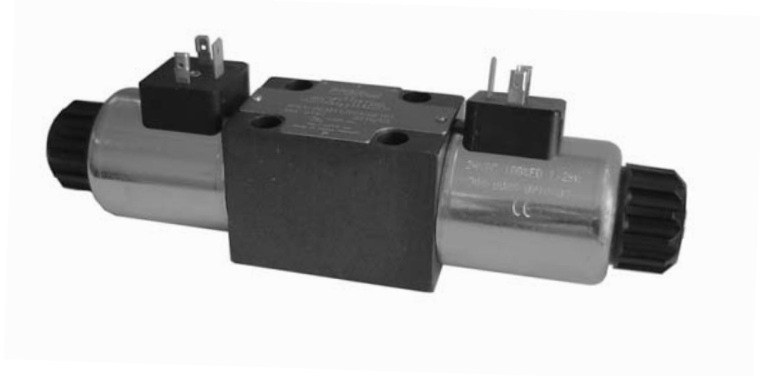
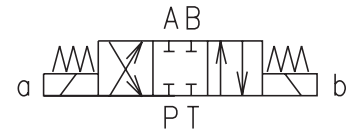


- 4/3-, 4/2- way directional control valves
- Solenoids can be turned around their axis to any position
- Four-land spool - reduced functional dependence on fluid viscosity
- Push button manual override
- Installation dimensions to DIN 24 340 / ISO 4401 / CETOP RP121-H
- Subplates see data sheet HU 0002
- CSA Upon request



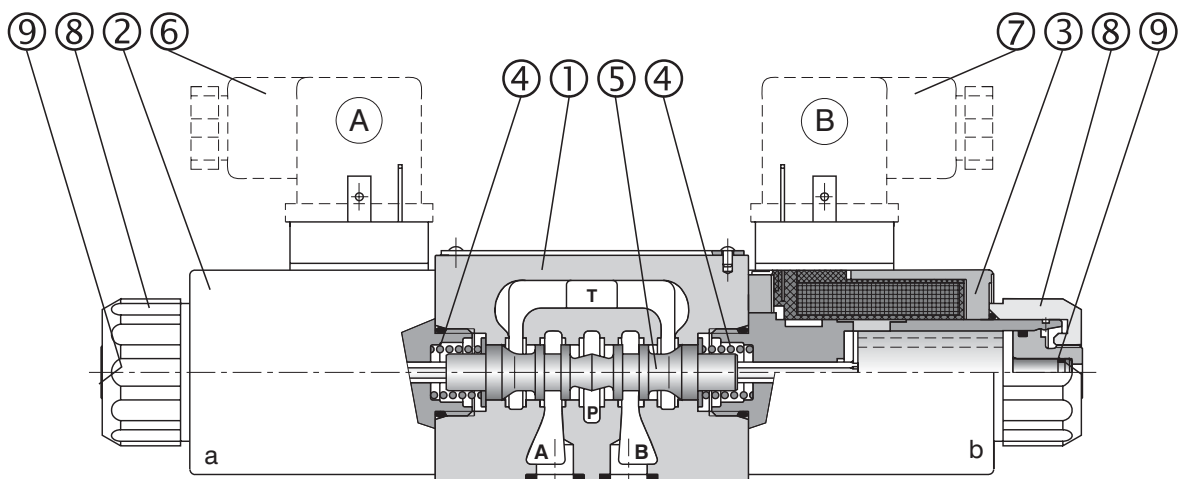
## Functional Description

The WE3 directional control valves consist of housing (1), a control spool (5) with two centering springs (4) and cylindrical operating solenoids (2, 3).

The three-position directional control valves are fitted with two solenoids and two springs. Two-position directional control valves have either one solenoid and one return spring or two solenoids and a detent assembly.

The operating solenoids are DC solenoids. For AC supply the solenoids are provided with a rectifiers which

are integrated in the DIN connector socket as part of the solenoid. The connectors (6, 7) can be turned by 90°. By loosening the nut (8), the solenoids can be turned or replaced without interfering with any seals of the valve. In the case of solenoid malfunction or power failure, the spool of the valve can be shifted by manual override (9), provided the pressure in T-port does not exceed 25 bar. The valve housing (1) is phosphate coated and the solenoids (2, 3) are zinc coated.



