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Power Quality Analyser

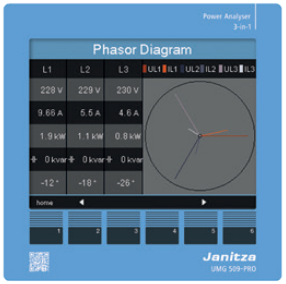
UMG 509-PRO

Installation manual

Residual current monitoring (RCM)

Deutsche Version: siehe Vorderseite

- Installation
- Device settings



User manual:

Janitza electronics GmbH
Vor dem Polstück 6
D-35633 Lahnau / Germany
Support tel. +49 6441 9642-22
e-mail: info@janitza.com
www.janitza.com

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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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 does not represent a full listing of all necessary safety measures required for safe operation of the device.
Certain operating conditions may require further measures. The installation manual contains information that you must observe for your own personal safety and to avoid damage to property.

Symbols used:

⚠	This symbol is used as an addition to the safety instructions and warns of an electrical hazard.
⚠	This symbol is used as an addition to the safety instructions and warns of a potential hazard.
☞	This symbol with the word **NOTE!** describes: • Procedures that do not entail any danger of injury. • Important information, procedures or handling steps.

Safety instructions are highlighted with a warning triangle and shown as follows, depending on the degree of hazard:

⚠ **DANGER!**	Indicates an immediately threatening hazard that leads to serious or even fatal injuries.
⚠ **WARNING!**	Indicates a potentially hazardous situation that could lead to serious or even fatal injuries.
⚠ **CAUTION!**	Indicates a potentially hazardous situation that could lead to minor injuries or damage to property.

Measures for safety
When operating electrical devices certain parts of these devices inevitable carry dangerous voltages. This could result in serious bodily injury or damage to property if not handled properly:
- De-energise your device before starting work! Check that it is de-energised.
- Before establishing electrical connections to the device, earth it at the ground wire connection if there is one.
- Hazardous voltages may arise in all circuit parts that are connected to the power supply.
- Even after disconnecting the supply voltage, there may still be hazardous voltages present in the device (capacitor storage).
- Do not operate equipment with current transformer circuits when open.
- Do not exceed the limit values stipulated in the user manual and on the rating plate - even during testing or commissioning.
- Observe the safety and warning information in the documents that belong to the devices!

Qualified personnel
In order to avoid injuries to personnel and property damage, only qualified personnel with electrical training are permitted to work on the devices with knowledge
- of the national regulations for accident prevention
- of safety standards
- of installation, commissioning and operation of the device.

Proper use
The device is
- intended for installation in switch cabinets and small installation distributors (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 Brief description of device

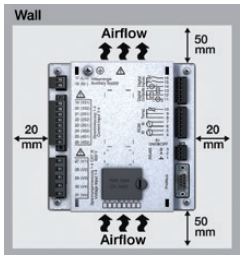
The device is a multi-functional network analyser, which

- measures and monitors residual currents (RCM) and currents at the central grounding point (CGP). The residual current monitoring is carried out via an external residual current transformer (30 mA rated current) on the current measurement inputs I5 and I6.
- measures and calculates electrical variables such as voltage, current, power, energy, harmonics, etc. in building installations, on distribution units, circuit breakers and busbar trunking systems.
- displays and saves measurement results and transmits them via interfaces.

NOTE!
If residual currents in electrical systems are monitored, the device (inputs I5/I6) can trigger warning pulses if a response threshold is exceeded. The warning pulses can provide an alarm before a protective device trips. The device does not provide protection against electric shock!

Assembly

Install the device in the weather-protected front panel of switch cabinets.



Cut-out size:
$138^{+0.8}$ x $138^{+0.8}$ mm

Ensure!
Adequate ventilation

- The device is installed vertically!
- Observance of clearance to adjacent components!

Fig. Installation situation, rear view

CAUTION!
Damage to property due to disregard of the installation instructions

Disregard of the installation instructions can damage or destroy your device.
Ensure that you have enough air circulation in your installation environment and in the event of high environmental temperatures, provide cooling if necessary.

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, the first measured value indication "Home" appears on the display. If no indication appears, check whether the supply voltage is within the rated voltage range.

WARNING!
Danger of injury due to electrical voltage!

Serious bodily injury or death can result from

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

Render the system free of voltage before starting work! Check the system is free of electrical energy!

