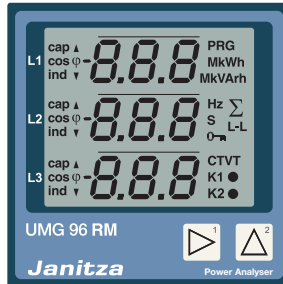


Power Analyser UMG 96 RM Installation manual

- Installation
- Device settings



User manual:

Deutsche Version:
siehe Vorderseite

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Janitza®

1

General

Disclaimer

The observance of the information products for the devices is a prerequisite for safe operation and to achieve the stipulated performance characteristics and product characteristics. Janitza electronics GmbH accepts no liability for injuries to personnel, property damage or financial losses arising due to a failure to comply with the information products. Ensure that your information products are accessible and legible.

Further information can be found on our website www.janitza.com at Support > Downloads.

Copyright notice

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All rights reserved. Duplication, editing, distribution and any form of exploitation, also as excerpts, is prohibited.

Subject to technical amendments

- Make sure that your device agrees with the installation manual.
- Read and understand first product-related documents.

- Keep product supporting documentation throughout the life available and, where appropriate, to pass on to subsequent users.
- Please inform yourself about device revisions and the associated adjustments to the product-related documentation on www.janitza.com.

Disposal

Please observe national regulations! If disposing of individual parts, please dispose of them in accordance with their nature and existing country-specific regulations, for example as:

- Electrical scrap
- Plastics
- Metals

Or, task a certified disposal business with the scrapping.

Relevant laws, applied standards and directives

The laws, standards and directives for the device applied by Janitza electronic GmbH can be found in the declaration of conformity on our website.

2

Safety

Safety information

The Installation manual is not a complete directory of all safety measures required to operate the device. Special operating conditions may require further measures. The Installation manual contains instructions that must be observed to ensure your personal safety and to prevent damage to property.

Symbols used:

	This symbol is an addition to the safety instructions and indicates an electrical hazard.
	This symbol is an addition to the safety instructions and indicates a potential hazard.
	This symbol with the word NOTE! describes: • Procedures that do not pose any risks of injuries. • Important information, procedures or handling steps.

Safety information is highlighted by a warning triangle and is indicated as follows depending on the degree of danger:



DANGER!

Indicates an imminent danger that causes severe or fatal injuries.



WARNING!

Indicates a potentially hazardous situation that can cause severe injuries or death.



CAUTION!

Indicates a potentially hazardous situation that can cause minor injuries or damage to property.

Safety measures

When operating electrical devices, certain parts of these devices are invariably subjected to hazardous voltage. Therefore, severe bodily injuries or damage to property can occur if they are not handled properly:

- Before connecting connections, earth the device at the ground wire connection if present.
- Hazardous voltages may be present in all switching parts that are connected to the power supply.

- Hazardous voltages may also be present in the device even after disconnecting the supply voltage (capacitor storage).
- Do not operate equipment with current transformer circuits while open.
- Do not exceed the threshold values specified in the user manual and on the rating plate. Also adhere to this when inspecting and commissioning.
- Observe the safety and warning instructions in the documents that belong to the device!

Qualified staff

In order to prevent personal injuries and damage to property, only qualified staff with electrical training may work on the device, with knowledge of

- the national accident prevention regulations
- the safety engineering standards
- installing, commissioning and operating the device.

Proper use

The device is

- intended for installation in switch cabinets and small installation distributors. It can be installed in any mounting position (please observe step 3 "Assembly").
- not intended for installation in vehicles! The use of the device in mobile equipment is considered to be non-standard environmental conditions and is therefore only permitted after separate agreement.
- not intended for installation in environments with hazardous oils, acids, gases, vapours, dusts, radiation, etc.

The prerequisites of faultless, safe operation of this device are proper transport and proper storage, set-up, installation, operation and maintenance.

3

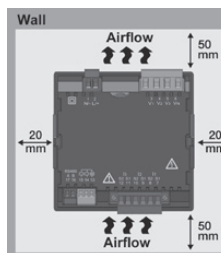
Device short description

The UMG 96 RM is a multi-functional network analyser, which:

- Measures and calculates electrical variables such as voltage, current, frequency, power, energy, harmonics (up to the 40th harmonic), etc. in building installations, on distribution units, circuit breakers and busbar trunking systems.
- displays and saves measurement results and transmits them via interfaces.

