

# EEM-MA770-R - Measuring device



2907944

<https://www.phoenixcontact.com/us/products/2907944>

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Multi-functional energy measuring device with integrated Modbus RTU/TCP 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	2907944
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	C446
Product key	CMMC21
GTIN	4055626261089
Weight per piece (including packing)	436.65 g
Weight per piece (excluding packing)	392.81 g
Customs tariff number	90303100
Country of origin	DE

## Technical data

### Product properties

Product type	Energy measuring device
Product family	EMpro
Number (Ethernet ports)	1

### Display

Display type	LCD display, backlit, 2-color, multi-line
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### 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 (reinforced insulation)	4 kV AC (50 Hz, 60 s)
Pollution degree	2

### 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
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### Electrical isolation Digital I/Os

Insulation	Functional insulation
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### Electrical isolation Communication interface

Insulation	Functional insulation
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### Supply

Supply voltage range	100 V AC ... 400 V AC ( $\pm 20\%$ )
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	150 V DC ... 250 V DC ( $\pm 20$ %)
Power consumption	$\leq 4$ 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

Description of the input	Digital input in accordance with IEC/EN 61131-2 (type 3)
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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 <sup>2</sup> ... 6 mm <sup>2</sup>
Conductor cross-section flexible	0.2 mm <sup>2</sup> ... 4 mm <sup>2</sup>
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 <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross-section flexible	0.14 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>
Conductor cross-section AWG	26 ... 14
Tightening torque	0.5 Nm ... 0.6 Nm

### RS-485

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
Conductor cross-section rigid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross-section flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross-section AWG	24 ... 12
Tightening torque	0.5 Nm ... 0.6 Nm

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## Interfaces

### Data: Network interface - Ethernet

Communication protocol	Modbus/TCP
	REST (HTTP)
Connection method	RJ45
Transmission speed	10 Mbps
	100 Mbps

### Data: Network interface - serial

Communication protocol	Modbus/RTU
Communication standard	RS-485
Connection method	Screw connection
Transmission speed range	2.4 kbps ... 115.2 kbps
Resistance	120 Ω (integrated)

## Dimensions

### Item dimensions

Width	96 mm
Height	96 mm
Depth	95 mm
	80 mm (Installation depth)

## Material specifications

Color	gray (RAL 7042)
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## Environmental and real-life conditions

### Ambient conditions

Degree of protection	IP20 (Housing)
	IP54 (Display with seal (included))
Ambient temperature (operation)	-25 °C ... 70 °C
Ambient temperature (storage/transport)	-30 °C ... 80 °C
Altitude	≤ 2000 m
Max. permissible relative humidity (operation)	≤ 95 % (non-condensing)

## Approvals

### CE

Certificate	CE-compliant
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### UL, USA/Canada

Identification	UL/C-UL Listed UL 61010-1
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### UL data

Operating mode	Indoor use
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## 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

