

# Directional spool valve electrically operated type WE6

NS 6 |  $p_{max}$  35 MPa |  $Q_{max}$  80 dm<sup>3</sup>/min | WK 420 970

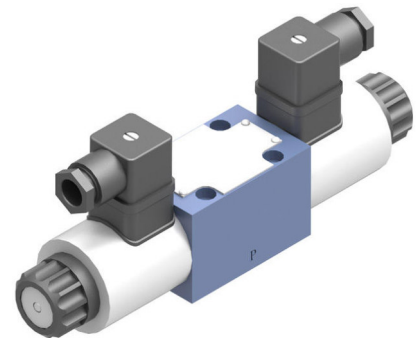


## DATA SHEET - OPERATION MANUAL

### APPLICATION

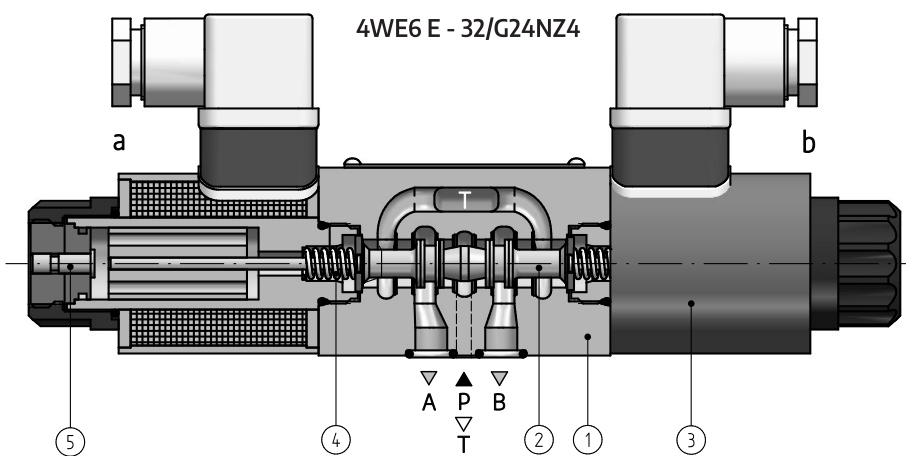
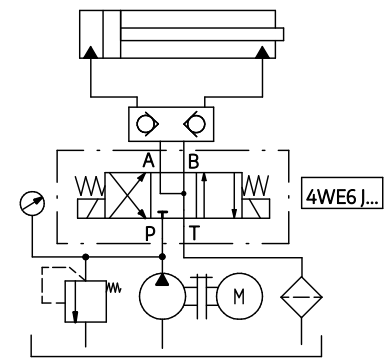
Directional spool valves type **WE6...** electrically operated are used to change direction of fluid flow in a hydraulic system which allows to change direction of movement of an actuator (usually a piston rod of a cylinder or a hydraulic motor) and to control functions: **start** and **stop**. These valves are used for subplate mounting in any position in a hydraulic system.

The product is compliant with the directive 2014/35/UE.



### EXAMPLE OF APPLICATION

in a hydraulic system



### DESCRIPTION OF OPERATION

Main elements of directional spool valve type **WE6...** : housing **1**, solenoids **3**, spool **2**, centering springs **4** and manual override **5**. The valve is shifted when spool **2** is moved into one of end positions by the force of solenoid **3**. The return of the spool into neutral (de-energized) position is caused by the centering springs **4**. The shape of the spool affects connections configuration of ports: **A, B, P** and **T**.

Function of ports: **P** - supply port; **T** - oil return to the tank; **A, B** - ports for an actuator (a cylinder or a hydraulic motor). In case of emergency, the spool can be shifted manually by the override **5** - only for version with manual override option. Directional spool valve should be mounted in easily accessible way.

