

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

Hybrid motor starter (CONTACTRON)

Data sheet
108323_en_00

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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	Order 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	Order No.	Pcs./Pkt.
3-phase loop bridge for 2 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
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: 3 m, with ferrules included.	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, with ferrules included.	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, with ferrules included.	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, with ferrules included.	BRIDGE- 5-3M	2901545	1

Accessories	Type	Order No.	Pcs./Pkt.
3-phase loop bridge for 6 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m, with ferrules included.	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, with ferrules included.	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, with ferrules included.	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, with ferrules included.	BRIDGE- 9-3M	2901701	1
3-phase loop bridge for 10 CONTACTRON modules, with screw connection and 22.5 mm housing width, connecting cable: 3 m, with ferrules included.	BRIDGE-10-3M	2901702	1
3-phase loop bridge for 2 modules from the CONTACTRON family with screw connection and 22.5 mm housing width, 1 m long connecting cable, without ferrules.	BRIDGE- 2-1M	2901542	1
3-phase loop bridge for 3 modules from the CONTACTRON family with screw connection and 22.5 mm housing width, 1 m long connecting cable, without ferrules.	BRIDGE- 3-1M	2901655	1
3-phase loop bridge for 4 modules from the CONTACTRON family with screw connection and 22.5 mm housing width, 1 m long connecting cable, without ferrules.	BRIDGE- 4-1M	2901658	1
3-phase loop bridge for 5 modules from the CONTACTRON family with screw connection and 22.5 mm housing width, 1 m long connecting cable, without ferrules.	BRIDGE- 5-1M	2901544	1
3-phase loop bridge for 6 modules in the CONTACTRON family with 1 m long connecting cable without ferrules, 22.5 mm housing width.	BRIDGE- 6-1M	2901649	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
Plastic label, Card, white, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, mounting type: adhesive, lettering field size: 15 x 5 mm	US-EMLP (15X5)	0828790	10
Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, PLOTMARK, mounting type: adhesive, lettering field size: 15 x 5 mm	UC-EMLP (15X5)	0819301	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.	0.88 W / 7 W
Dimensions W/H/D	22.5 mm / 99 mm / 114.5 mm

Connection data

Connection name	Control circuits
Connection method	Screw connection
Conductor cross section, solid	0.2 mm ² ... 2.5 mm ²
Conductor cross section, flexible	0.2 mm ² ... 2.5 mm ²
Conductor cross section [AWG]	24 ... 14
Stripping length	8 mm

Connection name	Load circuit
Connection method	Screw connection
Conductor cross section, solid	0.2 mm ² ... 2.5 mm ²
Conductor cross section, flexible	0.2 mm ² ... 2.5 mm ²
Conductor cross section [AWG]	24 ... 14
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
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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/EN 50178) at operating voltage ≤ 300 V AC Basic isolation (IEC 60947-1) at operating voltage 300 ... 500 V AC Safe isolation (EN 50178) at operating voltage 300 ... 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 Safe isolation (EN 50178) in the auxiliary circuit ≤ 300 V AC
Degree of pollution	2

Conformance/Approvals

UL, USA/Canada	NLDX.E228652
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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 equipment must not be exposed to mechanical or thermal influences that exceed the limits as described in the operating instructions. If required, the device should be installed in an appropriate housing with a suitable degree of protection (e. g. IP54) according to IEC 60529/EN 60529 to provide protection against mechanical and electrical damage. Where dust is present, the device must be installed in suitable housing (IP64, minimum) according to 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.
- 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 50178/ VDE 0160(SELV / PELV). This prevents 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

For use with a "low voltage, limited energy, isolated power supply" use copper cables approved to 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)
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6 Operating and indication elements

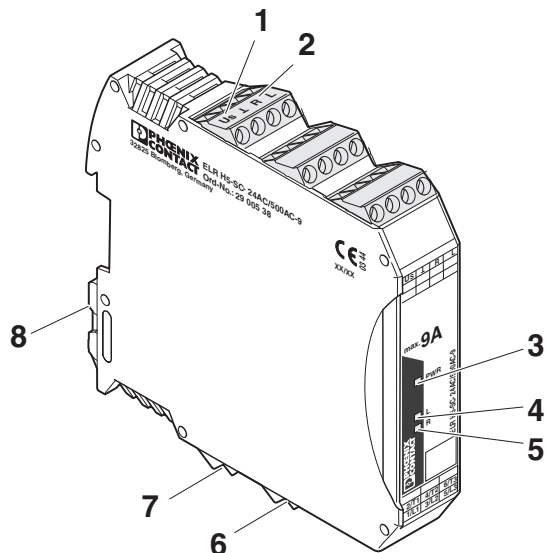


Figure 1 Operating and indication elements

- 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
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

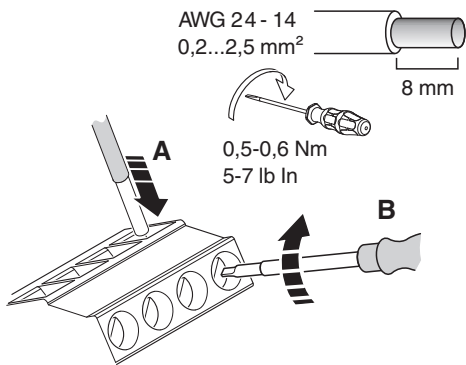


Figure 2 Screw connection

- 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

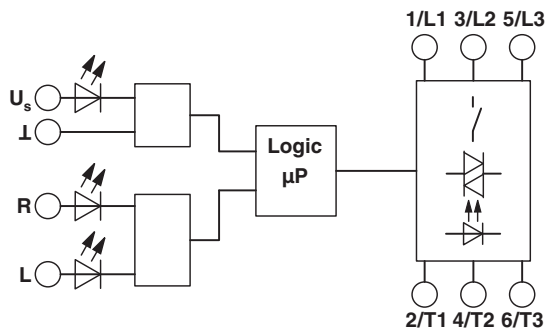


Figure 3 Block diagram

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.

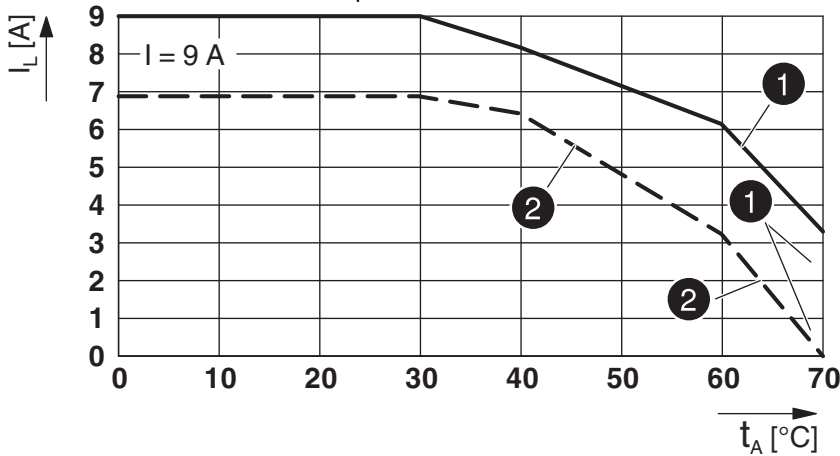


Figure 4 Derating curve

- I_L = Load current [A]
- t_A = Ambient temperature [°C]
- I_A = Starting current [A]
- ① = Aligned with 20 mm spacing
- ② = 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