MR-GW
Modbus TCP/Modbus RTU- Gateway
User Manual



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Preamble

1.1 About this User Manual

This document describes the operation of the **MR-GW** (Modbus RTU-Gateway), P/N **11083001**. The description contains information on the use and installation of the device. If you have any questions that cannot be answered with the help of this manual, please contact the manufacturer for further information.

The stated installation and assembly regulations and guidelines apply to the Federal Republic of Germany. If the device is being used abroad, the national regulations must be observed at the sole responsibility of the system manufacturer or operator.

1.2 Document history

Version	Date	Description
V 1.0	2020-05-26	MC-Search Utility, network settings
V 2.0	2021-02-16	Integration device parametrization METZ CONNECT MR-XX I/O modules
V 2.1	2023-02-02	Modbus timeout adjustment under 4.1.1/4.3.5 to 100ms
V 2.2	2026-06-22	Add Accessory Configuration
V 2.7	2026-07-01	Support for the MR-SM4 energy meter – Commissioning via web server possible
V 2.8	2026-09-01	Custom transformer configuration for MR-SM4 energy meter accessories possible.

1.3 Safety instructions

For the installation and use of the device, the respectively valid industrial safety, accident prevention and VDE regulations must be observed. Skilled workers or installers are advised that they must discharge themselves properly before installing or servicing the equipment. Assembly and installation work on the devices may only be carried out by qualified personnel, see section "qualified personnel". Every person who uses the device must read the descriptions of this have read and understood this manual.



Warning of dangerous electrical voltage!

Improper connection may result in danger to life. Serious physical injury or considerable damage to property may occur. Before working on the system, it must be disconnected from the power supply.

1.4 Qualified specialists

Qualified technical specialists in the sense of this manual are persons who are familiar with the described devices and have a qualification corresponding to their activity.

This includes, for example:

- Authorization to connect the device in accordance with VDE regulations and local EVU regulations, as well as authorization to switch the device on, off and on in accordance with internal company regulations.
- Knowledge of the accident prevention regulations.
- Knowledge of the use and application of the device within the system, etc.

1.5 Warranty terms

METZ CONNECT GmbH does not assume any liability or guarantee for consequences resulting from improper use, in particular non-observance of the instructions for use and installation. The user must ensure that the device is not operated outside the specified technical parameters. Any unauthorized alteration or modification of the device, as well as any repairs carried out by the user on his own authority, shall constitute "misuse" and/or "negligence" within the meaning of the warranty for the product and shall therefore exclude the warranty for the coverage of possible consequential damage. Furthermore the warranty claim expires.

1.6 Disclaimer of warranty

The contents of this document have been carefully compiled and checked for conformity with the product in terms of hardware and software. However, deviations cannot be completely ruled out. For this reason, the information contained in this manual does not imply any obligation or warranty of any kind. As a result, authors, companies and publishers do not assume any legal responsibility and will not assume any resulting or other liability arising in any way from the use of this information or parts thereof, including for infringement of patent rights and other rights of third parties that may result therefrom.

2 Description of the device

MR-GW is a compact Modbus RTU / Modbus TCP Gateway. The MR-Gateway enables bidirectional data exchange between Modbus RTU fieldbus devices and a Modbus TCP master (client). The MR-GW can be operated in two modes. Either as a transparent gateway in Modbus RTU over TCP mode or as a protocol converter (Modbus TCP mode). The MR-Gateway can be connected to METZ CONNECT Modbus RTU devices via two 4-pole terminals on the front of the device and a jumper plug. An integrated web server is used for parameter settings, management and monitoring of the two interfaces (Ethernet / RS485). The web interface is also used to update the firmware. The MR-Gateway is suitable for decentralized mounting in electrical sub-distribution boards or in control cabinets on TH35 mounting rails in accordance with IEC 60715.

2.1 Technical Data

Ethernet interface	
Network connection	1x Ethernet-Port (RJ-45 IEC 60603-7-51 (2010))
Speed	10/100 Mbits with auto-negotiation
Protocols	Modbus RTU over TCP (Transparent gateway), Modbus TCP/IP v1.0b, Telnet, HTTP 1.0
RS485-interface	
Protocol	Modbus RTU v1.1b3
Transmission rate	300 – 115.200 Bit/s
Bus termination resistor	120 Ohm switchable
Galvanic isolation	1,5 kV
Supply	
Operating voltage	24 V DC +/-10 % (SELV)
Power consumption (max.)	50 mA
Power loss (max.)	1,3 W
Indicator	
Operation „RDY“	Green LED
LAN-connection „LINK 10/100“	Green LED (100 Mbit) / LED yellow (10 Mbit)
RS485-bus „TX“ / „RX“	Green LED
housing	
Dimension (W x H x D)	35 x 69,3 x 60 mm / 1.378 in. 2.728 in. x 2.362 in.
Weight	64 g
Protection category housing / terminal blocks	IP40 / IP20
Temperature range	
Temperature - Operating	-5 °C - 55 °C / 23 °F – 131 °F
Temperature Storage	-20 °C - 70 °C / -4°F – 158°F

3 Installation

3.1 Installation location and state

The electrical installation and device connection may only be carried out by qualified personnel in compliance with VDE regulations and local regulations. Before working on the system, it must be disconnected from the power supply. The MR-GW is intended for fixed installation and operation inside enclosed rooms in electrical distribution boards and suitable control panels. The MR-GW is designed for mounting on TH35 mounting rails in accordance with IEC 60715. It can be installed in any position. Horizontal installation is recommended. It is possible to add them to other control cabinet components without spacing.

3.2 Mounting

The MR-GW is suitable for decentralized mounting in electrical sub-distribution boards or in switch cabinets on TH35 mounting rails according to IEC 60715. The MR-GW can be snapped onto a TH35 mounting rail according to IEC 60715 for installation in an electrical distributor or small enclosure. The device has to be accessible for operating, testing, inspection and maintenance.

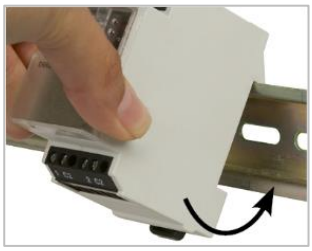


Figure 1 Mounting of MR-GW

3.3 Dismounting und disposal

Before disassembling, it must be ensured that the MR-GW has been taken out of operation and that all supply lines are de-energized. Once all supply lines have been removed, use a slotted screwdriver to move the bolt on the MR-GW outwards and remove the device from the mounting rail.

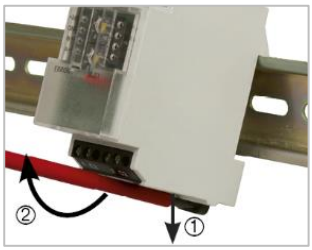


Figure 2 Dismounting of MR-GW

1 unlocking lever with a screwdriver

2 remove the device to the front

After using, the MR-GW must be disposed of as electronic scrap in accordance with the WEEE Directive and the laws in force in the respective country. Further information is available from METZ CONNECT GmbH.



Figure 3 WEEE identification

3.4 Connection

Warning of dangerous electrical voltage

Incorrect connection may result in fatal injury. Serious bodily injury or considerable damage to property can occur. Before working on the system, it must be disconnected from the power supply.

The electrical installation and device connection may only be carried out by qualified personnel in compliance with VDE regulations and local regulations. The correct connection must be checked before commissioning. Incorrect connection can destroy the MR-GW.

