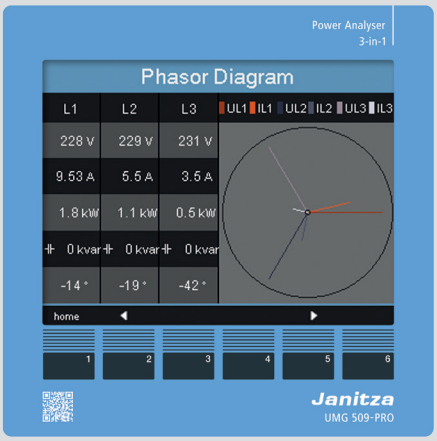



Power Quality Analyser

# UMG 509-PRO

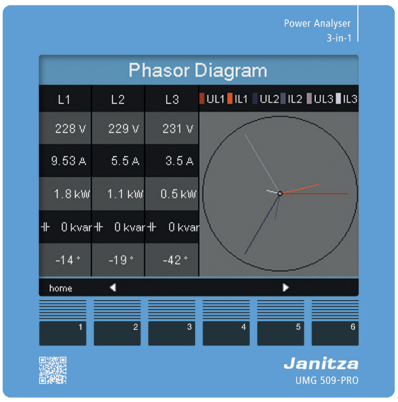
Data sheet

Dok.-Nr. 2.059.019.1.a 07/2023

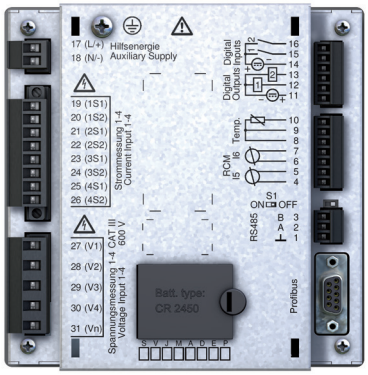
Janitza®

# DEVICE VIEWS

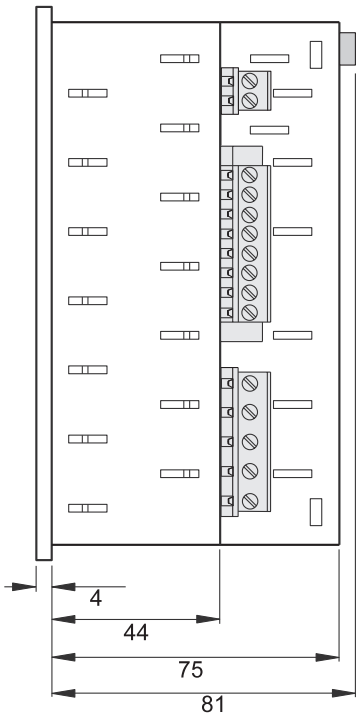
## Front view




## Rear view

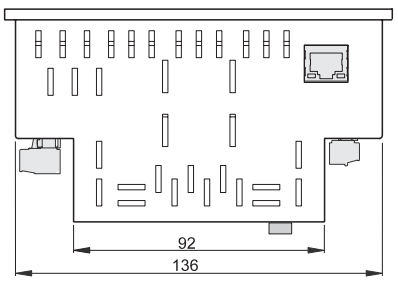



## Side view




All dimensions in mm

## Bottom view




Cut-out size:
$138^{+0,8}$ mm ($5.43^{+0,03}$ in) x $138^{+0,8}$ mm ($5.43^{+0,03}$ in)

# TECHNICAL DATA

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

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

| Ambient conditions during operation | |
|---|---|
| The device is intended for weather-protected, stationary use.<br>The device must be connected to the ground wire connection!<br>Protection class I in acc. with IEC 60536 (VDE 0106, Part 1). | |
| Working temperature range | -10 °C (14 °F) to +55 °C (131 °F) |
| Relative humidity | 5 to 95% RH at 25°C (77 °F)<br>without condensation |
| Operating altitude | 0 to 2000 m (1.24 mi) above sea level |
| Pollution degree | 2 |
| Installation position | upright |
| Ventilation | forced ventilation is not required. |
| Protection against ingress of solid foreign bodies and water<br>• Front<br>• Rear side | IP40 in acc. with EN60529<br>IP20 in acc. with EN60529 |

