# USER MANUAL

## Z-KEY MBUS

## R-KEY MBUS

### MODBUS (TCP-IP / RTU) TO M-BUS (METER BUS) GATEWAY




**SENECA S.r.l.**
**Via Austria 26 – 35127 – Z.I. - PADOVA (PD) - ITALY**
**Tel. +39.049.8705355 – 8705355 Fax +39 049.8706287**
**www.seneca.it**

**ORIGINAL INSTRUCTIONS**

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# Introduction

The content of this documentation refers to products and technologies described in it.
All technical data contained in the document may be changed without notice.
The content of this documentation is subject to periodic review.
To use the product safely and effectively, read the following instructions carefully before use.
The product must be used only for the use for which it was designed and manufactured: any other use is under the full responsibility of the user.
Installation, programming and set-up are allowed only to authorized operators, physically and intellectually suitable.
The set-up must be performed only after a correct installation and the user must follow all the operations described in the installation manual carefully.
Seneca is not responsible for failures, breakages and accidents caused by ignorance or failure to apply the indicated requirements.
Seneca is not responsible for any unauthorized modifications.
Seneca reserves the right to modify the device, for any commercial or construction requirement, without the obligation to promptly update the reference manuals.
No liability for the contents of this document can be accepted.
Use the concepts, examples and other content at your own risk.
There may be errors and inaccuracies in this document that could damage your system, so proceed with caution, the author(s) will not take responsibility for it.
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| CONTACT US | |
|---|---|
| Technical support | support@seneca.it |
| Product information | sales@seneca.it |

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## Document revisions

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| 17/06/2019 | 1.0.0.1 | Changed parameter name in: MBUS CYCLE PAUSE | MM |
| 27/06/2019 | 1.0.0.2 | Various fix | MM |
| 23/07/2019 | 1.0.0.3 | Added info with compatible Browser | MM |
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# 1. INTRODUCTION

**ATTENTION!**
**This user manual extends the information from the installation manual to the configuration of the device. Use the installation manual for more information.**

**ATTENTION!**
**In any case, SENECA s.r.l. or its suppliers will not be responsible for the loss of data/revenue or consequential or incidental damages due to negligence or bad/improper management of the device, even if SENECA is well aware of these possible damages.**
**SENECA, its subsidiaries, affiliates, group companies, suppliers and distributors do not guarantee that the functions fully meet the customer's expectations or that the device, firmware and software should have no errors or operate continuously.**

**ATTENTION!**
**In the Z-KEY-MBUS the PS1 button is currently not used.**

## 1.1. DESCRIPTION

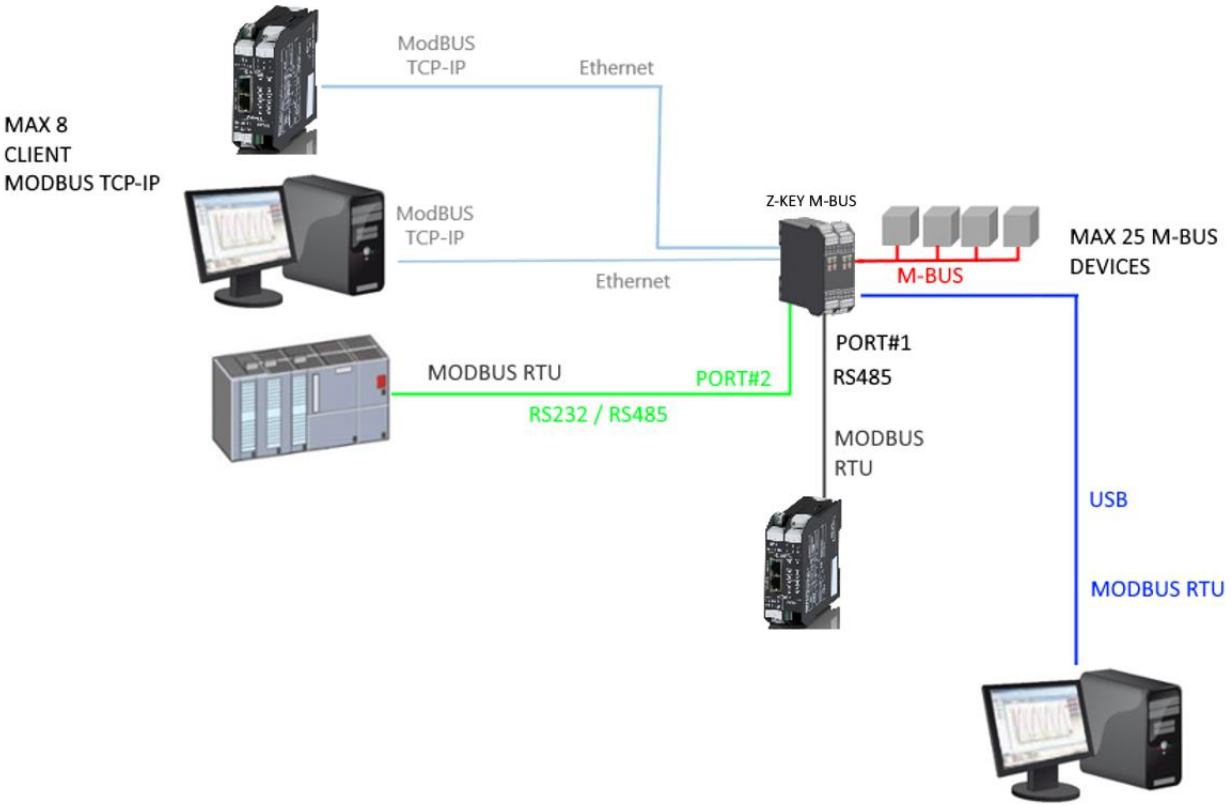
The Z-KEY-MBUS / R-KEY-MBUS product autonomously reads the registers of the devices on the Meter Bus (M-BUS) and makes them available for access through the two serial ports, the USB port or the Ethernet port via the Modbus RTU or Modbus TCP-IP protocols (Holding Register-type registers).

