UMG 96 RM-E

Power analyser with Ethernet and RCM



Areas of application



- Measurement, monitoring and checking of electrical characteristics in energy distribution systems
- Recording of load profiles in energy management systems (e.g. ISO 50001)
- Acquisition of the energy consumption for cost centre analysis
- Measured value transducer for building management systems or PLC (Modbus)
- Monitoring of power quality characteristics, e.g. harmonics up to 40th harmonic
- Residual current monitoring (RCM)

Main features

Universal meter

- Operating current monitoring for general electrical parameters
- High transparency through a multi-stage and scalable measurement system in the field of energy measurement
- Acquisition of events through continuous measurement with 200 ms high resolution



RCM device

- 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

Energy measurement device

- · Continuous acquisition of the energy data and load profiles
- Essential both in relation to energy efficiency and for the safe design of power distribution systems



Harmonics analyser / event recorder

- Analysis of individual harmonics for current and voltage
- Prevention of production downtimes
- Significantly longer service life for equipment
- Rapid identification and analysis of power quality fluctuations by means of user-friendly tools (GridVis[®])



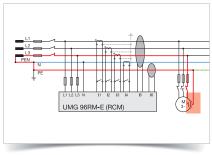


Fig.: UMG 96RM-E with residual current monitoring via measuring inputs I5 / I6 $\,$

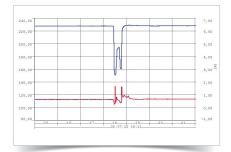


Fig.: Event logger: Voltage dip in the low voltage distribution system

² Janitza[®]



Extensive selection of tariffs

- 7 tariffs each for effective energy (consumption, delivery and without backstop)
- 7 tariffs each for reactive energy (inductive, capacitive and without backstop)
- 7 tariffs for apparent energy
- L1, L2 and L3, for each phase

Highest possible degree of reliability

- Continuous leakage current measurement
- Historical data: Long-term monitoring of the residual current allows changes to be identified in good time, e.g. insulation faults
- Time characteristics: Recognition of time relationships
- Prevention of neutral conductor carryover
- RCM threshold values can be optimized for each individual case: Fixed, dynamic and stepped RCM threshold value
- Monitoring of the CGP (central ground point) and the subdistribution panels

Analysis of fault current events

- Event list with time stamp and values
- Presentation of fault currents with characteristic and duration
- Reproduction of phase currents during the fault current surge
- Presentation of the phase voltages during the fault current surge

Analysis of the harmonic fault current components

- Frequencies of the fault currents (fault type)
- Current peaks of the individual frequency components in A and %
- Harmonics analysis up to 40th harmonic
- Maximum values with real-time bar display

Digital IOs

• Extensive configuration of IOs for intelligent integration, alarm and control tasks

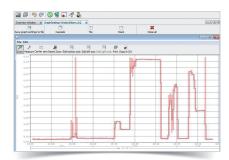


Fig.: Continuous leakage current measurement

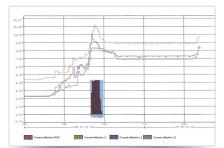


Fig.: Analysis of fault current events

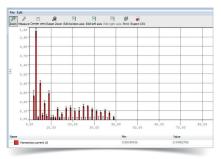


Fig.: Analysis of the harmonic fault current components



Ethernet (TCP/IP)- / Homepage- / Ethernet-Modbus gateway functionality

- Simple integration into the network
- More rapid and reliable data transfer
- Modern homepage
- World-wide access to measured values by means of standard web browsers via the device's inbuilt homepage
- Access to measurement data via various channels
- Reliable saving of measurement data possible over a very long periods of time in the 256 MByte measurement data memory
- Connection of Modbus slave devices via Ethernet-Modbus gateway



Measuring device homepage

- •Webserver on the measuring device, i.e. device's own homepage
- Remote operation of the device display via the homepage
- Comprehensive measurement data incl. PQ
- Online data directly available via the homepage, historic data optional via the APP measured value monitor, 51.00.246



