Power Analyser

UMG 508

Operating manual and technical data
General

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Disclaimer
The manufacturer does not accept any liability for errors or deficits in this handbook and is not obliged to keep the contents of this handbook updated.
Meaning of Symbols
The following pictograms are used in this handbook:

**Gefährliche Spannung!**
Danger of death or risk of major injury. Disconnect the system and device before beginning any work.

**Caution!**
Please pay attention to the documentation. This symbol should warn against possible dangers that can occur during assembly, initialization and use.

**Protective ground connection.**

**Inductive.**
The voltage lags the current

**Capacitive.**
The voltage lags the current.

**Note.**
Application Information

Please read this operating manual and all other publications that have to be consulted to work with this product (particularly for installation, operation or maintenance).

Please pay attention to all safety regulations and warning information. If you fail to follow the information, it can result in personal damage and/or damages to the product.

Any unauthorized change or use of this device beyond the specified mechanical, electrical or other operating limits can cause personal damage and/or damage to the product.

Any such unauthorized change represents "misuse" and/or "negligence" in the sense of guarantee for the product and therefore makes the guarantee covering possible consequential damages void.

This device is to be exclusively operated and maintained by a specialist.

Specialists are persons who, due to their relevant training and experience, are capable of recognizing risks and avoiding possible hazards that can be caused when operating or servicing the device.

When using the device, the necessary legal and safety regulations should be considered additionally for the respective application case.

Caution!
If the device is not operated according to the operating manual, protection is no longer ensured and the device may cause dangers.

Cables with single wires must be provided with ferrules.

Only screw plugs with the same pole number and the same type of construction can be plugged together.
**Goods-in Check**

Correct and safe operation of this device is subject to appropriate transportation, correct warehousing, installation and assembly as well as careful operation and maintenance. If it can be assumed that safe operation without any danger is no longer possible, the device must be taken out of operation immediately and secured against unintentional initialization.

Unpacking and packing must take place, with the usual care without applying force and using suitable tools. The devices must be checked for perfect condition with visual tests.

It should be assumed that risk-free operation is not possible if, for example:

- There is visible damage,
- It no longer works due despite the main supply being intact,
- Has been subject to unfavorable conditions (e.g. storage outside of the authorized climate limits without adaptation to the room climate, thawing etc.) over a longer period of time or transport stresses (e.g. a fall from a height, including without any visible external damage etc).
- Please check the delivered items for completeness before starting with the installation of the device.

All screw clamps that belong to the scope of supply are attached to the device.

The installation and initialization instructions also describe options that do not belong to the scope of supply.

All supplied options and design versions are described on the delivery note.
Scope of Supply

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Art.no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>52 21 xxx 1)</td>
<td>UMG508</td>
</tr>
<tr>
<td>1</td>
<td>33 03 121</td>
<td>operating manual</td>
</tr>
<tr>
<td>1</td>
<td>51 00 116</td>
<td>CD with the following contents:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- &quot;GridVis&quot; programming software,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- DEscription of functions, GridVis, UMG508,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- UMG508, GSD file &quot;U5080C2C.GSD&quot; for Profibus DP V0</td>
</tr>
<tr>
<td>1</td>
<td>10 01 601</td>
<td>screw clamp, pluggable, 2-pole (auxiliary power)</td>
</tr>
<tr>
<td>1</td>
<td>10 01 653</td>
<td>screw clamp, pluggable, 5-pole (voltage measurement 1-4)</td>
</tr>
<tr>
<td>1</td>
<td>10 01 674</td>
<td>screw clamp, pluggable, 8-pole (current measurement 1-4)</td>
</tr>
<tr>
<td>1</td>
<td>10 01 952</td>
<td>screw clamp, pluggable, 6-pole (digital outputs)</td>
</tr>
<tr>
<td>2</td>
<td>10 01 769</td>
<td>screw clamp, pluggable, 5-pole (digital inputs)</td>
</tr>
<tr>
<td>1</td>
<td>08 01 505</td>
<td>2m patch cable, twisted, gray (connection UMG508-PC/Switch/Hub)</td>
</tr>
<tr>
<td>1</td>
<td>52 19 301</td>
<td>fixing clips</td>
</tr>
<tr>
<td>1</td>
<td>52 00 008</td>
<td>RS485, external terminating resistor, 120 ohm</td>
</tr>
</tbody>
</table>

1) Refer to delivery note for article number.

Available accessories

<table>
<thead>
<tr>
<th>Art.no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 10 539</td>
<td>Profibus plug, 9-pole DSUB, with integrated switchable terminating resistors.</td>
</tr>
<tr>
<td>29 01 903</td>
<td>seal, 144x144.</td>
</tr>
</tbody>
</table>
Description

Intended Use

The UMG508 is intended for measurements in the building installation, on distributors, power switches and bus bars. Measurement voltages and measurement currents must come from the same network.

The UMG508 is suitable for installation in switch boards with a fixed, weather-protected extrada-
ta.

The UMG508 can be used in 2, 3 and 4 supply networks and in TN and TT networks.

The current measurement inputs of the UMG508 are connected using external ../1A or ../5A cur-
rent transformers.

The measurement in medium and high-voltage networks generally takes place using current and voltage transformers. The UMG508 can be used in residential and in-
dustrial areas.

Measurement results can be displayed, saved and read-out using serial interfaces for further processing.
Features

- Front board installation, 144x144mm,
- Working temperature range -10°C .. +55°C,
- Colour graphic display 320x240, 256 colours, 6 keys,
- 8 digital inputs, 5 digital outputs,
- 16Bit A/transformer, data memory 256MByte Flash, SDRAM 32Mbyte,
- Continuous scanning of voltage and current measurement inputs with 20kHz,
- Frequency range of fundamental oscillation 40Hz .. 70Hz
- 4 voltage measurement inputs, 4 current measurement inputs,
- Measurement in TN and TT networks,
- RS485: Profibus DP/V0, Modbus RTU, Modbus-Master, BACnet (Option)
- Ethernet: Web-Server, EMAIL, BACnet (Option), TCP/IP, EMAIL (SMTP), DHCP-Client (BootP), Modbus/TCP, Modbus RTU over Ethernet, FTP, ICMP (Ping), NTP, TFTP. BACnet (Option), SNMP.
- Detection of transients >50µs and storage with up to 16000 scanning points,
- Detection of more than 800 measurement values,
- Measurement of harmonics 1 to 40, for
  - Uln, I, P (ref/supply) and
  - Q (ind/cap),
- Programming own applications in Jasic.
Measurement Method
The UMG508 measures without any gaps and calculates all effective values over a 200ms interval.
The UMG508 measures the real effective value (TRMS) of the voltages and currents applied to the measurement inputs.

Operating Concept
You can program the UMG508 in several ways and call up measurement values.
• **Direct**- on the device using 6 keys and the display.
• Using the programming software **GridVis**.
• Using the UMG508 **homepage** for devices with an Ethernet interface.
• Using the RS485 with the **Modbus**-protocol. You can change and call up data with the help of the Modbus address list (stored on the enclosed data carrier).

Only operating the UMG508 using the integrated display and the 6 keys is described in this operating manual.
The GridVis programming software and the homepage have their own "online assistance".
GridVis network analysis software

The UMG508 can be programmed and read-out with the GridVis network analysis software included in the scope of supply. A PC must be connected using a serial interface (RS485/Ethernet) to the UMG508.

GridVis features

- Programming the UMG508.
- Configuration of recordings.
- Recordings read-out.
- Saving data in a database.
- Graphic presentation of measurement values.
- Programming specific applications for the client.

*Illu. Connection of a UMG508 to a PC using an interface converter.*

*Illu. Connection of a UMG508 to a PC using Ethernet.*
Assembly

Place of Installation
The UMG508 is suitable for installation in fixed, weather protected switch boards. Conducting switch boards have to be grounded.

Installation extradata
In order to achieve sufficient ventilation, the UMG508 has to be installed vertically. The clearance has to be at least 50mm at the top and bottom and 20mm at the side.

