

EEM-MA770-PN - Measuring device



2907946

<https://www.phoenixcontact.com/us/products/2907946>

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Multifunctional energy measuring device with integrated Modbus/TCP and PROFINET interface for measuring electrical parameters in low-voltage installations up to 690 V. ([phoenixcontact.com/empro-help](https://www.phoenixcontact.com/empro-help))

Product description

The multifunctional EMpro energy measuring devices acquire your energy data and offer numerous options for communicating the data to higher-level control and management systems. Configure and integrate your energy measuring devices in just a few steps using the web-based, user-guided installation wizard. In addition, benefit from many practice-oriented web server and device functions.

Your advantages

- Energy measurement in just three steps with the intuitive installation wizard
- Easy commissioning and service with intelligent web server and display functions
- Data protection through the targeted deactivation of key configuration functions and interfaces
- Fast integration into control and management systems with future-oriented communication solutions and digital services

Commercial data

| | |
|--------------------------------------|---------------|
| Item number | 2907946 |
| Packing unit | 1 pc |
| Minimum order quantity | 1 pc |
| Sales key | C446 |
| Product key | CMMC21 |
| GTIN | 4055626260372 |
| Weight per piece (including packing) | 511.85 g |
| Weight per piece (excluding packing) | 428.77 g |
| Customs tariff number | 90303100 |
| Country of origin | DE |

Technical data

Product properties

| | |
|-------------------------|-------------------------|
| Product type | Energy measuring device |
| Product family | EMpro |
| Number (Ethernet ports) | 3 |

Display

| | |
|--------------|---|
| Display type | LCD display, backlit, 2-color, multi-line |
|--------------|---|

Electrical properties

| | |
|---|---|
| Maximum power dissipation for nominal condition | 10 VA |
| Mains type | 3-phase (3 or 4-conductor), 2-phase (2-conductor), and single-phase (1-conductor) |

Electrical isolation

| | |
|------------------|-----------------------|
| Test voltage | 4 kV AC (50 Hz, 60 s) |
| Pollution degree | 2 |
| Insulation | Reinforced insulation |

Electrical isolation Housing against all potentials IEC 61010-1

| | |
|-----------------------|-----------------------|
| Standards/regulations | IEC 61010-1 |
| Overvoltage category | III (300 V AC) |
| | II (600 V AC) |
| Insulation | Reinforced insulation |

Electrical isolation Supply against all other potentials IEC 61010-1

| | |
|-----------------------|-----------------------|
| Standards/regulations | IEC 61010-1 |
| Overvoltage category | III (300 V AC) |
| | II (600 V AC) |
| Insulation | Reinforced insulation |

Electrical isolation Voltage measurement input against all other potentials IEC 61010-2-030

| | |
|-----------------------|-----------------------|
| Standards/regulations | IEC 61010-2-030 |
| Measuring category | III (300 V AC) |
| | II (600 V AC) |
| Insulation | Reinforced insulation |

Electrical isolation Current measurement input against all other potentials

| | |
|------------|-----------------------|
| Insulation | Functional insulation |
|------------|-----------------------|

Electrical isolation Digital I/Os

| | |
|------------|-----------------------|
| Insulation | Functional insulation |
|------------|-----------------------|

Electrical isolation Communication interface

| | |
|------------|-----------------------|
| Insulation | Functional insulation |
|------------|-----------------------|

Supply

| | |
|----------------------|--------------------------------------|
| Supply voltage range | 100 V AC ... 400 V AC ($\pm 20\%$) |
| | 150 V DC ... 250 V DC ($\pm 20\%$) |
| Power consumption | ≤ 4 W |
| Nominal frequency | 50 Hz ... 60 Hz (AC sine) |

Input data

Measuring data acquisition

| | |
|---|--|
| Measuring principle | True r.m.s. value measurement (seamless) |
| Frequency measuring range (Fundamental component) | 45 Hz ... 65 Hz |
| Measured value | AC sine (50 Hz/60 Hz) |
| Scanning rate | 12,8 kHz (50 Hz) / 15,4 kHz (60 Hz) |
| Number of periods | 10 (true RMS value at 50 Hz) |
| | 12 (true RMS value at 60 Hz) |
| Acquisition of harmonics | up to 63rd harmonic |

