



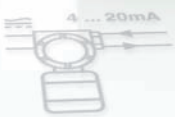
0-500 mV ± 500 mV

0-100 V ± 100 V

0-1 V, ± 1 V

0.5-2.5 V, 1-5 V, 2-10 V

1-5 mA, 2-10 mA, 4-20 mA



HART
COMMUNICATION PROTOCOL

SIL
IEC 61508

Universal signal conditioners – with safety MACX Analog

Functional safety – universal signal conditioners MACX Analog

MACX Analog – safe and high-performance signal conditioners. This product range enables you to safely isolate, convert, filter and amplify all the signals in your system.

All modules are SIL-certified and are also available for the Ex area.

Analog signal conditioners

- 1600 signal combinations
- Easily adjustable via DIP switch
- Short response time

Universal temperature transducers

- For RTD, TC, resistance-type sensors, mV voltages and customer-specific characteristic curves
- Easy configuration via FDT/DTM

What makes MACX Analog particularly safe?

In all phases of the product life cycle, the MACX Analog range has been consistently developed and produced according to standards for functional safety. This means the highest degree of reliability and safety for your systems.



0-500 mV, ± 500 mV
0-100 V, ± 100 V *0-1 V, ± 1 V*
0,5-2,5 V, 1-5 V, 2-10 V
1-5 mA, 2-10 mA, 4-20 mA

- On-site configuration via optional snap-on operator interface
- Universal power supply
- Freely adjustable PDT relays as signal and alarm outputs

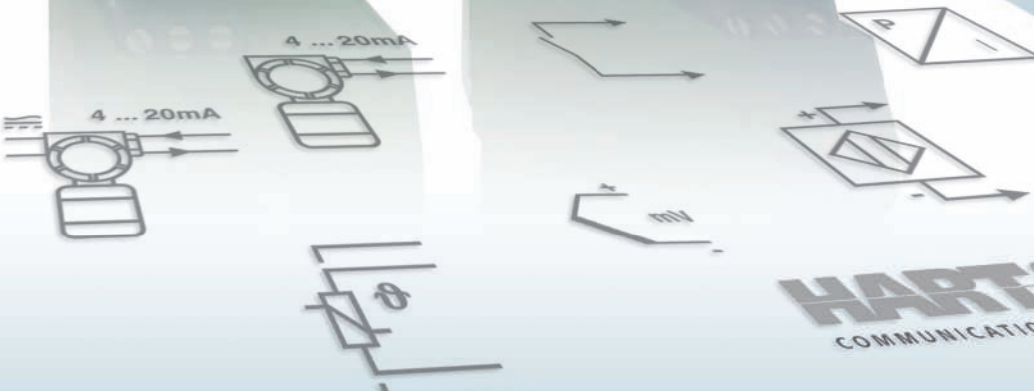
Operator interface

- On-site display of process values
- Easy monitoring, configuration and copying without software
- Can be snapped onto a measuring transducer or DIN rail



Ex approvals in accordance with ATEX, IECEx

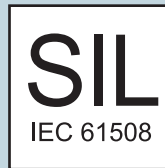
- Ex i for intrinsically safe circuits up to Ex zone 0 and Ex zone 20
- Ex n for installation in Ex zone 2



Functional safety – from the initial idea to the finished product

Phoenix Contact implements the requirements of functional safety in accordance with IEC 61508 in a standardized development process. Here, all fault avoidance and fault control measures are taken into consideration, from the very development and production of a device, right up to device operation. These measures are audited within the scope of a full assessment by an independent test center.

MACX Analog therefore makes a significant contribution to high system safety and availability.



Safety Life Cycle

Concept

All safety-related functions are defined and assessed right from the creation of the product specification.

Development

Product development incorporates hazard and risk analyses as well as measures for ensuring the required safety integrity.



Safety Life Cycle

Even during the planning phase, the concept of functional safety is taken into consideration.



Certified quality and safety

Independent test centers are involved throughout the entire development cycle. All certificates, technical information and the safety manual are available for you to download.

www.phoenixcontact.net/catalog

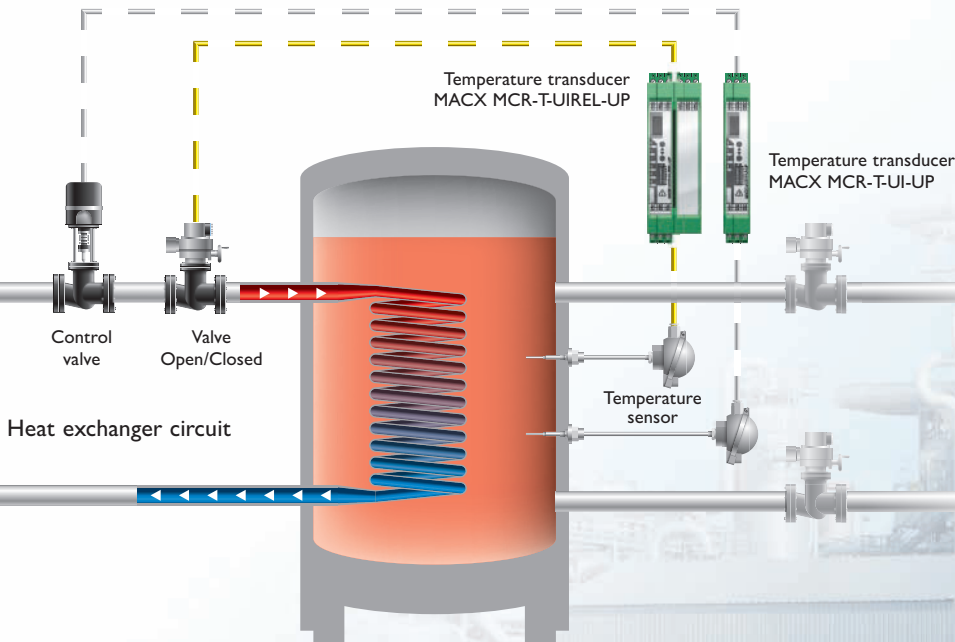


Production

During production, all of the defined specifications and test instructions are consistently implemented, verified and validated.

Device operation

The certified safety offers you the highest standard of quality and reliability during device operation.



Temperature control and monitoring with safe shutdown

The temperature in the vessel is continuously controlled and monitored. Here, the closed-loop control and safety equipment are consistently isolated.

