

4/2 and 4/3 directional isolator valve

RE 23193/07.11
Replaces: 08.06

1/16

Type Z4WE

Size 6
 Component series 3X
 Maximum operating pressure 315 bar
 Maximum flow 50 l/min



H5959

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Features

- Direct operated directional spool valve with solenoid actuation
 - Sandwich plate valve
 - As stop straight-through valve or as stop straight-through short circuit valve
 - Porting pattern according to DIN 24340 form A (**without** locating hole), (standard)
 - Porting pattern according to ISO 4401-03-02-0-05 (**with** locating hole)
 - Wet-pin DC or AC solenoids
 - Manual override, optional
- | – More information: | Data sheet |
|--|------------|
| • Subplates | 45052 |
| • Inductive position switch and proximity sensors (contactless) | 24830 |
| • Reliability characteristics according to EN ISO 13849 | 08012 |
| • General product information on hydraulic products | 07008 |
| • Installation, commissioning and maintenance of industrial valves | 07300 |

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

Z4WE	6	-3X/	E			K4			*
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Isolator valve, sandwich plate

Size 6 = 6

Spool symbols

e. g. D24, E51, E53, ...; with DC or AC solenoids; see page 3 to 5
 e. g. X250, X252, ...; only with DC solenoids; see page 6 (alternating voltage upon request)

Component series 30 to 39 = 3X
 (30 to 39: unchanged installation and connection dimensions)

High-power solenoid, wet-pin with detachable coil = E

Direct voltage 24 V = G24
 AC voltage 230 V 50/60 Hz = W230
 Direct voltage 205 V = G205¹⁾

With concealed manual override (standard) = N9
 With manual override = N
 Without manual override = no code

Further details in the plain text

No code = without locating hole
 /60³⁾ = **with** locating hole
 /62 = **with** locating hole and locating pin ISO 8752-3x8-St

Seal material
No code = NBR seals
V = FKM seals
 (other seals upon request)

Attention!
 Observe compatibility of seals with hydraulic fluid used!

Spool position monitoring
No code = without position switch
QMAG24 = Monitored spool position "a"
QMBG24 = Monitored spool position "b"
QM0G24 = Monitored rest position
 For more information see data sheet 24830

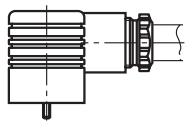
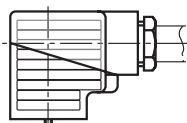
Electrical connection
K4²⁾ = without mating connector with connector DIN EN 175301-803

- ¹⁾ For connection to the AC voltage mains, a DC solenoid **must** be used, which is controlled via a rectifier (see table on the right).
 Electrical control is realized via a mating connector with integrated rectifier (separate order, see below).
- ²⁾ Mating connectors, separate order, see below
- ³⁾ Locating pin ISO 8752-3x8-St,
 Material no. **R900005694** (separate order)

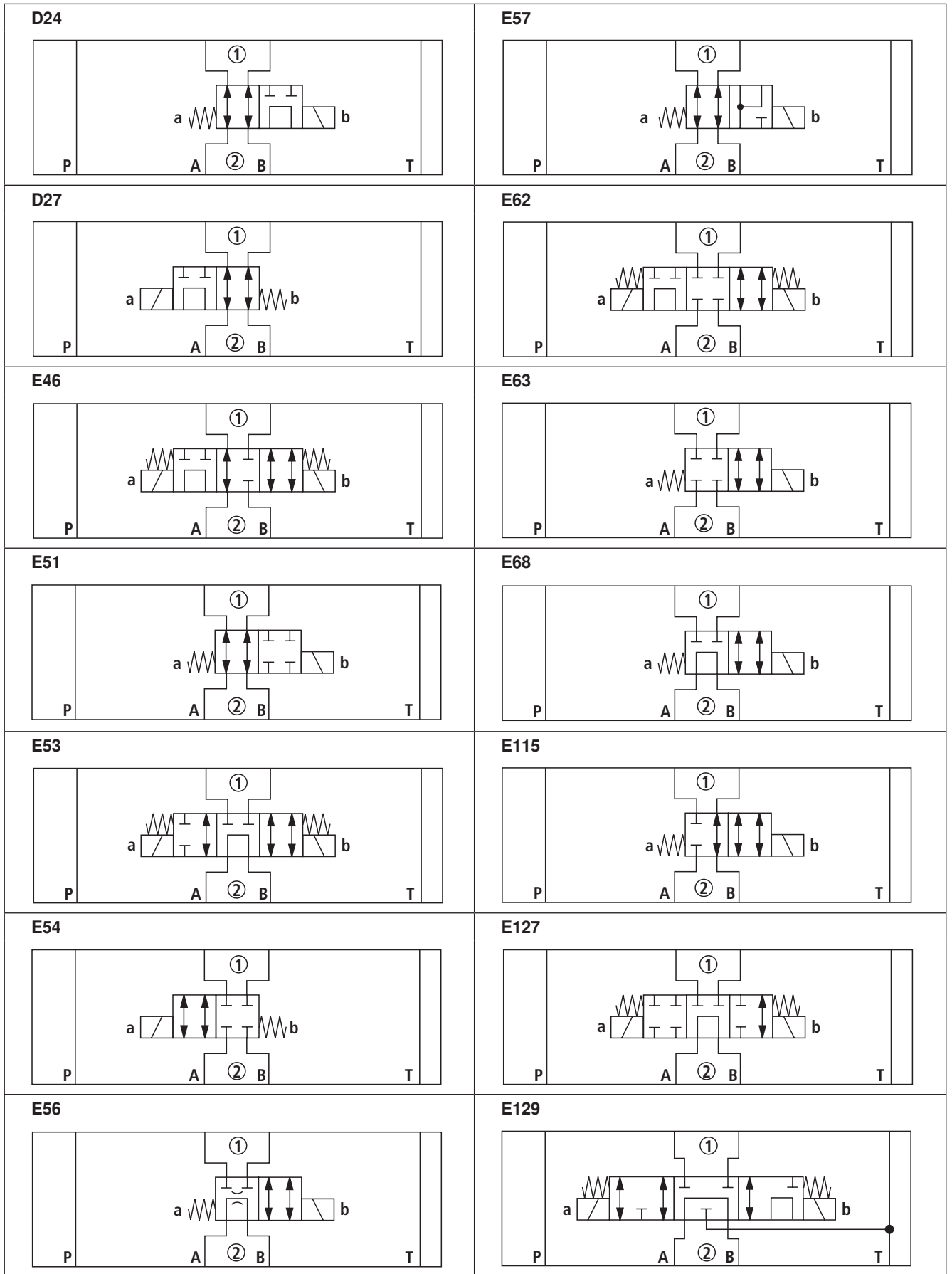
AC voltage mains (permissible voltage tolerance ±10 %)	Nominal voltage of the DC solenoid in case of operation with alternating voltage	Ordering code
110 V - 50/60 Hz	96 V	G96
230 V - 50/60 Hz	205 V	G205

Preferred types and standard units are contained in the EPS (standard price list).

