



UMG 604 – High performance power analysers

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High performance power analysers from the UMG 604 product family are suitable for use at all network levels. The high scanning rate enables a continuous measurement by gathering more than 800 measurement parameters. Due to the very high performance level of the digital signal processor, all important power quality parameters are recorded e.g. short-term interruptions with fault recorder function, transients, harmonics up to a 40th and starting current etc. Extensive communication options e.g. Ethernet (TCP/IP), BACnet, Modbus, Profibus, RS232, RS485, HTTP, FTP, SMTP, SNTP, SNMP or DNS... allow affordable and quick integration in the existing communication architecture. Worldwide access to the embedded web server can be gained through a web browser e.g. for energy consumption analysis. Programs specific to the user can be created with implemented graphic programming. It is possible to run 7 user programs simultaneously.

Areas of application

- For measuring, monitoring and checking electrical parameters in energy distribution units
- Consumption data collection and analysis (cost centre data collection)
- For monitoring the power quality (harmonics, short term interruptions, transients, initial current...)
- Measurement value generator for building management systems or PLC
- Control tasks e.g. depending upon the achieved measurement values or limit values
- Peak demand management (avoidance of costly and dangerous peak loads)
- Ethernet gateway for subordinate measurement points
- Remote monitoring

Various versions with UL-approval available!

UMG 604 the extra compact power analyser

Added value through additional functions

Through the integration of various functions, the UMG 604 power analyser goes far beyond the limits of digital multifunctional measuring equipment and, therefore, offers the respective added value. The UMG 604 and the use of state-of-the-art processors allow to offer a very fast and extremely compact power analyser at an affordable price.

The UMG 604 contains the following functions:

- Power analyser for electrical energy distribution (over 800 parameters)
- Energy consumption and cost centre data collection
- Monitoring of power quality
- Peak demand management (optional)
- PLC function (up to 7 simultaneous freely programmable programs, graphic programming)
- Transient recorder
- Event recorder
- Data logger
- Modbus/Ethernet gateway



Main features

- Continuous measurement
- Collection of all relevant power quality parameters (harmonics, short-term interruptions, unbalance ...)
- Ethernet and embedded web server
- Jasic® interpreter
- Up to 7 user defined programs
- GridVis software - full version included in the delivery

Applications

Major increases of energy costs make electrical energy a driving force in costing. With the UMG 604, you can make the first step towards better cost efficiency. The precise collection of all energy data and electrical parameters ensures the necessary amount of transparency in your energy supplies. Concepts can be developed on the basis of the data e.g. electricity cost reductions and the introduction of measures. These targeted improvements can also be monitored and recorded with the UMG 604.

The UMG 604, equipped with a 500 MHz DSP (digital signal processor), is a fast and high performing power analyser. The continuous scanning of eight channels

with 20 KHz per channel enables the collection of all relevant electrical parameters (more than 800 values), minimum and maximum values, the basic power quality values such as harmonics (up to the 40th, each phase with direction recognition) and short-term interruptions. Even fast transients ($> 50\mu\text{s}$) can be safely identified. Using modern communication processes, the collected data is conducted to a central location, stored centrally in a high-performance database and provided for further processing in an open system. Simple integration in an existing building management system control or PLC environment expands the areas of application of the UMG 604.

DIN rail mounting (6 units): reduction of installation costs

Measurement equipment is usually installed in the low voltage main distribution as an integral measurement instrument for the switchgear cabinet door. Installation and connection costs are significantly reduced by the installation of the UMG 604 on a 35mm DIN rail. This means that the panel cut-out and wiring to the cabinet door is no longer necessary. In order to make use of the extensive functions of modern measuring equipment, the interconnection and central analysis of the data plays an important role. This means that the on-site display generally serves the purpose of the initialisation and service only.

The decidedly compact UMG 604 is suitable for installation in low voltage main distribution panels and machines as well as in installation distribution boards which is particularly of interest for applications in building services engineering, information technology and data centres.



Modern communication processes through the Ethernet: affordable, rapid and safe communication

The costs for installation and communication (e.g. periphery for field buses) often surpass the costs of the equipment.

