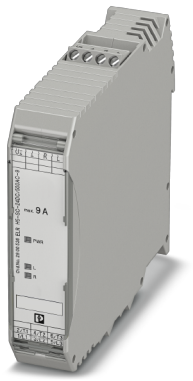
COMPLETE line

ELR H5-SC- 24DC/500AC-9

Hybrid motor starter (CONTACTRON)



Data sheet
108323_en_01

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1 Description

The 3-phase hybrid motor starter with reversing function provides the following functions.

– Forward running
– Reverse running

The amount of cabling required is reduced to a minimum by the internal locking circuit and the load wiring.

Make sure you always use the latest documentation.
It can be downloaded from the product at phoenixcontact.net/products.

This document is valid for the products listed in the “Ordering data”.

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3 Ordering data

Description	Type	Item no.	Pcs./Pkt.
Hybrid motor starter for reversing 3~ AC motors up to 500 V AC and 9 A output current, with 24 V DC control voltage, and screw connection.	ELR H5-SC- 24DC/500AC-9	2900538	1

Accessories	Type	Item no.	Pcs./Pkt.
Plastic label, Card, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 15 x 5 mm, Number of individual labels: 189	US-EMLP (15X5)	0828790	10
Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 15 x 5 mm, Number of individual labels: 10	UC-EMLP (15X5)	0819301	10
Modular power distribution board with CrossLink® interface, 125 A, 3-pos., touch-proof and protection against polarity reversal, width: 225 mm	EM-CPS-225	1002634	1
Modular power distribution board with CrossLink® interface, 125 A, 3-pos., touch-proof and protection against polarity reversal, width: 405 mm	EM-CPS-405	1002635	1
Connection module with integrated spring-loaded terminals for cables from 1.5 to 16 mm^2, 3-pos., maximum 63 A	EM-CPS-TB3/63A	1002633	4
Device adapter with fuse holder for 16 A fuse (10x38/Class CC), CrossLink® interface and fixed DIN rail	EM-CPS-DA-22,5F/16A	1002668	1
3-phase loop bridge for CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE- 2	2900746	1
3-phase loop bridge for 3 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE- 3	2900747	1
3-phase loop bridge for 4 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE- 4	2900748	1
3-phase loop bridge for 5 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE- 5	2900749	1
3-phase loop bridge for 6 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE- 6	2900750	1
3-phase loop bridge for 7 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE- 7	2900751	1

Accessories	Type	Item no.	Pcs./Pkt.
3-phase loop bridge for 8 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE- 8	2900752	1
3-phase loop bridge for 9 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE- 9	2900753	1
3-phase loop bridge for 10 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 0.3 m, with ferrules.	BRIDGE-10	2900754	1
3-phase loop bridge for 2 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 1 m	BRIDGE- 2-1M	2901542	1
3-phase loop bridge for 3 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 1 m	BRIDGE- 3-1M	2901655	1
3-phase loop bridge for 4 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 1 m	BRIDGE- 4-1M	2901658	1
3-phase loop bridge for 5 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 1 m	BRIDGE- 5-1M	2901544	1
3-phase loop bridge for 6 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 1 m	BRIDGE- 6-1M	2901649	1
3-phase loop bridge for 2 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE- 2-3M	2901543	1
3-phase loop bridge for 3 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE- 3-3M	2901656	1
3-phase loop bridge for 4 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE- 4-3M	2901659	1
3-phase loop bridge for 5 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE- 5-3M	2901545	1
3-phase loop bridge for 6 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE- 6-3M	2901697	1
3-phase loop bridge for 7 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE- 7-3M	2901698	1
3-phase loop bridge for 8 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE- 8-3M	2901700	1
3-phase loop bridge for 9 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE- 9-3M	2901701	1

Accessories	Type	Item no.	Pcs./Pkt.
3-phase loop bridge for 10 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m	BRIDGE-10-3M	2901702	1
3-phase loop bridge for 2 CONTACTRON modules, with screw connection and 22.5 mm housing width, cable length between the modules: 0.3 m, connecting cable: 2 m	BRIDGE- 2- 2M/0,3M	2909897	1
3-phase loop bridge for 3 CONTACTRON modules, with screw connection and 22.5 mm housing width, cable length between the modules: 0.3 m, connecting cable: 2 m	BRIDGE- 3- 2M/0,3M	2909898	1
3-phase loop bridge for 4 CONTACTRON modules, with screw connection and 22.5 mm housing width, cable length between the modules: 0.3 m, connecting cable: 2 m	BRIDGE- 4- 2M/0,3M	2909899	1
The BRIDGE COVER covering hood is used to cover unused plugs on the CONTACTRON bridge that may subsequently be used to extend the system. The hood can be used with the screw and Push-in version of the bridge.	BRIDGE COVER	2906240	10

