Coils for Operating Solenoids of Valves

C*

Size 03, 04, 06, 10

Technical Features

- Wide range of coil voltages
- Wide range of connectors and electrical connection options
- Easy replacement of coil solenoids
- The coils can be rotated and the required connector direction can be adjusted
- High resistance of coils against mechanical damage
- Coils supplied with AC current, fitted with integrated rectifier
- Coils with protection against possible damage due to induced voltage (Transil)

Technical Data

Quantity	Unit	Value
Nominal voltage (U_n)	V	see the list of voltages
Allowable voltage fluctuation		U_n ±10 %, if not stated otherwise in the valve data sheet
Coil current at U_n and 20 °C	A	see the table of coil types
Winding resistance at 20 °C	Ω	by calculation R = U_n/I
Input power of coil at 20 °C	W	by calculation P = U_n x I
Max. ambient temperature	°C (°F)	50 (122), if not stated otherwise in the data sheet
Operation conditions		see the data sheets of individual types of valves
Max. winding temperature	°C (°F)	155 (311)

	Data sheet	Type
General information	GI_0060	products and general conditions
Connectors	K_8008	connectors EN 175301-803-A

Product Description

Valves designed for a change of fluid direction, such as directional control valves and poppet-type valves, are often solenoid operated. Proportional valves are another large group controlling continuously parameters in the circuit within the defined interval. Electric current flowing through the coil winding creates a magnetic field. This field acts on the armature of the solenoid part and allows its shift which is then transferred to the valve control element (spool, poppet). The excitation winding made of copper wire placed on a plastic core is the basis. The coil is inserted into the steel housing amplifying the magnetic field and to protect it against mechanical damage. Moreover, the coil is molded into the housing by plastic material.
The connector part coupled with the coil is also made of the same plastic. A silicone seal protects the coil space against moisture and dust.

Coil Electrical Parameters

Standard control voltages are given in the table in the ordering code and coil currents are stated in the table of types. Electrical coil resistance is determined by the coil winding parameters. These along with input power of the coil can be calculated from the previous parameters. The coils are designed to be DC powered. When AC powered, it is necessary to use a coil with integrated rectifier or a connector plug with integrated rectifier.

In operation, the output power of coils is influenced both by keeping the given values of power supply and the operation conditions. Temperature rise of the winding causes an increase in its electrical resistance when exceeding operation conditions. This reduces both current flowing through the winding and generated magnetomotive force, thus magnetic field strength is also decreased. Hydraulic power of the solenoid operated valve is also decreased in an appropriate manner.

Protection of Control Electronics

A coil is an inductive load in an electrical circuit. Any change in the current flowing through a coil (e.g. when switching off the coil circuit), voltage is induced according to Lenz's law and opposes the change that produced it. This poses a damage risk to the control electronics. Especially for proportional valves, it is appropriate to use a coil with an integrated quenching diode - or transient-voltage-suppression diode (e.g. Transil). Transil is a proven and reliable semiconductor element connected in parallel to the coil. If the threshold voltage is exceeded, electric current starts to flow through it, thereby converting overvoltage energy to heat.

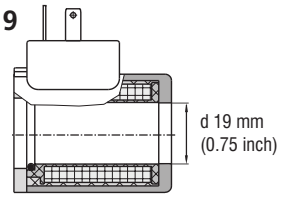
Quick disconnect

Induced voltage originating from a quick disconnect of the coil has according to Lenz's law a negative effect on OFF switching time regarding the solenoid armature. Special electronic circuit suppresses this unwanted phenomenon.

Coil sizes

Coil size	Diameter d [mm (inch)]	Valve size	Directional valves with housing		Cartridge valves		Proportional valves	
			High performance	Lightline	High performance	Lightline	Directional valves	Pressure
C14	13.4 (0.53)	Dn 03	RPEK1-03	RPEL1-04		SD2E-Ax/L SD3E-A2/L		SP4P1-B4
C19	19.0 (0.75)	Dn 04	RPE2-04 RPE3-04 SR4E2-B2	RPEL1-06	SD2E-Ax/H SD3E-A2/H SD1E-A2 SD1E-A3 ROE3	SD2E-Bx/L SD3E-B2/L	PRM2-04 PRM7-04	SR1P2-A2 SRN1P1-A2 SR4P2-B2 SRN4P1-B2 SP4P2-B3 SPN4P1-B3 PVRM1-063
C22	22.0 (0.87)	Dn 06	RPE3-06 RPEA3-06 RPEW4-06		SD2E-Bx/H SD3E-B2/H		PRM2-06 PRM7-06 PRM8-06	PVRM3-10
C31	31.0 (1.22)	Dn 10	RPE4-10 RPEW4-10				PRM6-10 PRM7-10	

Example: **C19**



For different sizes and versions of the valves, the appropriate coil sizes are used.
Size designation corresponds approximately to the inner diameter of the coil.

Connector Types

Basic connectors used to connect the power supply of the coils:

- Connector EN 175301-803-A (IP65)
- Connector AMP JUNIOR TIMER (IP67)
- Connector DEUTSCH DT04-2P (IP67 / IP69K)
- Special 2-pin connector EW designed to be slipped into the wirebox
- Loose conductors of standard length 300 mm (11.8 in)
- Loose conductors equipped with the connector at the end

Other connector types available upon agreement with the manufacturer.

EN 175301-803-A

AMP JUNIOR TIMER

DEUTSCH DT04-2P

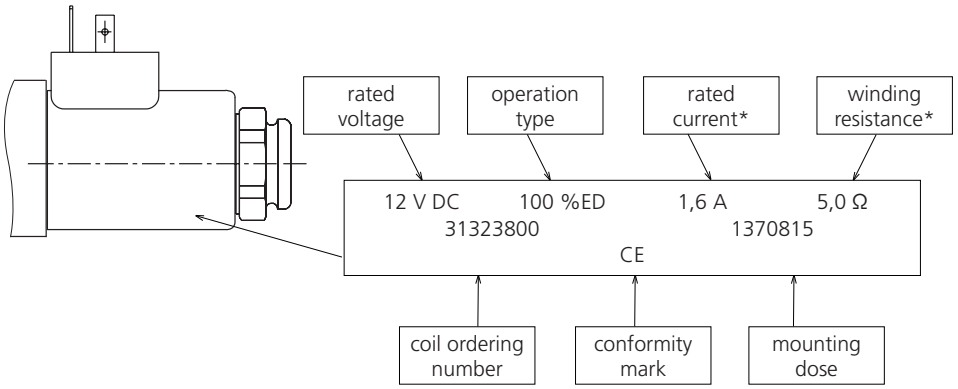
Connector EW

Loose Conductors

Identification of Coils

The CE conformity mark placed on the coil steel housing indicates that the product is in accordance with the following directives:

- 2014/30/ES for electromagnetic compatibility
- 2014/35/ES for low voltage equipment with rated voltage higher than 50 VAC and 75 VDC, respectively.