By connecting the equipment to an existing Ethernet system, a fast, optimally priced and reliable communication system can be developed. Additional interfaces allow the integration of power analysers in PLC systems or in central building management systems. The use of clear standards offers the user a high amount of flexibility.

Ethernet/Modbus gateway: the affordable connection of units without an Ethernet interface

With the Modbus gateway function, simple Modbus RTU units can be connected to the Ethernet using the UMG 604. For example, the UMG 604 can be used simultaneously as a gateway for subordinate measurement points or older units which already exist in the installation. Each unit with a Modbus RTU interface, where the data format and function codes match up, can be connected. Data can be marked and scaled.

Highspeed Modbus

The devices of the UMG 604 series can transfer data between the units using the RS485 interface at a speed of up to 921.5 kB/s.

The e-mail and homepage inform you wherever you are...

Who hasn't experienced it before? You are hardly through the door and the telephone is already ringing. There are problems in production, computers are crashing and the energy supplies are lost.

You have direct access to the extremely high performance homepage of the UMG 604 with a web browser and an IP address. Extensive information is already available to you on the homepage. Online data are available together with historical data and graphs recording events. The homepage can be used to directly convert the rates into costs and be exported as a csv file or printed. As an alternative, you can let yourself be informed by e-mail anywhere in the world if your energy supply becomes overloaded, if short-term interruptions to the voltage supplies bring your production processes to a standstill or unauthorized harmonics reduce the lifespan of equipment. The application possibilities are endless.



Residual current measurement (RCM)

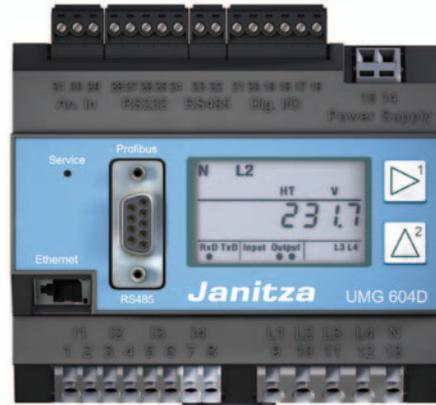
Functionality

All lines on the output to be monitored are fed through the current transformer, with the exception of the PE line. If the system is operating correctly, the sum of all currents is equal to zero so that no voltage is induced in the current transformer. In the event that a fault current flows via ground or other channel, the current difference induces a current in the current transformer which is captured by the residual current measurement device.

UMG 604D

The UMG 604D monitors the residual currents of pure alternating currents in TN and IT networks in electrical systems, displays the current value and issues a warning if the limit values are exceeded.

In addition to the operating currents L1-L3, the fourth measurement input for residual current measurement is coloured differently (light grey) and suitable for currents up to 30 mA. The current transformer with a transformation ratio of 600/1A and sufficiently-dimensioned internal dimensions (20x30, 50x80 or 80x120mm) can be found in section 6, page 166.



Differently coloured terminals for residual current measurement (current input 14)

Extended main features of UMG 604D

- Measures the increase in residual current
- Allows for maintenance scheduling
- Warns if the limit values are exceeded
- Detects slowly developing fault currents
- Detects weaknesses in the electrical system
- Residual current monitoring device (RCM – Residual current monitoring)

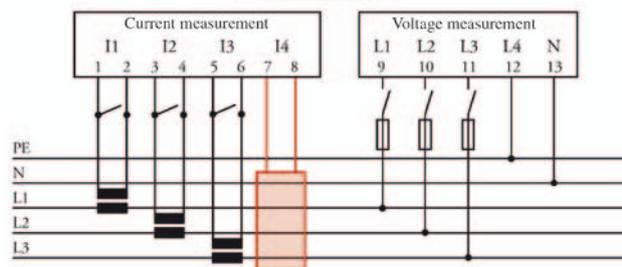


Illustration: Connection for measurement channels and differential current transformer of series KBU (split core).

GridVis EMS-/PQM system software

Online monitoring with the software GridVis

The software GridVis, which comes along with the content of delivery, allows an individual collection, reading out of historic data and visualisation of online data. The received data of multiple measuring points are collected, saved, processed, visualised and provided for further use. All measured values are available in the mode of online measurement either as a line graph or bar graph.

