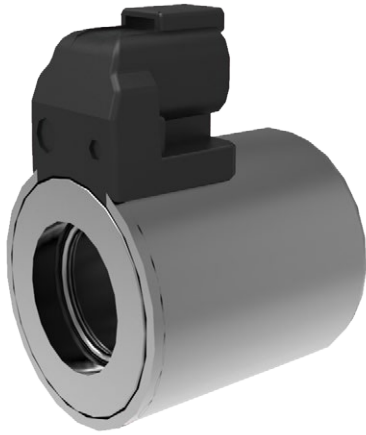


C***Coils for Operating Solenoids of Valves**

- 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		$U_N \pm 10\%$, 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 $P = U_N \times I$
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.

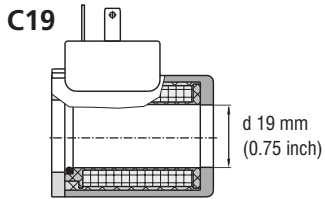
Quick disconnect

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:



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

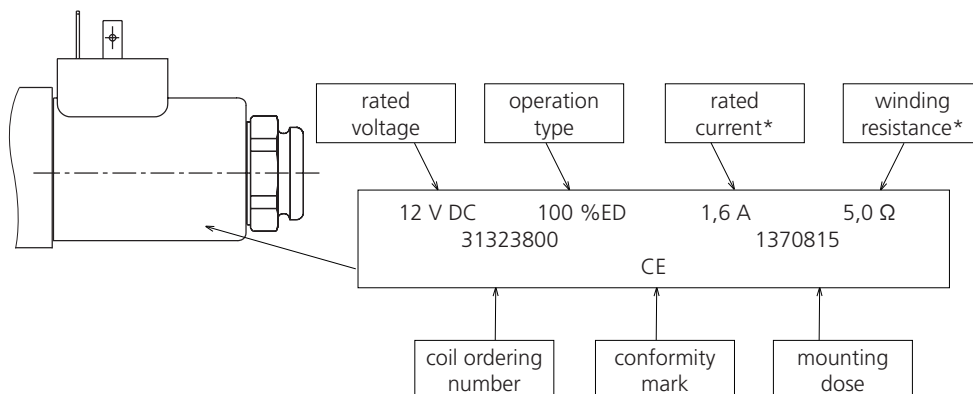


Loose Conductors

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.

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SP4P1-B4	5
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SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3	6
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SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H	10
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RPEW4-06 with CSA certification	11
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Mounting / dismantling the coils	18

Ordering Code

Solenoid coil		Special coil design	
Coil size		no designation	Coil for
inner diameter of coil		P	switching valves
Ø 13.4 mm (0.53 in)	14		proportional valves
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		no designation	Type of insulating material
cold rolled housing	A	H	standard
drawn housing	B		for valves with CSA certification
long drawn housing	C		
Rated voltage (on the coil terminals)		A	Housing surface treatment
12 V DC	01200		zinc coated, 240 h salt spray test acc. to ISO 9227
14 V DC	01400	B	zinc coated, 520 h salt spray test acc. to ISO 9227
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		N	Coil detent type (for type C31 only)
see the table		B	without detent
			with detent (by pin)
			Electrical winding resistance [Ω] at 20 °C (68 °F)
		300	
		xxx	Length of loose conductors
			standard length 300 mm (11.8 in)
			other length in mm (in)
			Additional protection of conductors (only for loose conductors)
			non-braided
			braided

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 106 V DC are intended for rectified supply voltage 120V AC / 60 Hz.

Coils with supply voltage 205 V DC are intended for rectified supply voltage 230 V AC / 60 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))

RPEK1-03, RPEL1-04	→	Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U _N
SD2E-A2/L, SD2E-A3/L, SD2E-A4/L, SD3E-A2/L	→	-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10
	→	-20...+50 (-4...+122)	-20...+60 (-4...+122)	± 10

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

Voltage [V]	Current [A]	Connector types		
		E1	E2	E3A
12 DC	1.83	16210300	24101600	28822500
		C14B-01200E1-6.55NA	C14B-01200E2-6.55NA	C14B-01200E3A-6.55NA
14 DC	1.57	24102200	on request	on request
		C14B-01400E1-8.91NA		
24 DC	0.92	16210400	24101800	28686400
		C14B-02400E1-26.2NA	C14B-02400E2-26.2NA	C14B-02400E3A-26.2NA
27 DC	0.80	33565000	on request	34319700
		C14B-02700E1-33.6NA		C14B-02700E3A-33.6NA