3.4.1 Connection diagram- and principle diagram

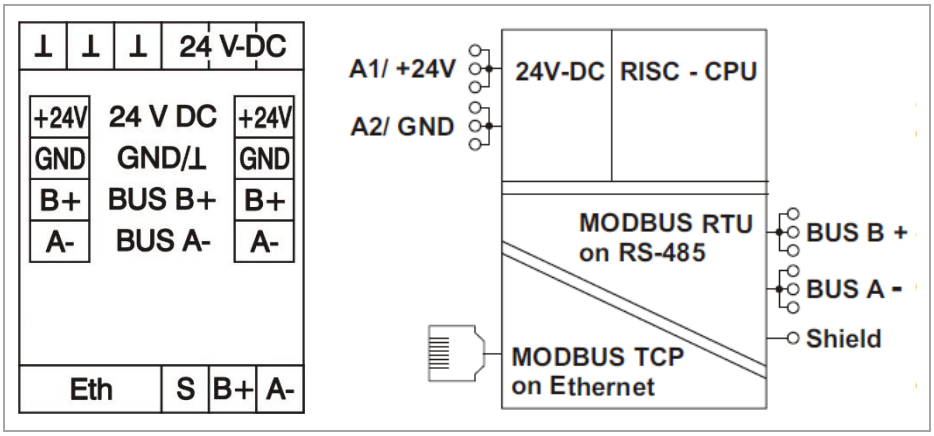


Figure 4 Connection diagram- and principle diagram

3.4.2 Power Supply

The operating voltage of the MR-GW is 24 Volt DC ± 10% (SELV) and is either provided via a jumper plug and the NG4 power supply unit from METZ CONNECT (Figure 5) or directly via the power supply terminals on the device.

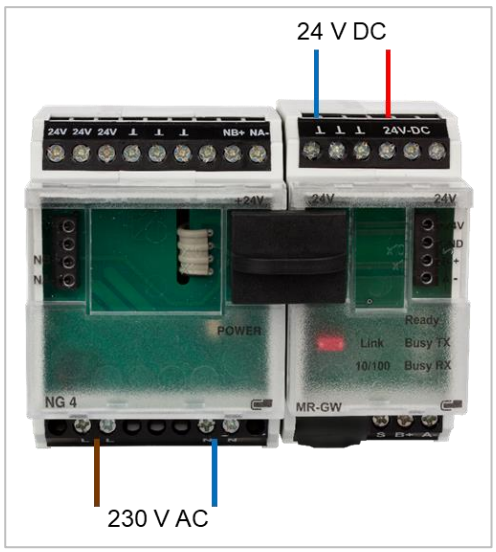


Figure 5 Power supply and RS485 bus connection via jumper plug

Danger!

The voltage of the power supply NG4 is 230 V AC. Serious physical injury or considerable damage to property may occur. Before working on the system, it must be disconnected from the power supply.

3.5 Indicators



Figure 6 LED Display

Designation	Function	LED-Display		Description
Ready	Operation	Green	LED: On	MR-Gateway is ready to operate
			LED: Off	MR-Gateway is not ready to operate
Link 10/100	LAN connection	Green	LED: On	MR-Gateway is connected to LAN speed 100 Mbit/s
			LED: Off	MR-Gateway is not connected to LAN
		Yellow	LED: On	MR-Gateway is connected to LAN speed 10 Mbit/s
			LED: Off	MR-Gateway is not connected to LAN
Busy TX	RS-485 „transmit“	Green	LED: On	MR-Gateway is transmitting RS-485 Data
			LED: Off	MR-Gateway is not transmitting RS-485 Data
Busy RX	RS-485 „receive“	Green	LED: On	MR-Gateway is receiving RS-485 Data
			LED: Off	MR-Gateway is not receiving RS-485 Data

3.6 Communication interfaces

3.6.1 Ethernet interface

The Ethernet interface of the MR-GW supports the following specifications:

- RJ-45 connector for Ethernet connection
- 10Base-T and 100BASE-T with auto-negotiation
- The software tool *MC-Search Utility* for Windows is provided for device search and configuration
- Configurable with Telnet network utility.
- Number of clients connected simultaneously (master devices) MODBUS TCP: 32
- Number of clients connected simultaneously (master devices) MODBUS RTU Over TCP: 1.

3.7 Ports

Description	Port
MODBUS TCP/IP Server network port	502
MODBUS RTU over TCP-Server network port	4001
Webserver network port	80
Telnet Server network port	23
Broadcast search Server port	1030

3.8 Timeout

The TCP/IP connection timeout to MODBUS RTU Over TCP is 60 seconds. When a client connection is established in MODBUS RTU Over TCP mode, a connection from another IP address is only possible if the existing connection is inactive during the specified timeout.

3.9 RS-485 interface

Description	Parameter
Data bits	8
Supported baud rates	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Parity	None, Even, Odd
Stop bits	1 or 2
Galvanic isolation	1,5 kV

4 Configuration

4.1 Web interface

The MR-GW has an integrated and intuitive web interface for parameter settings, management and monitoring of the two interfaces (Ethernet / RS485) in responsive design. The Ethernet connection is established via a standard patch cable and the RJ45 connector on the device.



Figure 7 Ethernet- connection with RJ-45 connector

The following functions can be configured via the web interface:

Description	Parameter
Password-based web client authentication	adjustable
Network settings	IP-address Subnet mask Gateway address Enable / disable DHCP Allowed Client Connections
RS-485 settings	Baud rate Parity Number of stop bits Modbus Timeout
TCP-Protocol mode	MODBUS TCP MODBUS RTU Over TCP.
Web interface language selection	German English France Russian
Firmware update	From local file

4.1.1 Default settings

Description	Parameter
Default password	admin
TCP-Protocol mode	MODBUS TCP
Network settings	
IP address	192.168.0.111
Subnet mask	255.255.255.0
Standard gateway:	192.168.0.1
DHCP	Disabled
Allowed clients Subnet IP for clients Subnet mask	Off 0.0.0.0 0.0.0.0
RS-485 settings	
Data bits	8
Baud rate	19200
Parity	Even
Stop bits	1
Modbus timeout	100 ms

4.2 Implementing

The MR-GW can be configured either using the free software tool *MC-Search Utility* or via the integrated web interface and the default IP address *192.168.0.111*.

4.3 Web interface configuration

The MR-GW is configured as follows:

Description	Address
IP address	192.168.0.111
Subnet mask	255.255.255.0
Standard gateway	192.168.0.1

To access the web interface and configure the MR-GW, the following steps must be performed:

1. On your PC, set LAN interface IP address e.g. to 192.168.1.100 and subnet mask to 255.255.255.0
2. Connect the PC to the device using an ETHERNET patch cable.
3. Connect +24V power supply to the device.
4. Start your web browser and type *192.168.0.111* in the address bar.

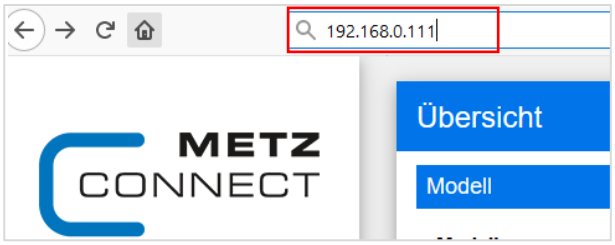


Figure 8 Access to the web interface via default IP address

5. The device web home page appears.
6. You will be prompted to enter a password. The default password is: *admin*.

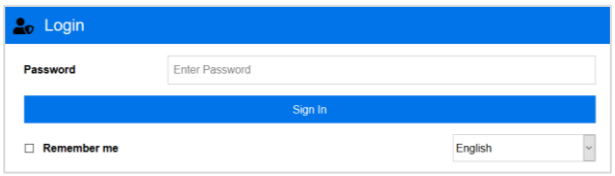


Figure 9 Enter password

	Note For security reasons we recommend to change the default password! → *Chapter 4.3.6. Security*

4.3.1 Overview

After the login process has been successfully completed, you will be taken to the start page of the web interface. The menu item Overview displays the current settings of the MR-GW. Double-clicking on the METZ CONNECT logo takes you directly to the product page on the homepage www.metz-connect.com/modbus-gateway.