*Winding resistance is given only for coils used in proportional solenoids. Limit (maximum) current, which is allowed to flow continuously through the coil winding, is also stated for these coils instead of rated current.

Content

Ordering Code **4**

Coils C14B (d = 13.4 mm (0.53 inch)) **5**
RPEK1-03, RPEL1-04 5
SD2E-A2/L, SD2E-A3/L, SD2E-A4/L, SD3E-A2/L 5
SP4P1-B4 5

Coils C19 (d = 19 mm (0.75 inch)) **6**
RPE2-04, RPE3-04, RPEL1-06, ROE3-04, ROE3-06, SR4E-B2 6
SD2E-B2/L, SD2E-B3/L, SD2E-B4/L, SD3E-B2/L 6
SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3 6
RPE3-04 with CSA certification 7
SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3, SR4E-B2 7
PRM2-04, PRM7-04 8
PRM2-04 proportional directional control valves without integrated electronic unit 8
PRM2-04, PRM7-04 proportional directional control valves with integrated electronic unit 8
SR1P2-A2, SRN1P1-A2, SR4P2-B2, SRN4P1-B2, SP4P2-B3, SPN4P1-B3 8
PVRM1-063 9

Coils C22 (d = 22 mm (0.87 inch)) **10**
RPE3-06, RPEA3-06, RPEW4-06 10
SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H 10
RPE3-06 with CSA certification 11
RPEW4-06 with CSA certification 11
SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H 12
PRM2-06, PRM7-06, PRM8-06 12
PRM2-06 proportional directional control valves with integrated electronic unit 12
PRM2-06 proportional directional control valves without integrated electronic unit 12
PRM7-06, PRM8-06 proportional directional control valves without integrated electronic unit 13
PVRM3-10 13

Coils C31 (d = 31 mm (1.22 inch)) **14**
RPE4-10 14
RPEW4-10 (Wirebox) 15
RPE4-10 with CSA certification 15
RPEW4-10 with CSA certification 15
PRM6-10, PRM7-10 15

Dimensions in millimeters (inch) **16**
Mounting / dismantling the coils **18**

Ordering Code

C □□-□□□□-□□□□□/M

Solenoid coil

Coil size
inner diameter of coil

Ø 13.4 mm (0.53 in)	**14**
Ø 19.0 mm (0.75 in)	**19**
Ø 22.0 mm (0.87 in)	**22**
Ø 31.0 mm (1.22 in)	**31**

Coil housing design version

cold rolled housing	**A**
drawn housing	**B**
long drawn housing	**C**

Rated voltage (on the coil terminals)

12 V DC	**01200**
14 V DC	**01400**
24 V DC	**02400**
27 V DC	**02700**
48 V DC	**04800**
106 V DC	**10600**
205 V DC	**20500**
115 V AC 50 Hz	**11550**
120 V AC 60 Hz	**12060**
230 V AC 50 Hz	**23050**

Connector type
see the table

Additional protection of conductors (only for loose conductors)

N	non-braided
B	braided

Length of loose conductors

300	standard length 300 mm (11.8 in)
xxx	other length in mm (in)

Electrical winding resistance [Ω] at 20 °C (68 °F)

Coil detent type (for type C31 only)

N	without detent
F	with detent (by pin)

Housing surface treatment

A	zinc coated, 240 h salt spray test acc. to ISO 9227
B	zinc coated, 520 h salt spray test acc. to ISO 9227

Type of insulating material

no designation	standard
H	for valves with CSA certification

Coil for

no designation	switching valves
P	proportional valves

Special coil design

Not all possible combinations of parameters are produced as actual coils. If the required coil is not included in the table of the standard types, please contact our technical department to verify feasibility and identification of the specific type.

Note explaining usage of coils:
Coils with supply voltage 21 V DC are intended for rectified supply voltage 24 V AC / 50 Hz.
Coils with supply voltage 106 V DC are intended for rectified supply voltage 120 V AC / 60 Hz.
Coils with supply voltage 205 V DC are intended for rectified supply voltage 230 V AC / 50 Hz.
Coils 115 V AC / 50 Hz have a built-in rectifier and can be also used for supply voltage 120 V AC / 50 Hz or 60 Hz.
Coils 230 V AC / 50 Hz have a built-in rectifier.

Overview of connector types and electrical connections of coils

Connector	Designation	Description
EN 175301-803-A	E1	Connector EN 175301-803-A
	E2	Connector EN 175301-803-A + quenching diode
	E5	Connector EN 175301-803-A + integrated rectifier
	E51	Connector EN 175301-803-A + integrated rectifier + quick disconnect
AMP Junior Timer	E3	Connector AMP Junior Timer (2 pins)
	E4	Connector AMP Junior Timer (2 pins) + quenching diode
AMP Junior Timer axially oriented	E3A	Axial connector AMP Junior Timer (2 pins)
	E4A	Axial connector AMP Junior Timer (2 pins) + quenching diode
Deutsch DT04-2P axially oriented	E12A	Axial connector Deutsch DT04-2P (2 pins)
	E13A	Axial connector Deutsch DT04-2P (2 pins) + quenching diode
Loose conductors	E8	Loose conductors
	E9	Loose conductors + quenching diode
Loose conductors with connector	E10	Loose conductors with connector DT04-2P (2 pins)
	E11	Loose conductors with connector DT04-2P (2 pins) + quenching diode
	E16	Loose conductors with Metri-Pack connector, series 150 (2 pins)
	E17	Loose conductors with Metri-Pack connector, series 150 (2 pins) + quenching diode
	E18	Loose conductors with Weather-Pack connector (2 pins)
	E19	Loose conductors with Weather-Pack connector (2 pins) + quenching diode
	E20	Loose conductors with Weather-Pack connector (2 jacks)
	E21	Loose conductors with Weather-Pack connector (2 jacks) + quenching diode
	E22	Loose conductors with Econoseal connector (2 pins)
	E23	Loose conductors with Econoseal connector (2 pins) + quenching diode
	E24	Loose conductors with connector DT04-2P (2 pins)
	E25	Loose conductors with connector DT04-2P (2 pins) + quenching diode
Special connector for wirebox	EW1	Special connector for wirebox
	EW2	Special connector for wirebox + quenching diode