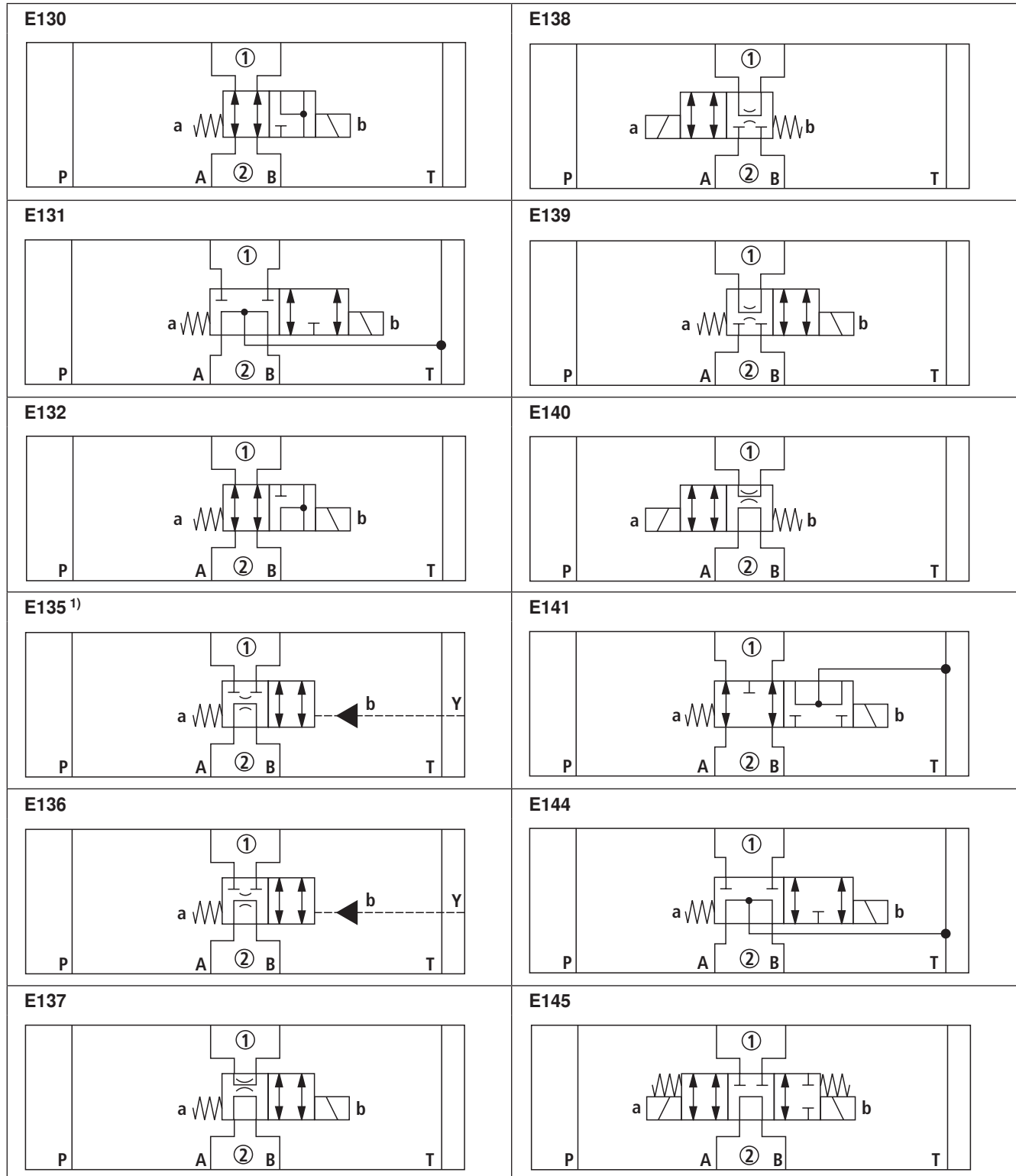
Mating connectors according to DIN EN 175301-803

For details and more mating connectors see data sheet 08006					
		Material no.			
Valve side	Color	without circuitry	with indicator light 12 ... 240 V	with rectifier 12 ... 240 V	with indicator light and Z diode suppression circuit 24 V
a	Gray	R901017010	-	-	-
b	Black	R901017011	-	-	-
a/b	Black	-	R901017022	R901017025	R901017026

Spool symbols: Direct or alternating voltage (① = component side, ② = plate side)

