

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		$U_n \pm 10 \%$, 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)
	Datasheet	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

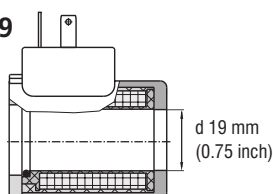
Induced voltage originating from a quick disconnect of the coil has according to Lenz's law a negative effect on OFF switching time regarding the solenoid armature. Special electronic circuit suppresses this unwanted phenomenon.

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		SD3P-A2/H	SP4P1-B4
C19	19.0 (0.75)	Dn 04	RPE2-04 RPE3-04	RPEL2-06	SD2E-Ax/H SD3E-A2/H SD1E-A2 SD1E-A3 ROE3 SR1E2-A2 SR4E2-B2 SP4E1-B3	SD2E-B*/L SD3E-B2/L	PRM2-04 PRM7-04	SD3P-B2/H	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 RPER3-06	RPEL1-10	SD2E-B*/H SD3E-B2/H SD3E-C2/H		PRM2-06 PRMR2-06 PRM7-06 PRM8-06	SD2P-B4/H SF32P-C3/H	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

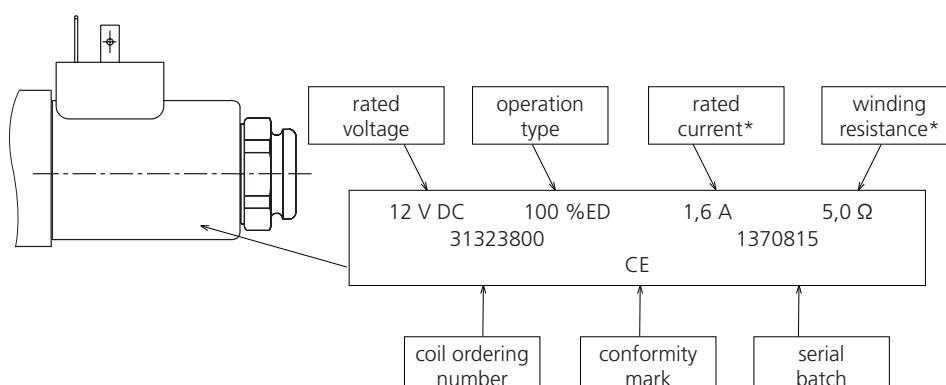


Loose Conductors

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, SD3P-A2	5
Coils C19 (d = 19 mm (0.75 inch)).....	6
RPE2-04, RPE3-04, RPEL2-06, ROE3-04, ROE3-06, SR1E2-A2, SR4E2-B2, SP4E1-B3	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 s certifikací CSA	7
SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3, SR4E-B2, SD3P-B2	7
PRM2-04, PRM7-04	8
PRM2-04 proporcionální rozváděče bez integrované elektroniky	8
PRM2-04, PRM7-04 proporcionální rozváděče s integrovanou elektronikou	8
SR1P2-A2, SRN1P1-A2, SR4P2-B2, SRN4P1-B2, SP4P2-B3, SPN4P1-B3	9
PVRM1-063	9
Coils C22 (d = 22 mm (0.87 inch)).....	10
RPE3-06, RPEA3-06, RPEW4-06, RPER3-06, RPEL1-10	10
SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H, SD3E-C2/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, SD3E-C2/H	11
PRM2-06, PRM7-06, PRM8-06, SD2P-B4	12
PRM2-06 proportional directional control valves with integrated electronic unit	13
PRM2-06 proportional directional control valves without integrated electronic unit	13
PRMR2-06 proportional directional control valves, with auxiliary lever override	13
PRM7-06, PRM8-06 proportional directional control valves without integrated electronic unit	13
SF32P-C3, 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														Special coil design
Coil size														Coil for
inner diameter of coil														no designation
Ø 13.4 mm (0.53 in)														P
Ø 19.0 mm (0.75 in)														switching valves
Ø 22.0 mm (0.87 in)														proportional valves
Ø 31.0 mm (1.22 in)														
Coil housing design version														Type of insulating material
cold rolled housing														no designation
drawn housing														H
long drawn housing														standard
														for valves with CSA certification
Rated voltage (on the coil terminals)														Housing surface treatment
12 V DC														A
14 V DC														B
24 V DC														zinc coated, 240 h salt spray test acc. to ISO 9227
27 V DC														N
48 V DC														F
106 V DC														zinc coated, 520 h salt spray test acc. to ISO 9227
205 V DC														
115 V AC 50 Hz														Coil detent type (for type C31 only)
120 V AC 60 Hz														without detent
230 V AC 50 Hz														with detent (by pin)
Connector type														Electrical winding resistance [Ω] at 20 °C (68 °F)
see the table														
														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 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 AMP Junior Timer (2 pins)
	E25	Loose conductors with connector AMP Junior Timer (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 SD2E-A2/L, SD2E-A3/L, SD2E-A4/L, SD3E-A2/L		→	Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U _n
		→	-30 ... +50 (-22 ... +122)	-30 ... +80 (-22 ... +176)	± 10
		→	-30 ... +50 (-22 ... +122)	-30 ... +60 (-22 ... +140)	± 10

