

# Proportional spool valve type USEB 6

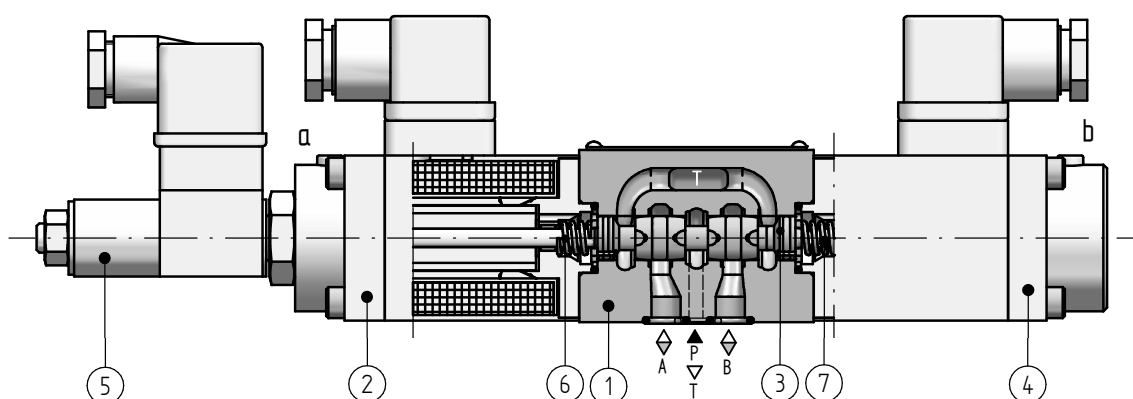
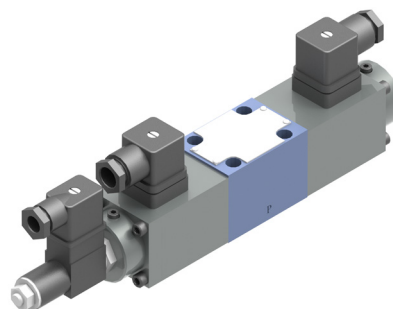
NS 6 |  $p_{max}$  35 MPa |  $Q_{max}$  32 dm<sup>3</sup>/min | WK 420 530



## DATA SHEET - OPERATION MANUAL

### APPLICATION

Proportional directional valve type USEB6... is used to control the direction and speed of movement of an actuator. Flow rate of hydraulic oil directed to the actuator is adjusted by change of electric current supplying the solenoid coil.



### DESCRIPTION OF OPERATION

The proportional directional valve type USEB 6 consists of the housing 1, solenoids 2 and 4, inductive offset detector 3, spool 5, springs 6 and 7. Electric regulator (30 RE ...) can be included with the valve. The regulator is applied to control proportional solenoids and receive the signals from offset detector. The proportional solenoid 2 or 4 pushes the spool from its neutral position. The neutral position is held by the springs 6 and 7. The inductive offset detector has double stroke. Its range allows to measure the offset of the spool from neutral position to the right or left. The offset of the spool

5 is transmitted electrically as initial data. It is held in the signal sent by the electronic regulator in form of current with certain intensity that is changed by the solenoid 2 or 4 into force pushing the spool 5 against spring 6 or 7. Simultaneously the offset detector 3 determines actual position of the spool and inform of electrical signals sends as feedback to the electronic regulator. The both signals: initial data and actual value are compared in the electronic regulator, which sends a new signal correcting the position of the spool 5 in order to adjust it in conforming with the initial signal.

### TECHNICAL DATA

hydraulic fluid required fluid cleanliness class	mineral oil ISO 4406 class 20/18/15
nominal fluid viscosity	37 mm <sup>2</sup> /s at temperature 55 °C
viscosity range	2,8 ÷ 380 mm <sup>2</sup> /s
fluid temperature range (in the tank)	rec: 40 ÷ 55°C; max.: -20 ÷ 70 °C
ambient temperature range	-20 ÷ 50 °C
max. working pressure	35 MPa (ports P, A, B); 21 MPa (port T)
hysteresis	<1%
repeatability	<1%
sensitivity	≤ 0,5% of nominal signal
hydr. zero shift	0,15%/ °C
working position	any position

