcs/kit (X, Y)
 - 11 - Dimension for electrical connection for **DC**
 - 12 - Dimension for electrical connection for **AC** (plug-in-connector with rectifier)
 - 13 - Porting pattern - configuration of surface holes in subplate in accordance with the following standards:
 - **CETOP RP 121H** - identified by **CETOP 4.2-4-R05** (nominal size **CETOP 05**)
 - **ISO 4401** - identified by **ISO 4401-05-05-0-05** mounting bolts **M6 x 35 - 10.9** in accordance with **PN - EN ISO 4762** - 4 pcs/kit tightening torque **Md = 15 Nm**
- NOTE:**
 (*) - It is sufficient connections with only one hole T from side port **A** or **B** - the port **TA** and **TB** are together connected by channel in housing of directional valve
- 14 - Subplate surface required

OVERALL AND CONNECTION DIMENSIONS

2-position versions spring positioned



- 1 - **2-position** main directional valve (spool schemes: C, D - on page 5)
 - 2 - **2-position** directional valve (pilot valve) type WE6Y...
 - 3 - Solenoid **b**
 - 4 - Plug-in-connector **B** - ISO 4400 (DIN 43650 - A)
 - 5 - Manual override
 - 6 - Pilot choke adjustment (optional accessories)
 - 7 - Sealing ring **o-ring 12,42 x 1,78** - 5 pcs/kit (P, T_A, T_B, A, B)
 - 8 - Sealing ring **o-ring 9,25 x 1,78** - 2 pcs/kit (X, Y)
 - 9 - Dimension for electrical connection for **DC**
 - 10 - Dimension for electrical connection for **AC** (plug-in-connector with rectifier)
 - 11 - Porting pattern - configuration of surface holes in subplate in accordance with the following standards:
 - CETOP RP 121H - identified by CETOP 4.2-4-R05 (nominal size CETOP 05)
 - ISO 4401 - identified by ISO 4401-05-05-0-05 mounting bolts **M6 x 35 - 10.9** in accordance with **PN - EN ISO 4762** - 4 pcs/kit tightening torque **Md = 15 Nm**
- NOTE:**
 (*) - It is sufficient connections with only one hole T from side port A or B - the port T_A and T_B are together connected by channel in housing of directional valve
- 12 - Subplate surface required

PILOT OIL SUPPLY AND PILOT OIL DRAIN

Pilot oil supply **X** – external
pilot oil drain **Y** – external
version ...UREP10.../...

In version ...UREP10.../... the pilot flow is taken externally system through port **X**.
 Drainage pilot flow is through independent port **Y** to tank.
 Two the hole screws plugs (3) and (4) in ports **X**, **Y** must be mounted in the position like given on the drawing.

Pilot oil supply **X** – internal
pilot oil drain **Y** – external
version ...UREP10.../...E...

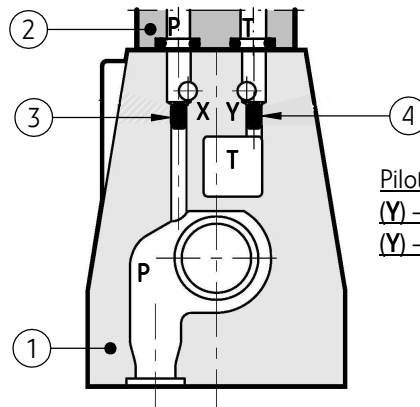
In version ...UREP10.../...E... the pilot flow is taken internally from port **P** main directional valve. Drainage pilot flow is through independent port **Y** to tank. The hole screw plug (3) is dismounted, the hole screw plug (4) is mounted. Port **X** in a subplate should be plugged.

Pilot oil supply **X** – internal
pilot oil drain **Y** – internal
version ...UREP10.../...ET...

In version ...UREP10.../...ET... the pilot flow is taken internally from port **P** main directional valve.
 Drainage pilot flow is through internally port **T** to tank.
 The hole screws plugs (3) and (4) is dismounted. Ports **X** and **Y** in a subplate must be plugged.

Pilot oil supply **X** – external
pilot oil drain **Y** – internal
version ...UREP10.../...T...

In version ...UREP10.../...T... the pilot flow is taken internally from port **P** main directional valve. Drainage pilot flow is through internally port **T** to tank. The hole screw plug (3) is mounted, the hole screw plug (4) is dismounted. Port **Y** in a subplate should be plugged.