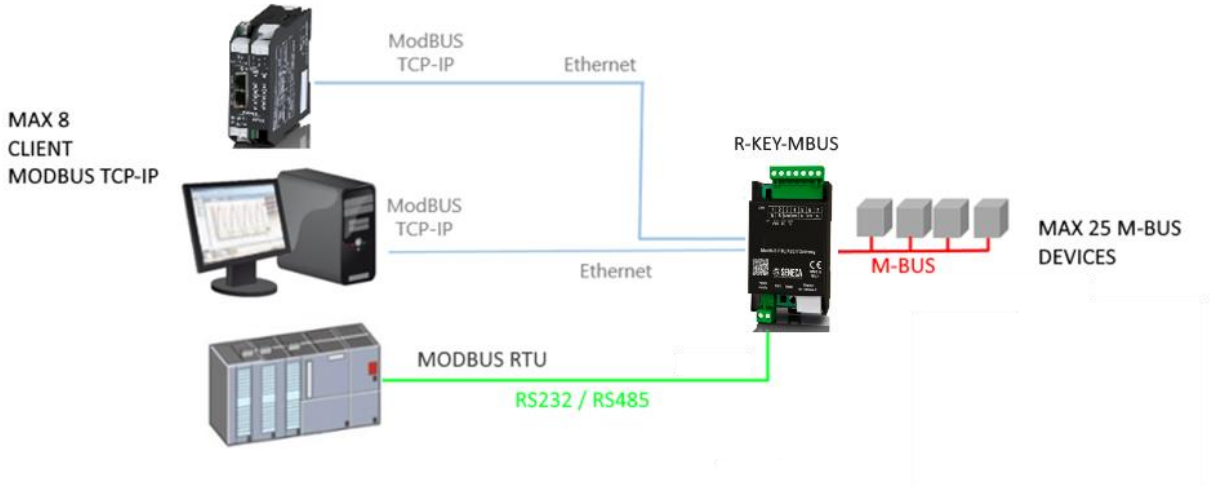
The Seneca device can be connected with up to 25 M-BUS devices and can manage up to 500 M-BUS variables (tag), since an M-BUS variable can occupy up to 2 Modbus registers, the device makes available up to 1000 Modbus registers (to which 32 diagnostic Modbus registers must be added).
To configure the device, the integrated webserver can be used without the need for external software.

Below are all the connection configurations working simultaneously:

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## 1.2. COMMUNICATION PORT SPECIFICATIONS

| ETHERNET COMMUNICATION PORT | |
|---|---|
| **Type** | Ethernet 100 baseT RJ45 front |
| **Configuration** | Through integrated Webserver |
| **Industrial communication protocol** | Modbus TCP-IP server (max 8 simultaneous clients) |
| **Ethernet device search** | Through Seneca Discovery software |
| **Factory address** | Static address 192.168.90.101 |

