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Deutsche Version: siehe Vorderseite

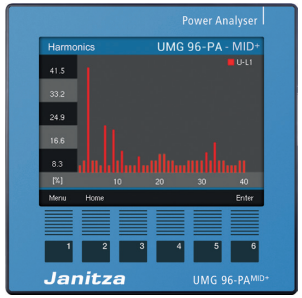
Power Analyzer

UMG 96-PA (from FW 3.50)

UMG 96-PA^{MID+} (as of FW 3.50)

Installation manual

Installation and device settings



The device fronts can deviate!

User Manual:

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Janitza®

1 General

Disclaimer
Compliance with the usage information for the devices is a prerequisite for safe operation and attaining the stated performance characteristics and product features. Janitza electronics GmbH assumes no liability for bodily injury, material damage or financial losses which result from disregard of the usage information.

Make sure that your usage information is readily available and legible.

Additional documentation can be found on our website at www.janitza.com under Support > Downloads.

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Subject to technical alterations.
- Make sure that your device matches the installation manual.
- First read and understand the documents associated with the product.
- Keep the documents associated with the product available for the entire service life and pass them on to any possible subsequent users.
- Please find out about device revisions and the associated amendments of the documentation associated with your product at www.janitza.com.

Disposal
Please abide by national regulations! Dispose of individual parts, as applicable, depending on their composition and existing country-specific regulations, for example, as
- Electronic waste
- Plastics
- Metals

or engage a certified disposal company to handle scrapping.

Relevant laws, standards and directive used
Please see the declaration of conformity on our website (www.janitza.com) for the laws, standards and directives applied for the device by Janitza electronics GmbH.

2 Safety

Safety information
The installation manual does not represent a complete set of all safety measures required for the operation of the device.
Special operating conditions can require additional measures. The installation instructions contain information which must be observed to ensure your personal safety and avoid material damage.

Symbols used on the device:

⚡	The additional symbol on the device itself indicates an electrical danger that can result in serious injuries or death.
⚠	This general warning symbol draws attention to a possible risk of injury. Be certain to observe all of the information listed under this symbol in order to avoid possible injury or even death.

Safety information in the installation manual is marked by a warning triangle and, in dependence on the degree of hazard, is displayed as follows:

⚠ DANGER
Warns of an imminent danger which, if not avoided, will result in serious or fatal injury.

⚠ WARNING
Warns of a potentially hazardous situation which, if not avoided, could result in serious injury or death.

⚠ CAUTION
Warns of an immediately hazardous situation which, if not avoided, can result in minor or moderate injury.

ATTENTION
Warns of an immediately hazardous situation which, if not avoided, can result in material or environmental damage.

INFORMATION
Indicates procedures in which there is **no** hazard of personal injury or material damage.

Safety measures
When operating electric devices, it is unavoidable for certain parts of these devices to conduct hazardous voltage. Consequently, severe bodily injury or material damage can occur if they are not handled properly:
- Before making connections to the device, ground the device by means of the ground wire connection, if present.
- Hazardous voltages can be present in all circuitry parts that are connected to the power supply.
- There can still be hazardous voltages present in the device even after it has been disconnected from the supply voltage (capacitor storage).
- Do not operate equipment with current transformer circuits when open.

⚠ WARNING
Risk of injury due to electrical voltage!
Severe bodily injury or death can result from:
· Touching bare or stripped leads that are energized.
· Device inputs that pose a hazard when touched.
Switch off your installation before commencing work! Secure it against being switched on! Check to be sure it is de-energized! Ground and short circuit! Cover or block off adjacent live parts!

- Do not exceed the limit values specified in the user manual and on the rating plate! This must also be observed during testing and commissioning!
- Take note of the safety and warning notices in the documents that belong to the device!

Qualified personnel
To avoid bodily injury and material damage, only qualified personnel with electrical training are permitted to work on the device who have knowledge of:
- the national accident prevention regulations.
- safety technology standards,
- installation, commissioning and operation of the device.

INFORMATION
During installation and when working on the **MID+** certified device**,** the person working on the device is responsible for preparing a device acceptance report or, if necessary, for adding entries! The device acceptance report contains information on current and voltage transformer types and their settings (transformer ratios, date and time specifications). The device acceptance protocol must be retained and kept available during the entire service life of the **MID+** certified devices!

Intended use
The device is:
- Intended for installation in switchboard cabinets and small distribution boards. The mounting orientation is arbitrary (Please observe step 3 "Installation").
- Not intended for installation in vehicles! Use of the device in non-stationary equipment constitutes an exceptional environmental condition and is only permissible by special agreement.
- Not intended for installation in environments with harmful oils, acids, gases, vapors, dusts, radiation, etc.
- Designed as an indoor meter.

Safe and trouble-free operation of the device presupposes proper transport, proper storage, set-up and assembly as well as operation and maintenance.

Incoming goods inspection
Exercise due caution when unpacking and packing the device, do not use force and only use suitable tools. Check the following:
- Visually inspect the devices for flawless mechanical condition.
- Check the scope of delivery (see user manual) for completeness before you begin installing the device.