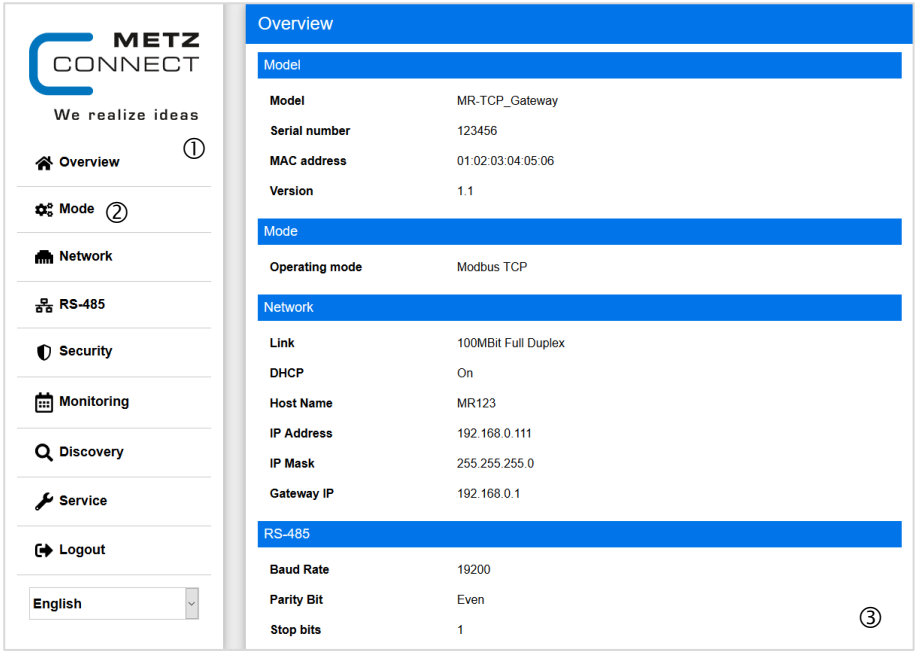


Figure 10 Overview of the current device settings

1 Navigation menu

2 Menu item

3 Information and display field

4.3.2 Dynamic page adaptation

The size and resolution of the web interface adapt to the display device used. The window size of the web interface can be reduced and adjusted as required. The navigation menu is collapsed.

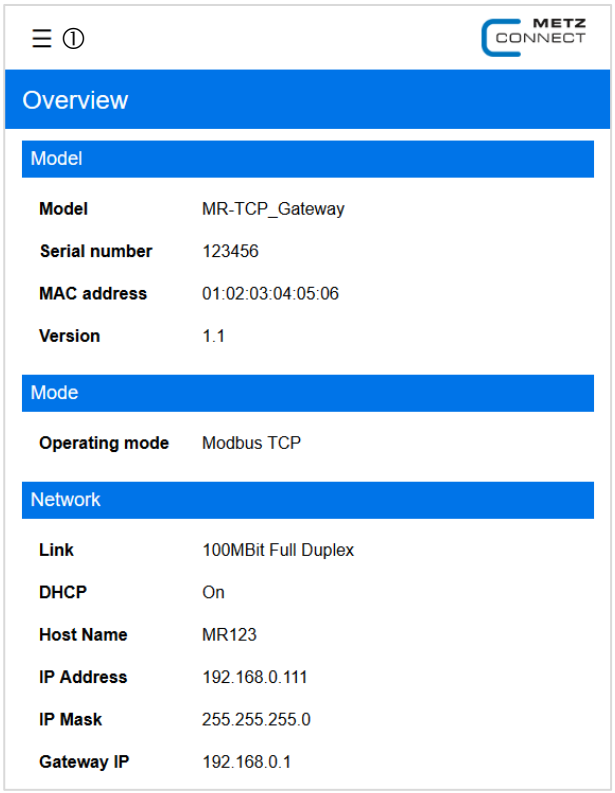


Figure 11 Reduced representation of the web interface

1 Open navigation menu

4.3.3 TCP protocol mode

In the *TCP protocol mode* menu item, the operating mode Modbus TCP or Modbus RTU over TCP of the Modbus TCP interface is set.

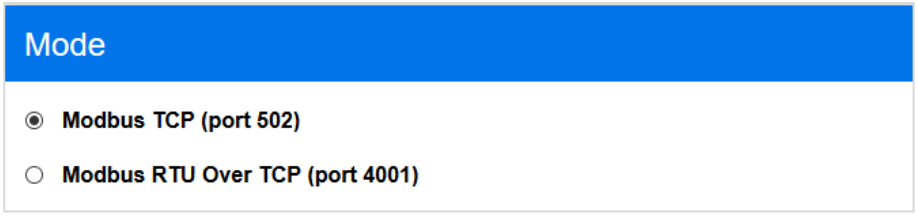


Figure 12 menu item TCP protocol mode

Mode	Description
Modbus TCP	Gateway acts as a protocol converter 32 Modbus TCP client connections simultaneously
Modbus RTU Over TCP	Gateway acts as a transparent gateway 1 Modbus TCP client connection simultaneously

4.3.4 Network

In the menu item ***Network*** the network settings are defined.

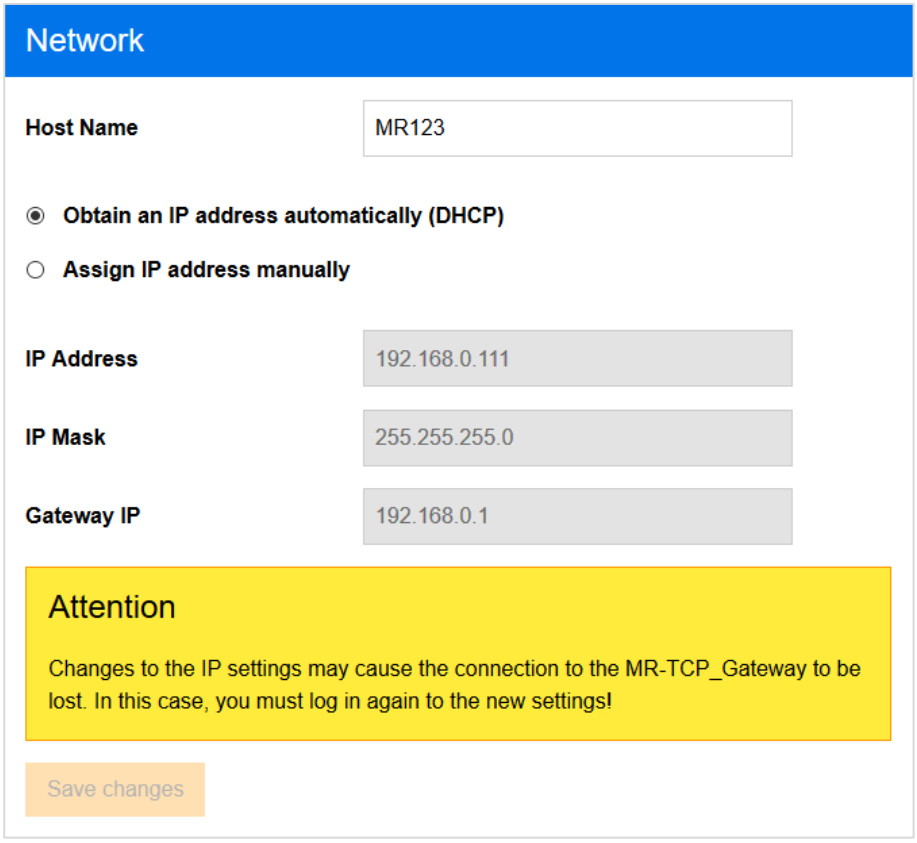


Figure 13 menu item Network

Network settings	Description
Host Name	Assign device name
Obtain an IP address automatically (DHCP)	IP address is automatically obtained via a DHCP server
Assign IP address manually	Device IP address, subnet mask, standard gateway are assigned manually

Attention

After changing the network settings, connection to device may be lost. In this case, reconnect to the device using the new settings.

If the IP address is changed, the following message appears in the foreground of the browser:



Figure 14 Warning when changing the IP address

The web interface can be unlocked again by following the instruction and entering the new IP address in the address bar of the browser and confirming with ENTER.

4.3.5 RS-485

In the ***RS-485*** menu item, the RS-485 interface of the MR-GW is configured.