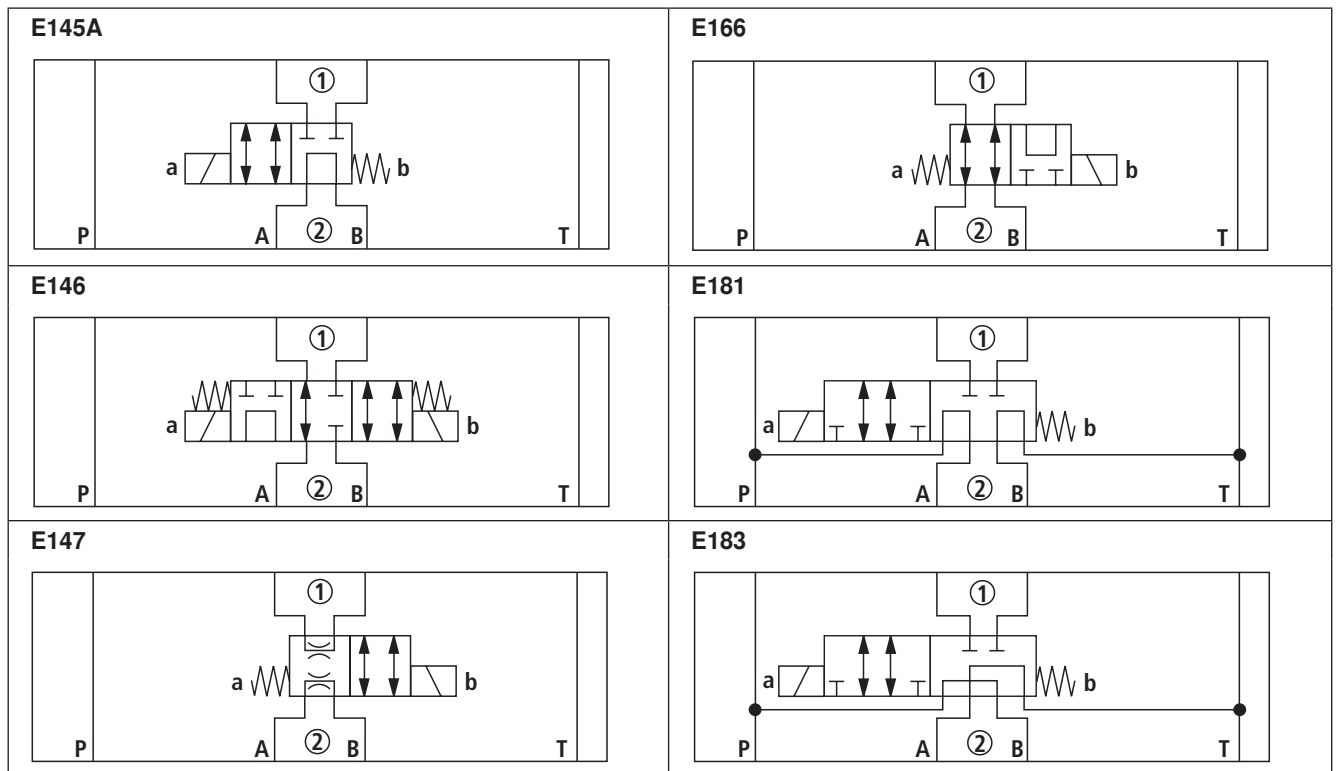


Spool symbols: Direct or alternating voltage (① = component side, ② = plate side)

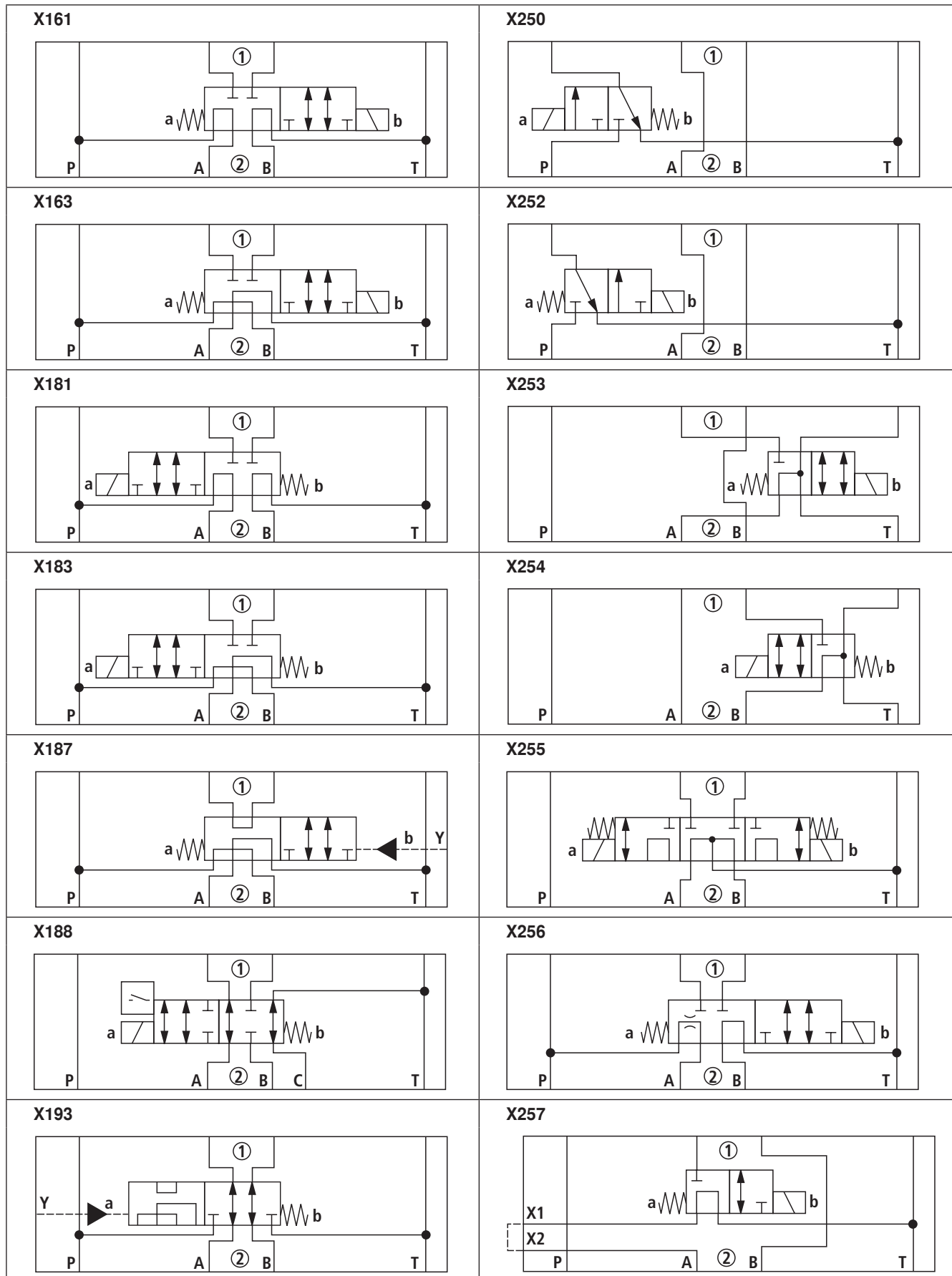


¹⁾ Throttle can be installed, upon request

Spool symbols: Direct or alternating voltage (① = component side, ② = plate side)



Spool symbols: Direct voltage (① = component side, ② = plate side)



Function, section

The directional valve type Z4WE is a solenoid-operated directional spool valve. It controls the start, stop and direction of a flow.

The directional valve basically consists of housing (1), one or two solenoids (2), control spool (3), as well as two return springs (4).

In the de-energized condition, control spool (3) is held in the central position or in the initial position by the return springs (4). The control spool (3) is actuated by wet-pin solenoids (2).

To ensure proper functioning, care must be taken that the pressure chamber of the solenoid is filled with oil.

The force of solenoid (2) acts via plunger (5) on control spool (3) and pushes the latter from its rest position to the required end position. This opens up the required flow direction A② to A① and B② to B①.

