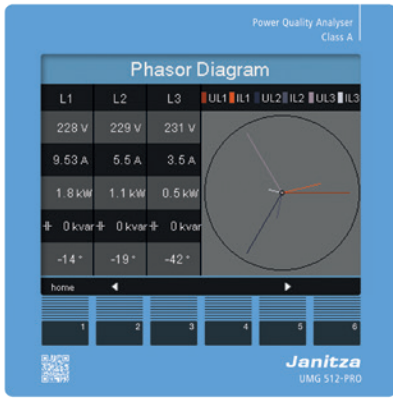


Power Quality Analyser UMG 512-PRO

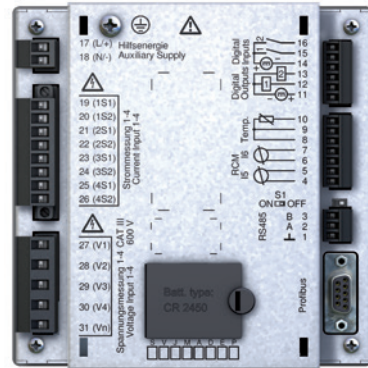
Data sheet

DEVICE VIEWS

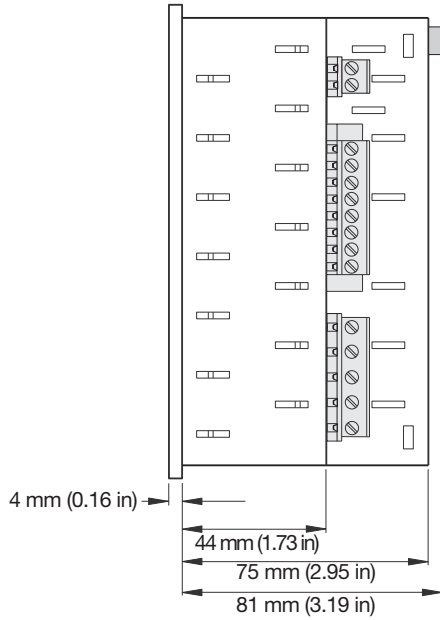
Front view



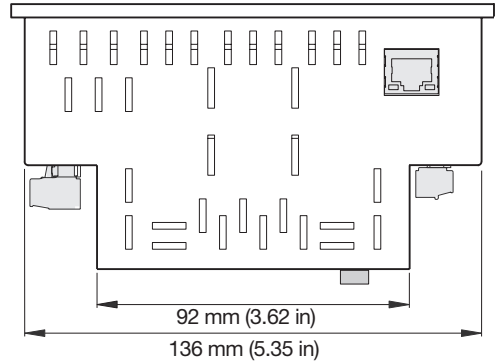
Rear view



Side view



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 connectors)	approx. 1080 g (2.38 lb)
Device dimensions	Approx. w = 144 mm (5.64 in), h = 144 mm (5.64 in), d = 75 mm (2.95 in)
Battery	Type Li-Mn CR2450, 3 V (approval i.a.w. UL 1642)
Clock - temperature range -40 °C (-40 °F) to +85 °C (185 °F)	+5 ppm (corresponding to approx. 3 minutes per year)
Impact resistance	IK07 according to IEC 62262

Transport and storage	
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) up to +70 °C (158 °F)

Ambient conditions during operation	
The device is intended for weatherproof, fixed installation and 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
Mounting position	Upright
Ventilation	Forced ventilation is not required.
Protection against ingress of solid foreign bodies and water - Front - Rear	IP40 in acc. with EN60529 IP20 in acc. with EN60529

Supply voltage	
Installations of overvoltage category	300 V CAT III
Protection of the supply voltage (fuse)	6 A, type B (approved i.a.w. UL/IEC)
230 V 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) / DC 24 to 150 V +-10% of nominal range max. 9 W / 13 VA

Terminal connection capacity (supply voltage)	
Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 4.0 mm ² , AWG 28-12
Cable end sleeve (not insulated)	0.2 - 2.5 mm ² , AWG 26-14
Cable end sleeve (insulated)	0.2 - 2.5 mm ² , AWG 26-14
Tightening torque	0.4 - 0.5 Nm (3.54 - 4.43 lbf in)
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 8.5 Amps
Crest factor	1.41
Overvoltage category	230 V option: 300 V CAT III 24 V option: 300 V 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	25.6 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 (+10%) 347 V / 600 V (UL listed)
Three-phase 3-conductor systems with rated voltages up to	600 V (+10%)
From a safety and reliability perspective, the voltage measurement inputs are designed as follows:	
Overvoltage category	600 V 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	25.6 kHz / phase
Transients	39 µs
U _{din} ²⁾ i.a.w. EN61000-4-30	100 to 250 V
Flicker range (dU/U)	27.5%
Frequency range of the fundamental oscillation - Resolution	15 Hz to 440 Hz 0.001 Hz


¹⁾The device can only determine measured values, if an L-N voltage of greater than 10 V_{eff} or an L-L voltage of greater than 18 V_{eff} is applied to at least one voltage measurement input.