If it can be assumed that safe operation is no longer possible, the device must be taken out of operation immediately and secured against unintentional start-up.

It can be assumed that safe operation is no longer possible if the device, for example:
- has visible damages,
- no longer functions despite an intact power supply,
- Was subjected to extended periods of unfavorable conditions (e.g. storage outside of the permissible climate thresholds without adjustment to the room climate, condensation, etc.) or transport stress (e.g. falling from an elevated position, even without visible external damage, etc.).

3 Brief device description

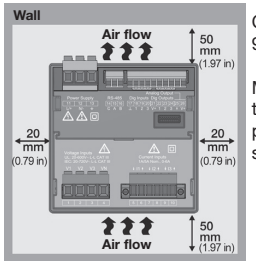
The device is a multifunctional network analyzer that:
- Measures and calculates electrical quantities such as voltage, current, frequency, power, work, harmonics current, etc. in building installations, at distribution boards, circuit breakers and busbar trunking systems.
- Displays and stores measurement results and transmits them via interfaces.

Tamper-proof meter reading cycle of the MID+ certified device.
The UMG 96-PA-MID+ records
- MID-calibrated meter readings of the energy values (active energy consumed and delivered) every 15 min. for 2 years.
- The energy values with increased accuracy, a time stamp (UTC) and checksum.
- Data sets with time instants in the GridVis® software.

INFORMATION
The certified meter reading cycle storage of the **UMG 96-PA-MID+** requires a time synchronization with the legal time according to PTB-A 50.7 (Physikalisch Technische Bundesanstalt, national metrology institute). More information on synchronization can be found in the user manual.

Mounting

Install the device in the weatherproof front panel of switchboard cabinets.



Cutout dimensions: $92^{+0.8}$ x $92^{+0.8}$ mm

Maintain the distances to neighboring components required for sufficient ventilation!

Fig. Mounting orientation Rear view UMG 96-PA

⚠ CAUTION
Material damage due to disregard of the installation instructions!
Disregard of the installation instructions can damage or destroy your device.
Provide adequate air circulation in your installation environment and cooling, as needed, when the ambient temperatures are high.

INFORMATION
More information on device functions, data and installation as well as the battery used in the device can be found in the user manual.

4 Applying the supply voltage

The level of the supply voltage for your device can be found on the rating plate. After connecting the supply voltage, the display becomes active. If no display appears, check whether the supply voltage is within the nominal voltage range.

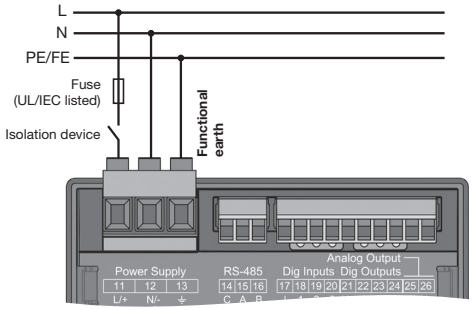


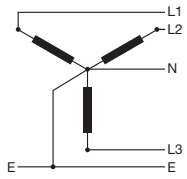
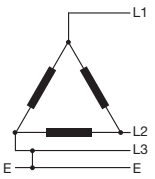
Fig. Supply voltage connection.

⚠ CAUTION
Material damage due to disregard of the connection conditions or impermissible overvoltages
Disregard of the connection instructions or exceeding the permissible voltage range can damage or destroy your device.

Before connecting the device to the supply voltage, please note:
- **Voltage and frequency must correspond to the specifications on the rating plate! Observe limit values as described in the user manual!**
- **In the building installation, secure the supply voltage with a UL/IEC listed line circuit breaker/fuse!**
- **Observe the following for the isolation device**
  - **Install it close to the device and easily accessible for the user.**
  - **Mark it for the respective device.**
- **Do not tap the supply voltage from the voltage transformers.**
- **Provide a fuse for the neutral conductor if the neutral conductor terminal of the source is not grounded!**

5 Grid systems

Suitable grid systems and maximum rated voltages (DIN EN 61010-1/A1):

	Three-phase 4-conductor systems with grounded neutral conductor	**Three-phase 3-conductor systems** with grounded phase
		
IEC	U_{L-N} / U_{L-L}: 417 V_{LN} / 720 V_{LL}	U_{L-L}: 600 V_{LL}
UL	U_{L-N} / U_{L-L}: 347 V_{LN} / 600 V_{LL}	U_{L-L}: 600 V_{LL}

The device must only be used in
- TN and TT networks
- Residential and industrial areas

6 Voltage measurement

The device has 3 voltage measurement inputs and is suitable for various connection variants.

⚠ DANGER

Risk of injury or damage to the device.
You can injure yourself or damage the device by not observing the connection conditions for the voltage measurement inputs. Therefore please abide by the following:

- **Concerning the voltage measurement inputs:**
  - **Do not apply DC voltage to them.**
  - **Equip them with a suitable fuse and isolation device appropriately marked and located nearby (alternatively: line circuit breaker).**
  - **The voltage measurement inputs are dangerous to touch.**
- **Connect voltages that exceed the permissible nominal network voltages via a voltage transformer.**
- **Measured voltages and currents must originate from the same network.**

ⓘ *INFORMATION*

As an alternative to the fuse and isolation device, you can use a line circuit breaker.