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

| **Terminal connection capacity (supply voltage)**<br>Connectable conductors. Only one conductor can be connected per terminal! | |
|---|---|
| Single core, multi-core, fine-stranded | 0.2 - 2.5 $mm^2$, AWG 24 - 12 |
| Terminal pins, core end sheath | 0.25 - 2.5 $mm^2$ |
| Tightening torque | 0.5 - 0.6 Nm |
| Stripping length | 7 mm (0.2756 in) |

| Current measurement | |
|---|---|
| Rated current | 5 A |
| Resolution | 0.1 mA |
| Metering range | 0.005 to 7 Arms |
| Measurement range exceeded (overload) | as of 7.5 Arms |
| Crest factor | 2.4 |
| Overvoltage category | 230 V option: 300 V CAT III<br>24 V option: 300V CAT II |
| Measurement surge voltage | 4 kV |
| Power consumption | approx. 0.2 VA (Ri=5 mOhm) |
| Overload for 1 sec. | 120 A (sinusoidal) |
| Sampling rate | 20 kHz / phase |

| Voltage measurement | |
|---|---|
| The voltage measurement inputs are suitable for measurements in the following power supply systems: | |
| Three-phase 4-conductor systems with rated voltages up to | 417 V / 720 V<br>347 V / 600 V UL listed |
| Three-phase 3-conductor systems with rated voltages up to | 600 V |
| From a safety and reliability perspective, the voltage measurement inputs are designed as follows: | |
| Overvoltage category | 600V CAT III |
| Measurement surge voltage | 6 kV |
| Protection of voltage measurement | 1 - 10 A |
| Metering range L-N | 0[1)] to 600 Vrms |
| Metering range L-L | 0[1)] to 1000 Vrms |
| Resolution | 0.01 V |
| Crest factor | 1.6 (related to 600 Vrms) |
| Impedance | 4 MOhm / phase |
| Power consumption | approx. 0.1 VA |
| Sampling rate | 20 kHz / phase |
| Transients | > 50 µs |
| Frequency of the fundamental oscillation<br>- Resolution | 40 Hz to 70 Hz<br>0.001 Hz |

1 ) The device 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.

| Measurement precision phase angle | 0,075 ° |
|---|---|

| **Terminal connection capacity (voltage and current measurement)**<br>Connectable conductors. Only one conductor can be connected per terminal! | |
|---|---|
| Single core, multi-core, fine-stranded | 0.2 - 2.5 mm², AWG 24-12 |
| Terminal pins, core end sheath | 0.25 - 2.5 mm² |
| Tightening torque | 0.5 - 0.6 Nm |
| Stripping length | 7 mm (0.2756 in) |

| **Residual current monitoring (RCM)** | |
|---|---|
| Rated current | 30 mArms |
| Metering range | 0 to 40 mArms |
| Triggering current | 100 µA |
| Resolution | 1 µA |
| Crest factor | 1.414 (related to 40 mA) |
| Burden | 4 Ohm |
| Overload for 1 sec. | 5 A |
| Sustained overload | 1 A |
| Overload for 20 ms | 50 A |
| Residual current monitoring | i.a.w. IEC/TR 60755 (2008-01), type A |
| Maximum external burden | 300 Ohm (for cable break detection) |

| **Terminal connection capacity (residual current monitoring)**<br>Connectable conductors. Only one conductor can be connected per terminal! | |
|---|---|
| Rigid/flexible | 0.14 - 1.5 mm², AWG 28-16 |
| Flexible with core end sheath without plastic sleeve | 0.20 - 1.5 mm² |
| Flexible with core end sheath with plastic sleeve | 0.20 - 1.5 mm² |
| Stripping length | 7 mm (0.2756 in) |
| Tightening torque | 0.20 - 0.25 Nm |
| Cable length | up to 30 m unshielded, from 30 m shielded |