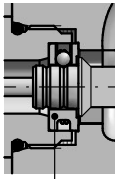
### TECHNICAL DATA

hydraulic fluid	mineral oil	supply voltage	DC	AC - plug with rectifier	AC-direct power
cleanliness class	ISO 4406 class 20/18/15	of solenoids	12V; 24V; 110 V	230V-50Hz; 110V-50Hz	supply 230V-50Hz
nominal fluid viscosity	37 mm <sup>2</sup> /s at temperature 55°C	supply voltage tolerance	± 10%		
viscosity range	2,8 ÷ 380 mm <sup>2</sup> /s	power consumption (DC)	30 W		
fluid temperature range (in the tank)	recommended: 40 ÷ 55 °C; max.: -20 ÷ 70 °C	holding power (AC)	-		
ambient temperature range	-20 ÷ 50 °C	switch-on power (AC)	-		
maximum operating pressure	35 MPa (ports P, A, B); 21 MPa (port T)	max. switching frequency	15 000/h		12 000/h
weight	with 1 solenoid	WE6...	5% of pressure change 30 ÷ 60 ms		
		WE6...H...	95% of pressure change 30 ÷ 70 ms		
	with 2 solenoids	WE6...	5% of pressure change 15 ÷ 50 ms		
		WE6...H...	5% of pressure change 30 ÷ 60 ms		
Flow cross-section (spool position 0)	spool W: 3% of nominal cross-section				
protection class	IP 65				
solenoid coil temperature	max. 150 °C				

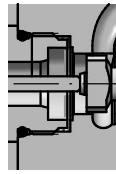
\* switching time according to ISO 6403 with a directional control valve in horizontal position

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

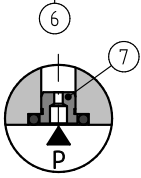
## SPOOL CENTERING VERSIONS OF... and O...



Version **WE6.../OF...** - 2-position directional spool valve without spring return, with detent. The spool **2** is positioned and fixed with detent **6** and shift is caused by providing voltage impulse to the solenoid.



Version **WE6.../O...** - 2-position directional spool valve without spring return. The spool is positioned and fixed with activated solenoid. The valve has no defined natural position in the de-energized condition.

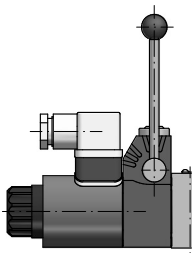


### VERSION WITH THROTTLE INSERT

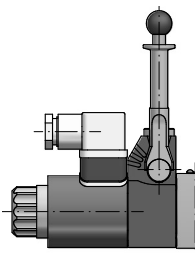
Version **WE6.../...B...** - directional spool valve has throttle insert **7** in port **P**.

## ADDITIONAL EQUIPMENT (OPTIONAL)

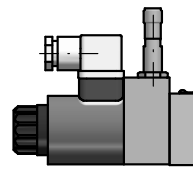
manual control lever	<b>WE6.../...H...</b>
manual control lever with a lock	<b>WE6.../...HF...</b>
inductive position switch type <b>S</b>	<b>WE6.../... - S</b>
inductive position switch type <b>M</b>	<b>WE6.../... - M</b>



