

**MANNESMANN
REXROTH****4/3-, 4/2- and 3/2-Directional Control Valves
Type WE 6.. /E,
Series 6X with Wet Pin AC or DC solenoids****RE
23 178/08.96**

Size 6

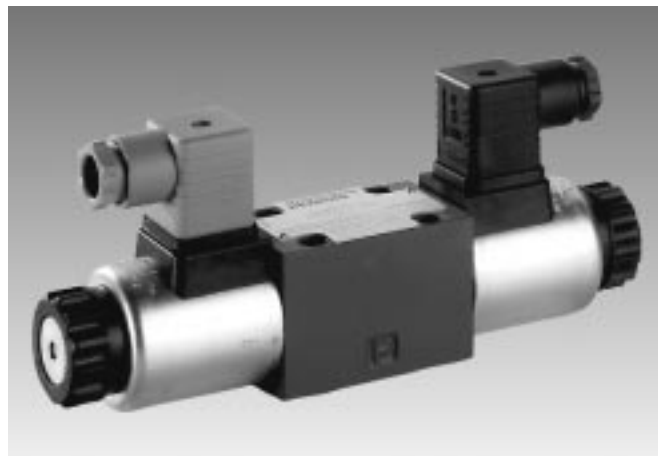
up to 350 bar

up to 80 L/min

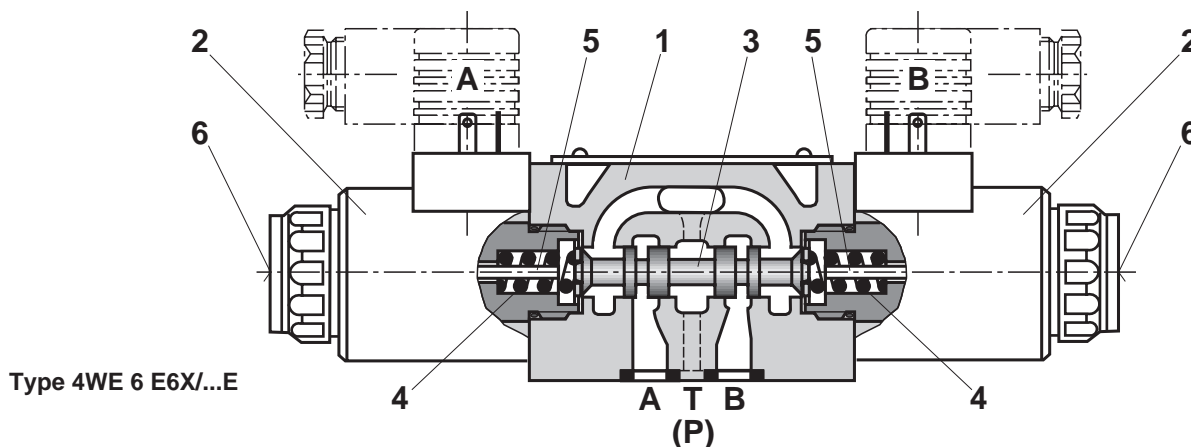
Replaces: 10.95

Characteristics:

- Direct operated, solenoid actuated directional spool valve high performance version
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H, for subplates see data sheet RE 45 052 (seperate order)
- Wet pin AC or DC solenoids with removable coil
- Solenoid coil can be rotated through 90°
- Coils can be replaced without releasing any fluid
- Choice of either central or individual electrical connections
- Optional hand emergency
- Soft switching version, see RE 23 183
- Inductive limit switches (contact or inductive), see RE 24 830



H/A 4661/95
Type 4WE 6 ..6X/EG24N9K4
with plug-in connector

Functional description, section

Type 4WE 6 E6X/...E

Type WE directional control valves are solenoid operated directional spool valves. They control the start, stop and direction of flow.

Essentially the directional control valves consist of housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).

In the de-energised condition the control spool (3) is held in the neutral or initial position by means of return springs (4) (except for impulse spool). The control spool (3) is operated by wet pin solenoids (2).

To guarantee satisfactory operation care should be taken to ensure that the solenoid pressure chamber is filled with oil.

The force of the solenoid (2) acts via the plunger (5) on the control spool (3) and pushes this from its neutral position to the required end position. This gives free flow from P to A and B to T or P to B and A to T.

When solenoid (2) is de-energised, the control spool (3) is returned to its neutral position by means of return springs (4).

An optional hand emergency (6), allows movement of the control spool (3) without energising the solenoid.

Type 4WE 6.. 6X/O... (only for symbols A, C and D)

This design incorporates directional control valves with 2 switching positions and 2 solenoids without detent. There is no definable switching position when the solenoids are de-energised.

