



UMG 96RM – Universal measurement instrument

(EN 50160, IEEE 519, ITIC)

UMG 96RM – Universal measurement instrument

Unrivalled in its class



The UMG 96RM is a very compact and powerful universal measurement device, mainly designed for use in low and medium voltage distribution systems.

In addition to the large quantity of electrical measurement values, this innovative measurement instrument offers a multitude of additional functions such as for example the measurement of harmonics up to the 40th order. The continuous sampling with 21.3 kHz enables a detection of the measured values in high resolution and thus provides an effective energy management tool for fault analysis and for monitoring power quality.

Areas of application

- For measuring, monitoring and checking electrical parameters in energy distribution systems
- Recording of load profiles for energy management systems (e.g. ISO50001, EN16001)
- Collection of energy consumption data for cost centre analysis
- Measurement value generator for building management systems or PLC (Modbus)
- Monitoring of power quality characteristics, e.g. harmonics up to the 40th order

UMG 96RM – Compact high performance

The compact and powerful multi-function measurement device for energy measurement.

The UMG 96RM is equipped with a powerful, innovative microprocessor. The sampling rate of all measurement channels at 21.3/25.6 kHz enables a continuous measurement and acquisition of several hundred measurement values in high resolution. The most up-to-date microprocessor technology, components with tight tolerance values, decades of design and production experience and prime firmware assure a very high measurement accuracy and reliability for the UMG 96RM.



Main features

- Measurement in IT and TN grids
- LCD-Display with backlight
- True RMS measurement (TRMS)
- Continuous sampling of voltage and current inputs with 21.3 kHz or 25.6 kHz
- Harmonic analysis up to the 40th order
- 7 Energy meter for L1, L2, L3 and sum
- 8 tariffs
- High measurement accuracy, effective energy class 0.5; accuracy U/I, 0.2%
- RCM (Option)
- High reliability and long lifespan
- Including extensive package of GridVis software
- up to 6 current inputs

The UMG 96RM collects the electrical energy consumption, electrical standard characteristics such as current, voltage, frequency, power and power quality characteristics, e.g. harmonics, up to the 40th order. The high measurement accuracy, compact construction, extensive measurement data, multi-faceted protocol for integration into upstream systems as well as the economical design result in the UMG 96RM being unrivalled.

Applications

The UMG 96S is a measurement instrument of the newest generation which is suitable for measuring, recording and monitoring electrical parameters (True-RMS) in low and medium voltage networks (1 and 3-phase systems with a neutral conductor).

One of the characteristics of this measurement instrument is the compact construction (96x96 mm), the LCD backlight and the measurement of harmonic currents and voltages in each conductor. The voltage measurement inputs are

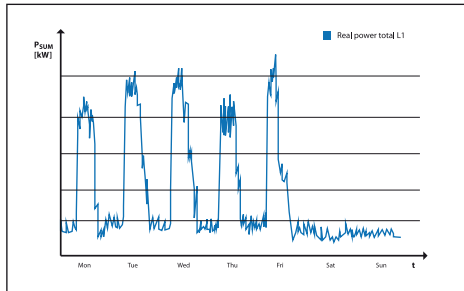
designed for the measurement in low voltage networks in which nominal voltages up to 300V against ground and surge voltages up to over voltage category III can occur.

An uncomplicated system integration (energy management system, PLC, SCADA, BMS) is assured through a multitude of interfaces and protocols. The GridVis software, which is included as part of the deliverables, is the basis for energy management systems and power quality investigations.

Typical applications

In order to achieve a sustainable reduction in energy costs, an overview of the energy consumption and the energy flows in the electrical system is first required. Whether for the build-up of energy management systems (ISO 50001/

EN16001), the cost centre management or the monitoring of the power quality, the universal measurement devices from the UMG 96RM range are the basis for every application.