Fig.: Ethernet-Modbus gateway functionality

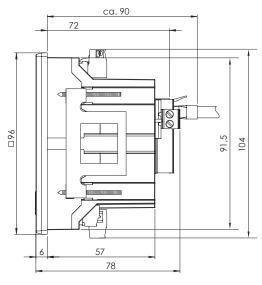


Fig.: Illustration of the online data via the device's inbuilt homepage



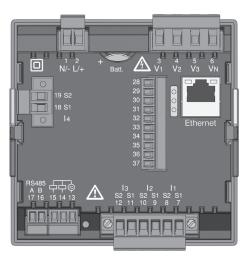
Dimension diagrams

All dimensions in mm



Side view

Cut out: 92+0,8 x 92+0,8 mm



Rear view



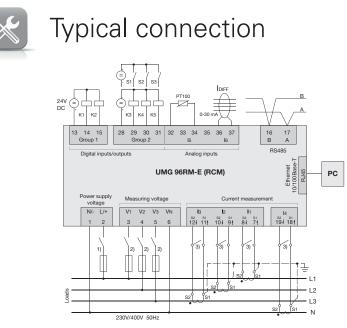


Fig.: Connection example with temperature and residual current measurement



Device overview and technical data

	UMG 96RM-E*1
Item number (90–277 V AC / 90–250 V DC)	52.22.062
Item number (24–90 V AC / 24–90 V DC)	52.22.063
BACnet communication	52.22.081
General	
Use in low and medium voltage networks	•
Accuracy voltage measurement	0.2 %
Accuracy current measurement	0.2 %
Accuracy active energy (kWh,/5 A)	Class 0.5S
Number of measurement points per period	426
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, ∑ L1–L3]	•
Number of tariffs	14
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	•

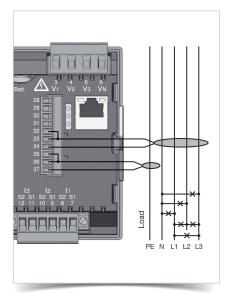


Fig.: Connection example residual current measurement and PE monitoring

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

• = included - = not included

*1 Inclusive UL certification.



Other measurements	
Operating hours measurement	•
Clock	•
Power quality measurements	
Harmonics per order / current and voltage	1st – 40th
Distortion factor THD-U in %	•
Distortion factor THD-I in %	•
Rotary field indication	•
Current and voltage, positive, zero and negative sequence component	•
Error / event recorder function	•
Under and overvoltage recording	•
Measured data recording	-
Memory (Flash)	256 MB
Average, minimum, maximum values	230 IVIB
Current measurement channel	4 (+2)
Alarm messages	4 (+2) •
5	
Time stamp Time basis average value	freely user-defined
	neery user-denned
RMS averaging, arithmetic	•
Displays and inputs / outputs	
LCD display (with backlighting), 2 buttons	•
Digital outputs (as switch or pulse output)	2
Digital inputs and outputs (selectable)	3
Analogue inputs (RCM, temperature, analogue)	2
Voltage inputs	L1, L2, L3 + N
Password protection	•
Communication	
Interfaces	
RS485: 9.6 – 115.2 kbps (Screw-type terminal)	•
Ethernet 10/100 Base-TX (RJ-45 socket)	•
Protocols	
Modbus RTU	•
ModbusTCP/IP	•
Modbus RTU over Ethernet	•
Modbus Gateway for Master-Slave configuration	•
HTTP (homepage configurable)	•
SMTP (email)	•
NTP (time synchronisation)	•
TFTP	•
FTP (File-Transfer)	•
SNMP	•
DHCP	•
BACnet (optional)	•
ICMP (Ping)	•
Software GridVis [®] -Basic* ²	
Online and historic 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	•
Graph sets	•
Graph sets Programming / threshold values / alarm management	•
Graph sets	•

	GridVis			
File Edit View Tools Window Help				
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Ð	Overview Window 88	🚪 Configuration(U	MG96RM-E-RCM-1700-9209] 10	
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5	Identity	select comparator	Comparator group 2	
9 Transformer Phase mapping Comparator A				
0	Measuringvariants	mode	higher than threshold	
Nominalvalues Assigned value Voltage effective L1		Voltage effective L1		
	Events		()	
RCM configuration Current value Averaging intervals threshold 280 Recording configuration Comparator 8				
		280		
	time	mode	lower than threshold	
	I/O configuration			
	Comparators	Assigned value Voltage effective L1		
	Serial ports		Current value	
	ip configuration threshold 210		210	
Emai		Pres.		
	display configuration	Comparator C		
	Passwords	mode	not used	
	SNMP	Assigned value	Not set	
	I/O naming			

Fig.: GridVis® software, configuration menu

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

• = included - = not included

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

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8	Transformer	Measuring input 5			
	Phase mapping	Measuring input 5			
	Measuringvariants				
	Nominalvalues	Measurement mode	lode AC		
Events					
	RCM configuration	tion Mode for limit calculation Dynamic calculation for limit current			
Averaging intervals Recording configuration Min. exceeding time 0,200					
		0,200			
	time Warnlevel (in relation to limit) 50,000000		to limit) 50,000000		
	I/O configuration				
Comparators					
		Reference value	Apparent Power Sum L1-L3		
	ip configuration				
	Email	Current per VA	0.001		
	display configuration	Current per device	0.000000		
	Passwords				
	SNMP	Number of devices	0		
	I/O naming	Tolerance	0.000000		
	Online recording	Offset for limit	0.030		

Fig.: RCM configuration, e.g. dynamic threshold value formation, for load-dependent threshold value adaptation

