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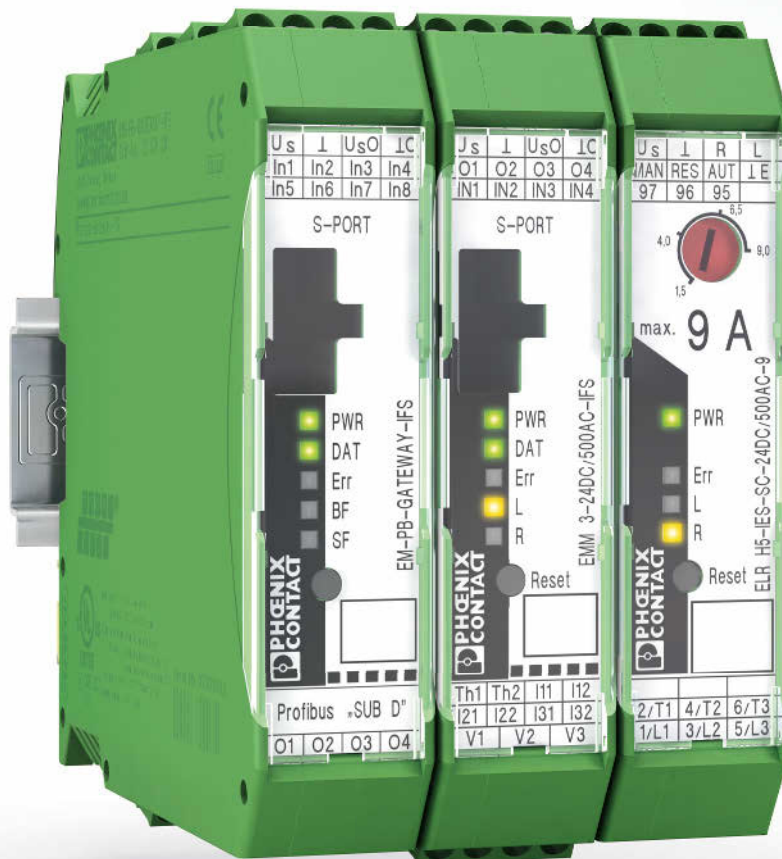
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Interface Technology and Switching Devices

2013/2014

7





PCB connection technology and electronics housing

- PCB terminal blocks and plug-in connectors
- Electronics housing



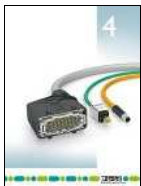
Connection technology for field devices

- Plug-in connectors
- Cables and connectors



Modular terminal blocks

- Modular terminal blocks



Sensor/actuator cabling and industrial plug-in connectors

- Sensor/actuator cabling
- Cables and connectors
- Plug-in connectors



Marking systems, tools, and mounting material

- Marking and labeling
- Tools
- Installation and mounting material



Surge protection and power supply units

- Lightning monitoring system
- Surge protection and interference filters
- Power supply units and UPS
- Protective devices








Interface technology and switching devices



Control technology, I/O systems and automation infrastructure

- Ethernet networks • Functional safety • HMIs and industrial PCs • I/O systems
- Industrial lighting and signaling • Industrial communication technology
- Fieldbus components and systems • Wireless data communication
- Process infrastructure • Software • Controllers

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Complete overview

Product range overview

Electronic switchgear and motor control



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Measurement and control technology



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Monitoring



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Monitoring



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Special function modules

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Lightning current measuring system
See Catalog 6



HMIs
See Catalog 8



Signal towers
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Relay modules



RIFLINE complete

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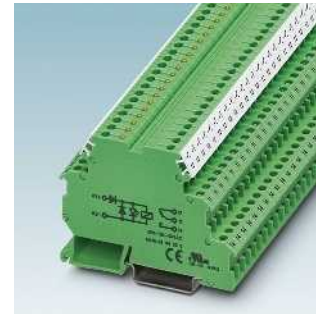
PLC series

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PR series

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System cabling for controllers



Front adapters

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Safety devices
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Monitoring relays

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Timer relays

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Universal interface modules

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Potential distributors

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Electronic switchgear and motor control

Switching devices for starting, reversing, and protecting electric motors are some of the most frequently used components in automation technology. These are often designed redundantly for safety-sensitive applications. When it comes to reducing installation time and space requirements, CONTACTRON hybrid motor starters are the state-of-the-art alternative.

This is because CONTACTRON hybrid motor starters combine up to 4 functions in a single device. Integration in popular fieldbus systems is implemented using the SmartWire-DT™ wiring system.

For protection of the entire system, the product range now includes the electronic motor manager (EMM). In addition to typical measured values such as voltage and current, the behavior of the system is monitored and protected by means of real power measurement. The process data in all popular fieldbus systems can be supplied via gateways and evaluated by a controller.

Product range overview

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Product overview

Motor management



Electronic motor management
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Gateways
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Reversing load relays with soft starter
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Solid-state contactors



3-phase solid-state reversing contactors
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3-phase solid-state contactors
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Solid-state reversing contactor for
DC motors
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Single-phase solid-state contactors
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Frequency inverters



Inline frequency inverters for the
control cabinet
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Hybrid motor starters