MACX Analog – the complete range

The modular signal conditioners prevent the distortion of analog signals caused by external interference. With accurate conversion, isolation, filtering or amplification of analog signals, they secure and increase transmission quality and thus the quality of closed-loop control circuits.

MACX Analog – the advantages to you:

- The universal nature of the product range provides you with a solution for all applications using analog signal transmission.
- The safe electrical isolation protects both staff and the system.
- The combination of high signal flexibility with safe isolation and SIL certification reduces planning and operating costs.
- Also with spring-cage connection method (Push-in Technology) for tool-free wiring.
- The end-to-end SIL-capability of the devices provides you with the highest degree of system safety and availability.
- With MACX Analog Ex, all relevant functions are also available with intrinsically safe (Ex i) inputs and outputs.



Push-in Technology
Designed by PHOENIX CONTACT



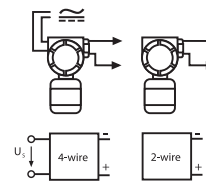
The DIN rail connector enables the modular bridging of the 24 V supply voltage.



Variants with universal power supply for global power supply networks (MACX MCR-...-UP).

Product overview

Analog IN/ Analog OUT

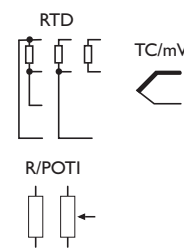


Isolating amplifier

- Universal and standard 3-way isolators
- 3-way repeater power supply
- 3-way output isolator
- 4-way signal duplicator

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MACX Analog Ex Page 12

Temperature

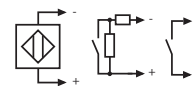


Temperature transducer

- Universal and standard measuring transducers
- 3-way measuring transducer
- 4-way measuring transducer with switching output
- Threshold value switch

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Digital IN

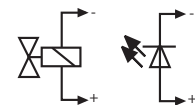


NAMUR isolation amplifier

- 1- and 2-channel
- Relay and transistor outputs
- Signal duplicator

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Digital OUT



Solenoid drivers

- For Ex i solenoid valves and alarm generators
- Various output characteristic curves for all commercial solenoid valves
- Loop-powered

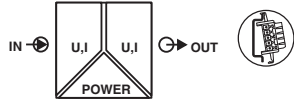
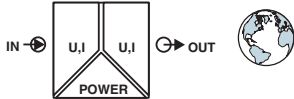
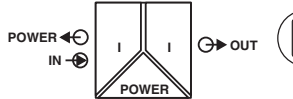
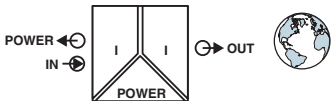
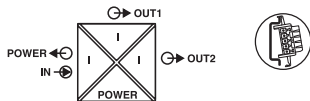
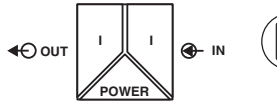
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Accessories

- Operator interface and display unit
- Power and error message module
- Power bridging, T connector
- Programming adapter

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MACX Analog – the complete range

	Analog IN	Analog IN	Analog IN
	 <p>Universal 3-way isolating amplifier, configurable</p>	 <p>Universal 3-way isolating amplifier, configurable</p>	 <p>Repeater power supply, HART-compatible</p>
IN	<p>unipolar: 0...50 mV to 0...100 V / 0...1 mA to 0...10 mA</p> <p>bipolar: -50...50 mV to -100...100 V / -1...1 mA to -100...+100 mA</p> <p>life-zero: 1...5 mA / 2...10 mA / 4...20 mA / 1...5 V / 2...10 V</p> <p>configurable via DIP switch</p>	<p>unipolar: 0...50 mV to 0...100 V / 0...1 mA to 0...10 mA</p> <p>bipolar: -50...50 mV to -100...100 V / -1...1 mA to -100...+100 mA</p> <p>life-zero: 1...5 mA / 2...10 mA / 4...20 mA / 1...5 V / 2...10 V</p> <p>configurable via DIP switch</p>	<p>Input isolator operation: 4...20 mA (0...20 mA)</p> <p>Repeater power supply operation: 4...20 mA</p>
OUT	<p>unipolar: 0...2.5 V / 0...5 V / 0...10 V / 0...5 mA / 0...10 mA / 0...20 mA</p> <p>bipolar: -2.5...2.5 V / -5...5 V / -10...10 V / -5...5 mA / -10...10 mA, -20...20 mA</p> <p>life-zero: 1...5 mA / 2...10 mA / 4...20 mA / 0.5...2.5 V / 1...5 V / 2...10 V</p> <p>configurable via DIP switch</p>	<p>unipolar: 0...2.5 V / 0...5 V / 0...10 V / 0...5 mA / 0...10 mA / 0...20 mA</p> <p>bipolar: -2.5...2.5 V / -5...5 V / -10...10 V / -5...5 mA / -10...10 mA / -20...20 mA</p> <p>life-zero: 1...5 mA / 2...10 mA / 4...20 mA / 0.5...2.5 V / 1...5 V / 2...10 V</p> <p>configurable via DIP switch</p>	<p>Input isolator operation: 4...20 mA (0...20 mA) active/passive</p> <p>Repeater power supply operation: 4...20 mA active/passive</p>
Design width	12.5 mm	12.5 mm	12.5 mm
Screw connection	MACX MCR-UI-UI-NC 2811446	MACX MCR-UI-UI-UP-NC 2811297	MACX MCR-SL-RPSSI-I 2865955
Spring-cage connection	MACX MCR-UI-UI-SP-NC 2811556	MACX MCR-UI-UI-UP-SP-NC 2811569	MACX MCR-SL-RPSSI-I-SP 2924207
	Analog IN	Analog IN	Analog OUT
	 <p>Repeater power supply, HART-compatible</p>	 <p>Supply duplicator, HART-compatible</p>	 <p>Output isolating amplifier, HART-compatible</p>
IN	<p>Input isolator operation: 4...20 mA (0...20 mA)</p> <p>Repeater power supply operation: 4...20 mA</p>	<p>Input isolator operation: 4...20 mA (0...20 mA)</p> <p>Repeater power supply operation: 4...20 mA</p>	4...20 mA (0...20 mA)
OUT	<p>Input isolator operation: 4...20 mA (0...20 mA) active/passive, 1...5 V (0...5 V)</p> <p>Repeater power supply operation: 4...20 mA active/passive, 1...5 V</p> <p>can be set via DIP switch</p>	<p>Input isolator operation: 4...20 mA (0...20 mA) active</p> <p>Repeater power supply operation: 4...20 mA active</p>	4...20 mA (0...20 mA)
Design width	17.5 mm	12.5 mm	12.5 mm
Screw connection	MACX MCR-SL-RPSSI-I-UP 2865968	MACX MCR-SL-RPSSI-2I 2924825	MACX MCR-SL-IDSI-I 2865971
Spring-cage connection	MACX MCR-SL-RPSSI-I-UP-SP 2924210	MACX MCR-SL-RPSSI-2I-SP 2924838	MACX MCR-SL-IDSI-I-SP 2924223