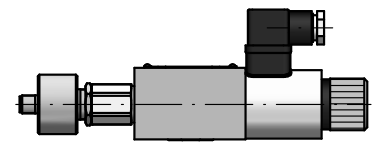
**WE6.../...H**



**WE6.../...HF**



**WE6.../...- S**

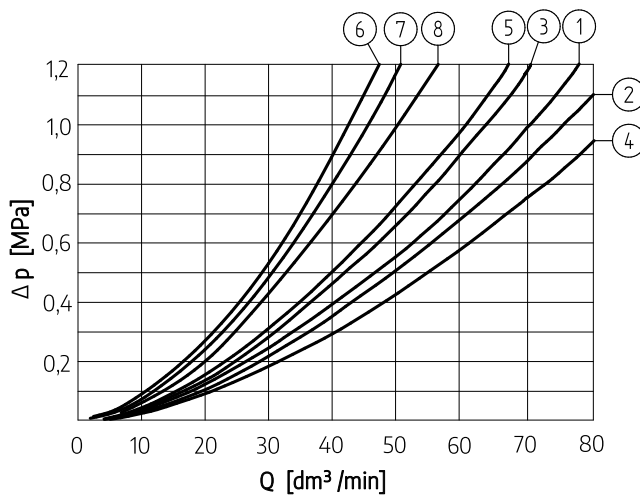


**WE6.../...- M**

## CHARACTERISTIC CURVES

flow resistance characteristic curves (measured at viscosity  $\nu = 41 \text{ mm}^2/\text{s}$  and temperature  $t = 50 \text{ }^\circ\text{C}$ )

characteristic curves  $\Delta p$  (**Q**) for directional spool valve type **WE6...** for various spool types

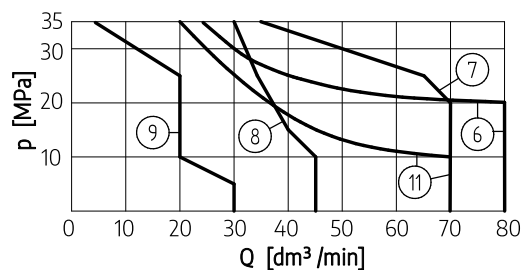
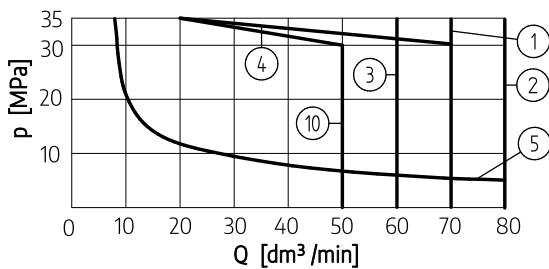


spool symbol working positions see pages 4; 5	characteristic curve			
	direction of flow			
	P → A	P → B	A → T	B → T
A; B	3	3	-	-
C	1	1	3	1
D; Y	5	5	3	3
E	3	3	1	1
F	2	3	3	5
G	7	7	6	6
H	2	4	2	2
J	1	1	2	1
L; W	1	1	2	2
M	2	4	3	3
P	2	3	3	5
U	3	1	3	3
D1	5	-	-	5
Y1	-	5	5	-
central position see pages 4; 5	direction of flow			
	P → A P → B	P → T	A → T B → T	B → A
G	-	8	-	-

## PERFORMANCE CURVES

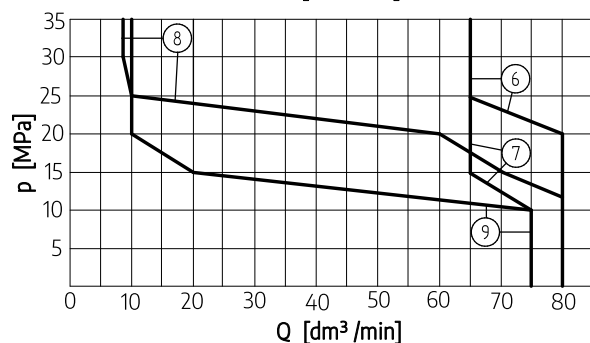
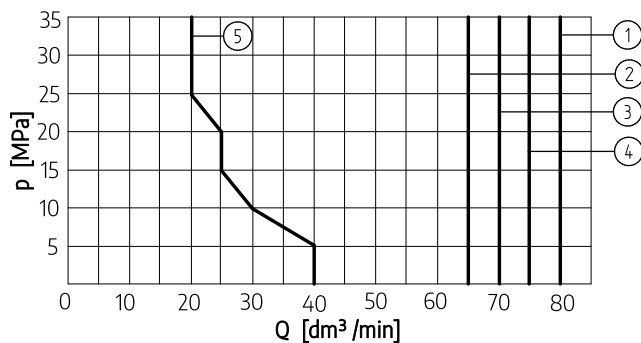
### Performance limits

characteristic curves **p-Q** for directional spool valve **WE6...** with **DC solenoids** for various spool types