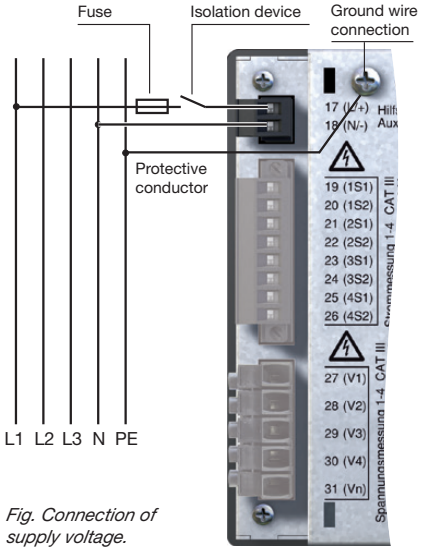


Fig. Connection of supply voltage.

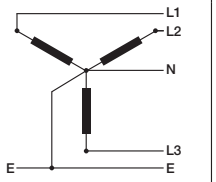
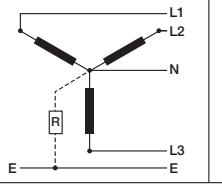
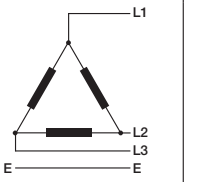
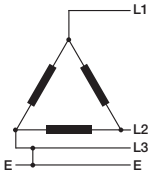
WARNING!
Danger of life / damage to property due to disregard of the connection conditions or impermissible overvoltage

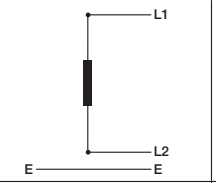
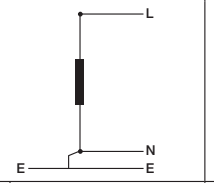
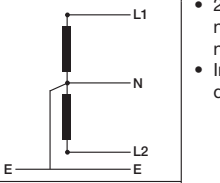
Your device can be damaged or destroyed by a failure to comply with the connection conditions or by exceeding the permissible voltage range.
Before connecting the device to the supply voltage, check:

- **The ground wire connection must be connected with the system earthing!**
- **Voltage and frequency correspond to the details on the ratings plate! Limit 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 isolation device**
  - **must be installed near the device and in a location that is easily accessible for the user.**
  - **must be labelled to identify the respective device.**
- **Do not tap the supply voltage from the voltage transformer.**
- **Provide a fuse for the neutral conductor if the neutral conductor terminal of the source is not grounded.**

5 Network systems

Network systems and max. rated voltages (DIN EN 61010-1/A1):

Three-phase, four-conductor system with earthed neutral conductor	**Three-phase, four-conductor system** with non-earthed neutral conductor	**Three-phase, three-conductor systems** Non-earthed	**Three-phase, three-conductor systems** With earthed phase
			
IEC U_{L-N} / U_{L-L}: 417 VLN / 720 VLL UL U_{L-N} / U_{L-L}: 347 VLN / 600 VLL	Only partially suitable for use in non-earthed networks (see step 7).		U_{L-L} 600 VLL

Two-phase, two-conductor systems Non-earthed	**Single-phase, two-conductor systems** with earthed neutral conductor	**Separated single-phase, three-conductor systems** with earthed neutral conductor
		
Only partially suitable for use in non-earthed networks (see step 7).	IEC U_{L-N} 480 VLN UL U_{L-N} 480 VLN	IEC U_{L-N} / U_{L-L}: 400 VLN / 690 VLL UL U_{L-N} / U_{L-L}: 347 VLN / 600 VLL

Application areas for the device:

- 2, 3 and 4 conductor networks (TN and TT networks).
- In residential and industrial applications.

6 Voltage measurement

The device has 4 voltage measurement inputs and is suitable for various connection variants.

CAUTION!

Danger of injury 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.
For this reason, note that:

- **Do not connect the voltage measurement inputs**
  - **to DC voltage.**
  - **Do not use for voltage measurement in SELV circuits (safe extra low voltage).**
- **Voltages that exceed the allowed network rated voltages be connected via a voltage transformer.**
- **The voltage measurement inputs are to be equipped with a suitable, labelled fuse and isolation device located in the vicinity.**
- **Measured voltages and measured currents must derive from the same network!**

NOTE!
A circuit breaker can be used as an alternative to a fuse and isolating device.

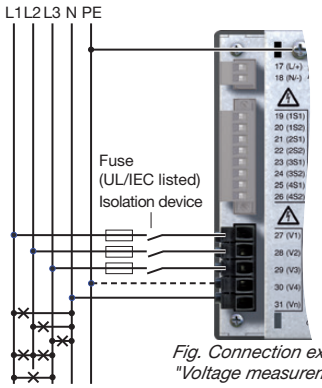


Fig. Connection example "Voltage measurement".

