UMG 96RM

Multifunctional power analyzer

Memory 256 MB

Harmonics

Measurement accuracy 0.5

8 Tariffs

Pulse inputs and outputs

Communication (device-specific)
- Modbus (RTU)
- Profibus DP V0
- Profinet
- TCP/IP
- M-Bus

Interfaces
- RS485 (UMG 96RM, UMG 96RM-P, UMG 96RM-CBM)
- Profibus (UMG 96RM-P)
- Profinet (UMG 96RM-PN)
- M-Bus (UMG 96RM-M)
- Ethernet (UMG 96RM-EL)
- USB (UMG 96RM-P, UMG 96RM-CBM)

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

Power quality
- Harmonics up to 40th harmonic
- Rotary field components
- Distortion factor THD-U / THD-I
- Waveform display (UMG 96RM-EL) via GridVis® Essentials software

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

Measured data memory (UMG 96RM-CBM, UMG 96RM-P)
(UMG 96RM, UMG 96RM-M und UMG 96RM-EL without measurement data memory, energy, minimum and maximum values will be saved in the EEPROM)
- 256 MB Flash

Up to 4 digital inputs
- Pulse input
- Logic input
- State monitoring

Up to 6 digital outputs
- Pulse output kWh / kvarh
- Switch output
- Threshold value output
- Logic output
- Remote via Modbus / Profibus

Power Grid Monitoring Software
- Free GridVis® Essentials

Areas of application

- Measurement, monitoring and checking of electrical characteristics in energy distribution systems
- Recording of load profiles for 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)

Main features

Particular advantages

- Compact construction saves space and costs during installation
- Seamless and sustained recording thanks to large measured data memory or via the online data acquisition
- High data security and redundancy
- Comprehensive communications options and protocols
- Multifaceted, pre-defined reports for power quality and energy consumption analysis
- Simple report generation at the press of a button or automatically in accordance with defined time plans
- Precision measurement results provide an effective infrastructure as well as high production availability
- Generic Modbus profile: Arbitrary Modbus-capable devices and systems from other manufacturers can be incorporated and visualised in the monitoring solutions
- Long-term availability of the measurement devices guarantees simple retrofitting with system expansions

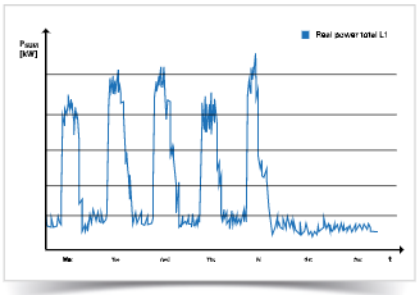


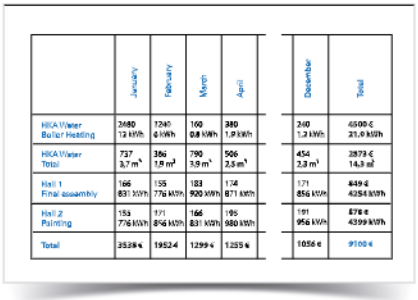
Fig.: Load profiles are the basis for energy management

Energy data acquisition & load profile

- Detailed acquisition of the energy data and the load profile
- More transparency in energy supply through energy analyses
- Safer design of the power distribution systems

Cost centre analysis

- Determination of energy costs
- Breakdown and allocation of energy consumers



	January	February	March	April	December	Total
HKA Water Boiler Heating	2680 12 kWh	1240 6 kWh	160 0.8 kWh	380 1.9 kWh	240 1.2 kWh	4500 € 21.0 kWh
HKA Water Total	737 3.7 m³	386 1.9 m³	790 3.9 m³	506 2.5 m³	454 2.3 m³	3873 € 14.3 m³
Hall 1 Final assembly	166 831 kWh	155 776 kWh	183 900 kWh	174 871 kWh	171 856 kWh	849 € 4264 kWh
Hall 2 Painting	153 776 kWh	171 856 kWh	166 831 kWh	195 980 kWh	191 956 kWh	878 € 4399 kWh
Total	3528 €	1952 €	1299 €	1255 €	1056 €	9100 €