Assembly

Install the UMG 96 RM in the weatherproof front panel of switch cabinets.



Cut-out size:
92^{+0.8} x 92^{+0.8} mm

Ensure!
Adequate ventilation

- install the device vertically!
- adhere to clearances from neighbouring components!

Fig. Installation situation, rear view UMG 96



Damage to property due to disregard of the installation instructions

CAUTION! Failing to observe the installation instructions can damage or destroy your device. Ensure that there is adequate air circulation in your installation environment; if the ambient temperatures are high, ensure there is adequate cooling if required.



NOTE!

For further information on device functions, data and assembly, see the user manual.

4

Connecting the supply voltage

The supply voltage level for your device is specified on the rating plate.

After connecting the supply voltage, an indication is shown on the display. If no indication appears, check whether the supply voltage is within the rated voltage range.

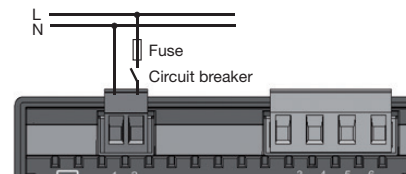


Fig. Connecting supply voltage.



WARNING!

Risk of injury due to electric voltage!

Serious bodily injury or death can result from:

- Contact with bare or stripped live wires.
- Device inputs that are dangerous to touch.

De-energise your device before starting work! Check that it is de-energised.



CAUTION!

Damage to property due to disregard of the connection conditions or impermissible voltage swells

Your device can be damaged or destroyed by a failure to comply with the connection conditions or by exceeding the permissible voltage range.

Before connecting the device to the supply voltage, please check:

- Voltage and frequency correspond to the details on the ratings plate! Threshold values stipulated in the user manual have been complied with!
- In building installations, the supply voltage must be protected with a UL/IEC approved circuit breaker / a fuse!
- The circuit breaker
 - must be easily accessible for the user and be installed close to the device.
 - must be labelled for the relevant device.
- Do not connect the supply voltage to the voltage transformers.
- Provide a fuse for the neutral conductor if the source's neutral conductor connection is not earthed.

5

Network systems

Suitable network systems and maximum rated voltages (DIN EN 61010-1/A1):

Three-phase four-conductor systems with earthed neutral conductor	Three-phase four-conductor systems with non-earthed neutral conductor (IT networks)	Three-phase, three-conductor systems Not earthed	Three-phase, three-conductor systems with earthed phase
U_{L-N} / U_{L-L} 277 VLN / 480 VLL	U_{L-N} / U_{L-L} 277 VLN / 480 VLL	U_{L-L} 480 VLL	U_{L-L} 240 VLL

Single-phase two-conductor systems with earthed neutral conductor	Separated single-phase, three-conductor systems with earthed neutral conductor
U_{L-N} 230 VLN	U_{L-N} / U_{L-L} 240 VLN / 480 VLL

The device can be used in

- 2, 3 and 4 conductor networks (TN, TT and IT networks)
- Residential and industrial applications

6

Voltage measurement

The device has 3 voltage measurement inputs and is suitable for different connection variants.



CAUTION!

Risk of injuries or damage to the device

Disregard of the connection conditions for the voltage measurement inputs can result in injuries or to the device being damaged.

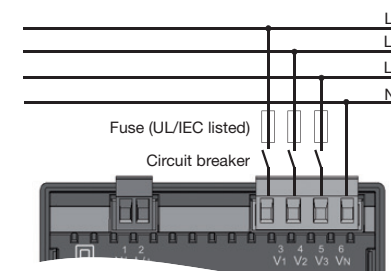
Therefore, note the following:

- The voltage measurement inputs
 - must not be occupied with DC voltage.
 - must be provided with a suitable, labelled fuse that is positioned close by and a circuit breaker (alternatively: a line safety switch).
 - are dangerous to touch.
- Voltages that exceed the allowed network rated voltages must be connected via a voltage transformer.
- Measured voltages and currents must derive from the same network.



NOTE!

As an alternative to the fuse and circuit breaker, you can use a line safety switch.



