

# UMG 96RM

## Multifunction power analyser

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®-Basic software

### Networks

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

### Network visualisation software

- Free GridVis®-Basic



## 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 (e.g. GridVis®-Service)
- High data security and redundancy
- Comprehensive communications options and protocols
- Multifaceted, pre-defined reports for power quality and energy consumption analysis (via GridVis®-Service)
- 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

### 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

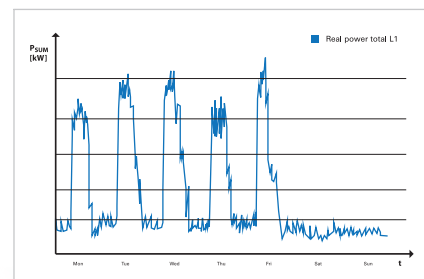


Fig.: Load profiles are the basis for energy management

### Cost centre analysis

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

### 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

	January	February	March	April	December	Total
HICA Water Boiler Heating	2480 12 kWh	1240 6 kWh	160 0,8 kWh	380 1,9 kWh	240 1,2 kWh	4500 € 21,9 kWh
HICA Water Total	737 3,7 m <sup>3</sup>	386 1,9 m <sup>3</sup>	790 3,9 m <sup>3</sup>	506 2,5 m <sup>3</sup>	454 2,3 m <sup>3</sup>	2873 € 14,3 m <sup>3</sup>
Hall 1 Final Assembly	166 831 kWh	155 776 kWh	183 920 kWh	174 871 kWh	171 856 kWh	849 € 4254 kWh
Hall 2 Painting	155 776 kWh	171 856 kWh	166 831 kWh	195 980 kWh	191 956 kWh	878 € 4399 kWh
<b>Total</b>	<b>3538 €</b>	<b>1952 €</b>	<b>1299 €</b>	<b>1255 €</b>	<b>1056 €</b>	<b>9100 €</b>

Fig.: Cost centre analysis

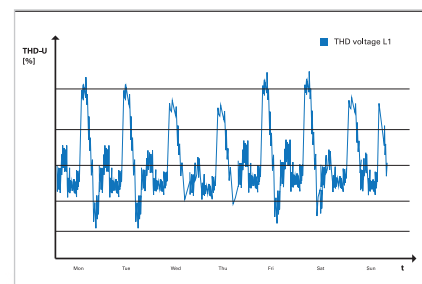


Fig.: Transparency of energy supply



### 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



### 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)

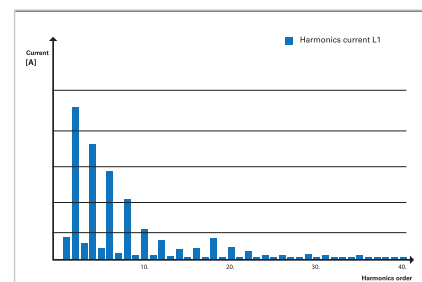


Fig.: Power quality monitoring (Harmonics analysis for the current up to 40th order harmonics)



**Large measurement data memory**

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



**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

**Backlight**

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

**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)



**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.

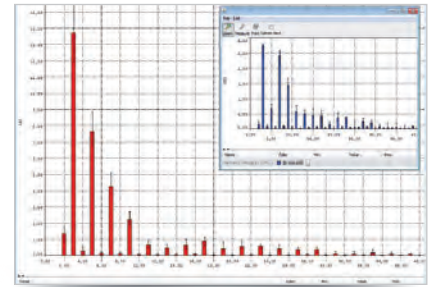


Fig.: GridVis® software: Harmonics analysis



Fig.: Pluggable screw terminals for easy connection



Fig.: LCD Display backlight

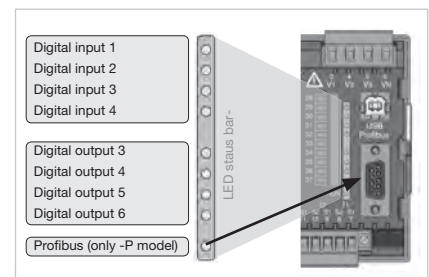


Fig.: LED status bar for the inputs and outputs (UMG 96RM-CBM and UMG 96RM-P)