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

Voltage [V]	Current [A]	Connector types		
		E1	E2	E3A
12 DC	1.83	on request	on request	on request
14 DC	1.57	on request	on request	on request
24 DC	0.92	on request	on request	on request

SP4P1-B4	→	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 [V]	Current [A]	Connector types		
		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 [V]	Current [A]	Connector types		
		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))

RPE2-04, RPE3-04, ROE3-04, ROE3-06, SR4E-B2	→
SD2E-B2/L, SD2E-B3/L, SD2E-B4/L, SD3E-B2/L	→
SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3	→

Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U _N
-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10
-20...+50 (-4...+122)	-20...+60 (-4...+122)	± 10
-20...+50 (-4...+122) -20...+80 (-4...+176) *	-20...+80 (-4...+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 -20...+50 °C (-4...+122 °F) and supply voltage fluctuations of up to ± 10 % U_N. Additional coils for supply voltages of 14 VDC, 27 VDC, 205 VDC and 230 VAC/50 Hz may even be used for environmental temperatures between -20...+80 °C (-4...+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 temperatures between -20...+80 °C (-4...+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 [V]	Current [A]	Connector types									
		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									
230 AC 50 Hz	0.12	27449900									
		C19B-23050E5-1653NA									

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

Voltage [V]	Current [A]	Connector types			
		E1	E2	E3A	E12A
14 DC	1.70	on request	on request	on request	33212800
					C19B-01400E12A-8.23NB
24 DC	1.15	28829600	32092500	on request	31330200
		C19B-02400E1-20.8NB	C19B-02400E2-20.8NB	on request	C19B-02400E13A-20.8NB
27 DC	0.89	on request	on request	33559000	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 [V]	Current [A]	Connector types	
		E1	E5
12 DC	2.41	24140700	not available
		C 19A-01200E1-4.98NAH	
24 DC	1.15	24140800	not available
		C 19A-02400E1-2.1NAH	
115 AC 50 Hz	0.24	not available	24140900
			C 19A-11550E5-433NAH
230 AC 50 Hz	0.12	not available	24141000
			C 19A-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
-20...+80 (-4...+176)	-20...+80 (-4...+176)	± 15



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

Voltage [V]	Current [A]	Connector types			
		E1	E2	E3	E4
12 DC	2.00	27669700	27669900	27670000	27670100
		C 19B-01200E1-6NA	C 19B-01200E2-6NA	C 19B-01200E3-6NA	C 19B-01200E4-6NA
24 DC	0.93	27670600	27670700	27670800	27670900
		C 19B-02400E1-25.75NA	C 19B-02400E2-25.75NA	C 19B-02400E3-25.75NA	C 19B-02400E4-25.75NA

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

Voltage [V]	Current [A]	Connector types	
		E1	E3
24 DC	0.93	30449100	33090800
		C 19B-02400E1-25.75NB	C 19B-02400E3-25.75NB

Voltage [V]	Current [A]	Connector types			
		E1	E2	E3	E4
12 DC	2.00	32829300	32829300	32829300	29871300
		C 19B-01200E12A-6NA	C 19B-01200E12A-6NA	C 19B-01200E12A-6NA	C 19B-01200E13A-6NA
24 DC	0.93	31330000	31330000	31330000	32801600
		C 19B-02400E4A-25.75NA	C 19B-02400E4A-25.75NA	C 19B-02400E4A-25.75NA	C 19B-02400E13A-25.75NA

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

PRM2-04, PRM7-04	→
-------------------------	---

Ambient temperature °C (°F)	Fluid temperature °C (°F)
+50 (+176)	-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 [V]	Current [A]	Connector types			
		E1	E2	E3	E4
12 DC	max. 1.7	27821900		27822000	
		C 19B-01200E1-4.68NAP	on request	C 19B-01200E3-4.68NAP	on request
24 DC	max 0.8	27824200	27824300	28145200	27824400
		C 19B-02400E1-20.6NAP	C 19B-02400E2-20.6NAP	C 19B-02400E3-20.6NAP	C 19B-02400E4-20.6NAP
			E3A	E12A	E13A
			31688600	27821200	on request
			C 19B-01200E3A-4.68NAP	C 19B-01200E12A-4.68NAP	on request
			31891300	30754900	29868600
			C 19B-02400E4-20.6NAP	C 19B-02400E12A-20.6NAP	C 19B-02400E13A-20.6NAP

