Proportional directional valve type USAB6

WK 420 520

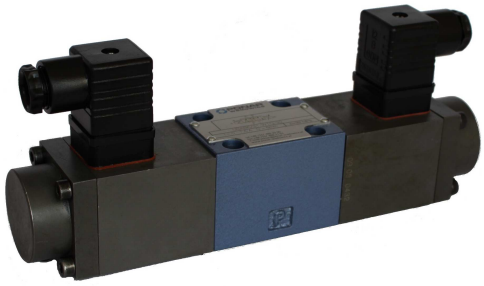
NS6	up to 31,5 MPa	up to 32 dm³/min

05.2015

DATA SHEET - OPERATION MANUAL

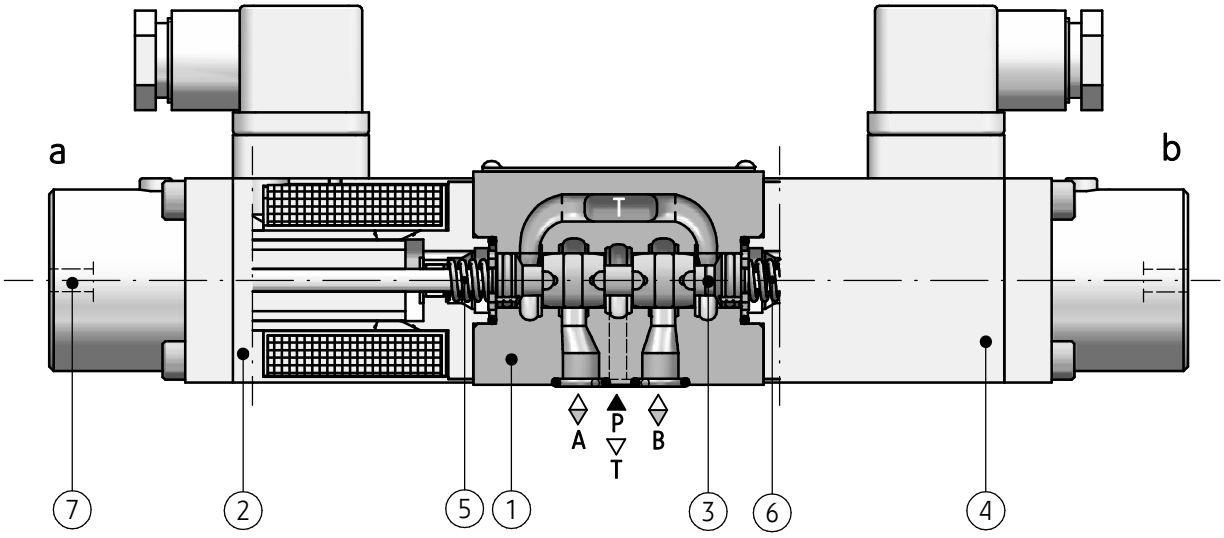
APPLICATION

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.



DESCRIPTION OF OPERATION

USAB6 - 3X/EQ20



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 page 5, 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) - version USAB6...**N**... allowing for manual override of the directional valve in the event of power failure.