spool symbol (see pages 4; 5)	characteristic curve
E; EA/O; EB/O; MA/O; MB/O; EA/OF; EB/OF; MA/OF; MB/OF	1
H; M; L; U; JA/O; JB/O; C/OF; D/OF; JA/OF; JB/OF; HA/OF; HB/OF	2
C/O; D/O	3
C; D; Y	4
A; B	5
A/O	6
J	7
G	8
F; P	9
D1; Y1	10
GA/O; GB/O; GA/OF; GB/OF	11

characteristic curves **p-Q** for directional spool valve type **WE6...** with **AC solenoids with direct supply** for various spool types



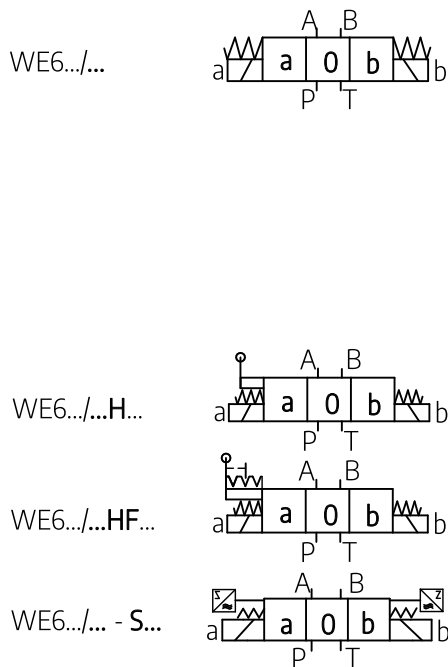
spool symbol (see pages 4; 5)	characteristic curve
C; D; H; D/O; HA/O; HB/O; EA/O; EB/O; JA/O; JB/O; D/OF; HA/OF; HB/OF; EA/OF; EB/OF; JA/OF; JB/OF; C/OF	1
W	2
E; MA/O; MB/O; MA/OF; MB/OF	3
L	4
G	5
J	6
M	7
A	8
GA/O; GB/O; GA/OF; GB/OF	9

### NOTES:

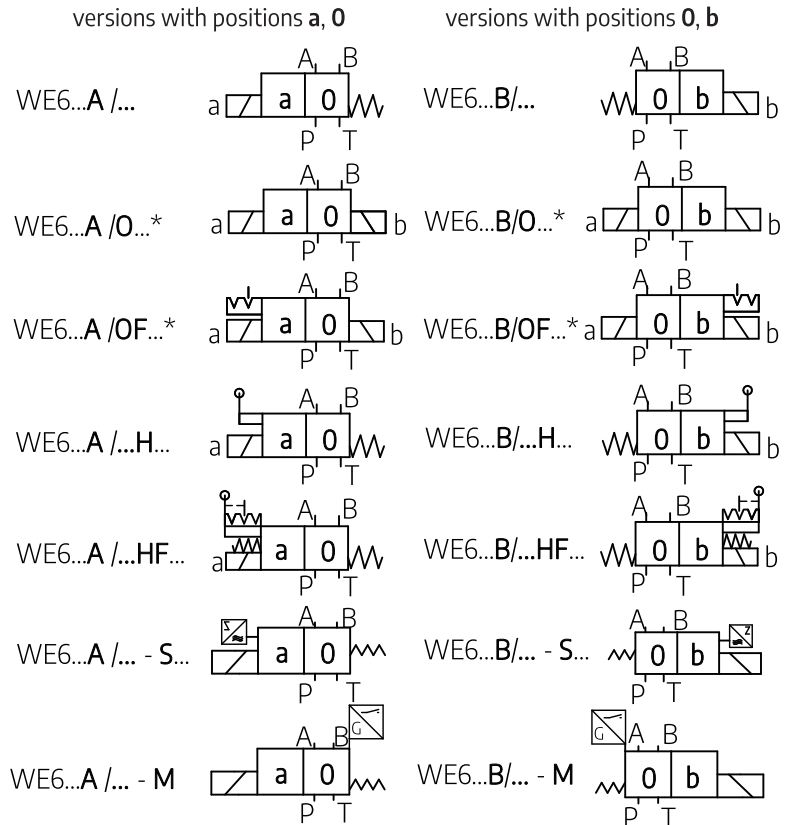
The above operating limits are related to symmetrical flow through all ports i.e. if the oil flows from **P** to **A**, then the same flow rate is from **B** to **T** (for directional control valves with 4 service ports). Asymmetry in flow affects the parameters negatively.