Voltage measurement connection variant 3p 4w (Addr. 509 = 0, standard setting)

The voltage measurement inputs are designed for measurements in low voltage networks, in which rated voltages of up to

- 277 V phase to earth and 480 V phase to phase in the 4-conductor system or
- 480 V phase to phase in the 3-conductor system occur.

The measurement and surge voltages meet over-voltage category 300 V CATIII.

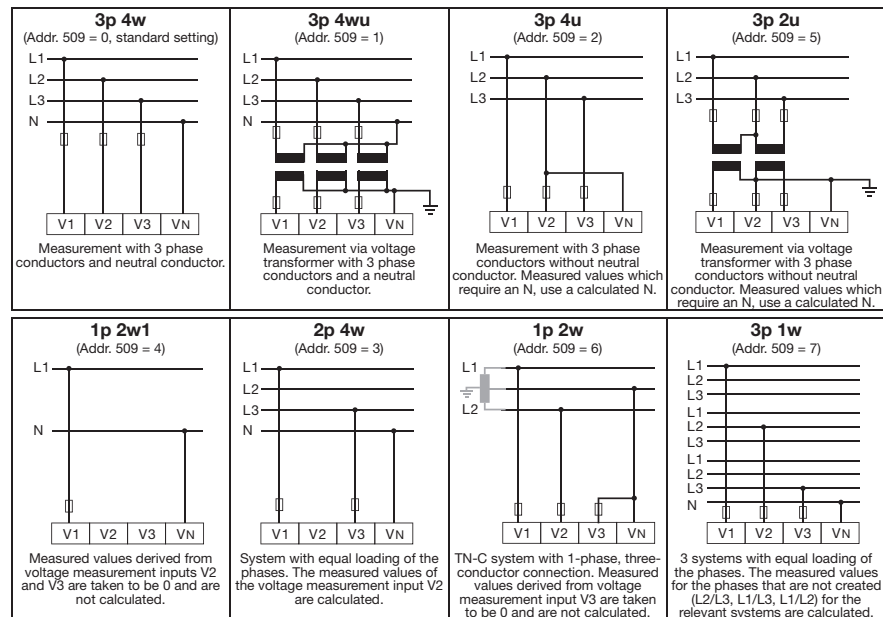


NOTE!

With measurement range exceeding, the measurement device display shows "EEE". Further information on this can be found in the user manual.

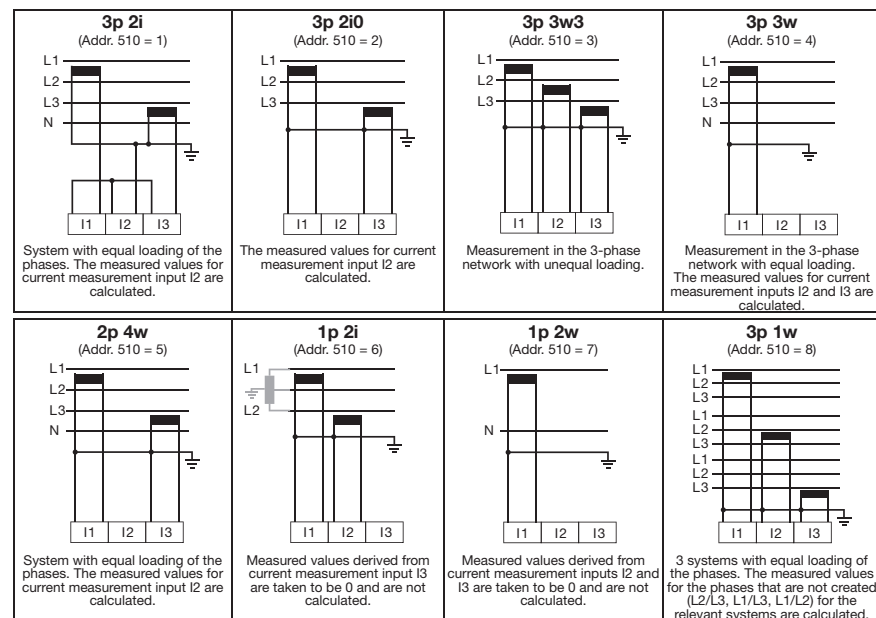
7

Voltage measurement connection variants



9

Connection variants for current measurement I1, I2, I3



8

Current measurement I1, I2, I3

The device

- is only approved for measuring current with a current transformer.
- is intended for connecting current transformers with secondary currents of ± 1 A and ± 5 A.
- has the current transformer ratio 5/5 A set as standard.



