RCM

Modbus

GridVis®
Analysis software

Harmonics via analysis channel

Alarm management

20 current channels

**UMG 20CM – 20 Channel Branch Circuit Monitoring Device with RCM**

ISO 50001
Made in Germany

**Interfaces / communication**
• RS485
• Modbus RTU

**Accuracy of measurement**
• Active energy Class 1
• Current: 1 %
• Voltage: 1 %

**NEW: Now available with memory**
• 768 kB

**Power quality**
• Harmonics up to 63rd harmonic (analysis channel)
• Crest factor / total harmonic distortion
• Minimum and maximum values for currents with time stamp
• Threshold value for each current channel / limit value bit

• **20 Current measurement channels**
• True RMS measurement
• High sampling rate at 20 kHz
• Operating current and residual current monitoring (RCM)

**2 digital outputs (open collector)**
• Pulse output kWh / kvarh
• Relay / PLC inputs

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

# Areas of application

- Continuous acquisition of the operating currents
- Permanent residual current monitoring
- Messages in the event of the nominal current being exceeded
- Energy acquisition for complete current distribution
- Cost centre accounting
- Transparency of energy costs
- More effective use of IT infrastructure
- PDUs in data centres
- Increase of high availability power supply

# Main features

**RCM and energy measurement device in a single unit**

- 20 current measurement channels +/- 0.5 %
- 3 voltage measurement channels +/- 0.5 %
- Internal RS485 interface (Modbus as Slave)
- 20 LEDs – One LED for each current channel (Green = o.k., Yellow = Warning; Red = Nominal current exceed)
- Measurement range of operation current with burden up to 63 A with closed or split core current transformers (standard measured values: V, A, kW, kVA, kVar, kWh)
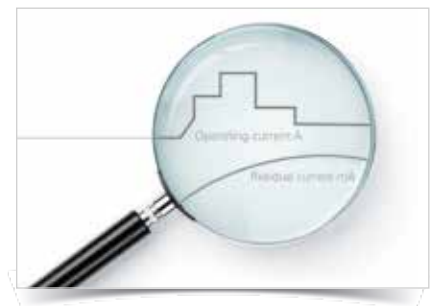
Fig.: Operating current and RCM fault current monitoring

**The system for smart people**

- Compact nature of the system
- Can be retrofitted to existing systems
- Modbus RTU directly on board
- State indication per channel (LEDs)
- Name stored per channel in the measurement device
- Polarity reversal for the current channels
- Memory function for the messages of the threshold monitoring
- Wide range power adapter (90 – 276 V ... AC / DC)
- Integration in the GridVis® software
- Diverse current transformer variants for the individual application
- Measurement variants:
    - Three-phase and single-phase energy measurement
    - RCM measurement three-phase and single-phase
- High sampling rate 20,000 Hz
- Current transformer connection monitoring (i.e. wire break will be detected)
- Harmonics analysis up to 63rd harmonic via analysis channel
- Saving of minimum and maximum values with time stamp
- Standard measured values: V, A, kW, kVA, kVar, kWh (variable list)
- Scalability of the system

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# The system

### Power supply without drop-outs

- Permanent monitoring and logging of processes in TN-S or TN-C-S systems
- Simple parameterisation and operation of the RCM measurement
- Automatic reporting in the event of problems enables a rapid initiation of countermeasures
- Comprehensive diagnostics increase safety and efficiency of a company



Fig.: Message before shut-down - an objective of residual current monitoring

### Alarms before failures (preventative residual current analysis)

- Faults arising will be detected in good time
- Monitoring, evaluation and reporting of creeping increases in residual currents (e.g. triggered by insulation faults and operating currents for system parts or loads being too high)
- Reduction of downtimes