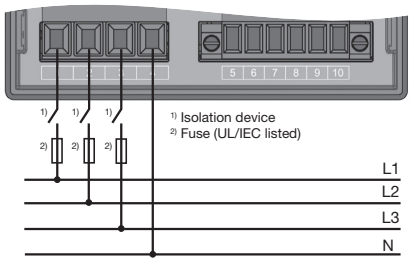
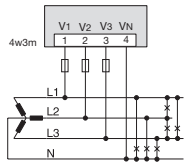
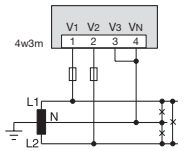
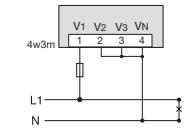
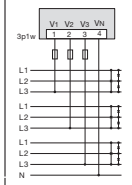
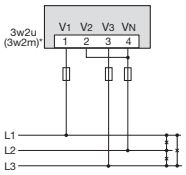
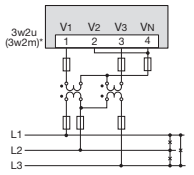


Fig. Connection variant "Measuring voltage directly in a three-phase 4-wire system"

The voltage measurement inputs are designed for measurements in low-voltage networks in which there are nominal voltages of up to 417 V phase to ground and 720 V phase to phase in the 4-wire system.
The rated and surge voltages correspond to the overvoltage category (see Technical Data).

7 Connection variants for voltage measurement

Three-phase 4-conductor system	Single-phase 3-conductor system	Single-phase 2-conductor system	Three-phase 3-conductor systems (UMG 96-PA only)
			 Per system, the power and energy of a phase are multiplied by 3. One of the neutral conductors must be connected.
Voltage measurement in three-phase 4-conductor system	Voltage measurement in a single-phase 3-conductor system	Voltage measurement in a single-phase 2-conductor system	Only with balanced load!

Three-phase 3-conductor system	
	
Three-phase 3-conductor system (asymmetrical load).	Three-phase 3-conductor system with voltage transformer.

* Setting 3w2u or 3w2m depending on the connection of the current measurement (step 9).

UMG 96-PA-MID+ in combination with voltage transformers:
Use calibrated/ permissible voltage transformers for MID-compliant measurement (secondary: 3 x 57.7/100 V - 3 x 289/500 V)!

The selected connection variant (e.g. "4w3m") must be set in the device, see step **18.**

8 Current measurements I1, I2, I3

The device:

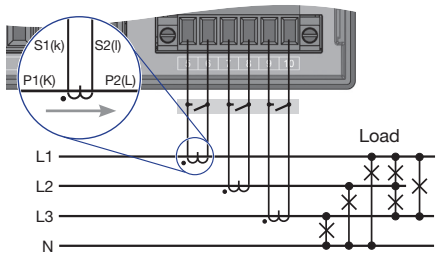
- Is only approved for current measurement via current transformers.
- Is designed for the connection of current transformers with secondary currents of ../1 A and ../5 A (preset current transformer ratio, 5/5 A).
- Does not measure DC currents.

The current transformers must have basic insulation according to IEC 61010-1:2010 for the nominal voltage of the circuit.

⚠ WARNING

Risk of injury due to electrical voltage!
Severe bodily injury or death can result from:
· Touching bare or stripped leads that are energized.
· Device inputs that pose a hazard when touched.
Disconnect your system from the power supply before starting work! Secure it against being switched on! Check to be sure it is de-energized! Ground and short circuit! Cover or block off adjacent live parts! Ground the system! Use the ground connection points with the ground symbol to do so!

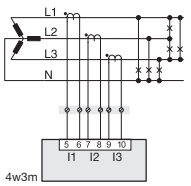
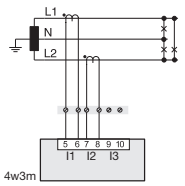
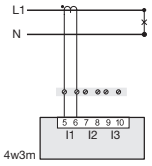
Connection "Current measurement via current transformer"

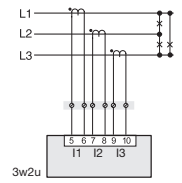
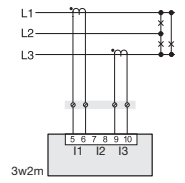
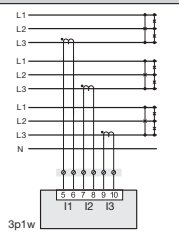


⚠ WARNING

Of electrical currents and voltages!
Current transformers operated while exposed on the secondary side (high voltage peaks) can result in severe bodily injury or death.
Avoid exposed operation of current transformers and short circuit unloaded transformers!

