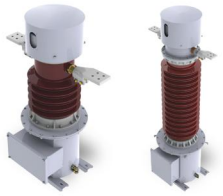
Medium Voltage Outdoor System up to 36 kV:
High Voltage Outdoor System up to 123 kV:
Current Transformer for Substation Type COU



Type COU

Type COL

Technical data

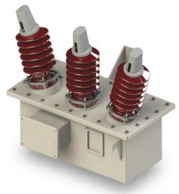
Description	COU-12	COU-24	COU-36	COU-123
Highest system voltage (kV)	12	24	36	123
Power frequency withstand voltage (r.m.s.) (kV)	28	50	70	230
Lightning impulse withstand voltage (peak) (kV)	75	125	170	550
Rated frequency (Hz)	50			
Insulating material	Oil immersed insulation Class A			
Rated primary current (A)	100 –2,000			
Rated secondary current (A)	1 , 5			
Primary terminal marking	P1-P2 , H1-H2			
Secondary terminal marking	s1-s2 , x1-x2			
Number of winding (Winding)	2 ,Up to 4*special on request			
Accuracy class & Burden (Max)				
- Metering	30VA Class 0.5, 50VA Class 0.5, 100VA Class 1, 200VA Class 3			
- Protection	30VA Class 5P20, 50VA Class 5P20, 100VA Class 5P10, 200VA Class 10P10			
Rated short-time thermal current Ith, r.m.s. (1 sec) (kA)	40 (Max)			
Rated dynamic current Idyn, r.m.s. (1 sec) (kA)	2.5 x Ith			
Rated continuous thermal current (%)	120			
Oil expansion	Metallic Bellow			
Weight (approx.) (kg.)	230			700
Standard	IEC61869-2 / IEEEC57.13-2008			

Current Transformer for Metering Purpose Type COL
Technical data

Description	COL-12	COL-24	COL-36
Highest system voltage (kV)	12	24	36
Power frequency withstand voltage (r.m.s.) (kV)	20	50	70
Lightning impulse withstand voltage (peak) (kV)	75	125	170
Rated frequency (Hz)	50		
Insulating material	Oil immersed insulation Class A		
Rated primary current (A)	10 -800		
Rated secondary current (A)	1 , 5		
Primary terminal marking	P1-P2 , H1-H2		
Secondary terminal marking	s1-s2 , x1-x2		
Number of winding (Winding)	1 , 2		
Accuracy class & Burden (Max)			
- Metering	30VA Class 0.5, 50VA Class 1, 60VA Class 3		
- Protection	30VA Class 5P20, 50VA Class 5P10, 60VA Class 10P10		
Rated short-time thermal current Ith, r.m.s. (1 sec) (kA)	40 (Max)		
Rated dynamic current Idyn, r.m.s. (1 sec) (kA)	2.5 x Ith		
Rated continuous thermal current (%)	120		
Weight (approx.) (kg.)	30		35
Standard	IEC61869-2 / IEEEC57.13-2008		

Medium Voltage Outdoor System up to 36 kV :
Single phase Voltage Transformer Type VOL


Type VOL


Type VOG

Technical data

Description	VOL-12	VOL-24	VOL-36
Highest system voltage (kV)	12	24	36
Power frequency withstand voltage (r.m.s.) (kV)	20	50	70
Lightning impulse withstand voltage (peak) (kV)	28	125	170
Rated frequency (Hz)	50		
Insulating material	Oil immersed insulation Class A		
Rated primary voltage (kV)	11	22	33
Rated secondary voltage (V)	100 , 110 , 120 , 230		
Primary terminal marking	U-V , A-B , H1-H2		
Secondary terminal marking	u-v , a-b , x1-x2		
Number of winding (Winding)	Up to 2		
Accuracy class & Burden (Max)			
- Metering	50VA Class 0.5, 100VA Class 1, 500VA Class 3		
- Protection	500VA Class 3P		
Voltage factor	1.2 Cont /1.5, 30 sec.		
Weight (approx.) (kg.)	50		70
Standard	IEC61869-3 / IEEEC57.13-2008		

Three Phase Voltage Transformer Type VOG
Technical data

Description	VOG-242	VOG-362
Highest system voltage (kV)	24	36
Power frequency withstand voltage (r.m.s.) (kV)	50	70
Lightning impulse withstand voltage (peak) (kV)	125	170
Rated frequency (Hz)	50	
Insulating material	Oil immersed insulation Class A	
Rated primary voltage (kV)	22/√3	33/√3
Rated secondary voltage (V)	110 / sqrt 3 , 110	
Primary terminal marking	A-B-C , H1-H2-H3	
Secondary terminal marking	a-b-c , x1-x2-x3	
Number of winding (Winding)	Up to 2	
Accuracy class & Burden		
- Metering	50VA Class 0.5, 500VA Class 3	
- Protection	500VA Class 3P	
Voltage factor (%)	1.2 Cont / 1.9, 8h	
Weight (approx.) (kg.)	135	180
Standard	IEC61869-3 / IEEEC57.13-2008	

Medium Voltage Outdoor System up to 36 kV :
Voltage Transformer for Substation Type VOG for EGAT

Type VOG

Technical data

Description	VOG-12	VOG-24	VOG-36
Highest system voltage (kV)	12	24	36
Power frequency withstand voltage (r.m.s.) (kV)	20	50	70
Lightning impulse withstand voltage (peak) (kV)	28	125	170
Rated frequency (Hz)	50		
Insulating material	Oil immersed insulation Class A		
Rated primary voltage (kV)	11/√3	22/√3	33/√3
Rated secondary voltage (V)	110/√3 , 110		
Primary terminal marking	A-B , H1-H0		
Secondary terminal marking	a-b , x1-x2		
Number of winding (Winding)	Up to 2		
Accuracy class & Burden			
- Metering	50VA Class 0.2, 0.3WXY		
- Protection	On request		
Voltage factor (%)	1.2 Cont / 1.9, 8h		
Oil expansion	Metalic bellow		
Weight (approx.) (kg.)	91		
Standard	IEC61869-3 / IEEEC57.13-2008		

Harmonics

Measurement accuracy 0.5

Temperature input

Memory 4 MByte

UMG 104 – Energy measurement device for DIN rails

Communication
- Profibus (DP / V0 – optional)
- Modbus RTU

Interfaces
- RS232
- RS485

Accuracy of measurement
- Energy: Class 0.5S (... / 5 A)
- Current: 0.2 %
- Voltage: 0.2 %

Power quality
- Harmonics up to 40th harmonic
- Unbalance, rotary field indication
- Distortion factor THD-U / THD-I

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

Temperature measurement
- PT100, PT1000, KTY83, KTY84

Network visualisation software
- GridVis®-Basic (in the scope of supply)

2 digital inputs
- Pulse input
- Signalling input logic
- State monitoring

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

Measured data memory
- 4 MByte Flash (156,000 measured values)

Areas of application

- Consumption data acquisition and evaluation (load profiles, load curves)
- Continuous power quality monitoring
- Cost centre accounting of energy costs
- Network protection
- Measured value transducer for building management systems or PLC

Main features

Power quality

- Harmonics analysis up to 40th harmonic
- Unbalance
- Rotary field indication
- Distortion factor THD-U / THD-I
- Measurement of positive, negative and zero sequence component

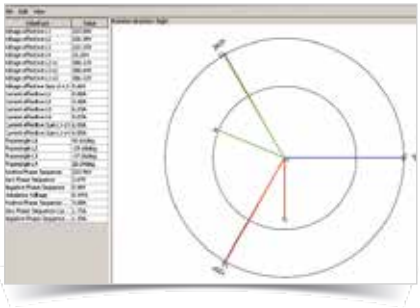


Fig.: GridVis® – Phasor diagram

High-speed Modbus

- Fast and reliable data exchange via RS485 interface
- Speed up to 921.6 kB/s

Secure and rapid communication via Modbus and Profibus

- Rapid, cost-optimised and reliable communication in existing Fieldbus architectures
- Integration in PLC systems and building management systems
- High flexibility due to the use of open standards