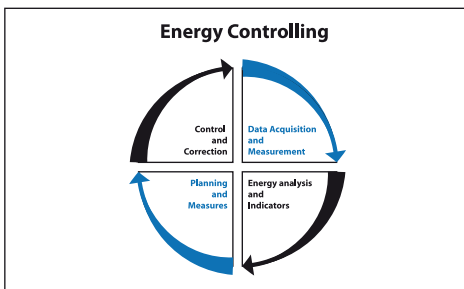
Energy data acquisition & load profile

With the help of the UMG 96RM detailed acquisition of energy data and the load profile is a simple task within the scope of energy analysis. This is essential for tracking energy efficiency and the safe design of the energy distribution systems.

	January	February	March	April	December	Total
HKA Water	3480 €	1240 €	160 €	380 €	240 €	4500 €
Boiler Heating	12 kWh	6 kWh	0.8 kWh	1.9 kWh	1.2 kWh	21.9 kWh
HKA Water	737 €	386 €	790 €	506 €	454 €	2873 €
Total	3.7 m³	1.9 m³	3.9 m³	2.5 m³	2.3 m³	14.3 m³
Hall 1	166 €	155 €	183 €	174 €	171 €	849 €
Final assembly	831 kWh	776 kWh	920 kWh	871 kWh	856 kWh	4254 kWh
Hall 2	155 €	171 €	166 €	195 €	191 €	878 €
Painting	776 kWh	856 kWh	831 kWh	980 kWh	956 kWh	4399 kWh
Total	3538 €	1952 €	1299 €	1255 €	1056 €	9100 €

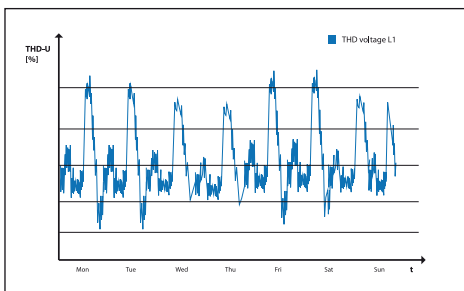
Cost centre analysis

It is becoming more and more important in industrial enterprises to be able to assign energy costs to particular products and to be able to determine the breakdown and allocation of energy costs to charge them to the individual processes and consumers. This also allows employees to focus on specific cost optimisation and conservation of energy.



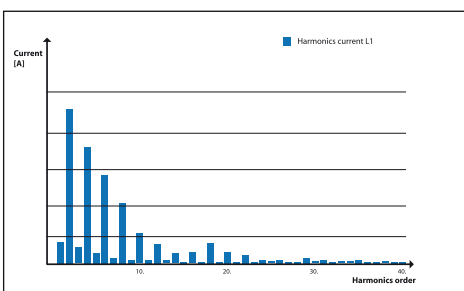
Energy management systems (ISO 50001/EN 16001)

Energy management systems per standard ISO50001/EN16001 are essential for continuous improvements in energy efficiency and reduction of costs. Universal measurement devices from the UMG 96RM range are an important constituent part of energy management systems, which can also secure tax breaks (e.g. in Germany) amongst other benefits.



Transparency of energy supply

A higher degree of transparency can be attained through a multi-stage and scalable measurement system within the scope of energy measurement technology. Only by means of continuous measurement with high resolution meters, sporadic events can be analysed and corrective solutions identified.



Power quality monitoring

The UMG 96RM gives indispensable information about insufficient power quality and enables measures to be undertaken to address grid problems. This result is the prevention of production drop-outs, significantly longer service life for the manufacturing resources and thus an improved sustainability for the investment associated with them.

Variants of UMG 96RM

The UMG 96RM is available in different versions to meet the various application specific market requirements. The differences between the variants are primarily with

the interfaces, protocols and configuration of the inputs and outputs. The basic device is already comprehensively equipped with a fast RS485 interface with Modbus protocol and 2 digital outputs.