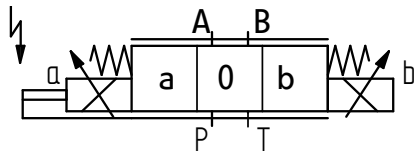
weight	with 2 solenoids	3 kg
	with 1 solenoids	1,8 kg
nom. power of the solenoid	13 W	
coil resistance	5,4 Ω (for cold electromagnet 20 °C)	
	8,5 Ω (for max. heated electromagnet)	
inductive switch stroke	± 4,5 mm linear	
linearity tolerance	1%	
resistance of sensor coil	coil I	56 Ω
	coil II	56 Ω
	coil III	112 Ω
electronic controllers	for valve with 2 solenoids	30RE21 acc. to WK 495 774
	for valves with 1 solenoid	30RE11 acc. to WK 495 772

assembly and operation requirements at: [www.operating-conditions.ponar.pl](http://www.operating-conditions.ponar.pl)

## HYDRAULIC DIAGRAMS

graphical symbols of 3-position spool valves

versions USEB6



### NOTES:

for spools **E1** i **W1** flows are:

$P \rightarrow A: Q_{max}$        $B \rightarrow T: 0,5 Q_{max}$

$P \rightarrow B: 0,5 Q_{max}$        $A \rightarrow T: Q_{max}$

for spools **E2** i **W2** flows are:

$P \rightarrow A: 0,5 Q_{max}$        $B \rightarrow T: Q_{max}$

$P \rightarrow B: Q_{max}$        $A \rightarrow T: 0,5 Q_{max}$

for spools **E3** i **W3** flows are:

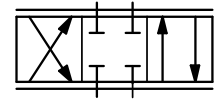
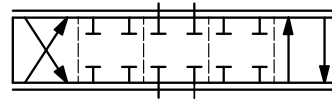
$P \rightarrow A: Q_{max}$        $B \rightarrow T: \text{closed}$

$P \rightarrow B: Q_{max}$        $A \rightarrow T: Q_{max}$

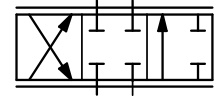
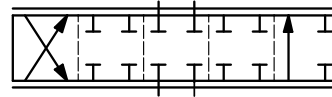
positions: working and interim

working

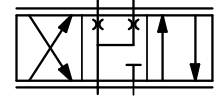
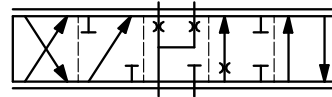
E, E1, E2



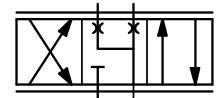
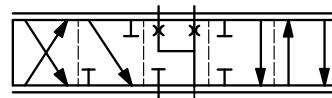
E3



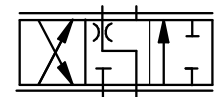
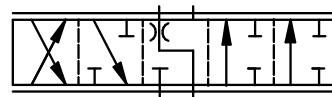
M



W, W1, W2

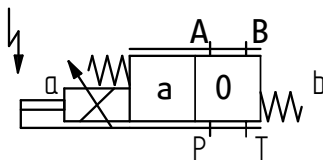


W3



graphical symbols of 2-position spool valves

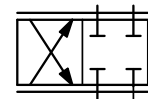
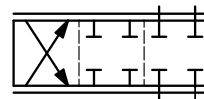
versions USEB6...A...



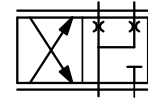
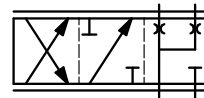
positions: working and interim

working

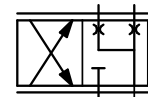
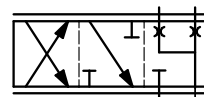
EA



