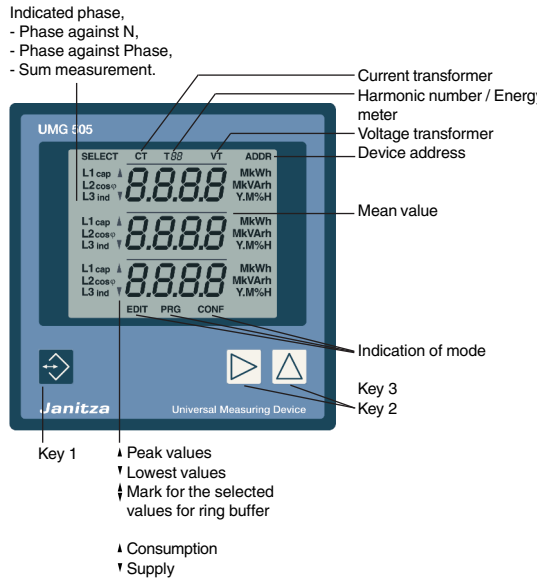
Universal Measuring Device
UMG 505
Operating Instructions

Brief instructions see last page



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Doc. No.: 1.023.034.c HW: series 1

Janitza®

Table of contents

Generals

Receipt control

In order to ensure a perfect and safe use of the device, a proper transport, expert storage, erection and mounting and careful usage and maintenance are required. When it may be supposed, that a safe operation is no longer possible, the device has to be put out of service and be protected against unintentional putting into service.
A safe operation can no longer be assumed, when the device

- shows visible damage,
  does not work in spite of intact net supply,
  has been exposed to disadvantageous conditions

for a longer time (e.g. storage out of the allowed climate without adaption to the room climate, dew etc.) or transport use (e.g. falling from great height, even without visible damage).

Please test the contents of delivery for completion, before starting the installation of the device. All delivered options are listed on the delivery papers.

Attention!
All plugs, which belong to the contents of delivery, are plugged on the device

The operating instructions also describe some **Options**, which do not belong to the contents of delivery.

Hints for maintenance

Before delivery the device is tested in various safety checks and marked with a seal. If the device is opened, these checks must be repeated.
There is no guarantee for devices, which are opened out of the manufacturing works.

Repairing and calibration
Repairing and calibration work can be carried out in the manufacturing works only.

Front foil
The cleaning of the front foil must be done with a soft cloth using a common cleansing agent. Acid or acidic agents may not be used for cleaning.

Battery
The life expectance of the battery is 5 years minimum for a storage temperature of +45°C. The typical life expectance of the battery is about 8 to 10 years. The battery is plumbed and should be exchanged in the manufacturing works only.

Waste management
The UMG 503 can be disposed as electronical waste according to the legal regulations and recycled. Please note, that the input Lithium battery must be disposed separately.

Meaning of symbols

The symbols, used in this manual have the following meaning:


Warning of dangerous electrical tension.


This symbol shall warn you about possible dangers, which can occur while mounting, putting into service and use of this device.


Connection of protective wire

Product description

Intended use

The UMG505 is designed for fix mounting in low and medium voltage switchgear and for measurement of voltage, current, power, energy and harmonics etc. Real and reactive energy can be given out via pulse signal at the digital outputs. The results of the measurement can be used for controlling consumers in energy distributions or energy generation.

The measurement with the UMG 505 can be carried out in TN-, TC- and IT-networks. Alternating voltage (50Hz/60Hz) up to 500VAC against ground and 870VAC outer conductor against outer conductor can be connected directly to the voltage measuring inputs. The voltage measuring inputs must be connected via external fuses 2A (medium time lag) to the UMG505. Voltage over 500VAC against ground must be connected via voltage transformers. The voltage measurement via voltage transformers can be carried out with two or three voltage transformers by choice.
To the current measurement input, .../5A or .../1A current transformers can be connected by choice. In networks with voltage up to 150VAC against ground, currents up to 5.2A can be connected directly to the UMG 505 and be measured.

The connection of the auxiliary voltage, the measurement inputs etc. are on the rear side via all-insulated plug connectors. The auxiliary voltage must be connected to the building installation via a separation (switch or power switch) and a 2...10 A overload protection.
A protective wire connection is necessary for operation of the UMG 505.

Hints for usage

This device may be put into service and used by qualified personnel according to the safety regulations and instructions only. Please mind the additional legal and safety regulations for the respective application.
Qualified personnel are persons, familiar with erection, mounting, putting into service and usage of the product and having the qualifications such as:

• education or instruction / entitlement to switch, release, ground or characterize current circuits and devices according to the standards of safety techniques.
• education or instruction in the care and usage of suitable safety equipment according to the standards of safety techniques.

Attention!
Measurement in systems with pulse load is not possible, because no continuous scanning of the measuring signals is carried out.

Support

If questions should occur, which are not described within this manual, please call us directly.
For the handling of your questions, we need the following information:

- Device description (see type plate),
- Serial number (see type plate),
- Software release,
- Measurement and auxiliary voltage and
- exact failure description.

We are opened for you:

Mo until Tu	07:00 until 15:00
Fr	07:00 until 12:00

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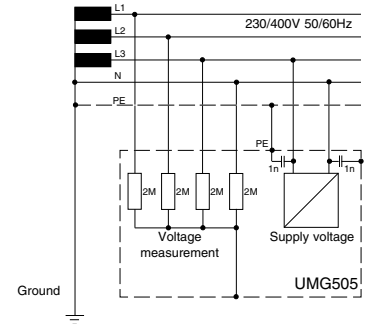
Functional description

Measurement

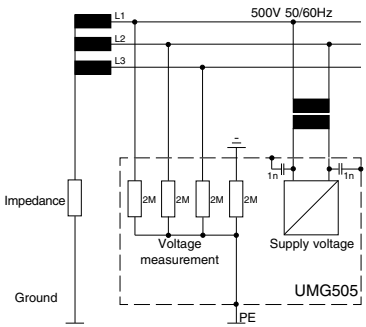
The electronical three phase measurement system determines and digitalizes the effective values of voltages and currents in 50/60 Hz networks.
Two random test measurements are carried out each second on all current and voltage measuring inputs. Signal interruptions, which are longer than 500ms are surely recognized. For each random test two periods are scanned. The scanning frequency for a 50Hz signal is 6400Hz. From those sampled values the microprocessor calculates the electrical magnitudes.
These measured values are indicated within the programmable display. Highest values, lowest values and programming data can be saved in a battery buffered storage.
Selected measured values will be saved with date and time in a ring buffer.

Measurement in IT-networks
The UMG505 can be used in IT-networks with outer conductor voltage up to 500V.

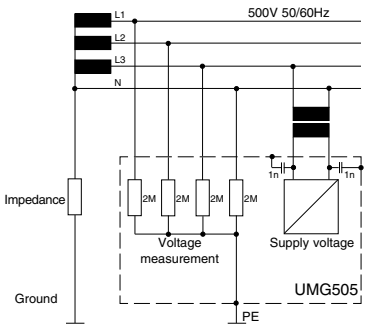
Measurement in networks without N
In networks without N, the voltages are measured against an artificial neutral point (PE). From the voltage L-PE, the voltage L-L is calculated.
The phase power in networks without N are used for the calculation of the sum power only, but have no further meaning.



*Diagr. **Drawing** UMG505 in TN-networks.*



*Diagr. **Drawing** UMG505 in IT-networks without N.*



*Diagr. **Drawing** UMG505 in IT-networks with N.*

Hints for installation

Supply voltage

A supply voltage is necessary for the operation of the UMG 505. The kind and dimension of the required supply voltage is noted on the type plate. The supply voltage is connected to the clamps 14 and 15. Between supply voltage (terminals 14, 15) and ground (PE) a maximum voltage of 300VAC may occur.
Higher voltage between supply voltage and ground (PE) can destroy the UMG505. To avoid overvoltage, the supply voltage should be earthed.

Attention!
- The connection wires of the supply voltage must be suitable for rated voltage up to 300VAC against ground.

- The supply voltage must be protected by a fuse. The fuse must be in the range of **4A up to 10A**.

- A switch or power switch for the supply voltage must be provided within the building installation.

- The switch must be near the device and easy to reach by the user.

- The switch must be marked as a separation for the device.

- Please ensure before connecting the supply voltage, that voltage and frequency match the statements on type plate!

- The device may be operated with earthed housing only!

- Cables with sigle soldered wires cannot the connected via screw terminals**!**

- The screw terminals may be plugged in voltage free condition only.

- Only screw clamps with the same pole number and the same colour may be connected.

- The supply voltage for the UMG 505 may not be taken from voltage transformers.
Switching procedures on medium voltage side can lead to short duration overvoltage, which can destroy the supply voltage input of the UMG 505.

Measuring voltage

The UMG505 is suitable for measurement of alternating voltage up to 500VAC against ground and 870VAC between the outer conductors. The wiring must be suitable for voltage up to 500VAC against ground and 870VAC between the outer conductors as well.

Attention!
The UMG505 is not suitable for measurement of direct current voltage.

Voltage over 500VAC against ground must be connected via voltage transformers.

For voltage measurement via **two voltage** transformers, the „Aron connection“ must be set in configuration mode of the UMG 505.

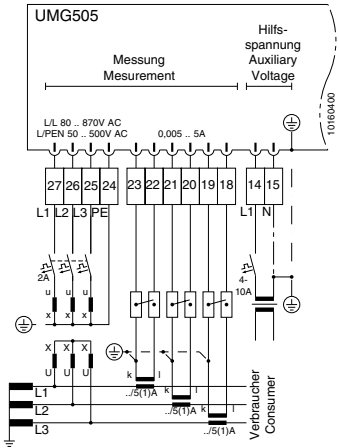
The wires for voltage measurement of the UMG 505 must be protected by an overcurrent fuse.

Measuring current

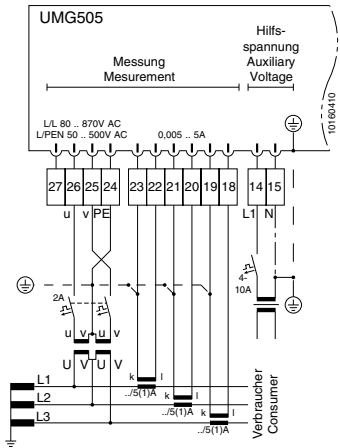
The UMG505 is designed for the connection of current transformes with secondary currents of ../1A and ../5A. When the device is delivered, a current transformer of ../5A is set.
Each currrent measurement input can be loaded with 5,2A over a long period or for 2 seconds with 180A.
Via the current measurement inputs only alternating current can be measured but no direct current..

Attention!
Current transformers can lead voltage, which is dangerous to touch and should be earthed.

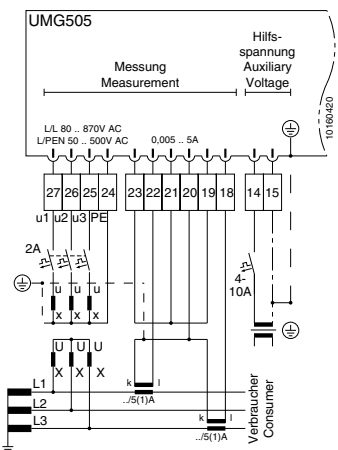
Current transformers, not loaded at the secondary, can lead voltage dangerous to touch and should be short circuited.



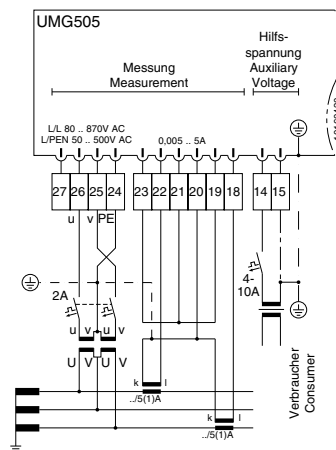
Diagr. 1 Medium voltage measurement with three voltage transformers and three current transformers.



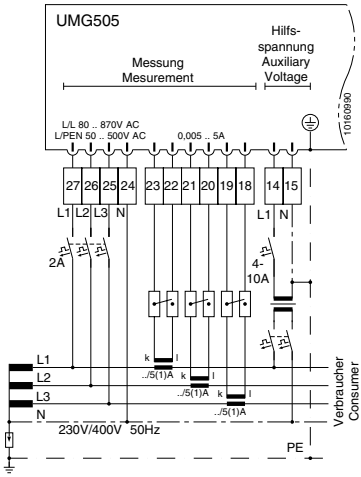
Diagr. 2 Medium voltage measurement with two voltage transformers and three current transformers.



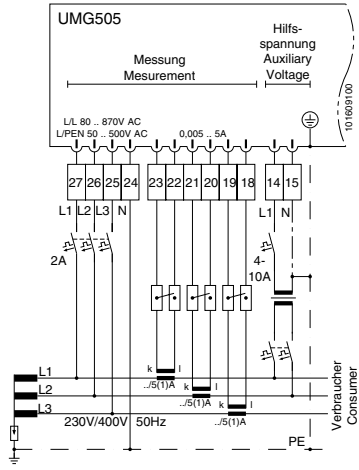
Diagr. 3 Medium voltage measurement with three voltage transformers and two current transformers.



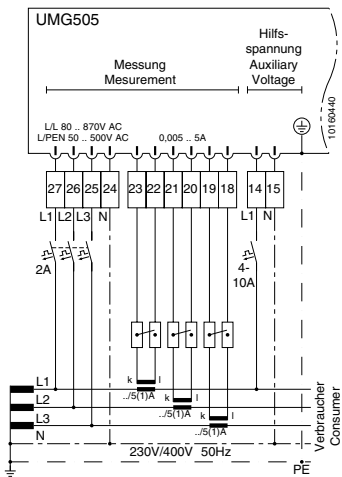
Diagr. 4 Medium voltage measurement with two voltage transformers and two current transformers.



*Diagr. 5 Measurement in **IT-networks** with N.*



*Diagr. 6 Measurement in **IT-Netz** without N.*



*Diagr. 7 Measurement in **TN-networks** with three current transformers.*

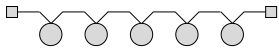
Serial interfaces

RS485 (Option)

Terminal resistors

All devices are connected in bus structure (line). In a segment, up to 32 participiants can be connected. At the beginning and at the end of a segment the cable is terminated with resistors. In the UMG505 these terminal resistors can be activated with pluggable bridges.

For more than 32 participiants a repeater must be used (amplifier), to connect the single segments.



Diagr. Bus structure with terminal resistors on both sides.

Terminal resistor

Device with RS485 interface

Protection

For connections via RS485 interface, a twisted and protected cable must be used. To reach the required protection, the shield must be connected to housing parts at both ends of the cable over a wide surface.

Cable type

Unitronic LI2YCYCTPJ2x2x0,22 (Lapp Kabel)

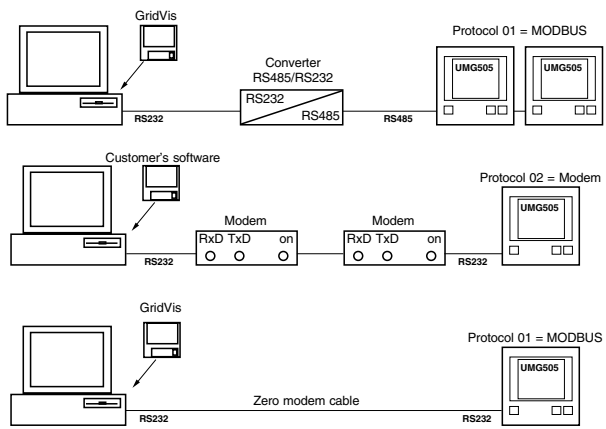
Cable length

1200m at baudrate 38,4k.

RS232 (Option)

The maximum distance between two devices with RS232 depends on the used cable and the baud-rate. The normal distance for a baudrate of 9600 Baud should not exceed 15 up to 30 meters. The allowed load must be bigger than 3kOhm, The capacitive load, caused by the transmission cable, is limited to 2500pF.

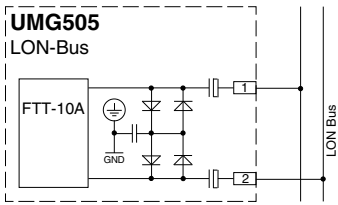
Diagr. Connection of two devices with RS232 interface



LON-Bus (Option)

For the connection of the UMG505 with other LON-bus devices a FTT10-transceiver is used within the UMG 505. Hence, the bus is safed against change of polarity and can be connected at one or two sides. Devices, that use a FTT10 -transceiver, can be connected to each other via line, star or ring structures.

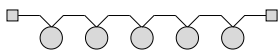
If the allowed transmission impedance is reached within a structure, the network can be enlarged by using repeaters or routers.



Diagr. Connection LON-Bus

Bus wiring

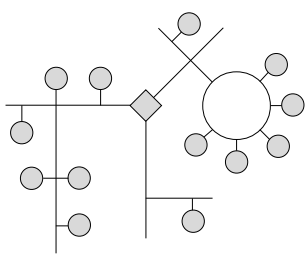
For bus wiring and connection at both sides, the total cable length may be 2700m at maximum. The UMG 505 does not have a connectable terminal resistor for LON-bus.



Diagr. Bus structure with terminal resistors at both ends.

Free wiring

For free wiring and bus connection at one end, the maximum cable length may be 500m, and the maximum distance between two devices may be 400m.



Diagr. Free structure

Allowed cable length

Depending on the selected structure of the network and the chosen cable type, different transmission distances can be achieved.

Cable type	Length Total	device - device
TIA 568A Category 5	500m	< 250m
Belden 85102, 16AWG	500m	< 500m
Belden 8471	500m	< 400m
UL Level IV, 22AWG	500m	< 400m
JY(St)Y 2x2x0.8, 20AWG	500m	< 320m

*Diagr. Maximum length at **free wiring.***

Cable type	Length
TIA 568A Category 5	< 900m
Belden 85102, 16AWG	< 2700m
Belden 8471	< 2700m
Level IV, 22AWG	< 1400m
JY (St) Y 2x2x0.8, 20AWG	< 900m

*Diagr. Maximum distance for **bus wiring.***

Termination or central feeding

Device with LON bus

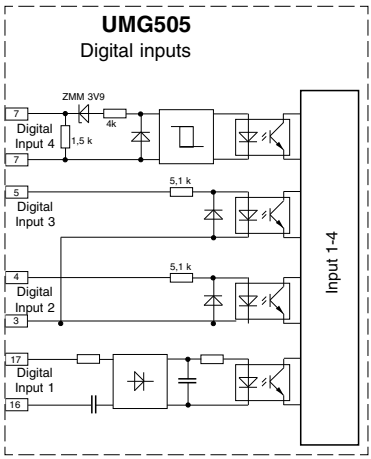
Terminal resistor

Digital inputs

The UMG 505 has four digital inputs, to which signal senders can be connected.

Digital Input 1
Digital Input 2 + 3
Digital Input 4

The inputs are separated by optical couplings and have different electrical properties. Only input 1 can operate with direct or alternating current voltage signals. Input 4 can be used as pulse input for real energy measurement as well.



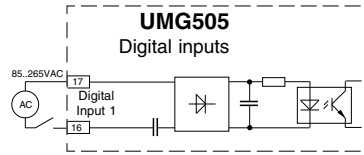
Diagr.: Internal circuit of the digital inputs.

Digital Input 1

The operating voltage for *Digital Input 1* depends on the allowed supply voltage of the UMG 505.

Voltage version 1

In the standard version, the UMG 505 is driven with the supply voltage of "85 .. 265VAC, 120 .. 370VDC". In this case, the *Digital Input 1* is activated with **alternating current voltage** of 85 .. 265VAC .

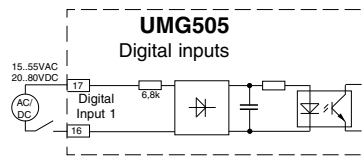


Diagr.: Digital Input 1 only for ***alternating current voltage.***

Voltage version 2

For UMG's, which are driven with a supply voltage of "15 .. 55VAC, 20 .. 80VDC" (Option), the *Digital Input 1* can be activated with an

alternating current voltage of 15 .. 55VAC or
direct current voltage of 20 .. 80VDC .

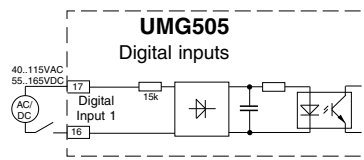


Diagr.: Digital Input 1 for ***direct or alternating current voltage.***

Voltage version 3

For UMG's, which are driven with a supply voltage of "40 .. 115AC, 55 .. 165VDC" (Option), the *Digital Input 1* can be activated with an

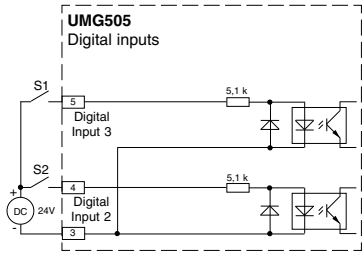
alternating current voltage of 40 .. 115VAC or
direct current voltage of 55 .. 165VDC .



Diagr.: Digital Input 1 for ***direct or alternating current voltage.***

Digital Input 2 and 3

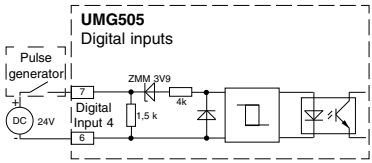
Both inputs Digital Input 2 and 3 can be controlled by a direct current voltage signal. For the operation, an external supply voltage of 20..30V DC is required.



Diagr.: Connection proposal; Digital Input 2 and 3 with external supply voltage.

Digital Input 4

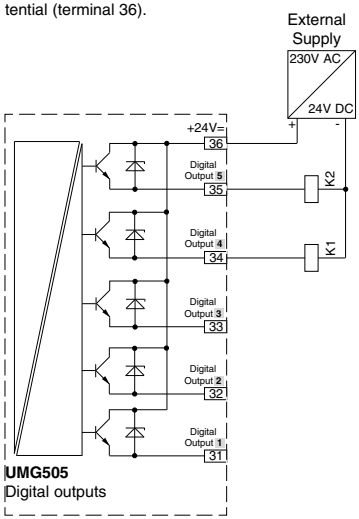
Input 4 can be used as a pulse input according to DIN EN62053-31 or as digital input. For the operation, an external supply voltage of 20..30V DC is required.



Diagr.: Connection proposal; Digital Input 4 as pulse input.

Digital outputs

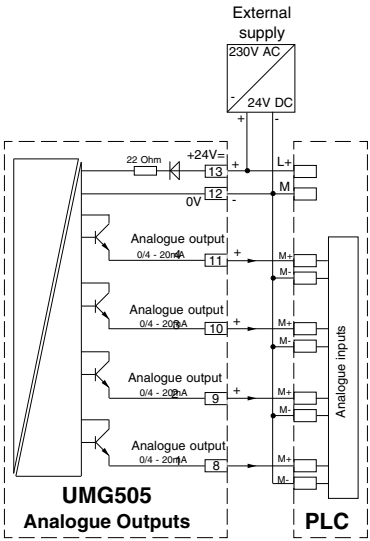
The UMG505 has 5 transistor switching outputs. These outputs are separated from the evaluation electronics via optical couplings. The collectors of the transistors are connected together with plus potential (terminal 36).



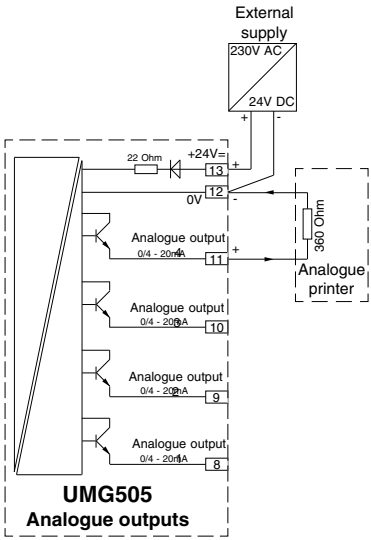
Diagr Connection of two relays to the digital outputs.

Analogue outputs

The UMG505 has 4 analogue outputs. Each analogue output can transmit a current of 0-20mA or 4-20mA. For the operation, an external net supply of 24VDC is required.



Diagr. Connection of the analogue outputs to a PLC.



Diagr. Connection of an analogue output to an analogue printer.

Putting into service

The device should be put into service as follows:

1. **Install the device**.

The UMG505 is suitable for panel mounting in low voltage switchgear, in which overvoltage in overvoltage class III can appear at maximum.

Any mounting position is allowed.

To ensure safety and functionality of the UMG 505, a protective wire connection is absolutely necessary.

2. **Connect supply voltage Uh** .

The size of the supply voltage Uh for the UMG505 must match the description on type plate. If supply voltage for alternating current voltage AC and for direct current voltage DC are given on type plate, the UMG505 can be operated with one of these supply voltage by choice. Connected supply voltage, which do not match the type plate, can lead to malfunction or damage of the device.

Between the inputs of the supply voltage Uh (terminals 14,15) and ground (PE), a maximum voltage of 300VAC may be attached. Higher voltage between supply voltage and ground (PE) can damage the UMG 505.

To avoid overvoltage at supply voltage input, the supply voltage should be earthed.

The cables for the supply voltage must be suitable for rated voltage up to 300VAC against ground.

3. Program **current and voltage transformers**

4. Connect **measurement voltage**.

The UMG505 is suitable for the measurement of voltage up to 500VAC against ground and 870VAC phase to phase.

The UMG505 is not suitable for the measurement of direct current voltage. Voltage over 500VAC against ground must be connected via voltage transformers.

For voltage measurement with two voltage transformers, „Aron Circuit“ must be entered within the configuration of the UMG 505.

After the connection of the measurement voltage, the indicated values for voltage L-N and L-L must match the ones at measurement voltage input. If a voltage transformer ratio is programmed, it has to be respected during this comparison.

5. Connect **measurement current**.

The UMG505 is designed for the connection of ../1A and ../5A current transformers. When the device is delivered, a current transformer of ../5A is set.

Each current measurement input can be loaded with 5.2A for long duration or 180A for two seconds.
Over the current measuring inputs only alternating current, but no direct current can be measured.
None earthed transformer clamps can be dangerous to touch. Current transformers, which are not loaded on the secondary can lead voltage dangerous to touch and should be short circuited.

The current measurement inputs should be connected one after the other. Please compare the current indicated by UMG 505 with the attached current.
If the current transformer is short circuited, the UMG 505 must show zero A in the corresponding outer conductor.
The current indicated by UMG505 must match the input current respecting the set current transformer.

6. Check measurement.

If all voltage and current inputs have been connected correctly, the phase and sum power is calculated and indicated correctly.

Check all phase power

If a current transformer is assigned to the wrong outer conductor, the corresponding phase power is indicated incorrectly.
The assignment of the outer conductor to current transformer is correct, if no voltage between the outer conductor and the corresponding current transformer (primary) appears.
To ensure, that an outer conductor at voltage measurement input is assigned to the right current transformer, the corresponding current transformer can be short circuited on the secondary. The apparent power, indicated by UMG 505 must be zero in this phase.

If the apparent power is displayed correctly, but the real power shows a „-“ sign, the current transformer clamps are exchanged or power is supplied to the energy supplier' network.

Check sum power

If all voltage, current and power are displayed correctly for the corresponding outer conductors, the sum values must be correct as well. This can be confirmed by comparing the measured sum power with the energy, measured by the KW meter in the distribution.