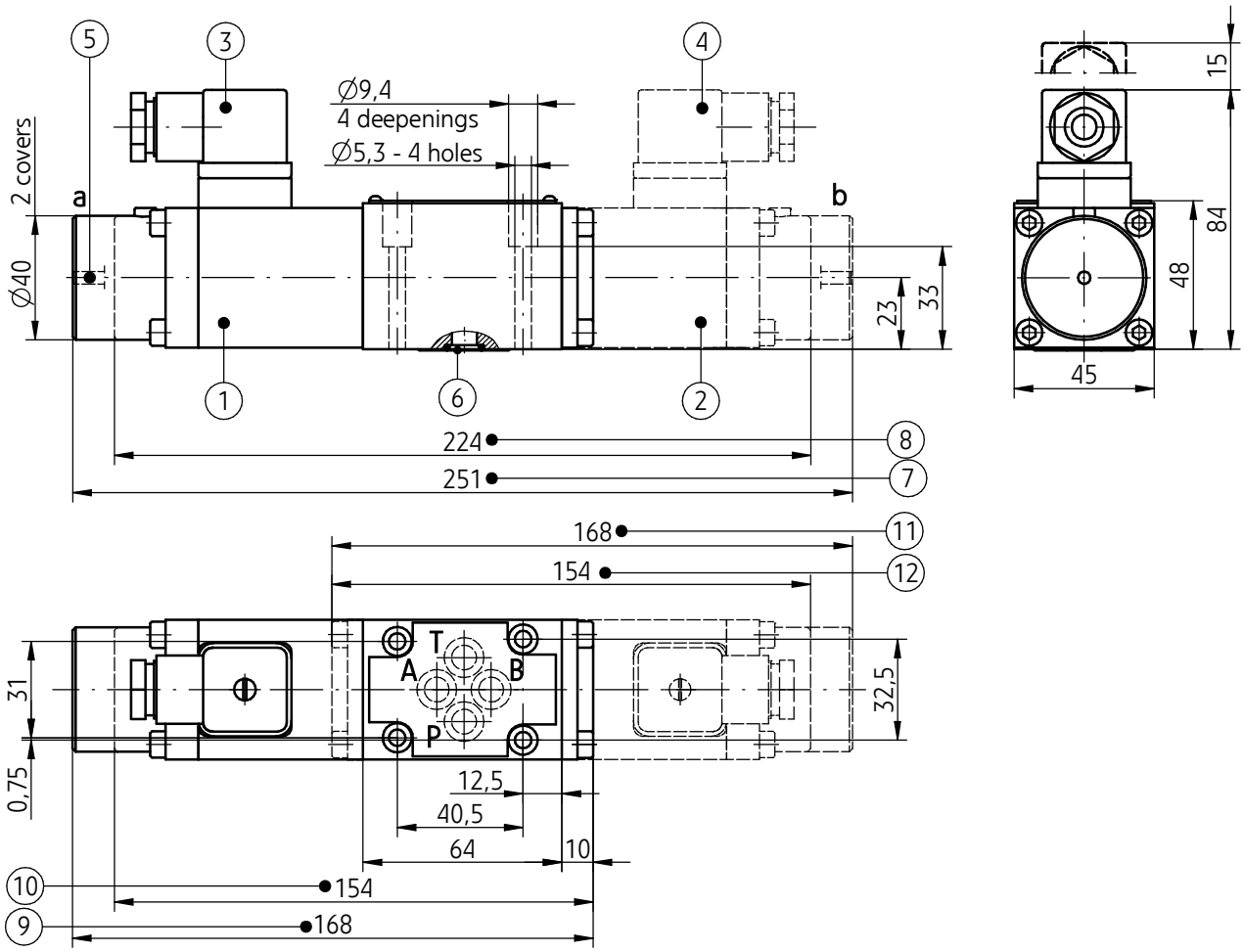
TECHNICAL DATA

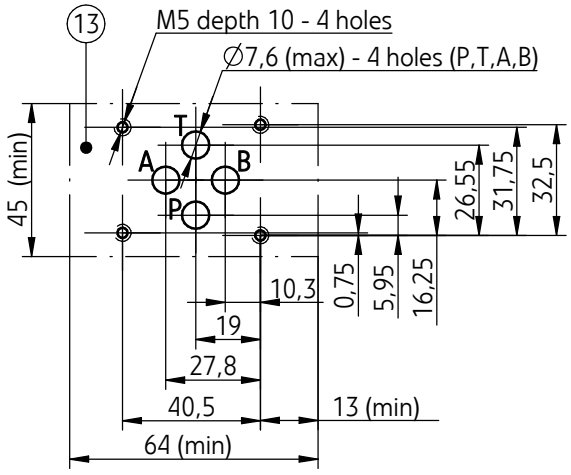
Hydraulic fluid	mineral oil	
Required fluid cleanliness class	**ISO 4406 class 20/18/15**	
Nominal fluid viscosity	37 mm^2/s at temperature 55°C	
Viscosity range	2,8 do 380 mm^2/s	
Fluid temperature range (in a tank)	recommended	40°C up to 55°C
	max	-20°C up to +70°C
Ambient temperature range	- 20°C up to +50°C	
Max operating pressure	**ports P, A, B**	**31, 5 MPa**
	port T	**16 MPa**
Hysteresis	<6%	
Repetition accuracy	<3%	
Operating position	optional	
Weight	with 1 solenoid - 1,8 kg	
	with 2 solenoids - 2,5 kg	
Nominal solenoid power	**13W**	
Resistance of cold solenoid coil (20 °C)	5,4 Ω	
Resistance of max hot solenoid coil	8,1 Ω	
Electronic regulators	**30 RE 20** according to Data Sheet **WK 495 773**	
	30 RE 20 D according to Data Sheet **WK 420 830**	
	MAP - SR - AR - according to Data Sheet on the Ponar Wadowice website - electronic joystick . • supply voltage **24V** • limit **Imax up to 1,5 A**	

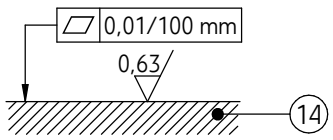
INSTALLATION AND OPERATION REQUIREMENTS

1. Only fully functional and operational valve, properly connected to electrical installation must be used. Connecting or disconnecting the valve to an electrical installation must only be carried out by qualified personnel.
2. Solenoid plug shall precisely adhere to socket and shall be secured with thread bolt screwed in securely in a place. It is forbidden to operate the valve if the tightness and suitable clamp of cable in the plug gland are not ensured.
3. During the period of operation must be kept fluid viscosity acc. to requirements defined in this Data Sheet - Operation Manual
4. In order to ensure failure free and safe operation the following must be checked:
   - condition of the electrical connection
   - proper working of the valve
   - cleanliness of the hydraulic fluid
5. Due to heating of valve housing to high temp., the valve shall be placed in such way to eliminate the risk of accidental contact with the valve during operation or to apply suitable covers acc. to PN-EN ISO 13732-1 and PN-EN 982
6. In order to ensure tightness of the valve block, one should take care of dimension of sealing rings and valve operation parameters given in this Data Sheet - Operation Manual
7. A person that operates the valve must be thoroughly familiar with this Data Sheet - Operation Manual.