Fig.: Cost centre analysis

Energy management systems (ISO 50001)

- Continuous increase in energy efficiency
- Cost reduction
- UMG 96RM series multifunctional power analysers are an important part of energy management systems

Transparency of energy supply

- More transparency through a multi-stage, scalable measurement system
- Acquisition of individual events through continuous measurement with high resolution

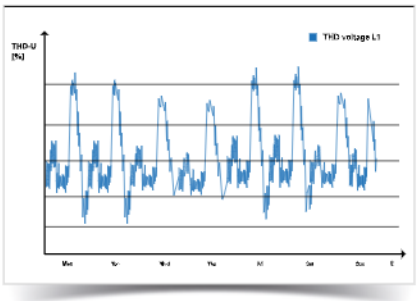


Fig.: Transparency of energy supply

Power quality monitoring

- Notification of inadequate power quality
- Introduction of measures to address network problems
- Prevention of production downtimes
- Significantly longer service life for equipment
- Improved sustainability

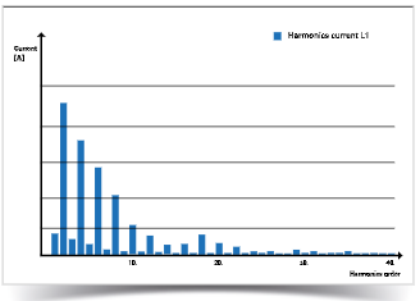


Fig.: Power quality monitoring (Harmonics analysis for the current up to 40th order harmonics)

Measurement accuracy of 0.2 % (V), kWh class = 0.5S

- High sampling rate at 21.3 kHz
- Reliable measurement accuracy of 0.2 % (V)
- Effective energy class (kWh): 0.5S

Energy meter with 8 tariffs, effective and reactive energy

- Energy measurement in 4 quadrants, each with 8 tariffs for effective and reactive energy
- Safe and precise acquisition of operational values for individual electrical loads

Communications options: Ethernet, Profibus, Modbus, M-Bus, ...

- Numerous interfaces and protocols, guaranteeing an easy system connection (energy management system, PLC, SCADA, BMS)

Large measurement data memory

- Saving of measurement data possible over very long periods of time
- Recording freely user configurable

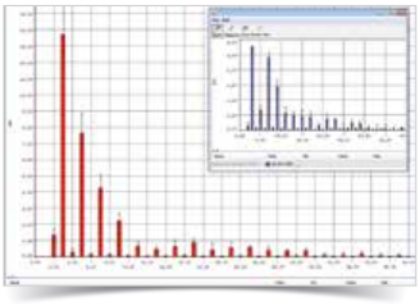


Fig.: GridVis® Power Grid Monitoring Software: Harmonics analysis

Harmonics analyser

- Harmonics analysis up to 40th harmonic
- Information about power quality, grid disturbances and possible "network polluters"

Pluggable screw terminals

- Convenient installation even where spaces are tight

Fig.: Pluggable screw terminals for easy connection

Backlight

- Large, high-contrast LCD display with backlighting
- Very good readability and intuitive operation, even in poor lighting conditions

Fig.: LCD Display backlight

Basic device

- RS485 interface with Modbus protocol and 2 digital outputs enable quick and low-cost monitoring of power quality and energy consumption

Profibus and digital IOs

- The Profibus connection is used in systems where the UMG 96RM-P is to be incorporated into the automation environment (PLC controllers)

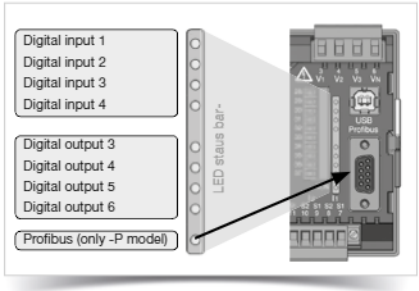


Fig.: LED status bar for the inputs and outputs (UMG 96RM-CBM and UMG 96RM-P)

M-Bus

- The UMG 96RM-M can be simply and cost-effectively integrated into consumption data acquisition systems via the M-Bus connection.
- The M-Bus is primarily used for the acquisition of consumption data collection from various different consumption meters, such as water, gas, heat or electrical current.