MA

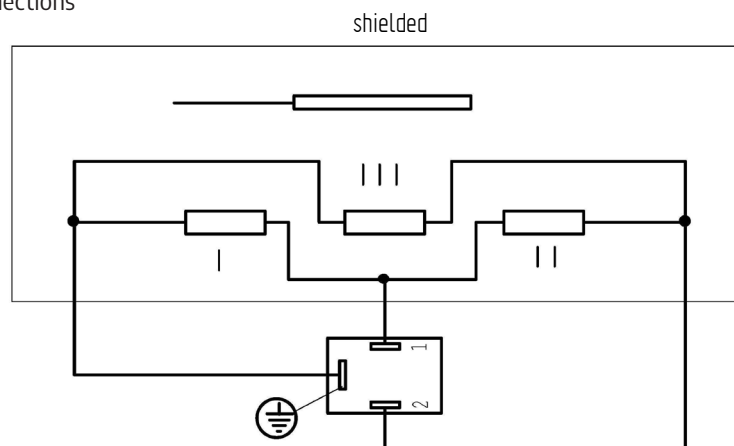


WA

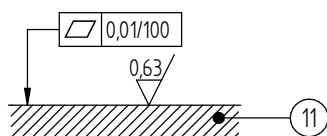
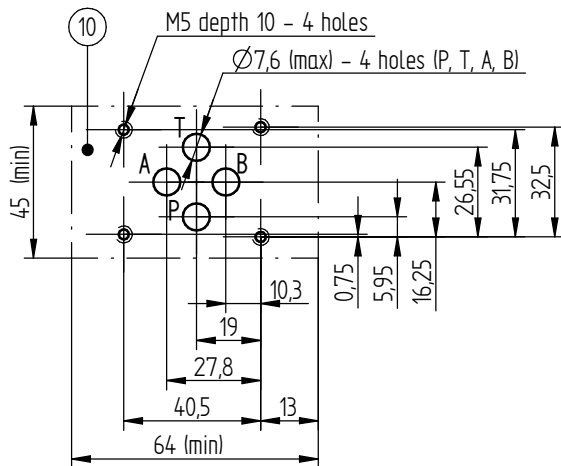
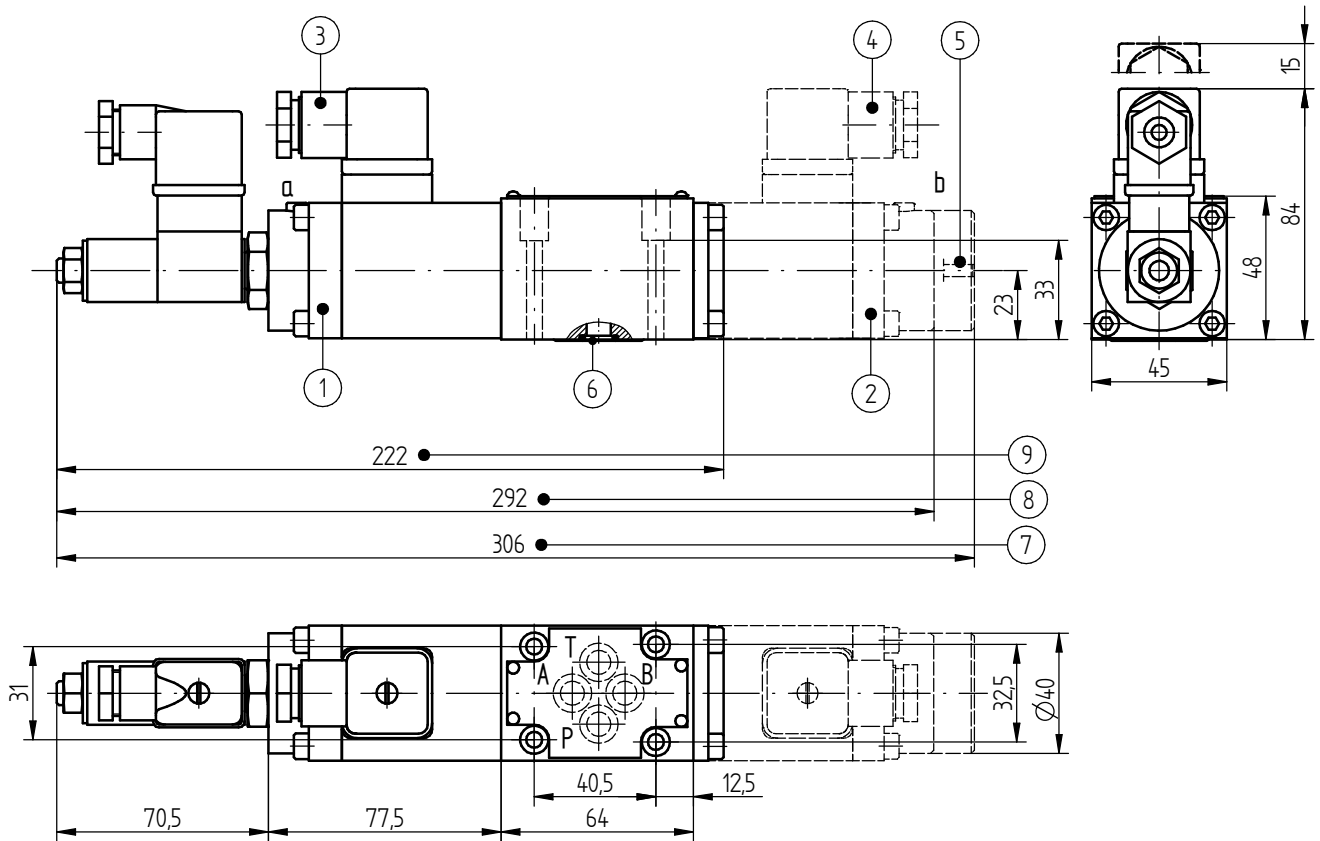