OVERALL AND CONNECTION DIMENSIONS





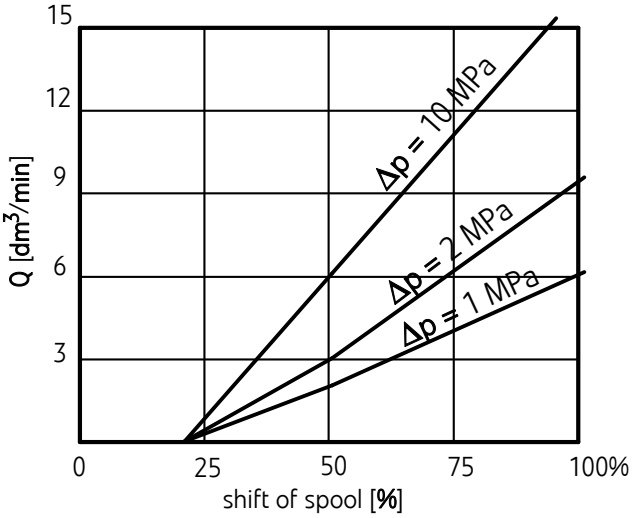


1 - Solenoid on side **a**
2 - Solenoid on side **b**
3 - Plug-in-connector on side **a** - type **ISO 4400** (DIN 43650 - A)
4 - Plug-in-connector on side **b** - type **ISO 4400** (DIN 43650 - A)
5 - Manual override
6 - Sealing **o-ring 9,2 x 1,8** - 4 pcs/set (**P**, **T**, **A**, **B**)
7 - Overall dimension of **3-position** valve with **2 solenoids** on side **a**, **b** - **with manual override** (spool diagrams: **E**, **E1**, **E2**, **E3**, **M**, **W**, **W1**, **W2**, **W3**, **V** - acc. to page 5)
8 - Overall valve dimension as item 7 - **without manual override**
9 - Overall dimension of **2-position** valve with **1 solenoid** on side **a** - **with manual override** (spool diagrams: **EA**, **MA**, **WA** - according to page 5)
10 - Overall valve dimension as item 9 - **without manual override**
11 - Overall dimension of **2-position** valve with **1 solenoid** on side **b** - **with manual override** (spool diagrams: **EB**, **MB**, **WB** - according to page 5)
12 - Overall valve dimension as item 11 - **without manual override**
13 - Porting pattern for proortional directional valve - configuration of connection holes in accordance with the standard **ISO 4401** - designation **ISO 4401**-03-02-0-94 (nominal size **CETOP 03**)
fixing screws **M5 x 40 - 10.9** in accordance with **PN -EN ISO 4762** - 4 pcs/set tightening torque **Md = 9 Nm**
14 - Requirements of surface state of the subplate

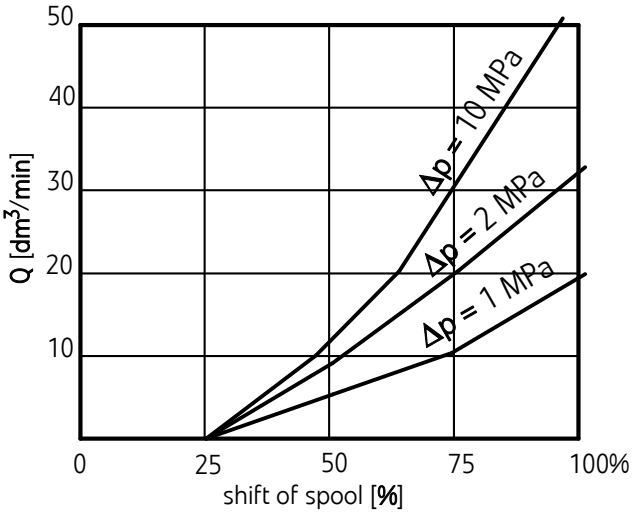
PERFORMANCE CURVES

measured at viscosity v = 41 mm²/s and temperature t = 50°C

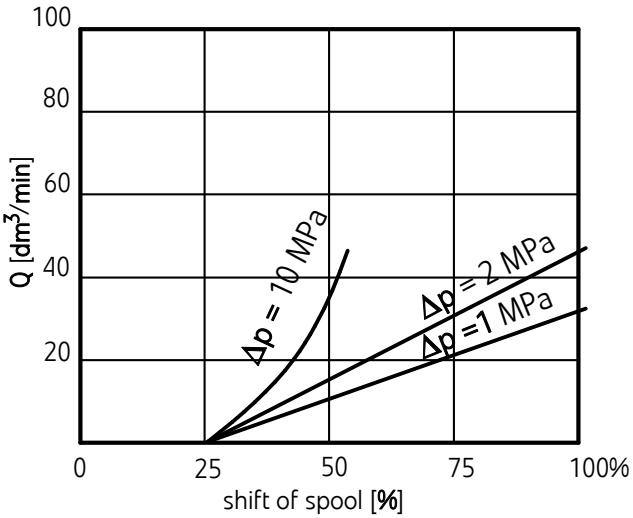
version USAB6...**L10**...



version USAB6...**Q20**...



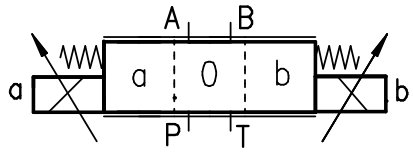
version USAB6...**Q32**...



