# UMG 509-PRO

## Multifunction power analyser with RCM

**Power quality**

**Ethernet connection**

**Graphic programming**


**Residual current monitoring**

**Ethernet-Modbus gateway**

**Alarm management**

**Communication**
- Profibus (DP/V0)
- Modbus (RTU, TCP, Gateway)
- TCP/IP
- BACnet (optional)
- HTTP (Homepage)
- FTP (File transfer)
- SNMP
- TFTP
- NTP (time synchronisation)
- SMTP (email function)
- DHCP

**Interfaces**
- Ethernet
- Profibus (DSUB-9)
- RS485 Modbus (terminal strip)

**Accuracy of measurement**
- Energy: Class 0.2S (... / 5 A)
- Current: 0.2 %
- Voltage: 0.1 %

**Power quality**
- Harmonics up to 63th harmonic
- Short-term interruptions (> 20 ms)
- Transient recorder (> 50 µs)
- Starting currents (> 20 ms)
- Unbalance

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

**Measured data memory**
- 256 MByte Flash
- 32 MB SDRAM

**PLC functionality**
- Graphical programming
- Jasic® programming language
- Programming of threshold values etc.

**2 digital inputs**
- Pulse input
- Logic input
- State monitoring
- HT / LT switching

**2 digital outputs**
- Pulse output kWh / kvarh
- Switch output
- Threshold value output
- Logic output

**Network visualisation software**
- Free GridVis®-Basic

**Thermistor input**
- PT100, PT1000, KTY83, KTY84

**RCM – Residual Current Monitoring**
- 2 residual current inputs

Janitza®

# Areas of application

- Continuous monitoring of the power quality
- Energy management systems (ISO 50001)
- Master device with Ethernet gateway for subordinate measurement points
- Visualisation of the energy supply in the LVDB
- Analysis of electrical disturbances in the event of power quality problems
- Cost centre analysis
- Remote monitoring in the property operation
- Use in test fields (e.g. in universities)

# Main features

**High quality measurement with high sampling rate (20 kHz per channel)**

**Power quality**

- Harmonics analysis up to 63rd harmonic
- Acquisition of short-term interruptions
- Acquisition of transients
- Display of waveforms (current and voltage)
- Unbalance
- Vector diagram

**RCM (Residual Current Monitoring)**

- Continuous monitoring of residual currents (Residual Current Monitor, RCM)
- Alarming in case a preset threshold fault current reached
- Near-realtime reactions for triggering countermeasures
- Permanent RCM measurement for systems in permanent operation without the opportunity to switch off
- Ideal for the central earthing point in TN-S systems

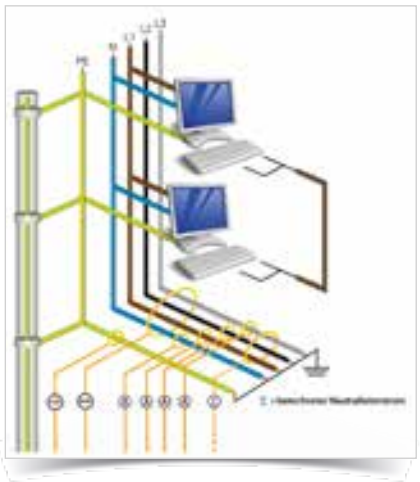


Fig.: Example RCM measurement

**Modern communications architecture via Ethernet**

- Ethernet interface and web server
- Faster, better cost-optimised and more reliable communication system
- High flexibility due to the use of open standards
- Integration in PLC systems and BMS through additional interfaces
- BACnet optionally available
- Up to 4 ports simultaneous
- Versatile IP protocols

### Modbus Gateway function

- Economical connection of devices without Ethernet interface
- Integration of devices with Modbus-RTU interface possible
- Data can be scaled and described
- Minimised number of IP addresses required

