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Multifunctional Energy Analyzer

UMG 806

User manual and technical data

(from firmware version 2.0.32)



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Janitza®

UMG 806
Multifunctional energy analyzer for recording energy quantities

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The German version is the original edition of the documentation.

Subject to technical alterations.

The contents of our documentation have been compiled with great care and reflect the current state of the information available to us. Nonetheless, we wish to point out that updates of this document are not always possible at the same time as technical refinements are implemented in our products. Please see our website under www.janitza.com for the current version.
Please see our website under www.janitza.com for the current version.

Information about the GridVis® software.

Janipedia: wiki.janitza.de

Tutorials: youtube.com/@gridvis

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1. Information on the device and the user manual

1.1 Disclaimer

Compliance with the informational products for the device 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 informational products.

Ensure that your informational products are readily accessible in a legible form.

1.2 Copyright notice

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All rights reserved.

Any reproduction, processing, distribution or other use of this informational product, in whole or in part, is prohibited.

All trademarks and the rights arising from them are the property of the respective owners of these rights.

1.3 Technical changes

- Make sure that your device matches the user manual.
- This user manual applies to the UMG 806. Separate validities and distinctions are marked.
- 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.
- Find out about device revisions and the associated modifications of the documentation associated with your product at www.janitza.com.

1.4 About this user manual

If you have questions, suggestions or ideas for improvement of the user manual, please let us know via email at: info@janitza.com.

INFORMATION

This user manual describes the UMG 806 and provides information on the operation of the device. Also consult the additional documentation relevant for this user manual, such as:
- Installation instructions.
- Data sheet.
- Safety information.
- As applicable, documents for expansion modules.
- Online help for the network visualization software GridVis®.

1.5 Defective device/disposal

Before sending **defective devices, modules or components** back to the manufacturer for testing:
· Contact the manufacturer's Support department.
· Send devices, modules or components complete with all accessories.
· When doing so, please bear the terms for transportation in mind.

INFORMATION

Please return defective or damaged devices to Janitza electronics GmbH in accordance with the shipping instructions for air or road freight (complete with accessories).
Observe special regulations for devices with built-in batteries or rechargeable batteries!

Do not attempt to open or repair the device (the component) on your own because otherwise all warranty claims become invalid!

For the **Disposal** of the device please observe national regulations! Dispose of individual parts, as applicable, depending on their composition and existing country-specific regulations, e.g. as
· Electronic waste,
· Batteries and rechargeable batteries.
· Plastics.
· Metals.

Engage a certified disposal company to handle scrapping as needed.

Information on service and maintenance of your device can be found in chapter „16. Service and maintenance“ on page 80.

2. Safety

The chapter on Safety contains information which must be observed to ensure your personal safety and avoid material damage.

2.1 Display of warning notices and safety information

The warning notices shown below
· are found throughout all of the documentation,
· can be found on the devices themselves.
· indicate potential risks and hazards,
· underscore aspects of the information provided that clarifies or simplifies procedures.



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.

2.2 Hazard levels

Warning and safety information is marked by a warning symbol, and the hazard levels are shown as follows, depending on the degree of hazard:

⚠ DANGER
Warns of an imminent danger which, if not avoided, results 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.

2.3 Product safety

The device reflects current engineering practice and accepted safety standards, but hazards can arise nonetheless.

Observe the safety regulations and warning notices. If notices are disregarded, this can lead to personal injury and/or damage to the product.

Every type of tampering with or use of this device,
· which goes beyond the mechanical, electrical or other operating limits can lead to personal injury and/or damage to the product;
· constitutes “misuse” and/or “negligence” under the product’s warranty and thus voids the warranty for any possible resulting damage.

Read and understand the user manual before installing, operating, maintaining and using the device.

Only operate the device when it is in perfect condition and in compliance with this user manual and the associated, included documents. Send defective devices back to the manufacturer in compliance with proper transport conditions. Retain the user manual throughout the service life of the device and keep it at hand for consultation.

When using the device, also observe the legal and safety regulations for your system that are applicable for the respective use case.

⚠ WARNING

Disregarding the connection conditions of the Janitza measurement devices or their components can lead to injuries and even death or to material damage!

· Do not use Janitza measurement devices or components for critical switching, control or protection applications where the safety of persons and property depends on this function.
· Do not carry out switching operations with the Janitza measurement devices or components without prior inspection by your plant manager with specialist knowledge! In particular, the safety of persons, material assets and the applicable standards must be taken into account!

2.4 Dangers when handling the device

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.
Therefore, when handling our devices, always observe the following:

· 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!
· Safety and warning notices in all documents that belong to the devices!

⚠ WARNING

Risk of injury due to electrical voltage!
Severe bodily injury or death can result! Therefore please abide by the following:

· **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!**
· **During operation and troubleshooting (especially for DIN rail devices), check your system for dangerous voltages and switch these off if necessary!**
· **Wear protective clothing and protective equipment in accordance with applicable guidelines when working on electrical systems!**
· **Before making connections to the device/the component, ground the device by means of the ground wire connection, if present.**
· **Do not touching bare or stripped leads that are energized! Equip stranded conductors with wire ferrules!**
· **Hazardous voltages can be present in all circuitry parts that are connected to the power supply.**
· **Protect wires, cables and devices with a suitable line circuit breaker/fuse!**
· **Never switch off, remove or tamper with safety devices!**
· **There can still be hazardous voltages present in the device or in the component even after it has been disconnected from the supply voltage (capacitor storage).**
· **Do not operate equipment with current transformer circuits when open.**
· **Only connect screw terminals with the same number of poles and design!**
· **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!**

2.5 Electrically qualified personnel

To avoid bodily injury and material damage, only electrically qualified personnel are permitted to work on the devices and their components, modules, assemblies, systems and current circuits who have knowledge of:

- the national and international accident prevention regulations,
- safety technology standards,
- installation, commissioning, operation, disconnection, grounding and marking of electrical equipment,
- the requirements concerning personal protective equipment.

Electrically qualified persons within the scope of the technical safety information of all documents associated with the device and its components are persons who can furnish proof of qualification as an electrically skilled person.

⚠ WARNING

Warning against unauthorized manipulation or improper use of the device or its components!
Opening, dismantling or unauthorized manipulation of the device and its components which goes beyond the mechanical, electrical or other operating limits indicated can lead to material damage or injury, up to and including death.

- **Only electrically qualified personnel are permitted to work on the devices and their components, assemblies, systems and current circuits.**
- **Always use your device or component only in the manner described in the associated documentation.**
- **If there is discernible damage, send the device or the component back to the manufacturer!**

2.6 Warranty in the event of damage

Any unauthorized tampering with or use of the device constitutes “misuse” and/or “negligence” under the product’s warranty and thus voids the warranty of any possible resulting damage. In this regard, please take note of section „4.3 Intended use“ on page 21.

2.7 Safety information for handling current transformers and measurement devices with residual current measurement

Only use double-insulated copper cables for the wiring.

⚠ WARNING

Risk of injury due to large currents and high electrical voltage on the current transformers!
Current transformers operated while open on the secondary side (high voltage peaks pose a hazard when touched) can result in severe bodily injury or death.

- **Avoid operating the current transformers while open; short circuit the unloaded transformers!**
- **Before interrupting the current supply, short circuit the secondary connections of the current transformers. Switch any test switches that automatically short circuit the secondary lines of the current transformers to the “Test” status (Check the test switch/short circuiting connection beforehand)!**
- **Only use current transformers with basic insulation to IEC 61010-1!**
- **Caution, even current transformers rated as safe for open operation can pose a hazard when touched during operation while open!**
- **Make sure that screw terminals for the current transformer connection on the device are adequately tightened!**
- **Comply with the information and provisions in the documentation of your current transformers!**

⚠ CAUTION

Risk of injury or damage to the meter due to high measurement currents at the connections of the current transformers!
High measurement currents can cause temperatures of up to 80 °C (176 °F) on the connections of the current transformers

- **Use wiring that is designed for an operating temperature of at least 80 °C (176 °F)!**
- **The current transformers can be hot even after the power supply has been switched off. Allow the connections of the current transformers and the connecting cables to cool down before touching them!**

⚠ WARNING

Risk of injury or damage to the meter due to improper use!
Meters with residual current measurement can trigger warning pulses if limit values are exceeded, and these are used exclusively for monitoring residual currents or failure monitoring. Use of the warning pulses as a stand-alone protective device against electrical shock can lead to injury and even death!
· **Do not use devices with residual current measurement as a stand-alone protective device. Employ suitable protective devices for your system!**

⚠ CAUTION

Risk of injury or damage to the meter/your system due to short circuit!
Inadequate insulation of the operating equipment at the residual current measuring input with respect to the supply circuits can cause voltages at the measuring input which represent a hazard when touched or damage to your device or system.
· **Ensure reinforced or double insulation with respect to the supply circuits!**
· **Ensure galvanic isolation of the residual current measuring inputs from each other!**

2.8 Handling batteries/accumulators

The following apply for the battery used in the device:

⚠ CAUTION

Risk of injury due to fire or burns!
The battery used in the device may cause fire or burns if used improperly.
· **In case of damage, return devices with a soldered battery to the manufacturer, observing proper transport conditions!**

3. Sécurité

Le chapitre Sécurité contient des informations que vous devez respecter pour votre propre sécurité personnelle et pour éviter les dommages matériels.

3.1 Représentation des avertissements et des consignes de sécurité

Les avertissements suivants
· se trouvent dans toute la documentation.
· se trouvent sur les appareils eux-mêmes.
· font référence à des risques et dangers potentiels.
· mettent en évidence des informations qui clarifient ou simplifient les procédures adéquates.



Le symbole supplémentaire sur l'appareil lui-même indique un risque électrique pouvant entraîner des blessures graves ou mortelles.





Le symbole d'avertissement général attire votre attention sur des risques potentiels de blessures. Respectez toutes les consignes figurant sous ce symbole afin d'éviter d'éventuelles blessures, voire des blessures mortelles.

3.2 Niveaux de danger

Les avertissements et les consignes de sécurité sont mis en évidence par un symbole d'avertissement. Les niveaux de danger sont représentés comme suit, en fonction du degré de danger :

⚠ DANGER

Avertissement d'un danger imminent qui, s'il n'est pas évité, peut entraîner des blessures graves ou mortelles.

⚠ AVERTISSEMENT

Avertissement d'une situation potentiellement dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures graves ou mortelles.

⚠ PRUDENCE

Avertissement d'une situation de danger imminent qui, si elle n'est pas évitée, peut entraîner des blessures mineures ou modérées.

ATTENTION

Avertissement d'une situation de danger imminent qui, si elle n'est pas évitée, peut entraîner des dommages matériels ou environnementaux.

INFORMATION

Fait référence à des opérations pour lesquelles il n'y a pas **pas** de risque de dommages corporels ou matériels.

3.3 Sécurité du produit

L'appareil correspond à l'état de la technique et aux règles de sécurité reconnues, mais des dangers peuvent toutefois survenir.

Respectez les consignes de sécurité et les avertissements. Le non-respect des instructions risque de provoquer des dommages personnels et/ou matériels au niveau du produit.

Toute manipulation ou utilisation non autorisée de cet appareil
· qui dépasse les limites de fonctionnement mécaniques, électriques ou autres indiquées peut provoquer des blessures corporelles et/ou endommager le produit.
· constitue un « abus » et/ou une « négligence » au sens de la garantie du produit et exclue donc la garantie de couverture des éventuels dommages qui en découlent.

Veuillez lire et comprendre le manuel d'utilisation avant d'installer, de faire fonctionner, d'entretenir et d'utiliser l'appareil.

Utilisez l'appareil uniquement s'il est en parfait état de fonctionnement, en respectant le présent manuel d'utilisation et les documents qui l'accompagnent. Renvoyez les appareils défectueux au fabricant en respectant les conditions de transport préconisées.
Conservez le manuel d'utilisation pendant toute la durée de vie de l'appareil et tenez-le à disposition pour toute consultation.

De plus, en utilisant l'appareil, respectez les prescriptions légales et consignes de sécurité applicables pour votre installation.

⚠ AVERTISSEMENT

Le non-respect des conditions de raccordement des appareils de mesure Janitza ou de leurs composants peut entraîner des blessures, des blessures mortelles ou des dommages matériels !
- N'utilisez pas les appareils de mesure ou composants Janitza pour des applications critiques de commutation, de commande ou de protection si la sécurité des personnes et des biens dépend de leur fonction.
- N'effectuez pas de manœuvres de commutation avec les appareils de mesure ou composants Janitza sans contrôle préalable par votre responsable d'installation qualifié ! Prenez notamment en compte la sécurité des personnes et des biens ainsi que les normes en vigueur !

3.4 Dangers liés à l'utilisation de l'appareil

Lors de l'utilisation d'appareils électriques, certaines parties de ces appareils se trouvent inévitablement sous une tension dangereuse. Des blessures corporelles graves ou des dommages matériels peuvent donc se produire si l'on n'agit pas de manière professionnelle.
D'une manière générale, veuillez donc toujours respecter les points suivants en utilisant nos appareils :
- ne dépassez pas les valeurs limites indiquées dans le manuel d'utilisation et sur la plaque signalétique ! Tenez compte de cette consigne également lors du contrôle et de la mise en service !
- Respectez les consignes de sécurité et les avertissements dans tous les documents accompagnant les appareils !

⚠ AVERTISSEMENT

Danger de blessure par tension électrique !
Des blessures corporelles graves ou mortelles peuvent survenir ! C'est pourquoi les consignes suivantes doivent être respectées :
- **Avant de travailler sur votre installation, mettez l'installation hors tension ! Sécurisez-la contre toute remise en marche ! Vérifier l'absence de tension ! Mettez l'installation à la terre et en court-circuit ! Recouvrez ou délimitez les parties avoisinantes sous tension !**
- **Lors de l'utilisation et du dépannage (surtout sur des appareils montés sur rail DIN), vérifiez que votre installation ne présente pas de tensions dangereuses et, le cas échéant, désactivez-la !**
- **En travaillant sur des installations électriques, portez des vêtements de protection et un équipement de protection conformes aux directives en vigueur !**
- **Avant de brancher des connexions, mettez l'appareil/le composant à la terre au niveau de la connexion du conducteur de protection, si présent !**
- **Ne touchez pas les câbles dénudés ou sans isolation qui se trouvent sous tension ! Equipez les conducteurs à fils simples d'embouts de câble !**
- **Des tensions dangereuses peuvent être présentes dans toutes les parties du circuit reliées à l'alimentation électrique.**
- **Sécuriser vos lignes, câbles et appareils avec un disjoncteur/fusible approprié !**
- **Ne désactivez, démontez ou manipulez jamais les dispositifs de sécurité !**
- **Même après avoir déconnecté la tension d'alimentation, des tensions dangereuses peuvent être présentes dans l'appareil ou dans le composant (tension résiduelle dans les condensateurs).**
- **Ne faites pas fonctionner les équipements à circuit de transformateur de manière ouverte.**
- **Reliez uniquement des bornes à vis ayant le même nombre de pôles et le même type de construction !**
- **Ne dépassez pas les valeurs limites indiquées dans le manuel d'utilisation et sur la plaque signalétique ! Tenez compte de cette consigne également lors du contrôle et de la mise en service !**
- **Respectez les consignes de sécurité et les avertissements dans les documents accompagnant les appareils et leurs composants !**

3.5 Personnel électrotechnique qualifié

Pour éviter les dommages corporels et matériels, tout travail sur des appareils et leurs composants, modules, sous-ensembles, systèmes et circuits électriques est réservé à des personnes qualifiées qui connaissent

- les directives nationales et internationales en matière de prévention des accidents.
- les normes relatives à la technologie de sécurité.
- les procédures d'installation, de mise en service, d'utilisation, de déconnexion, de mise à la terre et de marquage des équipements électrotechniques.
- les exigences en matière d'équipement de protection individuelle.

Le personnel électrotechnique qualifié au sens des consignes de sécurité de tous les documents relatifs à l'appareil et à ses composants représente des personnes ayant une qualification professionnelle en tant qu'électricien qualifié.

⚠ AVERTISSEMENT

Avertissement contre les manipulations non autorisées ou l'utilisation non conforme de l'appareil ou de ses composants !
L'ouverture, le démontage ou la manipulation non autorisée de l'appareil et de ses composants au-delà des limites de fonctionnement mécaniques, électriques ou autres indiquées peuvent entraîner des dommages matériels ou des blessures, voire des blessures mortelles.

- **Tout travail sur des appareils et leurs composants, modules, sous-ensembles, systèmes et circuits électriques est réservé à des personnes qualifiées en électrotechnique.**
- **Utilisez toujours votre appareil ou votre composant comme décrit dans la documentation correspondante.**
- **Si de dommages sont visibles, renvoyez l'appareil ou le composant au fabricant !**

3.6 Garantie en cas de dommages

Toute manipulation ou utilisation non autorisée de l'appareil constitue un « abus » et/ou une « négligence » au sens de la garantie du produit et exclue donc la garantie de couverture des éventuels dommages qui en découlent. À ce sujet, respectez les indications au chapitre „4.3 Intended use“ on page 21.

3.7 Consignes de sécurité pour l'utilisation de transformateurs et d'appareils de mesure avec mesure du courant différentiel

Utilisez uniquement des câbles en cuivre à double isolation pour le câblage.

⚠ AVERTISSEMENT

Danger de blessure dû à des courants importants et à des tensions électriques élevées au niveau des transformateurs !
Les transformateurs ouverts du côté secondaire (pics de tension élevés dangereux au contact) peuvent entraîner des blessures graves ou mortelles.

- **Evitez le fonctionnement ouvert des transformateurs, court-circuitez les transformateurs non chargés !**
- **Avant d'interrompre la ligne d'alimentation électrique, court-circuitez les connexions secondaires des transformateurs. Mettez les commutateurs de contrôle qui court-circuitent automatiquement les lignes secondaires des transformateurs dans l'état « Contrôler » (vérifiez auparavant les commutateurs de contrôle/court-circuiteurs) !**
- **Utilisez uniquement des transformateurs équipés d'une isolation de base conforme à la norme IEC 61010-1 !**
- **Attention, même les transformateurs à ouverture sûre peuvent présenter un risque de contact en cas de fonctionnement ouvert !**
- **Assurez-vous que les bornes à vis pour le raccordement du transformateur sur l'appareil sont correctement fixées !**
- **Respectez les consignes et dispositions indiquées dans la documentation de vos transformateurs !**

⚠ PRUDENCE

Danger de blessure ou d'endommagement de l'appareil de mesure par des courants de mesure élevés au niveau des connexions des transformateurs !
Des courants de mesure élevés peuvent générer des températures de jusqu'à 80 °C (176 °F) au niveau des bornes des transformateurs.

- **Utilisez des câbles conçus pour une température de fonctionnement de 80 °C (176 °F) minimum !**
- **Même après la coupure de l'alimentation électrique, les transformateurs peuvent être chauds. Laissez refroidir les connexions des transformateurs et les câbles de raccordement avant de les toucher !**

⚠ AVERTISSEMENT

Danger de blessure ou d'endommagement de l'appareil de mesure par une utilisation incorrecte !
En cas de dépassement des valeurs limites, les appareils de mesure avec mesure du courant différentiel peuvent déclencher des impulsions d'avertissement. Celles-ci servent uniquement à surveiller les courants différentiels ou à signaler des pannes de courant. L'utilisation des impulsions d'avertissement en tant que dispositif de protection autonome contre les chocs électriques peut entraîner des blessures ou des blessures mortelles !
· **N'utilisez pas les appareils avec mesure du courant différentiel comme dispositifs de protection autonome. Utilisez des dispositifs de protection adaptés à votre installation !**

⚠ PRUDENCE

Danger de blessure ou d'endommagement de l'appareil de mesure/de votre installation par court-circuit !
Une isolation inadéquate des équipements à l'entrée de mesure du courant différentiel par rapport aux circuits du réseau peut entraîner des tensions dangereuses au contact à l'entrée de mesure ou endommager votre appareil/installation.
· **Renforcez ou doublez l'isolation par rapport aux circuits du réseau !**
· **Séparez galvaniquement les entrées de mesure du courant différentiel les unes des autres !**

3.8 Manipulation des batteries/accumulateurs

Pour la batterie de l'appareil, les consignes suivantes s'appliquent :

⚠ PRUDENCE

Danger de blessures par incendie ou par brûlures chimiques !
La batterie interne l'appareil peut provoquer un incendie ou des brûlures chimiques si elle n'est pas utilisée correctement.
· **En cas d'endommagement, renvoyez les appareils équipés d'une batterie fixe au fabricant en respectant les conditions de transport !**

4. Product description

4.1 Device description

The device is a multifunctional network analyzer and is suitable for:

- Measurements and calculations of electrical quantities such as voltage, current, power, energy, harmonics current in building installations, on distribution boards, circuit breakers and busbar trunking systems.
- an extension of the range of functions with the 800-EC1 module.
- Measurements of voltages and currents from the same network.
- Measurements in low voltage networks (3-phase 4-conductor systems) with rated voltages up to L-L 480 V and L-N 277 V (measurement category 300 V CAT III).
- Measurements in medium and high voltage networks via current and voltage transformers.
- Current measurement via
  - External ../1 A or ../5 A current transformers.
  - Channel I5 (residual current measurement).
- Installation in industrial applications, in any installation position.
- The measurement of residual currents (Residual Current Monitoring, RCM) of an electrical system. The measurement device is not a protective device against electric shock!
- Use in industrial areas.

Measurement results are displayed by the measurement device and can be read and processed via interfaces.

⚠ CAUTION

Malfunction and damage of the device or risk of injury due to improper connection.
Improperly connected devices can deliver incorrect measured values, damage the device or pose a risk of injury to persons.
Observe the following:

- **That measured voltages and currents come from the same network.**
- **Do not use the device for measuring direct current / direct voltage!**
- **Ground current-conducting switchboards!**

4.2 Incoming goods inspection

Safe and trouble-free operation of this device and its components presupposes proper transport, proper storage, set-up and assembly as well as operation and maintenance in addition to compliance with the safety information and warning notices.