Removal of errors

Faults	Possible reason	Remedy
Indication dark	External prefuse has released.	Replace prefuse.
	Internal prefuse has released.	The fuse cannot be changed by the user. Please send the device back to the manufacturing works.
	Contrast setting too dark.	Change contrast settings in configuration menu.
	Device faulty.	Please send the device to the manufacturer for repair.
Bad legible display	Contrast setting too dark	Set contrast in configuration menu.
No current indication	Measurement voltage not connected	Connect measurement voltage.
Current too small	Current measurement in the wrong phase.	Check and correct connection.
	Current transformer factor programmed incorrectly.	Read current transformer ratio on current transf. and program correctly.
Wrong current	Current measurement in the wrong phase.	Check and correct connection.
	Current transformer factor programmed incorrectly.	Read current transformer ratio on current transf. and program correctly.
	Measuring range exceeded.	Install bigger current transformer.
	The peak current value on meas. input was exceeded caused by harmonics.	Install bigger current transformer. Attention: Please ensure, that the measuring inputs are not overloaded.
	The current on measuring input was underscored.	Install smaller current transformer.
Voltage L-N too small	Measurement in wrong phase.	Check and correct connection.
	Voltage transformer factor programmed incorrectly.	Read current transformer ratio on current transformer and program correctly. If the voltage is not measured via voltage transf. please program a voltage transf. ratio of 400/400.
	Voltage on measuring input out of measuring range.	Install smaller voltage transformer.
Voltage L-N incorrect	Measurement in wrong phase.	Check and correct connection.
	Voltage transformer factor programmed incorrectly.	Read current transformer ratio on current transformer and program correctly. If the voltage is not measured via voltage transf. please program a voltage transformer ratio of 400/400.
	Measured range exceeded.	Install bigger current transformer.
	The peak voltage value on meas. input was exceeded caused by harmonics.	Install bigger current transformer. Attention: Please ensure, that the measuring inputs are not overloaded.
Voltage L-L too small/ too big	Outer conductors exchanged.	Check and correct connection.
	N not connected.	Check and correct connection.
Phase shift ind /cap too small or big	Current path is assigned to the wrong voltage path.	Check and correct connection.
Program. data get lost	Battery empty.	Please send device to the manufacturer for exchanging the battery.
	The device has been exposed to electromagnetical interfer. bigger than the allowed by.	External protection measure such as shielding, filtering, earthing or spatial separation.

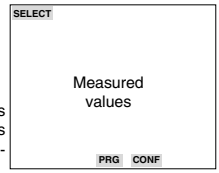
Faults	Possible reason	Remedy
Programming data lost the	Battery empty	Please send the device to the manufacturer for replacement of the battery.
Real power too small / too big	Current transformer factor programmed incorrectly.	Read current transformer ratio on current transformer and program correctly.
	Current path is assigned to the wrong voltage path.	Check and correct connection.
	Current on measuring input out of measuring range.	Install bigger or smaller current transformer. Attention: Please ensure, that the measuring inputs are not overloaded.
	Voltage transformer factor programmed incorrectly.	Read current transformer ratio on current transformer and program correctly. If the voltage is not measured via voltage transformer please program a voltage transformer ratio of 400/400.
	Current on measuring input out of measuring range.	Install bigger or smaller current transformer. Attention: Please ensure, that the measuring inputs are not overloaded.
Real power consump./ supply exchanged.	One current transformer at least exchanged.	Check and correct connection.
	Current path is assigned to the wrong voltage path.	Check and correct connection.
The time is indicated incorrectly.	The device has no automatical summer-/winter change over.	Correct time by hand.
"EEEE A" in the display. current	The measuring range of current was exceeded.	Check measuring current and insert a suitable transformer.
"EEEE V" in the display voltage	The measuring range of voltage was exceeded.	Check measuring voltage and insert a suitable transformer.
Duration of mem. =38s. measured	Not enough memory for all selected values.	Select more equal averaging times for the values.
Relay output, analogue output or pulse output do not react.	The outputs are not program.	Program the outputs.
	The service protocol 04 is set	Select another protocol.
The device does not work correctly in spite of the above	Device out of order.	Please send the device to the manufacturer with an exact description of the failure.

Usage and display

After net return, the UMG 505 shows always the first programmed measured value indication. The use of the UMG 505 is carried out via the three keys in the front.

= *Key 1*
= *Key 2*
= *Key 3*

In the various indications, the keys have different meanings.



Key 1 *Key 2* *Key 3*

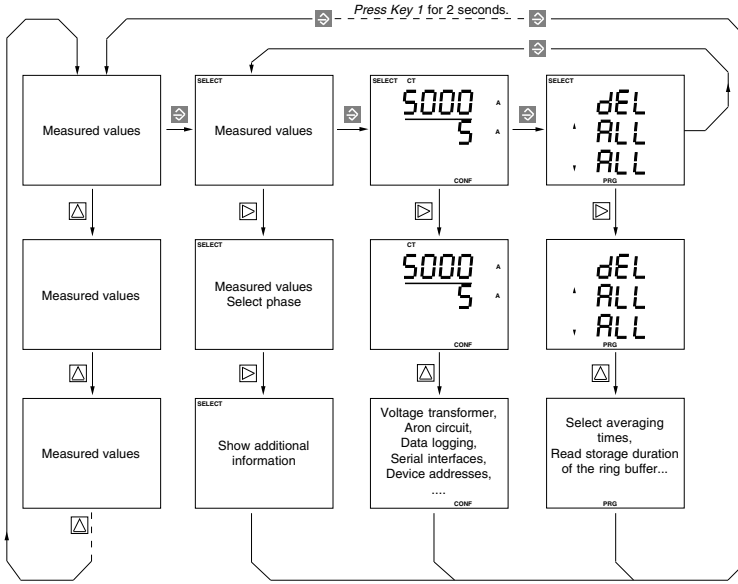
If you are in the measured value indication, you can change over to the below mentioned indication by using key 1.

the measured value indication,
the **SELECT** mode,
the configuration menu **CONF** and
the programming menu **PROG**

In configuration menu **CONF** and in programing menu **PRG,** the settings can be changed in edit mode **EDIT**.
In edit mode **EDIT** the keys have the following meaning:

Key 1 Select digit/number and leave edit mode.
Key 3 Change numbers.
Key 2 Multiplication of a number with factor 10

Pressing **key 1** for about 2 seconds, you return to the first measured value window of the measured value indication.
Pressing ***key 2*** or ***key 3*** for about **2 seconds** you return to the previous measured value window.



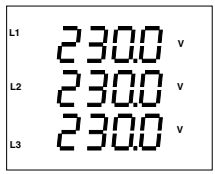
Diagr. Menu overview

Measured value indications

After a net return the device always starts with the first programmed measured value indication. In the indication of the UMG 505 up to three measured values can be indicated simultaneously. With the keys 2 and 3 one can scroll through those measured value indications. In order to keep the selection of measured values clear, only a part of the available measured values are programmed, when the device is delivered.

If other measured values are desired for the display of UMG 505, They can be selected via the programming and evaluation software **GridVis**, which belongs to the contents of delivery, and a PC, and transmitted to PC via the serial interface of the UMG 505.

Example:
Voltage L1-N, L2-N, L3-N.



SELECT Mode

For various measured values, it is possible to call up additional information directly in the measured value indications. For this purpose, you change into the **SELECT Mode** in the corresponding measured value indication.

Now the following additional indication for the measured values can be called up:

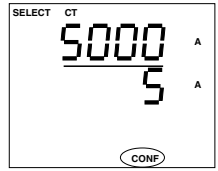
- Mean values and their **averaging time**.
- Minimum and maximum values with **date and time**.
- **Time of deletion and running time** of the energy measurement.
- The **energy meters** of the digital inputs.

Configuration menu CONF

In configuration menu **CONF** the settings, which are necessary for the operation of the UMG 505, are deposited. Besides others, it is the setting of the current transformer, device address and programming of the inputs and outputs.

In delivery condition, these settings are not protected and can be changed. Unintentional change of the settings can be avoided by setting a password.

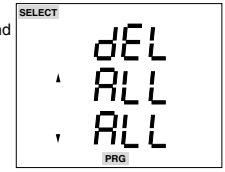
Example:
Current transformer setting, primary 5000A and secondary 5A.



Programming menu PRG

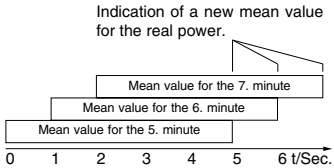
In programming menu PRG the minimum and maximum values and energy can be deleted.

Example:
Delete minimum and maximum values.



Mean values

For the most measured values a mean value is build over the last passed period of time within the UMG 505 each second. This passed period of time is the programmable averaging time.

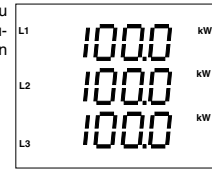


Diagr.: Mean value for real power over 5 seconds.

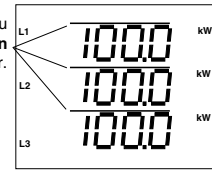
Only mean values can be marked for storage in the **ring buffer**.

The calling up - in the example for the power maximum value in phase L3 - is carried out as follows:

Using *key 3* you scroll to the measured value indication of the real power.

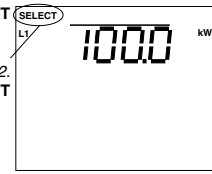


Pressing *key 2* you scroll to the **mean values** of real power.

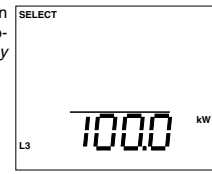


Select the **SELECT** mode using *key* 1.

Confirm with *key 2.* The symbol **SELECT** is on.

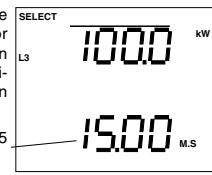


Select the mean value of the real power in L3 using *key 1.*



Call up the **averaging time** for the real power in phase L3 as an additional information using *key 2.*

Averaging time = 15 Minutes

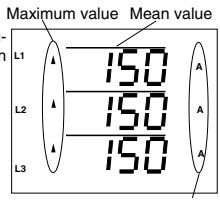


Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Minimum and maximum values

For the most measured values (see table measured and calculated quantities) the minimum and maximum values are saved. The minimum value is the smallest measured value, which was detected since the last deletion. The maximum value is the biggest measured value, which was detected since the last deletion. Every measured value is compared to the saved minimum and maximum values, which are overwritten in case of exceeding. For each minimum and maximum value, the first existance is saved with date and time.
After return of supply voltage, all minimum values are deleted automatically.
Minimum values are marked with an arrow downwards and maximum values with an arrow upwards.

The maximum value of the current mean value, for example, is indicated as follows:



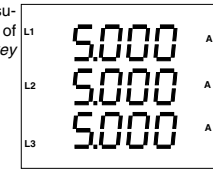
The highest measured current mean value is:

I_{L1} = 150A
I_{L2} = 150A
I_{L3} = 150A

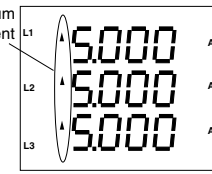
When the device is delivered, most of the minimum and maximum values can be called up via the keys 1 and 2. If you are interested in date and time of the minimum and maximum values, this information can be called up by the **SELECT** function.
All minimum and maximum values can be deleted all together or individually with the function **PRG**.

Example: Call up a maximum value
The maximum value „current in L2“ shall be called up:

Move to the measured value indication of the current using *key 3*.

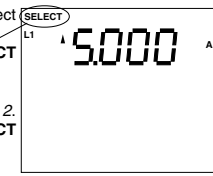


Go to the maximum values of current using *key 2*.

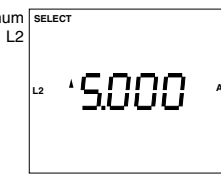


Chose the Select mode with *key 1*. The symbol **SELECT** flashes.

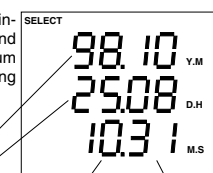
Confirm with *key 2*. The symbol **SELECT** is on.



Select the maximum current value in L2 using *key 1*.



Call up additional information date and time for the maximum value of current using *key 2*.



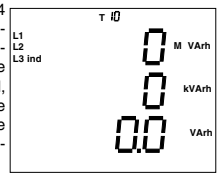
Year=98 Month=10
Day=25 Hour=08
Minute=10 Second=31

On 25.10.1998 at 08:10:31 appeared the maximum measured value of current in L2 since its last deletion.

Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Energy measurement

In the UMG505, all in all 30 energy meters are at your disposal. 24 meters can be controlled by tariff changeover. When the device is delivered, 12 energy meters are displayed in the measured value indication.



	Energy meter				
		Changeable			
Real energy					
Without rev. run. stop	T50	T51	T52	T53	T54
Consumption	T00	T01	T02	T03	T04
Supply	T30	T31	T32	T33	T34
Reactive energy					
Without rev. run. stop	T40	T41	T42	T43	T44
inductive	T10	T11	T12	T13	T14
capacitive	T20	T21	T22	T23	T24

Diagr. Overview energy meters

When the device is delivered, only the grey meters can be called up within the measured value indication.

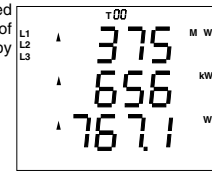
Time of deletion

For each energy meter, the running time is saved. If real energy or reactive energy is deleted, all corresponding tariffs are deleted as well. The time of deletion is saved and running time is started again.
As all real and reactive energy can be deleted simultaneously, there is one time of deletion only for all real and reactive energy meters.

The time of deletion can be called up directly within the measured value indications as additional information for the energy meters, provided this energy meter is configured for measured value indication (see manufacturer settings).

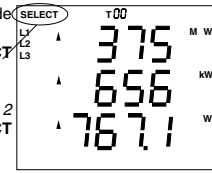
Example: Call up deletion time for real energy
The time of deletion can be called up in the measured value indication of real energy. To reach the first measured value indication from each programming part, press key 1 for about 2 seconds.

Scroll to measured value indication of real power T00 by pressing key 3.



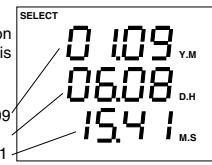
Chose select mode using key 1.
The symbol **SELECT** flashes.

Confirm with key *2*
The symbol **SELECT** is on.



Press key 2 again.
The time of deletion for real energy is indicated.

Year =01, Month =09
Day =06, Hour =08
Minute =15, Sec.=41



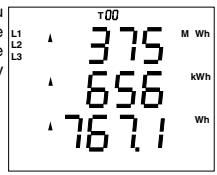
Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Show running time

Each energy meter, besides of the 6 non controllable energy meters TX0, can be controlled via the digital inputs and internal swiching clock. For each energy meter, the duration of energy measurement with the corresponding running time is saved.

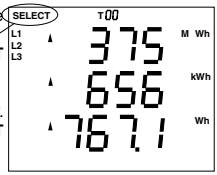
Example: Running time for real energy T00:
The running time for real energy can be called up in the measured value indication. From each program part, you reach the first measured value indication by pressing key 1 for about two seconds.

Pressing *key 3* you scroll to the measured value indication of energy T00.

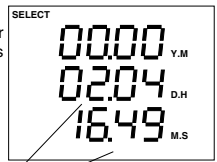


Chose select mode using key 1.
The symbol **SELECT** flashes.

Confirm with *key 2.*
The symbol **SELECT** is on.



Press *key 2* twice.
The running time for real energy T00 is indicated.



Days=02, Hours=04
Minutes=15, Sec.=41

Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Harmonics

Harmonic waves are the integer multiple of the fundamental. The UMG505 measures the fundamental of voltage in the range of 45 up to 65Hz. The calculated harmonic current and voltage are related to this fundamental. For strongly distorted voltage, the fundamental cannot be detected with sufficient accuracy. In order to calculate the harmonics nevertheless, a fix fundamental can be assumed with either 50Hz or 60Hz. Please see chapter „Scanning frequency“.
The UMG505 calculates harmonics up to the 20th.

Total harmonic distortion THD(f)

The calculated total harmonic content THD(f) represent the effective ratio of harmonics to the fundamental. The total harmonic distortion is given in %.

$$THD_I = \frac{\sqrt{I^2 - I_1^2}}{I} \times 100\%$$

$$THD_U = \frac{\sqrt{U^2 - U_1^2}}{U} \times 100\%$$

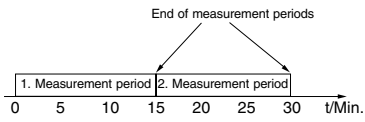
Partial harmonic content

In the further description, the single harmonics are called partial harmonics.
The partial harmonics for current are given in Ampere, the partial harmonics for voltage are given in Volt.

EMAX

Real power EMAX

For the real power the mean value **real power EMAX** is build over a programmable measurement period additionally. Here the measured value „sum real power“ is summarized each second and divided by the measuring period time. As a result, each second a new mean value „real power Emax“ is at disposal. At the end of a measuring period, the sum is deleted, and the measuring period starts again.
For the comparison and storage of the monthly Emax peak values, only that real power Emax is used, which was measured at the end of a period.



Diagr.: Calculation of mean value for real power EMAX over a measurement period of 15 minutes.

Pulse input

The measured value „Sum real power“ is calculated from the measured current and voltage, when the device is delivered. But if a pulse valence is assigned to „Digital Input 4“, „sum real power“ is calculated from pulse number and valence. The real power of the single phases will be calculated by the current and voltage, which the UMG 505 measures furthermore.

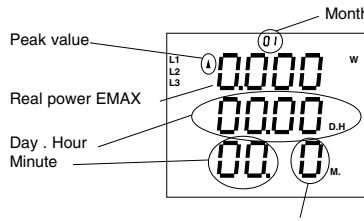
Target values

For the EMAX program in the UMG 505, 5 targets can be given. If no more settings were made, the target 1 is active. Via the **input channels** 1-16 and via the switching clock, one of the 5 target values can be selected and assigned to the Emax program. If a target value is activated via the input channels and at the same time another via the switching clock, the target with the highest number (priority) of Emax program is used.
Please note:

Target number 1 = low
Target number 2 = high

Monthly EMAX peak values

All monthly EMAX peak values are saved for all EMAX target numbers each month. The old monthly EMAX peak values are overwritten at the beginning of a new year.
If the real power EMAX is configurated for the display software GridVis, real power EMAX can be indicated in the display of the UMG 505 as well.
The monthly EMAX peak values can be read out directly at the UMG505 and via the serial interface, with the software GridVis, for instance.



Attention!
The „Monthly EMAX peak values“ are **not** indicated in the standard display configuration, when the device is delivered.
Those indications can be configured with the software GridVis, which belongs to the contents of delivery.

Reset of the measuring period

The averaging time for real power Emax is called measuring period.
The measuring period for real power Emax can be 5, 10, 15, 30 and 60 minutes. The manufacturer's setting is 15 minutes.
To be synchronized with the measurement of the energy supplier, the reset of the measuring period should be carried out via an input of UMG 505. If no reset via an input of UMG 505 occurs within the programmed measuring period, the reset is released automatically by the internal clock.
The reset of the measuring period deletes real power Emax and starts a new measuring period. The last measured real power Emax is used for the minimum and maximum storage and, if programmed, saved in the event memory.
If there are less than 30 seconds between two resets, the measuring period is reset and real power EMAX is deleted. The obsolete measured value is not saved in the maximum and minimum memory and **not** be deposited within the event memory, if programmed.

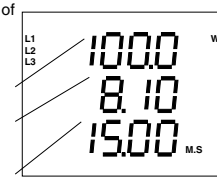
The measuring period for real power EMAX can be reset by the following means:
- automatically, after measuring period,
- internally, via keyboard,
- internally, via digital inputs,
- externally, with MODBUS Protocol,
- externally, with LON Bus.

The automatical reset after measuring period cannot be suppressed.

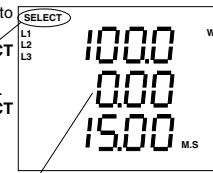
Reset of measuring period by keyboard

With *key 3* you scroll to the indication of real power EMAX.

Real power EMAX (Example 100W).
Rest time of period (Example. 8Min. 10Seconds).
Measuring period (Example 15Minutes).

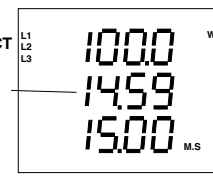


With *key1* go to Select-Mode.
The symbol **SELECT** flashes.
Confirm with *key 2* .
The symbol **SELECT** is visible.



Press *Key2* again.
The rest time is deleted.

The symbol **SELECT** disappears.
The period for real power EMAX is started again.



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Attention !
A change of
- the averaging time,
- the measuring period,
- the current transformer ratio,
- the voltage transformer ratio,
- the measurement (Aron circuit) or
- the measured value selection for ring buffer

delete the ring buffer.

Memory

The memory of the UMG 505 is deviced into three ranges. The **event memory**, the maximum and minimum memory and the **ring buffer**. The event and the ring buffer can be read out with the program **GridVis** and PC only. The data which are read out by PC are available in ASCII format.

In the minimum and maximum memory, the minimum and maximum values are deposited with date and time.
All **monthly EMAX peak values** are saved for all tariffs each month. The obsolete monthly Emax peak values are overwritten at the beginning of a new year.

Event memory

In the event memory, the following events can be saved with date and time:

- Deletion of event memory,
- Change of the digital inputs,
- Change of the digital Emax outputs,
- Breakdown and return of the supply voltage,
- Breakdown and return of the measurement voltage,
- Threshold violations.

The event memory can be read out with PC and the programming and reading out software **GridVis** only. The breakdown of the measurement voltage will be recognized, when:

- the measurement voltage is smaller than 50% of the set primary of the voltage transformer,
- and the breakdown remains longer than 500ms without interruption.

In the device, a part of the memory is available, which are shared by the **ring buffer** and the **event memory**. Here, the size of the event buffer can be set in menu „**Prot**“ by programming the number of saved events. If the number is set to "0", the whole memory is available for the ring buffer.

If the number of events, that are saved, are changed, the event memory and ring buffer are deleted.

Ring buffer

For the most measured values a mean value is calculated (please see table "Measured and calculated values"). Mean values are marked with a horizontal bar above the measured values. The mean values, selected for storage in the ring buffer, are marked by both of the arrow symbols.
For the storage in ring buffer, the following values can be selected in menu **PRG** of the UMG505

- the **mean values** of measured values**,**
- the **EMAX reset of the measuring period** and
- a part of the **energy meters** (Tx0)

The **changeable energy meters** (see table below) can be selected with the programming software **GridVis** only for saving in the ring buffer.
For **energies,** the period between two savings is set to one hour.

	Energy meter					
	Fix	Changeable				
Real energy						
without rev. run. stop	T50	T51	T52	T53	T54	
Consumption	T00	T01	T02	T03	T04	
Supply	T30	T31	T32	T33	T34	
Reactive energy						
without rev. run. stop	T40	T41	T42	T43	T44	
inductive	T10	T11	T12	T13	T14	
capacitive	T20	T21	T22	T23	T24	

Diagr. Overview of energy meters.

The more mean values are selected for storage in the ring buffer, the earlier the ring buffer is complete and will be overwritten. The period of storage for the ring buffer can be read out in the measured value indication.
The stored measured values can be read out of the ring buffer using the "programming- and reading out software **GridVis**" only.

Attention !
A change of
- the averaging time,
- the measuring period,
- the current transformer ratio,
- the voltage transformer ratio,
- the measurement (Aron circuit) or
- the measured value selection for ring buffer

delete the ring buffer.

Storage duration
The more mean values are marked for saving in the ring buffer, the shorter becomes the storage duration. When the device is delivered, the setting
Mean values: U1, U2, U3, I1, I2, I3, P1, P2, P3
Averaging time: 15 Minutes
leads to a storage duration of about 1 year. If this time is exceeded, the most obsolete values are overwritten.
If various averaging times are assigned to the mean values, more memory is required, and the storage duration becomes shorter.
To enlarge the storage duration, the number of saved values can be decreased, or all values should be programmed for saving with the same averaging time.

Ring buffer data format

Data sets can be saved in compressed or uncompressed form. With the presettings, the data are saved compressed.
The programming and reading out software GridVis can read compressed data from ring buffer only. Other applications can read data sets in uncompressed form only.
An uncompressed data set consists of the type of measured value, the date and the measured value. This value is always given in Float format.

Type of measured value

The type of the measured value can be determined by the addresses from the tables 1a and 1b. Example: If the type is marked by the decimal number „1004“, this corresponds to the current mean value in phase L2.

Type	Date	Meas. value
2 Bytes	6 Byte	4 Byte (float)

Extract from table 1a

Table 1a, Measured value
Meas. val. in floating point form.

Description	Addr.(dez)	r/w[1]	Type	
Current	1000	r	Meas. val[2] A	L1, L2, L3
	1001	*r*	*Actual value*	*in L2*
	1002	*r*	*Actual value*	*in L3*
	1003	*r*	*Mean value*	*in L1*
	1004	***r***	***Mean value***	***in L2***
	..	..	..	..
Voltage N-L	1012	r	Meas. val.[2] V	L1, L2,
Voltage L-L	1024	r	Meas. val.[2] V	L1-L2, L2-L3,
Real power	1036	r	Meas. val.[2] W	Sign -=Supply
..	..	..	.. ..	..

Diagr. Assign measured value type.

Date

In the part of the data set with the description „**Date“,** the date and time of the measurement are saved.

Meas. val. type	Date	Meas. value
2 Bytes	6 Byte	4 Byte (float)

char: Year, Month, Day, Hour, Minute, Second

Diagr. Structure of „Date“

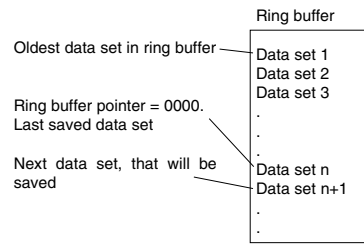
Changeover ring buffer

The changeover from compressed to uncompressed data is carried out via the serial interface and Modbus protocol.
If data should be saved uncompressed within the ring buffer, address **19010**dez must be overwritten by 2 Bytes of a content by choice.
If data should be saved uncompressed within the ring buffer, address **19020**dez must be overwritten by 2 Bytes of a content by choice.

Attention!
If another way of compression is selected, the total content of the ring buffer is deleted.

Read ring buffer

If the data sets have been saved uncompressed, they can be read via the serial interface with Modbus protocol.
To make this reading easy, there is a **ring buffer pointer** available. This ring buffer pointer always points to the beginning of a data set. One data set consists of 12 Bytes.



Diagr. Data sets in ring buffer.

[1] r/w = read/write
[2] Measured values {float: Actual value[L1, L2, L3], **Mean value[L1, L2, L3]**, Minimum[L1, L2, L3], Maximum[L1, L2, L3]}

Read data sets
The reading of data sets is controlled by the following addresses:

Read address **19000**dez.
The first 4 Bytes provide the contents of the ring buffer pointer.
The next 12 Bytes provide the first data set, which the pointer points on.
The ring buffer pointer is increased **automatically** by the number of read Bytes, but the first four Bytes are not included.

Write address **19000**dez.
Set ring buffer pointer on a data set of the ring buffer.
If the ring buffer pointer is overwritten by 0000, it points on the last read beginning of ring buffer with address **19008**dez.

Read address **19002**dez.
Read a number (4 Bytes) of data sets from that address on, on which the pointer points. The ring buffer pointer is increased **automatically** by the number of read Bytes. The number of read Bytes must be divisible by 12.

Read address **19004**dez.
Provides that address (4 Bytes), on which the actual pointer points.

Read address **19006**dez.
Read a number of data sets, from that address on, on which the pointer points. The ring buffer pointer is not increased.

Read address **19008**dez.
Delivers the number (4 Bytes) of the Bytes saved in ring buffer. If you divide this number by 12, the result is the number of the saved data sets.
The ring buffer pointer is set to the last data set in ring buffer. The contents of this pointer is therefore zero.
Overwrite address **19010**dez with 2 Bytes with a content by choice
New data sets are written into the ring buffer uncompressed. If data were saved before in a compressed form, the ring buffer will be deleted.
Read address **19010**dez.
Delivers the storage format of the ring buffer in 2 Bytes.
00=compressed ring buffer
01=uncompressed ring buffer

Overwrite address **19020**dez with 2 Bytes with a content by choice.
New data sets are written into the ring buffer compressed. If data were saved before in a uncompressed form, the ring buffer will be deleted.
Overwrite address **19030**dez with 2 Bytes with a content by choice.
The ring buffer will be deleted.