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

Voltage [V]	Current [A]	Connector types	
		E3	E12A
24 DC	max 0.8	31805200	31805300
		C 19B-02400E3-20.6NBP	C 19B-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 [V]	Current [A]	Connector types	
		E1	E2
12 DC	max. 1.7	16186100	
		C 19A-01200E1-4.98NAP	
24 DC	max 0.8	16186200	
		C 19A-02400E1-21NAP	

SR1P2-A2, SRN1P1-A2, SR4P2-B2, SRN4P1-B2, SP4P2-B3, SPN4P1-B3	→
--	---

Ambient temperature °C (°F)	Fluid temperature °C (°F)
-20...+80 (-4...+176)	-20...+120 (-4...+248)

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

Voltage [V]	Current [A]	Connector types			
		E1	E2	E3	E4
12 DC	max. 1	28145500	28145600	28145700	28145800
		C 19B-01200E1-6.5NAP	C 19B-01200E2-6.5NAP	C 19B-01200E3-6.5NAP	C 19B-02400E4-6.5NAP
24 DC	max 0.6	27824200	27824300	28145200	27824400
		C 19B-02400E1-20.6NAP	C 19B-02400E2-20.6NAP	C 19B-02400E3-20.6NAP	C 19B-02400E4-20.6NAP
			E3A	E12A	E13A
			33793900	28184900	29867600
			C 19B-01200E3A-6.5NAP	C 19B-01200E12A-6.5NAP	C 19B-02400E13A-6.5NAP
			31891300	30754900	29868600
			C 19B-02400E4-20.6NAP	C 19B-02400E12A-20.6NAP	C 19B-02400E13A-20.6NAP

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

Voltage [V]	Current [A]	Connector types	
		E3	E12A
24 DC	max 0.6	31805200	31805300
		C 19B-02400E3-20.6NBP	C 19B-02400E12A-20.6NBP

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

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

PVRM1-063

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

Voltage [V]	Current [A]	Connector types
12 DC	max. 1	E12A 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 [V]	Current [A]	Connector types
12 DC	max. 1.5	E4 27785600 C19B-01200E4-4.68NAP E13A 29869000 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 [V]	Current [A]	Connector types	E1	E2	E3	E3A	E4	E12A	E13A
24 DC	max 0.75		27824200 C19B-02400E1-20.6NAP	27824300 C19B-02400E2-20.6NAP	30118100 C19B-02400E3-20.6NAP	31891300 C19B-02400E3A-20.6NAP	27824400 C19B-02400E4-20.6NAP	30754900 C19B-02400E12A-20.6NAP	29868600 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 [V]	Current [A]	Connector types
24 DC	max 0.75	E3 31805200 C19B-02400E3-20.6NBP E12A 31805300 C19B-02400E12A-20.6NBP

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

		→		→	
RPE3-06, RPEA3-06, RPEW4-06		Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance	% of U _N
SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H		-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10	
		-20...+50 (-4...+122)	-20...+80 (-4...+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 -20...+50 °C (-4...+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 temperatures between -20...+80 °C (-4...+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 [V]	Current [A]	Connector types						
		E1	E2	E3A	E4A	E5	E12A	E13A
12 DC	2.72	16211400	24156100	24159600	24159700		24930801	19695100
		C22B-01200E1-4.41NA	C22B-01200E2-4.41NA	C22B-01200E3A-4.41NA	C22B-01200E4A-4.41NA	not available	C22B-01200E12A-4.41NA	C22B-01200E13A-4.41NA
14 DC	2.14	24158200	24930900	27662100	27662200		27663000	27663100
		C22B-01400E1-6.55NA	C22B-01400E2-6.55NA	C22B-01400E3A-6.55NA	C22B-01400E4A-6.55NA	not available	C22B-01400E12A-6.55NA	C22B-01400E13A-6.55NA
24 DC	1.29	16211600	24157400	24159800	24159900		19695900	19696000
		C22B-02400E1-18.6NA	C22B-02400E2-18.6NA	C22B-02400E3A-18.6NA	C22B-02400E4A-18.6NA	not available	C22B-02400E12A-18.6NA	C22B-02400E13A-18.6NA
27 DC	1.07	16211700	24157600	19744600	19744500		27663200	27663300
		C22B-02700E1-25.3NA	C22B-02700E2-25.3NA	C22B-02700E3A-25.3NA	C22B-02700E4A-25.3NA	not available	C22B-02700E12A-25.3NA	C22B-02700E13A-25.3NA
205 DC	0.15	16211500	not available	not available	not available		not available	not available
		C22B-20500E1-1400NA				not available		
230 AC 50 Hz	0.15	not available	not available	not available	not available		not available	not available
						18849000		
						C22B-23050E5-1400NA		