### Sensors for energy management

- Energy data of a large number of loads can be acquired and passed to a database with ease
- Automatic reading out and saving of the measured values and data saved in the measurement devices as well as the exceedance of parameterised threshold values
- Channel-specific measured values of the current monitoring devices can be displayed via the GridVis® software
  - The progression of measured values is visualised graphically
  - Display of warnings or fault messages possible, e.g. via the topology views.
  - Associated message texts can be freely configured for this
  - Automatic sending of an email in the event of operational or fault messages
  - Remote monitoring of the entire system is possible via internet
  - Residual current and operational current monitoring devices can be parameterised via GridVis® (Modbus)
- The evaluation and saving of data in central databases is implemented via the GridVis® software
- The greater the scope of information, the more accurate the determination of savings potentials
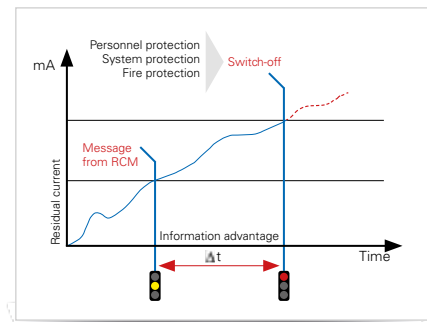- Energy optimisation offers a higher, more economical savings potential (ISO 50001)



Fig.: Read-out, analysis and saving of energy data

Feed-in
L1 L2 L3 N

N

PE

CGP

PAS

UMG 96RM-E

Ethernet
(TCP/IP)

Ethernet
(TCP/IP)