Exercise due caution when unpacking and packing the device, do not use force and only use suitable tools.

Before installing the device, please check the following:

- Its flawless mechanical condition by visual inspection.
- The scope of delivery for completeness.

If it can be assumed that safe operation of the device is no longer possible:

- Disconnect the device from the mains immediately!
- Secure the device against being switched on again!

It can be assumed that safe operation is no longer possible if the device, for example:

- Has visible damage.
- 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.).

4.3 Intended use

The device is:
· Only intended for use in the industrial sector for industrial applications.
· 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 interior meter.

Safe and trouble-free operation of the device requires proper transport, storage, assembly, installation, operation and maintenance.

4.4 Performance characteristics

General
- DIN rail measurement device with the dimensions 90 x 90 x 64 mm
- Mounting on DIN rail 35 mm
- Modularly expandable with the 806-EC1 module
- LCD display with backlight
- Operation via 2 buttons
- Password protection
- 4 voltage and 4 current measurement inputs, 1 residual current measurement input
- RS-485 interface (Modbus RTU)
- 1 temperature measuring input
- 1 pulse output (active energy)

Measurement uncertainty UMG 806
- Active energy, measurement uncertainty class 0.5S S for ../5 A transformers.
- Active energy, measurement uncertainty class 1 for ../1 A transformers.
- Reactive energy, class 2

Measurement
- Measurement in TN, TT and IT networks
- Measurement in networks with nominal voltages up to L-L 480 V and L-N 277 V (300 V CAT III)
- Measuring range, current 0.01 .. 6 A_{rms}
- True effective value measurement (TRMS)
- Continuous sampling of the voltage and current measurement inputs
- Frequency range of the fundamental oscillation 45 Hz .. 65 Hz
- Measurements of harmonics current, 1st to 31st for U and I
- Residual current and temperature measurement

4.5 EU conformity declaration

Please see the EU declaration of conformity posted at www.janitza.com for the laws, standards and directives applied by Janitza electronics GmbH for the devices. The CE conformity marking requirements for the device arise from the EU conformity declaration and the laws, standards and directives mentioned therein.

4.9 FCC Declaration of Conformity

The device
- complies with Part 15 of the FCC Rules for Class A digital devices (limits to protect against harmful interference in a industrial areas).
- generates, uses and can radiate high-frequency energy
- can cause harmful interference to radio communications if not installed and used properly. There is no guarantee that interference will not occur in a particular installation.

If there is radio or television reception interference, which can be determined by turning the device on and off, proceed as follows:
- Align or reposition the receiving antenna.
- Increase the distance between the device and the radio/television receiver.
- Connect the device and the radio/television receiver in different circuits.
- if necessary, contact Janitza support or a radio/television technician.

Code of Federal Regulations, Title 47, Part 15, Subpart B - Unintentional Radiators.

4.6 Scope of delivery

Quantity	Part. no.	Designation
1	14 02 XXX*	UMG 806
1	33 03 382	Installation instructions DE/EN

Tab. Scope of delivery
** Article number see delivery note*

4.7 Accessories

Quantity	Part. no.	Designation
1	14 02 051	Module 806-EC1 Ethernet communication module

Tab. Accessories

INFORMATION

- All screw terminals of the modules included in the scope of delivery are attached to the device.
- All supplied options and design variants are described on the delivery note.

4.8 Transformer

Please note! It is not permitted to use the outputs of Janitza measurement devices and components for switching protective devices or protective relays! Use **only** UL/IEC listed “Current transformers for measuring purposes” for Janitza measurement devices and Janitza components!
“Transformers”, unlike “protection transformers”, go into saturation at high current peaks. “Protection transformers” do not have this saturation behavior and can therefore significantly exceed the rated values in the secondary circuit. This can overload the current measurement inputs of the measurement devices!

⚠ WARNING

Risk of injury due to electrical voltage!
Severe bodily injury or death can result! Therefore please abide by the following:

- **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!**
- **During operation and troubleshooting (especially for DIN rail devices), check your system for dangerous voltages and switch these off if necessary!**
- **Wear protective clothing and protective equipment in accordance with applicable guidelines when working on electrical systems!**
- **Before making connections to the device/the component, ground the device by means of the ground wire connection, if present.**
- **Do not touching bare or stripped leads that are energized! Equip stranded conductors with wire ferrules!**
- **Hazardous voltages can be present in all circuitry parts that are connected to the power supply.**
- **Protect wires, cables and devices with a suitable line circuit breaker/fuse!**
- **Never switch off, remove or tamper with safety devices!**
- **There can still be hazardous voltages present in the device or in the component even after it has been disconnected from the supply voltage (capacitor storage).**
- **Do not operate equipment with current transformer circuits when open.**
- **Only connect screw terminals with the same number of poles and design!**
- **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!**

UMG 806 for use with listed energy-monitoring current transformers

UMG 806 à utiliser avec les transformateurs de courant de surveillance de l'énergie répertoriés

Furthermore, please note that Janitza measurement devices and components are **not** to be used for critical switching, control or protection applications (protective relays)!
Observe the safety and warning information in the chapters „8. Installation“ on page 32 and „2.3 Product safety“ on page 12!

⚠ AVERTISSEMENT

Danger de blessure par tension électrique !
Des blessures corporelles graves ou mortelles peuvent survenir ! C'est pourquoi les consignes suivantes doivent être respectées :

- **Avant de travailler sur votre installation, mettez l'installation hors tension ! Sécurisez-la contre toute remise en marche ! Vérifier l'absence de tension ! Mettez l'installation à la terre et en court-circuit ! Recouvrez ou délimitez les parties avoisinantes sous tension !**
- **Lors de l'utilisation et du dépannage (surtout sur des appareils montés sur rail DIN), vérifiez que votre installation ne présente pas de tensions dangereuses et, le cas échéant, désactivez-la !**
- **En travaillant sur des installations électriques, portez des vêtements de protection et un équipement de protection conformes aux directives en vigueur !**
- **Avant de brancher des connexions, mettez l'appareil/le composant à la terre au niveau de la connexion du conducteur de protection, si présent !**
- **Ne touchez pas les câbles dénudés ou sans isolation qui se trouvent sous tension ! Equipez les conducteurs à fils simples d'embouts de câble !**
- **Des tensions dangereuses peuvent être présentes dans toutes les parties du circuit reliées à l'alimentation électrique.**
- **Sécuriser vos lignes, câbles et appareils avec un disjoncteur/fusible approprié !**
- **Ne désactivez, démontez ou manipulez jamais les dispositifs de sécurité !**
- **Même après avoir déconnecté la tension d'alimentation, des tensions dangereuses peuvent être présentes dans l'appareil ou dans le composant (tension résiduelle dans les condensateurs).**
- **Ne faites pas fonctionner les équipements à circuit de transformateur de manière ouverte.**
- **Reliez uniquement des bornes à vis ayant le même nombre de pôles et le même type de construction !**
- **Ne dépassez pas les valeurs limites indiquées dans le manuel d'utilisation et sur la plaque signalétique ! Tenez compte de cette consigne également lors du contrôle et de la mise en service !**
- **Respectez les consignes de sécurité et les avertissements dans les documents accompagnant les appareils et leurs composants !**

4.10 Operating concept

The following options are offered for operating, configuring or reading the meter:
· **2 function buttons with display** for configuration and acquisition of data.

A standard Modbus address list is available at www.janitza.com.

This user manual describes how to operate the meter using 2 buttons. The GridVis® software has "online help" and e-learning instructions.

4.11 GridVis® network analysis software

Use the GridVis® network analysis software available at www.janitza.com to read out data for analysis. To do so, connect a PC to your measurement device via the Ethernet interface.

Performance characteristics of the GridVis® software

· Read out the device.
· Graphic display of measured values.
· Analysis of read data.
· Create reports.

Connections to the PC
Connections for communication between the PC and the measurement device can be found in chap. „9.1 Connection to a PC“ on page 47.

4.12 Overview of the range of functions

4.12.1 Configuration on the device (via 2 buttons)

· Password protection
· Module enhancements
· Current transformer primary / secondary
· Voltage transformer primary / secondary
· Fieldbus parameters
· Digital output
· Time, LCD standby
· Automatic change of the measuring displays

4.12.2 Communication

· One RS-485 interface for communication with Modbus/RTU devices.
· One Ethernet interface with the 806-EC1 module (available optionally).

4.12.3 Measured values / functions

Measured values / functions	
Voltage, current	✓
Neutral current	✓
Phase measured values, such as active / reactive / apparent power	✓
Phase and total power factor	✓
Active energy	✓
Active energy (applied, delivered)	✓
Apparent energy	✓
Reactive energy	✓
Reactive energy (ind., cap.)	✓
Distortion factor THD I / THD U	✓
Harmonics	1st - 31st
Phase position	✓
Unbalance	✓
Power factor	✓
Data recording of the min./max. values	✓

Table Overview of the measured values recorded by the device.

5. Structure of the device

5.1 Front panel and display

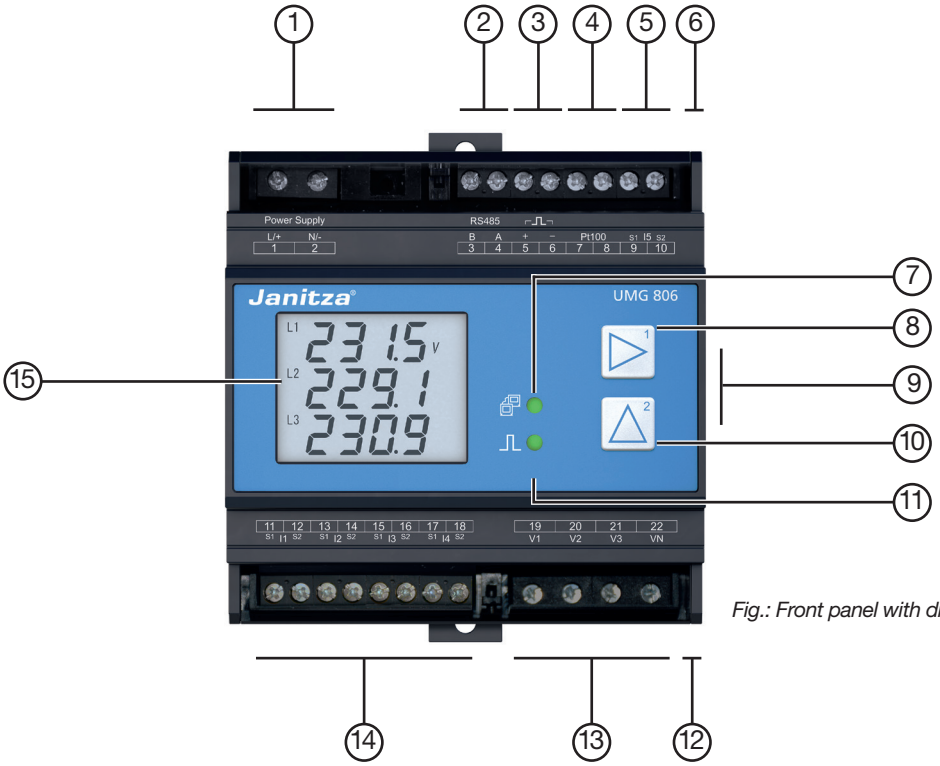


Fig.: Front panel with display

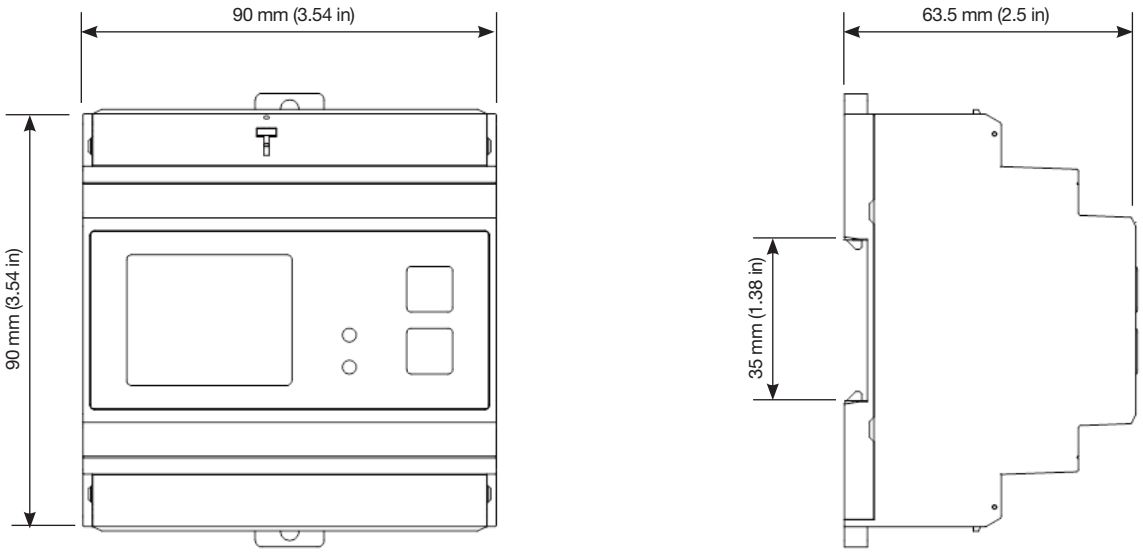


Fig.: Device front with screw terminal covers and display - 3D

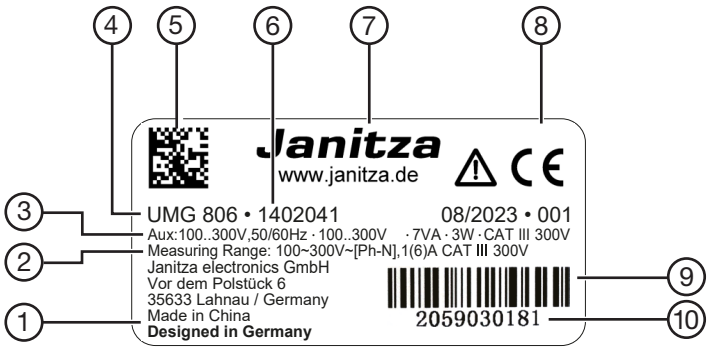
Item	Function/Designation
1	Supply voltage connection
2	RS-485 interface
3	Digital output (active energy)
4	Temperature measurement input (PT100)
5	Residual current measurement input I5
6	Module locking
7	LED (communication)
8	Button 1
9	Module communication interface
10	Button 2
11	LED (pulse activity)
12	Module locking
13	Voltage measurement inputs V_1, V_2, V_3 and V_N
14	Current measurement inputs I1 to I4
15	Device display
16	Cover plate for screw terminals (1) to (6)
17	Cover for the screw terminals (14) and (15)

Tab.: Device structure - Connections and controls

5.2 Front view / side view



5.3 Identification of the device (rating plate)



Item	Designation	Description
1	Designation of origin	Country of origin of the manufacturer.
2	Measuring Range	Measuring range of the measurement point.
3	Operational data	Supply voltage and maximum power consumption.
4	Device type	Device designation.
5	DataMatrix code	Coded manufacturer data.
6	Part number	Manufacturer's part number.
7	Logo/Internet address of the manufacturer	Logo of the device manufacturer.
8	CE conformity marking	See "EU Declaration of Conformity".
9	Barcode	Code for unique product identification.
10	Type/serial number	Number for identification of the device.

Tab.: Device identification, rating plate

6. Mounting

6.1 Installation location

⚠ DANGER

Danger of electric shock!
Electric shocks lead to serious injuries, including death.
· Disconnect your system from the power supply before mounting and connecting the device!
· 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!
· The installation must only be carried out by qualified personnel with electrical training!

Mount the meter in switch cabinets or small distribution boards according to DIN 43880 on a 35 mm mounting rail (for type, see chapter „17. Technical information“ on page 83) according to DIN EN 60715. The mounting orientation is arbitrary.

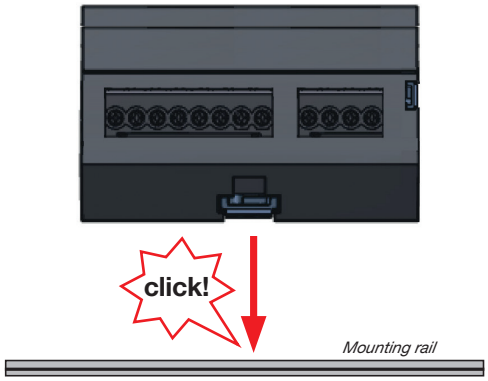


Fig. Mounting on mounting rail



Fig. Device on mounting rail to DIN EN 60715

6.2 Mounting orientation and attachment

Proceed as follows to mount the UMG 806 on the mounting rail:

1. Push in the bottom bolt of the clamping mechanism.

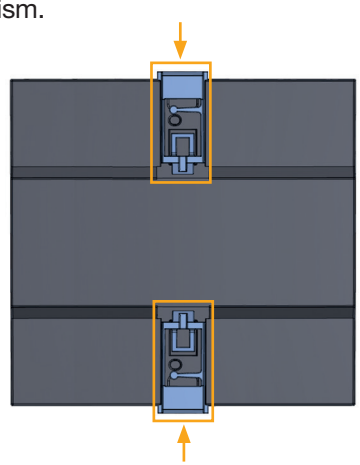


Fig. Bottom of the device with bottom bolt.

2. Place your measurement device on the mounting rail. Press the device onto the rail until the bottom bolts engage.

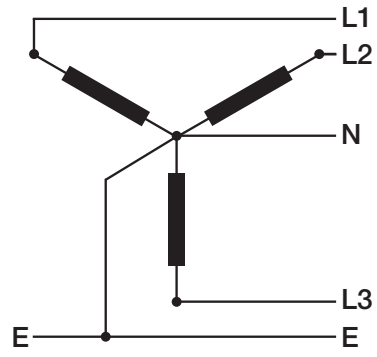
ATTENTION

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, as needed, cooling when the temperatures are high.

7. Grid systems

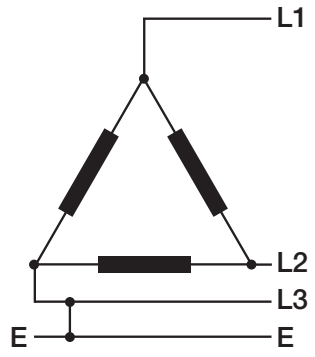
Suitable grid systems and maximum rated voltages according to DIN EN 61010-1/A1:

Three-phase 4-conductor systems
with grounded neutral conductor



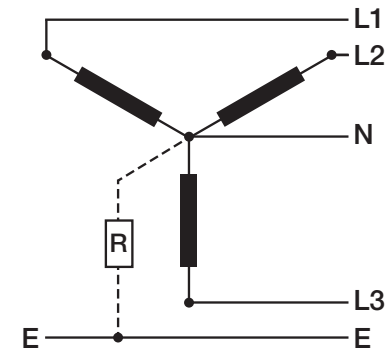
IEC	U_{L-N} / U_{L-L}: 277 V_{LN} / 480 V_{LL}
UL	U_{L-N} / U_{L-L}: 277 V_{LN} / 480 V_{LL}

Three-phase 3-conductor systems
with grounded phase



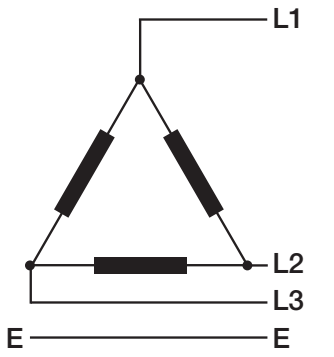
IEC	U_{L-L} 480 V_{LL}
UL	U_{L-L} 480 V_{LL}

Three-phase 4-conductor systems
with non-grounded neutral conductor (IT networks)



IEC	U_{L-N} / U_{L-L}: 277 V_{LN} / 480 V_{LL}
UL	U_{L-N} / U_{L-L}: 277 V_{LN} / 480 V_{LL}

Three-phase 3-conductor systems
ungrounded



IEC	U_{L-L} 480 V_{LL}
UL	U_{L-L} 480 V_{LL}

Range of application of the meter:
- 3 and 4-conductor networks (TN, TT and IT networks).
- Residential and industrial areas.

⚠ WARNING

Risk of injury due to electrical voltage!
Rated surge voltages above the permitted overvoltage category can damage the insulation in the device. This impairs the safety of the device. This can result in serious injury or death.
- **Only use the device in environments which comply with the permissible rated surge voltage.**
- **Observe the limit values specified in the user manual and on the rating plate.**

8. Installation

Use the meter for voltage measurement in TN, TT and IT networks with the approved overvoltage category.

⚠ WARNING

Risk of injury due to electrical voltage!
Do **not** short-circuit secondary connections of voltage transformers! This can result in serious injury or death.
· **Connect voltage transformers according to their documentation!**
· **Check your installation!**

⚠ WARNING

Disregard of the connection conditions of the transformers to Janitza measurement devices or their components can lead to injuries or even death or to material damage!
· Do not use Janitza measurement devices or components for critical switching, control or protection applications (protective relays)! It is not permitted to use measured values or measurement device outputs for critical applications!
· For Janitza measurement devices and their components use **only"Transformers for measurement purposes"** which are suitable for the energy monitoring of your system. Do **not use "Transformers for protection purposes"**!
· Observe the information, regulations and limit values in the use information on **"Transformers for measuring purposes"**, specifically during testing and commissioning of the Janitza measurement device, the Janitza component and your system.

8.1 Nominal voltages

8.1.1 Three-phase 4-conductor network

The device can be used in three-phase 4-conductor systems (TN, TT network) (50 Hz, 60 Hz) with grounded neutral conductor. The components of the electrical system are grounded.