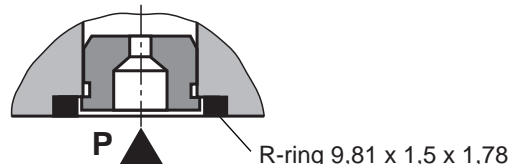
Type 4WE 6.. 6X/OF...(impulse spool, only for symbols A, C and D)

This design incorporates directional control valves with 2 switching positions, 2 solenoids and a detent. Both switching positions are thus fixed alternately and there is no need to continually energise the solenoid.

Cartridge throttle (Type 4WE 6..6X/.../B..)

If, due to particular operating conditions during the switching sequences, flows can occur which are larger than the valve performance curves allow, then it will be necessary to fit a cartridge throttle.

This is inserted in the P channel of the directional control valve.



Ordering code

Valve types which are marked in grey are readily available!
For preferred types see page 5.

	2	3	4	6	7	9	10	11	12	15	19	22	23
		WE	6		6X/		E			/			*
3 service ports	= 3												
4 service ports	= 4												
Size 6	= 6												
Symbol e.g.B, C, E, EA, EB etc. for designs possible see below	= 6X												
Series 60 to 69 (60 to 69: externally interchangeable)	= 6X												
Spring return	= No code												
Without spring return	= O												
Without spring return but with detent	= OF												
High power solenoid Wet pin (oil immersed) with removable coil	= E												
24 V DC	= G24												
230 V 50/60 Hz AC	= W230												
205 V DC	= G205 ²⁾												
For the ordering codes of other voltages and frequencies see page 3.													
With concealed hand emergency (Standard)	= N9												
With hand emergency	= N												
Without hand emergency	= No code												

Further details
in clear text

No code = NBR seals
V = FPM seals
 (other seals on request)

⚠ Attention!
 The compatibility of the seals and
 fluid type has to be taken into account!

No code = Without cartridge throttle

B 08 = Throttle Ø 0,8 mm
B 10 = Throttle Ø 1,0 mm
B 12 = Throttle Ø 1,2 mm

Used where flow exceeds >
 performance limit of valve,
 active in P line

Electrical connections
Individual connections

K4 ¹⁾ = Without plug-in connector, with protective plug

Central connections

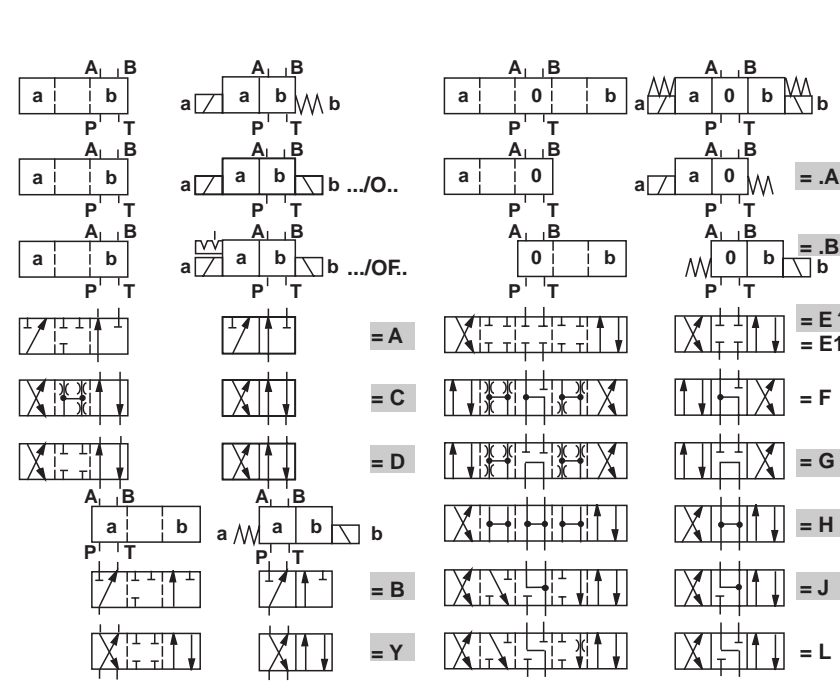
DL = Terminal box with cable connector Pg 16
 and lamps

DKL ³⁾ = Central connection on cover with lamp,
 (without plug-in connector)

AC supply voltage (permissible voltage tolerance ± 10%)	Nominal voltage of DC solenoids when used with an AC supply	Order code
110 V - 50/60 Hz 120 V - 60 Hz	96 V	G96
230 V - 50/60 Hz	205 V	G205

- 1) Plug-in connectors must be ordered separately (see page 5).
- 2) When connecting to an AC supply the DC solenoid **must** be controlled via a rectifier (see table left).
 With an individual connection a large plug-in connector with built-in rectifier can be used (separate order) (see page 5).
- 3) Plug-in connector (order no. 005538) must be ordered separately.