The topology gives a quick overview of the energy distributions and the possibility to locate power failures by comparing measuring points and checking the defined tolerances at a glance.

Depositing some graphical files (common formats such as .jpg) with circuit diagrams, flow processes or building plans and binding of the corresponding instruments by drag and drop to their real position, you can establish customer specific solutions quickly and simply.

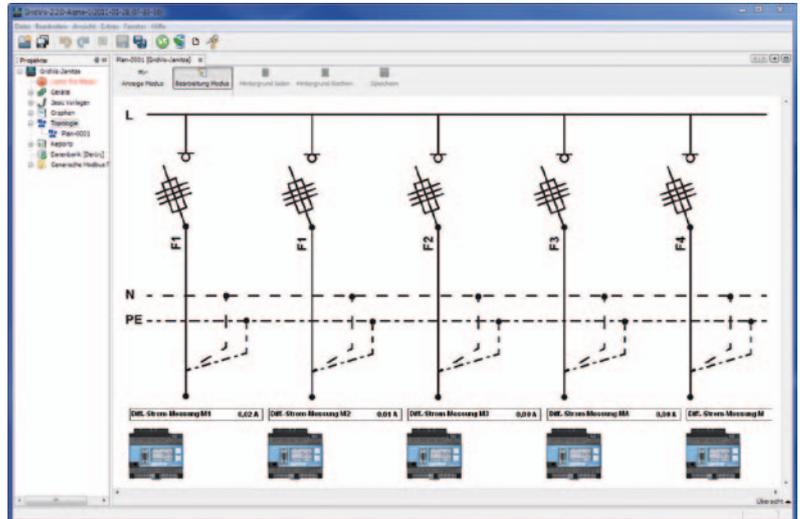


Illustration: topological view

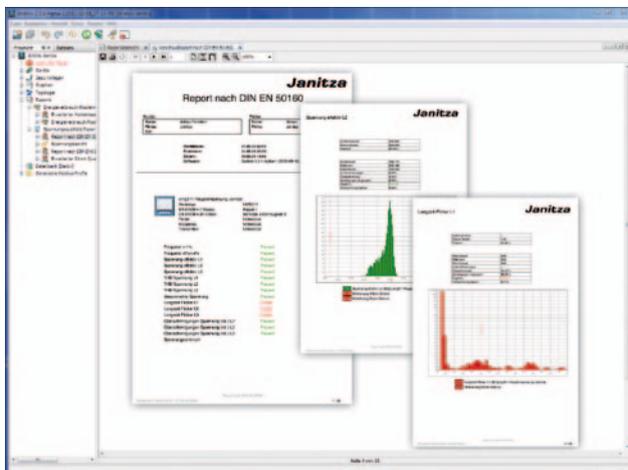


Illustration: Report presentation for voltage quality (simple report)

Main features

- Parameterisation and programming of UMG measurement equipment
- Visualisation of the measurement values with topological view
- Automatic download of the measurement data
- Data storage
- Online analysis tools
- Analysis tools for historic data