3-phase hybrid motor starters Page 18



3-phase hybrid motor starters with short-circuit protection Page 29



Hybrid motor starters with SmartWire-DT™ support Page 31



Accessories Page 36

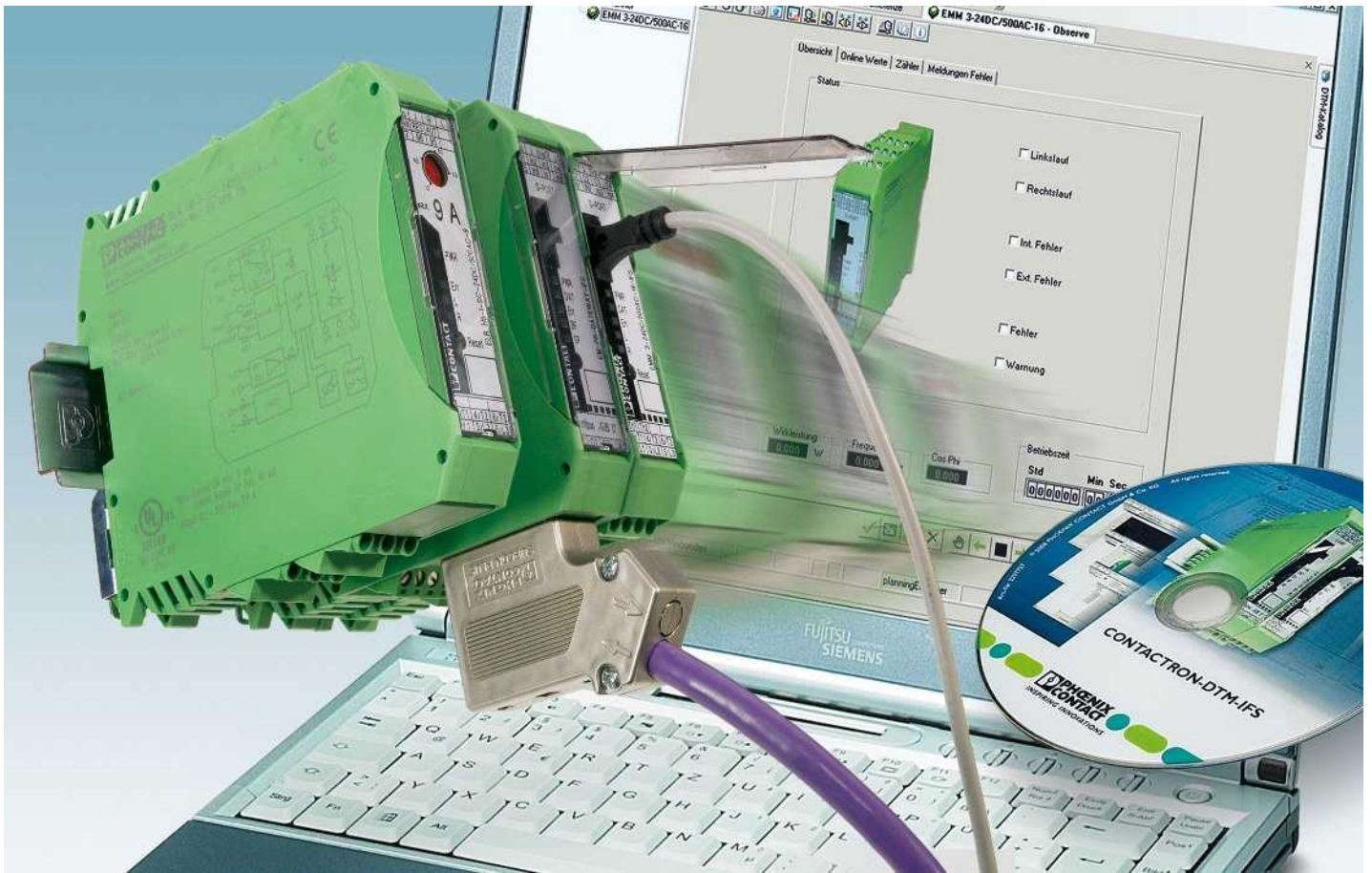
IP67 motor starters



PROFINET motor starters Page 48



Stainless steel base, IP67 protection Page 49



Electronic motor management (EMM)

The electronic motor management modules offer all the advantages of modern real power monitoring.

ELR-MM modules combine fast, wear-free electronic reversing load relays with modern measurement and evaluation electronics. EMM offers the same functionality for all performance classes, only without a power section.

Power within limits

Monitoring is based on freely parameterizable switching and signaling thresholds for overload and underload detection. Identical or separate settings can be made for the thresholds relating to the two directions of rotation. Parameterization relies on the real power consumed (calculated from three currents, voltages, and the phase angle), thereby offering a much more precise basis than if only the current is taken into consideration, as it is independent of voltage fluctuations and drive load. If a switching threshold is exceeded or not reached, the ELR-MM or EMM initiates an emergency shutdown of the motor immediately (or after an adjustable "delay time"). In addition, a message can be sent via an output.

This state can only be deactivated via a defined reset. If the effective power consumed is determined as being above or below the message thresholds, all that occurs is that a check-back is returned for the duration for which the module was addressed.

In addition, signals are generated by the module for the recognition of the direction of rotation. Asymmetry and phase failures are detected and signaled.

Permanent status monitoring with high scanning rates and the fast semiconductor switch enable complete system protection, including motor protection.

Without any extra wiring - and with just a single device - pumps, actuating drives, fans, and tools are monitored for proper functioning, contamination (filter or similar), and wear. The adjustable "inrush suppression" time can be used to mask out the switching operation from the monitoring process.



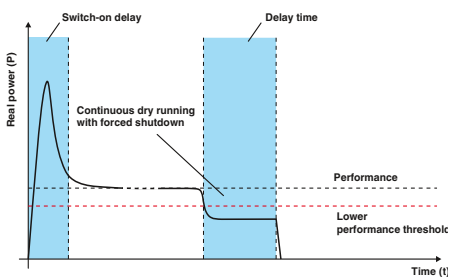
Protection against dry running, blocking, and cavitation, warning thresholds to indicate filter contamination.



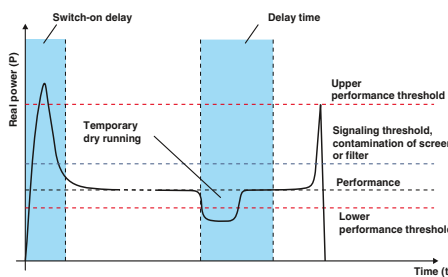
Protection against blocking, warning thresholds for bearing wear and other cases that trigger overload.



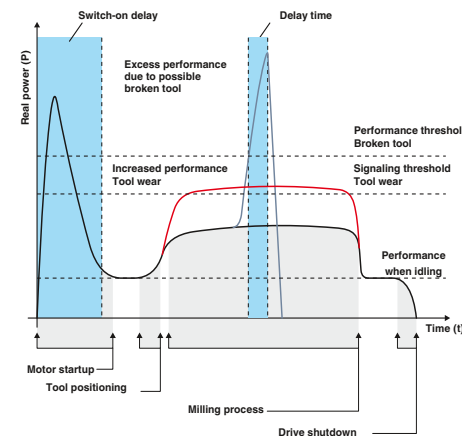
Protection against blocking and broken tools, warning thresholds for tool and bearing wear.



In the case of motor-driven pumps, the lower performance threshold provides reliable protection against hazardous dry running.



Forced shutdown of the drive can be delayed by the “delay time”. This prevents forced shutdown in the event of air bubbles.



Tooling machines are monitored and protected in a similar way when drilling, milling or grinding. If the feed value on a milling machine is set too high, a tool may break in the “worst-case” scenario. The power threshold - parameterized accordingly - can be used to resolve this issue.

Additionally, a message threshold signals tool wear in advance.

Motor management

Electronic motor management

The EMM motor management module (with/without current transformer) for all performance classes monitors and protects 3-phase loads, such as electrical drives.

- Freely parameterizable signaling or switching thresholds
- Digital outputs control external switching elements
- Optional connection to INTERFACE system and PROFIBUS-GATEWAY-IFS via TBUS

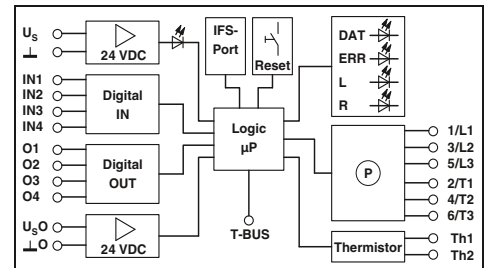
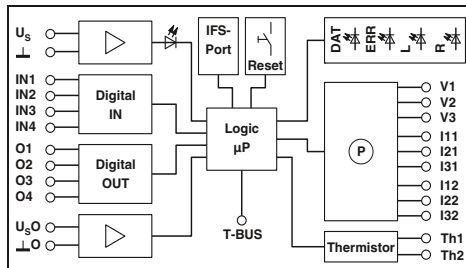


Allows the use of external current transformers



With integrated current transformers

Notes:
1) EMC: Class A product, see page 571



Technical data	
Input data	
Rated control supply voltage U_s	24 V DC 230 V AC
Rated control supply voltage range with reference to U_s	0.8 ... 1.25 0.4 ... 1.1
Rated control supply current I_s at U_s	25 mA 10 mA
Input data of digital inputs	EMM 3- 24DC/500AC-IFS ¹⁾ EMM 3-230AC/500AC-IFS ¹⁾
Number of inputs	4 (IN1 - IN4) 4 (IN1 - IN4)
Rated actuating voltage U_c	24 V DC 230 V AC
Rated actuating current I_c	3.3 mA 3.5 mA
Power measurement	
Voltage measuring input	42 V AC ... 575 V AC 42 V AC ... 575 V AC
Nominal current, voltage measuring input	< 0.5 mA < 0.5 mA
Current measuring input	5 A Secondary external converter 5 A Secondary external converter
Output power of the converter	> 1.25 VA > 1.25 VA
Internal resistance EMM	0.02 Ω 0.02 Ω
Output data for confirmation contacts	
O1 - O4 in the case of 1 signal	24 V DC (semiconductor output) / 500 mA 230 V AC (relay output/500 mA) / 500 mA
General data	
Rated insulation voltage	500 V
Rated surge voltage	6 kV/safe isolation 6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Standards/regulations	EN 60947 / EN 60947-4-2
EMC regulations	EN 61000-6-2 / EN 61000-6-3 / EN 61000-6-4
Degree of protection according to IEC 60529/ EN 60529	IP20
Mounting position	Vertical (horizontal DIN rail)
Screw connection solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 12
Dimensions	22.5 mm / 99 mm / 114.5 mm