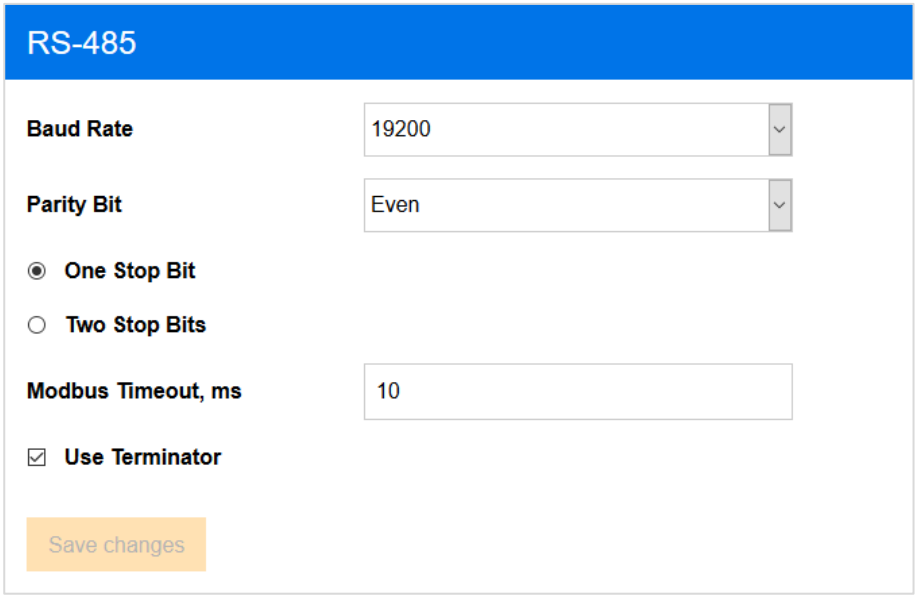


Figure 15 menu item RS-485

Parameter	Description
Baud Rate	Setting the transmission speed min. 1,200 bits/s (Bd) - max. 115,200 bits/s (Bd) default setting: 19,200 bit/s (Bd)
Parity	Setting the Parity Bit Odd, Even, None Default setting: Even
Stop Bits	Number of Stop Bits: One or Zwo Default setting: One Stop Bit
Modbus Timeout, ms	Timeout of the server - client response time 1 - 5000 ms adjustable Default setting: 100 ms
Use Terminator	Built-in 120 Ohm terminating resistor is switched on

4.3.6 Security

The menu item ***Security*** defines the required security settings.

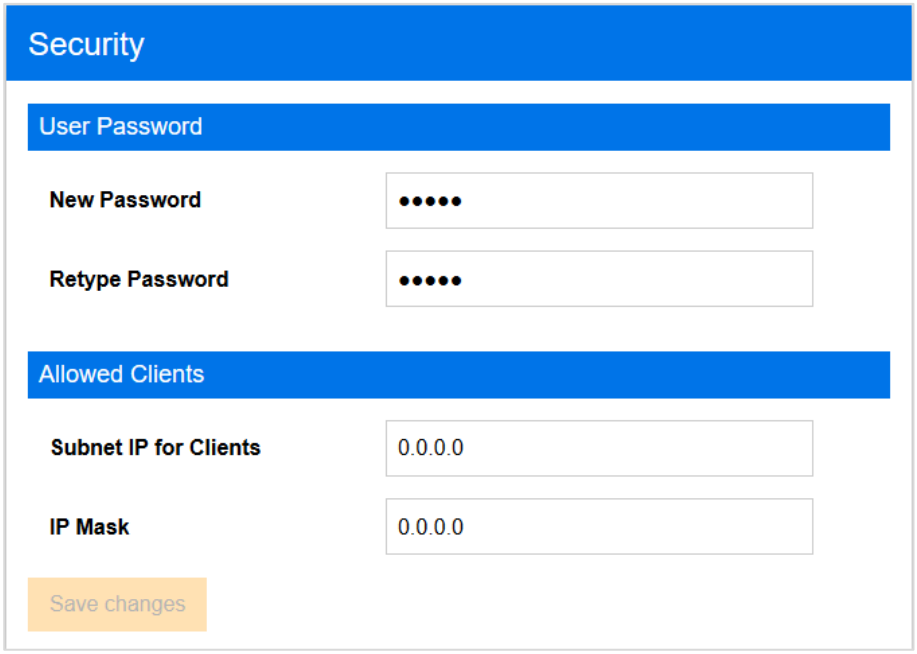


Figure 16 menu item Security

4.3.6.1 User Password

The default password ***admin*** is set in the delivery status. When logging in for the first time, you are prompted to enter the default password.

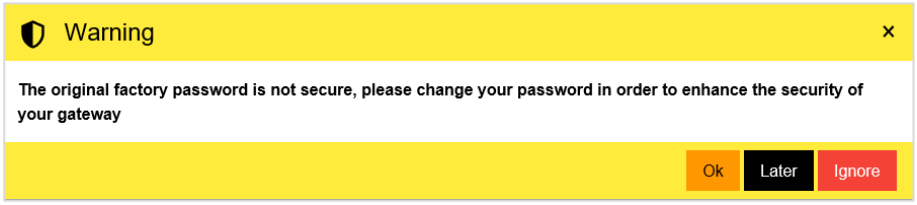


Figure 17 Password request at first login

Function	Description
OK	Assign new password
Later	The next time you log in in a new browser window, you will be prompted again to change the default password
Ignore	The next time you log in, you will be prompted for the default password ***admin***

Note

For security reasons we recommend to change the default password!
The request to change the password is stored locally in the respective browser settings.

4.3.6.2 Reset and reassign password

The password entry can be deactivated by a jumper on the top of the device. For this purpose, the housing cover must be removed and the jumper must be set to the *„ON"* position. The web interface can now be accessed without a password being requested. After a new password has been assigned, the jumper must be set to position *„OFF"* again. The new password is now active.

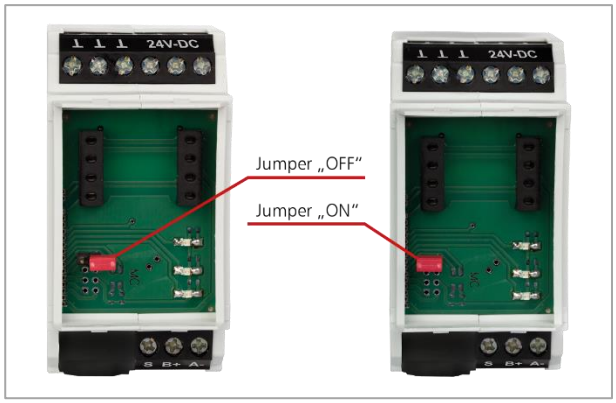


Figure 18 Password- jumper settings

4.3.6.3 Allowed Clients

The *Allowed client* connections allow you to add or block remote client IP addresses to prevent unauthorized access. The access to the MR-GW is controlled by an IP address. This means that if a client's IP address is in the accessible IP range, then the client is allowed to access the MR-GW.

Example 1:
Only a host with a specific IP address can access the MR-GW:

Network address of the clients	192.168.1.1
Subnet mask	255.255.255.255

Example 2:
Hosts in a specific subnet can access the MR-GW:

Network address of the clients	192.168.1.0
Subnet mask	255.255.255.0

4.3.7 Monitoring

In the menu item ***Monitoring*** a list of TCP clients and the current device status is displayed.