9 Connection variants for current measurement

Three-phase 4-conductor system	Single-phase 3-conductor system	Single-phase 2-conductor system
		
Current measurement via current transformer in a three-phase 4-conductor system	Current measurement in a single-phase 3-conductor system	Current measurement in a single-phase 2-conductor system

Three-phase 3-conductor system		Three-phase 3-conductor systems with symmetrical load (UMG 96-PA only)
		 The device multiplies the power and energy of one phase by a factor of 3 to determine the total values of the system. Only use if the load in each system is symmetrical at all times!
Current measurement via current transformer in a three-phase 3-conductor system	Current measurement via 2 current transformers (Aron circuit) in a three-phase 3-conductor system	Current measurement in up to 3 symmetrically loaded systems

UMG 96-PA-MID+: Use calibrated current transformers for MID-compliant measurement!

10 MID compliant mounting of the MID+ certified device

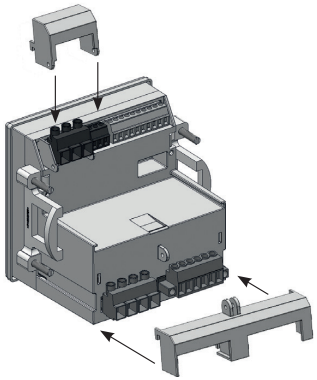


Fig. Installing the covers on the UMG 96-PA-MID+

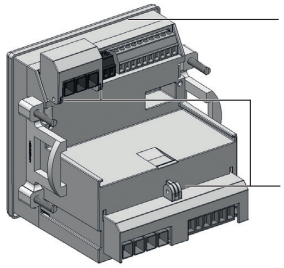


Fig. Rear view of the UMG 96-PA-MID+ with terminal covers, lead seal mechanisms and the mechanism for the silicone seal.

INFORMATION

UMG 96-PA-MID+:
For a tamper-proof installation (MID-compliant), install
- Your device with the supplied silicone seal between the device and the installation opening in the protected switchboard cabinet.
- After installing your device, use the supplied terminal covers and seal them with lead seals on the fixtures.

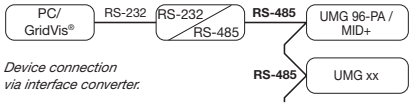
INFORMATION

UMG 96-PA-MID+:
- Use calibrated transformers when the device is to be used for billing purposes.
- Further information on MID devices can be found in the user manual.

11 Establish the connection to the PC

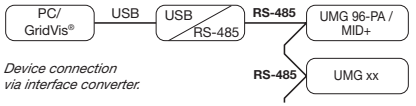
The most common connections for communication between the PC and the device:

1.



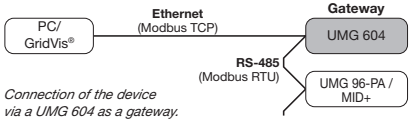
Device connection via interface converter.

2.



Device connection via interface converter.

3.



Connection of the device via a UMG 604 as a gateway.

The gateway functions as the master (client) of the RS-485 bus for the connected slaves (servers). The UMG 96-PA with Ethernet module can also be used as gateway. Information on the **Expansion module with Ethernet interface** can be found in the usage information on the module.

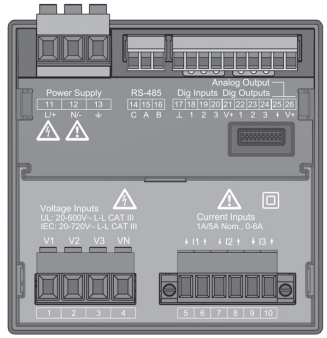


Fig. Back of UMG 96-PA

⚠ CAUTION

Material damage due to incorrect network settings.
Incorrect network settings can cause faults in the IT network!
Consult your network administrator for the correct network settings for your device.

12 Example: PC connection via the RS-485 interface and UMG 604 as the gateway

The PC connection of the device via the RS-485 serial interface, for example, to a UMG 604 as the gateway (see step **11, 3**), is a method for configuring the device(s) and reading out data.

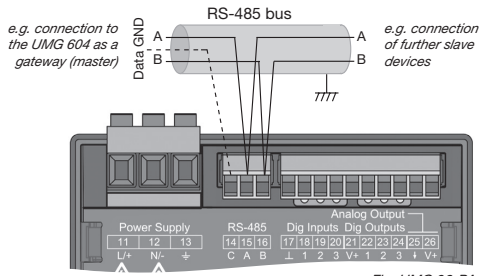
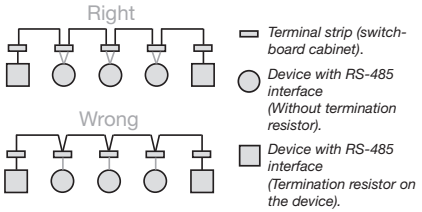


Fig. UMG 96-PA

RS485 bus structure
- In a RS485 bus structure (line), all devices are connected according to the master-slave principle.
- Place the gateway (master device) at the beginning or end of the bus structure.
- A segment of an RS485 bus structure can contain up to 32 nodes/devices.
- At the beginning and end of a segment, terminate the cable with termination resistors (120 Ω, 0.25 W). The device does not contain a termination resistor.
- Use repeaters to connect segments if there are more than 32 nodes.
- For more information, e.g. cable type, refer to the user manual.