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

Voltage [V]	Current [A]	Connector types	E1	E2	E3A	E4A	E12A	E13A
12 DC	1.83	16210300	C14B-01200E1-6.55NA	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	C14B-01400E1-8.91NA	on request	41194600	40291000	34948600	40498900
			C14B-01400E1-8.91NA	C14B-01400E3A-8.91NA	C14B-01400E4A-8.91NA	C14B-01400E12A-8.91NA	C14B-01400E13A-8.91NA	C14B-01400E13A-8.91NA
24 DC	0.92	16210400	C14B-02400E1-26.2NA	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	C14B-02700E1-33.6NA	on request	34319700	on request	43070900	40648800
			C14B-02700E1-33.6NA	C14B-02700E3A-33.6NA			C14B-02700E12A-33.6NA	C14B-02700E13A-33.6NA

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

Voltage [V]	Current [A]	Connector types	E1	E2	E3A	E4A	E12A	E13A
12 DC	1.83	42978200	C14B-01200E1-6.55NB	on request	on request	on request	32700900	on request
			C14B-01200E1-6.55NB	C14B-01200E2-6.55NB	C14B-01200E3A-6.55NB	C14B-01200E4A-6.55NB	C14B-01200E12A-6.55NB	C14B-01200E13A-6.55NB
14 DC	1.57	on request	on request	on request	on request	on request	34440200	on request
			C14B-01400E1-8.91NB	C14B-01400E3A-8.91NB	C14B-01400E4A-8.91NB	C14B-01400E12A-8.91NB	C14B-01400E13A-8.91NB	C14B-01400E13A-8.91NB
24 DC	0.92	31145400	C14B-02400E1-26.2NB	on request	41702200	on request	31145400	31145500
			C14B-02400E1-26.2NB	C14B-02400E2-26.2NB	C14B-02400E3A-26.2NB	C14B-02400E4A-26.2NB	C14B-02400E12A-26.2NB	C14B-02400E13A-26.2NB

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	E2	E3A	E12A	E13A
12 DC	max 0.7	on request	33038300	C14B-01200E3A-7.8NAP	32482500	C14B-01200E12A-7.8NAP	34186400
			C14B-01200E3A-7.8NAP	C14B-01200E4A-7.8NAP	C14B-01200E12A-7.8NAP	C14B-01200E13A-7.8NAP	C14B-01200E13A-7.8NAP
24 DC	max 0.35	34056200	C14B-02400E1-29.5NAP	33038400	32482400	C14B-02400E3A-29.5NAP	34186400
			C14B-02400E1-29.5NAP	C14B-02400E2-29.5NAP	C14B-02400E3A-29.5NAP	C14B-02400E4A-29.5NAP	C14B-02400E12A-29.5NAP

SD3P-A2/H

→	→	→	Ambient temperature °C (°F)	Fluid temperature °C (°F)
→	→	→	-30 ... +80 (-22 ... +176)	-30 ... +80 (-22 ... +176)

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

Voltage [V]	Current [A]	Connector types	E1	E2	E3A	E12A	E13A
12 DC	max 0.475	42978200	C14B-01200E1-6.55NB	on request	on request	32700900	on request
			C14B-01200E1-6.55NB	C14B-01200E2-6.55NB	C14B-01200E3A-6.55NB	C14B-01200E12A-6.55NB	C14B-01200E13A-6.55NB
24 DC	max 0.950	33469800	C14B-02400E1-26.2NB	on request	41702200	31145400	31145500
			C14B-02400E1-26.2NB	C14B-02400E2-26.2NB	C14B-02400E3A-26.2NB	C14B-02400E4A-26.2NB	C14B-02400E12A-26.2NB

