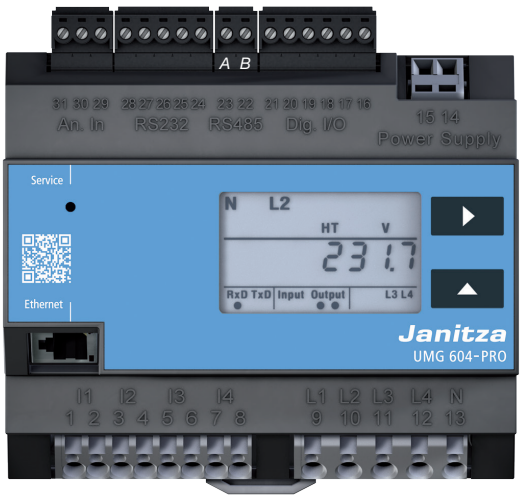
Part no. 33.03.125

www.janitza.com

Power Quality Analyzer

UMG 604-PRO

User manual and technical data



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Janitza

UMG 604-PRO
Functionally expandable power analyzer

Doc. no.: 1.033.059.7.a
Date: 02/2026
The German version is the original edition of the documentation.

INFORMATION

The content of this document reflects the measurement device firmware version 5.3.0 that was current at the time of creation. Check for the presently current version (www.janitza.com) and keep the measurement device firmware up to date!

Subject to technical alterations.

The contents of our documentation have been compiled with great care and reflect the current state of the information available to us. Nonetheless, we wish to point out that updates of this document are not always possible at the same time as technical refinements are implemented in our products. Please see our website under www.janitza.com for the current version.
Please see our website under www.janitza.com for the current version.

Information about the GridVis software

Janipedia: wiki.janitza.de

Tutorials: youtube.com/@gridvis

INHALTSVERZEICHNIS

1. Information on the device and the user manual

1.1 Disclaimer

Compliance with the usage information for the devices is a prerequisite for safe operation and attaining the stated performance characteristics and product features.

Janitza electronics GmbH assumes no liability for bodily injury, material damage or financial losses which result from disregard of the usage information.

Make sure that your usage information is readily available and legible.

1.2 Copyright notice

1.3 Technical changes

- Make sure that your device matches the user manual.
- This user manual applies to the UMG 604-PRO. Separate validities and distinctions are marked.
- First make sure you have read and understood the usage information accompanying the product.
- Keep the usage information associated with the product available for the entire service life and pass it on to any possible subsequent users.
- Find out about device revisions and the associated modifications of the usage information associated with your product at www.janitza.com.

1.4 About this user manual

If you have questions, suggestions or ideas for improvement of the user manual, please let us know via email at: info@janitza.com.

INFORMATION

This user manual describes the UMG 604-PRO and provides information on the operation of the device.

Also consult the additional documentation relevant for this user manual, such as:
- the installation manual.
- the data sheet.
- the "Safety instructions" supplement.

Furthermore, the **GridVis software** has an *Online Help* feature.

The illustrations and figures in this user manual may differ from the actual state of the device delivered!

INFORMATION

Our usage information uses the grammatical masculine form in a gender-neutral sense! This form always refers equally to women, men and diverse. In order to make the texts more readable, distinctions are not made. We ask for your understanding for these simplifications.

1.5 Defective device/disposal

Before sending a **defective device** back to the manufacturer for inspection:
- contact the manufacturer's Support department.
- send the device complete with accessories.
- when doing so, please bear the terms for transportation in mind.

Do not attempt to open or repair the device yourself, as this will invalidate the warranty!

For the **Disposal** of the device please observe national regulations! Dispose of individual parts, as applicable, depending on their composition and existing country-specific regulations, for example, as

- Electronic waste,
- Batteries and rechargeable batteries,
- Plastics,
- Metals.

Engage a certified disposal company to handle scrapping as needed.

Information on servicing and maintenance of your device can be found in Sect. “15. Service and maintenance” on p. 64.

1.6 Meaning of symbols

The following pictograms are used in this user manual:

Ground wire connection

Capacitive
The voltage lags behind the current.

Inductive
The current lags behind the voltage.

2. Safety

The chapter on Safety contains information which must be observed to ensure your personal safety and avoid material damage.

2.1 Display of warning notices and safety instructions

The warning notices shown below
· are found throughout all of the documentation,
· can be found on the devices themselves.
· indicate potential risks and hazards,
· underscore aspects of the information provided that clarifies or simplifies procedures.

The additional symbol on the device itself indicates an electrical danger that can result in serious injuries or death.

This general warning symbol draws attention to a possible risk of injury. Be certain to observe all of the information listed under this symbol in order to avoid possible injury or even death.

2.2 Hazard levels

Warning and safety instructions is marked by a warning symbol, and the hazard levels are shown as follows, depending on the degree of hazard:

⚠ DANGER
Warns of an imminent danger which results in serious or fatal injury.

⚠ WARNING
Warns of a potentially hazardous situation which could result in serious injury or death.

⚠ CAUTION
Warns of an immediately hazardous situation that may result in minor or moderate injury.

ATTENTION
Warns of an imminently hazardous situation that can result in material or environmental damage.

ⓘ *INFORMATION*

Indicates procedures in which there is **no** hazard of personal injury or material damage.

2.3 Product safety

The device reflects current engineering practice and accepted safety standards, but hazards can nonetheless arise.

Observe the safety regulations and warning notices. If notices are disregarded, this can lead to personal injury and/or damage to the product.

Every type of tampering with or use of this device,
· which goes beyond the mechanical, electrical or other operating limits can lead to personal injury and/or damage to the product;
· constitutes “misuse” and/or “negligence” under the product’s warranty and thus voids the warranty for any possible resulting damage.

Read and understand the user manual and the associated usage information before installing, operating, maintaining and using the device.
As applicable, observe all further usage information on the components (e.g. current and voltage transformers) of your system.

Only operate the device when it is in perfect condition and in compliance with this user manual and the associated usage information. Send defective devices back to the manufacturer in compliance with proper transport conditions.
Retain the user manual throughout the service life of the device and keep it at hand for consultation.

When using the device, also observe the legal and safety regulations for your system that are applicable for the respective use case.

2.4 Dangers when handling the device

When operating electric devices, it is unavoidable for certain parts of these devices to conduct hazardous voltage. Consequently, severe bodily injury or material damage can occur if they are not handled properly.

Consequently, when handling our devices, always observe the following:

· Do not exceed the limit values specified in the user manual and on the nameplate! This must also be observed during testing and commissioning!
· Safety and warning notices in all usage information that belongs to the device!

⚠ WARNING

Life-threatening danger or material damage due to disregard of connection conditions!

Disregarding the connection conditions of the Janitza measurement devices or their components can lead to injuries and even death or to material damage!

· **Do not use Janitza measurement devices or components for critical switching, control or protection applications where the safety of persons and property depends on this function.**
· **Do not carry out switching operations with the Janitza measurement devices or components without prior inspection by your system manager with specialist knowledge! In particular, the safety of persons, material assets and the applicable standards must be taken into account!**

⚠ WARNING

Risk of injury due to electrical currents and voltages!

Severe bodily injury or death can result! Therefore please abide by the following:

· **Switch off your installation before commencing work! Secure it against being switched on again! Check to be sure it is de-energized! Ground and short circuit! Cover or block off adjacent live parts!**
· **During operation and troubleshooting (especially with DIN rail devices), check the environment for dangerous voltages and switch these off if necessary!**
· **Wear protective clothing and protective equipment in accordance with applicable guidelines when working on electrical systems!**
· **Before making connections to the device, ground the device by means of the ground wire connection, if present!**
· **Do not touch any bare, stripped wires or inputs on the devices that are dangerous to touch. Equip stranded conductors with wire ferrules!**
· **Hazardous voltages can be present in all circuitry parts that are connected to the power supply.**
· **Protect wires, cables and devices with a suitable line circuit breaker/fuse!**
· **Never switch off, remove or tamper with safety devices!**
· **There can still be hazardous voltages present in the device even after it has been disconnected from the supply voltage (capacitor storage).**
· **Do not operate equipment with current transformer circuits with ../5A (1A) current transformers with exposed connections.**
· **Only connect screw terminals and spring terminals with the same number of poles and design!**
· **Do not exceed the limit values specified in the user manual and on the nameplate! This must also be observed during testing and commissioning.**
· **Observe the safety instructions and warnings in the associated usage information.**

2.5 Electrically qualified personnel

To avoid bodily injury and material damage, only electrically qualified personnel with knowledge of the national and international accident prevention regulations are permitted
· to work on the devices assemblies, systems and current circuits.
· Safety technology standards.
· Installation, commissioning, operation, disconnection, grounding and marking of electrical equipment.
· The requirements concerning personal protective equipment.

Electrically qualified persons within the scope of the technical safety information of all usage information associated with the device are persons who can furnish proof of qualification as an electrically skilled person.

⚠ WARNING

Warning against unauthorized manipulation or improper use of the device or its components!

Opening, dismantling or unauthorized manipulation of the device and its components which goes beyond the mechanical, electrical or other operating limits indicated can lead to material damage or injury, up to and including death.
· **Only electrically qualified personnel are permitted to work on the devices and their components, assemblies, systems and current circuits.**
· **Always use your devices or components as described in the associated usage information.**
· **If there is discernible damage, send the device or the component back to the manufacturer!**

2.6 Warranty in the event of damage

Any unauthorized tampering with or use of the device or components constitutes "misuse" and/ or "negligence" in terms of the product's warranty and thus voids the warranty with respect to any possible resulting damage. Note in this regard Sect. “3.8 Intended use” on p. 18.

2.7 Safety instructions for handling transformers

The field of transformer technology groups the totality of all devices that perform the function of a **current, voltage** or **measuring transformer** together as **sensors**.

In the usage information for our devices and components, the terms current transformer, voltage transformer or transformer all refer to sensors.

For Janitza measurement devices, only use **Measuring transformers for measuring purposes** that are suitable for the energy monitoring of your system!

2.8 Handling batteries/accumulators

The following apply for the battery used in the device:

⚠ CAUTION

Risk of injury due to fire or burns!

The battery used in the device may cause fire or burns if used improperly.
· **Only replace the battery with the same type or types recommended by Janitza!**
· **Observe the polarity when installing the battery!**
· **Remove batteries only with non-conductive tools (e.g. plastic tweezers)!**
· **Do not recharge, disassemble, burn or heat batteries above 100 °C (212 °F)!**
· **Do not dispose of batteries with household waste! Follow the disposal instructions in the respective device documentation!**
· **Keep batteries away from children and animals!**
· **In case of damage, return devices with a soldered battery to the manufacturer, observing proper transport conditions!**

3. Product description

3.1 Device description

Fig. UMG 604-PRO measurement device

The device is intended for:

- The measurement and calculation of electrical quantities such as voltage, current, power, work, harmonics in building installations, on distribution boards, circuit breakers and busbar trunking systems.
- The measurement of voltages and currents that originate from the same network.
- Measurement in low-voltage networks in which nominal voltages of up to 300 V from conductors to ground and surge voltages of overvoltage category III can occur.
- Installation in fixed switchboard cabinets or small distribution boards. The mounting orientation is arbitrary.
- Measurement in medium and high-voltage networks with current and voltage transformers.
- Current measurement via external ../1 A or ../5 A current transformers.

The measurement results can be displayed and read out and further processed via the interfaces of the device.

3.2 Measuring method

The device measures continuously and calculates all effective values over a 200 ms interval.

⚠ CAUTION

Malfunction and damage of the device or risk of injury due to improper connection.

Improperly connected devices can deliver incorrect measured values, damage the device or pose a risk of injury to persons.
Observe the following:
- **That measured voltages and currents come from the same network.**
- **Do not use the device for measuring direct current!**
- **Ground current-conducting switchboards!**

3.3 Transformers

For Janitza measurement devices and components, use **only** current transformers intended for measuring purposes (“transformers”)!

“Transformers”, unlike “protection transformers”, go into saturation at high current peaks.
“Protection transformers” do not have this saturation behavior and can therefore significantly exceed the rated values in the secondary circuit. This can overload the current measurement inputs of the measurement devices!
Furthermore, please note that Janitza measurement devices and components are **not** to be used for critical switching, control or protection applications (protective relays)! Observe the safety and warning information in the chapters **„Installation“** and **„Safety“!**

3.4 Mains power failure detection

A mains power failure is detected via the Voltage measurement inputs. The selection of the voltage measurement inputs can be configured with the GridVis software.

The device bridges the following mains failures at the auxiliary voltage input:

- Mains voltage: 230 VAC
- Bridging time: max. 80 ms

INFORMATION

For configuration on the device, use the parameter list from „18. Parameter list“ and for configuration via a serial interface, use the Modbus address list at www.janitza.com.

3.5 Operating concept

You can program the measurement device and retrieve measured values in several ways:

· **Directly** on the device via 2 buttons and the display.
· Via the **GridVis programming software.**
· Via the **measurement device homepage**.
· Via the **Modbus protocol**. You can change and retrieve data using the Modbus address list. This list is available at www.janitza.com.

This operating manual only describes the operation of the device using the 2 buttons. The GridVis programming software has its own online help.

3.6 GridVis network analysis software

You can program the device and read out data using the GridVis network analysis software available at www.janitza.com. To do so, a PC must be connected to the device via a serial interface (RS-485 / Ethernet).

With the GridVis network analysis software you can
· Program the device.
· Configure and read out recordings.
· Save data to a database.
· Display measured values graphically.
· Program customer-specific applications.

INFORMATION

Measurement in medium and high-voltage networks is always carried out using current and voltage transformers. Special safety regulations which are not discussed further here must be observed for these.

3.7 Incoming goods inspection

Safe and trouble-free operation of this measurement device and its components presupposes proper transport, storage, set-up and assembly as well as operation and maintenance in addition to compliance with the safety instructions and warning notices.Unpack and pack the device with the usual care, without using force and using only suitable tools. Check
· The measurement device by visually inspecting it for perfect mechanical condition.
· The scope of delivery for completeness before beginning with assembly and installation.

If it can be assumed that safe operation of your measurement device is not possible, disconnect the measurement device immediately. To avoid electrical accidents, follow the 5 safety rules as follows:

1. **Disconnect the system (devices, and components as applicable)!**
2. **Secure it against being switched on again!**
3. **Check to be sure it is de-energized!**
4. **Ground and short-circuit the system (devices, components as applicable)!**
5. **Cover or block off adjacent live parts!**

Safe operation is impossible, if, for example, the measurement device:
· has visible damage,
· no longer functions despite an intact power supply,
· was subjected to extended periods of unfavorable conditions (e.g. storage outside of the permissible climate conditions without adaptation to the room climate, condensation, etc.) or transport stress (e.g. falling from an elevated position, even without visible external damage, etc.).

3.8 Intended use

The measurement device is
· Suitable for use in industrial areas.
· Intended for installation in switchboard cabinets and small distribution boards.
· Designed as an interior meter.

The measurement device is **not** for installation
· In vehicles! Use of the device in non-stationary equipment constitutes an exceptional environmental condition and is only permissible by special agreement.
· In environments with harmful oils, acids, gases, vapors, dusts, radiation, etc.
· In potentially explosive environments.

Safe and trouble-free operation of the measurement device requires proper transport, storage, assembly, installation, operation and maintenance.

3.9 Performance characteristics

General
- Mounting on 35 mm DIN rail
- LCD display, backlight (option)
- Operation via 2 buttons
- 4 voltage and 4 current measurement inputs
- 1 temperature measurement input
- 2 digital outputs and 2 digital inputs
- RS-485 interface (Modbus RTU, Modbus master)
- RS-232 interface
- Ethernet (web server, email)
- Suitable for installation in distribution boards
- Suitable for measurement in networks with frequency converters
- Working temperature range of -10 °C .. +55 °C

Measurement
- Measurement in IT, TN and TT networks
- Continuous sampling of the voltage and current measurement inputs
- Recording and storing transients (>50 µs)
- Acquisition of more than 800 measured values
- Fourier analysis of 1st to 40th harmonics for U, I, P (consumption/delivered) and Q (ind./capacitive)
- Temperature measurement
- Working measurement, measurement uncertainty:
  - Class 0.5 for ../5 A transformers
  - Class 1 for ../1 A transformers
- Programming of custom applications in Jasic

3.10 Conformity declaration

The laws, standards and directives applied by Janitza electronics GmbH for the devices can be found in the declarations of conformity at www.janitza.com.

3.11 Scope of delivery

Quantity	Part. no.	Designation
1	5216xxx[1]	UMG 604-PRO
1	3303338	Installation manual DE/EN
1	3303352	"GridVis Software" Quick Guide
1	1001807	Screw terminal, plug-in, 2-pole
1	1001808	Screw terminal, plug-in, 3-pole
1	1001809	Screw terminal, plug-in, 5-pole
1	1001810	Screw terminal, plug-in, 6-pole
1	5200008	RS-485 termination resistor, 120 ohms

[1]For item number see delivery note

INFORMATION

All screw terminals included in the scope of delivery are attached to the device.

3.12 Accessories

Quantity	Part. no.	Designation
1	2101058	Battery type, Lithium CR2032, 3 V, (approval according to UL 1642)
1	802427	RS-232, connection cable (UMG 604-PRO - PC), 2 m, 5-pin

INFORMATION

The delivery note documents all delivered options and design variants.

4. Structure of the device

4.1 Product overview

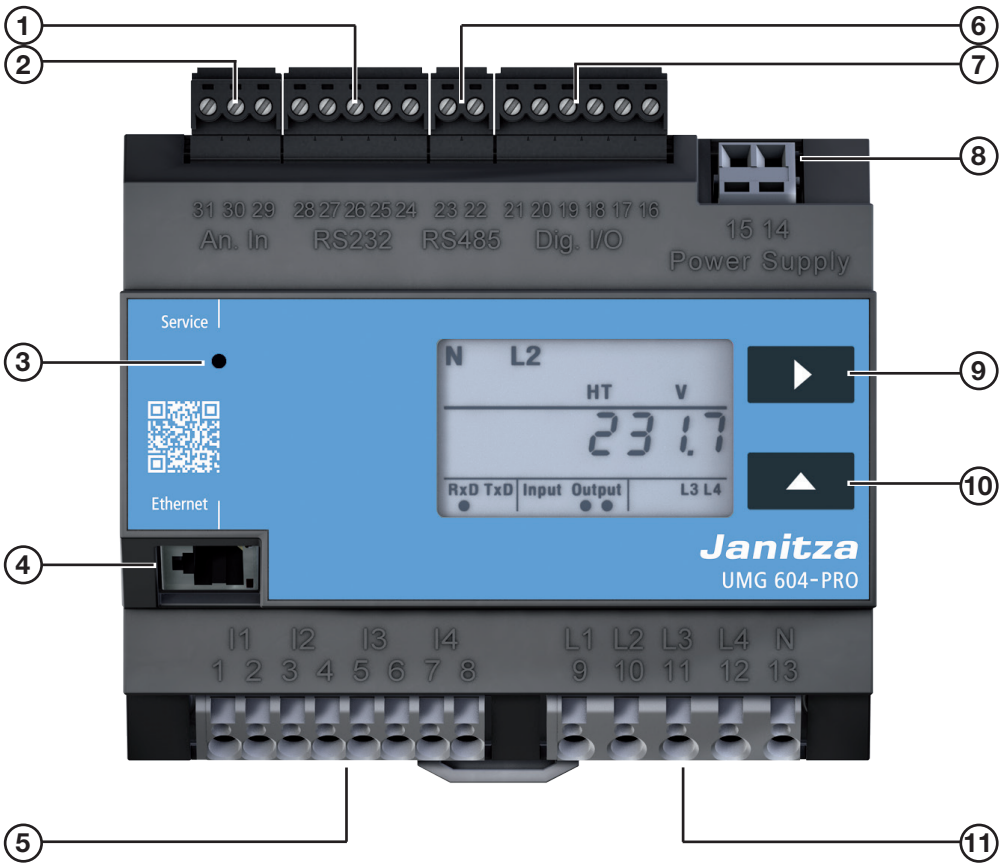
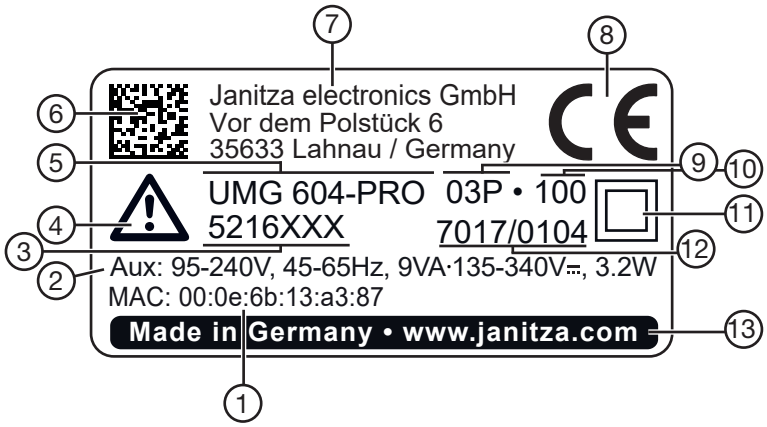


Fig. front view UMG 604-PRO

Item	Function/Designation
1	RS-232 interface
2	Temperature measurement input
3	Hidden service button
4	Ethernet interface
5	Current measurement inputs I1 to I4
6	RS-485 interface
7	Digital inputs/outputs
8	Supply voltage
9	Button 1
10	Button 2
11	Voltage measurement inputs L1 to L4

Tab. Device structure - Interfaces, controls and display elements

4.2 Identification of the device (nameplate)



Item	Designation	Description
1	MAC address	Unique identification of the device in a computer network.
2	Operational data	Supply voltage, nominal frequency, power consumption and max. power consumption
3	Item number of the measurement device	Manufacturer's item number - marking for traceability (Actual item number may differ from illustration - see delivery note)
4	Symbol for “Danger sign”	General warning symbol. Be certain to observe the warning notices applied to the device and shown in the usage information in order to avoid possible injury or even death.
5	Device type	Device designation.
6	Data matrix code	Coded manufacturer data.
7	Manufacturer’s address	Full address of the device manufacturer.
8	CE conformity marking	See section "3.10 Declaration of conformity" on p. 21
9	Manufacturer-specific data	Manufacturer data.
10	Hardware version	Hardware version of the device.
11	"Protection class II" symbol	Marking of the protection class "protective insulation".
12	Type/serial number	Number for identification of the device.
13	Designation of origin/web address	Country of origin and manufacturer’s web address.