INFORMATION

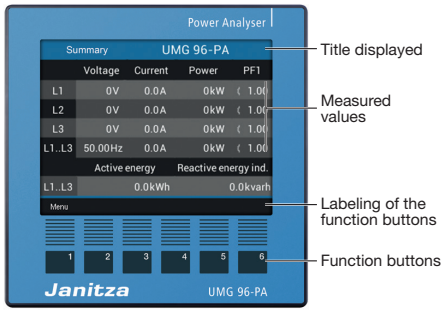
In the RS485 bus structure, use the corresponding menu items to assign the following to the slave devices
- Different device addresses.
- Device addresses that are different than the master device.
- The same transmission rate (baud rate).
- The same data framework.

13 Operation and button functions

The device is operated via 6 function buttons for
- Selecting measuring displays.
- Navigation within the menus.
- Editing device settings.

Button	Function
1	• *Display Menu* • *Exit* Menu • Cancel action (*ESC*)
2	• Go to the start screen (*Summary*). • Select position (to the left “ ◀ ”). • Configuration of a measuring display as the start screen (press until message appears).
3	• Select menu item or position (down “ ▼ ”). • Change (selection, number -1).
4	• Select menu item or position (up “ ▲ ”). • Change (selection, number +1).
5	• Select position (to the right “ ▶ ”).
6	• Confirm selection (*Enter*).

Fig. Standard display, UMG 96-PA / MID+ - Measuring display "Summary"



After a power recovery, the device starts with the measuring display *Summary* (default setting). Pressing function button 1 takes you to the menu selection (see the user manual for a description).

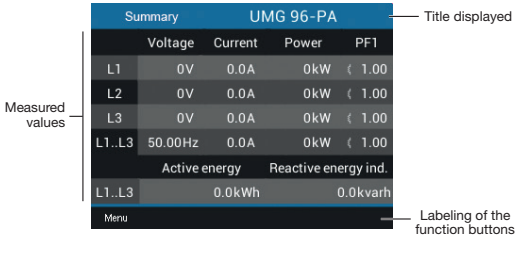
INFORMATION

More information on the operation, display and button functions of your device can be found in the user manual.

14 Standard display, UMG 96-PA

After restoration of network power, the UMG 96-PA starts with the measuring display *Summary*.

Fig. Measuring display "Summary" (UMG 96-PA)

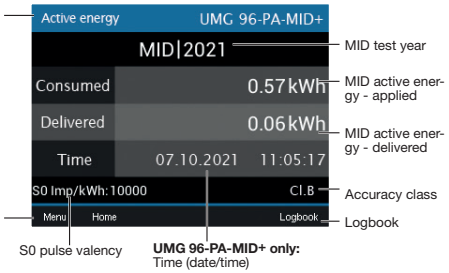


Pressing function button 1 (see step **13**) takes you to the menu selection (see the user manual for a description).

Standard display, UMG 96-PA-MID+

After a mains recovery, the UMG 96-PA-MID+ starts with the measuring display *Active energy* (standard display). The measuring display *Active energy* shows the measured values relevant for calibration!

Fig. Measuring display for "Active energy" (UMG 96-PA-MID+)



Pressing function button 1 takes you to the advanced menu selection (see the user manual for a description). After 1.5 minutes without input, the *Active energy* measuring display appears.

INFORMATION

The **UMG 96-PA-MID**+ has software-controlled tariffs, which are **not MID conform**.

15 Configuring the password

The meter has the option to lock the meter configuration with a password. After a password is configured, the meter prompts for a password each time the meter configuration is changed.

Configuration range:	1-99999	=	with password
	00000	=	no password (factory setting **UMG 96-PA**)

1. Press button 1 to open the Menu.
2. Use buttons 3 (▼) and 4 (▲) to select the menu item *Configuration* and confirm with button 6 *Enter*.
3. The *Configuration* window appears.
4. In the *Configuration* window, use buttons 3 (▼) and 4 (▲) to select the item *System* and confirm with button 6, *Enter*.
5. The *System* window appears.
6. Use buttons 3 (▼) and 4 (▲) in the *System* window to select the item *Password* and confirm with button 6 *Enter*.
7. The digits of the item *Password* are displayed in yellow (yellow = editing mode).
8. Use buttons 2 and 5 to select the digit to be set. Use buttons 3 (▼) and 4 (▲) to change the digit (-1 / +1).
9. Confirm your entries with button 6 *Enter* or end the action by pressing button 1 *Esc*.
10. To return to the start screen, press button 1 twice *Esc* and then press button 2 *Home*.

16 UMG 96-PA password

Ex works, the **UMG 96-PA** has the **Password00000** (no password).

- The measurement device locks the device configuration for 10 min. if the password is entered incorrectly 5 times.
- Write down your password and keep it safe!
- Without the password you cannot configure your device! Notify the device manufacturer's Support if the password is lost!

UMG 96-PA-MID+ password

UMG 96-PA-MID+ has the **Password 10000** as the factory setting.