Coils C14B (d = 13.4 mm (0.53 inch))

	Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U_n
RPEK1-03, RPEL1-04 →	-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10
SD2E-A2/L, SD2E-A3/L, SD2E-A4/L, SD3E-A2/L →	-30...+50 (-22...+122)	-30...+60 (-22...+140)	± 10

Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types					
[V]	[A]	E1	E2	E3A	E4A	E12A	E13A
12 DC	1.83	**16210300**	**24101600**	**28822500**	**28822600**	**29268200**	**29268800**
		C14B-01200E1-6.55NA	C14B-01200E2-6.55NA	C14B-01200E3A-6.55NA	C14B-01200E4A-6.55NA	C14B-01200E12A-6.55NA	C14B-01200E13A-6.55NA
14 DC	1.57	**24102200**	on request	on request	on request	**34948600**	on request
		C14B-01400E1-8.91NA				C14B-01400E12A-8.91NA	
24 DC	0.92	**16210400**	**24101800**	**28686400**	**28822400**	**29268900**	**29269000**
		C14B-02400E1-26.2NA	C14B-02400E2-26.2NA	C14B-02400E3A-26.2NA	C14B-02400E4A-26.2NA	C14B-02400E12A-26.2NA	C14B-02400E13A-26.2NA
27 DC	0.80	**33565000**	on request	**34319700**	on request	on request	on request
		C14B-02700E1-33.6NA		C14B-02700E3A-33.6NA			

Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types					
[V]	[A]	E1	E2	E3A	E4A	E12A	E13A
12 DC	1.83	on request	on request	on request	on request	**32700900**	on request
						C14B-01200E12A-6.55NB	
14 DC	1.57	on request	on request	on request	on request	**34440200**	on request
						C14B-01400E12A-8.91NB	
24 DC	0.92	on request	on request	on request	on request	**31145400**	**31145500**
						C14B-02400E12A-26.2NB	C14B-02400E13A-26.2NB

	Ambient temperature °C (°F)	Fluid temperature °C (°F)
SP4P1-B4 →	-30...+90 (-22...+194)	-30...+90 (-22...+194)

Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types		
[V]	[A]	E1	E3A	E12A
12 DC	max 0.7	on request	**33038300**	**32482500**
			C14B-01200E3A-7.8NAP	C14B-01200E12A-7.8NAP
24 DC	max 0.35	**34056200**	**33038400**	**32482400**
		C14B-02400E1-29.5NAP	C14B-02400E3A-29.5NAP	C14B-02400E12A-29.5NAP

Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types		
[V]	[A]	E1	E3A	E12A
24 DC	max 0.35	on request	on request	**34186400**
				C14B-02400E12A-29.5NBP

Coils C19 (d = 19 mm (0.75 inch))

		Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U_n
RPE2-04, RPE3-04, RPEL1-06, ROE3-04, ROE3-06, SR4E-B2	→	-30...+50 (-22…+122)	-30…+80 (-22…+176)	± 10
SD2E-B2/L, SD2E-B3/L, SD2E-B4/L, SD3E-B2/L	→	-30…+50 (-22…+122)	-30…+60 (-22…+140)	± 10
SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3	→	-30…+50 (-22…+122) -30…+80 (-22…+176) *	-30…+80 (-22…+176)	± 10 ± 15 *

Remarks concerning Coil Usage
For valves SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3 coils of two different power classes may be used, depending on operating conditions (max. environmental temperature, tolerance of the supply voltage).

› Coils of higher power listed in this table may be used for environmental temperatures between -30…+50 °C (-22…+122 °F) and supply voltage fluctuations of up to ± 10 % U_N. Additional coils for supply voltages of 14 V DC, 27 V DC, 205 V DC and 230 V AC/50 Hz may even be used for environmental temperatures between -30…+80 °C (-22…+176 °F) and supply voltage fluctuations of up to ±15 % U_N.

› Coils of lower power listed in table on p.7 may be used for environmental tempertures between -30…+80 °C (-22…+176 °F) and supply voltage fluctuations of up to ±15 % U_N.

Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types							
[V]	[A]	E1	E2	E3	E4	E3A	E4A	E12A	E13A
12 DC	2.45	**27316600**	**27631400**	**27330200**	**27631600**	**27449600**	**27631900**	**27351400**	**27632000**
		C19B-01200E1-4.9NA	C19B-01200E2-4.9NA	C19B-01200E3-4.9NA	C19B-01200E4-4.9NA	C19B-01200E3A-4.9NA	C19B-01200E4A-4.9NA	C19B-01200E12A-4.9NA	C19B-01200E13A-4.9NA
14 DC	1.70	**27634100**	**27634200**	**27634300**	**27634400**	**27634500**	**27634600**	**27635000**	**27635100**
		C19B-01400E1-8.23NA	C19B-01400E2-8.23NA	C19B-01400E3-8.23NA	C19B-01400E4-8.23NA	C19B-01400E3A-8.23NA	C19B-01400E4A-8.23NA	C19B-01400E12A-8.23NA	C19B-01400E13A-8.23NA
24 DC	1.15	**27316700**	**27632400**	**27330300**	**27633200**	**27449700**	**27633400**	**27330500**	**27633500**
		C19B-02400E1-20.8NA	C19B-02400E2-20.8NA	C19B-02400E3-20.8NA	C19B-02400E4-20.8NA	C19B-02400E3A-20.8NA	C19B-02400E4A-20.8NA	C19B-02400E12A-20.8NA	C19B-02400E13A-20.8NA
27 DC	0.89	**27636100**	**27639400**	**27641600**	**27641700**	**27641800**	**27642100**	**27642400**	**27642500**
		C19B-02700E1-30.4NA	C19B-02700E2-30.4NA	C19B-02700E3-30.4NA	C19B-02700E4-30.4NA	C19B-02700E3A-30.4NA	C19B-02700E4A-30.4NA	C19B-02700E12A-30.4NA	C19B-02700E13A-30.4NA
205 DC	0.12	**27382401**	not available	not available	not available	not available	not available	not available	not available
		C19B-20500E1-1653NA							
		E5							
230 AC 50 Hz	0.12	**27449900**							
		C19B-23050E5-1653NA							

Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types				
[V]	[A]	E1	E2	E3A	E12A	E13A
14 DC	1.70	on request	on request	on request	**33212800**	on request
					C19B-01400E12A-8.23NB	
24 DC	1.15	**28829600**	**32092500**	on request	on request	**31330200**
		C19B-02400E1-20.8NB	C19B-02400E2-20.8NB			C19B-02400E13A-20.8NB
27 DC	0.89	on request	on request	**33559000**	on request	**40052200**
				C19B-02700E3A-30.4NB		C19B-02700E13A-30.4NB

Coils C19 (d = 19 mm (0.75 inch))

RPE3-04 with CSA certification Surface treatment A: 240 h salt spray test acc. to ISO 9227			
Voltage	Current	Connector types	
[V]	[A]	E1	E5
12 DC	2.41	**24140700** C19A-01200E1-4.98NAH	not available
24 DC	1.15	**24140800** C19A-02400E1-21NAH	not available
115 AC 50 Hz	0.24	not available	**24140900** C19A-11550E5-433NAH
230 AC 50 Hz	0.12	not available	**24141000** C19A-23050E5-1653NAH

SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3, SR4E-B2 →

Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U_n
-30…+80 (-22…+176)	-30…+80 (-22…+176)	± 15

Surface treatment A: 240 h salt spray test acc. to ISO 9227								
Voltage	Current	Connector types						
[V]	[A]	E1	E2	E3	E4	E4A	E12A	E13A
12 DC	2.00	**27669700** C19B-01200E1-6NA	**27669900** C19B-01200E2-6NA	**27670000** C19B-01200E3-6NA	**27670100** C19B-01200E4-6NA	on request	**32829300** C19B-01200E12A-6NA	**29871300** C19B-01200E13A-6NA
24 DC	0,93	**27670600** C19B-02400E1-25.75NA	**27670700** C19B-02400E2-25.75NA	**27670800** C19B-02400E3-25.75NA	**27670900** C19B-02400E4-25.75NA	**30117800** C19B-02400E4A-25.75NA	**31330000** C19B-02400E12A-25.75NA	32801600 C19B-02400E13A-25.75NA

Surface treatment B: 520 h salt spray test acc. to ISO 9227			
Voltage	Current	Connector types	
[V]	[A]	E1	E3
24 DC	0.93	**30449100** C19B-02400E1-25.75NB	**33090800** C19B-02400E3-25.75NB

Coils C19 (d = 19 mm (0.75 inch))

PRM2-04, PRM7-04	→	Ambient temperature °C (°F)	Fluid temperature °C (°F)
		+50 (+122)	-30…+80 (-22…+176)

PRM2-04 proportional directional control valves without integrated electronic unit
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types						
[V]	[A]	E1	E2	E3	E4	E3A	E12A	E13A
12 DC	max. 1.7	**27821900**	on request	**27822000**	on request	**31688600**	**27821200**	on request
		C19B-01200E1-4.68NAP		C19B-01200E3-4.68NAP		C19B-01200E3A-4.68NAP	C19B-01200E12A-4.68NAP	
24 DC	max 0.8	**27824200**	**27824300**	**28145200**	**27824400**	**31891300**	**30754900**	**29868600**
		C19B-02400E1-20.6NAP	C19B-02400E2-20.6NAP	C19B-02400E3-20.6NAP	C19B-02400E4-20.6NAP	C19B-02400E3A-20.6NAP	C19B-02400E12A-20.6NAP	C19B-02400E13A-20.6NAP

Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types	
[V]	[A]	E3	E12A
24 DC	max 0.8	**31805200**	**31805300**
		C19B-02400E3-20.6NBP	C19B-02400E12A-20.6NBP

PRM2-04, PRM7-04 proportional directional control valves with integrated electronic unit
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types
[V]	[A]	E1
12 DC	max. 1.7	**16186100**
		C19A-01200E1-4.98NAP
24 DC	max 0.8	**16186200**
		C19A-02400E1-21NAP

SR1P2-A2, SRN1P1-A2, SR4P2-B2, SRN4P1-B2, SP4P2-B3, SPN4P1-B3	→	Ambient temperature °C (°F)	Fluid temperature °C (°F)
		-30…+80 (-22…+176)	-30…+120 (-22…+248)

Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types						
[V]	[A]	E1	E2	E3	E4	E3A	E12A	E13A
12 DC	max. 1	**28145500**	**28145600**	**28145700**	**28145800**	**33793900**	**28184900**	**29867600**
		C19B-01200E1-6.5NAP	C19B-01200E2-6.5NAP	C19B-01200E3-6.5NAP	C19B-01200E4-6.5NA	C19B-01200E3A-6.5NAP	C19B-01200E12A-6.5NAP	C19B-01200E13A-6.5NAP
24 DC	max 0.6	**27824200**	**27824300**	**28145200**	**27824400**	**31891300**	**30754900**	**29868600**
		C19B-02400E1-20.6NAP	C19B-02400E2-20.6NAP	C19B-02400E3-20.6NAP	C19B-02400E4-20.6NAP	C19B-02400E3A-20.6NAP	C19B-02400E12A-20.6NAP	C19B-02400E13A-20.6NAP

Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types	
[V]	[A]	E3	E12A
24 DC	max 0.6	**31805200**	**31805300**
		C19B-02400E3-20.6NBP	C19B-02400E12A-20.6NBP

Coils C19 (d = 19 mm (0.75 inch))

PVRM1-063	→

Ambient temperature °C (°F)	Fluid temperature °C (°F)
-30…+90 (-22…+194)	-30…+90 (-22…+194)

Max. reduced pressure 20 bar (290 PSI)
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types
[V]	[A]	E12A
12 DC	max. 1	**27821300**
		C19B-01200E13A-6.85NAP

Max. reduced pressure 32 bar (470 PSI)
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types	
[V]	[A]	E4	E13A
12 DC	max. 1.5	**27785600**	**29869000**
		C19B-01200E4-4.68NAP	C19B-01200E13A-4.68NAP

Max. reduced pressure 20 and 32 bar (290 and 470 PSI)
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types						
[V]	[A]	E1	E2	E3	E3A	E4	E12A	E13A
24 DC	max 0.75	**27824200**	**27824300**	**30118100**	**31891300**	**27824400**	**30754900**	**29868600**
		C19B-02400E1-20.6NAP	C19B-02400E2-20.6NAP	C19B-02400E3-20.6NAP	C19B-02400E3A-20.6NAP	C19B-02400E4-20.6NAP	C19B-02400E12A-20.6NAP	C19B-02400E13A-20.6NAP

Max. reduced pressure 20 and 32 bar (290 and 470 PSI)
Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types	
[V]	[A]	E3	E12A
24 DC	max 0.75	**31805200**	**31805300**
		C19B-02400E3-20.6NBP	C19B-02400E12A-20.6NBP

Coils C22 (d = 22 mm (0.87 inch))

		Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U_n
RPE3-06, RPEA3-06, RPEW4-06	→	-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10
SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H	→	-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10

Remarks concerning Coil Usage
For valves SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/Hcoils of two different power classes may be used, depending on operating conditions (max. environmental temperature, tolerance of the supply voltage).