Front Board Cutout
Cutout size: $138^{+0.8} \times 138^{+0.8}$ mm

Failure to maintain the minimum clearances can destroy the UMG508 at high environmental temperatures!
Ethernet Connection
The UMG508’s Ethernet connection is located on the underside of the housing. Depending on the bending radius of the Ethernet cable and plug type, you must provide a connection area beneath the UMG508.

The connection area beneath the UMG508 should not be less than 50 mm.

Fixing
The UMG508 is fixed into the switch board with two fixing clips that are each mounted on the device at the top and bottom.
Installation

Protective Wire Connection
Use a ring cable lug for connecting the protective wire to the UMG508.

Supply Voltage
A supply voltage is required to operate the UMG508. The type and level of the necessary supply voltage is noted on the label.

Before applying the supply voltage, make sure that the voltage and the frequency match the details on the label!

The connection cables for the supply voltage must be connected using a fuse. Use a UL/IEC listed fuse (6A type C).

Warning - danger of death!
It is necessary for the protective wire connection on the device to be connected with the system grounding.

Illu. Connection example; connection of supply voltage to a UMG508.
- An isolator or circuit breaker must be provided for the voltage supply in building installation.
- The isolator must be attached near to the device and must be easy for the user to access.
- The switch must be marked as a separator for this device.
- Voltages above the authorized voltage range can destroy the device.
Voltage Measurement

Three-phase 4 conductor systems

The UMG508 can be used in three-phase 4 conductor systems (TN, TT network) with a grounded neutral wire. The bodies of the electrical system are grounded.

Three-phase 3 conductor systems

The UMG508 is only suitable for use in IT networks with restrictions, because the measurement voltage is measured against the housing potential and the input impedance of the device causes a leakage current against ground. The leakage current can cause isolation monitoring in IT networks to respond. Connection variations with a voltage transformer are suitable for IT networks without any restrictions.


*Illu. Basic circuit diagram, UMG508 in the IT network without N.*
Nominal Voltages
Lists of the networks and their nominal network voltages in which the UMG508 can be used.

Three-phase 4 conductor systems with grounded neutral wire.

|----------------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

Maximum nominal voltage of the network according to UL

Illu. Table of suitable network nominal voltages for the voltage measurement inputs according to EN60664-1:2003.

Ungrounded three-phase 3 conductor systems.

|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

Maximum nominal voltage of the network

Illu. Table of suitable network nominal voltages for the voltage measurement inputs according to EN60664-1:2003.
Voltage Measurement Inputs
The UMG508 has 4 voltage measurement inputs (V1, V2, V3, V4).

Overvoltage
The voltage measurement inputs are suitable for measurements in networks in which overvoltages in the overvoltage category 600V CATIII can occur.

Frequency
The UMG508 requires the rated frequency for measuring and calculating measurement values. The UMG508 is suitable for measurements in networks with a rated frequency in the range of 40Hz to 70Hz.

A connection diagram does not have to be configured for the measurement inputs V4 and I4.
The following has to be considered when connecting the voltage measurement:

- A suitable separator is to be provided in order to disconnect the UMG508 from the current and voltage.

- The separator must be placed near to the UMG508, labelled for the user and must be easy to reach.

- Use UL/IEC authorized overcurrent protection and isolators (10A type C) only.

- The overcurrent protection device must have a nominal value calculated for the short-circuit current at the connection point.

- Measurement voltages and measurement currents must come from the same network.

**Warning!**
Voltsages that exceed the authorized network nominal voltages must be connected using a voltage converter.

**Warning!**
The UMG508 is not suitable for measuring DC voltages.

**Warning!**
The voltage measurement inputs on the UMG508 are dangerous to touch!

**Warning!**
The voltage measurement inputs may not be used for voltage measurement in SELV circuits (Safety Extra Low Voltage).
Connection diagrams, voltage measurement
Connection diagrams, current measurement

- **3p 4w**: 
  - L1
  - L2
  - L3
  - N
  - I1 I2 I3 I4

- **3p 2i**: 
  - L1
  - L2
  - L3
  - N
  - I1 I2 I3 I4

- **3p 2i0**: 
  - L1
  - L2
  - L3
  - N
  - I1 I2 I3 I4

- **1p 2i**: 
  - L1
  - L2
  - N
  - I1 I2 I3 I4
Current measurement

The UMG508 is designed for connecting current converters with secondary currents of ..1A and ..5A. Only alternating currents, and no direct currents, can be measured. Each current measurement input can be loaded with 120A for 1 second.

Warning!
The current measurement inputs are dangerous to touch.

Warning!
The UMG508 is not suitable for the measurement of direct voltages.

Grounding current converters!
If a connection is provided for grounding the secondary winding, this must be connected with ground.

Illustration: Connection example, current measurement using current converter.

A connection diagram does not have to be configured for measurement inputs V4 and I4.
Current Direction

The current direction can be corrected on the device or individually using the available serial interfaces for each phase.

In the case of incorrect connection, subsequent reconnection of the current converter is not necessary.

![Current converter connections!]
The secondary connections of the current converter must be short-circuited to these before the electricity cables are disconnected from the UMG508!
If a test switch is available which automatically shorts the secondary current converter lines, it is sufficient to set them to the "test" extradata, as long as the short-circuiters have been checked beforehand.

![Open current converters!]
Extreme contact danger due to voltage peaks can occur on current converters that are operated open on the secondary side!
For "anti-open current converters", the winding isolation is calculated so that the current converters can be operated open. However, these current converters are also dangerous to touch if they are operated open.
Total current measurement

If the current is measured using two current converters, the total transfer ratio of the current converters must be programmed in the UMG508.

Example

The current measurement takes place using two current converters. Both current converters have a transfer ratio of 1000/5A. The total measurement is carried out with a 5+5/5A total current converter.

The UMG508 must then be set as follows:

Primary current: 1000A + 1000A = 2000A

Secondary current: 5A

*Illu. Example, current measurement using a total current converter.*
Direct measurement
Nominal currents up to 5A can also be directly measured with the UMG508. Under consideration that the direct measurement will be carried out for the current only in three phase 4 wire systems with mains voltage till
- 127V/220V (300V CAT III) according UL
- 277V/480V (300V CAT III)

and three phase 3 wire systems with mains voltage till
- 277V (300V CAT III) according UL
- 480V (300V CAT III)

Due to the fact that the UMG508 does not have integrated protection for the current measurement, this protection must be foreseen in the installation.

Ampere meter
If you do not want to measure the current with the UMG508 alone, but also with an additional ampere meter, the ampere meter must be switched in series to the UMG508.

*Illu. Example, current measurement with an additional ampere meter.*

*Illu. Example, direct current measurement.*
RS485

The RS485 interface is designed as a 9-pole DSUB socket on the UMG508. On this interface, the UMG508 supports the following selection of protocols:

- Modbus RTU
- Profibus DP V0 Slave

For connection, we recommend a 9-pin profibus (modbus) plug e.g. the company Phoenix, type „SUBCON-Plus-ProfiB/AX/SC“ with the article number 2744380.
Connection of Bus Lines

The incoming bus line is connected to clamps 1A and 1B. The bus line for the next device in the line is connected to clamps 2A and 2B. If there is no further device in the line, the bus line has to be terminated with resistors (switch to ON).

In switch extradata ON, clamps 2A and 2B are switched off for the continuing bus line.

*Illu. Profibus plug with terminating resistors.*
Shields
A twisted, shielded cable is foreseen for connections using the RS485 interface.
• Ground the shields of all cables leading to the cabinet at the cabinet entry point.
• Connect the shield extensively and with good conductivity with a low external voltage ground.
• Intercept the cable mechanically above the ground clip in order to avoid damages caused by cable movements.
• Use suitable cable insert guides, such as PG glands, to guide the cable into the switch cabinet.

Cable type
The cables used must be suitable for an environmental temperature of at least 80°C.
Recommended cable types:
Unitronic Li2YCY(TP) 2x2x0.22 (Lapp cable)
Unitronic BUS L2/FIP 1x2x0.64 (Lapp cable)

Maximum cable length
1200m at a Baud rate of 38.4k.