Symbols



4) **Example:** Spool E with switching position "a" order code **..EA..**

5) Symbol E1-: P – A/B pre-opening

Pressure intensification with differential cylinders !

Technical data (For applications outside these parameters, please consult us!)					
General					
Installation position		optional			
Ambient temperature, max.	t	°C	50		
Weight	Single solenoid valve	m	kg	1,45	
	Valve with 2 solenoids	m	kg	1,95	
Hydraulic					
Operating pressure	Ports A, B, P	p	bar	350	
	Port T	p	bar	up to 210 (=) ; up to 160 (~) With symbols A and B, port T must be used as a drain port if the operating pressure is above the permitted tank pressure.	
Flow, max.	q_v	L/min	up to 80 (=); up to 60 (~)		
Flow cross section (switching position 0):	for symbol Q		A	mm ²	approx. 6 % of nominal cross section
	for symbol W		A	mm ²	approx. 3 % of nominal cross section
Pressure fluid	Mineral oil (HL, HLP) to DIN 51 524 ¹⁾ ; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) ¹ HEPG (polyglycol) ²⁾ ; HEES (synthetic ester) ²⁾ ; other fluids on request.				
¹⁾ suitable for NBR and FPM seals					
²⁾ only suitable for FPM seals					
Pressure fluid	t	°C	– 30 to + 80 (NBR seals)		
Temperature range	– 20 to + 80 (FPM seals)				
Viscosity range	v	mm ² /s	2,8 to 500		
Degree of fluid contamination	Maximum permissible degree of contamination of the fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.				
Electrical					
Type of voltage			DC voltage	AC voltage	
Available voltages ³⁾ (For ordering details of AC solenoids see below)	U	V	12, 24, 42, 60, 96, 110, 180, 205, 220	42, 110, 120, 230 50/60 Hz	
Voltage tolerance (nominal voltage)			%	±10	
Power consumption	P	W	30 (8 ⁵⁾)	–	
Holding current	P	VA	–	50	
In-rush current	P	VA	–	220	
Duty cycle			100 %	100 %	
Switching time to ON	T	ms	25 to 45	10 to 20	
ISO 6403 OFF	T	ms	10 to 25	15 to 40	
Switching frequency			Sw/h	up to 15000 up to 7200	
Insulation to DIN 40 050			IP 65	IP 65	
Coil temperature ⁴⁾	t	°C	up to 150	up to 180	
³⁾ Special voltages on request			With electrical connections the earth (PE \perp) must be correctly connected.		
⁴⁾ Due to the surface temperatures which occur on the solenoid coil, the European standards EN563 and EN982 have to be taken into account!					
⁵⁾ Please request data sheet RD 23 178-00!					
Note on AC solenoids					
These solenoids may be used for 2 or 3 types of supply;					
e.g. solenoid type W110 for 110 V, 50 Hz					
110 V, 60 Hz					
120 V, 60 Hz					
Order codes	W42	42 V, 50 Hz 42 V, 60 Hz			
	W110	110 V, 50 Hz 110 V, 60 Hz 120 V, 60 Hz			
	W230	230 V, 50 Hz 230 V, 60 Hz			

Switching power limits (measured at $v = 41 \text{ mm}^2/\text{s}$ and $t = 50^\circ\text{C}$)

⚠ Note!

The switching power limits given are for applications featuring two flow directions (e.g. from P to A and simultaneous return flow from B to T).

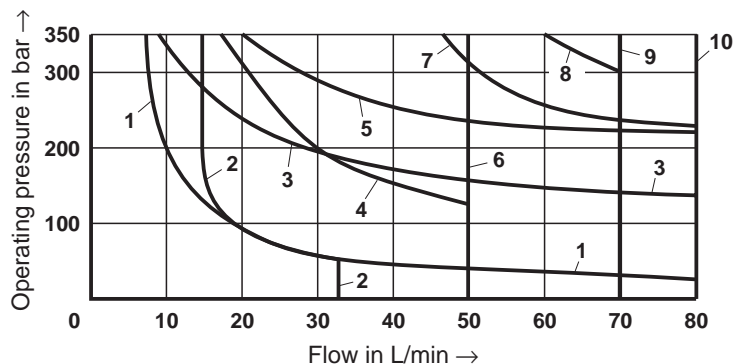
Due to the flow forces active within the valves the permitted power limit for directional valves may be considerably less where

there is only one direction of flow (e.g. from P to A and port B blocked) !