Modbus
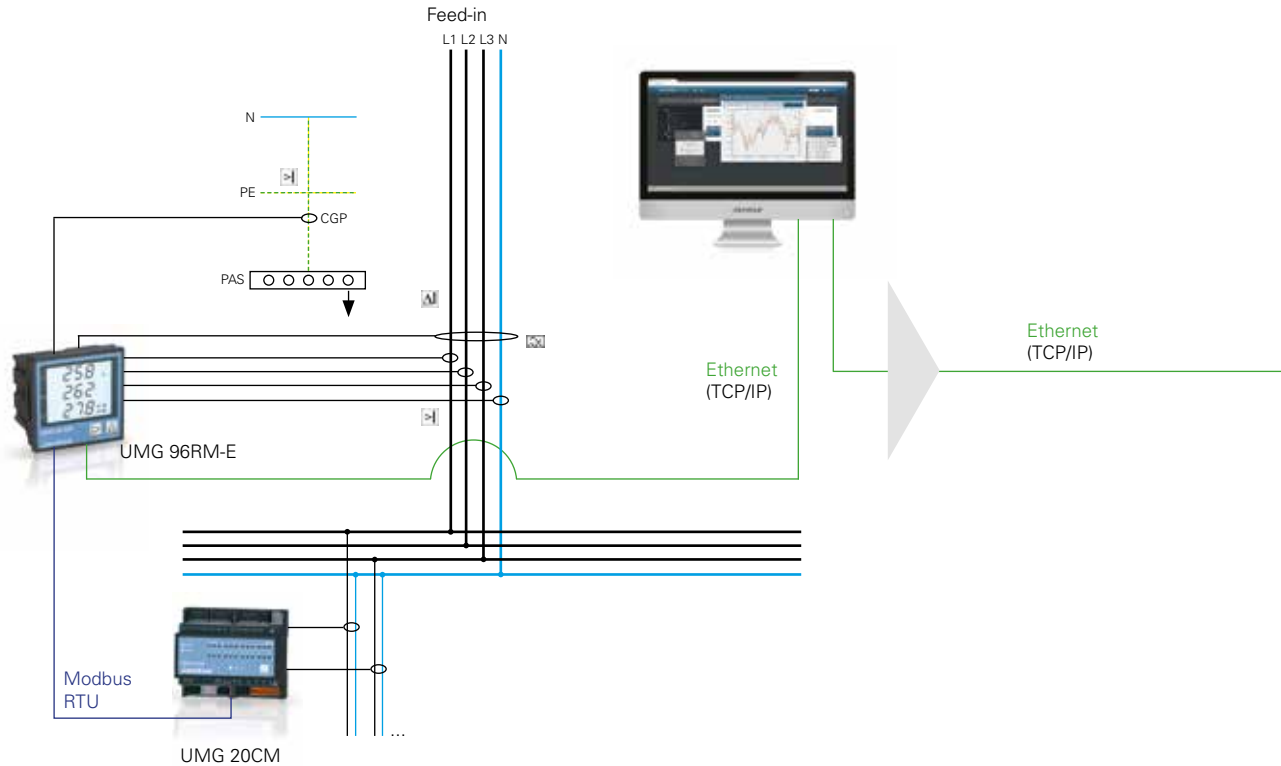RTU

UMG 20CM

Fig.: The 20 channels of the UMG 20CM can be optionally used for residual current or operational current monitoring by utilising the corresponding current measurement transformer. In the case of residual current monitoring, the residual currents flowing to ground or any other path are acquired.
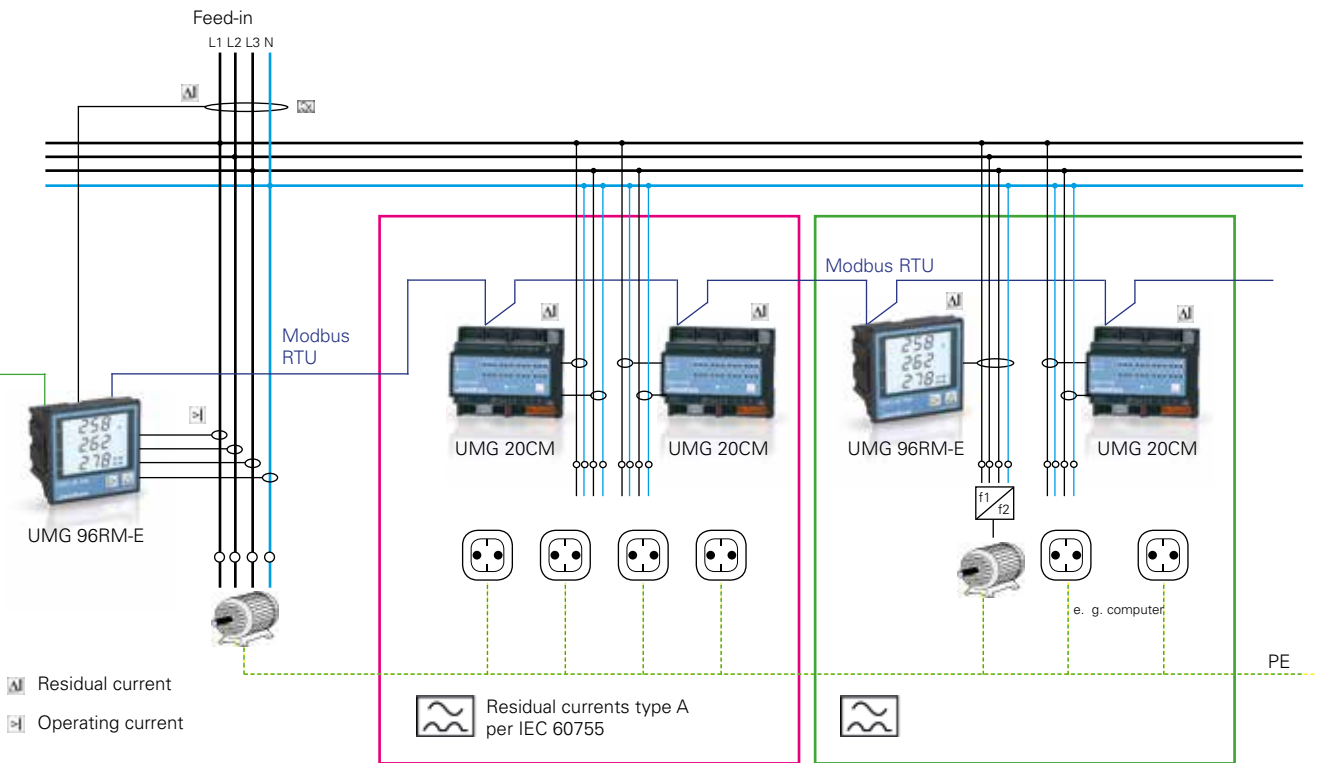
# Your benefits