Terminal resistors
The cable is terminated with resistors (120Ohm 1/4W) at the beginning and end of a segment.

The UMG508 does not have any terminal resistors.
**Bus structure**

- All devices are connected in a bus structure (line).
- In one segment, up to 32 participants can be switched together.
- The cable is terminated with resistors at the beginning and end of a segment.
- Repeaters (power boosters) must be used with more than 32 participants in order to connect the individual segments.
- Devices with terminated resistor have to be supplied.

- We recommend to install the master UMG at the end of the segment.
- In case that the master UMG with terminated bus resistor will be removed, the bus is not under operation.
- In case that slave UMG with terminated bus resistor will be removed or is not switched on, the bus is can be unstable.
- UMGs which have no termination can be replaced without any interruption of the bus.
Ethernet

The network settings for the Ethernet are specified by the network administrator and set accordingly on the UMG508. If the network settings are not known, the patch cable may not be plugged into the UMG508.

Warning!
Incorrect network settings can cause faults in the network!
Illu. Connection example; direct connection between the UMG508 and PC using a twisted patch cable (art. no. 08.01.505)

Illu. Connection example; UMG508 and PC are automatically allocated the IP address from a DHCP server.

Illu. Connection example; UMG508 and PC need a fixed IP address.
Digital outputs

The UMG508 has 5 digital outputs. These outputs are separated galvanically from the analysis electronics using optocouplers. The digital outputs have a common reference.

- The digital outputs can switch AC and DC loads.
- The digital outputs are not short-circuit proof.
- Connected lines that are longer than 30m must be laid with shields.
- External auxiliary power is necessary.

[Illustration: Digital outputs connection.]
Illu. Connection of two relays to digital outputs 4 and 5.
Digital Inputs

The UMG508 has 8 digital inputs. The digital inputs are divided into two groups, each with 4 inputs. Each group has a common reference.

*Illu. Example for the connection of external contacts S1 and S2 to the digital inputs 1 and 2.*

*Illu. Example for the connection of digital inputs.*
**S0 impulse input**
You can connect an S0 impulse generator in accordance with DIN EN62053-31 to each digital input.
You require an external auxiliary voltage with an output voltage in the range of 20 .. 28V DC and a resistor with 1.5kOhm.

*Illu. Example for the connection of an S0 impulse generator to digital input 1.*
Operation
The UMG508 is operated using six function keys. The six keys are allocated different functions depending on the context:
- Selection of measurement value displays.
- Navigation within the menu.
- Processing the device settings.
Measurement value displays

Main values
You can use keys 2 and 5 to browse between the main values of the measurement value displays.

Auxiliary values
You can use keys 3 and 4 to browse between the auxiliary values of a measurement value display.
"Home" measurement value display
Once the network returns, the UMG508 starts with the "Home" measurement value display. This measurement value display contains the device names and an overview of important measurement values. The device name consists of the device type and serial number upon delivery.

Using the "Home - Key 1", you come out of the measurement value displays for the main values directly to the first "Home" measurement value display.
Select measurement value display

You want to change to a measurement value display with main values.
- Use the function keys 2 and 5 to browse between the measurement value displays of the main values.
- With function key 1 (Home), you always access the first measurement value display.

You want to change to a measurement value display with auxiliary values.
- Select the measurement value display with the main values.
- Select the measurement value display with function keys 3 and 4 for the auxiliary values.

Example: selection of auxiliary value voltage.
Call up additional information

- Browse with keys 2 to 5 to the required measurement value display.
- Activate the measurement value selection with key 6 (selection).
- Select the required measurement value with keys 2 to 5.
- The background colour for the measurement value changes from grey to green. The additional information is shown in a blue window.
- End the process with key 1 (ESC) or select another measurement value with keys 2 to 5.
Delete min/max values individually

- Use keys 2 to 5 to browse to the required measurement value display.
- Activate the measurement value selection with key 6 (selection).
- Select the required minimum and maximum value with keys 2 to 5.
- The background colour for the measurement value changes from grey to green. The point with the date and time of occurrence is shown in an additional blue window.
- You can now delete the selected min or max value with key 6 (reset).
- End the process with key 1 (ESC) or select another min/max value with keys 2 to 5.

The date and time for the min/max values are shown in UTC time (coordinated world time).
List of transients

Recognized transients are listed in the transients list.

- The transients list consists of 2 pages.
- Transients 1 to 8 are listed on page 1 and 9 to 16 on page 2.

Display transients

- Go to the transients list with key 6 „selection“.
- Select a transient with keys 3 and 4.
- Allow to the transients to be presented graphically with key 6.
- Show or hide the legends with key 6 „Legends“.
- You can exit the graphic presentation of the transients with key 1.

Transient voltages are quick, impulsive transient oscillation processes in electrical networks. Transient voltages are not predictable with respect to time and have a limited period. Transient voltages are caused by the effects of lighting, by switching operations or by triggered fuses.
List of events

Recognized events are listed in the events list.

- The events list consists of 2 pages.
- Events 1 to 8 are listed on page 1 and events 9 to 18 on page 2.

Display incident

- Go to the events list with key 6 „Selection“.
- Select an incident with keys 3 and 4.
- Allow the incident to be graphically presented with key 6.
- Show or hide the legends with key 6 „Legends“.
- You can leave the graphic presentation of the incident with key 1.

Events are limit value violations of effective current and voltage values.
Configuration

The supply voltage must be connected for configuration of the UMG508.

Apply supply voltage
- The level of supply voltage for the UMG508 can be taken from the label.
- After applying the supply voltage, a startup screen appears on the display. Approximately ten seconds later, the UMG508 changes to the first „Home“ measurement value display.
- If a display does not appear, check whether the applied supply voltage is within the nominal voltage range.

Warning!
Supply voltages that do not correspond with the label details can lead to incorrect functions and damage to the device.

Illu. Example of "Home" measurement value.

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
<th>Real Power</th>
<th>Reactive Pw.</th>
<th>PF</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1-N</td>
<td>223 V</td>
<td>25.8 A</td>
<td>5.3 kW</td>
<td>+ 0.5 kvar</td>
</tr>
<tr>
<td>L2-N</td>
<td>223 V</td>
<td>28.0 A</td>
<td>5.9 kW</td>
<td>+ 1.2 kvar</td>
</tr>
<tr>
<td>L3-N</td>
<td>223 V</td>
<td>13.8 A</td>
<td>2.7 kW</td>
<td>+ 0.7 kvar</td>
</tr>
<tr>
<td>L4-N</td>
<td>0 V</td>
<td>0.00 A</td>
<td>0.00 kW</td>
<td>+ 0.00 kvar</td>
</tr>
<tr>
<td>L1..L3</td>
<td>50.0 Hz</td>
<td>23.96 A</td>
<td>13.9 kW</td>
<td>+ 2.4 kvar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>. . 3 4 5</td>
<td>. . . . . .</td>
</tr>
</tbody>
</table>
Configuration menu

Once the network returns, the „Home“ measurement value display is found on the start page.
• Browse to the menu configuration with key 1.

If you are in a measurement value display for main values, you use
• key 1 - „Home“ to directly access the first „Home“ measurement display.
• Use key 1 to browse to the menu configuration.

Language

You can set the language for the measurement value displays and menus directly in the "configuration" menu.
There are different languages to select between. The preset language in the factory is "English".
Communication
The UMG508 has an Ethernet and a RS485 interface.

Ethernet (TCP/IP)
Select the type of address allocation for the Ethernet interface here.

DHCP mode
- **Off** - IP address, Netmask and Gateway are specified by the user and set directly on the UMG508. Select this mode for simple networks without a DHCP server.
- **BOOTP** - BootP permits the fully automatic integration of a UMG508 in an existing network. BootP is an older protocol and does not have DHCP's extent of functions.
- **DHCP** - Upon starting, the UMG508 automatically collects the IP address, the Netmask and the Gateway from a DHCP server.