- The password protection **cannot** be deactivated for this device.
- The measurement device locks the device configuration for 10 min. if the password is entered incorrectly 5 times.
- Write down your password and keep it safe!
- Without the password you cannot configure your device! Notify the device manufacturer's Support if the password is lost!

The logbook:

· Only appears in the UMG 96-PA-MID+ (see step **14**).
· Records **password changes**, **changes of the current and voltage transformer ratios** (CT and VT) and **changes to the connection variants (grid systems)**. For more information, see the user manual.
· Records a maximum of 64 changes with the recording of the respective meter reading.
· After 64 entries in the logbook, the device locks the configuration of passwords and transformer ratios. Contact the device manufacturer's Support.

17 Configuring the RS-485 connection

If the device is in the *Summary* measuring display, proceed as follows to configure an RS485 connection:

1. Press button 1 to open the Menu.
2. Use buttons 3 (▼) and 4 (▲) to select the menu item *Configuration* and confirm with button 6 *Enter*.
3. **If the device is password protected, enter the password at this point (see step 15).**
4. The *Configuration* window appears.
5. Use buttons 3 (▼) and 4 (▲) to select the item *Communication* and confirm with button 6 *Enter*.
6. The *Communication* window appears (see Fig.).
7. In the *Communication* window, configure the entries for the *Fieldbus* (RS-485 connection), such as ***Device address***, ***Baud rate*** and ***Data frame*** by selecting the respective entry and confirming with button 6, *Enter*.
8. Use buttons 3 (▼) and 4 (▲) to change the setting of the selected entry.
9. Confirm your entries with button 6 *Enter* or end the action by pressing button 1 *Esc*.
10. To return to the start screen, press button 1 twice *Esc* and then press button 2 *Home*.

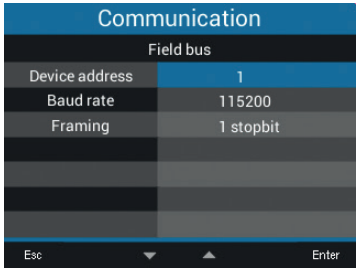


Fig. "Communication" window with the entries for configuring the RS-485 connection.

INFORMATION

Alternatively, all settings can be made conveniently in the device configuration of the GridVis® software!

18 Setting the connection variant

To calculate power and energy values, you must set the installed connection variant in the device (see steps **7** and **9**).

1. Press button 1 to open the Menu.
2. Use buttons 3 (▼) and 4 (▲) to select the menu item *Configuration* and confirm with button 6 *Enter*.
3. **If the device is password protected, enter the password at this point (see step 15).**
4. The *Configuration* window appears.
5. Use buttons 3 (▼) and 4 (▲) to select the item *Measurement* and confirm with button 6 *Enter*.
6. The *Measurement* window appears.

7. Select the item *Connection variant* and confirm with button 6 *Enter*.
8. Use buttons 3 (▼) and 4 (▲) to select the connection variant.
9. Confirm your selection by pressing button 6 *Enter*.

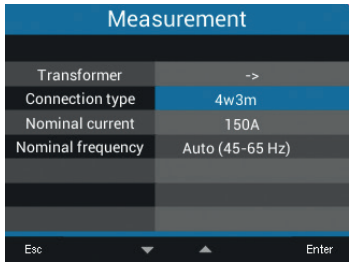


Fig. "Measurement" window with the configuration of the connection variant.

10. To set the transformers in the next step, press button 4 (▲).

Optional: To return to the start screen, press button 1 three times *Esc* and then press button 2 *Home*.

ⓘ INFORMATION

More information on the settings can be found in the user manual.

19 Configure current / voltage transformer

For correct measurement results, you must adjust the transformer ratios to the current and voltage transformers used.

1. Press button 1 to open the Menu.
2. Use buttons 3 (▼) and 4 (▲) to select the menu item *Configuration* and confirm with button 6 *Enter*.
3. **If the device is password protected, enter the password at this point (see step 15).**
4. The *Configuration* window appears.
5. Use buttons 3 (▼) and 4 (▲) to select the item *Measurement* and confirm with button 6 *Enter*.
6. The *Measurement* window appears.

7. In the *Measurement* window, select the item *Transformers* and confirm with button 6 *Enter*.
8. The configuration window appears with the transformer ratios for current and voltage transformers (see Fig.).

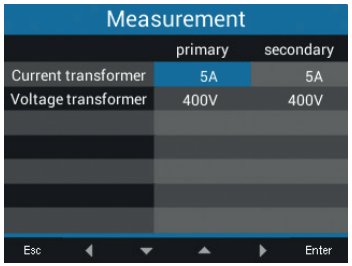


Fig. "Measurement" window with the configuration of the current and voltage transformers.

9. Use buttons 2 to 5 to select an entry for current or voltage transformer (primary or secondary side).
10. Confirm your selection with button 6 *Enter.*
11. Use buttons 2 and 5 to select the digit to be set. Use buttons 3 (▼) and 4 (▲) to change the digit (-1 / +1).
12. Confirm the entered value with button 6 (*Enter*).
13. To return to the start screen, press button 1 three times *Esc* and then press button 2 *Home*.