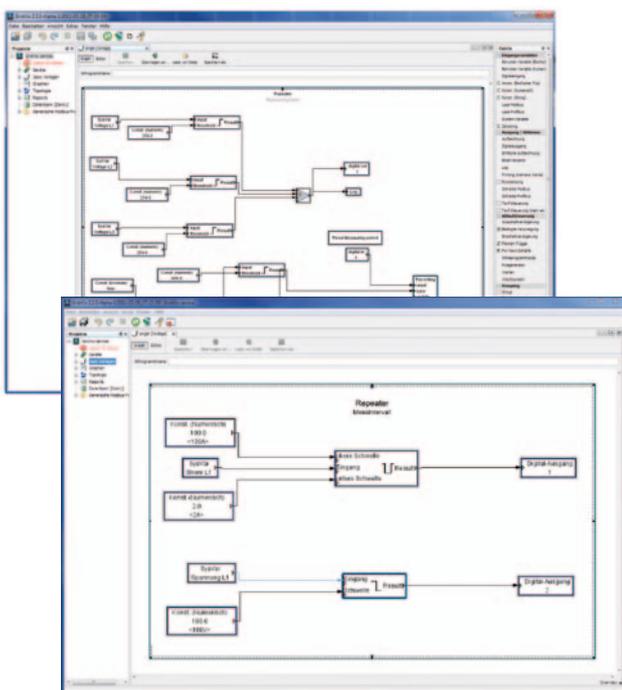
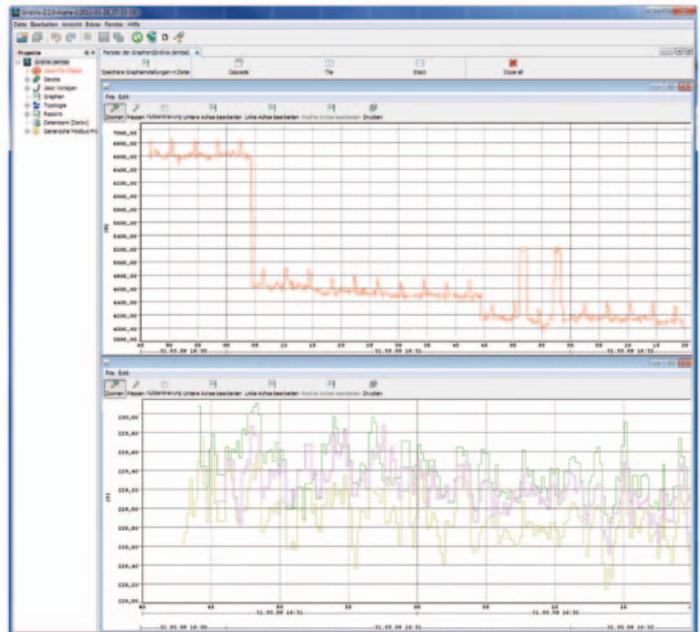
Visualisation, topological view

GridVis allows an individually adaptable visualisation of online data. The topological view provides a rapid overview of energy distribution with the possibility of localising power faults by comparing the individual measurement points and by offering the possibility to check the defined tolerances at a glance.

Customer specific solutions can be quickly and simply implemented through uploading of graphic documents (standard formats such as JPG) with circuit diagrams, production lines or construction plans and incorporating the respective measurement units by drag and drop into their actual locations. Limit value excesses (e.g. THD-U is too high) and the status of inputs and outputs can also be displayed.

Online values and analysis of historic data

With the graphic line writer function, GridVis enables rapid online presentation of the selected measurement values. In this function, the graph is continuously expanded with new measurement values. For example, load profiles can be presented through the analysis of historic data in order to produce exact consumption analysis for optimised electricity supply contracts. Fault analysis through the comparison of various parameters can also be achieved with a few mouse clicks.



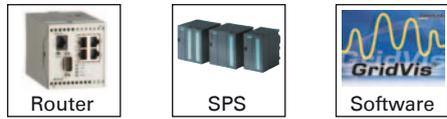
Graphic programming

The graphic programming option for user programs is completely new in the field of digital power analysers. Programs specific to the application can be created with this method such as the free programming of inputs and outputs, monitoring of processes or the issue of reports when defined limit values are achieved. In addition to the operator-friendly graphic programming, the user is also free to program the Jasic® code directly.

programming language

Jasic®

The Jasic® programming language offers brand new opportunities. The user is no longer tied to the functions which are fixed integrations in the unit; the unit can be expanded to include more functions. Up to seven of these freely definable user programs can be processed simultaneously in the unit.