Tab. Device identification Nameplate

5. Mounting

⚠ DANGER

Life-threatening danger due to electric shock!

Electric shocks lead to serious injuries, including death.
Before installing and connecting the device:
- **Disconnect the supply of power to the system!**
- **Secure it against being switched on again!**
- **Check to be sure it is de-energized!**
- **Ground and short circuit!**
- **Cover or block off adjacent live parts!**
- **The installation must only be carried out by qualified personnel with electrical training!**

Mount the measurement device in switchboard cabinets or small distribution boards according to DIN 43880 on a 35 mm DIN rail (for type, see Sect. “17. Technical specifications” on p. 66) according to DIN EN 60715. The mounting orientation is arbitrary.

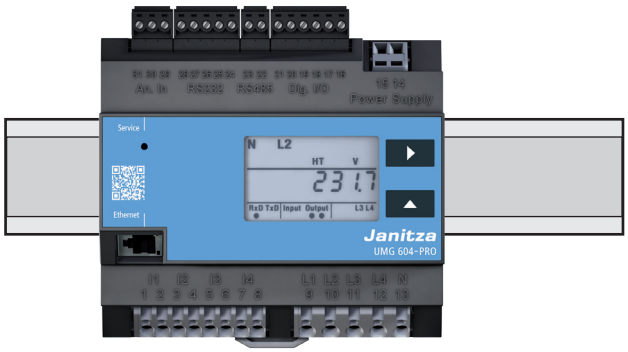


Fig. Front view of UMG 604-PRO on mounting rail

⚠ CAUTION

Disregard of the installation instructions may cause property damage or personal injury!

Failure to observe the installation instructions can damage or destroy your basic device and even lead to personal injury.
- **In addition to the installation instructions for the measurement device, also observe the installation instructions for the devices integrated in your measurement device topology, in particular the safety instructions.**
- **Provide adequate air circulation in your installation environment and cooling, as needed, when the ambient temperatures are high.**
- **Return defective measurement devices to Janitza electronics GmbH in accordance with the shipping instructions for air or road freight (complete with accessories).**
- **All usage information is also available as a download at www.janitza.com.**

ATTENTION

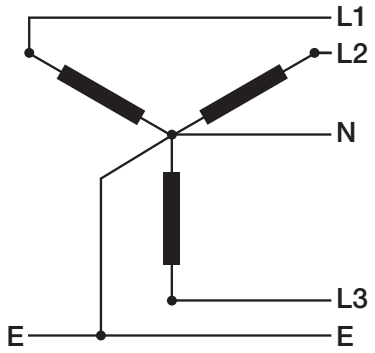
Material damage due to improper handling!

Improper handling or handling them too roughly can destroy your devices. Contacts, bottom bolts and retaining clips can be damaged or broken off during mounting or dismounting.
- **Never use force to assemble or disassemble devices! Never tear devices off the DIN rail.**
- **When dismantling devices, first remove the wiring (e.g. cables, current and voltage transformers, etc.).**
- **Carefully unlock the bottom bolts and retaining clips of the devices with a screwdriver.**
- **Never touch or manipulate contacts! Protect the contacts during handling, transport and storage!**
- **Observe related usage information on the devices.**

6. Grid systems

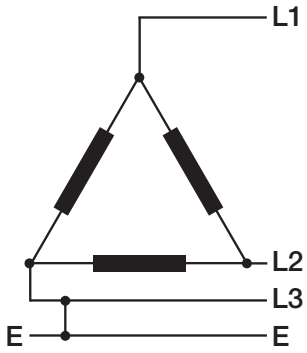
Suitable grid systems and maximum rated voltages (DIN EN 61010-1/A1):

Three-phase 4-conductor systems
with grounded neutral conductor



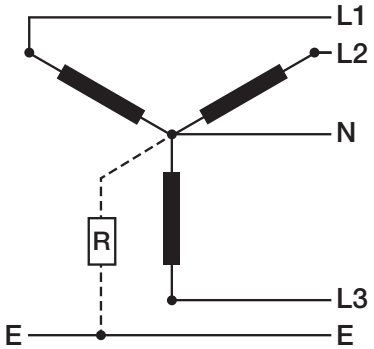
U_{L-N} / U_{L-L}
277 V_{LN} / 480 V_{LL}

Three-phase 3-conductor systems
with grounded phase



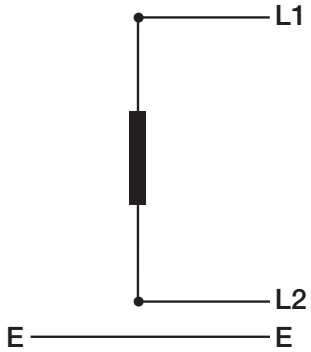
U_{L-L}
480 V_{LL}

Three-phase 4-conductor systems
with ungrounded neutral conductor (IT networks)



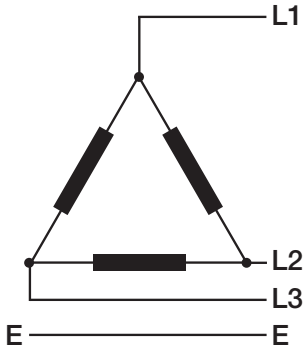
U_{L-N} / U_{L-L}
277 V_{LN} / 480 V_{LL}

Two-phase two-conductor systems
ungrounded



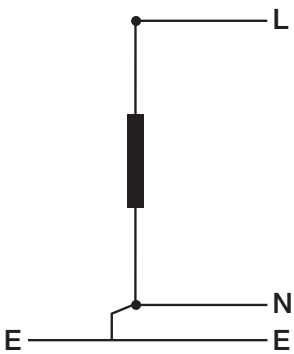
U_{L-L}
480 V_{LL}

Three-phase 3-conductor systems
ungrounded



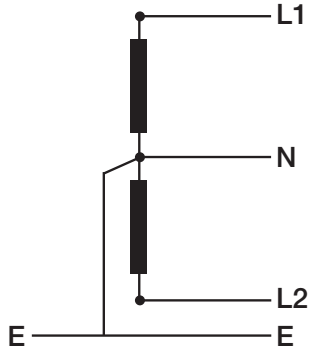
U_{L-L}
480 V_{LL}

One-phase 2-conductor systems
with grounded neutral conductor



U_{L-N}
480 V_{LN}

Split one-phase 3-conductor system
with grounded neutral conductor



U_{L-N} / U_{L-L}
277 V_{LN} / 480 V_{LL}

Range of application of the meter:
· 2, 3 and 4-conductor networks (TN, TT and IT networks).
· Residential and industrial areas.

⚠ WARNING

Risk of injury due to electrical voltage!
Rated surge voltages above the permitted overvoltage category can damage the insulation in the device. This impairs the safety of the device. This can result in serious injury or death.
· **Only use the device in environments which comply with the permissible rated surge voltage.**
· **Observe the limit values specified in the user manual and on the nameplate.**

6.1 Three-phase 4-conductor systems

The device can be used in three-phase 4-conductor systems (TN, TT network) (50 Hz, 60 Hz) with an earthed neutral conductor. The components of the electrical system are grounded.
The voltage *Conductor to neutral conductor* must not exceed 300 VAC.

The device is only suitable for environments in which the permissible rated surge voltage and overvoltage category are not exceeded.

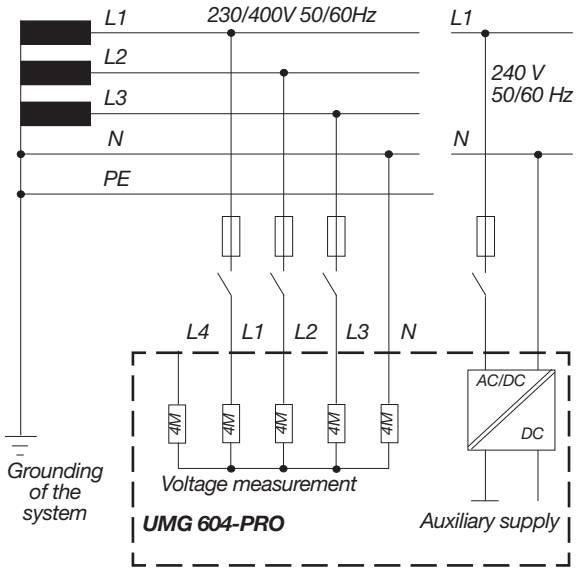


Fig. Schematic diagram, UMG 604-PRO in a TN network

6.2 Three-phase 3-conductor systems

The device can be used in unearthed three-phase 3-conductor systems (IT network).

The voltage *Conductor to conductor* must not exceed 480 VAC (50 Hz, 60 Hz).
In an IT system, the neutral point of the voltage generator is not grounded. The components of the electrical system are grounded. Grounding via a high-ohmic impedance is permitted.

IT networks are only permitted in certain systems with their own transformer or generator.

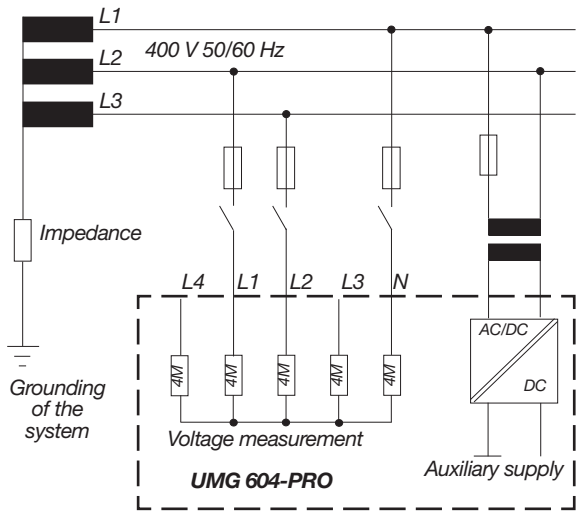


Fig. Schematic diagram, UMG 604-PRO in an IT network without N

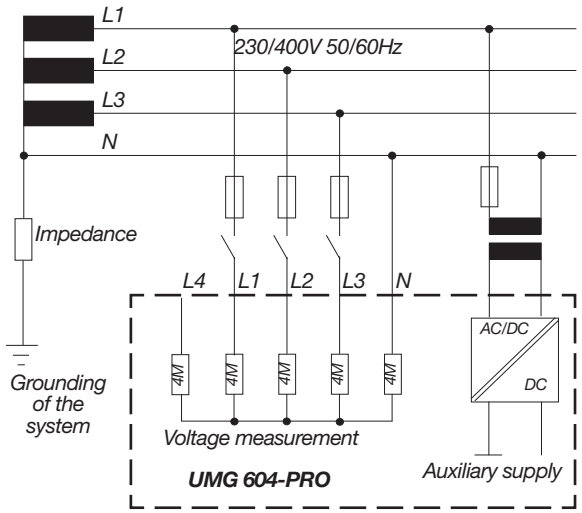


Fig. Schematic diagram, UMG 604-PRO in an IT network with N

6.3 Nominal voltages

The following figures show lists of the networks and associated nominal network voltages in which the device can be used.

U_{L-N} / U_{L-L}
66 V / 115 V
120 V / 208 V
127 V / 220 V
220 V / 380 V
230 V / 400 V
240 V / 415 V
260 V / 440 V
277 V /480 V

Table: Suitable rated voltages in a three-phase four-conductor system

U_{L-L}
66 V
115 V
120 V
127 V
200 V
230 V
240 V
260 V
277 V
347 V
380 V
400 V
415 V
440 V
480 V

Table: Suitable nominal voltages in a three-phase three-conductor system

7. Installation

⚠ WARNING

Risk of injury due to electrical voltage!

Disregard of the connection conditions of the transformers to Janitza measurement devices or their components can lead to injuries or even death or to material damage!

- **Do not use Janitza measurement devices or components for critical switching, control or protection applications (protective relays)! It is not permitted to use measured values or measurement device outputs for critical applications!**
- **For Janitza measurement devices and their components use only "Transformers for measurement purposes" which are suitable for the energy monitoring of your system. Do not use "transformers for protection purposes"!**
- **Observe the information, regulations and limit values in the usage information for "Transformers for measuring purposes", including during testing and commissioning of the Janitza measurement device, the Janitza component and your system.**

7.1 Circuit breaker

When installing in a building, provide a suitable circuit breaker for the supply voltage in order to disconnect your system and thus your device from the supply of power.

- Install the circuit breaker of your system or device in such a way that it is easily accessible by the user.
- Mark the switch as an isolation device.

⚠ WARNING

Life-threatening danger due to electrical voltage!
Severe bodily injury or death can result from:

- Touching bare or stripped leads that are energized.
- Device inputs that pose a hazard when touched.

Before mounting and connecting the device, do the following on your system:

- **Disconnect the supply of power!**
- **Secure it against being switched on again!**
- **Check to be sure it is de-energized!**
- **Ground and short circuit!**
- **Cover or block off adjacent live parts!**

7.2 Supply voltage

A supply voltage is required to operate the device.

Before applying the supply voltage, make sure that the voltage and frequency match the specifications on the nameplate.

The connecting cables for the supply voltage must be protected by a UL-listed fuse or line circuit breaker.

⚠ CAUTION

Disregard of the connection conditions can result in material damage!

Therefore please abide by the following:

- Observe the voltage and frequency specifications on the nameplate.
- Connect the supply voltage via a fuse in accordance with the technical data.
- Do not tap the supply voltage at the voltage transformers.

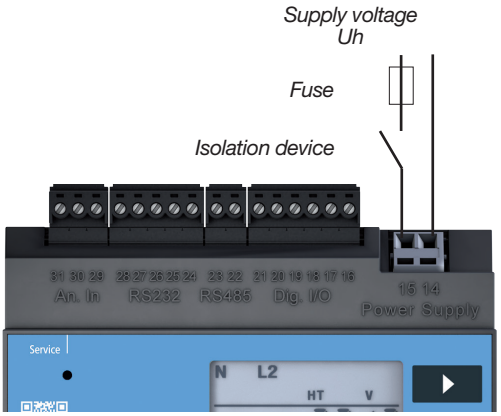


Fig. Connection example for the supply voltage Uh

ⓘ *INFORMATION*

Equip stranded conductors with wire ferrules!
Devices that are operated with DC voltage are protected against polarity reversal.

7.3 Voltage measurement

The device is designed for measuring AC voltages in 300 V networks in which category III overvoltages can occur.

The device can only determine measured values if a measured voltage of greater than 10 V_{eff} is present on at least one voltage measurement input.

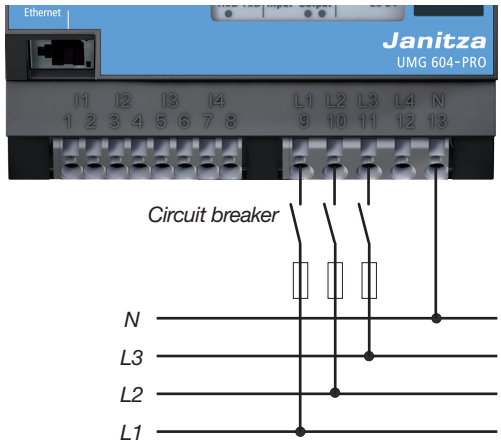


Fig. Connection example: Voltage measurement via short-circuit-proof test leads

Please note the following when selecting the test leads:
- Use test leads that are suitable for 300 V to ground and 520 V conductor to conductor.
- Protect normal test leads with an overcurrent protection device.
- Run short-circuit-proof test leads via a circuit breaker.
- Connect voltages above 300 VAC to ground via voltage transformers.

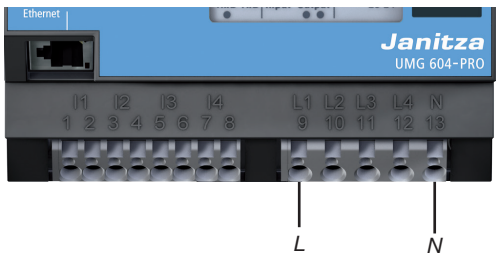


Fig. Voltage measurement input with connected phase L and neutral conductor N

⚠ CAUTION

Malfunction due to improper connection!
If the device is connected incorrectly, incorrect measured values may result.

Therefore please abide by the following:
- **Measured voltages and currents must originate from the same network.**
- **The device is not suitable for measuring DC voltage.**

⚠ WARNING

Life-threatening danger due to electrical voltage!
Failure to observe the connection conditions for the voltage measurement inputs can result in serious physical injury or death.

Therefore please abide by the following:
- **Do not use the device for voltage measurement in SELV circuits.**
- **Connect voltages that exceed the permitted nominal network voltages via voltage transformers.**
- **The voltage measurement inputs on the device are dangerous to touch!**
- **Install a circuit breaker as described in the section „Circuit breaker“ on page 27 .**

7.4 Current measurement

The device:
· Is designed for the connection of current transformers with secondary currents of ../1 A and ../5 A.
· Does not measure DC currents.
· Has current measurement inputs that can be continuously loaded with 6 A or with 100 A for 1 second.

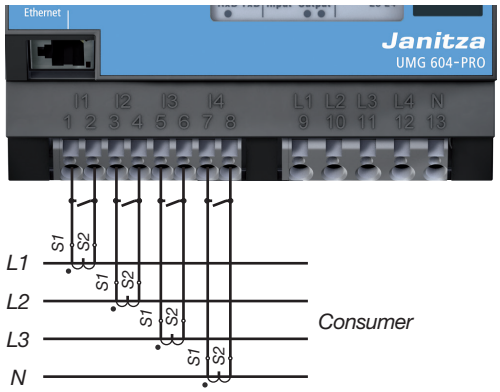


Fig. Connection example, Current measurement via current transformer

INFORMATION

For the measurement inputs L4 and I4, no connection diagram has to be configured.