Measurement: Voltage

| | |
|---|--|
| Input name | Voltage measuring input V1, V2, V3 |
| Input voltage range direct | 18 V AC ... 690 V AC (Phase/Phase) |
| | 11 V AC ... 400 V AC (Phase/neutral conductor) |
| Input voltage range via external transformers | 60 V AC ... 2000000 V AC (primary) |
| | 60 V AC ... 400 V AC (secondary) |
| Surge voltage capacity | 760 V AC (Phase/Phase) |
| Precision | 0.2 % |
| Power consumption | < 0.5 VA |

Measurement: Current

| | |
|---|-------------------------------------|
| Input name | Current measurement I1, I2, I3 |
| Input current | 1 A (secondary) |
| | 5 A (secondary) |
| Measuring range | 1 A ... 20000 A (primary) |
| Overload capacity | 6 A (I_{max}) |
| Response threshold from measuring range nominal value | 10 mA (1 A) |
| | 50 mA (5 A) |
| Precision | 0.2 % |
| Current overload | 50 A for 1 s |
| | 20 A ($4 \times I_N$, continuous) |
| Power consumption | < 0.5 VA |

Measurement: Power

| | |
|-------------------------------|-------------|
| Precision | 0.5 % |
| Active energy (IEC 62053-22) | Class 0.5 S |
| Reactive power (IEC 62053-23) | Class 2 |
| ANSI C12.20 | Class 0.5 S |

Digital

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| | |
|--------------------------|--|
| Description of the input | Digital input in accordance with IEC/EN 61131-2 (type 3) |
| Number | 1 |
| Voltage input signal | 24 V DC 0 V DC ... 30 V DC |
| Current input signal | 2 mA ... 15 mA |
| Protection | 250 mA (fast-blow) |
| Protective circuit | Protection against incorrect DC connection (max. 30 V) |

Output data

Digital

| | |
|-----------------------|---|
| Output description | Digital output in accordance with IEC/EN 61131-2 (type 3) |
| Number | 1 |
| Current output signal | ≤ 100 mA |
| Voltage output signal | 24 V DC |
| Protection | 250 mA (fast-blow) |
| Protective circuit | Protection against incorrect DC connection (max. 30 V) |

Connection data

Current / voltage / supply

| | |
|----------------------------------|---|
| Connection method | Screw connection |
| Stripping length | 8 mm |
| Screw thread | M3 |
| Conductor cross-section rigid | 0.2 mm ² ... 6 mm ² |
| Conductor cross-section flexible | 0.2 mm ² ... 4 mm ² |
| Conductor cross-section AWG | 24 ... 10 |
| Tightening torque | 0.5 Nm ... 0.6 Nm |

Digital I/O / communication

| | |
|----------------------------------|--|
| Connection method | Screw connection |
| Stripping length | 7 mm |
| Screw thread | M3 |
| Conductor cross-section rigid | 0.14 mm ² ... 2.5 mm ² |
| Conductor cross-section flexible | 0.14 mm ² ... 1.5 mm ² |
| Conductor cross-section AWG | 26 ... 14 |
| Tightening torque | 0.5 Nm ... 0.6 Nm |

Interfaces

Data: Network interface

| | |
|------------------------|---------------------|
| Communication protocol | Modbus/TCP REST |
| Connection method | RJ45 |
| Transmission speed | 10 Mbps 100 Mbps |

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Data: Network interface

| | |
|------------------------|-------------|
| Communication protocol | PROFINET RT |
| Connection method | RJ45 |
| Number of connections | 2 |
| Note | CC-B |

Dimensions

Item dimensions

| | |
|--------|------------------------------|
| Width | 96 mm |
| Height | 96 mm |
| Depth | 89.8 mm |
| | 74.8 mm (Installation depth) |

Material specifications

| | |
|-------|-----------------|
| Color | gray (RAL 7042) |
|-------|-----------------|

Environmental and real-life conditions

Ambient conditions

| | |
|--|-------------------------------------|
| Degree of protection | IP20 (Housing) |
| | IP54 (Display with seal (included)) |
| Ambient temperature (operation) | -10 °C ... 55 °C |
| Ambient temperature (storage/transport) | -40 °C ... 70 °C |
| Altitude | ≤ 2000 m |
| Max. permissible relative humidity (operation) | ≤ 95 % (non-condensing) |

Approvals

CE

| | |
|-------------|--------------|
| Certificate | CE-compliant |
|-------------|--------------|

UL, USA/Canada

| | |
|----------------|---------------------------|
| Identification | UL/C-UL Listed UL 61010-1 |
|----------------|---------------------------|

UL data

| | |
|----------------|------------|
| Operating mode | Indoor use |
|----------------|------------|