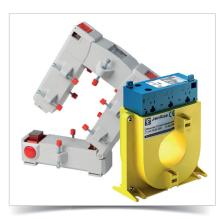


Fig.: Residual current transformer for the acquisition of residual currents. Wide range with different config-urations and sizes allow use in almost all applications

Type of measurementConstant true RMS Up to 40th harmonicNominal voltage, three-phase, 4-conductor (LN, LL)277 / 480 V ACMessurement in quadrants4Messurement in quadrants4NetworksTN, TT, ITMeasurement range, voltage LN, AC (without potential transformer)0° 300 VrmsMessurement range, voltage LA, AC (without potential transformer)0° 520 VrmsResolution0.01 VImpedance3 MOhm / phaseFrequency measuring range45 66 HzPower consumptionapprox. 0.1VASampling frequency per channel (50 / 60 Hz)21.33 / 25.6 kHzMeasurement range, voltage LL, AC (without potential transformer)0.1 VAImpedance3 MOhm / phasePrequency measuring range45 66 HzPower consumptionapprox. 0.1VASampling frequency per channel (50 / 60 Hz)21.33 / 25.6 kHzMessurement range0.005 6 AmpsOvervoltage category300 V CAT IIMessurement range0.005 6 AmpsOvervoltage category300 V CAT IIMessurement range, residual current input21.33 / 25.6 kHzAnalogue inputs21.37 / 25.6 kHzResidual current input0.05 30 mADigital outputs0.05 30 mAMessurement range, residual current input***0.05 30 mADigital outputsmax. 50 V C.33 V ACSwitching outputsmax. 50 V C.33 V ACSwitching outputsmax. 50 V C.23 V, Vp E LithiumProtection class per EN 605/9Fr	Technical data	
Nominal voltage, three-phase, 3-conductor (LL) 480 V AC Measurement in quadrants 4 Networks TN,TT, IT Measured voltage input 0° 300 V CAT III Overvoltage category 300 V CAT III Measurement range, voltage LN, AC 0° 300 Vrms Measurement range, voltage LN, AC 0° 300 Vrms Measurement range, voltage LL, AC 0° 520 Vrms Impedance 3 MOhn / phase Frequency measuring range 45 65 Hz Power consumption 0.11 V Sampling frequency per channel (50 / 60 Hz) 21.33 / 25.6 kHz Measurement range 0.005 6 Amps Overvoltage category 300 V CAT II Measurement range 0.01 mA Measurement range 0.005 6 Amps Overvoltage category 300 V CAT II Measurement surge voltage 2 kV Power consumption approx. 0.2VA (Ri = 5 mOhm) Overvoltage category 300 V CAT II Measurement range, residual current input 2 Analogue inputs 2 (for residual current or temperature measurement) Device dimensions in m (H × W × D) ²⁴ 2 (for residual current or temperature measurement) Measurement range 0.07 / 12 periods + 10 ms Pulse output (energy pulse) m	Type of measurement	
Measurement in quadrants 4 Networks TN, TT, IT Measured voltage input 0° Overvoltage category 300 V CAT III Measurement range, voltage LN, AC (without potential transformer) 0° Measurement range, voltage LL, AC (without potential transformer) 0° Measurement range, voltage LL, AC (without potential transformer) 0° Frequency measuring range 45 65 Hz Power consumption approx. 0.1 VA Sampling frequency per channel (50 / 60 Hz) 21.33 / 25.6 kHz Measurement range 0.5 .6 Amps Overvoltage category 300 V CAT II Measurement range 0.1 mA Measurement surge voltage 2 kV Power consumption approx. 0.2 VA (Ri = 5 mOhm) Overload for 1 sec. 120 A (sinusoidal) Sampling frequency per channel (50 / 60 Hz) 21.33 / 25.6 kHz Residual current input 0.5 .30 mA Over consumption approx. 0.2 VA (Ri = 5 mOhm) Over consumption approx. 30 vAC Sampling frequency per channel (50 / 60 Hz) 21.33 / 25.6 kHz Residual current input 0.5	Nominal voltage, three-phase, 4-conductor (L-N, L-L)	277 / 480 V AC
Networks TN, TT, IT Messured voltage input 0° 300 V CAT III Messurement range, voltage LN, AC 0° 300 Vrms Messurement range, voltage LL, AC 0° 520 Vrms Resolution 0.01 V Impedance 3 MOhm / phase Frequency measuring range 45 65 Hz Power consumption 2133 / 25 6 Hz Sampling frequency measuring range 45 65 Hz Power consumption 0.11 MA Measurement range 0.05 6 Amps Overvoltage category 300 V CAT III Measurement range 0.05 6 Amps Overvoltage category 300 V CAT III Measurement surge voltage 2 kV Power consumption approx. 0.2 VA (RI = 5 mOhm) Overvoltage category 300 V CAT III Measurement range, residual current input 2133 / 25 6 Hz Residual current input 2 (for residual current or temperature measurement) Measurement range, residual current input*3 0.05 30 mA Digital outputs 2 (for residual current or temperature measurement) Measurement range, residual current input*3 0.05 30 mA Digital output	Nominal voltage, three-phase, 3-conductor (L-L)	480 V AC