The voltage measurement inputs are designed for measurements in low voltage networks, that contain the following nominal voltages:

- According to IEC - 417 V phase to earth and 720 V phase to phase in 4-conductor systems.
- According to UL - 347 V phase to earth and 600 V phase to phase in 4-conductor systems.
- 600 V phase to phase in 3-conductor systems.

The rated voltages and surge voltages comply with the overvoltage category 600 V CATIII.

7 Schematic diagram for voltage measurement

Voltage measurement in the three-phase, four-conductor system (TN, TT networks).
Note: Earth your system!

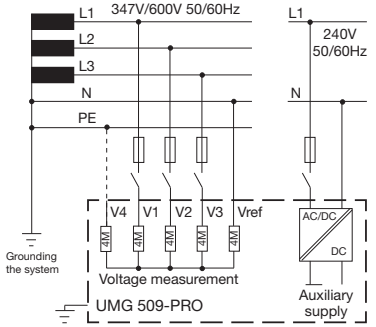


*Fig. Schematic diagram, device in a **TN** network.*

RECOMMENDATION!
For a PE/N measurement, connect the protective earth (PE) to measurement input V4. Do not use a green/yellow wire for this as the conductor does not have any protective function!

Voltage measurement in the three-phase, three-conductor system (IT network).
The device is only suitable to a limited extent for use in IT networks, since the measured voltage relative to the housing potential is measured and the input impedance of the device creates residual current against the earth. The residual current can trigger the insulation monitoring in IT networks.
Connection variants with voltage transformers are suitable for IT networks without restrictions!

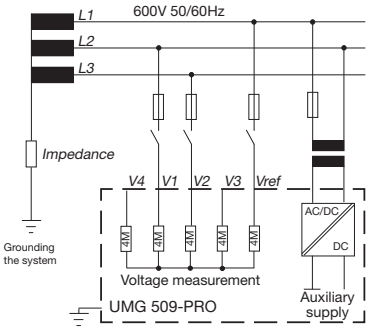
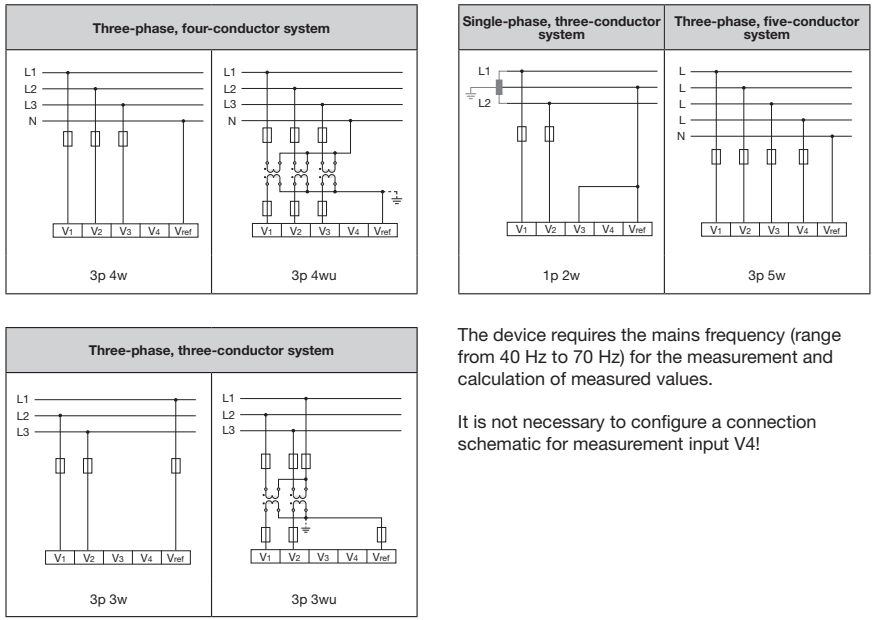


Fig. Schematic diagram, device in an IT network without N.

8 Further connection variants for voltage measurement



The device requires the mains frequency (range from 40 Hz to 70 Hz) for the measurement and calculation of measured values.

It is not necessary to configure a connection schematic for measurement input V4!

9 Current measurement

The device

- is intended for the connection of current transformers with secondary currents of ../1 A and ../5 A.
- does not measure DC.

The current measurement inputs can be loaded with max. 120 A for 1 second.

WARNING!

Danger of injury due to electrical voltage!