(Please consult us for applications of this kind.)

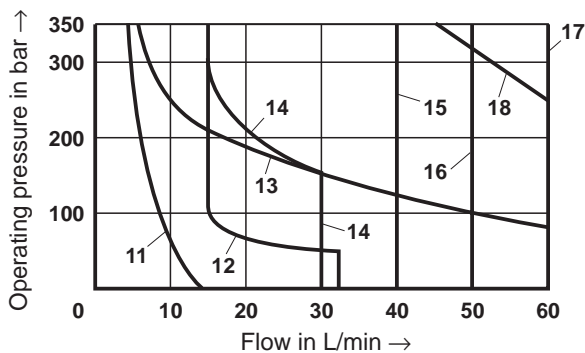
The power limit for directional valves was determined using solenoids at their operating temperature, 10% under voltage and with no pre-loading of the tank.

DC solenoid e.g. G24: 24 V		AC solenoid e.g. W230: 230 V, 50 Hz (see below)		AC solenoid e.g. W230: 230 V, 60 Hz (see below)	
Curve	Symbol	Curve	Symbol	Curve	Symbol
1	A, B ¹⁾	11	A, B ¹⁾	19	A, B ¹⁾
2	V	12	V	20	V
3	A, B	13	A, B	21	A, B
4	F, P	14	F, P	22	F, P
5	J	15	G, T	23	G, T
6	G, H, T	16	H	24	J, L, U
7	A/O, A/OF, L, U	17	A/O, A/OF, C/O, C/OF	25	A/O, A/OF, Q, W
8	C, D, Y		D/O, D/OF, E, E1 ⁻²⁾ , J, L	26	C, D, Y
9	M		M, Q, R ³⁾ , U, W	27	H
10	E, E1 ⁻²⁾ , R ³⁾ , C/O, C/OF D/O, D/OF, Q, W	18	C, D, Y	28	C/O, C/OF, D/O, D/OF, E, E1 ⁻²⁾ , M, R ³⁾

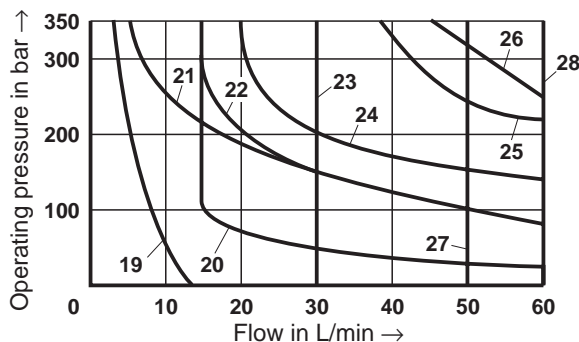


- 1) With hand emergency
- 2) P – A/B pre-opening
- 3) Return flow from actuator to tank

DC solenoid
Curves 1 to 10

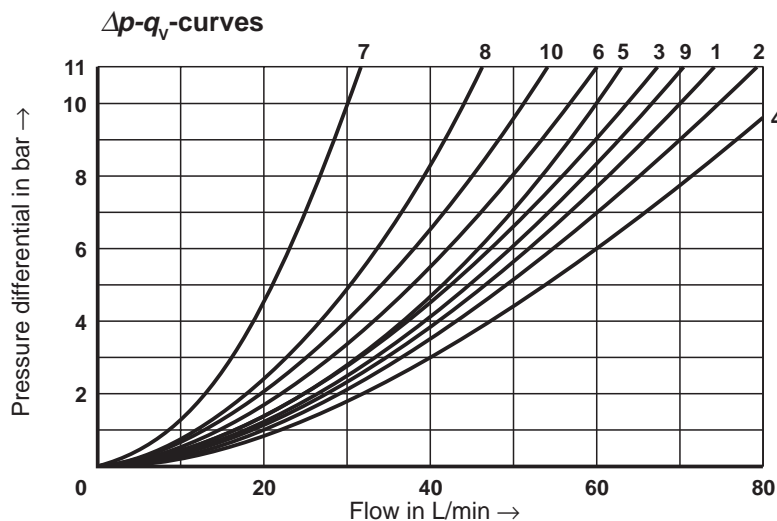


AC solenoid		
Curves	Solenoid Cross reference	
11	W42	42 V, 50 Hz
to	W110	110 V, 50 Hz
18	W230	230 V, 50 Hz



AC solenoid		
Curves	Solenoid Cross reference	
19	W42	42 V, 60 Hz
to	W110	110 V, 60 Hz
28	W230	230 V, 60 Hz