Example 1: Read the last saved data set.
Read adress **19008**dez. The ring buffer pointer (0000) is set to the last data set in ring buffer.
Read 12 Bytes from address **19006**dez. 12 Bytes correspond to one data set. The ring buffer pointer is not increased.

Example 2: Read all saved data sets.
1.) Read address **19008**dez. The number of saved Bytes is read. If you divide the result by 12, the number corresponds to the saved data sets. The pointer points to the last saved data set in ring buffer.
2.) Read the content of the Bytes in ring buffer by address **19002**dez. With the MODBUS-Protocol, at maximum 240 Bytes=20 data sets can be read per reading. The number of read Bytes must be divisible by 12.
The ring buffer pointer is increased automatically by the number of read Bytes and points to the next data set, which has not been read yet.
3.) Repeat reading of address **19002**dez as long as all data sets have been read.

Attention!
If a failure appeared during data transmission, the complete procedure must be repeated, starting with step 1.

Example 3: Read all saved data sets.
1.) Read address **19008**dez. Reads the number of saved Bytes in ring buffer. Divided by 12, the number of saved data sets is the result. The pointer points to the last saved data set.
2.) Read address **19000**dez. The first 4 Bytes refer to the actual address of the pointer. The next 12 Bytes provide the first data set of the ring buffer. With MODBUS-Protockol you can read 244Bytes (4Byte + 20 data sets) at maximum per reading.
3.) Repeat reading address **19000**dez as long as all data sets have been read.

Attention!
If a failure occured during data transmission, the last actual address of the ring buffer pointer must be written on address **19000**dez and the last reading procedure must be repeated.

Programming menu PRG

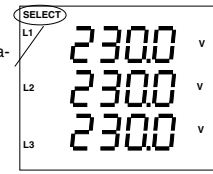
The following settings can be carried out in programming menu **PRG** :

delete all max. and minimum values "dEL",
delete real and reactive energy,
Select measured values for the **ring buffer**,
Select averaging times for the measured values,
Delete maximum and minimum values individually,
Read storage duration for the ring buffer.

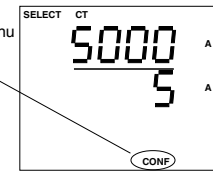
Select menu PRG

Only from a measured value indication of the UMG 505 can be changed over to the menu PRG. To reach the first measured value indication from each program part, press key 1 for about 2 seconds.

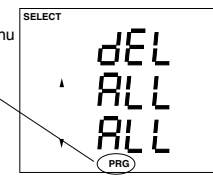
Press *key 1*.
The text **SELECT** flashes in the indication.



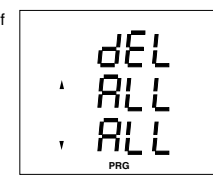
Press *key 1* again.
Now you are in menu **CONF**.



Press *key 1* again.
Now you are in menu **PRG**.



Confirm selection of the menu **PRG** pressing *key 2*.
The text **SELECT** disappears.

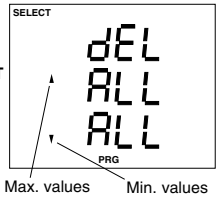


Delete all min/max values

If you are in programming menu **PRG,** and you want to delete all maximum values, please proceed like this:

Confirm selection with *key 2*.

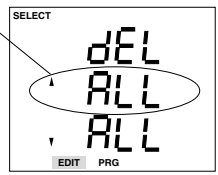
The symbol **SELECT** disappears.



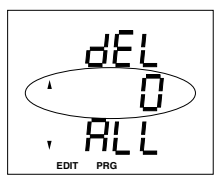
Select maximum values with *key 1*.

The text „ **ALL**“ flashes.

The symbol **EDIT** appears.



Confirm selection with *key 3*.
The text „ ALL“ disappears.
The number „0“ appears in the indication and flashes.
All maximum values are marked for deletion and are deleted, when you change to the next indication.



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Attention!
The monthly peak values of real power Emax belong to the maximum values and are deleted as well.

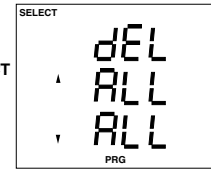
Attention!
After return of the supply voltage, all minimum values are deleted.

Delete max/min val. individually

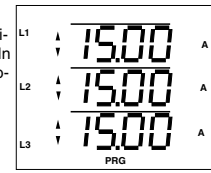
If you are in menu **PRG** and want to delete the voltage peak value in L2, please proceed like this:

Confirm selection with *key 2*.

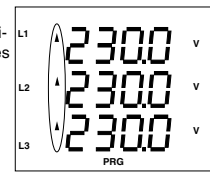
The symbol **SELECT** disappears.



Change to the measured value indication using *key* 3. In this example the programming of the current in the three phases is shown. The averaging time of the currents is 15 minutes.

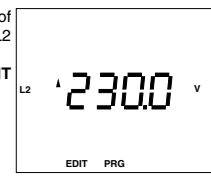


Now scroll to the measured value indication of the voltages by using *key 3*.



Select max. value of voltage in phase L2 with *key 1*.
The symbol **EDIT** appears.

Confirm with *key 3*.
The selected maximum value is deleted.



The indicated maximum value is set to 000.0 for a short time, and will be overwritten with the next measured value.

Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Delete real and reactive energy

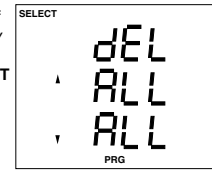
Real and reactive energy can be deleted separately via keyboard or serial interface.
The group of the reactive energy meters and the group of the real energy meters are reset separately. Starting time and running time will be actualized.
If real energy is deleted, also the meters T50 - T54, T00-T04 and T30-T34 are deleted.
If reactive energy is deleted, also the meters T40 - T44, T10-T14 and T20-T24 are deleted.

	Energy meter					
		Changeable				
Real energy						
without rev. run. stop	T50	T51	T52	T53	T54	
Consumption	T00	T01	T02	T03	T04	
Supply	T30	T31	T32	T33	T34	
Reactive energy						
without rev. run. stop	T40	T41	T42	T43	T44	
inductive	T10	T11	T12	T13	T14	
capacitive	T20	T21	T22	T23	T24	

Diagr. Overview of the energy meters.

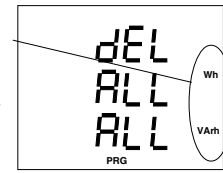
If you are in menu **PRG** and would like to delete the real energy meter, please proceed as follows:

Confirm selection of menu **PRG** with *key 2*.
The symbol **SELECT** disappears.

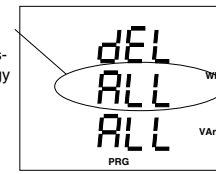


Scroll to real and reactive energy meters using *key 2*.

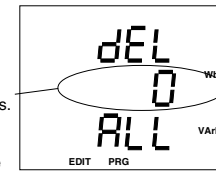
The arrows for minimum and maximum values disappear.



Select real energy meter with *key 1*.
The text „ **ALL**“ flashes. The real energy meters are marked for deletion.
The symbol **EDIT** appears.



Confirm selection with *key 3*.
The text „ ALL“ disappears.
The number „0“ appears and flashes.
All real energy meters are marked for deletion and are deleted while changing into the next indication.



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Program ring buffer

The following values can be chosen for storage in the ring buffer in menu **PRG** of the UMG505

- the mean values of the measured values,
- the reset of measuring period Emax
- a part of the energy meters (Tx0)

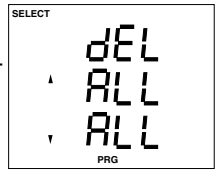
Mean values, which are selected for storage in the ring buffer are marked by both arrow symbols before the mean value.

Mean values

If you are in menu **PRG** and want to provide the mean value of voltage in phase L2 for storage in the ring buffer, please proceed as follows:

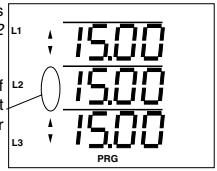
Confirm selection with *key 2*.

The symbol **SELECT** disappears.

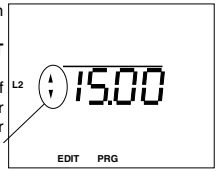


Scroll to mean values of voltage with *key 2* and *key 3*.

The mean value of voltage in L2 is not programmed for storage.



Select voltage in phase L2 with *key 1*. The symbol **EDIT** appears.
Mark mean value of voltage in L2 for storage in ring buffer with *key 2*.



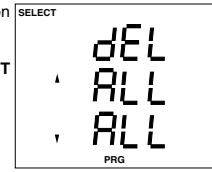
Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.
The mean value of voltage in phase L2 is programmed for storage in ring buffer.

Reset of measuring period EMAX

If you are in menu **PRG** and would like to provide the reset the measuring period Emax for storage, please proceed as follows:

Confirm selection with *key 2*.

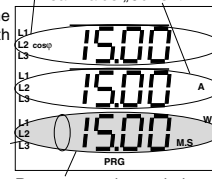
The symbol **SELECT** disappears.



Mean value „Sum cosPhi“
Mean value „Current in N“

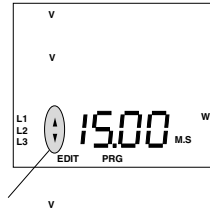
Scroll to the indication beside with *key 3*.

The reset of the measuring period Emax is not programmed for storage.



Reset measuring period Emax with 15 minutes period.

Select measuring period with *key 1*. The symbol **EDIT** appears.
Select reset of measuring period Emax for storage with *key 2*.



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Attention !
A change of the measured value selection for the ring buffer deletes the ring buffer!

Averaging time

An averaging time can be assigned to each mean value. The following averaging times can be set:

1, 5, 10, 15, 30 seconds,
1, 5, 10, 15, 30, 60 minutes.

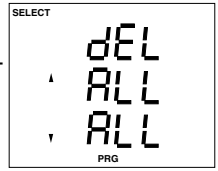
All averaging times are programmed to 15 minutes, when the device leaves the factory.

Set averaging times

If the averaging time, for example, for voltage L2 should be changed to 5 seconds, please proceed as follows in menu **PRG**:

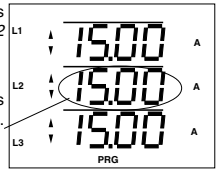
Confirm selection with *key 2*.

The symbol **SELECT** disappears.

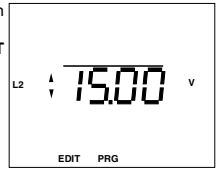


Scroll to mean values of voltage with *key 2* and *key 3*.

The averaging times are set to 15 minutes.

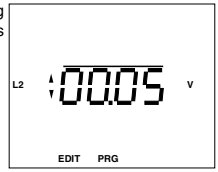


Select voltage in phase L2 with *key 1*. The symbol **EDIT** appears.



Scroll to averaging time of 5 seconds with *key 3*.

00:05 = 5 seconds
(15:00 = 15 minutes)



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

The averaging time is saved.

Attention !
A change of the averaging time deletes the ring buffer.

Period of storage

The more mean values are marked for storage in the ring buffer, the shorter becomes the period of storage. If the ring buffer is completely full, the most obsolete values are overwritten.
With the factory's presettings

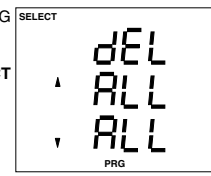
Mean values: U1, U2, U3, I1, I2, I3, P1, P2, P3
Averaging time: 15 minutes.

The mean values of about 1 year are saved in the device. If this period is over, the most obsolete values are overwritten.
If various averaging times are assigned to the mean values to be stored, more room for storage can be required, and the period of storage can get much shorter.

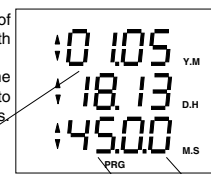
To enlarge the period of storage, the number of saved mean values can be decreased or all mean values can be programmed with the same averaging time.
An **estimation** of the period of storage can be called up in menu **PRG**.

Confirm menu PRG with *key 2*.

The symbol **SELECT** disappears.



Scroll to indication of period of storage with *key 2* and *key 3*.
In the example, the period is estimated to 1 year and 5 months.



1year, 5months, 18days, 13hours, 45minutes, 0seconds

Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Configuration

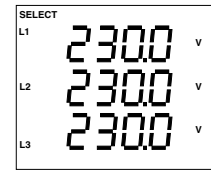
In configuration menu **CONF** the required settings are noted for operating the UMG505 (see also "Table of configuration data"). When the device is delivered, these settings are not protected and can be changed. An unintended change of the settings can be avoided using a password.

The following settings can be read out and changed:

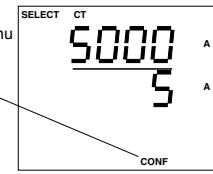
Current transformer
Voltage transformer
Aron circuit
Data logging
Serial interfaces
RS485 interface (Option)
RS232 interface (Option)
LON (Option)
Device address
Measured value rotation
Event memory
Net frequency
Switching outputs 1 to 5
Switching clock
Switch-on time
Switch-off time
Channels
EMAX target value (Option)
EMAX digital outputs(Option) **,**
Power
min. connection time
EMAX digital outputs (Option)**,**
min. disconnection time
max. disconnection time
EMAX analogue outputs (Option)
max. power of consumer
min. power of consumer
EMAX analogue outputs (Option)
max. disconnection power
or
min. connection time of the Generator
Time between minP und maxP
Digital inputs
Pulse valence
Digital outputs
Pulse width
Analogue outputs, source and scale
Analogue outputs, scale range 0/4mA
LCD contrast
Clock, summer/winterzeit
Password
Serial number
Software Release

To reach menu **CONF** from a measured value indication, please proceed as follows:

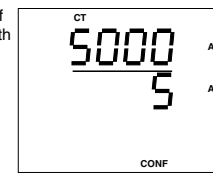
Press *key 1*.
The text **SELECT** appears in the indication and flashes.



Press *key 1* again.
Now you are in menu **CONF**.



Confirm selection of the menu **CONF** with *key 2*.
The text **SELECT** disappears.
Now you are in menu **CONF,** and the current transformer ratio is indicated.

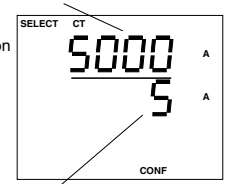


Current transformer

The ratio of the current transformer is set in configuration menu **CONF**. The secondary current can either be set to ../1A or ../5A.
If you are in configuration menu **CONF**, the current transformer ratio can be changed as follows:

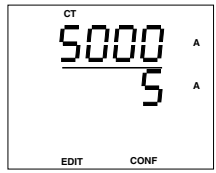
Primary current

Select:
Confirm the selection of the current transformer menu with *key 2*.
The text **SELECT** disappears.



Secondary current

Set:
Select the number to be changed using *key 1*. The selected number flashes. The text **EDIT** appears.
Change the selected number using *key 3*.
Multiply the number with a factor 10 with *key 2*.

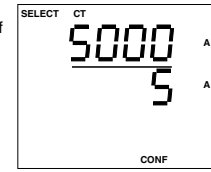


When the ratio of the current transformer is set, press *key 1* as often, as no digit is flashing any longer. **EDIT** disappears.
With *key 3* you move to the next menu. The ratio of the current transformer is saved.

Voltage transformer

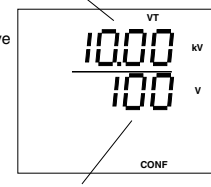
The ratio of the voltage transformer is set in configuration menu **CONF**. The secondary voltage can be set in the range of 1V up to 500V.
If you are in configuration menu **CONF,** change the ratio of the current transformer as follows:

Select
Confirm selection of current transformer menu with *key 2*.
The text **SELECT** disappears.



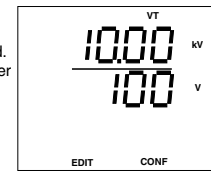
Primary voltage

Select
With *key 3* you move to the voltage transformer menu.



Secondary voltage

Set
Using *key 1* the number to be changed is selected. The selected number flashes. The text **EDIT** appears.
With *key 3* the selected number is changed.
Key 2 multiplies the number with a factor 10.



When the ratio of the voltage transformer is set, press *key 1* as often, as no digit is flashing any longer. **EDIT** disappears.
With *key 3* you move to the next menu. The ratio of the voltage transformer is saved.

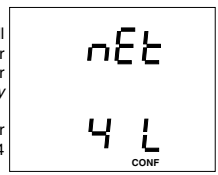
Aron circuit

Voltage over 500VAC against ground must be connected via voltage transformers. The voltage measurement via voltage transformers can be carried out via two voltage transformers (Aron circuit) or three voltage transformers by choice.
For direct measurement and measurement via three voltage transformers, „4L“ must be set at UMG 505 and for measurement with two voltage transformers, „3L“ must be set.

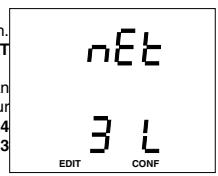
The manufacturer's presetting is „4L“.

In menu **CONF** you can select between Aron circuit „3L“ or four wire measurement „4L“.

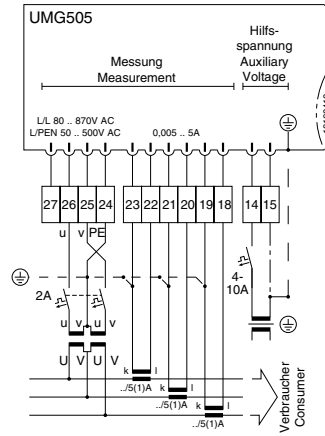
Select
In menu **CONF** scroll to indication of four wire measurement or Aron circuit with *key 3*.
In this example, four wire measurement „4 L“ is activated.



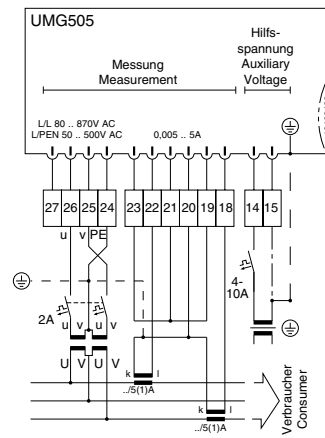
Change
Press *key 1*.
The digits „**4 L**“ flash.
The symbol **EDIT** appears.
With *key 3* you can changeover from four wire measurement „**4 L**“ and Aron circuit „**3 L**“ .
Confirm selection with *key 1*.
The symbol **EDIT** disappears.



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.



Diagr. Aron circuit with two voltage transformers and three current transformers.



Diagr. Aron circuit with two voltage transformers and two current transformers.

Data logging

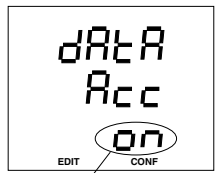
The memory of the UMG505 is divided into three ranges:

- the event memory,
- the minimum and maximum storage and
- the ring buffer.

When the device is deliverd, the data logging is on (**on**) and all three ranges can be written. If no data logging should be carried out, data logging must be switched **oFF**.

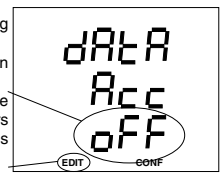
Select

In menu **CONF,** you scroll to the indication of data logging „dAtA“ with *key 3*. Confirm selection with *key 1*. The text **EDIT** appears. The set data logging is indicated and flashes. In this example is data logging = **on**, which means, the three ranges of memory can be written.



Change

The set data logging is flashing. Change between on and off with *key 1*. Pressing key *1*, the text **EDIT** disappears and the change is saved.



Pressing key 3, you change over to the programming of the measured value rotation.

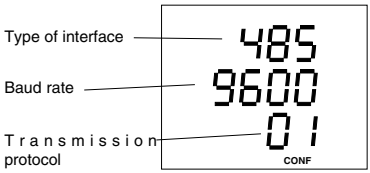
Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Serial interfaces

In the UMG505, there is always a RS485 or RS232 interface included.

RS485 interface (Option)

The RS485 interface is suited for transmission of data over a distance of 1200 m. Up to 31 UMG505 and a master (PC or SPS) can be connected.



Baud rate

The baudrates:
9600, 19.2k and 38.4k
can be set.

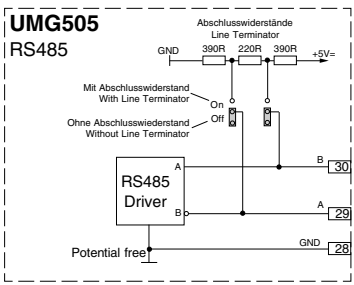
Transmission protocol RS485

The following protocols can be selected:

oFF	no protocol, interface is off.
01	Modbus RTU (Slave).
02	Modem.

Terminal resistors

If the device is connected to the end of a bus cable, the bus cable must be terminated by terminal resistors. The required terminal resistors are integrated within the device and are activated in condition ON.



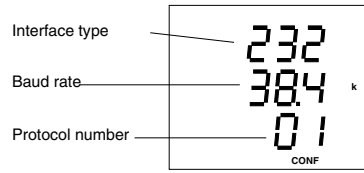
Diagr: Connection diagram RS485

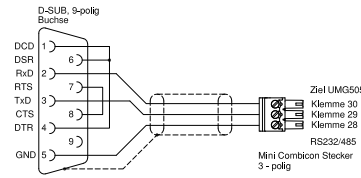
Interface converter

If a UMG 505, which is equipped with a RS485 interface, should be connected to a PC, which has got an RS232 interface, an interface converter is required.

RS232 interface (Option)

The RS232 interface is suited for transmission of data over a distance of 30m. The UMG 505 can be connected directly via this interface to the COM-port of PC or an external analogue modem.
The connection to PC must be carried out via a **RS232 cable**.





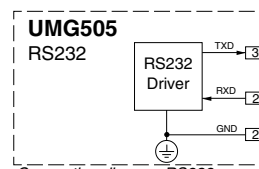
Diagr. Connection diagram RS232 cable

Baud rate

The following baud rates can be set:
9600, 19.2k and 38.4k.

Transmission protocols RS232

oFF	no protocol, interface is off
01	Modbus RTU (Slave).
02	Modem.



Diagr. Connection diagram RS232

Modem

Via the RS232 interface, the UMG505 can be connected to an external analogue modem. The connection between UMG505 and the Modem is carried out via a "RS232" cable.
For modem operation, the transmission protocol 2 (modem) must be selected for the RS232 interface.

Modbus RTU

Via Modbus RTU Protocol, the data of the following tables can be retrieved:

Table 1a Measured values in floating point format
Table 1b Measured values in floating point format
Table 2a Time information for the minimum and maximum values and system time
Table 2b Time information for the minimum and maximum values and time of summer/ winter time changeover
Table 3 Averaging times of mean values
Table 4a Measured values, Integer format
Table 4b Mean values, Integer format
Table 4c Maximum values, Integer format
Table 4d Minimum values, Integer format
Table 5 Energy in Integer format
Table 6 Delete energy
Table 7 Energy in floating point format
Table 8 EMAX peak values
Table 9 Scale of meas. values in Integer format
Table 10 Digital and analogue inputs and outputs

Transmission mode

RTU- Mode with CRC-Check.

Transmission parameters

Baud rate : 9600,19200 und 38400 (RS232 and RS485)
Data bits : 8
Parity : none
Stop bits : 2

Realized functions

Read Holding Register, function 03
Preset Single Register, function 06
Preset Multiple Registers, function 16

Example: Reading system time

The system time is deposited in table 1 under the address 3000. The system time consists of 6 Bytes with year, month, day, hours, minutes and seconds in format "char" = 0..255. The device address of the UMG 505 is considered as address = 01.

The "Query Message" looks as follows:

Description	Hex	Comment
Device address	01	UMG505, Address = 1
Function	03	"Read Holding Register"
Start address Hi	0B	3000dez = 0BB8hex
Start address Lo	B8	
Number of val. Hi	00	6dez = 0006hex
Number of val. Lo	06	
Error Check	-	

The "Response" of the UMG505 can look as follows:

Description	Hex	Comment
Device address	01	UMG505, Address = 1
Function	03	
Byte counter	06	
Data	00	Year = **00**hex = 00dez = 20**00**dez
Data	0A	Month = 0Ahex = 10dez = Okt.
Data	0C	Day = 0Chex = 12dez
Data	0F	Hour = 0Fhex = 15dez
Data	1E	Minute = 1Ehex = 30dez
Data	0A	Second =0Ahex = 10dez
Error Check (CRC)-		

LON interface (Option)

For the connection of UMG505 with other LON-Bus devices, a FTT10-Transceiver is used within the UMG 505. The bus is proof against change of polarity, and can be connected to one side or both sides. Devices which use a FTT10- Transceiver, can be linked to each other via line star or ring structures.

If the allowed transmission resistance in a structure is reached, the network can be expanded by the use of repeaters or routers only.

Service Pin

The Service Pin is a special input of a node (UMG 505) for service purpose. In the UMG505, the service pin is activated via the keys in the front.

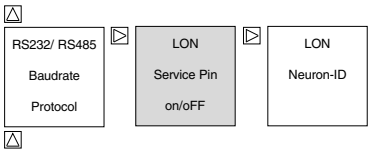
If the service pin is activated, the UMG 505 sends a message over the LON-Bus. This message contains the Neuron-ID and the Program-ID of the neuron chip inside the UMG505. By this means, a node can be announced at a tool.

Activate Service Pin

The Service Pin can be activated in menu **CONF**. Please change into menu **CONF** (See chapter "Configuration").

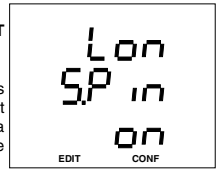
Activate

In menu **CONF,** please scroll to the indication of the serial interfaces (RS232/485) using key 3.



With *key 2* scroll to **Service Pin**.

Press *key 1*.
The text **EDIT** appears.
Press *key 3*.
The **Service Pin** is activated, and the text „**on**“ appears for a short time in the display.



Neuron-ID

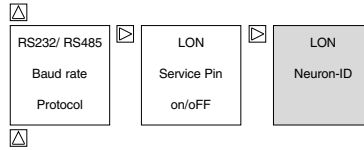
The LON protocol runs on a Neuron-Chip, which is included in the UMG505. Each Neuron-Chip is assigned to a unique identification number during production, the Neuron-ID.

Call up Neuron-ID

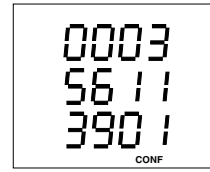
The Neuron-ID can be called up in menu **CONF**. Please change to menu **CONF** (See chapter "Configuration").

Indication

In menu **CONF,** scroll to the indication of the serial interfaces (RS232/485) with key 3.



With *key 2* scroll to **Neuron-ID**.
In this example, the Neuron-ID "356113901" is displayed.



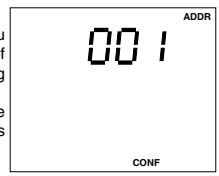
Device address

If several devices are connected via the **RS485 interface**, a master device (PC, PLC) can distinguish them by the device address only. Therefore each UMG 503 must have another device address.
Device addresses can be given from 0 to 255.

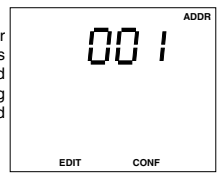
Program

The set device address can be called and changed in menu **CONF**. Please move to menu **CONF** (See chapter "configuration").

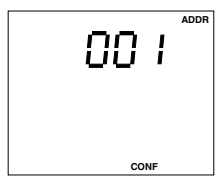
Select
In menu **CONF** you move to indication of device address using *key 3*.
In this example the factory's presetting is indicated as "1".



Change
With *key 1* a number of the device address can be selected and be changed using *key 3*. The selected number is flashing.



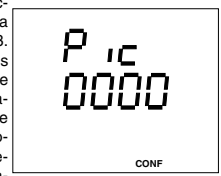
Save
If you have set the desired device address, please use *key 1* as often as no digit is flashing any longer.
Pressing *key 2,* the text **EDIT**disappears**,** and the indicated device address will be saved.