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

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

RPEA3-06

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

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

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

RPEW4-06
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage [V]	Current [A]	Connector types
		EW1 EW2
12 DC	2.64	16205100 C22C-01200EW1-4.54NAH/M
24 DC	1.32	16205000 C22C-02400EW1-18.2NAH/M
		16205400 C22C-01200EW2-4.54NAH/M
		16205500 C22C-02400EW2-18.2NAH/M

RPE3-06 with CSA certification
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage [V]	Current [A]	Connector types
		E1 E5
12 DC	2.72	24154300 C22A-01200E1-4.41NAH
24 DC	1.29	24154400 C22A-02400E1-18.6NAH
115 AC 50 Hz	0.30	not available
230 AC 50 Hz	0.15	not available
		24154500 C22A-11550E5-344NAH
		24154600 C22A-23050E5-1393NAH

RPEW4-06 with CSA certification
Surface treatment A: 240 h salt spray test acc. to ISO 9227

Voltage [V]	Current [A]	Connector types
		EW1 EW2
12 DC	2.64	24154700 C22C-01200EW1-4.54NAH/M
24 DC	1.32	24154900 C22C-02400EW1-18.2NAH/M
106 DC	0.27	24155100 C22C-10600EW1-400NAH/M
		24155500 C22C-01200EW2-4.54NAH/M
		24155300 C22C-02400EW2-18.2NAH/M
		not available

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

				→		Ambient temperature °C (°F)		Fluid temperature °C (°F)		Supply voltage tolerance % of U _N	
						-20...+80 (-4...+176)		-20...+80 (-4...+176)		± 15	

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

Voltage [V]	Current [A]	Connector types						
		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	not available	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	not available	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 [V]	Current [A]	Connector types	
		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 (+176)		-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 [V]	Current [A]	Connector types		
		E1	E12A	E13A
12 DC	max 1.6	16187500	19696100	19909300
		C22A-01200E1-5.15NAP	C22B-01200E12A-2.33NAP	C22B-01200E13A-2.33NAP
24 DC	max 1	16186800	19744300	30691600
		C22A-02400E1-13.4NAP	C22B-02400E3A-13.4NAP	C22B-02400E13A-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 [V]	Current [A]	Connector types			
		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 [V]	Current [A]	Connector types		
		E1	E3A	E12A / E13A
12 DC	max 2.5	34180800	on request	on request
		C22B-01200E1-2.33NBP		
24 DC	max 1	34184200	on request	28811200
		C22B-02400E1-13.4NBP	C22B-02400E3A-13.4NBP	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 [V]	Current [A]	Connector types		
		E1	E3A	E12A / E13A
12 DC	max 2.5	18838500	on request	19909300
		C22B-01200E1-2.33NBP	C22B-01200E3A-2.33NBP	C22B-01200E12A-2.33NBP
24 DC	max 1	18838300	on request	30691600
		C22B-02400E1-13.4NBP	C22B-02400E3A-13.4NBP	C22B-02400E12A-13.4NBP