Suitable mains and nominal voltages for your meter:

U_{L-N} / U_{L-L}
66 V / 115 V
120 V / 208 V
127 V / 220 V
220 V / 380 V
230 V / 400 V
240 V / 415 V
260 V / 440 V
277 V / 480 V

Tab.: Nominal network voltages suitable for measuring inputs acc. to EN 60664-1

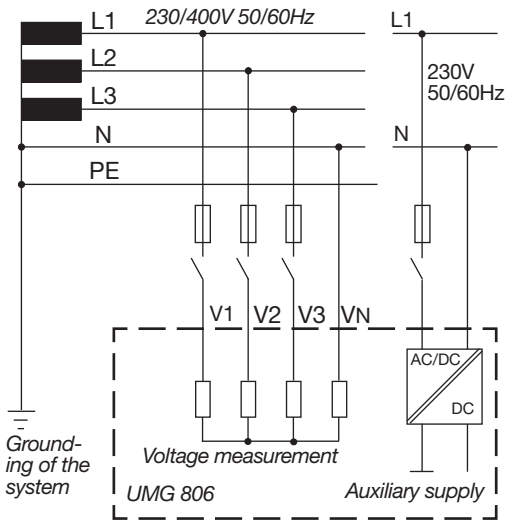


Fig. Schematic diagram, UMG 806 in a TN network

8.1.2 Three-phase 3-conductor network

The device can be used in ungrounded three-phase 3-conductor systems (IT network).

- In an IT system, the neutral point of the voltage generator is not grounded.
- The components of the electrical system are grounded.
- Grounding via a high-ohmic impedance is permitted.

IT networks are only permitted in certain systems with their own transformer or generator.

Suitable mains and nominal voltages for your meter:

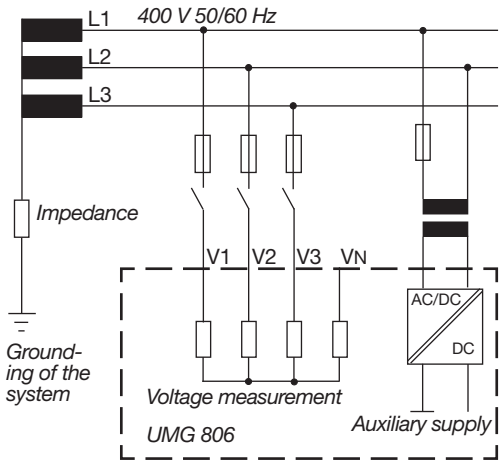


Fig. Schematic diagram, UMG 806 in an IT network without N.

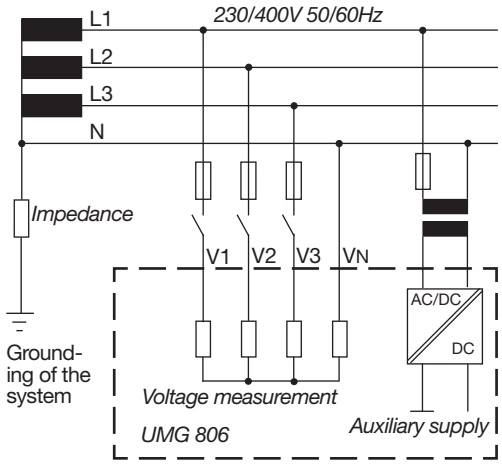


Fig. Schematic diagram, UMG 806 in an IT network with N.

Suitable mains and nominal voltages for your meter:

U_{L-L}	U_{L-L}
66 V	277 V
115 V	347 V
120 V	380 V
127 V	400 V
200 V	415 V
230 V	440 V
240 V	480 V
260 V	

Tab.: Nominal network voltages suitable for measuring inputs acc. to EN 60664-1

8.2 Disconnect switch

When installing in a building, provide a suitable disconnect switch for the supply voltage in order to disconnect your system and thus your device from the supply of power.

· Install the disconnect switch of your system or device in such a way that it is easily accessible by the user.
· Mark the switch as an isolation device for your system or device.

8.3 Supply voltage

⚠ 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 mounting and connecting the device!
· 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!

A supply voltage is required to operate the device. The type and level of the supply voltage for your device can be found on the rating plate.

The supply voltage is connected via the terminals on the front of the device.

Before applying the supply voltage, make sure that the voltage and frequency match the specifications on the rating plate.

After connecting the supply voltage, the display becomes active.

ⓘ *INFORMATION*

Note that the device requires an initialization phase (boot time) at startup!

If no display appears, check:
· The connection of your device.
· The supply voltage.

ⓘ *INFORMATION*

The fuse is a line protection - it is not a device protection!

ATTENTION

Material damage due to disregard of the connection instructions!
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!
· Comply with the limit values (see "Technical data") as described!
· 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.

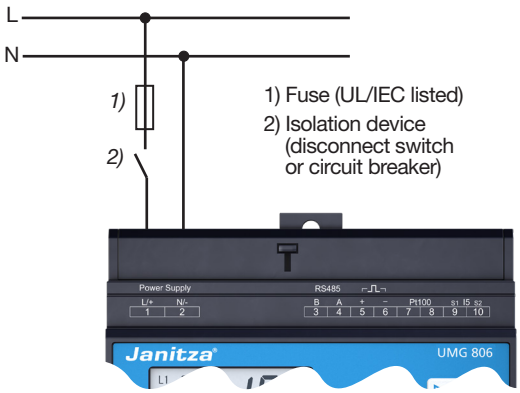


Fig. Supply voltage connection.

⚠ WARNUNG

Risk of injury or damage to the appliance due to electrical voltage and improper connection! Ambient influences can cause temperatures of more than 60 °C (140 °F) at the connections. Use cables for an operating temperature of up to 80 °C (176 °F)!

⚠ WARNUNG

Risque de blessure ou d'endommagement de l'appareil en raison de la tension électrique et d'un raccordement non conforme ! Les influences environnementales peuvent générer des températures supérieures à 60 °C (140 °F) au niveau des connexions. Utilisez des câbles pour une température de fonctionnement allant jusqu'à 80 °C (176 °F) !

8.4 Voltage measurement

The device has 4 voltage measurement inputs (V_1,V_2, V_3 and V_N) and is suitable for various connection variants.

⚠ WARNING

Risk of injury or damage to the device due to electrical voltage and improper connection!
Disregard of the conditions for the connections of the voltage and current measurement inputs may damage the device or cause serious injury or death. Connecting the voltage lines to the current measurement inputs also poses a fire hazard!
Therefore, please abide by the following:

- **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!**
- **Check the condition of the connections, including the cabling, especially the connection of the voltage and current measurement.**
- **Do not apply a DC voltage**
  - **to the voltage measurement inputs.**
  - **Equip the voltage measurement inputs with a suitable, marked fuse and isolation device (alternatively: line circuit breaker) located nearby.**
  - **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.

⚠ WARNUNG

Risk of injury or damage to the appliance due to electrical voltage and improper connection!
Ambient influences can cause temperatures of more than 60 °C (140 °F) at the connections.
Use cables for an operating temperature of up to 80 °C (176 °F)!

⚠ WARNUNG

Risque de blessure ou d'endommagement de l'appareil en raison de la tension électrique et d'un raccordement non conforme !
Les influences environnementales peuvent générer des températures supérieures à 60 °C (140 °F) au niveau des connexions.
Utilisez des câbles pour une température de fonctionnement allant jusqu'à 80 °C (176 °F) !

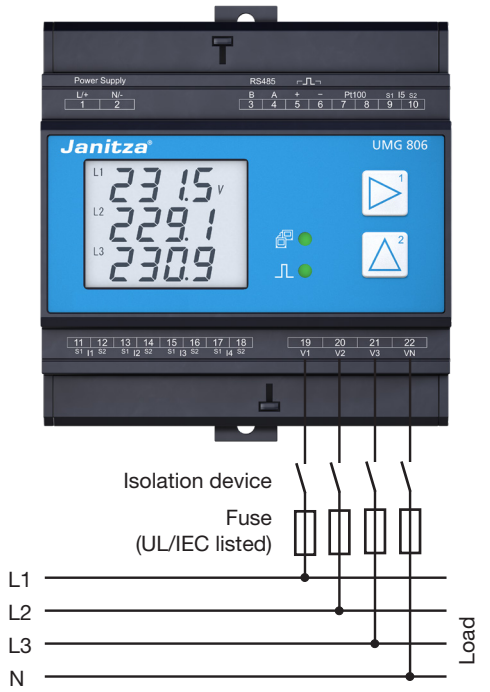


Fig. Connection example for "voltage measurement".

8.4.1 Overvoltage

The voltage measurement inputs are designed for measurements in low-voltage networks in which nominal voltages occur as described in the chapter "Technical data".
Information on the rated surge voltages and overvoltage categories can also be found in the technical data.

8.4.2 Mains frequency

The device:

- Requires the mains frequency for the measurement and calculation of measured values.
- Is suitable for measurement in networks in which the fundamental oscillation of the voltage is in the range from 45 Hz to 65 Hz.
- Requires a voltage at the voltage measurement input for the automatic determination of the mains frequency
- Calculates the sampling frequency of the voltage and current measurement inputs from the mains frequency.

ⓘ *INFORMATION*

The device only determines measured values if there is a voltage at the voltage measurement input.

Use line protection with IEC/UL approval (1 - 10 A, tripping characteristic B) as an overcurrent protective device for the voltage measurements.

8.5 Current measurement

The devices:
· Measures current exclusively via current transformers.
· Does not measure DC currents.
· Permits the connection of current transformers with a transformer ratio of ../1 A and ../5 A for current measurement inputs I1 to I4 (terminals 11-18).
· Has a current transformer ratio of 5/5A (I1 to I4) as the default setting.
· Permits a residual current measurement via current measurement input I5 (terminals 9/10)

The current transformers require a basic insulation according to IEC 61010-1 for the nominal voltage of the circuit.

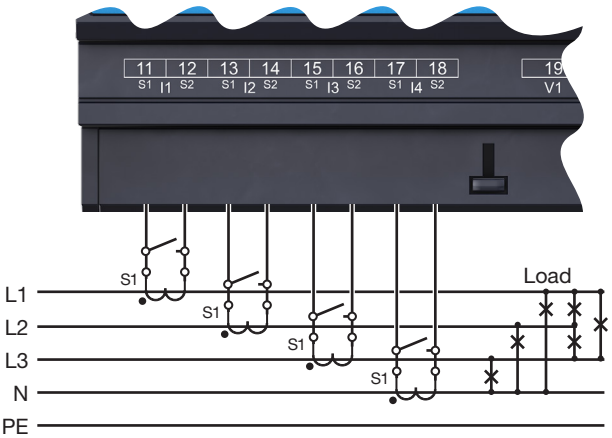


Fig. Connection example for "current measurement".

UMG 806 for use with listed energy-monitoring current transformers

The current transformer cables must remain within the same housing of the end product.

The current transformers are intended for installation within the same enclosure as the equipment. They may not be installed within switchgears an panel boards.

WARNING

Risk of injury due to electrical voltage!
Severe bodily injury or death can result! Therefore please abide by the following:
· **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!**
· **During operation and troubleshooting (especially for DIN rail devices), check your system for dangerous voltages and switch these off if necessary!**
· **Wear protective clothing and protective equipment in accordance with applicable guidelines when working on electrical systems!**
· **Before making connections to the device/the component, ground the device by means of the ground wire connection, if present.**
· **Do not touching bare or stripped leads that are energized! Equip stranded conductors with wire ferrules!**
· **Hazardous voltages can be present in all circuitry parts that are connected to the power supply.**
· **Protect wires, cables and devices with a suitable line circuit breaker/fuse!**
· **Never switch off, remove or tamper with safety devices!**
· **There can still be hazardous voltages present in the device or in the component even after it has been disconnected from the supply voltage (capacitor storage).**
· **Do not operate equipment with current transformer circuits when open.**
· **Only connect screw terminals with the same number of poles and design!**
· **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!**

ATTENTION

Material damage due to disregard of the connection instructions during current measurement.
Failure to comply with the connection requirements of your device can result in the permissible current measurement range being exceeded. This can lead to damage or destruction of or fire in your device or system and thus to material damage!
· **Use current transformers for current measurement! The device only allows current measurement via current transformers!**
· **Observe the connection conditions for the current measurement inputs of your device and the current transformers!**

⚠ AVERTISSEMENT

Danger de blessure par tension électrique !
Des blessures corporelles graves ou mortelles peuvent survenir ! C'est pourquoi les consignes suivantes doivent être respectées :

- **Avant de travailler sur votre installation, mettez l'installation hors tension ! Sécurisez-la contre toute remise en marche ! Vérifier l'absence de tension ! Mettez l'installation à la terre et en court-circuit ! Recouvrez ou délimitez les parties avoisinantes sous tension !**
- **Lors de l'utilisation et du dépannage (surtout sur des appareils montés sur rail DIN), vérifiez que votre installation ne présente pas de tensions dangereuses et, le cas échéant, désactivez-la !**
- **En travaillant sur des installations électriques, portez des vêtements de protection et un équipement de protection conformes aux directives en vigueur !**
- **Avant de brancher des connexions, mettez l'appareil/le composant à la terre au niveau de la connexion du conducteur de protection, si présent !**
- **Ne touchez pas les câbles dénudés ou sans isolation qui se trouvent sous tension ! Equipez les conducteurs à fils simples d'embouts de câble !**
- **Des tensions dangereuses peuvent être présentes dans toutes les parties du circuit reliées à l'alimentation électrique.**
- **Sécuriser vos lignes, câbles et appareils avec un disjoncteur/fusible approprié !**
- **Ne désactivez, démontez ou manipulez jamais les dispositifs de sécurité !**
- **Même après avoir déconnecté la tension d'alimentation, des tensions dangereuses peuvent être présentes dans l'appareil ou dans le composant (tension résiduelle dans les condensateurs).**
- **Ne faites pas fonctionner les équipements à circuit de transformateur de manière ouverte.**
- **Reliez uniquement des bornes à vis ayant le même nombre de pôles et le même type de construction !**
- **Ne dépassez pas les valeurs limites indiquées dans le manuel d'utilisation et sur la plaque signalétique ! Tenez compte de cette consigne également lors du contrôle et de la mise en service !**
- **Respectez les consignes de sécurité et les avertissements dans les documents accompagnant les appareils et leurs composants !**

⚠ WARNING

Risk of injury due to high currents and high electrical voltages!
Severe bodily injury or death can result from:

- Touching bare or stripped leads that are energized.
- Dangerous live current measurement inputs of the device and at the current transformers.

Therefore, please note for your system:

- **Disconnect the supply of power before starting work!**
- **Secure it against being switched on!**
- **Check to be sure it is de-energized!**
- **Ground and short circuit! Use the ground connection points with the ground symbol for grounding!**
- **Cover or block off adjacent live parts!**

⚠ WARNING

Risk of injury due to electrical voltage at current transformers!
Current transformers which are operated exposed on the secondary side can carry hazardous live high voltage peaks which can lead to serious bodily injury or death.
Therefore please abide by the following:

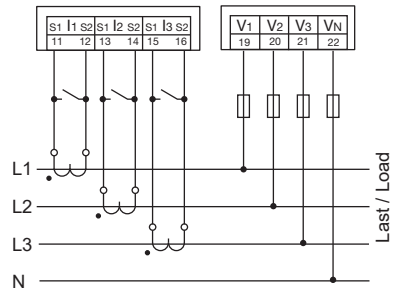
- **Switch off your installation before commencing work! Secure it against being switched on! Check to be sure it is de-energized! Ground and short circuit! Cover or block off adjacent live parts!**
- **Avoid exposed operation of the current transformers.**
- **Short-circuit unloaded current transformers.**
- **Before interrupting the current supply, short circuit the secondary connections of the current transformers.**
- **If there is a test switch which automatically short-circuits the secondary current transformer lines, it is sufficient to set it to the "Test" position, provided that the short-circuiters have been checked beforehand.**
- **Only use current transformers with basic insulation according to IEC 61010-1.**
- **Even current transformers rated as safe for exposed operation are dangerous to touch if they are operated exposed.**

⚠ WARNING

Risk of injury or damage to the device due to electrical voltage and improper connection!
High measuring currents can cause temperatures of up to 80 °C (176 °F) at the connections.
Use wiring designed for an operating temperature of up to 80 °C (176 °F)!

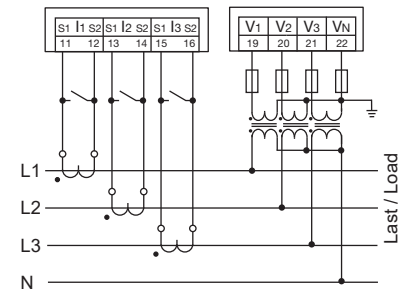
8.5.1 Measuring variants

Three-phase 4-conductor system



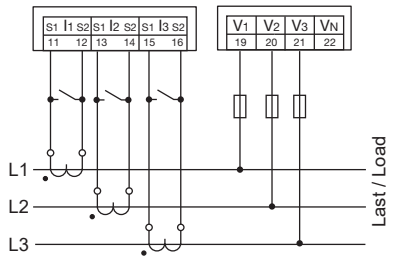
Current measurement via 3 current transformers

Three-phase 4-conductor system



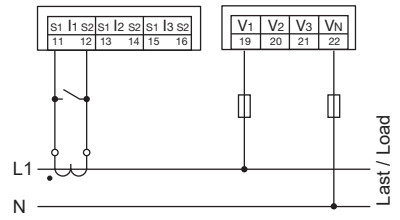
Measurement via 3 current and 3 voltage transformers

Three-phase 3-conductor system



Current measurement via 3 current transformers

One-phase 2-conductor system



Current measurement via 1 current transformer

⚠ WARNING

Risk of injury or damage and fire hazard to the device due to improper connection!
Disregard of the conditions for the connections, e.g. connecting the voltage lines to the current measurement inputs, may damage the device or cause serious injury or death. Connecting the voltage lines to the current measurement inputs also poses a fire hazard!

Therefore, please abide by the following before start-up:

- **Check the condition of the connections, including the cabling, especially the connection of the voltage and current measurement.**

INFORMATION

Current transformer ratios can be configured conveniently via the device menu.

For information on programming the current transformer ratios, refer to the chapter „11.2.2 Configuring the current transformer ratios“ on page 53.

INFORMATION

When measuring via one-phase 2-conductor system, only the measured phase is calculated. The other phases are not affected.

8.5.2 Summation current measurement

For a summation current measurement via two current transformers, first set their total ratio on the device (for setting the current transformer ratios, see section „11.2.2 Configuring the current transformer ratios“ on page 53).

Example:
The current is measured via two current transformers. Both current transformers have a ratio of 1000/5 A. The summation measurement is carried out with a summation current transformer of 5+5/5 A.
Set the device as follows:
Primary current: 1000 A + 1000 A = **2000 A**
Secondary current: **5A**

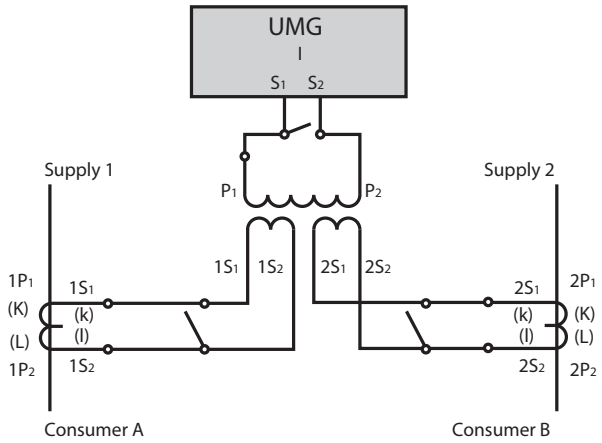


Fig. Example for current measurement via a summation current transformer.

8.5.3 Ammeter

For a current measurement with an additional ammeter, connect the ammeter in series to the UMG:

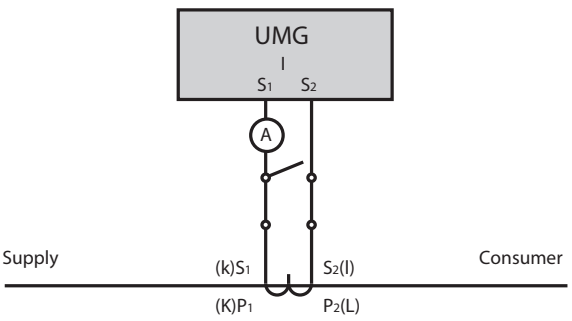


Fig. Example circuit diagram with ammeter in series connection

8.6 Residual current measurement (RCM)

The measurement device is suitable as a residual current monitoring device (RCM) for monitoring alternating currents and pulsating direct currents.

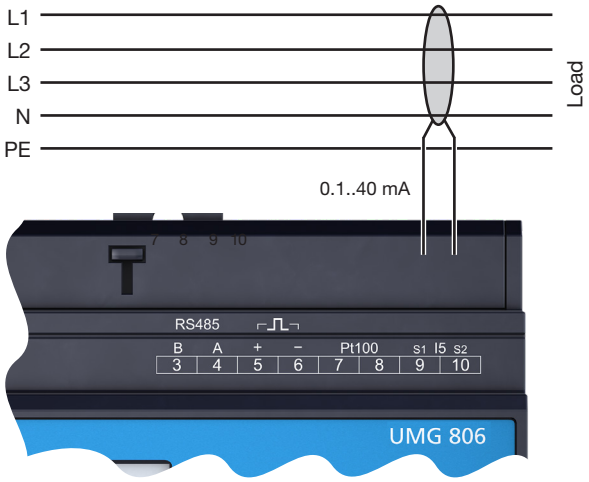


Fig. Connection example “Variant, residual current measurement” via current transformer (Type A).

Residual current transformers with a nominal current as given in the section "Technical data" are suitable for the meter’s residual current measurement function.

Monitoring the residual currents of an electrical system via the residual current input of the device (terminal 9/10, I5), allows an alarm management system to be set up using the GridVis® software. This allows the system operator to be alerted before a protective device is triggered.

The measurements in medium and high voltage networks are made via current and voltage transformers.

INFORMATION

The meter is not an independent protective device against electric shock!

INFORMATION

Suitable for recording residual currents > 100 mA in combination with Janitza residual current transformers.

8.6.1 Current direction of the residual current transformers

For residual current measurement with current transformers in AC operation at the measuring inputs, the device does not distinguish between the current directions. Incorrect connection of the residual current transformers in AC operation does not require subsequent rewiring.