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

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

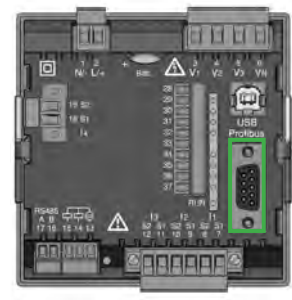
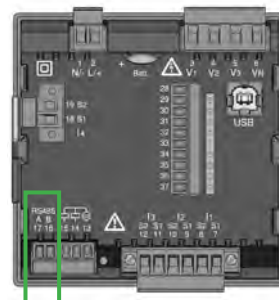
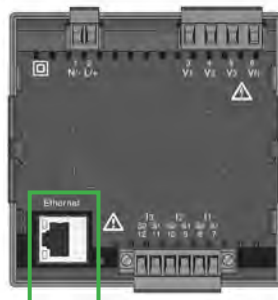
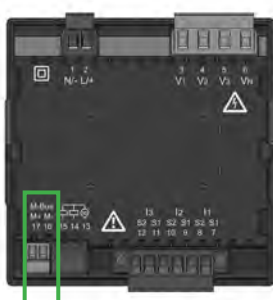
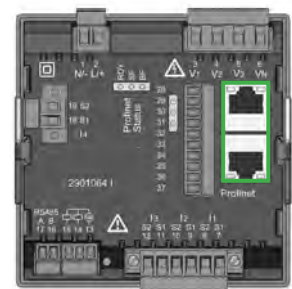
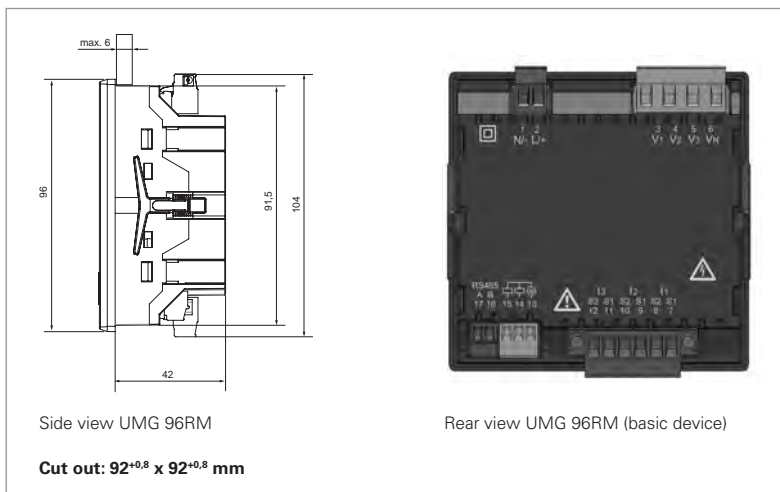
**4th current transformer input**

- 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**

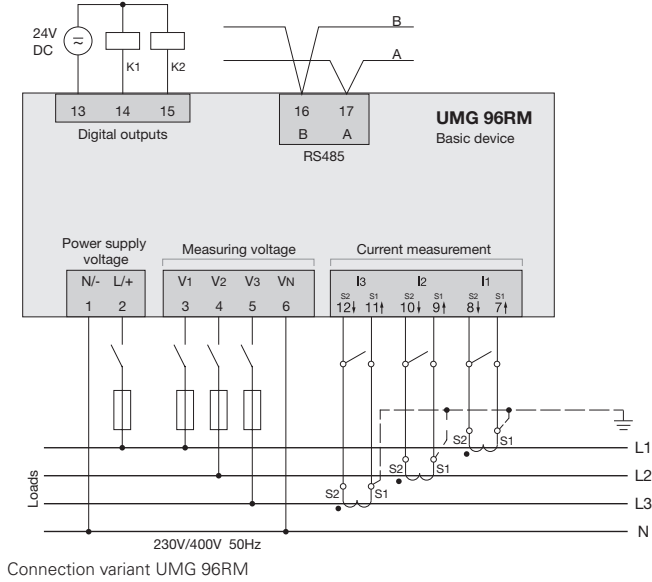
All dimensions in mm



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



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

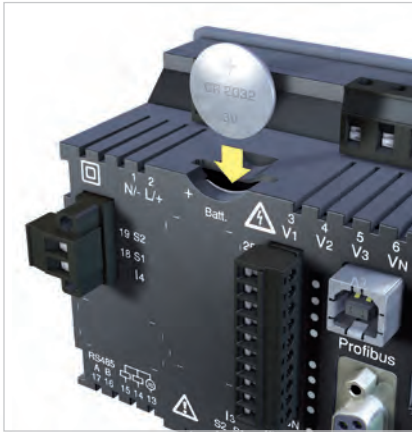


Fig.: Battery insertion on the rear (UMG 96RM-CBM and UMG 96RM-P)