Standards and regulations

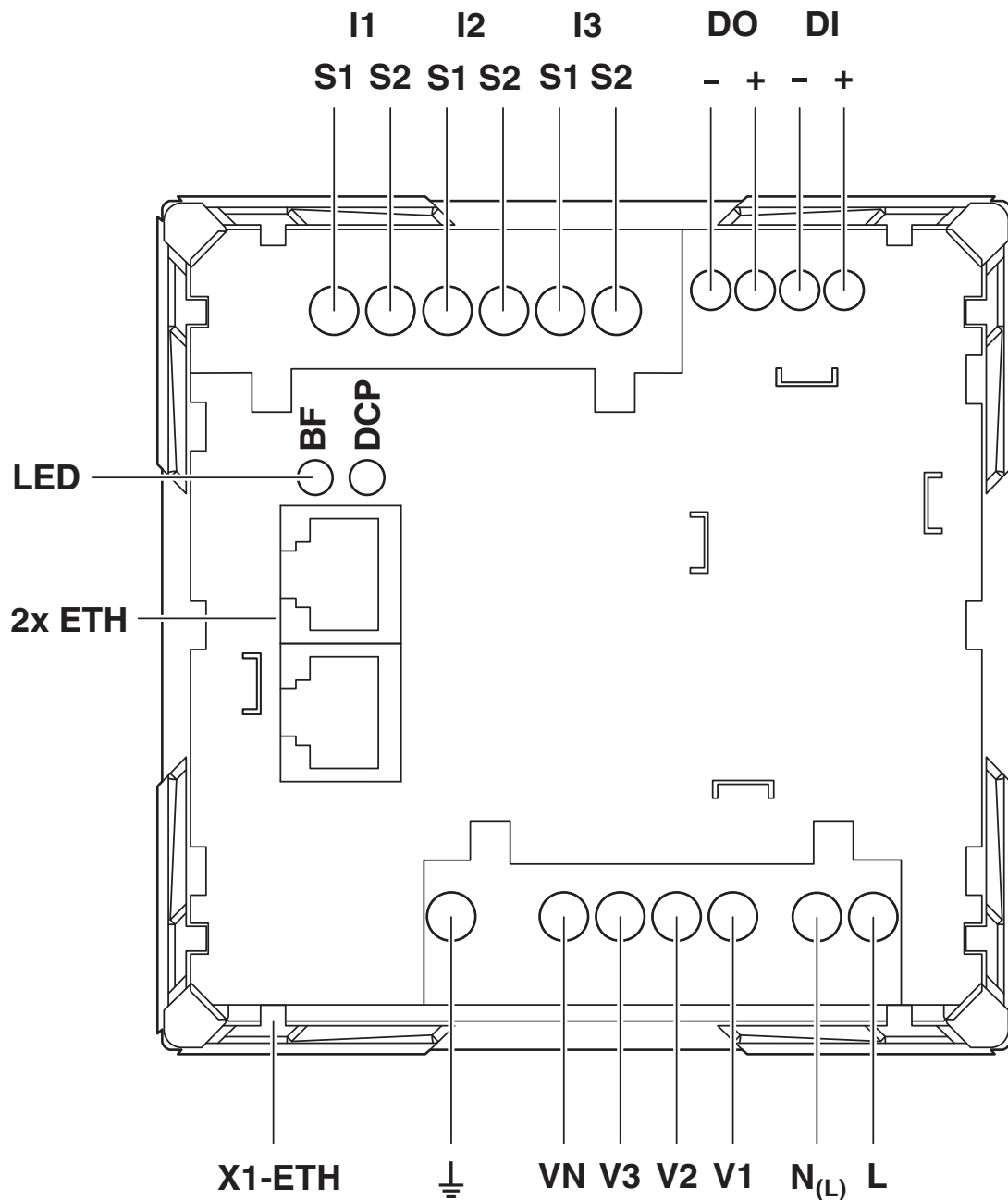
| | |
|-----------------------|--------------|
| Standards/regulations | IEC 61010-1 |
| | IEC 61326-1 |
| | IEC 61557-12 |

Mounting

| | |
|-------------------|--------------------------------------|
| Mounting type | Panel mount |
| Mounting position | Front panel installation, horizontal |