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Measured value rotation

All measured values are calculated two times per second and can be called up in the display.
Normally the selection is carried out via the key 2 and 3. Additionally, there is the possibility of the measured value rotation, which means the indication of automatic changing of selected measured values.



if no key is pressed for about 60 seconds, the measured value rotation is activated, and the selected measured values are shown one after the other.

All measured values, which can be called up by the keys are also available for the measured value rotation.
The time between two indication is called the changing time, and can be set in the range of
0 .. 9999 seconds.
To activate the measured value rotation, at least one value must be selected and the changing time must be programmed bigger than 0 seconds.

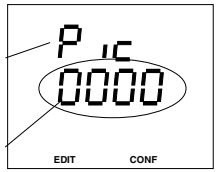
If zero seconds are set for the changing time, no changing is carried out.

If the changing time is bigger than 0, but only one measured value indication is selected, only this indication is shown.

Program changing time

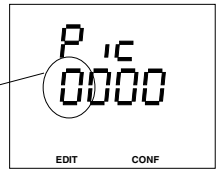
Select

In menu **CONF** you can scroll to the indication of the changing time „Pic“ with key 3.



With key 1, you confirm the selection of the menu.
The text EDIT appears.
The set changing time is indicated and flashes.
In this example, a changing time of 0 seconds is indicated, which means the measured value rotation is not activated.

Change



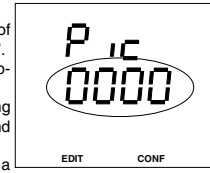
The selected changing time flashes.
Confirm selection of changing time with *key* 1.
The first number of the changing time flashes.
Now change to the selected number by pressing *key* 1.
If a number is flashing, it can be changed by pressing *key* 3.
If all numbers are flashing, you can change to the measured value selection with *key* 2.
If no digit is flashing, you can change to the programming of the analogue outputs with *key* 3.

Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

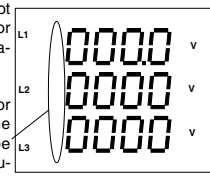
Program measured value selection

Select

In menu **CONF** you can scroll to the indication of the changing time „Pic“ with key 3.

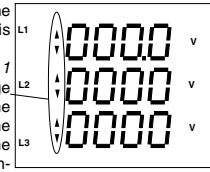


Confirm selection of the menu with *key 1.*
The symbol **EDIT** appears.
The set changing time is indicated and flashes.
In this example, a changing time of 0 seconds is indicated, which means the measured value rotation is not activated.
Change to measured value selection with *key 2.*
In this example, the display of voltage L against N appears.
This indication is not yet programmed for measured value rotation.



By pressing *key 1* for a short time, the indication will be activated for measured value rotation.

By a second short pressing of *key 1,* the indication is deactivated again.
Pressing *key 1* longer, you change back to the programming of the changing time. The number of the changing time flashes.



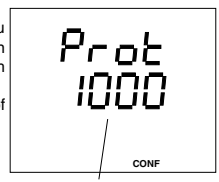
Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Set event memory

The UMG505 is delivered with a memory of 512kB RAM. A part of this memory is used for the ring buffer and the **event memory**.
The division between ring buffer and event memory varies and is defined by the size of the event memory. The smaller the event memory is selected, the more memory is available for the ring buffer.
The size of the event memory is determined by the number of saved events.
At maximum 9999 events can be saved in the event memory. If more events are registered, the most obsolete events are overwritten.

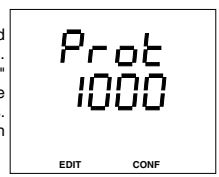
The number of events, that should be saved, can be called up and changed in menu **CONF**.

Indicate:
In menu **CONF** you scroll to the indication of event memory with *key 3*.
Here the number of 1000 events is set.



Number of events = 1000

Change:
Select the selected number with *key 1*. The symbol "**EDIT**" appears and the selected digit flashes. Change number with *key 3*.



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Attention!
If the selection of saved events is changed, the ring buffer is deleted.

Net frequency

The net frequency is determined from the measurement voltage within the UMG 505. From the net frequency the scanning frequency for the current and voltage inputs is calculated.
For measurements with very distorted voltages, the frequency of the voltage fundamental cannot exactly be determined any longer. Voltage distortion occurs in measurements at consumers, which are driven with phase changing controllings.
For highly distorted measurement voltage, the corresponding net frequency should be programmed.
Distortion of the current does not affect the determination of the frequency.

Without measurement voltage, no net frequency can be determined, and no scanning frequency can be calculated. Voltage, current and all resulting values are not calculated and indicated with zero.
If the current should be measured without measurement voltage, the net frequency must be programmed at UMG 505.

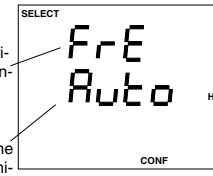
The determination of the net frequency can be carried out automatically or as a fix frequency.
The following settings for the determination of the frequency are at your disposal:

"**Auto**"	Automatical frequency
"**50**"Hz	Fix frequency
"**60**"Hz	Fix frequency

The proceeding for the determination of the frequency can be called up and changed in the menu **CONF**.

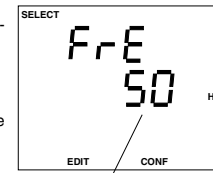
Select
In menu **CONF** you can scroll to the indication of the frequency determination using *key 3*.

In this example, the frequency is determined automatically.



Change
Using *key 1*, the determination of the frequency is selected, and the text "Auto" flashes.
In the indication, the text **EDIT** appears.

Using *key 3*, you can change over between the two methods of frequency determination.



In this example a fix frequency of 50Hz is set.

Limit supervision

For the supervision of limits of measured values 5 threshold outputs can be programmed. Each threshold output can be assigned to up to three comparators (A, B, C). For each comparator,

2 limits and two measured values or

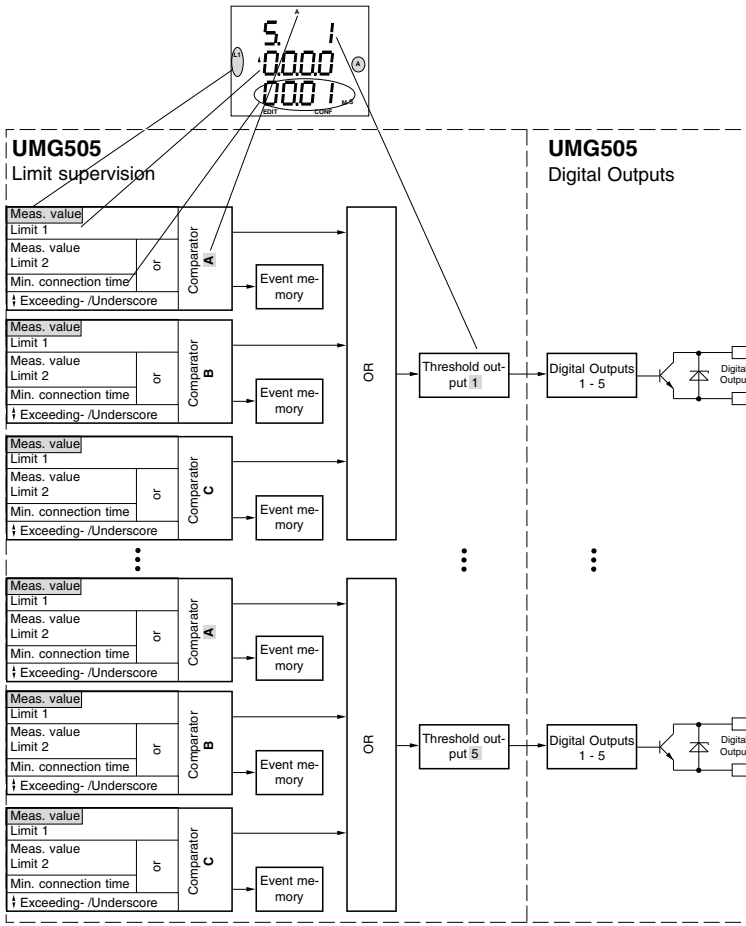
2 limits and 1 measured value or

1 limit and the minimum connection time can be programmed. The function of the corresponding combination can be seen in the following diagrams.

If a limit violation is detected in one of the comparators "A", "B" or "C", the threshold output is activated. The violation is registered within the event memory with date and time and can be given out via a „Digital Output".

The assignment of a threshold output to a „**Digital Output**" is carried out while programming the digital outputs.

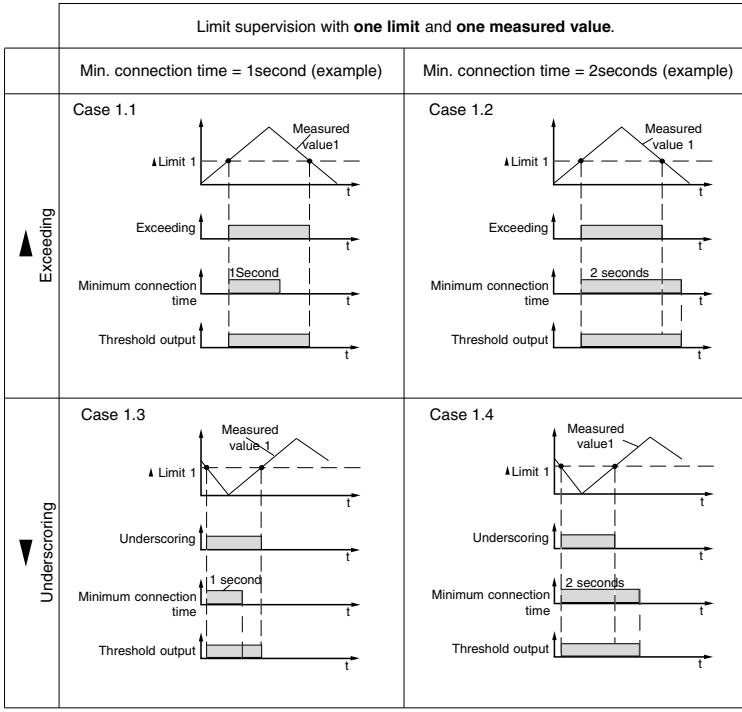
Limits may be positive or negative. Negative limits are marked with a "-" before the limit.



Diagr. Principle diagram limit supervision

▲ = Max. value or consumption ▼ = Min. value or supply

= Key1 = Key 2 = Key 3



Diagr. Limit supervision with one limit and one measured value.

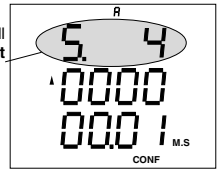
Programming of case 1.1

When voltage in L1 exceeds the limit of 240V, the treshold output 4 should be activated. The comparison is carried out by comparator „A“. The comparators „B“ and „C“ are not used.

Please note, that the UMG 505 carries out the measurement twice a second, but the shortest minimum connection time is 1second.

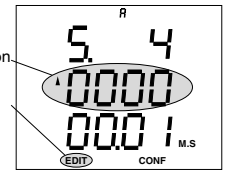
Threshold output

In menu **CONF** scroll to **threshold output 4** with *key 3*.

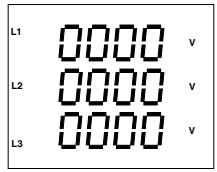


Measured value

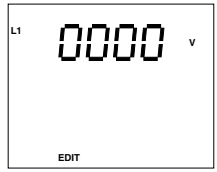
Confirm selection with *key* 1.
The middle indication flashes.
The text **EDIT** appears.
Now the measured value can be selected, or deleted, if one was programmed before, using *key 3*.



Scroll to indication of voltage with *key 2* and *key 3*.

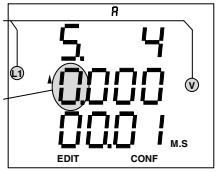


Select voltage L1 with *key 1*.
The text EDIT appears.
Confirm selection with *key 2*.



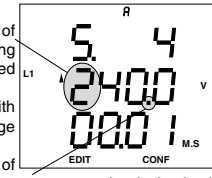
The selected measured value appears in the threshold indication.

The first digit is flashing.



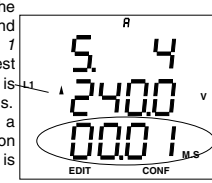
Limit

The first number of the limit is flashing and can be changed with *key 3*.
Select other digit with *key 1* and change with *key 3*.
As long as a digit of the limit is flashing, you can move the decimal point with *key 2*.

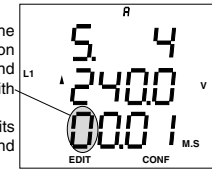


Minimum connection time

If the last digit of the limit is flashing, and you press *key 1* again, the lowest programming block is selected and flashes.
In this example, a minimum connection time of 1 second is indicated.

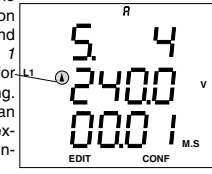


Press *key 1* again.
The first digit of the minimum connection time is flashing and can be changed with *key 3*.
Select the other digits with *key 1* and change with *key 3*.



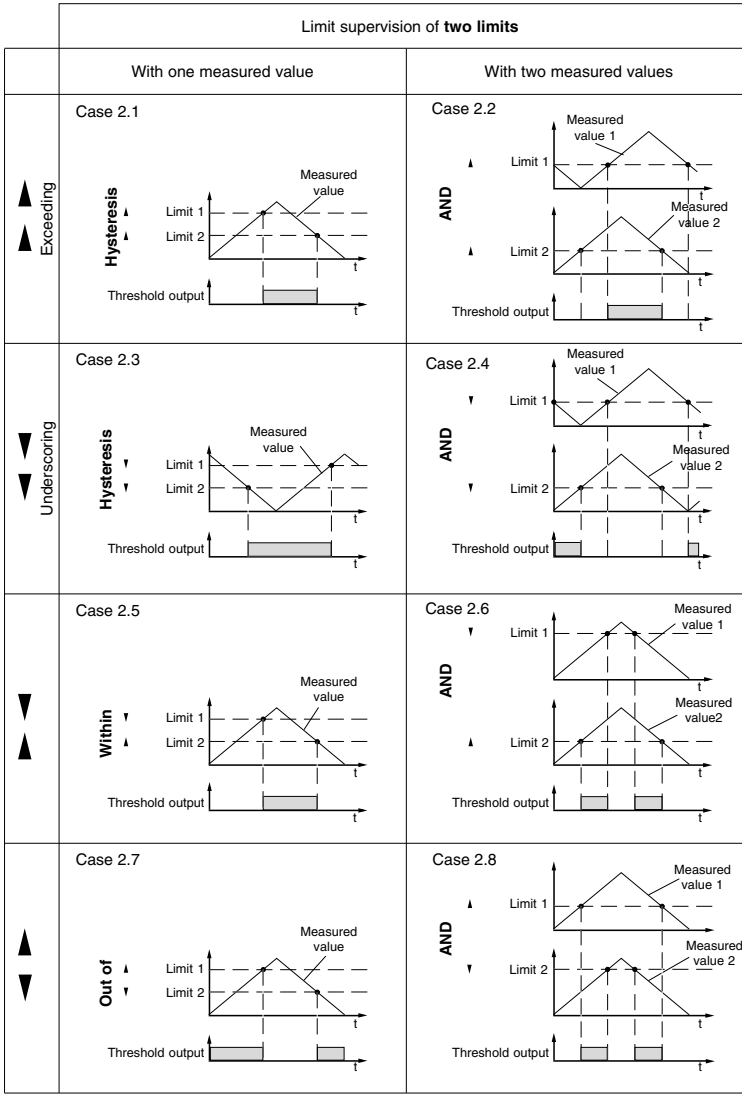
Exceeding or underscoring

If the last digit of the minimum connection time is flashing, and you press *key 1* again, the arrow for exceeding is flashing.
With *key 3* you can change between exceeding and underscoring.



Confirm programming with key *1*.
The text EDIT disappears.
The comparator „A“ is programmed for threshold output 4. With *key 3* you can change to the next threshold output, or pressing *key 1* for about 2 seconds, you return to the first measured value indication.

If a measured value is programmed to the comparators „B“ and „C“ as well, this assignment must be deleted.

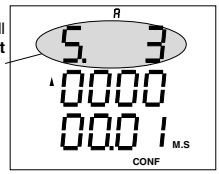


Diagr. Supervision of limits with two limits

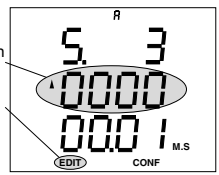
Programming example case 2.1

When the current in L1 exceeds the limit 1 (120A), the threshold output 3 must be activated, and when the current underscores the limit 2 (80A), the threshold output 3 should be deactivated. The comparison is carried out with comparator „A“. The comparators „B“ and „C“ are not used.
Please note, that the UMG 505 measured twice a second.

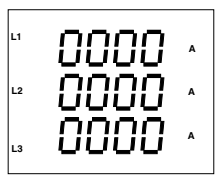
Threshold output
In menu **CONF** scroll to **threshold output 3** with *key 3*.



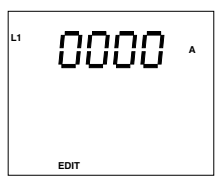
Measured value
Confirm selection with *key* 1.
The middle indication flashes.
The text **EDIT** appears.
Now the measured value can be selected, or deleted, if one was programmed before, using *key 3*.



Scroll to indication of current with *key 2* and *key 3*.

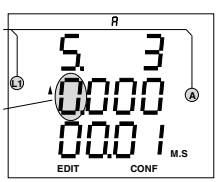


Select current L1 with *key 1*.
The text EDIT appears.
Confirm selection with *key 2*.

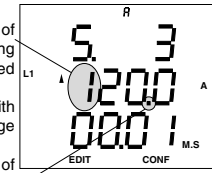


The selected measured value appears in the threshold indication.

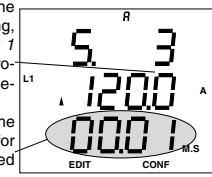
The first digit is flashing.



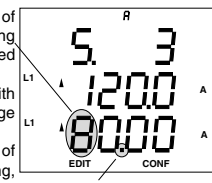
Limit 1
The first number of the limit is flashing and can be changed with *key 3*.
Select other digit with *key 1* and change with *key 3*.
As long as a digit of the limit is flashing, you can move the decimal point with *key 2*.



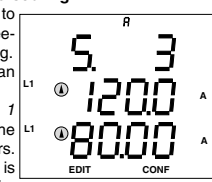
Limit 2
If the last digit of the first limit is flashing, and you press *key 1* again, the lowest program block is selected and flashes.
Now select the measured value for limit 2 as described for limit 1.



Limit 2
The first number of the limit is flashing and can be changed with *key 3*.
Select other digit with *key 1* and change with *key 3*.
As long as a digit of the limit is flashing, you can move the decimal point with *key 2*.



Exceeding or underscoring
With *key 1* move to the arrows for exceeding or underscoring. With *key 3* you can select.
Please press *key 1* so often, unless the text **EDIT** disappears. The comparator „A“ is now programmed for threshold output 3.
With *key 3* you can change to the next threshold output, or pressing *key 1* for about 2 seconds, you return to the first measured value indication.



Attention!
If a measured value is assigned to the comparators „B“ and „C“, this assignement must be deleted.

Switching clock

The switching clock of the UMG505 has 100 switching clock channels. Each switching clock channel describes a certain period. The period is described by a switch-on time and switch-off time. The switch-on and -off time is determined by the day, hour and minute.

Each switching clock channel can control a switching clock output, and select an Emax target value and an energy meter.

In the programming of the digital outputs, a „Digital Output“ can be assigned to the switching clock outputs.

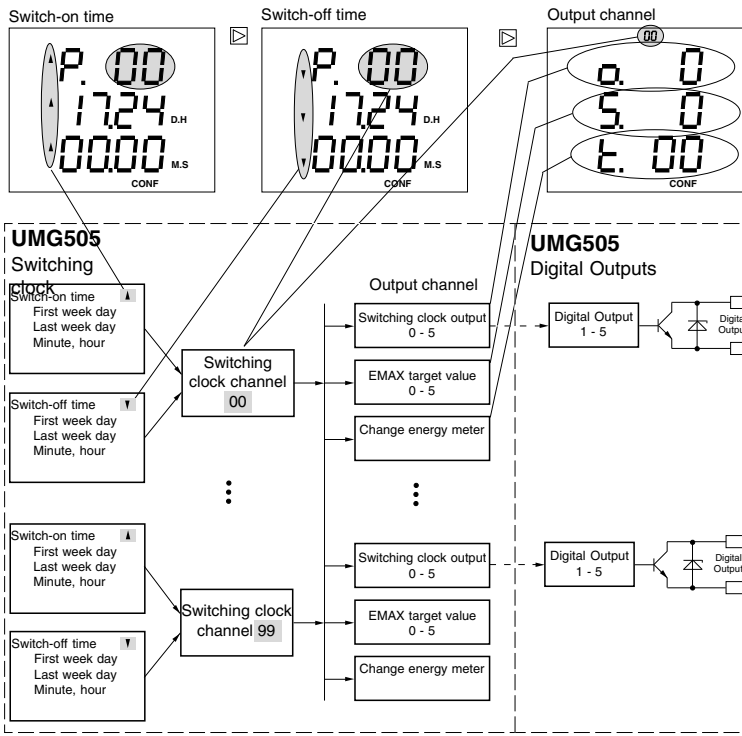
Setting range:

Switching clock channels	00 - 99
Switching clock outputs	0[1] - 5
EMAX target number	0[1] - 5
Energy meter	see table, TX0[1]

[1] No assignment

	Energy meter				
		Changeable			
Real energy					
without rev. run. stop	T50	T51	T52	T53	T54
Consumption (EMAX)	T00	T01	T02	T03	T04
Supply	T30	T31	T32	T33	T34
Reactive energy					
without rev. run. stop	T40	T41	T42	T43	T44
inductive	T10	T11	T12	T13	T14
capacitive	T20	T21	T22	T23	T24

Diagr. Energy meters of UMG505.



Diagr. Principle diagram of the switching clock

Swich-on and switch-off time

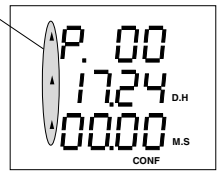
Each switching clock channel is described by its switch-on and switch-off time, which is determined by one or more week days and the time. The time is given in hours and minutes. If the time is valid for one week day only, the first week day is identical to the last week day. The switching clock channel is not active, when the switch-on time is programmed to 24:00h.

Assignment of the week days:

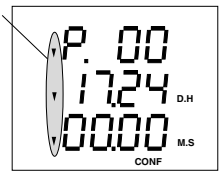
1 - Monday
2 - Tuesday
3 - Wednesday
4 - Thursday
5 - Friday
6 - Saturday
7 - Sunday

▲ Switch-on time
▼ Switch-off time

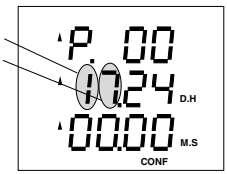
Switch-on time



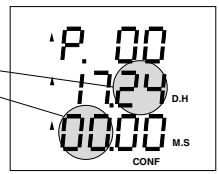
Switch-off time



First week day
Last week day



Time =
Hour
Minute

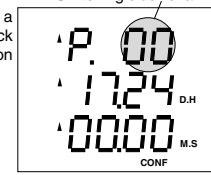


Switching clock channel

Each channel consists of a switch-on time and a switch-off time. Each switching clock channel can be assigned to several output channels.

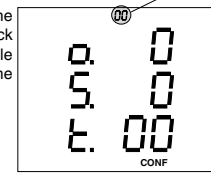
Switching clock channel

Programming of a switching clock channel for switch-on and -off time.



Switching clock channel

Indication of the switching clock channel while programming the output channels.



Output channel

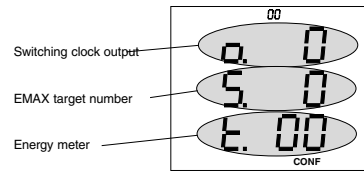
Several switching clock channels can be assigned to an output channel. If a switching clock channel is active, also the output channel is active.

Possible output channels:

Switching clock output	0[1] - 5
EMAX target number	0[1] - 5
Energy meter	see table, TX0[1]

[1] No assignment

Each switching clock channel of the switching clock can be assigned to a „Digital Output“.



Attention!
If several targets are used by the switching clock, the target with the highest number is used by Emax program.

Programming example

The EMAX target „01“ was assigned to a value of 200kW by the Emax programming. This EMAX target shall be active from Monday to Friday from 08:00 until 20:00h.

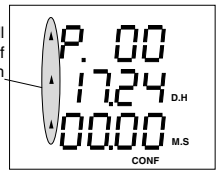
The switching clock channel 1 is programmed for the period from Monday to Friday.

The set switch-on and -off times can be called up and changed in menu **CONF**. Please change to menu **CONF** (See chapter "Configuration").

Switch-on time

In menu **CONF,** scroll to the indication of switch-on time with *key 3*

.

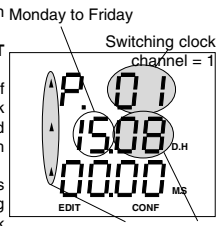


Confirm selection with *key 1*.

The symbol **EDIT** appears.

The first number of the switching clock channel flashes and can be changed with *key 3*.

Select the numbers for the switching clock channel, week days and switch-on time with *key 1* and change with *key 3*.



Save

Press *key 1* until no digit is flashing.

Confirm with *key 2*.

The symbol **EDIT** disappears**,** and the indicated switch-on time is saved.

The next window (switch-off time) appears.

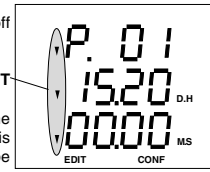
Switch-off time

Scroll to switch-off time with *key 2*.

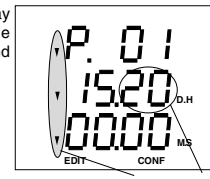
Confirm with *key 1*.

The symbol **EDIT** appears.

The first digit of the first week day is flashing and can be changed with *key 3*.



Select last week day and switch-on time with *key 1* and change with *key 3*.



Switch-off time = 20:00

Save

Press *key 1* until no digit is flashing.

Confirm with *key 2*.

The symbol **EDIT** disappears**,** and the indicated switch-on time is saved.

The next window (switch-off time) appears.

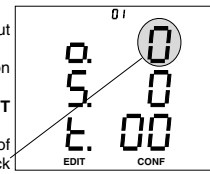
Output channel

Scroll to output channel with *key 2*.

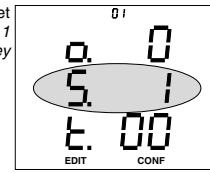
Confirm selection with *key 1*.

The symbol **EDIT** appears.

The first number of the switching clock channel is flashing.



Select Emax target number with *key 1* and change with *key 3*.



Save

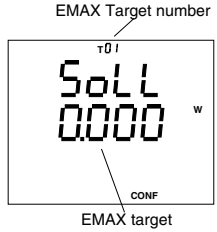
Press *key 1* until no digit is flashing.

Confirm with *key 2*.

The symbol **EDIT** disappears**,** and the indicated switch-on time is saved.

EMAX target value (Option)

For the EMAX-Program, up to 5 EMAX target values can be programmed. To each target, a target number is assigned (1-5). The changeover of the target is effected via the EMAX target numbers. The changeover can be selected via the internal clock or the digital inputs of the UMG 505.



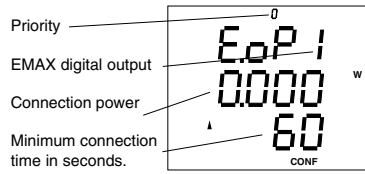
EMAX digital outputs (Option)

Connection power and connection time

The EMAX program can control up to 5 Emax digital outputs. Each Emax digital output can have a priority 0 ... 9. EMAX outputs with priority 0 are not considered in the trand calculation of the Emax program. EMAX outputs with low priority, example 1, are disconnected at first and reconnected at last. EMAX outputs with the same priority have equal rights. Only if all Emax outputs of the same priority have been disconnected, the next priority will be considered for disconnection.

