

proportional directional valve type USAB6

NS 6 | p_{max} 31,5 MPa | Q_{max} 60 dm³/min | WK 420 740



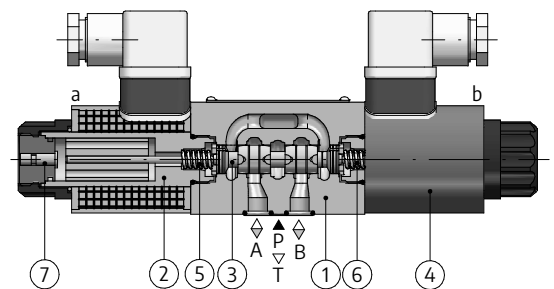
DATA SHEET – OPERATION MANUAL

DEVICE CHARACTERISTICS

Proportional directional valve type USAB6... is used to control the direction and speed of movement of a receiver. Flow rate of hydraulic oil directed to the receiver is adjusted by change of electric current supplying the solenoid coil.

OPERATION DESCRIPTION

The main elements of the proportional directional valve type USAB6... are: the valve body **1**, proportional solenoids **2** and **4**, the spool **3** and springs **5** and **6**. Solenoids **2**, **4** move the spool **3** from the neutral position, proportionally to the supplied current. It makes it possible to control both the direction and the flow rate of oil in the system, which allows for changing the direction and speed of the receiver motion. Return of the spool **3** to the neutral (de-energized) position is provided by the centering springs **5** and **6**. The shape of the spool (control edge spacing) affects the configuration of connections between the ports: P, A, B, T as shown on the hydraulic diagrams, and different shapes and flow cross-sections influence the nominal performance of the directional valve and the nature of flow change (linear or progressive). A list of electronic controllers that can be used for controlling the proportional solenoids **2** and **4** is shown in the table on page 2. Solenoids **2** and **4** can be equipped with manual override buttons **7** allowing for manual override of the directional valve in the event of power failure.

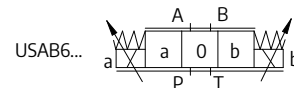


TECHNICAL PARAMETERS

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 ÷ 380 mm ² /s	
fluid temperature range (in a tank)	recommended 40 ÷ 55 °C	
	maximum -20 ÷ +70 °C	
ambient temperature range	-20 ÷ +50 °C	
maximum operating pressure	ports: P, A, B – 31,5 MPa	
	port T – 25 MPa	
hysteresis	< 6% Q_{max}	
repetition accuracy	< 3% Q_{max}	
operating position	optional	
weight	with 1 solenoid – 1,5 kg	
	with 2 solenoids – 2,1 kg	
maximum current of solenoid coil	1,5 A	0,8 A
resistance of cold solenoid coil (20°C)	5,4 Ω	19,5 Ω
electronic amplifiers	according to table on page 2	
installation and operation requirements	available on:	
http://eksploatacja.ponar.pl/general_operating_conditions_EN_03.2019_01.pdf		

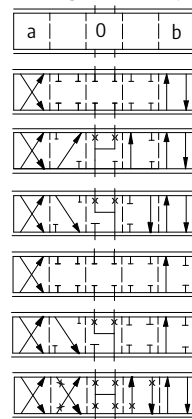
HYDRAULIC DIAGRAMS

3-position directional valves

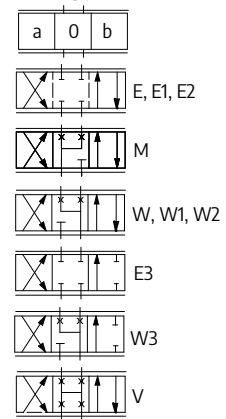


spool diagrams

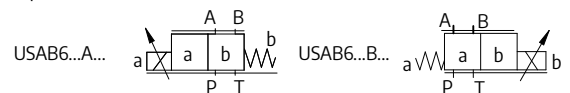
working and indirect positions



working positions

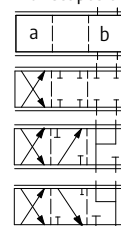


2-position directional valves

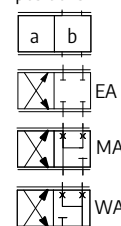


spool diagrams

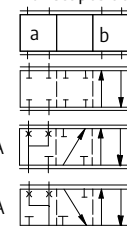
working and indirect positions



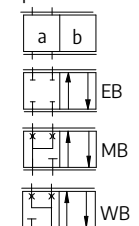
working positions



working and indirect positions



working positions



ELECTRONIC AMPLIFIERS

max current of solenoid coil	1,5 A	0,8 A
	30RE20 to Data Sheet WK 495 773	–
	30RE20D to Data Sheet WK 420 830	–
electronic amplifier	30RC20D* to Data Sheet WK 430 340	
	MAP2* to Data Sheet "electronic joystick" on website www.ponar-wadowice.pl	
	(*) – when powered by a stabilized voltage 24 V DC set the maximum current value I_{max}	

FLOW RATE VALUES

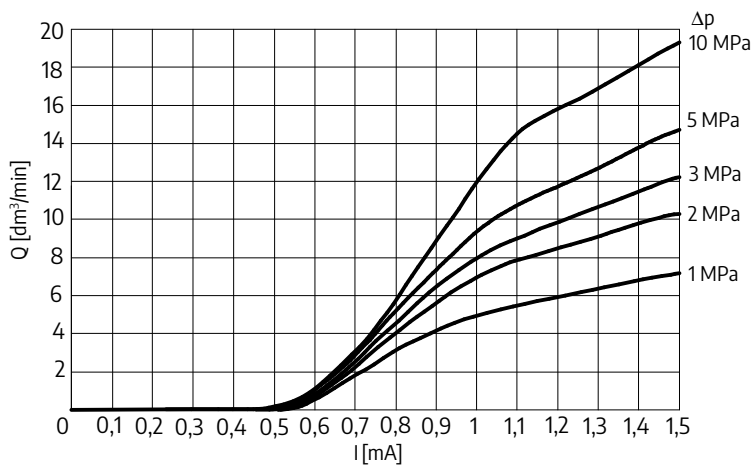
spool symbol	flow rate			
	P → A	P → B	A → T	B → T
E1, W1	Q_{max}	$Q/2$	Q_{max}	$Q/2$
E2, W2	$Q/2$	Q_{max}	$Q/2$	Q_{max}
E3, W3	Q_{max}	Q_{max}	Q_{max}	closed