## DIAGRAMS

diagram of the sensor coil connections



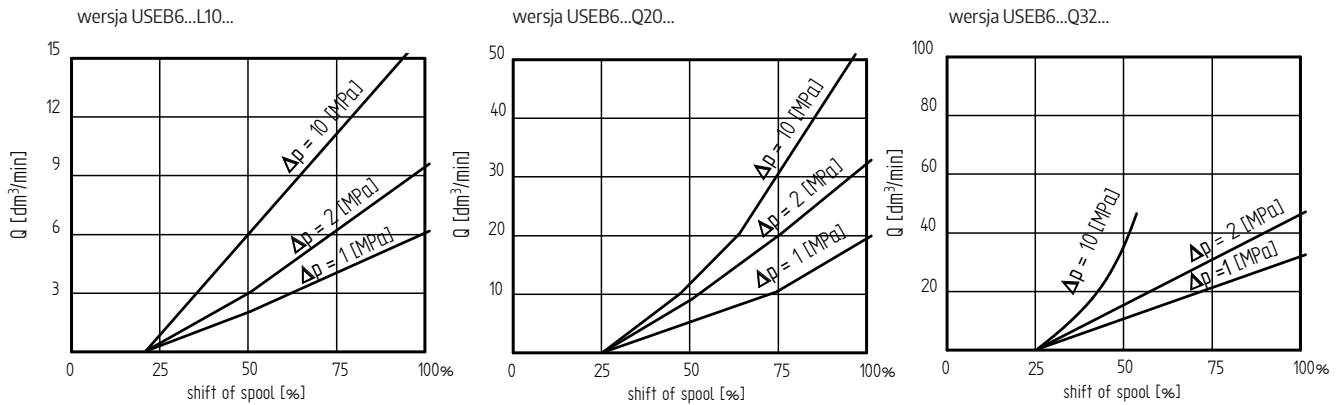
## OVERALL AND CONNECTION DIMENSIONS



1. solenoid on a side
2. solenoid on b side
3. connector on a side - type ISO 4400 (DIN 43650)
4. connector on b side - type ISO 4400 (DIN 43650)
5. manual override
6. o-ring  $9,2 \times 1,8$  - 4 pcs/set (P, T, A, B)
7. dimension of a 3-position valve with 2 solenoids - on sides a, b - with manual override - only on side b (port B) (spools: E, E1, E2, E3, M, W, W1, W2, W3 see page 2)
8. dimension of the valve as in poin 7, - **without manual override**
9. dimension of a 2-position valve with with 1 solenoid on a side (spools: EA, MA, WA - see page 2)
10. porting pattern of the subplate compliant with ISO 4401 designation ISO 4401-03-04-0-94 (CETOP 03)
11. required surface quality of the valve contact surface

## PERFORMANCE CURVES

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



## HOW TO ORDER

USEB **6** —  /         \*

1                      2                      3                      4                      5                      6                      7                      8

### 1 nominal size (NS)

NS6 =

### 2 series number

**series 32 =**   
series 30÷39 connection and installation dimensions unchanged

### 3 spool symbol

spool symbols -  see page 2

### 4 flow changes

linear\* =   
**progressive =**

\* only for version with nominal flow 10 dm<sup>3</sup>/min for version with spool E with nominal flow 20 dm<sup>3</sup>/min

### 5 nominal flow (at $\Delta p = 1 \text{ MPa}$ )

10 dm<sup>3</sup>/min =   
20 dm<sup>3</sup>/min =   
32 dm<sup>3</sup>/min =

### 6 manual override\*

**without manual override =**   
with manual override =

\* available only for 3-position versions for solenoid on side b (port B)

### 7 sealing

**NBR (for fluids on mineral oil base) =**   
FKM (for fluids on phosphate ester base) =

### 8 further requirements = \*

(agreed upon with the Manufacturer)

Ø indicates that the box should be left blank.

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

Coding example: **USEB6-3X/EQ10**

## SUBPLATES AND MOUNTING SCREWS

Subplates must be ordered according to data sheet WK 496 480:

G 341/01 - threaded connection G  $\frac{1}{4}$

**G 342/01 - threaded connection G  $\frac{3}{8}$**

G 502/01 - threaded connection G  $\frac{1}{2}$

Mounting screws for the directional spool valve:

**M5 × 40 - 10,9** acc. to **PN - EN ISO 4762 (PN/M-82302)**

4 pcs/set delivered on separate order.

Tightening torque of the screws  $M_d = 9 \text{ Nm}$

## CONTACT

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