Pilot oil supply
(X) – external - the plug (3) is mounted
(X) – internal - the plug (3) is dismounted

Pilot oil drain
(Y) – external - the plug (4) is mounted
(Y) – internal - the plug (4) is dismounted

- 1 - Main valve body
- 2 - Pilot valve body
- 3 - Hole screw plug **M5 x 6** - pilot oil supply (**X**)
- 4 - Hole screw plug **M5 x 6** - pilot oil drain (**Y**)

ACCESSORIES FOR STANDARD DIRECTIONAL VALVE

Pilot choke adjustment

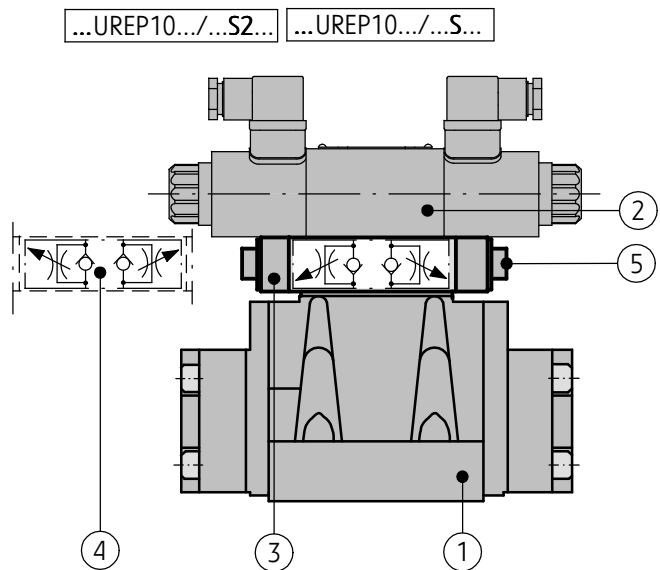
versions: ...UREP10.../...S...
...UREP10.../...S2...

Directional spool valves type **UREP10...** may be optionally provided with pilot choke adjustment (3) which allows to adjust switching time of directional spool valve.

Rotation of the adjusting screw (4) clockwise increases and counterclockwise decreases switching time of the valve.

The change of adjustment method of switching time (flow throttling): on inlet - version ...UREP10.../...S... or on outlet - version ...UREP10.../...S2... is made while mounting by rotating the pilot choke adjustment (3) by 180 degrees around its longitudinal axis.

The pilot choke adjustment (3) is fixed by means of bolts **M5 x 80 - 10.9** - 4 pcs/kit in accordance with **PN - EN ISO 4762** with tightening torque of **Md = 5 Nm**.

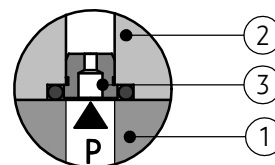


- 1 - Main valve
- 2 - Pilot valve
- 3 - Pilot choke adjustment with adjustment of switching time on inlet
- 4 - Assembly method of pilot choke adjustment with adjustment of switching time on outlet
- 5 - Adjusting screw

Throttle insert

version ...UREP10.../...B...

Directional valves type **UREP10...** may be equipped with throttle insert (3) in port **P** in pilot valve (2) which allows to **delay switching time** of the main valve.



- 1 - Main valve body
- 2 - Pilot valve body
- 3 - Throttle insert

OPTIONAL ACCESSORIES FOR DIRECTIONAL VALVE

Stroke limiter

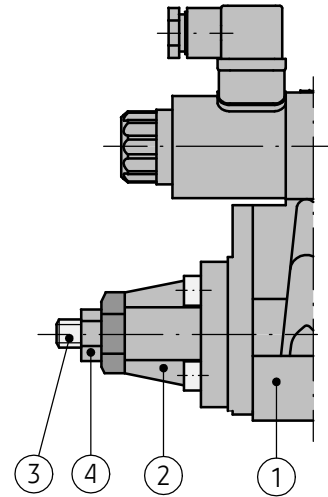
version ...UREP10.../...10...

Mounting options

Directional valves type **UREP10...** with **3-position spools, spring centered** may be equipped with stroke limiter, it may be mounted on canal **A** or **B** (version ...UREP10.../...10...).