Basic device



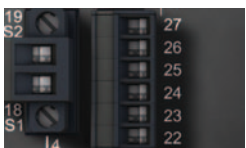
The fast RS485 interface with the Modbus protocol and the 2 digital outputs allows a quick and cost-effective monitoring of the power quality and energy consumptions.

Profibus and digital IOs



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

Temperature input and analogue output



A multitude of inputs and outputs enable effective integration into upstream systems. Low voltage distribution systems, the transformer or the server cabinet can be protected from over-temperature simultaneously by means of the temperature input.

M-Bus



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

4th current transformer input



The increasing proportion of non-linear loads leads to increasing pollution effects on the grid, in particular overloading of the neutral conductor by harmonic currents. The N-line can be continuously monitored through the 4th current input.

Ethernet (TCP/IP)

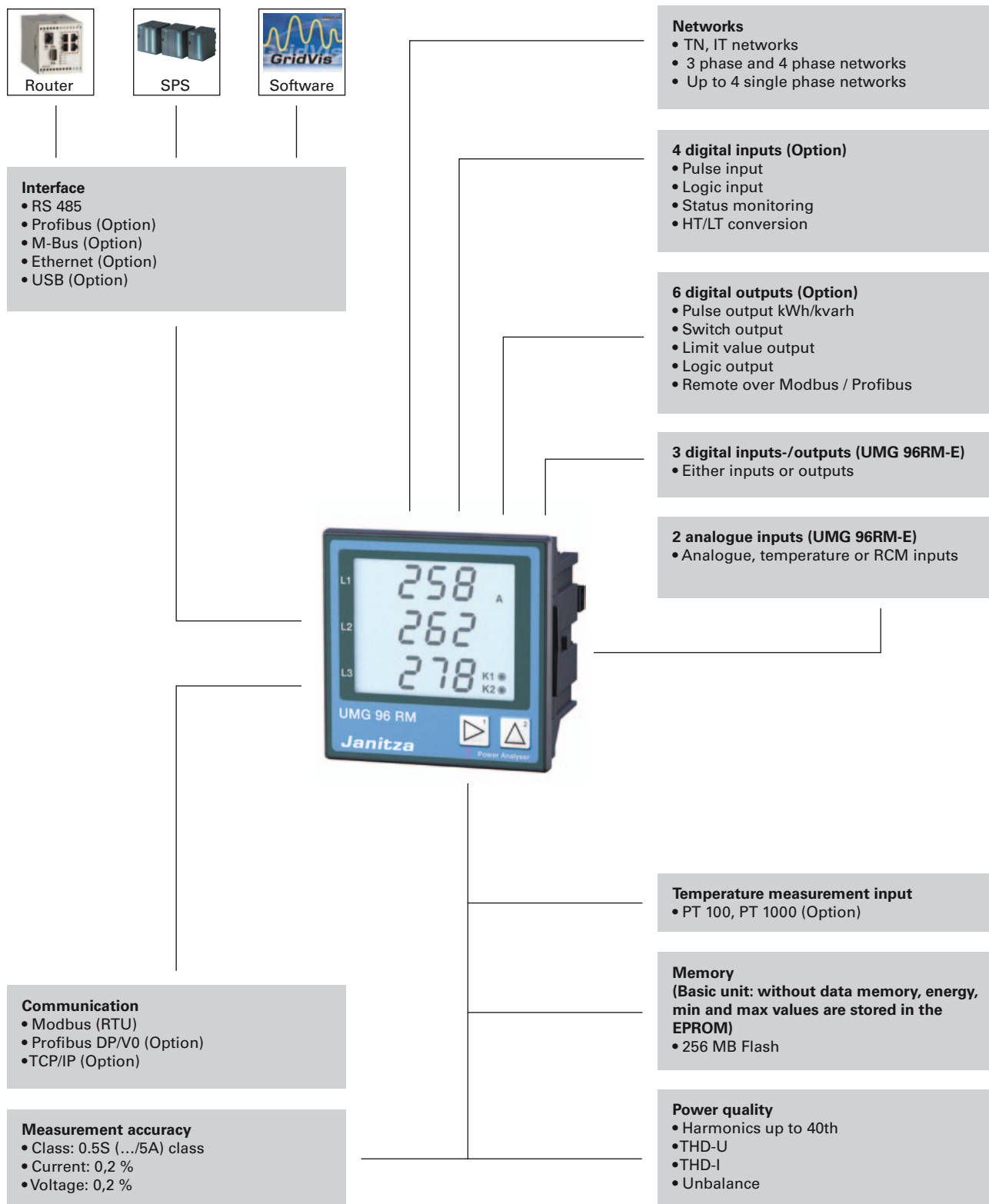


Increasingly communications are moving from typical field bus to Ethernet (TCP/IP). The UMG 96RM Ethernet connection guarantees a simple integration into the network and a fast and reliable communications architecture.

Digital IOs



Along with network transparency Smart Grid stands for the active control of energy flows and power. In addition the UMG 96RM offers a multitude of configurations for IOs for intelligent integration and control tasks.



Scope of operation and technical data UMG 96RM

Overview of product variants

Three/four phase power analysers; 50/60Hz; current transformer .../1/5A; including GridVis programming and analysis software														
Supply voltage**: 95...240 V AC, 80...340 V DC ±10% vof nominal range	Digital inputs	Digital-/ pulse output	Digital inputs/outputs (either 3 inputs or 3 outputs)	Analogue inputs Temperature/ residual current, combinable	4th current transformer input	Memory size	Clock an battery	Interfaces					Type	Item number