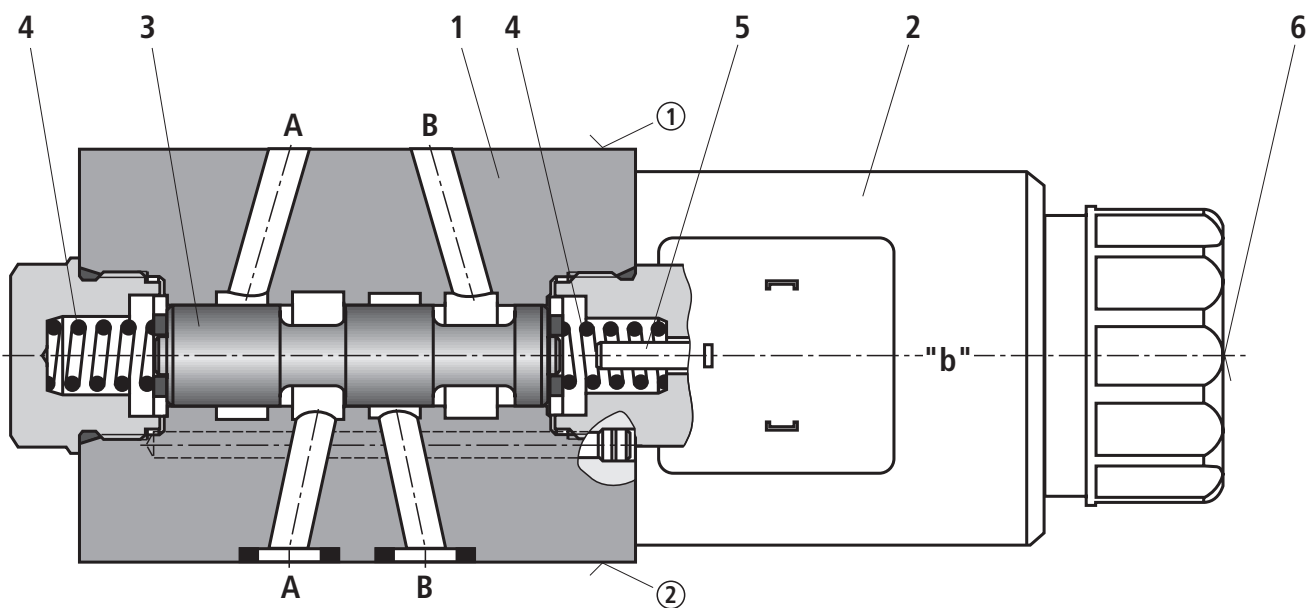
After solenoid (2) was de-energized, return spring (4) pushes control spool (3) again back to its rest position.

An optional manual override (6) allows control spool (3) to be moved without energization of the solenoid.

Notice!

Due to the design principle, internal leakage is inherent to the valves, which may increase over the service life.

Admissible shock and vibration loads see data sheet 08012.



Type Z4WE 6 ...

① = component side

② = plate side

Technical data (For applications outside these parameters, please consult us!)**general**

Weight	- Valve with one solenoid	kg	1.2
	- Valve with two solenoids	kg	1.6
Installation position			Any
Ambient temperature range		°C	-30 to +50 (NBR seals) -20 to +70 (FKM seals)
MTTF _d values according to EN ISO 13849		Years	150 (for further details see data sheet 08012)
Admissible shock and vibration loads			See data sheet 08012

hydraulic

Maximum operating pressure	- Port P, A, B	bar	315
	- Port T	bar	210 with direct voltage 160 with alternating voltage
Maximum flow		l/min	50
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-30 to +80 (NBR seals) -20 to +80 (FKM seals)
Viscosity range		mm ² /s	2.8 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 ¹⁾

Hydraulic fluid	Classification	Suitable sealing materials	Standards	
Mineral oils and related hydrocarbons	HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	
Environmentally compatible	- Insoluble in water	HETG	ISO 15380	
		HEES		
	- Soluble in water	HEPG	FKM	ISO 15380
	- Water-containing	HFC	NBR	ISO 12922

Important information on hydraulic fluids!

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the process and operating medium used must be 15 K higher than the maximum solenoid surface temperature.

- **Flame-resistant – water-containing:** Maximum pressure differential per control edge 175 bar; otherwise, increased cavitation erosion! Tank pre-loading < 1 bar or > 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!
- **Environmentally compatible:** When using environmentally compatible hydraulic fluids that are simultaneously zinc-soluble, zinc may accumulate in the medium (700 mg zinc per pole tube).

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For selecting the filters, see www.boschrexroth.com/filter.

Technical data (For applications outside these parameters, please consult us!)

electric

Voltage type		Direct voltage	Alternating voltage 50/60 Hz
Available voltages ²⁾	V	12, 24, 96, 205	110, 230
Voltage tolerance (nominal voltage)	%	±10	±10
Power consumption	W	30	–
Holding power	VA	–	50
Switch-on power	VA	–	220
Duty cycle (ED)	%	100	100
Switching time according to ISO 6403 ³⁾	– ON	ms	20 to 45
	– OFF	ms	10 to 25
Maximum switching frequency	1/h	15000	7200
Maximum coil temperature ⁴⁾	°C	150	180
Protection class according to DIN EN 60529		IP 65 (with mating connector mounted and locked)	

²⁾ Special voltages upon request

³⁾ The switching times have been determined at a hydraulic fluid temperature of 40 °C and 46 cSt. Deviating hydraulic fluid temperatures can result in different switching times! Switching times change depending on operating time and application conditions.

⁴⁾ Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

The specified surface temperature in AC voltage solenoids is valid for the faultless operation. In case of failure (e. g. blocking of the control spool), the surface temperature may rise to above 180 °C. Considering the flash point (see page 8), the system must therefore be checked for possible risks.

As fuse protection, circuit breakers (see table on the right) must be used unless the creation of an ignitable atmosphere can be excluded in a different way. Thus, the surface temperature can - in case of failure - be limited to maximally 220 °C. The tripping current must lie within a time interval of 0.6 s with 8 to 10 times the nominal power consumption. (Tripping characteristics "K").

The necessary non-tripping current of the fuse must not fall below the value I_1 (see table page 16). The maximum tripping current of the fuse must not exceed the value I_2 (see table page 16).

The temperature dependence of the tripping behavior of the circuit breakers has to be considered according to the manufacturer's specifications.

👉 Notices!

- Actuation of the manual override is only possible up to a tank pressure of ca. 50 bar. Avoid damage to the bore for the manual override! (Special tool for the operation, separate order, Material no. **R900024943**). When the manual override is blocked, the operation of the solenoid must be ruled out!
- The simultaneous operation of the solenoids must be ruled out!

In the electrical connection, the protective earthing conductor (PE $\frac{\perp}{\perp}$) is to be connected properly.