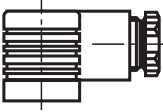
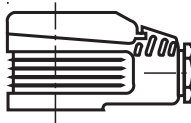
Characteristic curves (measured at $v = 41 \text{ mm}^2/\text{s}$ and $t = 50 \text{ }^\circ\text{C}$)



- 7 Symbol "R" in switching position A - B
 8 Symbol "G" and "T" in centre position P - T

Symbol	Flow direction			
	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	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J, Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	-
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

Ordering code for plug-in connectors (individual)

		Plug-in connector DIN 43 650 ISO 4400	Large plug-in connector			
						
			without lamp	with lamp	with rectifier	with lamp and protective diode
Valve side a, Plug, colour grey	Order No.	074683	008616	313923/24V 313926/180-240V	313932	310994
Valve side b, Plug, colour black		074684	009129	313928/24V 313931/180-240V	313933	310995

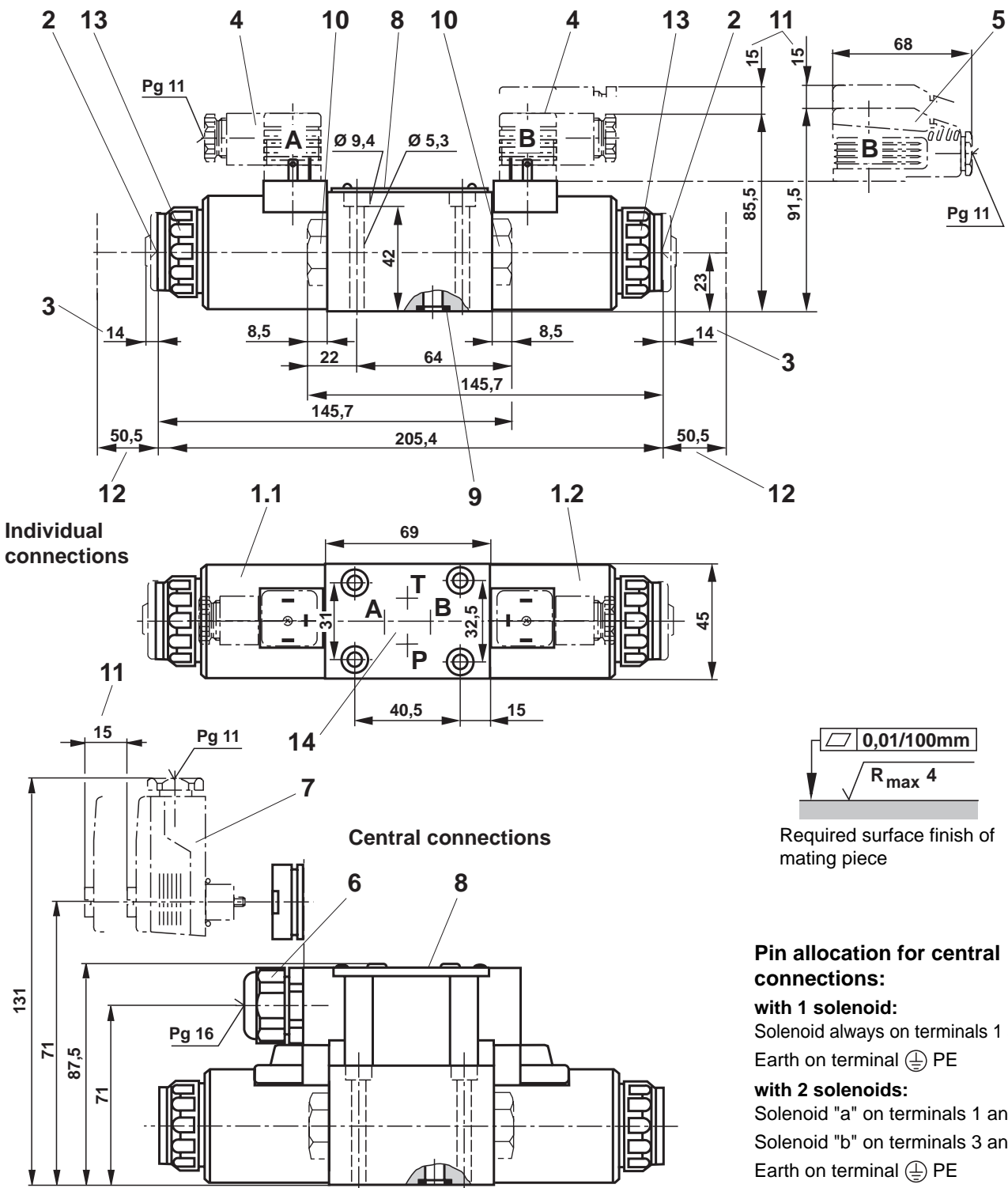
Preferred types (available at short notice)