Technical data	
Input data	
Rated control supply voltage U_s	24 V DC 230 V AC
Rated control supply voltage range with reference to U_s	0.8 ... 1.25 0.4 ... 1.1
Rated control supply current I_s at U_s	25 mA 10 mA
Input data of digital inputs	EMM 3- 24DC/500AC-IFS ¹⁾ EMM 3-230AC/500AC-IFS ¹⁾
Number of inputs	4 (IN1 - IN4) 4 (IN1 - IN4)
Rated actuating voltage U_c	24 V DC 230 V AC
Rated actuating current I_c	3.3 mA 3.5 mA
Power measurement	
Voltage measuring input	- -
Nominal current, voltage measuring input	- -
Current measuring input	max. 16 A max. 16 A
Output power of the converter	- -
Internal resistance EMM	- -
Output data for confirmation contacts	
O1 - O4 in the case of 1 signal	24 V DC (semiconductor output) / 500 mA 230 V AC (relay output/500 mA) / 500 mA
General data	
Rated insulation voltage	500 V
Rated surge voltage	6 kV/safe isolation 6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Standards/regulations	EN 60947 / EN 60947-4-2
EMC regulations	EN 61000-6-2 / EN 61000-6-3 / EN 61000-6-4
Degree of protection according to IEC 60529/ EN 60529	IP20
Mounting position	Vertical (horizontal DIN rail)
Screw connection solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 12
Dimensions	22.5 mm / 99 mm / 114.5 mm

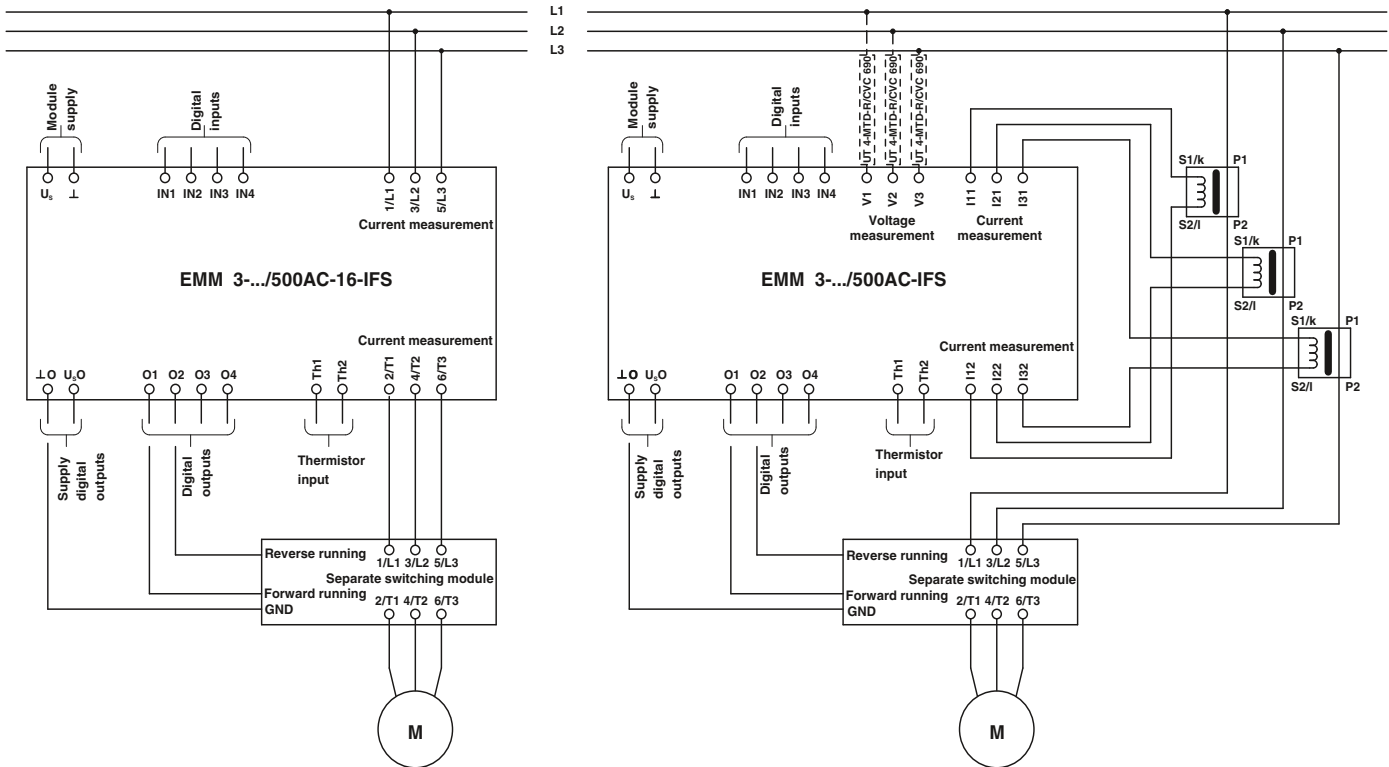
Ordering data	
Description	
Electronic motor management	
EMM 3- 24DC/500AC-IFS ¹⁾	2297497 1
EMM 3-230AC/500AC-IFS ¹⁾	2297507 1

Ordering data	
Description	
Electronic motor management	
EMM 3- 24DC/500AC-16-IFS ¹⁾	2297523 1
EMM 3-230AC/500AC-16-IFS ¹⁾	2297536 1

Accessories	
Programming adapter for configuring modules with S-PORT interface	IFS-USB-PROG-ADAPTER ¹⁾ 2811271 1
DIN rail connector	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN 2707437 50
Voltage transducer for 690 V, for EMM 3-.../500AC-IFS, comprising 3 modular terminal blocks and cover	UT 4-MTD-R/CVC 690/SET 2901667 1
Multi-functional memory block for the INTERFACE system	
- Flat design	IFS-CONFSTICK ¹⁾ 2986122 1
- Tall design	IFS-CONFSTICK-L 2901103 1
Mini COMBICON connectors	
- Socket contact	MC 1,5/ 5-ST-3,81 1803604 50
- Pin contact	IMC 1,5/ 5-ST-3,81 1857919 50

Accessories	
Programming adapter for configuring modules with S-PORT interface	IFS-USB-PROG-ADAPTER ¹⁾ 2811271 1
DIN rail connector	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN 2707437 50
Voltage transducer for 690 V, for EMM 3-.../500AC-IFS, comprising 3 modular terminal blocks and cover	UT 4-MTD-R/CVC 690/SET 2901667 1
Multi-functional memory block for the INTERFACE system	
- Flat design	IFS-CONFSTICK ¹⁾ 2986122 1
- Tall design	IFS-CONFSTICK-L 2901103 1
Mini COMBICON connectors	
- Socket contact	MC 1,5/ 5-ST-3,81 1803604 50
- Pin contact	IMC 1,5/ 5-ST-3,81 1857919 50

Electronic motor management



The electronic motor management modules offer all the advantages of modern effective power monitoring. Every 6.6 ms, the effective power of a drive system or of any other 3-phase consumer is calculated from three currents, voltages and the phase angle. Currents of up to 16 A can be directly acquired and currents >16 A are supplied via external converters. Digital outputs can be used to control separate mechanical or electronic switching elements that adopt the actual switching of the load. In this configuration, the EMM reliably protects connected loads – irrespective of their power consumption – against overload and underload, and provides permanent status monitoring.

Up to 8 freely parameterizable switching, message thresholds and up to four freely configurable inputs and outputs enable the protection of electrical drives and the system.

The EMM modules can record the following data:

- Apparent effective and reactive power
- Currents and voltages
- Phase angle
- Switching-cycle and operating-hours
- Power meter.

Additional Functions:

- Adjustable bimetal function class 5-30
- Thermistor monitor
- Recording measured values
- PROFIBUS connection via TBUS
- Pre-configured motor exits such as reversing starters, star delta starters, etc.

The EMM modules can be used to record complete "curves that can be used for system documentation.

The operating modes forward and reversing running, reverse and limit switch operation (with integrated restart inhibit) switch actuating and regulating drives, pumps etc. and also check for wear.