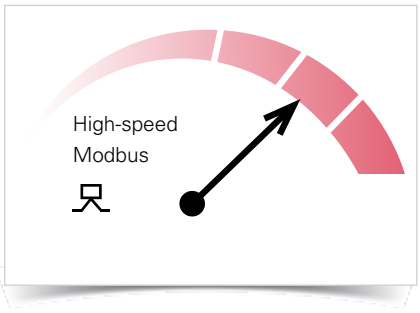


Fig.: High-speed Modbus

Large measurement data memory

- 4 MByte
- 156,000 saved values
- Recording range dependent on the user-defined measurement data memory configuration over a few months
- Recording freely configurable

Added value through additional functions

The UMG 104 goes far beyond the limits of digital multifunction measurement devices thanks to the integration of additional functions:

- Multifunction measurement device
- State monitoring
- Data logger
- Meters (kWh, kvarh)
- Temperature monitoring
- Harmonics analyser

Due to the four current and voltage inputs there are also particular advantages with the monitoring of up to four single-phase outputs, e.g. in data centres, offices or single-phase motor outputs.

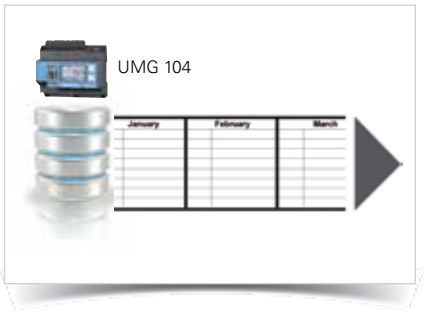
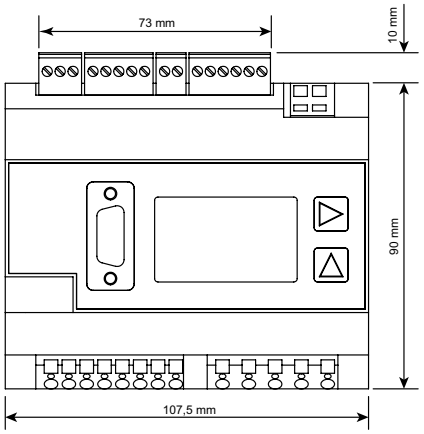


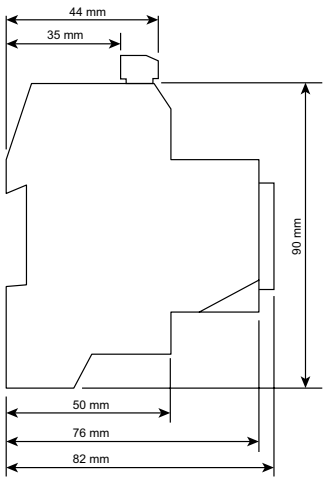
Fig.: Large measurement data memory

Dimension diagrams

All dimensions in mm

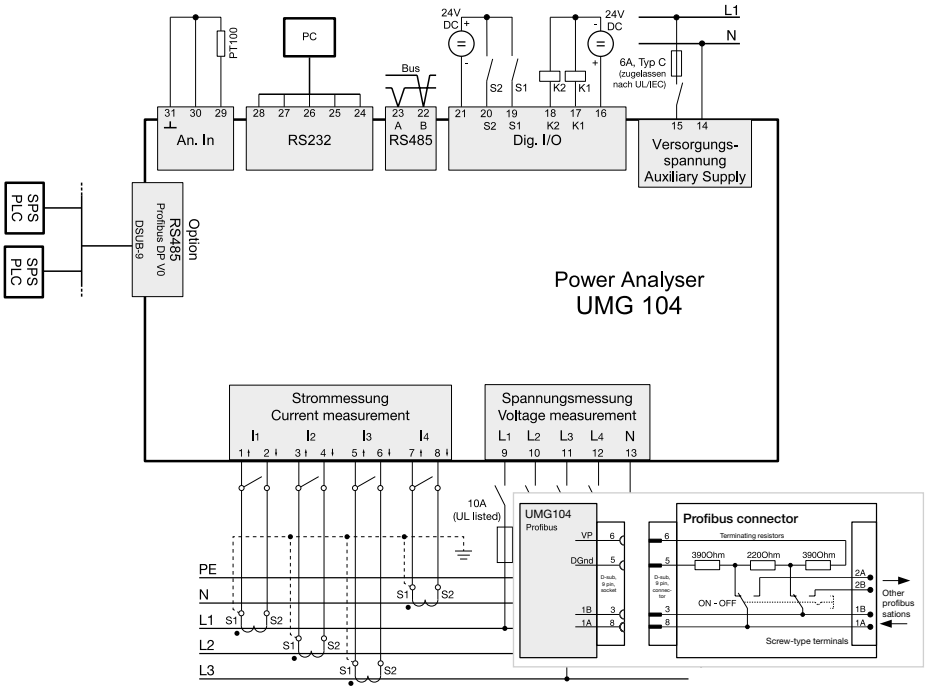


Front view



Side view

Typical connection



Device overview and technical data

	UMG 104			UMG 104P
Item number		**52.20.003**		
Item number (UL)	**52.20.201**	**-**	**52.20.205**	**52.20.202**
Supply voltage AC	95 ... 240 V AC	50 ... 110 V AC	20 ... 50 V AC	95 ... 240 V AC
Supply voltage DC	135 ... 340 V DC	50 ... 155 V DC	20 ... 70 V DC	135 ... 340 V DC
Communication				
Interfaces				
RS485: 9.6 – 921.6 kbps (Screw-type terminal)	•	•	•	•
RS232: 9.6 – 115.2 kbps (Screw-type terminal)	•	•	•	•
Profibus DP: Up to 12 Mbps (DSUB-9-socket)	-	-	-	•

General	
Use in low and medium voltage networks	•
Accuracy voltage measurement	0.2 %
Accuracy current measurement	0.25 %
Accuracy active energy (kWh, .../5 A)	Class 0.5S
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	•

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

• = included - = not included

An RS232 connecting cable is not included in the delivery and must be ordered separately as item no. 08.02.427.

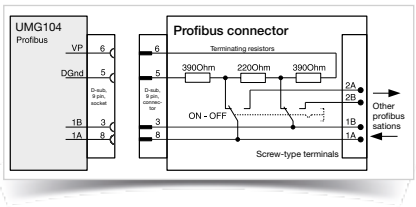


Fig.: Profibus connector, contact allocation

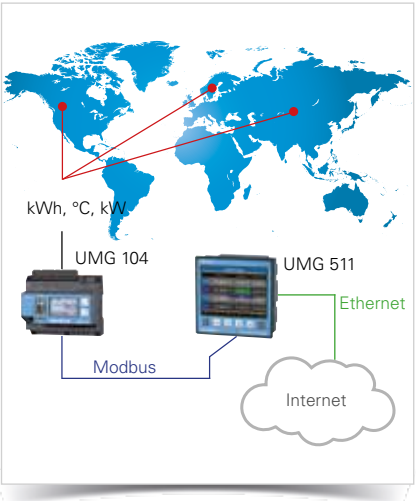


Fig.: Word-wide remote monitoring of the energy consumption and temperature for various different locations