WARNING

Life-threatening danger due to electrical voltage!

Current transformers which are operated exposed on the secondary side can carry hazardous, live high voltage peaks which can lead to serious bodily injury or death.

Therefore please abide by the following:
· **Avoid exposed operation of the current transformers.**
· **Short circuit unloaded current transformers.**
· **Connect the ground connections provided for the current transformers to earth.**
· **Before interrupting the supply of power, it isessential to short the secondary connections of the current transformers.**
· **If there is a test switch that automatically short-circuits the secondary current transformer lines, it is sufficient to set it to the *Test* position, provided that the short-circuiters have been checked beforehand.**
· **Ensure that the attached screw terminal is sufficiently secured to the device with the two screws.**
· **Even current transformers and current measurement inputs rated as safe for exposed operation are dangerous to touch if they are operated exposed.**

7.4.1 Amperemeter

If you want to measure the current not only with the UMG, but also with an ammeter, connect the amperemeter to the UMG in series.

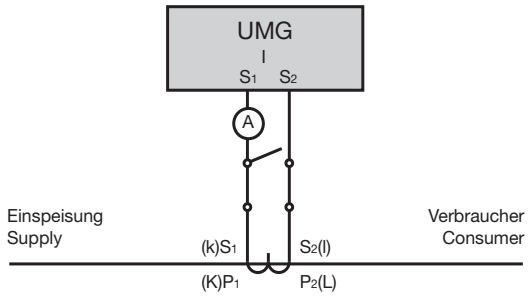


Fig. Circuit diagram with additional amperemeter connected in series

7.4.2 Direct measurement

Nominal currents up to 5 A can be measured directly on the device. Please note that each current measurement input may be continuously loaded with 6 A or with max. 100 A for 1 second.

The device has no built-in protection for current measurement. Consequently, provide a 6 A line protection fuse or circuit breaker to protect against overcurrent during installation.

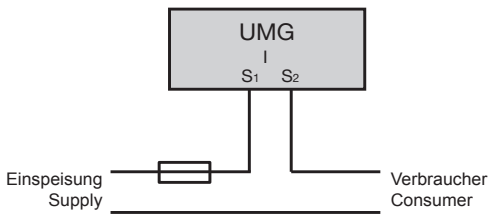


Fig. Example of direct current measurement

7.4.3 Summation current measurement

For a summation current measurement via two current transformers, first set their total ratio on the device. Setting the current transformer ratios is described in section „12.1 Current transformer ratio“.

Example:
The current is measured via two current transformers. Both current transformers have a transformer ratio of 1000 / 5 A. The summation measurement is carried out with a 5+5 / 5 A summation current transformer.

The device must then be adjusted as follows:
Primary current: 1000 A + 1000 A = 2000 A
Secondary current: 5 A

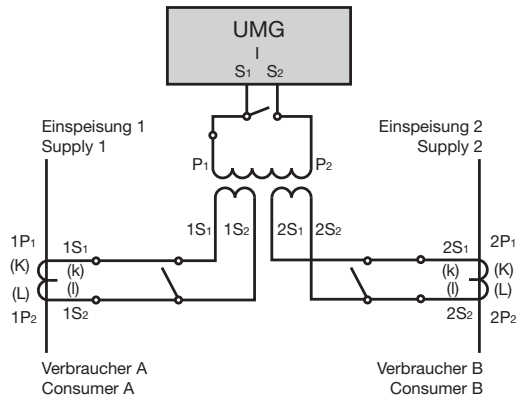


Fig. Example for current measurement via a summation current transformer.

7.5 Connection variants

7.5.1 Voltage measurement

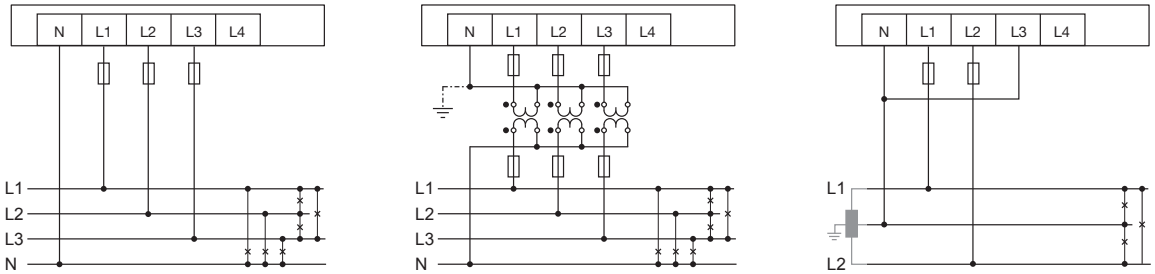


Fig. Connection examples for voltage measurement in three-phase 4-conductor networksand single 3-conductor networks

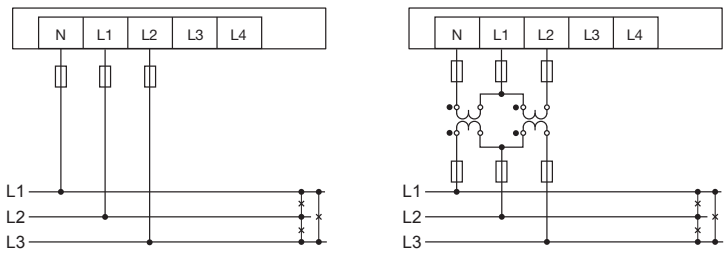


Fig. Connection examples for voltage measurement in three-phase 3-conductor networks

7.5.2 Current measurement

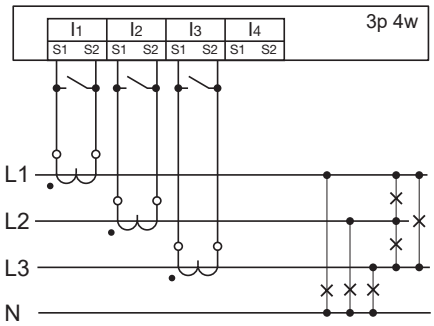


Fig. Current measurement, connection example for connection variant 0

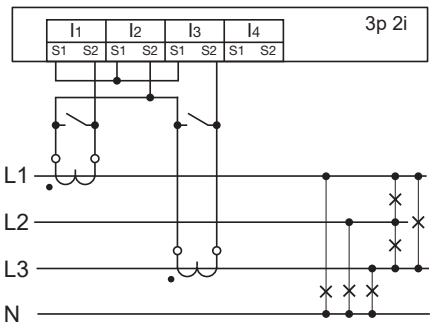


Fig. Current measurement, connection example for connection variant 0

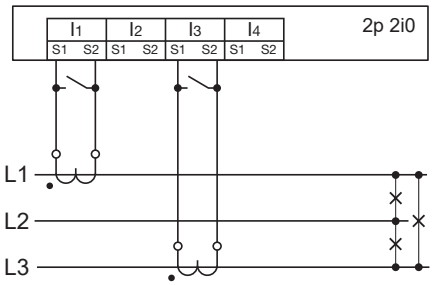


Fig. Current measurement, connection example for connection variant 1

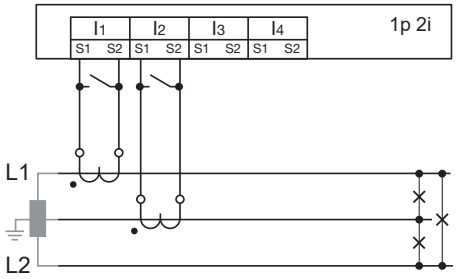


Fig. Current measurement in single-phase 3-conductor system, connection variant 0

7.5.3 Connection variants for V4 measurement

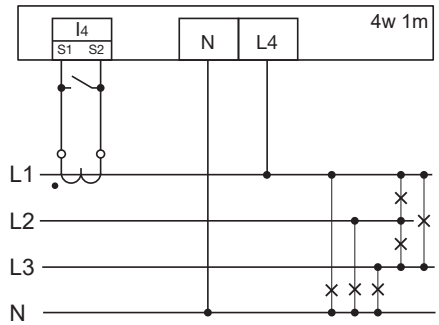


Fig. Measurement in a three-phase 4-conductor network with a symmetrical load

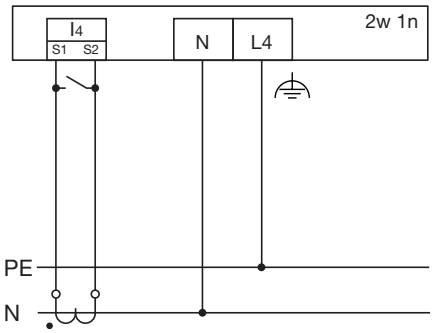


Fig. Measurement of voltage between N and PE. Measurement of the current in the neutral conductor

INFORMATION

Measured voltages and currents must originate from the same network.

When using measurement input V4, a voltage is required at the main input to determine the frequency.

If the main measurement is connected to a three-phase 3-conductor network, measurement input V4 can no longer be used.

7.6 Temperature measurement

The device has a temperature measurement input that is designed for a maximum total load of 4 kOhms. The total load refers to the sensor and cable.

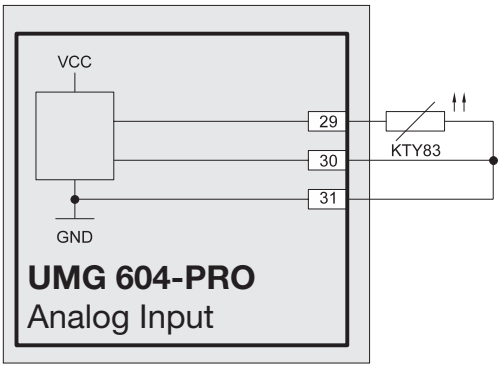


Fig. Example of temperature measurement with a KTY83

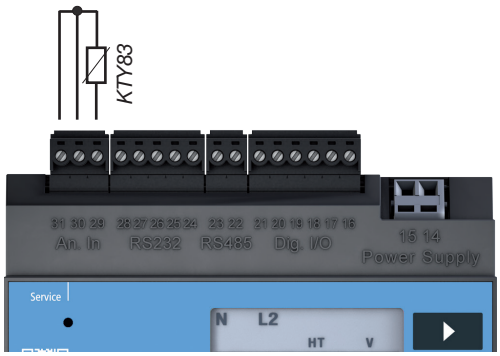


Fig. Connection of a temperature sensor to the measurement input

Temperature offset

A temperature offset in °C can be set via the Modbus address 12411 (_TEMPERATURE_OFFSET).

Example:
- If the displayed temperature is 2°C below the actual ambient temperature, enter *2* in the register.
- If the displayed temperature is 1.5°C higher than the actual ambient temperature, enter *-1.5* in the register.

⚠ CAUTION

Transmission error and material damage due to electrical malfunction.

With a cable length of more than 30 m, there is an increased probability of transmission errors and damage to the device due to atmospheric discharge.
Use a shielded cable for the connection to the temperature sensor.

⚠ CAUTION

Risk of injury due to electrical voltage!

Insufficient insulation of the equipment from the supply circuits at the temperature measurement input can result in the temperature measurement input and the RS-232 and RS-485 interfaces carrying dangerous voltages.
Ensure reinforced or double insulation with respect to the supply circuits!

⚠ WARNING

Risk of injury due to electrical voltage!

The RS-232, RS-485 and the temperature measurement input are not galvanically isolated from each other.
Therefore, please note that dangerous voltages at the non-galvanically isolated inputs can have an effect on the other connections.

8. Interfaces

The device has the following interfaces:

· RS-232
· RS-485
· Ethernet

All interfaces can be used simultaneously.

8.1 Shielding

A twisted and shielded cable must be used for connections via the RS-232 and RS-485 interfaces.

Ground the shields of all cables leading into the cabinet at the cabinet entrance.

Connect the shield to a noiseless ground and ensure a large surface area with good conductivity.

Mechanically restrain the cables before the grounding clamp to prevent damage from cable movement.

Use suitable cable glands, for example PG glands, to route the cable into the switchboard cabinet.

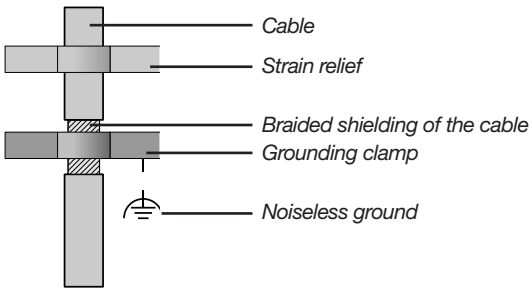


Fig. Shielding design at the entrance to the cabinet.

⚠ WARNING

Risk of injury due to electrical voltage!

The RS-232, RS-485 and the temperature measurement input are not galvanically isolated from each other. Ethernet is functionally isolated from the other interfaces.
Therefore, please note that dangerous voltages at the non-galvanically isolated inputs can have an effect on the other connections.

8.2 RS-232

With an RS-232 connection cable you can Connect the device to a PC.

The distance that can be achieved between two devices with an RS-232 interface depends on the cable used and the baud rate.

The maximum connectable cable length is 30 m.

As a guideline, a distance of 15 m to 30 m should not be exceeded at a transmission rate of 9600 baud. The permissible ohmic load must be greater than 3 kOhms and the capacitive load caused by the transmission line must be less than 2500 pF.

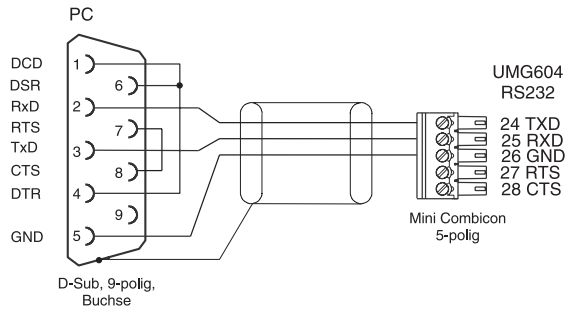


Fig. Pin assignment for the PC connection cable

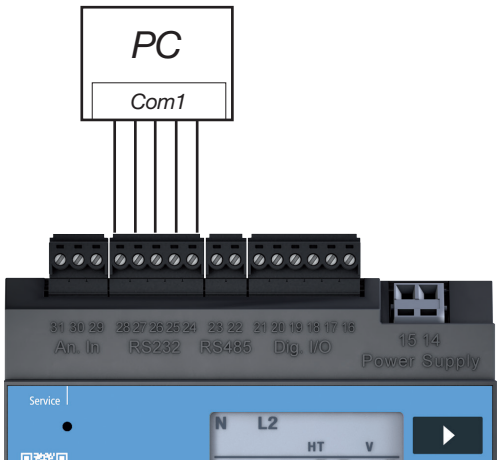


Fig. Example, connecting a UMG 604-PRO to a PC via the RS-232 interface

8.3 RS-485

The RS-485 interface of the UMG 604 is designed as a 2-pole plug contact.

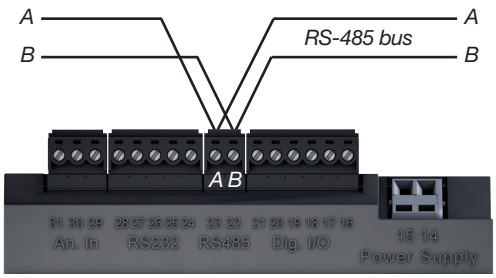


Fig. RS-485 interface, 2-pin plug contact

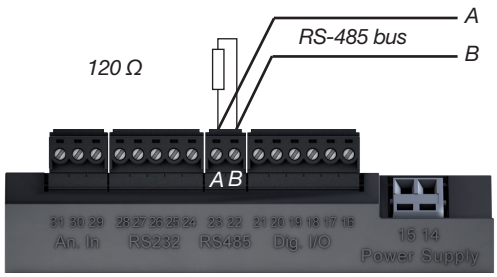


Fig. RS-485 interface, 2-pin plug contact with termination resistor

8.3.1 Cable type

CAT cables are not suitable for bus wiring. Instead, we recommend the following cable type:

· Unitronic Li2YCY(TP) 2x2x0.22 (Lapp cable)

The maximum cable length is 1200 m at a baud rate of 38.4 k.

⚠ WARNING

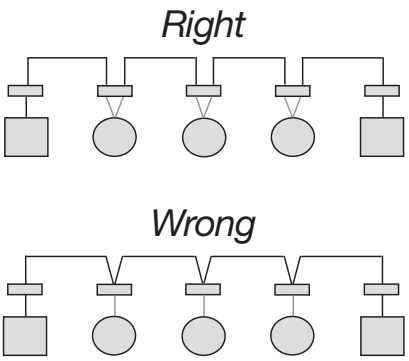
Risk of injury due to electrical voltage!

At high measuring currents, temperatures of up to 80 °C can occur at the connections.
Therefore, use cables that are designed for an operating temperature of at least 80 °C.

8.3.2 Termination resistors

At the beginning and end of a segment, the cable must be terminated with resistors (120 Ω, 1/4 W).

The UMG 604-PRO does not contain any termination resistors.



Terminal strip in the switchboard cabinet.

Device with RS-485 interface
(Without termination resistor)

Device with RS-485 interface
(With termination resistor on the device)

8.4 Bus structure

- All devices are connected in a bus structure (line).
- Up to 32 nodes can be connected together in one segment.
- The cable is terminated with resistors at the beginning and end of a segment.
- If there are more than 32 nodes, repeaters (line amplifiers) must be used to connect the individual segments.
- Devices with bus termination switched on must be powered.
- It is recommended that the client be placed at the end of a segment.
- If the client is replaced with the bus termination switched on, the bus is out of operation.
- If a server with bus termination switched on is replaced or is without voltage the bus may become unstable.
- Devices that are not involved in the bus termination can be replaced without the bus becoming unstable.

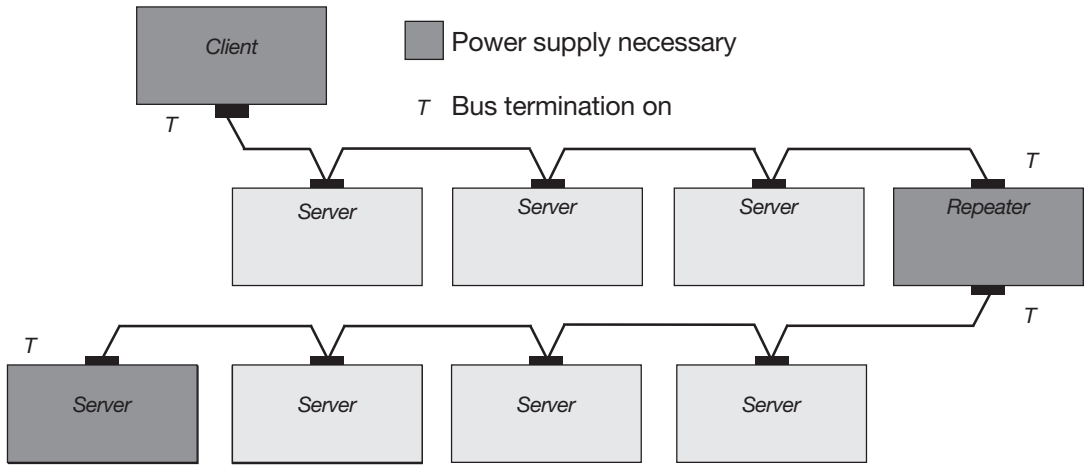


Fig. Bus structure

8.5 Modbus TCP/IP – Frequency register 14131

- The measurement device refreshes frequency measurement values every 100 ms at the latest.
- Regardless of the system load, the measurement device guarantees a maximum refresh rate of ≤ 100 ms.
- In load situations with a free CPU load without simultaneous web-server or recording activity, the measurement device provides new measured values after ~ 20 ms. However, this is not guaranteed and depends on the internal process flow.
- For applications with normative relevance (e.g. certifications in accordance with VDE-AR-N 4110), the secure provision of new frequency values within 100 ms is ensured.