Factory pre-setting: DHCP

The UMG508 may only be connected to the Ethernet after coordinating with the network administrator!
RS485
You can specify the protocol, the device address and the Baud rate for operating the RS485 interface.

Protocol
Selection options:
• Modbus Slave
• Modbus Master/Gateway
• Profibus DP V0
• BACnet (Option)

Factory pre-setting: Modbus Master/Gateway

Device address
Setting range: 0 - 255
Factory pre-setting: 1

Baud rate
Setting range: 9.600, 19.200, 38.400, 57.600, 115.200, 921.600 kbps

Factory pre-setting: 115.200 kbps
Measurement
Configure here:
- The measurement converters for the current and voltage measurement.
- The record of transients.
- The recording of events.
- The rated frequency.
**Rated frequency**
For measuring and calculating the measurement values, the UMG508 requires the Rated frequency of a.c. systems. The UMG508 is suitable for measurements in networks with a rated frequency in the range of 40Hz to 70Hz.

The rated frequency can be specified by the user or automatically detected by the device.
- **Auto** - Factory pre-setting. The rated frequency is measured.
- **50Hz** - The rated frequency is set to 50Hz. The rated frequency is not measured.
- **60Hz** - The rated frequency is set to 60Hz. The rated frequency is not measured.

**Automatic frequency detection**
A voltage (V-Vref) larger than 10Veff must be applied on at least one of the voltage measurement inputs for the automatic detection of frequency by the UMG508. If a sufficient measurement voltage is not applied, the UMG508 can not detect the rated frequency and a measurement can therefore not be carried out.
**Voltage converter**
You can allocate the main measurement and the auxiliary measurement voltage converter relations.
You select the setting 400 V / 400 V for measurements without a voltage converter.

Setting range:
Primary  1 .. 999,999 V
Secondary 1 .. 999 V

Factory pre-setting:
Primary  400 V
Secondary 400 V

**Nominal voltage**
The nominal voltage specifies the value which
• transients,
• events and automatic graphic scaling refer to.

Setting range:  0 .. 1,000,000 V
Factory pre-setting:  230 V

For example, you can also select the primary voltage as nominal voltage.
Connection diagram for voltage measurement
For the voltage measurement, you can select between the following connection diagrams:

3p4w  - 3 phase 4 conductor
3p4wu - 3 phase 4 conductor
3p3w  - 3 phase 4 conductor
For networks without a neutral conductor under symmetric load.
3p3wu - 3 Phasen 3 Leiter
For networks without a neutral conductor under symmetric load.
3p5w  - 3 Phasen 4 Leiter
Measurement of an additional measuring point.
1p2w  - 1 phase 2 conductor (180°)

Factory pre-setting:  3p4w

A connection diagram has to be configured for the measurement inputs V4 and I4.

Illu. Example for voltage measurement in a 3 phase 4 conductor network.
Current converter
You can allocate both the main measurement and auxiliary measurement current converter relations.
Select setting 5/5A for direct measurement of currents.

Setting range:
- Primary: 1 .. 999,999 A
- Secondary: 1 .. 5 A

Factory pre-setting:
- Primary: 5 A
- Secondary: 5 A

Nominal current
The nominal current specifies which value
- overcurrent,
- current transients,
- and automatic graphics scaling refer to.

Setting range: 0 .. 1,000,000 A

You can only set the nominal values for measurement of the K-Factor and TDD using GridVis.
Connection diagram for current measurement
You can select between the following connection diagrams for current measurement:

3p4w - 3 phase 4 conductor, 3 current conv.
3p5w - 3 phase 4 conductor, 4 current conv. The fourth current transformer can be used for measuring the neutral conductor e.g.
3p2i - 3 phase 4 conductor, 2 current conv. For networks under symmetric load.
3p2i0 - 3 phase 3 conductor, 2 current conv. Aron connection for networks without a neutral conductor. The third current will be calculated.
1p2i - 1 Phase 2 Leiter, 2 Stromwandler

Factory pre-setting: 3p4w

A connection diagram does not have to be configured for measurement inputs V4 and I4.
**Transients**

Transient voltages are rapid, impulsive transient oscillation processes in electrical networks. Transient voltages are not predictable with respect to time and last for a limited period. Transient voltages are caused by the effects of lighting, due to switching operations or the triggering of fuses.

- The UMG508 recognizes transients that are longer than 50µs.
- The UMG508 monitors the voltage measurement inputs on transients.
- Transient monitoring can be set per phase.
- There are two independent criteria for recognizing transients.
- If a transient has been recognized, the waveform shape is saved in a transient recording.
- If a transient has been recognized, the limit value is automatically increased by 20V, both in automatic and manual modes. This automatic increase of the limit value fades within 10 minutes.
- If another transient is recognized within the next 60 seconds, this transient is recorded with 512 points.
- You can display recorded transients with the GridVis incident browser.
Mode (absolute)
If a scanning value exceeds the set limit value, a transient is recognized.
- **Off** - Transient monitoring is switched off
- **Automatic** - Factory pre-setting. The limit value is automatically calculated and is 110% of the current 200 ms effective value.
- **Manual** - Transient monitoring uses the adjustable limit value under "Peak U".

Mode (delta)
If the difference of two neighbouring scanning points exceeds the set limit value, a transient is recognized.
- **Off** - Transient monitoring is switched off.
- **Automatic** - Factoring pre-setting. The limit value is calculated automatically and is 0.2175 times the current 200ms effective value.
- **Manual** - Transient monitoring uses the adjustable limit value under "Trns U".

Accept L2-L4
Transient monitoring can be set per phase. You can accept settings from phase L1 into phases L2, L3 and L4.
- **No** - The L1 phase settings are not transferred to the stages L2, L3 and L4.
- **Yes** - The settings from phase L1 are taken over into phases L2, L3 and L4.
Events

Events are threshold value violations of set threshold values for current and voltage. Here, threshold values are compared with the full wave effective values for current and voltage from the measurement channels. The event record consists of a mean value, a minimum or maximum value, a start time and an end time.

- Monitoring of the threshold values can be switched off (Off/Manual).
- Threshold values must be set as a percentage of the nominal value.
- Threshold values can be set for excess voltage, undervoltage and overcurrent.
- An event is triggered if in the course of the pre-run period there is an uninterrupted threshold value violation. An event is ended if there are no threshold value violations in the course of the after-run period.
- If an event has occurred, the corresponding measurement value is recorded with the set pre-run and after-run periods (respectively 0..1000 full waves).
- Event records are configured with the GridVis and displayed with the event browser.

Fig. Shows the full wave effective values for an event.
Voltage
Drop
A drop in voltage is set in % of the nominal voltage.

Overvoltage
The overvoltage is set in % of the nominal voltage.

Current
Overcurrent
The rapid increase of current is set in % of the nominal current.

Accept L2-L4
Monitoring of events can be set per phase. You can accept settings from phase L1 into phases L2, L3 and L4.

- No - Settings from phase L1 are not taken over into phases L2, L3 and L4.
- Yes - The settings from phase L1 are taken over into phases L2, L3 and L4.

Preparation time
The preparation time can only be set with GridVis.
Factory pre-setting: 0

Follow-up time
The follow-up time can only be set with GridVis.
Factory pre-setting: 0
Display

Brightness
The brightness level of the background illumination can be adjusted. The brightness level set here is used during operation of the UMG508.
Setting range: 0 .. 100%
Factory pre-setting: 70%
(0% = dark, 100% = very bright)

Standby
This refers to the time before the brightness changes to "standby brightness".
Setting range: 60 .. 9999 seconds
Factory pre-setting: 900 seconds

Standby brightness
This refers to the brightness level changed to after the end of the standby time. The standby time is restarted by using keys 1-6.
Setting range: 0 .. 60%
Factory pre-setting: 40%

Screensaver
The screensaver prevents a screen on the LCD from "sticking" if the screen does not change for a longer period of time.
Setting range: yes, no
Factory pre-setting: on

Presentation
You can specify the speed at which new measurement values should appear on the measurement value displays.
Setting range: fast (200ms), slow (1s)
Factory pre-setting: fast

Rotate
The measurement value displays are automatically displayed in sequence. The configuration displays are not affected by this.
Setting range: yes, no
Factory pre-setting: no
**Transition time**

You can set the time between automatic transition to the next measurement value display.