INFORMATION

The meter does not distinguish between the current directions of the residual currents.
The residual currents of the grid side or load side are **not** directionally sensitive.

WARNING

Risk of injury due to large currents and high electrical voltage on the current transformers!
Current transformers operated while open on the secondary side (high voltage peaks pose a hazard when touched) can result in severe bodily injury or death.

- **Avoid operating the current transformers while open; short circuit the unloaded transformers!**
- **Before interrupting the current supply, short circuit the secondary connections of the current transformers. Switch any test switches that automatically short circuit the secondary lines of the current transformers to the "Test" status (Check the test switch/short circuiting connection beforehand)!**
- **Only use current transformers with basic insulation to IEC 61010-1!**
- **Caution, even current transformers rated as safe for open operation can pose a hazard when touched during operation while open!**
- **Make sure that screw terminals for the current transformer connection on the device are adequately tightened!**
- **Comply with the information and provisions in the documentation of your current transformers!**
- **Ground connections present on the secondary windings of the current transformers must be connected to ground!**
- **Observe the general safety information for handling current transformers and devices with residual current measurement.**

8.6.2 Residual current transformer example

Operating equipment must have reinforced or double insulation from supply circuits!

Example:
A residual current transformer is used to measure on insulated mains wiring in a 300 V CAT III network.
Solution:
Provide basic insulation for 300 V CAT III for the insulation of the network wiring and the insulation of the residual current transformer. This corresponds to a test voltage of 1500 V AC (1 min. duration) for the insulated network wiring and a test voltage of 1500 V AC (1 min. duration) for the residual current transformer.

CAUTION

Risk of injury or damage to the meter/your system due to short circuit!
Inadequate insulation of the operating equipment at the residual current measuring input with respect to the supply circuits can cause voltages at the measuring input which represent a hazard when touched or damage to your device or system.

- **Ensure reinforced or double insulation with respect to the supply circuits.**

WARNING

Risk of injury or damage to the device due to electrical voltage and improper connection!
High measuring currents can cause temperatures of up to 80 °C (176 °F) at the connections.
Use wiring designed for an operating temperature of up to 80 °C (176 °F)!

8.6.3 Connection example - Residual current monitoring

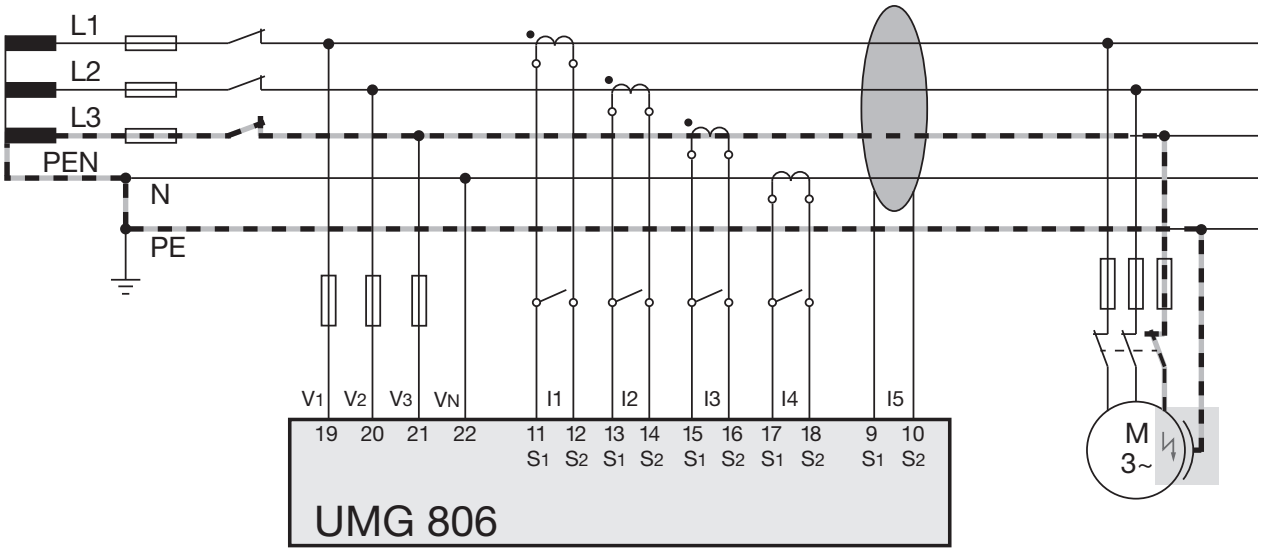


Fig. Connection example, UMG 806 with residual current monitoring

8.7 Temperature measurement

The device has a temperature measurement input. The temperature is measured via terminals 7 and 8 ("Pt100").

The measured values of the connections declared as temperature inputs are obtained by determining the average value from accumulated resistance values. The meter calculates the temperature value from the average value.

The device supports the temperature sensor

· PT100

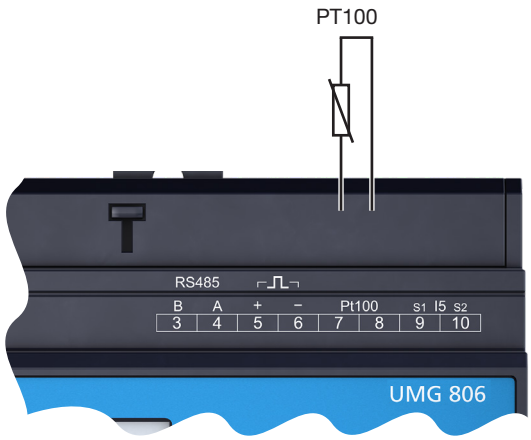


Fig. Connection example for "temperature measurement".

Example of temperature sensor:
A temperature sensor is to measure near uninsulated power lines in a 300 V CAT III network.

Solution:
Use reinforced or doubled insulation for the temperature sensor for the 300V CAT III network! This corresponds to a test voltage of 3000 V AC (1 min. duration) for the temperature sensor.

ATTENTION

Damage to the meter and/or your system due to a short circuit!
Inadequate insulation of the operating equipment (e.g. the temperature sensor) at the temperature measuring inputs with respect to the supply circuits can cause damage to your meter and/or your system.

- **Ensure a reinforced or double insulation of your operating equipment with respect to the supply circuits!**
- **Use shielded lines to connect the temperature sensor!**
- **Do not exceed a total load of 0.35 kΩ (temperature sensor and cable)!**

8.8 RS-485 interface

The serial RS-485 interface of this device is designed as a 2-pole screw contact and communicates using the Modbus RTU protocol.

For the connection capacity of the terminals, see chapter „17. Technical information“ on page 83.

Examples

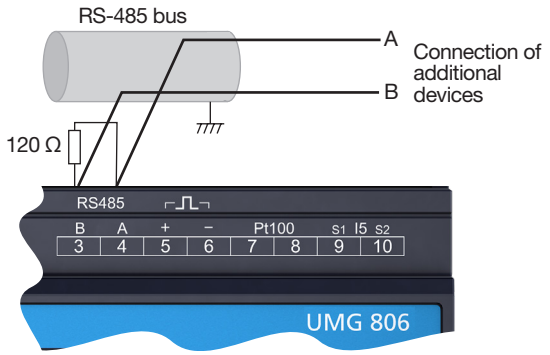


Fig. Example:
RS-485 interface of the UMG 806 (at the beginning of a bus topology)

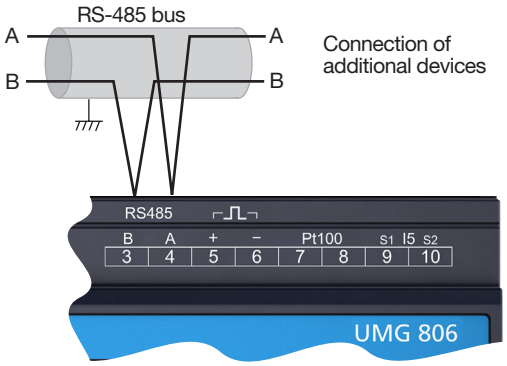


Illustration example:
RS-485 interface of the UMG 806 (in the middle of a bus topology)

INFORMATION

- The device does not contain an integrated termination resistor. A termination resistor must be set for termination for a UMG 806 at the beginning or end of a bus segment, (see section "Termination resistors / Termination").
- CAT cables are not suitable for bus wiring! **Recommendation:** Use Unitronic Li2YCY(TP) 2x2x0.22 (Lapp cable) for bus wiring.
- A segment of an RS-485 bus structure can contain up to 32 nodes/devices. If there are more than 32 nodes/devices, use repeaters to connect segments.

WARNING

Risk of injury or damage to the device due to electrical voltage and improper connection!
High measuring currents can cause temperatures of up to 80 °C (176 °F) at the connections.
Use wiring designed for an operating temperature of up to 80 °C (176 °F)!

8.8.1 Shielding

For connections via the interfaces, use a twisted and shielded cable and observe the following for the shielding:

- Ground the shields of all cables leading into the switchboard cabinet at the cabinet entrance.
- Route the cables into the switchboard cabinet through suitable cable inlets, e.g. PG glands.
- Connect the shield to a noiseless ground and ensure a large surface area with good conductivity.
- Mechanically restrain the cables before the grounding clamp to prevent damage from cable movement (strain relief).

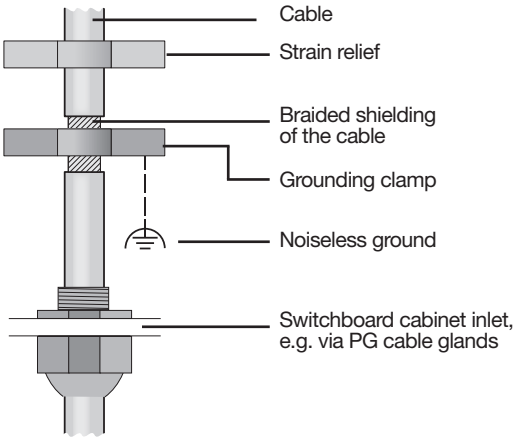


Fig. Shielding design at entrance to switchboard cabinet.

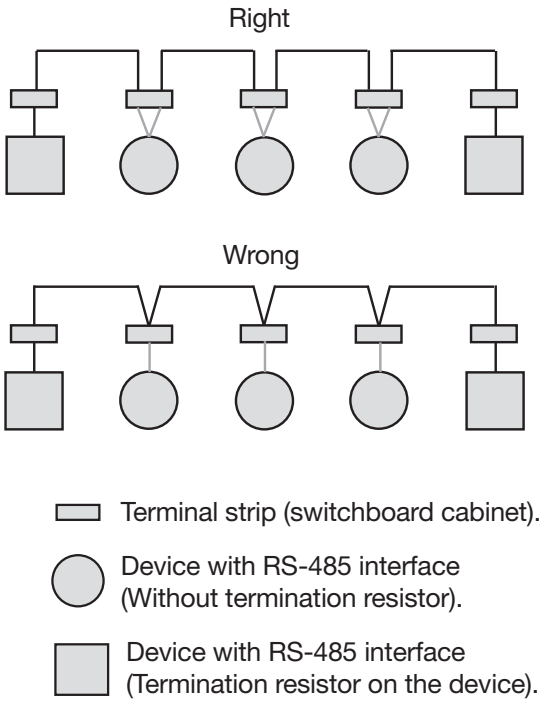
⚠ WARNING

Risk of injury due to high currents and high electrical voltages!
Atmospheric discharge can cause transmission errors and dangerous voltages on the device.
Therefore please abide by the following:

- **Connect the cable shielding to functional earth (PE) at least once.**
- **For larger sources of interference or frequency converters in the switchboard cabinet, connect the shielding to functional earth (PE) as close to the device as possible.**
- **Comply with the maximum cable length of 1,200 m at a baud rate of 38.4 kbps.**
- **Use shielded cables.**
- **Route interface cables spatially separated or additionally insulated from mains voltage-carrying system components.**

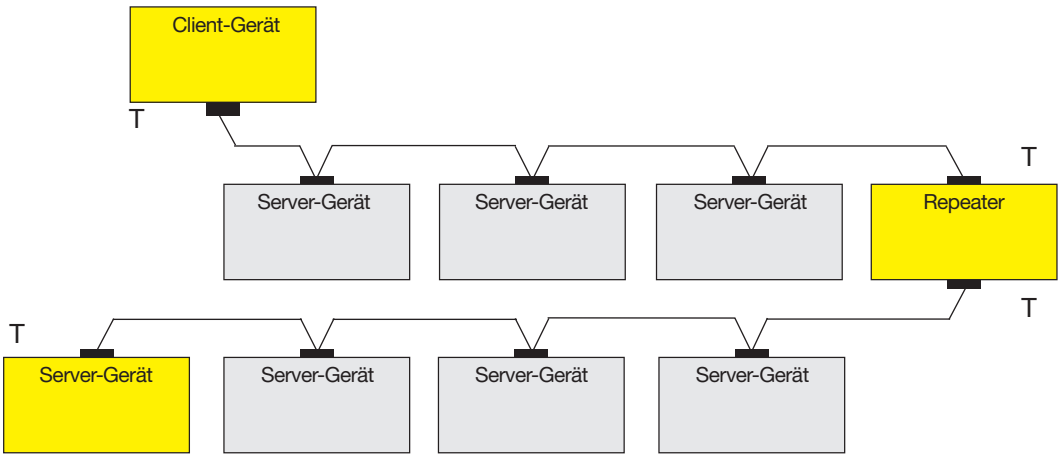
8.8.2 Termination resistors/Termination

Terminate the beginning and end of your bus segments with termination resistors (120 Ω/0.25 W - see section "Bus structure (bus segment)"). The device does not contain an integrated termination resistor!



8.8.3 Bus structure (bus segment)

In a bus structure:
· Connect all devices in line.
· Each device has its own device address.
· You can integrate up to 32 devices (nodes). Terminate the beginning and the end of your bus segment with termination resistors (inside the devices or with 120 Ω/0.25 W termination resistors).
· Use repeaters (signal amplifiers) to connect bus segments if there are more than 32 nodes.
· Devices with bus termination switched on must be powered.
· Position the client device (formerly master device) at the beginning or end of the bus structure. If the client device is replaced with the bus termination switched on, the bus is out of operation.
· the bus can become unstable if a server device (formerly slave device) with a switched-on bus termination is replaced or is de-energized
· Devices that are not involved in the bus termination can be replaced without the bus becoming unstable.



- Power supply necessary
T - Bus terminator on
Client - e.g. UMG 605
Server - e.g. UMG 806

Fig. Representation of a bus structure

INFORMATION

In a Modbus system, the Modbus organization (modbus.org) uses the terms **"client"** and **"server"** to describe Modbus communication. This is characterized by communication between **client devices - formerly master devices** - that initiate communication and make requests, and **server devices - formerly slave devices** - that process the requests and return an appropriate response (or error message).

8.9 Digital output

The device has 1 digital output, which
- Is electrically isolated from the evaluation electronics via an optocoupler.
- Is not short-circuit proof.
- Is used as a pulse output to count the energy consumption.
- Can switch direct and alternating current loads via relays or semiconductor electronics

Pulse constant
The device delivers 5000 pulses per secondary kWh, i.e. the transformer ratios are not taken into account. The energy value actually consumed (primary side) in relation to the time period must be scaled using the transformer ratios of the transformers.

$$x\ kWh = \frac{\text{Number of pulses}}{5000} \times \frac{I_P}{I_S} \times \frac{U_P}{U_S}$$

IP/IS: Current transformer ratio (primary to secondary current)
UP/US: Voltage transformer ratio (primary to secondary voltage)

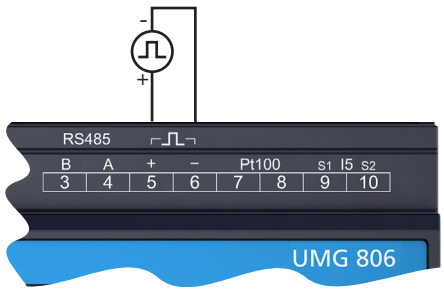


Fig.: Connection example for digital output

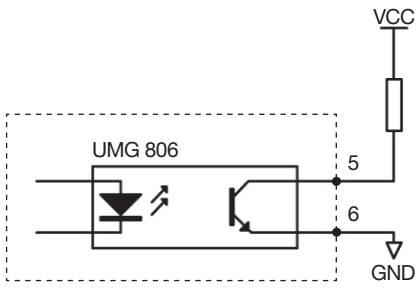


Fig.: Schematic diagram of digital output

ATTENTION

Transmission error and material damage due to electrical malfunction.
With a cable length of more than 30 m, there is an increased probability of transmission errors and damage to the device due to atmospheric discharge!
Use shielded cables for the connections to the digital inputs and outputs!

ATTENTION

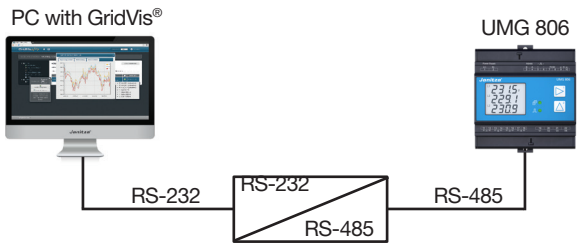
Connection errors can damage the device and cause material damage.
The digital outputs are not short-circuit proof! Connection errors can therefore lead to damage to the connections.
Make sure that the wiring is correct when connecting the outputs.

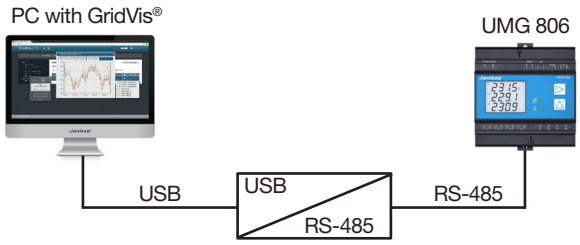
9. PC connection

9.1 Connection to a PC

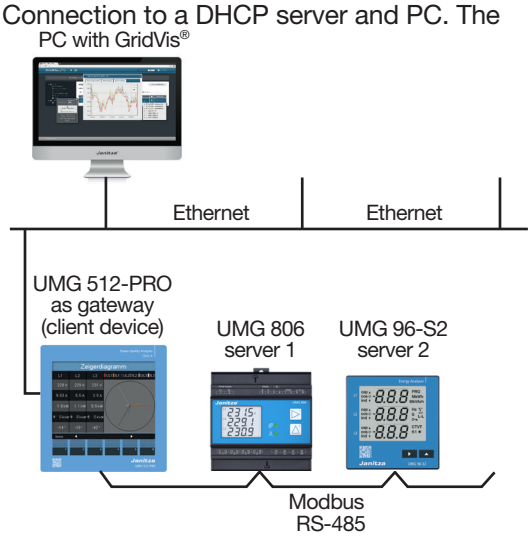
The most common connection methods for communication of the device with a PC (with GridVis® software installed) are described below.

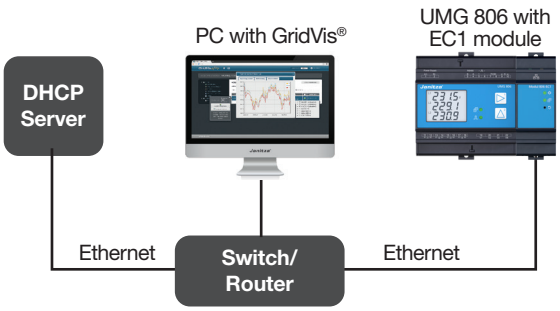
1. Connection via interface converter:





2. Connection via a client device (UMG 512-PRO) as a gateway:
3. Connection to a DHCP server and PC. The DHCP server automatically assigns IP addresses to the device and the PC.





INFORMATION

In a Modbus system, the Modbus organization (modbus.org) uses the terms **"client"** and **"server"** to describe Modbus communication. This is characterized by communication between **client devices - formerly master devices** - that initiate communication and make requests, and **server devices - formerly slave devices** - that process the requests and return an appropriate response (or error message).

ATTENTION

Material damage due to security vulnerabilities in programs, IT networks and protocols.
Security vulnerabilities can lead to data misuse and faults and even the standstill of your IT infrastructure.
To protect your IT system, network, data communications and measurement devices:
- **Inform your network administrator and/or IT representative.**
- **Always keep the meter firmware up to date and protect the communication to the meter with an external firewall. Close unused ports.**
- **Take protective measures against viruses and cyber attacks from the Internet, e.g. through firewall solutions, security updates and virus protection programs.**
- **Eliminate security vulnerabilities and update or renew existing protection for your IT infrastructure.**

ATTENTION

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.

10. Operation and button functions

10.1 Controls

The device has a display and 2 function buttons to enable installation, commissioning and configuration without a PC. The 2 function buttons are for:
· Navigation within the measuring displays (display mode).
· Entering the configuration mode.
· The device configuration.

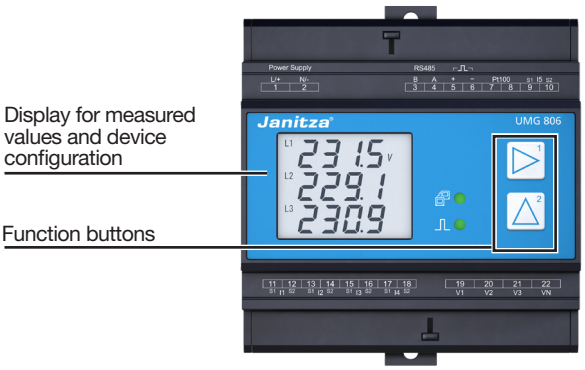
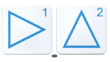


Fig. UMG 806 measuring display "Voltage L1-N, L2-N and L3-N" and function buttons.

10.2 Function buttons

Button	Function
	· Select position (to the right " ▶ "). · Confirm selection. · Navigate to the measuring displays (display mode).
	· Increment digit or change decimal place. · Navigate to the measuring displays (display mode).
	· Press and hold buttons 1 and 2 simultaneously for 1 s to enter the **Configuration mode**. For more information on parameter configuration, see chapter „11. Configuration“ on page 52.