Interfaces

- Ethernet
- RS 232
- RS 485

Networks

- IT, TN, TT - networks
- 3 phase and 4 phase networks
- Up to 4 single phase networks

2 digital inputs

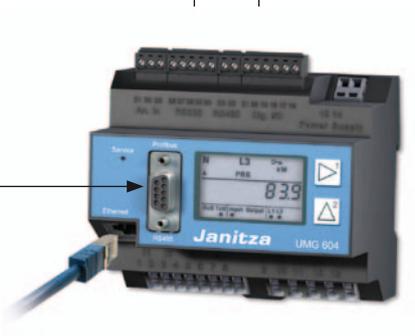
- Pulse input
- Logic input
- Status monitoring
- HT/LT conversion
- Emax (max. demand) resetting

2 digital outputs

- Pulse output kWh/kvarh
- Switch output
- Limit value output
- Emax output
- Logic output

(can be extended through external I/O modules – see chapter 6)

Profibus connection



Communication

- Profibus (DP/V0)
- Modbus (RTU, UDP, TCP, gateway)
- TCP/IP
- BACnet
- HTTP (freely configurable homepage)
- FTP (file transfer)
- SNMP
- TFTP (automatic configuration)
- NTP (time synchronisation)
- SMTP (e-mail function)
- DHCP

Temperature measurement input

- PT 100, PT 1000, KTY 83, KTY 84

Memory

- 128 MB Flash
- 16 MB RAM

Measurement accuracy

- Class: 0.5S (.../5A) class
- Current: 0.2%
- Voltage: 0.2%

Power quality

- Harmonics up to 40th
- Short-term interruptions
- Transient recorder (>50µs)
- Starting current (>10ms)
- Unbalance
- Full wave-effective value recordings (up to 4.5 min)

Peak demand management (optional)

- 64 stages for load shedding

programming language
Jasic®

Product variants and technical data UMG 604

Overview of product variants

| Three/four phase power analysers; 50/60Hz; current transformer .../1/5a; including GridVis programming and analysis software | | | | | | | | | | | | | | | |
|--|---|---|-----------------------------------|------------------------|------------------|-------------------|---------------------|------------|--------|-------------------|----------------|---|-----------|-------------|-----------|
| Supply voltage | | | 4 voltage and 4 current inputs | Memory 128 MB Flash | 2 digital inputs | 2 digital outputs | 1 temperature input | Interfaces | | | | 7 freely programmable application programs | Type | Item number | |
| 95...240 V AC, 135...340 V DC ±10% of nominal range | 50...110V AC 50...155V DC ±10% of nominal range | 20...55V AC 20...77V DC ±10% of nominal range | | | | | | RS 232 | RS 485 | Ethernet 100baseT | Profibus DP V0 | | | | |
| • | - | - | • | • | • | • | • | • | • | • | • | • | • | UMG 604 E | 52.16.002 |
| - | • | - | • | • | • | • | • | • | • | • | • | • | • | UMG 604 E | 52.16.012 |
| - | - | • | • | • | • | • | • | • | • | • | • | • | • | UMG 604 E | 52.16.022 |
| • | - | - | • | • | • | • | • | • | • | • | • | • | • | UMG 604 EP | 52.16.001 |
| - | - | • | • | • | • | • | • | • | • | • | • | • | • | UMG 604 EP | 52.16.021 |
| • | - | - | • | • | • | • | • | • | • | • | • | • | • | UMG 604 DE | 52.16.041 |
| Options (for all versions) | | | | | | | | | | | | | | | |
| Emax function application program (peak demand management) | | | | | | | | | | | | Emax | 52.16.080 | | |
| BACnet communication | | | | | | | | | | | | BACnet | 52.16.081 | | |
| Accessories for UMG 604D | | | | | | | | | | | | | | | |
| Differential current transformer, transmission ratio of 600/1A, interior dimensions: 20mm x 30mm | | | | | | | | | | | | KBU 23D | 15.03.400 | | |
| Differential current transformer, transmission ratio of 600/1A, interior dimensions: 50mm x 80mm | | | | | | | | | | | | KBU 58D | 15.03.401 | | |
| Differential current transformer, transmission ratio of 600/1A, interior dimensions: 80mm x 120mm | | | | | | | | | | | | KBU 812D | 15.03.402 | | |

- = Not possible • = Contained

Not suitable for use in residential areas.