Fig.: UMG 96RM-PN with Profinet interface





## Device overview and technical data

	UMG 96RM <sup>*1</sup>	UMG 96RM-M <sup>*1</sup>	UMG 96RM-EL <sup>*1</sup>	UMG 96RM-CBM <sup>*1</sup>	UMG 96RM-P <sup>*1</sup>	UMG 96RM-PN <sup>*1</sup>
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
<b>Protocols</b>						
Modbus RTU	•	-	-	•	•	•
Modbus TCP	-	-	•	-	-	•
Profibus DP V0	-	-	-	-	•	-
Profinet	-	-	-	-	-	•
M-Bus	-	•	-	-	-	-
DHCP or DCP	-	-	•	-	-	•
ICMP (Ping)	-	-	•	-	-	•
<b>Measurement data recording</b>						
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	-	-	-	•	•	-
<b>Digital inputs and outputs</b>						
Digital inputs	-	-	-	4	4	3 <sup>*3</sup>
Digital outputs (as switch or pulse output)	2	2	-	6	6	2 (+3) <sup>*3</sup>
<b>Mechanical properties</b>						
Device dimensions in mm (W x H x D) <sup>*2</sup>	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

<sup>\*1</sup> UL certification included.

<sup>\*2</sup> Accurate device dimensions can be found in the operation manual.

<sup>\*3</sup> Optional 3 digital inputs or outputs (no pulse output)

<b>General</b>	
Service life of backlight	40000 h (50% of the initial brightness)

<b>Transport and storage</b>	
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)
Relative humidity	0 to 90% RH

<b>Ambient conditions during operation</b>	
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)
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	IP40 in acc. with EN60529
- Rear	IP20 in acc. with EN60529
- Front with seal	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 mm <sup>2</sup> , AWG 26 - 12
Terminal pins, core end sheath	0.2 - 2.5 mm <sup>2</sup>
Tightening torque	0.4 - 0.5 Nm
Stripping length	7 mm

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 <sup>1)</sup> to 300 V <sub>rms</sub> (max. overvoltage 520 V <sub>rms</sub> )
Metering range L-L	0 <sup>1)</sup> to 520 V <sub>rms</sub> (max. overvoltage 900 V <sub>rms</sub> )
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

<sup>1)</sup> 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 <sub>rms</sub>
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

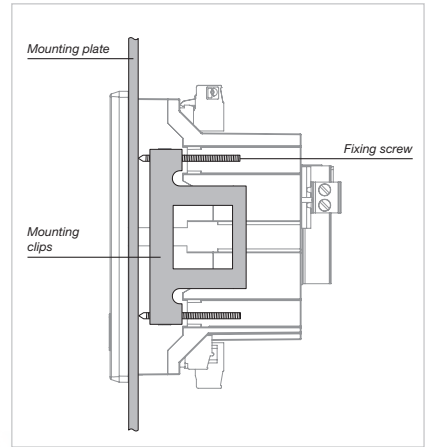


Fig.: The fastening into a switchboard is implemented via the side-mounted fastening clamps (UMG 96RM-P / UMG 96RM-CBM)

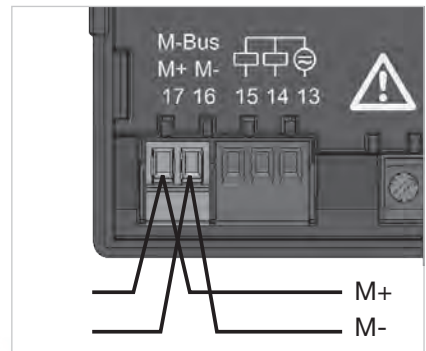


Fig.: M-Bus interface with 2-pole plug contact



Fig.: 2-pole plug contact with cable connection (cable type: 2 x 0.75 mm<sup>2</sup>) via twin core end sheaths