Order No.	Type	Order No.	Type
561180	3WE 6 A 6X/ EG24 N9 K4	561284	4WE 6 GA 6X/ EG24 N9 K4
561270	3WE 6 B 6X/ EG24 N9 K4	561285	4WE 6 GB 6X/ EG24 N9 K4
561272	4WE 6 C 6X/ EG24 N9 K4	561286	4WE 6 H 6X/ EG24 N9 K4
561274	4WE 6 D 6X/ EG24 N9 K4	561288	4WE 6 J 6X/ EG24 N9 K4
561276	4WE 6 Y 6X/ EG24 N9 K4	561290	4WE 6 JA 6X/ EG24 N9 K4
561278	4WE 6 E 6X/ EG24 N9 K4	561291	4WE 6 JB 6X/ EG24 N9 K4
561280	4WE 6 EA 6X/ EG24 N9 K4	561292	4WE 6 Q 6X/ EG24 N9 K4
561281	4WE 6 EB 6X/ EG24 N9 K4		
561282	4WE 6 G 6X/ EG24 N9 K4		

Symbol

Unit dimensions: Valve with DC solenoid

(Dimensions in mm)

**Individual connections****Central connections****Pin allocation for central connections:****with 1 solenoid:**

Solenoid always on terminals 1 and 2
Earth on terminal \oplus PE

with 2 solenoids:

Solenoid "a" on terminals 1 and 2
Solenoid "b" on terminals 3 and 4
Earth on terminal \oplus PE

- | | |
|--|---|
| 1.1 Solenoid "a" (plug colour grey) | 4 Plug-in connector DIN 43 650 ¹⁾ |
| 1.2 Solenoid "b" (plug colour black) | 5 Large plug-in connector ¹⁾ |
| 2 Hand emergency "N9" (Standard) | 6 Cable gland Pg. 16 "DL" |
| – The hand emergency can only be operated up to a tank pressure of approx. 50 bar. | 7 Angled plug (plug colour red, must be ordered separately, order no. 005538) |
| Avoid damage to hand emergency pin bore! | 8 Name plate |
| 3 Dimension for solenoid with hand emergency "N" | 9 R-ring 9,81 x 1,5 x 1,78 |
| | 10 Plug for valves with one solenoid |
| | 11 Space required to remove plug-in connector |

12 Space required to remove coil

13 Securing nut, Tightening torque $M_A = 4$ Nm

14 Porting pattern DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H

Subplates G 341/01 (G 1/4)
G 342/01 (G 3/8)
G 502/01 (G 1/2)

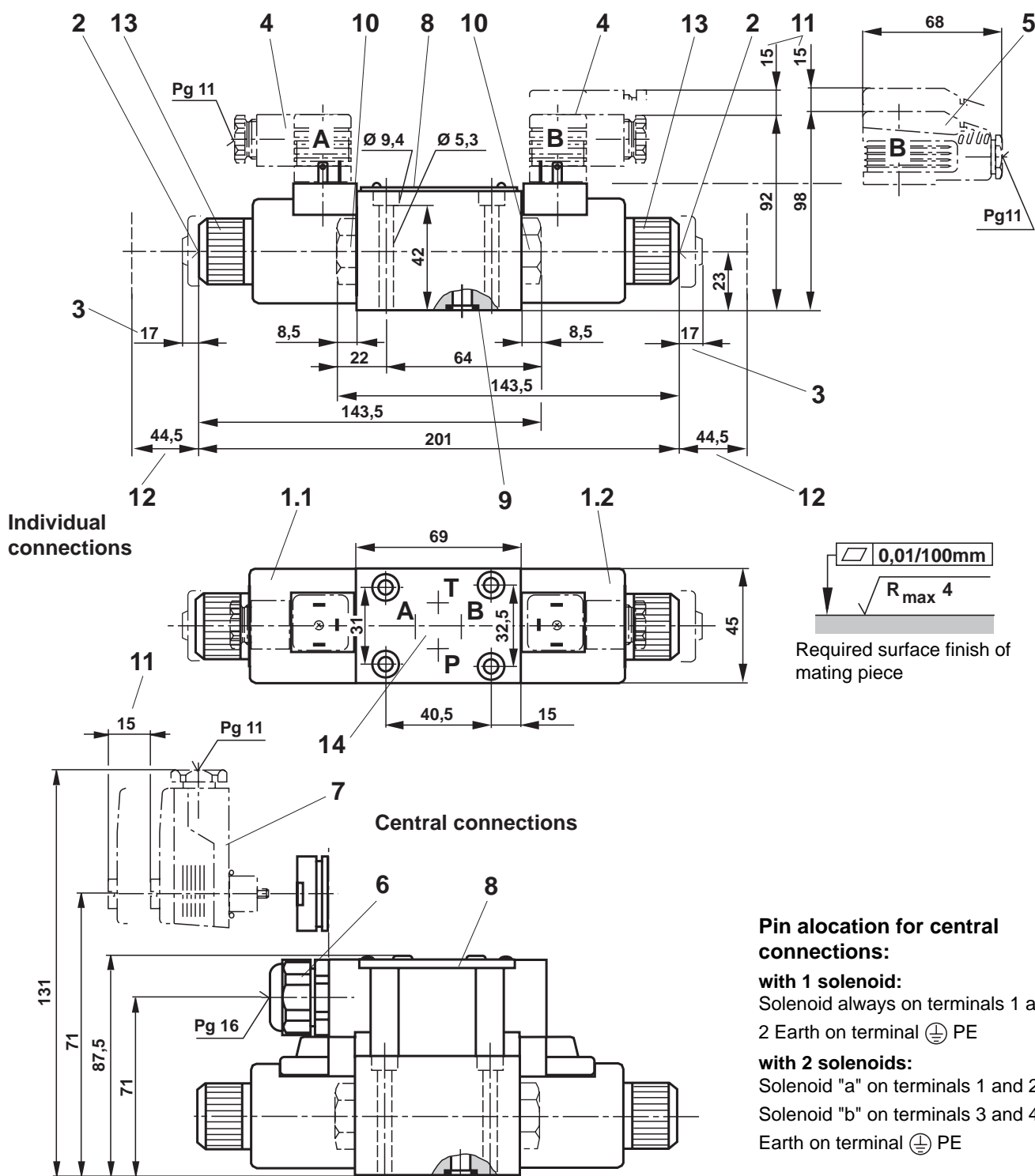
to data sheet RE 45 052 and **valve fixing screws**