| **Temperature measurement input**<br>3-wire measurement | |
|---|---|
| Update time | 1 second |
| Connectable sensors | PT100, PT1000, KTY83, KTY84 |
| Total burden (sensor + cable) | max. 4 kOhm |
| Cable length | up to 30 m (32.81 yd) unshielded, from 30 m (32.81 yd) shielded |

| Sensor type | Temperature range | Resistor range | Measurement uncertainty |
|---|---|---|---|
| KTY83 | -55 °C (-67 °F) to +175 °C (347 °F) | 500 Ohm to 2.6 kOhm | ± 1.5% rng |
| KTY84 | -40 °C (-40 °F) to +300 °C (572 °F) | 350 Ohm to 2.6 kOhm | ± 1.5% rng |
| PT100 | -99 °C (-146 °F) to +500 °C (932 °F) | 60 Ohm to 180 Ohm | ± 1.5% rng |
| PT1000 | -99 °C (-146 °F) to +500 °C (932 °F) | 600 Ohm to 1.8 kOhm | ± 1.5% rng |

| **Terminal connection capacity (temperature measurement input)**<br>Connectable conductors. Only one conductor can be connected per terminal! | |
|---|---|
| Single core, multi-core, fine-stranded | 0.08 - 1.5 $mm^2$ |
| Terminal pins, core end sheath | 1 $mm^2$ |

| **Digital inputs**<br>2 Digital inputs with a joint earth | |
|---|---|
| Maximum counter frequency | 20 Hz |
| Response time (Jasic program) | 200 ms |
| Input signal present | 18 V to 28 V DC (typical 4 mA) |
| Input signal not present | 0 to 5 V DC, current less than 0.5 mA |
| Cable length | up to 30 m (32.81 yd) unshielded, from 30 m (32.81 yd) shielded |

| **Digital outputs**<br>2 digital outputs with a joint earth; opto coupler, not short-circuit proof | |
|---|---|
| Supply voltage | 20 V - 30 V DC (SELV or PELV supply) |
| Switching voltage | max. 60 V DC, 30 V AC |
| Switching current | max. 50 mAeff AC/DC |
| Response time (Jasic program) | 200 ms |
| Output of voltage dips | 20 ms |
| Output of voltage exceedance events | 20 ms |
| Switching frequency | max. 20 Hz |
| Cable length | up to 30 m (32.81 yd) unshielded, from 30 m (32.81 yd) shielded |

| **Terminal connection capacity (digital inputs and outputs)** | |
|---|---|
| Rigid/flexible | 0.14 - 1.5 $mm^2$, AWG 28-16 |
| Flexible with core end sheath without plastic sleeve | 0.25 - 1.5 $mm^2$ |
| Flexible with core end sheath with plastic sleeve | 0.25 - 0.5 $mm^2$ |
| Tightening torque | 0.22 - 0.25 Nm |
| Stripping length | 7 mm (0.2756 in) |

| **RS485 interface**<br>3-wire connection with GND, A, B | |
|---|---|
| Protocol | Modbus RTU/slave, Modbus RTU/master, Modbus RTU /gateway |
| Transmission rate | 9.6 kbps, 19.2 kbps, 38.4 kbps, 57.6 kbps, 115.2 kbps, 921.6 kbps |
| Termination resistor | can be activated by micro switch |

| **Profibus interface** | |
|---|---|
| Connection | SUB D 9-pin |
| Protocol | Profibus DP/V0 per EN 50170 |
| Transmission rate | 9.6 kBaud to 12 MBaud |

| **Ethernet interface** | |
|---|---|
| Connection | RJ45 |
| Function | Modbus gateway, embedded web server (HTTP) |
| Protocols | CP/IP, EMAIL (SMTP), DHCP client (BootP), Modbus/TCP, Modbus RTU over Ethernet, FTP, ICMP (Ping), NTP, TFTP, BACnet (optional), SNMP |