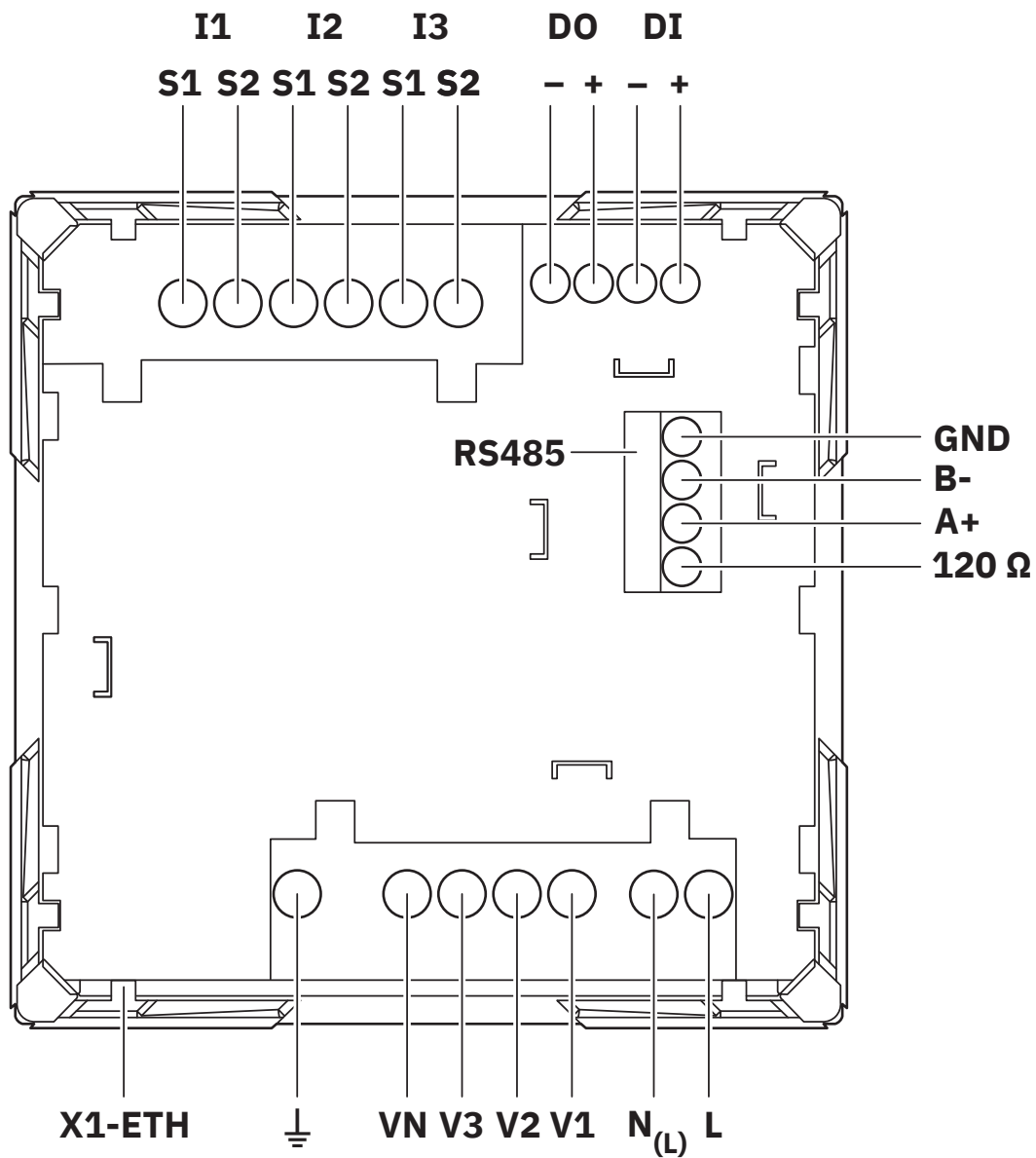
# EEM-MA770-R - Measuring device

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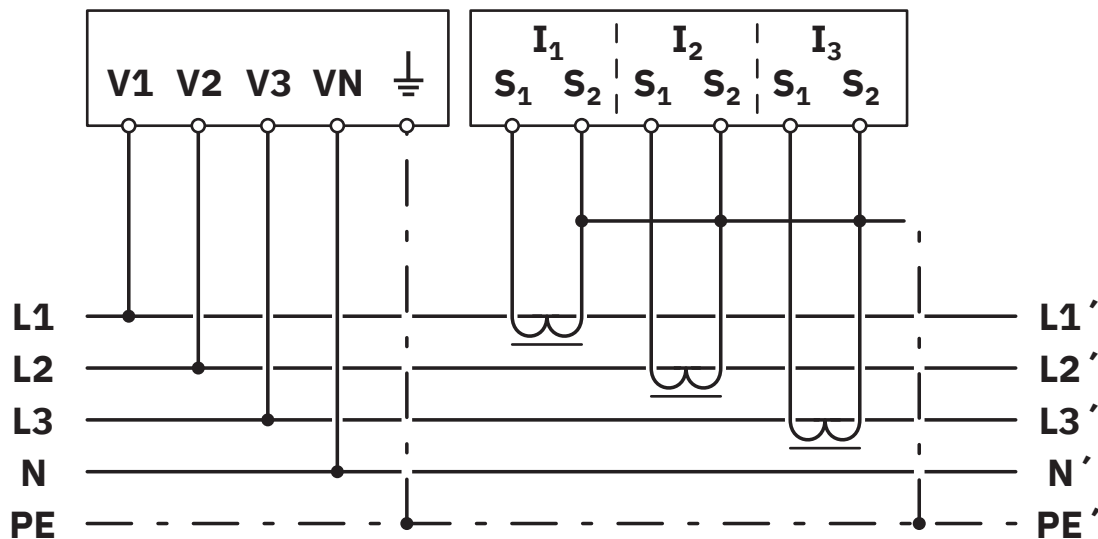
## Drawings