Ethernet (TCP/IP) with the UMG 96RM-EL

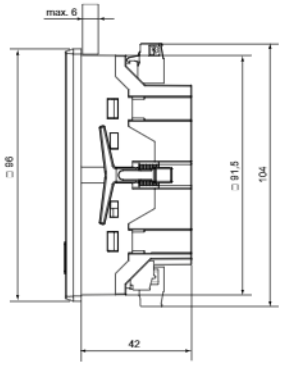
- Simple integration into the Ethernet (LAN) network
- Fast and reliable data communication

4th current transformer input

- Continuous monitoring of the N-conductor by means of the 4th current input
- Available with variants UMG 96RM-P and UMG 96RM-CBM

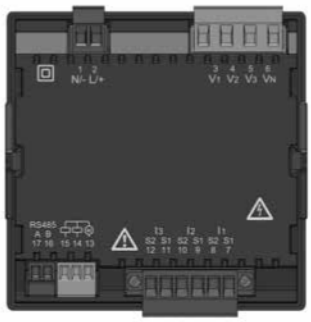
Dimension diagrams

All dimensions in mm

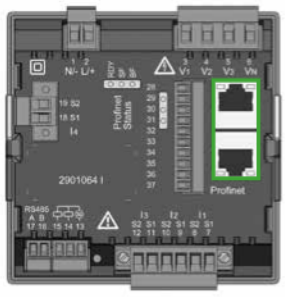


Side view UMG 96RM

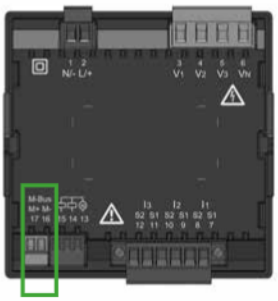
Cut out: $92^{+0,8}$ x $92^{+0,8}$ mm



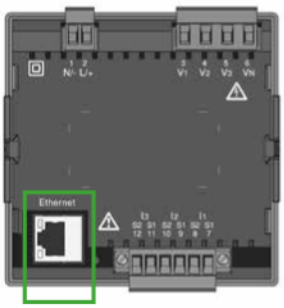
Rear view UMG 96RM (basic device)



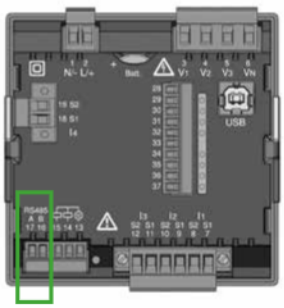
Rear view UMG 96RM-PN
Profinet variant



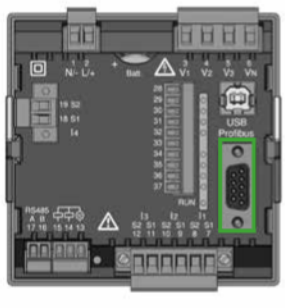
Rear view 96RM-M
M-Bus variant



Rear view 96RM-EL
Ethernet light variant



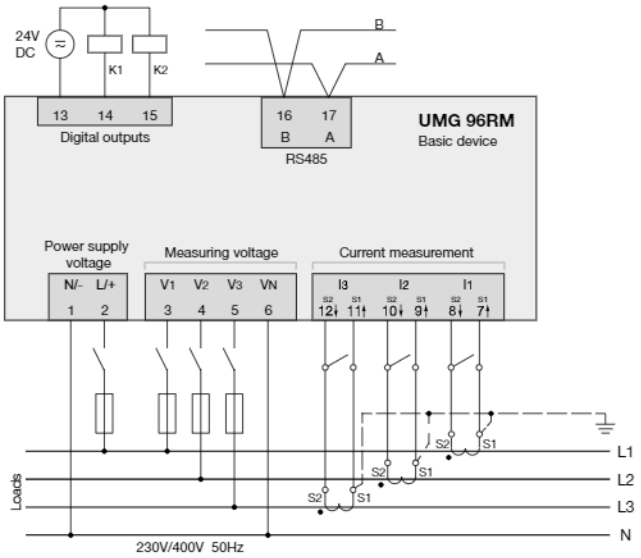
Rear view 96RM-CBM
Modbus variant



Rear view 96RM-P
Profibus variant

The illustrations shown here are examples. Further dimensional drawings and connection diagrams are available on request or can be viewed on our homepage.