PERFORMANCE CURVES

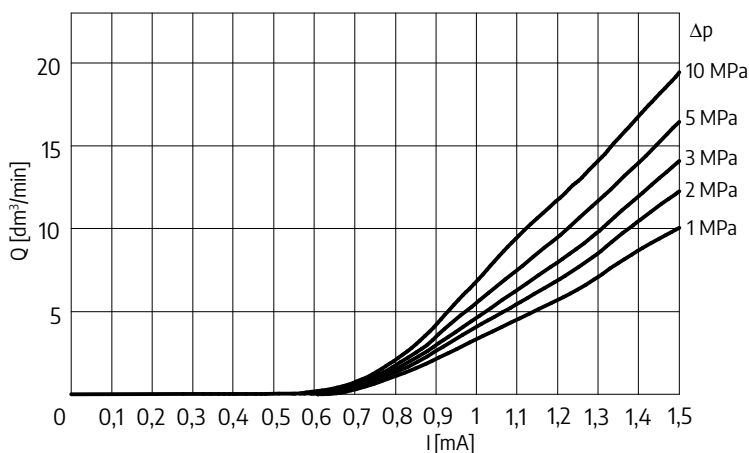
measured at viscosity $\nu = 41 \text{ mm}^2/\text{s}$ and temperature $t = 50 \text{ }^\circ\text{C}$

flow rate curves related to the reference signal I at constant Δp ranges

spool type EL10

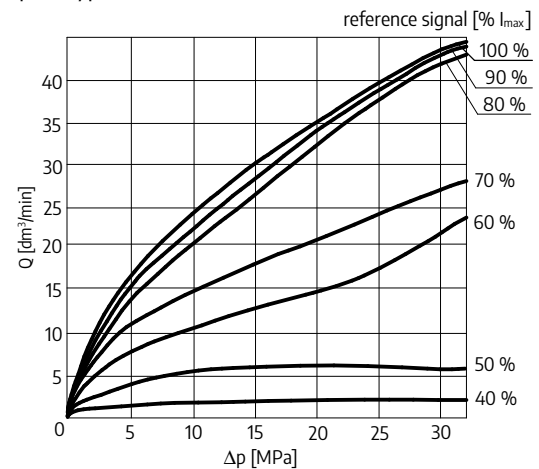


spool type EQ10

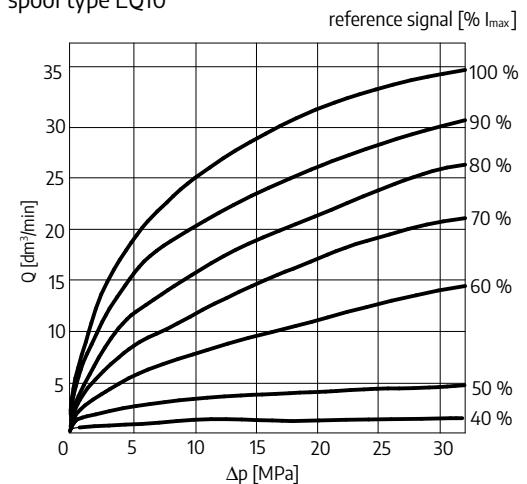


flow rate curves related to Δp at constant reference signal values

spool type EL10



spool type EQ10

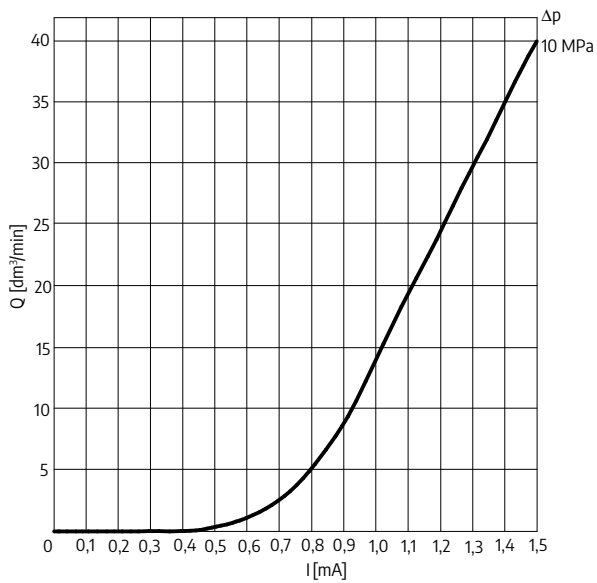
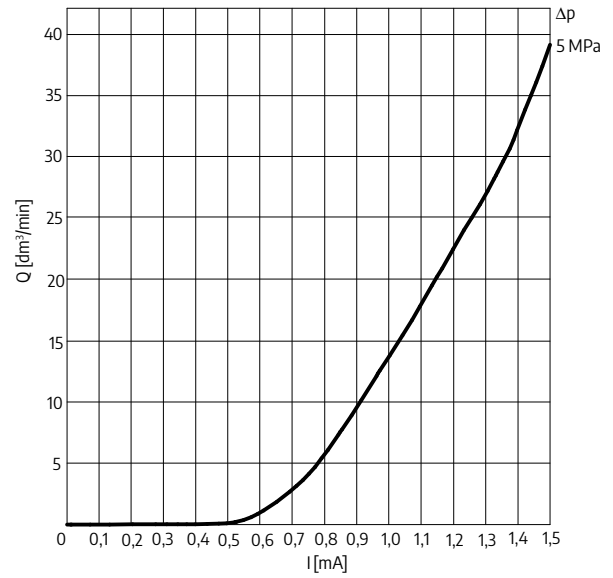
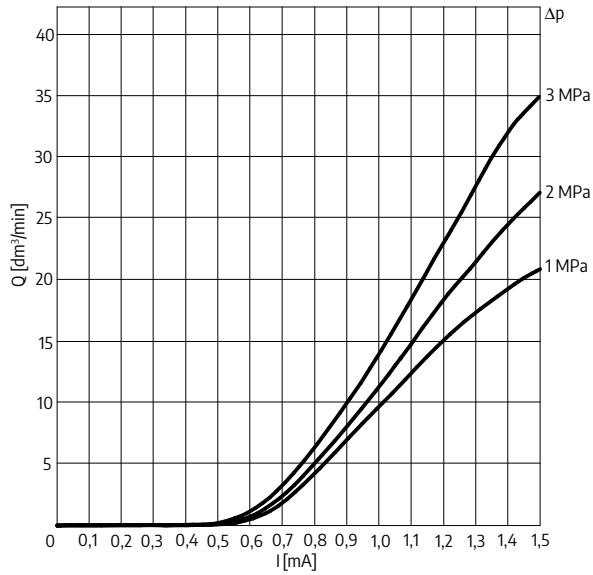