Current transformer

The external converters should be selected with a secondary nominal current of 5 A. The primary current is determined by the current consumption of the consumer (refer to connection diagram). For suitable current transformers, see catalog INTERFACE.

DIN rail connector TBUS

The **TBUS** (Order No. 2707437) can be used to supply several EMMs with 24 V DC or to couple up to 31 EMMs (for example) to the PROFIBUS-GATEWAY-IFS.

Switching element

Depending on the particular requirement of the application, either an electro-mechanical contactor or reversing contactor combination, or a semiconductor contactor or a solid-state reversing contactor is to be used for the actual task of switching the load. These switching elements are controlled via the digital outputs of the EMM modules.

Motor management

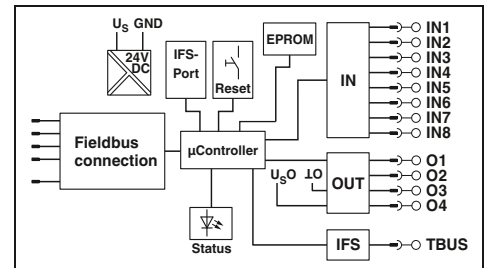
IFS gateways for electronic motor management modules

EM...GATEWAY-IFS for connecting EMM...IFS modules to popular bus systems: PROFIBUS DP, Modbus, Modbus TCP, DeviceNet™, and CANopen®.

- Communication via T-BUS with up to 31 EMM...IFS modules
- Equipped with freely parameterizable digital inputs and outputs
- Digital switching outputs for direct control of EMM...IFS (forward/reverse running)

Notes:

1) EMC: Class A product, see page 571



Technical data

Input data	
Operating voltage U_B	24 V DC -20 % ... +25 %
Nominal input current at U_{IN}	85 mA
Input circuit	Polarity protection, surge protection
Digital inputs	
Input voltage	24 V DC $\pm 20\%$
Nominal input current at U_{IN}	3 mA
Input circuit	Polarity protection, surge protection
Digital outputs	
Maximum switching voltage	23 V DC ($U_B - U_{resid.}$ of the output)
Max. switching current	500 mA
Residual voltage	1 V
Output protection	Parallel protection against polarity reversal, pay attention to the fuse
IFS interface	
Connection method	TBUS
General data	
Test voltage data interface/power supply	1.5 kV
Ambient temperature (operation)	-35°C ... 50°C
Nominal operating mode	100% operating factor
Standards/regulations	EN 50178
Degree of protection	IP20
Mounting position/mounting	Any / -
Connection data solid / stranded / AWG	0.2 ... 2.5 mm ² / 0.2 ... 2.5 mm ² / 24 - 12
Dimensions	22.5 mm / 99 mm / 114.5 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
IFS gateways for electronic motor management modules			
PROFIBUS DP	EM-PB-GATEWAY-IFS ¹⁾	2297620	1
RS-232	EM-RS232-GATEWAY-IFS	2901526	1
RS-485	EM-RS485-GATEWAY-IFS	2901527	1
Modbus TCP	EM-MODBUS-GATEWAY-IFS	2901528	1
DeviceNet™	EM-DNET-GATEWAY-IFS	2901529	1
CANopen®	EM-CAN-GATEWAY-IFS	2901504	1

Accessories

Programming adapter for configuring modules with S-PORT interface	IFS-USB-PROG-ADAPTER ¹⁾	2811271	1
DIN rail connector	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
Mini COMBICON connectors			
- Socket contact	MC 1,5/ 5-ST-3,81	1803604	50
- Pin contact	IMC 1,5/ 5-ST-3,81	1857919	50

Device Type Manager (DTM) for motor management modules EMM...IFS

- CONTACTRON-DTM-IFS, programming adapter, and user manual on CD available as configuration package
- Also available as USB programming adapter even individually
- CONTACTRON-DTM-IFS also available free of charge as a separate download from www.phoenixcontact.com



Notes:

1) EMC: Class A product, see page 571

Ordering data		
Type	Order No.	Pcs. / Pkt.
Configuration package for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD		
MM-CONF-SET	2297992	1
Accessories		
Programming adapter for configuring modules with S-PORT interface		
IFS-USB-PROG-ADAPTER ¹⁾	2811271	1



Hybrid motor starters for controlling 3-phase asynchronous motors combine up to four functions in one device as required. These include forward running, reverse running with optional reversing function including load wiring. The locking circuit for the reversing function is also integrated and certified as a single electronic reversing starter according to UL 508a and the new UL 60947-1. Furthermore, the devices protect the motor by means of an integrated motor protection relay with automatic and remote reset function. The implemented safety function according to Performance Level e (PL e) of EN ISO 13849-1 provides the emergency stop requirement. A PDT confirmation contact provides information regarding the availability of the device, and the motor state. This means that in the event of motor control without an error message the integrated current measurement and symmetry scanning ensures that the motor is turning. Even with these numerous functions, the hybrid motor starter is just 22.5 mm wide.

Short-circuit-proof hybrid motor starters with integrated protective devices, for mounting on 35 mm DIN rails and 60 mm busbar systems and connection to popular bus systems via SmartWire-DT™ complete the product portfolio.



Hybrid motor starters with up to four functions in one device: forward running, reverse running, motor protection, and emergency stop.



Short-circuit-proof hybrid motor starters with integrated fuses for mounting on 35 mm DIN rails and 60 mm busbar systems.



Connection of hybrid motor starters in a bus system via SmartWire-DT™. Gateways are provided for the main bus systems: PROFIBUS, Modbus TCB, EtherNet/IP™, and CANopen®.



The uniform design of the control side enables the combination of short-circuit-proof hybrid motor starters with SmartWire-DT™ adapters for integration in a bus system.

Hybrid motor starters

"4 in 1" hybrid motor starter with reversing function, motor protection, and emergency stop

These 3-phase "4 in 1" hybrid motor starters combine four functions in one device: right contactor, left contactor, motor protection relay, and emergency stop up to category 3.

Offer the following advantages:

- 22.5 mm wide
- They save wiring
- Bi-metal function can be set up to 9 A
- Long service life
- Space-saving
- 3-phase loop bridging

Safety level according to:

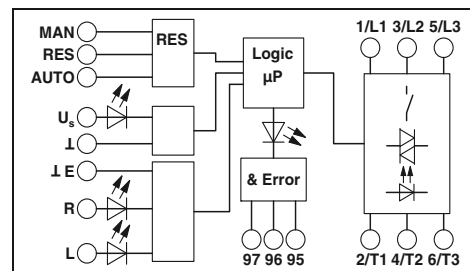
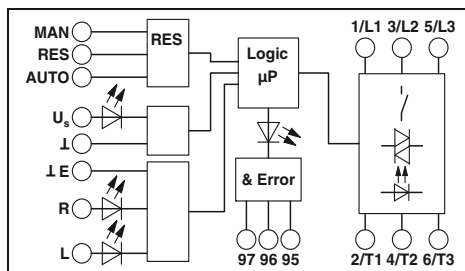
- IEC 61508-1: SIL3
- ISO 13849: PL e



For reversing 3~ AC motors up to 550 V AC/3 x 0.6 A



For reversing 3~ AC motors up to 550 V AC/3 x 2 A



Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5

Technical data	
Input data	
Rated control supply voltage U_s	24 V DC / 230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_s	0.8 ... 1.25 / 0.4 ... 1.1
Rated control supply current I_s at U_s	40 mA / 4 mA
Rated actuating voltage U_c R/L	24 V DC / 230 V AC
Rated actuating voltage range with reference to U_c	0.8 ... 1.25 / 0.4 ... 1.1
Rated actuating current I_c at U_c	5 mA / 7 mA
Input circuit	Protection against polarity reversal, Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
Output data load side	
Output voltage range	42 V AC ... 550 V AC / 42 V AC ... 550 V AC
Load current	max. 600 mA / max. 600 mA (see derating curve)
Surge current	100 A (t = 10 ms) / 100 A (t = 10 ms)
Min. load current	75 mA / 75 mA
Residual voltage	< 0.2 V / < 0.2 V
Output protection	Surge protection
General data	
Rated insulation voltage	500 V
Rated surge voltage	6 kV/safe isolation / 6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Electrical service life	3 x 10 ⁷ cycles
Standards/regulations	DIN EN 50178 / EN 60947
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with spacing = 20 mm
Connection data solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 14
Dimensions	22.5 mm / 99 mm / 114.5 mm
Safety data	
EC-type examination certificate according to ATEX	Ex II (2) G, Ex II (2) D / Ex II (2) G, Ex II (2) D