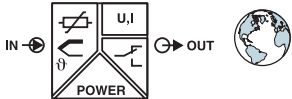
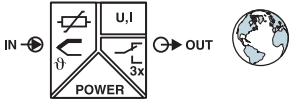
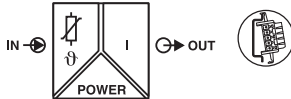
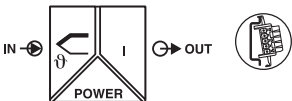
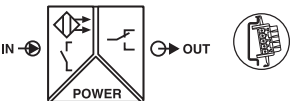
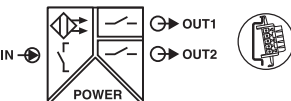


The DIN rail connector enables the modular bridging of the 24 V supply voltage.



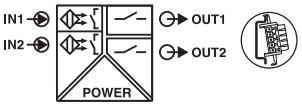
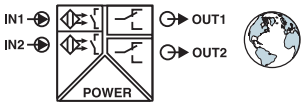
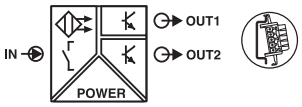
Variants with universal power supply for global power supply networks (MACX MCR-...-UP).

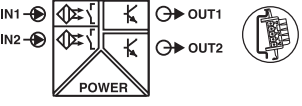
MACX Analog – the complete range

	Temperature	Temperature	Temperature
	 <p>Universal temperature transducer, with limit value relay, configurable</p>	 <p>Universal temperature transducer, with three limit value relays, configurable</p>	 <p>Temperature transducer for RTD sensors, configurable</p>
IN	RTD: PT 10...PT 10,000, Ni 10...Ni 10,000, Cu10, Cu53, KTY TC: Type B, E, J, K, N, R, S, T, L, U, C, D, A-1, A-2, A-3, M, L Potentiometer: 0...50 kOhm linear resistance: 0...50 kOhm configurable via IFS-CONF or IFS-OP-UNIT	RTD: PT 10...PT 10,000, Ni 10...Ni 10,000, Cu10, Cu53, KTY TC: Type B, E, J, K, N, R, S, T, L, U, C, D, A-1, A-2, A-3, M, L Potentiometer: 0...50 kOhm linear resistance: 0...50 kOhm configurable via IFS-CONF or IFS-OP-UNIT	RTD: PT 50, PT 100, PT 200, PT 500, PT 100S, PT 500S, Ni 100, Ni 500, Cu50, Cu53 Potentiometer: 0...2000 Ohm linear resistance: 0...2000 Ohm configurable via IFS-CONF
OUT	analog: 0...20 mA / -10...+10 V (freely scalable) digital: 1 PDT relay configurable via IFS-CONF or IFS-OP-UNIT	analog: 0...20 mA / -10...+10 V (freely scalable) digital: 3 PDT relays configurable via IFS-CONF or IFS-OP-UNIT	0...20 mA / 4...20 mA configurable via IFS-CONF
Design width	17.5 mm	35.0 mm	12.5 mm
Screw connection	MACX MCR-T-UI-UP 2811394	MACX MCR-T-UIREL-UP 2811378	MACX MCR-SL-RTD-I-NC 2865078
Spring-cage connection	MACX MCR-T-UI-UP-SP 2811860	MACX MCR-T-UIREL-UP-SP 2811828	MACX MCR-SL-RTD-I-SP-NC 2924320
	Temperature	Digital IN	Digital IN
	 <p>Temperature transducer for TC sensors, configurable</p>	 <p>NAMUR isolation amplifier, 1-channel, PDT output</p>	 <p>NAMUR isolation amplifier, 1-channel, N/O contact outputs</p>
IN	TC: Type E, J, K, N, L, Voltages: -20 mV...70 mV configurable via IFS-CONF	NAMUR sensors dry contacts	NAMUR sensors dry contacts
OUT	0...20 mA / 4...20 mA configurable via IFS-CONF	1 relay (PDT), 250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A) Switching behavior can be configured via DIP switch	2 relays (N/O contacts), 250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A) Switching behavior can be configured via DIP switch
Design width	12.5 mm	12.5 mm	12.5 mm
Screw connection	MACX MCR-SL-TC-I-NC 2924346	MACX MCR-SL-NAM-R 2865997	MACX MCR-SL-NAM-2RO 2865010
Spring-cage connection		MACX MCR-SL-NAM-R-SP 2924252	MACX MCR-SL-NAM-2RO-SP 2924265