| RS485/RS232 SERIAL COMMUNICATION PORTS (only Z-KEY-MBUS) | |
|---|---|
| **Number of ports** | 2 |
| **Type** | COM#1 RS485 port for IDC10 connector<br>Terminal COM#2 RS485/RS232 port |
| **Baud rate** | From 1200 to 115200 bit/s |
| **Protocol** | Modbus RTU Slave |
| **RS485/RS232 SERIAL COMMUNICATION PORTS (only R-KEY-MBUS)** | |
| **Number of ports** | 1 |
| **Type** | Terminal RS485/RS232 port |
| **Baud rate** | From 1200 to 115200 bit/s |
| **Protocol** | Modbus RTU Slave |
| **USB COMMUNICATION PORT (only Z-KEY-MBUS)** | |
| **Number of ports** | 1 |
| **Type** | Driver Windows/Linux Virtual Com CDC standard |
| **Protocol** | Modbus RTU Slave |
| **Configuration** | Not modifiable 115200 bit/s, 8 bits, No parity, 1 stop bit, station address 1 |

| METER BUS COMMUNICATION PORT | |
|---|---|
| **Number of ports** | 1 |
| **Number of maximum Slave MBUS** | 25 |
| **Baud rate** | From 300 to 38400 bit/s |

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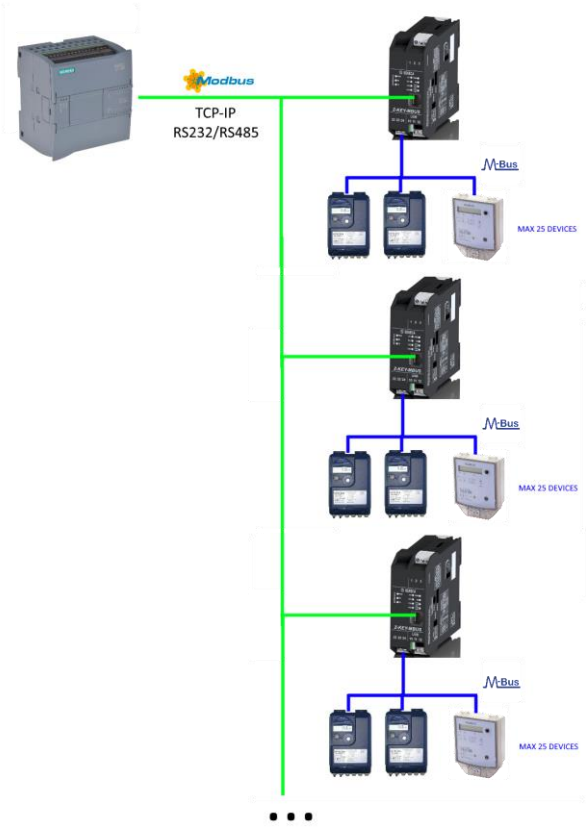

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# 2. APPLICATION FIELDS

## 2.1. CONNECTION WITH A PLC

The most classic sphere of application is the Z/R-KEY-MBUS connection with a PLC, in this case it is sufficient for the PLC to support one of the following protocols:

- MODBUS RTU Master (via RS232 or RS485)
- MODBUS TCP-IP Client (via Ethernet)




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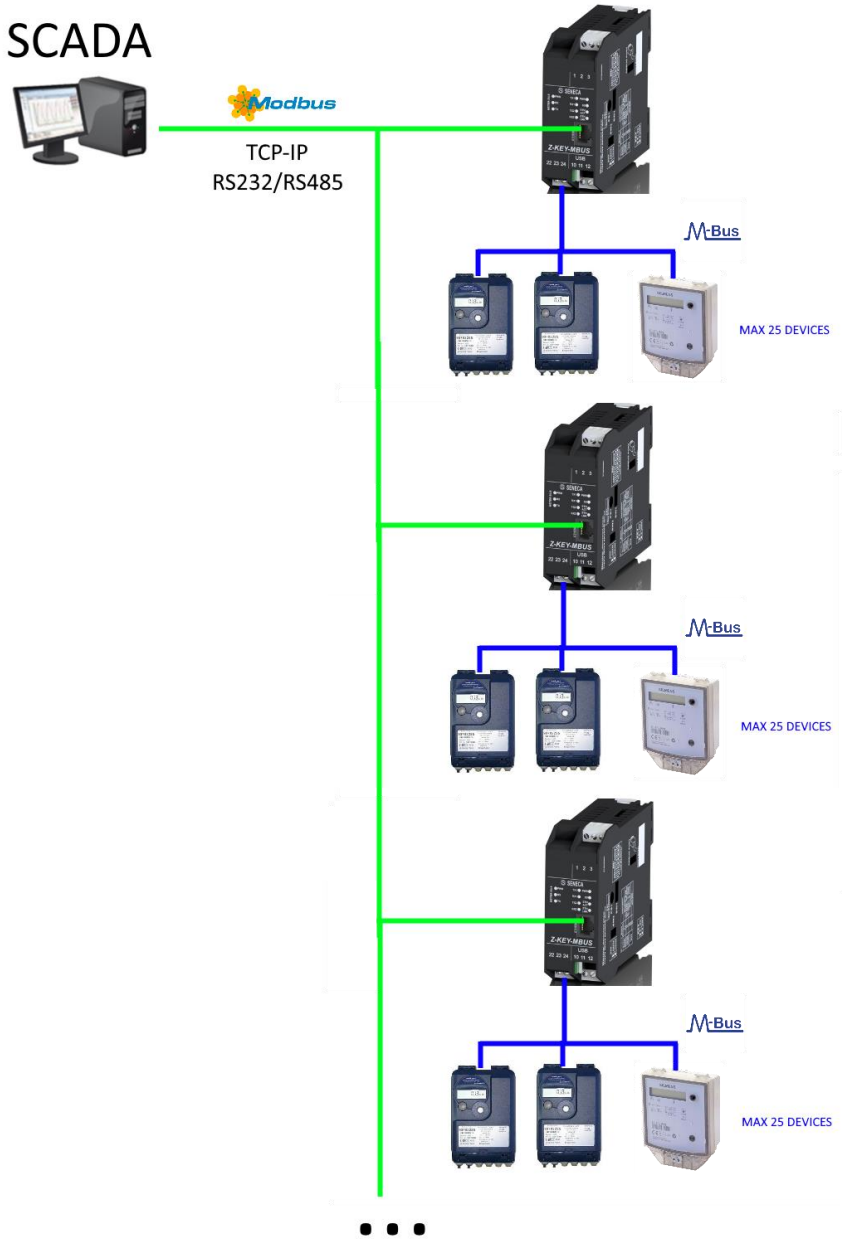