Circuit breaker with tripping characteristic K according to EN 60898-1 (VDE 0641-11), EN 60947-2 (VDE 0660-101), IEC 60898 and IEC 60947-2:

Nominal voltage valve	Nominal current consumption		Recommended rated current fuse
	50 Hz	60 Hz	
24	2	1.5	3
42	1.26	0.98	2
48	1	0.95	1.6
100	0.56	0.5	1
110	0.52	0.45	0.75
115	0.45	0.37	0.75
127	0.42	0.32	0.75
200	0.29	0.26	0.5
220	0.27	0.23	0.5
230	0.23	0.17	0.5
240	0.23	0.19	0.5

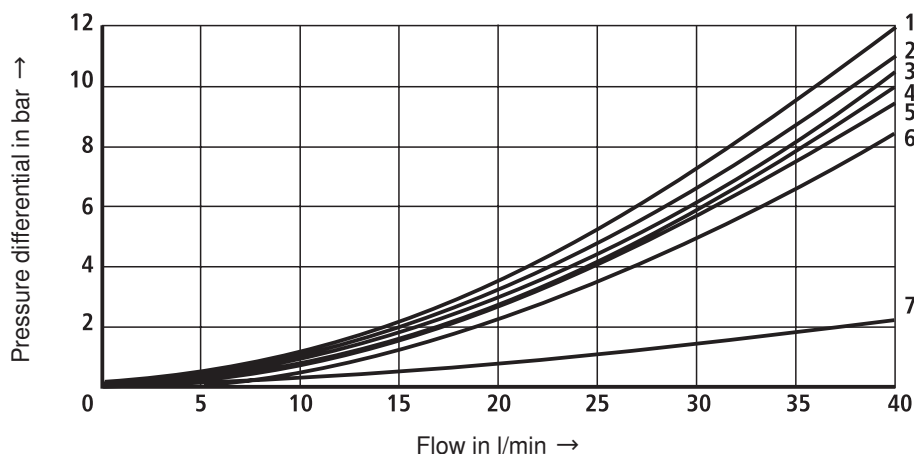
👉 Notice!

AC solenoids can be used for 2 or 3 mains, e.g. solenoid type **W110** for:
110 V, 50 Hz; 110 V, 60 Hz; 120 V, 60 Hz

Ordering code	Mains
W110	110 V, 50 Hz 110 V, 60 Hz 120 V, 60 Hz
W230	230 V, 50 Hz 230 V, 60 Hz

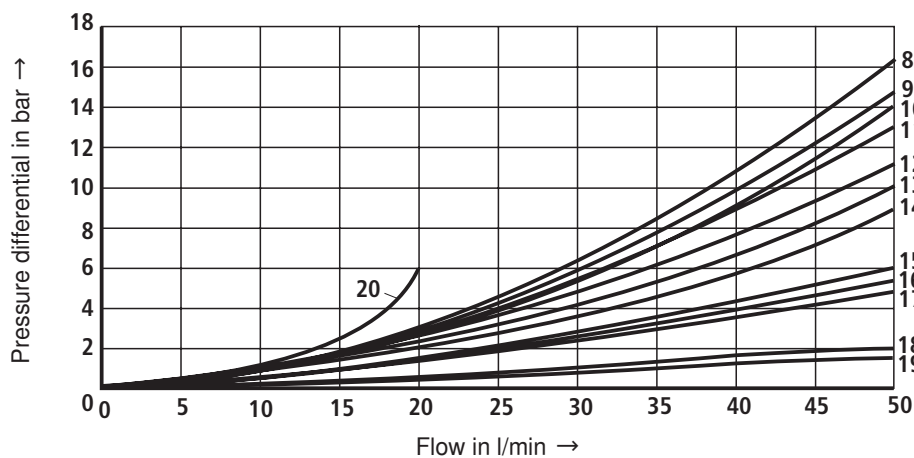
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$)

Δp - q_v characteristic curves



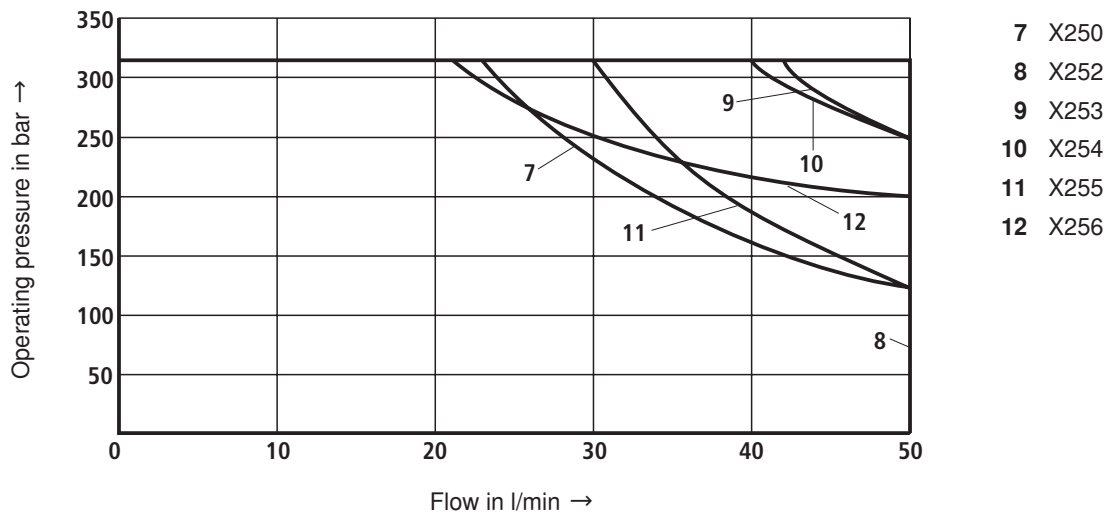
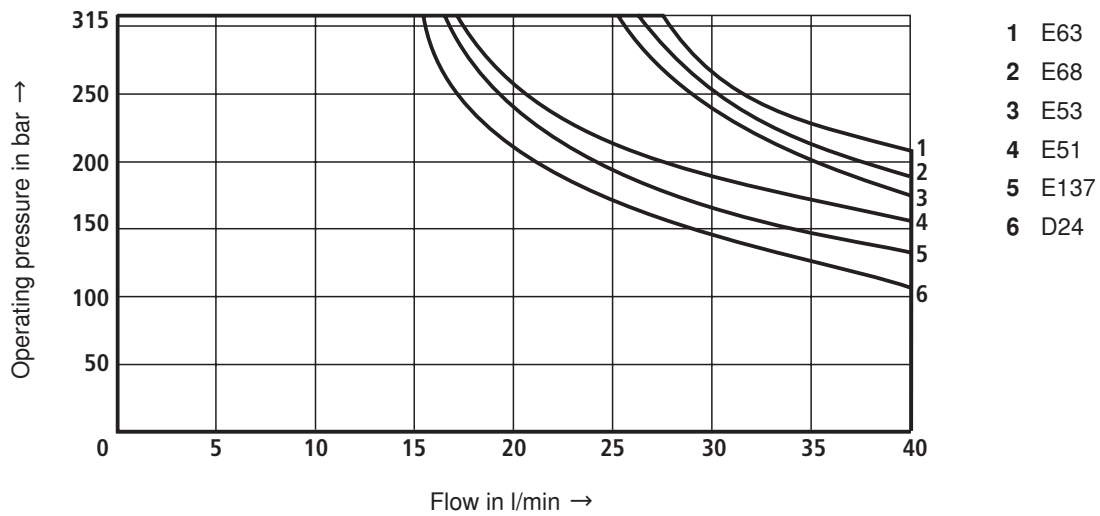
Spool symbols D27, E46, E54, E56, E57, E62, E115, E127, E129, E130, E131, E132, E135, E136, E138, E139, E140, E141, E144, E145, E145A, E146, E147, E166, E181 and E183 upon request.