Connection diagram



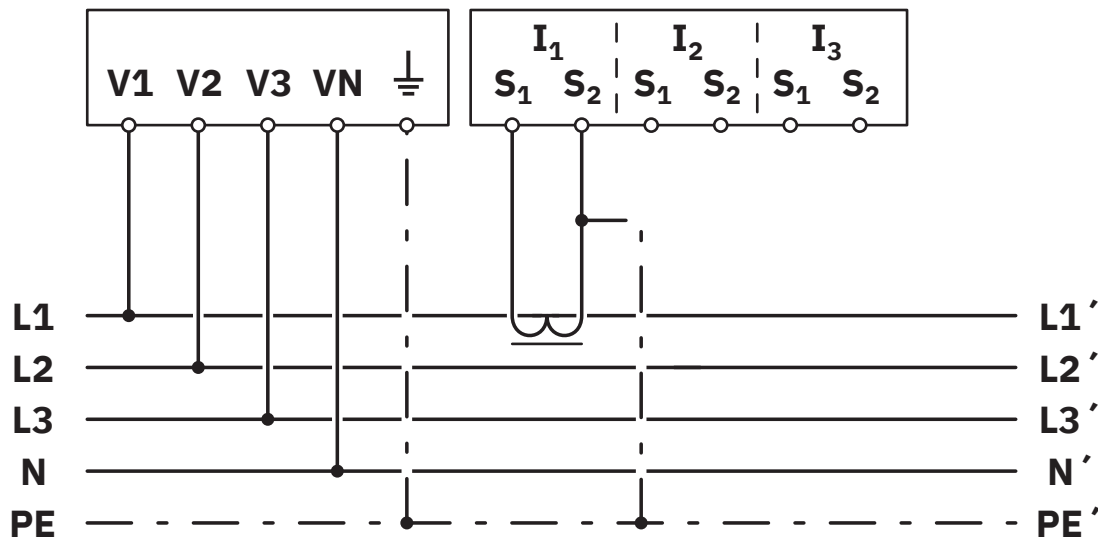
Connection assignment

Connection diagram



Network type: 3PH-4W-3CT

Connection diagram

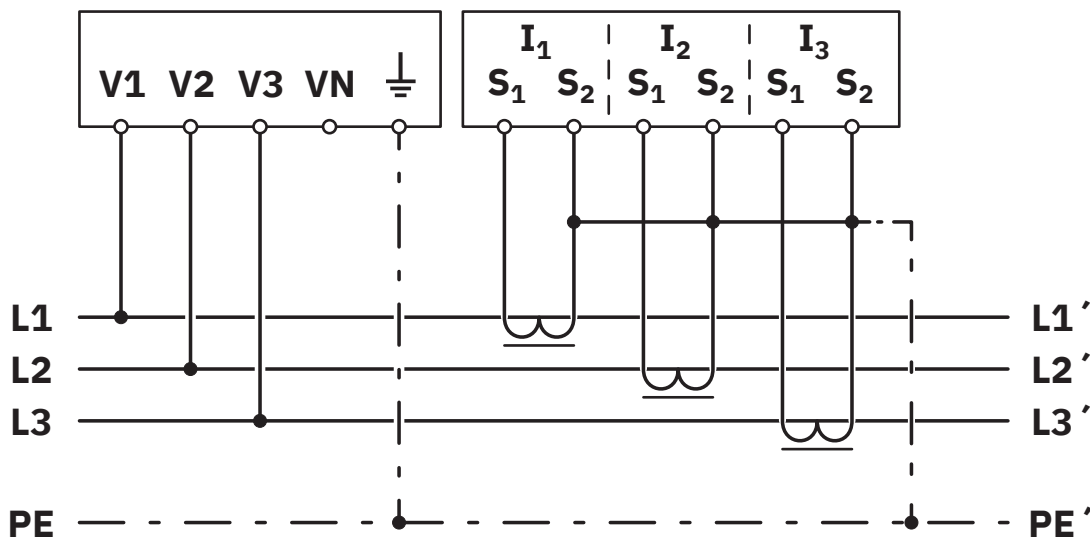


Network type: 3PH-4W-1CT

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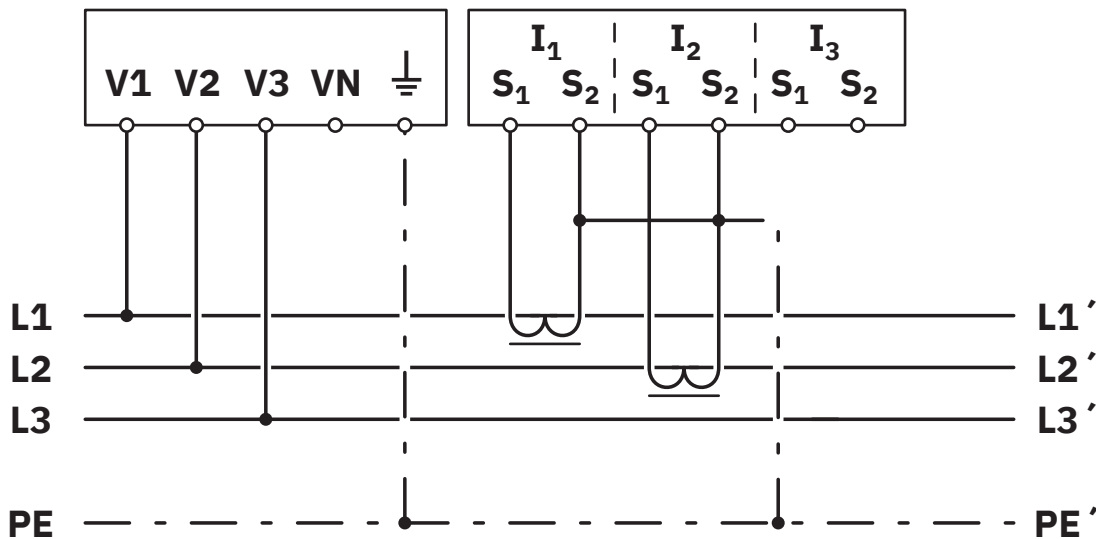
<https://www.phoenixcontact.com/us/products/2907944>