# Order Code

WE3-06   /

**Directional Control Valves Solenoid Operated**

**Valve size**

**Number of valve positions**




two positions **2**  
three positions **3**

**Spool symbols**

see the table spool symbols

**Rated supply voltage of solenoids**

(at the coil terminals)

12 V DC / 2.72 A  **01200**  
24 V DC / 1.29 A  **02400**  
205 V DC / 0.15 A **20500**  
230 V AC / 0.17 A / 50 (60) Hz  **23050**

The AC coils correspond with E5 type

CSA Upon request 

**Type of solenoid coil**

with terminal for the connector, EN 1745301-803 **E1**  
with integrated quenching diode and terminal **E2**  
for the connector, EN 1745301-803  
with AMP-Junior-Timer-connector **E3A**  
with integrated quenching diode and terminal **E4A**  
for AMP-Junior-Timer connector  
with integrated rectifier and terminal **E5**  
for the connector, EN 1745301-803

Other coils on demand see catalog HA8007

**Sensing of the end position**

**no designation** without sensor  
**S1** normally-open sensor to 50 bar (725PSI)  
**S2** normally-open sensor to 210bar (3045 PSI)  
**S4** normally-closed sensor to 50bar (725 PSI)

**Seals**  
**no designation** NBR  
**V** FPM (Viton)

**Orifice in P port**  
**no designation** without orifice  
**D1** Ø1.0 mm (0.039 inch)  
**D2** Ø1.5 mm (0.059 inch)  
**D3** Ø2.0 mm (0.079 inch)  
**D4** Ø2.2 mm (0.087 inch)  
**D5** Ø2.5 mm (0.098 inch)

**Soft Shift - Spool speed control orifice**  
**no designation** without damping  
**T1** orifice Ø 0.7 mm (0.03 inch) in solenoid

**Manual override**  
**no designation** tandard  
**N1** covered with retaining nut  
**N2** covered with rubber boot  
**N3** with detent assembly

**Note:** Connector of the position sensor **is not supplied**  
(see ordering number on page 10)

**FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE, FUNCTIONAL SYMBOLS AND TABLE OF PREFERRED TYPES ON PAGE 10**

# Technical Data

Valve size	mm (US)	D 06 (03)	
Maximum flow	L/min (GPM)	see p-Q characteristics	
Max. operating pressure at porte P, A, B	bar (PSI)	standard 350 (5076), according to CSA 320 bar (4641PSI)	
Max. operating pressure at port T	bar (PSI)	50 (725) for version <b>S1, S4</b> and 210 (3000) for version <b>S2</b>	
Pressure drop	bar (PSI)	see Δp-Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range for NBR seals	°C (°F)	-30 ... +80 (-22 ... +176)	
Fluid temperature range for FPM seals	°C (°F)	-20 ... +80 (-4 ... +176)	
Ambient temperature max.	°C (°F)	+50 (+122)	
Viscosity range	mm <sup>2</sup> /s (SUS)	20 ... 400 (98 ... 1840)	
Maximum degree of fluid contamination		Class 21/18/15 to ISO 4406 (2006)	
Max. allowable voltage variation	%	DC: ±10	AC: ±10
Max. switching frequency	h <sup>-1</sup>	15 000	
Switching time, on: at v=32 mm <sup>2</sup> .s <sup>-1</sup> (156 SUS)	ms	DC: 30 ... 50	AC: 30 ... 40
Switching time, off: at v=32 mm <sup>2</sup> .s <sup>-1</sup> (156 SUS)	ms	DC: 10 ... 50	AC: 30 ... 70
Duty cycle	%	100	
Service life	cycles	10 <sup>7</sup>	
Enclosure type to EN 60 529		IP 65	
Weight - valve with 1 solenoid	kg (lbs)	1.6 (3.52)	
- valve with 2 solenoids		2.2 (4.84)	
Mounting position		any	