Spool symbol	A②-A①	A①-A②	B②-B①	B①-B②	A②-B②	B②-A②	T②-T①	P②-P①
D24	4	1	2	4	3	2	7	7
E51	3	1	1	3	-	-	7	7
E53	2	2	2	2	5	2	7	7
E63	2	5	5	3	-	-	7	7
E68	4	4	6	5	4	5	7	7
E137	1	4	3	2	5	6	7	7

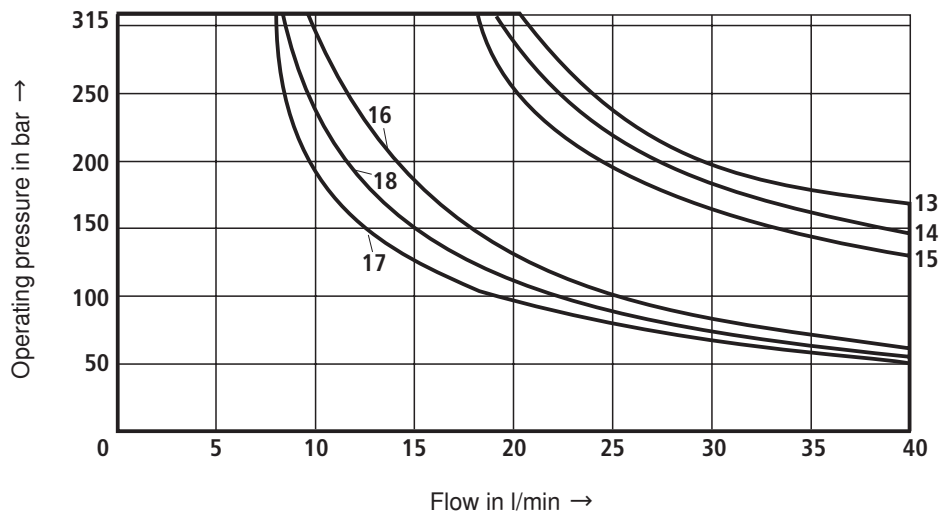


Spool symbols X161, X163, X181, X183, X187, X188, X193 and X157 upon request.

Spool symbol	Spool position	A①-A②	B①-B②	B②-B①	T②-T①	P②-P①	P①-T②	B②-T②	P②-P①	A②-T②	P②-A②
		A②-A①								A②-T②	
X250		16	17	17	18	13	11	-	-	-	-
X252		16	17	17	18	9	10	-	-	-	-
X253		13	14	14	19	18	-	-	-	8	-
X254		16	12	13	18	18	-	12	-	-	-
X255	0	-	-	-	15	-	-	8	-	8	-
	a	12	-	-	-	-	-	13	-	-	-
	b	-	12	12	-	-	-	-	-	13	-
X256		12	9	9	18	-	-	-	18	-	20

Performance limits (measured with HLP46, $\vartheta_{Oil} = 40 \text{ °C} \pm 5 \text{ °C}$ and 24 V direct voltage)


Spool symbols D27, E46, E54, E56, E57, E62, E115, E127, E129, E130, E131, E132, E133, E134, E135, E136, E138, E139, E140, E141, E144, E145, E145A, E146, E147, E166, E181, E183, X161, X163, X181, X183, X187, X188, X193 and X157 upon request.

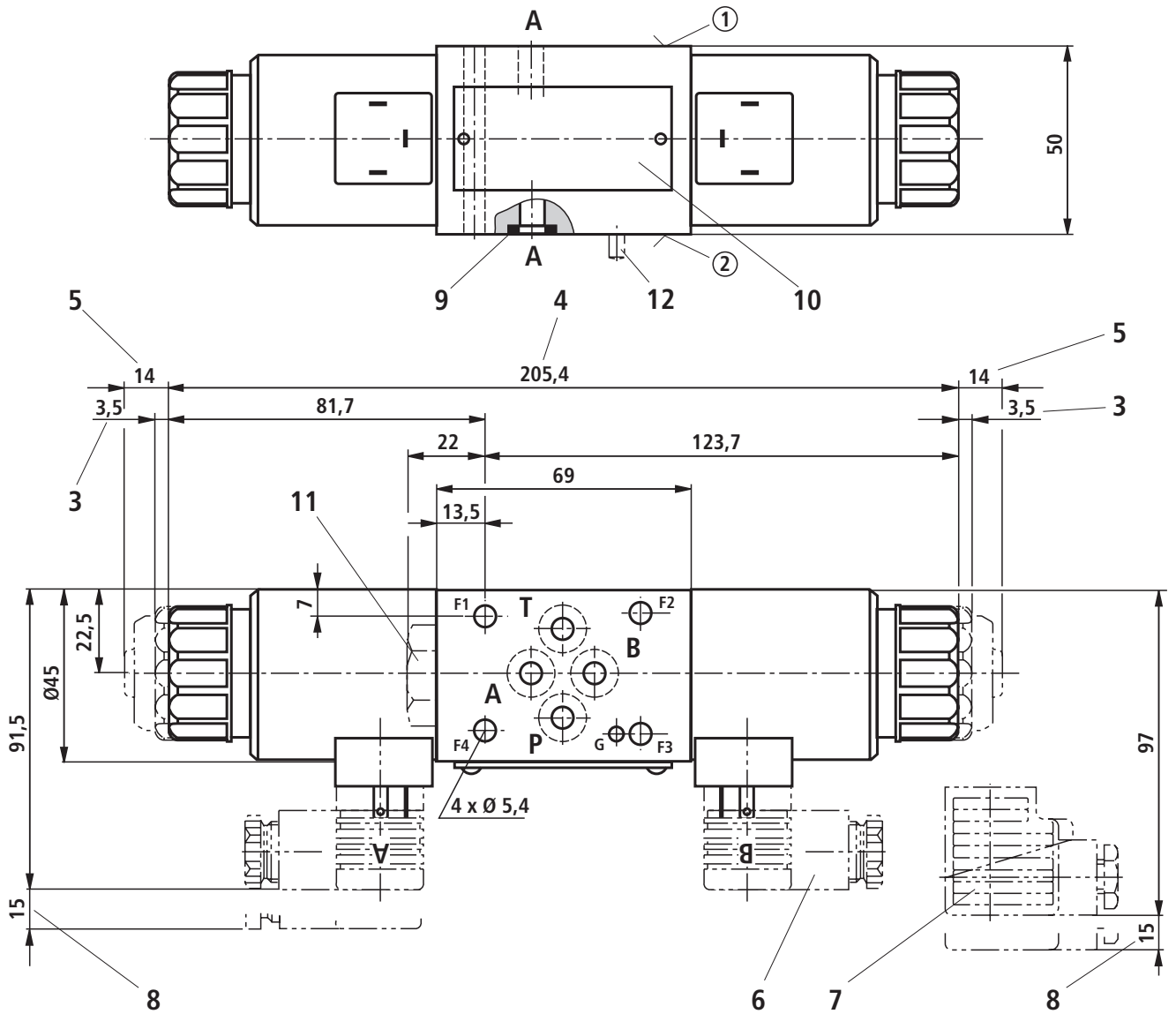
Performance limits (measured with HLP46, $\vartheta_{\text{Oil}} = 40 \text{ °C} \pm 5 \text{ °C}$ and 230 V alternating voltage)