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

• = included - = not included

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

Energy measurement	
Active, reactive and apparent energy [L1,L2,L3, L4, ∑ L1–L3, ∑ L1–L4]	•
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	
Clock	•
Power quality measurements	
Harmonics per order / current and voltage	1st – 40th
Harmonics per order / active and reactive power	1st – 40th
Distortion factor THD-U in %	•
Distortion factor THD-I in %	•
Voltage unbalance	•
Rotary field indication	•
Current and voltage, positive, zero and negative sequence component	•
Measured data recording	
Memory (Flash)	4 MB
Average, minimum, maximum values	•
Measured data channels	4
Alarm messages	•
Time stamp	•
Time basis average value	freely user-defined
RMS averaging, arithmetic	•
Displays and inputs / outputs	
LCD display	•
Digital inputs	2
Digital outputs (as switch or pulse output)	2
Thermistor input (PT100, PT1000, KTY83, KTY84)	•
Voltage and current inputs	every 4
Password protection	•
Communication	
Protocols	
Modbus RTU	• / •
Profibus DP V0	- / •
Software GridVis®-Basic*1	
Online graphs	•
Databases (Janitza DB, Derby DB); MySQL, MS SQL with higher GridVis® versions)	•
Manual reports (energy, power quality)	•
Topology views	•
Manual read-out of the measuring devices	•
Graph sets	•
Programming / threshold values / alarm management	
Comparator (2 Groups with 4 comparators each)	•
Technical data	
Type of measurement	Constant true RMS Up to 40th harmonic
Nominal voltage, three-phase, 4-conductor (L-N, L-L)	277 / 480 V AC
Nominal voltage, three-phase, 3-conductor (L-L)	480 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	300 V CAT III
Measured range, voltage L-N, AC (without potential transformer)	10 ... 600 Vrms
Measured range, voltage L-L, AC (without potential transformer)	18 ... 1,000 Vrms
Resolution	0.01 V
Impedance	4 MOhm / phase
Frequency measuring range	45 ... 65 Hz
Power consumption	approx. 0.1 VA
Sampling frequency	20 kHz / phase

Measured current input	
Rated current	1 / 5 A
Resolution	1 mA
Measurement range	0.001 ... 8.5 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.	100 A (sinusoidal)
Sampling frequency	20 kHz
Digital inputs and outputs	
Number of digital inputs	2
Maximum counting frequency	20 Hz
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
Pulse output (energy pulse)	max. 20 Hz
Maximum cable length	up to 30 m unscreened, from 30 m screened
Mechanical properties	
Weight	350 g
Device dimensions in mm (H x W x D)	90 x 107.5 x approx. 82
Battery	Type Lithium CR2032, 3 V
Protection class per EN 60529	IP20
Assembly per IEC EN 60999-1 / DIN EN 50022	35-mm DIN rail
Connecting phase (U / I), Single core, multi-core, fine-stranded Terminal pins, core end sheath	 0.08 to 2.5 mm² 1.5 mm²
Environmental conditions	
Temperature range	Operation: K55 (-10 ... +55 °C)
Relative humidity	Operation: 5 to 95 % (at 25 °C)
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	
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. Firmware download (free of charge) from the website: http://www.janitza.com

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

• = included - = not included

Class A

Reporting

Harmonics

Flicker

Homepage

Alarm management

EN 50160 / ISO 50001 Made in Germany

UMG 511 – Class A power quality analyser

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

Interfaces
- Ethernet
- Profibus / RS485 (DSUB-9)

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

Power quality acc. Class A
- Harmonics up to the 63rd harmonic
- Flicker measurement
- Short-term interruptions (> 20 ms)
- Transient recorder (> 50 µs)
- Starting currents (> 10 ms)
- Unbalance
- Half wave RMS recordings (up to 4.5 min.)

Networks
- IT, TN, TT networks
- 3 and 4-phase networks

Measured data memory
- 256 MByte Flash

Programming language
- Graphical programming
- Jasic®
- PLC functionality

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

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

(expandable via external I/O modules)

Peak demand management (optional)
- Up to 64 switch-off stages

Network visualisation software
- GridVis®-Basic (in the scope of supply)
- PQ Report Generator

Areas of application

- Continuous monitoring of the power quality
- Harmonics analysis with power quality problems
- Checking the internal supply network according to EN 61000-4-7, EN 6100-4-15, EN 61000-4-30
- Fault analysis in case of problems with the energy supply
- Documentation of the power quality for customers and regulatory authorities
- Ethernet Gateway for subordinate measurement points
- Report generator for power quality standards: EN 50160, IEE519, ITIC ...
- Report generator for energy consumptions
- Energy Dashboard
- Remote monitoring of critical processes

Main features

Power quality

- Harmonics analysis up to the 63rd harmonic, even / odd (U, I, P, Q)
- Interharmonics (U, I)
- Distortion factor THD-U / THD-I / TDD
- Measurement of positive, negative and zero sequence component
- Unbalance
- Direction of rotation field
- Voltage crest factor
- Flicker measurement in accordance with DIN EN 61000-4-15
- Logging and storage of transients (> 50 µs)
- Short-term interruptions (> 20 ms)
- Monitoring start-up processes


Certificate of Conformity
IEC 61000-4-30 Class A
Janitza UMG511

Fig.: UMG 511 Class A-certified

High quality measurement

- Constant true RMS measurement
- Measurement process in accordance with IEC 61000-4-30
- Certified accuracy of measurement according to class A
- Continuous sampling of the voltage and current measurement inputs at 20,000 Hz
- 400 measurement points per period
- Recording of over 2,000 measured values per measurement cycle
- Accuracy of active energy measurement: Class 0.2S
- Fast measurement even enables the logging of rapid transients from 50 µs
- Logging of currents and voltages (15 – 440 Hz)

User-friendly, colour graphical display with intuitive user guidance

- High resolution colour graphical display 320 x 240, 256 colours, 6 buttons
- User-friendly, self-explanatory and intuitive operation
- Backlight for optimum reading, even in darker environments
- Illustration of measured values in numeric form, as a bar graph or line graph
- Clear and informative representation of online graphs and power quality events
- Multilingual: German, English, Russian, Spanish, Chinese, French, Japanese, Turkish ...

Fig.: Transients list

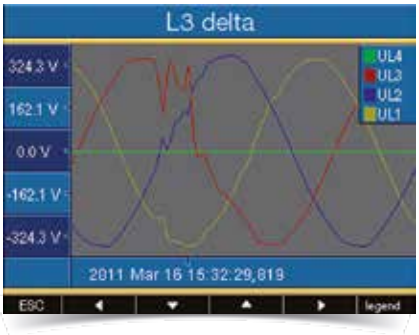


Fig.: Graphical representation of a transient

Various characteristics

- 4 voltage and 4 current measurement inputs, i.e. logging of N and / or PE possible
- 8 digital inputs, e.g. as data logger for S0 meter
- 5 digital outputs for alarm message or e.g. for connection to a BMS or PLC
- Free name assignment for the digital IOs, e.g. if used as data logger

Comprehensive communication and connection possibilities

- Modbus
- Profibus
- Ethernet (TCP/IP)
- Digital IOs
- BACnet (optional)
- Configurable Firewall

Modern communications architecture via Ethernet

- Simple integration in an Ethernet network
- Reliable and cost-optimised establishment of communication
- Ideal for Master-Slave structures
- High flexibility due to the use of open standards
- Integration in PLC systems and BMS through additional interfaces
- Various IP protocols: SNMP, ICMP (Ping), NTP, FTP ...