Risk of injury due to electric voltage!

WARNING!

Serious bodily injury or death can result from:

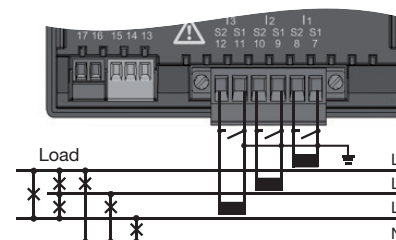
- Contact with bare or stripped live wires.
- Current measurement inputs that are dangerous to touch on the device and on the current transformers.

De-energise your device before starting work! Check that it is de-energised.

Earth the system. Use the earth connection points with earthing symbols for this!

Earth the secondary windings of current transformers and all of the metal parts of the transformer that could be touched!

Connection variant 3p 4w current measurement (I1, I2, I3) via current transformer (Addr. 510 = 0, standard setting).



NOTE!

With measurement range exceeding, the measurement device display shows "EEE". Further information on this can be found in the user manual.



WARNING!

Risk of injury due to large currents and high electric voltages!

Current transformers operating with an open secondary circuit (high voltage peaks) can result in serious or even fatal injuries.

Avoid open operation of the current transformers - short-circuit unloaded transformers!

10

Establish the connection to the PC

The most common connections for communication between the PC and the device:

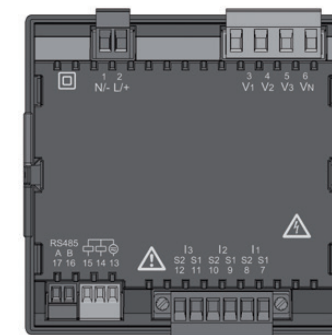
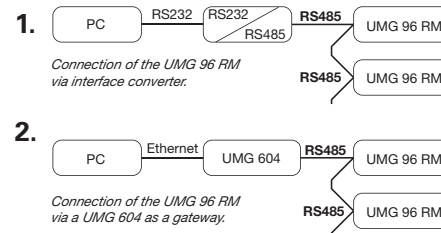


Fig. Rear side UMG 96 RM

More details on device configuration and communication can be found from section 11.



CAUTION!

Damage to property due to incorrect network settings

Incorrect network settings can cause faults in the IT network!

Obtain information from your network administrator about the correct Ethernet network settings for your device.

Operation and button functions

The device is operated with buttons 1 and 2, whereby the following distinctions are made:

- Short press (button 1 or 2): Next step (+1).
- Long press (button 1 or 2): previous step (-1).

The device differentiates between display and programming mode.

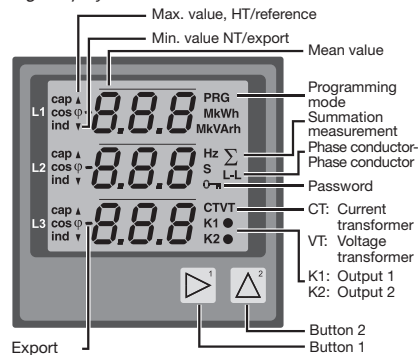
Display mode

- You can use buttons 1 and 2 to scroll between the measured value indications.
- The measured value indication shows up to 3 measured values.
- A time for an automatic indication change between the measured value indications can be configured in the GridVis® software.

Programming mode

- Press and hold buttons 1 and 2 simultaneously for 1 second to switch between display mode and programming mode. The text **PRG** appears in the display.
- Configure the necessary settings for the operation of the device in programming mode.

Fig. Display UMG 96 RM



- The programming mode can be protected with a user password.
 - Button 2 switches between the programming menus:
 1. **Current transformer**
 2. **Voltage transformer**
 3. **Parameter list**
- To switch from programming mode to display mode,
- press buttons 1 and 2 simultaneously for 1 second.
 - do not press any buttons for 60 seconds (automatic).



NOTE!

Changes are only applied after exiting programming mode.



NOTE!

- The following section contains an explanation of the most important programming menus **current transformer**, **voltage transformer** and **parameter list**.
- More detailed information on the operation, display and button functions for your device can be found in the user manual.