To determine the time of switching more accurate, each Emax output must be programmed with its connection power, which means the power of the connected consumers.

The assigned switching times are held in any case. The minimum connection time describes, for how long a consumer must be connected between two disconnections.

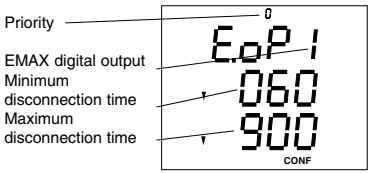


The programmable parameters are:

Priority	: 0 .. 9 (0 = off)
EMAX digital outputs	: 1 .. 5
Connection power	: 0W .. 9999MW
Min. connection time	: 20 .. 999seconds
Min. disconnection time	: 20 .. 999seconds
Max. disconnection time	: 20 .. 999seconds

Disconnection time

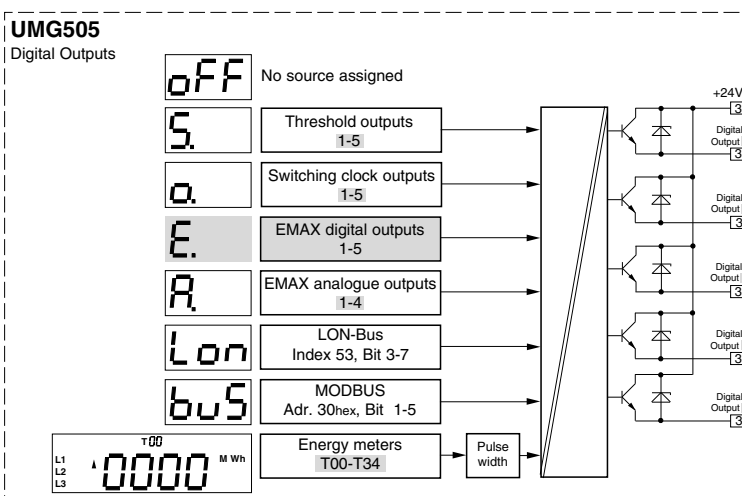
The **minimum disconnection time** describes, how long a consumer, which is connected to an Emax output, must be disconnected before reconnection. The **maximum disconnection time** describes, how long a consumer may be disconnected at maximum.



The programmable parameters are:

Priority	: 0 .. 9 (0 = off)
EMAX digital outputs	: 1 .. 5
Connection power	: 0W .. 9999MW
Min. connection time	: 20 .. 999seconds
Min. disconnection time	: 20 .. 999seconds
Max. disconnection time	: 20 .. 999seconds

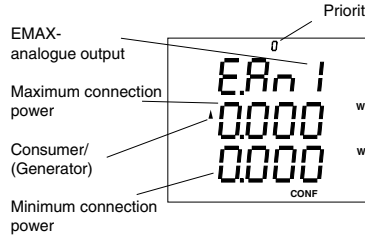
Attention!
The EMAX digital outputs must be assigned to the „Digital Outputs“ in the programming.



Diagr. Priciple diagram for the digital outputs

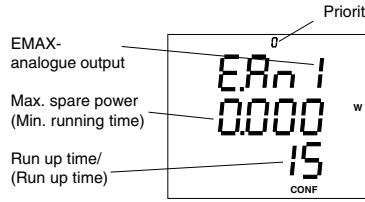
EMAX analogue outputs

The UMG505 has 5 digital and 4 analogue Emax-outputs internally. Each internal Emax analogue output can be assigned to an „analogue output“. If a generator should be controlled by an Emax analogue output, the internal Emax analogue output cannot only be assigned to an „Analogue Output“, but also to a „Digital Output“. The „**Digital Output**“ is active, when the calculated current of the Emax analogue output is bigger than 0mA. Therefore, this „Digital Output“ can be used as a starting signal for generator control.

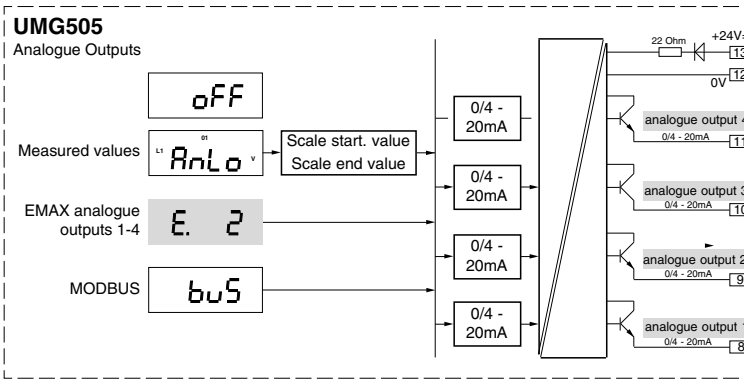


For the EMAX analogue outputs, the following parameters can be set:

Description	Setting range
Priority	: 0 .. 9 (0 = off)
EMAX analogue output	: 1 .. 4
Max. connection power	: 0W .. 9999MW
Min. connection power	: 0W .. 9999MW
Consumer ▲	
Max. spare power	: 0W .. 9999MW
Run up time	: 10 .. 9999sec.
Generator ▼	
Min. running time	: 0 .. 9999minutes
Run up time	: 0 .. 99seconds



⚠ **Attention!**
The EMAX analogue outputs must be assigned to an „Analogue Output“ in the programming.



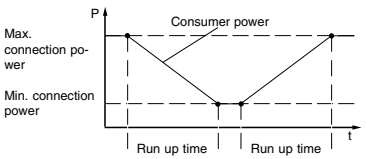
Diagr. Priciple diagram for the analogue outputs. Selection of source.

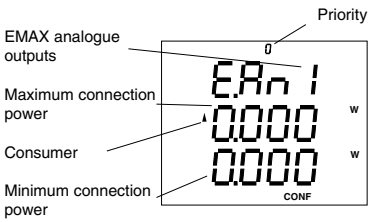
Consumer control

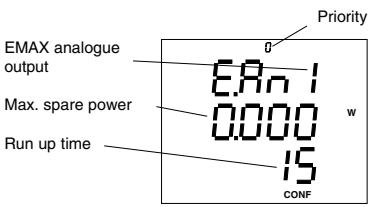
The **run up time** sets a limit to the starting speed of the consumer's power. To reach maximum connection power from minimum connection power takes the run up time.

The **maximum spare power** represents the power, that may be spared within one measuring period.

Description	Setting range
Priority	: 0 .. 9 (0 = off)
EMAX analogue output	: 1 .. 4
Max. connection power	: 0W .. 9999MW
Min. connection power	: 0W .. 9999MW
Max. spare power	: 0W .. 9999MW
Run up time	: 10 .. 9999sec.







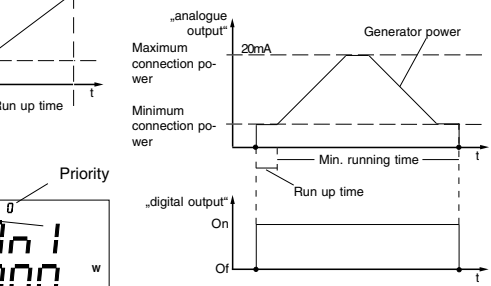
Generator control

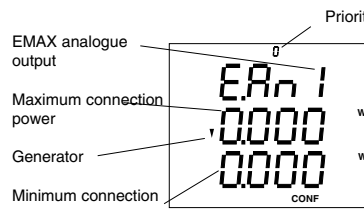
The **Run up time** is here the time, which the generator needs to supply its power after switching on.

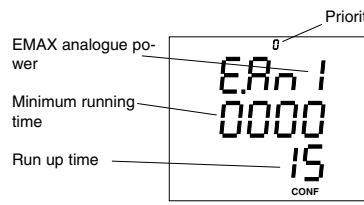
The **minimum running time** is the time, which the generator must run, before it can be disconnected again by the UMG 505.

The **speed,** with what the analogue signal is changing, is 2% of the difference from maximum connection power less minimum connection power per second. The **speed** cannot be changed directly.

Description	Setting range
Priority	: 0 .. 9 (0 = off)
EMAX analogue output	: 1 .. 4
Max. connection power	: 0W .. 9999MW
Min. connection power	: 0W .. 9999MW
Minimum running time	: 0 .. 9999minutes
Run up time	: 0 .. 99sec.







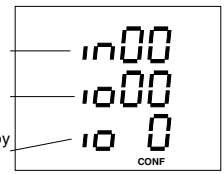
Digital Inputs

The UMG505 has 20 internal inputs. On the internal inputs 1 to 4, the 4 optical inputs (*digital inputs 1-4*) are handled. On the internal inputs 5 to 12 the 8 inputs of the LON-Bus interface (Option), and on the internal inputs 13 to 20 the 8 inputs of the MODBUS interface (Option) are handled.
The **condition** of the digital inputs *digital input 1-4* can be called up via the serial interfaces (Option).

Each of the 20 internal inputs can be assigned to one of the 16 input channels.
Each input channel can simultaneously
- Changeover an energy meter,
- Effect the Emax reset,
- Synchronize the internal clock and
- Select another target value for Emax program.

Two digital inputs (*digital inputs*) can be combined by **AND** and the result can be assigned to an input channel. In this case, both digital inputs must be active to activate the assigned input channel.

Each of the *digital Inputs 1-4* is assigned to an event counter. The deletion of the event counters is done together with the real energy meters.
If a function except pulse valence is assigned to a *digital input 1-4*, all changes of the input are saved with date and time.



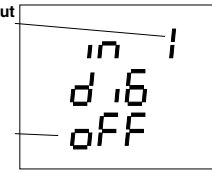
Digital input 4

Digital input 4 can be used as **pulse input** for real energy measurement. For this purpose, a pulse valence must be assigned to the *digital input 4* in menu „S0 input“. If the pulse valence was assigned to the *digital input 4*, the changes of the input are not registered in the event memory.

Call up event counter

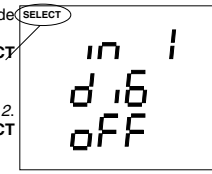
Scroll to **Digital input 1** with *key 3*.

oFF= no signal.
on = signal at input



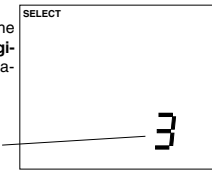
Go to select mode with *key 1*.
The symbol **SELECT** flashes.

Confirm with *key 2*.
The symbol **SELECT** remains.



Press *key 2* again.
The contents of the event counter of **Digital input 1** is indicated.

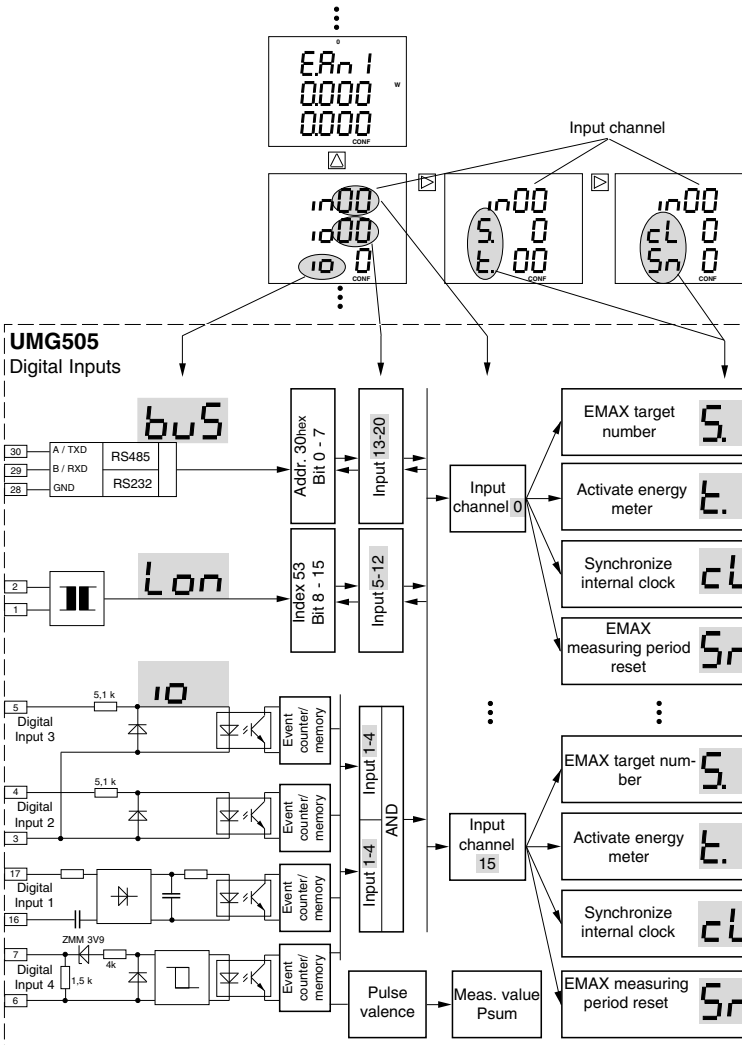
Event counter = 3



Press *key 1* for about 2 seconds and you return to the first measured value window of the measured value indication from each program part.

Internal input	Comment	Indication in third line
0	No input selected	No input selected
01 .. 04	Internal inputs of UMG505	Combination with a second internal input
05 .. 12	External input via LON-Bus	Just indication "Lon"
13 .. 20	External input via MODBUS	Just indication "bus"

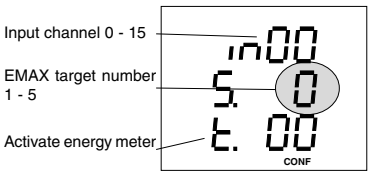
Principle diagram , digital inputs



Diagr. Principle diagram digital inputs

Changeover of EMAX targ. val. (Option)

For the EMAX program, up to 5 targets can be valid. If not otherwise programmed, target 1 is active. Via the **input channels** 1-16 and via the switching clock, one of the 5 targets can be selected and assigned to the EMAX program.
If the target is activated via the input channels, and another target simultaneously by the switching clock, the target with the highest target number is used by the EMAX program.

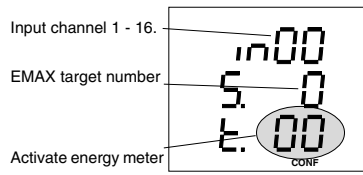


Activate energy meter

In UMG505 up to 30 energy meters are at your disposal. The 6 energy meters Tx0 can only be deleted, but not deactivated. The other 24 energy meters can be deactivated. Only active energy meters count the occurred energy. The changeable energy meters are marked grey in the following diagram.
The changeover of the energy meters is carried out via the input channels 1-16 or via the switching clock. An energy meter is active, when it is activated via an input channel **or** the switching clock.

	Energy meter				
	Fix	Changeable			
Real energy					
without rev. run. stop	T50	T51	T52	T53	T54
Consumption	T00	T01	T02	T03	T04
Supply	T30	T31	T32	T33	T34
Reactive energy					
Without rev. run. stop	T40	T41	T42	T43	T44
inductive	T10	T11	T12	T13	T14
capacitive	T20	T21	T22	T23	T24

Diagr. The energy meters of UMG 505.

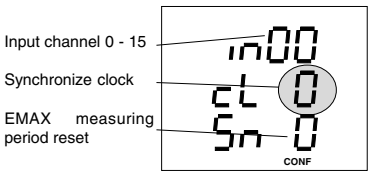


Synchronize internal clock

Inaccuracies of the internal clock can be corrected by synchronization via one of the internal inputs. If the internal input, which is assigned for synchronicity, is active, the clock in UMG 505 will be set to the nearest full hour.

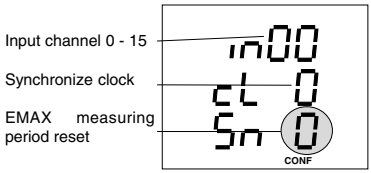
Example 1
If the UMG 505 shows a time of 15:05h, the clock will be corrected to 15:00h..

Example 2
If the UMG 505 shows a time of 15:35h, the clock will be corrected to 16:00h..



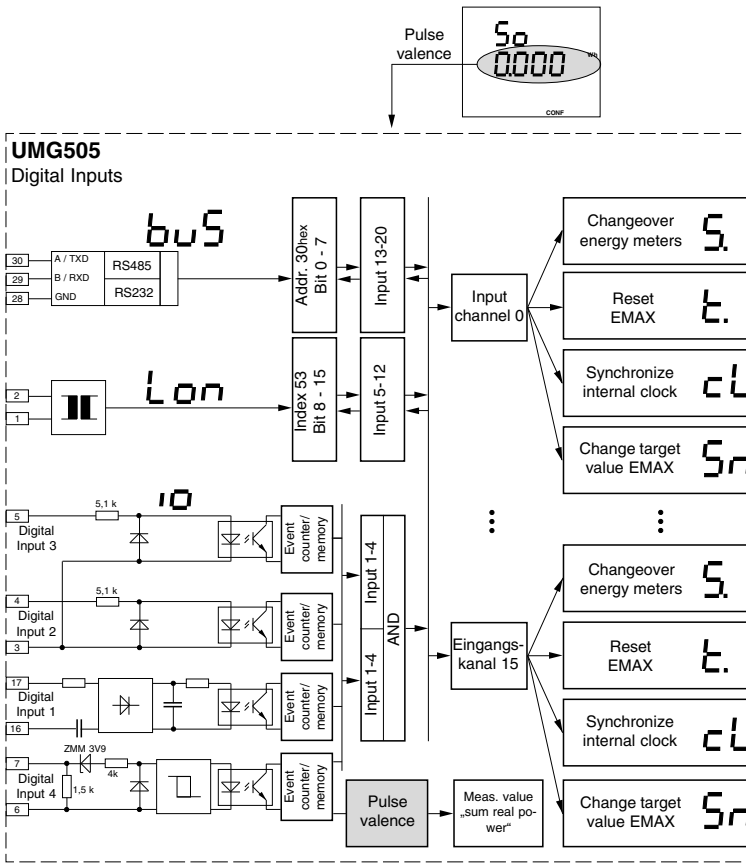
EMAX measuring period reset

The reset of the measuring period should be carried out via an input of the UMG 505 to run synchronized to the energy suplliers measurement. If no reset is carried out at the input of the UMG 505 within the programmed measuring period, the reset is done automatically, effected by the internal clock.
The reset of the measuring period deletes the EMAX real power and starts a new measuring period. The last measured EMAX real power is used for minimum and maximum storage and, if programmed, saved in event memory.



Pulse valence

With the manufacturer's settings, the measured value „sum real power" is calculated by the real power of the single phases.
If a pulse valence is assigned to **„digital input 4"**, the measured value „sum real power" is calculated by the incoming pulses of **„digital input 4"**, and changes at the input are no longer registered in event memory.
The EMAX program (Option) in UMG505 uses the measured value „sum real power" for the control of disconnection and connection of the consumers and generators.



Diagr. Principle diagram digital inputs

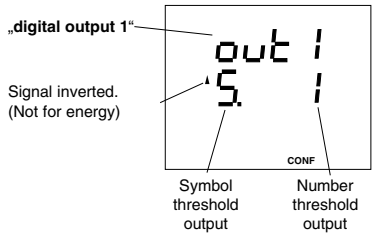
Digital Outputs

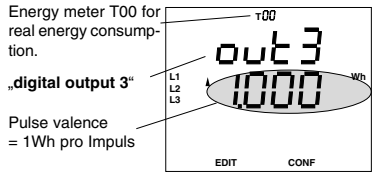
The UMG505 has 5 digital transistor outputs. These outputs are depicted with **out1** to **out5** in display. Each output can be assigned to different data sources. There are 7 different data sources at disposal:

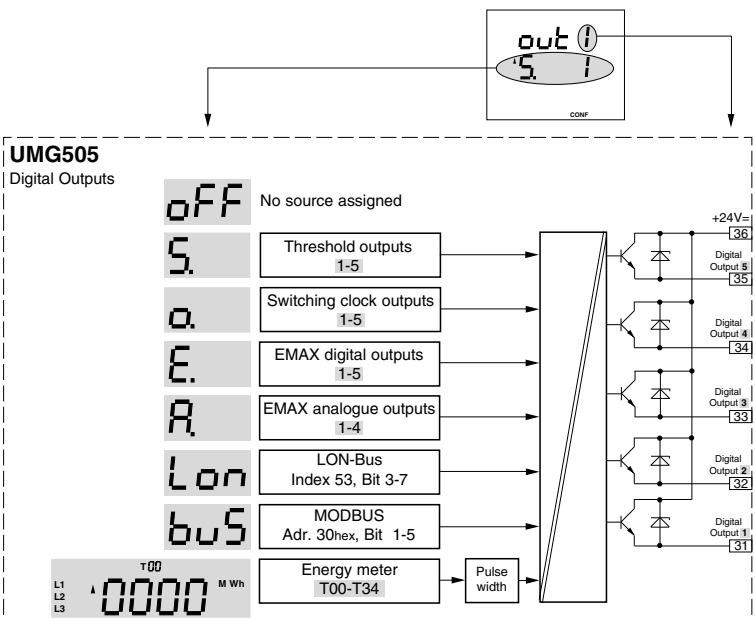
Threshold outputs,
Switching clock outputs,
EMAX digital outputs,
EMAX analogue outputs,
LON-Bus (Option),
MODBUS,
Energy meters T00 - T04, T30 - T34,
T10-T24, T20 - T24.

Each data source can be assigned to one output only. If the output is assigned to an energy meter, the output works as **pulse output.**
The signals from all data sources except the energy meter, can be inverted.

▲ Signal is inverted
▼ Signal is not inverted







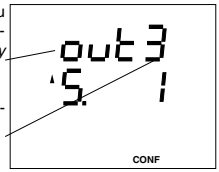
Diagr. Principle diagram digital outputs

No source

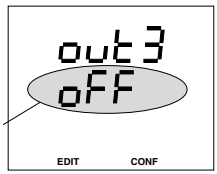
In the following programming example, no source (off) is assigned to „**digital output 3**“.

In configuration menu **CONF** scroll to the digital outputs with *key 3*.

Scroll to output number 3 with *key 2*.



Confirm selection with *key 1*.
The symbol **EDIT** appears.
Use *key 3* to switch off data source.
The indication „oFF“ appears.
Confirm selection with *key 2*.
The symbol **EDIT** disappears.

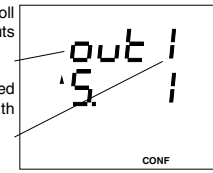


Threshold output

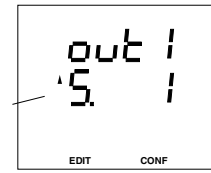
In the following programming example, the inverted signal of threshold output 3 is assigned to „**digital output 1**“.

In menu **CONF** scroll to the digital outputs using *key 3*.

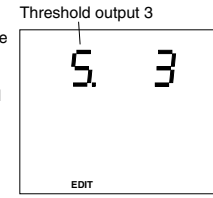
Scroll to the desired output number with *key 2*.



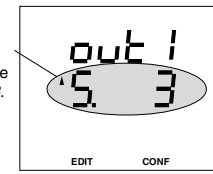
Confirm selection with *key 1*.
The text **EDIT** appears.
The actual data source is flashing.



Change data source with *key 2*.
Select data source with the *keys 2* and *3*.
Confirm selection with *key 1*.
The symbol **EDIT** appears.



Confirm with *key 2*.
The arrow for inverting flashes.
The inverting can be changed with *key 3*.

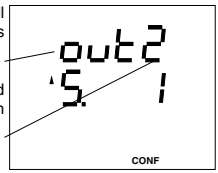


Press *key 1*. Threshold output 3 has been assigned to „**digital output 1**“ . The symbol **EDIT** disappears.
Scroll through configuration menu with key *3*.

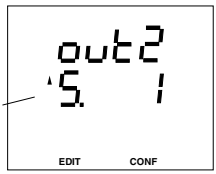
Switching clock outputs
In the following programming example, the signal of a switching clock output 1 should be assigned to digital output 2.

In menu **CONF** scroll to the digital outputs using *key 3*.

Scroll to the desired output number with *key 2*.

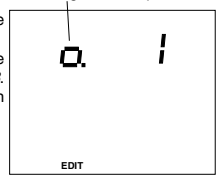


Confirm selection with *key 1*.
The text **EDIT** appears.
The actual data source is flashing.

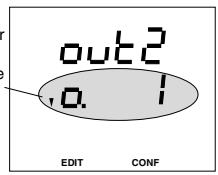


Switching clock output

Change data source with *key 2*.
Select data source with the *keys 2* and *3*.
Confirm selection with *key 1*.



Confirm with *key 2*.
The arrow for inverting flashes.
The inverting can be changed with *key 3*.

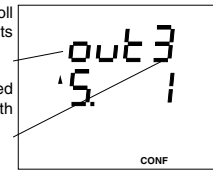


Press *key 1*. Switching clock output 1 has been assigned to „**digital output 2**“ . The symbol **EDIT** disappears.
Scroll through configuration menu with key *3*.

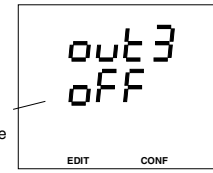
EMAX digital outputs
In the following programming example, the signal of Emax output 1 shall be assigned to digital output 3.

In menu **CONF** scroll to the digital outputs using *key 3*.

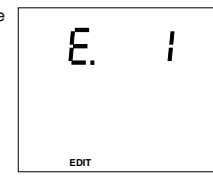
Scroll to the desired output number with *key 2*.



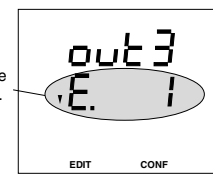
Confirm selection with *key 1*.
The text **EDIT** appears.
The actual data source is flashing.
Here no data source has been selected.



Change data source with *key 2*.
Select data source with the *keys 2* and *3*.
Confirm selection with *key 1*.



Confirm with *key 2*.
The arrow for inverting flashes.
The inverting can be changed with *key 3*.



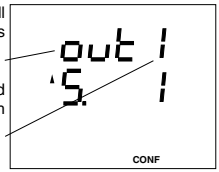
Press *key 1*. EMAX output 1 has been assigned to „**digital output 3**“ . The symbol **EDIT** disappears.
Scroll through configuration menu with key *3*.

LON-Bus

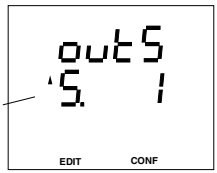
In the following programming example, Bit 3 with index 53from the LON network variables is assigned to digital output 5.

In menu **CONF** scroll to the digital outputs using *key 3*.

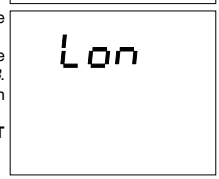
Scroll to the desired output number with *key 2*.



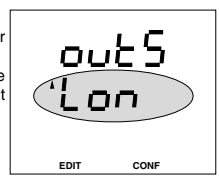
Confirm selection with *key 1*.
The text **EDIT** appears.
The actual data source is flashing.



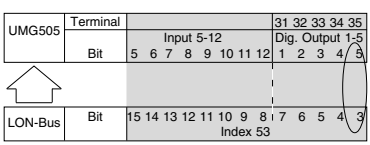
Change data source with *key 2*.
Select data source with the *keys 2* and *3*.
Confirm selection with *key 1*.
The symbol **EDIT** appears.



Confirm with *key 2*.
The arrow for inverting is flashing.
Using *key 3* the inverting, here of Bit 7, can be changed.



Press *key 1*. Bit 3 of the LON network variable with index 53 was assigned to digital output 5. The text **EDIT** disappears.
Scroll through configuration menu with key *3*.



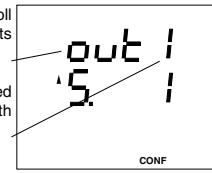
Diagr. Data transmission from LON-bus to UMG 505.