M5 x 50 DIN 912-10.9, $M_A = 8,9$ Nm, must be ordered separately.

¹⁾ Must be ordered separately, see page 5.

Unit dimensions: Valve with AC solenoid

(Dimensions in mm)

**Pin allocation for central connections:**

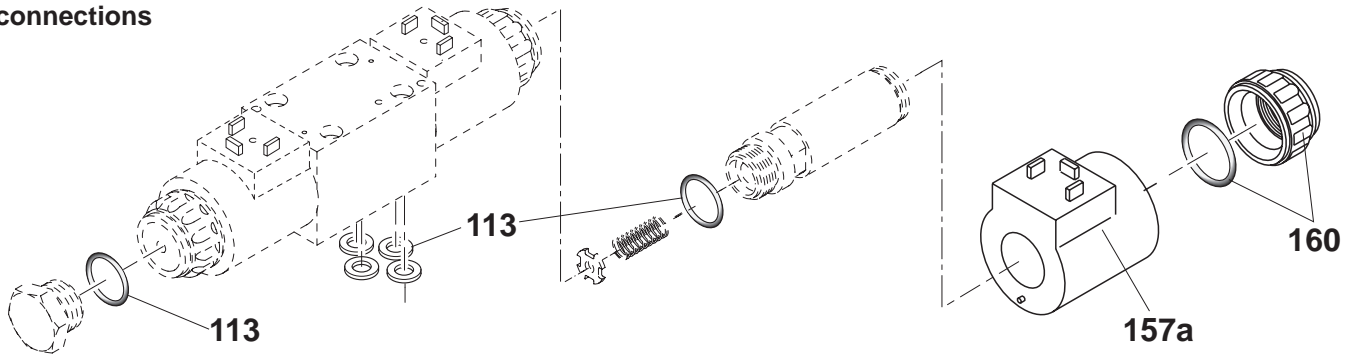
with 1 solenoid:
Solenoid always on terminals 1 and 2
Earth on terminal \oplus PE

with 2 solenoids:
Solenoid "a" on terminals 1 and 2
Solenoid "b" on terminals 3 and 4
Earth on terminal \oplus PE