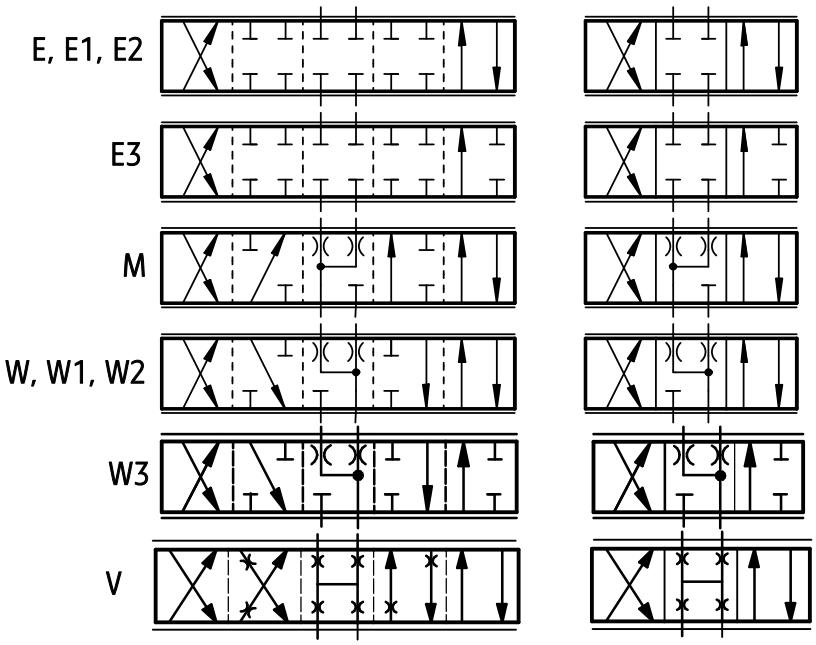
DIAGRAMS

diagrams of 3-position valves

versions USAB6**...**



spool diagrams



NOTES:

Flow rates for spools **E1**, **W1**:

P → A: Q max	**B → T: 0,5Q max**
P → B: 0,5Q max	**A → T: Q max**

Flow rates for spools **E2**, **W2**:

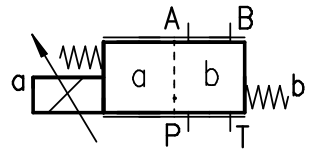
P → A: 0,5Q max	**B → T: Q max**
P → B: Q max	**A → T: 0,5Q max**

Flow rates for spools **E3**, **W3**:

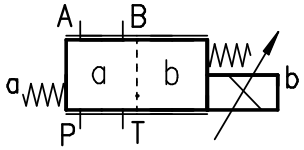
P → A: Q max	**B → T: close**
P → B: Q max	**A → T: Q max**