4 Technical data

Device supply	
Rated control circuit supply voltage U_S	24 V DC
Control supply voltage range	19.2 V DC ... 30 V DC
Rated control supply current I_S	40 mA
Protective circuit	Surge protection Reverse polarity protection
Control input right/left	
Rated actuating voltage U_C	24 V DC
Rated actuating current I_C	5 mA (Input type 1)
Switching threshold	9.6 V (“0” signal) 19.2 V (“1” signal)
Typical turn-off time	< 30 ms
Protective circuit	Reverse polarity protection
AC output	
Rated operating voltage U_e	500 V AC (50/60 Hz)
Operating voltage range	42 V AC ... 550 V AC
Load current range see to derating	0 A ... 9 A
Trigger characteristic in acc. with IEC 60947-4-2	-
Rated operating current I_e AC-51	9 A
Rated operating current I_e AC-53a	6.5 A
Leakage current	0 mA
Protective circuit	Surge protection
Status and diagnostics indicators	
Status display	Yellow LED
Operating voltage display	Green LED
General data	
Mounting position	vertical (horizontal DIN rail, motor output below)
Mounting	alignable, for spacing see derating
Operating mode	100% operating factor
Degree of protection	IP20
Power dissipation min./max.	1.1 W / 14.6 W
Dimensions W/H/D	22.5 mm / 107 mm / 114 mm

Connection data	
Connection name	**Control circuits**
Connection method	Screw connection
Conductor cross section, rigid	0.2 mm² ... 2.5 mm²
Conductor cross section, flexible	0.2 mm² ... 2.5 mm²
Conductor cross section [AWG]	24 ... 14
Stripping length	8 mm
Tightening torque	0.5 Nm ... 0.6 Nm / 5 lb_f-in. ... 7 lb_f-in.
Connection name	**Load circuit**
Connection method	Screw connection
Conductor cross section, rigid	0.2 mm² ... 2.5 mm²
Conductor cross section, flexible	0.2 mm² ... 2.5 mm²
Conductor cross section [AWG]	24 ... 14
Tightening torque	0.5 Nm ... 0.6 Nm / 5 lb_f-in. ... 7 lb_f-in.
Stripping length	8 mm

Ambient conditions	
Ambient temperature (operation)	-25 °C ... 70 °C (observe derating)
Ambient temperature (storage/transport)	-40 °C ... 80 °C

Standards/regulations	
Standards	IEC 60947-1 IEC 60947-4-2 IEC 61508 ISO 13849

Insulation characteristics	
Rated insulation voltage	500 V
Rated surge voltage / insulation	6 kV
Insulation characteristics between the control input and control supply voltage, and auxiliary circuit to the main circuit	Safe isolation (IEC 60947-1) at operating voltage ≤ 300 V AC Basic insulation (IEC 60947-1) at operating voltage 300 V AC ... 500 V AC
Isolation characteristics between the control input and control supply voltage to auxiliary circuit	Safe isolation (IEC 60947-1) in the auxiliary circuit ≤ 300 V AC
Degree of pollution	2
Overvoltage category	III

Conformance/approvals	
UKCA UKCA-compliant	
UL approval NLDX.E228652	

5 Safety regulations and installation notes

- When working on the device, observe the national safety and accident prevention regulations.
- Disregarding these safety regulations may result in death, serious personal injury or damage to equipment.
- Startup, mounting, modifications, and upgrades should only be carried out by a skilled electrical engineer!
- Disconnect the power to the module.
- During operation, parts of electrical switching devices carry hazardous voltages.
- During operation, the protective covers must not be removed from the electric switchgear.
- Keep the product documentation in a safe place.
- The device is an associated item of equipment. Do not install the device in potentially explosive areas. When installing and operating associated equipment, the applicable safety directives must be observed.
- The device may not be exposed to mechanical or thermal influences that exceed the limits as described in the operating instructions. To protect against mechanical or electrical damage, install the device in an appropriate housing with a suitable degree of protection (at least IP54) in accordance with IEC 60529/EN 60529. Where dust is present, the device must be installed in suitable housing (at least IP64) in accordance with EN 60079-14.
- Install the device according to the instructions in the installation instructions. Access to circuits within the device is not permitted.
- The operating equipment cannot be repaired by the user and must be replaced by an equivalent device. Repairs may only be carried out by the manufacturer.
- Observe the safety information, conditions, and limits of use specified in the product documentation. Comply with them.
- The device performs diagnostics of the functions when the drive is switched on or has been switched off.
- Only use power supply units with safe isolation with SELV / PELV voltage in accordance with EN 60950-1 / EN 60204 (SELV / PELV). They prevent short circuits between primary and secondary sides.
- Switching off the control voltage supply with a controlled motor always results in wear in the hybrid motor starter.