Measuring device homepage

- Web server on the measuring device, i.e. device's inbuilt homepage
- Function expansion possible through APPs
- Remote operation of the device display via the homepage
- Comprehensive measurement data incl. PQ (transients, events...)
- Online data directly available via the homepage, historic data optional via the APP measured value monitor, 51.00.245

Fig.: Illustration of the historic data via the homepage

BACnet protocol for building communication

- Optimal interoperability between devices from various manufacturers
- Predefined BIBBs (BACnet Interoperability Building Block)
- BACnet is optionally available with UMG 511
- UMG 511 supports the device type B-SA with the BIBBs DS-RP-B and DS-WP-B
- Furthermore, the BIBBs DS-COV-B and DM-UTC-B are also supported

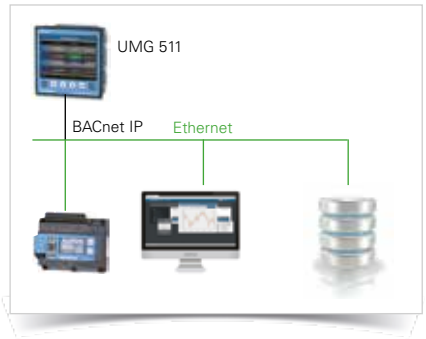


Fig.: BACnet topology

Modbus Gateway function

- Economical connection of subordinate measuring devices without Ethernet interface
- Integration of devices with Modbus-RTU interface possible (harmonisation of data format and function code necessary)
- Data can be scaled and described
- Minimised number of IP addresses required
- Tried and tested integrated solution without additional hardware

Programming / PLC functionality

- Further processing of the measurement data in the measuring device (local intelligence)
- Monitoring and alarm functions simple to program
- Sustainable functional expansions far beyond pure measurement
- Comprehensive programming options with
  - Jasic® source code programming
  - Graphical programming
- Complete APPs from the Janitza library

Large measurement data memory

- 256 MB data memory
- Memory range up to 2 years (configuration-dependent)
- Individually configurable recordings

- Recording averaging times can be freely selected
- PQ recordings template preconfigured for conventional standards (e.g. EN 50160)
- User-defined memory segmenting possible

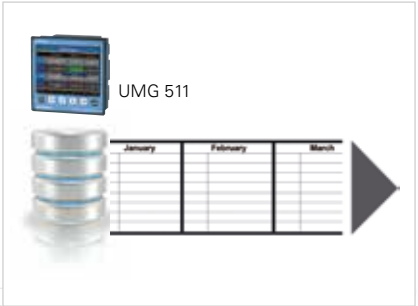


Fig.: Large measurement data memory

Powerful alarm management

- Information available immediately by email
- Inform maintenance personnel via the powerful device homepage
- Via digital outputs, Modbus addresses, GridVis® software
- Programming via Jasic® or graphical programming
- Further alarm management functions via GridVis®-Service alarm management


Fig.: GridVis® alarm management, alarm list (logbook)

Peak load representation and peak load management

- Illustration of the 3 highest monthly power peaks on the LCD display (P, Q, S)
- Rolling bar chart representation of the peak power values over 3 years on the LCD display (P, Q, S)
- Plain text representation on the LCD display (P)

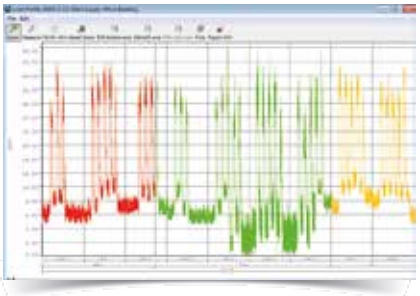


Fig.: GridVis® load profile, asic instrument for EnMS

GridVis®-Basic power quality analysis software

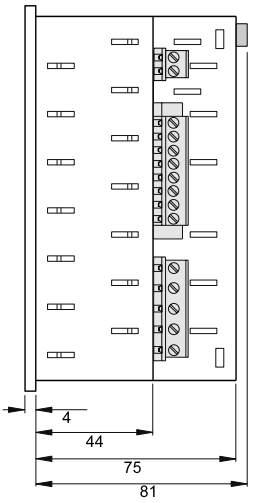
- Multilingual
- Manual read-out of the measuring devices
- Manual report generation (power quality and energy consumption reports)
- Comprehensive PQ analysis with individual graphs
  - Online graphs
  - Historic graphs
  - Graph sets
- Integrated databases (Janitza DB, Derby DB)
- Graphical programming
- Topology views
- High memory range

Certified quality through independent institutes

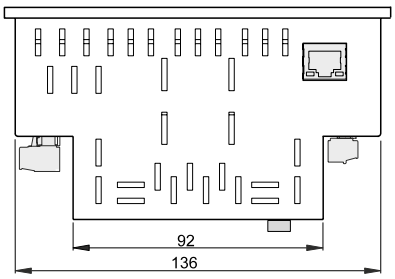
- ISO 9001
- Energy management certified according to ISO 50001
- Class A certificate (IEC 61000-4-30)
- UL certificate
- EMC-tested product

Dimension diagrams

All dimensions in mm



Side view

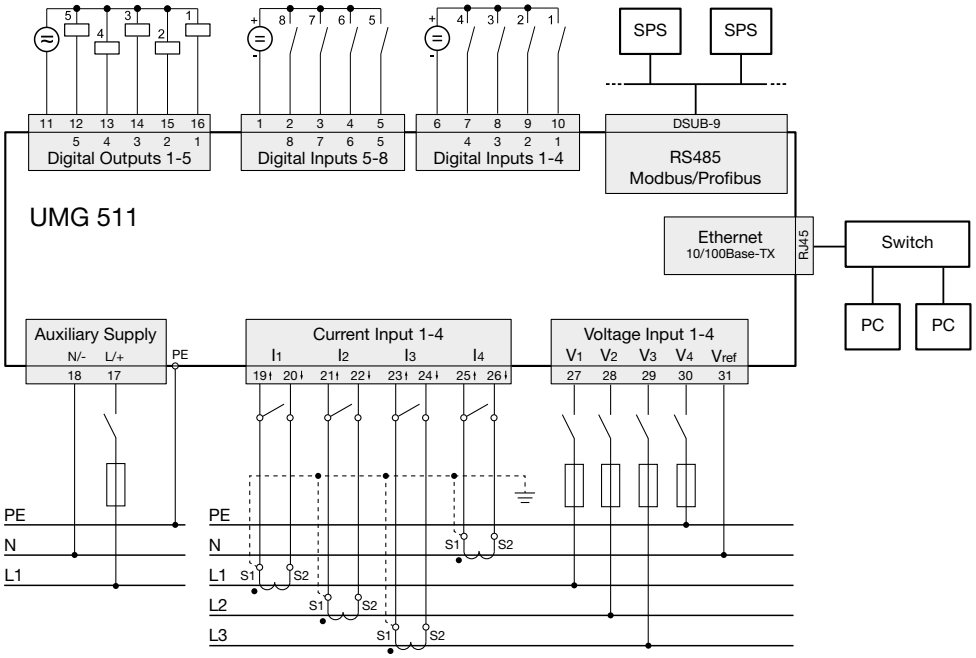


View from below

Rear view

Cut out: $138^{+0,8}$ x $138^{+0,8}$ mm

Typical connection



Device overview and technical data

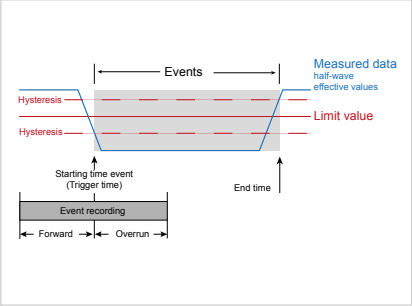


Fig.: The event record consists of a mean value, a minimum or maximum value, a start time and an end time.