Serious bodily injury or death can result from:

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

Render the system free of voltage before starting work! Check the system is free of electrical energy!
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!

The current direction can be corrected via the serial interfaces or on the device for each phase. If incorrectly connected, a subsequent re-connection of the current transformer is not required.

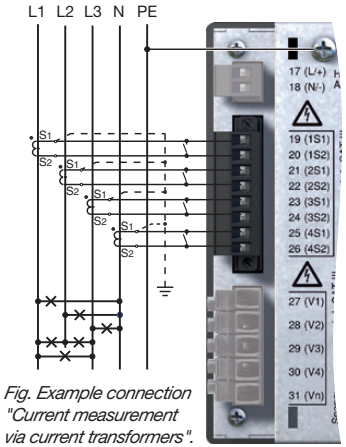


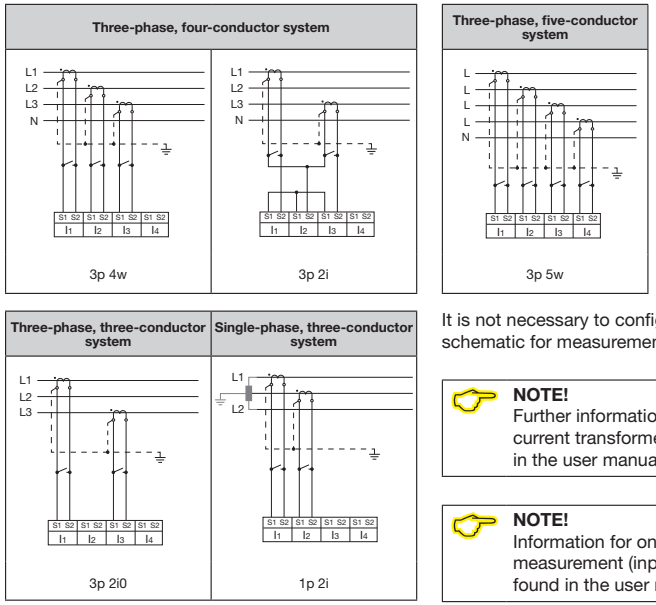
Fig. Example connection "Current measurement via current transformers".

WARNING!

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

Current transformers that are operated open in the secondary side (high voltage peaks) can cause severe bodily injuries or death.
Avoid operating current transformers when open, short circuit transformers that are unloaded!

10 Further connection variants, current measurement

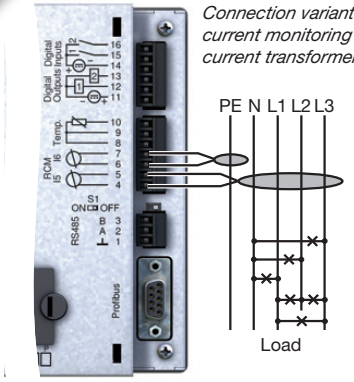


It is not necessary to configure a connection schematic for measurement input I4!

NOTE!
Further information on current data and current transformer data can be found in the user manual.

NOTE!
Information for on supporting measurement (input V4/I4) can be found in the user manual

11 Residual current monitoring (RCM) via I5 and I6



Connection variant "Residual current monitoring via current transformer"

The UMG 509-PRO is suitable for use as a residual current monitoring device (RCM) as well as for monitoring
- AC and
- pulsing DC

The device measures residual currents in accordance with IEC/TR 60755 (2008-01),

Type A

Suitable residual current transformers with a rated current of 30 mA are connected to terminals 4 and 5 (**I5**) and terminals 6 and 7 (**I6**).

NOTE!
- The transformation ratios for the residual current transformer inputs can be configured via the software.
- A connection variant **"UMG 509-PRO with residual current monitoring via measurement inputs I5/I6"** can be found in the user manual.
- It is not necessary to configure a connection schematic for measurement inputs I5 and I6.

12 Establish connection to the PC

The 3 most common connections for communication between PC and device:

1. PC — Ethernet (crossover patch cable) — UMG

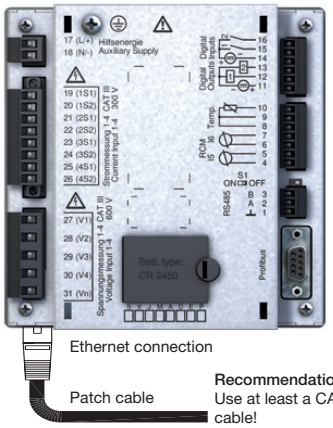
The device and PC require a static IP address.

2. PC — Patch cabel — Switch/ Router — Patch cabel — UMG

The device and PC require a static IP address.