Technical data	
Input data	
Rated control supply voltage U_s	24 V DC / 230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_s	0.8 ... 1.25 / 0.4 ... 1.1
Rated control supply current I_s at U_s	40 mA / 4 mA
Rated actuating voltage U_c R/L	24 V DC / 230 V AC
Rated actuating voltage range with reference to U_c	0.8 ... 1.25 / 0.4 ... 1.1
Rated actuating current I_c at U_c	5 mA / 7 mA
Input circuit	Protection against polarity reversal, Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
Output data load side	
Output voltage range	42 V AC ... 550 V AC / 42 V AC ... 550 V AC
Load current	max. 2.4 A / max. 2.4 A (see derating curve)
Surge current	100 A (t = 10 ms) / 100 A (t = 10 ms)
Min. load current	180 mA / 180 mA
Residual voltage	< 0.3 V / < 0.3 V
Output protection	Surge protection
General data	
Rated insulation voltage	500 V
Rated surge voltage	6 kV/safe isolation / 6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Electrical service life	3 x 10 ⁷ cycles
Standards/regulations	DIN EN 50178 / EN 60947
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with spacing = 20 mm
Connection data solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 14
Dimensions	22.5 mm / 99 mm / 114.5 mm
Safety data	
EC-type examination certificate according to ATEX	Ex II (2) G, Ex II (2) D / Ex II (2) G, Ex II (2) D

Technical data	
Input data	
Rated control supply voltage U_s	24 V DC / 230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_s	0.8 ... 1.25 / 0.4 ... 1.1
Rated control supply current I_s at U_s	40 mA / 4 mA
Rated actuating voltage U_c R/L	24 V DC / 230 V AC
Rated actuating voltage range with reference to U_c	0.8 ... 1.25 / 0.4 ... 1.1
Rated actuating current I_c at U_c	5 mA / 7 mA
Input circuit	Protection against polarity reversal, Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
Output data load side	
Output voltage range	42 V AC ... 550 V AC / 42 V AC ... 550 V AC
Load current	max. 2.4 A / max. 2.4 A (see derating curve)
Surge current	100 A (t = 10 ms) / 100 A (t = 10 ms)
Min. load current	180 mA / 180 mA
Residual voltage	< 0.3 V / < 0.3 V
Output protection	Surge protection
General data	
Rated insulation voltage	500 V
Rated surge voltage	6 kV/safe isolation / 6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Electrical service life	3 x 10 ⁷ cycles
Standards/regulations	DIN EN 50178 / EN 60947
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with spacing = 20 mm
Connection data solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 14
Dimensions	22.5 mm / 99 mm / 114.5 mm
Safety data	
EC-type examination certificate according to ATEX	Ex II (2) G, Ex II (2) D / Ex II (2) G, Ex II (2) D

Ordering data	
Description	
"4 in 1" hybrid motor starter, incl. right contactor, left contactor, motor protection relay, and emergency stop	
Screw connection	ELR H5-IES-SC- 24DC/500AC-0,6
Push-in connection	ELR H5-IES-PT-24DC/500AC-0,6
Screw connection	ELR H5-IES-SC-230AC/500AC-0,6
"4 in 1" hybrid motor starter, incl. right contactor, left contactor, motor protection relay, and emergency stop, terminals L1, L2, L3 and T1, T2, T3 rotated	

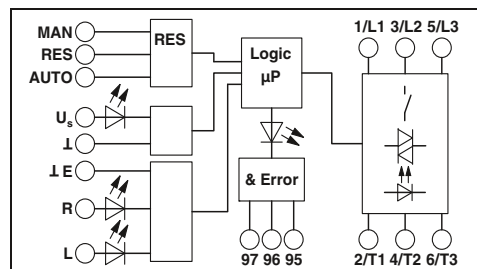
Ordering data	
Type	Order No.
ELR H5-IES-SC- 24DC/500AC-0,6	2900582
ELR H5-IES-PT-24DC/500AC-0,6	2903902
ELR H5-IES-SC-230AC/500AC-0,6	2900692

Ordering data	
Type	Order No.
ELR H5-IES-SC- 24DC/500AC-2	2900414
ELR H5-IES-PT-24DC/500AC-2	2903904
ELR H5-IES-SC-230AC/500AC-2	2900420
ELR W3- 24DC/500AC- 2I	2297031
ELR W3-230AC/500AC- 2I	2297044



For reversing 3~ AC motors up to 550 V AC/3 x 9 A

CB Ex: Ex



Technical data

24 V DC 230 V AC (50/60 Hz)
0.8 ... 1.25 0.4 ... 1.1

40 mA 4 mA
24 V DC 230 V AC
0.8 ... 1.25 0.4 ... 1.1

5 mA 7 mA
Protection against polarity reversal, Surge protection
Surge protection

Green LED / Yellow LED / Red LED

42 V AC ... 550 V AC 42 V AC ... 550 V AC
max. 9 A max. 9 A
(see derating curve) (see derating curve)

100 A (t = 10 ms) 100 A (t = 10 ms)
1.5 A 1.5 A
< 0.5 V < 0.5 V
Surge protection

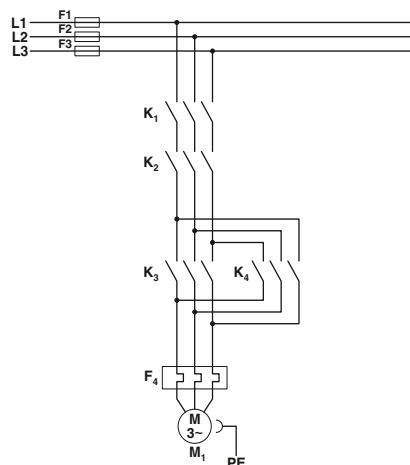
500 V
6 kV/safe isolation 6 kV/safe isolation
-25°C ... 70°C
3 x 10⁷ cycles
DIN EN 50178 / EN 60947
Vertical (horizontal DIN rail)
Can be aligned with spacing = 20 mm
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
22.5 mm / 99 mm / 114.5 mm

Ex II (2) G, Ex II (2) D Ex II (2) G, Ex II (2) D
PTB 07 ATEX 3145 PTB 07 ATEX 3145

Ordering data

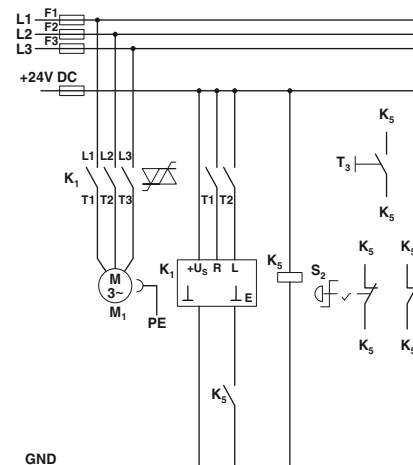
Type	Order No.	Pcs. / Pkt.
ELR H5-IES-SC- 24DC/500AC-9	2900421	1
ELR H5-IES-PT-24DC/500AC-9	2903906	1
ELR H5-IES-SC-230AC/500AC-9	2900422	1
ELR W3- 24DC/500AC- 9I	2297057	1
ELR W3-230AC/500AC- 9I	2297060	1

Conventional structure Main current path reversing contactor according to category 3