Typical connection



Connection variant UMG 96RM

The illustration shown here is an example.
Further connection diagrams are available on request or can be viewed on our homepage.

Fig.: Battery insertion on the rear
(UMG 96RM-CBM and UMG 96RM-P)

Fig.: UMG 96RM-PN with Profinet interface

Device overview and technical data

	UMG 96RM*1	UMG 96RM-M*1	UMG 96RM-EL*1	UMG 96RM-CBM*1	UMG 96RM-P*1	UMG 96RM-PN*1
Item no. (90–277 V AC/90–250 V DC)	**52.22.061**	**52.22.069**	**52.22.068**	**52.22.066**	**52.22.064**	**52.22.090**
Item no. (24-90 V AC/24-90 V DC)	**52.22.070**	**52.22.073**	**52.22.072**	**52.22.067**	**52.22.065**	**52.22.091**
Interfaces	RS485	M-Bus	Ethernet	RS485, USB	RS485, Profibus, USB	RS485, Ethernet, Profinet
Protocols						
Modbus RTU	•	-	-	•	•	•
Modbus TCP	-	-	•	-	-	•
Profibus DP V0	-	-	-	-	•	-
Profinet	-	-	-	-	-	•
M-Bus	-	•	-	-	-	-
DHCP or DCP	-	-	•	-	-	•
ICMP (Ping)	-	-	•	-	-	•
Measurement data recording						
Current measurement channels	3	3	3	4	4	4 (+2)
Memory (Flash)	-	-	-	256 MB	256 MB	-
Battery	-	-	-	Type CR2032 3 V, Li-Mn	Type CR2032 3 V, Li-Mn	-
Clock	-	-	-	•	•	-
Digital inputs and outputs						
Digital inputs	-	-	-	4	4	3*3
Digital outputs (as switch or pulse output)	2	2	-	6	6	2 (+3)*3
Mechanical properties						
Device dimensions in mm (W xH x D)*2	96 x 96 x approx. 48	96 x 96 x approx. 48	96 x 96 x approx. 48	96 x 96 x approx. 78	96 x 96 x approx. 78	96 x 96 x approx. 78

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

• = included - = not included

*1 UL certification included.

*2 Accurate device dimensions can be found in the operation manual.

*3 Optional 3 digital inputs or outputs (no pulse output)

General	
Service life of backlight	40000 h (50% of the initial brightness)

Transport and storage The following information applies to devices which are transported or stored in the original packaging.	
Free fall	1 m
Temperature	K55 (-25 °C to +70 °C) (–13 °F ..to 158 °F)
Relative humidity	0 to 90% RH

Ambient conditions during operation	
The UMG 96RM is intended for weather-protected, stationary use. Protection class II in acc. with IEC 60536 (VDE 0106, Part 1).	
Rated temperature range	K55 (–10 °C to +55 °C) (14 °F ..to 131 °F)
Relative humidity	0 to 75% RH
Operating altitude	0 to 2000 m above sea level
Pollution degree	2
Installation position	any
Ventilation	forced ventilation is not required.
Protection against ingress of solid foreign bodies and water - Front - Rear - Front with seal	 IP40 in acc. with EN60529 IP20 in acc. with EN60529 IP54 in acc. with EN60529

Supply voltage		
230 V option	Nominal range	90 V - 277 V (50/60 Hz) or DC 90 V - 250 V; 300 V CAT III
	Power consumption	max. 4.5 VA / 2 W (RM-M) max. 5.5 VA / 3 W (RM) max. 5 VA / 2 W (RM-EL) max. 6 VA / 3 W (RM-CBM) max. 7.5 VA / 4 W (RM-P) max. 8.5 VA / 5 W (RM-PN)
24 V option	Nominal range	24 V - 90 V AC / DC; 150 V CAT III
	Power consumption	max. 2.5 VA / 2 W (RM-M) max. 3.5 VA / 2 W (RM-EL) max. 4.5 VA / 3 W (RM) max. 5 VA / 3 W (RM-CBM) max. 6.5 VA / 5 W (RM-P) max. 7 VA / 5 W (RM-PN)
Operating range	±10% of nominal range	
Internal fuse, not replaceable	Type T1A / 250 V/277 V according to IEC 60127	
Recommended overcurrent protection device for line protection (certified under UL)		230 V option: 6 - 16 A 24 V option: 1 - 6 A (Char. B)