Area of application

- In circuits in potentially dust-explosive areas of zones 21 and 22, it must be guaranteed that the equipment connected to this circuit complies with category 2D or 3D or is certified as such.
- This is a product for environment A (industry). The device can cause unwanted radio interference if used in Class B environments (household). In this case, the user may be obligated to take the necessary precautionary measures.

5.1 UL notes

WARNING: Risk of electric shock and fire

The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted.

To reduce the risk of fire or electric shock, current-carrying parts and the other components of the controller should be examined and replaced if damaged.

Failure to follow instructions can result in death, serious injury, or equipment damage.

NOTE

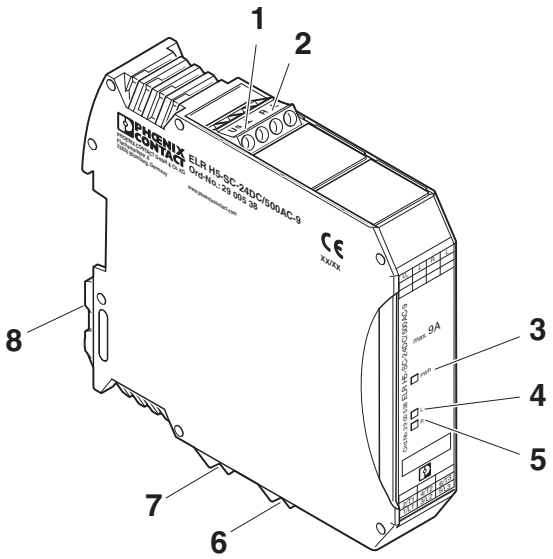
Use copper cables approved for at least 75 °C.

The device is designed for use with a "low voltage, limited energy, isolated power supply".

SCCR (single and group installation)	
Suitable for use on a circuit capable of delivering not more than 5 kA rms symmetrical amperes, 500 Volts maximum when protected by a 20 A class RK5 fuse (coordination type 1).	
Suitable for use on a circuit capable of delivering not more than 100 kA rms symmetrical amperes, 500 Volts maximum when protected by a 30 A class J or class CC fuse (coordination type 1).	
FLA	6.5 A (500 V AC)

6 Operating and indication elements

Figure 1 Operating and indication elements



1 Input: Control supply voltage
2 Control input: Forward/reverse running
3 LED PWR: Control supply voltage
4 LED L: Reverse running
5 LED R: Forward running
6 3-phase output voltage
7 3-phase input voltage
8 Metal lock for fixing to DIN rail

7 Connection notes

WARNING: Danger to life by electric shock!
Never carry out work when voltage is present.

7.1 Mains connection and line protection

- When connecting the 3-phase network, it is essential to observe the terminal identification.
- The following specifications apply for the fuses used.

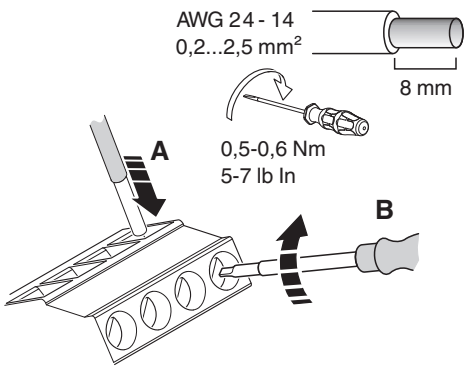
25 A gG / 10 kA / 500 V	Coordination type 1
16 A B-circuit breaker / 1.5 kA / 400 V	Coordination type 1
30 A CC / 30 kA / 500 V	Coordination type 1
3RV2021-4AA20 / 10 kA / 420 V / ≤45°C	Coordination type 1
FAZ-C16/3 /10 kA /420 V / ≤45°C	Coordination type 1
PKZM0-6,3 / 30 kA / 420 V / ≤45°C	Coordination type 1
PKZM0-4 / 100 kA / 420 V / ≤45°C	Coordination type 1
16 A FA (6.3 x 32 mm) / 1.5 kA / 500 V	Coordination type 2
16 A FF / gR (10 x 38 mm) / 10 kA / 500 V	Coordination type 2

- The control supply voltage and control voltage inputs must be operated with power supply modules according to IEC 61131-2 (max. 5 % residual ripple).
- In order to avoid inductive or capacitive coupling of noise emissions where long control wires are used, we recommend the use of shielded conductors.