Measured voltage input 200 V CAT III Overvoltage category 300 V CAT III Measurement range, voltage L-N, AC 0* 300 Vrms (without potential transformer) 0* 520 Vrms Measurement range, voltage L-L, AC 0* 520 Vrms (without potential transformer) 0.01 V Impedance 3 MOhm / phase Frequency measuring range 45 65 Hz Power consumption approx. 0.1 VA Sampling frequency per channel (50 / 60 Hz) 21.33 / 25. 6 kHz Measurement range 0.005 6 Amps Overvoltage category 300 V CAT II Measurement range 0.005 6 Amps Overvoltage category 300 V CAT II Measurement range 0.10 M Measurement range, voltage 2 kV Power consumption approx. 0.2 VA (Ri = 5 mOhm) Overvoltage category 300 V CAT II Measurement range, residual current input* 0.05 30 mA Digital outputs measurement) Residual current input* 0.05 30 MA Measurement range, residual current input** 0.05 30 MA Digital outputs measurement) <td>Measurement in quadrants</td> <td>4</td>	Measurement in quadrants	4
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Sampling frequency per channel (50 / 60 Hz)21.33 / 25.6 kHzMeasured current inputIRated current1 / 5 AResolution0.1 mAMeasurement range0.005 6 AmpsOvervoltage category300 V CAT IIMeasurement surge voltage2 kVPower consumptionapprox. 0.2 VA (Ri = 5 mOhm)Overoal for 1 sec.100 A (sinusoidal)Sampling frequency per channel (50 / 60 Hz)21.33 / 25.6 kHzResidual current input2Analogue inputs2 (for residual current or temperature measurement)Measurement range, residual current input*30.05 30 mADigital outputs0.05 30 mASwitching voltagemax. 60 V DC, 33 V ACSwitching voltagemax. 50 mA Eff AC / DCResponse time10 / 12 periods + 10 msPulse output (energy pulse)max. 50 HzMaximum cable lengthup to 30 m unscreened, from 30 m screenedMechanical propertiesMechanical propertiesWeightapprox. 370 gDevice dimensions in mm (H × W × D)*496 × 96 × 78BatteryCR2032, 3 V, type LithiumProtection class per EN 60529Front: IP40; Front with seal: IP54; Back: IP20Assembly per IEC EN 60999-1 / DIN EN 50022Front panel installationCable cross section0.2 to 2.5 mm²Voltage measurement0.2 to 2.5 mm²Voltage measurement0.2 to 2.5 mm²Voltage measurement0.08 to 4.0 mm²Environmental conditionsTTemperature rangeOperation:	Frequency measuring range	45 65 Hz
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Supply voltage 0.2 to 2.5 mm² Current measurement 0.2 to 2.5 mm² Voltage measurement 0.08 to 4.0 mm² Environmental conditions Image: Constant of the second s	Assembly per IEC EN 60999-1 / DIN EN 50022	Front panel installation
Current measurement 0.2 to 2.5 mm² Voltage measurement 0.08 to 4.0 mm² Environmental conditions Image: Constraint of the second	Cable cross section	
Voltage measurement 0.08 to 4.0 mm² Environmental conditions Image: Constraint of the second	Supply voltage	0.2 to 2.5 mm ²
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Degree of pollution 2 Installation position user-defined Electromagnetic compatibility Electromagnetic compatibility of	Relative humidity	Operation: 0 to 75 % RH
Installation position user-defined Electromagnetic compatibility Electromagnetic compatibility of	Operating height	0 2,000 m above sea level
Electromagnetic compatibility Electromagnetic compatibility of Directive 2004/108/EC	Degree of pollution	2
Electromagnetic compatibility of Directive 2004/108/EC	Installation position	user-defined
	Electromagnetic compatibility	
		Directive 2004/108/EC
Electrical appliances for application within particular voltage limits Directive 2006/95/EC		Directive 2006/95/EC

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

• = included -= not included

*3 Example of residual current input 30 mA with 600/1 residual current transformer: 600 x 30 mA = 18,000 mA

 $^{\ast 4}$ Accurate device dimensions can be found in the operation manual.

*5 The UMG 96RM-E can only detect measurements when a voltage L1-N greater than 20V eff (4-wire measurement) at voltage input V1 or a voltage L1-L2 greater than 34V eff (3-wire measurement) is applied.



UMG 96 RM-E

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
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