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

RPE2-04, RPE3-04, RPEL2-06, ROE3-04, ROE3-06, SR1E2-A2, SR4E2-B2, SP4E1-B3
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
-30...+50 (-22...+122)	-30...+60 (-22...+140)	± 10
-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10
-30...+80 (-22...+176) *		± 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 temperatures 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 [V]	Current [A]	E1	E2	E3	E4	E3A	E4A	E12A	E13A
12 DC	2.45	27316600 C 19B-01200E1-4.9NA	27631400 C 19B-01200E2-4.9NA	27330200 C 19B-01200E3-4.9NA	27631600 C 19B-01200E4-4.9NA	27449600 C 19B-01200E3A-4.9NA	27631900 C 19B-01200E4A-4.9NA	27351400 C 19B-01200E12A-4.9NA	27632000 C 19B-01200E13A-4.9NA
14 DC	1.70	27634100 C 19B-01400E1-8.23NA	27634200 C 19B-01400E2-8.23NA	27634300 C 19B-01400E3-8.23NA	27634400 C 19B-01400E4-8.23NA	27634500 C 19B-01400E3A-8.23NA	27634600 C 19B-01400E4A-8.23NA	27635000 C 19B-01400E12A-8.23NA	27635100 C 19B-01400E13A-8.23NA
24 DC	1.15	27316700 C 19B-02400E1-20.8NA	27632400 C 19B-02400E2-20.8NA	27330300 C 19B-02400E3-20.8NA	27633200 C 19B-02400E4-20.8NA	27449700 C 19B-02400E3A-20.8NA	27633400 C 19B-02400E4A-20.8NA	27330500 C 19B-02400E12A-20.8NA	27633500 C 19B-02400E13A-20.8NA
27 DC	0.89	27636100 C 19B-02700E1-30.4NA	27639400 C 19B-02700E2-30.4NA	27641600 C 19B-02700E3-30.4NA	27641700 C 19B-02700E4-30.4NA	27641800 C 19B-02700E3A-30.4NA	27642100 C 19B-02700E4A-30.4NA	27642400 C 19B-02700E12A-30.4NA	27642500 C 19B-02700E13A-30.4NA
205 DC	0.12	27382401 C 19B-20500E1-1653NA	not available	not available	not available	not available	not available	not available	not available
120 AC 60 Hz	0.22	27642700 C 19B-12060E5-494NA							
230 AC 50 Hz	0.12	27449900 C 19B-23050E5-1653NA							

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

Voltage [V]	Current [A]	E1	E2	E3A	E4A	E12A	E13A
12 DC	2.45	40134900 C 19B-01200E1-4.9NB	on request	42999500 C 19B-01200E3-4.9NB	43486900 C 19B-01200E4A-4.9NB	40317600 C 19B-01200E12A-4.9NB	43930600 C 19B-01200E13A-4.9NB
14 DC	1.70	43106200 C 19B-01400E1-8.23NB	on request	on request	on request	33212800 C 19B-01400E12A-8.23NB	on request
24 DC	1.15	28829600 C 19B-02400E1-20.8NB	on request	on request	43191500 C 19B-02400E4A-20.8NB	40384800 C 19B-02400E12A-20.8NB	31330200 C 19B-02400E13A-20.8NB
27 DC	0.89	41176700 C 19B-02700E1-30.4NB	on request	33559000 C 19B-02700E3A-30.4NB	on request	on request	40052200 C 19B-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
12 DC	2.41	24140700 C19A-01200E1-4.98NAH
24 DC	1.15	24140800 C19A-02400E1-21NAH

SD2E-A2/H, SD2E-A3/H, SD2E-A4/H, SD3E-A2/H, SD1E-A2, SD1E-A3, SR4E2-B2		
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Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U _n
-30...+80 (-22...+176)	-30...+80 (-22...+176)	± 15

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

Voltage [V]	Current [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 [V]	Current [A]	E1	E3
24 DC	0.93	30449100 C19B-02400E1-25.75NB	33090800 C19B-02400E3-25.75NB

SD3P-B2/H		
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Ambient temperature °C (°F)	Fluid temperature °C (°F)
-30...+80 (-22...+176)	-30...+80 (-22...+176)

→ → →

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

Voltage [V]	Current [A]	E1	E2	E3	E3A	E4A	E12A	E13A
12 DC	max. 1.2	40134900 C19B-01200E1-4.9NB	on request	42999500 C19B-01200E3-4.9NB	on request	43486900 C19B-01200E4A-4.9NB	40317600 C19B-01200E12A-4.9NB	43930600 C19B-01200E13A-4.9NB
24 DC	max 0.6	28829600 C19B-02400E1-20.8NB	32092500 C19B-02400E2-20.8NB	on request	44017500 C19B-02400E3A-20.8NB	43191500 C19B-02400E4A-20.8NB	40384800 C19B-02400E12A-20.8NB	31330200 C19B-02400E13A-20.8NB