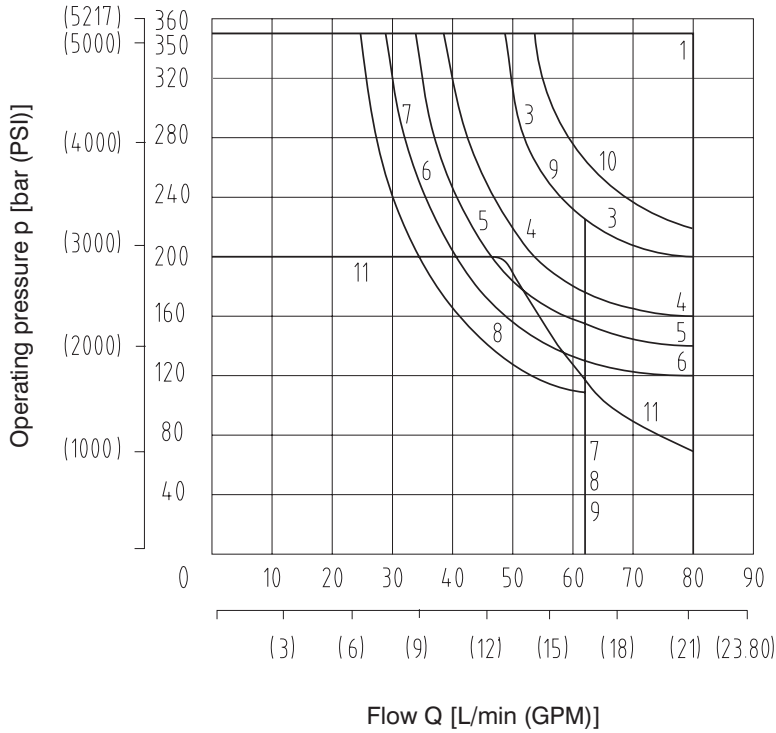
# Spool Symbols

Type	Symbol	Crossover	Type	Symbol	Crossover
Z11			Z51		
C11			Z71		
H11			Z81		
P11			Z91		
Y11			R31		
L21			H51		
B11			F51		
Y41			Z11		
Z21			X11		
C41			C11		
F11			H11		
R11			K11		
R21			N11		
A51			F11		
P51			X25		
Y51			J15		
C51			J75		

# p-Q Characteristics

Measured at  $v = 32 \text{ mm}^2/\text{s}$  (156 SUS)

Operating limits for maximum hydraulic power transferred by the directional valve.  
For respective spool type - see spool symbols.

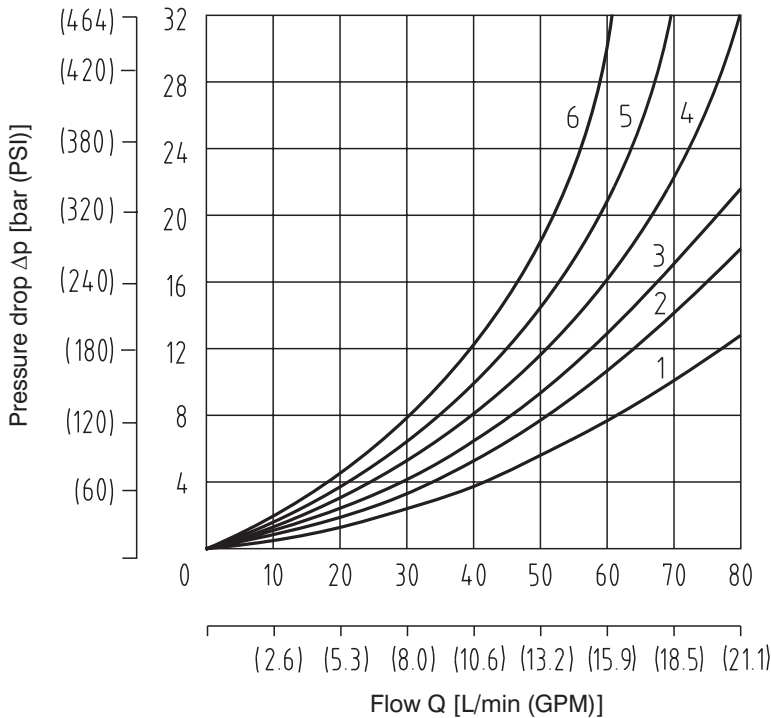


Z11	1
C11	7
H11	4
P11	1
Y11	3
L21	6
B11	9
Y41	7
Z21	1
C41	6
F11	6
R11	4
R21	5
A51	6
P51	1
Y51	3
C51	7
Z51	1
Z71	8
Z81	8
Z91	8
R31	6
H51	8
F51	8
X11	4
K11	8
N11	8
X25	11
J15	1
J75	10

# Δp-Q Characteristics

Measured at  $v = 32 \text{ mm}^2/\text{s}$  (156 SUS)

Pressure drop  $\Delta p$  related to flow rate.