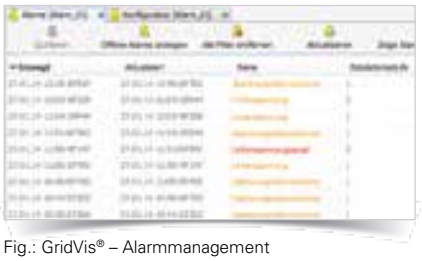


Fig.: GridVis® – Alarmmanagement

### Graphical programming

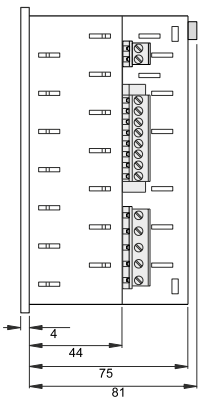
- Comprehensive programming options (PLC functionality)
- Jasic® source code programming
- Sustainable functional expansions far beyond pure measurement
- Complete APPs from the Janitza library

### Powerful alarm management

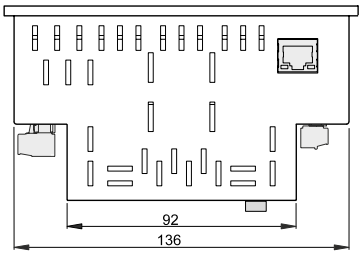
- Can be programmed via the graphic programming or Jasic® source code
- All measured values can be used
- Can be arbitrarily, mathematically processed
- Individual forwarding via email sending, switching of digital outputs, writing to Modbus addresses etc.
- Watchdog APPs
- Further alarm management functions via GridVis®-Service alarm management