PERFORMANCE CURVES

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

flow rate curves related to the reference signal I
at constant Δp values

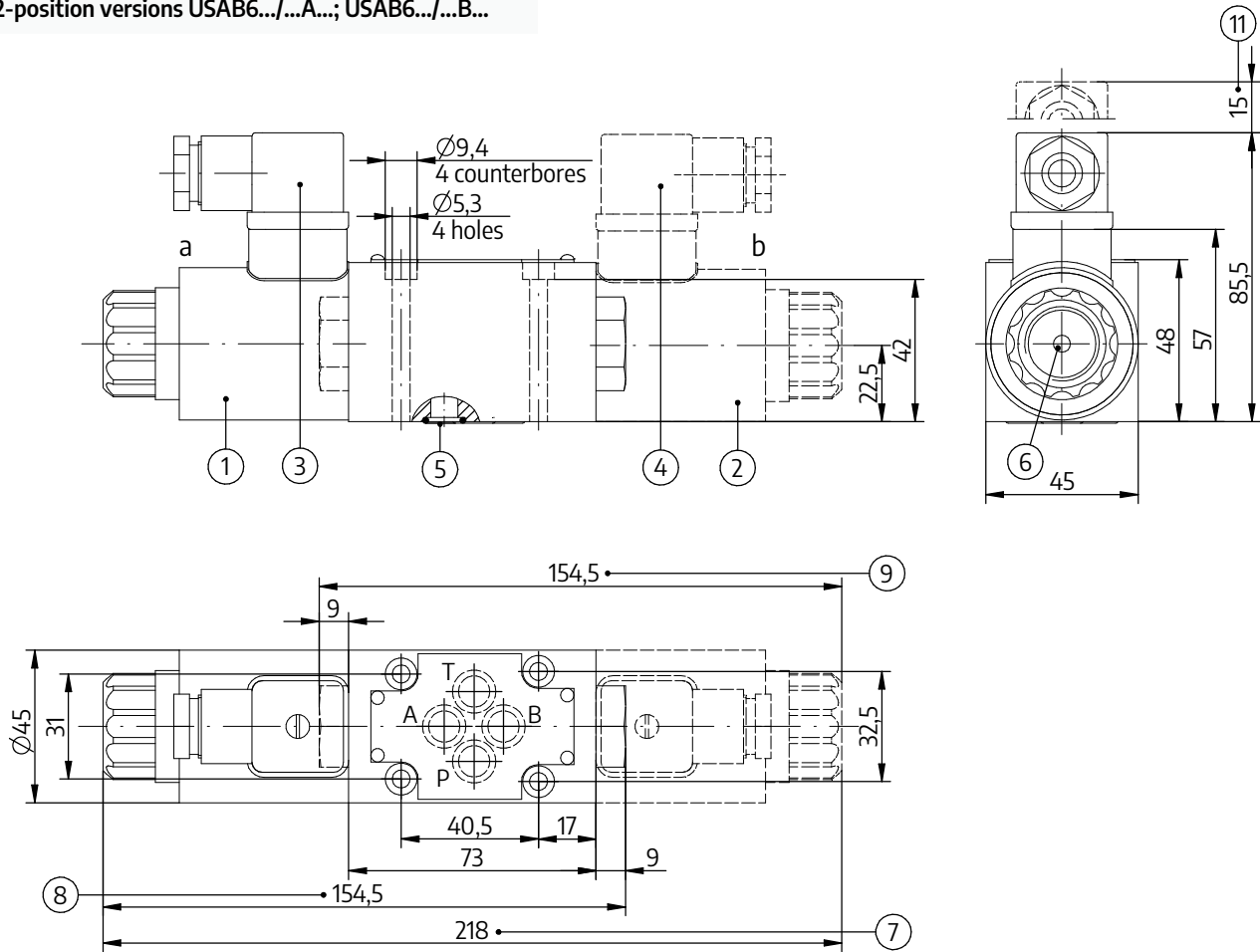
spool type WQ32



OVERALL AND CONNECTION DIMENSIONS

3-position versions USAB6.../...

2-position versions USAB6.../...A...; USAB6.../...B...



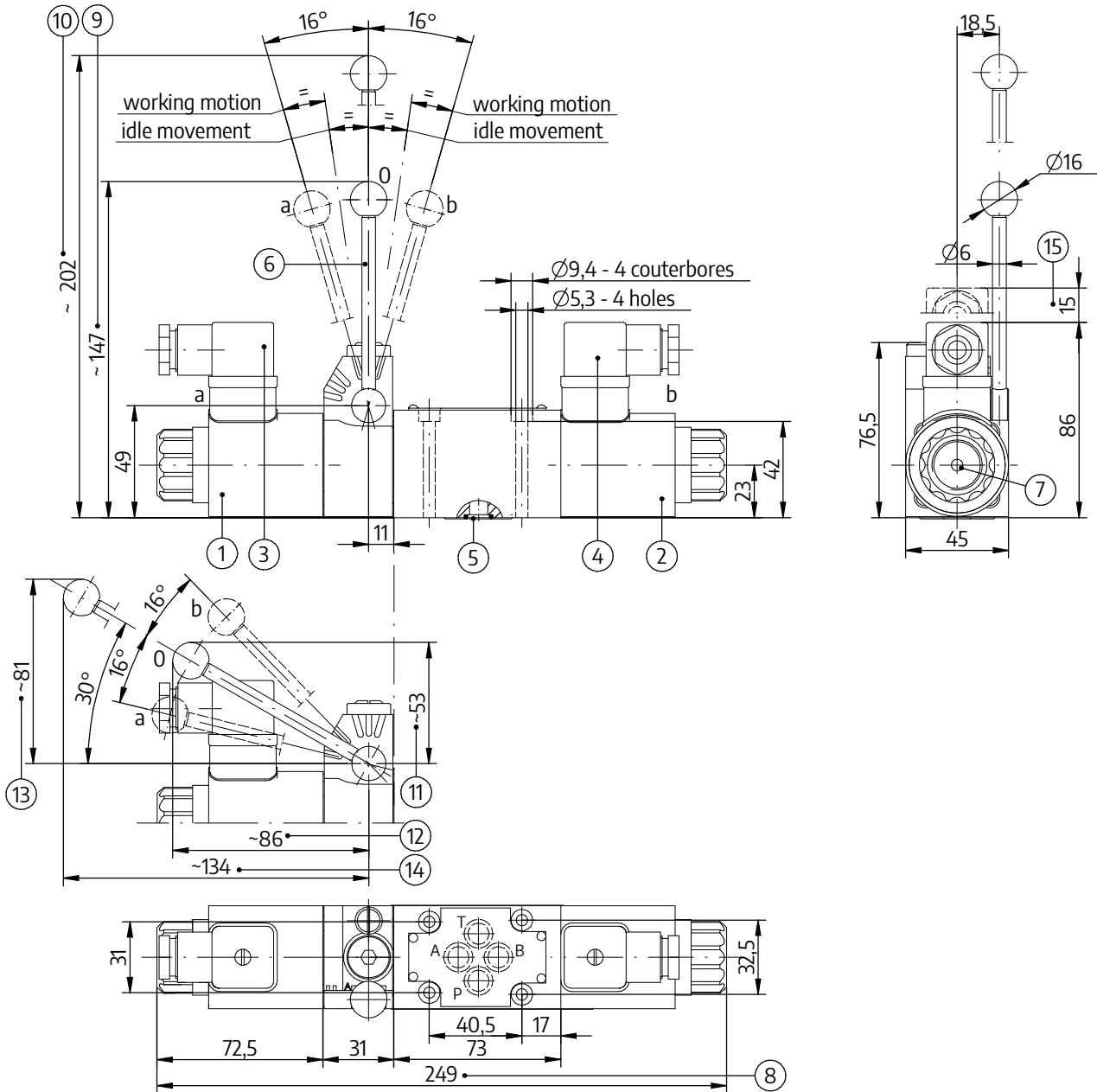
1. Solenoid at the **a** side
2. Solenoid at the **b** side
3. Plug-in connector at the **a** side – type ISO 4400* (DIN 43650 – A)
4. Plug-in connector at the **b** side – type ISO 4400* (DIN 43650 – A)
5. Sealing ring o-ring 9,2 x 1,8 - pcs 4/set (P, T, A, B)
6. Manual override
7. Overall dimension of 3-position version USAB6.../... with 2 solenoids at the **a** and the **b** side – spool symbols: E, E1, E2, E3, M, W, W1, W2, W3, V on page 1
8. Overall dimension of 2-position version USAB6.../...A... with 1 solenoid at the **a** side – spool symbols: EA, MA, WA on page 1
9. Overall dimension of 2-position version USAB6.../...B... with 1 solenoid at the **b** side – spool symbols: EB, MB, WB on page 1
10. Porting pattern – configuration of connection holes compliant with ISO 4401 standard; designation ISO 4401-03-02-0-94 (CETOP03); fixing screws M5 x 50 – 10.9 to PN – EN ISO 4762 – pcs 4/set delivered on separate order; tightening torque $M_d = 9 \text{ Nm}$
11. Space for disassembly of plug-in connectors – items 3, 4
12. Subplate surface required

NOTE:

(*) – optional solenoid control and electrical connections types on page 9

OVERALL AND CONNECTION DIMENSIONS

3-positions versions: USAB6...H...; ...HL...; ...HS...; ...HSL...