Connection diagram



Network type: 3PH-3W-3CT

Connection diagram

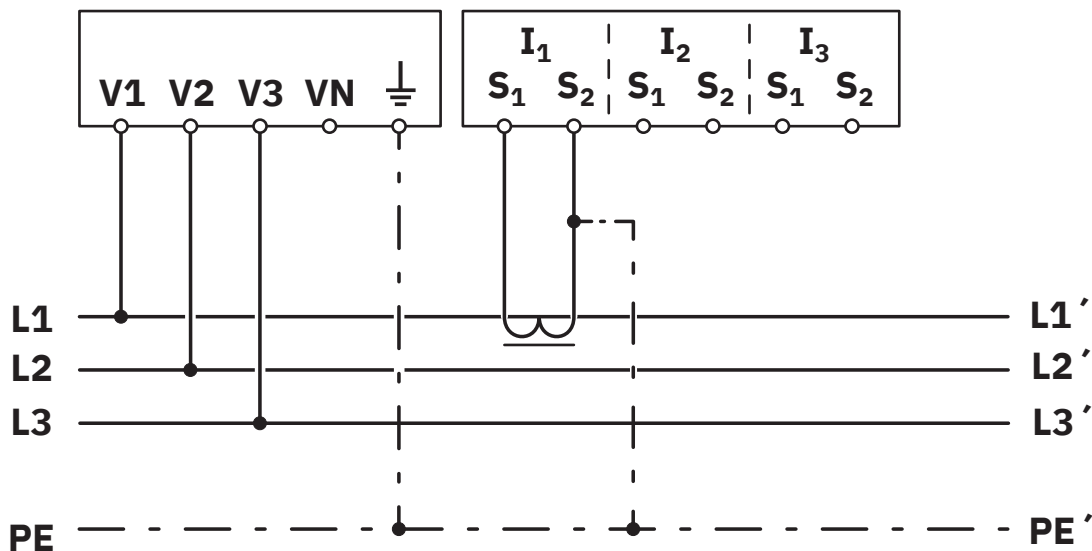


Network type: 3PH-3W-2CT

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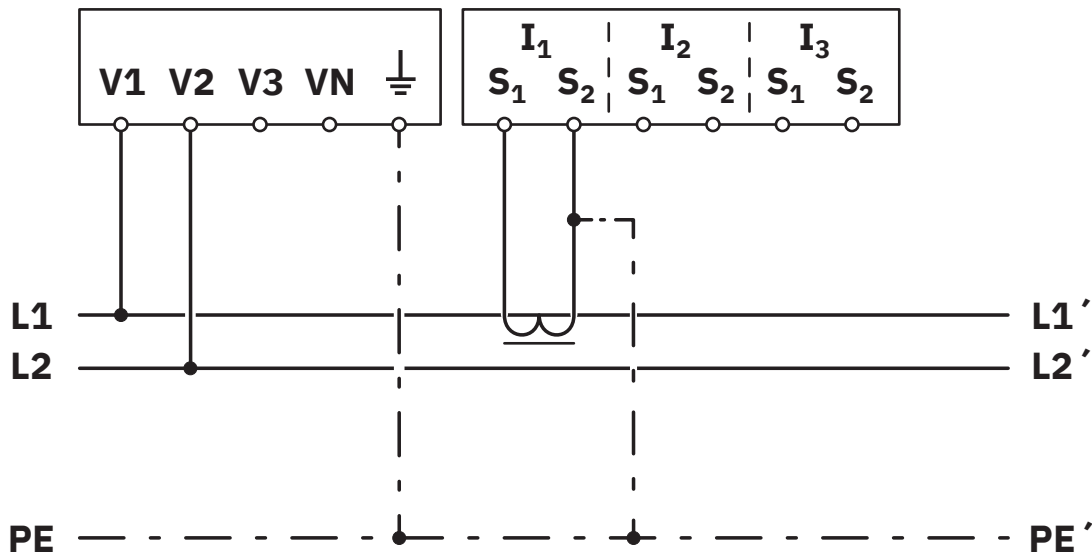
<https://www.phoenixcontact.com/us/products/2907944>