**The intelligent system solution**

- Early warning with system failures
- Avoidance of costly and hazardous system downtimes; the availability of systems is increased
- Localisation of individual faulty feeders, reduced work when troubleshooting
- Early detection of an overloading of the N conductor and critical residual currents, resulting in increased fire safety
- Through parameterisation of the system in new condition and constant monitoring, all changes to the system state after the point of commissioning can be detected
- Fulfilment of the safety criteria "RCM residual current monitoring" in data centres
- Convenient monitoring and parameterisation solution with GridVis® software
- Operating current acquisition of all relevant consumers as a basis for an energy management system (EnMS)
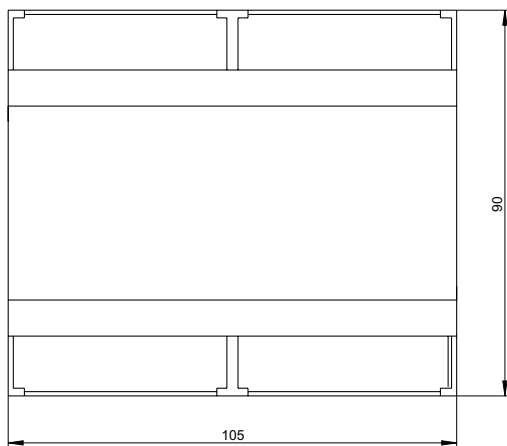
Fig.: Constant processes and highly sensitive applications such as data centres, are based on RCM monitoring.

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Feed-in
L1 L2 L3 N

Modbus
RTU

Modbus RTU

UMG 20CM    UMG 20CM    UMG 96RM-E    UMG 20CM

UMG 96RM-E

f1
f2

e.  g. computer

PE

⟦ΔI⟧ Residual current

⟦>I⟧ Operating current

⟦∿⟧ Residual currents type A
per IEC 60755

⟦∿⟧

# Dimension diagrams

All dimensions in mm

90

105

Front view

27

48

73

45.5

62

90
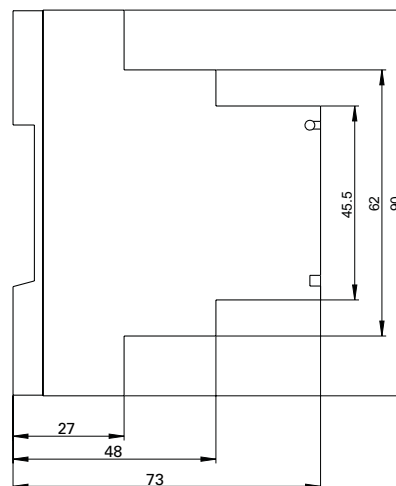
Side view

# Typical connection



3Ph/N/PE AC 50 Hz 230/400 V

L1
L2
L3
N
PE

ΔI max 1000 mA     ΔI max 1000 mA

Ch1     Ch20

UMG 96RM-E
UMG 508
UMG 511
UMG 604
UMG 605

ModbusRTU

24 V
UC

Supply voltage
90 ...276 V 50/60 Hz AC / DC

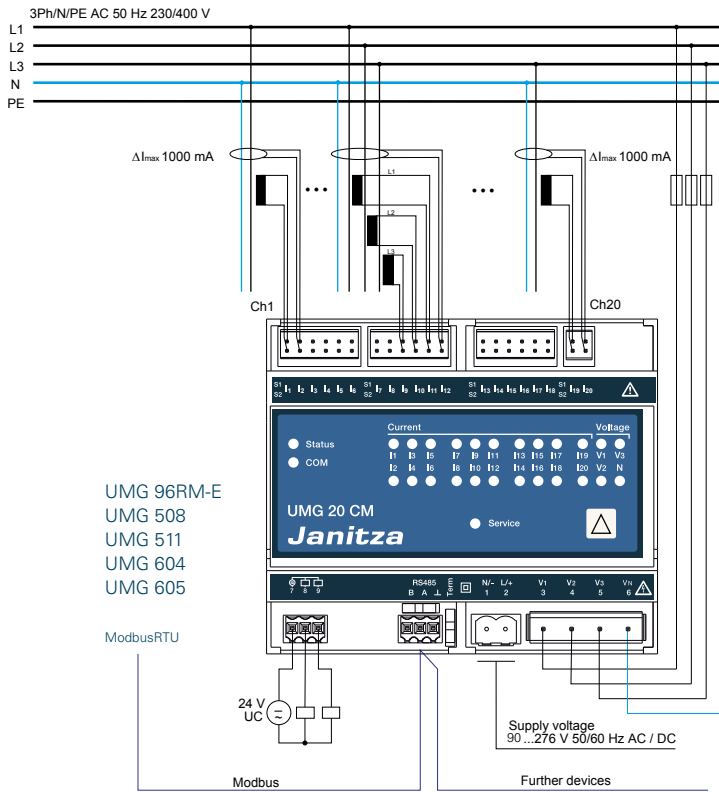Modbus     Further devices

Recommendation: The bus should not contain more than 10 devices, type UMG 20CM if several UMG 20CM measuring channels are used. If the APP "20CM-Webmonitor" is used, the number is limited to 5 devices due to the APP management).