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



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

PRM2-04, PRM7-04

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	E3A	E12A	E13A
12 DC	max. 1.7		27821900 C19B-01200E1-4.68NAP	on request	27822000 C19B-01200E3-4.68NAP	27785600 C19B-01200E4-4.68NA	31688600 C19B-01200E3A-4.68NAP	27821200 C19B-01200E12A-4.68NAP	on request
24 DC	max 0.8		27824200 C19B-02400E1-20.6NAP	27824300 C19B-02400E2-20.6NAP	28145200 C19B-02400E3-20.6NAP	27824400 C19B-02400E4-20.6NAP	31891300 C19B-02400E3A-20.6NAP	30754900 C19B-02400E12A-20.6NAP	29868600 C19B-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 C19B-02400E3-20.6NBP	31805300 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 [V]	Current [A]	Connector types	E1
12 DC	max. 1.7		16186100 C19A-01200E1-4.98NAP
24 DC	max 0.8		16186200 C19A-02400E1-21NAP

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

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 [V]	Current [A]	Connector types	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-01200E4-6.5 NA	C19B-01200E3A-6.5NAP	C19B-01200E12A-6.5NAP	C19B-01200E13A-6.5 NAP
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-02400E4-20.6 NAP	C19B-02400E3A-20.6NAP	C19B-02400E12A-20.6NAP	C19B-02400E13A-20.6 NAP

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
			C19B-02400E3-20.6NBP	C19B-02400E12A-20.6NBP

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

	Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U _n
RPE3-06, RPEA3-06, RPEW4-06, RPER3-06, RPEL1-10	-30...+50 (-22...+122)	-30...+80 (-22...+176)	± 10
SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H, SD3E-C2/H	-30...+50 (-22...+122) -30...+80 (-22...+176) *	-30...+80 (-22...+176)	± 10 ± 15 *

* Remarks concerning Coil Usage



For valves SD2E-B2/H, SD2E-B3/H, SD3E-B2/H, SD3E-B4/H, SD2E-B4/H, SD2E-B3/H, SD3E-C2/H 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 $-30...+50^{\circ}\text{C}$ ($-22...+122^{\circ}\text{F}$) and supply voltage fluctuations of up to $\pm 10\%$ U_N . Coils of lower power listed in table on p.12 may be used for environmental temperatures between $-30...+80^{\circ}\text{C}$ ($-22...+176^{\circ}\text{F}$) and supply voltage fluctuations of up to $\pm 15\%$ U_N .

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

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			
		C22B-01200E1-4.41NA	C22B-01200E2-4.41NA	C22B-01200E3A-4.41NA	C22B-01200E4A-4.41NA	not available	24930801	19695100
14 DC	2.14	24158200	24930900	27662100	27662200			
		C22B-01400E1-6.55NA	C22B-01400E2-6.55NA	C22B-01400E3A-6.55NA	C22B-01400E4A-6.55NA	not available	27663000	27663100
24 DC	1.29	16211600	24157400	24159800	24159900			
		C22B-02400E1-18.6NA	C22B-02400E2-18.6NA	C22B-02400E3A-18.6NA	C22B-02400E4A-18.6NA	not available	19695900	19696000
27 DC	1.07	16211700	24157600	19744600	19744500			
		C22B-02700E1-25.3NA	C22B-02700E2-25.3NA	C22B-02700E3A-25.3NA	C22B-02700E4A-25.3NA	not available	27663200	27663300
205 DC	0.15	16211500	not available	not available	not available	not available	not available	not available
230 AC 50 Hz	0.15	not available	not available	not available	not available	18849000	not available	not available
		C22B-20500E1-1400NA	not available	not available	C22B-23050E5-1400NA			

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

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	43962500	on request	not available	31536900	40099400	
			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	
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

RPEA3-06		
Surface treatment A: 240 h salt spray test acc. to ISO 9227		
Voltage	Current	Connector types
[V]	[A]	E1
24 DC	0.33	EW1
		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 [V]	Current [A]	Connector types	EW2
12 DC	2.64	16205100 C22C-01200EW1-4.54NA/M	16205400 C22C-01200EW2-4.54NA/M
24 DC	1.32	16205000 C22C-02400EW1-18.2NA/M	16205500 C22C-02400EW2-18.2NA/M