## SYMBOLS

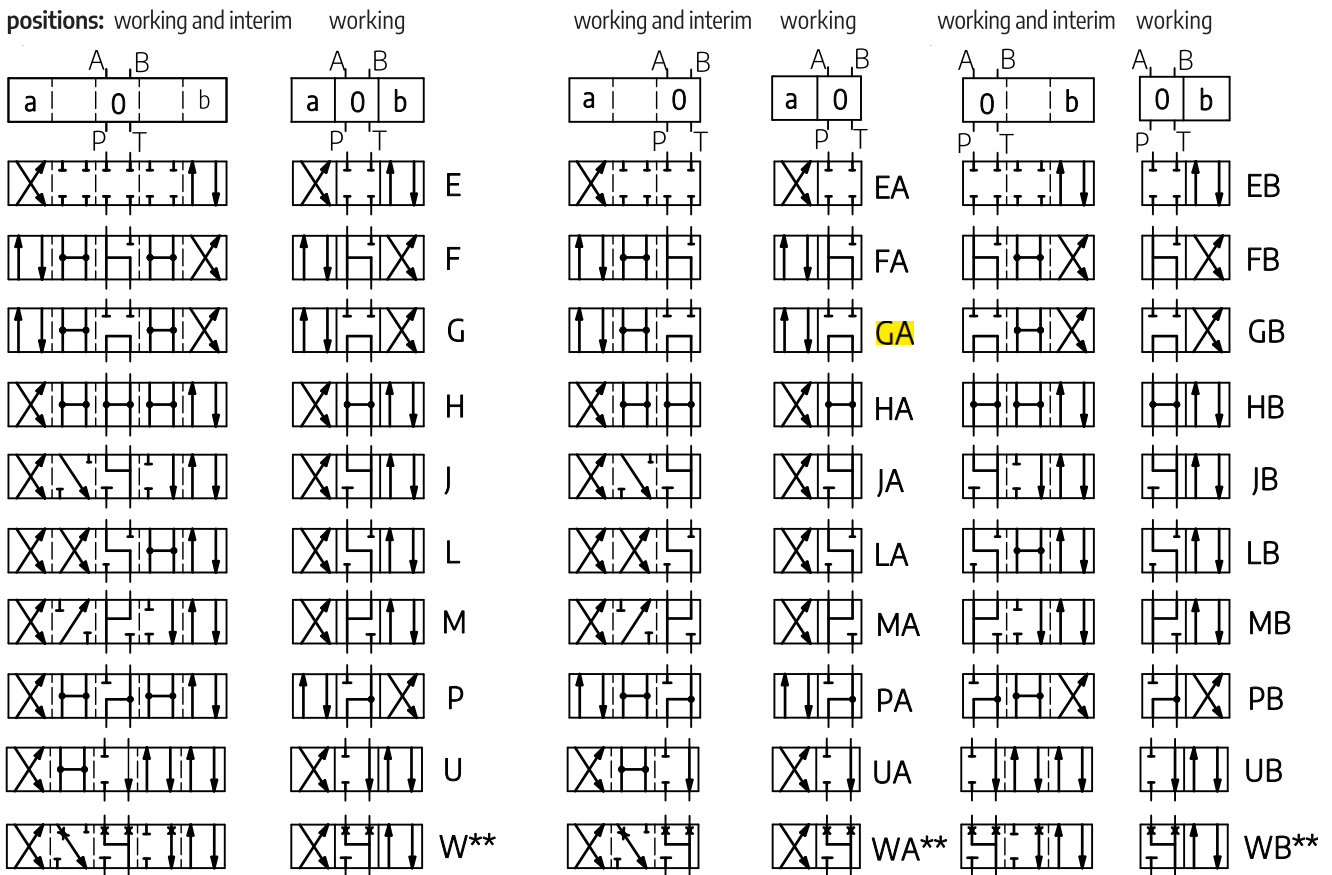
symbols for 3-position directional spool valves