# Dimension diagrams

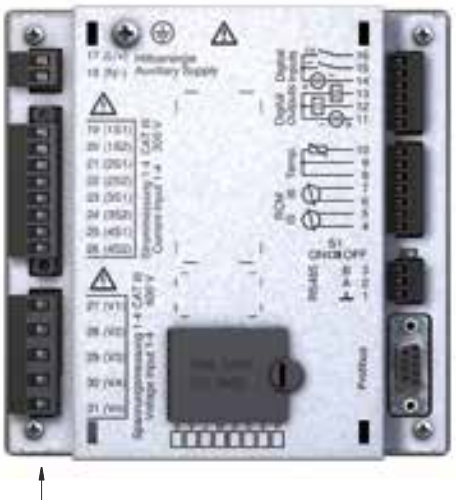
All dimensions in mm




Side view



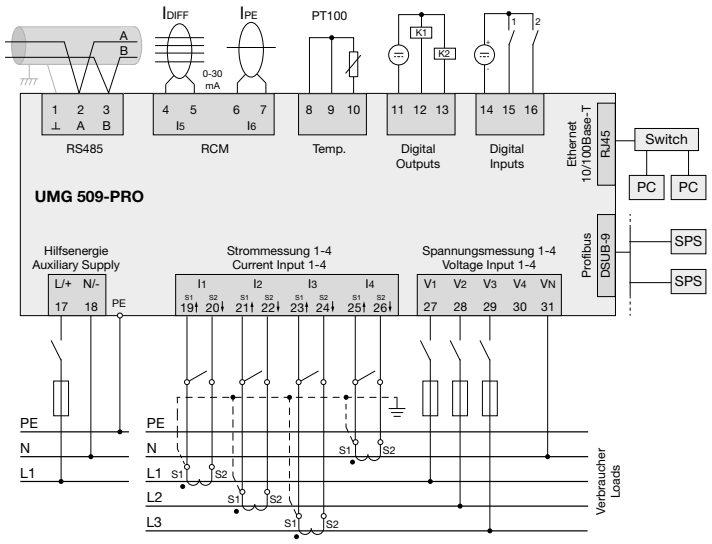

View from below



Ethernet connection

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

# Typical connection




# Device overview and technical data

| | UMG 509-PRO | |
|---|---|---|
| **Item number** | **52.26.001** | **52.26.003** |
| Supply voltage AC | 95 ... 240 V AC | 48 ... 110 V AC |
| Supply voltage DC | 80 ... 300 V DC | 24 ... 150 V DC |
| **Device options** | | |
| BACnet communication | **52.26.081** | **52.26.081** |
| **General** | | |
| Use in low, medium and high voltage networks | | • |
| Accuracy voltage measurement | | 0.1 % |
| Accuracy current measurement | | 0.2 % |
| Accuracy active energy (kWh, .../5 A) | | Class 0.2S |
| Number of measurement points per period | | 400 |
| Uninterrupted measurement | | • |
| **RMS - momentary value** | | |
| Current, voltage, frequency | | • |
| Active, reactive and apparent power / total and per phase | | • |
| Power factor / total and per phase | | • |
| **Energy measurement** | | |
| Active, reactive and apparent energy [L1, L2, L3, L4, ∑ L1–L3, ∑ L1–4] | | • |
| Number of tariffs | | 8 |
| **Recording of the mean values** | | |
| Voltage, current / actual and maximum | | • |
| Active, reactive and apparent power / actual and maximum | | • |
| Frequency / actual and maximum | | • |
| Demand calculation mode (bi-metallic function) / thermal | | • |
| **Other measurements** | | |
| Operating hours measurement | | • |
| Clock | | • |
| Weekly timer | | Jasic® |
| **Power quality measurements** | | |
| Harmonics per order / current and voltage | | 1st – 63rd |
| Harmonics per order / active and reactive power | | 1st – 63rd |
| Distortion factor THD-U in % | | • |
| Distortion factor THD-I in % | | • |

Comment:
For detailed technical information please refer to the operation manual and the Modbus address list

• = included - = not included

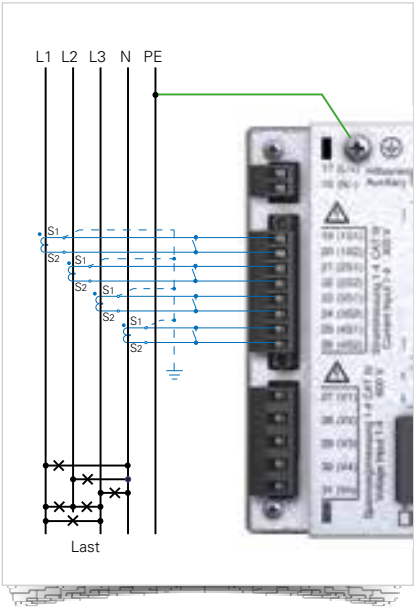



Fig.: Example current measurement

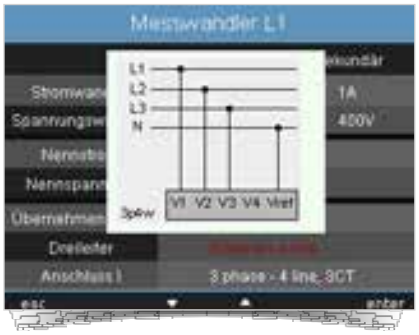



Fig.: Example for the configuration of current measurement via 3 current transformers in a three-phase 4-wire network on the UMG 509-PRO display

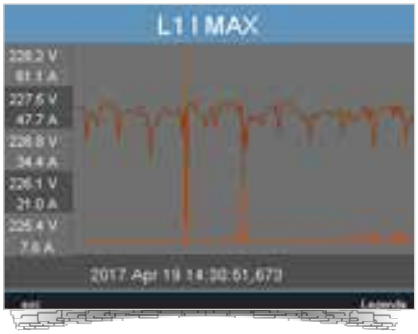



Fig.: Illustration of the full wave effective values for an event (voltage drop)

Comment:
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*1 Optional additional functions with the packages GridVis®-Professional, GridVis®-Service and GridVis®-Ultimate.