RPE3-06 with CSA certification			
Surface treatment A: 240 h salt spray test acc. to ISO 9227			
Voltage [V]	Current [A]	Connector types	E5
12 DC	2.72	24154300 C22A-01200E1-4.41NAH	not available
24 DC	1.29	24154400 C22A-02400E1-18.6NAH	not available
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 [V]	Current [A]	Typy konektorů	EW2
12 DC	2.64	24154700 C22C-01200EW1-4.54NAH/M	24155500 C22C-01200EW2-4.54NAH/M
24 DC	1.32	24154900 C22C-02400EW1-18.2NAH/M	24155300 C22C-02400EW2-18.2NAH/M
106 DC	0.27	24155100 C22C-10600EW1-400NAH/M	not available

SD2E-B2/H, SD2E-B3/H, SD2E-B4/H, SD3E-B2/H, SD3E-B2/H, SD3E-C2/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 [V]	Current [A]	Connector types	E1	E2	E3A	E4A
12 DC	1.83	27222400 C22B-01200E1-6.55NA	27222500 C22B-01200E2-6.55NA	27222600 C22B-01200E3A-6.55NA	27222700 C22B-01200E4A-6.55NA	27222800 C22B-01200E5-6.55NA
24 DC	0.95	27222800 C22B-02400E1-25.3NA	27222900 C22B-02400E2-25.3NA	27223000 C22B-02400E3A-25.3NA	27223100 C22B-02400E4A-25.3NA	27223200 C22B-02400E5-25.3NA
205 DC	0.09	24160100 C22B-20500E1-2353NA	not available	not available	not available	not available
230 AC 50 Hz	0.09	not available	not available	not available	not available	not available

Surface treatment B: 520 h salt spray test acc. to ISO 9227			
Voltage [V]	Current [A]	Connector types	E13A
24 DC	0.95	30129500 C22B-02400E1-25.3NB	33028000 C22B-02400E13A-25.3NB

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

SD2P-B4/H	→ →	Ambient temperature °C (°F) -30 ...90 (-22 ...194), +100 (212) short time	Fluid temperature °C (°F) -30 ...90 (-22 ...194), +100 (212) short time
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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 1.5	18838400 C22B-01200E1-5NAP	18838400 C22B-01200E3A-5NAP	24157900 C22B-01200E3A-5NAP	41262000 C22B-01200E12A-5NBP	31323800 C22B-01200E13A-5NAP
24 DC	max 1	18838300 C22B-02400E1-13.4NAP	18838300 C22B-02400E3A-13.4NAP	19744300 C22B-02400E3A-13.4NAP	19696200 C22B-02400E12A-13.4NAP	

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 1.5	on request	41598800 C22B-01200E3A-5NBP	41598800 C22B-01200E3A-5NBP	41262000 C22B-01200E12A-5NBP	on request
24 DC	max 1	34184200 C22B-02400E1-13.4NBP	34184200 C22B-02400E3A-13.4NBP	33288400 C22B-02400E3A-13.4NBP	40948200 C22B-02400E12A-13.4NBP	28811200 C22B-02400E13A-13.4NBP

PRM2-06, PRM7-06, PRM8-06

PRM2-06, PRM7-06, PRM8-06	→ →	Ambient temperature °C (°F) +50 (+122)	Fluid temperature °C (°F) -30 ...+80 (-22 ...+176)
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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	E3A	E12A	E13A
12 DC	max 1.6	16187500 C22A-01200E1-5.15NAP	16187500 C22A-01200E1-5.15NAP			
24 DC	max 1	16186800 C22A-02400E1-13.4NAP	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 [V]	Current [A]	Connector types	E1	E3A	E12A	E13A
12 DC	max 2.5	18838500 C22B-01200E1-2.33NAP	18838500 C22B-01200E3A-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	18838300 C22B-02400E3A-13.4NAP	19744300 C22B-02400E3A-13.4NAP	19696200 C22B-02400E12A-13.4NAP	30691600 C22B-02400E13A-13.4NAP

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

PRM2-06 proportional directional control valves without integrated electronic unit, PRMR2-06 proportional directional control valves, with auxiliary lever override
Surface treatment B: 520 h salt spray test acc. to ISO 9227