NOTES:

- porting pattern and requirements of surface state of the subplate on page 4
- after switching the valve by the manual control lever – item 6 return of the lever to the initial (neutral) position occurs automatically
- after switching the valve by using the solenoid – item 1, 2, the lever 6 remains inactive

- Solenoid at the **a** side
- Solenoid at the **b** side
- Plug-in connector at the **a** side – type ISO 4400* (DIN 43650 – A)
- Plug-in connector at the **b** side – type ISO 4400* (DIN 43650 – A)
- Sealing ring o-ring 9,2 x 1,8 - pcs 4/set (P, T, A, B)
- Manual control lever
- Manual override
- 8, 9. Overall dimension of 3-position version USAB6.../...H... with 2 solenoids at the **a** and the **b** side – spool symbols: E, E1, E2, E3, M, W, W1, W2, W3, V on page 1
10. Overall dimension of 3-position version USAB6.../...HL...
- 11, 12. Overall dimensions of 3-position version USAB6.../...HS...
- 13, 14. Overall dimensions of 3-position version USAB6.../...HSL...
15. Space for disassembly of plug-in connectors – items 3, 4

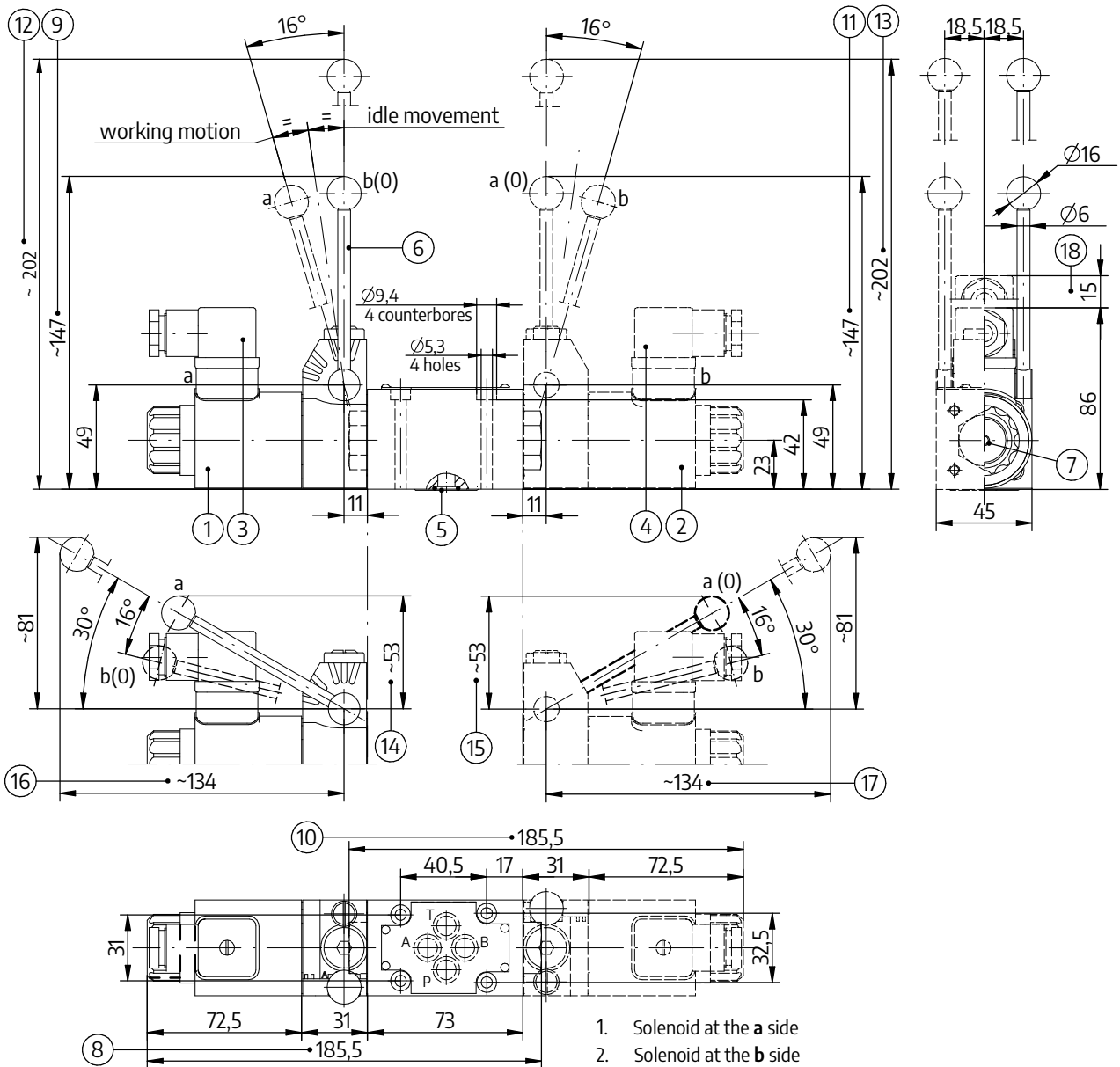
NOTE:

(*) – optional solenoid control and electrical connections types on page 10

OVERALL AND CONNECTION DIMENSIONS

2-position versions: USAB6...A...H...; ...HL...; ...HS...; ...HSL...

2-position versions: USAB6...B...H...; ...HL...; ...HS...; ...HSL...



NOTES:

- porting pattern and requirements of surface state of the subplate on page 4
- after switching the valve by the manual control lever – item 6 return of the lever to the initial (neutral) position occurs automatically
- after switching the valve by using the solenoid – items 1, 2, the lever 6 remains unactive