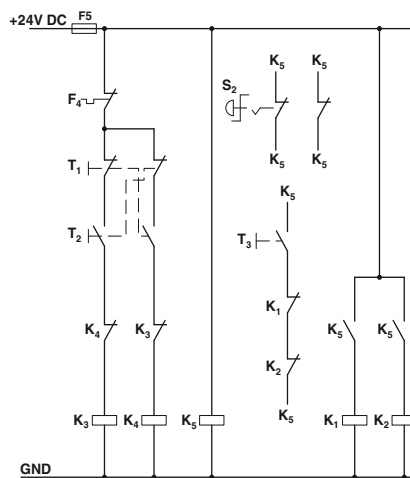
K1 + K2 = Emergency stop contactor
K3 = Left contactor
K4 = Right contactor
F4 = Motor protection relay

Structure with CONTACTRON Main and control current path for "4 in 1" hybrid motor starter with reversing function according to category 3

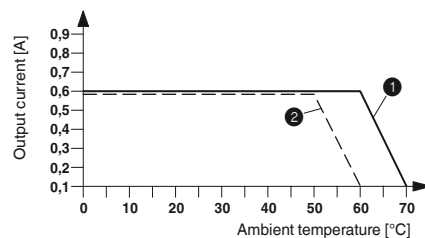


K1 = "4 in 1" hybrid motor starter with reversing function
K5 = PSR SCP-24DC.../Safety relay
T1 = Left, T2 = Right, T3 = Reset
S2 = Emergency stop

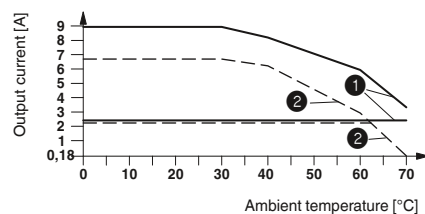
Conventional structure Control current path reversing contactor according to category 3



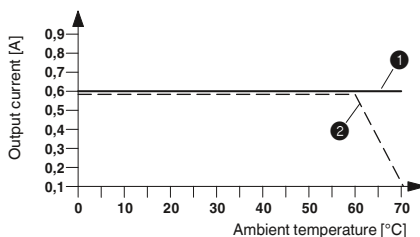
K1 + K2 = Emergency stop contactor
K3 = Left contactor
K4 = Right contactor
K5 = PSR SCP-24DC.../Safety relay
T1 = Left, T2 = Right, T3 = Reset
S2 = Emergency stop
F4 = Motor protection relay



Derating curve ELR H5-IES-SC-230AC/500AC-0,6 100% operating time

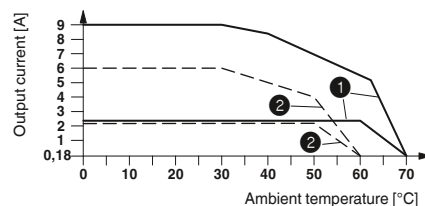


Derating curve ELR H5-IES-SC-24DC/500AC-2 and ELR H5-IES-SC-24DC/500AC-9 100% operating time



Derating curve ELR H5-IES-SC-24DC/500AC-0,6 100% operating time

1 Aligned with > 20 mm spacing
2 Aligned without spacing



Derating curve ELR H5-IES-SC-230AC/500AC-2 and ELR H5-IES-SC-230AC/500AC-9 100% operating time

Hybrid motor starters

"3 in 1" hybrid motor starter with motor protection and emergency stop

These 3-phase "3 in 1" hybrid motor starters combine three functions in one device: right contactor, motor protection relay, and emergency stop up to category 3.

Offer the following advantages:

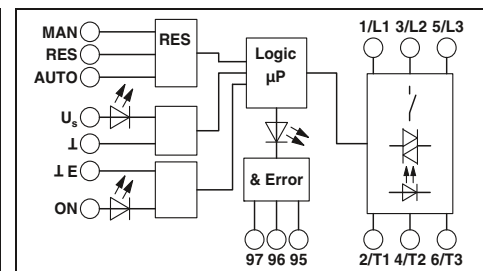
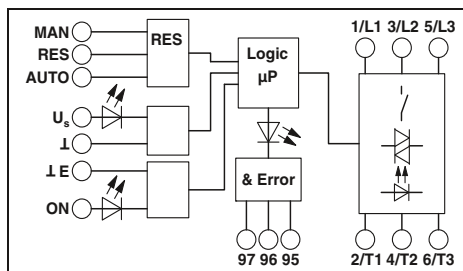
- 22.5 mm wide
- They save wiring
- Bi-metal function can be set up to 9 A
- Long service life
- Space-saving
- 3-phase loop bridging
- Safety level according to:
 - IEC 61508-1: SIL3
 - ISO 13849: PL e



For starting 3~ AC motors up to 550 V AC/3 x 0.6 A



For starting 3~ AC motors up to 550 V AC/3 x 2 A



Notes:	
Type of housing:	Polyamide PA non-reinforced, color: green.
Marking systems and mounting material	See Catalog 5

Technical data

Input data		
Rated control supply voltage U_s	24 V DC	230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_s	0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_s at U_s	40 mA	4 mA
Rated actuation voltage U_c ON	24 V DC	230 V AC
Rated actuating voltage range with reference to U_c	0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_c at U_c	5 mA	7 mA
Input circuit	Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED	
Output data load side		
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Load current	max. 600 mA (see derating curve)	max. 600 mA (see derating curve)
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)
Min. load current	75 mA	75 mA
Residual voltage	< 0.2 V	< 0.2 V
Output protection	Surge protection	
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C	
Electrical service life	3 x 10 ⁷ cycles	
Standards/regulations	DIN EN 50178 / EN 60947	
Mounting position	Vertical (horizontal DIN rail)	
Mounting	Can be aligned with spacing = 20 mm	
Connection data solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 14	
Dimensions	22.5 mm / 99 mm / 114.5 mm	
Safety data		
EC-type examination certificate according to ATEX	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145

Input data		
Rated control supply voltage U_s	24 V DC	230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_s	0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_s at U_s	40 mA	4 mA
Rated actuation voltage U_c ON	24 V DC	230 V AC
Rated actuating voltage range with reference to U_c	0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_c at U_c	5 mA	7 mA
Input circuit	Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED	
Output data load side		
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Load current	max. 2.4 A (see derating curve)	max. 2.4 A (see derating curve)
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)
Min. load current	180 mA	180 mA
Residual voltage	< 0.3 V	< 0.3 V
Output protection	Surge protection	
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C	
Electrical service life	3 x 10 ⁷ cycles	
Standards/regulations	DIN EN 50178 / EN 60947	
Mounting position	Vertical (horizontal DIN rail)	
Mounting	Can be aligned with spacing = 20 mm	
Connection data solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 14	
Dimensions	22.5 mm / 99 mm / 114.5 mm	
Safety data		
EC-type examination certificate according to ATEX	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145

Technical data

Input data		
Rated control supply voltage U_s	24 V DC	230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_s	0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_s at U_s	40 mA	4 mA
Rated actuation voltage U_c ON	24 V DC	230 V AC
Rated actuating voltage range with reference to U_c	0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_c at U_c	5 mA	7 mA
Input circuit	Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED	
Output data load side		
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Load current	max. 2.4 A (see derating curve)	max. 2.4 A (see derating curve)
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)
Min. load current	180 mA	180 mA
Residual voltage	< 0.3 V	< 0.3 V
Output protection	Surge protection	
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C	
Electrical service life	3 x 10 ⁷ cycles	
Standards/regulations	DIN EN 50178 / EN 60947	
Mounting position	Vertical (horizontal DIN rail)	
Mounting	Can be aligned with spacing = 20 mm	
Connection data solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 14	
Dimensions	22.5 mm / 99 mm / 114.5 mm	
Safety data		
EC-type examination certificate according to ATEX	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145

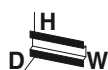
Ordering data

Description
"3 in 1" hybrid motor starter, incl. right contactor, motor protection relay, and emergency stop
Screw connection
Push-in connection
Screw connection

Type	Order No.	Pcs. / Pkt.
ELR H3-IES-SC- 24DC/500AC-0,6	2900566	1
ELR H3-IES-PT-24DC/500AC-0,6	2903914	1
ELR H3-IES-SC-230AC/500AC-0,6	2900689	1