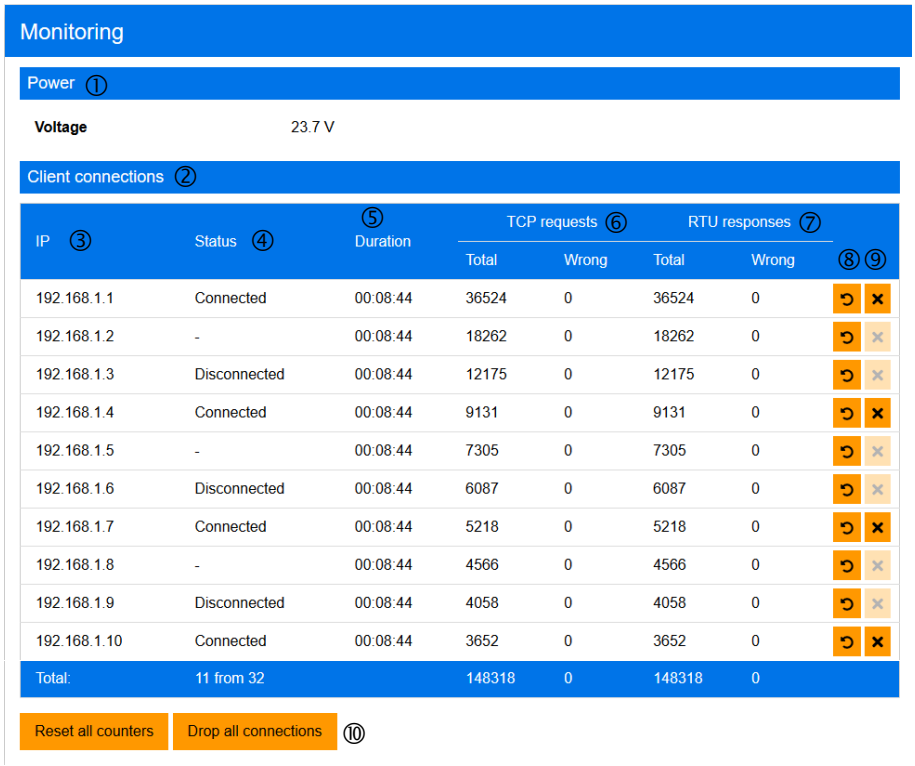


Figure 19 menu item monitoring

1 Supply voltage of MR-GW

2 Modbus TCP-Client connections

3 IP address of Modbus TCP-Clients

4 Connection status

5 Duration of connection

6 Total and wrong Modbus TCP-Client requests

7 Total and wrong Modbus RTU responses

8 Reset Modbus TCP-Client connection counter

9 Drop of Modbus TCP-Client connection

10 Drop of and reset all connections

4.3.8 Discovery and parameterisation

In the menu item ***Discovery***, all connected METZ CONNECT Modbus RTU devices to the RS485 bus are searched and displayed.

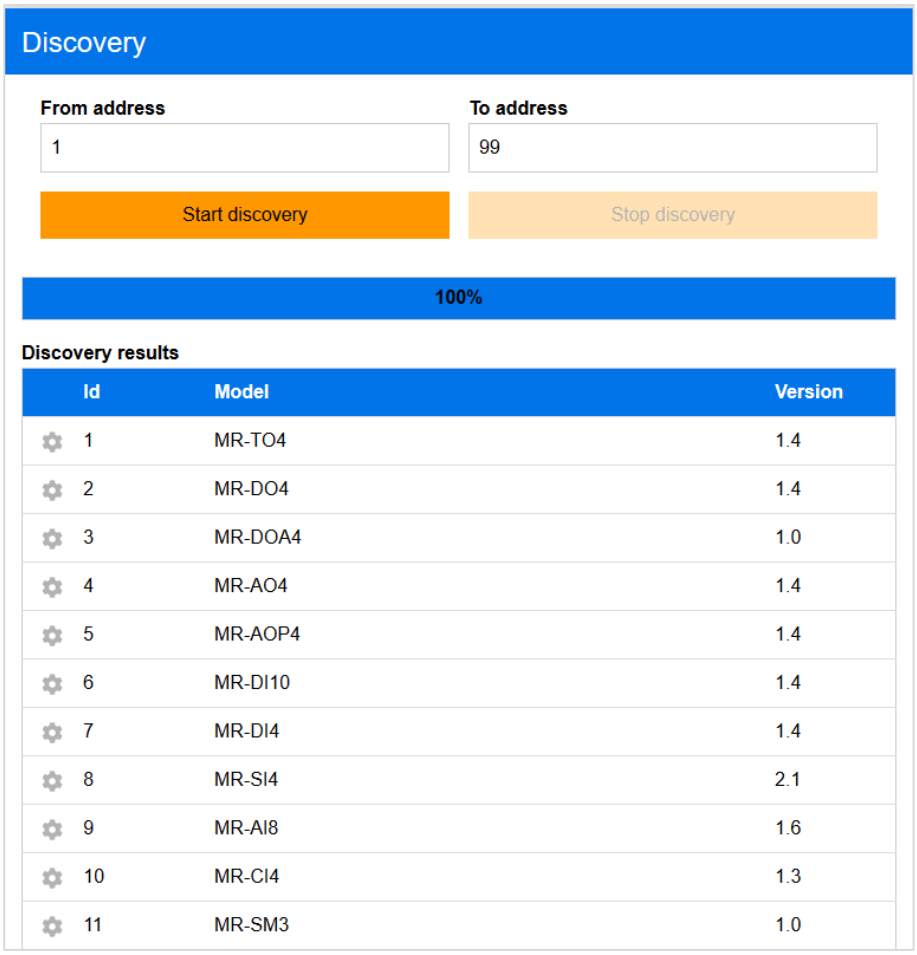


Figure 20 menu item Discovery

1. Specify the start address in the ***From address*** input field and the end address in the ***To address*** field.
2. Start discovery
3. The RS-485 interface will be searched and all Metz Connect Modbus RTU- modules found during this process will be displayed in the ***Discovery results*** list. Other manufacturers' modules will also be shown if they support the MODBUS RTU standard identification function (function 43).
4. Activate the ***Manual request mode***: Configurations and settings of the settings of the METZ CONNECT IOs can be changed and the measured values displayed.