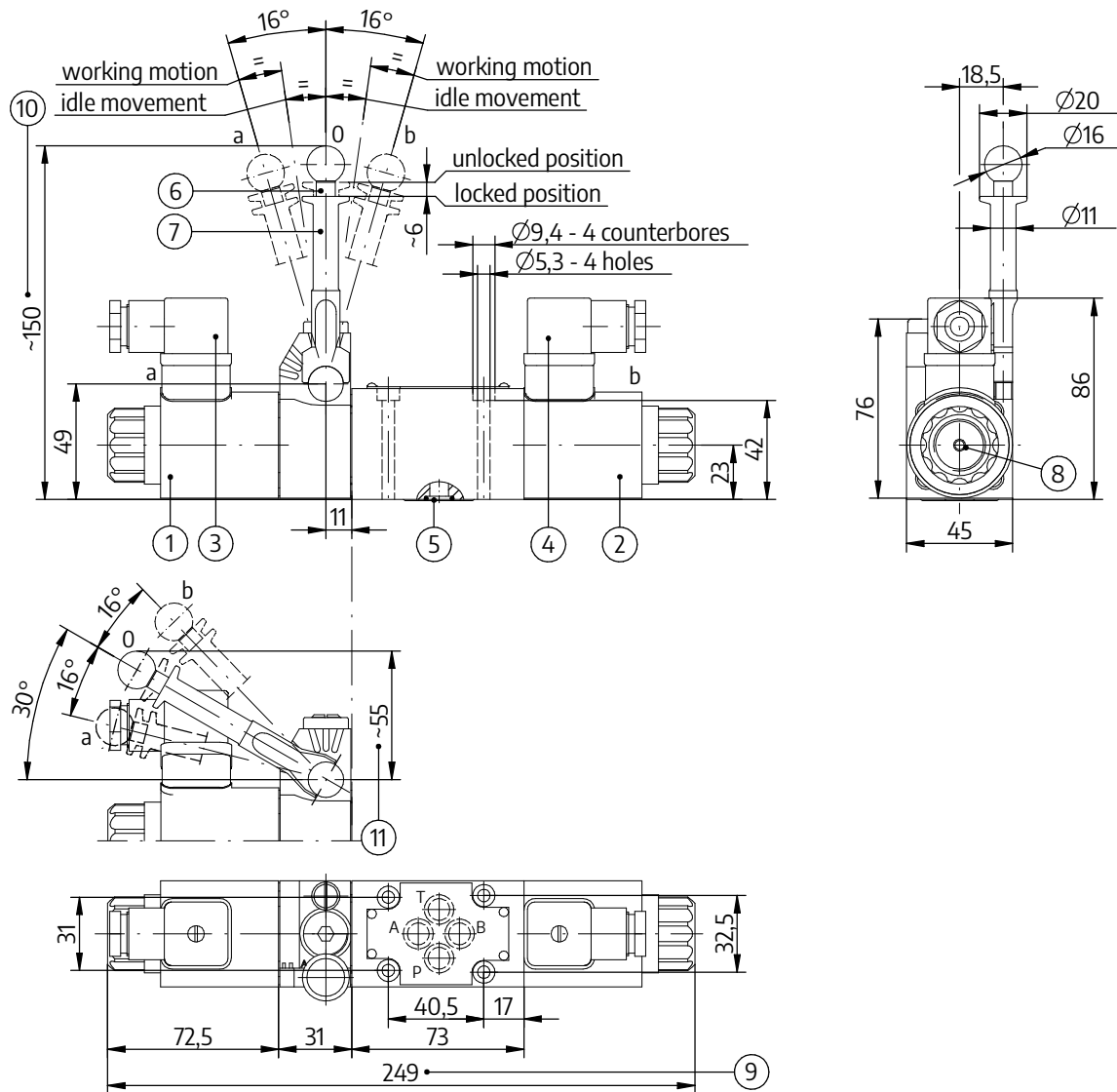
- Solenoid at the a side
- Solenoid at the b side
- Plug-in connector at the a side – type ISO 4400* (DIN 43650 – A)
- Plug-in connector at the b side – type ISO 4400* (DIN 43650 – A)
- Sealing ring o-ring 9,2 x 1,8 - pcs 4/set (P, T, A, B)
- Manual control lever
- Manual override
9. Overall dimension of 2-position version USAB6.../...A...H... with 1 solenoid at the a side – spool symbols: EA, MA, WA on page 1
- 10, 11. Overall dimension of 2-position version USAB6.../...B...H... with 1 solenoid at the b side – spool symbols: EB, MB, WB on page 1
12. Overall dimension of 2-position version USAB6.../...A...HL...
13. Overall dimension of 2-position version USAB6.../...B...HL...
14. Overall dimension of 2-position version USAB6.../...A...HS...
15. Overall dimension of 2-position version USAB6.../...B...HS...
16. Overall dimension of 2-position version USAB6.../...A...HSL...
17. Overall dimension of 2-position version USAB6.../...B...HSL...
18. Space for disassembly of plug-in connectors – items 3, 4

NOTE:

(*) – optional solenoid control and electrical connections types on pages 11, 12

OVERALL AND CONNECTION DIMENSIONS

3-position versions: USAB6...HF...; ...HSF...



NOTES:

- porting pattern and requirements of surface state of the subplate on page 4
- after switching the valve by the manual control lever – item 6 return of the lever to the initial (neutral) position occurs automatically; in order for the lever – item 6 to remain in switched position, one should move the lock sleeve – item 7 to the lower position until it stops
- after switching the valve by using the solenoid – item 1, 2, the lever - item 6 remains unactive

- Solenoid at the **a** side
- Solenoid at the **b** side
- Plug-in connector at the **a** side – type ISO 4400* (DIN 43650 – A)
- Plug-in connector at the **b** side – type ISO 4400* (DIN 43650 – A)
- Sealing ring o-ring 9,2 x 1,8 - pcs 4/set (P, T, A, B)
- Manual control lever
- Manual control lever lock sleeve
- Manual override
- 9, 10. Overall dimension of 3-position version USAB6.../...HF... with 2 solenoids at the **a** and the **b** side – spool symbols: E, E1, E2, E3, M, W, W1, W2, W3, V on page 1
11. Overall dimension of 3-position version USAB6.../...HSF...

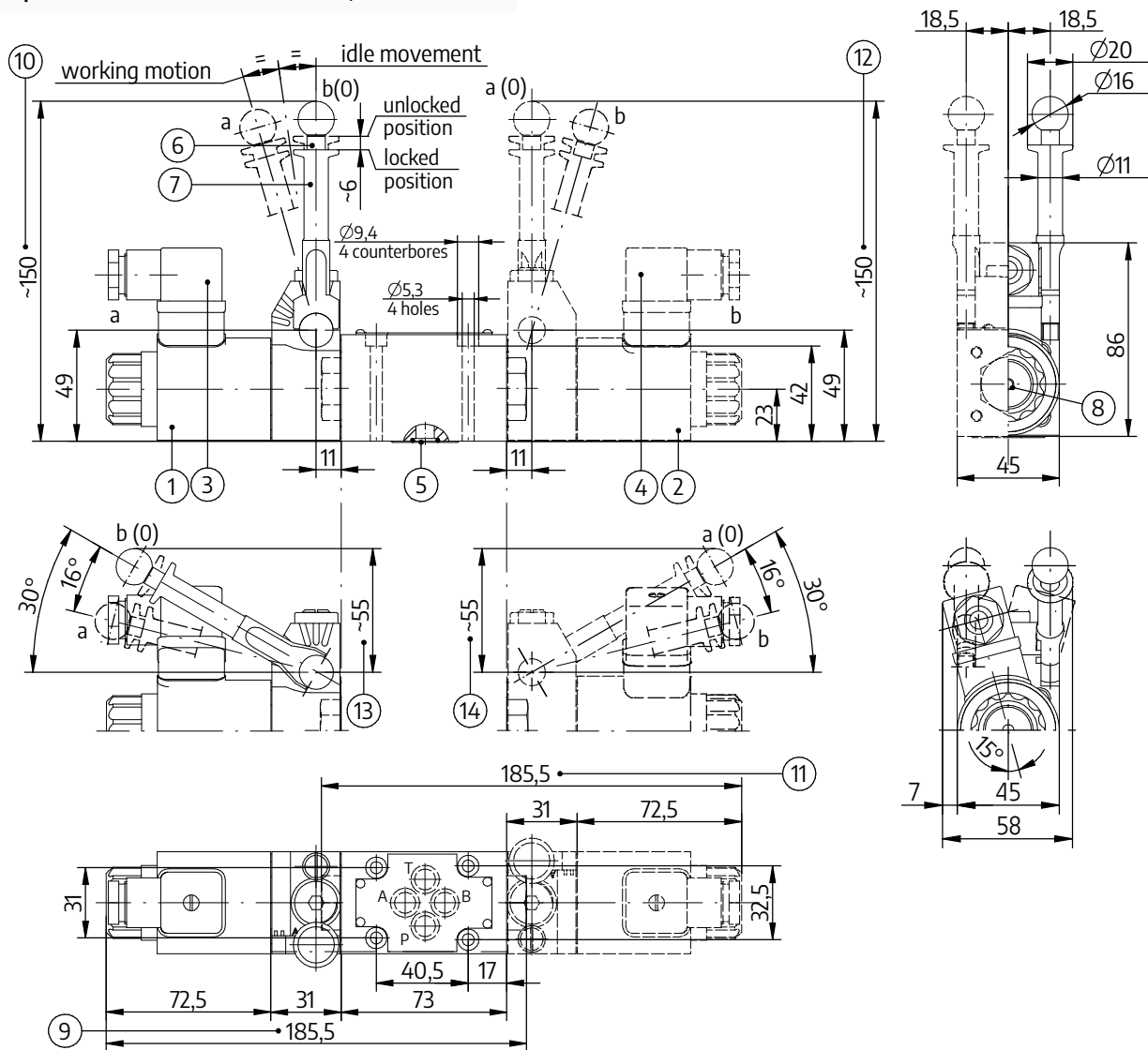
NOTE:

(*) – optional solenoid control and electrical connections types on page 10

OVERALL AND CONNECTION DIMENSIONS

2-position versions: USAB6...A...HF...; ...A...HSF...

2-position versions: USAB6...B...HF...; ...B...HSF...



1. Solenoid at the **a** side
2. Solenoid at the **b** side
3. Plug-in connector at the **a** side – type ISO 4400* (DIN 43650 – A)
4. Plug-in connector at the **b** side – type ISO 4400* (DIN 43650 – A)
5. Sealing ring o-ring 9,2 x 1,8 - pcs 4/set (P, T, A, B)
6. Manual control lever
7. Manual control lock sleeve
8. Manual override
- 9, 10. Overall dimension of 2-position version USAB6.../...A...HF... with 1 solenoid at the **a** side – spool symbols: EA, MA, WA on page 1
- 11, 12. Overall dimension of 2-position version USAB6.../...B...HF... with 1 solenoid at the **b** side – spool symbols: EB, MB, WB on page 1
13. Overall dimension of 2-position version USAB6.../...A...HSF...
14. Overall dimension of 2-position version USAB6.../...B...HSF...

NOTES:

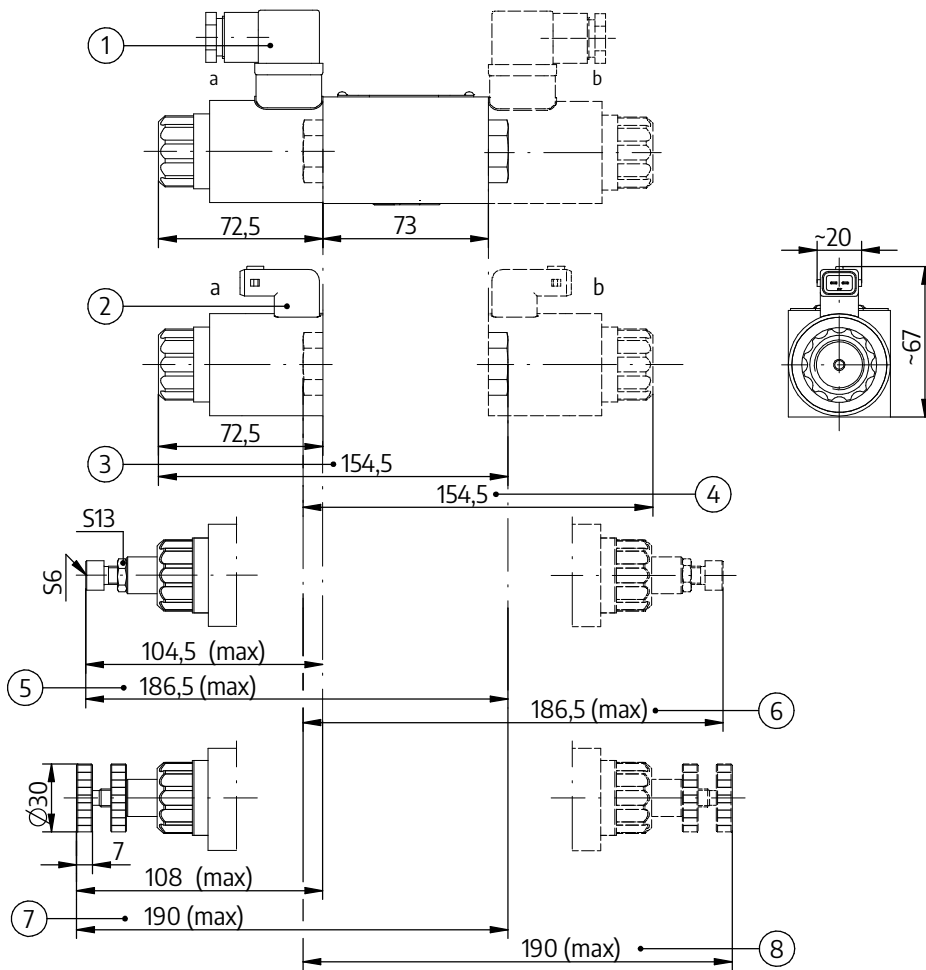
- porting pattern and requirements of surface state of the subplate on page 4
- after switching the valve by the manual control lever – item 6 return of the lever to the initial (neutral) position occurs automatically; in order for the lever – item 6 to remain in switched position, one should move the lock sleeve – item 7 to the lower position until it stops
- after switching the valve by using the solenoid – item 1, 2, the lever - item 6 remains unactive

NOTE:

(*) – optional solenoid control and electrical connections types on pages 11, 12

OVERALL AND CONNECTION DIMENSIONS

optional solenoid control and electrical connection types



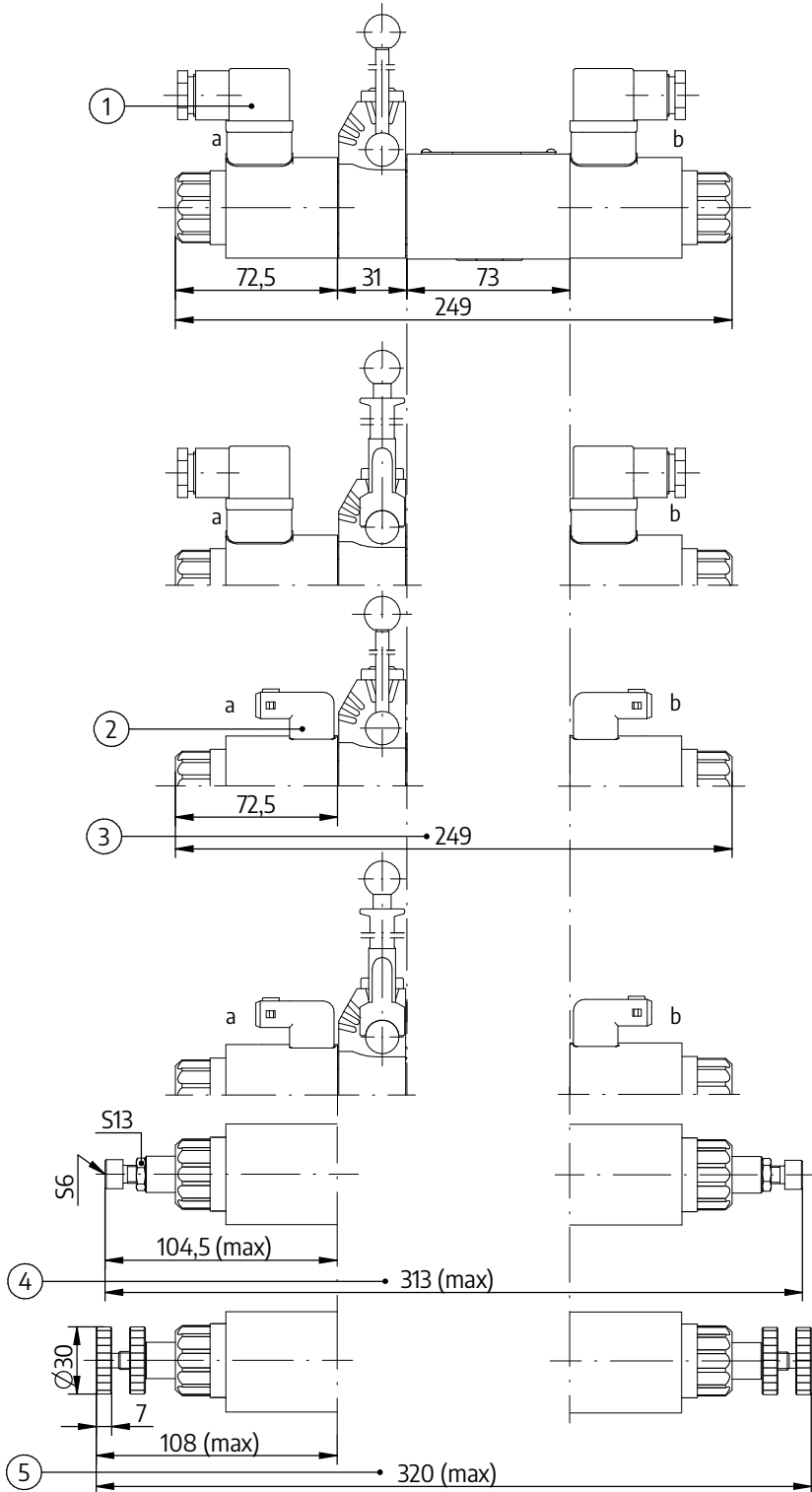
NOTES:

- porting pattern and requirements of surface state of the subplate on page 4
- other dimensions and details of the valve drawing as in standard versions on page 4

- Plug-in connector type ISO 4400 (DIN 43650 – A)
- 2-pole male AMP Junior Timer type socket (plug-in connectors not shown on the drawing must be ordered separately to Data Sheet WK 499 963)
- Overall dimension of 2-position version USAB6...A...J...
- Overall dimension of 2-position version USAB6...B...J...
- Overall dimension of 2-position version USAB6...A...JR...
- Overall dimension of 2-position version USAB6...B...JR...
- Overall dimension of 2-position version USAB6...A...JR1...
- Overall dimension of 2-position version USAB6...A...JR1...

OVERALL AND CONNECTION DIMENSIONS

optional solenoid control and electrical connection types



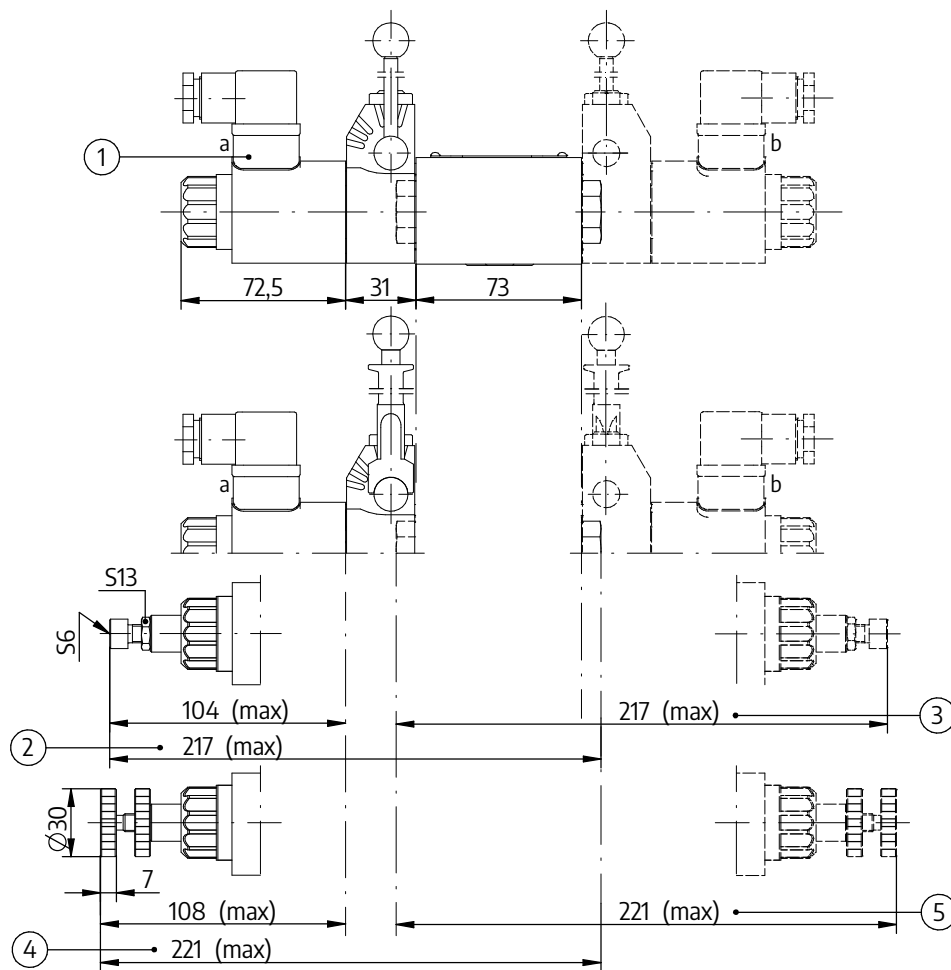
NOTES:

- porting pattern and requirements of surface state of the subplate on page 4
- other dimensions and details of the valve drawing as in standard versions on pages 5, 7

- Plug-in connector type ISO 4400 (DIN 43650 - A)
- 2-pole male AMP Junior Timer type socket (plug-in connectors not shown on the drawing must be ordered separately to Data Sheet WK 499 963)
- Overall dimension of 3-position versions:
USAB6.....J...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 3-position versions:
USAB6...JR...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 3-position versions:
USAB6...JR1...H/HS/HL /HSL/HF/HSF...