› Coils of higher power listed in this table may be used for environmental temperatures between -30…+50 °C (-22…+122 °F) and supply voltage fluctuations of up to ± 10 % U_N.

› Coils of lower power listed in table on p.12 may be used for environmental tempertures between -30…+80 °C (-22…+176 °F) and supply voltage fluctuations of up to ±15 % U_N.

Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types						
[V]	[A]	E1	E2	E3A	E4A	E5	E12A	E13A
12 DC	2.72	**16211400**	**24156100**	**24159600**	**24159700**	not available	**24930801**	**19695100**
		C22B-01200E1-4.41NA	C22B-01200E2-4.41NA	C22B-01200E3A-4.41NA	C22B-01200E4A-4.41NA		C22B-01200E12A-4.41NA	C22B-01200E13A-4.41NA
14 DC	2.14	**24158200**	**24930900**	**27662100**	**27662200**	not available	**27663000**	**27663100**
		C22B-01400E1-6.55NA	C22B-01400E2-6.55NA	C22B-01400E3A-6.55NA	C22B-01400E4A-6.55NA		C22B-01400E12A-6.55NA	C22B-01400E13A-6.55NA
24 DC	1.29	**16211600**	**24157400**	**24159800**	**24159900**	not available	**19695900**	**19696000**
		C22B-02400E1-18.6NA	C22B-02400E2-18.6NA	C22B-02400E3A-18.6NA	C22B-02400E4A-18.6NA		C22B-02400E12A-18.6NA	C22B-02400E13A-18.6NA
27 DC	1.07	**16211700**	**24157600**	**19744600**	**19744500**	not available	**27663200**	**27663300**
		C22B-02700E1-25.3NA	C22B-02700E2-25.3NA	C22B-02700E3A-25.3NA	C22B-02700E4A-25.3NA		C22B-02700E12A-25.3NA	C22B-02700E13A-25.3NA
205 DC	0.15	**16211500**	not available	not available	not available	not available	not available	not available
		C22B-20500E1-1400NA						
230 AC 50 Hz	0.15	not available	not available	not available	not available	**18849000**	not available	not available
						C22B-23050E5-1400NA		

Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types						
[V]	[A]	E1	E2	E3A	E4A	E5	E12A	E13A
12 DC	2.72	**34007700**	**32489000**	on request	on request	not available	**31536900**	on request
		C22B-01200E1-4.41NB	C22B-01200E2-4.41NB				C22B-01200E12A-4.41NB	
24 DC	1.29	**24156800**	**32092900**	**24160200**	**24160300**	not available	**31156300**	**33089500**
		C22B-02400E1-18.6NB	C22B-02400E2-18.6NB	C22B-02400E3A-18.6NB	C22B-02400E4A-18.6NB		C22B-02400E12A-18.6NB	C22B-02400E13A-18.6NB
27 DC	1.07	**33570600**	on request	**31802800**	on request	not available	**31802900**	on request
		C22B-02700E1-25.3NB		C22B-02700E3A-25.3NB			C22B-02700E12A-25.3NB	

RPEA3-06
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types	
[V]	[A]	E1	EW1
24 DC	0.33	**24157700**	**24014000**
		C22B-02400E1-72NA	C22C-02400EW1-72NA/M

Coils C22 (d = 22 mm (0.87 inch))

RPEW4-06 Surface treatment A: 240 h salt spray test acc. to ISO 9227			
Voltage	Current	Connector types	
[V]	[A]	EW1	EW2
12 DC	2.64	**16205100**	**16205400**
		C22C-01200EW1-4.54NA/M	C22C-01200EW2-4.54NA/M
24 DC	1.32	**16205000**	**16205500**
		C22C-02400EW1-18.2NA/M	C22C-02400EW2-18.2NA/M

RPE3-06 with CSA certification Surface treatment A: 240 h salt spray test acc. to ISO 9227			
Voltage	Current	Connector types	
[V]	[A]	E1	E5
12 DC	2.72	**24154300**	not available
		C22A-01200E1-4.41NAH	
24 DC	1.29	**24154400**	not available
		C22A-02400E1-18.6NAH	
115 AC 50 Hz	0.30	not available	**24154500**
			C22A-11550E5-344NAH
230 AC 50 Hz	0.15	not available	**24154600**
			C22A-23050E5-1393NAH

RPEW4-06 with CSA certification Surface treatment A: 240 h salt spray test acc. to ISO 9227			
Voltage	Current	Connector types	
[V]	[A]	EW1	EW2
12 DC	2.64	**24154700**	**24155500**
		C22C-01200EW1-4.54NAH/M	C22C-01200EW2-4.54NAH/M
24 DC	1.32	**24154900**	**24155300**
		C22C-02400EW1-18.2NAH/M	C22C-02400EW2-18.2NAH/M
106 DC	0.27	**24155100**	not available
		C22C-10600EW1-400NAH/M	

Coils C22 (d = 22 mm (0.87 inch))

SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H →

Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U_n
-30…+80 (-22…+176)	-30…+80 (-22…+176)	± 15

Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types						
[V]	[A]	E1	E2	E3A	E4A	E5	E12A	E13A
12 DC	1.83	**27222400**	**27222500**	**27222600**	**27222700**	not available	**18815601**	**19909000**
		C22B-01200E1-6.55NA	C22B-01200E2-6.55NA	C22B-01200E3A-6.55NA	C22B-01200E4A-6.55NA		C22B-01200E12A-6.55NA	C22B-01200E13A-6.55NA
24 DC	0.95	**27222800**	**27222900**	**27223000**	**27223100**	not available	**19909101**	**19909200**
		C22B-02400E1-25.3NA	C22B-02400E2-25.3NA	C22B-02400E3A-25.3NA	C22B-02400E4A-25.3NA		C22B-02400E12A-25.3NA	C22B-02400E13A-25.3NA
205 DC	0.09	**24160100**	not available	not available	not available	not available	not available	not available
		C22B-20500E1-2353NA						
230 AC 50 Hz	0.09	not available	not available	not available	not available	**20004200**	not available	not available
						C22B-23050E5-2353NA		

Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types	
[V]	[A]	E1	E13A
24 DC	0.95	**30129500**	**33028000**
		C22B-02400E1-25.3NB	C22B-02400E13A-25.3NB

PRM2-06, PRM7-06, PRM8-06 →

Ambient temperature °C (°F)	Fluid temperature °C (°F)
+50 (+122)	-30…+80 (-22…+176)

PRM2-06 proportional directional control valves with integrated electronic unit
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types
[V]	[A]	E1
12 DC	max 1.6	**16187500**
		C22A-01200E1-5.15NAP
24 DC	max 1	**16186800**
		C22A-02400E1-13.4NAP

PRM2-06 proportional directional control valves without integrated electronic unit
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types			
[V]	[A]	E1	E3A	E12A	E13A
12 DC	max 2.5	**18838500**	**19744700**	**19696100**	**19909300**
		C22B-01200E1-2.33NAP	C22B-01200E3A-2.33NAP	C22B-01200E12A-2.33NAP	C22B-01200E13A-2.33NAP
24 DC	max 1	**18838300**	**19744300**	**19696200**	**30691600**
		C22B-02400E1-13.4NAP	C22B-02400E3A-13.4NAP	C22B-02400E12A-13.4NAP	C22B-02400E13A-13.4NAP

Coils C22 (d = 22 mm (0.87 inch))

PRM2-06 proportional directional control valves without integrated electronic unit Surface treatment B: 520 h salt spray test acc. to ISO 9227					
Voltage	Current	Connector types			
[V]	[A]	E1	E3A	E12A	E13A
12 DC	max 2.5	**34180800** C22B-01200E1-2.33NBP	on request	on request	on request
24 DC	max 1	**34184200** C22B-02400E1-13.4NBP	**33288400** C22B-02400E3A-13.4NBP	on request	**28811200** C22B-02400E13A-13.4NBP

PRM7-06, PRM8-06 proportional directional control valves without integrated electronic unit Surface treatment A: 240 h salt spray test acc. to ISO 9227					
Voltage	Current	Connector types			
[V]	[A]	E1	E3A	E12A	E13A
12 DC	max 2.5	**18838500** C22B-01200E1-2.33NAP	**19744700** C22B-01200E3A-2.33NAP	**19696100** C22B-01200E12A-2.33NAP	**19909300** C22B-01200E13A-2.33NAP
24 DC	max 1	**18838300** C22B-02400E1-13.4NAP	**19744300** C22B-02400E3A-13.4NAP	**19696200** C22B-02400E12A-13.4NAP	**30691600** C22B-02400E13A-13.4NAP

PRM7-06, PRM8-06 proportional directional control valves without integrated electronic unit Surface treatment B: 520 h salt spray test acc. to ISO 9227					
Voltage	Current	Connector types			
[V]	[A]	E1	E3A	E12A	E13A
12 DC	max 2.5	**34180800** C22B-01200E1-2.33NBP	on request	on request	on request
24 DC	max 1	**34184200** C22B-02400E1-13.4NBP	**33288400** C22B-02400E3A-13.4NBP	on request	**28811200** C22B-02400E13A-13.4NBP

PVRM3-10	→	Ambient temperature °C (°F)	Fluid temperature °C (°F)
		-30…+90 (-22…+194)	-30…+90 (-22…+194)

Surface treatment A: 240 h salt spray test acc. to ISO 9227		
Voltage	Current	Connector types
[V]	[A]	EA3
12 DC	max 1.5	**24157900** C22B-01200E3A-5NAP
24 DC	max 1	**19744300** C22B-02400E3A-13.4NAP

Coils C31 (d = 31 mm (1.22 inch))

RPE4-10	→	Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U_n
		-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10

RPE4-10
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types						
[V]	[A]	E1	E2	E3	E4	E5	E12A	E13A
12 DC	3.17	**16195700** C31A-01200E1-3.78FA	**27660800** C31A-01200E2-3.78FA	**16197000** C31A-01200E3-3.78FA	**16196900** C31A-01200E4-3.78FA	not available	**33252200** C31A-01200E12A-3.78FA	on request
14 DC	2.98	**16195900** C31A-01400E1-4.73FA	**27660900** C31A-01400E2-4.73FA	**27661100** C31A-01400E3-4.73FA	**27661200** C31A-01400E4-4.73FA	not available	on request	on request
24 DC	1.73	**16196100** C31A-02400E1-13.9FA	**23896000** C31A-02400E2-13.9FA	**16197200** C31A-02400E3-13.9FA	**16197100** C31A-02400E4-13.9FA	not available	**33252300** C31A-02400E12A-13.9FA	**34234400** C31A-02400E13A-13.9FA
27 DC	1.52	**16196300** C31A-02700E1-17.8FA	**27661000** C31A-02700E2-17.8FA	**27661300** C31A-02700E3-17.8FA	**27661400** C31A-02700E4-17.8FA	not available	on request	**33863900** C31A-02700E13A-17.8FA
205 DC	0.20	**16196700** C31A-20500E1-1027FA	not available	not available	not available	not available	not available	not available
230 AC 50 Hz	0.20	not available	not available	not available	not available	**16195100** C31A-23050E5-1027FA	not available	not available

RPE4-10
Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage	Current	Connector types				
[V]	[A]	E1	E3	E4	E5	E12A
24 DC	1.73	**31648900** C31A-02400E1-13.9FB	**29427900** C31A-02400E3-13.9FB	**33081100** C31A-02400E4-13.9FB	not available	**33267000** C31A-02400E12A-13.9FB
27 DC	1.52	on request	**31803100** C31A-02700E3-17.8FB	on request	not available	on request
205 DC	0.20	**34353800** C31A-20500E1-1027FB	not available	not available	not available	not available
230 AC 50 Hz	0.20	not available	not available	not available	**31884600** C31A-23050E5-1027FB	not available

Coils C31 (d = 31 mm (1.22 inch))