Setting range: 0 .. 255 seconds
Factory pre-setting: 2 seconds

The service life of the background illumination extends if the brightness of the background illumination is kept lower.
**System settings**

Display of system settings specific to the device.

- Firmware version
- Device serial number
- Fixed device MAC address
- Set IP address
- Set Gateway address
- Date and time
- Set password
- Reset settings

Illu. Example for the display of system settings.

You cannot configure the date and time directly on the device. Settings for time synchronization and the date and time can only be made using GridVis.
Password
The user can block access to the configuration with a password. Changing the configuration directly on the device is then only possible after entering the password. The password consists of a 6 digit combination of numbers.

Setting range:  1-999999 = with password
000000 = without password

A password (000000) is not programmed in the factory.

• In order to change a set password, you must know the current password.
• Note any changed password.
• If you do not want a password request anymore, enter "000000" as a password.

Forgotten password
If you have forgotten the password, you can only delete the password using the "GridVis" software.
In order to do this, connect the UMG508 with the PC using a suitable interface. Further information can be found in the GridVis assistant.
Delete minimum and maximum values

An dieser Stelle können Sie alle Min- und Maxwerte im UMG508 gleichzeitig löschen.

How to delete the individual minimum and maximum values is described in the chapter "individually deleting min. and max. values".

Delete all minimum and maximum values.
- Select "yes" with key 3
- Confirm with key 6.
- The message "executed" appears in the line - all minimum and maximum values have been deleted.
Delete power meters

You can delete all power meters in the UMG508 at the same time. A selection of certain power meters is not possible.

- Select with key 3 "yes"
- Confirm with key 6.
- The message "executed" appears in the line - all power meters have been deleted.
Delivered condition

All settings such as the configuration and recorded data are reset to the factory pre-settings or deleted. Entered release codes are not deleted.

- Select with key 3 "yes"
- Confirm with key 6.
- The message "executed" appears in the line - the delivered condition is reinstored.

Restart

The UMG508 restarts all programs.

- Select with the key 3 "yes".
- Confirm with key 6.
- The message "executed" appears in the line - all programs have been restarted.
Colors
Selection of colors for the presentation of current and voltage in the graphic presentations.
Extensions
Under "Extensions" you can subsequently release charged functions and show the status of Jasic programs.
Release
The UMG508 contains chargeable functions that can be subsequently released.
List of release functions:

- BACnet
- EMAX

You receive the release code from the manufacturer. The manufacturer needs the device serial number and the name of function to be released. In order to release the function, you enter the 6 digit release code in the respective line. Please note that the release code is only valid for one device.
**Jasic status**

Up to 7 specific customer Jasic programs (1-7) and one recording can run in the UMG508. The Jasic programs can adopt the following statuses:

- Stopped
- Running

You cannot change the status of Jasic programs on the device.
Initialization

Applying the supply voltage

- The level of supply voltage for the UMG508 can be taken from the label.
- After applying the supply voltage, a startup screen appears on the display. Around ten seconds later, the UMG508 changes to the first measurement value display.
- If no display appears, you must check whether the supply voltage is within the nominal voltage range.

Warning!
Supply voltages that do not correspond with the details on the type label can lead to malfunctions and damage to the device.
Apply measurement voltage

- Voltage measurements in networks with nominal voltages above 500VAC against ground must be connected using a voltage converter.
- After connection of the measurement voltages, the measurement values displayed by the UMG508 for voltages L-N and L-L must match those at the voltage measurement input.
- If a voltage converter factor is programmed, this must be considered upon comparison.

Rotary field direction

Check the direction of the voltage rotary field on the measurement value display of the UMG508. A "right" rotary field is usually available.

Presentation of the phase sequence according to the rotary field direction.

UL1-UL2-UL3 = right rotary field
UL1-UL3-UL2 = left rotary field

⚠️ Warning! The UMG508 is not suitable for measuring DC voltages.
Applying measurement current

The UMG508 is designed for the connection of ../1A and ../5A current converters. Only AC currents, and not DC currents, can be measured using the current measurement inputs.

Short-circuit all current converter outputs except one. Compare the currents displayed by the UMG508 with the applied current. The current displayed by the UMG508 must match the input current under consideration of the current converter transfer relation. The UMG508 must display approx. zero amperes in the short-circuited current measurement inputs.

The current converter ratio is set to 5/5A in the factory and may have to be adapted to the current converter used.

Sign

Reactive power
- positive (+) with inductive load,
- negative (-) with capacitive load.

Phase angle (U/I)
- positive (+) with capacitive load,
- negative (-) with inductive load.

Warning!
Voltages and currents outside of the authorized measurement range can destroy the device.
Voltage and current only have a minor difference in the phase.

- The current measurement input is allocated to the right voltage measurement input.

Voltage and current have a difference of approximately 180° in the phase.

- The current measurement input is allocated to the right voltage measurement input.
- In this current measurement, the connections k and l are swapped over or there is a return feed into the supplier network.
Checking the power measurement
Short-circuit all current converter outputs except one and check the displayed power outputs.
The UMG508 may only display one power output in the phase with the current converter input that is not short-circuited. If this does not apply, please check the connection of the measurement voltage and measurement current.

If the amount of effective power is correct but the sign of effective power is negative, this may have two causes:
- Connections S1(k) and S2(l) are mixed up on the current converter.
- Effective power is returned to the network.

Checking communication
The UMG508 counts all received (RX), all sent (TX) and all faulty data packages.
In the ideal case, the number of errors shown in the error column is zero.

Reset
You can delete the counters for the data packages with key 6.
The start time for the recount is reset.

In the pointer diagram, voltages are shown with the longer pointers and currents with shorter pointers.
Metering range exceedance (overload)

Metering range exceedances are displayed for as long as they are present and cannot be acknowledged. A metering range is exceeded if at least one of the four voltage or current measuring inputs is outside of its specified metering range.

Limit values for metering range exceedance: (200 ms rms values):

\[
\begin{align*}
I &= 8,5 \text{ A}_\text{rms} \\
U_{L-N} &= 600 \text{ V}_\text{rms}
\end{align*}
\]

Display of the metering range exceedance in the voltage circuit L2 and in the current circuit of the 4th phase (I4).
Profibus

Profibus profile
A Profibus profile contains data to be exchanged between a UMG and an SPS. Four Profibus profiles are pre-configured in the factory.

With a Profibus profile, you can:
- call-up measurement values from the UMG,
- set the digital outputs in the UMG,
- request the status of the digital inputs in the UMG.

Each Profibus profile can contain a maximum of 127Bytes. You can apply further Profibus profiles if more data has to be transferred.

- Each Profibus profile has a profile number. The profile number is sent by the PLC to the UMG.
- You can directly process 16 Profibus profiles with GridVis (profile numbers 0..15).
- Additional Profibus profiles (profile numbers 16..255) can be applied using Jasic programs.
- Factory pre-configured Profibus profiles can be subsequently changed.

Variable definition
All system variables and global variables\(^1\) can be scaled individually and converted into one of the following formats:
- 8, 16, 32Bit integer with and without sign.
- 32 or 64Bit float format.
- Big or Little Endian.

\(\text{Big-Endian} = \text{High Byte before Low Byte.} \)
\(\text{Little-Endian} = \text{Low Byte before High Byte.} \)

Device master file
The device master file, abbreviated with GSD file, describes the Profibus characteristics of the UMG508. The GSD file is required by the PLC configuration program.
The device master file for the UMG508 has the file name "0C2C.GSD“ and is contained on the data carrier supplied with the delivery.

\(^1\)Global variables are variables that are defined by the user in Jasic and are provided to each interface in the UMG508.
Example
Collect measurement values using Profibus
You must transfer at least one Profibus profile with GridVis and transfer it to the UMG508.
A Jasic program is not necessary.