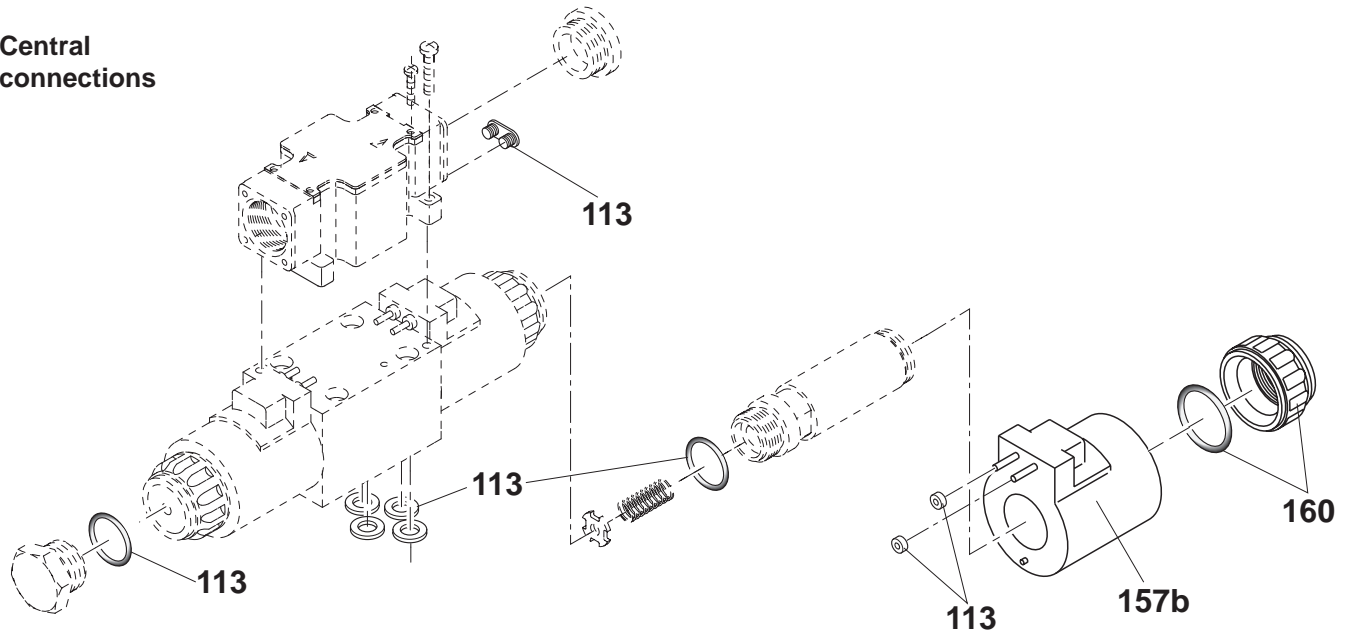
- | | | |
|--|--|--|
| <p>1.1 Solenoid "a" (plug colour grey)</p> <p>1.2 Solenoid "b" (plug colour black)</p> <p>2 Hand emergency "N9" (Standard)
–Hand emergency can only be operated up to a tank pressure of approx. 50 bar.
Avoid damage to the hand emergency pin bore!</p> <p>3 Dimensions for solenoid with hand emergency "N"</p> | <p>4 Plug-in connector to DIN 43 650 ¹⁾</p> <p>5 Large plug-in connector ¹⁾</p> <p>6 Cable gland Pg. 16 "DL"</p> <p>7 Angled plug (plug colour red, must be ordered separately, order no. 005538)</p> <p>8 Name plate</p> <p>9 R-Ring 9,81 x 1,5 x 1,78</p> <p>10 Plug for valves with one solenoid</p> <p>11 Space required to remove plug-in connector</p> | <p>12 Space required to remove coil</p> <p>13 Securing nut,
Tightening torque $M_A = 4 \text{ Nm}$</p> <p>14 Porting pattern DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H</p> <p>Subplates G 341/01 (G 1/4)
G 342/01 (G 3/8)
G 502/01 (G 1/2)</p> <p>to data sheet RE 45 052 and valve fixing screws
M5 x 50 DIN 912-10.9, $M_A = 8,9 \text{ Nm}$, must be ordered separately.</p> |
|--|--|--|
- ¹⁾ must be ordered separately, see page 5.

Ordering code : Available spare parts and seals

Individual connections



Central connections



Spare parts – Solenoid

Pos.	Description	DC		AC	
		Available voltages	Order No.	Available voltages	Order No.
157a	Coil for individual connections	12 V	021388	110 V, 50/60 Hz	020175
		24 V	021389	230 V, 50/60 Hz	071030
157b	Coil for central connections	12 V	021462	110 V, 50/60 Hz	021464
		24 V	021463	230 V, 50/60 Hz	071035
160	Seal kit – Nut for pole tube without hand override and pole tube with concealed hand override		068604		833831
	Seal kit – Nut for pole tube with hand override		068605		833808

Seal kit – Valve: Individual connections

Pos.	Seal material	Order No.
113	NBR seals	313162
	FPM seals	313163

Seal kit – Valve: Central connections

Pos.	Seal material	Order No.
113	NBR seals	833687
	FPM seals	833689

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