

Part number:

HYDROMA
HYDRAULICKÉ SYSTÉMY

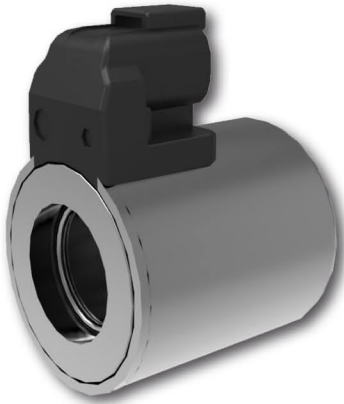
HIDROMA
SYSTEMS
UKŁADY HYDRAULICZNE

HYDROMA
ГИДРАВЛИЧЕСКИЕ СИСТЕМЫ

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	V	see Ordering code			
Allowable voltage fluctuation		$U_n \pm 10\%$, if not stated otherwise in the valve datasheet			
Nominal and max. current	A	see the table of coil types			
Winding resistance at 20 °C*	Ω	see the table of coil types			
Input power of coil at 20 °C	W	by calculation $P = U^2 / R$			
Max. ambient temperature	°C (°F)	50 (122), if not stated otherwise in the datasheet			
Operation conditions		see the datasheets of individual types of valves			
Max. winding temperature	°C (°F)	155 (311)			
Approximate weight of the coils	Coil size	C 14	C 19	C 22	C 31
	kg (lbs)	0.13 (0.29)	0.22 (0.48)	0.35 (0.77)	0.96 (2.12)
	Datasheet	Type			
General information	HA 0060	products and general conditions			
Connectors	HA 8008	connectors EN 175301-803-A			

*The nominal resistance R20 (measured at 20 °C) of the coil winding may fluctuate within $\pm 7\%$ of the nominal value due to used coil winding technology.

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

Nominal voltages and nominal resistances (resistance value at 20°C) are listed in the coil ordering codes. Nominal currents (coils for switching valves) and maximum permissible currents (coils for proportional valves) are listed in the type table. The coils are designed for DC power supply. For AC supply, a coil with built-in rectifier or a plug-in rectifier must be used.



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

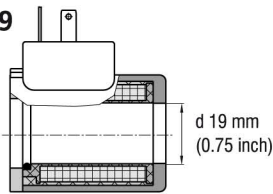
Induced voltage originating from a quick disconnect of the coil has according to Lenz's law a negative effect on OFF switching time regarding the solenoid armature. Special electronic circuit suppresses this unwanted phenomenon.

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 SR4E2-C2 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 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



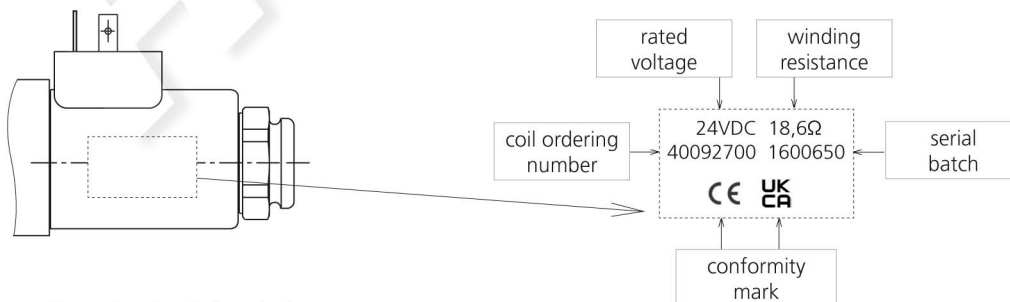
Connector EW



Loose Conductors

Identification of Coils

The **CE** and **UK CA** conformity mark placed on the coil steel housing indicates that the product is in accordance with the European directives and the relevant UK requirements.



Example of coil description:

Type sticker information can differ due to huge variety of coil designs.

Ordering Code

C												/M
Solenoid coil												Special coil design
Coil size												Type of insulating material
inner diameter of coil												no designation H
Ø 13.4 mm (0.53 in)												standard
Ø 19.0 mm (0.75 in)												for valves with CSA certification
Ø 22.0 mm (0.87 in)												Housing surface treatment
Ø 31.0 mm (1.22 in)												A zinc coated, 240 h salt spray test acc. to ISO 9227
												B zinc coated, 520 h salt spray test acc. to ISO 9227
Coil housing design version												Coil detent type (for type C31 only)
cold rolled housing												N without detent
drawn housing												F with detent (by pin)
long drawn housing												
Rated voltage (on the coil terminals)												Electrical winding resistance [Ω] at 20 °C (68 °F) ± 7 %
12 V DC												300
14 V DC												xxx
24 V DC												
27 V DC												
48 V DC												
106 V DC												
205 V DC												
115 V AC 50 Hz												Length of loose conductors
120 V AC 60 Hz												standard length 300 mm (11.8 in)
230 V AC 50 Hz												other length in mm (in)
Connector type												Additional protection of conductors (only for loose conductors)
see the table												N non-braided
												B 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.