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 [V]	Current [A]	Connector types		
		E1	E3A	E12A / E13A
12 DC	max 2.5	34180800	on request	on request
		C22B-01200E1-2.33NBP		
24 DC	max 1	34184200	on request	28811200
		C22B-02400E1-13.4NBP	C22B-02400E3A-13.4NBP	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 [V]	Current [A]	Connector types	
		EA3	EA5
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	<table border="1"> <tr> <td>Ambient temperature °C (°F)</td> <td>Fluid temperature °C (°F)</td> <td>Supply voltage tolerance % of U_N</td> </tr> <tr> <td>-30...+50 (-22...+122)</td> <td>-30...+80 (-22...+176)</td> <td>± 10</td> </tr> </table>	Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U _N	-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 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 [V]	Current [A]	Connector types				
		E1	E2	E3	E4	E5
12 DC	3.17	16195700	27660800	16197000	16196900	E12A
		C31A-01200E1-3.78FA	C31A-01200E2-3.78FA	C31A-01200E3-3.78FA	C31A-01200E4-3.78FA	C31A-01200E12A-3.78FA
14 DC	2.98	16195900	27660900	27661100	27661200	on request
		C31A-01400E1-4.73FA	C31A-01400E2-4.73FA	C31A-01400E3-4.73FA	C31A-01400E4-4.73FA	on request
24 DC	1.73	16196100	23896000	16197200	16197100	34234400
		C31A-02400E1-13.9FA	C31A-02400E2-13.9FA	C31A-02400E3-13.9FA	C31A-02400E4-13.9FA	C31A-02400E13A-13.9FA
27 DC	1.52	16196300	27661000	27661300	27661400	33863900
		C31A-02700E1-17.8FA	C31A-02700E2-17.8FA	C31A-02700E3-17.8FA	C31A-02700E4-17.8FA	C31A-02700E13A-17.8FA
205 DC	0.20	16196700	not available	not available	not available	not available
230 AC 50 Hz	0.20	C31A-20500E1-1027FA	not available	not available	not available	not available
		not available	not available	not available	not available	not available

RPE4-10						
Surface treatment B: 520 h salt spray test acc. to ISO 9227						
Voltage [V]	Current [A]	Connector types				
		E1	E3	E4	E5	E12A
24 DC	1.73	31648900	29427900	33081100	not available	33267000
		C31A-02400E1-13.9FB	C31A-02400E3-13.9FB	C31A-02400E4-13.9FB	C31A-02400E12A-13.9FB	C31A-02400E12A-13.9FB
27 DC	1.52	on request	31803100	on request	not available	on request
		C31A-02700E3-17.8FB	C31A-02700E3-17.8FB	on request	not available	on request
205 DC	0.20	34353800	not available	not available	not available	not available
		C31A-20500E1-1027FB	not available	not available	not available	not available
230 AC 50 Hz	0.20	not available	not available	not available	31884600	not available
		not available	not available	not available	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 [V]	Current [A]	Connector types
12 DC	3.17	EW1 24172000 C31A-01200EW1-3.78FAM
24 DC	1.73	24172200 C31A-02400EW1-13.9FAM
106 DC	0.38	24172400 C31A-10600EW1-276FAM

RPE4-10 with CSA certification

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

Voltage [V]	Current [A]	Connector types
12 DC	0.38	E5 24172800 C31A-12060E5-276FAH

RPEW4-10 with CSA certification

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

Voltage [V]	Current [A]	Connector types
120 AC 60 Hz	0.38	EW1 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

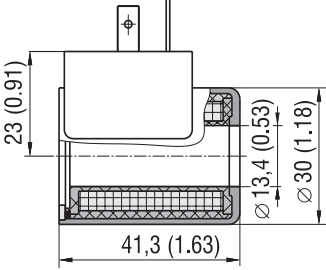
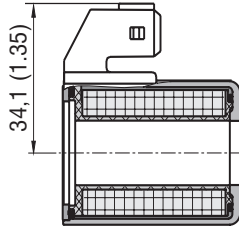
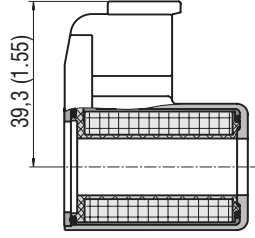
Voltage [V]	Current [A]	Connector types
12 DC	max 1.9	E1 E3 16195800 33223900 C31A-01200E1-4.73FAP C31A-01200E3-4.73FAP
24 DC	max 1.1	16196200 31354800 C31A-02400E1-13.9FAP C31A-02400E3-13.9FAP
		E12A 33252400 C31A-01200E12A-4.73FAP 33251800 C31A-02400E12A-13.9FAP