3. DHCP server, PC, UMG — Patch cabel — Switch/ Router — Patch cabel

DHCP server automatically assigns IP addresses to the device and PC.



Recommendation: Use at least a CAT5 cable!

CAUTION! **Property damage due to incorrect network settings**

Incorrect network settings can cause faults in the IT network!
Find out the correct Ethernet network settings for your device from your network administrator.

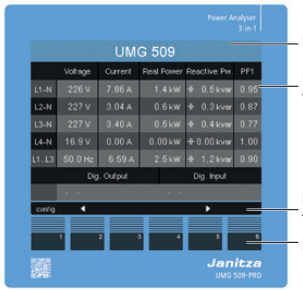
13 Controls and button functions

The device is operated via 6 function keys for the
- Selecting measured value indications.
- Navigation within the menus.
- Editing device settings.

Key	Function
1	• Back to home screen • Exits selection menu
2	• Select digit (to the left) • Selects main values (U, I, P ...)
3	• Changes (number -1) • By-values (select) • Selects menu item
4	• Changes (number +1) • By-values (select) • Selects menu item
5	• Select digit (to the right) • Selects main values (U, I, P ...)
6	• Opens selection menu • Confirm selection

NOTE!
More detailed information on operation, display and button functions for your device can be found in the user manual.

Fig. UMG 509-PRO display - measured value indication "Home"



NOTE!
Current and voltage transformer ratios.
The current and voltage transformer ratios can be conveniently configured via
- the menu Configuration > Measurement > Measurement transformer > Phase L1.
- the GridVis® software.

More details on current transformers and voltage transformer ratios and their adjustment can be found in the user manual.

14

Configuration

After the power returns, the device displays the first measured value indication "*Home*".

- Press button 1 "*ESC*", to access the "*Main menu*":

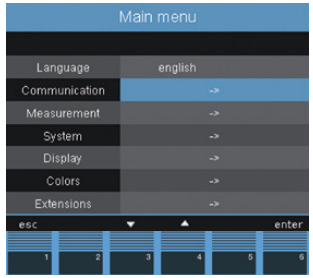


Fig. "Main menu"

- Select the menu entry to adjust with the 3 and 4 buttons in the "*Main menu*".
- Confirm the selected menu entry with button 6 "*Enter*"!

Press button 1 "*ESC*" to change back to the higher menu level.

The menu entry "*Communication*" takes you to the following window:

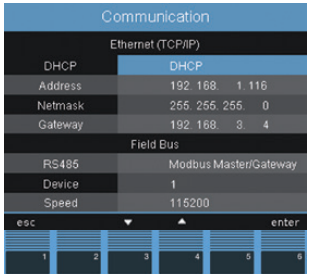


Fig. "Communication" window

Your device has 1 Ethernet interface and 1 RS485 interface (fieldbus) for communication, which can be adjusted in the "*Communication*" window.

NOTE!
Detailed information on all menu entries and their settings can be found in the user manual.

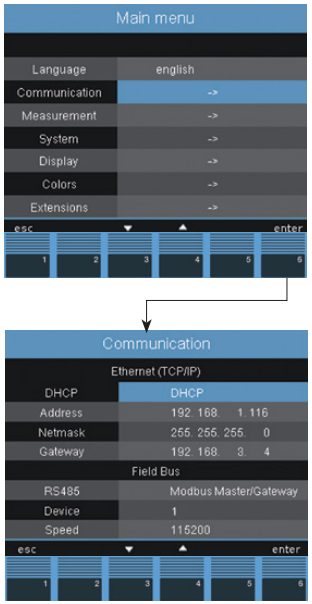
15

Communication via Ethernet interface (TCP/IP)

The device has 3 types of address allocation for the Ethernet interface (TCP/IP) in **DHCP** mode:

1. **OFF (fixed IP address)**
   The user selects the IP address, network mask and gateway on the device. Use this mode for straightforward networks without DHCP servers.
2. **BOOTP**
   Automatically integrates your device into an existing network. BOOTP is an older protocol and has a smaller scope of functions than DHCP.
3. **DHCP**
   When started, the device automatically receives the IP address, the network mask and the gateway from the DHCP server.

Standard setting for the device is DHCP!



NOTES!

- Find out the Ethernet network settings for your device from your network administrator.
- The description of additional communication interfaces can be found in the user manual for your device.
- For more information about connection and communication of your device with the software, see the quick guide of software GridVis®.