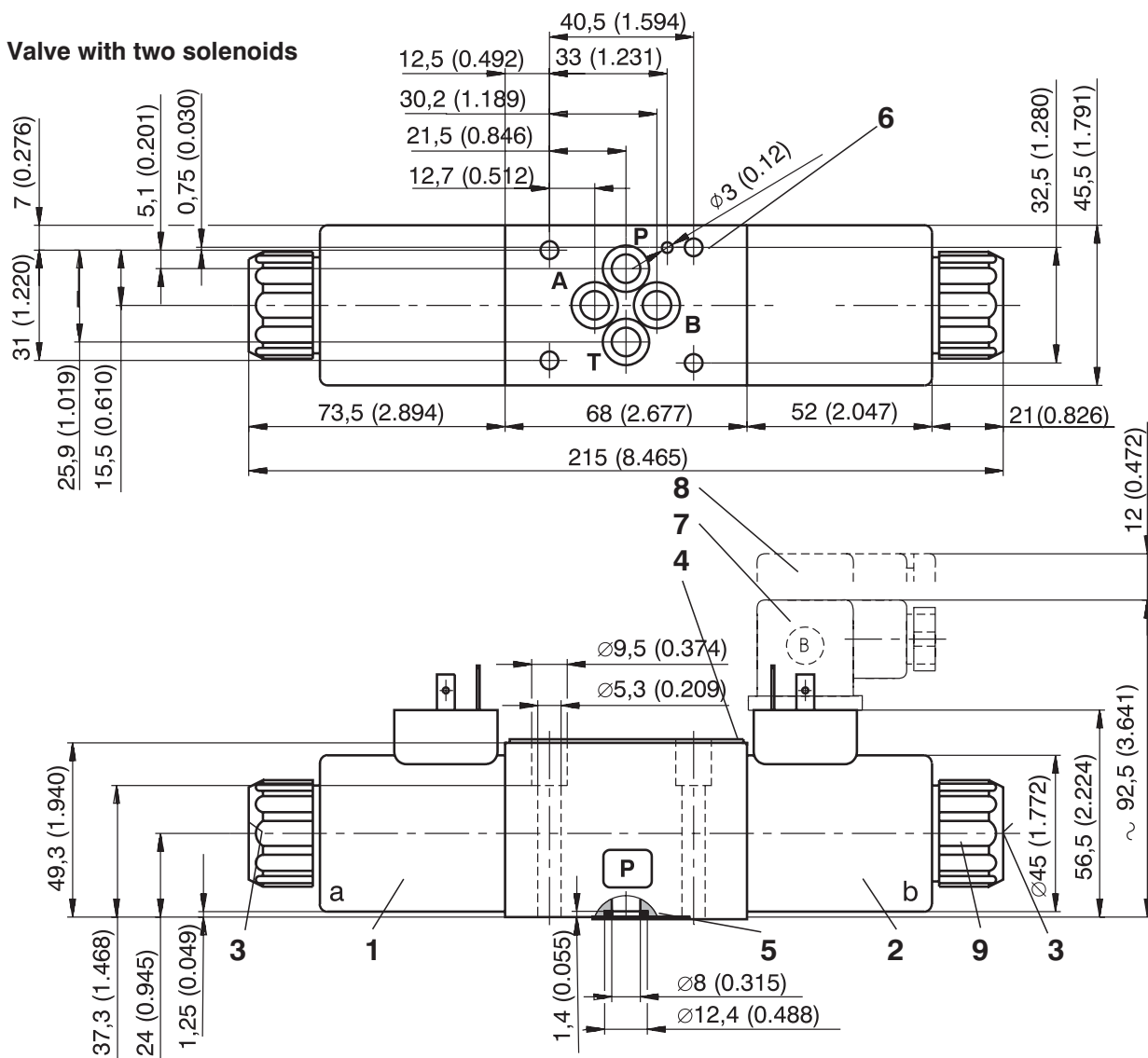


	P-A	P-B	A-T	B-T	P-T
Z11	2	2	3	3	
C11	5	5	5	6	3
H11	2	2	2	3	3
P11	1	1	3	3	
Y11	2	2	2	2	
L21	2	2	3	3	
B11	2	2	3	3	
Y41	3	3	3	3	
Z21		2	3		
C41	4	4			5
F11	1	2		3	3
R11	2	2	3	3	
R21	2	2	3	3	
A51	2	2			
P51		1	3		
Y51		2	2		
C51	2			3	4
Z51		2	3		
Z71	3	3			
Z81			3	3	
Z91	3			3	3
R31	2			3	
H51		2	3		
F51		2	3		
X11	2	2	3	3	
K11		2	3		
N11	2	2	3	3	
X25	3	3	3		
J15	2	2	3	3	
J75	2	2			

# Valve Dimensions

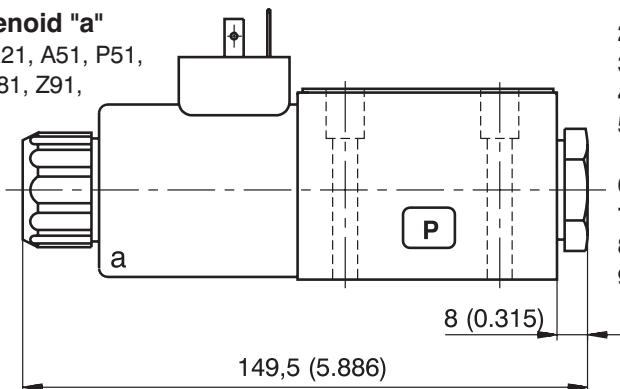
Dimensions in millimeters (inches)

## Valve with two solenoids



## Valve with one solenoid "a"

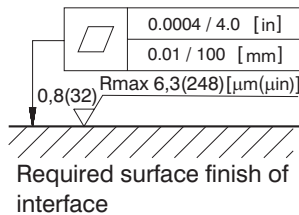
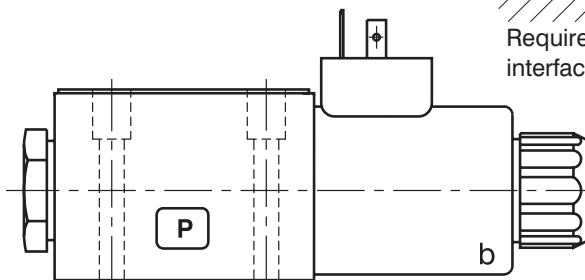
Spool symbols R11, R21, A51, P51, Y51, Z51, C51, Z71, Z81, Z91, R31, H51, F51, X25



- 1 Solenoid a
- 2 Solenoid b
- 3 Manual override
- 4 Name plate
- 5 Square ring (4 pcs.)  
9.25 x 1.68 supplied with valve
- 6 4 mounting holes
- 7 Electrical connector, EN 1745301-803
- 8 Space required to remove connector
- 9 Solenoid fixing nut  
[Nut torque 2.95 ft-lbs (4 Nm)]

## Valve with one solenoid "b"

Spool symbols X11, Z11, C11, H11, K11, N11, F11



## Type of the Solenoid Coil

Designation	Dimensional sketch	Description
<b>E1</b>		Solenoid coil with terminal for the electrical connector, EN 1745301-803.
<b>E2</b>		Solenoid coil with integrated quenching diode (bipolar transil diode) and terminal for the electrical connector, EN 1745301-803.
<b>E3A</b>		Solenoid coil with terminal for AMP-Junior-Timer electrical connector.
<b>E4A</b>		Solenoid coil with integrated quenching diode (bipolar transil diode) and terminal for AMP-Junior-Timer electrical connector.
<b>E5</b>		Solenoid coil with integrated rectifier and terminal for the electrical connector, EN 1745301-803.