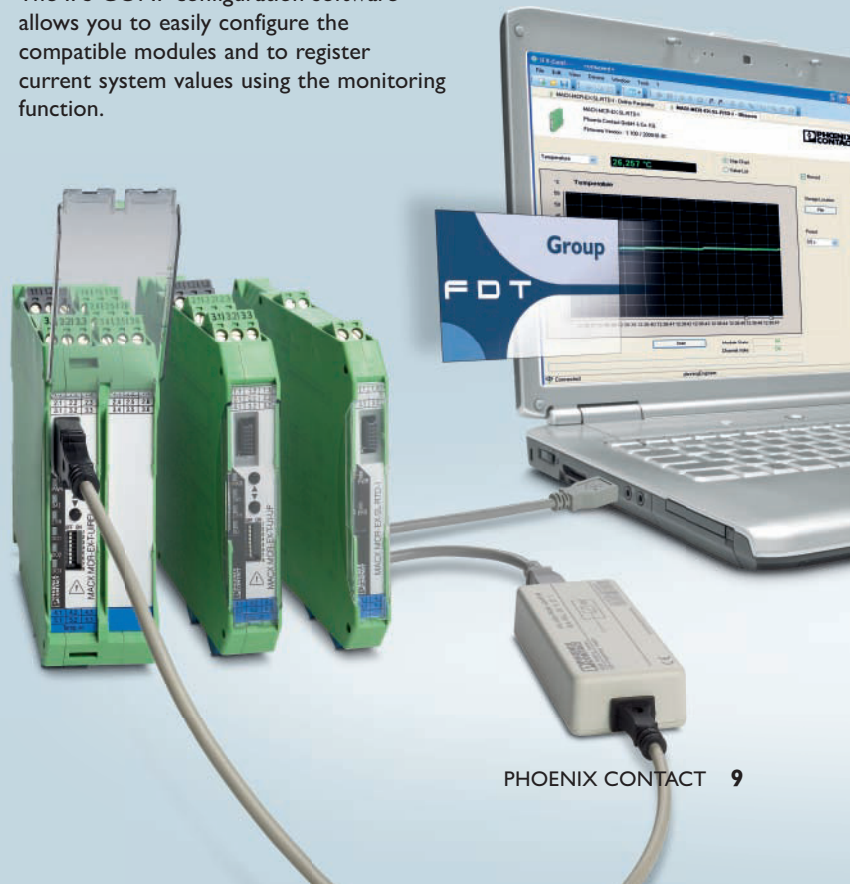
MACX Analog – the complete range

	Digital IN	Digital IN	Digital IN
	 <p>NAMUR isolation amplifier, 2-channel, N/O contact outputs</p>	 <p>NAMUR isolation amplifier, 2-channel, PDT outputs</p>	 <p>NAMUR isolation amplifier, 1-channel, transistor outputs</p>
IN	NAMUR sensors, dry contacts	NAMUR sensors, dry contacts	NAMUR sensors, dry contacts
OUT	2 relays (N/O contacts), 250 V AC (2 A), 120 V DC (0.2 A), 30 V DC (2 A) Switching behavior can be configured via DIP switch	2 relays (PDTs), 250 V AC (2 A), 120 V DC (0.2 A), 30 V DC (2 A) Switching behavior can be configured via DIP switch	2 transistor outputs, passive 30 V DC/5 mA Switching frequency: max. 5 kHz Switching behavior can be configured via DIP switch
Design width	12.5 mm	17.5 mm	12.5 mm
Screw connection	MACX MCR-SL-2NAM-RO 2865049	MACX MCR-SL-2NAM-R-UP 2865052	MACX MCR-SL-NAM-2T 2865023
Spring-cage connection	MACX MCR-SL-2NAM-RO-SP 2924294	MACX MCR-SL-2NAM-R-UP-SP 2924304	MACX MCR-SL-NAM-2T-SP 2924278

	Digital IN
	 <p>NAMUR isolation amplifier, 2-channel, transistor outputs</p>
IN	NAMUR sensors, dry contacts
OUT	2 transistor outputs, passive 30 V DC/5 mA Switching frequency: max. 5 kHz Switching behavior can be configured via DIP switch
Design width	12.5 mm
Screw connection	MACX MCR-SL-2NAM-T 2865036
Spring-cage connection	MACX MCR-SL-2NAM-T-SP 2924281

Easy configuration and monitoring

The IFS-CONF configuration software allows you to easily configure the compatible modules and to register current system values using the monitoring function.



MACX Analog Ex – The widest range in the narrowest housing

MACX Analog Ex – signal conditioners with intrinsically safe (EX i) input and output circuits. The product range offers you the fullest scope for signal processing, with a design width of just 12.5 mm. MACX Analog Ex represents maximum explosion protection with minimum space requirements.

MACX Analog Ex – the advantages to you:

- Bidirectional transmission of the HART communication signal for all Analog In and Analog Out isolators.
- The safe electrical isolation protects both staff and the system.
- Long service life and precise transmission via a patented circuit with a low current consumption.
- Variants in a 2-channel design (MACX MCR-...-2...)
- The end-to-end SIL-capability of the devices provides the highest degree of system safety and availability.
- LED display in accordance with NAMUR NE 44 for supply voltage, switching state and malfunction.
- Also with spring-cage connection method (Push-in Technology) for tool-free wiring.



Push-in Technology
Designed by PHOENIX CONTACT



The DIN rail connector enables the modular bridging of the 24 V supply voltage.



Variants with universal power supply for global power supply networks (MACX MCR-...-UP).



Suitable for all Ex zones and gas groups

All MACX Analog Ex signal conditioners are approved in accordance with the applicable ATEX or IECEx standards:

- **Ex i** – for intrinsically safe circuits up to Ex zone 0 (gas) and Ex zone 20 (dust)
Marking: XII(1)G [Ex ia] IIC; XII(1)D [Ex iaD]
- **Ex n** – for device installation in Ex zone 2,
Marking: XII3(1)G Ex nAC [ia] IIC T4 X

The relevant national approvals such as UL and Gost are available.

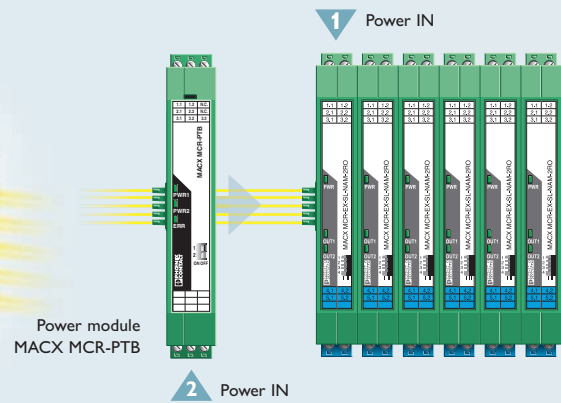


Voltage supply and diagnostics - flexible and easy with the DIN rail connector

The DIN rail connector enables the modular bridging of the 24 V supply voltage. This simplifies wiring and gives you the option to extend the system or replace the module, even during operation.