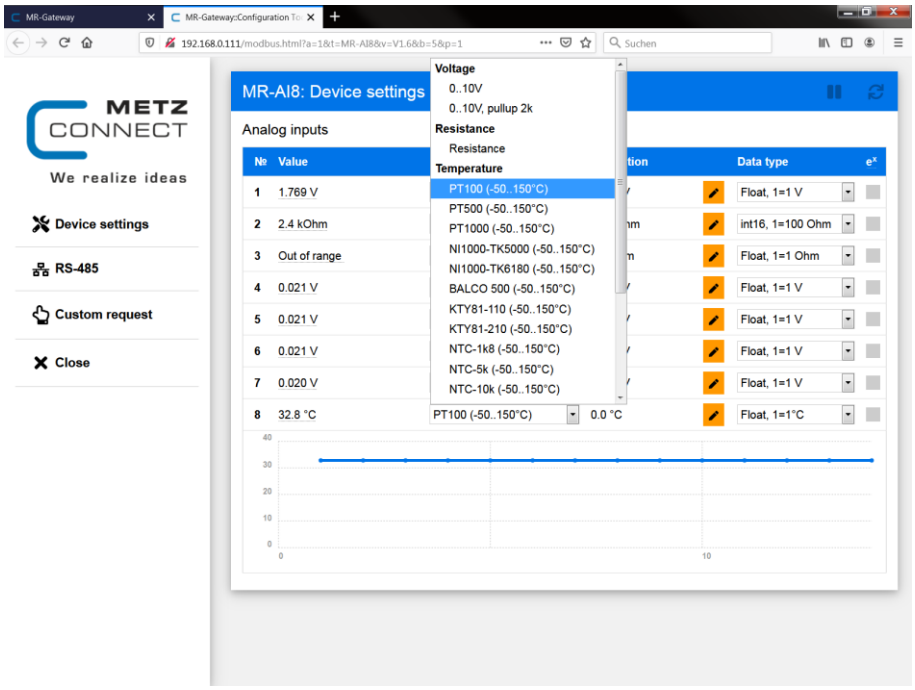


Figure 21 IO settings and values

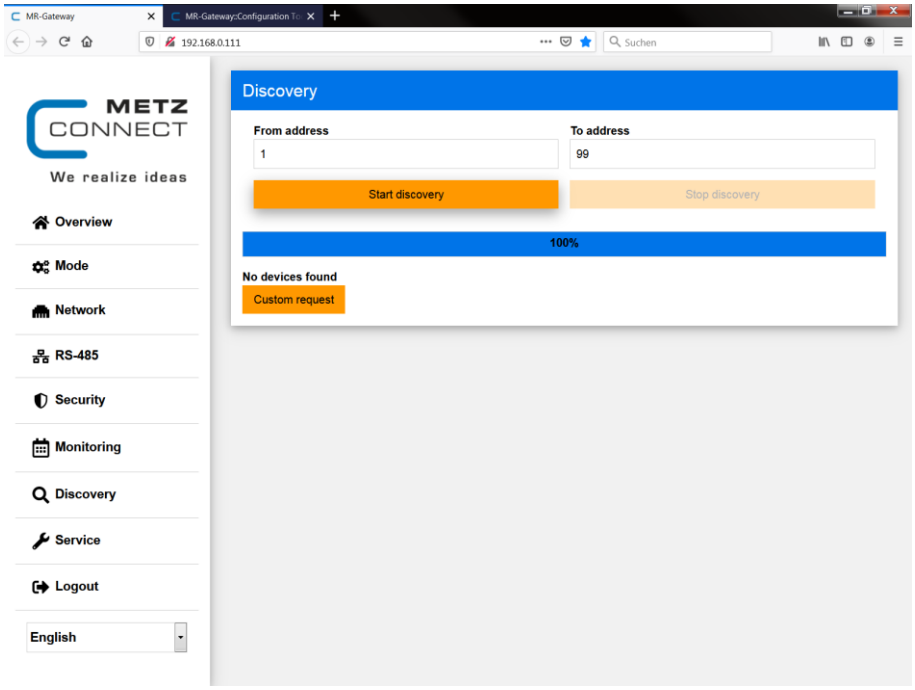


Figure 22 Device discovery

If no devices are found, the customised device control can be started via the button "Custom query".

A new browser window opens. The MODBUS registers of the module can be read and written, and other MODBUS RTU commands can be executed.

This function can be used with Modbus RTU devices that do not support the Modbus function 043/14 "Read Device Identification".

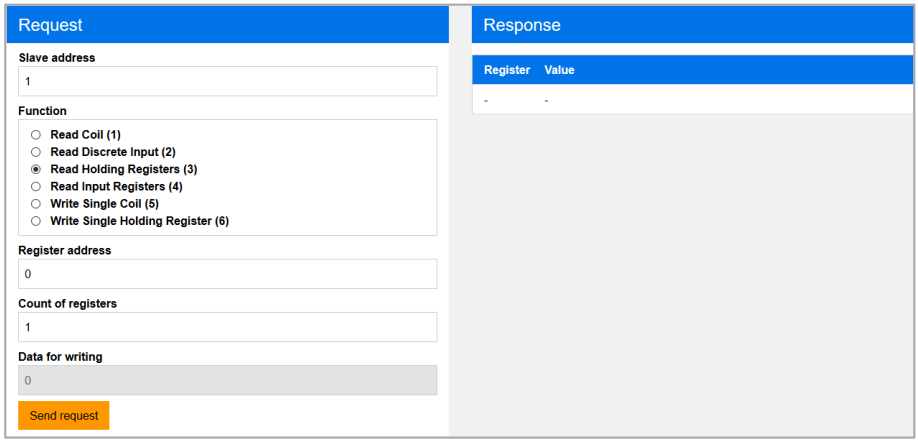


Figure 23 manual request mode

4.3.9 Service

In the menu item ***Service*** the device settings are saved and restored and you can make a firmware update.

4.3.9.1 Settings

The current device settings are saved in a backup file on a PC and can be restored on any MR-GW

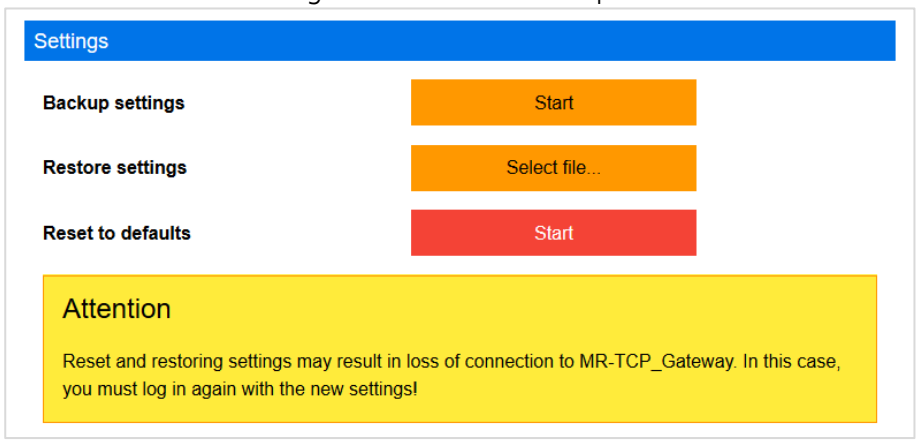


Figure 24 Backup and restore device settings

Backup settings ***Start***	Save backup file ****.cfg*** to local drive
Restore settings ***Select file…***	Select storage location and open backup file ****.cfg***
Reset to defaults ***Start***	Reset MR-GW to default settings → *Chapter 4.1.1 Default settings*

Attention

After restoring new settings, the connection to the MR-GW may be lost.
In this case, reconnect to the device using the new settings!

4.3.9.2 Firmware Update

To update the software of the MR-GW, a firmware update can be carried out. The latest firmware is available on the METZ CONNECT homepage at www.metz-connect.com/modbus-gateway.

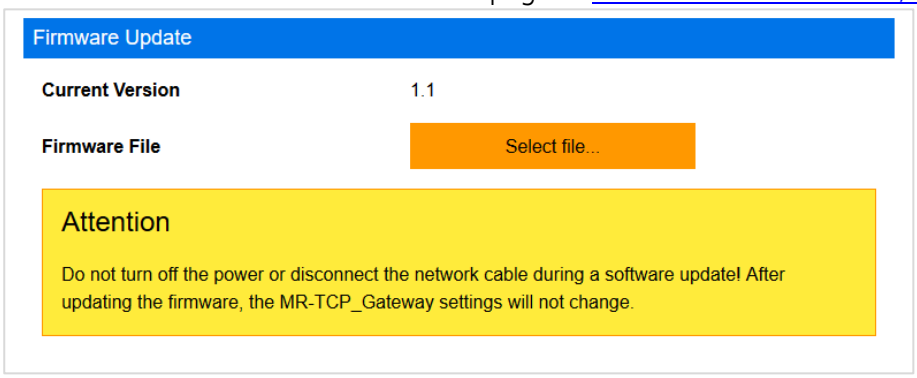


Figure 25 Make a Firmware Update

Current Version	Firmware Version of MR-GW
Firmware File ***Select file…***	Select storage location and open firmware file ****.mrg***

Attention

Do not turn off power or disconnect network cable while flashing device firmware. When the firmware update is complete, all settings are preserved!

4.4 Accessory Configuration

4.4.1 MR-SM4

MR-GW allows easy integration of the MR-SM4 (i and u) energy meter. Current measured values can be viewed live, transformer ratios can be adjusted, and selected meter readings can be reset.