symbols for 2-position directional spool valves



## DIAGRAMS OF SPOOLS

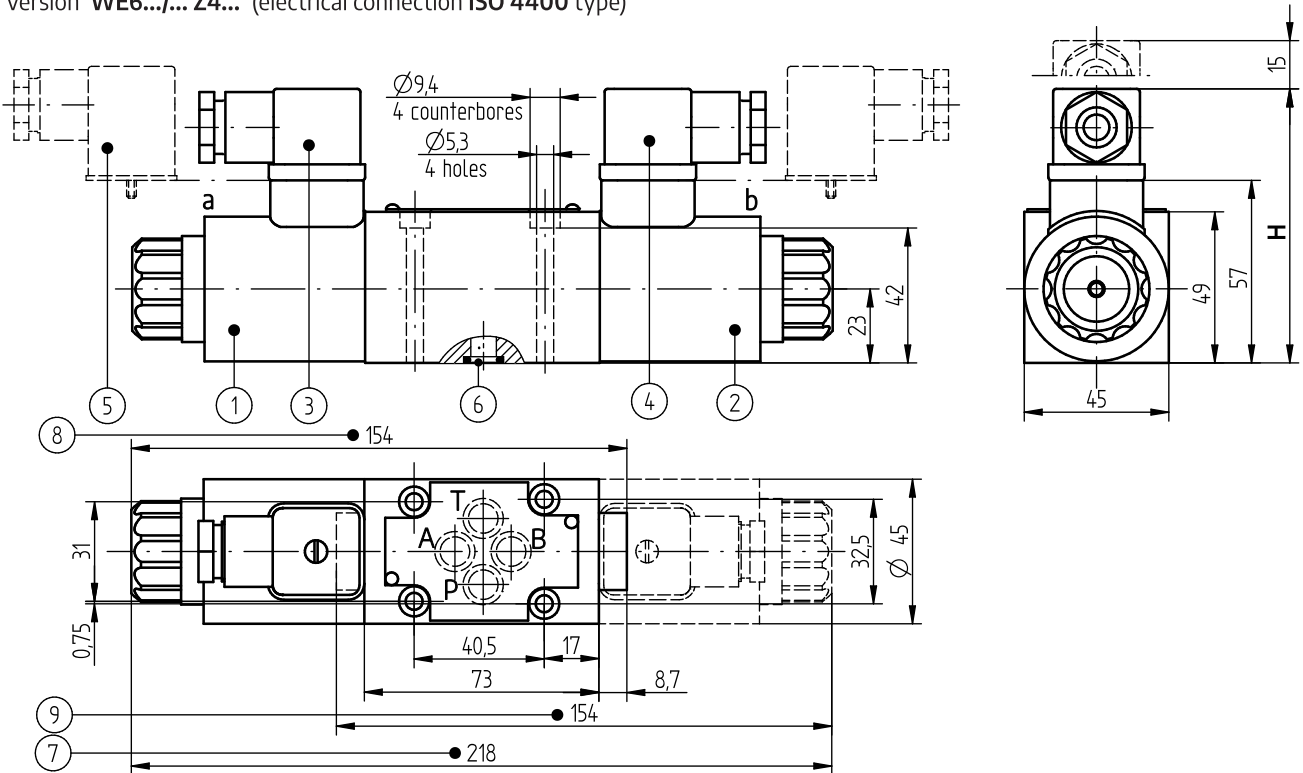


(\*) - versions available only with spools: EA, GA, HA, JA, MA, EB, GB, HB, JB, MB