Drawings

Connection diagram



Connection assignment

Connection diagram



Network type: 3PH-4W-3CT

Connection diagram



Network type: 3PH-4W-1CT

Connection diagram



Network type: 3PH-3W-3CT

Connection diagram



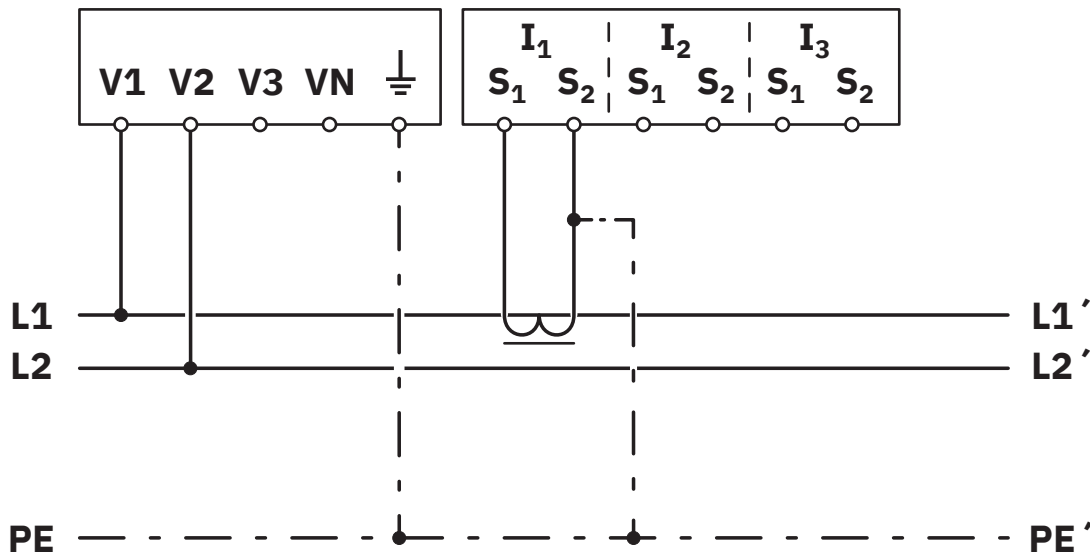
Network type: 3PH-3W-2CT

Connection diagram



Network type: 3PH-3W-1CT

Connection diagram



Network type: 2PH-2W-1CT

Connection diagram