# Device overview and technical data

|  | UMG 20CM |
|---|---|
| Item number | 14.01.625 |
| Power supply voltage | 90 ... 264 V AC / 120 ... 350 V DC |

| General |  |
|---|---|
| Use in low and medium voltage networks | • |
| Accuracy voltage measurement | 1 % |
| Accuracy current measurement | 1 % |
| Accuracy active energy (kWh) | Class 1 |
| Number of measurement points per period | 400 |
| Uninterrupted measurement | • |
| **RMS - momentary value** |  |
| Current, voltage, frequency | • |
| Active, reactive and apparent power for each of the 20 current inputs | • |
| Power factor for each of the 20 current inputs | • |
| **Energy measurement** |  |
| Active energy (for each of the 20 current inputs, + 7 aggregating channels) | • |
| **Recording of the mean values** |  |
| Current / present, minimum and maximum | • |
| Active power / present, minimum and maximum | • |
| Frequency / present | • |
| Aggregating channels | 7 |



1 -10
1-phase
measurements

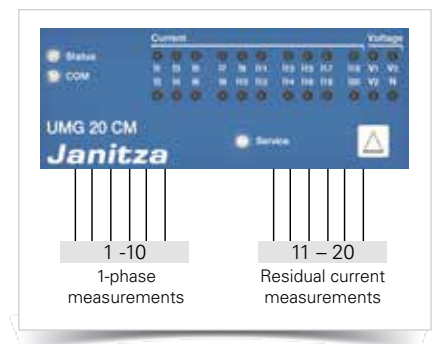11 – 20
Residual current
measurements

Fig.: 10 single-phase operational current measurements,
10 single-phase residual current measurements,

Comment: For detailed technical information please refer to the operation manual and the Modbus address list.
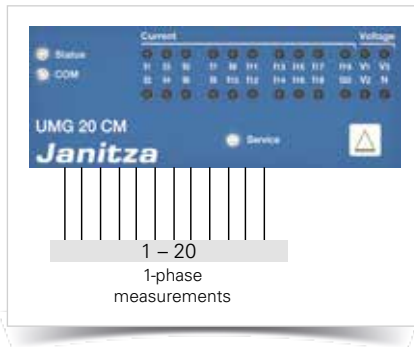
• = included    - = not included

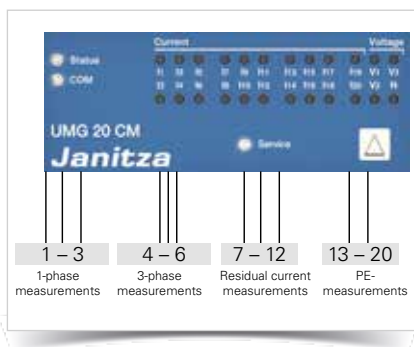Fig.: 20 single-phase operating current or RCM measurements



Fig.: 3 single-phase operational current measurements,
1 three-phase operational current measurement,
6 single-phase residual current measurements,
8 single-phase PE measurements

| RCM measurement | |
|---|---|
| Residual current monitoring for all 20 channels (selectable) | • |
| Current transformer connection monitoring (i.e. wire break will be detected) | • |
| **Power quality measurements** | |
| Harmonics per order / current and voltage (absolute and in %) | 1st – 63rd |
| Distortion factor THD-I in % | • |
| Under and overcurrent recording | • |
| Crest factor | • |
| **Measured data recording** | |
| Memory (Flash) | 768 kB |
| Minimum, maximum values | • |
| Measured data channels | 24 |
| Alarm messages | • |
| Time stamp | • |
| **Displays and inputs / outputs** | |
| LCD display | - |
| LEDs (3 states each) | 27 |
| Digital outputs (as switch or pulse output) | 2 |
| Voltage measurement inputs | L1, L2, L3 + N |
| Current measurement inputs | 20 |
| **Communication** | |
| **Interfaces** | |
| RS485: 9.6 – 115.2 kbps (Screw-type terminal) | • |
| **Protocols** | |
| Modbus RTU (Slave) | • |
| **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 | • |

