Energy meter

MRE-44S

MRE-44S/DC24V energy meter

- Comprehensive consumption data analysis in real time
- High resolution and accuracy (class 0.1)
  even in harmonically distorted grids
- Also analyses harmonics (optional, up to 50 kHz)
- Compatible with all popular transformer types
- Integrated web browser for application-compatible
  configuration and visualization
- Integration into distributed control systems via fieldbuses

MRE

Energy meter

Overview of features

Due to its compact size and the use of interface technologies such as Modbus TCP, the MRE is perfectly suited for use in installations with multiple loads that require monitoring. To do so, one meter is connected to each corresponding power terminal or load to be measured.

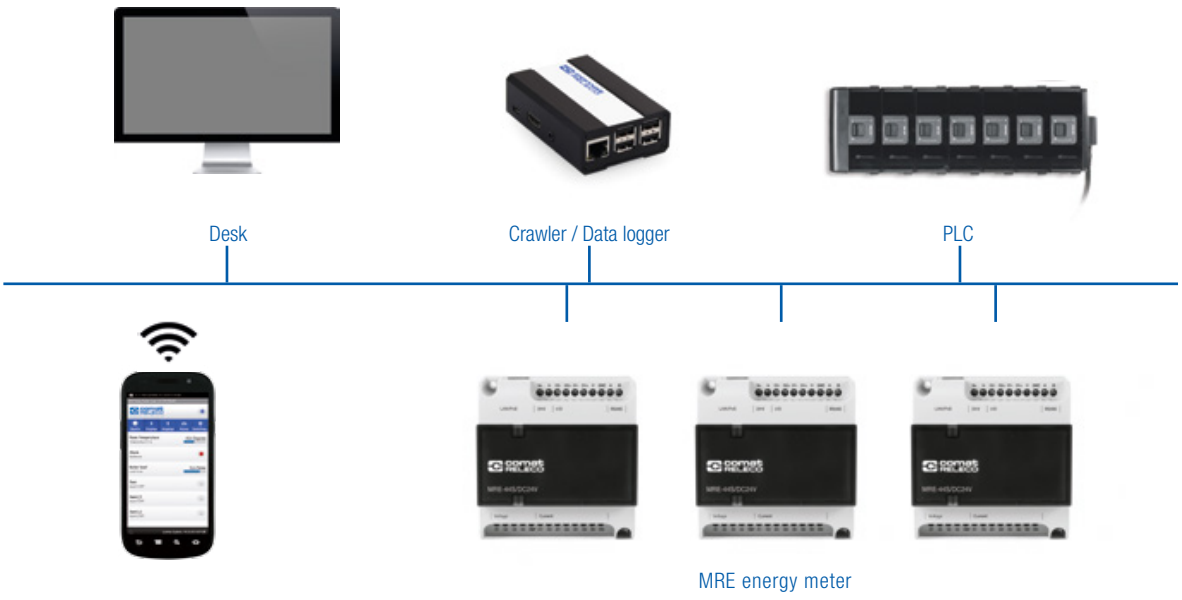
Thanks to precise measurements and sophisticated calculation processes, the MRE records highly precise values for the electrical quantities, regardless of the type of load or the grid situation (e.g. power electronics providers). It can be used in all conventional systems operating at 16.7 Hz, 50 Hz and 60 Hz.

As a result of the high accuracy grade (current 0.1, voltage 0.05) and numerous features that can be enabled – such as an expansion of the grid frequency range from 15 Hz to 400 Hz, a complete power quality analysis and the analysis of harmonics up to 50 kHz – it can be used flexibly for nearly all measuring tasks related to electrical infrastructure in industrial settings as well as office and administrative buildings.

- High-precision measuring, recording and archiving of all important electrical variables. For the identification of savings potentials and deviations in the context of energy management as per DIN EN ISO 50001.
- Monitoring of power quality (PQ) through complete PQ analysis and comprehensive recording of harmonics up to 50 kHz. Monitoring of individual loads or entire grids allows for the identification of PQ problems or the monitoring of critical components.
- Continuous management through an integrated web browser for visualisation and parameterisation. Quick access to all relevant data at all times via mobile devices or laptops, and without additional software.
- Sophisticated data recording via the data logger allows for long-term analyses in high resolution and can also be used for statistical data analysis and fault prognosis.