Programming the current transformer

1. Switch to programming mode.
2. The symbols for programming mode **PRG** and for the current transformer **CT** appear.
3. Press button 1 - the first digit of the input field for the primary current flashes.
4. Use button 2 to select the value for the 1st digit.
5. Use button 1 to move to the 2nd. digit.
6. Use button 2 to select the value of the 2nd digit.
7. Use button 1 to move to the 3rd digit.
8. Use button 2 to select the value of the 3rd digit.
9. Confirm with button 1.
10. The complete number flashes.
11. Use button 2 to select the decimal place and thus the unit of the primary current.
12. Confirm with button 1.
13. The input range of the secondary current flashes.
14. Use button 2 to set the secondary current (value 1 A or 5 A).
15. Confirm with button 1.
16. Pressing buttons 1 and 2 simultaneously (1. sec.) exits the programming mode. Use button 2 to change to the input field for the voltage transformer.

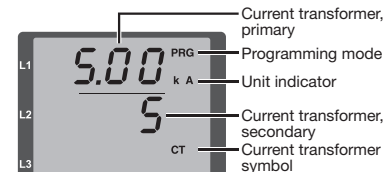


Fig. "Current transformer" input area



NOTE!

- Changes are only applied after exiting programming mode.
- For further information on current transformers and current transformer ratios, see the user manual.

Programming voltage transformers

1. Switch to programming mode.
2. The symbols for programming mode **PRG** and for the current transformer **CT** appear.
3. Use button 2 to change to programming mode for the voltage transformer.
4. The symbols for Programming mode **PRG**, and for the voltage transformer **VT** appear.
5. Press button 1 to confirm - the first digit of the input area for the primary voltage flashes.
6. Use button 2 to select the value of the 1st. digit.
7. Use button 1 to move to the 2nd. digit.
8. Use button 2 to select the value of the 2nd digit.
9. Use button 1 to move to the 3rd digit.
10. Use button 2 to select the value of the 3rd digit.
11. Confirm with button 1.
12. The complete number flashes.
13. Use button 2 to select the decimal place and thus the unit of the primary voltage.
14. Confirm with button 1.
15. The input range of the secondary voltage flashes.
16. Set the secondary voltage with button 2.

17. Confirm with button 1.
18. Pressing buttons 1 and 2 simultaneously (1. sec.) exits the programming mode. Use button 2 to change to the programming mode for the parameter list.

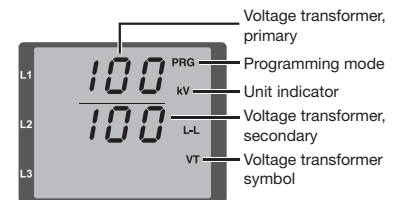


Fig. "Voltage transformer" input area



NOTE!

- Changes are only applied after exiting programming mode.
- Further information on voltage transformers and voltage transformer ratios can be found in the user manual.

Programming parameters

1. Switch to programming mode.
2. The symbols for programming mode **PRG** and for the current transformer **CT** appear.
3. Press button 2 twice to change to the programming mode for the parameter list.
4. The input area of the parameter list appears.

NOTE!

- A detailed parameter list with setting areas and pre-settings can be found in the user manual or the Modbus address list on our website.
 - The parameter addresses of the device address (000) and the Baud rate (001) are explained in the following.
5. Confirm with button 1 - the first digit of the parameter address flashes.
 6. Use button 2 to select the value of the 1st digit.
 7. Continue the process for the next digits of the parameter address and for the parameter settings.
 8. Exit programming mode by simultaneously pressing button 1 and 2 (1 second). Use button 2 to change back to the input field for the current transformer.

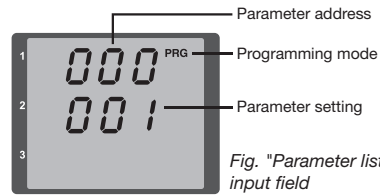


Fig. "Parameter list" input field

Set the device address (parameter address 000)

In a Master-Slave network via the RS485 interface, a master device can distinguish between the UMGs on the basis of the device address.

In the case of devices within this network, for the parameter address 000 please note

- you must assign different device addresses.
- the parameter setting of the parameter address 000 must lie within the range of 1 to 247 (0 and 248 to 255 are reserved).