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

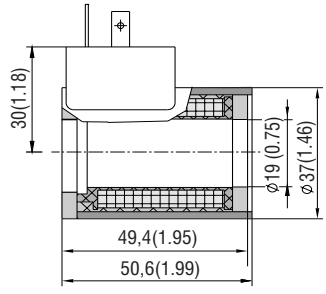
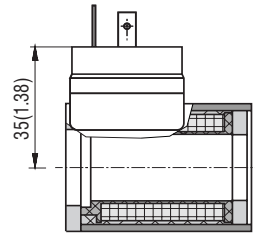
Voltage [V]	Current [A]	Connector types
24 DC	max 1.1	E1 33461500 C31A-02400E1-13.9FBP

Dimensions in millimeters (inch)

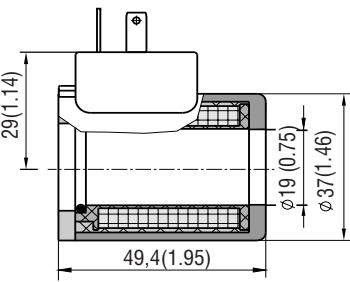
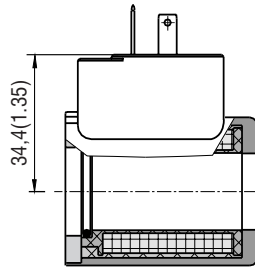
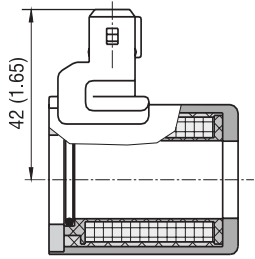
C14B

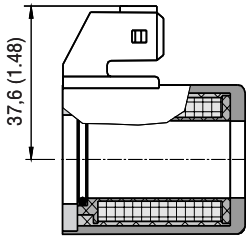
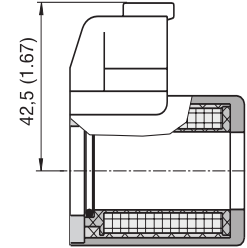
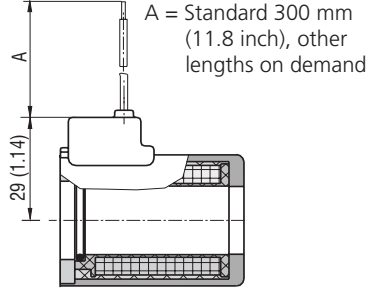
E1, E2	IP65	E3A, E4A	IP67	E12A, E13A	IP67 / IP69K
					

C19A

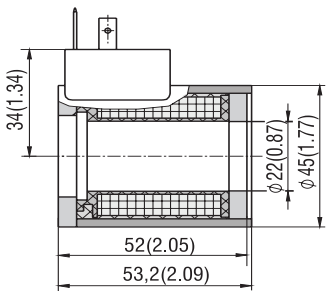
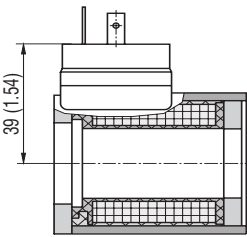
E1, E2	IP65	E5	IP65		
					

C19B

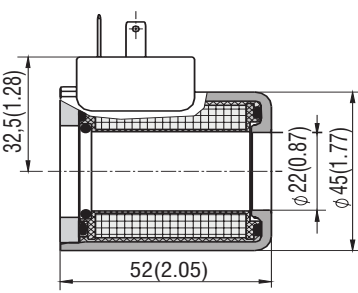
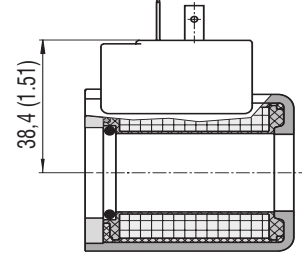
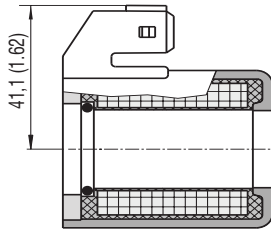
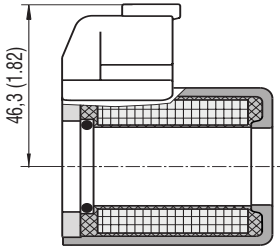
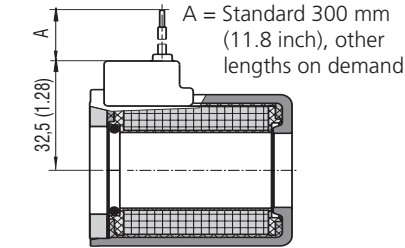
E1, E2	IP65	E5, E51	IP65	E3, E4	IP67
					