								RS 485	Profibus	M-Bus	Ethernet 100baseT	USB		
•	-	2	-	-	-	-	-	•	-	-	-	-	UMG 96RM	52.22.001
•	4	6	-	-	•	256 MB*	•	•	•	-	-	•	UMG 96RM-P	52.22.002
•	-	2	-	-	-	-	-	-	-	•	-	-	UMG 96RM-M	52.22.003*2
•	-	2	3	2	•	256 MB*	•	•	-	-	•	-	UMG 96RM-E	52.22.004*1
•	4	6	-	-	•	256 MB*	•	•	-	-	-	•	UMG 96RM-CBM	52.22.005
•	-	-	-	-	-	-	-	-	-	-	•	-	UMG 96RM-EL	52.22.006*2
Accessories														
Fastening clamps for UMG 96 RM (52.22.001), UMG 96 RM-M (52.22.003) and UMG 96RM-EL (52.22.006). Clamps for fastening the measurement instrument - with front panel thickness from 6 mm or with heavy vibrations.														52.22.251

• = Contained – = Not possible

*1 available from 2nd quarter 2012 *2 available from 4th quarter 2012 * 192 MB available for recordings **Optional additional auxiliary voltages.
For parameterization of the basic unit (item-no. 52.22.001) is an interface converter and the software GridVis recommended.

Features

Three wire/Four wire	yes/yes
Sampling frequency	21.33 / 25.6 kHz
Energy tariffs	4 x kWh / 4xkVArh
Harmonics	1..40th
Distortion factor THD-U / THD-I in %	yes
Imbalance	yes
Clock	+/- 1 min per month
Operating hour meter	yes

Communication

Interfaces	RS 485	9.6, 19.2, 38.4, 57.6, 76.8, 115.2, 921.6 kbps	yes, not M and EL
	Profibus DP	Plug, sub D 9-pole up to 12Mbps	yes, Version P
	M-Bus		yes, Version M
	Ethernet	RJ45-sockets	yes, Version E and EL
	USB		yes, Version P and CBM
	Webserver		yes, Version E
Protocols	Modbus RTU		yes, not M and EL
	Profibus DP V0		yes, Version P
	Modbus TCP/IP		yes, Version E and EL
	Modbus over TCP		yes, Version E
	Modbus-Gateway		yes, Version E
	HTTP	Homepage (configurable)	yes, Version E
	SMTP	E-Mail	yes, Version E
	SNMP		yes, Version E
	SNTP	Time synchronisation	yes, Version E
	TFTP	Automatic configuration	yes, Version E
	FTP	File Transfer	yes, Version E
	DHCP		yes, Version E