Voltage [V]	Current [A]	Connector types	E3A	E12A	E13A
12 DC	max 2.5	34180800 C22B-01200E1-2.33NBP	43850600 C22B-01200E3A-2.33NBP	40426100 C22B-01200E12A-2.33NBP	on request
24 DC	max 1	34184200 C22B-02400E1-13.4NBP	33288400 C22B-02400E3A-13.4NBP	40948200 C22B-02400E12A-13.4NBP	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 [V]	Current [A]	Connector types	E3A	E4A	E12A	E13A
12 DC	max 2.5	18838500 C22B-01200E1-2.33NBP	19744700 C22B-01200E3A-2.33NBP	on request	19696100 C22B-01200E12A-2.33NBP	19909300 C22B-01200E13A-2.33NBP
24 DC	max 1	18838300 C22B-02400E1-13.4NBP	19744300 C22B-02400E3A-13.4NBP	40755800 C22B-02400E4A-13.4NBP	19696200 C22B-02400E12A-13.4NBP	30691600 C22B-02400E13A-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	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

SF32P-C3	→ →	Ambient temperature °C (°F)	Fluid temperature °C (°F)
		-30 ... +80 (-22 ... +176)	-30 ... +80 (-22 ... +176)

B: 520 h v NSS podle ISO 9227						
Voltage		Connector types				
[V]	Current [A]	E1	E3A	E4A	E12A	E13A
12 DC	max 2.6	34180800 C22B-01200E1-2.33NBP	43850600 C22B-01200E3A-2.33NBP	42752300 C22B-01200E4A-2.33NBP	40426100 C22B-01200E12A-2.33NBP	on request
24 DC	max 1	43534000 C22B-02400E1-13.1NBP	on request	on request	43498500 C22B-02400E12A-13.1NBP	on request

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
12 DC	max 1.5	24157900 C22B-01200E3A-5NBP
24 DC	max 1	19744300 C22B-02400E3A-13.4NBP

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

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	E12A
12 DC	3.17	16195700	27660800	16197001	16197001	16197001	16196901	not available	33252200
		C31A-01200E1-3.78FA	C31A-01200E2-3.78FA	C31A-01200E3-3.78FA	C31A-01200E3-3.78FA	C31A-01200E3-3.78FA	C31A-01200E4-3.78FA	on request	C31A-01200E12A-3.78FA
14 DC	2.98	16195900	27660900	16197201	16197201	16197201	16197101	not available	on request
		C31A-01400E1-4.73FA	C31A-01400E2-4.73FA	C31A-01400E2-4.73FA	C31A-01400E2-4.73FA	C31A-01400E2-4.73FA	C31A-01400E2-4.73FA	on request	on request
24 DC	1.73	16196100	23896000	16197301	16197301	16197301	16197101	not available	33252300
		C31A-02400E1-13.9FA	C31A-02400E2-13.9FA	C31A-02400E3-13.9FA	C31A-02400E3-13.9FA	C31A-02400E3-13.9FA	C31A-02400E4-13.9FA	on request	C31A-02400E12A-13.9FA
27 DC	1.52	16196300	27661000	16197401	16197401	16197401	16197101	not available	33863900
		C31A-02700E1-17.8FA	C31A-02700E2-17.8FA	C31A-02700E3-17.8FA	C31A-02700E3-17.8FA	C31A-02700E3-17.8FA	C31A-02700E4-17.8FA	on request	C31A-02700E12A-17.8FA
205 DC	0.20	16196700	not available	not available	not available	not available	not available	not available	not available
		C31A-20500E1-1027FA							
230 AC 50 Hz	0.20	not available	not available	not available	not available	not available	not available	16195101	not available
								C31A-23050E5-1027FA	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	E12A		
24 DC	1.73	31648900	29427901	31648900	29427901	29427901	33267000	on request	C31A-02400E12A-13.9FB
		C31A-02400E1-13.9FB	C31A-02400E3-13.9FB	C31A-02400E1-13.9FB	C31A-02400E3-13.9FB	C31A-02400E3-13.9FB	C31A-02400E3-13.9FB	on request	on request
27 DC	1.52	40167600	31803101	40167600	31803101	31803101	on request	on request	on request
		C31A-02700E1-17.8FB	C31A-02700E3-17.8FB	C31A-02700E1-17.8FB	C31A-02700E3-17.8FB	C31A-02700E3-17.8FB	on request	on request	on request
205 DC	0.20	34353800	not available	not available	not available	not available	not available	not available	not available
		C31A-20500E1-1027FB							

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	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	

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	24172600 C31A-10600EW1-276FAH/M	