Spool symbol	W230-50 Hz	W230-60 Hz
E63	13	16
E68	14	18
E53	15	18
E137	17	17
E51	17	17
D24	17	17

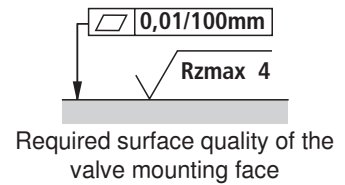
Spool symbols D27, E46, E54, E56, E57, E62, E115, E127, E129, E130, E131, E132, E135, E136, E138, E139, E140, E141, E144, E145, E145A, E146, E147, E166, E181 and E183 upon request.

Unit dimensions: With DC solenoid (dimensions in mm)

Spool symbols D24, E51, E53, E63, E68, E137, ...

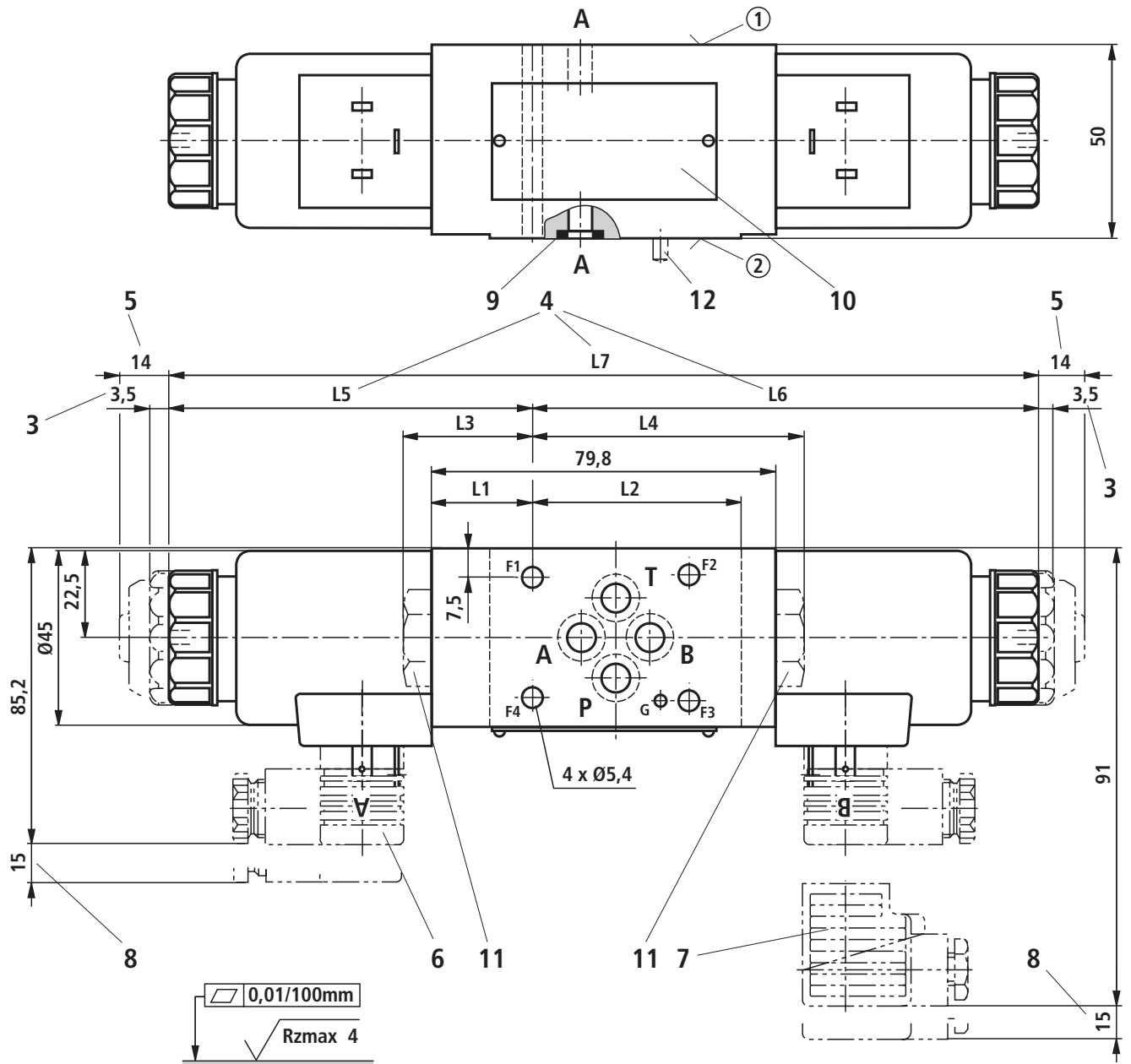


Item explanations, subplates, and valve mounting screws see page 16.



Unit dimensions: With DC solenoid (dimensions in mm)

Spool symbols X250, X252, X253, X254, X255, X256, ...