| **Technical data** | |
|---|---|
| Type of measurement | Constant true RMS up to the 63rd harmonic |
| Nominal voltage, three-phase, 4-conductor (L-N, L-L) | 230 / 400 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 20 times 1 ph |
| **Measured voltage input** | |
| Overvoltage category | 300 V CAT III |
| Measured range, voltage L-N, AC (without potential transformer) | 10 ... 300 Vrms |
| Measured range, voltage L-L, AC (without potential transformer) | 18 ... 480 Vrms |
| Resolution | 0.1 V |
| Impedance | 1.3 MOhm / phase |
| Frequency measuring range | 45 ... 65 Hz |
| Sampling frequency | 20 kHz / phase |
| **Measured current input** | |
| Evaluation range of the operating current | 0 ... 600 A |
| Evaluation range of the residual current | 10 mA ... 15 A |
| Resolution | 1 mA |
| **Digital inputs and outputs** | |
| Number of digital outputs | 2 |
| Switching voltage | max. 60 V DC, 30 V AC |
| Maximum current | 350 mA |
| Switch-on resistance | 2 Ohm |
| Maximum cable length | up to 30 m unscreened, from 30 m screened |

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.

| Mechanical properties | |
|---|---|
| Weight | 270 g |
| Device dimensions in mm (H x W x D) | 90 x 105 x approx. 73 |
| Protection class per EN 60529 | IP20 |
| Assembly per IEC EN 60999-1 / DIN EN 50022 | 35-mm DIN rail |
| **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 | 3 |
| 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 |
| RFI Field Strength 30 – 1,000 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 |





Fig.: Residual current transformer for the acquisition of residual currents. Different configurations and sizes allow use in almost all applications (see chapter 06, current / voltage transformers and sensors).

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

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Ethernet

**UMG 508** Measurement of the main feed-in with event analysis

Main distribution

Modbus

**UMG 96RM-E** Operating & RCM measurement of the main feeder to the sub-distribution

Sub distribution

60 current measurements

1-20    21-40    41-60

**UMG 20CM**

20 x 1-phase measurements    20 x 1-phase measurements    20 x 1-phase measurements
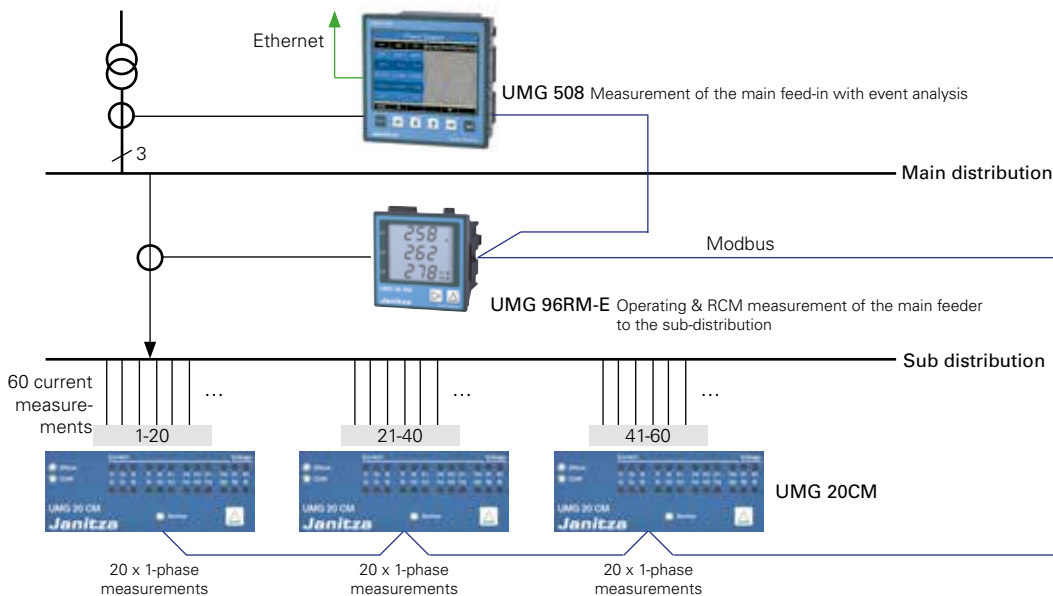
Fig.: Extremely compact solution for complete monitoring via three levels with leading-edge master-slave communication architecture

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