ⓘ *INFORMATION*

The measurement device has this function as of firmware version 5.030.

9. Digital inputs and outputs

9.1 Digital inputs

The device has two digital inputs, to each of which you can connect a signal generator.

An input signal is detected at a digital input when a voltage of at least 10 V and a maximum of 28 V is applied.

A current of at least 1 mA and at most 6 mA then flows.

Observe the polarity of the supply voltage!

⚠ CAUTION

Transmission error and material damage due to electrical malfunction

With a cable length of more than 30 m, there is an increased probability of transmission errors and damage to the device due to atmospheric discharge.
Use a shielded cable for the connection to the digital inputs.

⚠ CAUTION

Material damage due to connection errors

The device may be damaged if the supply voltage is incorrect.
Make sure that the supply voltage
· is a DC voltage.
· is poled correctly.
· does not exceed the maximum permissible voltage.

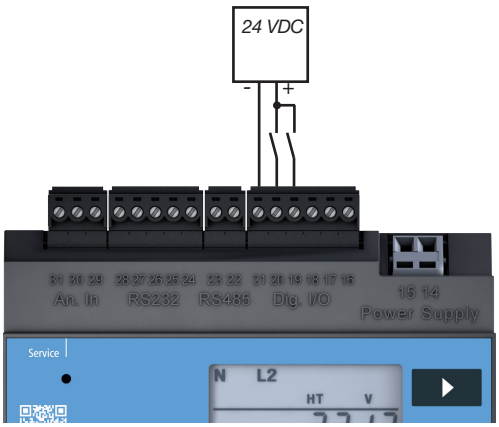


Fig. Connection example for digital inputs

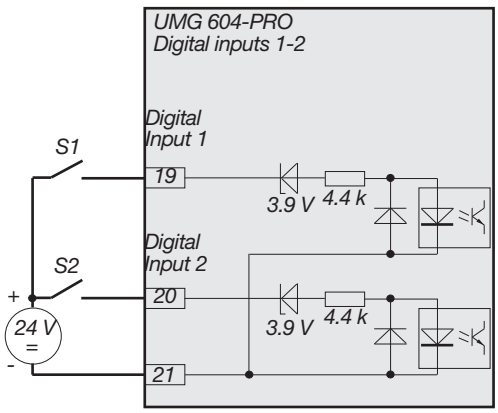


Fig. Example of connection of external switching contacts S1 and S2 to digital inputs 1 and 2

9.2 S0 pulse input

You can also connect S0 pulse generators in accordance with DIN EN62053-31 to any UMG 604-PRO with inputs for 24 V.

For this you need an external auxiliary voltage of 20..28 VDC and an external 1.5 kOhm resistor each.

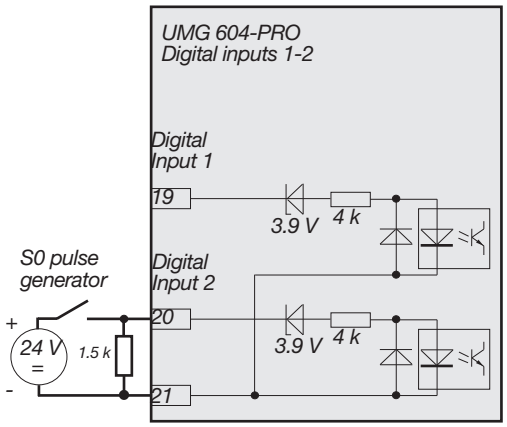


Fig. UMG 604-PRO with inputs for 24 V and an S0 pulse generator at digital input 2

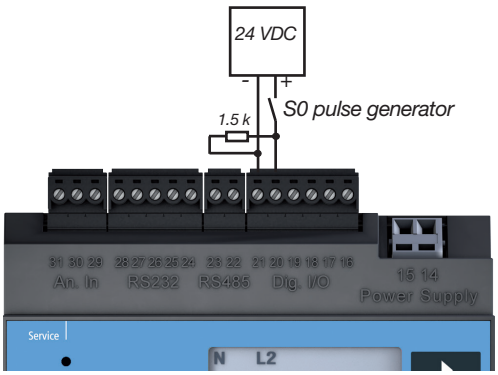


Fig. UMG 604-PRO with inputs for 24 V. Example with S0 pulse generator

9.3 Digital outputs

The device has two transistor switching outputs that are galvanically isolated from the evaluation electronics via opto-couplers.

The digital outputs
- Can switch direct-current or alternating-current loads.
- Can switch loads regardless of the polarity of the supply voltage.

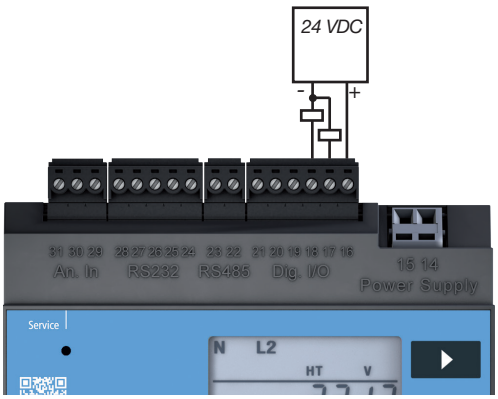


Fig. Connection example for digital outputs

⚠ CAUTION

Transmission error and material damage due to electrical malfunction

With a cable length of more than 30 m, there is an increased probability of transmission errors and damage to the device due to atmospheric discharge.
Use a shielded cable for the connection to the digital outputs.

⚠ CAUTION

Measurement error when used as a pulse output

When the digital outputs are used as pulse outputs, measurement errors can occur due to residual ripple.
For the supply voltage of the digital inputs and outputs, therefore use a power supply whose residual ripple is less than 5% of the supply voltage.

⚠ CAUTION

Material damage due to connection errors

The digital outputs are not short-circuit proof! Connection errors can therefore lead to damage to the connections.
Make sure that the wiring is correct when connecting the outputs.

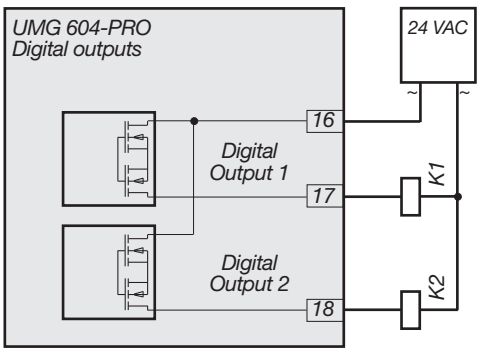


Fig. Connection of AC relays to the digital outputs

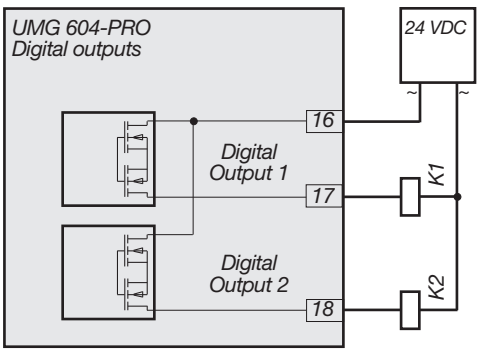


Fig. Connection of DC relays to the digital outputs

10. Commissioning

Before commissioning, delete any production-related contents from the energy meters, such as min/max values and recordings.

10.1 Apply supply voltage

The text *Start up* appears on the display after the supply voltage is applied. Approximately two to six seconds later, the device switches to the first measuring display.

If no display appears, check whether the supply voltage is within the nominal voltage range.

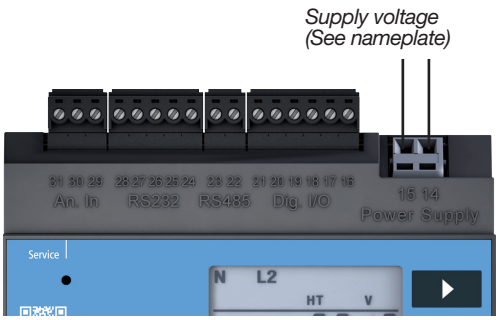


Fig. Connection example for the supply voltage Uh

10.2 Frequency measurement

For frequency measurement, the measured voltage must be greater than 10 Veff on at least one voltage measurement path (L-N).
Only detected frequencies in the range 45 Hz to 65 Hz are used for measurement at the current and voltage measurement inputs.

10.3 Apply measured voltage

The device is suitable for measuring voltages of up to 300 VAC to ground and 520 VAC conductor to conductor. The device is **not** suitable for measuring DC voltages. Voltages above 300 VAC to ground must be connected via voltage transformers.

After connecting the measured voltages, the measured values displayed by the device for the voltages L-N and L-L must match those at the voltage measurement input. If a voltage transformer factor is programmed, this must be taken into account in the comparison.

At least one phase (L) and the neutral conductor (N) must be connected to the voltage measurement input for the measurement.
A measured voltage greater than 10 V_{eff} must be applied to at least one of the voltage measurement inputs so that the device can determine the mains frequency.

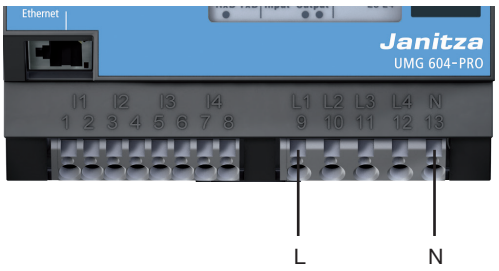


Fig. Connection example for phase and neutral conductor

10.4 Direction of rotating field

Check the direction of the voltage rotating field in the measuring display of the device. Usually it is a right rotating field.

10.5 Applying the measured current

The device
· Is designed for the connection of current transformers with secondary currents of ../1 A and ../5 A.
· Does not measure DC currents.
· Has current measurement inputs that can be continuously loaded with 6 A or with 100 A for 1 second.

Proceed as follows to apply a measured current to the device:

1. Connect the currents to be measured to the voltage measurement inputs I1 to I4.
2. Short-circuit all current transformer outputs except one.
3. Compare the currents displayed by the device with the applied current.

   · The current displayed by the device must match the input current, taking into account the current transformer ratio.
   · The device must display approx. 0 A at the short-circuited current measurement inputs.

The current transformer ratio is set at the factory to 5/5A and may need to be adjusted to the current transformers used.

10.6 Checking the power measurement

Short-circuit all current transformer outputs except one and check the indicated powers.

The device must only show power in the phase with the current transformer input that is not short-circuited. If this is not the case, check the connection of the measured voltage and measured current.

If the amount of power is correct but the sign of the power is negative, the connections S1(k) and S2(l) on the current transformer may be reversed, or you are supplying active energy back to the grid.

11. Operation

To facilitate installation and commissioning of the device without a PC, it has a display and the buttons 1, 2, and Service.

Important parameters such as the current transformer and device address are listed in the parameter list in the section „18. Parameter list“ and can be programmed directly on the device.

A distinction is made between two operating modes:
· Display mode
· Programming mode

11.1 Button functions

Press button *briefly*:
· Scroll forwards
· Digit/value +1

Press button *long*:
· Scroll backwards
· Digit/value -1

Press and hold both buttons simultaneously for about 1 second:
· Switch between display mode and programming mode.

The device is operated using buttons 1 and 2. The service button is only for use by trained service staff.

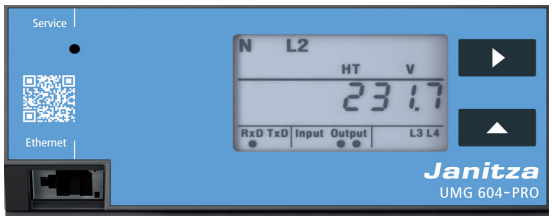


Fig. Front view of UMG 604-PRO control element

11.2 Display mode

After a network recovery, the device is in display mode.

Buttons 1 and 2 can be used in display mode to scroll between the measuring displays.

· Use button 1 to select the phase for the measured values.
· Use button 2 to scroll between the measured values for current, voltage, power, etc.

The factory default settings for the measuring displays are shown in the section „19. Measuring displays“.

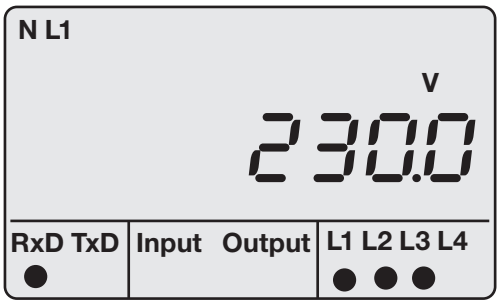


Fig. Display example of display mode. Displayed measured value U_{L1-N} = 230.0 V

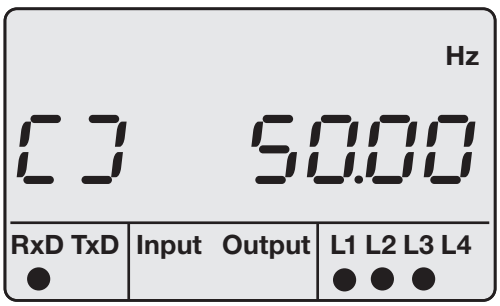


Fig. Display example for rotating field and frequency

ⓘ *INFORMATION*

You can reconfigure the function of the buttons and the selection of the values to be displayed using the GridVis software as a Jasic program (see www.janitza.com)

11.3 Programming mode

In programming mode, you can view and change the most important settings for operating the device.

The addresses for the most important settings can be found in section the „18. Parameter list“.

You can make further settings using the GridVis software included in the scope of delivery.

Press buttons 1 and 2 simultaneously for about one second to enter programming mode via the password query.

If no display password has been programmed, you are taken directly to the first programming menu.

Programming mode is indicated by the text *PRG* on the display. The digit of the address blinks. If the device is in programming mode and no button has been pressed for approx. 60 seconds, or buttons 1 and 2 have been pressed simultaneously for approx. one second, the device returns to display mode.

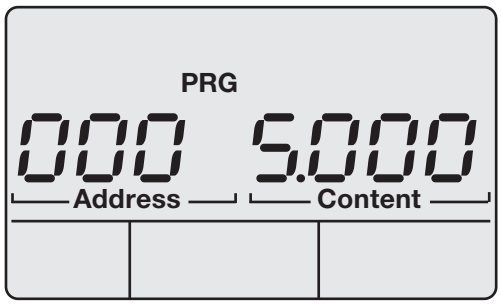


Fig. Display example of programming mode, address 000 with the content 5,000

11.4 Display password

To make it more difficult to accidentally change the programming data directly on the device, you can program a 4-digit display password. In the factory default setting, no display password is requested.

11.5 Homepage password

You can protect access to the device's homepage with a password. The factory default is that no homepage password is set.

The device distinguishes between 3 password modes for the homepage password:

- 0 = The homepage password is not requested.
- 2 = Changes to the configuration and the display of measured values require the password to be entered once.
- 128 = Every change to the configuration requires the password to be entered again.

INFORMATION

If you no longer know the password, you can only change it using the GridVis software (see www.janitza.com).

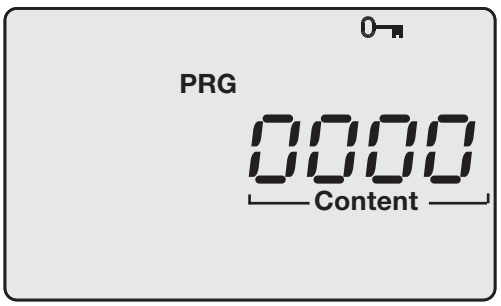


Fig. Query window for the display password

Addr.	Contents
500	Display password 0 = The password is not requested.
501	Homepage, password mode
502	Homepage password

Tab. Excerpt from the parameter list

12. Configuration

This section explains how to configure the device using the two buttons on the device.

12.1 Current transformer ratio

You can assign a separate current transformer ratio to each of the four current transformer inputs.

- A current transformer ratio of 5 A / 5 A is programmed at the factory for all four current transformer inputs.
- You can program current transformers with the same current transformer ratios in addresses 000 and 001.
- Current transformers with different current transformer ratios can be programmed in addresses 010 to 041.
- Changing the current transformer values in addresses 000 or 001 overwrites the contents of addresses 010 to 041 with the current transformer values from addresses 000 and 001.
- Changing the current transformer values in one of the addresses 010 to 041 deletes the current transformer values in addresses 000 and 001.

Address	Current transformer values
000	L1 L2 L3 L4 (primary)
001	L1 L2 L3 L4 (secondary)
010	L1 (primary)
011	L1 (secondary)
020	L2 (primary)
021	L2 (secondary)
030	L3 (primary)
031	L3 (secondary)
040	L4 (primary)
041	L4 (secondary)

12.2 Connection variants for current

The device has two connection variants for current measurement.

Connection variant 0
- Measurement using three current transformers in three-phase four-conductor networks.
- Measurement using two current transformers in networks with equal load.
- Measurement in one-phase 3-conductor systems.

Connection variant 1
- Measurement using two current transformers (Aron circuit) in three-phase three-conductor networks.

Address	Connection variant
110	0 = Three current transformers (Factory default setting) 1 = Two current transformers (Aron circuit)

INFORMATION

No connection diagram needs to be configured for measurement input 4.

12.3 Voltage transformer ratio

You can assign a separate voltage transformer ratio to each of the four voltage transformer inputs.

- A direct measurement voltage transformer ratio of 400 V / 400 V is programmed at the factory for all four voltage transformer inputs.
- You can program voltage transformers with the same voltage transformer ratios in addresses 002 and 003.
- Voltage transformers with different voltage transformer ratios are programmed in addresses 012 to 043.
- Changing the voltage transformer values in addresses 002 or 003 overwrites the contents of addresses 012 to 043 with the voltage transformer values from addresses 002 and 003.

Address	Voltage transformer values
002	L1 L2 L3 L4 (primary)
003	L1 L2 L3 L4 (secondary)
012	L1 (primary)
013	L1 (secondary)
022	L2 (primary)
023	L2 (secondary)
032	L3 (primary)
033	L3 (secondary)
042	L4 (primary)
043	L4 (secondary)

12.4 Connection variants for voltage

The device has two connection variants for voltage measurement.

Connection variant 0
- Direct measurement of the voltage in three-phase four-conductor networks.
- Measurement using three voltage transformers in three-phase four-conductor networks.
- Measurement in one-phase 3-conductor systems.

Connection variant 1
- Direct measurement of the voltage in three-phase three-conductor networks.
- Measurement using two voltage transformers (Aron circuit) in three-phase three-conductor networks.

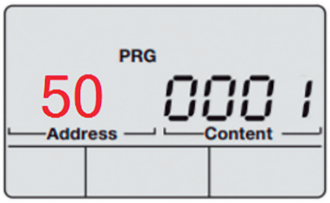
Address	Connection variant
111	0 = Three-phase four-conductor networks (factory default setting) 1 = Three-phase three-conductor networks

INFORMATION

For the measurement inputs L4 and I4, no connection diagram has to be configured.

12.5 Locking transformer ratios

The current and voltage transformer ratios can locked/unlocked via the display by programming address 50.



The status can be read out via an internal device address (Modbus address):

· If the entry *Lock all transformers* contains the value *0*, the registers are not locked (neither current transformer (CT) nor voltage transformer (VT) ratios).
· If the entry *Lock all transformers* contains the value *1*, the registers are locked (CT and VT ratios).

Modbus address	Value / Function
19716	Locking transformer ratios 0 = Not locked 1 = Locked

12.6 RS-232 configuration

The following data must be programmed for operation of the RS-232 interface:

· Baud rate
· Operating mode

The factory default setting and the setting ranges can be found in the parameter list in the section „18. Parameter list“.

Address	Settings
201	Baud rate, RS-232 0 = 9600 bits/s 1 = 19200 bits/s 2 = 38400 bits/s 3 = 57600 bits/s 4 = 115200 bits/s
204	RS-232, mode 0 = Modbus RTU/Server 3 = Debug

12.7 RS-485 configuration

The following data must be programmed to operate the RS-485 interface:

· Device address
· Baud rate
· Operating mode

The factory default setting and the setting ranges can be found in the parameter list in the section „18. Parameter list“.