	UMG 511		
Item number	**52.19.001**	**52.19.002**	**52.19.003**
Supply voltage AC	95 ... 240 V AC	44 ... 130 V AC	20 ... 50 V AC
Supply voltage DC	80 ... 340 V DC	48 ... 180 V DC	20 ... 70 V DC
Item number (UL)	**52.19.011**	**52.19.012**	
Supply voltage AC	95 ... 240 V AC	44 ... 130 V AC	
Supply voltage DC	80 ... 280 V DC	48 ... 180 V DC	
Device options			
BACnet communication	**52.19.081**	**52.19.081**	**52.19.081**

General information	
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
Seamless 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, L4, L3, ∑ 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 %	•
Voltage unbalance	•
Current and voltage, positive, zero and negative sequence component	•
Flicker	•
Transients	> 50 µs
Error / event recorder function	•
Short-term interruptions	20 ms
Oscillogram function (wave form U and I)	•
Ripple voltage signal	•
Under and overvoltage recording	•
Measured data recording	
Memory (Flash)	256 MB
Average, minimum, maximum values	•
Measured data channels	8
Alarm messages	•
Time stamp	•
Time basis average value	freely user-defined
RMS averaging, arithmetic	•

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

• = included - = not included

Displays and inputs / outputs	
LCD colour graphical display 320 x 240, 256 colours, 6 buttons	•
Language selection	•
Digital inputs	8
Digital outputs (as switch or pulse output)	5
Voltage and current inputs	each 4
Password protection	•
Peak load management (optionally 64 channels)	•
Communication	
Interfaces	
RS485: 9.6 – 921.6 kbps (DSUB-9 connector)	•
Profibus DP: Up to 12 Mbps (DSUB-9 connector)	•
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 up to the 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)	10 ... 600 Vrms
Measured range, voltage L-L, AC (without potential transformer)	18 ... 1000 Vrms
Resolution	0.01 V
Impedance	4 MOhm / phase
Frequency measuring range	15 ... 440 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	0.001 ... 8.5 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

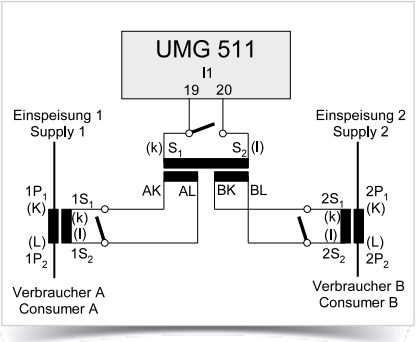


Fig.: Example, current measurement via a summation current transformer

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

• = included - = not included

*1 Optional additional functions with the packages GridVis®-Professional, GridVis®-Service and GridVis®-Ultimate.
*2 With UL variants: 347/600 V

Digital inputs and outputs	
Number of digital inputs	8
Maximum counting frequency	20 Hz
Reaction time (Jasic® program)	200 ms
Input signal present	18 ... 28 V DC (typically 4 mA)
Input signal not present	0 ... 5 V DC, current < 0.5 mA
Number of digital outputs	5
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 CR1/2AA, 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), Single core, multi-core, fine-stranded Terminal pins, core end sheath	 0.2 to 2.5 mm² 0.25 to 2.5 mm²
Environmental conditions	
Temperature range	Operation: K55 (-10 ... +55 °C)
Relative humidity	Operation: 0 to 95 % 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. Firmware download (free of charge) from the website: http://www.janitza.com

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

• = included - = not included

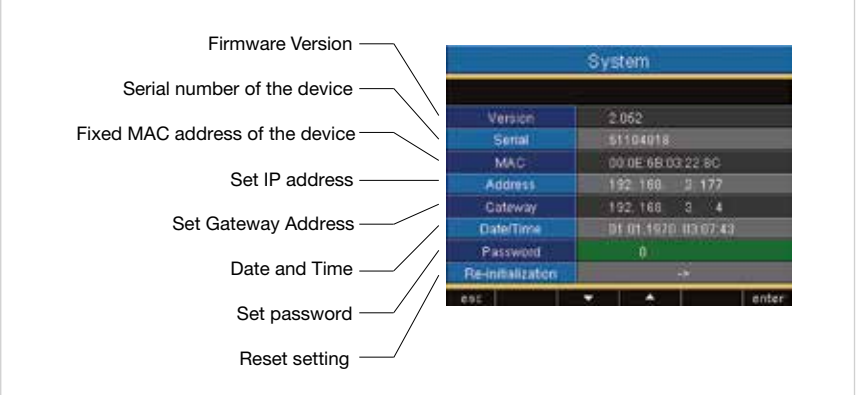
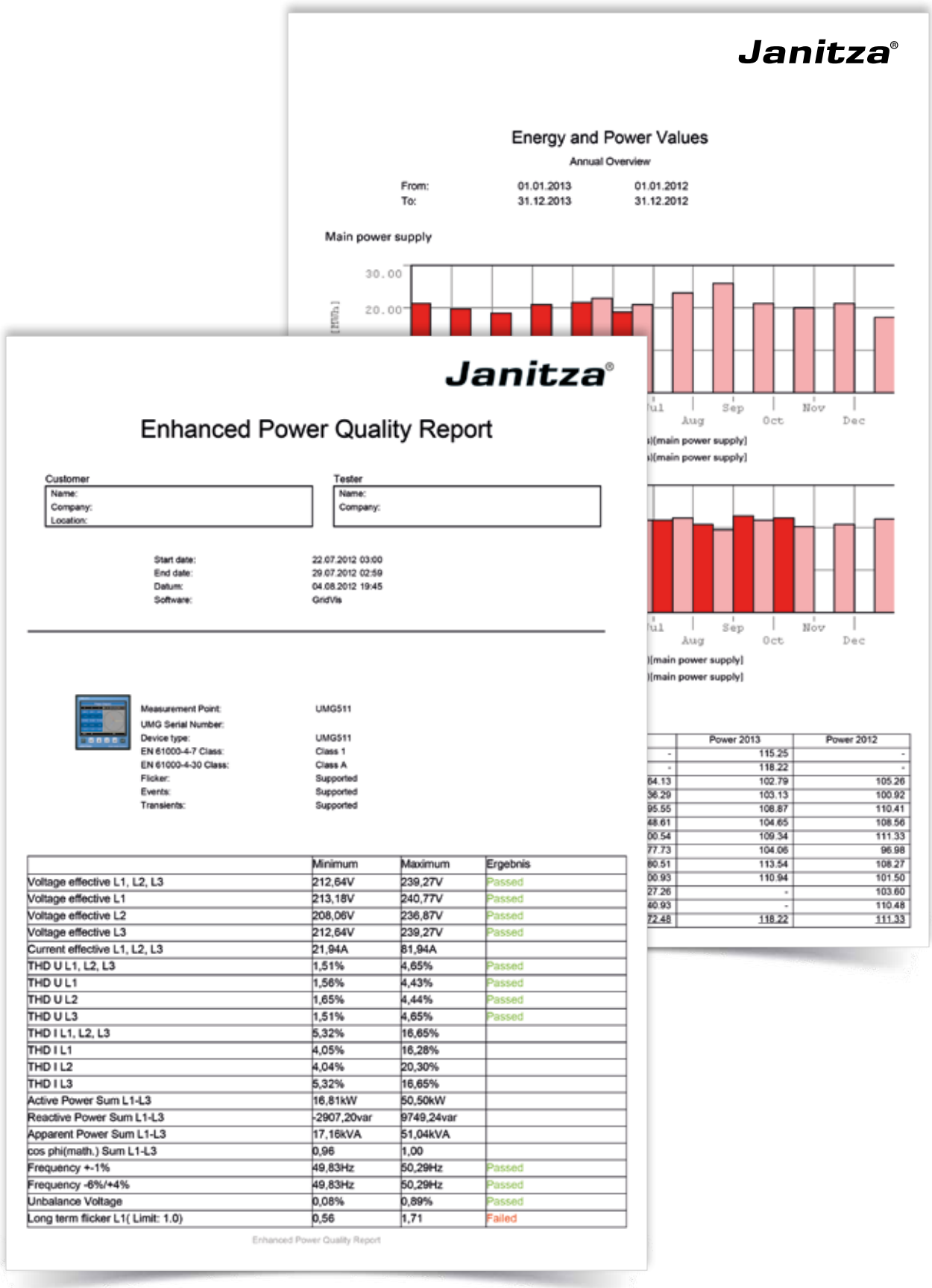


Fig.: User-friendly system of IP addresses, date, time and password



Janitza®

Energy and Power Values

Annual Overview

From: 01.01.2013 01.01.2012
To: 31.12.2013 31.12.2012

Main power supply

30.00
20.00

Jul Aug Sep Oct Nov Dec

(main power supply)
(main power supply)

(main power supply)
(main power supply)