# FUNCTION PERFORMANCE CHARACTERISTICS

| Function | Symbol | Precision class | Metering range | Display range |
|---|---|---|---|---|
| Total active power | P | 0.2 [5] (IEC61557-12) | 0 to 15.3kW | 0 W to 9999 GW * |
| Total reactive power | QA [6], Qv [6] | 1 (IEC61557-12) | 0 to 15.3 kvar | 0 varh .. 9999 Gvar * |
| Total apparent power | SA, Sv [6] | 0.2 [5] (IEC61557-12) | 0 to 15.3 kVA | 0 VA to 9999 GVA * |
| Total active energy | Ea | 0.2 [5] (IEC61557-12)<br>0.2S [5] (IEC62053-22)<br>0.5 (ANSI C12.20) | 0 to 15.3 kWh | 0 Wh to 9999 GWh * |
| Total reactive energy | ErA [6], ErV [6] | 1 (IEC61557-12) | 0 to 15.3 kvarh | 0 varh .. 9999 Gvarh * |
| Total apparent energy | EapA,EapV [6] | 0.2 [5] (IEC61557-12) | 0 to 15.3 kVAh | 0 VAh to 9999 GVAh * |
| Frequency | f | 0.05 (IEC61557-12) | 40 to 70 Hz | 40 Hz to 70 Hz |
| Phase current | I | 0.2 (IEC61557-12) | 0.005 to 7 Arms | 0 A to 9999 kA |
| Measured neutral conductor current | IN | 0.2 (IEC61557-12) | 0.005 to 7 Arms | 0 A to 9999 kA |
| Residual currents I5, I6 | IDIFF | 1 (IEC61557-12) | 0 to 40 mArms | 0 A to 9999 kA |
| Computed neutral conductor current | INc | 0.5 (IEC61557-12) | 0.005 to 21 A | 0 A to 9999 kA |
| Voltage | U L-N | 0.1 (IEC61557-12) | 10 to 600 Vrms | 0 V to 9999 kV |
| Voltage | U L-L | 0.1 (IEC61557-12) | 18 to 1000 Vrms | 0 V to 9999 kV |
| Power factor | PFA, PFV | 0.5 (IEC61557-12) | 0.00 to 1.00 | 0 to 1 |
| Short-term flicker, long-term flicker | Pst, Plt | - | - | - |
| Voltage dips | Udip | 0.2 (IEC61557-12) | 10 to 600 Vrms | 0 V to 9999 kV |
| Voltage increases | Uswl | 0.2 (IEC61557-12) | 10 to 600 Vrms | 0 V to 9999 kV |
| Transient overvoltages | Utr | 0.2 (IEC61557-12) | 10 to 600 Vrms | 0 V to 9999 kV |
| Voltage interruptions | Uint | - | - | - |
| Voltage unbalance [1] | Unba | 0.2 (IEC61557-12) | 10 to 600 Vrms | 0 V to 9999 kV |
| Voltage unbalance [2] | Unb | 0.2 (IEC61557-12) | 10 to 600 Vrms | 0 V to 9999 kV |
| Voltage harmonics | Uh | Cl. 1 (IEC61000-4-7) | Up to 2.5 kHz | 0 V to 9999 kV |
| THD of the voltage [3] | THDu | 1.0 (IEC61557-12) | Up to 2.5 kHz | 0% to 999 % |
| THD of the voltage [4] | THD-Ru | 1.0 (IEC61557-12) | Up to 2.5 kHz | 0% to 999 % |
| Current harmonics | Ih | Cl. 1 (IEC61000-4-7) | Up to 2.5 kHz | 0 A to 9999 kA |
| THD of the current [3] | THDi | 1.0 (IEC61557-12) | Up to 2.5 kHz | 0% to 999 % |
| THD of the current [4] | THD-Ri | 1.0 (IEC61557-12) | Up to 2.5 kHz | 0% to 999 % |
| Mains signal voltage (interharmonics voltage) | MSV | - | - | - |

1) In relation to the amplitude.
2) In relation to phase and amplitude.
3) In relation to fundamental oscillation.
4) In relation to effective value.
5) Precision class 0.2/0.2S with.../ 5A converter.
Precision class 0.5/0.5S with.../ 1A converter.
6) Calculation from fundamental oscillation.

* When the max. total working value s have been reached, the display returns to 0 W.

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