4.4.1.1 Base Configuration

In the "Device Search" menu item (see also Chapter 4.3.8), the MR-SM4u or MR-SM4i device appears after a successful search:

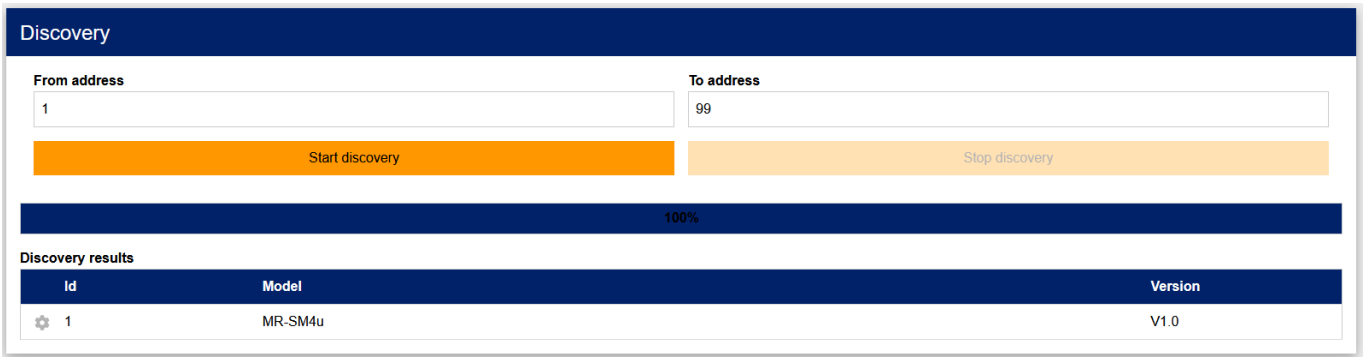


Figure 26 MR-SM4 u / I device search

Using the symbo takes you to the device's parameterization tool:

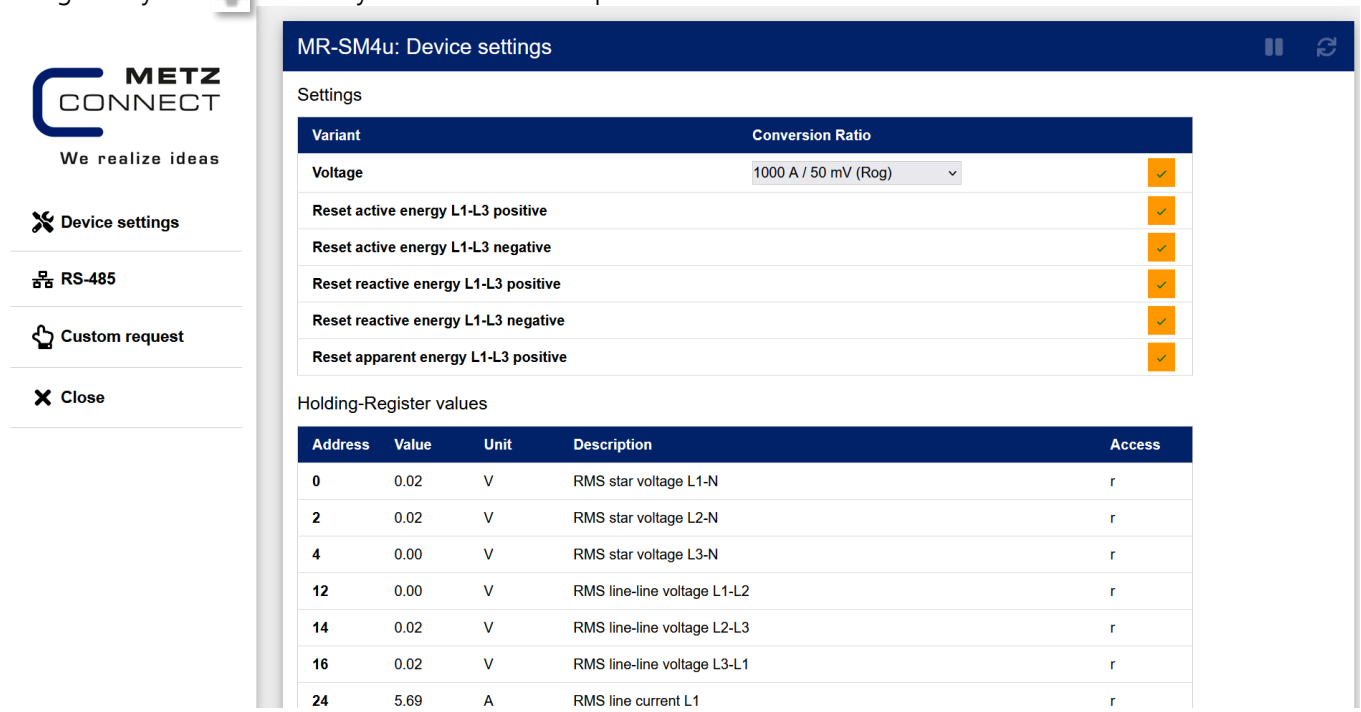


Figure 27 Parameterization MR-SM4 u / i

In the "Transformer Ratio" submenu, supported transformers can be selected directly.

4.4.1.2 Manually Setting Transformer Ratios

If the desired transformer ratios are not available, they can be set manually. For this purpose, a "Custom Request" can be sent:

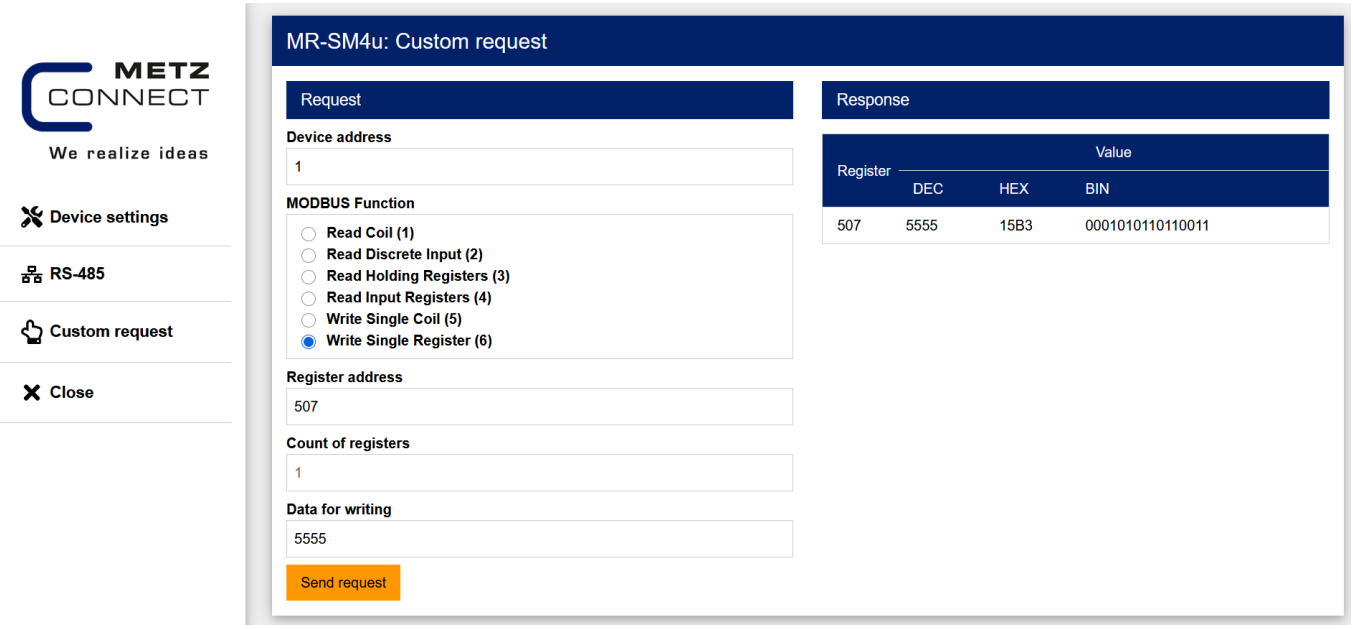


Figure 28 Set custom transformer ratios

The meter value is in register 507, the denominator in register 509.