Address	Settings
200	Device address 1 .. 255) is for Modbus 1 = Factory setting
202	Baud rate, RS-485 0 = 9600 bits/s 1 = 19200 bits/s 2 = 38400 bits/s 3 = 57600 bits/s 4 = 115200 bits/s 5 = 921600 bits/s
203	RS-485, mode 0 = Modbus RTU/Server 1 = Modbus RTU/Client 2 = Gateway transparent

12.8 Ethernet configuration

Fixed IP address
In simple networks without a DHCP server, the network address must be set directly on the device.

BootP
BootP allows fully automatic integration of the device into an existing network. BootP is an older protocol and does not have the range of functions that DHCP does.

DHCP mode
DHCP enables the fully automatic integration of a UMG 604-PRO into an existing network without further configuration. At startup, the device automatically obtains the IP address, the netmask and the gateway from the DHCP server.
The device is preset to DHCP client at the factory.

⚠ CAUTION

Material damage due to incorrect network settings

Incorrect network settings can cause faults in the IT network.
Consult your network administrator for the correct network settings for your device.

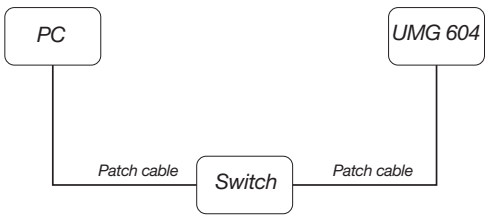


Fig. Connection example, UMG 604-PRO and PC require a fixed IP address

Address	Settings
205	DHCP mode 0 = Fixed IP 1 = BootP 2 = DHCP client
300	IP address, xxx --- --- ---
301	IP address, --- xxx --- ---
302	IP address, --- --- xxx ---
303	IP address, --- --- --- xxx
304	IP mask, xxx --- --- ---
305	IP mask, --- xxx --- ---
306	IP mask, --- --- xxx ---
307	IP mask, --- --- --- xxx
310	IP gateway, xxx --- --- ---
311	IP gateway, --- xxx --- ---
312	IP gateway, --- --- xxx ---
313	IP gateway, --- --- --- xxx

ATTENTION

Material damage due to security vulnerabilities in programs, IT networks and protocols.

Security vulnerabilities can lead to data misuse and faults and even the standstill of your IT infrastructure.
To protect your IT system, network, data communications and measurement devices:
- **Inform your network administrator and/or IT representative.**
- **Always keep the meter firmware up to date and protect the communication to the meter with an external firewall. Close unused ports.**
- **Take protective measures against viruses and cyber attacks from the Internet, e.g. through firewall solutions, security updates and virus protection programs.**
- **Eliminate security vulnerabilities and update or renew existing protection for your IT infrastructure.**

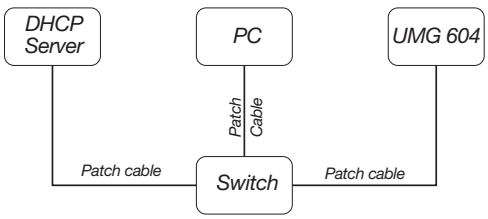


Fig. Connection example, UMG 604-PRO and PC receive an automatically assigned IP address from a DHCP server

12.9 Recording configuration

Two recordings are preconfigured in the factory settings of the device.

Recordings can be adapted and expanded using the GridVis software.

Profile	Measured value	Time base	Type
1	Effective voltage L1, L2, L3, L4, L1 - L2, L2 - L3, L3-L1	15 min.	Average value (RMS), Min/max values
1	Effective current, L1, L2, L3, L4	15 min.	Average value (arithmetic), Min/max values
1	Active power L1, L2, L3, L4	15 min.	Average value (arithmetic), Min/max values
1	Active power sum L1 .. L3, L1 .. L4	15 min.	Average value (arithmetic), Min/max values
1	Reactive power, fundamental oscillation L1, L2, L3, L4	15 min.	Average value (arithmetic), Min/max values
1	Reactive power, fundamental oscillation, sum L1..L3, L1..L4	15 min.	Average value (arithmetic), Min/max values
2	Consumed active energy L1, L2, L3, L4	1 hr.	Sample
2	Consumed active energy, sum L1..L3, L1..L4	1 hr.	Sample
2	Inductive reactive energy L1, L2, L3, L4	1 hr.	Sample
2	Inductive reactive energy sum L1..L3, L1..L4	1 hr.	Sample

12.10 PTP configuration

The device supports the **Precision Time Protocol** (**PTP**) in accordance with the Standard Annex J IEEE 1588-2008 **PTP Default Profile**.

The PTP protocol is executed in a logical area known as the domain. The time specified by the protocol in one domain is independent of the times in other domains.

The PTP protocol enables precise time synchronization in the network from the time server (master) to the clients (slaves). The prerequisite for this is the PTP capability of the client. The reference time for the system is determined by what is known as the Grandmaster Clock.
Time synchronization in a network is achieved by the exchange of PTP time control messages. Clients use the time control information in the PTP messages to set their time to that of the time server (master) in their part of the hierarchy.
While NTP uses the client-server model – each client must be configured with a name or the IP address – the system configures itself according to the default PTP profile.

For the **Device** (as of firmware version 5.017), activate PTP (or NTP):
· In the GridVis software (device configuration).
· Via the parameter *_MODE_NTP* (the Modbus address can be found in the Modbus address list of your device at www.janitza.com).

12.10.1 Important Modbus parameters for the PTP configuration of the device

Meanings of the Modbus parameters:

Parameter name	Data type	Permission	Entry (range)
_MODE_NTP (see „12.10.2 PTP parameter _MODE_NTP“)	int	RD/WR	NTP/PTP activation
_PTP_DOMAIN [1]	byte	RD/WR	Default = 0 (0 - 127)
_PTP_ANNOUNCE_RECEIPT_TIMEOUT [2]	byte	RD/WR	Default = 3 (2 - 10)
_PTP_MANAGEMENT_INTERFACE [3]	short	RD/WR	Default = 0 (0 - 1)

[1] Domain number (default domain = 0). A PTP domain is a range of PTP clocks (devices) which synchronize themselves with each other using the PTP protocol.

[2] Selects the PTP Announce Receipt Timeout. This parameter specifies the number of intervals that are allowed to elapse without receipt of an announce message (default = 3).

[3] 0 (default) - Device supports PTP configuration via Modbus.
1 - Alternative configuration method (enables detailed configuration via the interface port).

12.10.2 PTP parameter _MODE_NTP

In this context, the entries have the following functions:

Parameter _MODE_NTP	Entry	Description
TIME_PROTOCOL_NONE	= 0	No time protocol is active. Manual time configuration.
TIME_PROTOCOL_NTP_BROADCAST	= 1	NTP mode “Listen”, PTP deactivated.
TIME_PROTOCOL_NTP_ACTIVE	= 2	NTP mode “Active”, PTP deactivated.
TIME_PROTOCOL_PTP	= 3	PTP mode is activated, NTP deactivated.

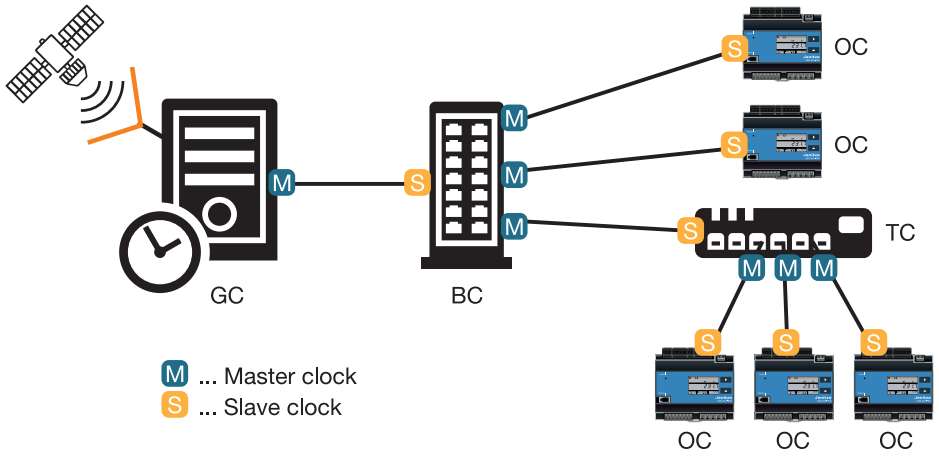
INFORMATION

· A Modbus address list including all the PTP parameters of your device can be found in the download area at www.janitza.com.

· Specifications for PTP (Precision Time Protocol) can be found in IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems (IEEE Std. 1588-2008).

· The device supports PTP according to the default PTP profile Annex J IEEE 1588-2008 with the profile ID 00-1B-19-00-01-00.

12.10.3 Example: PTP timing according to IEEE 1588-2008 and clock types



Ordinary clock (OC)	Simple clock (one port, measures one client) that is connected with a master as the slave and synchronizes its time with the master.
Boundary clock (BC)	Clock that contains several *ordinary clocks* (several ports) and, as the master, synchronizes several slaves with its time and transports this beyond a network boundary. The *boundary clock* can also be connected to a master as a slave and synchronize its time with the master.
Transparent clock (TC)	Clock that does not actively intervene in time synchronization. It is more a piece of hardware that transmits time synchronization data packets (e.g. a network switch). *Transparent clocks* can also correct the time stamp within the data packet by the dwell time within the hardware, if needed.
Grandmaster clock (GC)	The *grandmaster clock* is an *ordinary clock* that has access to GPS or another very accurate time and provides this time for all subordinate nodes.

13. System information

Overrange

As long as measuring ranges are exceeded, they continue to be displayed and cannot be acknowledged. The measuring range is exceeded if at least one of the four voltage or current measurement inputs is outside its specified measuring range.

If a measuring range has been exceeded, this is indicated by *EEEE* in the display.

The respective symbols *L1*, *L2*, *L3* and *L4* indicate the input at which the overrange occurred. The symbols *V* and *A* indicate whether the overrange occurred in the current or voltage circuit.

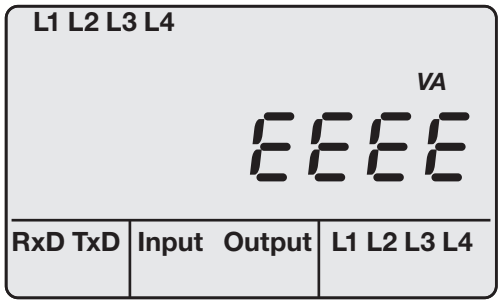


Fig. Measuring display with overrange

⚠ CAUTION

Material damage due to disregard of the connection conditions

Disregard of the connection conditions can damage or destroy your device.
Observe the voltage and frequency specifications on the nameplate.

Serial number

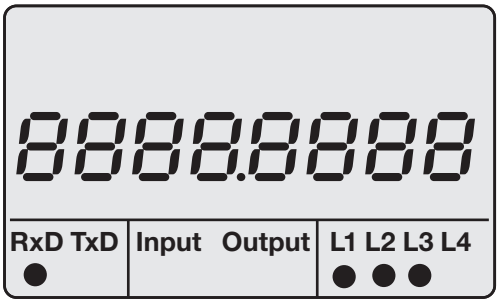


Fig. Measuring display with serial number

Date

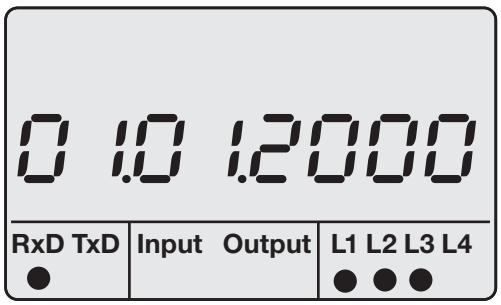


Fig. Measuring display with date

Firmware release

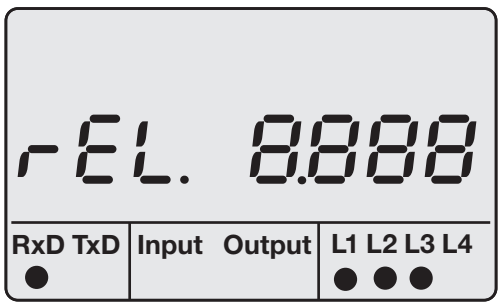


Fig. Measuring display for the firmware release

Time

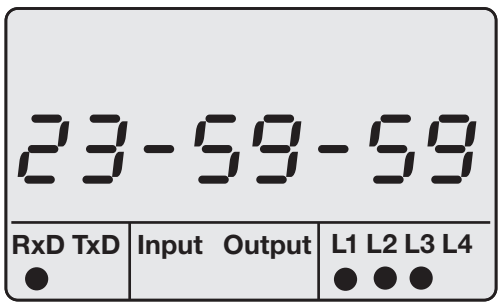


Fig. Measuring display with time

14. Measurement device homepage

Your measurement device has an integrated web server with its own device homepage. This device homepage allows you to access your meter with a conventional web browser from any end device. You can reach the homepage of your device by entering the IP address of the device into a web browser on your end device. A description of how to connect the device to the Internet can be found in the section „12.8 Ethernet configuration“.

On the device homepage you can perform the following without prior software installation

- Retrieve historical and current measured values.
- Retrieve the power quality status in an easy-to-understand display.
- Remotely control your device.
- Access installed apps.

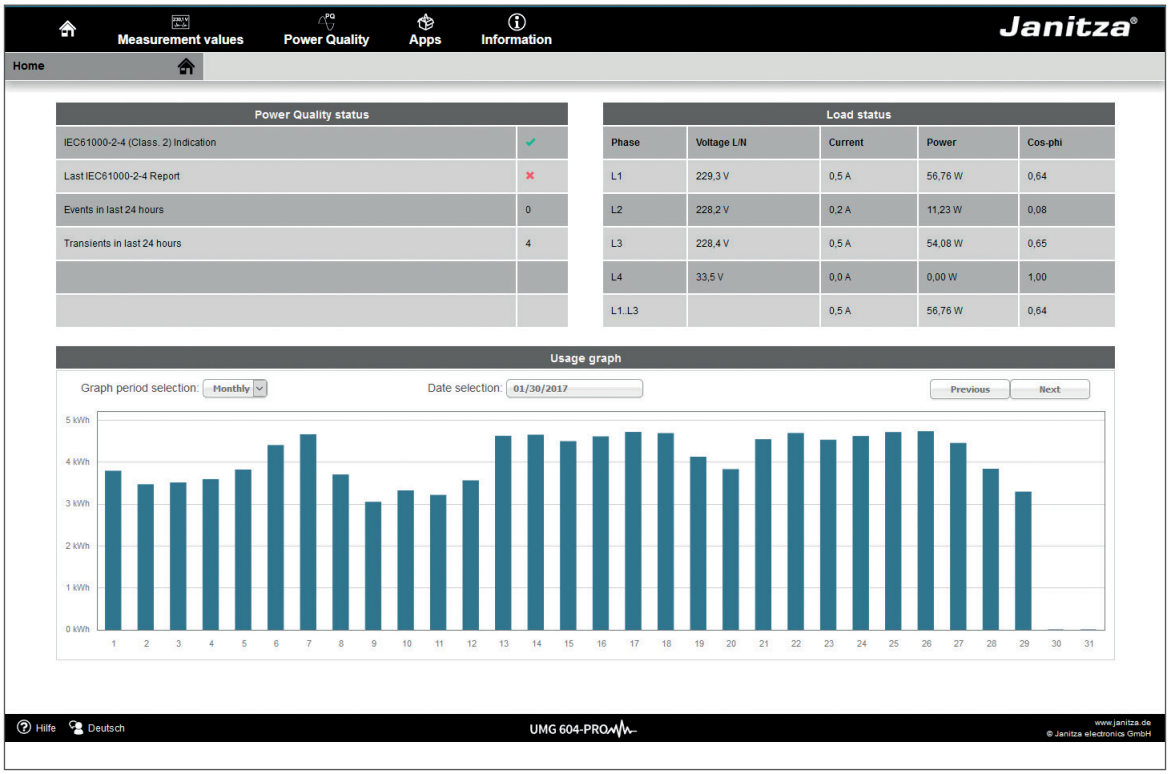


Fig. Overview of the measurement device homepage

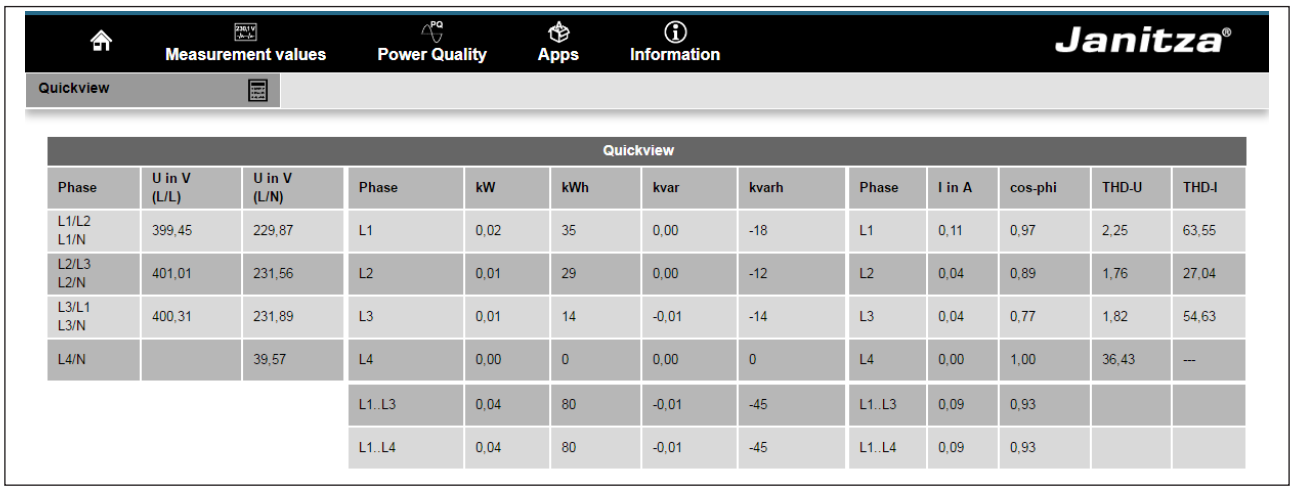
14.1 Measured values

The menu item *Measured values* allows you to call up simple and detailed views of measured values and visualize individual measured values. The following menu items are available here:

· Brief overview
· Detailed measured values
· Charts
· Events
· Transients

14.1.1 Brief overview

The *Brief overview* shows the most important measured values for each phase, such as momentary voltage values, power values and current strength.