The DIN rail connector gives you two supply options:

1. direct supply
via any MACX Analog Ex module



2. via the power and error message module
 - Single or redundant supply (decoupled from diode)
 - Error message output (auxiliary voltage loss message and line fault group message with NAMUR isolation amplifiers)

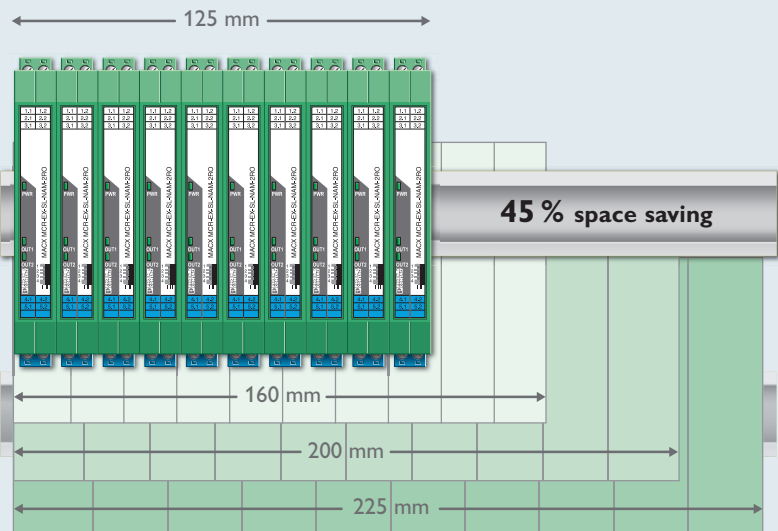
Maximum explosion protection with minimum space requirements

With a housing width of just 12.5 mm for all 1- and 2-channel 24 V devices, MACX Analog Ex boasts a space saving of up to 45% in contrast to commercial Ex i isolating amplifiers.



Plug-in connection method

- For service-friendly installation
- Coding and clear labeling prevent plugging mistakes
- Integrated test sockets, e.g., for HART communicators





MACX Analog Ex – the complete range

	Analog IN	Analog IN	Analog IN
	<p>Repeater power supply, HART-compatible</p>	<p>Repeater power supply, HART-compatible</p>	<p>Supply duplicator, HART-compatible</p>
IN	Input isolator operation: 4...20 mA (0...20 mA) Repeater power supply operation: 4...20 mA	Input isolator operation: 4...20 mA (0...20 mA) Repeater power supply operation: 4...20 mA	Input isolator operation: 4...20 mA (0...20 mA) Repeater power supply operation: 4...20 mA
OUT	Input isolator operation: 4...20 mA (0...20 mA) active/passive Repeater power supply operation: 4...20 mA active/passive	Input isolator operation: 4...20 mA (0...20 mA) active/passive, 1...5 V (0...5 V) Repeater power supply operation: 4...20 mA active/passive, 1...5 V can be set via DIP switch	Input isolator operation: 4...20 mA (0...20 mA) active Repeater power supply operation: 4...20 mA active
Design width	12.5 mm	17.5 mm	12.5 mm
Screw connection	MACX MCR-EX-SL-RPSSI-I 2865340	MACX MCR-EX-SL-RPSSI-I-UP 2865793	MACX MCR-EX-SL-RPSSI-2I 2865366
Spring-cage connection	MACX MCR-EX-SL-RPSSI-I-SP 2924016	MACX MCR-EX-SL-RPSSI-I-UP-SP 2924029	MACX MCR-EX-SL-RPSSI-2I-SP 2924236
	Analog OUT	Temperature	Temperature
	<p>Output isolating amplifier HART-compatible</p>	<p>Universal temperature transducer, with limit value relay, configurable</p>	<p>Universal temperature transducer, with three limit value relays, configurable</p>
IN	4...20 mA (0...20 mA)	RTD: PT 10...PT 10,000, Ni 10...Ni 10,000, Cu10, Cu53, KTY TC: Type B, E, J, K, N, R, S, T, L, U, C, D, A-1, A-2, A-3, M, L Potentiometer: 0...50 kOhm linear resistance: 0...50 kOhm configurable via IFS-CONF or IFS-OP-UNIT	RTD: PT 10...PT 10,000, Ni 10...Ni 10,000, Cu10, Cu53, KTY TC: Type B, E, J, K, N, R, S, T, L, U, C, D, A-1, A-2, A-3, M, L Potentiometer: 0...50 kOhm linear resistance: 0...50 Ohm configurable via IFS-CONF or IFS-OP-UNIT
OUT	4...20 mA (0...20 mA)	analog: 0...20 mA/-10...+10 V (freely scalable) digital: 1 PDT relay configurable via IFS-CONF or IFS-OP-UNIT	analog: 0...20 mA/-10...+10 V (freely scalable) digital: 3 PDT relays configurable via IFS-CONF or IFS-OP-UNIT
Design width	12.5 mm	17.5 mm	35.0 mm
Screw connection	MACX MCR-EX-SL-IDS-I 2865405	MACX MCR-EX-T-UI-UP 2865654	MACX MCR-EX-T-UIREL-UP 2865751
Spring-cage connection	MACX MCR-EX-SL-IDS-I-SP 2924032	MACX MCR-EX-T-UI-UP-SP 2924689	MACX MCR-T-UIREL-UP-SP 2924799



MACX Analog Ex – the complete range

	Temperature	Temperature	Digital IN
	<p>Temperature transducer for RTD sensors, configurable</p>	<p>Temperature transducer for TC sensors, configurable</p>	<p>NAMUR isolation amplifier, 1-channel, PDT output</p>
IN	RTD: PT 50, PT 100, PT 200, PT 500, PT 100S, PT 500S, Ni100, Ni500, Cu50 Potentiometer: 0...2000 Ohm linear resistance: 0...2000 Ohm configurable via IFS-CONF	TC: Type E, J, K, N, L, Voltages: -20 mV...70 mV configurable via IFS-CONF	NAMUR sensors, dry contacts
OUT	0...20 mA / 4...20 mA configurable via IFS-CONF	0...20 mA / 4...20 mA configurable via IFS-CONF	1 relay (PDT), 250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A) Switching behavior can be configured via DIP switch
Design width	12.5 mm	12.5 mm	12.5 mm
Screw connection	MACX MCR-EX-SL-RTD-I-NC 2865573	MACX MCR-EX-SL-TC-I-NC 2865586	MACX MCR-EX-SL-NAM-R 2865434
Spring-cage connection	MACX MCR-EX-SL-RTD-I-SP-NC 2924168		MACX MCR-EX-SL-NAM-R-SP 2924045
	Digital IN	Digital IN	Digital IN
	<p>NAMUR isolation amplifier, 1-channel, N/O contact outputs</p>	<p>NAMUR isolation amplifier, 2-channel, N/O contact outputs</p>	<p>NAMUR isolation amplifier, 2-channel, PDT outputs</p>
IN	NAMUR sensors dry contacts	NAMUR sensors dry contacts	NAMUR sensors dry contacts
OUT	2 relays (N/O contacts), 250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A) Switching behavior can be configured via DIP switch	2 relays (N/O contacts), 250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A) Switching behavior can be configured via DIP switch	2 relays (PDT), 250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A) Switching behavior can be configured via DIP switch
Design width	12.5 mm	12.5 mm	17.5 mm
Screw connection	MACX MCR-EX-SL-NAM-2RO 2865450	MACX MCR-EX-SL-2NAM-RO 2865476	MACX MCR-EX-SL-2NAM-R-UP 2865984
Spring-cage connection	MACX MCR-SL-EX-NAM-2RO-SP 2924061	MACX MCR-EX-SL-2NAM-RO-SP 2924087	MACX MCR-EX-SL-2NAM-R-UP-SP 2924249