## Manual Override

STANDARD	CLOSED NUT
<p><b>no designation</b> Dimensions</p> <p>Standard model of the manual override. Standard retaining nut of the solenoid.</p>	<p><b>Type N1</b> Dimensions</p> <p>Manual override with retaining nut. Can be used after removing nut.</p>
RUBBER BOOT	DETENT ASSEMBLY
<p><b>Type N2</b> Dimensions</p> <p>Manual override protected by rubber boot.</p>	<p><b>Type N3</b> Dimensions</p> <p>Manual override holds the spool in the shifted position.</p>

## Spool Speed Control Orifice

Type	Dimension	Description
T1		<p>Important: This directional valve provides control spool soft shifting by means of orifice situated in the solenoid armature. To ensure the proper function of the valve, perfect air bleeding of the solenoid is required (by us of bleeder plug (1). The plugs are accessible after removing the rubber boot (2) from the solenoid retaining nut (3).</p>

### Switching times

Switching time, on and off	ms	300 ... 800
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The switching times shown are valid for viscosity  $\nu = 32 \text{ mm}^2/\text{s}$  (156 SUS) and nominal voltage. They are dependent upon working pressure and flow rate of the directional control valve

## Orifice in P-Port

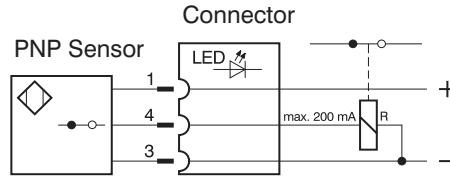
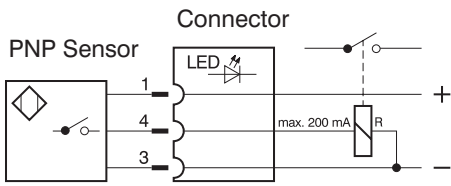
Type	ØD mm (inch)	Dimensions	Description
D1	1.0 (0.039)		<p>P-port orifices limit the flow into the directional control valve.</p> <p><b>Attention:</b> When the orifice in P port is additionally mounted the standard used square ring NBR is replaced with O-ring from Viton.</p>
D2	1.5 (0.059)		
D3	2.0 (0.079)		
D4	2.2 (0.087)		
D5	2.5 (0.098)		

# Spool Ship Position Sensor

**S1, S2** - Circuit diagram of the normally-open sensor

**S4** - Circuit diagram of the normally-closed sensor

The proximity sensor transforms the spool position into an electrical step signal. It can be used with directional control valves with one or two solenoids.



**Technical Data of the Sensor**

Rated power supply voltage	V	<b>S1, S4</b>	24 DC	<b>S2</b>
Power supply voltage range	V		10 ... 30 DC	
Rated current	mA		200	
Enclosure type of sensor to EN 60529			IP 67	
Max. operating pressure	bar (PSI)		50 (725)	210 (3046)
Switching frequency	Hz		1000	
Ambient temperature range	°C (°F)		-25 ... +80 (-13 ... +176)	

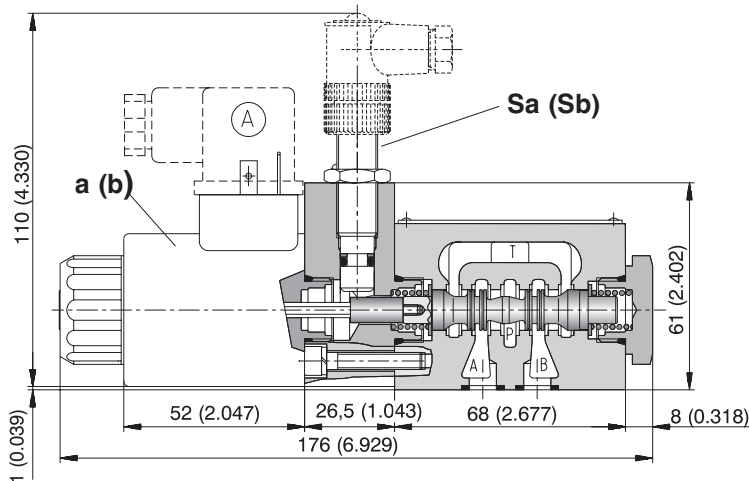
**Technical Data of the Connector**

Power supply voltage range	V	10 ... 30 DC
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)
Indication		yellow LED

**Two-Position Directional Control Valve**

Dimensions in millimeters (inches)