Connection diagram



Network type: 3PH-3W-1CT

Connection diagram

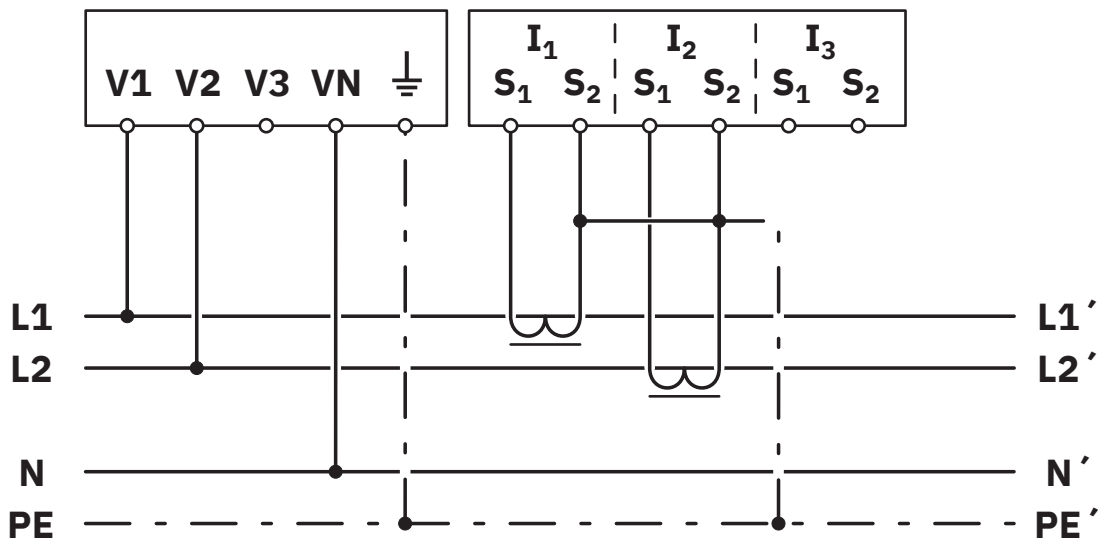


Network type: 2PH-2W-1CT

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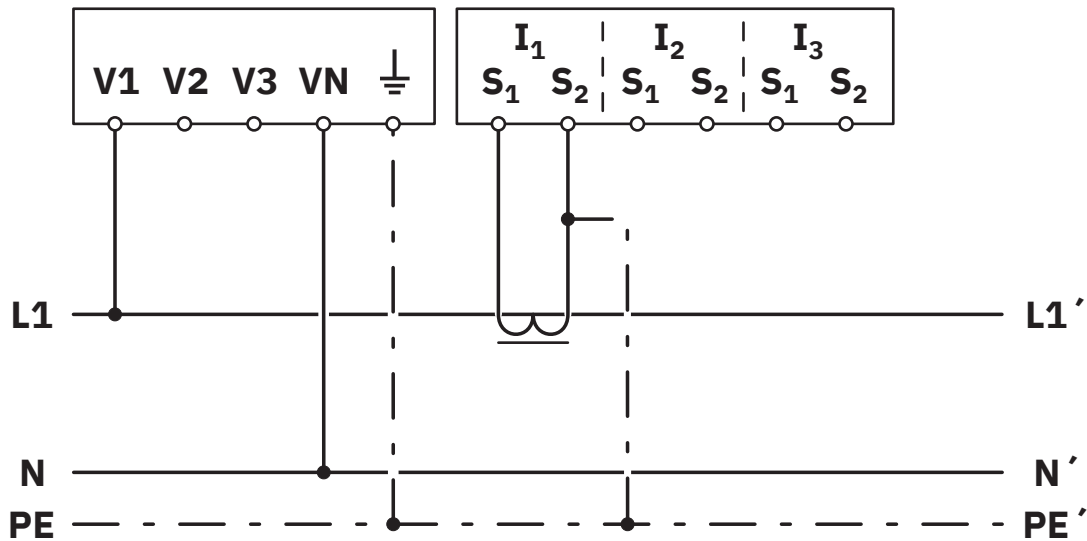
<https://www.phoenixcontact.com/us/products/2907944>