16

Technical data

General	
Net weight (with attached connectors)	approx. 1080 g (2.38 lb)
Device dimensions	Approx. l = 144 mm (5.64 in), b = 144 mm (5.64 in), h = 75 mm (2.95 in)
Battery	Typ Li-Mn CR2450, 3 V (approval i.a.w. UL 1642)
Clock (in temperature range -40°C (-40 °F) to 85°C (185))	+-5ppm (corresponding to approx. 3 minutes p.a.)

Transport and storage The following information applies to devices which are transported or stored in the original packaging.	
Free fall	1 m (39.37 in)
Temperature	-25 °C (-13 °F) to +70 °C (158 °F)

Ambient conditions during operation	
The device • weather-protected and stationary use. • connected to the protective conductor connection. • corresponds to protection class I in acc. with IEC 60536 (VDE 0106, Part 1).	
Working temperature range	-10 °C (-14 °F) .. +55 °C(131 °F)
Relative humidity	5 to 95 % at 25 °C (77 °F) without condensation
Operating altitude	0 to 2000 m (1.24 mi) above sea level
Pollution degree	2
Mounting position	vertical
Ventilation	no forced ventilation required.
Protection against ingress of solid foreign bodies and water - Front side - Rear side	 IP40 in acc. with EN60529 IP20 in acc. with EN60529

Supply voltage	
Protection of the supply voltage (fuse)	6 A, Char B (approved i.a.w. UL/IEC)
Installations of overvoltage category	300 V CAT III
Nominal range	**Option 230 V**: AC 95 V - 240 V (50/60 Hz) or DC 80 V - 300 V
	Option 24 V: AC 48 V - 110 V (50/60 Hz) or DC 24 V - 150 V
Operating range	+-10% of nominal range
Power consumption	**Option 230 V**: max. 14 VA / 7 W **Option 24 V**: max. 13 VA / 9 W

Voltage measurement	
Three-phase 4-conductor systems with rated voltages (L-N/L-L) up to	IEC: max. 417 V/720 V
	UL: max. 347 V/600 V
Three-phase 3-conductor systems with rated voltages (L-L) up to	max. 600 V (+10%)
Overvoltage category	600 V CAT III
Rated surge voltage	6 kV
Protection of voltage measurement	1 - 10 A (With IEC / UL approval)
Measurement range L-N [1]	0 .. 600 Vrms
Measurement range L-L [1]	0 .. 1000 Vrms
Resolution	0.01 V
Crest factor	1.6 (related to 600 Vrms)
Impedance	4 MΩ / phase
Power consumption	ca. 0,1 VA
Sampling rate	20 kHz / phase
Transients	> 50 µs
Frequency range of the fundamental oscillation - resolution	40 Hz .. 70 Hz 0.001 Hz

1) The device can only determine measured values, if at least a voltage L-N greater than 10Veff or a voltage L-L of greater than 18Veff is present at one voltage measurement input.

Current measurement	
Rated current	5 A
Metering range	0.005 to 7 Arms
Measurement range exceeded (overload)	From 7,5 Arms
Crest factor	2.4
Resolution	0.1 mA
Overvoltage category	**Option 230 V**: 300 V CAT III **Option 24 V**: 300 V CAT II
Measurement surge voltage	4 kV
Power consumption	approx. 0.2 VA (Ri=5 mΩ)
Overload for 1 sec.	120 A (sinusoidal)
Sampling rate	20 kHz / phase

Residual current monitoring I5 / I6 (RCM)	
Rated current	30 mArms
Metering range	0 to 40 mArms
Triggering current	100 µA
Resolution	1 µA
Crest factor	1,414 (related to 40mA)
Burden	4 Ohm
Overload for 1 sec.	5 A
Sustained overload	1 A
Overload for 20 ms	50 A
Maximum external burden	300 Ohm (for cable break detection)

Digital inputs 2 digital inputs with a joint earth.	
Maximum counter frequency	20 Hz
Response time (Jasic program)	200 ms
Input signal present	18 V to 28 V DC (typical 4 mA)
Input signal not present	0 to 5 V DC, current less than 0.5 mA

Digital outputs 2 digital outputs with a joint earth; semiconductor relay, not short-circuit proof.	
Supply voltage	20 - 30 V DC (SELV or PELV supply)
Switching voltage	max. 30 V AC, 60 V DC
Switching current	max. 50 mAeff AC/DC
Response time (Jasic program)	200 ms
Output of voltage dips	20 ms
Output of voltage exceedance events	20 ms
Pulse output (energy pulse)	max. 20 Hz