**Illu. Block switch diagram for data exchange between PLC and UMG508.**
### Profibus profile number 0

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<th>Value format</th>
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<th>Format</th>
<th>Scaling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Effective power L1</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>Effective power L2</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>Effective power L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>Effective power total L1-L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>17</td>
<td>Current L1</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>21</td>
<td>Current L2</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>25</td>
<td>Current L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>29</td>
<td>Current total L1-L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>33</td>
<td>Effective consumption total L1-L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>37</td>
<td>CosPhi (math.) L1</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>41</td>
<td>CosPhi (math.) L2</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>45</td>
<td>CosPhi (math.) L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>49</td>
<td>CosPhi (math.) total L1-L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>53</td>
<td>Reactive power L1</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>53</td>
<td>Reactive power L2</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>53</td>
<td>Reactive power L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>53</td>
<td>Reactive power total L1-L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>53</td>
<td>Apparent power L1</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>53</td>
<td>Apparent power L2</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>53</td>
<td>Apparent power L3</td>
<td>Float</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>53</td>
<td>Apparent power total L1-L3</td>
<td>Float</td>
<td>1</td>
</tr>
</tbody>
</table>
Service and Maintenance

The device is subjected to different safety tests before delivery and marked with a seal. If a device is opened, the safety tests have to be repeated. A guarantee is only provided for unopened devices.

Repair and Calibration

Repair work and calibration can only be undertaken by the manufacturer.

Front film

Cleaning the front film can be done with a soft cloth and domestic detergent. Acids and products containing acids may not be used for cleaning.

Battery

The internal clock is fed from the supply voltage. If the supply voltage fails, the clock is supplied by the battery. The clock provides the date and time information, e.g. for recordings, minimum and maximum values and events. The expected battery life is at least 5 years at a storage temperature of +45°C. The typical battery life is 8 to 10 years. The device must be opened to exchange the battery. If the device has been opened, a new safety test is required for safe operation. A guarantee is only provided for unopened devices.

Disposal

The UMG508 can be recycled as electronic scrap in accordance with the legal regulations. The fixed, integrated lithium battery must be disposed of separately.

Firmware update

If a firmware update has to be carried out for your UMG508, you can do this with the GridVis software included in the delivery.

Service

Should any questions arise that are not described in this handbook please contact the manufacturer directly. We will require the following compulsory details from you for processing:

- Device name (refer to label),
- Serial number (refer to label),
- Software release (refer to measurement value display),
- Measurement voltage and supply voltage,
- Precise error description.
## Procedure in case of errors

<table>
<thead>
<tr>
<th>Possible error</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>None <strong>Display.</strong></td>
<td>External fuse for the supply voltage has triggered.</td>
<td>Replace fuse.</td>
</tr>
<tr>
<td>None <strong>Current display.</strong></td>
<td>The measurement voltage is not connected.</td>
<td>Connect measurement voltage.</td>
</tr>
<tr>
<td></td>
<td>The measurement current is not connected.</td>
<td>Connect measurement current.</td>
</tr>
<tr>
<td>Displayed <strong>current</strong> is too high or low.</td>
<td>Current measurement is in the wrong phase.</td>
<td>Check connection and correct if necessary.</td>
</tr>
<tr>
<td></td>
<td>Current converter factor is incorrectly programmed.</td>
<td>Read current converter transfer ratio on the current converter and program it.</td>
</tr>
<tr>
<td>Displayed <strong>voltage</strong> is too low or high</td>
<td>Measurement in the wrong phase.</td>
<td>Check connection and correct if necessary.</td>
</tr>
<tr>
<td></td>
<td>Voltage converter is incorrectly programmed.</td>
<td>Read voltage converter transfer ratio on the voltage converter and program it.</td>
</tr>
<tr>
<td>Displayed <strong>voltage</strong> is too light.</td>
<td>Measurement range exceeded.</td>
<td>Use a voltage converter.</td>
</tr>
<tr>
<td></td>
<td>The voltage peak at the measurement input has been exceeded due to harmonics.</td>
<td><strong>Warning!</strong> It is necessary to make sure that the measurement inputs are not overloaded.</td>
</tr>
<tr>
<td>Possible errors</td>
<td>Cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Metering range exceedance (overload)</td>
<td>Voltage or current input out of range (see chapter metering range exceedance)</td>
<td>Check and correct the connection if necessary. Use suitable voltage or current transformers. Read and program the current or voltage transformer ratio on the transformer.</td>
</tr>
<tr>
<td>Effective power is too high or low.</td>
<td>The programmed current converter transfer ratio is wrong. The current path is allocated to the wrong voltage path. The programmed voltage converter transfer ratio is wrong.</td>
<td>Read and program the current converter transfer ratio on the current converter. Check the connection and correct if necessary. Read and program the current converter transfer ratio on the current converter.</td>
</tr>
<tr>
<td>Effective power-receipt/supply are mixed up.</td>
<td>At least one current converter connection is mixed up. A current path is allocated to the wrong voltage path.</td>
<td>Check and correct the connection if necessary. Check and correct the connection if necessary.</td>
</tr>
</tbody>
</table>
### Possible errors

<table>
<thead>
<tr>
<th>No connection to device.</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS485:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Wrong device address.</td>
<td></td>
<td>Set device address.</td>
</tr>
<tr>
<td>- Different bus speeds</td>
<td></td>
<td>Check and correct the speed (baudrate)</td>
</tr>
<tr>
<td>- Wrong protocol.</td>
<td></td>
<td>Select protocol.</td>
</tr>
<tr>
<td>- Termination is missing.</td>
<td></td>
<td>Connect bus with terminating resistor (120 Ohm).</td>
</tr>
<tr>
<td>Ethernet:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- IP address is wrong</td>
<td></td>
<td>Set IP address on the device.</td>
</tr>
</tbody>
</table>

The device does not work despite taking the above measures.

Device is defective.

Send the device to the manufacturer to check with an exact description of the error.
Technical data

General

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net weight</td>
<td>1080g</td>
</tr>
<tr>
<td>Device dimensions</td>
<td>approx. l=144mm, w=144mm, h=75mm</td>
</tr>
<tr>
<td>Battery</td>
<td>Type VARTA CR1/2AA, 3 V, Li-Mn</td>
</tr>
<tr>
<td>Service life of background illumination</td>
<td>40000h (50% of initial brightness)</td>
</tr>
</tbody>
</table>

Transport and storage

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free fall</td>
<td>1m</td>
</tr>
<tr>
<td>Temperature</td>
<td>K55 (-25°C to +70°C)</td>
</tr>
<tr>
<td>Relative air humidity</td>
<td>0 to 90 % RH</td>
</tr>
</tbody>
</table>

Environmental conditions in operation

The UMG508 is intended for use in a weather-protected, fixed extradata.
The UMG508 must be connected to the protective wire connection! Protection class I according to IEC 60536 (VDE 0106, part 1).
Calculation temperature range            | K55 (-10°C .. +55°C)                       |
Relative air humidity                    | 0 to 75 % RH                               |
Operating height                         | 0 .. 2000m above sea level                 |
Impurity level                           | 2                                          |
Installation extradata                   | any                                        |
Ventilation                              | external ventilation is not required.      |
Foreign matter and water protection,     |                                            |
  Front                                  | IP50 according to EN60529                  |
  Reverse side                           | IP20 according to EN60529                  |
## Supply voltage

| Installation overvoltage category | : II |
| Safeguarding of supply voltage | |
| Circuit breaker | : 6A typ C (approved by UL/IEC) |
| Option 230V (Art. no. 52.21.001) | |
| Nominal range | : 95V .. 240V (45-65Hz) or DC 80V .. 340V |
| Working range | : +6%/-10% of nominal range |
| Power consumption | : max. 10W, max. 15VA |
| Option 90V (Art.no. 52.21.002) | |
| Nominal range | : 44V .. 130V (45-65Hz) or DC 48V .. 180V |
| Working range | : +-10% of nominal range |
| Power consumption | : max. 6W, max. 9VA |
| Option 24V (Art.no. 52.21.003) | |
| Nominal range | : 20V .. 50V (45-65Hz) or DC 20V .. 70V |
| Working range | : +-10% of nominal range |
| Power consumption | : max. 7W, max. 9VA |

## Connection capacity of terminal points

Connectable conductors. Only one conductor per terminal point may be connected!