Tab.: Function buttons

When the power supply is restored, the device starts with the first measuring display *Voltage L1-N, L2-N and L3-N.*

10.3 Operation

During operation, the device distinguishes between the display and configuration modes.

10.3.1 Display mode

· Use button 1 and button 2 to scroll between the measuring displays.
· The measuring display shows up to 3 measured values.

10.3.2 Configuration mode

· The configuration mode is used to configure the parameters necessary for the operation of the device.
· Press and hold buttons 1 and 2 simultaneously for 1 s to switch between the display and configuration modes.
· A password request (standard setting 0000 - no password - see the section Password) takes you to the configuration mode.
· In configuration mode, the character ✕ appears on the display.

To switch back to the display mode:
· Press buttons 1 and 2 simultaneously for 1 s.
· Do not press any buttons for 4 m (240 s) – automatic.

INFORMATION

The device saves changes only after leaving the configuration mode (press buttons 1 and 2 simultaneously; the device saves and then changes back to the display mode).

10.4 Password

In order to prevent configuration data from being changed inadvertently, the device has the option of requiring a password. The device requires a password when switching from the display to the configuration mode (simultaneous pressing of buttons 1 and 2). Configure parameter 500 for this purpose!
Default setting "Configuration without password request": 0000 (in parameter 500).

10.5 Overview of measuring display (display mode)

The measurement device measures electrical quantities such as voltage, current, power, power factor, frequency, energy, harmonics, asymmetries or extreme values. Some of these electrical quantities can only be read out via the communication interface. More detailed information can be found in the Modbus address list.

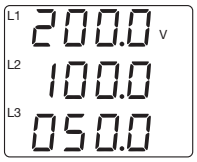
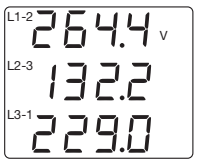
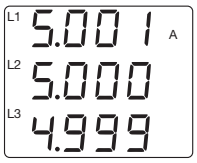
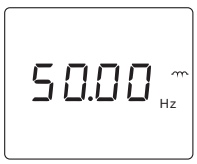
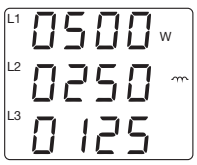
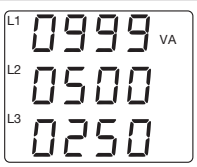
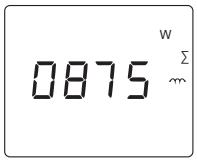
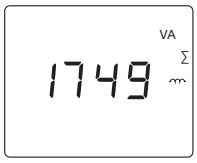
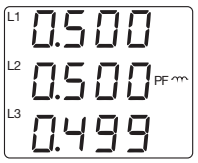
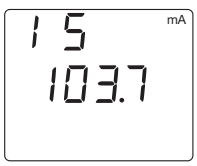
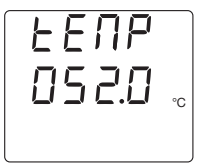
Measuring display (display mode)

- **Measured values**
  - Voltage L-N
  - Voltage L-L
  - Current 1-3
  - Current IN
  - Current I4
  - Frequency
  - Active power
  - Reactive power
  - Apparent power
  - Active power, total
  - Reactive power, total
  - Apparent power, total
  - Power factor
  - Power factor, total
  - Current I5 (mA)
  - Temperature
- **Energy values**
  - Active energy (+), applied
  - Active energy (-), delivered
  - Reactive energy (+), applied
  - Reactive energy (-), delivered
- **Total harmonic distortion THD UA (L1)**
  - THDA UA (L1) - average value
  - THD UA (L1) - 2nd harmonic
  - THD UA (L1) - 31st harmonic
- **Total harmonic distortion THD UB (L2)**
  - THDA UB (L2) - average value
  - THD UB (L2) - 2nd harmonic
  - THD UB (L2) - 31st harmonic
- **Total harmonic distortion THD UC (L3)**
  - THDA UC (L3) - average value
  - THD UC (L3) - 2nd harmonic
  - THD UC (L3) - 31st harmonic
- **Total harmonic distortion THD IA (L1)**
  - THDA IA (L1) - average value
  - THD IA (L1) - 2nd harmonic
  - THD IA (L1) - 31st harmonic
- **Total harmonic distortion THD IB (L2)**
  - THDA IB (L2) - average value
  - THD IB (L2) - 2nd harmonic
  - THD IB (L2) - 31st harmonic
- **Total harmonic distortion THD IC (L3)**
  - THDA IC (L3) - average value
  - THD IC (L3) - 2nd harmonic
  - THD IC (L3) - 31st harmonic
- **Time display**

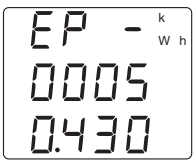
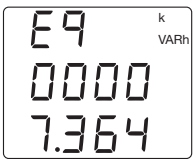
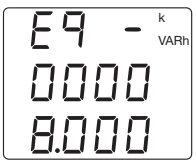
INFORMATION

Coupled and activated extension modules change or enhance the measuring display.

10.6 Examples of basic measuring displays

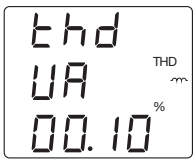
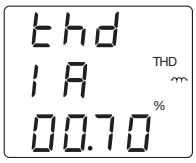
	Phase voltage U L1 = 200.0 V U L2 = 100.0 V U L3 = 50.0 V
	Mains voltage U L1-L2 = 264.4 V U L2-L3 = 132.2 V U L3-L1 = 229.0 V
	Phase current I 1 = 5.001 A I 2 = 5.000 A I 3 = 4.999 A
	Frequency F = 50.00 Hz
	Active power P L1 = 500 W P L2 = 250 W P L3 = 125 W
	Reactive power Q L1 = 865 var Q L2 = 433 var Q L3 = 217 var
	Apparent power S L1 = 999 VA S L2 = 500 VA S L3 = 250 VA
	Total active power ∑P = 875 W
	Total reactive power ∑Q = 1515 var
	Total apparent power ∑S = 1749 VA
	Power factor PF 1 = 0.500 PF 2 = 0.500 PF 3 = 0.499
	Total power factor PF = 0.500
	Residual current I5 = 103.7 mA
	Temperature T = 52.0 °C

10.7 Examples of energy measurement

	Active energy applied EP = 30.784 kWh
	Active energy delivered EP- = 50.430 kWh
	Reactive energy applied EQ = 7.364 kvarh
	Reactive energy delivered EQ- = 8.000 kvarh

Energy values can be reset by the user!

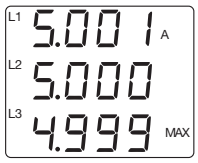
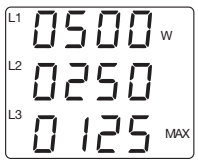
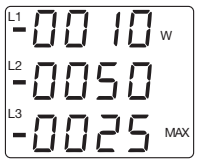
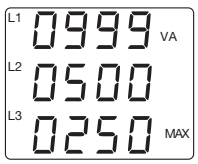
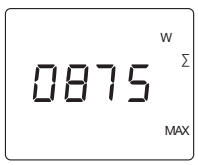
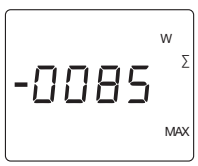
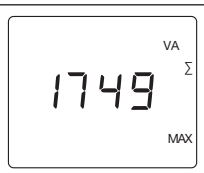
10.8 Examples of power quality

	Total harmonic distortion of the voltage THD U L1 = 0.1 %
	Total harmonic distortion of the current THD I L1 = 0.7 %

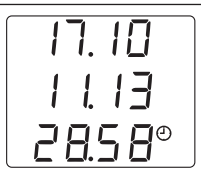
The meter measures
· The harmonic distortion of current and voltage
· Harmonics up to the 31st
· intermediary harmonic which can be read out via the communication interface

10.9 Max value

Display current, forward active power, reverse active power, apparent power history max.

	Maximum value of current I_{L1} = 5.001A I_{L2} = 5.000A I_{L3} = 4.999A
	Maximum value of split-phase active power, forward P_{L1} = 500W P_{L2} = 250W P_{L3} = 125W
	Maximum value of active power by phase, reverse direction P_{L1} = -10W P_{L2} = -50W P_{L3} = -25W
	Maximum value of sub-phase apparent power S_{L1} = 999 VA S_{L2} = 500 VA S_{L3} = 250 VA
	Maximum total active power, forward P= 875 W
	Maximum total active power, reverse P = -85 W
	Total apparent power max. S = 1749 VA

10.10 Example of time display

	Date and time are displayed October 11, 2017, 13h 28m 58s

INFORMATION

After synchronizing the time via GridVis, the device displays UTC time.

11. Configuration

11.1 Configuration mode

The configuration mode is used to configure the parameters necessary for the operation of the device. The device requires the supply voltage for configuration.

· Press and hold buttons 1 and 2 simultaneously for 1 s to switch between the display and configuration modes.
· A password request (standard setting 0000 - no password - see the section Password) takes you to the configuration mode.
· In configuration mode, the character ⚒ appears on the display.



⚠ WARNING

Risk of injury due to electrical voltage!
Severe bodily injury or death can result from:
· Touching bare or stripped leads that are energized.
· Terminals / inputs of the device that pose a hazard when touched.
Therefore please abide by the following
· Cover or block off adjacent live parts!
· Use non-conductive tools and wear protective clothing.
· Inform yourself about applicable safety guidelines.

11.2 Configuration

· Press and hold buttons 1 and 2 simultaneously for 1 s to switch between the display and configuration modes.
· Enter the code (password) in the display CodE by pressing button 1 (confirm or change digit position) and button 2 (increment digit).
  - Default setting **0000 - no password**
· The 1st parameter address 000 for configuration of the primary current transformers I1 ..I3 appears.
· To complete your configurations and save them, press and hold buttons 1 and 2 simultaneously for 1 s.
· The device then switches to the display mode.

Select the parameter to be configured according to the parameter list.

INFORMATION

A parameter list can be found in chapter **„11.3 Parameter list“ on page 58.**

Function of the buttons in the configuration mode

Button	Function in the configuration mode
1	**With button 1** · Change the digit position. · Confirm your input/number.
2	**With button 2** · Increment the activated digit or change the decimal place.
1 + 2	· To save your changes and switch to the display mode, press buttons 1 and 2 simultaneously for 1 s!

Tab.: Function buttons

11.2.1 Configuring the network system

Configure your network system in the following parameter address:

Address	Designation
110	Network system/wiring 0 : 3P4W (default setting) 1 : 3P3W 2 : 1P2W

Configure the parameters above as already described in section „11.2 Configuration“ on page 52.

11.2.2 Configuring the current transformer ratios

The UMG 806 has 4 current measurement inputs (I1 to I4) and one residual current measurement input (I5).

- The default setting of all current transformer ratios of the device (I1-I4 and I5) is 5 A / 5 A.
- The current transformer ratios must be configured separately for **current measurement inputs I1-I3**, **current measurement input I4** and **residual current measurement input I5** (see table "Configuration of current transformer ratios").
- To configure the current transformer ratios, switch to the configuration mode of the device as described in section „11.2 Configuration“ on page 52.

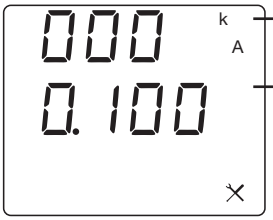
Parameters for configuring the current transformer ratios:

Address	Designation
000	Current transformer primary, I1..I3
001	Current transformer secondary, I1..I3
010	Current transformer primary, I4
011	Current transformer secondary, I4
020	Residual current transformer primary, I5
021	Residual current transformer secondary, I5

Tab.: Configuration of the current transformer ratios

11.2.3 Example: Configuring the current transformer ratios I1-I3

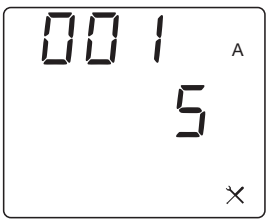
- Press and hold buttons 1 and 2 simultaneously for 1 s to switch between the display and configuration modes.
- Enter the code (password) in the display CodE using button 1 (confirm or change digit position) and button 2 (increment digit) (default setting **0000 - no password request).**
- Parameter address 000 appears with the display for configuring the current transformer ratio - primary side I1 - I3.
- Configure, for example, **a primary side current of 100 A.**



Parameter address

Value of the primary current (100 A)

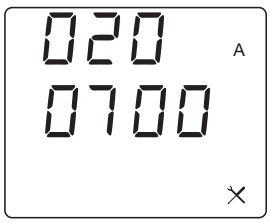
- Go to the 1st digit (blinking) of the primary current value by pressing button 1.
- Use button 2 to enter the value 0 for the 1st digit and use button 1 to go to the 2nd digit (blinking).
- Use button 2 to enter the value 1 for the 2nd digit and use button 1 to go to the 3rd digit (blinking).
- Use button 2 to enter the value 0 for the 3rd digit and use button 1 to go to the 4th digit (blinking).
- Use button 2 to enter the value 0 for the 4th digit and use button 1 to switch to the configuration of the decimal point.
- In the example here, place the decimal point after the 1st digit.
- Confirm your configuration by pressing button 1.
- The 1st digit of the parameter address blinks.
- Go to parameter address 001 using buttons 1 and 2 as described.
- Use buttons 1 and 2 to configure the secondary current (e.g. 5 A) in the same way as described above.



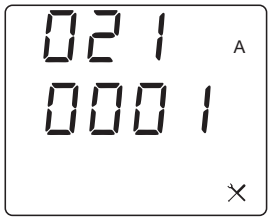
- Finally, confirm the configuration by pressing buttons 1 and 2 simultaneously.
- If necessary, configure the **current transformer ratios of current measurement input I4** in the same way (see table "Configuration of current transformer ratios").
- The device switches to the display mode (1st measuring display).

11.2.4 Example: Configuring the current transformer ratios of residual current measurement input I5 (700:1)

· Press and hold buttons 1 and 2 simultaneously for 1 s to switch between the display and configuration modes.
· Enter a password in the display CodE using button 1 (confirm or change digit position) and button 2 (increment digit) if necessary (default setting **0000 - no password).**
· The parameter address 000 appears.
· Use buttons 1 and 2 to go to parameter address 020 as described (see tab "Configuration of current transformer ratios").
· The primary value can be taken from your residual current transformer (**e.g.** 700 - with a transformer ratio of 700:1 of your residual current transformer).
· Configure **the primary side for residual current measurement, e.g. 700.**



· Go to the 1st digit (blinking) of the primary current value by pressing button 1.
· Use button 2 to enter the value 0 for the 1st digit and use button 1 to go to the 2nd digit (blinking).
· Use button 2 to enter the value 7 for the 2nd digit and use button 1 to go to the 3rd digit (blinking).
· Use button 2 to enter the value 0 for the 3rd digit and use button 1 to go to the 4th digit (blinking).
· Use button 2 to enter the value 0 for the 4th digit.
· Confirm your configuration by pressing button 1.
· The 1st digit of the parameter address blinks.
· Go to parameter address 021 using buttons 1 and 2 as described.
· Now configure the secondary side of the current transformer ratio with buttons 1 and 2.
· Configure a 1 for the secondary value of your residual current transformer, whereby this corresponds to the maximum value of the I5 measuring range (40 mA - see section Technical data - current measurement channel I5).



· To save and finish, confirm the configuration by pressing buttons 1 and 2 simultaneously.
· The device switches to the display mode (1st measuring display).
· The current transformer configuration is finished.

Example

A current transformer ratio configuration of 700:1 and a secondary-side maximum value of the measuring range of 40 mA results in a maximum primary current of 28 A.

If there is now a secondary current of e.g. 3.57 mA at measuring input I5, this corresponds to a primary current of 2.5 A.

11.2.5 Configuring the voltage transformer ratios

The UMG 806 has 4 voltage measurement inputs (V1 - V3 and VN). Of these, you can configure the inputs L1 (V1) to L3 (V3).

· The default setting of all voltage transformer ratios of the device (V1-V3) is 380 V / 380 V.
· The voltage transformer ratios must be configured for the voltage measurement inputs V1-V3 (L1-L3).
· To configure the voltage transformer ratios, switch to the configuration mode of the device as described in section „11.2 Configuration“ on page 52.

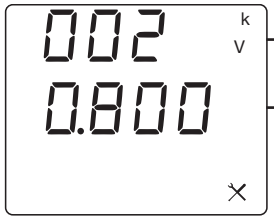
Parameters for configuring the voltage transformer ratios:

Address	Designation
002	Voltage transformer primary, V1..V3 (L1..L3).
003	Voltage transformer secondary, V1..V3 (L1..L3).

Tab.: Configuration of the voltage transformer ratios

11.2.6 Example: Configuring the voltage transformer ratios

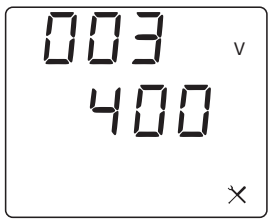
· Press and hold buttons 1 and 2 simultaneously for 1 s to switch between the display and configuration modes.
· Enter the code (password) in the display CodE using button 1 (confirm or change digit position) and button 2 (increment digit) (default setting **0000 - no password request).**
· The parameter address 000 appears.
· Go to parameter address 002 using buttons 1 and 2 as described.
· The display for configuring the primary side of the voltage transformer ratio appears. For example, configure **a primary voltage of 800 V.**



Parameter address

Value of the primary voltage (800 V)

· Go to the 1st digit (blinking) of the primary voltage value by pressing button 1.
· Use button 2 to enter the value 0 for the 1st digit and use button 1 to go to the 2nd digit (blinking).
· Use button 2 to enter the value 4 for the 2nd digit and use button 1 to go to the 3rd digit (blinking).
· Use button 2 to enter the value 0 for the 3rd digit and use button 1 to go to the 4th digit (blinking).
· Use button 2 to enter the value 0 for the 4th digit and use button 1 to switch to the configuration of the decimal point.
· In the example here, place the decimal point after the 1st digit.
· Confirm your configuration by pressing button 1.
· The 1st digit of the parameter address blinks.
· Go to parameter address 003 using buttons 1 and 2 as described.
· Use buttons 1 and 2 to configure the secondary voltage (e.g. 400 V) in the same way as described above.



· Finally, confirm the configuration by pressing buttons 1 and 2 simultaneously.
· The device switches to the display mode (1st measuring display).

11.2.7 Configuring the RS-485 interface (Modbus)

To operate the device via the RS-485 interface (see chapter „8.8 RS-485 interface“ on page 43), configure the following parameter addresses:

· Device address
· Baud rate
· Parity
· Operating mode

Address	Designation
200	Device address (1 .. 247)
201	Baud rate, RS-485 0 = 9600 1 = 19200 2 = 38400 3 = 57600 4 = 115200
202	RS-485, parity 0 = N.8.1 1 = E.8.1 2 = O.8.1 3 = N.8.2
203	RS-485, mode 0 = Modbus RTU/Server (formerly Slave) 1 = Modbus RTU/client (formerly master)

Tab.: Configuration of the RS-485 interface

Configure the parameters above as already described in section „11.2 Configuration“ on page 52.

INFORMATION

A parameter list can be found in chapter „11.3 Parameter list“ on page 58

11.2.8 Configuring the Ethernet interface

INFORMATION

The description of the Ethernet interface (module 806-EC1) can be found in chapter „14.5.2 Configuring the Ethernet interface“ on page 68**.**

11.2.9 Configuring date and time

You can set the date and time on the UMG 806 via the device display.
You must then save the change as follows:

- To do this, use buttons 1 and 2 to change to parameter address 406 as described.
- Change to the digit 0 (flashing) by pressing button 1.
- Use button 2 to change the value 0 to 1
- Finally, confirm the configuration by pressing buttons 1 and 2 simultaneously.
- The change is now effective
- The device switches to display mode (1st measured value display).

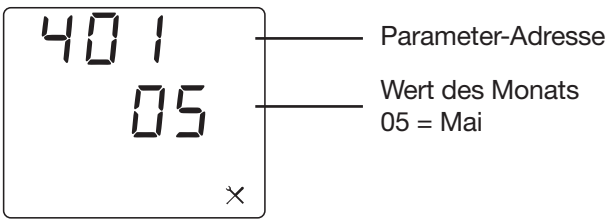
Adresse	Bezeichnung
400	Day
401	Month
402	Year
403	Hour
404	Minute
405	Second
406	Accept data and time, 1 = Accept set data

INFORMATION

After synchronizing the time via GridVis, the device displays UTC time.

11.2.10 Example: Configure month

- Press and hold buttons 1 and 2 simultaneously for 1 s to switch between the display and configuration modes.
- Enter the code (password) in the display CodE using button 1 (confirm or change digit position) and button 2 (increment digit) (default setting **0000 - no password request).**
- The parameter address 000 appears.
- Use buttons 1 and 2 to change to parameter address 401 as described.
- Change to the 1st digit (flashing) of the value of the month by pressing button 1.
- Use button 2 to enter the value 0 for the 1st digit and use button 1 to change to the 2nd digit (flashes).
- Use button 2 to enter the value 5 for the month of May for the 2nd digit.



- Confirm your configuration by pressing button 1. The 1st digit of the parameter address flashes. Use buttons 1 and 2 to change to parameter address 406.
  Press button 1 to change to the digit 0 (flashing) and use button 2 to change the value 0 to 1
  Finally, confirm the configuration by pressing buttons 1 and 2 simultaneously.
  The device switches to display mode (1st measured value display).