Set the Baud rate (parameter address 001)

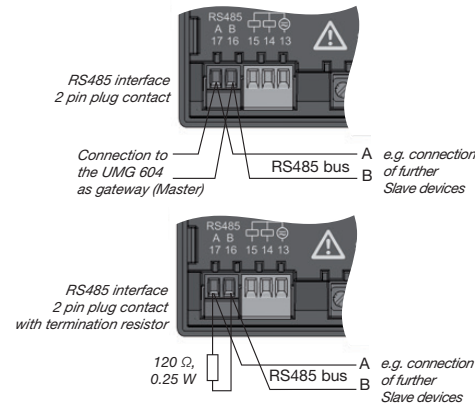
In a Master-Slave network via the RS485 interface, for each device:

- select a uniform Baud rate (parameter address 001) (for settings see the user manual).
- select the number of stop bits (parameter address 003) (0=1 Bit, 1=2 Bits).

Data bits (8) and parity (none) are pre-set.

Example: PC connection via RS485 interface and UMG 604 as gateway

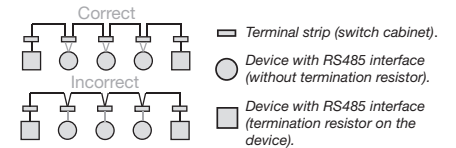
The UMG 96 RM communicates with a PC via the serial RS485 interface and a UMG 604 as gateway:



RS485 bus structure

- In an RS485 bus structure (line), connect all devices according to the master-slave principle.

- One segment in an RS485 bus structure can contain up to 32 participants/devices.
- Terminate the cable at the start and the end of a segment with termination resistors (120 Ω, 0.25 W). The UMG 96 RM does not contain any termination resistors.
- With more than 32 subscribers, repeaters must be used to connect segments.



NOTE!

In order to include the UMG 96 RM in an RS485 bus structure (master-slave principle) with UMG 604 as a master device, first

- enter a 1 in **address 203** of the UMG 604 (Modbus RTU/master)!

NOTE!

For further information on parameter lists, device addresses and Baud rates, see the user manual.

Technical data

General information	
Net weight (with attached connectors)	approx. 265 g
Packaging weight (including accessories)	approx. 300 g
Service life of background lighting	40000 h (after this period of time the background lighting efficiency will reduce by approx. 50%)

Transport and storage	
The following information applies to devices which are transported or stored in the original packaging.	
Free fall	1 m
Temperature	K55 (-25° C to +70° C)
Relative humidity	0 to 90% RH

Ambient conditions during operation	
The device is intended for weather-protected, stationary use. Protection class II i.a.w. IEC 60536 (VDE 0106, Part 1).	
Operating temperature range	K55 (-10° C .. +55° C)
Relative humidity	0 to 75% RH
Operating altitude	0 .. 2000 m above sea level
Degree of pollution	2
Mounting position	vertical
Ventilation	Forced ventilation is not required.
Protection against ingress of solid foreign bodies and water	
- Front side	IP40 i.a.w. EN60529
- Rear side	IP20 i.a.w. EN60529
- Front with seal	IP54 i.a.w. EN60529

Supply voltage	
Nominal range	Option 230 V: AC 90 V - 277 V (50/60 Hz) or DC 90 V - 250 V, 300 V CATIII Option 24 V: AC 24 V - 90 V (50/60 Hz) or DC 24 V - 90 V, 150 V CATIII
Operating range	+/-10% of the nominal range
Power consumption	Option 230 V: max. 5,5 VA / 3 W Option 24 V: max. 4,5 VA / 3 W
Internal fuse, not replaceable	Type T1A / 250 VDC / 277 VAC according to IEC 60127
Recommended over-current protection device for the line protection	Option 230 V: 6-16 A Option 24 V: 1-6 A (Char. B) (IEC/UL approval)

Voltage measurement	
3-phase 4-conductor systems with rated voltages of up to	277 V/480 V (+/-10%)
3-phase 3-conductor systems, not earthed, with rated voltages of up to	IT 480 V (+/-10%)
Overvoltage category	300 V CAT III
Rated surge voltage	4 kV
Protection of voltage measurement	1 - 10 A (with IEC-/UL approval)
Metering range L-N	0 ¹⁾ to 300 Vrms (max. overvoltage 520 Vrms)
Metering range L-L	0 ¹⁾ to 520 Vrms (max. overvoltage 900 Vrms)
Resolution	0.01 V
Crest factor	2.45 (based on metering range)
Impedance	4 MOhm / phase
Power consumption	approx. 0.1 VA
Sampling rate	21.33 kHz (50 Hz), 25.6 kHz (60 Hz) for each measurement channel
Frequency range of the fundamental oscillation - resolution	45 Hz to 65 Hz 0.01 Hz

1) ... The device determines measured values only if the Voltage measurement input V1 voltage L1-N greater than 20 Vrms (4-wire measurement) or a voltage L1-L2 of larger 34 Vrms (3-wire measurement) is applied.