- Single wire, multi-wire, fine wire : 0.2 - 2.5mm², AWG 24 - 12
- Pin terminals, ferrules : 0.25 - 2.5mm²
- Tightening torque : 0.5 - 0.6 Nm,
- Insulation length : 7mm
Inputs and outputs

8 digital inputs
  - Maximum counting frequency: 20Hz
  - Reaction time (Jasic program): 200ms
  - Input signal applied: 18V .. 28V DC (typical 4mA)
  - Input signal not applied: 0 .. 5V DC, current lower than 0.5mA

5 digital outputs, semi-conductor relay, not short-circuit proof.
  - Switch voltage: max. 60V DC, 30V AC
  - Switch current: max. 50mAeff AC/DC
  - Reaction time (Jasic program): 200ms
  - Output of voltage drops: 20ms
  - Output of voltage excesses: 20ms
  - Impulse output (power impulse): max. 20Hz

Line length
  - up to 30m - not shielded
  - larger than 30m - shielded

Connection capacity of terminal points

Rigid/flexible: 0.14 - 1.5mm², AWG 28-16
Flexible with ferrules without plastic sleeve: 0.25 - 1.5mm²
Flexible with ferrules with plastic sleeve: 0.25 - 0.5mm²
Tightening torque: 0.22 - 0.25Nm
Insulation length: 7mm
# Measurement inputs

## Voltage measurement

The voltage measuring inputs are suitable for the following grids of power supply:

- **Three-phase 4 conductor systems L-N/L-L**: 417V/720V (+10%)
- **Three-phase 3 conductor systems L-L**: 600V (+10%)

The voltage measuring inputs regarding safety and reliability reasons are dimensioned as follows:

- **Overvoltage category**: 600V CAT III
- **Measurement surge voltage**: 6kV

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range L-N</td>
<td>0¹) .. 600Vrms</td>
</tr>
<tr>
<td>Measuring range L-L</td>
<td>0¹) .. 1000Vrms</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.01V</td>
</tr>
<tr>
<td>Crest factor</td>
<td>1.6 (relating to 600Vrms)</td>
</tr>
<tr>
<td>Impedance</td>
<td>4MOhm/Phase</td>
</tr>
<tr>
<td>Power consumption</td>
<td>ca. 0.1 VA</td>
</tr>
<tr>
<td>Scanning frequency</td>
<td>20kHz/phase</td>
</tr>
<tr>
<td>Transients</td>
<td>&gt;50µs</td>
</tr>
<tr>
<td>Frequency of fundamental oscillation</td>
<td>40Hz .. 70Hz</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.001Hz</td>
</tr>
</tbody>
</table>

¹)The UMG508 can only detect measurement values if a voltage L-N larger than 10Veff or a voltage L-L larger than 18Veff is applied to at least one voltage measurement input.
Current measurement

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated current</td>
<td>5A</td>
</tr>
<tr>
<td>Resolution</td>
<td>0,1mA</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0,001 .. 8,5Arms</td>
</tr>
<tr>
<td>Crest factor</td>
<td>2,4</td>
</tr>
<tr>
<td>Overvoltage category</td>
<td>300V CAT III</td>
</tr>
<tr>
<td>Measurement surge voltage</td>
<td>4kV</td>
</tr>
<tr>
<td>Power consumption</td>
<td>ca. 0.2 VA, (Ri=5mOhm)</td>
</tr>
<tr>
<td>Overload for 1 second</td>
<td>120A (sinusoidal)</td>
</tr>
<tr>
<td>Scanning frequency</td>
<td>20kHz</td>
</tr>
</tbody>
</table>

Connection capacity of terminal points

Connectable conductor (current measurement and voltage measurement). Only one conductor per terminal point may be connected!

- Single wire, multi-wire, fine wire: 0.2 - 2.5mm², AWG 24 - 12
- Pin terminals, ferrules: 0.25 - 2.5mm²
- Tightening torque: 0.5 - 0.6Nm,
- Insulation length: 7mm
## Serial interfaces

<table>
<thead>
<tr>
<th>RS485</th>
<th>Protocol, Modbus RTU</th>
<th>Transfer rate</th>
<th>Protocol, Profibus</th>
<th>Transfer rate</th>
<th>Protocol, BACnet (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>plug, SUB D 9-pole</td>
<td>9.6kbps, 19.2kbps, 38.4kbps, 57.6kbps, 115.2kbps, 921.6kbps</td>
<td>Modbus RTU/Slave, Modbus RTU/Master</td>
<td>Profibus DP/V0 according to EN 50170</td>
<td>9.6kBaud to 12MBaud</td>
</tr>
<tr>
<td></td>
<td>Protocol, Profibus</td>
<td></td>
<td>Protocol, BACnet (option)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethernet 10/100Base-TX</td>
<td>: RJ-45</td>
<td>: Modbus Gateway, Embedded Webserver (HTTP)</td>
<td>: TCP/IP, EMAIL (SMTP), DHCP-Client (BootP), Modbus/TCP, Modbus RTU over Ethernet, FTP, ICMP (Ping), NTP, TFTP, BACnet (Option), SNMP.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Specifications
(Measurement using current converters ..5A)

## Network quality parameters

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Accuracy class</th>
<th>Measur. range</th>
<th>Display range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>f</td>
<td>0.05 (IEC61557-12)</td>
<td>40 .. 70 Hz</td>
<td>40 Hz .. 70 Hz</td>
</tr>
<tr>
<td>Phase current</td>
<td>I</td>
<td>0.2 (IEC61557-12)</td>
<td>0.001 .. 8.5 Arms</td>
<td>0 A .. 9999 kA</td>
</tr>
<tr>
<td>Neutral cond. current measured</td>
<td>IN</td>
<td>0.2 (IEC61557-12)</td>
<td>0.001 .. 8.5 Arms</td>
<td>0 A .. 9999 kA</td>
</tr>
<tr>
<td>Neutral cond. current calculated</td>
<td>INc</td>
<td>0.5 (IEC61557-12)</td>
<td>0.001 .. 25.5 A</td>
<td>0 A .. 9999 kA</td>
</tr>
<tr>
<td>Voltage</td>
<td>U L-N</td>
<td>0.1 (IEC61557-12)</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage</td>
<td>U L-L</td>
<td>0.1 (IEC61557-12)</td>
<td>18 .. 1000 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Short-time flicker, long-time fli.</td>
<td>Pst, Plt</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Voltage drops (L-N)</td>
<td>Udip</td>
<td>0.2 (IEC61557-12)</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage rises (L-N)</td>
<td>Uswl</td>
<td>0.2 (IEC61557-12)</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage interruptions</td>
<td>Uint</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Voltage unbalance (L-N)(^1)</td>
<td>Unba</td>
<td>0.2 (IEC61557-12)</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage inbalance (L-N)(^2)</td>
<td>Unb</td>
<td>0.2 (IEC61557-12)</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage harmonics</td>
<td>Uh</td>
<td>cl. 1 (IEC61000-4-7)</td>
<td>to 2.5 kHz</td>
<td>0 % .. 100 %</td>
</tr>
<tr>
<td>Current harmonics</td>
<td>Ih</td>
<td>cl. 1 (IEC61000-4-7)</td>
<td>to 2.5 kHz</td>
<td>0 % .. 100 %</td>
</tr>
<tr>
<td>Network signal voltage</td>
<td>MSV</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1) Reference to amplitude.
2) Reference to phase and amplitude.
## Function parameters