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

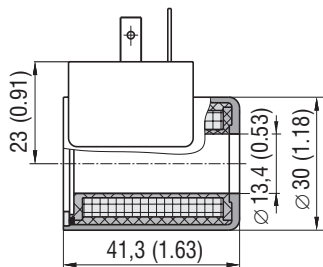
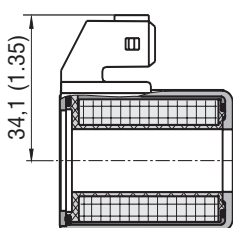
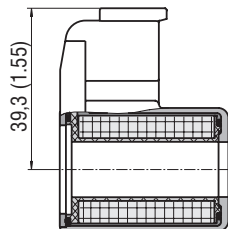
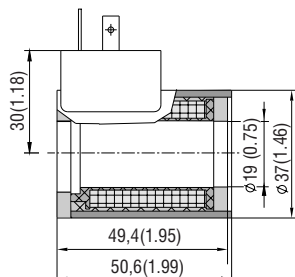
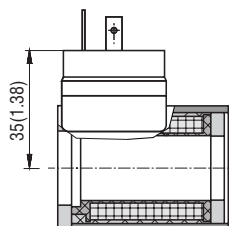
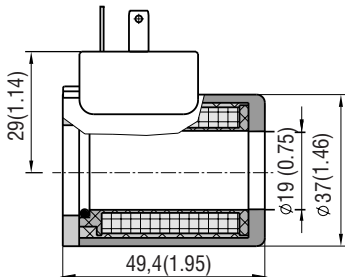
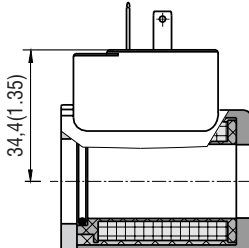
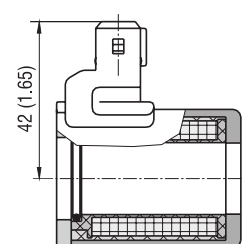
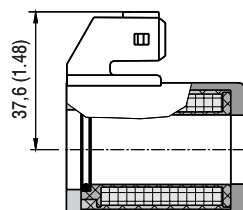
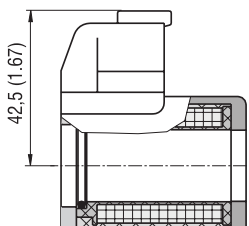
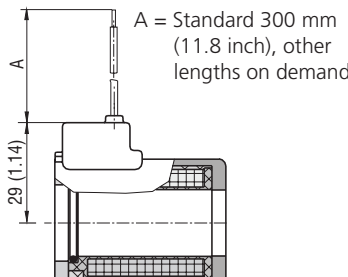
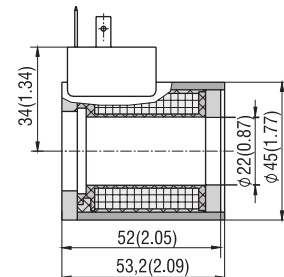
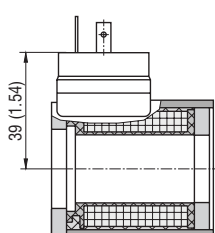