The DIN rail connector enables the modular bridging of the 24 V supply voltage.



Variants with universal power supply for global power supply networks (MACX MCR-...-UP).



MACX Analog Ex – the complete range

	Digital IN	Digital IN	Digital OUT
	<p>NAMUR isolation amplifier, 1-channel, transistor outputs</p>	<p>NAMUR isolation amplifier, 2-channel, transistor outputs</p>	<p>Solenoid driver Current limitation at 25 mA</p>
IN	NAMUR sensors Dry contacts	NAMUR sensors Dry contacts	20...30 V DC/10...70 mA DC (45 mA at $U_e = 24$ V DC)
OUT	2 transistor outputs, passive 30 V DC/5 mA Switching frequency: max. 5 kHz Switching behavior can be configured via DIP switch	2 transistor outputs, passive 30 V DC/5 mA Switching frequency: max. 5 kHz Switching behavior can be configured via DIP switch	5.5 V DC (at 25 mA) Current limitation: 25 mA Non-load voltage: 21.9 V DC Internal resistance: 641 Ω
Design width	12.5 mm	12.5 mm	12.5 mm
Screw connection	MACX MCR-EX-SL-NAM-2T 2865463	MACX MCR-EX-SL-2NAM-T 2865489	MACX MCR-EX-SL-SD-21-25-LP 2865492
Spring-cage connection	MACX MCR-EX-SL-NAM-2T-SP 2924074	MACX MCR-EX-SL-2NAM-T-SP 2924090	MACX MCR-EX-SL-SD-21-25-LP-SP 2924113
	Digital OUT	Digital OUT	Digital OUT
	<p>Solenoid driver Current limitation at 40 mA</p>	<p>Solenoid driver Current limitation at 48 mA</p>	<p>Solenoid driver Current limitation at 58 mA</p>
IN	20...30 V DC/10...95 mA DC (65 mA at $U_e = 24$ V DC)	20...30 V DC/10...95 mA DC (75 mA at $U_e = 24$ V DC)	20...30 V DC/10...105 mA DC (95 mA at $U_e = 24$ V DC)
OUT	10 V DC (at 40 mA) Current limitation: 40 mA Non-load voltage: 21.9 V DC Internal resistance: 287 Ω	10.5 V DC (at 48 mA) Current limitation: 48 mA Non-load voltage: 24 V DC Internal resistance: 276 Ω	12.9 V DC (at 58 mA) Current limitation: 58 mA Non-load voltage: 21.9 V DC Internal resistance: 133 Ω
Design width	12.5 mm	12.5 mm	12.5 mm
Screw connection	MACX MCR-EX-SL-SD-21-40-LP 2865764	MACX MCR-EX-SL-SD-24-48-LP 2865609	MACX MCR-EX-SL-SD-21-60-LP 2865515
Spring-cage connection	MACX MCR-EX-SL-SD-21-40-LP-SP 2924139	MACX MCR-EX-SL-SD-24-48-LP-SP 2924126	MACX MCR-EX-SL-SD-21-60-LP-SP 2924100



Accessories for MACX Analog



Operator interface

IFS-OP-UNIT

Order No.: 2811899

For process value display and parameterization

- Can be plugged directly onto 35 mm devices and the IFS-OP-CRADLE adapter unit



Adapter unit for operator interface

IFS-OP-CRADLE

Order No.: 2811886

Adapter for IFS-OP-UNIT to connect to 17.5 mm/35 mm modules and for use as a remote display unit



Power and error message module

MACX MCR-PTB

Order No.: 2865625 (screw connection)

MACX MCR-PTB-SP

Order No.: 2924184 (spring-cage connection)

- Input voltage
 U_{IN} : 19.2...30 V DC
- Output voltage
 U_{OUT} : U_{IN} - max. 0.8 V, at 3.75 A
- Error message - PDT relay

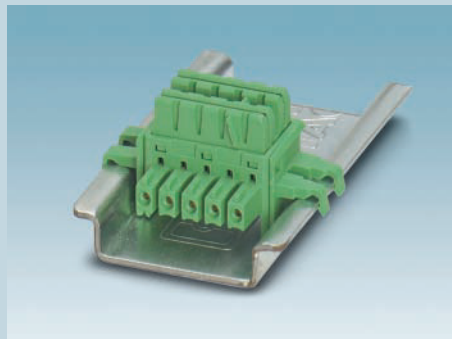


Programming adapter

MACX-USB-PROG-ADAPTER

Order No.: 2811271

For programming the software with the MACX-MCR-CONF software



DIN rail connector

ME 6,2 TBUS-2 1,5/5-ST-3.81 GN

Order No.: 2869728

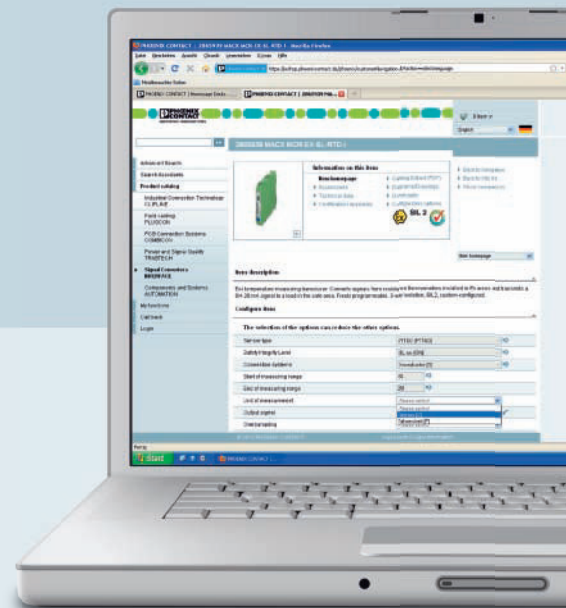
For direct supply via any MACX Analog device or for supply via a power and error message module with the same shape