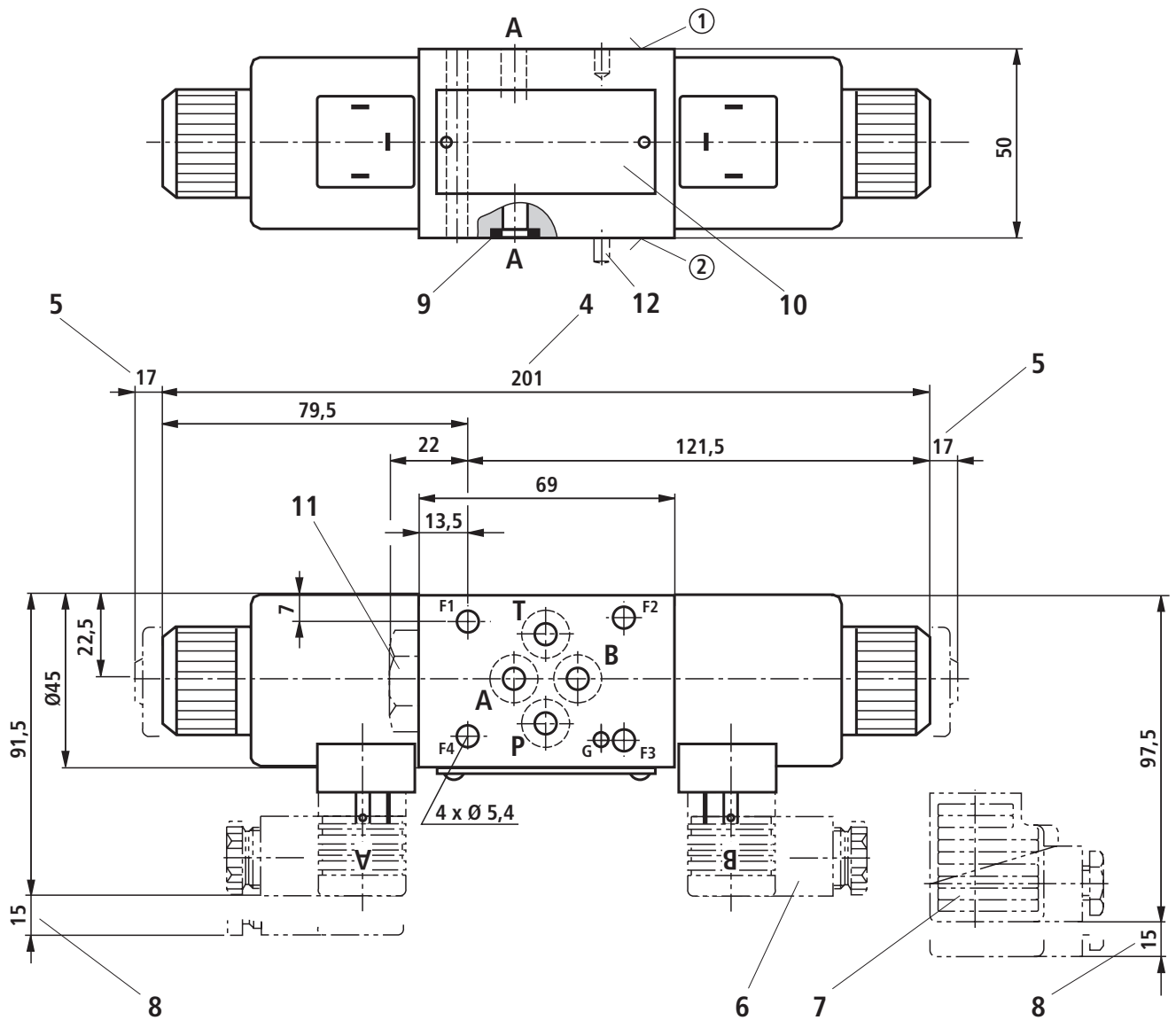
Required surface quality of the valve mounting face

Item explanations, subplates, and valve mounting screws see page 16.

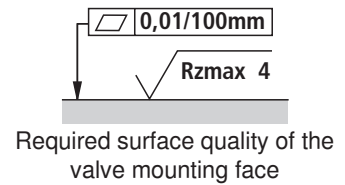
Spool symbol	Solenoid side a	Solenoid side b	L1	L2	L3	L4	L5	L6	L7
X250	X		24.9	54.9	-	63.3	93.3	-	-
X252		X	24.9	54.9	33.5	-	-	123.1	-
X253		X	18.3	54.3	26.9	-	-	129.7	-
X254	X		18.3	54.3	-	69.9	86.7	-	-
X255	X	X	25.9	53.9	-	-	94.3	131.1	225.4
X256		X	12	54.8	20.6	-	-	136	-

Spool symbols X161, X163, X181, X183, X187, X188, X193 and X157 upon request.

Unit dimensions: With AC solenoid (dimensions in mm)



Item explanations, subplates, and valve mounting screws see page 16.



Unit dimensions

- ① Component side – porting pattern according to DIN 24340 form A (without locating hole), or ISO 4401-03-02-0-05 (with locating hole $\varnothing 3 \times 5$ mm deep)
- ② Plate side – porting pattern according to ISO 4401-03-02-0-05 (with locating hole for locating pin ISO 8752-3x8-St, version "/60" and "/62")
- 3 Dimension for valve without manual override
- 4 Dimension for solenoid **with concealed** manual override "**N9**" (standard)
- 5 Dimension for valve with manual override "N"
- 6 Mating connector **without** circuitry (separate order, see page 2 and data sheet 08006)
- 7 Mating connector **with** circuitry (separate order, see page 2 and data sheet 08006)
- 8 Space required for removing the mating connector
- 9 Identical seal rings for ports A, B, P, T (plate side)
- 10 Name plate
- 11 Plug screw for valve with one solenoid
- 12 Locating pin ISO 8752-3x8-St; only version "/62"

Subplates according to data sheet 45052 (separate order)

(without locating hole)	G 341/01 (G1/4)
	G 342/01 (G3/8)
	G 502/01 (G1/2)
(with locating hole)	G 341/60 (G1/4)
	G 342/60 (G3/8)
	G 502/60 (G1/2)

Valve mounting screws (separate order)

– 4 hexagon socket head cap screws
ISO 4762 - M5 - 10.9-fIZn-240h-L

friction coefficient $\mu_{\text{total}} = 0.09$ to 0.14 ,
tightening torque $M_A = 7 \text{ Nm} \pm 10 \%$
or

– 4 hexagon socket head cap screws ISO 4762 - M5 - 10.9

with friction coefficient $\mu_{\text{total}} = 0.12$ to 0.17 ,
tightening torque $M_A = 8.1 \text{ Nm} \pm 10 \%$

 **Notice!**

Length and tightening torque of the valve mounting screws must be calculated according to the components mounted under and over the sandwich plate valve.

Circuit breaker with tripping characteristics "K"

according to EN 60898-1 (VDE 0641-11), EN 60947-2 (VDE 0660-101), IEC 60898 and IEC 60947-2

AC solenoid	Lower rated current I_1 in A	Upper rated current I_2 in A
50 Hz		
W24	2.30	3.60
W42	1.45	1.92
W48	1.15	1.92
W100	0.64	0.90
W110	0.60	0.90
W115	0.52	0.90
W127	0.48	0.60
W200	0.33	0.60
W220	0.31	0.60
W230	0.26	0.36
W240	0.26	0.36

AC solenoid	Lower rated current I_1 in A	Upper rated current I_2 in A
60 Hz		
W24	1.73	2.40
W42	1.13	1.92
W48	1.09	1.92
W100	0.58	0.90
W110	0.52	0.90
W115	0.43	0.90
W127	0.37	0.60
W200	0.30	0.60
W220	0.26	0.36
W230	0.20	0.36
W240	0.22	0.36