RPEW4-10 (Wirebox) Surface treatment A: 240 h salt spray test acc. to ISO 9227		
Voltage	Current	Connector types
[V]	[A]	EW1
12 DC	3.17	**24172000**
		C31A-01200EW1-3.78FA/M
24 DC	1.73	**24172200**
		C31A-02400EW1-13.9FA/M
106 DC	0.38	**24172400**
		C31A-10600EW1-276FA/M

RPE4-10 with CSA certification Surface treatment A: 240 h salt spray test acc. to ISO 9227		
Voltage	Current	Connector types
[V]	[A]	E5
120 AC 60 Hz	0.38	**24172800**
		C31A-12060E5-276FAH

RPEW4-10 with CSA certification Surface treatment A: 240 h salt spray test acc. to ISO 9227		
Voltage	Current	Connector types
[V]	[A]	EW1
120 AC 60 Hz	0.38	**24172600**
		C31A-10600EW1-276FAH/M

PRM6-10, PRM7-10 →

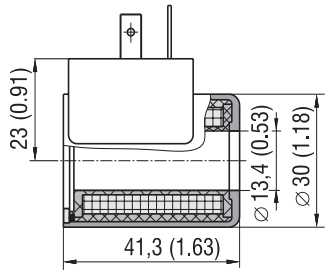
Ambient temperature °C (°F)	Fluid temperature °C (°F)
+50 (+122)	-30…+80 (-22…+176)

Surface treatment A: 240 h salt spray test acc. to ISO 9227				
Voltage	Current	Connector types		
[V]	[A]	E1	E3	E12A
12 DC	max 1.9	**16195800**	**33223900**	**33252400**
		C31A-01200E1-4.73FAP	C31A-01200E3-4.73FAP	C31A-01200E12A-4.73FAP
24 DC	max 1.1	**16196200**	**31354800**	**33251800**
		C31A-02400E1-13.9FAP	C31A-02400E3-13.9FAP	C31A-02400E12A-13.9FAP

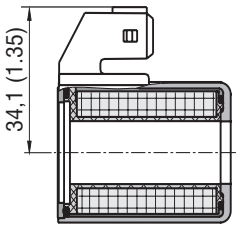
Surface treatment B: 520 h salt spray test acc. to ISO 9227		
Voltage	Current	Connector types
[V]	[A]	E1
24 DC	max 1.1	33461500
		C31A-02400E1-13.9FBP