General technical data

| | | |
|-----------------------------|---|---|
| Nominal voltage | 3-phase 4-wire grid (L-N, L-L) 3-phase 3-wire grid (L-L) | 277/480 V AC 480 V AC |
| Overvoltage category | | 300V CAT III |
| Quadrants | | 4 |
| Continuous measurement | | yes |
| 8 channel scanning rate | Per channel | 20 kHz |
| Weight | | 350g |
| Dimensions | | L=107.5mm* W=90mm* H=62 mm |
| Mounting | According to IEC EN60999-1/DIN EN50022 | 35mm DIN rail |
| Working temperature range | | -10...55 °C |
| Connectable conductor (U/I) | Single wire, multi-wire, fine-wire pin cable lugs, ferrule | 0.08 - 2.5 mm ² , 1.5 mm ² |
| Protection class | According to EN 60529 | IP 20 |

Measurement range

| | | |
|--|-----------------------------------|---|
| L-N voltage, AC (without voltage transformer) | Free voltage transformer settings | Networks to 480 V AC |
| Current (transformer: x/1 and x/5A) | | 0.001..75 A |
| Frequency of mains | | 45 ..65 Hz |
| Networks | | IT, TN, TT |
| Measurement in single/multi-phase networks | | 1 ph, 2 ph, 3 ph, 4 ph and up to 4 x 1 ph |

Periphery

| | | |
|-------------------------------|-------------------------------------|-----|
| Digital inputs | Status, logic or pulse input | 2 |
| Digital outputs | Switch logic output or pulse output | 2 |
| Temperature measurement input | PT100, PT1000, KTY83, KTY84 | 1 |
| Password protection | Multilevel | yes |
| Peak demand management | Optional 64 channels | yes |
| Software | GridVis | yes |

Measurement values

| | | |
|--|--|--|
| Voltage | L1, L2, L3, L4, L1-L2, L2-L3, L1-L3 | Accuracy ±0.2% |
| Current | L1, L2, L3, L4, Sum L1-L3, Sum L1-L4 | Accuracy ±0.2% |
| K-factor | L1, L2, L3, L4 | yes |
| Three-phase current components | Positive/negative/zero phase sequence | yes |
| Effective, reactive and apparent power | L1, L2, L3, L4, Sum L1-L3, Sum L1-L4 | Accuracy ±0.4% |
| Cos-phi, power factor | L1, L2, L3, L4, Sum L1-L3, Sum L1-L4 | yes |
| Phase angle | L1, L2, L3, L4 | yes |
| Effective energy (kWh) | L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Purchased effective energy (tariff 1, tariff 2) - Supplied effective energy (tariff 1, tariff 2) | Class 0.5S (.../5 A), Class 1 (.../1 A) |
| Reactive energy (kvarh) | L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Induktive Blindarbeit (Tarif 1, Tarif 2) - Kapazitive Blindarbeit | Class 2 |
| Apparent energy (kVAh) | L1, L2, L3, L4, Sum L1-L3, Sum L1-L4 | yes |
| Current/voltage wave form | L1, L2, L3, L4 | yes |
| Frequency of mains | | Accuracy ±0.01 |
| Temperature measurement | | Accuracy ±1.5% |
| Average value | | yes |
| Minimum and maximum values | | yes |

Features

| | | |
|----------------------|--|-----------------------------|
| Memory | | 128 MB |
| Clock | | +/- 1 min per month |
| Integrated logic | | Programming language Jasic® |
| Operating hour meter | | yes |
| Weekly time switch | | Jasic® |