*2 With UL variants: 347/600 V

*3 The UMG 509-PRO can only determine measured values, if an L-N voltage of greater than 10 Veff or an L-L voltage of greater than 18 Veff is applied to at least one voltage measurement input.

| | |
|---|---|
| Voltage unbalance | • |
| Rotary field indication | • |
| Current and voltage, positive, zero and negative sequence component | • |
| Transients | > 50 µs |
| Error / event recorder function | • |
| Short-term interruptions | 20 ms |
| Oscillogram recording (waveform U and I) | • |
| Full wave effective values (U, I, P, Q) | • |
| Under and overvoltage recording | • |
| **Measured data recording** | |
| Memory (Flash) | 256 MB |
| Average, minimum, maximum values | • |
| Measured data channels | 10 |
| Alarm messages | • |
| Time stamp | • |
| Time basis average value | freely user-defined |
| RMS averaging, arithmetic | • |
| **Displays and inputs / outputs** | |
| LCD colour graphical display 320 x 240, 256 colours, 6 buttons | • |
| Language selection | • |
| Digital inputs | 2 |
| Digital outputs (as switch or pulse output) | 2 |
| Voltage and current inputs | each 4 |
| Residual current inputs | 2 |
| Temperature input | 1 |
| Password protection | • |
| **Communication** | |
| **Interfaces** | |
| RS485: 9.6 – 921.6 kbps (terminal board) | • |
| Profibus DP: Up to 12 Mbps (DSUB-9-plug) | • |
| Ethernet 10/100 Base-TX (RJ-45 socket) | • |
| **Protocols** | |
| Modbus RTU, Modbus TCP, Modbus RTU over Ethernet | • |
| Modbus Gateway for Master-Slave configuration | • |
| Profibus DP V0 | • |
| HTTP (homepage configurable) | • |
| SMTP (email) | • |
| NTP (time synchronisation) | • |
| TFTP | • |
| FTP (File-Transfer) | • |
| SNMP | • |
| DHCP | • |
| TCP/IP | • |
| BACnet (optional) | • |
| ICMP (Ping) | • |
| **Software GridVis®-Basic*1** | |
| Online and historic graphs | • |
| Databases (Janitza DB, Derby DB); MySQL, MS SQL with higher GridVis® versions) | • |
| Manual reports (energy, power quality) | • |
| Graphical programming | • |
| Topology views | • |
| Manual read-out of the measuring devices | • |
| Graph sets | • |
| **Programming / threshold values / alarm management** | |
| Application programs freely programmable | 7 |
| Graphical programming | • |
| Programming via source code Jasic® | • |

| | |
|---|---|
| **Technical data** | |
| Type of measurement | Constant true RMS<br>Up to 63rd harmonic |
| Nominal voltage, three-phase, 4-conductor (L-N, L-L) | 417 / 720 V AC *2 |
| Nominal voltage, three-phase, 3-conductor (L-L) | 600 V AC |
| Measurement in quadrants | 4 |
| Networks | TN, TT, IT |
| Measurement in single-phase/multi-phase networks | 1 ph, 2 ph, 3 ph, 4 ph and up to 4 times 1 ph |
| **Measured voltage input** | |
| Overvoltage category | 600 V CAT III |
| Measured range, voltage L-N, AC (without potential transformer) | 0*3 ... 600 Vrms |