General technical data

Nominal voltage	3-phase 4-wire grid (L-N, L-L)	277/480 V AC
	3-phase 3-wire grid (L-L)	480 V AC
Overvoltage category		300 V CAT III
Quadrants		4
Continuous measurement		yes
Scanning rate 50/60 Hz	Per channel	21.33 / 25.6 kHz
Mounting		Front panel installation
Working temperature range		-10...55 °C
Connectable conductor (U/I)	Single wire, multi-wire, fine-wire	0.08 - 2.5 mm ²
	pin cable lugs, ferrule	1.5 mm ²
Protection class	According to EN 60529	IP 20

Measurement values

Measurement parameter	Display range	Measurement range at scaling factor 1	L1	L2	L3	Sum	Lowest value	Average value	Maximum value	Measurement accuracy
Current	0 .. 9999 kA	0 .. 5 A	•	•	•	•	•	•	•	±0.5 %
Current calculated in N	0,03 .. 9999 kA	0.03 .. 25 A				•	•	•	•	±1.0 %
Voltage L-N	0 .. 9999 kV	10 .. 300 V	•	•	•		•	•	•	±0.2 %
Voltage L-L	0,0 .. 9999 kV	18 .. 520 V	•	•	•		•	•	•	±0.2 %
Frequency (U)	45,00 .. 65,00 Hz	45.00 .. 65.00 Hz	•							±0.05 %
Effective power per phase	0 W .. 9999 GW	0 W .. 1.8 kW	•	•	•			•	•	±0.5 %
Apparent power per phase	0 VA .. 9999 GVA	0 VA .. 1.8 kVA	•	•	•			•	•	±0.5 %
Reactive power per phase	0 var .. 9999 Gvar	0 var .. 1.8 kvar	•	•	•			•	ind.	±1.0 %
Effective power, sum	0 W .. 9999 GW	0 W .. 5.4 kW				•		•	•	±0.5 %
Apparent power sum	0 VA .. 9999 GVA	0 VA .. 5.4 kVA				•		•	•	±0.5 %
Reactive power, sum	0 var .. 9999 Gvar	0 var .. 5.4 kvar				•		•	ind.	±1.0 %
cos-phi	0.00 kap. .. 1.00 .. 0.00 ind.	0.00 kap. .. 1.00 .. 0.00 ind.				•		•		±1.0 degree
Effective energy, consumed	0 .. 999,999,999 kWh					•				Class 0.5(5A)
Reactive energy, inductive	0 .. 999,999,999 kvarh					•				Class 1(5A)
Operating hour meter	0 .. 999,999,999 h					•				±2 min per day