MODBUS

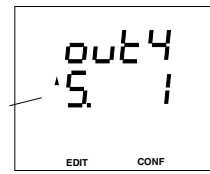
In the following programming example, Bit 11 from Hex-address 0x30 (see table 10) is assigned via MODBUS protocol to digital output 4.

In menu **CONF** scroll to the digital outputs using *key 3*.

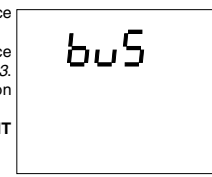
Scroll to the desired output number with *key 2*.



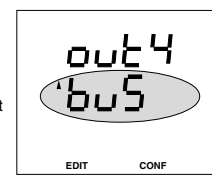
Confirm selection with *key 1*.
The text **EDIT** appears.
The actual data source is flashing.



Change data source with *key 2*.
Select data source with the *keys 2* and *3*.
Confirm selection with *key 1*.
The symbol **EDIT** appears.



Confirm with *key 2*.
The arrow for inverting is flashing.
Using *key 3* the inverting, here of Bit 7, can be changed.



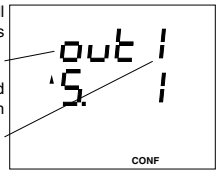
Press *key 1*. Bit 11 of the MODBUS, HEX-address 0x30 was assigned to digital output 4. The text **EDIT** disappears.
Scroll through configuration menu with key *3*.

Energy meter

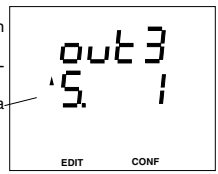
In the following programming example, the consumed real energy is assigned to „**digital output 3**“.

In menu **CONF** scroll to the digital outputs using *key 3*.

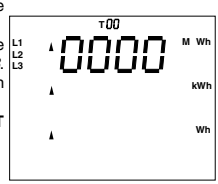
Scroll to the desired output number with *key 2*.



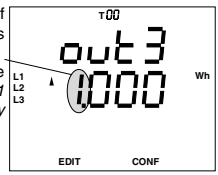
Confirm selection with *key 1*.
The text **EDIT** appears.
The actual data source is flashing.



Change data source with *key 2*.
Select data source with the *keys 2* and *3*.
Confirm selection with *key 1*.
The symbol **EDIT** appears.



The first number of the pulse valence is flashing.
Select the digit to be changed with *key 1* and change with *key 3*.



Press *key 1*. Consumed real power was assigned to digital output 3. The text **EDIT** disappears.
Scroll through configuration menu with key *3*.

	Energy meter					
		Changeable				
Real energy						
without rev. run. stop	T50	T51	T52	T53	T54	
Consumption	T00	T01	T02	T03	T04	
Supply	T30	T31	T32	T33	T34	
Reactive energy						
without rev. run. stop	T40	T41	T42	T43	T44	
inductive	T10	T11	T12	T13	T14	
capacitive	T20	T21	T22	T23	T24	

Diagr. Overview of the energy meters.

Set pulse valence

To the pulses of UMG 505, energy can be assigned. The energy per pulse is called pulse valence Iw in Wh/pulse.

Iw = energy/pulse

The pulse valence may not be confused with the meter constant. The meter constant is given in rotation per kWh.
The correlation between pulse valence and meter constant is:

Meter constant = 1/pulse valence
Pulse valence = 1/meter constant

Example 1.: The pulse frequency for a total power of 500kW should be calculated, when the pulse valence should be 250Wh/pulse.

$$\text{Pulse-Freq. [Hz]} = \frac{\text{Ptot [kW]}}{\text{Pulse valence [Wh]} \bullet 3{,}6}$$

$$\text{Pulse-Freq.} = \frac{500\ \text{kW}}{250\ \text{Wh} \bullet 3{,}6} = \underline{0{,}55\ \text{Hz}}$$

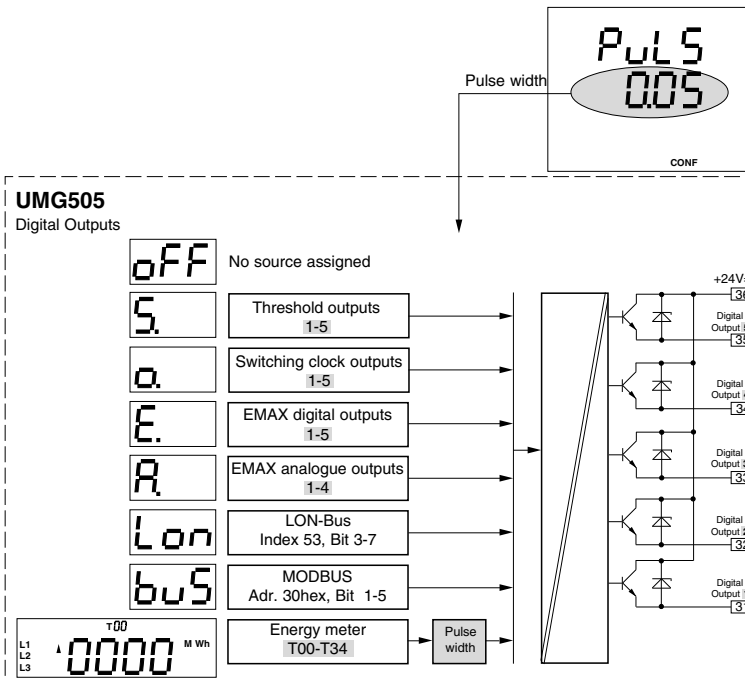
Example 2.: The pulse valence for a total power of 100kW should be calculated, if the pulse frequency should be 2Hz.

$$\text{Pulse valence [Wh]} = \frac{\text{Ptot [kW]}}{\text{Pulse-Freq. [Hz]} \bullet 3{,}6}$$

$$\text{Pulse valence} = \frac{100\ \text{kW}}{2\ \text{Hz} \bullet 3{,}6} = \underline{13{,}88\ \text{Wh}}$$

Pulse width

To each „**digital output**“, that was assigned to energy, a pulse width and valence can be assigned. In the manufacturers presettings, the pulse width is set to 50ms.
The pulse width can be set in the raneg of
50ms to 99,99 seconds.
At pulse width of 50ms, pulses with a maximum frequeny of 10 Hz can be given out.
Pulses, that cannot be sent, are saved in pulse memory. The pulse memory can save up to 32000 pulses.



Diagr. Principle diagram for digital outputs

Analogue outputs

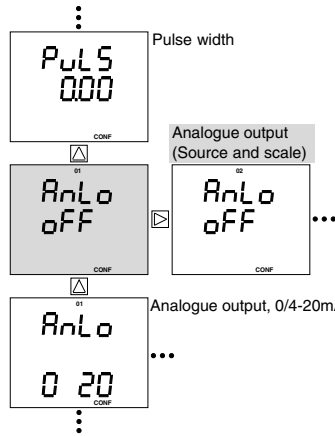
Source, destination and scale

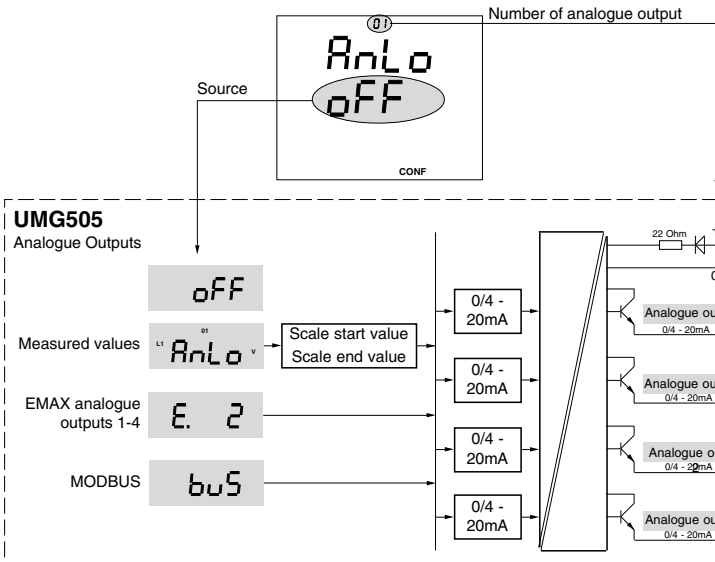
The UMG505 has 4 analogue outputs. The analogue outputs have a common earth and are separated galvanically against the other inputs and outputs of the UMG 505. For the operation of the analogue outputs, an external auxiliary voltage of 20V to 30V DC is required.
The maximum burden may not exceed 360 Ohm. If the analogue output is loaded by a bigger resistance, the output range (20mA) is limited.
To each analogue output, a range of 4-20mA or 0-20mA can be assigned.

The following sources can be used for the analogue outputs:
- Measured values,
- The internal EMAX analogue outputs 1-4 and
- Values, which are transmitted to UMG 505 via Modbus.

Only measured values, which are configured for the measured values indication, can be given out by the analogue outputs. The measured values of real energy and reactive energy cannot be given out by the analogue outputs.

Select indication
In menu **CONF** scroll to indication „analogue output (source)“ with *key 3*.
Carry on scrolling to the desired analogue output (01-04) pressing *key 2*.





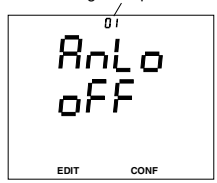
Diagr. Principle diagram analogue outputs. Selection of source.

Programming

We are in the indication „analogue output (source)“ with the respective output number. Here, for example analogue output **01**. No source **oFF** has been assigned.

Analogue output 01

Select analogue output with *key 2*. Confirm selection with *key 1*. The text „AnLo“ flashes and the symbol **EDIT** appears.



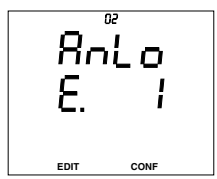
Changeover between the source with *key 3*:
- oFF (no source),
- EMAX analogue outputs and
- MODBUS

or select measured values with *key 2*.

EMAX analogue output

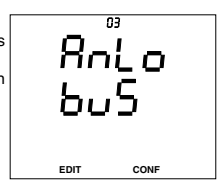
Only if an EMAX analogue output is programmed, it appears as a source. If an EMAX analogue output is programmed, it is assigned to the analogue output with the same number automatically. An EMAX analogue output cannot be assigned to an analogue output at will.

Example: EMAX analogue output
Select „EMAX analogue output as source with *key 3*. Confirm selection with *key 2*. The programmed EMAX analogue output appears. Select other EMAX analogue outputs with *key 2* and *key 3*.



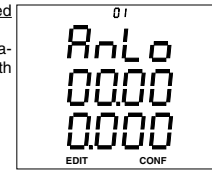
MODBUS

Example: MODBUS
Select MODBUS as source with *key 3*. Confirm selection with *key 2*.

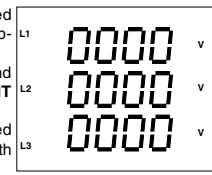


Measured value

Example: Measured values
Select measured values as source with *key 2*.

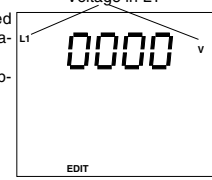


The first measured value indication appears.
The text „**AnLo**“ and the symbol **EDIT** disappear.
Select measured value indication with *key 3*.



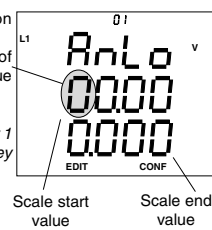
Voltage in L1

Select a measured value from the indication using *key 1*.
The symbol **EDIT** appears.



Confirm selection with *key 2*.
The first number of the scale start value flashes.

Select digit with *key 1* and change with *key 3*.

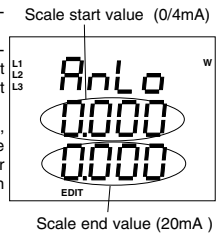


Scale

Scale start value and scale end value

Scale start and end value can be set within the setting range of the corresponding measured value.

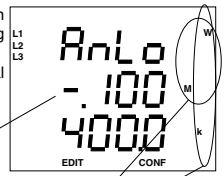
The text "**AnLo**" flashes. Press *key 1*.
The text **EDIT** appears and the first digit of the scale start value flashes.
Pressing *key 1* again, every other digit of the scale start value or scale end value can be selected.



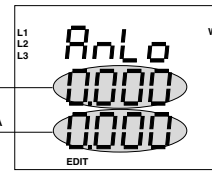
In the first digit of the scale start value and the scale end value. the sign „-“ can be entered. The sign appears after the number „9“.
After selection of the last number of the scale end value, the text **EDIT** disappears, and you can change to the next menu with *key 3*.

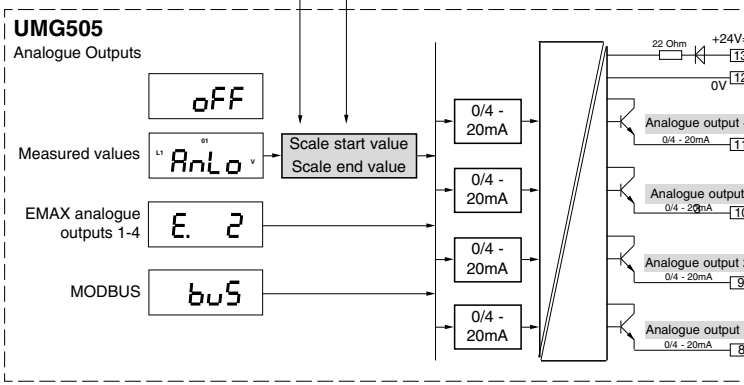
At a selected output range of 4-20mA, a current of 4mA is effected for -100kW and 20mA for 400kW.

With *key 3* you can change the flashing number.
with *key 2* the decimal point can be moved:



Scale start value = - 0.100MW = - 100kW
Scale end value = 400kW





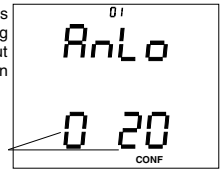
Diagr. Principle diagram analogue output, selection of scale start value and scale end value.

Output range

The output range of the analogue outputs of the UMG 505 can be programmed to 0-20mA or 4-20mA. The presettings are 4-20mA.

The text "**AnLo**" is flashing. Pressing *key 2*, the output range is shown in "mA".

Output range
0..20mA (4..20mA)



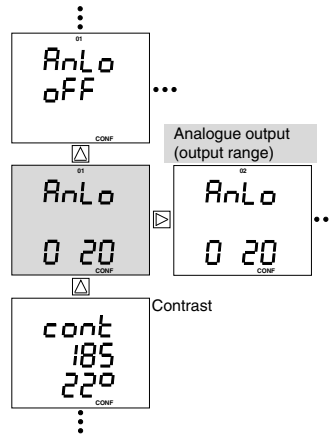
Select output range with *key 1*. the text **EDIT** appears.

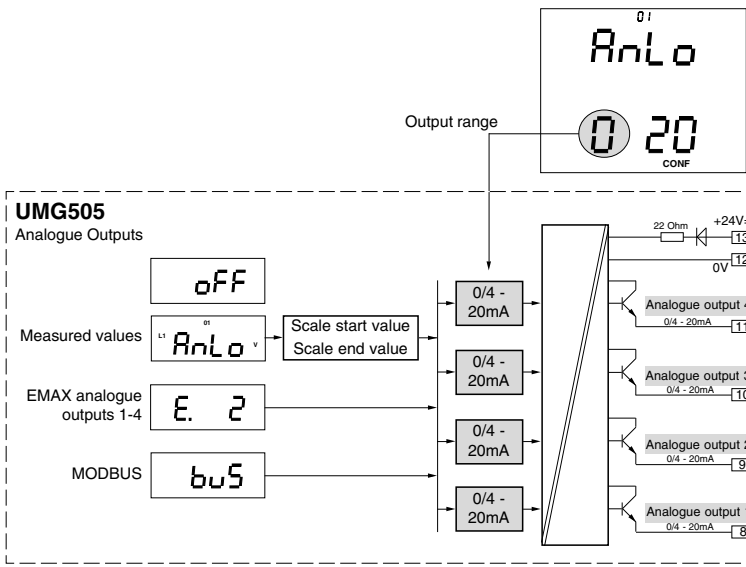
With *key 3* you can select the output range.

Select indication

In menu **CONF** scroll to indication „analogue output" (output range) with *key 3*.

Carry on scrolling to the desired analogue output (01-04) with *key 2*.

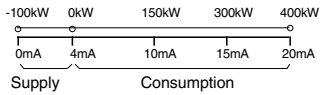




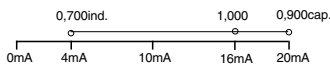
Diagr. Principle diagram analogue output. Set output range.

Example: Sum real power
The sum real power must be given out via analogue output of UMG 505. As sometimes a generator is connected, also that power shall be transmitted, which is delivered to the energy supplier. Real power supply is marked be a „-“ before the measured value.
The following settings are required:
Output range = 0 .. 20mA
Measured value = Sum real power
Scale start value = -100kW (supply)
Scale end value = 400kW (consumption)

With the selected settings, a range of 100kW + 400kW = 500kW is covered. Therefore: 500kW = 20mA.
1mA means 500kW/20 = 25kW.
If no real power is consumed or supplied, a current of 4mA flows.
If real power is supplied, the current is smaller but 4mA.



Example: cos(phi)
Output range = 4 .. 20mA
Scale start value = 0.700inductive
Scale end value = 0.900capacitive
The scale range of 0.400 is divided into 16mA, cos(phi)=1 lies at 16mA.



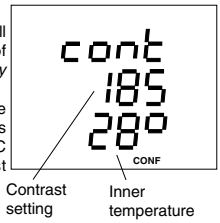
LCD contrast

The best direction for the LCD display is „from below“. The contrast of the LCD display can be adapted by the user.
The contrast setting is possible in the range of 170 230 in 5 wide steps.

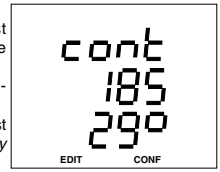
230 = Very light
170 = Very dark

To reach the optimum contrast over the whole raneg of temperature, the inner temperature of the device is measured and the contrast setting is corrected automatically. This correction is not indicated in the contrast indication.

Select
In menu **CONF** scroll to the indication of LCD contrast with *key 3*.
In this example, the inner temperature is indicated with 28°C and the contrast setting is 185.



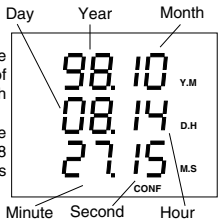
Change
Select contrast setting with *key 1*, the number flashes.
The text **EDIT** appears.
Increase the contrast setting by 5 with *key 3*.
If 230 is exceeded, the value jumps to 170.



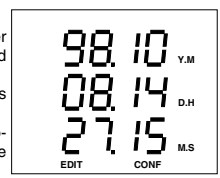
Clock

Date and time are set to the Middle European summer time. There is no automatical changeover from summer to winter time.
Date and time are needed as time information for highest and lowest value and storage of measured values in the ring buffer.

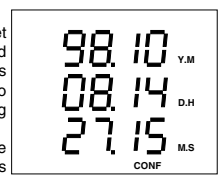
Date and time can be called up and changed in menu **CONF**. Therefore please change to menu **CONF** (See chapter "configuration").



Select
In menu **CONF** move to the indication of date and time with *key 3*.
In this example the date is 10.08.1998 and the time is 14:27:15.



Change
With *key 1* a number can be selected and changed with *key 3*.
The selected digit is flashing.
The text "**EDIT**" appears. Date and time stop.



Save
When you have set the actual date and time, please press *key 1* as often as no number is flashing any longer.
Pressing *key 2,* the text **EDIT**disappears and date and time run with their new settings.

Summer-/Winter time changeover

The UMG505 can carry out an automatical changeover of the summer/winter time. The following possibilities are available:

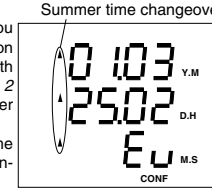
oFF - No summer/winter time changeover.
on - Specific changeover.
Eu - Listed changeover times.

At the date, marked with the arrow downwards, the time jumps back from 03:00 to 02:00.
At the date marked with the arrow upwards, the time jumps from 02:00 to 03:00.

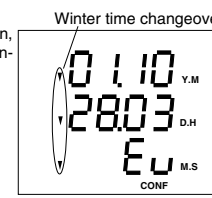
Specific changeover
If the summer wintertime changeover is activated „on“, both changeover times can be entered individually. The changeover times from the list are not used.

Listed changeover times
In the UMG505, a list of changeover times is deposited until year 2020. In this list, the changeover times are always set to the last weekend in March and the last weekend in October of each year.
If the summer/winter changeover is set to "Eu", the changeover times of this list are used.

Select
In menu **CONF** you scroll to the indication of date and time with *key 3* and use *key 2* to reach the summer time changeover.
In this example, the date 25.03.2001 is indicated.



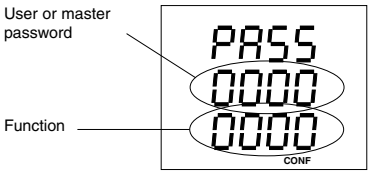
Pressing *key 2* again, the winter time changeover is indicated.

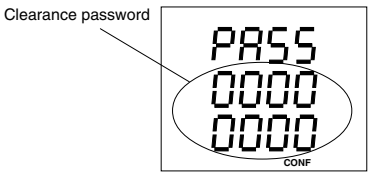


Password

Special functions of the device are protected by passwords.
There are three types of passwords:

- Clearance password (8-digit)
- User password (4-digit)
- Master password (4-digit)





Clearance password

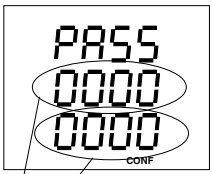
In the various device variants functions are available as an option. These function expansions can be released in the manufacturing works, when ordering. When later a functional expansion shall be released by the user, a clearance password is needed with 8 digits. This password is deposited in the manufacturing works.

Functional expansions (options), that can be released:

- EMAX

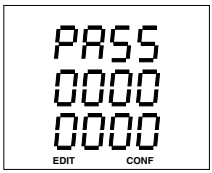
To release a functional expansion via the clearance password, please proceed as follows:

Select
In menu **CONF** you move to the indication of the password with *key 3*.
In the basic setting a 0000 0000 is indicated.



Clearance password "0000 0000"

Input
With *key 1* you select the cipher to be changed. The text **EDIT** appears within the indication
With *key 3* you change the selected number.



Save
When the password is put in, please confirm *key 1* as often as no digit is flashing any longer and confirm with *key 2*.
When the password is accepted, the password is deleted and 0000 0000 appears in the indication.
Now the released functional expansion can be called up in the programming or configuration menu.

User password

With the four digit user password the user can protect the programmed data and configuration against unintentional change. The programming and configuration will just be indicated but cannot be changed.
In delivery condition, the user password is "0000".
If the user cannot remember the user password, it can be changed with the master password only.

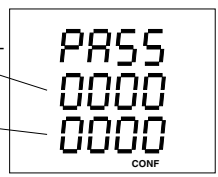
There are four functions for the user password at your disposal:

Function	Description
0001	Lock programming and configuration.
0002	Admit programming and configuration.
0003	Input user password.
0004	Delete user password.

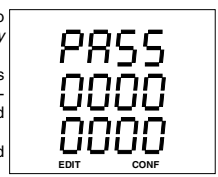
To activate a function, the user password and the desired function must be put in the password menu. A new user password can be put in, when it was deleted with function 4 by putting in the old user password. A deleted password is indicated with "0000".

User or master password

Function



Input
Select the number to be changed using *key 1*.
The text **EDIT** is flashing in the indication. The selected number is flashing.
Change the selected number using *key 3*.



Save
When you have put in the password and function, press *key 1* as often as no number is flashing any longer and confirm with *key 2*.
If the password was accepted, the password is deleted and 0000 0000 appears in the indication.

Master password

The four digit master password is needed for service purpose only and it is not announced to the user.

Function	Comment
0004	Delete user password.
7645	Restore delivery conditions.

After calling up the function „0004“, the user password is set back to the condition of delivery:

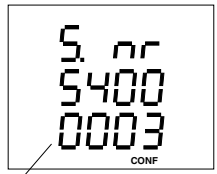
User password = "0000".

Now programming and configuration is possible with user password "0000" again with function „0002“.

The input of the master password is done in the same way like the user password.

Serial number

Each device has its 8 digit serial number, which cannot be changed by the user.
For several devices, even after delivery a release of certain functions is possible. In this case, the serial number of the device is needed in the manufacturing works.
For each device there are passwords deposited in the producing works for releasing the functions (options).



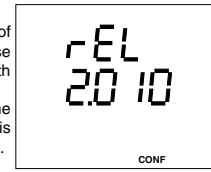
Example:
Serial number = 5400 0003

Software Release

The software within the device is ammended and expanded continously. The software issue of the devices are therefore marked with a software release. The software release cannot be overwritten by the customer.

The software release can be called up in menu **CONF**. Please change into menu **CONF** (see chapter "Configuration").

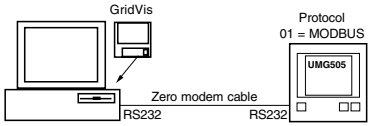
Select
Scroll to indication of the software release in menu **CONF** with *key 3*.
In this example, the software release is indicated with 2.010.



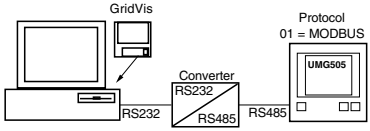
GridVis

The programming and evaluation software GridVis belongs to the contents of delivery of the UMG505. With this software, you can
- Configure the display,
- Read out event memory and ring buffer and save it to PC and
- Read, change and save configuration by PC.

For the operation, a PC with COM interface and Windows® operating system is required.
The connection between UMG 505 and PC can be carried out via RS232 or RS485 interface, depending on the version of UMG 505.
If the UMG 505 has a RS232 interface, the connection to PC is carried out via zero modem cable.
If the UMG 505 has a RS485 interface, the connection to PC must be carried out via an interface converter.



Diagr. UMG505 with RS232 interface.



Diagr. UMG505 with RS485 interface.

PC hardware

The hardware, on which the GridVis can be installed, should fullfill the following minimum requirements:
- CPU, AMD®/Intel® from 200MHz,
- 32 MByte main memory,
- ca. 5MB harddisk for the program,
- Colour monitor, 800x600, 265 colours,
- 8MByte Graphical board,
- CD-ROM drive,
- Serial interfaces (COM1/2 ..)

PC operating system

The software GridVis can run with the following operating systems:
- WIN98SE® or
- NT4.0® with SP3 or
- WIN2000® with SP2.

Functions

Configure the UMG505

A simple configuration of the UMG 505 can be done directly via the three function keys and display. But the more comfortable way of programming the UMG 505 is possible with the function "Configuration of UMG505" with GridVis and PC. Configurations can be saved on PC. Only the measured value indications can be printed.

Configure measured value indications

With the manufacturer's presettings, only a part of the possible measured values is indicated by UMG 505. This program part allows:
- To read the actual configuration of the measured value indications.
- To load a configuration of the measured value indications from PC.
- Determine the sequence of the indicated measured values.
- Load the configuration of the measured value indications into UMG 505.
- Save the configuration of the measured value indications to PC.

Read memory

The memory of the UMG 505 is divided into three ranges:

the event memory,
the ring buffer and
the storage for minimum and maximum values.

The event memory and ring buffer can be read out by PC only. The minimum and maximum values can be called up at UMG 505 directly via the keys.

Tables

Overview

Data formats

For the data, the following formats are used:

char : 1 Byte (0 .. 255)
word : 2 Byte (- 32 768 .. + 32 767)
unsign. long : 2 Byte (0 .. 4 294 967 296)
long : 4 Byte (- 2 147 483 648 .. + 2 147 483 647)
float : 4 Byte (IEEE754)
double : 8 Byte (IEEE754)

The sequence of bytes is high before low byte.