11.3 Parameter list

· Parameter addresses are **not** Modbus addresses!
· Modbus addresses can be found in the separate Modbus address list in the download area at www.janitza.com

Address	Format	Designation	Setting range	Unit	Default setting
000	uint32	Current transformer primary, I1..I3	1 .. 9999999	A	5
001	uint16	Current transformer secondary, I1..I3	1 .. 6	A	5
002	uint32	Voltage transformer primär, L1..L3	1 .. 9999999	V	400
003	uint16	Voltage transformer secondary, L1..L3	1 .. 690	V	400
010	uint32	Current transformer primary, I4	1 .. 9999	A	5
011	uint16	Current transformer secondary, I4	1 .. 6	A	5
020	uint32	Current transformer primary, I5	1 .. 9999	A	5
021	uint16	Current transformer secondary, I5	1 .. 9999	A	5
110	uint16	Network system/wiring 0 : 3P4W 1 : 3P3W 2 : 1P2W	0, 1, 2		0
113	uint16	Deletes all energy data (1: delete)	0.1		
114	uint16	Resets all recordings (1 = reset)	0.1		
115	uint16	Resets all min. and max. values (1 = reset)	0.1		
116	uint16	Resets and all minimum and maximum value (1=reset)	0.1		

Address	Format	Designation	Setting range	Unit	Default setting
200	uint8	Device address	1 .. 247		1
201	uint8	Baud rate, RS485 0 = 9600 1 = 19200 2 = 38400 3 = 57600 4 = 115200	0 ..4		3
202	uint8	RS-485, parity 0 = N.8.1 1 = E.8.1 2 = O.8.1 3 = N.8.2	0 .. 3		0
203	uint8	RS-485, mode 0 = Modbus RTU/Server (formerly Slave) 1 = Modbus RTU/client (formerly master)	0.1		0
205	uint16	DHCP mode 0 = fixed IP 1 = DHCP client	0.1		0
300	uint8	IP address, xxx --- --- ---	0 .. 255		0
301	uint8	IP address, --- xxx --- ---	0 .. 255		
302	uint8	IP address, --- --- xxx ---	0 .. 255		
303	uint8	IP address, --- --- --- xxx	0 .. 255		

Address	Format	Designation	Setting range	Unit	Default setting
304	uint8	IP mask, xxx --- --- ---	0 .. 255		
305	uint8	IP mask, --- xxx --- ---	0 .. 255		
306	uint8	IP mask, --- --- xxx ---	0 .. 255		
307	uint8	IP mask, --- --- --- xxx	0 .. 255		
310	uint8	IP gateway, xxx --- --- ---	0 .. 255		
311	uint8	IP gateway, --- xxx --- ---	0 .. 255		
312	uint8	IP gateway, --- --- xxx ---	0 .. 255		
313	uint8	IP gateway, --- --- --- xxx	0 .. 255		

Address	Format	Designation	Setting range	Unit	Default setting
400	uint8	Day	1 .. 31		xx
401	uint8	Month	1 .. 12		xx
402	uint8	Year	0 - 99		xx
403	uint8	Hour	0 .. 23		xx
404	uint8	Minute	0 .. 59		xx
405	uint8	Second	0 .. 59		xx
406	uint8	Accept data and time, 1 = Accept set data	0.1		0
500	uint16	Device password 0 = No password configured	0 .. 9999	s	0000
540	uint16	Temperature offset value	-99.9 .. 99.9	°C	0
603	uint8	LCD backlight (on), time	0 .. 180	s	60
604	uint8	LCD start screen 0 = U (voltage) 1 = I (current) 2 = P (active power) 3 = PF (power factor) 4 = EP (applied active energy) 5 = THD (total harmonic distortion)	0 .. 5		0

12. Commissioning

INFORMATION

Before commissioning, delete any production-related contents of the energy meters (see section „11.3 Parameter list“ on page 58).

WARNING

Material damage due to disregard of the connection instructions!
Voltages and currents outside the permissible measuring range can destroy the device.
Comply with the measuring range specifications from the technical data.

12.1 Supply voltage

Proceed as follows when applying the supply voltage:

1. Connect the supply voltage to terminals 1 and 2 of the device. The proper supply voltage can be found on the rating plate.
2. The standard display appears on the display.
3. If no display appears, check:
   - The connection of your device.
   - Whether the supply voltage is within the nominal voltage range.

12.2 Measured voltage

Connect measured voltage:

1. Connect the measured voltage to the terminals provided for this purpose (see section "Installation").
2. After connecting the measured voltage, check the measured values displayed by the meter for the voltages L-N and L-L (take into account any voltage transformer factors that may have been set).

INFORMATION

· In networks that exceed the specified nominal voltages, make sure to connect the voltage measurement inputs via voltage transformers

WARNING

Risk of injury due to electrical voltage!
If the device is exposed to surge voltages above the permissible overvoltage category, safety-relevant areas of insulation in the device can be damaged. This means that the safety of the product can no longer be guaranteed.
Only use the device in environments in which the permissible overvoltage category is not exceeded (cf. section “Technical data”).

12.3 Frequency measurement

The device requires the mains frequency for the measurement and calculation of measured values. The mains frequency is determined automatically by the device.

· To determine the mains frequency, a voltage greater than 10 V_{rms} (4-conductor measurement) or a voltage L1-L2 greater than 17 V_{rms} (3-conductor measurement) must be applied to voltage measurement input V1.
· The mains frequency must be in the range from 45 Hz to 65 Hz.
· If the measured voltage is not sufficiently high, the device cannot determine the mains frequency and therefore cannot carry out a measurement.

12.4 Measured current

The device:
· Measures current exclusively via current transformers.
· Is designed for the connection of current transformers with secondary currents of ../1 A and ../5 A.
· Does not measure DC currents.

The factory-set current transformer ratio is 5/5 A and must be adapted to the current transformers used as needed.
The current transformers require a basic insulation according to IEC 61010-1 for the nominal voltage of the circuit.

1. Short-circuit all current transformer outputs except one.
2. Compare the current displayed on the device with the applied input current.
   - The currents must match after taking the current transformer ratio into account (see section “Basic parameter settings”).
   - In the short-circuited current measurement inputs, the device must indicate approx. 0 amperes.

12.5 Checking the phase assignment

The assignment of the phase conductor to the current transformer is correct if a current transformer is short-circuited on the secondary side and the current indicated by the device in the associated phase conductor drops to 0 A.

12.6 Checking the power measurement

1. Short-circuit all current transformer outputs except one and check the indicated powers.
2. The device must only display power in the phase conductor with the current transformer output that is not short-circuited.
3. If this is not the case, check the connections of the measured voltage and the measured current.

If the amount of the measured active power is correct, but the sign is negative, this can have 2 causes:
1. Reversed connections S1(k) and S2(l) at current transformer or
2. Active energy is being delivered back into the grid.

12.7 Checking measurement

Correctly connected voltage and current measurement inputs result in correctly calculated and displayed individual and summation power readings.

12.8 Checking individual power

If a current transformer is assigned to the wrong phase, the corresponding power is measured and displayed incorrectly.

The phase conductor and current transformer are correctly assigned on the device if there is no voltage between the phase conductor and the associated current transformer (primary).

To ensure that a phase conductor at the voltage measurement input is assigned to the correct current transformer for the power measurement, the respective current transformer can be short-circuited on the secondary side. The apparent power displayed by the device must then be zero in this phase conductor.

If the apparent power is displayed correctly but the active power has a negative (“-”) sign, then the current transformer terminals are reversed or power is being supplied to the electric utility.

12.9 Checking summation power

If all voltages, currents and powers for the respective phase conductors are correctly displayed, the summation powers measured by the device are also correct. To confirm, compare the summation power values measured by the device with the power values of the meters installed in the feeders.

12.10 Recording measured values

Two recording sets are configured in the measuring device

In the recording configuration, the measured values are defined over a time interval according to the mean value and sample types:
· Average type: Arithmetic mean value of the measured values over the defined time interval.
· Sample type: Measured value (instantaneous value) at the end of the defined time interval.

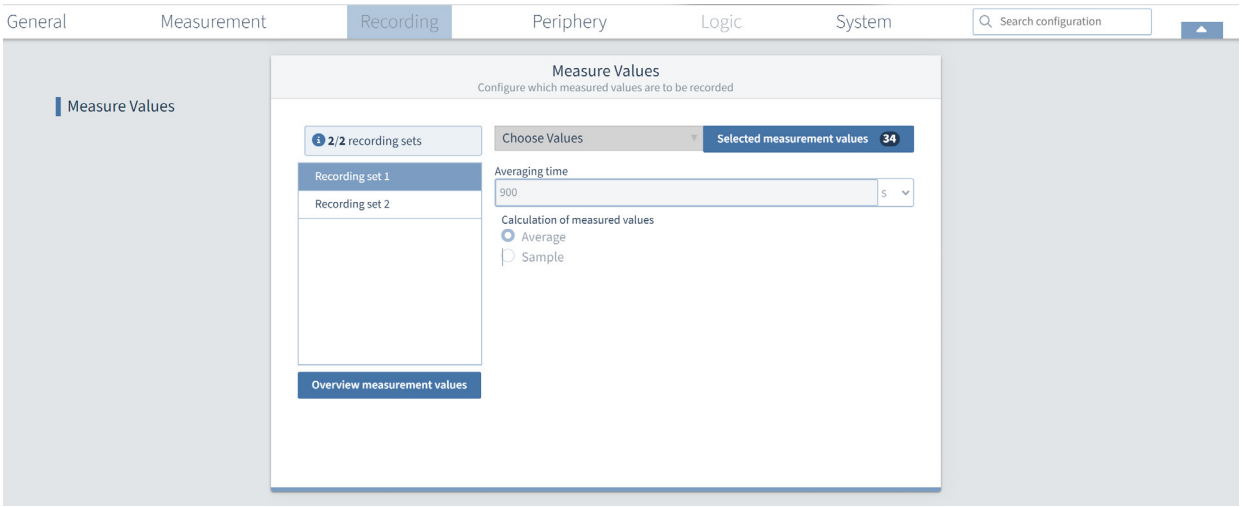


Abb. Recording configuration in the GridVis® software

Recording set 1

The following measured values are recorded with a time base of 15 minutes.

· the calculation of measured values is based on the Average
· the extremals are considered

Preset recording set 1 (900 s)	
Active Energy Total Tariff	Sum L1-L3
Active Power	L1
	L2
	L3
	Sum L1-L3
Actual limit for over current	L5
Apparent power	L1
	L2
	L3
	Sum L1-L3
Consumed Active Energy Total Tariff	Sum L1-L3
cos phi (math.)	L1
	L2
	L3
	Sum L1-L3
Current effective Analogue input	In01
	In02
	In03
	In04
Current effective	L1
	L2
	L3
	L4
	L5
Inductive Reactive Energy Total Tariff	Sum L1-L3
Reactive power fundamental	L1
	L2
	L3
	Sum L1-L3
Supplied Active Energy Total Tariff	Sum L1-L3
Temperature [°C] External	Temp_Extern
Voltage effective	L1
	L2
	L3

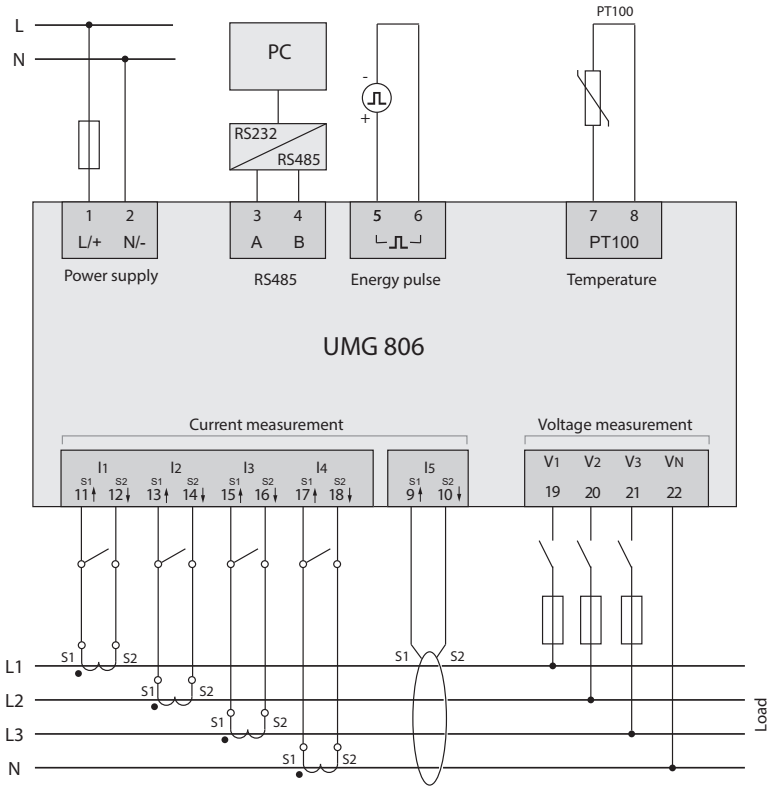
Recording set 2

The following measured values are recorded with a time base of 1 hour:

· the calculation of measured values is based on Sample
· the Extremals are not measured

Preset recording set 1 (3600 s)	
Active Energy Total Tariff	L1
	L2
	L3
	Sum L1-L3
Consumed Active Energy Total Tariff	L1
	L2
	L3
	Sum L1-L3
Inductive Reactive Energy Total Tariff	L1
	L2
	L3
	Sum L1-L3

13. Connection example



14. Expansion modules

The following optional expansion modules can be used to extend the functionality of the basic device (the basic device only supports **one** extension module per module type):

· 806-EC1 module

Use the parameter list to activate the respective module, see chapters „11.3 Parameter list“ on page 58.

14.1 806-EC1 module

The 806-EC1 communication module
· Requires no external power supply.
· Extends the functional range of the basic device by an additional Ethernet interface for Modbus/TCP and SNMP (MIB file in the download area at www.janitza.com).
· Has a gateway/master functionality.

INFORMATION

When setting up your meter and module topology, note that:
· The UMG 806 as a basic device allows the installation of **one** module type each.
· For communication between the basic device and the module, the protective sticker on the side must be removed and the modules must be placed next to the basic device in a form-fit manner.
· The locking clamps between the basic device and the module removed previously must be put back in place.

ATTENTION

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, as needed, cooling when the temperatures are high.

WARNING

Risk of injury due to high currents and high electrical voltages!
Severe bodily injury or death can result from:
· Touching bare or stripped leads that are energized.
· Dangerous live current measurement inputs of the device and at the current transformers.
Therefore, please note for your system:
· **Disconnect the supply of power before starting work!**
· **Secure it against being switched on!**
· **Check to be sure it is de-energized!**
· **Ground and short circuit! Use the ground connection points with the ground symbol for grounding!**
· **Cover or block off adjacent live parts!**

14.2 Installing the modules

Install the module in switchboard cabinets or small distribution boxes according to DIN 43880 (any mounting orientation possible) on a 35 mm (1.38") DIN rail as follows:

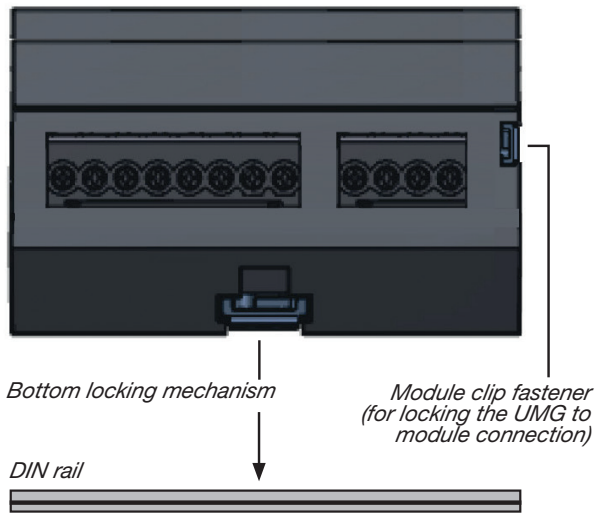
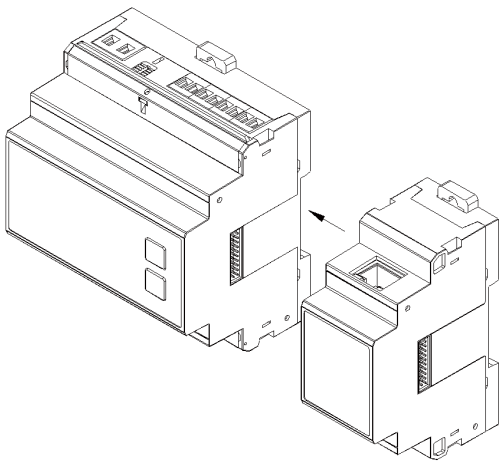
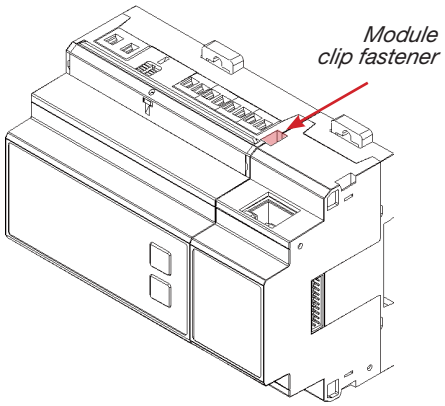


Fig. Device on DIN rail.

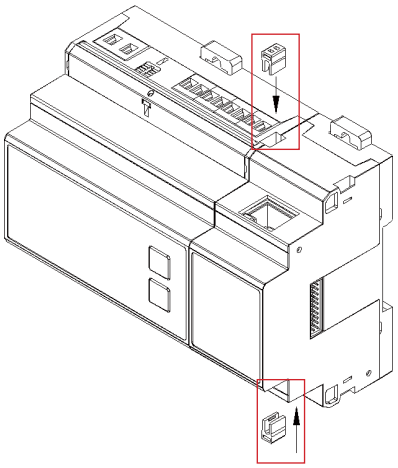
1. Remove the protective sticker on the side of the device.
2. Remove the module clip fasteners on the top and bottom - if present.
3. Plug in the module (the plug is recessed on the side of the UMG, the socket is on the module).



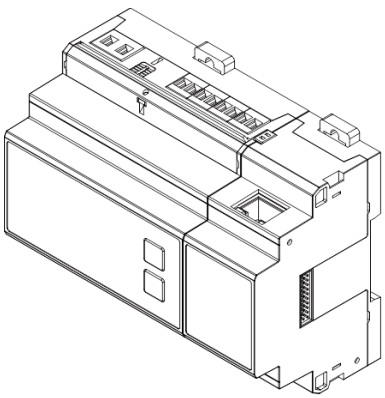
4. Check the connection of the UMG to the module!



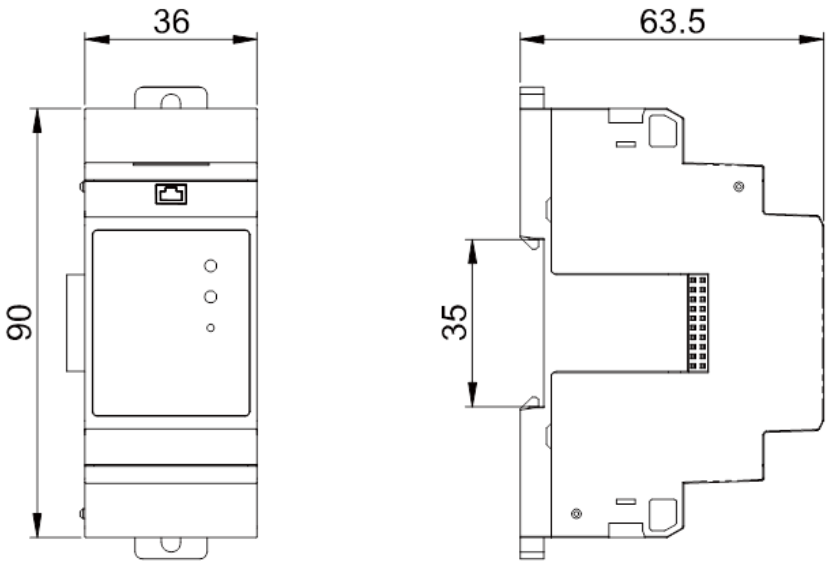
5. Lock the device together with the module at the top and bottom with the module clip fasteners.



6. The UMG 806 can be combined with an 806-EC1.



14.3 Front / side views 806-EC1 module

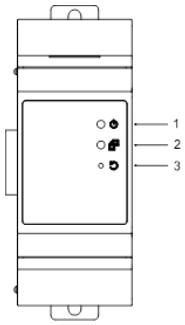


14.4 Module detection

Expansion modules are detected automatically and are in active mode after detection.

14.5 Description Module 806-EC1

14.5.1 Front LEDs and reset button



(1) Operation (RUN LED)

(2) Communication between UMG and module (COM LED)

(3) Reset button (load factory settings or restart)

Meaning of the RUN and COM LEDs

· The RUN LED is always on after power up.
· The RUN and COM LEDs blink 3 times quickly and simultaneously -> Reset
· The RUN and COM LEDs blink 3 times slowly and simultaneously -> Reset to factory settings
· COM LED not lit --> No data transmission
· COM LED is blinking -> Data transmission active

Hardware and software preparation:

1. Prepare the 806-EC1 module and the UMG 806 measurement device.
2. Plug the 806-EC1 module onto the UMG 806 measurement device. Switch on the measurement device. Connect the UMG 806-EC1 to a PC via a network cable.

Reset button:

1. To restart the system (with user configurations retained), press the reset button for 3-5 seconds while the system is running.
2. To reset the device to default settings (clears user configurations), press the reset button before power on and hold it for 5-10 seconds during power on (RUN and COM LED blinking).

IP configuration factory settings:

· DHCP: 1 (on)

The device automatically obtains the IP address, the IP mask and the IP gateway from the DHCP server at startup.

14.5.2 Configuring the Ethernet interface

INFORMATION

The UMG 806 basic device requires the 806-EC1 module to configure an Ethernet interface (see section „9. PC connection“ on page 47)!

To operate the device via the Ethernet interface, configure the following parameter addresses:

· **DHCP mode**
· **IP address**
· **IP subnet mask**
· **IP gateway**

DHCP mode

· Use DHCP to configure your UMG 806 with the 806-EC1 module for incorporation into an existing network.
· Depending on the configuration of the DHCP mode, the device automatically obtains the IP address, the IP mask (netmask) and the IP gateway from the DHCP server when it is started.
· A network setting assigned via DHCP can be read out via addresses 300-313 (see following table).
· If the DHCP mode is set to "fixed IP address" (parameter 205=0), but **no** network settings are set, the device tries to obtain an IP address via DHCP.