Areas of application	Key areas	Conformity / Standards
• Industry • Infrastructure • Testing devices • Service sector • Public sector	• Modular measurement for multiple outlets • Accuracy class 0.1 for electricity and 0.05 for voltage in accordance with IEC 61557-12 • High flexibility and intuitive operation • Plug and Play • PQ functionality in accordance with IEC 61000-4-30 via a software option PQ • Flickermeter in accordance with IEC 61000-4-15 • Records harmonics in current and voltage up to 50 kHz UP • Highly precise measurements in the additional frequency range of 15…400 Hz UP	• IEC 61557-12 • IEC 61000-4-15 • IEC 61000-4-30 • ISO 14025

Connectivity / Ethernet architecture



MRE

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Discovery Tool

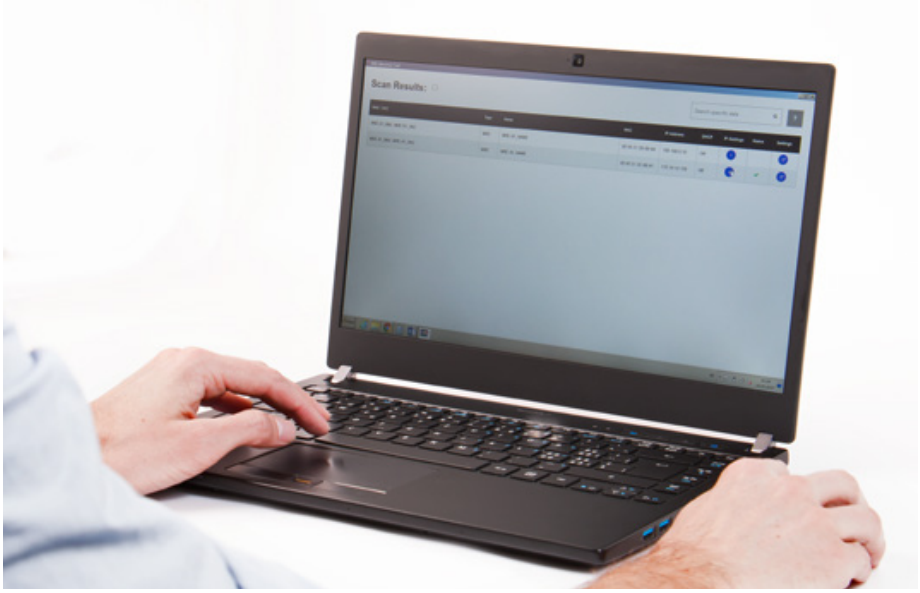
The MRE is configured with a preset IP address upon delivery. With the free discovery tool, the device can easily be located from any computer in all networks. No special knowledge is required, nor is it necessary to modify the communication parameters of your own computer. Whether you are using a fixed IP address or DHCP, the discovery tool allows the basic settings of the MRE's communication interface to be configured as required.

Web server

The integrated web server provides a clear interface for configuring the MRE for each individual application. In just a few clicks, the MRE can be configured for the circuit to be measured. The integrated search function allows the desired parameters to be found quickly. Important variables can be added to a favourites list and displayed graphically. Two access levels protect the device from unauthorised access and ensure a high degree of security.

Flexibel

- Simplified wiring with PoE
- Measurements close to load (transformer and meter)
- Data logging and customised dashboards via optional data logger
- Full PQ functionality and individual protective functions can be optionally integrated
- Transformers of various accuracy grades available as accessories



Access and configuration via the Discovery tool and the web server

Versions and software packages

B Basic

Basic version with the following features:

- Measurement and highly precise calculation of all variables corresponding to IEC 61557-12 class 0.1 (current) and 0.05 (voltage)
- Harmonics up to 10 kHz
- Modbus, TCP, web server, and alarms can be freely parameterised
- External data logger (optional)

PQ Power-Quality *

Software package for determining energy quality:

- Features in the basic version
- PQ metering in accordance with IEC 61000-4-30
- Flickermeter IEC 61000-4-15
- Compilation of reports in accordance with EN 50160 when used together with data logger

UP Ultra Precise *

Software package for highly precise measurements:

- Extended measurement range up to 50 kHz (cf. recommendations of IEC 61000-4-30) for determining switching frequencies, pulse patterns, and supraharmonics
- Customised protective features, e. g. for capacitor banks and rectifiers
- All basic features can optionally be expanded with PQ
- Frequency range 15…400 Hz