	Power 2013	Power 2012
-	115.25	-
-	118.22	-
64.13	102.79	105.26
96.29	103.13	100.92
95.55	108.87	110.41
48.61	104.65	108.56
00.54	109.34	111.33
77.73	104.06	96.98
80.51	113.54	108.27
00.93	110.94	101.50
27.26	-	103.60
40.93	-	110.48
72.48	118.22	111.33

Janitza®

Enhanced Power Quality Report

Customer
Name:
Company:
Location:

Tester
Name:
Company:

Start date: 22.07.2012 03:00
End date: 29.07.2012 02:59
Datum: 04.08.2012 19:45
Software: GridVis

Measurement Point: UMG511
UMG Serial Number:
Device type: UMG511
EN 61000-4-7 Class: Class 1
EN 61000-4-30 Class: Class A
Flicker: Supported
Events: Supported
Transients: Supported

	Minimum	Maximum	Ergebnis
Voltage effective L1, L2, L3	212,64V	239,27V	Passed
Voltage effective L1	213,18V	240,77V	Passed
Voltage effective L2	208,06V	236,87V	Passed
Voltage effective L3	212,64V	239,27V	Passed
Current effective L1, L2, L3	21,94A	81,94A	
THD U L1, L2, L3	1,51%	4,65%	Passed
THD U L1	1,56%	4,43%	Passed
THD U L2	1,65%	4,44%	Passed
THD U L3	1,51%	4,65%	Passed
THD I L1, L2, L3	5,32%	16,65%	
THD I L1	4,05%	16,28%	
THD I L2	4,04%	20,30%	
THD I L3	5,32%	16,65%	
Active Power Sum L1-L3	16,81kW	50,50kW	
Reactive Power Sum L1-L3	-2907,20var	9749,24var	
Apparent Power Sum L1-L3	17,16kVA	51,04kVA	
cos phi(math.) Sum L1-L3	0,96	1,00	
Frequency +-1%	49,83Hz	50,29Hz	Passed
Frequency -6%/+4%	49,83Hz	50,29Hz	Passed
Unbalance Voltage	0,08%	0,89%	Passed
Long term flicker L1(Limit: 1.0)	0,56	1,71	Failed

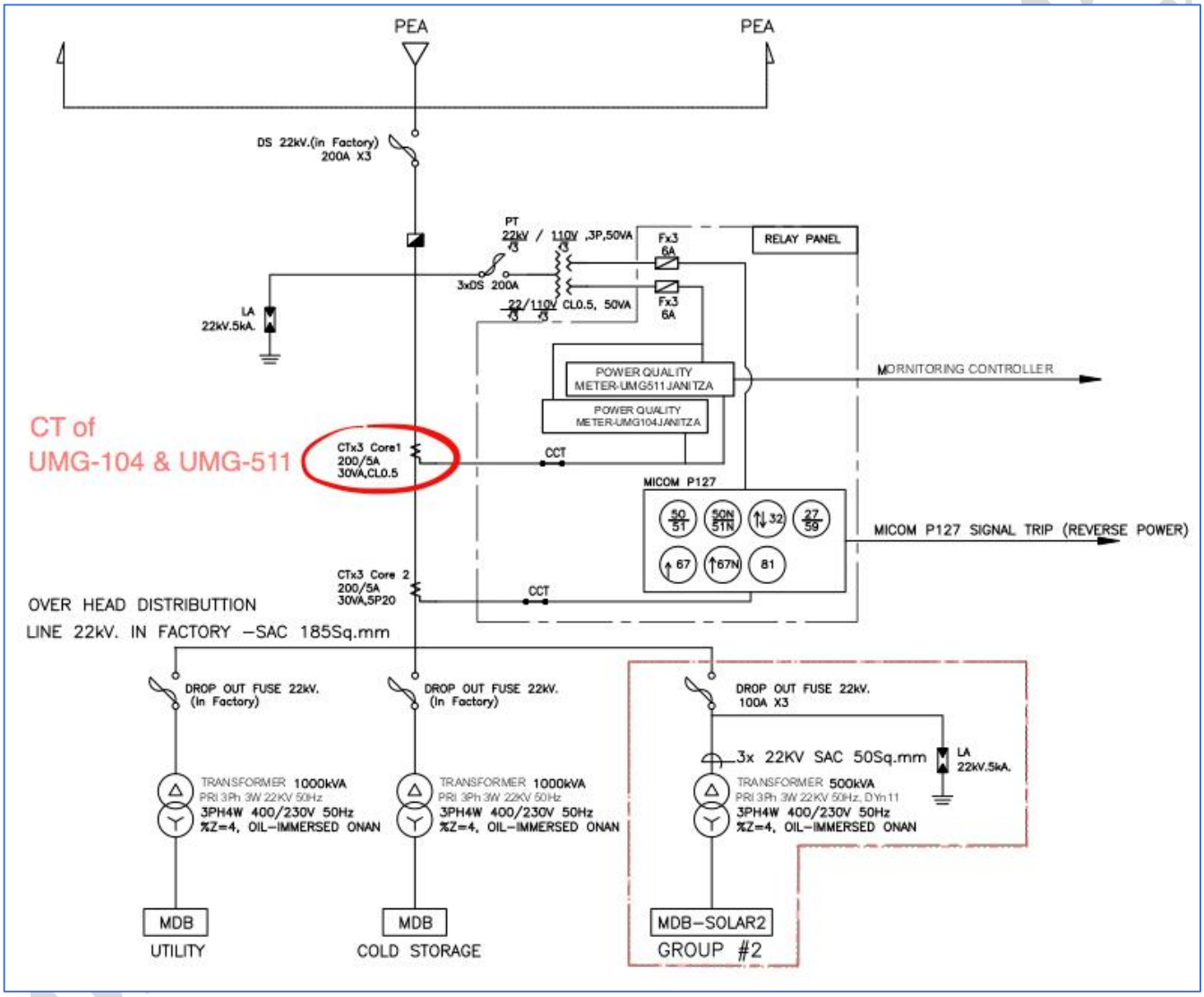
Enhanced Power Quality Report

Fig.: Automatically generated power quality and energy report

kittiphongh@solomon.co.th

Zero Export กับ Medium Voltage Meter

บทนำ กรณีที่ผู้ใช้งานต้องการให้ระบบ Zero Export ทำงานที่ตำแหน่ง Medium Voltage ถ้าผู้ใช้งานมีการติดตั้ง PQM (เช่น UMG511) ตามข้อกำหนดของการไฟฟ้าอยู่แล้วเราสามารถอนุกรม UMG104 Meter เข้าไปดังรูป



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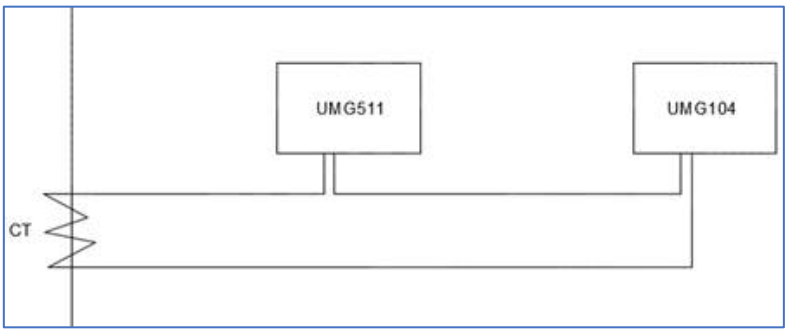
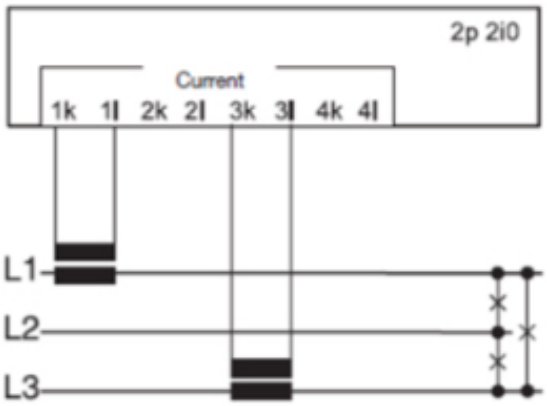