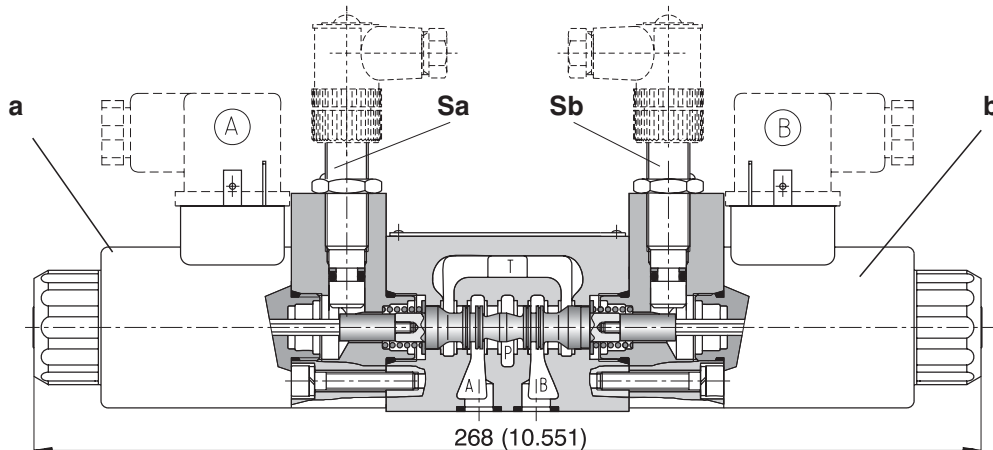
Signal of solenoid a (b)	Signal of sensor Sa (Sb)		LED	
	S1, S2 - normally-open	S4 - normally-closed	S1, S2	S4
0	1	0	ON	OFF
1	0	1	OFF	ON



**Three-Position Directional Control Valve**

Dimensions in millimeters (inches)

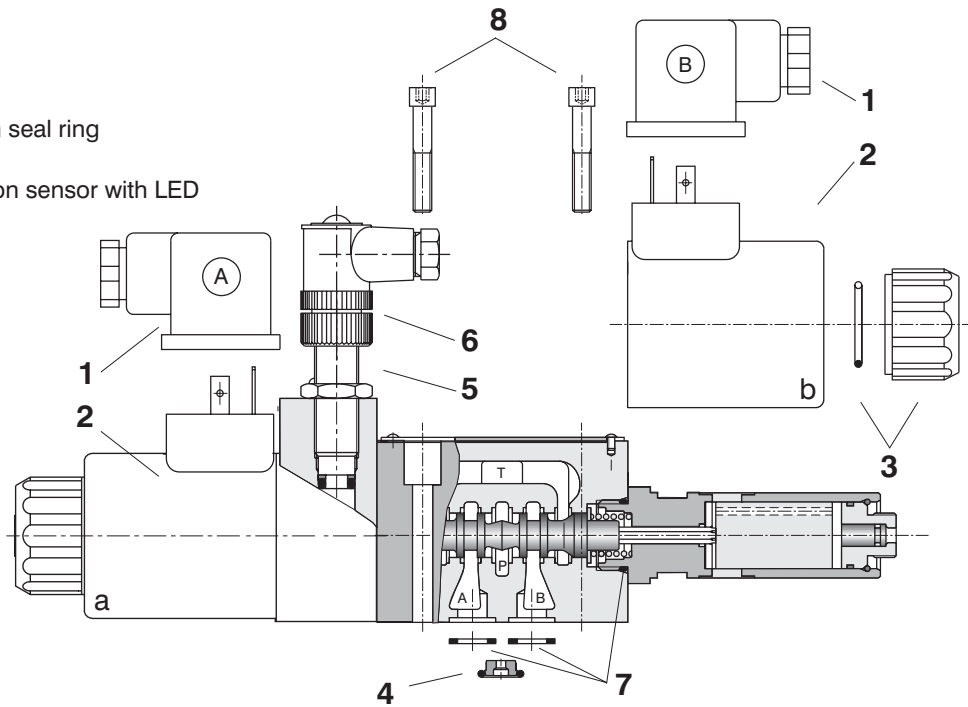
Signal of solenoid		Signal of sensor Sa (Sb)				LED			
		S1, S2 - normally-open		S4 - normally-closed		S1, S2		S4	
a	b	Sa	Sb	Sa	Sb	Sa - LED	Sb - LED	Sa - LED	Sb - LED
0	0	1	1	0	0	ON	ON	OFF	OFF
1	0	0	1	1	0	OFF	ON	ON	OFF