PRM6-10, PRM7-10

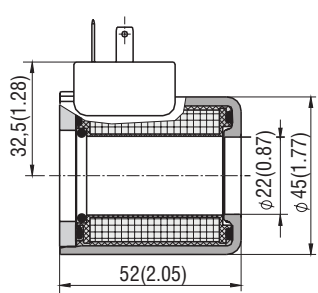
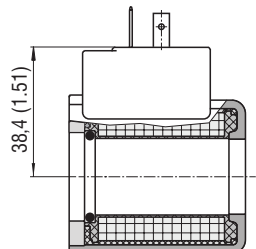
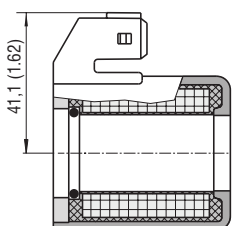
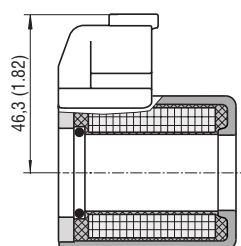
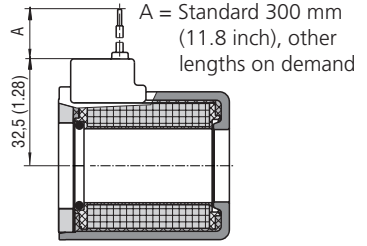
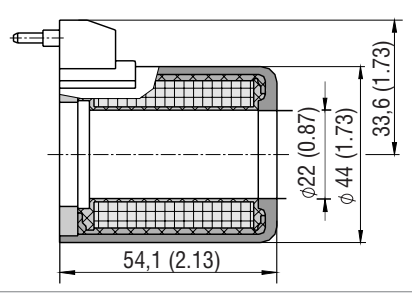
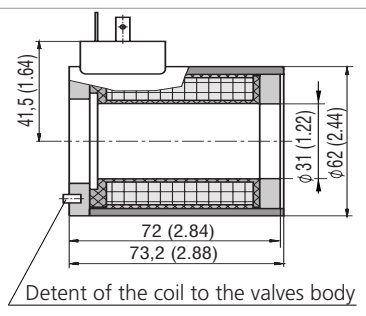
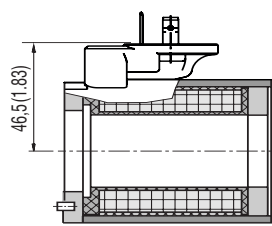
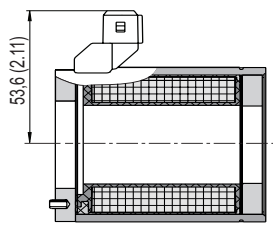
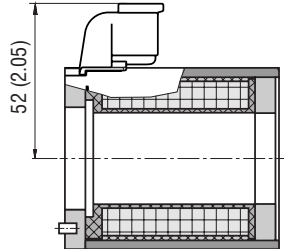
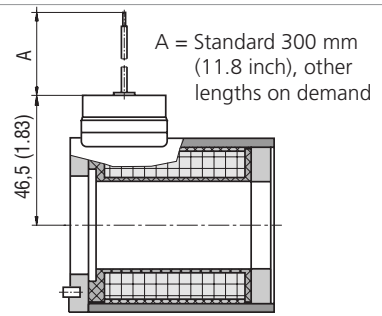
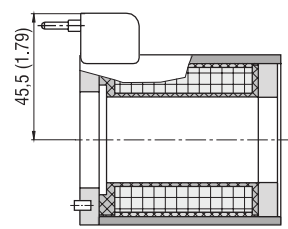
Surface treatment A: 240 h salt spray test acc. to ISO 9227				
Voltage [V]	Current [A]	Connector types	E3	E12A
12 DC	max 1.9	16195800 C31A-01200E1-4.73FAP	33223901 C31A-01200E3-4.73FAP	33252400 C31A-01200E12A-4.73FAP
24 DC	max 1.1	16196200 C31A-02400E1-13.9FAP	31354801 C31A-02400E3-13.9FAP	33251800 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	33461500 C31A-02400E1-13.9FBP	

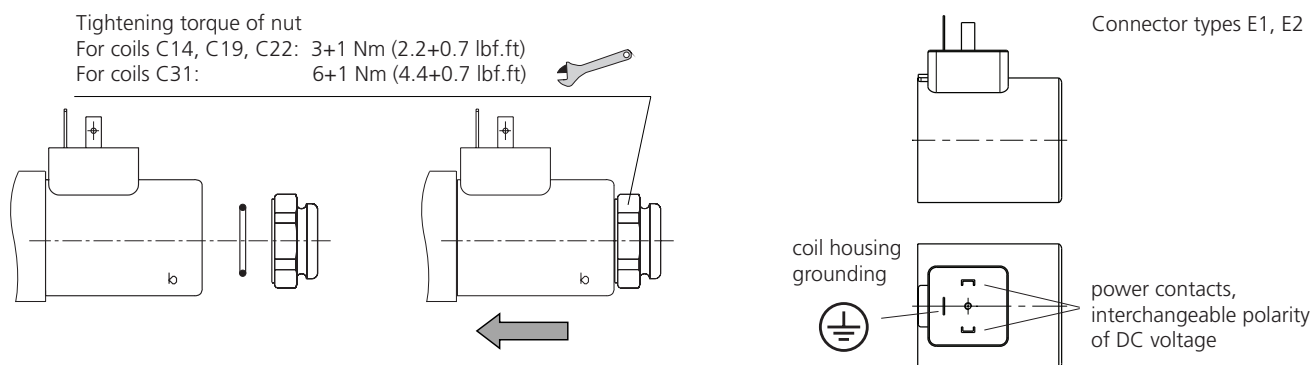
Dimensions in millimeters (inch)

C14B					
E1, E2		IP65	E3A, E4A		IP67
					
C19A					
E1, E2		IP65	E5		IP65
					
C19B					
E1, E2		IP65	E5, E51		IP65
					
E3A, EA4		IP67	E12A, E13A		IP67 / IP69K
					
C22A					
E1, E2		IP65	E5		IP65
					

Dimensions in millimeters (inch)

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			
							

Mounting / dismantling the coils



- › 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.