Temperature measurement input 3-wire measurement.	
Update time	1 second
Connectable sensors	PT100, PT1000, KTY83, KTY84
Total burden (sensor + cable)	max. 4 kOhm

Cable length (Residual current monitoring, digital inputs and outputs, temperature measurement input)	
Up to 30 m (32.81 yd)	Unshielded
More than 30 m (32.81 yd)	Shielded

RS485 interface 3-wire connection with A, B, GND	
Protocol	Modbus RTU/slave, Modbus RTU/master, Modbus RTU/Gateway
Transmission rate	9.6 kbps, 19.2 kbps, 38.4 kbps, 57.6 kbps, 115.2 kbps, 921.6 kbps
Termination resistor	Can be activated by micro switch

Profibus interface	
Connection	SUB D, 9-pole
Protocol	Profibus DP/V0 as per EN 50170
Transmission rate	9.6 kBaud to 12 MBaud

Ethernet interface	
Connection	RJ45
Function	Modbus gateway, embedded Webserver (HTTP)
Protocols	CP/IP, EMAIL (SMTP), DHCP-Client (BootP), Modbus/TCP, Modbus RTU over Ethernet, FTP, ICMP (Ping), NTP, TFTP, BACnet (Option), SNMP

Potential separation and electrical safety for the interfaces

The interfaces (RS485, Profibus, Ethernet) have
- a double insulation to the inputs of the supply voltage, voltage and current measurement.
- a functional insulation against each other, to the measuring inputs RCM and temperature and to the digital I/Os.

The interfaces of the connected devices requires a double or reinforced insulation against the mains voltages (acc. to IEC 61010-1: 2010).

Anschlussvermögen der Klemmstellen (Differenzstrommessung (RCM)) Anschließbare Leiter. Pro Klemmstelle nur einen Leiter anschließen!	
Starr/flexibel	0,14 - 1,5 mm², AWG 28-16
Flexibel mit Aderendhülsen mit Kunststoffhülse	0,2 - 1,5 mm²
Flexibel mit Aderendhülsen ohne Kunststoffhülse	0,2 - 1,5 mm²
Anzugsdrehmoment	0,2 - 0,25 Nm
Abisolierlänge	7 mm

Potentialtrennung und elektrische Sicherheit der RCM-Messeingänge

Die RCM-Messeingänge besitzen
- eine doppelte Isolierung zu den Eingängen der Versorgungsspannung, Spannungs- und Strommessung.
- keine Isolierung zu den Temperaturmesseingängen.
- eine Funktionsisolierung zu den Schnittstellen Ethernet, Profibus, RS485 und den digitalen I/Os.

Angeschlossene Differenzstromwandler und zu messende Leitungen benötigen eine Basis- oder eine zusätzliche Isolierung nach IEC61010-1:2010 für die anliegende Netzspannung.

Anschlussvermögen der Klemmstellen (Digitale Ein- und Ausgänge (I/Os))	
Starr/flexibel	0,14 - 1,5 mm², AWG 28-16
Flexibel mit Aderendhülsen mit Kunststoffhülse	0,25 - 0,5 mm²
Flexibel mit Aderendhülsen ohne Kunststoffhülse	0,25 - 1,5 mm²
Anzugsdrehmoment	0,22 - 0,25 Nm
Abisolierlänge	7 mm

Potentialtrennung und elektrische Sicherheit der digitalen Ein- und Ausgänge (I/Os)

Die digitalen Ein- und Ausgänge besitzen
- eine doppelte Isolierung zu den Eingängen der Versorgungsspannung, Spannungs- und Strommessung.
- eine Funktionsisolierung gegeneinander, zu den Schnittstellen Ethernet, Profibus, RS485 und dem Temperaturmesseingang

Die externe Hilfsspannung entsprechend SELV oder PELV realisieren.

HINWEIS!
Weitere Technische Daten finden Sie im Benutzerhandbuch zum Gerät.