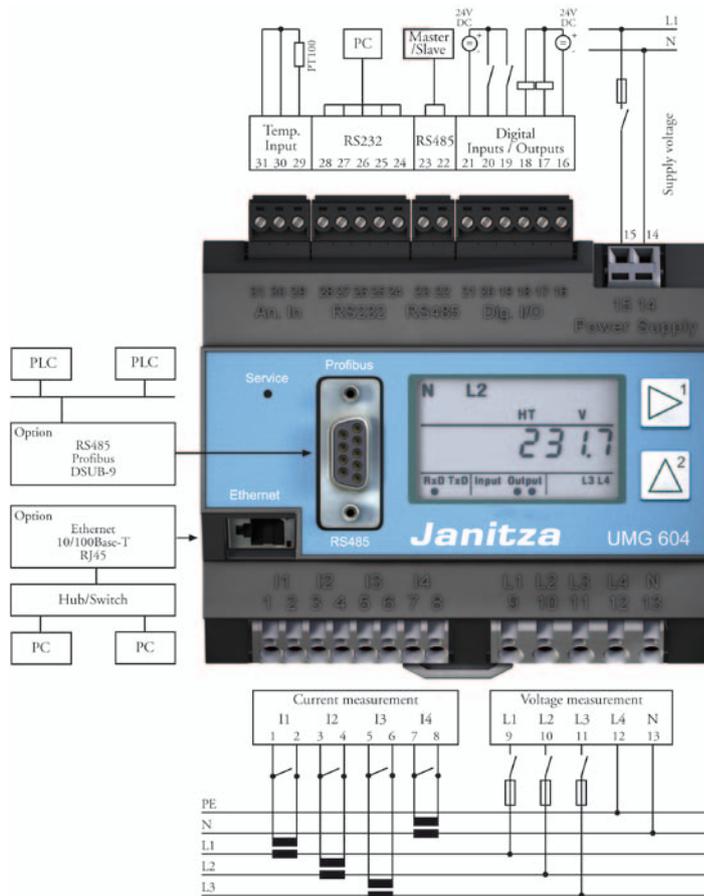
Power quality

| | | |
|-------------------------------|---|----------------|
| Harmonics, 1-40 harmonic | Current, voltage reactive/effective power (±) L1, L2, L3, L4 | Accuracy ±0,5% |
| Distortion factor THD- U in % | L1, L2, L3, L4 | yes |
| Distortion factor THD- I in % | L1, L2, L3, L4 | yes |
| Unbalance | | yes |
| Positive/negative/zero system | | yes |
| Transients | 50 µs | yes |
| Start-up processes | 10 ms | yes |
| Fault recorder function | | yes |
| Short-term interruptions | | yes |

Communication

| | | | |
|------------|-------------------------|--|-----------------|
| Interfaces | RS 232 | 9.6, 19.2, 38.4, 115.2 kbps | yes |
| | RS 485 | 9.6, 19.2, 38.4, 57.6, 76.8, 115.2, 921.6 kbps | yes |
| | Profibus DP | Plug, sub D 9-pole up to 12Mbps | Yes, EP version |
| | Ethernet 10/100 Base-TX | RRJ-45 sockets | yes |
| Protocols | Modbus RTU | | yes |
| | Profibus DP V0 | | Yes, EP version |
| | ModbusTCP | | yes |
| | Modbus overTCP | | yes |
| | Modbus-Gateway | | yes |
| | HTTP | Homepage (configurable) | yes |
| | SMTP | E-mail | yes |
| | SNMP | | yes |
| | SNTP | Time synchronisation | yes |
| | TFTP | Automatic configuration | yes |
| | FTP | File transfer | yes |
| | DHCP | | yes |
| | BACnet / IP | | yes, option |

Connection illustration



Dimensional drawing

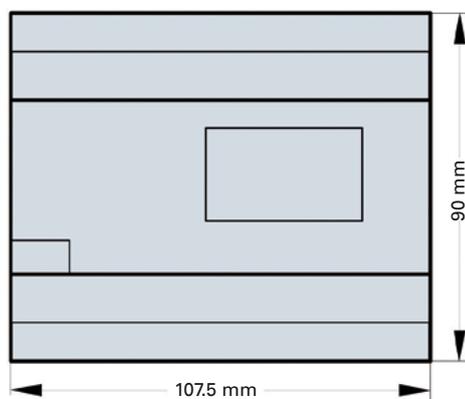


Illustration: front view

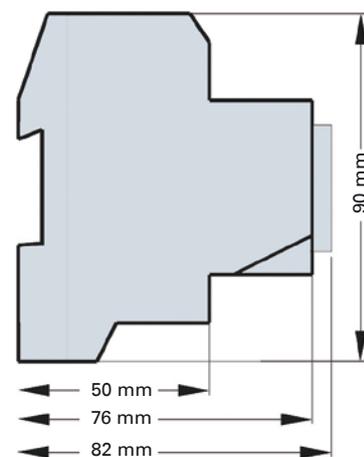


Illustration: side view