diagrams of 2-position valves

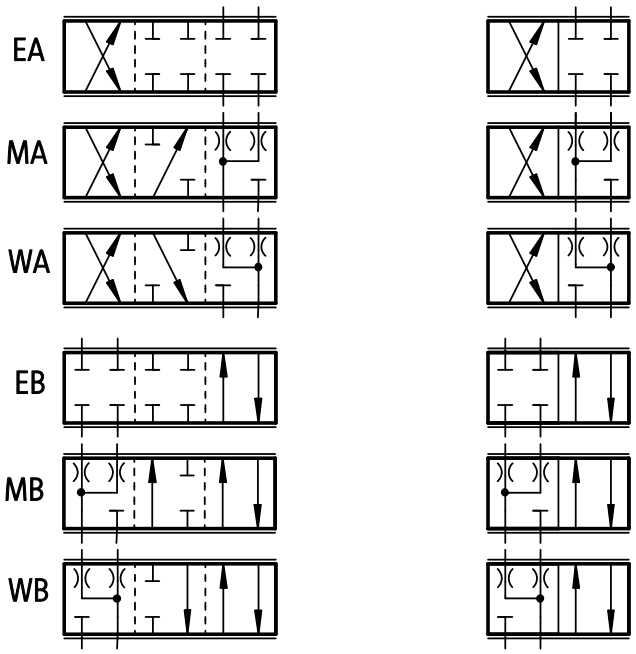
versions USAB6...**A...**



versions USAB6...**B...**



spool diagrams



HOW TO ORDER

USAB	6	+	/					★

Nominal size (NS)
NS6 = **6**

Series number
(30-39) - installation and connection dimensions unchanged = 3X

Spool symbol
spool diagrams - according to **page 5**

Flow changes
Linear (only for version with nominal flow 10 dm^3/min or additionally for version with spool **E** with nominal flow 20 dm^3/min) = L
Progressive = **Q**

Nominal flow at Δ p = 1MPa
10 dm^3/min = **10**
20 dm^3/min = **20**
32 dm^3/min = **32**

Manual override
solenoids withot manual override = **no designation**
solenoids with manual override = N

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:

Proportional valve should be ordered according to above coding.
The symbols in bold are the preffered versions available in short delivery time.

Coding example:USAB 6 - 3X /E Q 10

SUBPLATES AND FIXING SCREWS

Subplates must be ordered according to Data 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

Subplates and fixing screws **M5 x 40 - 10,9**
in accordance with **PN - EN ISO 4762** - 4 pcs/set)
must be ordered separately.
Tightening torque **Md = 9 Nm**
The subplate symbol in bold is the preferred version available in short delivery time.

Special design
version USAB6...SO.../495

APPLICATION, DESCRIPTION OF OPERATION, INSTALLATION AND OPERATION REQUIREMENTS, PORTING PATTERN, REQUIREMENTS OF SURFACE STATE OF SUBPLATE, PERFORMANCE CURVES, DIAGRAMS, SUBPLATES AND FIXING SCREWS
as in basic execution of proportional valve according to
pages 1, 2, 4, 5, 6