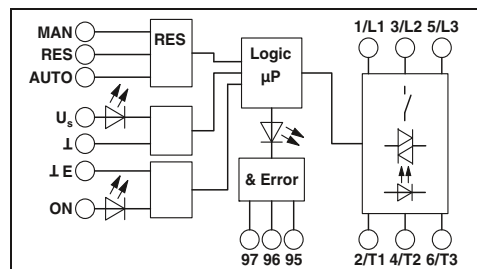
Ordering data

Type	Order No.	Pcs. / Pkt.
ELR H3-IES-SC- 24DC/500AC-2	2900567	1
ELR H3-IES-PT-24DC/500AC-2	2903916	1
ELR H3-IES-SC-230AC/500AC-2	2900568	1



For starting 3~ AC motors up to 550 V AC/3 x 9 A

CB Ex: Ex



Technical data

24 V DC 0.8 ... 1.25 230 V AC (50/60 Hz) 0.4 ... 1.1

40 mA 24 V DC 0.8 ... 1.25 4 mA 230 V AC 0.4 ... 1.1

5 mA Protection against polarity reversal, Surge protection 7 mA Surge protection

Green LED / Yellow LED / Red LED

42 V AC ... 550 V AC max. 9 A (see derating curve) 42 V AC ... 550 V AC max. 9 A (see derating curve)

100 A (t = 10 ms) 1.5 A < 0.5 V Surge protection 100 A (t = 10 ms) 1.5 A < 0.5 V Surge protection

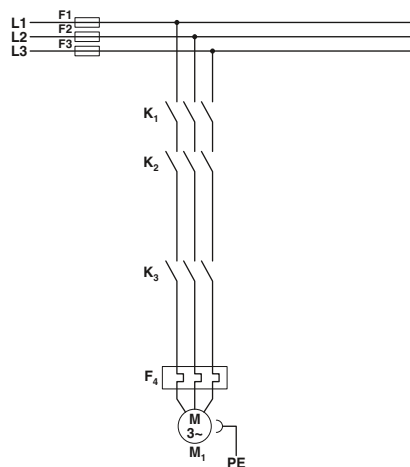
500 V 6 kV/safe isolation -25°C ... 70°C 3 x 10⁷ cycles DIN EN 50178 / EN 60947 Vertical (horizontal DIN rail) Can be aligned with spacing = 20 mm 0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14 22.5 mm / 99 mm / 114.5 mm

Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145 Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145

Ordering data

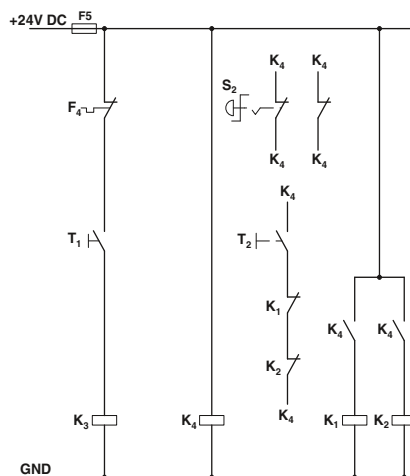
Type	Order No.	Pcs. / Pkt.
ELR H3-IES-SC- 24DC/500AC-9	2900569	1
ELR H3-IES-PT-24DC/500AC-9	2903918	1
ELR H3-IES-SC-230AC/500AC-9	2900570	1

Conventional structure Main current path contactor according to category 3



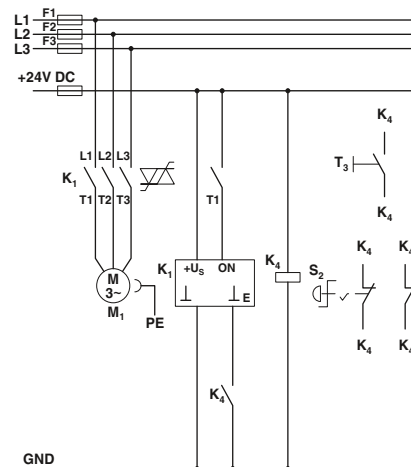
K1 + K2 = Emergency stop contactor
K3 = Right contactor
F4 = Motor protection relay

Conventional structure Control current path contactor according to category 3

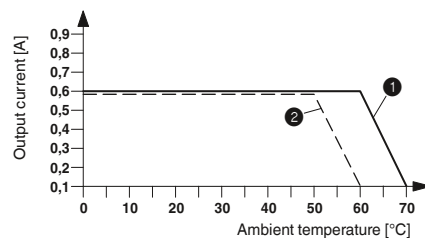


K1 + K2 = Emergency stop contactor
K3 = Right contactor
K4 = PSR SCP-24DC.../Safety relay
T1 = Right, T3 = Reset
S2 = Emergency stop
F4 = Motor protection relay

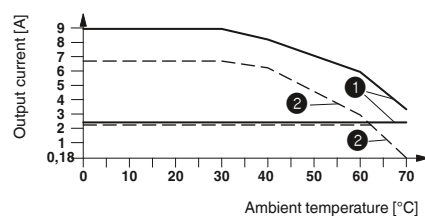
Structure with CONTACTRON Main and control current path for "3 in 1" hybrid motor starter according to category 3



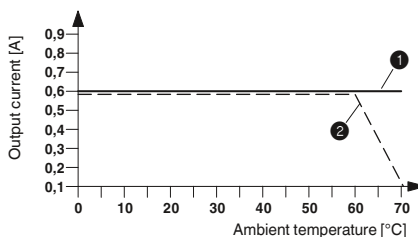
K1 = "3 in 1" hybrid motor starter
K4 = PSR SCP-24DC.../Safety relay
T1 = Right, T3 = Reset
S2 = Emergency stop



Derating curve ELR H3-IES-SC-230AC/500AC-0,6 100% operating time

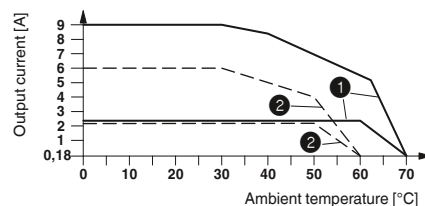


Derating curve ELR H3-IES-SC-24DC/500AC-2 and ELR H3-IES-SC-24DC/500AC-9 100% operating time



Derating curve ELR H3-IES-SC-24DC/500AC-0,6 100% operating time

1 Aligned with > 20 mm spacing
2 Aligned without spacing



Derating curve ELR H3-IES-SC-230AC/500AC-2 and ELR H3-IES-SC-230AC/500AC-9 100% operating time

Hybrid motor starters

"3 in 1" hybrid motor starter with reversing function and motor protection

These 3-phase "3 in 1" hybrid motor starters combine three functions in one device: right contactor, left contactor, and motor protection relay.