Current measurement I1 - I4	
Nominal current	5 A
Metering range	0 to 6 Arms
Crest factor	1.98
Resolution	0.1 mA (display 0.01 A)
Overvoltage category	300 V CAT II
Rated surge voltage	2 kV
Power consumption	approx. 0.2 VA (Ri = 5 mOhm)
Overload for 1 sec.	120 A (sinusoidal)
Sampling rate	21.33 kHz (50 Hz), 25.6 kHz (60 Hz) for each measurement channel

Digital outputs	
2 digital outputs, semiconductor relays, not short-circuit proof.	
Switching voltage	max. 33 V AC, 60 V DC
Switching current	max. 50 mAeff AC/DC
Response time	10/12 periods + 10 ms *
Pulse output (energy pulse)	max. 50 Hz

* Response time e.g. at 50 Hz: 200 ms + 10 ms = 210 ms

Serial interface	
RS485 - Modbus RTU/Slave	9.6 kbps, 19.2 kbps, 38.4 kbps, 57.6 kbps, 115.2 kbps
Stripping length	7 mm

Terminal connection capacity (power supply voltage)	
Conductors to be connected. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 2.5 mm ² , AWG 26 - 12
Terminal pins, core end sheath	0.2 - 2.5 mm ²
Tightening torque	0.4 - 0.5 Nm
Stripping length	7 mm

Terminal connection capacity (digital outputs)	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm ² , AWG 28-16
Terminal pins, core end sheath	0.2 - 1.5 mm ²
Tightening torque	0.2 - 0.25 Nm
Stripping length	7 mm

Terminal connection capacity (serial interface)	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm ² , AWG 28 - 16
Terminal pins, core end sheath	0.2 - 1.5 mm ²
Tightening torque	0.2 - 0.25 Nm
Stripping length	7 mm

Terminal connection capacity (current measurement)	
Conductors to be connected. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 2.5 mm ² , AWG 26-12
Terminal pins, core end sheath	0.2 - 2.5 mm ²
Tightening torque	0.4 - 0.5 Nm
Stripping length	7 mm

Terminal connection capacity (voltage measurement)	
Conductors to be connected. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.08 - 4.0 mm ² , AWG 28-12
Terminal pins, core end sheath	0.2 - 2.5 mm ²
Tightening torque	0.4 - 0.5 Nm
Stripping length	7 mm

 **NOTE!**
Further technical data can be found in the use manual for the device.

17

Procedure in the event of faults

Possible fault	Cause	Remedy
No display	External fusing for the power supply voltage has tripped.	Replace fuse.
No current display	Measurement voltage is not connected.	Connect the measuring-circuit voltage.
	Measurement current is not connected.	Connect measuring-circuit current.
Current displayed is too large or too small.	Current measurement in the wrong phase.	Check connection and correct if necessary.
	Current transformer factor is incorrectly programmed.	Read out and program the current transformer transformation ratio at the current transformer.
	The current peak value at the measurement input was exceeded by harmonic components.	Install current transformer with a larger transformation ratio.
Voltage displayed is too large or too small.	The current at the measurement input fell short of.	Install current transformer with a suitable transformation ratio.
	Measurement in the wrong phase.	Check connection and correct if necessary.
Voltage displayed is too small.	Voltage transformer incorrectly programmed.	Read out and program the voltage transformer transformation ratio at the voltage transformer.
	Overrange.	Install voltage transformers.
"EEE" in the display	The peak voltage value at the measurement input has been exceeded by harmonic components.	Caution! Ensure the measurement inputs are not overloaded.
	See „error messages“ in the user manual.	
Device still does not work despite the above measures.	Device defective.	Send the device to the manufacturer for inspection and testing along with an accurate fault description.