Table 1a, Measured values

Measured values in floating point format

Description	Address(dez)	r/w[1)]	Type	Unit	Comment
Current	1000	r	Meas. val.	A	L1, L2, L3
Voltage N-L	1012	r	Meas. val.	V	L1, L2, L3
Voltage L-L	1024	r	Meas. val.	V	L1-L2, L2-L3, L1-L3
Real power	1036	r	Meas. val.	W	Sign. -=supply, +=consumption
Apparebt power	1048	r	Meas. val.	VA	L1, L2, L3
Reactive power	1060	r	Meas. val.	var	Sign -=cap, +=ind
Cos(phi)	1072	r	Meas. val.		Sign -=cap, +=ind
Frequency	1084	r	Meas. val.	Hz	L1, L2, L3
Real power, Sum	1096	r	Sum	W	Sign -=supply, +=Consumption
Apparent power, Sum	1100	r	Sum	VA	
Reactive power, Sum	1104	r	Sum	var	Sign -=cap, +=ind
Cos(phi), Sum	1108	r	Sum		Sign -=cap, +=ind
Total harmonic distortion _U					
Measured value	1112	r	float	%	
Maximum value	1115	r	float	%	
Total harmonic distortion _I					
Measured value	1118	r	float	%	
	1120				
Maximum value	1121	r	float	%	
Partial harmonic content _U					
Maximum value	1124	r	float[20][3]	V	Partial harmonic 1-20; L1, L2, L3
	1132				
	..				
	1180				
Partial harmonic content _U					
Measured value	1184	r	float[20][3]	V	Partial harmonic 1-20; L1, L2, L3
	1192				
	..				
	1240				
Partial harmonic content _I					
Maximum value	1244	r	float[20][3]	A	Partial harmonic 1-20; L1, L2, L3
	1252				
	..				
	1300				
Partial harmonic content _I					
Measured value	1304	r	float[20][3]	A	Partial harmonic 1-20; L1, L2, L3
	1312				
	..				
	1360				
Real power EMAX	1365	r	Emax	W	Sign. -=Supply, +=Consumption
	1372				
	1384				

Measured values {float: Actual value [L1, L2, L3], Mean value[L1, L2, L3], Minimun value[L1, L2, L3], Maximum value[L1, L2, L3]}
Sum {float: Actual value[Sum], Mean value[Sum], Minimum value[Sum], Maximum value[Sum]}
Emax {float: Actual value[Sum], Minimum[Sum], Maximum value[Sum]}

1) r/w = read/write

Table 1b, Messwerte
Measured values in floating point format

Description	Address(dez)	r/w[1)]	Type	Unit	Comment
Total harmonic distortion _U Mean value	1390	r	float[3]	%	L1, L2, L3
Total harmonic distortion _I Mean value	1393 1396	r	float[3]	%	L1, L2, L3
Partial harmonic content _U Minimum value	1400 1408 .. 1456	r	float[20][3]	V	Partial harmonic 1-20; L1, L2, L3
Partial harmonic content_I Minimum value	1460 1468 .. 1516	r	float[20][3]	A	Partial harmonic 1-20; L1, L2, L3
Partial harmonic content _U Mean value	1520 1528 .. 1576	r	float[20][3]	V	Partial harmonic 1-20; L1, L2, L3
Partial harmonic content _I Mean value	1580 1588 .. 1636	r	float[20][3]	A	Partial harmonic 1-20; L1, L2, L3
Total harmonic distortion _U Minimum value	1640	r	float[3]	%	L1, L2, L3
Total harmonic distortion _I Minimum value	1643	r	float[3]	%	L1, L2, L3
Current, N	1646 1648 1660	r	float	A	
Maximum value of current mean value	1663	r	float[3]	A	L1, L2, L3

Table 2a, Time information

Time information for the minimum and maximum values and system time

Description	Address(dez)	r/w[1)]	Type	Comment
System time	3000	r	date	System time
Current L1, L2, L3	3001	r	date[2][3]	Min.-, max.- val.; L1, L2, L3
Voltage N-L	3007	r	date[2][3]	Min.-, max.- val.; L1, L2, L3
Voltage L-L	3013	r	date[2][3]	Min.-, max.- val.; L1, L2, L3
Real power	3019	r	date[2][3]	Min.-, max.- val.; L1, L2, L3
Apparent power	3025	r	date[2][3]	Min.-, max.- val.; L1, L2, L3
Reactive power	3031	r	date[2][3]	Min.-, max.- val.; L1, L2, L3
Cos(phi)	3037	r	date[2][3]	Min.-, max.- val.; L1, L2, L3
Frequency	3043	r	date[2][3]	Min.-, max.- val.; L1, L2, L3
Real power, Sum	3049	r	date[2]	Min.-, max.- val.;
Apparent power, Sum	3051	r	date[2]	Min.-, max.- val.;
Reactive power, Sum	3053	r	date[2]	Min.-, max.- val.;
Cos(phi), Sum	3055	r	date[2]	Min.-, max.- val.;
Total harmonic distortion_U				
Maximum value	3057	r	date[3]	L1, L2, L3
Total harmonic distortion_I				
Maximum value	3060	r	date[3]	L1, L2, L3
	3061			
Partial harmonic distortion_U				
Maximum value	3063	r	date[20][3]	Partial harmonic 1-20; L1, L2, L3
	3067			
	..			
	3121			
Partial harmonic content_I				
Maximum value	3123	r	date[20][3]	Partial harmonic 1-20; L1, L2, L3
	3127			
	..			
	3181			
free	3187			
free	3188			
free	3189			
Real energy consumption T00	3190	r	date	Deletion time
React. energy inductive T10	3191	r	date	Deletion time
React. energy capacitive T20	3192	r	date	Deletion time
Real energy supply T30	3193	r	date	Deletion time
Reactive energy				
Without rev. run. stop T40	3194	r	date	Deletion time
Real energy				
Without rev. run. stop T50	3195	r	date	Deletion time
free	3196			
..	..			
free	3198			
free	3199			

Format of time information: date {char: Year, Month, Day, Hour, Minute, Second}Year: 00 .. 99 = 2000 .. 2099

Table 2b, Time information

Time information for the minimum and maximum values and system time

Description	Address(dez)	r/w[1)]	Type	Comment
free	3205			
Partial harmonic content_U				
Minimum value	3210	r	date[20][3]	Partial harmonic 1-20; L1, L2, L3
	3211			
	..			
	3265			
Partial harmonic content_U				
Minimum value	3270	r	date[20][3]	Partial harmonic 1-20; L1, L2, L3
	3271			
	..			
	3325			
free	3331			
free	3332			
Total harmonic distortion_I				
Minimum value	3333	r	date[3]	L1, L2, L3
Current, N	3336	r	date[2]	Minimum and maximum value,
Maximum value	3337			
Real power EMAX	3338	r	date[2]	Minimum and maximum value,
Current mean val. (L1, L2, L3)	3340	r	date[2][3]	Min.- and max.- value; L1, L2, L3
Time changeover	3343	r	date2[2]	Summer/wintertime in seconds

0 = oFF - No summer/winter changeover.
1 = on - Individual changeover.
2 = Eu - Listed changeover.

Format of time information:
date {char: year, month, day, hour, minute, second} year: 00 .. 99 = 2000 .. 2099

Format of time information:
date2 {char: year, month, day, hour, minute, second} year: 00 .. 99 = 2000 .. 2099

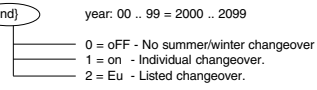


Table 3, Mean values

Averaging times and mean values

Description	Address(dez)	r/w[1)]	Type	Description
Current	4000	r	date[3]	L1, L2, L3
Voltage N-L	4003	r	date[3]	L1, L2, L3
Voltage L-L	4006	r	date[3]	L1-L2, L2-L3, L1-L3
Real power	4009	r	date[3]	L1, L2, L3
Apparent power	4012	r	date[3]	L1, L2, L3
Reactive power	4015	r	date[3]	L1, L2, L3
Cos(phi)	4018	r	date[3]	L1, L2, L3
Frequency	4021	r	date[3]	L1, L2, L3
Real power, Sum	4024	r	date	
Real power EMAX	4156	r	date	5=5, 6=10, 7=15, 8=30, 9=60 Minutes
Apparent power, Sum	4025	r	date	
Reactive power, Sum	4026	r	date	
Cos(phi), Sum	4027	r	date	
Current, N	4028	r	date	
Total harmonic distortion _U	4150	r	date[3]	L1, L2, L3
Total harmonic distortion _I	4153	r	date[3]	L1, L2, L3
Partial harmonic content_U	4030	r	date[20][3]	Partial harmonic 1-20; L1, L2, L3
Partial harmonic content _I	4090	r	date[20][3]	Partial harmonic 1-20; L1, L2, L3

Format of time information: date {char: year, month, day, hour, minute, second} year: 00 .. 99 = 2000 .. 2099

1) r/w = read/write

Table 4a, measured values

Measured values in integer format

Measured values	Address(dez)	r/w[1]	Format	Unit	Comment
Current	8000	r	word[3]	A	L1, L2, L3
Voltage	8003	r	word[3]	V	N-L1, N-L2, N-L3
Voltage	8006	r	word[3]	V	L1-L2, L2-L3, L1-L3
Real power[2]	8009	r	word[3]	W	L1, L2, L3
Apparent power	8012	r	word[3]	VA	L1, L2, L3
Reactive power[3]	8015	r	word[3]	var	L1, L2, L3
Cos(phi)[3]	8018	r	word[3]		L1, L2, L3
Frequency	8021	r	word[3]	Hz	L1, L2, L3
Real power, Sum[2]	8024	r	word	W	
Apparent power, Sum	8025	r	word	VA	
Reactive power, Sum[3]	8026	r	word	var	
Cos(phi), Sum[3]	8027	r	word		
Current, N	8028	r	word	A	Current in Neutral
Partial harmonic content _U	8030	r	word[20][3]	V	Part. harm.1-20; L1, L2, L3
	8036				
	..				
	8084				
Partial harmonic content _I	8090	r	word[20][3]	A	Part. harm.1-20; L1, L2, L3
	8096				
	..				
	8144				
Total harmonic distortion _U	8150	r	word[3]	‰	L1, L2, L3
Total harmonic distortion _I	8153	r	word[3]	‰	L1, L2, L3
Real power EMAX, Sum[2]	8156	r	word	W	

1) r/w = read/write
2) Sign - = supply, + = consumption
3) sign - = cap, + = ind

Table 4b, measured values

Mean values in integer format

Mean values	Address(dez)	r/w[1]	Format	Unit	Comment
Current	8157	r	word[3]	A	L1, L2, L3
Voltage	8160	r	word[3]	V	N-L1, N-L2, N-L3
Voltage	8163	r	word[3]	V	L1-L2, L2-L3, L1-L3
Real power[2]	8166	r	word[3]	W	L1, L2, L3
	8168				
Apparent power	8169	r	word[3]	VA	L1, L2, L3
Reactive power[3]	8172	r	word[3]	var	L1, L2, L3
Cos(phi)[3]	8175	r	word[3]		L1, L2, L3
Frequency	8178	r	word[3]	Hz	L1, L2, L3
	8180				
Real power, Sum[2]	8181	r	word	W	
Apparent power, Sum	8182	r	word	VA	
Reactive power, Sum[3]	8183	r	word	var	
Cos(phi), Sum[3]	8184	r	word		
Current, N	8185	r	word	A	Current in Neutral
Partial harmonic content _U	8187	r	word[20][3]	V	Part. harm. 1-20; L1, L2, L3
	8192				
	..				
	8240				
Partial harmonic content _I	8247	r	word[20][3]	A	Part. harm. 1-20; L1, L2, L3
	8252				
	..				
	8300				
Total harmonic distortion _U	8307	r	word[3]	‰	L1, L2, L3
Total harmonic distortion _I	8310	r	word[3]	‰	L1, L2, L3

Table 4c, maximum values

Maximum values in iteger format

Maximum values	Address(dez)	r/w[1]	Format	Unit	Comment
Current	8314	r	word[3]	A	L1, L2, L3
Voltage	8317	r	word[3]	V	N-L1, N-L2, N-L3
Voltage	8320	r	word[3]	V	L1-L2, L2-L3, L1-L3
Real power[2]	8323	r	word[3]	W	L1, L2, L3
Apparent power	8326	r	word[3]	VA	L1, L2, L3
Reactive power[3]	8329	r	word[3]	var	L1, L2, L3
Cos(phi)[3]	8332	r	word[3]		L1, L2, L3
Frequency	8335	r	word[3]	Hz	L1, L2, L3
Real power, Sum[2]	8338	r	word	W	
Apparent power, Sum	8339	r	word	VA	
Reactive power, Sum[3]	8340	r	word	var	
Cos(phi), Sum[3]	8341	r	word		
Current, N	8342	r	word	A	Current in Neutral
Partial harmonic content _U	8344	r	word[20][3]	V	Part. harm. 1-20; L1, L2, L3
Partial harmonic content _I	8404	r	word[20][3]	A	Part. harm. 1-20; L1, L2, L3
Total harmonic distortion _U	8464	r	word[3]	‰	L1, L2, L3
Total harmonic distortion _I	8467	r	word[3]	‰	L1, L2, L3
Real power EMAX, Sum[2]	8470	r	word	W	
Current mean value	8663	r	word[3]	A	L1, L2, L3

1) r/w = read/write
2) Sign - = Supply, + = Consumption
3) Sign - = cap, + = ind

Table 4d, Minimum values

Mean values in integer format

Minimum values	Address(dez)	r/w[1]	Format	Unit	Comment
Current	8471	r	word[3]	A	L1, L2, L3
Voltage	8474	r	word[3]	V	N-L1, N-L2, N-L3
Voltage	8477	r	word[3]	V	L1-L2, L2-L3, L1-L3
Real power[2]	8480	r	word[3]	W	L1, L2, L3
Apparent power	8483	r	word[3]	VA	L1, L2, L3
Reactive power[3]	8486	r	word[3]	var	L1, L2, L3
Cos(phi)[3]	8489	r	word[3]		L1, L2, L3
Frequency	8492	r	word[3]	Hz	L1, L2, L3
Real power, Sum[2]	8495	r	word	W	
Apparent power, Sum	8496	r	word	VA	
Reactive power, Sum[3]	8497	r	word	var	
Cos(phi), Sum[3]	8498	r	word		
Current, N	8499	r	word	A	Current in neutral
Partial harmonic content _U	8501	r	word[20][3]	V	Part. harm.1-20; L1, L2, L3
Partial harmonic content _I	8561	r	word[20][3]	A	Part. harm.1-20; L1, L2, L3
Total harmonic distortion _U	8621	r	word[3]	‰	L1, L2, L3
Total harmonic distortion _I	8624	r	word[3]	‰	L1, L2, L3
Real power EMAX, Sum[2]	8627	r	word	W	

Table 5, read energy

Energy in integer format

Energy	Address(dez)	r/w[1)]	Format	Unit	Comment
Real energy consumption, T10	9000	r	long	Wh	scale see address 9102
Real energy supply, T30	9001	r	long	Wh	scale see address 9102
Real energy without rev. run. stop, T50	9002	r	long	Wh	scale see address 9102
Reactive energy capacitive, T20	9003	r	long	varh	scale see address 9102
Reactive energy inductive, T10	9004	r	long	varh	scale see address 9102
React. energy without rev. run. stop T40	9005	r	long	varh	scale see address 9102
Running time of energy meters	7600	r	date[6][5]	sec.	Running time in seconds

Format of time information: date {unsign. long}

Table 6, delete energy

Description	Address(dez)	r/w[1)]	Format	Unit	Comment
Delete real energy	576	w	word		1=delete
Delete reactive energy	578	w	word		1=delete
Delete maximum values	580	w	word		1=delete
Delete minimum values	582	w	word		1=delete

Table 7, energy

Energy in floating point format

Description	Address(dez)	r/w[1)]	Type	Unit	Comment
Real energy consumption	2000	r	double[5]	Wh	Energy, T00 .. T04
Reactive energy inductive	2010	r	double[5]	varh	Energy, T10 .. T14
Reactive energy capacitive	2020	r	double[5]	varh	Energy, T20 .. T24
Real energy supply	2030	r	double[5]	Wh	Energy, T30 .. T34
React. energy without rev. run. stop	2040	r	double[5]	varh	Energy, T40 .. T44
Real energy without rev. run. stop	2050	r	double[5]	Wh	Energy, T50 .. T54

Table 8, EMAX-maximum values

EMAX-maximum values

Description	Address(dez)	r/w[1)]	Format	Comment
Real power EMAX				
Peak value	16000	r	float [Tariff] [Month]	Measured value in Watt.
Date				
Year	16500	r	char [Month]	In which year the month was.
Day	16600	r	char [Tariff] [Month]	On which day of the month the peak value ocurred.
Time				
Hour	16700	r	char [Tariff] [Month]	
Minute	16800	r	char [Tariff] [Monat]	

For each month, one peak value is saved per tariff. After one year, the peak value is overwritten.

Year = 0 .. 99 00 .. 99 = 2000 .. 2099
Tariff = 0 .. 4 0 = T00, 1 = T01, ..
Month = 0 .. 11 0 = January, 1 = February, ..

1) r/w = read/write

Table 9, Scale

Scale of measured values, which are called in integer format.

Measured values	Address(dez)	r/w[1]	Format	Possible scale
Currents	9100	r	word	-3 .. 6
Voltage	9101	r	word	-3 .. 6
Power	9102	r	word	-3 .. 6
Cos(phi)	9103	r	word	-3
Frequency	9104	r	word	-2
THD	9105	r	word	-3

Within the UMG 505 almost all measured values are available in floating point format (Table 2). For the transmission of measured values the floating point values are recalculated in integer format by the UMG 505, such as char, int and word (Table 4).
To lose no digits after decimal point, the value, that should be transmitted, is scaled. The opening value from UMG 505 is calculated as follows:

Measured value = Transmitted value * Factor

The scales of the measured values are calculated from UMG 505 out of current and voltage transformer ratio. Here the minimum definition of the transmitted value of 0,1% is strived for.

The scales of the UMG 505 can be retrieved under the following addresses:

10 scale factors are at your disposal:

Scale	Factor
-3	/1000
-2	/100
-1	/10
0	1
1	* 10
2	* 100
3	* 1 000
4	* 10 000
5	* 100 000
6	* 1000 000

The scale of energy is determined by the scale of power

Example
Transmitted value UMG 505 = 2301
Programmed scale = -1
Which voltage is measured by the UMG 505?

From the scale table, you can read the factor =/10 for scale=-1:

Measured value = Transmitted value * Factor
Measured value = 2301 * 1/10
Measured value = 230,1V

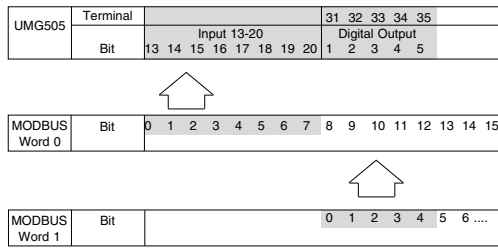
The measured voltage is 230,1V.

1) r/w = read/write

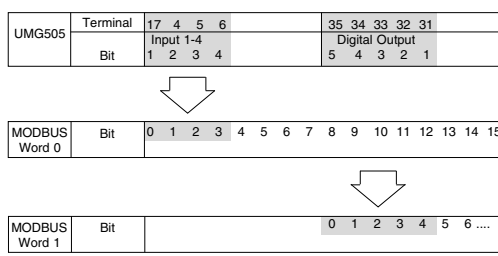
Table 10, Inputs and outputs

Description	Address	r/w[1)]	Format	Unit	Comment
Digital Input 1-4, Energy meter	272_{dez}	r/w	long[4]	-	
Analogue output 1-4	544_{dez}	r/w	word[4]	-	Range 0 -10000 0 = 0/4mA, 10000=20mA

Description	Address	r/w[1)]	Format	Unit	Comment
Digital Outputs	30_{hex}	r/w	word	-	Assignment see Diagr.



Description	Address	r/w[1)]	Format	Unit	Comment
Digital Inputs	20_{hex}	r	word	-	Assignment see diagr.



1) r/w = read/write

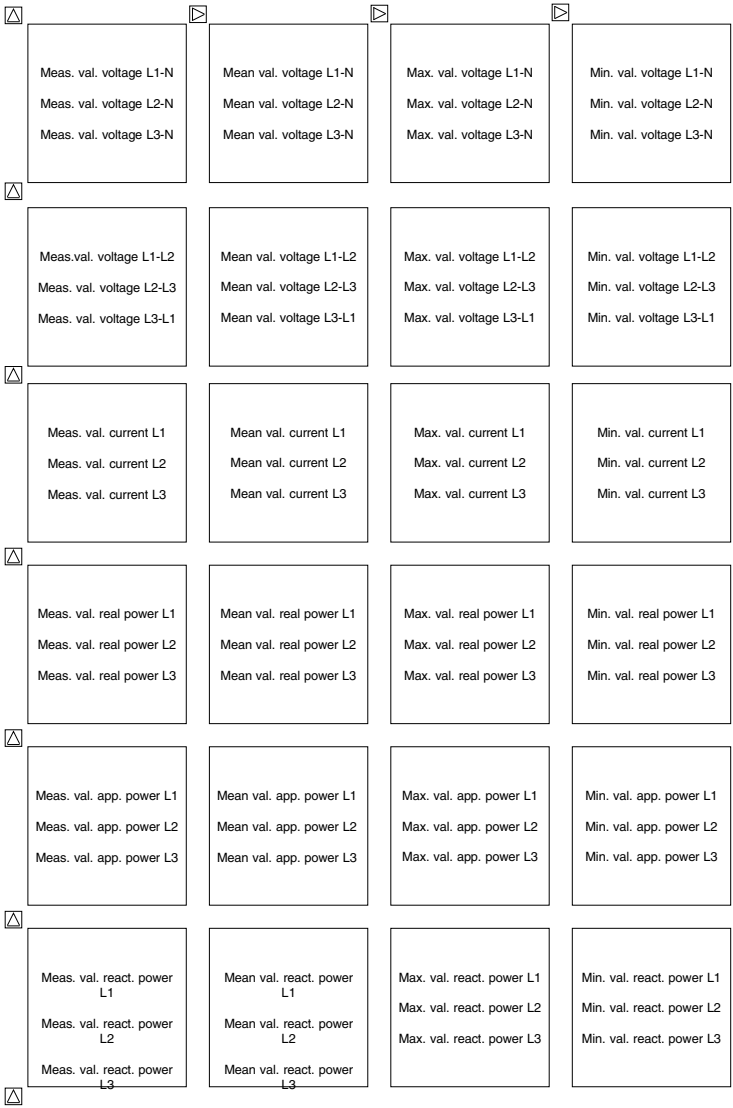
Table 11, LON variables

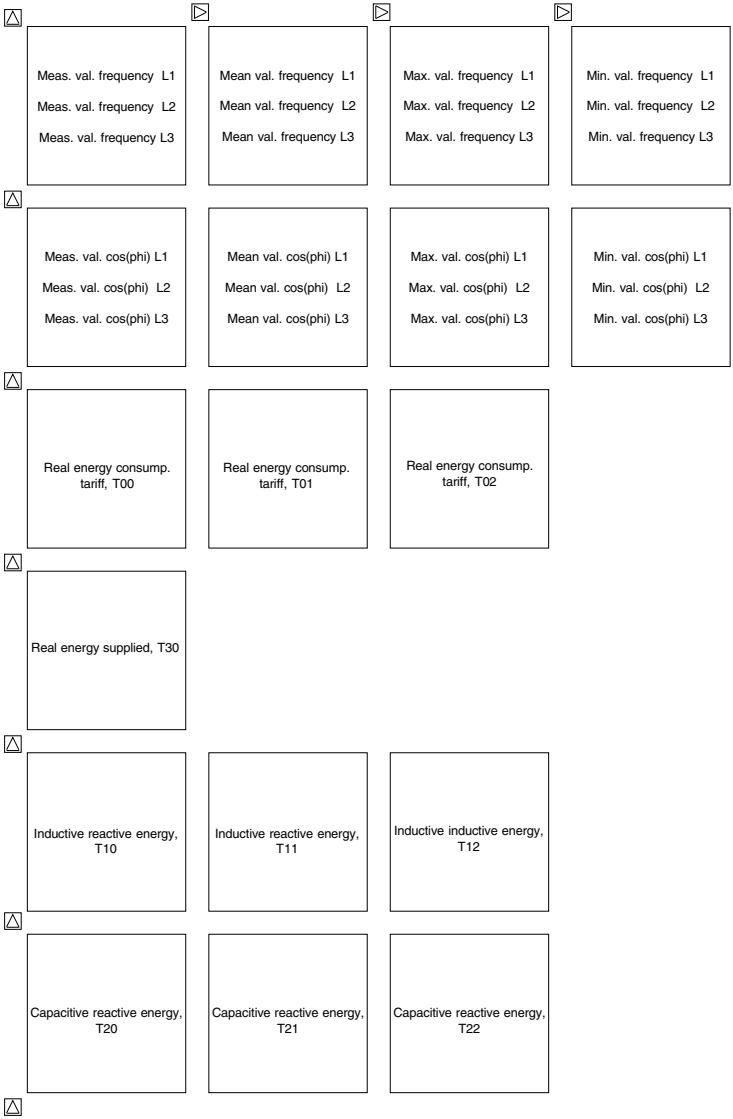
Description	SNVT-Typ	Indic.	Direction	Unit	Presett.	Type	Comment
nvi00Request	SNVT_obj_request	0	Output				nvi00Request
nvo00Status	SNVT_obj_status	1	Output				nvo00Status
volt_NL1	SNVT_volt_f	2	Output	V		float	voltage L1-N
volt_NL2	SNVT_volt_f	3	Output	V		float	voltage L2-N
volt_NL3	SNVT_volt_f	4	Output	V		float	voltage L3-N
volt_LL12	SNVT_volt_f	5	Output	V		float	voltage L1-L2
volt_LL23	SNVT_volt_f	6	Output	V		float	voltage L2-L3
volt_LL31	SNVT_volt_f	7	Output	V		float	voltage L3-L1
amp_L1	SNVT_amp_f	8	Output	A		float	current L1
amp_L2	SNVT_amp_f	9	Output			float	current L2
amp_L3	SNVT_amp_f	10	Output	A		float	current L3
power_L1	SNVT_power _f	11	Output	W		float	real power L1
power_L2	SNVT_power _f	12	Output	W		float	real power L2
power_L3	SNVT_power _f	13	Output	W		float	real power L3
frq_L1	SNVT_freq _f	14	Output	Hz		float	frequency L1
frq_L2	SNVT_freq _f	15	Output	Hz		float	frequency L2
frq_L3	SNVT_freq _f	16	Output	Hz		float	frequency L3
amp_L1_avg	SNVT_amp_f	17	Output	A		float	Strommittelwert L1
amp_L2_avg	SNVT_amp_f	18	Output	A		float	Strommittelwert L2
amp_L2_avg	SNVT_amp_f	19	Output	A		float	Strommittelwert L3
amp_L1_avg_max	SNVT_amp_f	20	Output	A		float	Maximaler Strommittelwert L1
amp_L2_avg_max	SNVT_amp_f	21	Output	A		float	Maximaler Strommittelwert L2
amp_L3_avg_max	SNVT_amp_f	22	Output	A		float	Maximaler Strommittelwert L3
cos_phi_L1	SNVT_pwr_fact_f	23	Output			float	Cos-phi L1
cos_phi_L2	SNVT_pwr_fact_f	24	Output			float	Cos-phi L2
cos_phi_L3	SNVT_pwr_fact_f	25	Output			float	Cos-phi L3
r_power_L1	SNVT_power_f	26	Output	var		float	reactive power L1
r_power_L2	SNVT_power_f	27	Output	var		float	reactive power L2
r_power_L3	SNVT_power_f	28	Output	var		float	reactive power L3
va_power_L1	SNVT_power_f	29	Output	VA		float	Scheinleistung L1
va_power_L1	SNVT_power_f	30	Output	VA		float	Scheinleistung L2
va_power_L1	SNVT_power_f	31	Output	VA		float	Scheinleistung L3
energie	SNVT_elec_whr_f	32	Output	Wh		float	real energy, sum
t1_energie	SNVT_elec_whr_f	33	Output	Wh		float	real energy, T1
t2_energie	SNVT_elec_whr_f	34	Output	Wh		float	real energy, T2
r_energie	SNVT_elec_whr_f	35	Output	varh		float	reactive energy, ind.
t1_r_energie	SNVT_elec_whr_f	36	Output	varh		float	reactive energy, ind T1
t2_r_energie	SNVT_elec_whr_f	37	Output	varh		float	reactive energy, ind T2
power_tot	SNVT_power_f	38	Output	W		float	real energy, sum
va_power_tot	SNVT_power_f	39	Output	VA		float	Scheinleistung, sum
r_power_tot	SNVT_power_f	40	Output	var		float	reactive energy, sum
cos_phi_tot	SNVT_pwr_fact_f	41	Output			float	Cos-phi, sum
power_tot_max	SNVT_power_f	42	Output	W		float	Wirkleistung, Summe Maximum
va_power_tot_max	SNVT_power_f	43	Output	VA		float	Scheinleistung, Summe Max.
system_time	SNVT_time_stamp	44	Output				Systemzeit UMG505 (nur lesen)
input_state	SNVT_state	45	Input				Status der Ein-/Ausgänge
Configuration properties							
amp_deltaI	SNVT_amp_f	46	Input	A	0	float	DELTA I [1)]
amp_deltaU	SNVT_amp_f	47	Input	V	0	float	DELTA U [1)]
power_delta	SNVT_power_f	48	Input	W	0	float	DELTA P [1)]
frq_delta	SNVT_freq_f	49	Input	Hz	0	float	DELTA F [1)]
cos_phi_delta	SNVT_pwr_fact_f	50	Input		0	float	DELTA cos-phi [1)]
energie_delta	SNVT_elec_whr_f	51	Input		0	float	DELTA Energie [1)]
maxsendtime	NONE	52	Input	sec	0	unsig. long	MaxSendTime
outputState	SNVT_state	53	Input				Setzen der intern. Ein-/Ausgänge
rset_energie	SNVT_lev_disc	54	Input				Energiezähler löschen