(\*\*) - flow cross-section for spool W (position O) - 3% of nominal flow

## OVERALL AND CONNECTION DIMENSIONS

version WE6.../... Z4... (electrical connection ISO 4400 type)



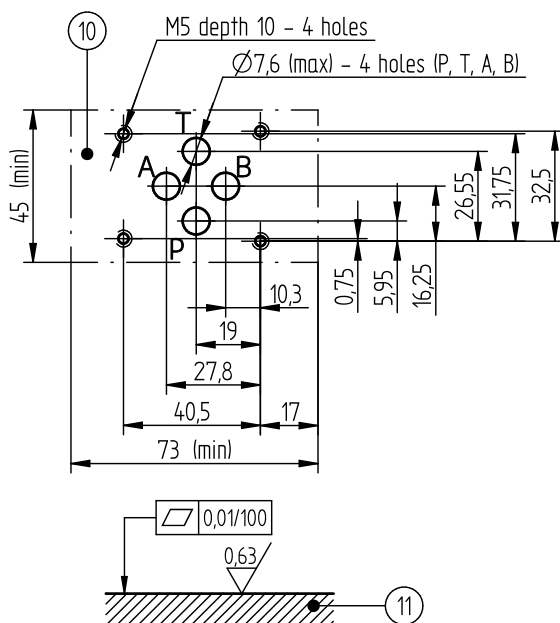
### electrical connection option ...Z4... (ISO 4400)

connector type	supply voltage	dimension H
<b>ISO 4400 (DIN 43650-A)</b>	<b>DC: 12V; 24V; 110V</b>	<b>86</b>
ISO 4400 (DIN 43650-A) with rectifier	AC: 110V; 220V; 230V	93

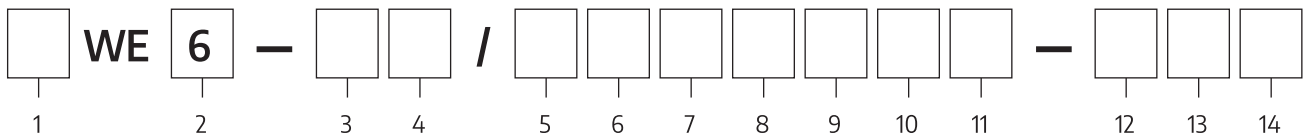
### NOTES:

- versions of WE6... DC solenoids with other connectors, see page 7
- versions of WE6... AC solenoids with direct power supply, see page 8

- solenoid on **a** side
- solenoid on **b** side
- connector on **a** side - ISO 4400 type (DIN 43650 - A)
- connector on **b** side - ISO 4400 type (DIN 43650 - A)
- connector - ISO 4400 type (DIN 43650 - A) with rectifier
- o-ring  $9,25 \times 1,78$  - pcs. 4 /set (P, T, A, B)
- directional spool valve dimension with 2 solenoids on side - **a, b**
  - 3-position with spring return (spool diagrams: E, F, G, H, I, L, M, P, U, W - see page 4)
  - 2-position without spring return
  - 2-position without spring return and with detent (versions WE6.../O...; .../OF...; spools: A, C, D, EA, GA, HA, JA, MA, EB, GB, HB, JB, MB - see pages 4, 5)
- directional spool valve dimension with 1 solenoid on **a** side 2-position with spring return (spools: A, C, D, D1, EA, FA, GA, HA, JA, LA, MA, PA, UA, WA - see pages 4, 5)
- directional spool valve dimension with 1 solenoid on **b** side 2-position with spring return (spools: B, Y, Y1, EB, FB, GB, HB, JB, LB, MB, PB, UB, WB - see pages 4, 5)
- porting pattern of subplate surface compliant with ISO 4401 designation ISO 4401-03-02-0-94 (CETOP 03) mounting screws M5 × 50 -10.9 in accordance with PN-EN ISO 4762 (PN/M-82302) - pcs. 4 /set tightening torque  $M_d = 9 \text{ Nm}$ .
- required surface quality of the valve contact surface