ⓘ INFORMATION

You can also configure current and voltage transformer ratios in the device configuration of the Software GridVis®!

Refer to the user manual for details on transformer ratios and their settings.

ⓘ INFORMATION

Important for the MID+ certified device:
Create, check and/or complete entries of the transformer configurations in the device acceptance report!

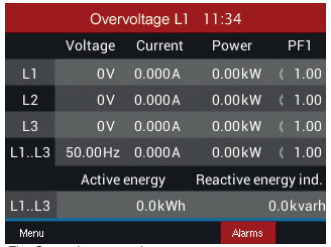


Fig. Overvoltage warning

If the **measuring range is exceeded**, the device display shows the warning message *Overvoltage* or *Overcurrent* with an indication of the phase (further information in the user manual).

Use button 5, *Alarms,* to acknowledge the warning message.

20 Technical data

General	
Net weight (with attached plug-in connectors)	approx. 250 g (0.55 lbs)
Package weight (incl. accessories)	approx. 500 g (1.1 lbs)
Battery	Type Lithium CR2032, 3 V (UL 1642 approved)
Data memory	8 MB
Backlight service life	40000 h (after 40000 h the backlight goes down to approx. 50%)
Impact resistance	IK07 according to IEC 62262

Transport and storage The following specifications apply for devices transported and stored in the original packaging.	
Free fall	1 m (39.37 in)
Temperature	-25 °C (-13 °F) to +70 °C (158 °F)
Relative air humidity (non-condensing)	0 to 90% RH

Environmental conditions during operation	
Install the device in a weather-protected and stationary location. Protection class II according to IEC 60536 (VDE 0106, Part 1).	
Rated temperature range	-10 °C (14 °F) to +55 °C (131 °F)
Relative air humidity (non-condensing)	0 to 75% RH
Operating elevation	0-2000 m (6562 ft) above sea level
Pollution degree	2
Mounting orientation	As desired
Ventilation	No forced ventilation required.
Protection against foreign matter and water - Front - Rear - Front with seal	 IP40 according to EN60529 IP20 according to EN60529 IP54 according to EN60529

Supply voltage	
Nominal range	**Option 230 V**: AC 90 V - 277 V (50/60 Hz) or DC 90 V - 250 V, 300 V CATIII **Option 24 V***: AC 24 V - 90 V (50/60 Hz) or DC 24 V - 90 V, 150 V CATIII
Operating range	+-10% of nominal range
Power consumption	**Option 230 V**: max. 4.5 VA / 2 W **Option 24 V***: max. 4.5 VA / 2 W
Internal fuse, not replaceable	Type T1A / 250 VDC / 277 VAC according to IEC 60127
Recommended overcurrent protective device for line protection	**Option 230 V**: 6 - 16 A **Option 24 V***: 1 - 6 A (Char. B) (IEC/UL approval)

* The 24 V option only applies to the UMG 96-PA!

Current measurement	
Nominal current	5 A
Measuring range	0.005 - 6 A $_{rms}$
Crest factor (relative to nominal current)	2 (referenced to 6 A $_{rms}$)
Overload for 1 s	60 A (sinusoidal)
Resolution	0.1 mA (display 0.001 A)
Overvoltage category	300 V CAT II
Rated surge voltage	2.5 kV
Power consumption	approx. 0.2 VA (Ri=5 mΩ)
Sampling frequency	8.13 kHz
Fourier analysis	1st - 40th Harmonics

Voltage measurement	
Three-phase 4-conductor systems with rated voltages up to	417 V / 720 V (+-10%) according to IEC 347 V / 600 V (+-10%) according to UL
Three-phase 3-conductor systems with rated voltages up to	600 V (+10%)
Single-phase 2-conductor systems with rated voltages up to	480 V (+-10%)
Overvoltage category	600 V CAT III, 300 V CAT IV
Rated surge voltage	6 kV
Protection of the voltage measurement	1 - 10 A Tripping characteristic B (with IEC/UL approval)
Measuring range L-N	0[1)] - 600 Vrms (max. overvoltage 800 Vrms)
Measuring range L-L	0[1)] - 1040 Vrms (max. overvoltage 1350 Vrms)
Resolution	0.01 V
Crest factor	2.45 (referred to measuring range)
Impedance	3 MΩ/phase
Power consumption	approx. 0.1 VA
Sampling frequency	8.13 kHz
Frequency of fundamental oscillation - Resolution	45 Hz - 65 Hz 0.01 Hz
Fourier analysis	1st - 40th Harmonics

1) ... The device only determines measured values if a voltage L1-N of greater than 20 Veff (4-conductor measurement) or a voltage L1-L2 of greater than 34 Veff (3-conductor measurement) is applied to voltage measurement input V1.

Technical data for the MID+ certified device	
Voltage range	3 x 57.7 / 100 V - 3 x 289 / 500 V
Current range	0.002 - 6 A
Frequency range	45 - 65 Hz
Reference frequency	50 Hz
Accuracy class	B
Pulse valency S0 (pulse constant)	10000 pulses/kWh [1)]
Electromagnetic compatibility	E2
Mechanical compatibility	M1
Suitable grid systems	1p2w, 3p3w, 3p4w

1) The pulse valency S0 is automatically adapted to the voltage transformer ratio that has been set. The momentary pulse valency S0 appears in the *Active energy* measuring display (see step **14**).