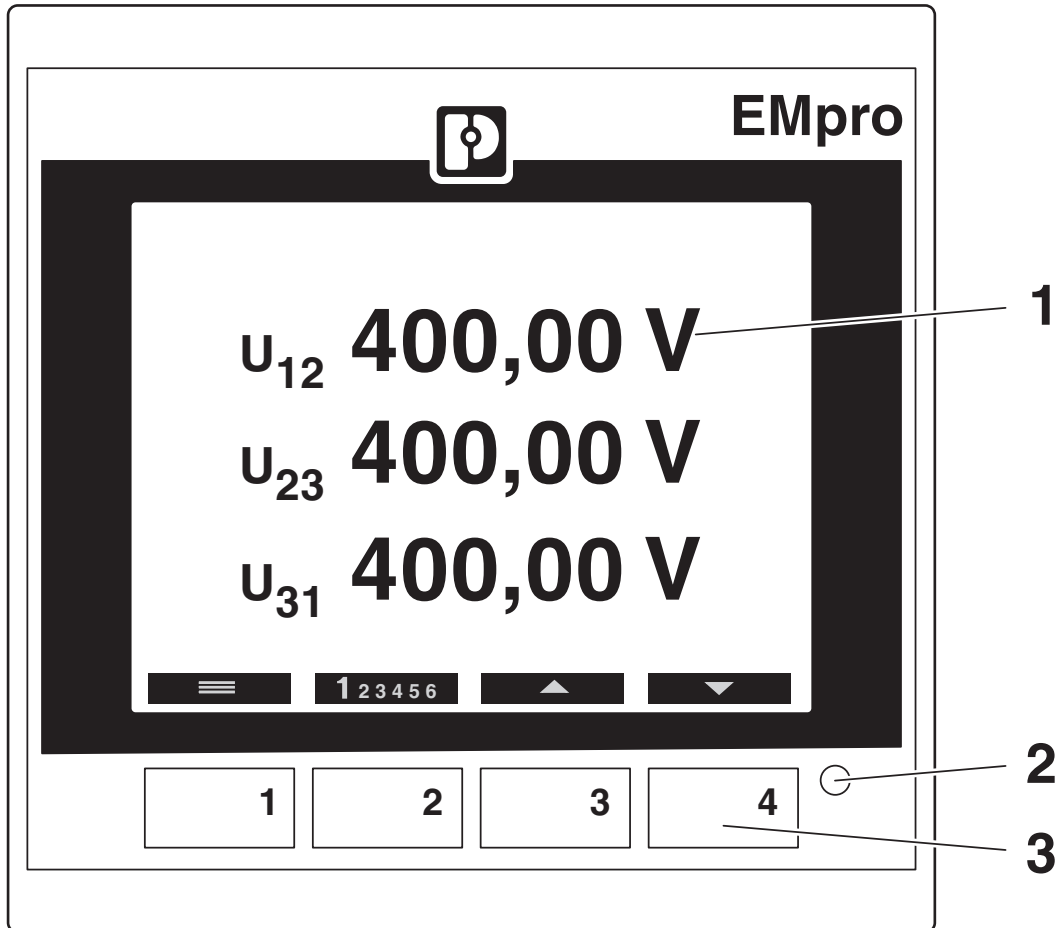
Network type: 2PH-3W-2CT

Connection diagram



Network type: 1PH-2W-1CT

Schematic diagram



Operating and indication elements

1 Backlit LCD

2 Pulse LED

3 Operating buttons for displaying measured values and for changing the configuration

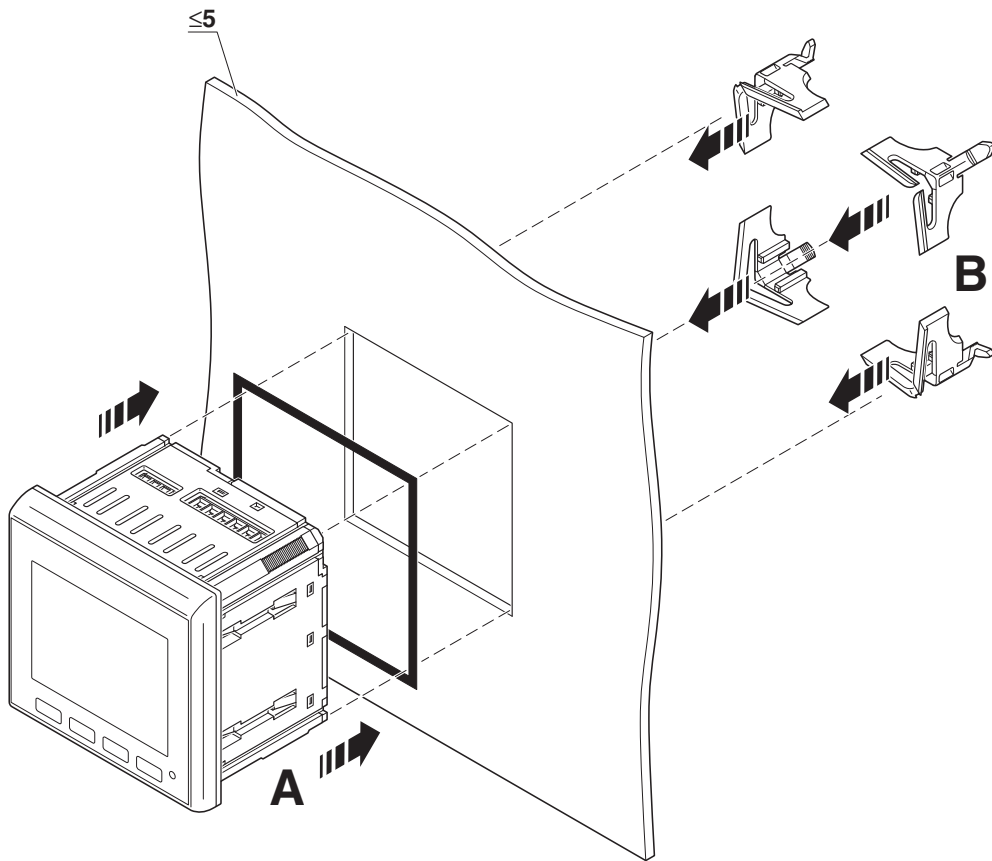
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Schematic diagram