The default setting of the basic device with module is “IP address via DHCP” (1 in parameter 205)!

Address	Designation
205	DHCP mode 0 = fixed IP address 1 = DHCP client
300	IP address, xxx --- --- ---
301	IP address, --- xxx --- ---
302	IP address, --- --- xxx ---
303	IP address, --- --- --- xxx
304	IP mask, xxx --- --- ---
305	IP mask, --- xxx --- ---
306	IP mask, --- --- xxx ---
307	IP mask, --- --- --- xxx
310	IP gateway, xxx --- --- ---
311	IP gateway, --- xxx --- ---
312	IP gateway, --- --- xxx ---
313	IP gateway, --- --- --- xxx

Tab.: Configuration of the Ethernet interface

INFORMATION

If the device is configured as a DHCP client (address 205 = 1), restart the device to obtain an IP address!

Configure the parameters above as already described in section „11.2 Configuration“ on page 52.

INFORMATION

- Parameter addresses are not Modbus addresses!
- Modbus addresses can be found in the separate Modbus address list.

ATTENTION

Material damage due to security vulnerabilities in programs, IT networks and protocols.
Security vulnerabilities can lead to data misuse and faults and even the standstill of your IT infrastructure.
To protect your IT system, network, data communications and measurement devices:
- **Inform your network administrator and/or IT representative.**
- **Always keep the meter firmware up to date and protect the communication to the meter with an external firewall. Close unused ports.**
- **Take protective measures against viruses and cyber attacks from the Internet, e.g. through firewall solutions, security updates and virus protection programs.**
- **Eliminate security vulnerabilities and update or renew existing protection for your IT infrastructure.**

Connection examples

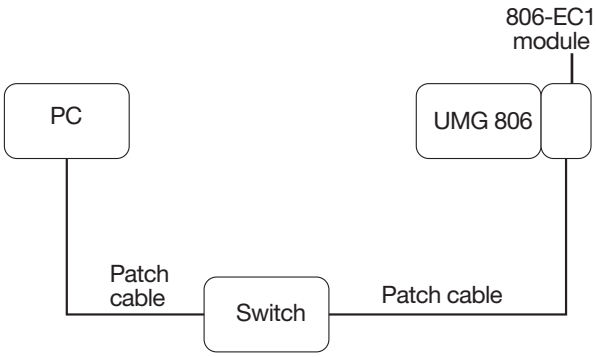


Fig. Connection example: UMG 806 with 806-EC1 module and PC require a fixed IP address (parameter 205 = 0).

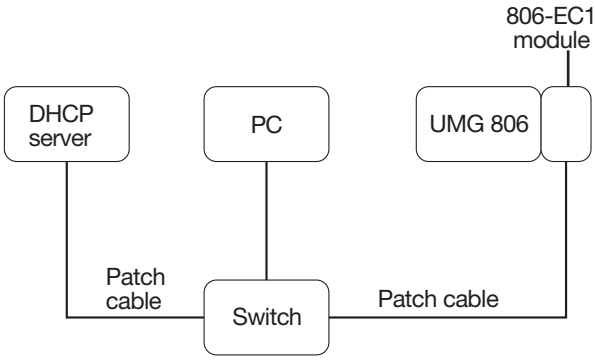


Fig. Connection example: UMG 806 with 806-EC1 module and PC are automatically assigned the IP address by a DHCP server (parameter 205 = 1 - default setting).

Gateway

- Timeout while establishing the connection
  If no data is exchanged within 30 s while TCP communication is being established, the connection is terminated.

- Timeout due to response timeout
  If there is no response within 1 s (not configurable) after sending data, a timeout error occurs.

ATTENTION

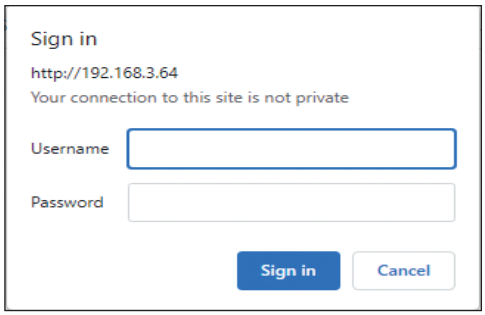
Material damage due to incorrect network settings.
Incorrect network settings can cause faults in the IT network!
Consult your network administrator for the correct network settings for your device.

15. EC1 module homepage

15.1 LOG IN

The device's own UMG 806 module homepage can be accessed via the EC1 module by calling up the IP address in a web browser.
The network settings of the EC1 module can be found in the chapter „14.5 Description Module 806-EC1“ on page 68.

Default username: **admin**
Default password: **admin**



15.2 Overview

The homepage consists of four main parts:

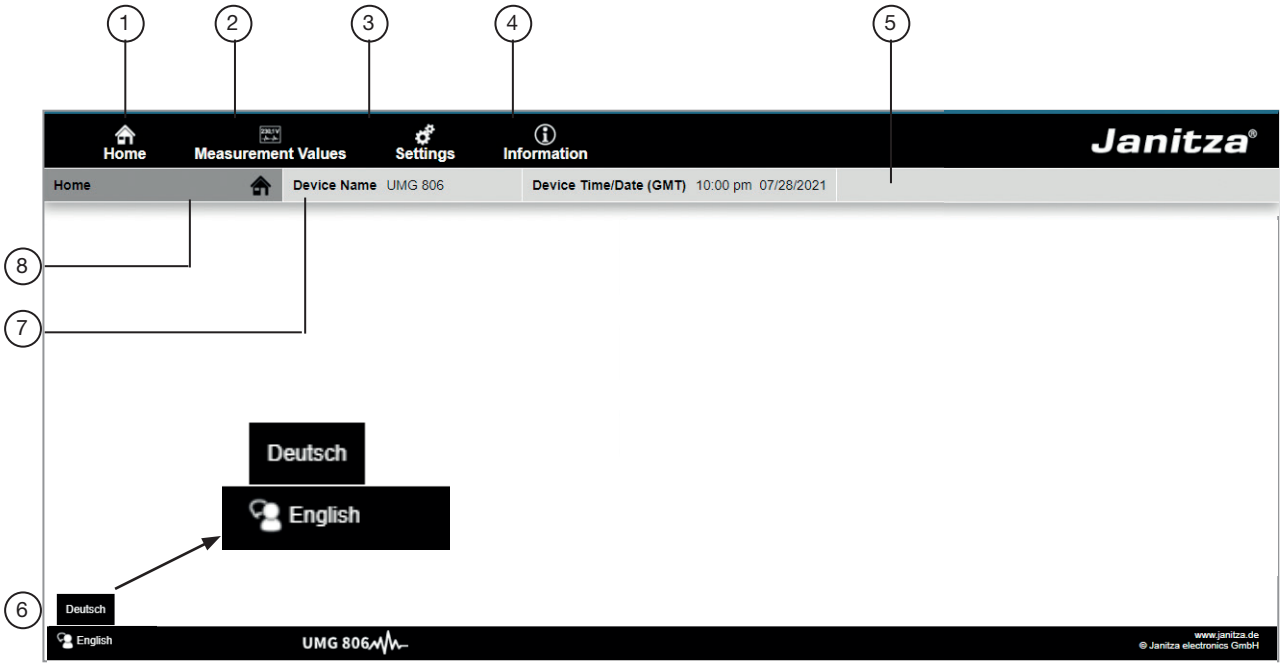
· Home
Start page

· Measured values
Display of the device's realtime values

· System settings
Change settings and parameters

· Information
System information and firmware update function

The overview line shown on the following page is always visible and accessible on every page of the homepage.



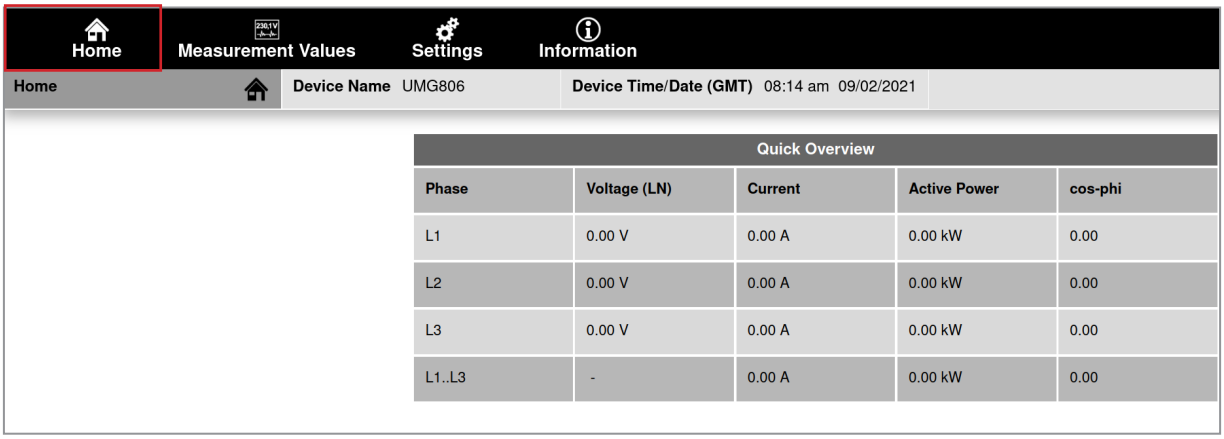
1	Home: Start page with a brief overview of the most important measured values
2	Measured values: Complete overview of all relevant measured values
3	Settings Drop-down menu providing access to all setting options
4	Information: Displays basic device information
5	Time / Date: Displays the time and date (GMT)
6	Switch language: German or English
7	Device name: Name of the device
8	Currently displayed page: The example here shows the page "*Home*"

15.3 Home



Contains a brief overview of the most important measured values present on the individual phases

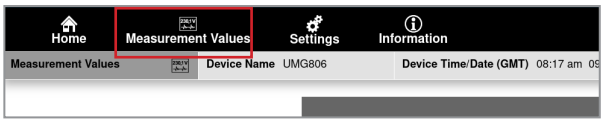
· Voltage in volts (LN reference)
· Current in amps
· Active power in kilowatts
· Cos-phi (unitless)
· Vectorial sum value (L1..L3) of the active power and cos-phi



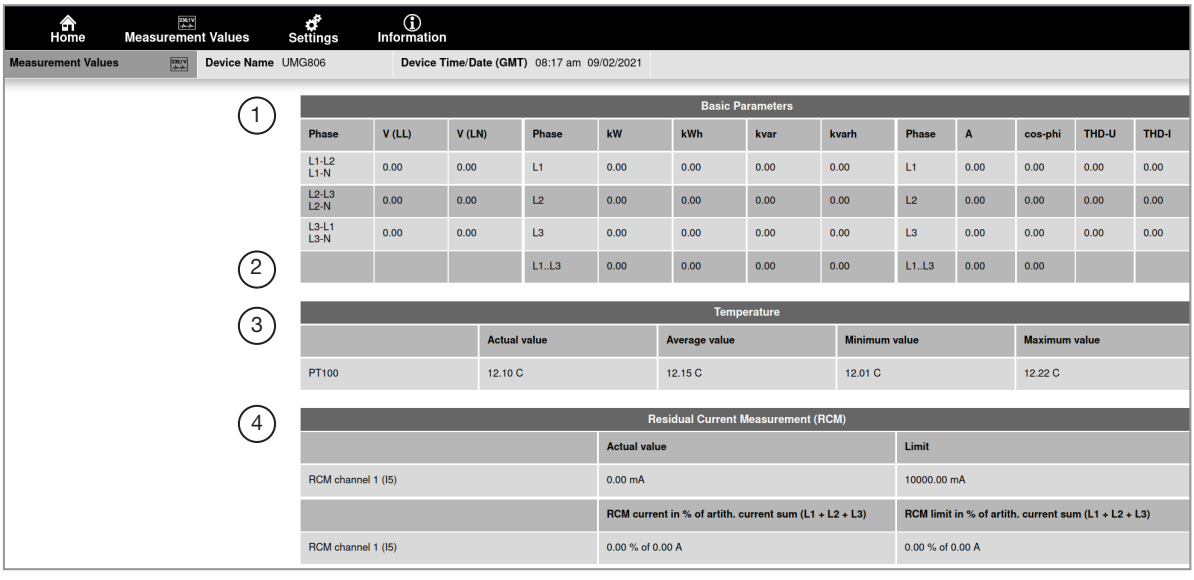
Quick Overview				
Phase	Voltage (LN)	Current	Active Power	cos-phi
L1	0.00 V	0.00 A	0.00 kW	0.00
L2	0.00 V	0.00 A	0.00 kW	0.00
L3	0.00 V	0.00 A	0.00 kW	0.00
L1..L3	-	0.00 A	0.00 kW	0.00

Fig. Homepage of the UMG 806 with EC1 module

15.4 Measured value display



In the menu bar, select "*Measured values*" to display a complete overview of the device's relevant realtime measured values.



Basic Parameters												
Phase	V (LL)	V (LN)	Phase	kW	kWh	kvar	kvarh	Phase	A	cos-phi	THD-U	THD-I
L1-L2 L1-N	0.00	0.00	L1	0.00	0.00	0.00	0.00	L1	0.00	0.00	0.00	0.00
L2-L3 L2-N	0.00	0.00	L2	0.00	0.00	0.00	0.00	L2	0.00	0.00	0.00	0.00
L3-L1 L3-N	0.00	0.00	L3	0.00	0.00	0.00	0.00	L3	0.00	0.00	0.00	0.00
			L1..L3	0.00	0.00	0.00	0.00	L1..L3	0.00	0.00		

Temperature				
	Actual value	Average value	Minimum value	Maximum value
PT100	12.10 C	12.15 C	12.01 C	12.22 C

Residual Current Measurement (RCM)		
	Actual value	Limit
RCM channel 1 (I5)	0.00 mA	10000.00 mA
	RCM current in % of artith. current sum (L1 + L2 + L3)	RCM limit in % of artith. current sum (L1 + L2 + L3)
RCM channel 1 (I5)	0.00 % of 0.00 A	0.00 % of 0.00 A

Fig. Measured value display Basic parameters, temperature, RCM

①	**Basic parameters, phase-referenced (L1, L2, L3)** Voltage in volts (LL reference) (V) Voltage in volts (LN reference) (V) Active power in kilowatts (kW) Consumed active energy in kilowatt hours (kWh) Reactive power in kilovar (kvar) Reactive energy in kilovarh (kvarh) Current in amperes (A) cos-phi (unitless) THD U (unitless) THD I (unitless)
②	**Basic parameters, vectorial sum (L1..L3)** Active power in kilowatts (kW) Active energy in kilowatt hours (kWh) Reactive power in kilovar (kvar) Reactive energy in kilovarh (kvarh) cos-phi (unitless)
③	**Temperature** · Can be determined by means of PT100 (connection to pin 7 and 8 of the device) · Current value in degrees Celsius °C · Average value (averaged over the last 10 minutes) in degrees Celsius °C · Minimum value (measured by the device so far) in degrees Celsius °C · Maximum value (measured by the device so far) in degrees Celsius °C
④	**Residual current monitoring (RCM)** · RCM channel 1 (I5) (connection to pin 7 and 8 of the device) · Current value in milliamperes (mA) · Limit value (presently set limit value in (mA) to trigger the RCM alarm). The value displayed depends on the setting selected by the user: - Static - Dynamic - Incremental (the limit value associated with the current power level is always displayed) · RCM current in % of arith. current sum (L1 + L2 + L3) · Percentage display of the momentary residual current measured value relative to the arithmetic current sum · RCM limit value in % of arith. current sum (L1 + L2 + L3) · Percentage display of the present limit value relative to the arithmetic current sum

15.5 Settings

Select "*Settings*" in the menu bar to access the parameter configuration items.

The drop-down menu for selecting the setting options is divided into five sections:

· **TCP/IP**: Change the network settings
· **Modbus**: Change the Modbus settings
· **Transformers**: Change the transformer ratios
· **Password**: Change the password to access the homepage
· **Firmware Update:** Update of the firmware for the UMG 806 and EC1 module

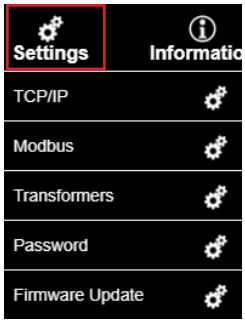


Fig. Menu for settings

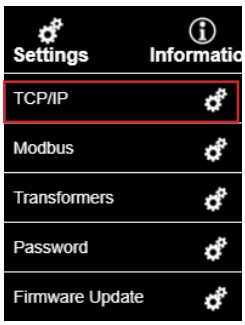
15.5.1 TCP/IP

· Configuration of all TCP/IP network settings for the communication between the UMG 806 basic device and the EC1 module.

· DHCP is the default setting when the device is delivered.

· Configuration options:
- **DHCP:** ON/OFF
- **IP address**
- **Subnet mask**
- **Gateway**

· All changes must be saved with "Save" for them to take effect.



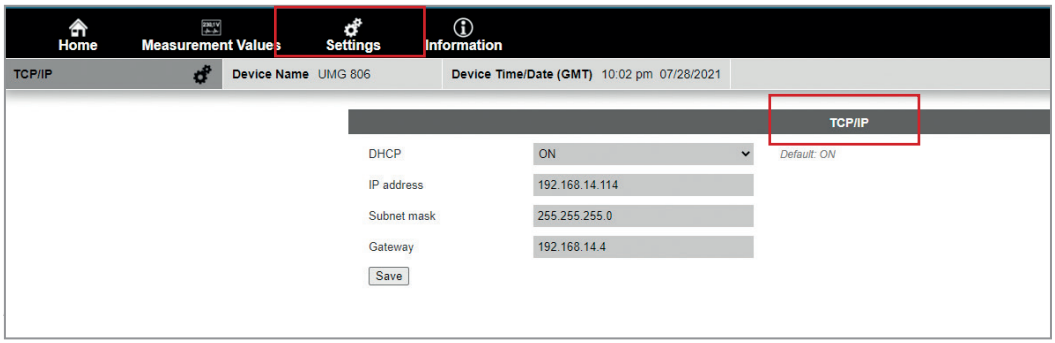
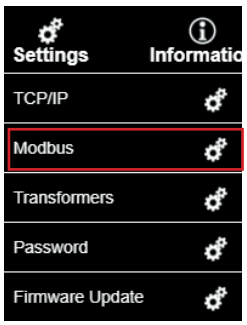


Fig. Settings: TC/IP

15.5.2 MODBUS



· **Configuration of all Modbus settings for the UMG 806**
· Configuration options:
- **Device address:** Default setting: 1
- **Baud rate in bit/s:** from 9600 to 115200 bit/s; default: 9600 bit /s)
- **Data type:** N.8.1, E.8.1, O.8.1, N.8.2; default: N.8.1
- **Mode:** Slave (Server), Master (Client); default: Slave (Server)

· All changes must be saved with "Save" for them to take effect.

INFORMATION

In a Modbus system, the Modbus organization (modbus.org) uses the terms **"client"** and **"server"** to describe Modbus communication. This is characterized by communication between **client devices - formerly master devices** - that initiate communication and make requests, and **server devices - formerly slave devices** - that process the requests and return an appropriate response (or error message).

· **Configuration of the device address for the EC1 module**

With the EC1, it is possible to read measured values from basic devices that are connected to a UMG 806 (mode: master [Client]) via RS-485 (mode: slave [Server]).
Restriction: Measured values from the additional modules cannot be displayed via this function.

· Configuration options:
- **Device address EC:** For communication with the corresponding UMG 806 (this setting depends on the mode set on the UMG 806 basic device).
- **UMG 806 in "slave mode":** Automatic setting of the EC1 device address
- **UMG 806 in "master mode":** Manual setting of EC1 device address. The device address of the EC1 must match the corresponding device address of the UMG 806 whose values are to be displayed on the homepage.

· All changes must be saved with "Save" for them to take effect.

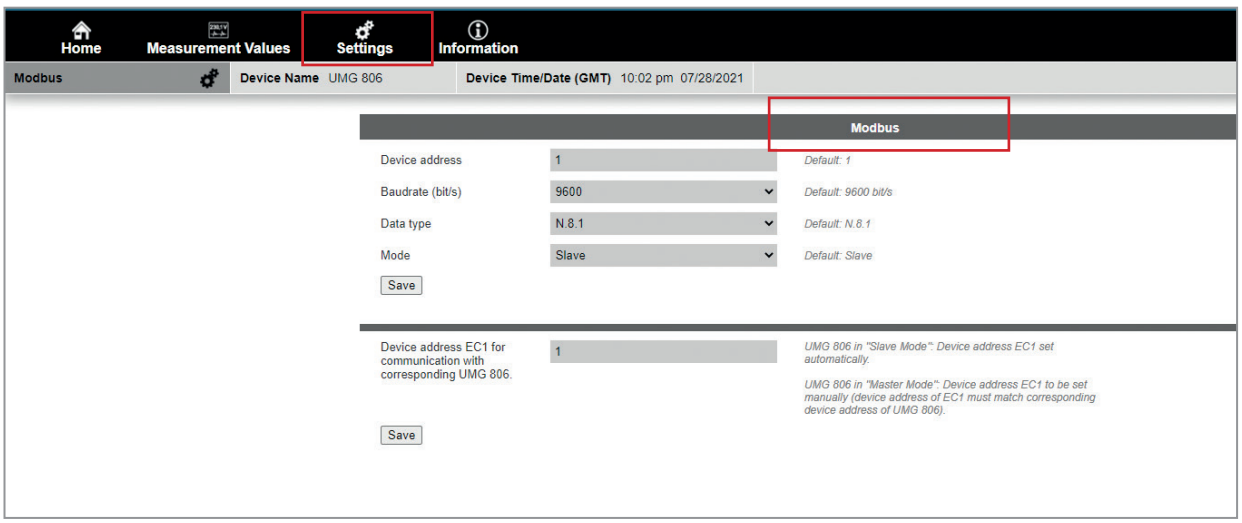
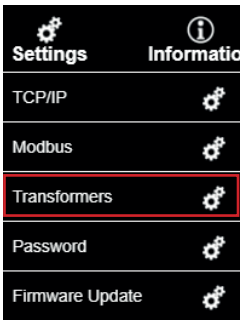


Fig. Example of Modbus settings for the UMG 806 device

15.5.3 Current transformer (CT) / Voltage transformer (VT) ratios



Configuration of all transformer ratios

· Configuration options:

- **VT-1 (L1-L3):** Entry for primary side voltage transformers L1-L3 (range 1 to 999999)
- **VT-2 (L1-L3):** Entry for secondary side voltage transformers L1-L3 (range 1 to 690)
- **CT-1 (I1-I3)**: Entry for primary side current transformers L1-L3 (range 1 to 999999)
- **CT-2 (I1-I3):** Entry for secondary side current transformers L1-L3 (range 1 to 6)
- **CT-1 (I4):** Entry for primary side current transformer, fourth current input (range 1 to 9999)
- **CT-2 (I4):** Entry for secondary side current transformer, fourth current input (range 1 to 6)
- **CT-1 (I5):** Entry for primary side current transformer, RCM current input (range 1 to 999)
- **CT-2 (I5):** Entry for secondary side current transformer, RCM current input (range 1 to 6)

· All changes must be saved with "Save" for them to take effect.