* Available from…Q3/2018

MRE

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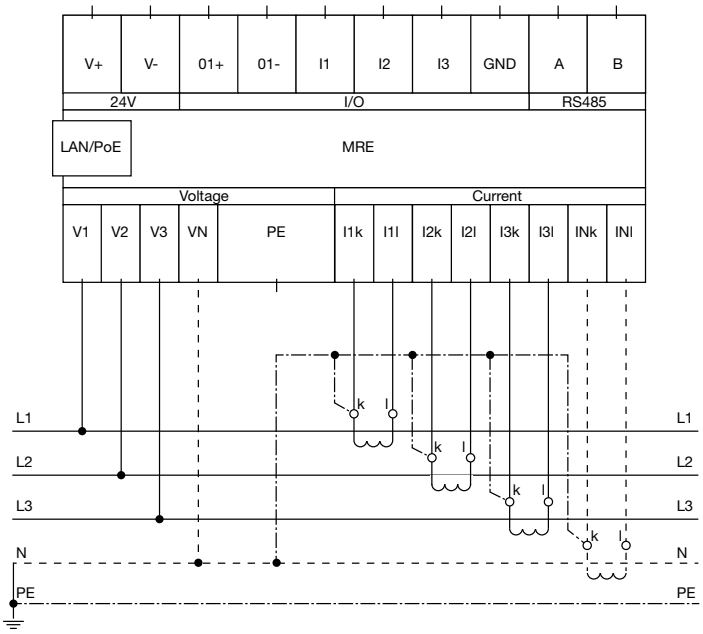
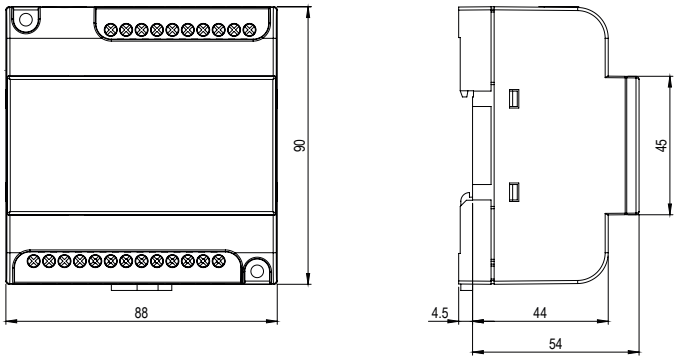
Connectors



Connection example for a four-wire TN-S grid.

Dimensions



Sample calculation

$$\text{Number of harmonics} = \frac{\text{Harmonics}}{\text{Base frequency}} = \frac{10\,\text{kHz}}{50\,\text{Hz}} = 200 \text{ harmonics}$$

Technical data

General data	MRE-44S/DC24V
Insulation voltage L-N	300 V
Overvoltage category	III
Pollution category	II
Weight	140 g
Dimensions W × H × D	88 x 90 x 58.5 mm
Connector wire cross sectional area max.	2.5 mm²
Protection class	IP20
Ambient operating temperature	-25...55 °C
Supply voltage	
Designated supply voltage	24 VDC
Designated supply voltage range	18…30 VDC
Power over Ethernet	Yes
Power consumption	5 W
Measuring circuit	
No. of voltage inputs	4
Voltage L-N / L-L	230 VAC/400 VAC
Voltage measurement range L-N / L-L	5…276 VAC/5…480 VAC
No. of current inputs	4
Current	5 A
Frequency range (base frequency) B PQ / UP	30…65 Hz / 15…400 Hz
Harmonics[1] B PQ / UP	up to 10 kHz / 50 kHz
Sampling frequency per channel B PQ / UP	20 kS/s / 100 kS/s
Bandwidth B PQ / UP	10 kHz / 50 kHz
Measured quantities and accuracy in accordance with IEC 61557-12 (PMD Sx)	
Active energy E	0.2
Voltage U (L–N)	0.05
Current I from measured value / range	0.1
Frequency	0.02
Power factor cos phi	0.5
Active power P	0.1
Reactive power Q	1
Apparent power S	0.2
THD_U	1
THD_I	1
Inputs/Outputs	
Inputs analogue digital 24 V / 0…10 V	3 x
Transistor outputs NO	1 x
Interfaces	
RS-485 interface	RTU modbus
RS-485 transfer rate	19200 baud
Ethernet interface	TCP modbus
Ethernet transfer rate	100 Mbit

[1] *Sample calculation on facing page.*

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