The set values can be checked in the "Device Settings" view:

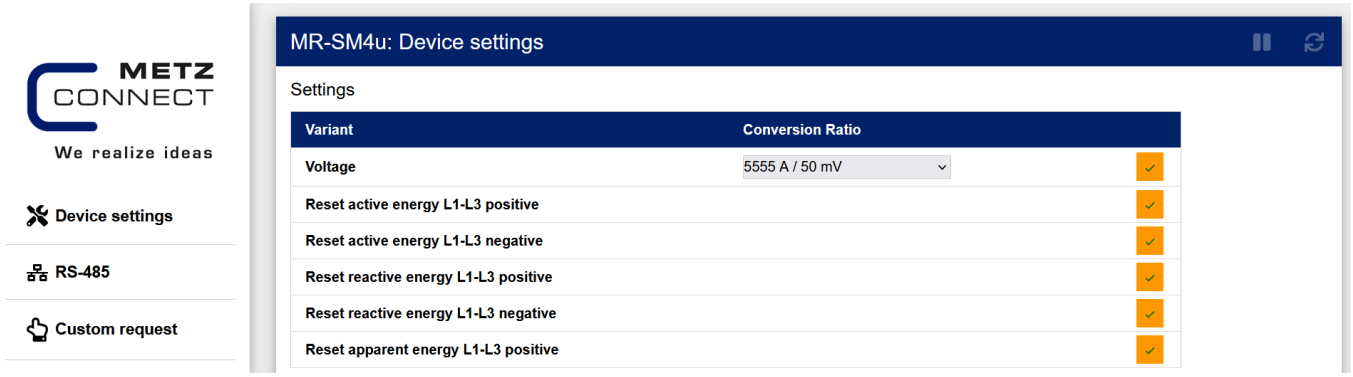


Figure 29: Verify custom transformer ratios

A detailed description of the registers can be found in the MR-SM4 user manual.

4.5 MC-Search Utility

MC-Search Utility is a Windows-based and free tool for the configuration of the MR-GW, which detects all connected MR-Gateway in a TCP/IP network.

For the access to the web interface of MR-GW, the network settings must be configured via the *MC-Search Utility* tool:

1. Download *MC-Search Utility* from www.metz-connect.com/modbus-gateway
2. Installation of the Software
3. Connect +24V power supply to the device
4. Connect the device with an Ethernet patch cable to your PC.
5. Run the installed of *MC-Search Utility*
6. A list of all found devices appears in the selection list

> **Note**
> The MR-GW which is being searched must be in the same network area as the PC.

7. Select the required device

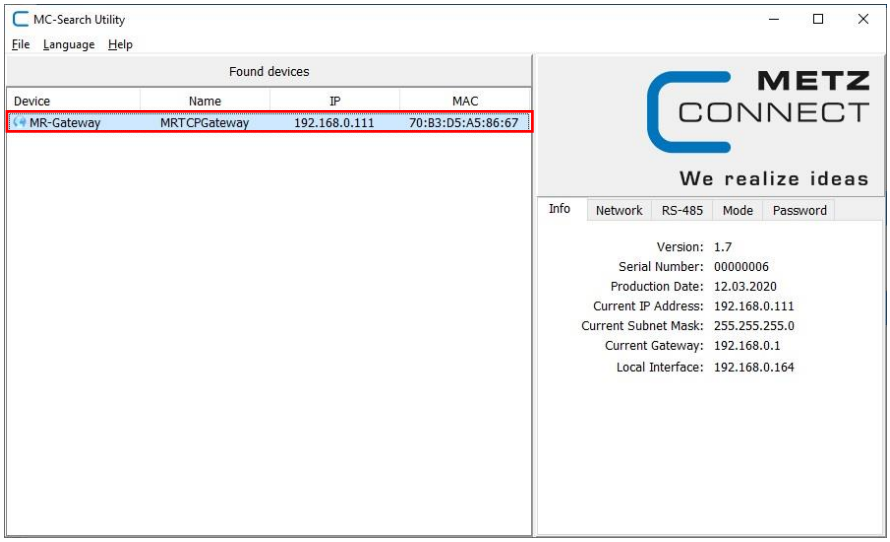


Figure 30 MC-Search Utility

8. You will be prompted to enter a password. The default password is: ***admin.***

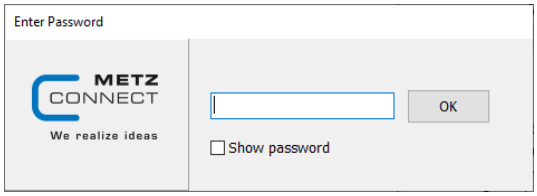


Figure 31 Enter Password

9. Configure network settings

4.5.1 Network settings

The ***Network*** tab is used to configure the network settings:

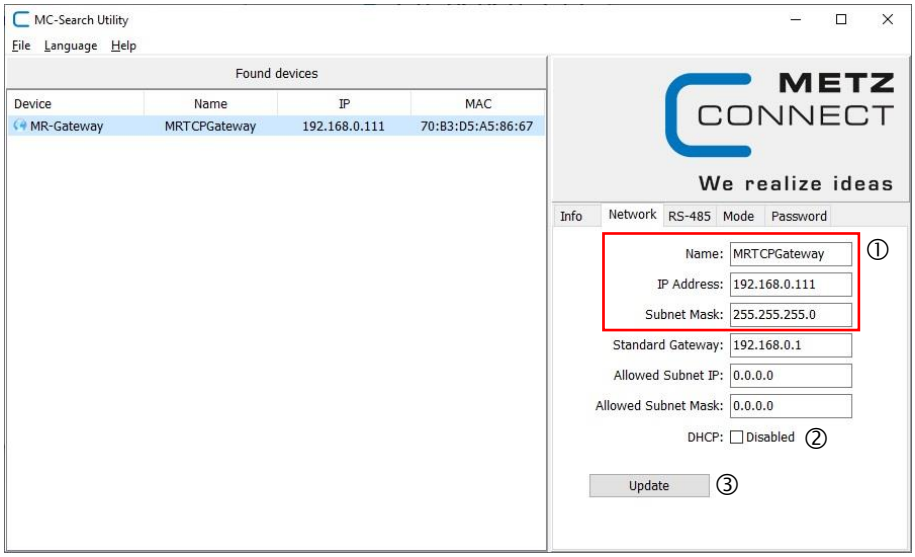


Figure 32 MC-Search Utility Network settings

1 Configuring network settings manually

2 ***DHCP*** - Obtain an IP address automatically via a DHCP server.
The prerequisite for this is that a DHCP server is available in the network!

3 ***Update*** - the new network settings are saved and accepted in the device.

The new IP address is displayed in the device list after a short time. Double-clicking on the ***device found*** in the selection list takes you directly to the web interface of the MR-GW. The MR-GW is then configured via the web interface.

4.5.2 Configuration with MC-Search Utility

The default settings of the MR-GW can be configured via the **MC-Search Utility** software tool if required. Access to the web interface is not necessary.

The following functions can be configured using the respective tab pages:

tab	Parameter
Network	Hostname IP address Subnet Mark Gateway address DHCP enabled / disabled Allowed Client Connections
RS-485	Baud rate Parity Stop Bits: Timeout Terminator enabled / disabled
Mode	Device mode: MODBUS TCP / MODBUS RTU Over TCP
Password	Set Device password Display Password jumper

4.6 Telnet access

The Telnet protocol allows remote access to the MR-GW via the IP network. To connect with telnet to the device, enter following command:

```
telnet xxx.xxx.xxx.xxx
```

// IP address of MR-GW

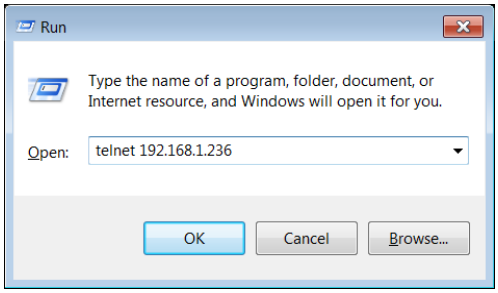


Figure 33 Telnet Access

Note

If the Telnet client is not installed as the default application, it must be enabled in the Windows settings. Any other application that supports the Telnet protocol can also be used.

A detailed documentation of the Telnet commands is described in a separate software manual ***MR-GW Telnet-Beschreibung***, which is available for download on our homepage www.metz-connect.com/modbus-gateway.