Anschlussvermögen der Klemmstellen (Versorgungsspannung) Anschließbare Leiter. Pro Klemmstelle nur einen Leiter anschließen!	
Eindrähtige, mehrdrähtige, feindrähtige	0,2 - 2,5 mm², AWG 24 - 12
Stiftkabelschuhe, Aderendhülsen	0,25 - 2,5 mm²
Anzugsdrehmoment	0,5 - 0,6 Nm
Abisolierlänge	7 mm

Anschlussvermögen der Klemmstellen (Spannungs- und Strommessung) Anschließbare Leiter. Pro Klemmstelle nur einen Leiter anschließen!	
Eindrähtige, mehrdrähtige, feindrähtige	0,2 - 2,5 mm², AWG 24-12
Stiftkabelschuhe, Aderendhülsen	0,25 - 2,5 mm²
Anzugsdrehmoment	0,5 - 0,6 Nm
Abisolierlänge	7 mm

Anschlussvermögen der Klemmstellen (Temperaturmesseingang) Anschließbare Leiter. Pro Klemmstelle nur einen Leiter anschließen!	
Eindrähtige, mehrdrähtige, feindrähtige	0,08 - 1,5 mm²
Stiftkabelschuhe, Aderendhülsen	1 mm²

Potentialtrennung und elektrische Sicherheit des Temperaturmesseingangs

Der Temperaturmesseingang besitzt
- eine doppelte Isolierung zu den Eingängen der Versorgungsspannung, Spannungs- und Strommessung.
- keine Isolierung zum RCM-Messeingang.
- eine Funktionsisolierung zu den Schnittstellen Ethernet, Profibus, RS485 und den digitalen I/Os.

Ein externer Temperatursensor benötigt eine doppelte Isolierung zu Anlagenteilen mit gefährlicher Berührungsspannung (gemäß IEC61010-1:2010).

17 Vorgehen im Fehlerfall

Fehlermöglichkeit	Ursache	Abhilfe
Keine Anzeige	Externe Sicherung für die Versorgungsspannung hat ausgelöst.	Sicherung ersetzen.
Keine Stromanzeige	Messspannung nicht angeschlossen.	Messspannung anschließen.
	Messstrom nicht angeschlossen.	Messstrom anschließen.
Angezeigter Strom ist zu groß oder zu klein.	Strommessung in der falschen Phase.	Anschluss überprüfen und ggf. korrigieren.
	Stromwandlerfaktor falsch programmiert.	Stromwandler-Übersetzungsverhältnis am Stromwandler ablesen und programmieren.
	Stromoberschwingung überschreitet den Strom-scheitelwert am Messeingang.	Stromwandler mit einem größeren Stromwandler-Übersetzungsverhältnis einbauen.
	Der Strom am Messeingang wurde unterschritten.	Stromwandler mit einem kleineren Stromwandler-Übersetzungsverhältnis einbauen.
Angezeigte Spannung ist zu groß oder zu klein.	Messung in der falschen Phase.	Anschluss überprüfen und ggf. korrigieren.
	Spannungswandler falsch programmiert.	Spannungswandler-Übersetzungsverhältnis am Spannungswandler ablesen und programmieren.
Angezeigte Spannung ist zu klein.	Messbereichsüberschreitung.	Spannungswandler verwenden.
	Der Spannungsscheitelwert am Messeingang wurde durch Oberschwingungen überschritten.	**Achtung!** Stellen Sie sicher, dass die Messeingänge nicht überlastet werden.
Phasenverschiebung ind/kap.	Strompfad ist dem falschen Spannungspfad zugeordnet.	Anschluss überprüfen und ggf. korrigieren.
Wirkleistung Bezug/Lieferung ist vertauscht.	Mindestens ein Stromwandleranschluss ist vertauscht.	Anschluss überprüfen und ggf. korrigieren.
	Ein Strompfad ist dem falschen Spannungspfad zugeordnet.	Anschluss überprüfen und ggf. korrigieren.

Possible fault	Cause	Remedy
Effective power too large or too small.	The programmed CT ratio is incorrect.	Read out and program the current transformer transformation ratio at the current transformer.
	The current path is assigned to the wrong voltage circuit.	Check connection and correct if necessary.
	The programmed voltage transformer ratio is incorrect.	Read out and program the voltage transformer transformation ratio at the voltage transformer.
An output is not responding.	The output was incorrectly programmed.	Check programming and correct if necessary.
	The output was incorrectly connected.	Check and correct connection if necessary.
Measurement range exceeded display (overload).	Voltage and current measurement input outside the measurement range.	Check and correct connection if necessary.
		Use suitable voltage or current transformer.
		Read voltage / current transformer ratio at the transformer and program.
No connection with the device.	RS485 • Device address is incorrect. • Different bus speeds (Baud rate). • Wrong protocol. • Termination missing.	• Adjust the device address. • Adjust speed (baud rate). • Select the correct protocol. • Terminate bus with termination resistor.
	Ethernet • IP Device address is incorrect. • Incorrect addressing mode.	• Adjust IP device address. • Adjust the IP address assignment mode.
Device still does not work despite the above measures.	Device defective.	Send device and error description for verification to the manufacturer.

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