Offer the following advantages:

- 22.5 mm wide
- They save wiring
- Bi-metal function can be set up to 9 A
- Long service life
- Space-saving
- 3-phase loop bridging

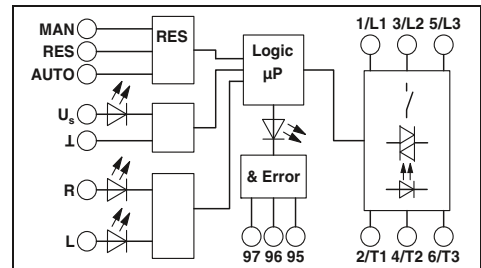
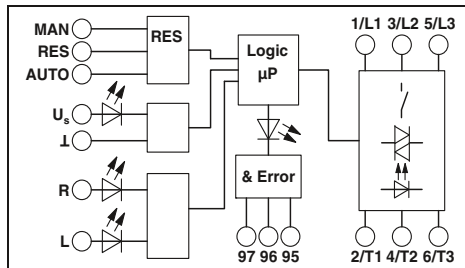


For starting 3~ AC motors up to 550 V AC/3 x 0.6 A



For starting 3~ AC motors up to 550 V AC/3 x 2 A

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5



Input data	
Rated control supply voltage U_s	24 V DC
Rated control supply voltage range with reference to U_s	0.8 ... 1.25
Rated control supply current I_s at U_s	40 mA
Rated actuation voltage U_c ON	24 V DC
Rated actuating voltage range with reference to U_c	0.8 ... 1.25
Rated actuating current I_c at U_c	5 mA
Input circuit	Protection against polarity reversal, Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
Output data load side	
Output voltage range	42 V AC ... 550 V AC
Load current	max. 600 mA (see derating curve)
Surge current	100 A (t = 10 ms)
Min. load current	75 mA
Residual voltage	< 0.2 V
Output protection	Surge protection
General data	
Rated insulation voltage	500 V
Rated surge voltage	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Electrical service life	3 x 10 ⁷ cycles
Standards/regulations	DIN EN 50178 / EN 60947
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with spacing = 20 mm
Screw connection solid / stranded / AWG	0.14 - 2.5 mm ² / 0.14 - 2.5 mm ² / 26 - 14
Dimensions	22.5 mm / 99 mm / 114.5 mm

Technical data

24 V DC	230 V AC (50/60 Hz)
0.8 ... 1.25	0.4 ... 1.1
40 mA	4 mA
24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
5 mA	7 mA
Protection against polarity reversal, Surge protection	Surge protection

Technical data

24 V DC	230 V AC (50/60 Hz)
0.8 ... 1.25	0.4 ... 1.1
40 mA	4 mA
24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
5 mA	7 mA
Protection against polarity reversal, Surge protection	Surge protection

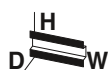
Ordering data

Type	Order No.	Pcs. / Pkt.
ELR H5-I-SC- 24DC/500AC-0,6	2900573	1
ELR H5-I-SC-230AC/500AC-0,6	2900691	1

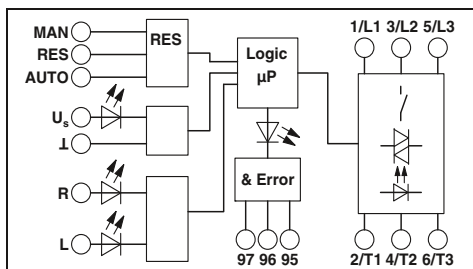
Ordering data

Type	Order No.	Pcs. / Pkt.
ELR H5-I-SC- 24DC/500AC-2	2900574	1
ELR H5-I-SC-230AC/500AC-2	2900575	1

Description
"3 in 1" hybrid motor starter, incl. right contactor, left contactor, and motor protection relay



For starting 3~ AC motors up to 550 V AC/3 x 9 A



Technical data

24 V DC 0.8 ... 1.25 230 V AC (50/60 Hz) 0.4 ... 1.1

40 mA 24 V DC 0.8 ... 1.25 4 mA 230 V AC 0.4 ... 1.1

5 mA Protection against polarity reversal, Surge protection 7 mA Surge protection

Green LED / Yellow LED / Red LED

42 V AC ... 550 V AC max. 9 A (see derating curve) 42 V AC ... 550 V AC max. 9 A (see derating curve)

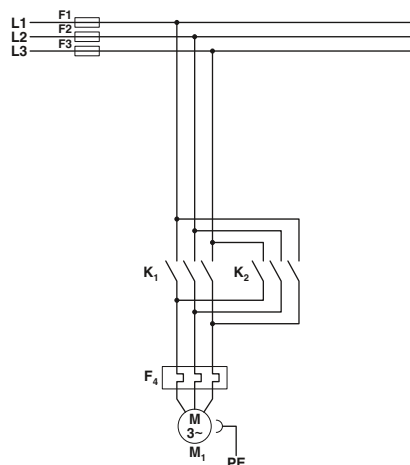
100 A (t = 10 ms) 1.5 A < 0.5 V Surge protection 100 A (t = 10 ms) 1.5 A < 0.5 V

500 V 6 kV/safe isolation -25°C ... 70°C 3 x 10⁷ cycles DIN EN 50178 / EN 60947 Vertical (horizontal DIN rail) Can be aligned with spacing = 20 mm 0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14 22.5 mm / 99 mm / 114.5 mm

Ordering data

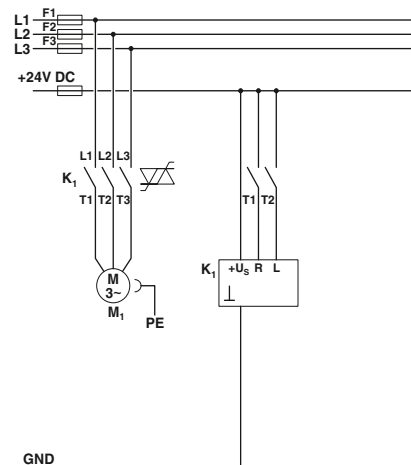
Type	Order No.	Pcs. / Pkt.
ELR H5-I-SC- 24DC/500AC-9	2900576	1
ELR H5-I-SC-230AC/500AC-9	2900578	1

Conventional structure Main current path contactor according to category 3



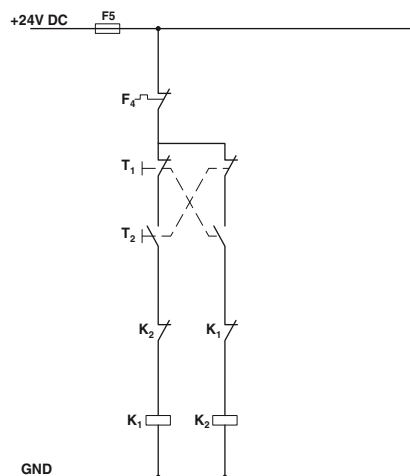
K1 = Left contactor
K2 = Right contactor
F4 = Motor protection relay

Structure with CONTACTRON Main and control current path for "3 in 1" hybrid motor starter according to category 3

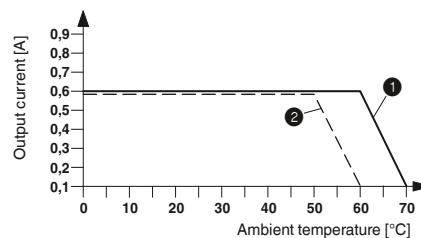


K1 = "3 in 1" hybrid motor starter
T1 = Right, T2 = Left, T3 = Reset

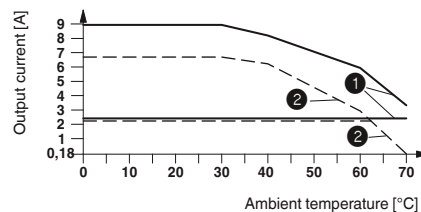
Conventional structure Control current path contactor according to category 3



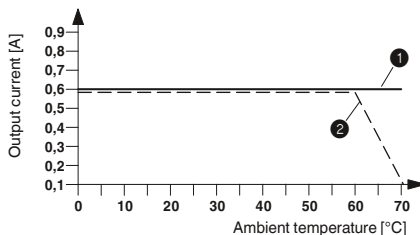
K1 = Left contactor
K2 = Right contactor
T1 = Right, T2 = Left, T3 = Reset
F4 = Motor protection relay



Derating curve ELR H5-I-SC-230AC/500AC-0,6 100% operating time

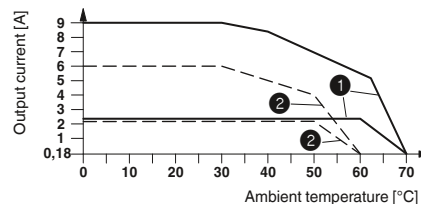


Derating curve ELR H5-I-SC-24DC/500AC-2 and ELR H5-I-SC-24DC/500AC-99 100% operating time



Derating curve ELR H5-I-SC-24DC/500AC-0,6 100% operating time

- 1 Aligned with > 20 mm spacing
- 2 Aligned without spacing



Derating curve ELR H5-I-SC-230AC/500AC-2 and ELR H5-I-SC-230AC/500AC-9 100% operating time