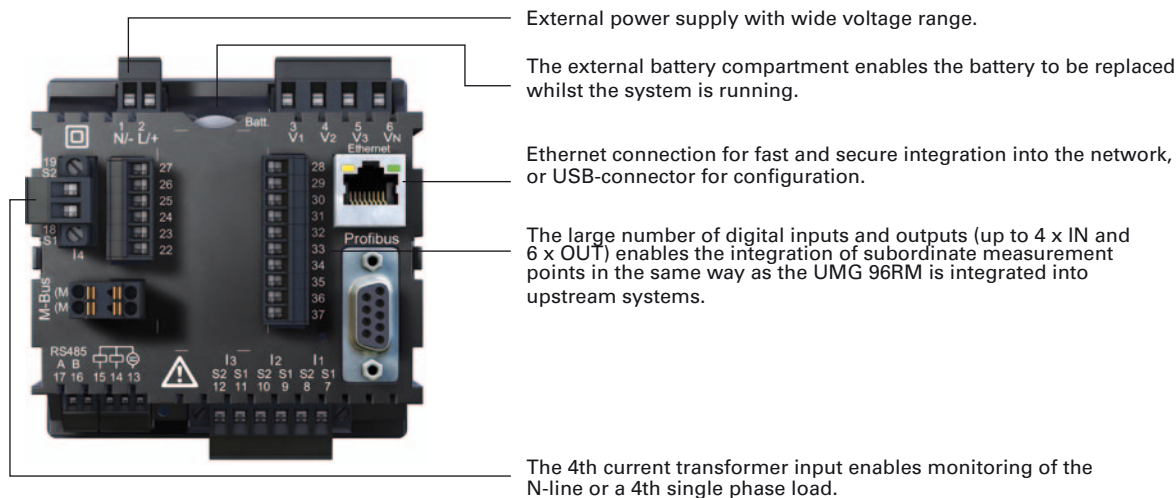
Power quality

Harmonics, 1-40 harmonic	Current, voltage L1, L2, L3	Accuracy class 1
Distortion factor THD-U in %	L1, L2, L3	Accuracy class 1
Distortion factor THD-I in %	L1, L2, L3	Accuracy class 1
Recorder for threshold events		yes, for units with memory

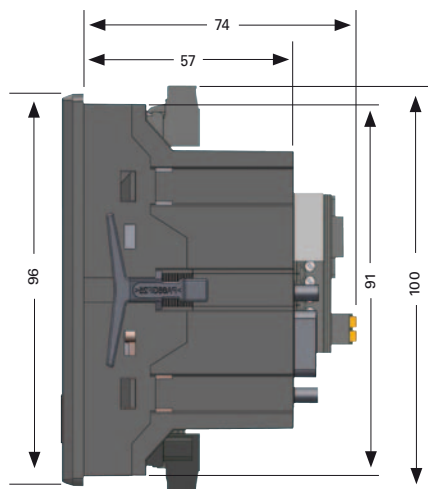
Peripherie

Digital inputs	As a status or pulse input	refer to order details
Digital outputs	As a switch or pulse output	refer to order details
Analogue outputs	4...20mA, Temp. or RCM	refer to order details
Password protection		yes
Software GridVis	Refer to chapter 5	yes

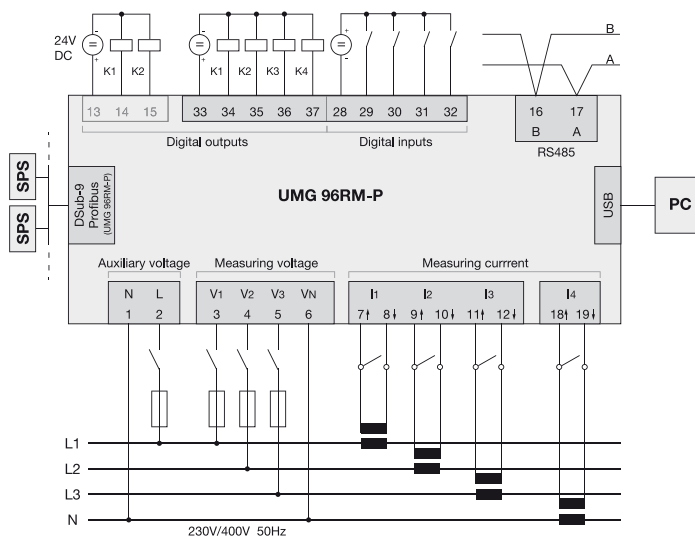
Combination of the various variants



Dimensional drawing



Typical connection option (UMG 96RM-P)



The compact...

...particularly for applications with tight spaces. The shallow installation depth enables integration even where space is limited, for example in subdistribution panels. Installation and connection costs can be substantially reduced due to the user-friendly construction.

Side and rear views are showing each a combination of the various variants just to indicate overall dimensions, as well as placement of interfaces and connectors. For the specific design of an individual variant please refer to our operation manual.