## HOW TO ORDER



### 1 number of main ports

3 main ports (only for spools A, B) = 3  
**4 main ports (for the other spools) = 4**

### 2 nominal size (NS)

**NS6 = 6**

### 3 spool symbol

spool symbols - see pages 4; 5

### 4 series number

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

### 5 spool positioning

with spring return =  $\emptyset$   
 without spring return\* = 0  
 without spring return with detent\* = OF

\* options available only for spools: A, C, D, EA, GA, HA, JA, MA, EB, GB, HB, JB, MB)

### 6 supply voltage of solenoids

12V DC = G12  
**24V DC = G24**  
 110V DC = G110  
 110V AC 50Hz  
 (connector with rectifier) = W110R  
 220V AC 50Hz  
 (connector with rectifier) = W220R  
**230V AC 50Hz**  
**(connector with rectifier) = W230R**  
 230V AC 50Hz  
 (direct power supply  
 with AC current) = W230-50

### 7 manual override

**solenoids with manual override = N**  
 solenoids without manual override (only for version with inductive position switch M type) =  $\emptyset$

### 8 manual lever control\*

no lever =  $\emptyset$   
 lever positioned vertically = H  
 lever positioned vertically with a lock = HF  
 lever positioned diagonally = HS  
 lever positioned diagonally with a lock = HSF

\* options with a manual lever control (...H...; ...HS...; ...HF...; ...HSF...) for versions: WE6...A/O...; ...A/O...; ...B/O...; ...B/O... with spools: EA, GA, HA, JA, MA, EB, GB, HB, JB, MB available after consultation with the Manufacturer

### 9 electrical connection type

**connector ISO 4400 (DIN 43650-A) without LED = Z4**  
 connector ISO 4400 (DIN 43650-A) with LED = Z4L  
 AMP Junior Timer (without mating connector; only for options G12; G24) = J  
 Deutsch (without mating connector; only for option G12; G24) = D

### 10 throttle insert (in port P)

without throttle insert =  $\emptyset$   
 throttle insert  $\emptyset$  0,8 = B 08  
 throttle insert  $\emptyset$  1,0 = B 10  
 throttle insert  $\emptyset$  1,2 = B 12

### 11 seal type

**NBR (for fluids on mineral oil base) =  $\emptyset$**   
 FKM (for fluids on phosphate ester base) = V

### 12 spool position monitoring\*

without position switch =  $\emptyset$   
 spool position switch type S1 = S1  
 spool position switch type S2 = S2  
 spool position switch type M (only for 2-position versions with spring return) = M

\* optional versions with a spool position switch and a manual lever control (options ...H...; ...HS...; ...HF...; ...HSF...) available after consultation with the Manufacturer

### 13 monitored spool position

without spool position monitoring =  $\emptyset$   
 monitored position 0 - zero = 0

\* 3-position versions, 2-position versions with positions (a, 0) or (0, b)

monitored position a = A

\* 2-position versions with positions (a, 0) or (a, b)

monitored position b = B

\* 2-position versions with positions (a, b) or (0, b)

monitored positions a and b = AB

\* 3-position versions

### 14 further requirements = \*

(to be agreed upon with the Manufacturer)

$\emptyset$  indicates that the box should be left blank.

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

Coding example:: **4 WE6 E - 32/G24 N Z4 B08 - S1 AB**

## SUBPLATES AND MOUNTING SCREWS

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

- G341/01 - threaded connections G 1/4
- **G342/01** - threaded connections **G 3/8**
- G502/01 - threaded connections G 1/2

Subplates and screws for mounting directional spool valve **M5 × 50 -10.9** in accordance with **PN-EN ISO 4762** - 4 pcs./set. Tightening torque of the screws **Md = 9 Nm**.

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

**Subplates and mounting screws must be ordered separately.**