Quickview

Phase	U in V (L/L)	U in V (L/N)	Phase	kW	kWh	kvar	kvarh	Phase	I in A	cos-phi	THD-U	THD-I
L1/L2 L1/N	399,45	229,87	L1	0,02	35	0,00	-18	L1	0,11	0,97	2,25	63,55
L2/L3 L2/N	401,01	231,56	L2	0,01	29	0,00	-12	L2	0,04	0,89	1,76	27,04
L3/L1 L3/N	400,31	231,89	L3	0,01	14	-0,01	-14	L3	0,04	0,77	1,82	54,63
L4/N		39,57	L4	0,00	0	0,00	0	L4	0,00	1,00	36,43	---
			L1..L3	0,04	80	-0,01	-45	L1..L3	0,09	0,93		
			L1..L4	0,04	80	-0,01	-45	L1..L4	0,09	0,93		

Fig. Brief overview of the measured values

14.1.2 Detailed measured values

The *Overview* provides access to extensive information on the following points:

· Voltage
· Current
· Power
· Harmonic oscillations
· Work
· Peripherals (digital inputs/outputs, temperature measurements)

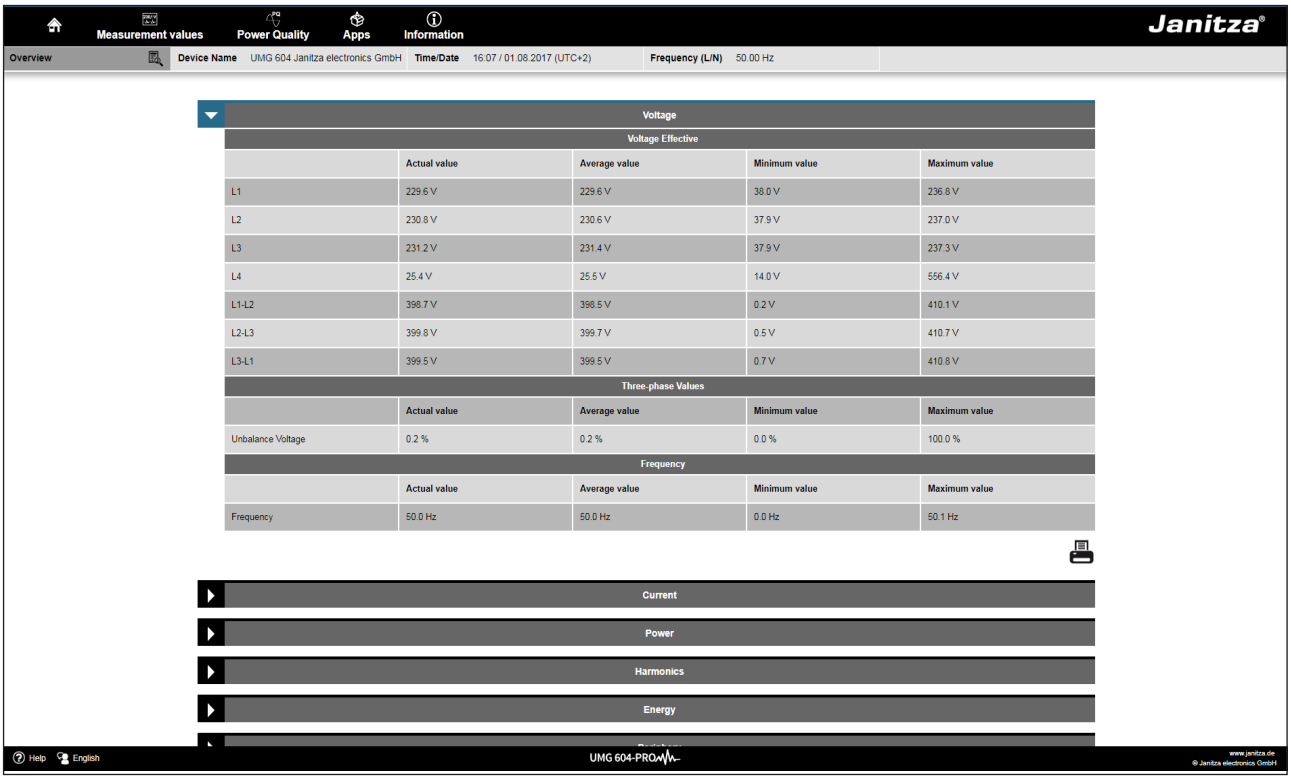


Fig. Detailed overview of the measured values

14.1.3 Charts

You can access the measured value monitor via the *Charts* item. The measured value monitor is a configurable display of current and historical measured values with automatic scaling. To display a graph of the measured values, drag the desired values from the list on the left side of the screen into the field in the center of the screen.

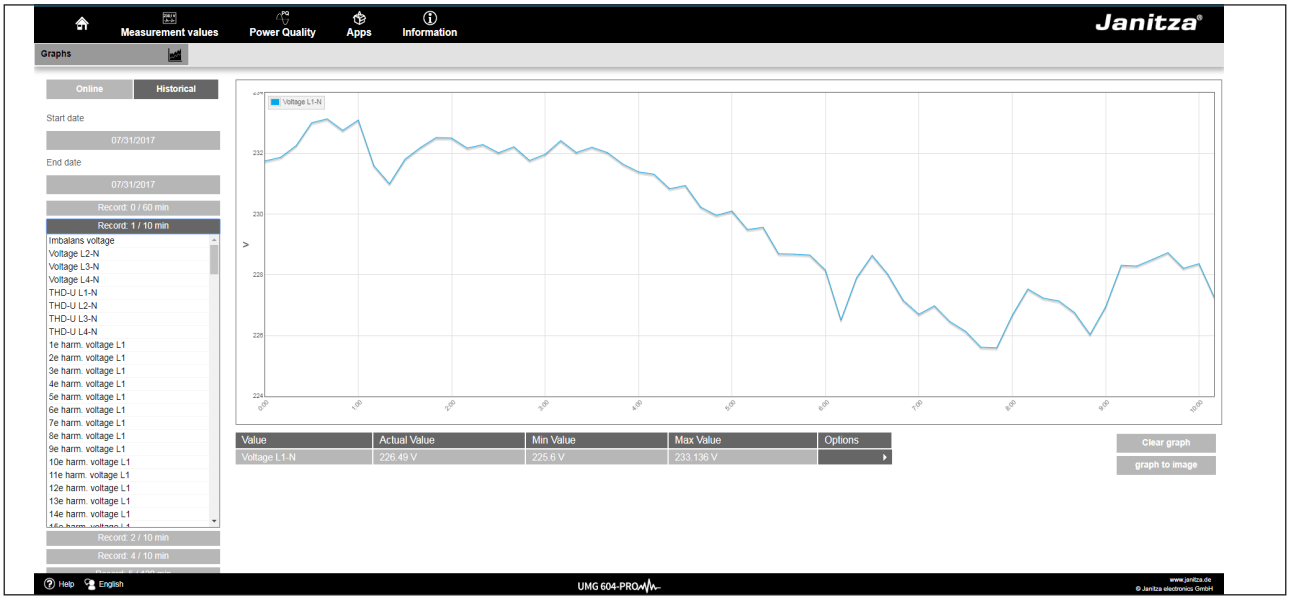


Fig. Device home page event recordings

14.1.4 Events

The *Events* item allows you to display a graphical visualization of the recorded events, such as overcurrent or undervoltage, by clicking on the desired event in the list.

Fig. Event recording

14.1.5 Transients

The *Transients* area shows the graphical visualization of transients within a date list.
Transient voltages

· Are fast pulse-like transient processes in electrical networks.
· Are not predictable in terms of time and are of limited duration.
· Are caused by lightning, switching operations or fuses blowing.

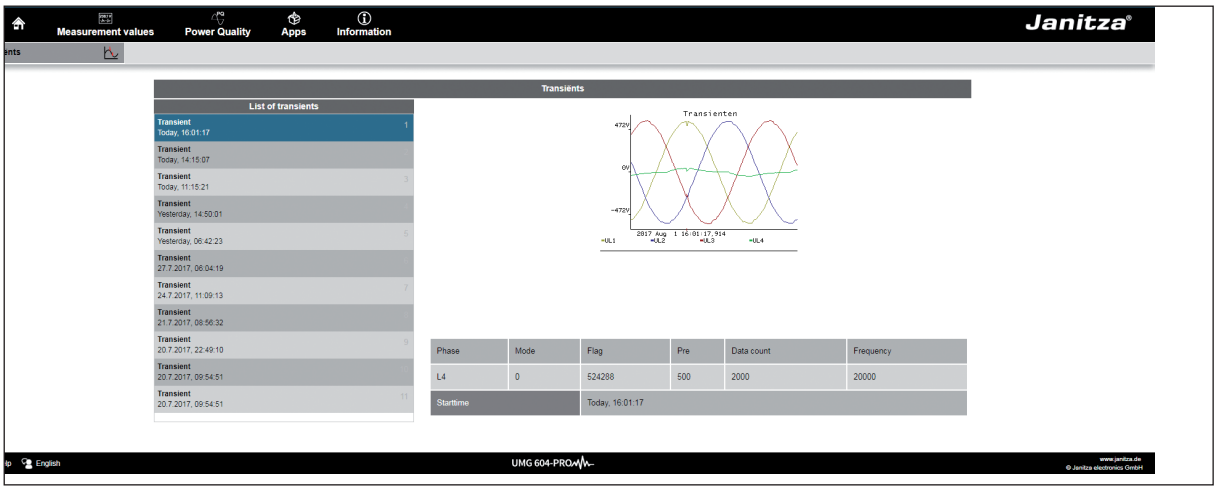


Fig. Transients

14.2 Power quality

In the *Power Quality (PQ)* area, you have the option to retrieve the PQ status with a clear overview according to common standards. Here you have access to permanent monitoring of power quality based on:

· **IEC 61000-2-4** PQ for customers' supply networks

The evaluation takes place via indicator (quick evaluation), as well as within the *Watchdog* app (time-based evaluation). The class of the IEC 61000-2-4 can be temporarily changed within the indicator *Settings*. However, this has no lasting effect.

A change of the class is reset to class 2 (*Compatibility level as in the public network*) after leaving the page.

If you have installed further apps for the power quality, there are additional menu items in the *Power quality* menu:

For the app *IEC 61000-2-4 Watchdog*:
· **IEC 61000-2-4 settings**
· **IEC 61000-2-4 Watchdog**

Changing the IEC 61000-2-4 class in the watchdog settings changes the class permanently in the watchdog, as well as in the indicator.

The display using the traffic light principle allows the events that do not comply with the respective quality agreements to be identified without in-depth knowledge.

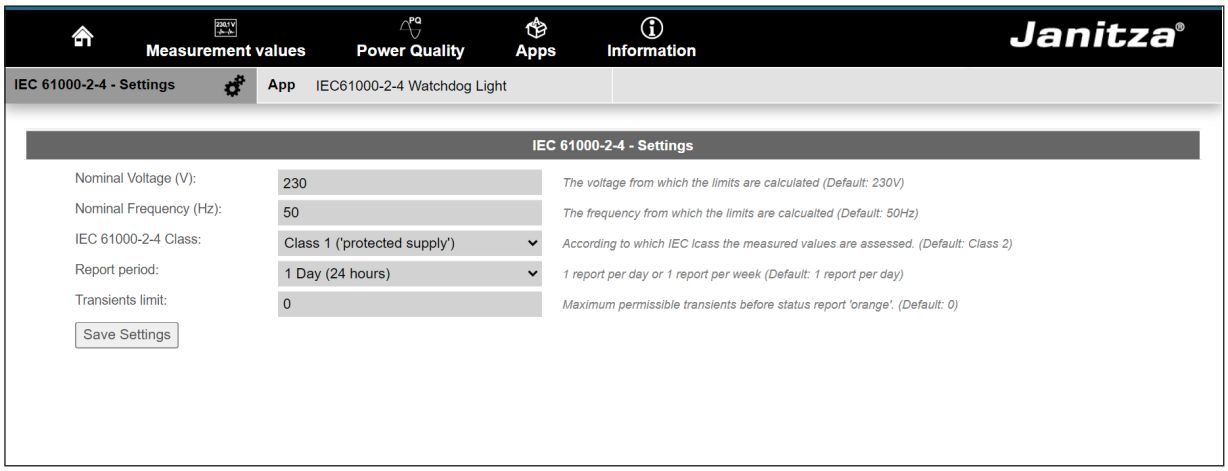


Fig. IEC61000-2-4 Watchdog settings for the report

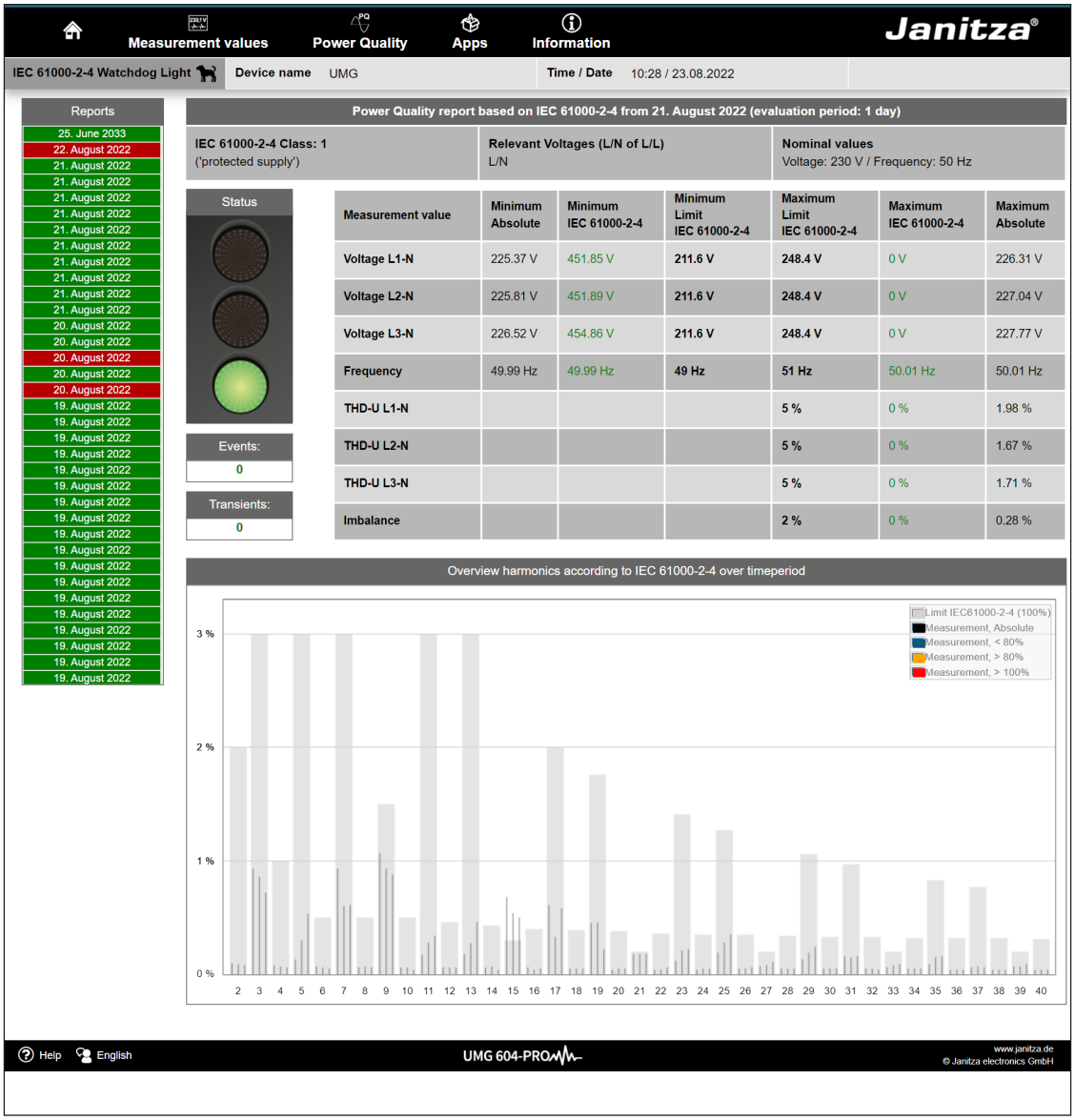


Fig. IEC 61000-2-4 Watchdog parameters with traffic light principle - report

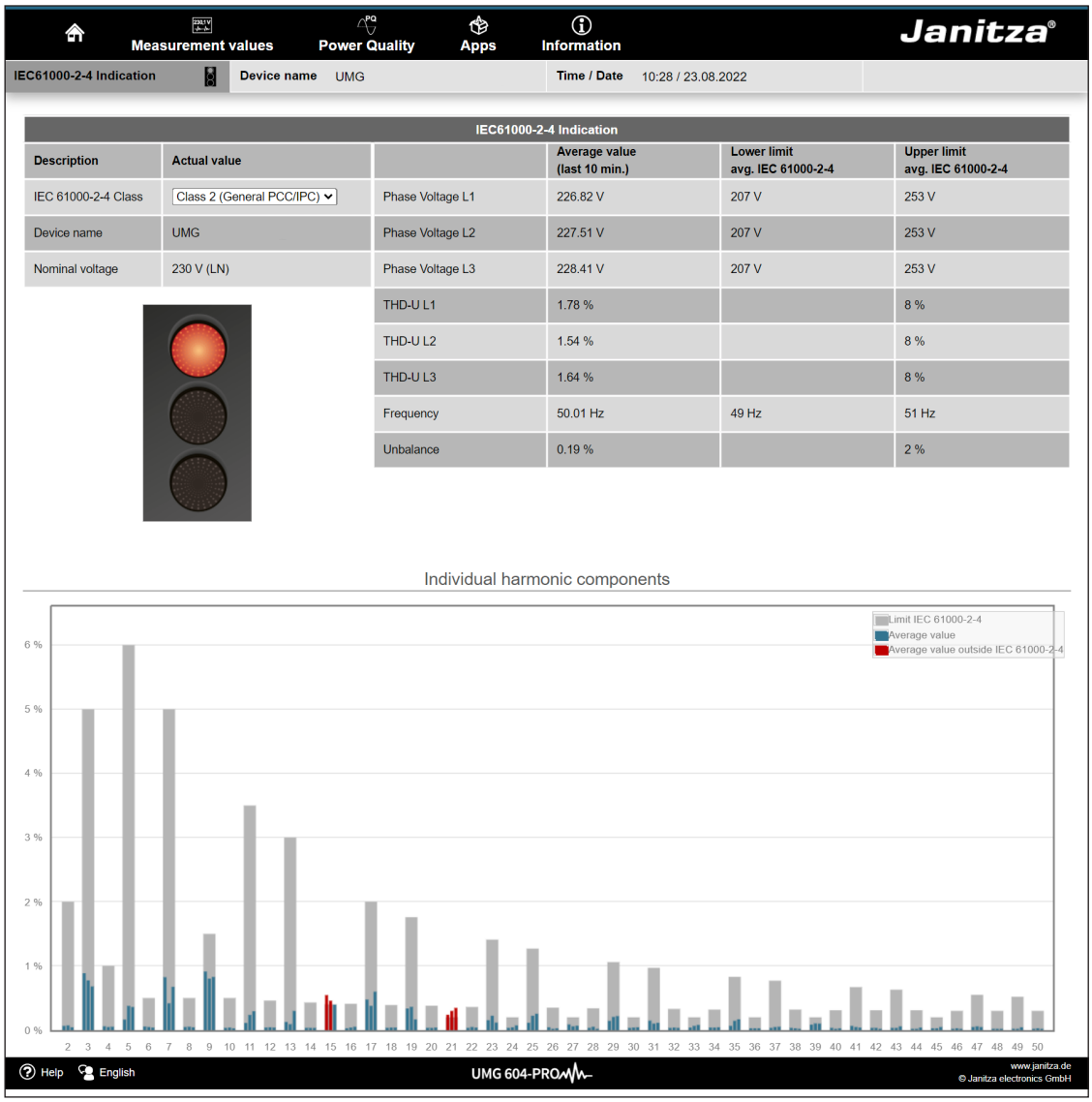


Fig. IEC61000-2-4 PQ indicator parameters with traffic light principle - snapshot

14.3 Apps

You have the option of enhancing the functionality of your device later on by installing additional apps.

An example of an installable app is the *Push Service*. With the *Push Service*, measured values are sent directly from the device to a cloud or portal solution of your choice – such as the Janitza Energy Portal.