Coils 120 V AC / 60 Hz have a built-in rectifier.

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
EW2		Special connector for wirebox + quenching diode

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

	Ambient temperature °C (°F)	Fluid temperature °C (°F)	Supply voltage tolerance % of U _n
→	-30...+50 (-22...+122)	-30...+60 (-22...+140)	±10
→	-30...+50 (-22...+122)	-30...+80 (-22...+176)	±10
→ limited operating conditions of the valves	-30...+50 (-22...+122)	-30...+80 (-22...+176)	±10

	E1	E2	E3	E4	E4A	E12A	E13A
SD2E-B2/L, SD2E-B3/L, SD2E-B4/L, SD3E-B2/L	→	→	→	→	→	→	→
RPE2-04, RPE3-04, RPEL2-06, ROE3-04, ROE3-06, SR1E2-A2, SR4E2-B2, SR4E2-C2, SP4E1-B3	→	→	→	→	→	→	→
SD2E-A2/H, SD2E-A3/H, SD2E-A4/Hx, SD3E-A2/H, SD1E-A2, SD1E-A3	→	→	→	→	→	→	→

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

Voltage [V]	Current [A]	Connector types	E1	E2	E3	E4	E4A	E12A	E13A	
12 DC	2.45		27316600 C19B-01200E1-4.9NA	27631400 C19B-01200E2-4.9NA	27330200 C19B-01200E3-4.9NA	27631600 C19B-01200E4-4.9NA	27449600 C19B-01200E3A-4.9NA	27631900 C19B-01200E4A-4.9NA	27351400 C19B-01200E12A-4.9NA	27632000 C19B-01200E13A-4.9NA
14 DC	1.70		27634100 C19B-01400E1-8.23NA	27634200 C19B-01400E2-8.23NA	27634300 C19B-01400E3-8.23NA	27634400 C19B-01400E4-8.23NA	27634500 C19B-01400E3A-8.23NA	27634600 C19B-01400E4A-8.23NA	27635000 C19B-01400E12A-8.23NA	27635100 C19B-01400E13A-8.23NA
24 DC	1.15		27316700 C19B-02400E1-20.8NA	27632400 C19B-02400E2-20.8NA	27330300 C19B-02400E3-20.8NA	27633200 C19B-02400E4-20.8NA	27449700 C19B-02400E3A-20.8NA	27633400 C19B-02400E4A-20.8NA	27330500 C19B-02400E12A-20.8NA	27633500 C19B-02400E13A-20.8NA
27 DC	0.89		27636100 C19B-02700E1-30.4NA	27639400 C19B-02700E2-30.4NA	27641600 C19B-02700E3-30.4NA	27641700 C19B-02700E4-30.4NA	27641800 C19B-02700E3A-30.4NA	27642100 C19B-02700E4A-30.4NA	27642400 C19B-02700E12A-30.4NA	27642500 C19B-02700E13A-30.4NA
205 DC	0.12		27382401 C19B-20500E1-1653NA	not available	not available	not available	not available	not available	not available	not available
120 AC	0.22		E5							
60 Hz			27642700 C19B-12060E5-494NA							
230 AC	0.12		27668600 C19B-23050E5-2065NA							

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

Voltage [V]	Current [A]	Connector types	E1	E2	E3	E3A	E4A	E12A	E13A
12 DC	2.45		40134900 C19B-01200E1-4.9NB	on request	42995500 C19B-01200E3-4.9NB	on request	43486900 C19B-01200E4A-4.9NB	40317600 C19B-01200E12A-4.9NB	43930600 C19B-01200E13A-4.9NB
14 DC	1.70		43106200 C19B-01400E1-8.23NB	on request	on request	on request	on request	33212800 C19B-01400E12A-8.23NB	on request
24 DC	1.15		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
27 DC	0.89		41167700 C19B-02700E1-30.4NB	on request	on request	33559000 C19B-02700E3A-30.4NB	on request	on request	40052200 C19B-02700E13A-30.4NB

RPE3-04 with CSA certification	
Surface treatment A: 240 h salt spray test acc. to ISO 9227	
Voltage [V]	Current [A]
12 DC	2.41
24 DC	1.15