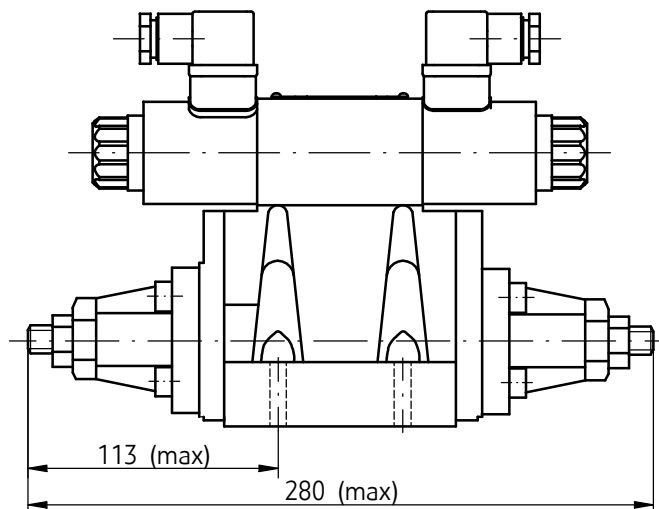
Adjustment of the stroke of the main spool is by rotating the pin (3) and securing with locknut (4). Rotating the pin (3) clockwise reduces the stroke of the main spool (2). While adjusting the stroke the control chamber must be at zero pressure.

...UREP10.../...10...



- 1 - Main valve
- 2 - Stroke limiter body
- 3 - Pin
- 4 - Locknut

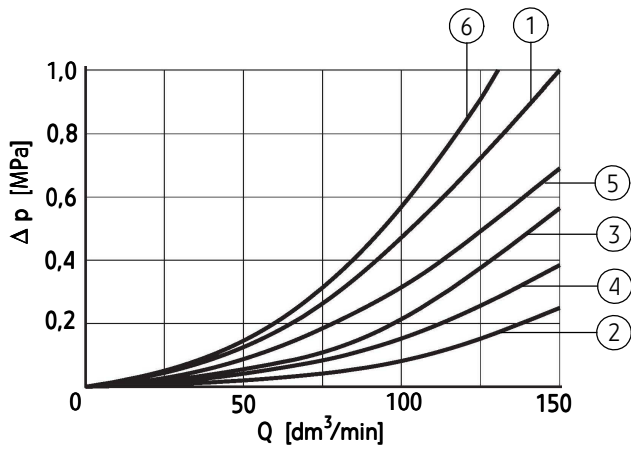
Overall dimensions



PERFORMANCE CURVES

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

Pressure resistance curves



Spool type schemes according to page 5	Spool position	Performance diagram number				
		flow direction				
		P → A	P → B	A → T	B → T	P → T
D	energized de-energized	1	1	4	3	
E	energized	1	1	2	3	
F	de-energized energized	6	6	3	5	6 ⁽¹⁾
G	de-energized energized	6	6	3	5	6
H	de-energized energized	5	5	2	4	6 ⁽²⁾
J	de-energized energized	1	1	1 ⁽³⁾ 2	1 ⁽¹⁾ 4	
L	de-energized energized	1	1	1 2	3	
M	de-energized energized	1 ⁽³⁾ 5	1 ⁽¹⁾ 5	2	3	
U	de-energized energized	1	1	2	1 4	
W	energized	1	1	2	2	

NOTES:

- (1) - port A - blocked
- (2) - connection A - B - blocked
- (3) - port B - blocked

Flow limits

spool type	pressure p	
	21 MPa	31,5 MPa
	flow rate Q max	
E, G, H, J, L, M, U, W, C, D	120 dm ³ /min	100 dm ³ /min
F	150 dm ³ /min	120 dm ³ /min

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

4	UREP	10	/						+
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Nominal size (NS)

NS10 = 10

Type of the main spool spool schemes

- according to **page 5**

Series number

(00-09) - installation and connection dimensions unchanged = 0X
series 02 = **02**

Supply voltage for solenoids at pilot valve

12 V DC = G 12
24 V DC = **G 24**
110 V DC = G 110
110 V AC 50 Hz (plug-in-connector with rectifier) = W 110 R
230 V AC 50 Hz (plug-in-connector with rectifier) = **W 230 R**

Manual override

solenoids without manual override = no designation
solenoids with manual override = **N**

Pilot oil supply and pilot oil drain

external pilot oil supply, external pilot oil drain = no designation
internal pilot oil supply, external pilot oil drain = E
internal pilot oil supply, internal pilot oil drain = **ET**
external pilot oil supply, internal pilot oil drain = T

Switching time adjustment

without switching time adjustment = **no designation**
switching time adjustment as meter-in control = S
switching time adjustment as meter-out control = S2

Electrical connection

plug-in-connector ISO 4400 type without LED = **Z4**
plug-in-connector ISO 4400 type with LED = Z4L

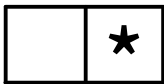
Throttle insert in port P of the pilot valve

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

Accessories

without accessories = **no designation**
stroke limiter on valve ends A and B = 10

HOW TO ORDER



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

Sealing

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

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: 4 UREP 10 E 02/G24 N ET Z4

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