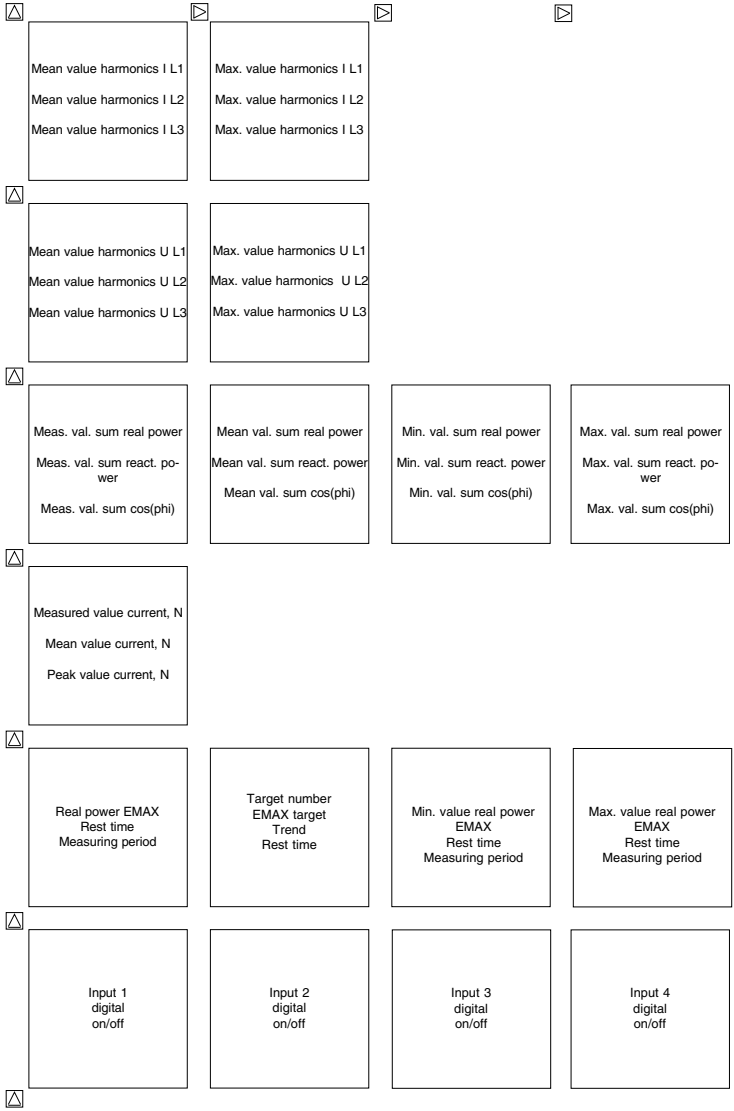
BIT Belegung:

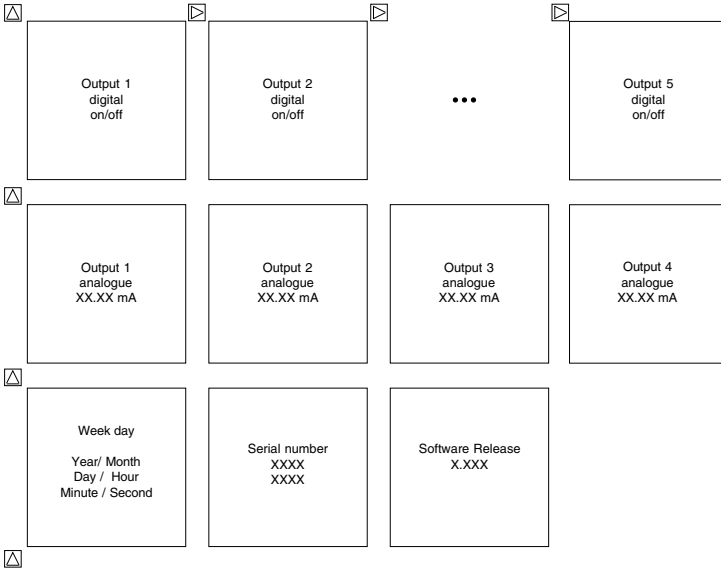
nvoInputState	=	Bit 0	nicht benutzt
		Bit 1	nicht benutzt
		Bit 2	nicht benutzt
		Bit 3	nicht benutzt
		Bit 4	Status Digital Eingang 4
		Bit 5	Status Digital Eingang 3
		Bit 6	Status Digital Eingang 2
		Bit 7	Status Digital Eingang 1
		Bit 8	nicht benutzt
		Bit 9	nicht benutzt
		Bit 10	nicht benutzt
		Bit 11	Status Digital Ausgang 1
		Bit 12	Status Digital Ausgang 2
		Bit 13	Status Digital Ausgang 3
		Bit 14	Status Digital Ausgang 4
		Bit 15	Status Digital Ausgang 5
nvoOutputState	=	Bit 0	nicht benutzt
		Bit 1	nicht benutzt
		Bit 2	nicht benutzt
		Bit 3	setzt Digital Ausgang 3 [2)]
		Bit 4	setzt Digital Ausgang 4 [2)]
		Bit 5	setzt Digital Ausgang 3 [2)]
		Bit 6	setzt Digital Ausgang 2 [2)]
		Bit 7	setzt Digital Ausgang 1 [2)]
		Bit 8	interner Eingang 12
		Bit 9	interner Eingang 11
		Bit 10	interner Eingang 10
		Bit 11	interner Eingang 9
		Bit 12	interner Eingang 8
		Bit 13	interner Eingang 7
		Bit 14	interner Eingang 6
		Bit 15	interner Eingang 5

Measured value indications (Presettings)




Meas. val. frequency L1
Meas. val. frequency L2
Meas. val. frequency L3
Mean val. frequency L1
Mean val. frequency L2
Mean val. frequency L3
Max. val. frequency L1
Max. val. frequency L2
Max. val. frequency L3
Min. val. frequency L1
Min. val. frequency L2
Min. val. frequency L3
Meas. val. cos(phi) L1
Meas. val. cos(phi) L2
Meas. val. cos(phi) L3
Mean val. cos(phi) L1
Mean val. cos(phi) L2
Mean val. cos(phi) L3
Max. val. cos(phi) L1
Max. val. cos(phi) L2
Max. val. cos(phi) L3
Min. val. cos(phi) L1
Min. val. cos(phi) L2
Min. val. cos(phi) L3
Real energy consump. tariff, T00
Real energy consump. tariff, T01
Real energy consump. tariff, T02
Real energy supplied, T30
Inductive reactive energy, T10
Inductive reactive energy, T11
Inductive inductive energy, T12
Capacitive reactive energy, T20
Capacitive reactive energy, T21
Capacitive reactive energy, T22


Mean value harmonics I L1
Mean value harmonics I L2
Mean value harmonics I L3
Max. value harmonics I L1
Max. value harmonics I L2
Max. value harmonics I L3
Mean value harmonics U L1
Mean value harmonics U L2
Mean value harmonics U L3
Max. value harmonics U L1
Max. value harmonics U L2
Max. value harmonics U L3
Meas. val. sum real power
Meas. val. sum react. power
Meas. val. sum cos(phi)
Mean val. sum real power
Mean val. sum react. power
Mean val. sum cos(phi)
Min. val. sum real power
Min. val. sum react. power
Min. val. sum cos(phi)
Max. val. sum real power
Max. val. sum react. power
Max. val. sum cos(phi)
Measured value current, N
Mean value current, N
Peak value current, N
Real power EMAX
Rest time
Measuring period
Target number
EMAX target
Trend
Rest time
Min. value real power
EMAX
Rest time
Measuring period
Max. value real power
EMAX
Rest time
Measuring period
Input 1
digital
on/off
Input 2
digital
on/off
Input 3
digital
on/off
Input 4
digital
on/off


Output 1
digital
on/off
Output 2
digital
on/off
•••
Output 5
digital
on/off
Output 1
analogue
XX.XX mA
Output 2
analogue
XX.XX mA
Output 3
analogue
XX.XX mA
Output 4
analogue
XX.XX mA
Week day
Year/ Month
Day / Hour
Minute / Second
Serial number
XXXX
XXXX
Software Release
X.XXX

Configuration data

Description	Indication	Setting range	Presettings
Current transformer, primary	**CT**	1A .. 999,9MA	"5000"A
Current transformer, secondary	**CT**	1A .. 5A	" 5" A
Voltage transformer, primary	**VT**	100V.. 999,9MV	" 400" V
Volrage transformer, secondary	**VT**	100V .. 500V	" 400" V
Aron circuit (Option)	" **nEt**"	3L, 4L	"4 L"
Data logging	"**dAtA**"	on, off	"on"
Serial interfaces		RS485, RS232, LON	
RS485 (Option)	" **485**"		
Baud rate		9.6, 19.2, 38.4kbps "38.4"	
Protocol		oFF, 1, 2	"01"
RS232 (Option)	" **232**"		
Baud rate		9600bps, 19.2kbps, 38.4kbps	"38.4"
Protocol		oFF, 1, 2	"01"
LON (Option)	" **Lon**"		
Device address	**ADDR**	0 .. 255	" 1"
Measured value rotation	"**Pic** "		
Changing time		0 .. 9999 seconds	"0000"
Display selection		All meas. value indications	No meas. value indica.
Event memory	"**Prot**"		
Devices with 512k RAM		0-9999 Events	1000 Events
Net frequency	"**FrE** "	Auto, 50Hz, 60Hz	"Auto"
Switching outputs 1-5			
Number	"**S.** x"	1, 2	" 1"
Limit		All measured values	"L1 0.000 A"
Minimum switching time	" . M.S"	1 .. 59 seconds	"00.01 M.S"
Exceeding	▲		▲
Underscoring	▼		
Switching clock	„**P.** xx“		
Output channel			
Switching output	„**o.** x“	0 .. 5	0 = No assignment
EMAX target number	„**S.** x“	0 .. 5	0 = No assignment
Energy meter	„**t.** xx“	00 .. 54	00 = No assignment
Switch-on time	▲		
First week day		1= Monday, .. 7= Sunday	„1xxx“ = Monday
Last week day		1= Monday, .. 7= Sunday	„x7xx“ = Sunday
Hour		00 h .. 24 h.	„xx.24 d.h.“ = *inactive*
Minute		00 m .. 59 m.	„00.xx m.“
Switch-off time	▼		
First week day		1= Monday, .. 7= Sunday	„1xxx“ = Monday
Last week day		1= Monday, .. 7= Sunday	„x7xx“ = Sunday
Hour		00 h .. 24 h.	„xx.24 d.h.“
Minute		00 m .. 59 m.	„00.xx m.“

Description	Indication	Setting range	Presettings
EMAX			
Target 1-5	„**SoLL**“	0W .. 9999MW	0 W
Priority		0 .. 9 (0=off)	0
EMAX-Digital outputs 1-5	„**E.oPx**“		
Connection power		0W .. 9999MW	0 W
Min. switch-on time	▲	20 .. 999 seconds	60 seconds
Min. switch-off time	▼	20 .. 999 seconds	60 seconds
Max. disconnection time	▼	20 .. 999 seconds	900 seconds
EMAX analogue outputs 1-4	„**E.Anx**“		
Consumers	▲		
Max. Spare power		0W .. 9999MW	0 W
Run up time		0 .. 999 seconds	0 seconds
Generator	▼		
Min. running time		0 .. 999 minutes	0 minutes
Run up time		0 .. 99 seconds	0 seconds
Digital inputs 1-4	„**in**xx“		
Input, S0	„**So**“	0Wh .. 9999MWh	
Digital outputs 1-5	„**out**x“		
Pulse output	„**PuLS**“	00.05 .. 99.99 seconds	0.05 seconds
Analogue output	„**AnLo**“		
Measured value			
Scale start value		0 .. 9999	0
Scale end value		0 .. 9999	0
LCD contrast	"**cont**"	170 .. 230	185
Inner temperature	"88°"	2-digit	actual inner temperature
Date and time			Date and time
Summer time	"oFF"	oFF, on, Eu	oFF
Winter time	"oFF"	oFF, on, Eu	oFF
User password	"**PASS**"	0000 .. 9999	"0000"
Serial number	"**S. nr**"	8-digit	Producer programmed
Software Release	"**rEL**"	4-digit	loaded Firmware version

Measured and calculated quantities

Measured value	Measured value L1	L2	L3	Sum.	Mean value L1	L2	L3	Sum.	Measured value Min. value/Max. value		Date and Time
Voltage L-N	x	x	x		x	x	x		x	x	x
Voltage L-L	x	x	x		x	x	x		x	x	x
Current	x	x	x		x	x	x		x	x[2)]	x
Current in N				x				x	x	x	x
Real power	x	x	x	x	x	x	x	x	x	x	x
Real power, EMAX				x					x[3)]	x[3)]	x
Apparent power	x	x	x	x	x	x	x	x	x	x	x
Reactive power (fundamental)	x	x	x	x	x	x	x	x	ind	cap	x
cos(phi) (der Grundschwingung)	x	x	x	x	x	x	x	x	ind	cap	x
Frequency of voltage	x	x	x		x	x	x		x	x	x
Real energy											
without rev. run. stop, T50				x							Start/run. time
Consumption , T00				x							Start/run. time
Supply, T30				x							Start/run. time
Reactive energy											
Without rev. run. stop, T40				x							Start/run. time
induktive, T10				x							Start/run. time
capacitive, T20				x							Start/run. time
Partial harmonic content, U	x	x	x		x	x	x		x	x	x
Partial harmonic content, I	x	x	x		x	x	x		x	x	x
Total harm. distortion THD, U	x	x	x		x	x	x		x	x	x
Total harm. distortion THD, I	x	x	x		x	x	x		x	x	x

[1)] Current in N.
[2)] Maximum value for current measured and mean value.
[3)] Is saved with time of measuring period reset.
These measured values cannot be used in measurement in „IT-networks without N“.

Indication range and accuracy

Quantity	Indication range	Measuring range scale factor = 1	Measuring accuracy (../5A)
Voltage L-N	0,0V .. 999,9 MV	50 .. 500 V	+-0,2% omr
L-L	0,0V .. 999,9 MV	80 .. 870 V	+-0,2% omr
Current	0,000 .. 9999 A	0,005 .. 5 A	+-0,2% omr
Current in N	0,000 .. 9999 A	0,060 .. 15 A	+-0,6% omr
Frequency (voltage)	45,00 .. 65,00 Hz	45,00 .. 65,00 Hz	+-0,1% omv
Power			
Real power, consumption	0,00W .. 9999 MW	0,05 W .. 2,5 kW	+-0,5% omr
Real power, supply	-0,00W .. -999 MW	0,05 W .. 2,5 kW	+-0,5% omr
Apparent power	0,00VA .. 9999 MVA	0,05 VA .. 2,5 kVA	+-0,5% omr
Reactive power	0,00VAr.. 9999 MVAr	0,05 kvar .. 2,5 kvar	+-0,5% omr
Energy (max. 10digits)			
Real energy, Without reverse running stop	0,0 Wh .. 9999 GWh	0,05 Ws .. 9999 MWh	1)
Real energy, consumption	0,0 Wh .. 9999 GWh	0,05 Ws .. 9999 MWh	1)
Real energy, Supply	0,0 Wh .. 9999 GWh	0,05 Ws .. 9999 MWh	1)
Reactive energy	0,0 vars .. 9999 Gvarh	0,05 vars .. 9999 Mvarh	1)
Total harmonic THD(f)			
Current	0,0 .. 100 %	0,0 .. 100 %	+-0,5% omr
Voltage	0,0 .. 100 %	0,0 .. 100 %	+-0,5% omr
Partial harmonic content			
Current (1. - 20.)	0,000 .. 9999 A	0,005 A .. 5A (1A)	+-0,5% omr
Voltage (1. - 20.)	0,0V .. 99,99 kV	0,000 V .. 9999 V	+-0,5% omr
cos(Phi)	0,00ind ..1,00..0,00cap.	0,00ind .. 1,00 .. 0,00cap.	2)
Energy meters			
digital input 1-3 (max. 1Hz)	0 - 42 9496 7295 (130 years with 1Hz)		-
digital input 4 (max. 10Hz)	0 - 42 9496 7295 (13 years with10Hz)		-

Accuracy of internal clock

At ambient temperature 20°C	+- 5Sec./day
Within the complete temperature range	+- 9Sec./day

The specifications presuppose the following ambient conditions:
Yearly calibration.
Warm up 10 minutes.
Ambient temperature of 18 .. 28°C.
In the range of -10..18°C and 28..55°C an additional error of +-0,2% Mv per K must be considered.

Used abbreviations:
omr = of measuring range
omv = of measured value
ind = inductive
cap = capacitive

1) Accuracy class according to EN61036:1996, VDE0418part 7:May 1997, IEC1036:1996
With current transformer ../5A : Class 1
With current transformer ../1A : Class 2
2) If the measured apparent power is in the range of 1% .. 100% of the measuring range, the cos(phi) is indicated with an accuracy of +-1% of 1.000.

⚠ Attention!
The accurcy of the data, which are compressed in the ring buffer, is +-0,4% at maximum.

Technical Data

Ambient conditions

Pollution degree	: 2
Operating temperature	: -10°C .. +55°C
Storage temperature	: -20°C .. +60°C
Humidity	: 15% .. 95% without dew
Operating height	: 0 .. 2000m over NN

Protection class

Front	: IP50 according to EN60529
Front with seal (Option)	: IP65 according to EN60529
Back side	: IP20 according to EN60529
Screw terminals	: IP20 according to EN60529

Testing voltage

Voltage measuring inputs against housing, LON, RS232 and RS485
: 3250V AC

Relay outputs, digital inputs and current measuring inputs against housing, LON, RS232 and RS485
: 2200V AC

Supply voltage Uh	: see type plate
Overvoltage class	: 300V CATIII
Range 1 (Standard)	: 85 .. 265V AC, 80 .. 370V DC
Range 2 (Option)	: 40 .. 115V AC, 55 .. 165V DC
Range 3 (Option)	: 15 .. 55V AC, 20 .. 80V DC
Fuse	: 4A up to 10 A,
Power consumption	: max. 7VA
Fuse	: 4 .. 10A

Measuring inputs

Rated pulse voltage	: 6kV
Signal frequency	: 45Hz .. 1200Hz

Current measurement

Overvoltage class	: 150V CATIII
Power consumption	: ca. 0,2 VA
Rated current at ../5A (../1A)	: 5A (1A)
Minimum working current	: 5mA
Limiting current	: 5,2A(sinus shape)
Overload	: 180A for 2 sec.

Voltage measurement

Overvoltage class	: 600V CATIII
Impedance	: 2MOhm/Phase
Power consumption	: ca. 0,1 VA
Maximum fuse: M2A	
Measuring range L-N	: 50 .. 500V AC, *2,3..23VAC (Opt.)*
Measuring range L-L	: 80 .. 870V AC, *4..40V AC (Opt.)*
Frequency of fundamental : 45Hz..65Hz	

Accuracy class according to EN61036:1996, VDE0418part 7:May 1997, IEC1036:1996

With current transformer ../5A	: Class 1
With current transformer ../1A	: Class 2

Accuracy of internal clock : +- 1 Minute/Month

Measurement

Measuring mode	: True (RMS)
Measuring rate	: 2 measurement/second.
Scanning frequency	: 6,4kHz (50Hz)
	: 7,68kHz (60Hz)
Actualization	
Display	: 1 time per second
Analogue outputs	: < 500ms
Relay outputs	: < 500ms

Digital inputs

Maximum frequency	
Digital Input 1	: 1 Hz
Digital Input 2 + 3	: 1 Hz
Digital Input 4	: 20Hz
Current consumption	
Digital Input 1	: ca. 2,5mA .. 10mA
Digital Input 2 + 3	: ca. 2,5mA .. 10mA
Digital Input 4	: 2/10mA

Digital outputs (not proof against short circuit)

As switching output	
Switching voltage	: max. 30VDC
Switching current	: max. 30mA
Switching frequency	: max. 1Hz
Voltage supply, external	: 20V .. 30VDC
As pulse output	
Switching frequency	: max. 10Hz
Switching current	: max. 30mA
Max. cable length	: 100m
Supply voltage, external	: 20V .. 30VDC

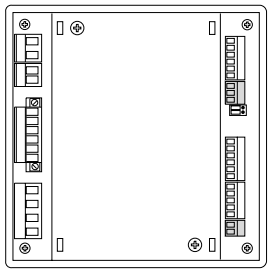
Analogue outputs

Definition	: 12Bit
Accuracy	: +-1,5%
Load	: max. 300Ohm
Reaction time	: 1,5seconds
Supply voltage, external	: 20V.. 30VDC/50mA

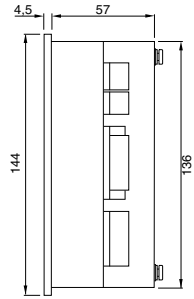
Interfaces	: RS232 (Option)
	: RS485 (Option)
	: LON (Option), FTT10A-Transceiver
Weight:	: 1 kg
Mounting position	: Any
Safety guidelines	: EN61010-1 03.1994, + A2 05.1996
	: IEC1010-1
Protection class	: I (device with protective wire)
Interference resistance (industrial areas)	: EN50082-2:1995
	: IEC1000-4-3, 10V/m
	: IEC1000-4-4, 2kV
	: IEC1000-4-2, 8kV
Spurious radiation (residential areas)	: EN55011 10.1997

Design for panel mounting

Back side



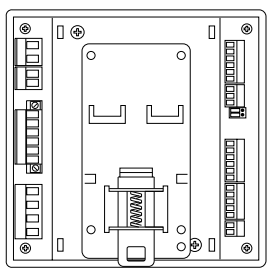
Side view



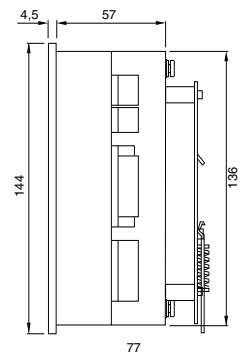
The grey marked connections are not available in any housing version.
All dimensions are given in mm.

Version for DIN rail mounting (Option)

Back side

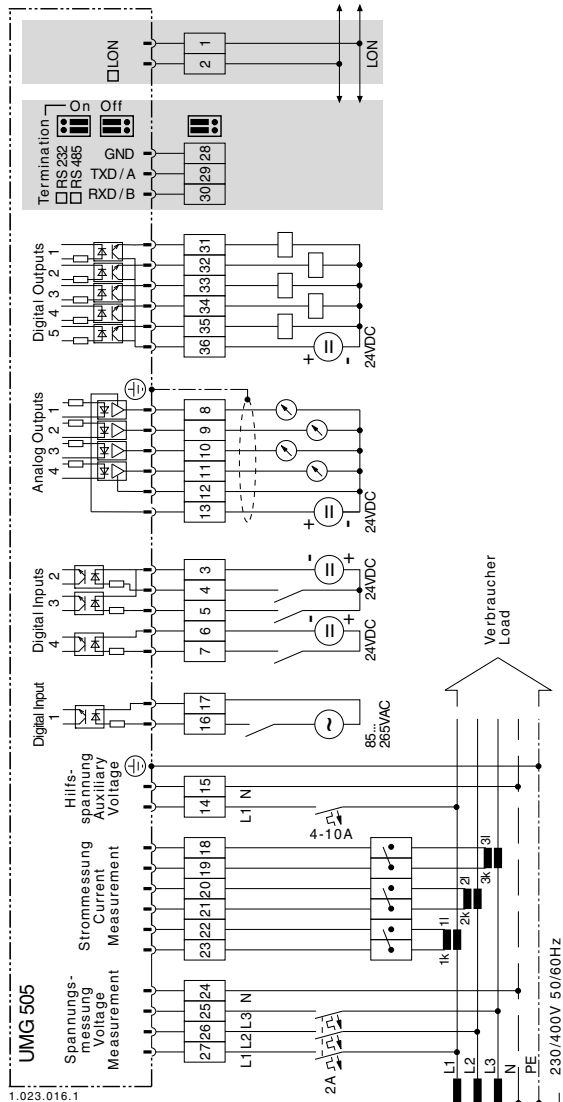


Side view



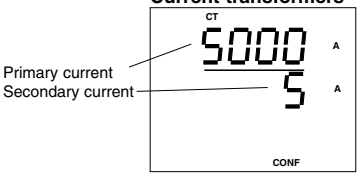
Diagr. Cable connections for UMG 505 UMG505 for DIN rail mounting.

Connection example



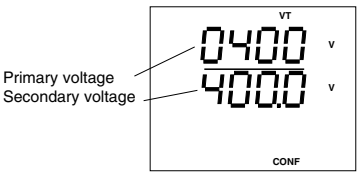
Brief instructions

Current transformers



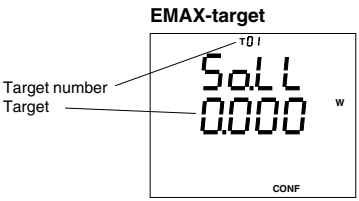
⇳	2 x	Select programming menu
▷	1 x	Select current transformer
⇳		Select number
△		Change number
▷		Move decimal point
⇳	2 Sek.	Save and measured value indication.

Voltage transformer



⇳	2 x	Select programming menu
▷	1 x	Confirm selection
△	1 x	Select voltage transformer
⇳		Select number
△		Change number
▷		Move decimal point
⇳	2 Sek.	Save and measured value indication

EMAX-target



⇳	2 x	Select programming menu
▷	1 x	Confirm selection
△	15 x	Scroll to EMAX target
⇳		Select number
△		Change number
▷		Move decimal point
⇳	2 Sek.	Save and measured value indication