Connection diagram



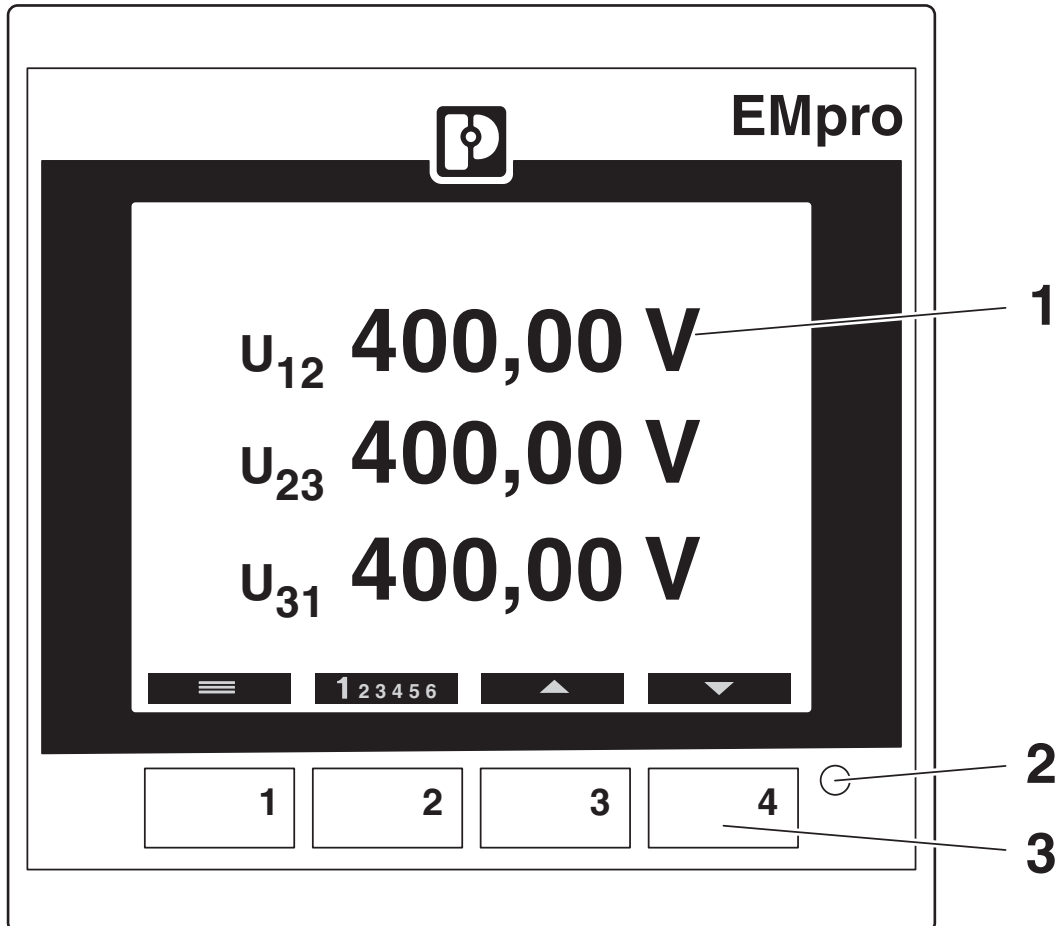
Network type: 2PH-3W-2CT

Connection diagram



Network type: 1PH-2W-1CT

Schematic diagram



Operating and indication elements

1 Backlit LCD

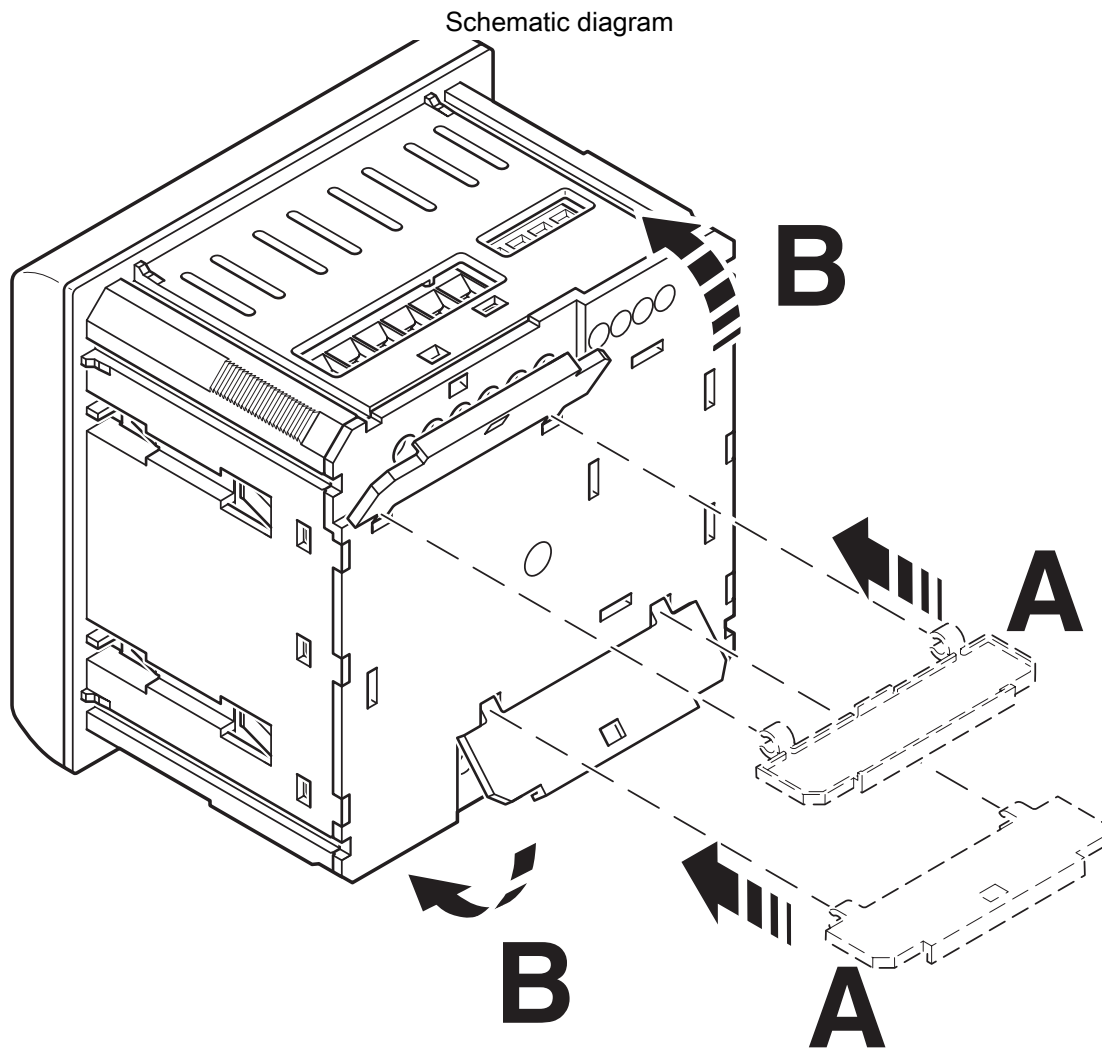
2 Pulse LED

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

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Mounting

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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2907944>



**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
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### 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	091c4bd8-4733-4f41-a7ec-e50e8e41a213

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