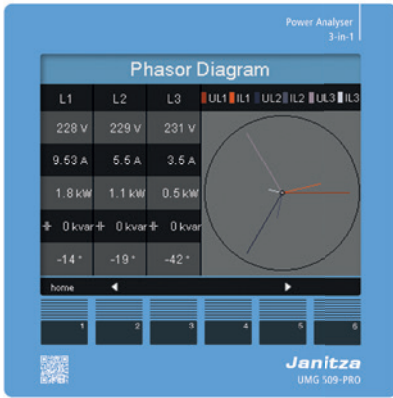


## Power Quality Analyser UMG 509-PRO

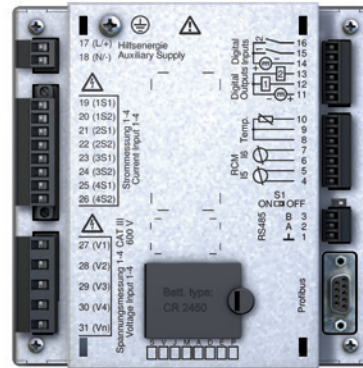
Data sheet

# DEVICE VIEWS

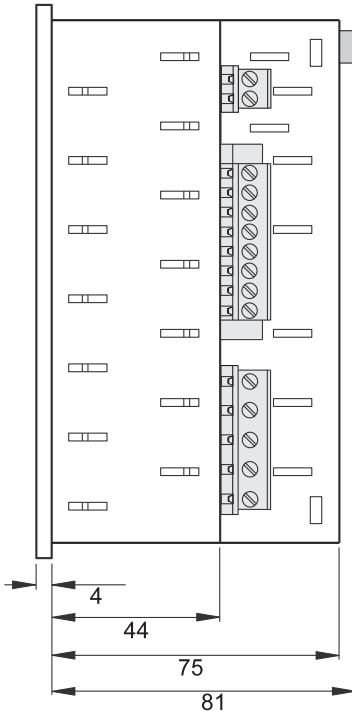
Front view



Rear view

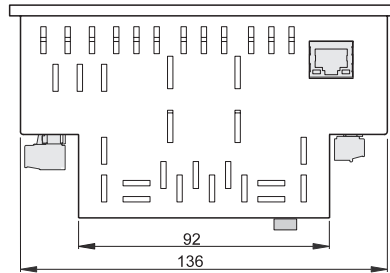


Side view



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

<b>General</b>	
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)

<b>Transport and storage</b>	
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)

<b>Ambient conditions during operation</b>	
The device is intended for weather-protected, stationary use. The device must be connected to the ground wire connection! 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) 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 <ul style="list-style-type: none"> <li>• Front</li> <li>• Rear side</li> </ul>	IP40 in acc. with EN60529 IP20 in acc. with EN60529

<b>Supply voltage</b>	
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: - Nominal range - Operating range - Power consumption	95 V to 240 V (50/60 Hz) / DC 80 V to 300 V +-10% of nominal range max. 7 W / 14 VA
24V option: • Nominal range • Operating range • Power consumption	48 V to 110 V (50/60 Hz) or DC 24 to 150 V +-10% of nominal range max. 9 W / 13 VA

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


<b>Current measurement</b>	
Rated current	5 A
Resolution	0.1 mA
Metering range	0.005 to 7 Amps
Measurement range exceeded (overload)	as of 7.5 Amps
Crest factor	2.4
Overvoltage category	230 V option: 300 V CAT III 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

<b>Voltage measurement</b>	
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 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 <sup>1)</sup> to 600 Vrms
Metering range L-L	0 <sup>1)</sup> 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 $\mu$ s
Frequency of the fundamental oscillation - Resolution	40 Hz to 70 Hz 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.

<b>Measurement precision phase angle</b>	0,075 °
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<b>Terminal connection capacity (voltage and current measurement)</b>	
Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 2.5 mm <sup>2</sup> , AWG 24-12
Terminal pins, core end sheath	0.25 - 2.5 mm <sup>2</sup>
Tightening torque	0.5 - 0.6 Nm
Stripping length	7 mm (0.2756 in)

<b>Residual current monitoring (RCM)</b>	
Rated current	30 mAmps
Metering range	0 to 40 mAmps
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)

<b>Terminal connection capacity (residual current monitoring)</b>	
Connectable conductors. Only one conductor can be connected per terminal!	
Rigid/flexible	0.14 - 1.5 mm <sup>2</sup> , AWG 28-16
Flexible with core end sheath without plastic sleeve	0.20 - 1.5 mm <sup>2</sup>
Flexible with core end sheath with plastic sleeve	0.20 - 1.5 mm <sup>2</sup>
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

<b>Temperature measurement input</b> 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

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

<b>Digital inputs</b> 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

<b>Digital outputs</b> 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

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

<b>RS485 interface</b>	
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

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

<b>Ethernet interface</b>	
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 <sup>5)</sup> (IEC61557-12)	0 to 15.3kW	0 W to 9999 GW *
Total reactive power	QA <sup>6)</sup> , Qv <sup>6)</sup>	1 (IEC61557-12)	0 to 15.3 kvar	0 varh .. 9999 Gvar *
Total apparent power	SA, Sv <sup>6)</sup>	0.2 <sup>5)</sup> (IEC61557-12)	0 to 15.3 kVA	0 VA to 9999 GVA *
Total active energy	Ea	0.2 <sup>5)</sup> (IEC61557-12) 0.2S <sup>5)</sup> (IEC62053-22)	0 to 15.3 kWh	0 Wh to 9999 GWh *
Total reactive energy	ErA <sup>6)</sup> , ErV <sup>6)</sup>	1 (IEC61557-12)	0 to 15.3 kvarh	0 varh .. 9999 Gvarh *
Total apparent energy	EapA, EapV <sup>6)</sup>	0.2 <sup>5)</sup> (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 Amps	0 A to 9999 kA
Measured neutral conductor current	IN	0.2 (IEC61557-12)	0.005 to 7 Amps	0 A to 9999 kA
Residual currents I5, I6	IDIFF	1 (IEC61557-12)	0 to 40 mAmps	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 <sup>1)</sup>	Unba	0.2 (IEC61557-12)	10 to 600 Vrms	0 V to 9999 kV
Voltage unbalance <sup>2)</sup>	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 <sup>3)</sup>	THDu	1.0 (IEC61557-12)	Up to 2.5 kHz	0% to 999 %
THD of the voltage <sup>4)</sup>	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 <sup>3)</sup>	THDi	1.0 (IEC61557-12)	Up to 2.5 kHz	0% to 999 %
THD of the current <sup>4)</sup>	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.



Janitza electronics GmbH  
Vor dem Polstück 6  
35633 Lahnau, Germany  
Support Tel. +49 6441 9642-22  
Fax +49 6441 9642-30  
e-mail: [info@janitza.com](mailto:info@janitza.com)  
[www.janitza.com](http://www.janitza.com)

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