E3A, EA4	IP67	E12A, E13A	IP67 / IP69K	E8, E9	
					

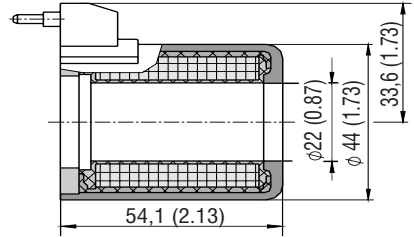
C22A

E1, E2	IP65	E5	IP65		
					

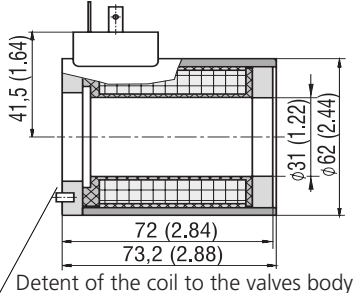
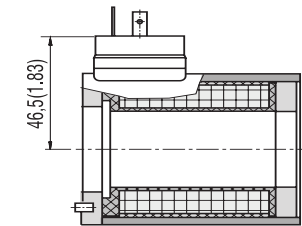
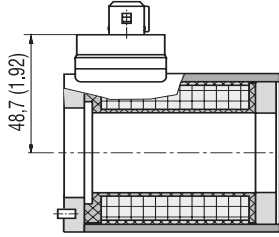
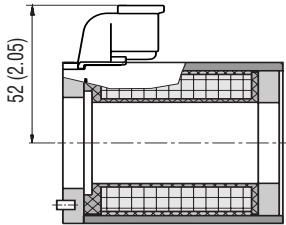
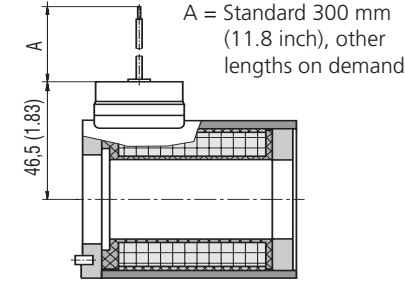
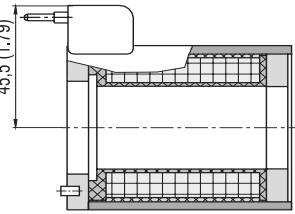
C22B

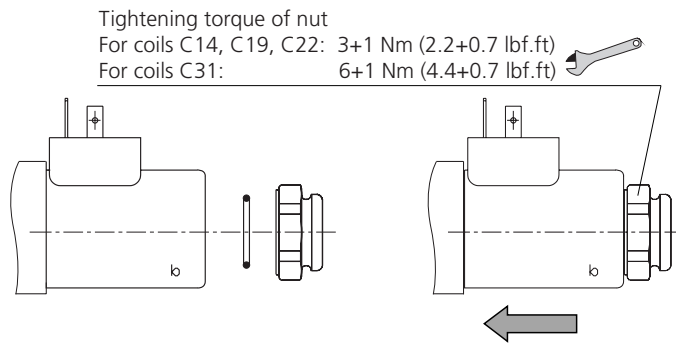
<p>E1, E2 IP65</p> 	<p>E5, E51 IP65</p> 	<p>E3A, E4A IP67</p> 
<p>E12A, E13A IP67 / IP69K</p> 	<p>E8, E9</p> 	

C22C

<p>EW1, EW2 IP65</p> 
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C31A

<p>E1, E2 IP65</p> 	<p>E5, E51 IP65</p> 	<p>E3, E4 IP67</p> 
<p>E12A, E13A IP67 / IP69K</p> 	<p>E8, E9</p> 	<p>EW1 IP65</p> 



- › 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 dismantling 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 $\pm 10\%$, 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.