OVERALL AND CONNECTION DIMENSIONS

optional solenoid control and electrical connection types



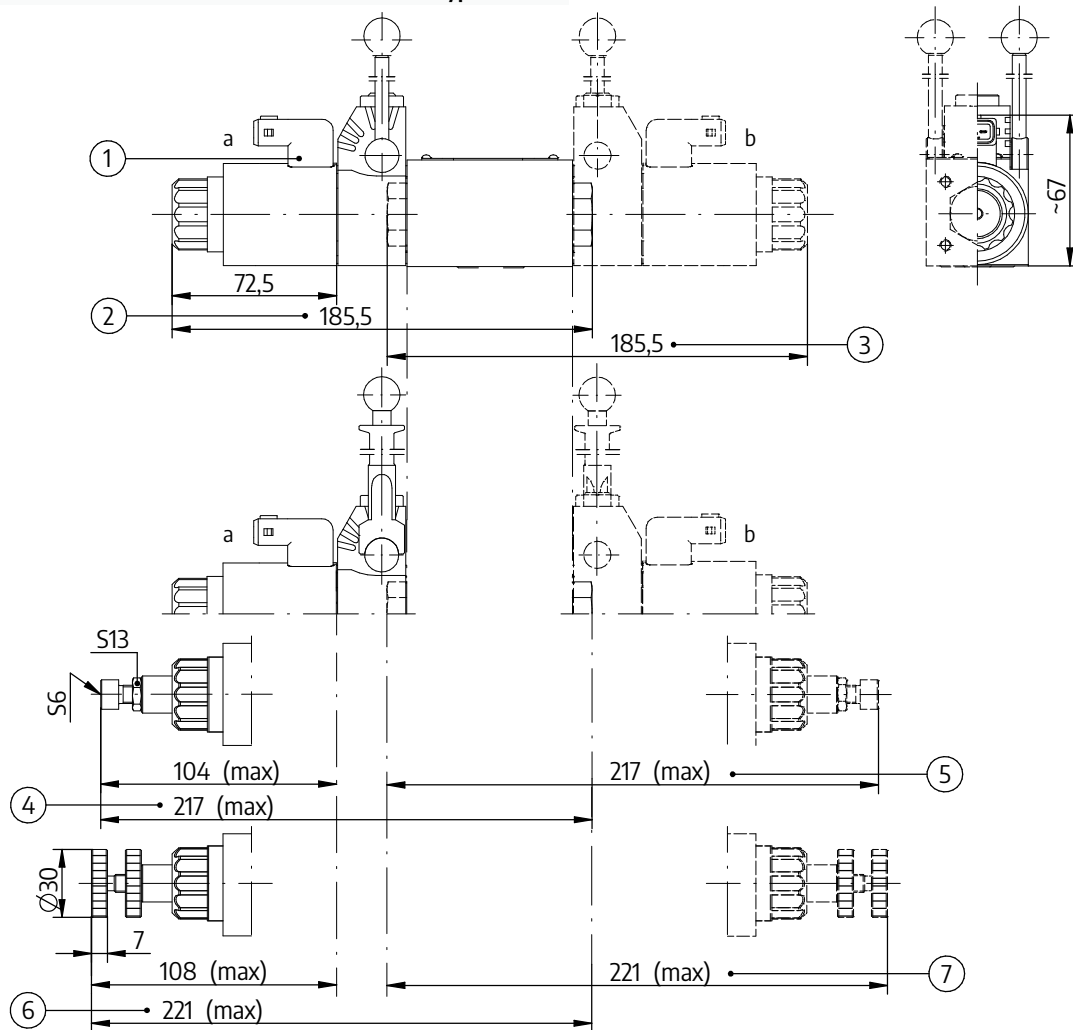
NOTES:

- porting pattern and requirements of surface state of the subplate on page 4
- other dimensions and details of the valve drawing as in standard versions on pages 6, 8

- Plug-in connector type ISO 4400 (DIN 43650 - A)
- Overall dimension of 2-position versions:
USAB6...A...Z4R...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 2-position versions:
USAB6...B...Z4R...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 2-position versions:
USAB6...A...Z4R1...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 2-position versions:
USAB6...B...Z4R1...H/HS/HL /HSL/HF/HSF...

OVERALL AND CONNECTION DIMENSIONS

optional solenoid control and electrical connection types



NOTES:

- porting pattern and requirements of surface state of the subplate on page 4
- other dimensions and details of the valve drawing as in standard versions on pages 6, 8

- 2-pole male AMP Junior Timer type socket (plug-in connectors not shown on the drawing must be ordered separately to Data Sheet WK 499 963)
- Overall dimension of 2-position versions:
USAB6...A...J...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 2-position versions:
USAB6...B...J...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 2-position versions:
USAB6...A...JR...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 2-position versions:
USAB6...B...JR...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 2-position versions:
USAB6...A...JR1...H/HS/HL /HSL/HF/HSF...
- Overall dimension of 2-position versions:
USAB6...B...JR1...H/HS/HL /HSL/HF/HSF...

HOW TO ORDER

USAB **6** - / - N

1 2 3 4 5 6 7 8 9 10 11 12 13

1 nominal size

NS 6 =

6

2 series number

(42 - 49) - connection and installation dimensions unchanged =

4X

series 42 =

42

3 spool symbol

(spool symbols according to page 1)

3-position = E, E1, E2, W, W1, W2, E3, W3, V

2-position = EA, MA, WA, EB, MB, WB

4 flow changes

linear =

L

progressive =

Q

5 nominal flow rate at $\Delta p = 1$ MPa

10 dm³/min =

10

20 dm³/min =

20

32 dm³/min =

32

6 solenoid coil

coil for max current $I_{max} = 1,5$ A =

12

coil for max current $I_{maks.} = 0,8$ A =

24

7 manual override

solenoid with manual override =

N

8 solenoid electrical connection

plug-in connector type ISO 4401

(DIN 43650-A) =

Z4

without plug-in connector, with 2-pole

male AMP Junior Timer type socket =

J

9 solenoid control

electrical =

Ø

electrical with mechanical adjustment;

adjusting element - set screw with

hexagon socket =

R

electrical with mechanical adjustment;

adjusting element - hand knob =

R1

10 manual lever control

without a manual lever =

Ø

with a lever positioned vertically =

H

with a lever positioned vertically with

lock sleeve =

HF

with a lever positioned at an angle =

HS

with a long lever positioned vertically

vertically =

HL

with a long lever positioned

at an angle =

HSL

with a long lever positioned

at an angle with lock sleeve =

HSF

11 material of manufacture

(applicable only to version USAB6.../...H...)

galvanized elements =

Ø

aluminium elements =

AL

stainless elements =

SN

12 sealing

NBR (for fluids on mineral

oil base) =

Ø

FKM (for fluids on phosphate

ester base) =

V

for low temperature =

NL

13 further requirements = *

(to be agreed with the manufacturer)

the mark „Ø” means the option with no designation

the symbols **in bold** are the preferred versions available

in short delivery time

SUBPLATES AND FIXING SCREWS

Subplates must be ordered according to Data Sheet WK 496 480.

Subplate symbols:

G341/01 – threaded connections G1/4

G342/01 – threaded connections G3/8

G502/01 – threaded connections G1/2

Subplate and fixing screws M5 × 50 – 10.9 acc. to PN – EN ISO 4762

pcs 4/set must be ordered separately.

Tightening torque $M_d = 9$ Nm.

NOTE:

The subplate symbol **in bold** is the preferred version available in short

delivery time.

CONTACT

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