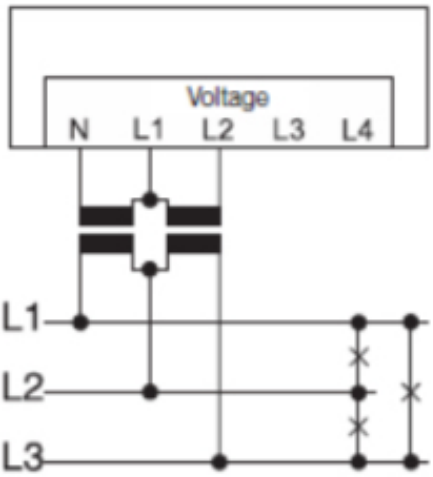
การต่อสายไฟ AC ผู้ติดตั้ง UMG104 โปรดศึกษาข้อมูลจากคู่มือให้มาพร้อมกับเครื่องวัดหรือขอข้อมูลโดยละเอียดเกี่ยวกับวิธีเชื่อมต่อและการตั้งค่าอุปกรณ์กับตัวแทนจำหน่ายของท่านพร้อมกับค่าต่าง ๆจากการไฟฟ้า โดยจะมีหลัก ๆ อยู่ด้วยกันคือ

ค่าขนาดของ current transformers (CT) ที่เชื่อมต่อกับ Meter CT inputs.
ค่าช่วงการทำงานของ voltage transformers (VT) จะเชื่อมต่อกับ Meter phase inputs.
ตัวอย่างตัวเลขต่อไปนี้แสดงการเชื่อมต่อ CT และ VT



CT

Connecting Current Transformers to the Janitza UMG 104



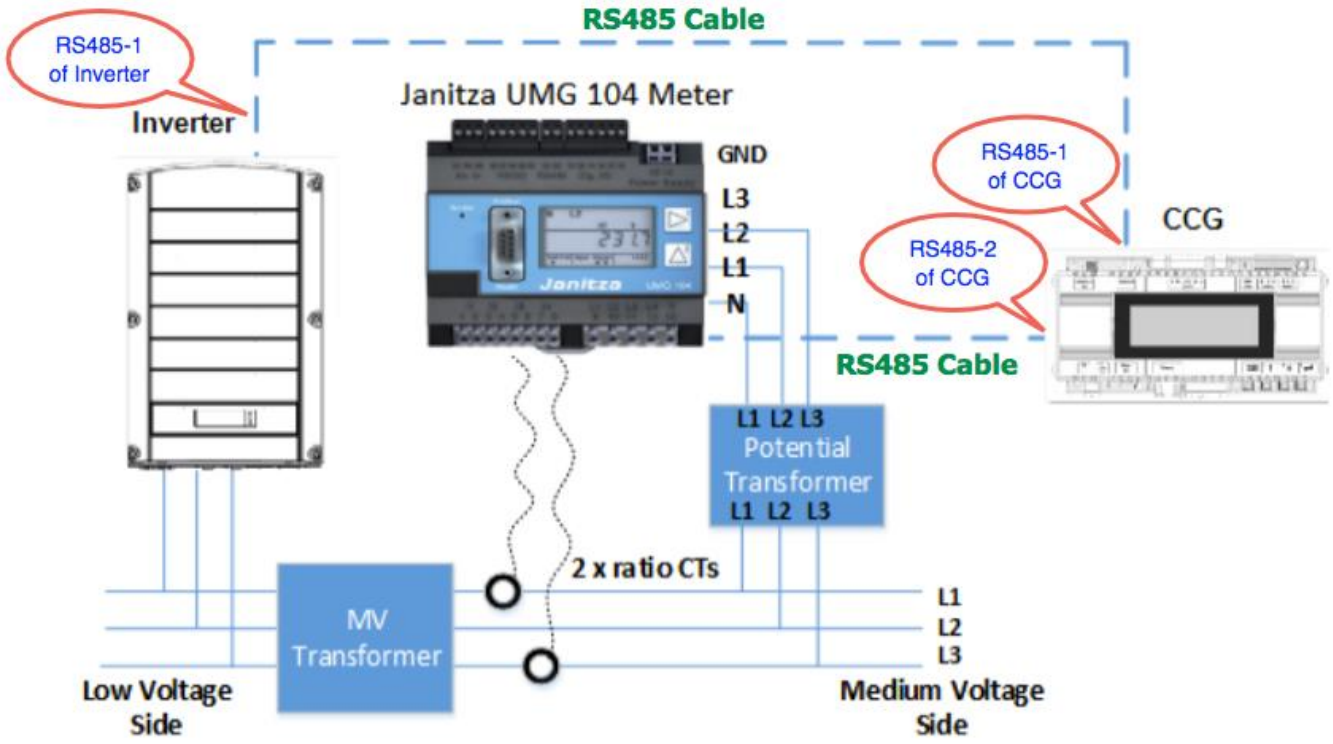
VT

Connecting Voltage Transformers to the Janitza UMG 104

การต่อสาย RS485 สายที่จะนำมาใช้เดินสัญญาณ RS485

-Cable type: Min. 3-wire shielded twisted pair (a 4-wire cable may be used)
-Wire cross-section area: 0.2- 1 mm2/ 24-18 AWG (a CAT5e cable may be used)
-สาย LAN Outdoor shielded CAT5e และ CAT6 สามารถนำมาใช้ทดแทนได้
สอบถามรายละเอียดเรื่องสายเพิ่มเติมได้ที่ Mail: kittiphongh@solomon.co.th

- Feed in Limitation ของระบบ Solar Edge สามารถทำงานร่วมกับ Medium Volt ได้โดยการเชื่อมต่ออุปกรณ์ เช่น SolarEdge Inverter, CCG กับกับ UMG104 ด้วย RS485 ตัวอย่างของการเชื่อมต่อดังกล่าวดังรูปด้านล่าง

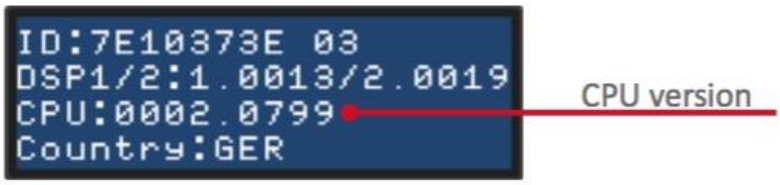


การตั้งค่าอุปกรณ์ที่เกี่ยวข้อง

ตั้งค่า Janitza UMG104 ให้ตั้งค่า Address เป็น 200 และ Content เป็น 002

kittiphongh@solomon.co.th

ตั้งค่า SolarEdge Inverter, CCG ตรวจสอบความพร้อมของอุปกรณ์เพื่อให้สามารถติดต่อกับ Inverter/CCG ได้ ก่อนดำเนินการตั้งค่าตามคู่มือนี้ **โปรดตรวจสอบว่า CPU Version ของ Inverter, CCG ว่าเป็น Ver ที่สูงกว่า 2.0799** แล้วหรือยัง
ด้วยการกดปุ่ม LCD ไล่ไปจนกระทั่งเห็นหน้าจอต่อไปนี้ หากพบว่าต่ำกว่าควร Upgrade firmware ก่อน