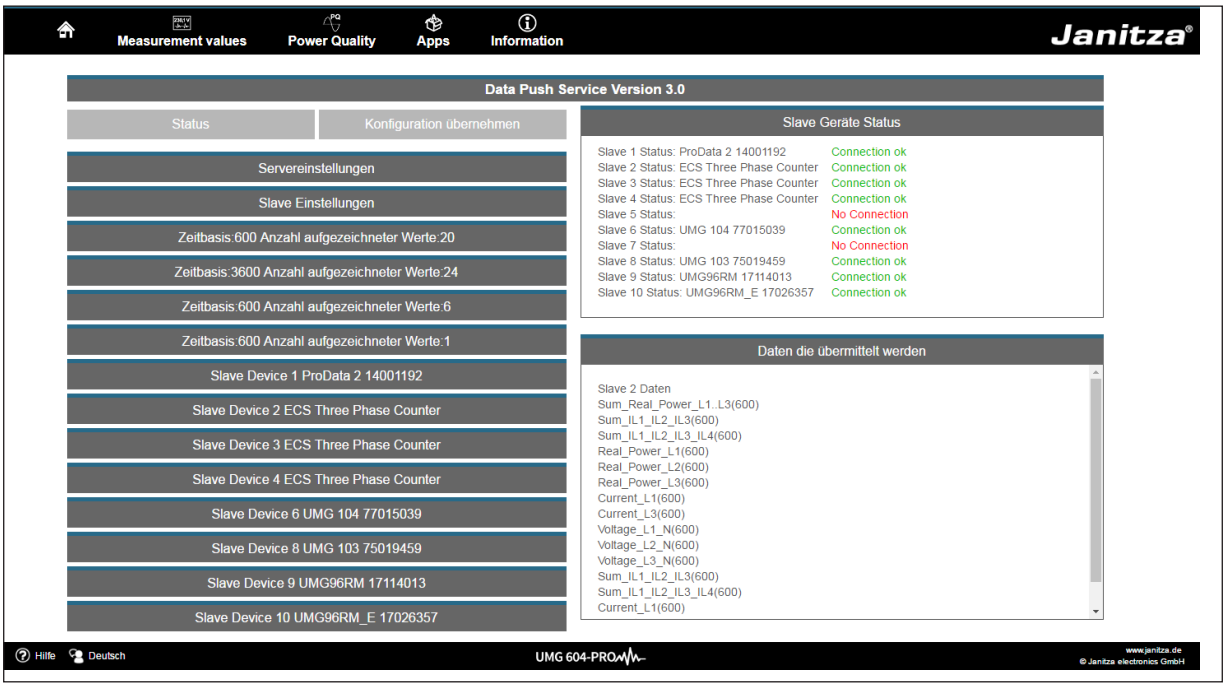


Fig. Push Service

14.4 Information

14.4.1 Device information

The *Device information* menu item shows all the information about the device as well as settings that you can change on it.

14.4.2 Downloads

Click on *Downloads* to access the download area of the Janitza homepage. Here you can download catalogs, operating manuals and other additional documents.

14.4.3 Display

The item *Display* shows the display of the device that corresponds to the actual display.

You can control the device remotely by pressing the operating buttons with the mouse on the digital display.

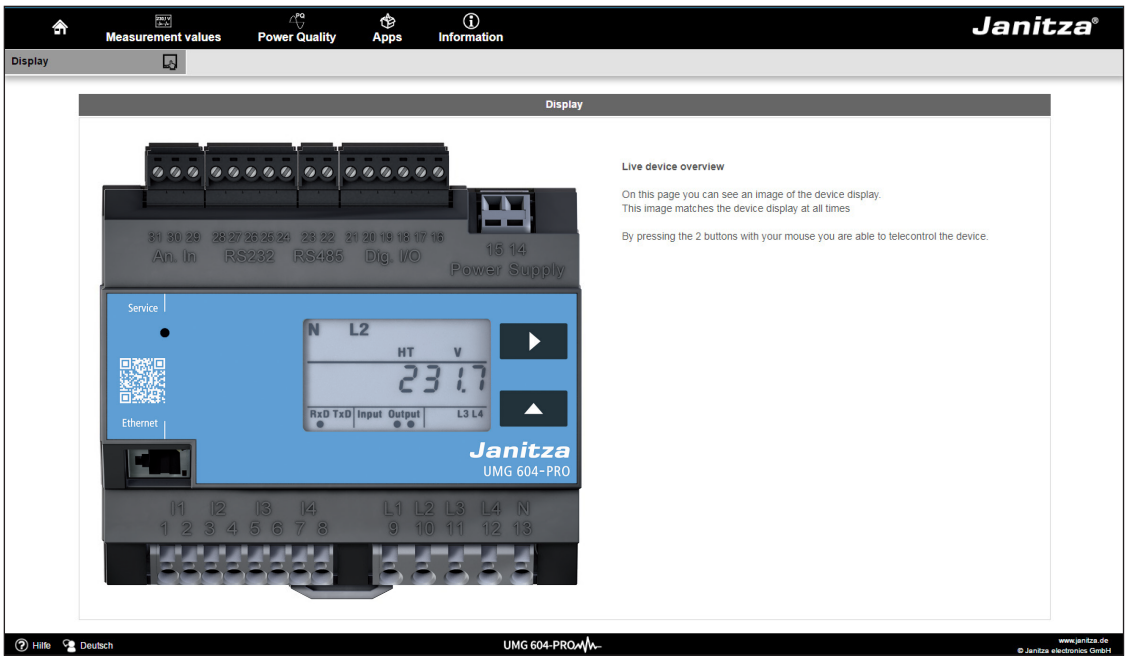


Fig. Operation of the UMG 604-PRO via the measurement device homepage

15. Service and maintenance

The manufacturer, Janitza electronics GmbH, subjects the device to various safety tests before delivery and marks it with a seal.

INFORMATION

- Opened devices (damaged or removed seal) require new safety checks for safe operation!
- The manufacturer warranties only unopened devices!

WARNING

Warning of unauthorized tampering or improper use of the device.

Opening, dismantling or unauthorized manipulation of the device which goes beyond the mechanical, electrical or other operating limits indicated can lead to material damage or injury, up to and including death.

- **Only electrically qualified personnel are permitted to work on the devices and their components, assemblies, systems and current circuits!**
- **Always use your device or component only in the manner described in the associated documentation.**
- **In the event of visible damage, or for the purpose of repair and calibration, return the device to the manufacturer!**

15.1 Repairs and calibration

Repair and calibration of the device must only be carried out by the manufacturer or an accredited laboratory! The manufacturer recommends calibrating the device every 5 years.

15.2 Front panel foil

The front panel foil can be cleaned with a soft cloth and standard household cleaning agents. Acids and acidic agents must not be used for cleaning.

15.3 Service

If questions arise that are not described in this manual, please contact the manufacturer directly.

The following information is essential for us to be able to answer any questions you may have:

- Device designation (see nameplate)
- Serial number (see nameplate)
- Software release (see measuring display)
- Measured voltage and supply voltage
- An exact error description.

15.4 Battery

The internal clock is powered by the supply voltage.

If the supply voltage fails, the clock is supplied by the battery. The clock provides date and time information for records, min and max values and events, for example.

The life expectancy of the battery is at least 5 years at a storage temperature of +45° C. The typical life expectancy of the battery is 8 to 10 years.

The device must be opened to replace the battery.

INFORMATION

If the device has been opened, a new safety check is required for safe operation. A warranty is only assumed for unopened devices.

15.5 Firmware update

To carry out a firmware update, connect the device to a computer via Ethernet and access it using the GridVis software.

Open the firmware update wizard by clicking on *Update Device* in the *Extras* menu.

Select a corresponding update file and carry out the update.

INFORMATION

A firmware update is not possible using the RS-485 interface.

16. Procedure in the event of a malfunction

Enhanced risk	Cause	Remedy
No display	External fuse for the supply voltage has tripped.	Replace fuses.
	Device defective.	Send the device to the manufacturer for repair
No current display.	No measured voltage connected.	Connect measured voltage.
	No measured current connected.	Connect measured current.
Displayed current is too low or too high	Current measurement on the wrong phase.	Check connection and correct if necessary.
	Current transformer factor incorrectly programmed.	Read and program the current transformer ratio on the current transformer.
Displayed voltage is too low or too high.	Measurement on the wrong phase.	Check connection and correct if necessary.
	Voltage transformer programmed incorrectly.	Read the voltage transformer ratio on the voltage transformer and program.
Displayed voltage is too low.	Overrange.	Use a voltage transformer.
	The voltage peak value at the measurement input was exceeded due to harmonics current.	**Attention!** Make sure that the measurement inputs are not overloaded.
EEEE and *V* on the display	The voltage measurement range has been exceeded.	Check the measured voltage and install a suitable voltage transformer as needed.
EEE and *A* on the display	The current measurement range has been exceeded.	Check the measured current and install a suitable current transformer as needed.
Error CF on the display	The calibration data could not be read out.	Send the device to the manufacturer for inspection with an exact error description.
Active power consumed / delivered are reversed.	At least one current transformer connection is reversed.	Check connection and correct if necessary.
	A current path is assigned to the wrong voltage circuit.	Check connection and correct if necessary.
Active power too small or too great.	The programmed current transformer ratio is incorrect.	Read and program the current transformer ratio on 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 the voltage transformer ratio on the voltage transformer and program.
No connection to the device.	RS-485: - Device address incorrect. - Incorrect protocol. - No termination.	Set the device address. Select protocol. Terminate the bus with a termination resistor (120 ohms).
	Ethernet: - IP address incorrect - The hidden button (Service) has been pressed.	Set the IP address on the device. Enter 0 for address 204 and set the IP address or activate DHCP.
Despite the above measures, the device does not function.	Device defective.	Send the device to the manufacturer for inspection with an exact error description.

Tab. Procedure in the event of a malfunction

17. Technical specifications

17.1 General

General	
Net weight	350 g (0.771 lb)
Device dimensions	approx. W=107.5 mm (4.23 in), H=90 mm (3.54 in), D=82 mm (3.23 in)
Width in DIN modules (M)	6 M
Battery	Type, lithium CR1632, 3 V (UL 1642 approved)
Housing flammability classification	UL 94V-0
Mounting orientation	As desired
Installation/assembly	Suitable DIN rails - 35 mm (1.38 in) according to IEC/EN60999-1, DIN EN 50022
Service life of the backlight (option)	40000 h (50% of the initial brightness)
Impact resistance	IK08 according to IEC 62262

Transport and storage The following specifications apply for devices transported and stored in the original packaging.	
Free fall	1 m (39.37 in)
Temperature	-20 °C (-4 °F) to +70 °C (158 °F)

Environmental conditions during operation	
The device is intended for weather-protected, stationary use and meets the operating conditions according to DIN IEC 60721-3-3.	
Working temperature range	-10 °C (14 °F) to +55 °C (131 °F)
Relative humidity	5 to 95% at 25 °C (77 °F), no condensation
Operating height	0 ... 2000 m (6562 ft) above sea level
Pollution degree	2
Ventilation	No forced ventilation required
Mounting orientation	As desired

17.2 Supply voltage

The supply voltage must be connected to the device via a UL/IEC approved fuse (6 A Char. B).

Supply voltage option 230 V	
Nominal range	95 V .. 240 V (50/60 Hz) / DC 135 V .. 340 V
Operating range	+/-10% of nominal range
Power consumption	max. 3.2 W/9 VA
Overvoltage category	300 V CATII

Supply voltage option 90 V (without UL approval)	
Nominal range	50 V .. 110 V (50/60 Hz) / DC 50 V .. 155 V
Operating range	+/-10% of nominal range
Power consumption	max. 3.2 W / 9 VA
Overvoltage category	300 V CATII

Supply voltage option 24 V	
Nominal range	20 V .. 50 V (50/60 Hz) / DC 20 V .. 70 V
Operating range	+/-10% of nominal range
Power consumption	max. 5 W / 8 VA
Overvoltage category	150 V CATII

Terminal connection capacity (supply voltage) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.08 - 2.5 mm^2, AWG 28 - 12
Wire ferrules (non-insulated)	0.20 - 1.5 mm^2, AWG 24 - 16
Wire ferrules (insulated)	0.25 - 1.5 mm^2, AWG 24 - 16
Strip length	5 - 6 mm (0.2 - 0.24 in)

17.3 Protection class

Protection class II according to IEC 60536 (VDE 0106, Part 1), i.e. a protective conductor (ground wire) connection is not required!

Protection against foreign matter and water	IP20 according to EN 60529 September 2014, IEC 60529:2013

17.4 Digital inputs and outputs

Digital inputs	
Maximum counter frequency (pulse input S0)	20 Hz
Switching input	
Input signal applied	18 V .. 28 V DC (typically 4 mA)
Input signal not applied	0 .. 5 V DC, current less than 0.5 mA
Response time (Jasic program)	200 ms
Line length	Up to 30 m (32.81 yd) not shielded Greater than 30 m (32.81 yd) shielded

Digital outputs 2 digital outputs; solid state relay, not short-circuit proof.	
Switching voltage	max. 60 VDC, 30 VAC
Switching current	max. 50 mAeff AC/DC
Response time (Jasic program)	200 ms
Output of voltage dips	20 ms
Output of voltage exceedances	20 ms
Switching frequency	max. 20 Hz
Line length	Up to 30 m (32.81 yd) not shielded Greater than 30 m (32.81 yd) shielded

Terminal connection capacity (digital inputs and outputs) Connectible conductors: Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm^2, AWG 24 - 16
Wire ferrules (non-insulated)	0.2 - 1.5 mm^2
Wire ferrules (insulated)	0.2 - 1.5 mm^2
Tightening torque	0.25 Nm (2.21 lbf in)
Strip length	7 mm (0.2756 in)

Potential isolation and electrical safety of the digital inputs and outputs

- The digital inputs and outputs are double insulated relative to the current and voltage measurement inputs as well as to the supply voltage.
- There is only functional insulation from each other and from the Ethernet, RS-485, RS-232 interfaces and the temperature measurement input.
- The auxiliary voltage to be connected externally must be realized as SELV or PELV.

17.5 Temperature measurement input

Temperature measurement input 3-wire measurement	
Update time	approx. 200 ms
Connectible sensors	PT100, PT1000, KTY83, KTY84
Total load (sensor and cable)	max. 4 kOhms
Line length	Up to 30 m (32.81 yd) not shielded Greater than 30 m (32.81 yd) shielded

Sensor type	Temperature range	Resistance range	Measurement uncertainty
KTY83	-55 °C (-67 °F) to +175 °C (347 °F)	500 ohms to 2.6 kOhms	± 1.5% rng[1]
KTY84	-40 °C (-40 °F) to +300 °C (572 °F)	350 ohms to 2.6 kOhms	± 1.5% rng[1]
PT100	-99 °C (-146 °F) to +500 °C (932 °F)	60 ohms to 280 ohms	± 1.5% rng[1]
PT1000	-99 °C (-146 °F) to +500 °C (932 °F)	600 ohms to 2.8 kOhms	± 1.5% rng[1]

[1]rng = measuring range

Terminal connection capacity (temperature measurement input)	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm², AWG 24 - 16
Wire ferrules (non-insulated)	0.2 - 1.5 mm²
Wire ferrules (insulated)	0.2 - 1.5 mm²
Tightening torque	0.25 Nm (2.21 lbf in)
Strip length	7 mm (0.2756 in)

Potential isolation and electrical safety of the temperature measurement inputs

- The temperature measurement input is double insulated relative to the current and voltage measurement inputs as well as to the supply voltage.
- There is no isolation to the RS-232 and RS-485 interfaces.
- There is only functional insulation relative to the Ethernet interface and the digital inputs/outputs.
- The external temperature sensor must be double insulated from system parts with dangerous contact voltage (in accordance with IEC 61010-1:2010).

17.6 Voltage measurement inputs

Three-phase 4-conductor systems (L-N/L-L)	max. 277 V / 480 V
Three-phase three-conductor systems (L-L)	max. 480 V
Resolution	0.01 V
Measuring range L-N	0[1] .. 600 Vrms
Measuring range L-L	0[1] .. 1000 Vrms
Crest factor	2 (based on 480 Vrms)
Overvoltage category	300 V CAT III
Rated surge voltage	4 kV
Protection of the voltage measurement	1 - 10 A
Impedance	4 MOhms/phase
Power consumption	approx. 0.1 VA
Sampling frequency	20 kHz/phase
Transients	> 50 µs
Frequency of the fundamental oscillation	45 Hz .. 65 Hz
- Resolution	0.001 Hz

[1] The measurement device can only determine measured values if a voltage L-N greater than 10 Vrms or a voltage L-L greater than 18 Vrms is present on at least one voltage measurement input.

Connection capacity of the terminals (voltage measurement) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.08 - 4.0 mm², AWG 28 - 12
Wire ferrules (non-insulated)	0.25 - 2.5 mm²
Wire ferrules (insulated)	0.25 - 2.5 mm²
Strip length	8 - 9 mm (0.31 - 0.35 in)

17.7 Current measurement inputs

Nominal current	5 A
Rated current	6 A
Fuse protection for direct measurement (without current transformer)	6 A Char. B (approved according to UL/IEC)
Resolution on the display	10 mA
Measuring range	0.005 .. 7 Arms
Crest factor	2 (based on 6 Arms)
Overvoltage category	300 V CAT III
Rated surge voltage	4 kV
Power consumption	approx. 0.2 VA (Ri = 5 mOhm)
Overload for 1 s	100 A (sinusoidal)
Sampling frequency	20 kHz

Measuring accuracy, phase angle	0.15°

Connection capacity of the terminals (current measurement) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.08 - 4.0 mm², AWG 28 - 12
Wire ferrules (non-insulated)	0.25 - 2.5 mm²
Wire ferrules (insulated)	0.25 - 2.5 mm²
Strip length	8 - 9 mm (0.31 - 0.35 in)

17.8 Interfaces

RS232 interface	
Connection	5-pole screw terminals
Protocol	Modbus RTU/Server

RS-485 interface	
Connection	2-pole screw terminals
Protocol	Modbus RTU/Server, Modbus RTU/Client
Transmission rate	9.6 kbps, 19.2 kbps, 38.4 kbps, 57.6 kbps, 115.2 kbps, 921.6 kbps

Terminal connection capacity (serial interface - RS-485) Connectible conductors: Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm², AWG 24 - 16
Wire ferrules (non-insulated)	0.2 - 1.5 mm²
Wire ferrules (insulated)	0.2 - 1.5 mm²
Tightening torque	0.25 Nm (2.21 lbf in)
Strip length	7 mm (0.2756 in)

Ethernet interface	
Connection	RJ45
Function	Modbus gateway, embedded web server (HTTP)
Protocols	TCP/IP, EMAIL (SMTP), DHCP client (BootP), Modbus/TCP (port 502), ICMP (Ping), NTP, TFTP, Modbus RTU over Ethernet (port 8000), FTP SNMP.

Potential isolation and electrical safety of the interfaces

- The RS-485, RS-232 and Ethernet interfaces are double insulated relative to the current and voltage measurement inputs and the supply voltage.
- The RS-232 and RS-485 interfaces are not interface from each other or from the temperature measurement input.
- The Ethernet interface is functionally insulated from the RS-232, RS-485, the temperature measurement input and the digital inputs and outputs.
- The interfaces of the devices connected here must have double or reinforced insulation against mains voltages (according to IEC 61010-1: 2010).

17.9 Measurement uncertainty

The measurement uncertainty of the device applies to the use of the following measuring ranges.
The measured value must be within the specified limits. Outside these limits, the measurement uncertainty is not specified.

Measured value	Measurement uncertainties
Voltage	± 0.2% according to DIN EN 61557-12:2008
Current L	± 0.25% based on DIN EN 61557-12:2008
Current N	± 1% according to DIN EN 61557-12:2008
Power	± 0.4% according to DIN EN 61557-12:2008
Harmonics U, I	Class 1 DIN EN 61000-4-7
Active energy	
Current transformer ../5 A	Class 0.5 (IEC 61557-12) Class 0.5S (IEC 62053-22) Class 0.5 (ANSI C12.20)
Current transformer ../1 A	Class 1 (IEC 61557-12)
Reactive energy	
Current transformer ../5 A	Class 2 (IEC 62053-23)
Current transformer ../1 A	Class 2 (IEC 62053-23)
Frequency	±0.01 Hz
Internal clock	±1 minute/month (18°C ... 28°C

The specification applies under the following conditions:

· Annual recalibration
· A preheating time of 10 minutes
· An ambient temperature of 18 .. 28°C

If the device is operated outside the range of 18 .. 28°C, an additional measurement error of ±0.01% of the measured value per °C deviation must be taken into account.