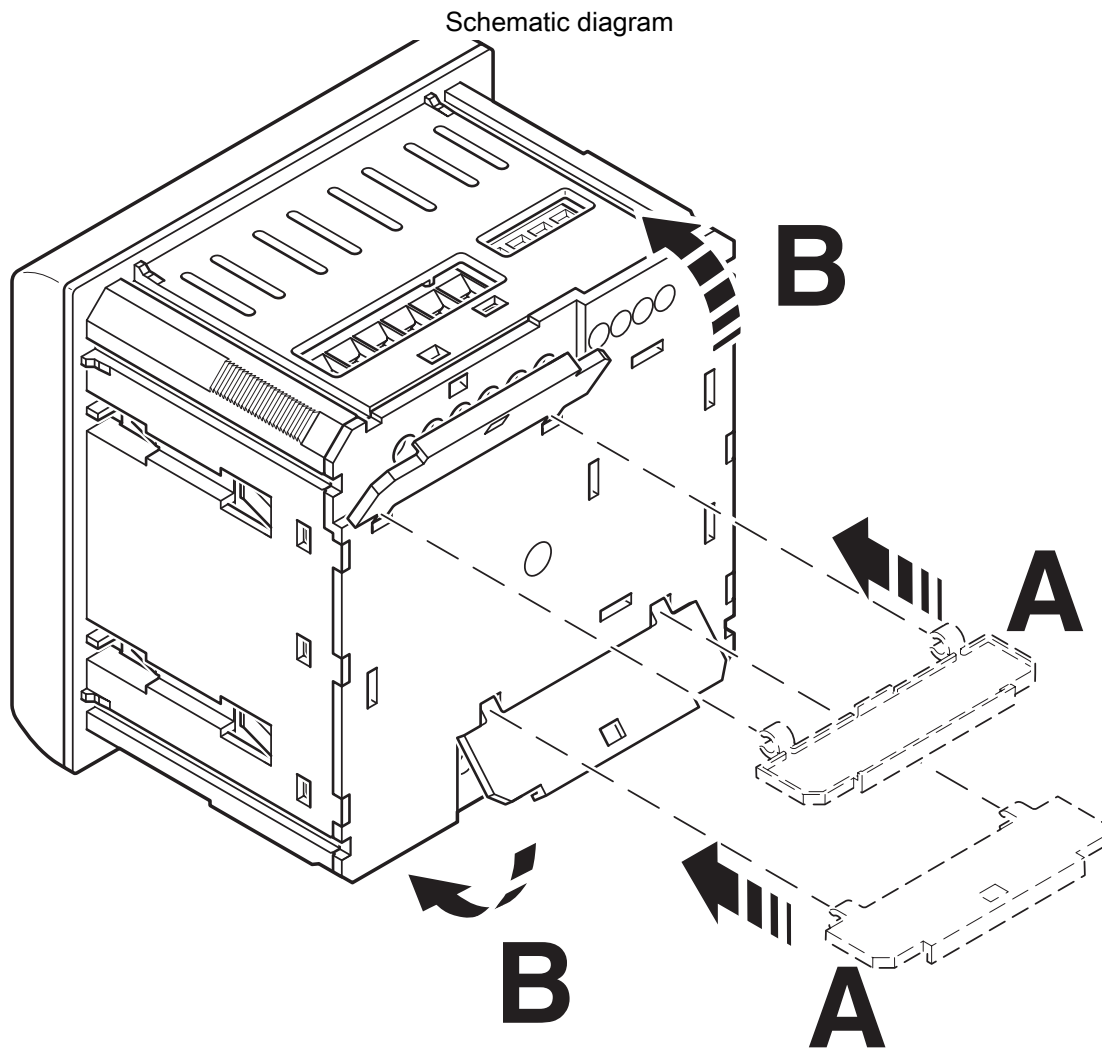


Mounting

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Approvals

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PROFINET

Approval ID: Z12426



cULus Listed

Approval ID: E357804-20191112

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Classifications

ECLASS

| | |
|-------------|----------|
| ECLASS-13.0 | 27142330 |
| ECLASS-15.0 | 27142330 |

ETIM

| | |
|-----------|----------|
| ETIM 10.0 | EC002301 |
|-----------|----------|

UNSPSC

| | |
|-------------|----------|
| UNSPSC 21.0 | 41113600 |
|-------------|----------|

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Environmental product compliance

EU RoHS

| | |
|---|--------------|
| Fulfills EU RoHS substance requirements | Yes |
| Exemption | 7(a), 7(c)-I |

China RoHS

| | |
|--|---|
| Environment friendly use period (EFUP) | EFUP-50 |
| | An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required. |

EU REACH SVHC

| | |
|-------------------------------------|--|
| REACH candidate substance (CAS No.) | Lead(CAS: 7439-92-1) |
| | Perfluorobutane sulfonic acid (PFBS) and its salts(CAS: n/a) |
| | 6,6'-di-tert-butyl-2,2'-methylenedi-p-cresol(CAS: 119-47-1) |
| SCIP | 07dea559-2a6a-4abc-af12-198d5da0423c |

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