NOTE: Electrical safety
Only connect conductors with the same conductor cross section to a terminal point.

7.2 Connecting cables

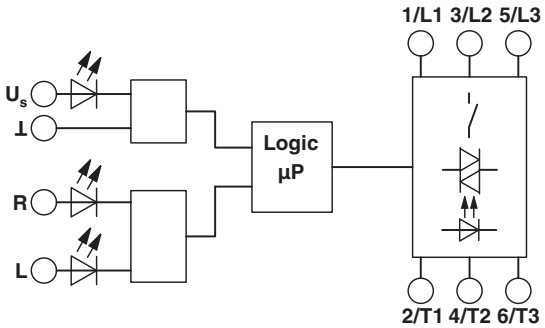
Figure 2 Screw connection



- Strip off each individual wire to 8 mm.
- Insert the wire into the corresponding connection terminal block.
- Use a screwdriver to tighten the screw in the opening above the connection terminal block.

7.3 Block diagram

Figure 3 Block diagram



8 Function

8.1 Status and diagnostics indicators

The device visualizes the operating states with a total of three LEDs.

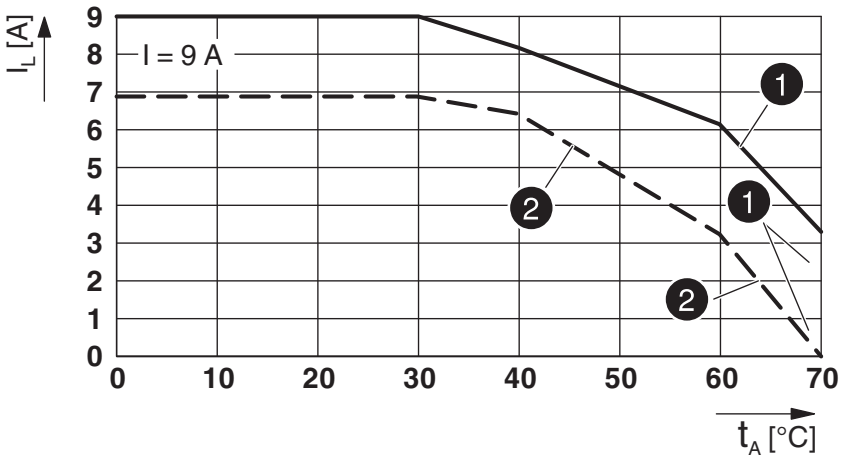
LED PWR	Green	Device status
LED L	Yellow	Reverse running
LED R	Yellow	Forward running

After applying the control supply voltage, all LEDs light up once as an LED test.

9 Derating curves for 100 % operating time

Additional data is available on request.

Figure 4 Derating curve



I_L = Load current [A]
t_A = Ambient temperature [°C]
I_A = Starting current [A]
❶ = Aligned with 20 mm spacing
❷ = Aligned without spacing

The adjustment factors described here refer to hybrid motor starters with a maximum load current of 9 A. You can determine the maximum permissible rated current of the motor using the load current, the overcurrent factor (see data sheet of the relevant motor), and the 9 A derating curve.

9 A derating curve										
Overcurrent factor I_A/I_N	1	2	3	4	5	6	7	8	9	10
Adjustment factor K	1	1	1	1	1	0.96	0.83	0.72	0.64	0.58

Example 1	
Motor with overcurrent factor I_A/I_N (from motor data sheet)	8
Adjustment factor K	0.72
Max. permissible load current I_L at 30°C, not aligned (from derating curve)	9 A
Max. permissible rated current I_N of the motor	6.5 A

Example 2	
Motor with overcurrent factor I_A/I_N (from motor data sheet)	5
Adjustment factor K	1
Max. permissible load current I_L at 60°C, aligned (from derating curve)	3.2 A
Max. permissible rated current I_N of the motor	3.2 A