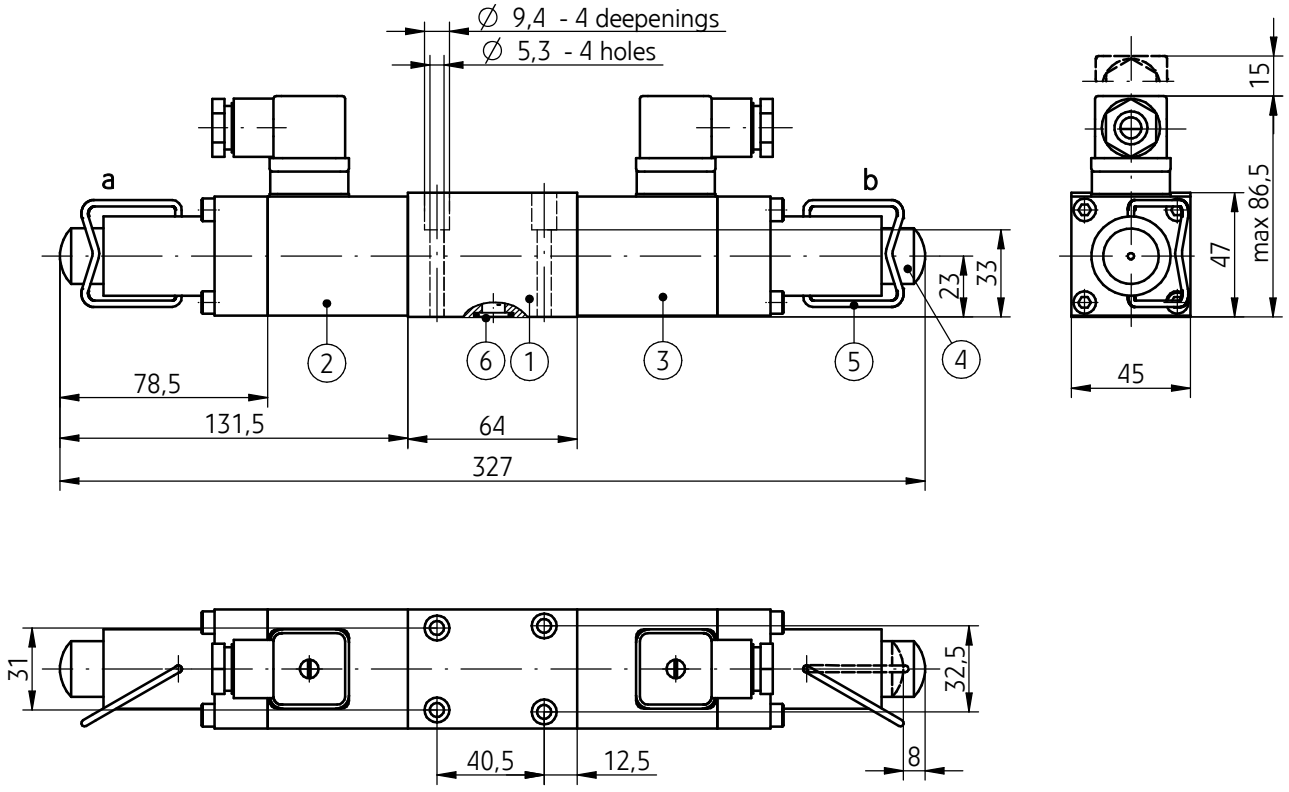
TECHNICAL DATA

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 +50°C	
Paint coating of the valve body	version USAB6...**SO 495**	paint coating - standard version	
	version USAB6...**SO7/495**	paint coating - tropical version: •reactive polyvinyl primer VERNOL •epoxy primer with high zinc content SIGMACOVER ZINC PRIMER •polyurethane-acrylic primer PU •polyurethane enamel tropicalized PU - T, colour RAL 6003 (olive-green)	
Max operating pressure		**ports P, A, B**	**31,5 MPa**
		port T	**16 MPa**
Hysteresis		<6%	
Repetition accuracy		<3%	
Operating position		optional	
Weight		with 1 solenoid - 1,8 kg	
		with 2 solenoids - 2,5 kg	
Nominal solenoid power		**13W**	
Resistance of cold solenoid coil (20°)C		5,4 Ω	
Resistance of max hot solenoid coil		8,1 Ω	
Electronic regulator		**30 RE 20** according to Data Sheet **WK 495 773**	

Special design
version USAB6...- SO.../495

OVERALL AND CONNECTION DIMENSIONS

version USAB6...- SO.../495



1 - Valve housing
2 - Solenoid on side **a**
3 - Solenoid on side **b**
4 - Manual override
5 - Lock spring
6 - Sealing **o-ring 9,2 x 1,8** - 4 pcs/set (**P**, **T**, **A**, **B**)

Special design
version USAB6...- SO.../495

HOW TO ORDER

USAB	6	–		/				N	V	–	

Nominal size (NS)
NS6 = 6

Series number
(30-39) - installation and connection dimensions unchanged = 3X

Spool symbol
spool diagrams - according to page 5

Flow changes
Linear (only for version with nominal flow Q =10 dm^3/min or additionally for version with spool **E** with nominal flow Q = 20 dm^3/min) = L
Progressive = Q

Nominal flow at Δ p = 1MPa
10 dm^3/min = 10
20 dm^3/min = 20
32 dm^3/min = 32

Manual override
solenoids with manual override = N

Sealing
FKM (for fluids on phosphate ester base) = V

Special design

solenoids with lock spring, standard plug-in-connector type ISO 4400 (DIN 43650 - A) = **SO495**

solenoids with lock spring, standard plug-in-connector type ISO 4400 (DIN 43650 - A);
paint coating of the valve body - tropical version acc. to page 7 = SO7/495

NOTES:

Special versions of proportional directional valve should be ordered according to above coding.
Coding example: USAB6 - 3X/W L 10 N V - SO 495

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