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Accuracy class</th>
<th>Measurem. range</th>
<th>Display range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total effective power</td>
<td>P</td>
<td>0.2&lt;sup&gt;5&lt;/sup&gt;</td>
<td>0 .. 15.3 kW</td>
<td>0 W .. 9999 GW</td>
</tr>
<tr>
<td>Total reactive power</td>
<td>QA, Qv</td>
<td>1</td>
<td>0 .. 15.3 kvar</td>
<td>0 varh .. 9999 Gvar</td>
</tr>
<tr>
<td>Total apparent power</td>
<td>SA, Sv</td>
<td>0.2&lt;sup&gt;5&lt;/sup&gt;</td>
<td>0 .. 15.3 kVA</td>
<td>0 VA .. 9999 GVA</td>
</tr>
<tr>
<td>Total effective energy</td>
<td>Ea</td>
<td>0.2&lt;sup&gt;5&lt;/sup&gt;</td>
<td>0 .. 15.3 kWh</td>
<td>0 Wh .. 9999 GWh</td>
</tr>
<tr>
<td>Total reactive energy</td>
<td>ErA, ErV</td>
<td>1</td>
<td>0 .. 15.3 kvarh</td>
<td>0 varh .. 9999 Gvarh</td>
</tr>
<tr>
<td>Total apparent energy</td>
<td>EapA, EapV</td>
<td>0.2&lt;sup&gt;5&lt;/sup&gt;</td>
<td>0 .. 15.3 kVAh</td>
<td>0 VAh .. 9999 GVAh</td>
</tr>
<tr>
<td>Frequency</td>
<td>f</td>
<td>0.05</td>
<td>40 .. 70 Hz</td>
<td>40 Hz .. 70 Hz</td>
</tr>
<tr>
<td>Phase current</td>
<td>I</td>
<td>0.2</td>
<td>0.001 .. 8.5 Arms</td>
<td>0 A .. 9999 kA</td>
</tr>
<tr>
<td>Neutral cond. current measured</td>
<td>IN</td>
<td>0.2</td>
<td>0.001 .. 8.5 Arms</td>
<td>0 A .. 9999 kA</td>
</tr>
<tr>
<td>Neutral cond. current calculated</td>
<td>INc</td>
<td>0.5</td>
<td>0.001 .. 25.5 A</td>
<td>0 A .. 9999 kA</td>
</tr>
<tr>
<td>Voltage</td>
<td>U L-N</td>
<td>0.1</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage</td>
<td>U L-L</td>
<td>0.1</td>
<td>18 .. 1000 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Power factor</td>
<td>PFA, PFV</td>
<td>0.5</td>
<td>0.00 .. 1.00</td>
<td>0 .. 1</td>
</tr>
<tr>
<td>Short-time flicker, long-time fl.</td>
<td>Pst, Plt</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Voltage drops</td>
<td>Udip</td>
<td>0.2</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage rises</td>
<td>Uswl</td>
<td>0.2</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Transient overvoltages</td>
<td>Utr</td>
<td>0.2</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage interruptions</td>
<td>Uint</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Voltage imbalance&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Unba</td>
<td>0.2</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage imbalance&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Unb</td>
<td>0.2</td>
<td>10 .. 600 Vrms</td>
<td>0 V .. 9999 kV</td>
</tr>
<tr>
<td>Voltage harmonics</td>
<td>Uh</td>
<td>cl. 1</td>
<td>to 2.5 kHz</td>
<td>0 % .. 999 %</td>
</tr>
<tr>
<td>THD of voltage&lt;sup&gt;3&lt;/sup&gt;</td>
<td>THDu</td>
<td>1.0</td>
<td>to 2.5 kHz</td>
<td>0 % .. 999 %</td>
</tr>
<tr>
<td>THD of voltage&lt;sup&gt;4&lt;/sup&gt;</td>
<td>THD-Ru</td>
<td>1.0</td>
<td>to 2.5 kHz</td>
<td>0 % .. 999 %</td>
</tr>
<tr>
<td>Current harmonics</td>
<td>Ih cl.</td>
<td>1</td>
<td>to 2.5 kHz</td>
<td>0 % .. 999 %</td>
</tr>
<tr>
<td>THD of current&lt;sup&gt;3&lt;/sup&gt;</td>
<td>THDi</td>
<td>1.0</td>
<td>to 2.5 kHz</td>
<td>0 % .. 999 %</td>
</tr>
<tr>
<td>THD des Stromes&lt;sup&gt;4&lt;/sup&gt;</td>
<td>THD-Ri</td>
<td>1.0</td>
<td>to 2.5 kHz</td>
<td>0 % .. 999 %</td>
</tr>
<tr>
<td>Mains signal voltage</td>
<td>MSV</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

1) Reference to amplitude.
2) Reference to phase and amplitude.
3) Reference to basic oscillation.
4) Reference to effective value.
5) Accuracy class 0.2 with ../5A converter.

Accuracy class 0.5 with ../1A converter.
# Declaration of Conformity

The product fulfils the following EC Directives:

<table>
<thead>
<tr>
<th>Directive</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006/95/EG</td>
<td>Electrical equipment for use within certain voltage limits.</td>
</tr>
</tbody>
</table>

## Considered standards:

### Noise immunity

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC/EN 61326-1:2013</td>
<td>Class A: Industrial environment</td>
</tr>
<tr>
<td>IEC/EN 61000-4-2:2009</td>
<td>Electrostatic discharge</td>
</tr>
<tr>
<td>IEC/EN 61000-4-3:2011</td>
<td>Electromagnetic RF Field 80-1000MHz</td>
</tr>
<tr>
<td>IEC/EN 61000-4-3:2011, EMV-ILA V01-03</td>
<td>Electromagnetic RF Field 1000-2700MHz</td>
</tr>
<tr>
<td>IEC/EN 61000-4-4:2013, EMV-ILA V01-03</td>
<td>Burst</td>
</tr>
<tr>
<td>IEC/EN 61000-4-5:2007, EMV-ILA V01-03</td>
<td>Surge</td>
</tr>
<tr>
<td>IEC/EN 61000-4-6:2009, EMV-ILA V01-03</td>
<td>Conducted disturbances 0.15-80MHz</td>
</tr>
<tr>
<td>IEC/EN 61000-4-8:2010</td>
<td>Power frequency magnetic field</td>
</tr>
<tr>
<td>IEC/EN 61000-4-11:2005, EMV-ILA V01-03</td>
<td>Voltage dips, short interrupts, voltage variations and frequency changes</td>
</tr>
</tbody>
</table>

### Noise emission

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
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<tbody>
<tr>
<td>IEC/EN 61326-1:2013</td>
<td>Class B: Residential environment</td>
</tr>
<tr>
<td>IEC/CISPR11/EN 55011:2011</td>
<td>Radio disturbance field strength 30-1000MHz</td>
</tr>
<tr>
<td>IEC/CISPR11/EN 55011:2011</td>
<td>Radio disturbance voltage 0.15-30MHz</td>
</tr>
<tr>
<td>EMV-ILA V01-03</td>
<td>Radio disturbance voltage 9-150kHz</td>
</tr>
<tr>
<td>EMV-ILA V01-03</td>
<td>Flicker</td>
</tr>
</tbody>
</table>

### Equipment safety

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC/EN 61010-1:2011</td>
<td>Safety requirements for electrical equipment for Measurement, control and laboratory use – Part 1: General requirements</td>
</tr>
<tr>
<td>IEC/EN 61010-2-030:2011</td>
<td>Particular requirements for testing and measuring circuits</td>
</tr>
</tbody>
</table>
Dimensioned drawings
Cutout size: $138^{+0,8} \times 138^{+0,8}$ mm

Reverse side

Patch cable
configuration overview
Measurement value displays overview

Device name
Overview
Measurement values

Voltage L-N

Current L1..L4

Sum Real Power L1..L4
(Real Power L1..L3)

Configuration

Voltage L-L

Current Sum

Reactive Power
(Sum Real Power L1..L3)

Auxiliary values

Apparent Power
(Sum Real Power L1..L3)
Connection example

UMG 508

Auxiliary Supply

L1

N

L1

PE

Current Input 1-4

Voltage Input 1-4

S1

S2

S1

S2

Switch

PC

PC