17.10 Information on saving measured values and configuration data

INFORMATION

The measurement device saves the following measured values every 5 minutes in a non-volatile memory.
In the event of an operating voltage failure, recording may be interrupted for a maximum of 5 minutes:

· **Comparator timer**
· **S0 meter readings**
· **Min / max / average values (without date and time)**
· **Energy values**

The device saves configuration data immediately (1 - 2 s)!

A detailed Modbus address and parameter list can be found at www.janitza.com.

18. Parameter list

18.1 Measurement settings

Address	Designation	Setting range	Unit	Default setting
000	Current transformer primary, L1 .. L4	0 .. 1000000	A	5
001	Current transformer secondary, L1 .. L4	1 .. 5	A	5
002	Voltage transformer primary, L1 .. L4	0 .. 1000000	V	400
003	Voltage transformer secondary, L1 .. L4	1 .. 400	V	400
010	Current transformer primary, L1	0 .. 1000000	A	5
011	Current transformer secondary, L1	1 .. 5	A	5
012	Voltage transformer primary, L1	0 .. 1000000	V	400
013	Voltage transformer secondary, L1	1 .. 400	V	400
020	Current transformer primary, L2	0 .. 1000000	A	5
021	Current transformer secondary, L2	1 .. 5	A	5
022	Voltage transformer primary, L2	0 .. 1000000	V	400
023	Voltage transformer secondary, L2	1 .. 400	V	400
030	Current transformer primary, L3	0 .. 1000000	A	5
031	Current transformer secondary, L3	1 .. 5	A	5
032	Voltage transformer primary, L3	0 .. 1000000	V	400
033	Voltage transformer secondary, L3	1 .. 400	V	400
040	Current transformer primary, L4	0 .. 1000000	A	5
041	Current transformer secondary, L4	1 .. 5	A	5
042	Current transformer primary, L4	0 .. 1000000	V	400
043	Voltage transformer secondary, L4	1 .. 400	V	400
100	Retrieve TFTP configuration file automatically 0 = Switched off x = File number	0 .. 9999	-	0
101	TFTP error handling 0 = In the event of an error, the configuration menu appears on the display. 1 = TFTP error handling in the device is switched off	0 .. 1	-	0
110	Current transformer circuit (L1 .. L3) 0 = Three current transformers 1 = Two current transformers (Aron circuit)	0 .. 1	-	0
111	Network configuration, voltage measurement 0 = Three-phase four-conductor system. (TT, TN network) 1 = Three-phase three-conductor system. (IT network)	0 .. 1	-	0
112	Deletes all active energy meters, apparent energy meters and S0 meters (1 = delete)	0 .. 1	-	0
113	Deletes all reactive energy meters (1 = delete)	0 .. 1	-	0
114	Resets all min. and max. values (1 = Reset)	0 .. 1	-	0

Tab. Parameter list of measurement settings

18.2 Bus settings

Address	Designation	Setting range	Unit	Default setting
200	Device address, Modbus	1 .. 255	-	1
201	Baud rate, RS-232 0 = 9600 bits/s 1 = 19200 bits/s 2 = 38400 bits/s 3 = 57600 bits/s 4 = 115200 bits/s	0 .. 4	-	4
202	Baud rate, RS-485 0 = 9600 bits/s 1 = 19200 bits/s 2 = 38400 bits/s 3 = 57600 bits/s 4 = 115200 bits/s 5 = 921600 bits/s	0 .. 5	-	4
203	RS-485, mode 0 = Modbus RTU/slave 1 = Modbus RTU/master 2 = Gateway transparent	0 .. 6	-	0
204	RS-232, mode 0 .. 6 0 0 = Modbus RTU/slave 3 = Debug 6 = SLIP (for internal use only)	0 .. 6	-	0

Tab. Parameter list of bus settings

Address	Designation	Setting range	Unit	Default setting
205	DHCP mode 0 = Fixed IP 1 = BootP 2 = DHCP client	0, 1, 2	-	2
300	IP address, xxx --- --- ---	0 .. 255	-	000
301	IP address, --- xxx --- ---	0 .. 255	-	000
302	IP address, --- --- xxx ---	0 .. 255	-	000
303	IP address, --- --- --- xxx	0 .. 255	-	000
304	IP mask, xxx --- --- ---	0 .. 255	-	000
305	IP mask, --- xxx --- ---	0 .. 255	-	000
306	IP mask, --- --- xxx ---	0 .. 255	-	000
307	IP mask, --- --- --- xxx	0 .. 255	-	000
310	IP gateway, xxx --- --- ---	0 .. 255	-	000
311	IP gateway, --- xxx --- ---	0 .. 255	-	000
312	IP gateway, --- --- xxx ---	0 .. 255	-	000
313	IP gateway, --- --- --- xxx	0 .. 255	-	000

Tab. Parameter list of Ethernet settings

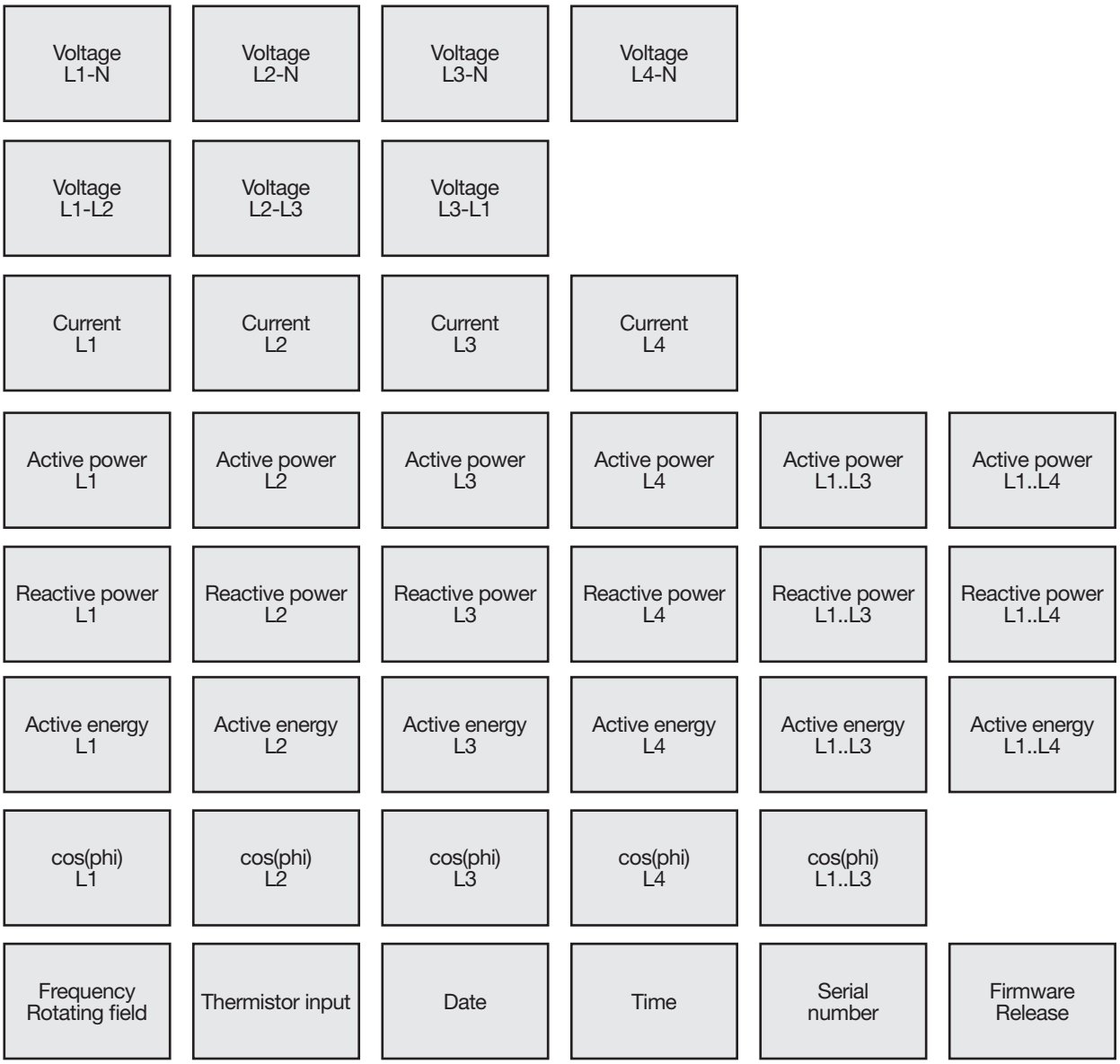
Address	Designation	Setting range	Unit	Default setting
400	Day	1 .. 31	-	xx
401	Month	1 .. 12	-	xx
402	Year	1 .. 9999	-	xxxx
403	Hour	0 .. 23	-	xx
404	Minute	0 .. 59	-	xx
405	Second	0 .. 59	-	xx
406	Accept date and time 1 = Accept set data	0, 1	-	0
500	Device password	0 .. 9999	-	xxxx
501	Homepage, password mode	0, 2, 128, 130	-	0
502	Homepage, password	0 .. 9999	-	xxxx
510	Activation option *EMAX* license part1	0 .. 9999	-	xxxx
511	Activation option *EMAX* license part2	0 .. 9999	-	xxxx
520	Activation option *BACnet* license part1	0 .. 9999	-	xxxx
521	Activation option *BACnet* license part2	0 .. 9999	-	xxxx
600	LCD, contrast	0 .. 99	-	50
601	LCD, backlight, max. brightness	0 .. 16	-	10
602	LCD, backlight, min. brightness	0 .. 8	-	3
603	LCD, backlight, time to switch from maximum to minimum brightness.	0 .. 9999	s	60

Tab. Parameter list of other settings

19. Measuring displays

In the factory default setting, you can display the following measured values using buttons 1 and 2.
The measured value designations used are abbreviated and have the following meaning:

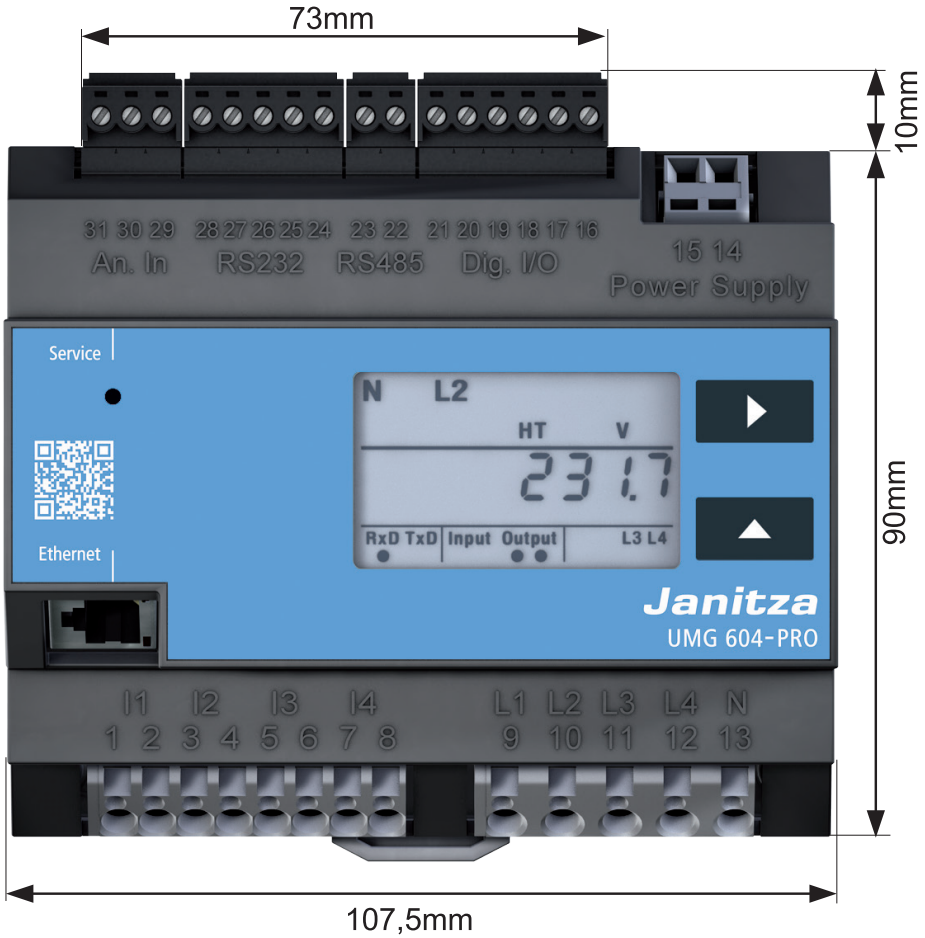
· Active power = active power, consumed
· Reactive power = reactive power, inductive
· Active energy = active energy, consumed with backstop



20. Dimensional drawings

· The figures are for illustration purposes only and are not to scale.
· Please also note the dimensions of the terminals used during installation!
· All dimensions in mm.

20.1 Front view



Front view of UMG 604-PRO with installation dimensions

20.2 Side view

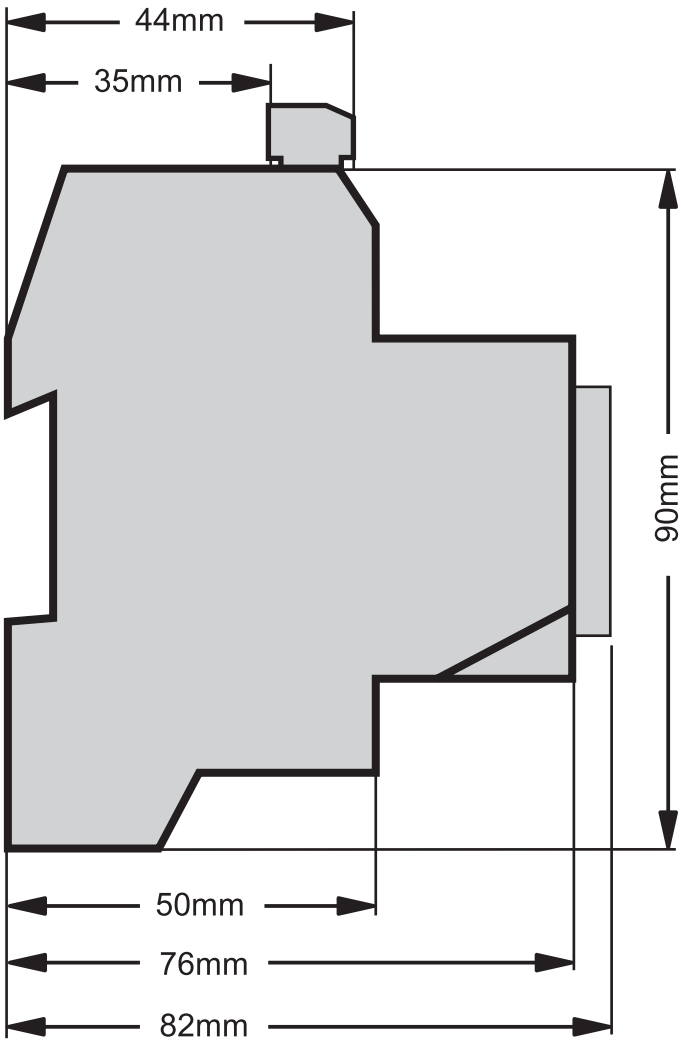


Fig. Schematic side view of the UMG 604-PRO with installation dimensions

21. Connection example

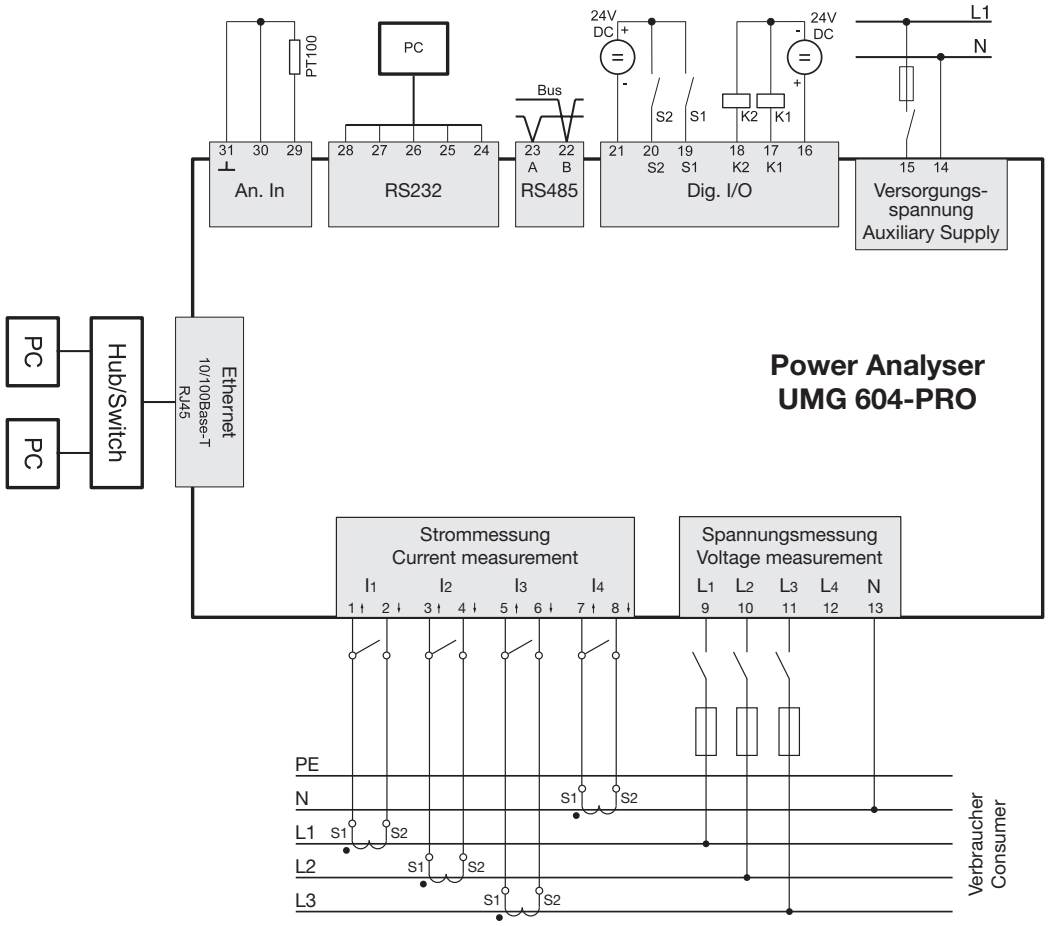


Fig. Connection example UMG 604-PRO

22. Quick guide (setting the primary current)

You have three identical current transformers with a current transformer ratio of 200 A /5 A.
You want to program the primary current of 200 A.
To do this, you must enter the enter the value of 200 for the primary current in address *000*.
The secondary current is preset to 5 A at the factory in address *001*.

1. Go to the programming mode by pressing buttons 1 and 2 simultaneously for about one second.
   · The symbol for the PRG programming mode appears.
   · The content of address 000 is displayed.

2. Enter the primary current by pressing button 1 to select the digit to be changed and pressing button 2 to change the selected digit.

3. Exit programming mode by once again pressing buttons 1 and 2 simultaneously for about one second.
   · The current transformer setting is saved.
   · The device returns to display mode.

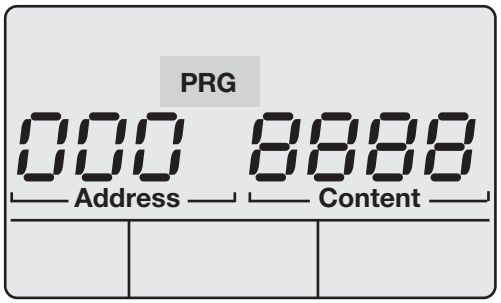


Fig. UMG 604-PRO display in program mode

Fig. UMG 604-PRO display in program mode

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