# Spare Parts

- 1 Electrical connector
- 2 Solenoid coil
- 3 Nut with seal
- 4 Orifice in P port with seal ring
- 5 Sensor
- 6 Connector of position sensor with LED
- 7 Seal kit
- 8 Mounting bolts



Solenoid coil					
Solenoid type	Coil type				
	E1	E2	E3A	E4A	E5
Order number					
01200	16211400	24156100	24159600	24159700	
01200*	24154300	-	-	-	
02400	-	24157400	24159800	24159900	
02400*	24154400				
20500	-				
23500				18849000	
23500*				24154600	

\*CSA Upon request

Solenoid retaining nut with seal		
Type of the nut	Seal ring	Order number
Standard nut	22 x 2	15844600
Closed nut		15844700
Nut with rubber boot		15844800
Nut with detent assembly		15844900

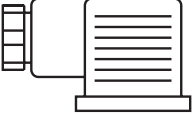
Connector of position sensor			
Type designation	Model	Max. input voltage	Ordering number
K02	connector of position sensor with LED	10...30 V DC	17364800
S1	normally-open sensor	10...30 V DC	16688500
S2	normally-open sensor	10...30 V DC	18838900
S4	normally-closed sensor	10...30 V DC	20725300

Orifice in P-port			
Type	ØD mm (inch)	Seal ring	Order number
D1	1.0 (0.039)	9.25 x 1.75	15845600
D2	1.5 (0.059)		15845700
D3	2.0 (0.079)		15845800
D4	2.2 (0.087)		15846000
D5	2.5 (0.098)		15845900

Bolt kit		
Dimensions, quantity	Bolt torque	Order number
M5 x 45 DIN 912-10.9 (4 pcs.)	8.9 Nm (6.6 ft-lbs)	15845100

Seal kit			
Type	Dimensions, quantity		Order number
Standard - NBR70	9.25 x 1.68 x 1.68 (4 pcs.)	17 x 1.8 (2 pcs.)	15845200
Viton	9.25 x 1.78 (4 pcs.)	17.17 x 1.78 (2 pcs.)	15845400

Electrical connector, EN 1745301-803		
Type	Connector <b>A grey</b>	Connector <b>B black</b>
	Ordering number	
K1	16202200	16202100
K5	16202600	16202500
K2	16202800	16202700
K3	16202400	16202300
K4	16203000	16202900

Electrical Connector, EN 1745301-803				
Type	Description	Max. input voltage	Solenoid connections	
K1	connector - B (black)	230 V AC/DC	M16x1.5 bushing bore $\varnothing$ 6-8 mm (0.24-0.31 in)	
	connector - A (gray)			
K5	connector - B (black)	230 V AC/DC	M16x1.5 bushing bore $\varnothing$ 4-6 mm (0.16-0.24 in)	
	connector - A (gray)			
K11	connector - B (black)	230 V AC/DC	1/2 NPTF bushing bore $\varnothing$ 6-8 mm (0.24-0.31 in)	
	connector - A (gray)			
K2	connector with LED and guenching diode - B (black)	230 V AC/DC	M16x1.5 bushing bore $\varnothing$ 6-8 mm (0.24-0.31 in)	
	connector with LED and guenching diode - A (gray)			
Recommended solenoid coils used with electrical connector with rectifiers - <b>type designation K3, K4</b>				
Rated supply source voltage (permissible rated voltage variation $\pm 10\%$ )		Type designation of the solenoid voltage		
230 V AC / 0.17 A / 50 (60) Hz		20500		

## Preferred Types of Valves

Type	Type
WE3-063Z11/02400E1	WE-3-063Y11/02400E1
WE3-063C11/02400E1	WE-3-062R11/02400E1

## Caution!

- When the distributor contains two electromagnets any of the two electromagnets can be switched on only after the other one switches off. The electromagnets switching time on distributors with locking arrangement must not be shorter than 60 ms. With directional valves with cushioned spool shifting, the switching time must correspond with the shifting time.
- Distributors with other interconnections than those shown in the catalogue can be supplied on request.
- The packaging foil can be recycled
- The transport base plate can be returned to the manufacturer.
- Mounting screws M5 x 45 DIN 912-10.9 or bolts must be ordered separately.  
The screws tightening torque is 8.9 Nm (6.6 ft-lbs).
- The mentioned data only serve to describe the product and in no case are to be understood in terms of law as guaranteed characteristics.