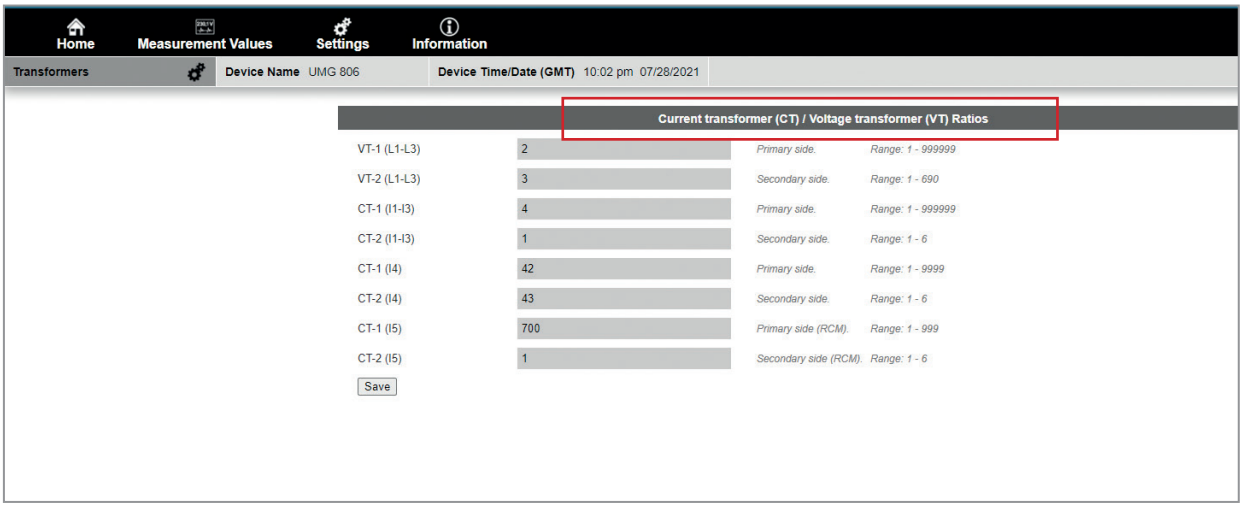
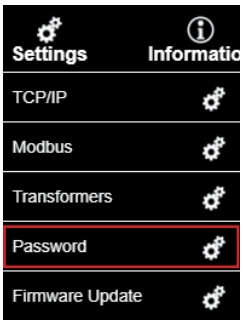


Fig. Example of current and voltage transformer settings (CT/VT)

15.5.4 Password



Enter and/or change password to access device settings and homepage.

- **Default:** admin / admin
- **Current password:** Enter the current password.
- **New password:** Enter the new, user-defined password with a maximum of 20 characters.
- **Confirm new password:** Enter the new password again.
- All changes must be saved with "Save" for them to take effect.

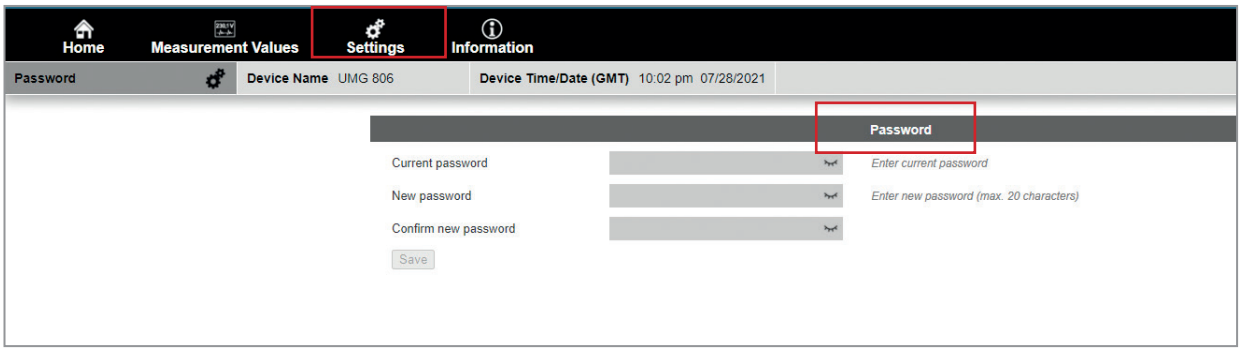
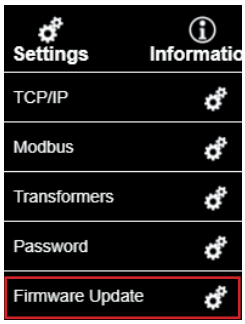


Fig. Entering / changing the password

15.5.5 Firmware Update



This function can be used to update the firmware of the UMG 806 basic device as well as the EC1 communication module.

- **Select device:** Selection of the device to be updated.
- **Select file:**
  1. Unzip the update ZIP file and select BIN file UMG 806.2025.bin.
  2. Confirm the selection with the "Upload firmware" button.
- The connection to the EC1 module might be lost after the update. The connection can be restored by a browser refresh after a successful update.
- The new firmware versions can be viewed under the menu item "Information".

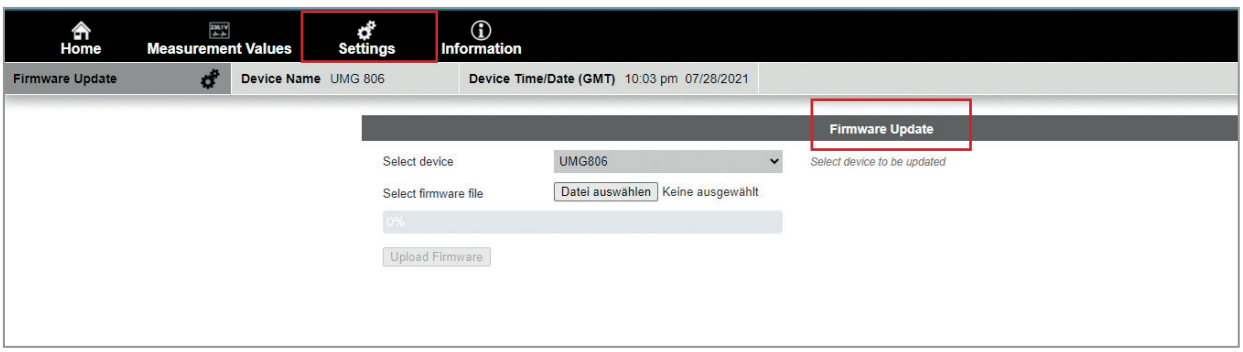


Fig. Firmware update

15.6 General information



This area displays basic information about the device.

· **Device name:**
  - User-defined configuration via the GridVis® software
  - Is identical to the device name displayed at the top left of every page on the homepage (20 characters; ASCII 256)

Device description:
  - Can be set via GridVis
  - Can contain user-defined additional information about the device (40 characters; ASCII 256)

· **Basic device firmware version (UMG 806):** Currently installed firmware version
· **Communication module firmware version (EC1):** Currently installed firmware version
· **Homepage version:** Current homepage version
· **MAC address:** Device-specific MAC address

Home | Measurement Values | Settings | Information

Information | Device Name UMG806 | Device Time/Date (GMT) 08:13 am 09/02/2021

General Information

Description	Details
Name of device	UMG806
Description of device	Power Meter
Firmware version basis device (UMG 806)	V2.0.18
Firmware version communication module (EC1)	EC1.2024.210810
Homepage version	V2.0.2
MAC address	00-0e-6b-10-1e-3b

Fig. Information about the device and the module

16. Service and maintenance

Prior to outbound delivery, the device is subjected to various safety tests and is marked with a seal.

INFORMATION

For opened devices (damaged or removed seal):
· New safety inspections are required for safe operation!
· The warranty expires!

The warranty is only valid for unopened devices!

16.1 Repair and calibration

Repair and calibration of the device must only be carried out by the manufacturer or an accredited laboratory!
The manufacturer recommends calibrating the device every 5 years!

WARNING

Warning of unauthorized tampering or improper use of the device.
Opening, dismantling or unauthorized manipulation of the device which goes beyond the mechanical, electrical or other operating limits indicated can lead to material damage or injury, up to and including death.
· **Only electrically qualified personnel are permitted to work on the devices and their components, assemblies, systems and current circuits!**
· **Always use your device or component only in the manner described in the associated documentation.**
· **In the event of visible damage, or for the purpose of repair and calibration, return the device to the manufacturer!**

16.2 Front panel foil and display

Please note the following for the care and cleaning of the front foil and the display:

ATTENTION

Material damage due to improper care and cleaning of the device.
The use of water or other solvents, such as denatured alcohol, acids, acidic agents for the front foil or the display can damage or destroy the device during cleaning. Water can, for example, penetrate into the device housing and destroy the device.
· **Clean the device, the front foil or the display with a soft cloth.**
· **Use a cloth moistened with clear water for heavy soiling.**
· **Clean the front foil and the display, e.g. of fingerprints, with a special LCD cleaner and a lint-free cloth.**
· **Do not use acids or acidic agents to clean the devices.**

16.3 Service

For questions not answered or described in this manual, please contact the manufacturer. Please be certain to have the following information ready to answer any questions:
· Device designation (see rating plate).
· Serial number (see rating plate).
· Software release (see system display).
· Measured voltage and supply voltage.
· An exact error description.

16.4 Device adjustment

The manufacturer adjusts the devices before delivery. No readjustment is required when the environmental conditions are complied with.

16.5 Clock/Battery

The supply voltage supplies the internal clock of the meter. If the supply voltage fails, the battery takes over the supply of voltage to the clock. The clock provides date and time information, for example, for recordings, minimum/maximum values and events.

The life expectancy of the battery is at least 5 years at a storage temperature of +45 °C (113 °F). The typical life expectancy of the battery is 8 to 10 years.

⚠ WARNING

Risk of injury due to electrical voltage! Serious personal injury or death may occur due to:
· Touching bare or stripped leads that are energized.
· Device inputs that pose a hazard when touched.
Also observe the following when handling your device before starting work:
· Disconnect the system/device from the power supply!
· 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!

⚠ CAUTION

Risk of injury due to fire or burns!
The battery used in the device may cause fire or burns if used improperly.
· **In case of damage, return devices with a soldered battery to the manufacturer, observing proper transport conditions!**

16.6 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 transformer with larger current transformer ratio.
	The current at the measuring input is too low.	Install current transformer with smaller 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.
Incorrect display “Inductive/ capacitive phase shift”	Current path assigned to the wrong voltage circuit.	Check connection and correct if necessary.
Active power consumed/delivered is reversed.	At least one current transformer connection is reversed.	Check connection and correct if necessary.
	One current path assigned to the wrong voltage circuit.	Check connection and correct if necessary.
Active power too small or too great.	Incorrectly programmed current transformer ratio.	Read and program the current transformer ratio on the current transformer.
	Current path assigned to the wrong voltage circuit.	Check connection and correct if necessary.
	Incorrectly programmed voltage transformer ratio.	Read the voltage transformer ratio on the voltage transformer and program.
An input/output is not responding.	Incorrectly programmed input/output.	Check programming and correct if necessary.
	Incorrectly connected input/output.	Check connection and correct if necessary.
No communication with the basic device	RS-485: - Incorrect device address - Different bus speeds (baud rate) and/or data frames. - Incorrect protocol. - No termination.	- Correct the device address. - Correct the speed (baud rate). Correct the data frame. - Correct the protocol. - Terminate bus with termination resistor.
No communication with the EC1 Ethernet module	- Incorrect device IP address - Incorrect subnet mask - Incorrect gateway	- Check and change the settings if necessary
No module communication with the basic device	- Incorrect mounting of module to the basic device	- Check the installation of the basic device and the module - Check the plug connections between the device and the modules
Despite the above measures, the device does not function.	Device defective.	Send the device and error description to the manufacturer for inspection.

ATTENTION

Material damage due to overloaded measuring inputs!
Too high current and voltage values overload the measuring inputs and can damage the device.
· **Adhere to the limit values specified on the rating plate and in the technical data**
· **Check your installation and connections!**

17. Technical information

17.1 Technical data

General	
Net weight	approx. 300 g (0.66 lb)
Device dimensions	Approx. B = 90 mm (3.54 in), H = 90 mm (3.54 in), D = 63.5 mm (2.5 in)
Horizontal pitch	5 HP
Battery	Type Li-Mn CR1632, 3 V
Backlight service life	45000 h (50% of the initial brightness)
Mounting orientation	As desired
Impact resistance	IK04 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	-30° C (-22 °F) to +80° C (176 °F)
Relative humidity	5 to 95 % RH at 77 °F (25 °C), non-condensing

Environmental conditions during operation	
The device: For weather-protected and stationary use. Fulfills operating conditions according to DIN IEC 60721-3-3. Has protection class II according to IEC 60536 (VDE 0106, part 1), a ground wire connection is not required!	
Rated temperature range	-25 °C (-13 °F) to +70 °C (158 °F)
Relative humidity	5 to 95 % at 77 °F (25 °C), non-condensing
Operating elevation/overvoltage category	< 2000 m (6560 ft) above sea level
Pollution degree	2
Ventilation	No forced ventilation required.
Protection against foreign matter and water	IP20 according to EN60529

Supply voltage	
Nominal range	AC: 100 V - 300 V 50/60 Hz / DC: 100 V - 300 V OVC III
Power consumption	max. 7 VA / 3 W
Recommended overcurrent protective device for line protection	5 A, (type B), IEC/UL approval

Voltage measurement	
3-phase 4-conductor systems with rated voltages up to	277 V_{LN} / 480 V_{LL} (+/-10%) acc. to IEC 277 V_{LN} / 480 V_{LL} (+/-10%) acc. to UL
3-phase 3-conductor systems (grounded) with rated voltages up to	480 V_{LL} (+/-10%) acc. to IEC 480 V_{LL} (+/-10%) acc. to UL
Overvoltage category	300 V CAT III acc. to IEC 300 V CAT III acc. to UL
Rated surge voltage	4 kV
Protection of the voltage measurement	1 - 10 A tripping characteristic B (with IEC/UL approval)
Measuring range L-N	0[1)] .. 300 V_{rms} (max. overvoltage 520 V_{rms})
Measuring range L-L	0[1)] .. 520 V_{rms} (max. overvoltage 900 V_{rms})
Resolution	0.1 V
Crest factor	2 (referred to measuring range 230 V L-N)
Impedance	>1.7 MΩ/Phase
Power consumption	approx. 0.1 VA / phase
Sampling frequency	8 kHz / phase
Frequency of fundamental oscillation - Resolution	45 Hz .. 65 Hz 0.01 Hz
Harmonics	1 .. 31.

1) ... The device only measures if at least one voltage measurement input has an L-N voltage of > 10 Vrms or an L-L voltage of > 17 Vrms present.

Current measurement (../1 A) (../5 A)	
Nominal current	1 A / 5 A
Channels	4
Measuring range	0.005 .. 6 A_{rms}
Crest factor (relative to the nominal current)	2
Overload for 1 s	100 A (sinusoidal)
Resolution	1 mA
Overvoltage category	300 V CAT III
Rated surge voltage	4 kV
Power consumption	approx. 0.2 VA
Sampling frequency	8 kHz
Harmonics	1 .. 31.

RCM Strommessung (I5)	
Nominal current	40 mA
Measuring range	0 .. 500 mA_{rms}
Operating current	0.01 mA
Resolution	0.01 mA
Crest factor	1.141 (relative to 500 mA)
Load	0.75 Ω
Overload for 1 s	5 A
Permanent overload	1 A
Overload for 20 ms	10 A
Measurement of residual currents	Typ A

Digital outputs Energy pulse output	
Switching voltage	max. 35 V DC
Switching current	max. 10 mA_{rms} DC
Response time	approx. 500 ms
Pulse width	80 ms ±20%
Digital output (energy pulses)	max. 10 Hz

Temperature measurement	
Update time	1 s
Total load (sensor and cable)	max. 0,35 kΩ
Suitable sensor types	PT100

Cable length (digital output, temperature measurement)	
Up to 30 m (32.81 yd)	Unshielded
Greater than 30 m (32.81 yd)	Shielded

RS-485 interface 2-wire connection	
Protocol	Modbus RTU
Transmission rate	up to 115.2 kbps

Connecting capacity of the terminals (supply voltage) Connectible conductors. Only connect one conductor per terminal point!	
Single core, multi-core, fine-stranded	0.14 - 2.5 mm², AWG 26-14
Wire ferrules (non-insulated)	0.25 - 2.5 mm², AWG 23-14
Wire ferrules (insulated)	0.25 - 1.5 mm², AWG 23-16
Tightening torque	0.5 - 0.6 Nm (4.43 - 5.31 lbf in)
Strip length	7 mm (0.2756 in)

Connecting 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 24-12
Wire ferrules (non-insulated)	0.25 - 2.5 mm², AWG 23-14
Wire ferrules (insulated)	0.25 - 1.5 mm², AWG 23-16
Tightening torque	0.5 - 0.6 Nm (4.43 - 5.31 lbf in)
Strip length	7 mm (0.2756 in)

Connecting 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 24-12
Wire ferrules (insulated/non-insulated)	0.25 - 2.5 mm², AWG 23-14
Strip length	7 mm (0.2756 in)

Connection capacity of the terminals (RS-485, digital output, temperature measurement)	
Single core, multi-core, fine-stranded	0.2 - 4 mm², AWG 24-12
Wire ferrules (non-insulated)	0.25 - 2.5 mm², AWG 23-14
Wire ferrules (insulated)	0.25 - 1.5 mm², AWG 23-16
Tightening torque	0.5 - 0.6 Nm (4.43 - 5.31 lbf in)
Strip length	7 mm (0.2756 in)

17.2 Performance characteristics of functions

Function	Symbol	Accuracy class	Display range	Norm
Voltage	U	0.2	0-999.9 kV	IEC61557-12
Current	I	0.2	0-99,99 kA	IEC61557-12
Active power	P	0.5	0-9999 MW	IEC61557-12
Reactive power	Q	0.5	0-9999 Mvar	IEC61557-12
Apparent power	S	0.5	0-9999 MVA	IEC61557-12
Power factor	PF	0.5	0-1.000	IEC61557-12
Frequency	F	±0.01 Hz	45.00 Hz-65.00 Hz	IEC61557-12
Active energy	EP	0.5 s	0-99999999 MWh	IEC62053-22
Reactive energy	EQ	2	0-99999999 Mvarh	IEC62053-23
Harmonic ratio of voltage	THDu	1 (50 Hz) 5 (60 Hz)	0-99.99 %	IEC61557-12
Harmonic ratio of current	THDi		0-99.99%	IEC61557-12
Sub-harmonic voltage component	THDu		0-99.99 %	IEC61557-12
Sub-harmonic current component	THDi		0-99.99 %	IEC61557-12
Voltage unbalance	Uunb	0.5	--	IEC61557-12
Current unbalance	Iunb	0.5	--	IEC61557-12
Phase sequence of the mains voltage	--	0.5	--	IEC61557-12
Phase position of the mains voltage / mains current	--	±0.1°		IEC61557-12
Phase sequence of the mains current	--	0.5	--	IEC61557-12
Extreme value	--	0.5	--	IEC61557-12
Consumption	--	0.5	--	IEC61557-12
Temperature	T	±2° C	--	--

Note:
For open type current transformers or Rogowski coils, the following applies:
· Current accuracy 0.5
· Power accuracy 1.0
· Active energy class 2

17.3 806-EC1 module

General	
Net weight	approx. 82 g (0.18 lbs)
Device dimensions	Approx. B = 36 mm (1.42 in), H = 90 mm (3.54 in), D = 63.5 mm (2.5 in)
Mounting orientation	As desired
Installation - suitable DIN rails - 35 mm (1.38")	According to EN 60715
Impact resistance	IK04 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	-30 °C (-22 °F) to +80 °C (176 °F)
Relative humidity	5 to 95 % RH at 77 °F (25 °C), non-condensing

Environmental conditions during operation	
The device: For weather-protected and stationary use. Fulfills operating conditions according to DIN IEC 60721-3-3. Has protection class II according to IEC 60536 (VDE 0106, part 1), a ground wire connection is not required!	
Rated temperature range	-25 °C (-13 °F) to +70 °C (158 °F)
Relative humidity	5 to 95 % at 77 °F (25 °C), non-condensing
Operating elevation	< 2000 m (6560 ft) above sea level
Pollution degree	2
Ventilation	No forced ventilation required.
Protection against foreign matter and water	IP20 according to EN60529

Ethernet communication	
Interface	RJ45 (10M)
Transmission technology	IEEE 802.3
Operating mode	Server
MAC	IEEE certification
IP	Static, DHCP
Protocol	Modbus/TCP, SNMP V2c Connection timeout > 30 s
Function	Modbus gateway Response timeout > 1 s
Isolation voltage	1.5 kV AC

NOTES

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