Serial interface	
RS-485 - Modbus RTU/Slave	9.6 kbps, 19.2 kbps, 38.4 kbps, 57.6 kbps, 115.2 kbps

Digital outputs 3 digital outputs, solid state relays, not short-circuit proof.	
Switching voltage	max. 33 V AC, 40 V DC
Switching current	max. 50 mAeff AC/DC
Response time	approx. 200 ms
Digital output (energy pulses)	max. 50 Hz

UMG 96-PA-MID+:
The measured value "Active energy" (consumed/delivered) is assigned to digital output 1 (terminal 21/22).

Digital inputs 3 digital inputs, solid state relays, not short-circuit proof.	
Maximum counter frequency	20 Hz
Input signal applied	18 V - 28 V DC (typical 4 mA)
Input signal not applied	0 - 5 V DC, current less than 0.5 mA

Cable length (digital inputs/outputs)	
Up to 30 m (32.81 yd)	Unshielded
Greater than 30 m (32.81 yd)	Shielded

Analog outputs	
External power supply	max. 33 V
Current	0 - 20 mA
Update time	1 sec
Load	max. 300 Ω
Resolution	10 bit

Connection capacity of the terminals (supply voltage) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.2 - 4 mm², AWG 28-12
Wire ferrules (non-insulated)	0.2 - 2.5 mm², AWG 26-14
Wire ferrules (insulated)	0.2 - 2.5 mm², AWG 26-14
Tightening torque	0.4 - 0.5 Nm (3.54 - 4.43 lbf in)
Strip length	7 mm (0.2756 in)

Connection capacity of the terminals (digital inputs/outputs, analog output) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm², AWG 28-16
Wire ferrules (non-insulated)	0.2 - 1.5 mm², AWG 26-16
Wire ferrules (insulated)	0.2 - 1.5 mm², AWG 26-16
Tightening torque	0.2 - 0.25 Nm (1.77 - 2.21 lbf in)
Strip length	7 mm (0.2756 in)

Connection capacity of the terminals (serial interface) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.2 - 1.5 mm², AWG 28-16
Wire ferrules (non-insulated)	0.2 - 1.5 mm², AWG 26-16
Wire ferrules (insulated)	0.2 - 1.5 mm², AWG 26-16
Tightening torque	0.2 - 0.25 Nm (1.77 - 2.21 lbf in)
Strip length	7 mm (0.2756 in)

Connection capacity of the terminals (current measurement) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.2 - 4 mm², AWG 28-12
Wire ferrules (non-insulated)	0.2 - 2.5 mm², AWG 26-14
Wire ferrules (insulated)	0.2 - 2.5 mm², AWG 26-14
Tightening torque	0.4 - 0.5 Nm (3.54 - 4.43 lbf in)
Strip length	7 mm (0.2756 in)

Connection capacity of the terminals (voltage measurement) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.2 - 4 mm², AWG 28-12
Wire ferrules (non-insulated)	0.2 - 2.5 mm², AWG 26-14
Wire ferrules (insulated)	0.2 - 2.5 mm², AWG 26-14
Tightening torque	0.4 - 0.5 Nm (3.54 - 4.43 lbf in)
Strip length	7 mm (0.2756 in)

21

Procedure in the event of a malfunction

Failure mode	Cause	Remedy
No display	External fuse for the supply voltage has tripped.	Replace fuse.
No current display.	No measured voltage connected.	Connect measured voltage.
	No measured current connected.	Connect measured current.
Displayed current is too great or too small.	Current measurement on the wrong phase.	Check connection and correct if necessary.
	Current transformer factor incorrectly programmed.	Read and program the current transformer ratio on the current transformer.
	Current harmonic exceeds current peak value at measuring input.	Install current transformers with a higher current transformer ratio.
	The current at the measuring input is too low.	Install current transformers with a lower current transformer ratio.
Displayed voltage is too high or too low.	Measurement on the wrong phase.	Check connection and correct if necessary.
	Voltage transformer programmed incorrectly.	Read the voltage transformer ratio on the voltage transformer and program.
Displayed voltage is too low.	Overrange.	Use a voltage transformer.
	The voltage peak value at the measuring input was exceeded due to harmonics current.	**Attention!** Make sure that the measuring inputs are not overloaded.
Password or transformer ratio changes are not possible.	Logbook lock after 64 entries.	Notify the manufacturer's support!
Despite the above measures, the device does not function.	Device defective.	Send the device and error description to the manufacturer for inspection.

INFORMATION

Use **MID+ certified devices** in accordance with national specifications. The period of validity of the calibration depends on the applicable national law. In Germany, this is 8 years, after which it can be extended by a state-approved inspection body.

INFORMATION

Due to legal regulations, a firmware update for **MID+ certified devices** is restricted to the non-MID relevant area!

Janitza®