²⁾ U_{din} = arranged input voltage according to DIN EN 61000-4-30

Measurement precision phase angle	0,075 °
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Terminal connection capacity (voltage measurement)	
Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 4 mm ² , AWG 28-12
Cable end sleeve (not insulated)	0.2 - 2.5 mm ² , AWG 26-14
Cable end sleeve (insulated)	0.2 - 2.5 mm ² , AWG 26-14
Tightening torque	0.4 - 0.5 Nm (3.54 - 4.43 lbf in)
Stripping length	7 mm (0.2756 in)

Terminal connection capacity (current measurement)	
Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 4 mm ² , AWG 28-12
Cable end sleeve (not insulated)	0.2 - 4 mm ² , AWG 26-12
Cable end sleeve (insulated)	0.2 - 2.5 mm ² , AWG 26-14
Tightening torque	0.4 - 0.5 Nm (3.54 - 4.43 lbf in)
Stripping length	7 mm (0.2756 in)

Residual current monitoring (RCM)	
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)

Terminal connection capacity (residual current monitoring)	
Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm ² , AWG 28-16
Cable end sleeve (not insulated)	0.2 - 1.5 mm ² , AWG 26-16
Cable end sleeve (insulated)	0.2 - 1.5 mm ² , AWG 26-16
Tightening torque	0.2 - 0.25 Nm (1.77 - 2.21 lbf in)
Stripping length	7 mm (0.2756 in)
Cable length	up to 30 m (32.81 yd) unshielded, from 30 m (32.81 yd) shielded

Thermistor input 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 (thermistor input) Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0,2 - 1,5 mm ² , AWG 28-16
Cable end sleeve (not insulated)	0,2 - 1,5 mm ² , AWG 26-16
Cable end sleeve (insulated)	0,2 - 1,5 mm ² , AWG 26-16
Tightening torque	0,2 - 0,25 Nm (1.77 - 2.21 lbf in)
Stripping length	7 mm (0.2756 in)

Digital inputs 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 (typically 4 mA) (SELV or PELV supply)
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 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
Switching current	max. 50 mAeff AC/DC
Response time (Jasic program)	200 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) Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm ² , AWG 28-16
Cable end sleeve (not insulated)	0.2 - 1.5 mm ² , AWG 26-16
Cable end sleeve (insulated)	0.2 - 1.5 mm ² , AWG 26-16
Tightening torque	0.2 - 0.25 Nm (1.77 - 2.21 lbf in)
Stripping length	7 mm (0.2756 in)

RS485 interface 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

Terminal connection capacity (serial interface - RS485) Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm ² , AWG 28-16
Cable end sleeve (not insulated)	0.2 - 1.5 mm ² , AWG 26-16
Cable end sleeve (insulated)	0.2 - 1.5 mm ² , AWG 26-16
Tightening torque	0.2 - 0.25 Nm (1.77 - 2.21 lbf in)
Stripping length	7 mm (0.2756 in)

Profibus interface	
Connection	SUB D 9-pole
Protocol	Profibus DP/V0 as 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

Measurements with 50/60 Hz

The measurements are carried out via current transformer ..5A.

Function	Symbol	Precision class	Metering range	Display range
Total active power	P	0.2 ⁵⁾ (IEC61557-12)	0 to 15.3 kW	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) 0.2 ⁵⁾ (IEC62053-22)	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	0.02 (IEC61557-12)	40 to 70 Hz	40 Hz to 70 Hz
Phase current	I	0.1 (IEC61557-12)	0.005 to 7 Arms	0 A to 9999 kA
Measured neutral conductor current	IN	0.1 (IEC61557-12)	0.005 to 7 Arms	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	Cl. A (IEC61000-4-15)	0.4 Pst to 10.0 Pst	0 to 10
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	Duration +- 1 cycle	-	-
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 ⁷⁾	Uh	Cl. 1 (IEC61000-4-7)	Up to 3 kHz	0 V to 9999 kV
THD of the voltage ³⁾⁷⁾	THDu	1.0 (IEC61557-12)	Up to 3 kHz	0% to 999 %
THD of the voltage ⁴⁾⁷⁾	THD-Ru	1.0 (IEC61557-12)	Up to 3 kHz	0% to 999 %
Current harmonics ⁷⁾	Ih	Cl. 1 (IEC61000-4-7)	Up to 3 kHz	0 A to 9999 kA
THD of the current ³⁾⁷⁾	THDi	1.0 (IEC61557-12)	Up to 3 kHz	0% to 999 %
THD of the current ⁴⁾⁷⁾	THD-Ri	1.0 (IEC61557-12)	Up to 3 kHz	0% to 999 %
Mains signal voltage (interharmonics voltage)	MSV	IEC 61000-4-7 class 1	10% – 200% of IEC 61000-2-4 class 3	0 V to 9999 kV