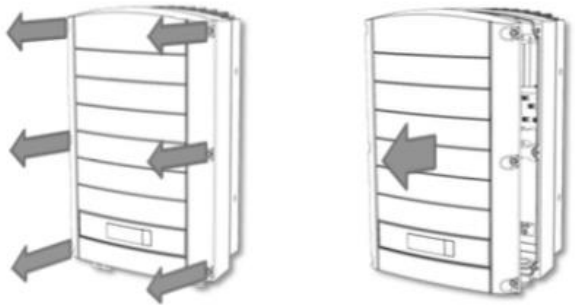


ติดต่อขอ Firmware และวิธีการ Upgrade ได้ที่ kittiphongh@solomon.co.th

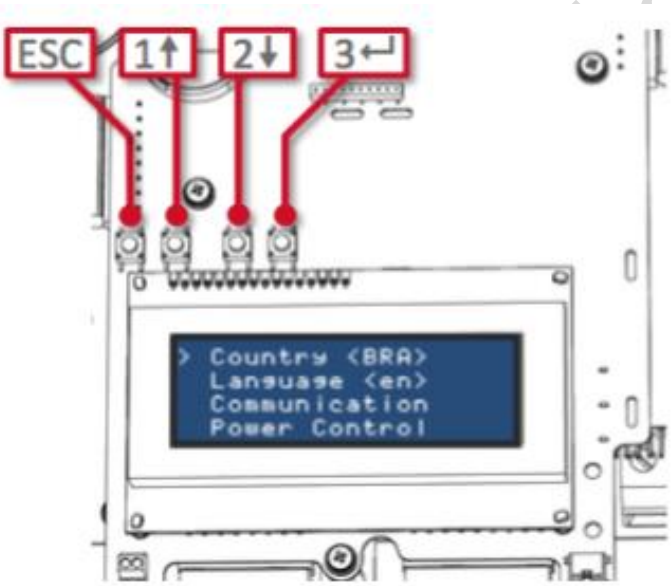
1.ตั้งค่า อุปกรณ์ Solar Edge Inverter และ CCG
-ถ้า Site ที่ใช้งานอยู่มีตัว CCG ผู้ใช้งานสามารถข้ามไปทำขั้นตอนที่ 1.2 ได้เลย
-ถ้า Site ที่ใช้งานอยู่มีแต่ Inverter ไม่มีตัว CCG ผู้ใช้งานจะต้องทำตามวิธี 1.1 ก่อน

1.1 ปิด Switch เพื่อให้ Inverter ตัวที่จะทำการตั้งค่าหยุดการผลิต และรอให้ แรงดันไฟฟ้ากระแสตรง (Volt DC) ลดลงต่ำกว่า 50V ก่อน จึงจะเปิดฝาครอบออก

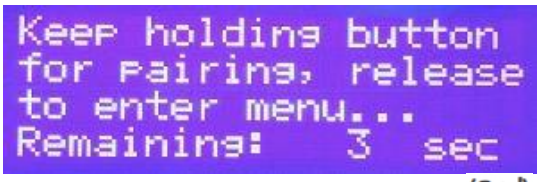
- Loosen all 6 Allen screws
- Remove the cover



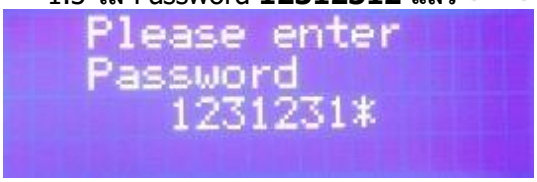
*** ความหมายของปุ่มกดบน Communication Board
(1↑) / (2↓): การเลื่อน ขึ้น/ลง
(3↵): การตกลง Enter
(ESC): การยกเลิก/กลับสู่เมนูก่อนหน้า



1.2 กด ปุ่ม (3↵) ค้างไว้ประมาณ 5 วินาที เมื่อขึ้นหน้าจอดังรูปด้านล่างให้ปล่อยมือออกจากปุ่ม (3↵)

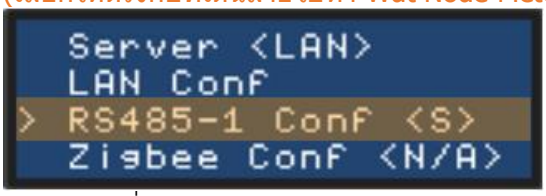


1.3 ใส่ Password **12312312** แล้ว (3↵)

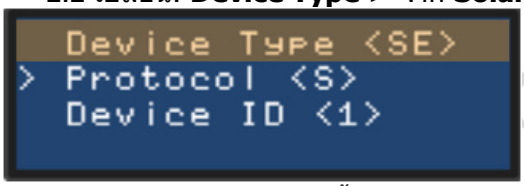


2.เมื่อเข้าสู่โหมด Administrator แล้วให้ดำเนินการดังนี้

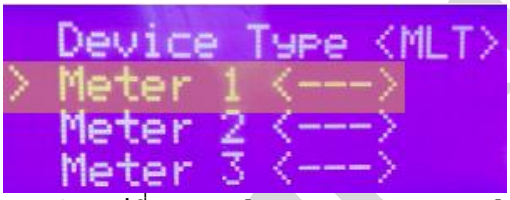
2.1 เลือก: **Communication เลือก >RS485-1 Conf**
(เลือกให้ตรงกับที่เดินสายไปหา Wat Node Meter) และเปลี่ยนให้เป็น **Master**



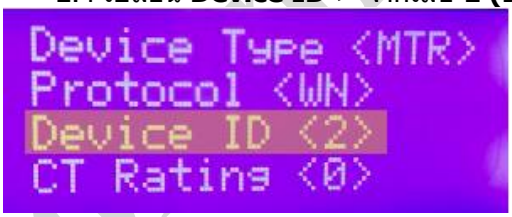
2.2 เปลี่ยน: **Device Type >** จาก **Solar Edge SE** (default) ให้เป็น **Multi Devices**



2.3 เลือก: **Meter 1 >** ตั้งให้เป็น **Janitsa**



2.4 เปลี่ยน **Device ID** > จากเลข **1 (Default)** ให้เป็นเลข **2**

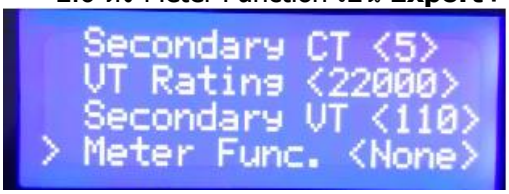


2.5 ตั้ง CT Rating, Secondary Rating, VT Rating, Secondary VT ให้ตรงกับกระแสจริงที่ CT คล้องอยู่ (ควรตรวจสอบค่ากับการไฟฟ้า) *คู่มือนี้ขอใช้ค่าด้านล่างนี้เพื่อแสดงให้เห็นเป็นตัวอย่างเท่านั้น

CT Rating = 200 (According to the primary MVCT)
Secondary Rating = 5 (According to the secondary MVCT)
VT Rating = 22000 (According to the primary potential transformer)
Secondary VT = 110 (According to the secondary potential transformer)

ใส่ค่าให้ตรงกับ CT และหม้อแปลงของการไฟฟ้าที่ใช้

2.6 ตั้ง Meter Function เป็น **Export+ Import**



เมื่อตั้งค่าเสร็จแล้วกด Esc ออก มาจะพบว่า Port RS485-2 มีค่าของอุปกรณ์ที่นำมาต่อแสดงขึ้นมาแล้ว

การตั้งค่า Zero Export

3. กดปุ่ม (ESC) : เพื่อกลับสู่หน้าแรกของโหมด Administrator

3.1 เลือกหัวข้อ **Power Control**

3.3 เลือกหัวข้อ **Energy Manager >** เลือก **Limit Control** ปรับเป็น **Enable**

3.4 เลือกหัวข้อ **Control Mode** >เลือกเป็น **Export Ctrl.**

3.5 เลือกหัวข้อ **Site Limit** >ใส่เลข **0.00 kW** ตามรูป **>กดปุ่ม** (3↵) **ค้างเพื่อ Apply**

3.6 เลือกหัวข้อ **Limit Mode** >เลือกเป็น **Total.**

เสร็จสิ้นการตั้งค่า

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