Terminal connection capacity (supply voltage) Connectable conductors. Only one conductor can be connected per terminal!	
Single core, multi-core, fine-stranded	0.2 - 2.5 mm², AWG 26 - 12
Terminal pins, core end sheath	0.2 - 2.5 mm²
Tightening torque	0.4 - 0.5 Nm (3.54 - 4.43 lbf in)
Stripping length	7 mm (0.2756 in)

Voltage measurement	
Three-phase 4-conductor systems with rated voltages up to	277 V/480 V (±10%)
Three-phase 3-conductor systems, unearthed, with rated voltages up to	IT 480 V (±10%)
Overvoltage category	300 V CAT III
Measurement voltage surge	4 kV
Metering range L-N	0[1] to 300 V_{rms} (max. overvoltage 520 V_{rms})
Metering range L-L	0[1] to 520 V_{rms} (max. overvoltage 900 V_{rms})
Resolution	0.01 V
Crest factor	2.45 (related to the measurement range)
Impedance	3 MΩ/phase
Power consumption	approx. 0.1 VA
Sampling rate	21.33 kHz (50 Hz), 25.6 kHz (60 Hz) for each measurement channel
Frequency of the fundamental oscillation - Resolution	45 Hz to 65 Hz 0.01 Hz

[1] The UMG 96RM can only determine measured values if a voltage L1-N greater than 20 Veff (4-wire measurement) or a voltage L1-L2 greater than 34 Veff (3-wire measurement) is applied at the voltage measurement input V1.

Current measurement	
Rated current	5 A
Metering range	0 to 6 A_{rms}
Crest factor	1.98
Resolution	0.1 mA (display 0.01 A)
Overvoltage category	300 V CAT II
Measurement voltage surge	2 kV
Power consumption	approx. 0.2 VA (Ri = 5 mOhm)
Overload for 1 sec.	120 A (sinusoidal)
Sampling rate	21.33 kHz (50 Hz), 25.6 kHz (60 Hz) for each measurement channel

Firmware	
Firmware update	Please observe the operating instructions

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

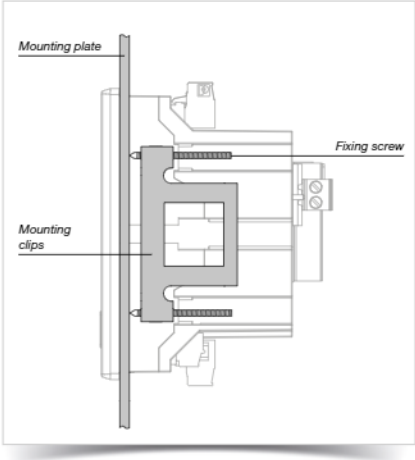


Fig.: The fastening into a switchboard is implemented via the side-mounted fastening clamps (UMG 96RM-P / UMG 96RM-CBM)

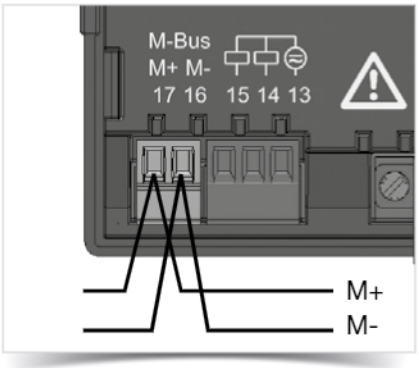


Fig.: M-Bus interface with 2-pole plug contact

Fig.: 2-pole plug contact with cable connection (cable type: 2 x 0.75 mm²) via twin core end sheathes