Order configuration

You can order your desired device configuration easily and flexibly:

- using order keys from the catalog
- in the user-guided e-shop

www.phoenixcontact.net/catalog



Termination Carriers – Consistent interface solutions for system technology

The compact termination carriers allow you to connect the MACX Analog devices to your automation system quickly and error-free. You can simply connect the signals – plug-and-play – using standardized system cables.

The following standard DIN rail devices are available for safe signal processing:

- Isolating amplifiers 6 mm – MINI Analog
- PSR-SIL coupling relays for process automation

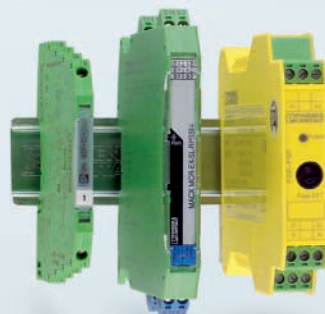
The termination carrier concept

- Stable gridless aluminum device profile with integrated DIN rail design to accommodate standard interfaces
- Protected by device profile PCBs – mechanically decoupled
- Integrated DIN rail attachment with end clamps
- Module connection via plug-in and coded cable sets
- Hood with labeling options

Your consistent interface solution for system technology

1. Selecting a standard module

Select the appropriate functions for signal processing from a wide range of standard DIN rail devices.



2. Termination carriers

Snap the standard modules onto the DIN rails integrated into the device profile. The connection to the termination carrier PCB is established quickly and safely thanks to plug-in and coded cable sets.





compact

For high packing density

- Saves up to 30 % of space due to compact design
- Space-saving connection points
- Integrated end clamps

robust

For high system availability

- Stable, vibration-resistant aluminum carrier device profile
- Mechanically decoupled termination PCB
- Passive PCB without active components
- Redundant supply and monitoring electronics in a separate DIN rail module

easy maintenance

For simplified documentation and startup

- Use of standard DIN rail devices
- Easy access to connection points
- Module replacement during operation (hot swap)
- Pre-assembled system cabling with front adapter

flexible

For optimum adaptation

- Gridless profile lengths for controller-specific number of I/Os
- Different system plug types, even redundant
- Horizontal and vertical mounting



3. Front adapter with system cable

The devices are connected to controller-specific I/O modules via high-position system cables. These enable connections via standardized or controller-specific systems.

ABB
Emerson
Honeywell
Invensys
Siemens
Yokogawa
and more...



Accessories for MACX Analog – universal termination carriers



**MACX Analog Ex –
SIL isolating amplifiers**

TC-D37SUB-ADIO16-EX-P-UNI

Order No.: 2924854

- For 16 MACX Analog Ex devices + 1 x power module
- with 1:1 pinning on DSUB37

TC-D37SUB-AIO16-EX-PS-UNI

Order No.: 2902932

- For 16 MACX Analog Ex devices + 1 x power module
- with 1:1 pinning on DSUB37
- additional option of HART decoupling



**MINI Analog –
Ultra-compact isolating amplifiers**

TC-D37SUB-ADIO16-M-P-UNI

Order No.: 2902933

- For 16 MINI Analog devices + 1 x power module and 1 x feed-through terminal block
- with 1:1 pinning on DSUB37

TC-D37SUB-AIO16-M-PS-UNI

Order No.: 2902934

- For 16 MINI Analog devices + 1 x power module and 1 x feed-through terminal block
- with 1:1 pinning on DSUB37
- additional option of HART decoupling



PSR – SIL coupling relays

TC-2D37SUB-DO16-ESD-AR-UNI

Order No.: 2902913

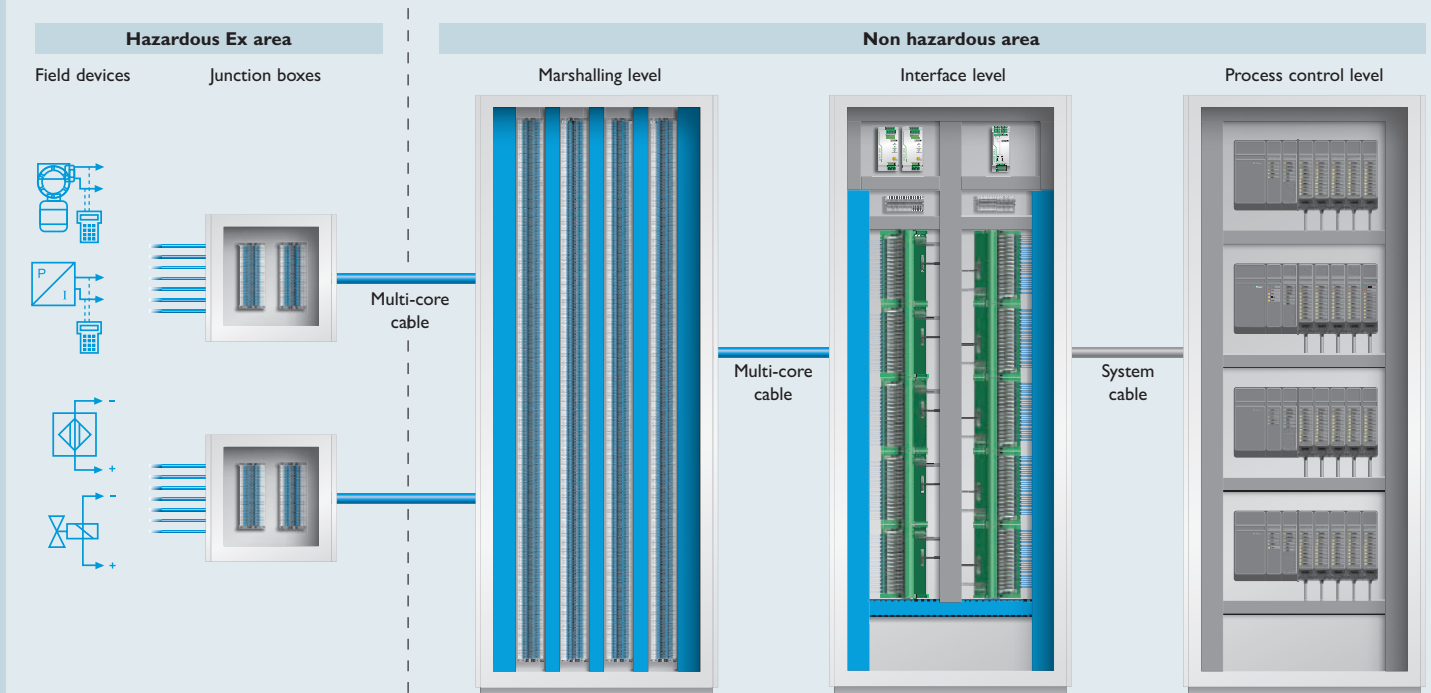
- For 16 PSR coupling relays, for safe interruption of circuits
- with 1:1 pinning on DSUB37