C14B

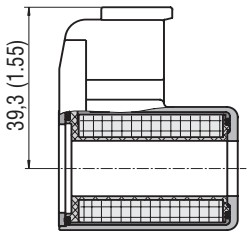
E1, E2 IP65



E3A, E4A IP67

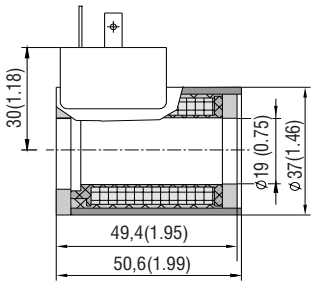


E12A , E13A IP67 / IP69K

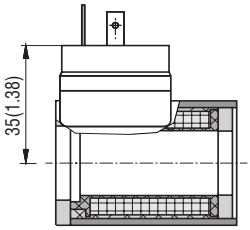


C19A

E1, E2 IP65

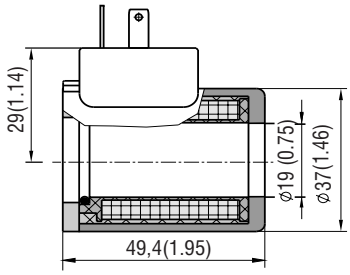


E5 IP65

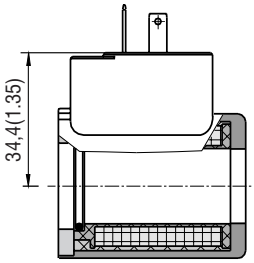


C19B

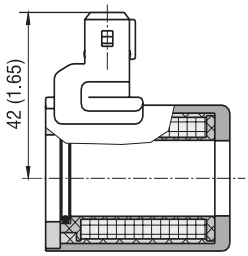
E1, E2 IP65



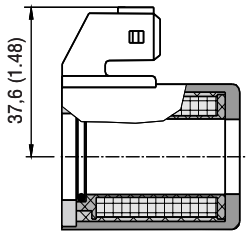
E5, E51 IP65



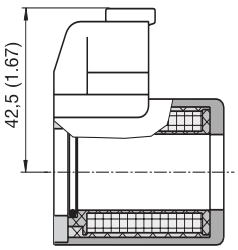
E3, E4 IP67



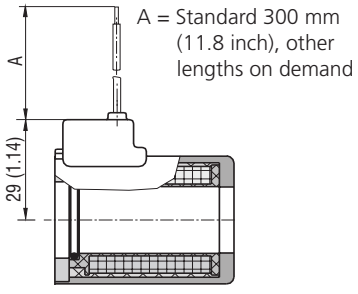
E3A , EA4 IP67



E12A , E13A IP67 / IP69K

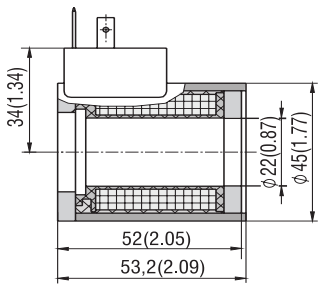


E8, E9

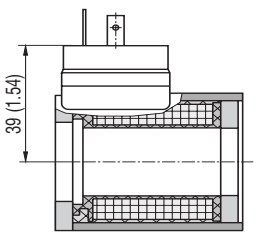


C22A

E1, E2 IP65

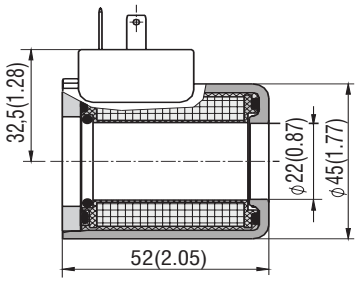


E5 IP65

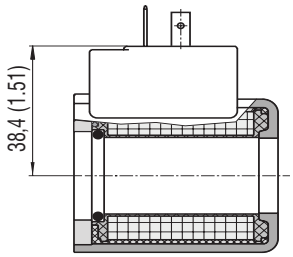


C22B

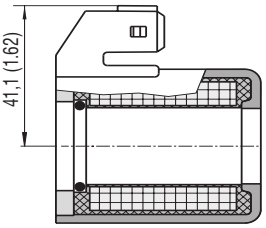
E1, E2 IP65



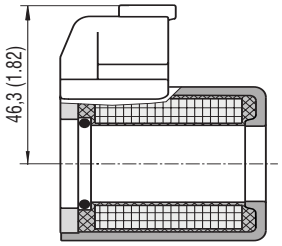
E5, E51 IP65



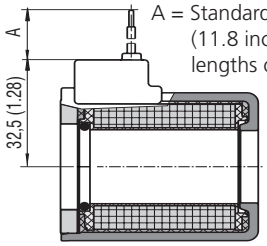
E3A , E4A IP67



E12A , E13A IP67 / IP69K

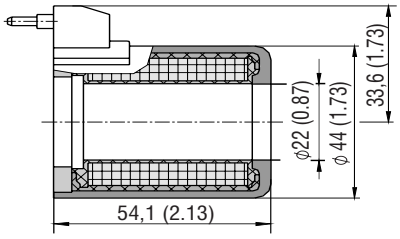


E8, E9



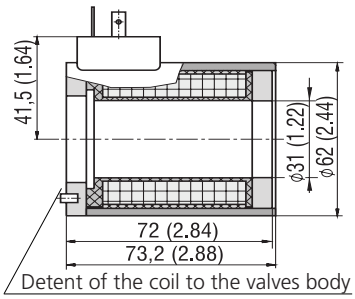
C22C

EW1, EW2 IP65

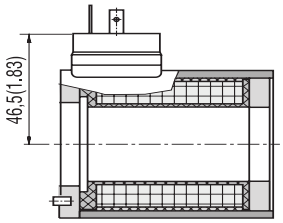


C31A

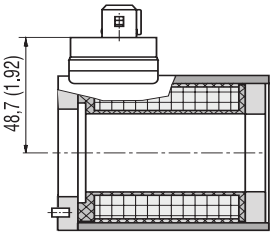
E1, E2 IP65



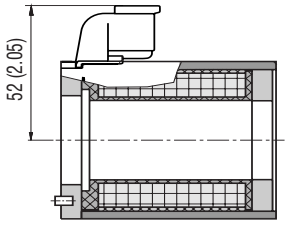
E5, E51 IP65



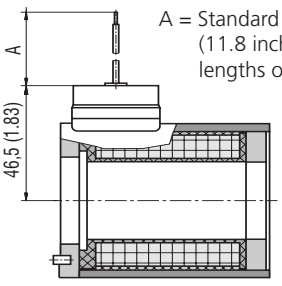
E3, E4 IP67



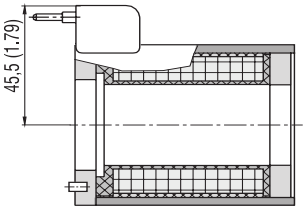
E12A , E13A IP67 / IP69K

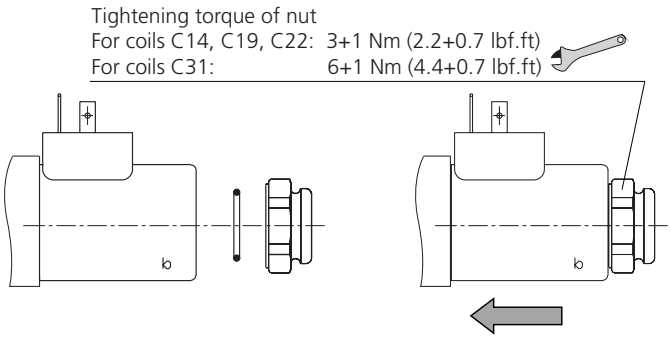


E8, E9



EW1 IP65





› Choose the correct coil type according to the valve type given in this data sheet HA 8007.
When AC power supply is chosen, the connector with integrated rectifier or the connector plug with integrated rectifier must be used.
› The coil is placed on the solenoid actuating system (as indicated in the picture) and its position is fixed by a nut.
The nut must be tightened with the specified torque.
› The connector position can be set by rotating the coil around its longitudinal axis - continuously in the range of 0 - 360° / by 90° for coils with a locating pin.

CAUTION

› Coil mounting, especially the connection to power supply, must be carried out by a competent person only.

WARNING

› Before any handling the coil must be disconnected from the power supply.
› The hydraulic circuit must be switched off and unloaded during installation.
› Disconnect the coil from the power supply before dismounting and let it cool down to avoid burns.
The temperature may exceed 100 °C (212 °F) during operation.

Operation

Basic operating parameters are stated in the data sheet of the relevant solenoid operated valve and the coil description is given in the data sheet HA 8007.

CAUTION

› Power supply parameters must correspond to the specified coil type. Switching coils are controlled by voltage. The voltage indicated on the coil is the nominal voltage. Control voltage should not deviate from nominal by more than ±10 %, if not stated otherwise in the data sheet. Proportional coils are controlled by current. The current indicated on the coil is the limit (maximum) current which may continuously flow through the coil winding.
› The coil may be energized only if correctly placed on the solenoid actuating system and properly fixed by a nut.
› If a valve is operated by two solenoids acting in the opposite directions, the two solenoids must never be energized simultaneously.
› Protect the coil against the effects of high temperatures and thermal shocks. The operating temperature range of hydraulic fluid and maximum ambient temperature are stated in the data sheet of the given valve. In general, there must be a sufficient heat removal from the coil so that the mean winding temperature does not exceed 155 °C (311 °F).
› Protect the coil against peak voltages by a suitable overvoltage protection.
› Protect the coil against mechanical damage, excessive vibrations and shocks.
› Protect the coil against effects of a corrosive environment and aggressive chemicals.
› The coil is not designed for operation immersed in fluid.

WARNING - notices regarding the residual risks

› Damaged coils, coils with damaged parts of the power supply connector or a damaged cable must be taken out of operation immediately. There is a possibility of electric shock.
› Don't touch the coil surface during operation. The coil becomes warm and there is a risk of burns.

Applicability of legal regulations

The following requirements apply to the coils:
› Directive 2014/30/EU for electromagnetic compatibility of electrical equipment
› Directive 2014/35/EU for low voltage equipment with rated voltage higher than 75 V DC and 50 V AC, respectively.

Coils are designated by the CE conformity mark and they are delivered with instructions. The declaration of conformity is issued for each item.
Tests of coils according to the CSA standard are carried out together with the hydraulic part. The certification covers the complete directional control valves.