| | |
|---|---|
| Measured range, voltage L-L, AC (without potential transformer) | 0*3 ... 1000 Vrms |
| Resolution | 0.01 V |
| Impedance | 4 MOhm / phase |
| Frequency measuring range | 40 ... 70 Hz |
| Power consumption | approx. 0.1 VA |
| Sampling frequency | 20 kHz / phase |
| **Measured current input** | |
| Rated current | 1 / 5 A |
| Resolution | 0.1 mA |
| Measurement range | 0.005 ... 7 Amps |
| Overvoltage category | 300 V CAT III |
| Measurement surge voltage | 4 kV |
| Power consumption | approx. 0.2 VA (Ri = 5 MOhm) |
| Overload for 1 sec. | 120 A (sinusoidal) |
| Sampling frequency | 20 kHz |
| **Residual current / Temperature inputs** | |
| Residual current inputs | 2 |
| Measurement range, residual current inputs | 0,05 ... 30 mA |
| Temperature input | 1 |
| **Digital inputs and outputs** | |
| Number of digital inputs | 2 |
| Maximum counting frequency | 20 Hz |
| Reaction time (Jasic® program) | 200 ms |
| Input signal present | 18 ... 28 V DC (typical 4 mA) |
| Input signal not present | 0 ... 5 V DC, current < 0.5 mA |
| Number of digital outputs | 2 |
| Switching voltage | max. 60 V DC, 30 V AC |
| Switching current | max. 50 mA Eff AC / DC |
| Output of voltage dips | 20 ms |
| Pulse output (energy pulse) | max. 20 Hz |
| Maximum cable length | up to 30 m unscreened, from 30 m screened |
| **Mechanical properties** | |
| Weight | 1080 g |
| Device dimensions in mm (H x W x D) | 144 x 144 x approx. 81 |
| Battery | Type CR2450, 3 V, Li-Mn |
| Protection class per EN 60529 | Front: IP40; Rear: IP20 |
| Assembly per IEC EN 60999-1 / DIN EN 50022 | Front panel installation |
| Connecting phase (U / I),<br>Single core, multi-core, fine-stranded<br>Terminal pins, core end sheath | <br>0.2 to 2.5 mm²<br>0.2 to 2.5 mm² |
| **Environmental conditions** | |
| Temperature range | Operation: K55 (-10 ... +55 °C) |
| Relative humidity | Operation: 0 ... 75 % RH |
| Operating height | 0 ... 2,000 m above sea level |
| Degree of pollution | 2 |
| Installation position | user-defined |
| **Electromagnetic compatibility** | |
| Electromagnetic compatibility of electrical equipment | Directive 2004/108/EC |
| Electrical appliances for application within particular voltage limits | Directive 2006/95/EC |
| **Equipment safety** | |
| Safety requirements for electrical equipment for measurement, regulation, control and laboratory use – Part 1: General requirements | IEC/EN 61010-1 |
| Part 2-030: Particular requirements for testing and measuring circuits | IEC/EN 61010-2-030 |
| **Noise immunity** | |
| Class A: Industrial environment | IEC/EN 61326-1 |
| Electrostatic discharge | IEC/EN 61000-4-2 |
| Voltage dips | IEC/EN 61000-4-11 |
| **Emissions** | |
| Class B: Residential environment | IEC/EN 61326-1 |
| Radio disturbanc voltage strength 30 – 1000 MHz | IEC/CISPR11/EN 55011 |
| Radiated interference voltage 0.15 – 30 MHz | IEC/CISPR11/EN 55011 |
| **Safety** | |
| Europe | CE labelling |
| USA and Canada | UL variants available |
| **Firmware** | |
| Firmware update | Update via GridVis® software.<br>Firmware download (free of charge) from the website:<br>http://www.janitza.com |

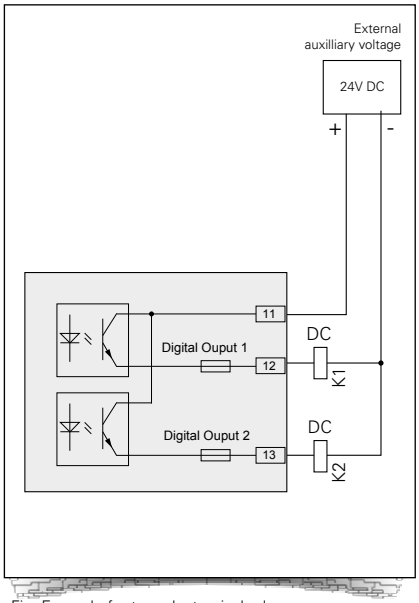


Fig. Example for two electronical relays connected to the digital outputs

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