TC-2D37SUB-DO16-F&G-AR-UNI

Order No.: 2902914

- For 16 PSR coupling relays, for safe switching on of circuits
- with 1:1 pinning on DSUB37

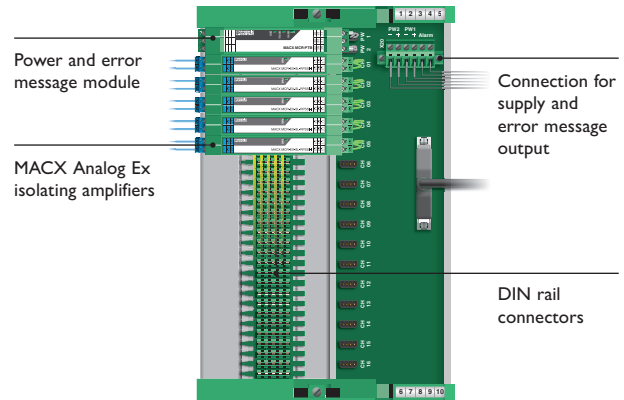
Diagram of typical system with point-to-point wiring



Modular power concept – for high availability

The isolating amplifiers are connected to a power module and error message module via the integrated DIN rail connectors. This provides redundant supply and monitoring electronics in a separate device.

As such, the PCB is terminated in a passive manner – it does not contain active components whose failure would require the replacement of the termination carrier.



i

Alongside universal termination carriers, versions are also available which are tailored to I/O modules for different automation systems.

Please contact us for more information.

Space-saving and quick to install

The compact termination carrier solution enables you to integrate up to 384 signals in one 80 x 200 cm control cabinet – when using 2-channel MACX Analog Ex devices.

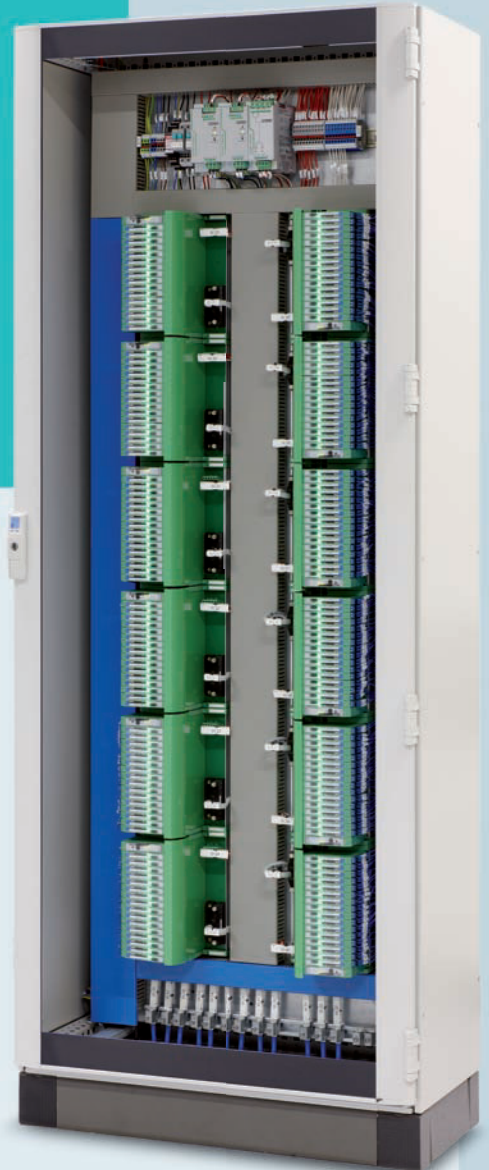
Experience fast and problem-free mounting and startup with pre-assembled system cables.

Efficient signal connection with MACX Analog Ex

Normally, measurement and control circuits are designed with Ex i intrinsically safety protection for use in process technology environments where potentially explosive atmospheres can occur. MACX Analog Ex i isolating amplifiers and measuring transducers isolate intrinsically safe from non-intrinsically

safe circuits at the Interface level and safely limit the energy supplied to the Ex area. Furthermore, they handle extensive signal conditioning tasks.

In the hazardous Ex area, cables from intrinsically safe field devices are grouped together via junction boxes to form shielded multi-core cables. In the non-hazardous area, they are then routed via the marshalling level to the interface level. From there, the isolating amplifiers are individually wired with the corresponding I/O cards. The significant amount of time needed for installation and startup is greatly reduced by the termination carrier, thanks to the use of plug and play system cables.





Always up-to-date, always available to you. Here you'll find everything on our products, solutions and service:

phoenixcontact.net

Product range

- Cables and connectors
- Controllers and PLCs
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- Electronic reversing contactors and motor control
- Electronics housing
- Ethernet networks
- Fieldbus components and systems
- Functional safety
- HMIs and Industrial PCs
- I/O systems
- Industrial communication technology
- Industrial lighting
- Installation and mounting material
- Marking and labeling
- Measurement and control technology
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- PCB Terminal Blocks and PCB Connectors
- Plug connectors
- Protective devices
- Relays
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- Software
- Surge protection devices
- System cabling for DCS and PLC
- Tools
- Wireless data communication

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