Measurements in the range 15 to 45 / 65 to 440 Hz

Function	Symbol	Precision class	Metering range	Display range
Total active power	P	2 (IEC61557-12)	0 to 15.3kW	0 W to 9999 GW *
Total reactive power	QA ⁶⁾ , Qv ⁶⁾	2 (IEC61557-12)	0 to 15.3 kvar	0 varh .. 9999 Gvar *
Total apparent power	SA, Sv ⁶⁾	1 (IEC61557-12)	0 to 15.3 kVA	0 VA to 9999 GVA *
Total active energy	Ea	2 (IEC61557-12)	0 to 15.3 kWh	0 Wh to 9999 GWh *
Total reactive energy	ErA ⁶⁾ , ErV ⁶⁾	2 (IEC61557-12)	0 to 15.3 kvarh	0 varh .. 9999 Gvarh *
Total apparent energy	EapA, EapV ⁶⁾	1 (IEC61557-12)	0 to 15.3 kVAh	0 VAh to 9999 GVAh *
Frequency	f	0.02 (IEC61557-12)	15 to 440 Hz	15 Hz to 440 Hz
Phase current	I	0.5 (IEC61557-12)	0.005 to 7 Arms	0 A to 9999 kA
Measured neutral conductor current	IN	0.5 (IEC61557-12)	0.005 to 7 Arms	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	1.5 (IEC61557-12)	0.005 to 21 A	0 A to 9999 kA
Voltage	U L-N	0.5 (IEC61557-12)	10 to 600 Vrms	0 V to 9999 kV
Voltage	U L-L	0.5 (IEC61557-12)	18 to 1000 Vrms	0 V to 9999 kV
Power factor	PFA, PFV	2 (IEC61557-12)	0.00 to 1.00	0 to 1
Short-term flicker, long-term flicker	Pst, Plt	-	-	-
Voltage dips	Udip	0.5 (IEC61557-12)	10 to 600 Vrms	0 V to 9999 kV
Voltage increases	Uswl	0.5 (IEC61557-12)	10 to 600 Vrms	0 V to 9999 kV
Transient overvoltages	Utr	0.5 (IEC61557-12)	10 to 600 Vrms	0 V to 9999 kV
Voltage interruptions	Uint	Duration +- 1 cycle	-	-
Voltage unbalance ¹⁾	Unba	0.5 (IEC61557-12)	10 to 600 Vrms	0 V to 9999 kV
Voltage unbalance ²⁾	Unb	0.5 (IEC61557-12)	10 to 600 Vrms	0 V to 9999 kV
Voltage harmonics ⁷⁾	Uh	Cl. 2 (IEC61000-4-7)	Up to 3 kHz	0 V to 9999 kV
THD of the voltage ⁷⁾	THDu	2.0 (IEC61557-12)	Up to 3 kHz	0% to 999 %

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.

7) measuring range: up to 50. harmonic, but maximum 3 KHz

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

Specifications as per IEC 61000-4-30

Characteristic	Uncertainty	Metering range
5.1 Frequency	± 10 mHz	42.5 Hz – 57.5 Hz, 51 Hz – 69 Hz
5.2 Supply voltage level	$\pm 0.1\%$ of U_{din}	10% – 150% of U_{din}
5.3 Flicker	$\pm 5\%$ of measured value	0.2 – 10 Pst
5.4 Dips and excessive increases	Amplitude: $\pm 0.2\%$ of U_{din} Duration: ± 1 period	N/A
5.5 Voltage interruptions	Duration: ± 1 period	N/A
5.7 Unbalance	$\pm 0.15\%$	0.5% – 5% u_2 0.5% – 5% u_0
5.8 Harmonics	IEC 61000-4-7 class 1	10% – 200% of Class 3 of IEC 61000-2-4
5.9 Interharmonics	IEC 61000-4-7 class 1	10% – 200% of Class 3 of IEC 61000-2-4
5.10 Mains signal voltage	In the range 3%-15% of U_{din} , $\pm 5\%$ of U_{din} . In the range 1%-3% of U_{din} , $\pm 0.15\%$ of U_{din} . There are no uncertainty requirements for values $< 1\%$ of U_{din} .	0% – 15% of U_{din}
5.12 Downward/upward deviation	$\pm 0.1\%$ of U_{din}	10% – 150% of U_{din}

The device meets the requirements according to IEC 61000-4-30 class A for:

- compensation
- time uncertainty
- marking concept
- transient influence quantities

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