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## 2.2. CONNECTION WITH A SCADA

To connect a SCADA to the Z-KEY-MBUS gateway, the SCADA must support at least one of the following protocols:

- MODBUS RTU Master (via RS232 or RS485)
- MODBUS TCP-IP Client (via ethernet)

Practically all SCADAs support these protocols.
Virtually there are no limits to the number of Z-KEY-MBUS gateways that can be connected to a SCADA:




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# 3. ETHERNET PORT

The factory configuration of the Ethernet port is:

STATIC IP: 192.168.90.101
SUBNET MASK: 255.255.0.0
GATEWAY: 192.168.90.1

Multiple devices must not be inserted on the same network with the same static IP.
If you want to connect multiple devices on the same network, you need to change the IP address configuration using the Webserver or the Seneca Discovery software.

**ATTENTION!**
***DO NOT CONNECT 2 OR MORE FACTORY-CONFIGURED DEVICES ON THE SAME NETWORK, OR THE DEVICE WILL NOT WORK***
***(CONFLICT OF IP ADDRESSES 192.168.90.101)***

If the addressing mode with DHCP is activated and an IP address is not received within 2 minutes, the device will set an error IP address such as:

169.254.x.y

Where x.y are the last two values of the MAC ADDRESS.

# 4. STEP BY STEP GUIDE FOR THE FIRST ACCESS TO THE WEBSERVER

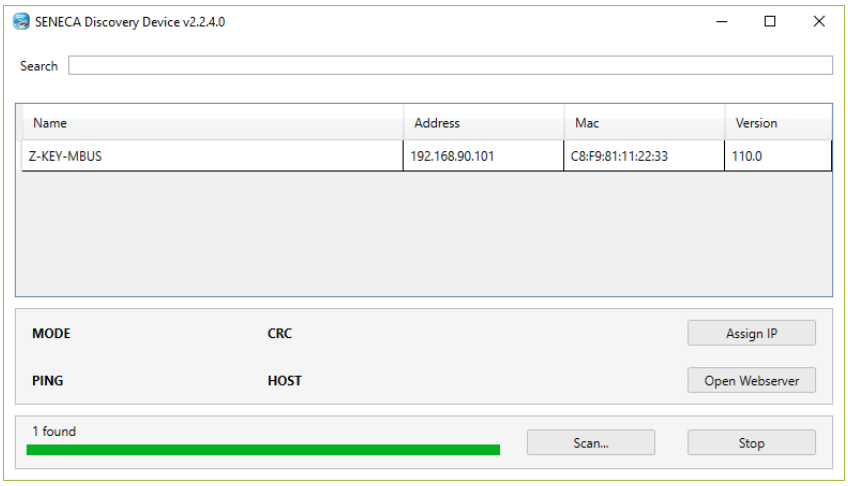
***STEP 1: POWER AND CONNECT THE ETHERNET PORT***

***STEP 2: SENECA DISCOVERY DEVICE SOFTWARE INSTALLATION***
Download (from the Seneca website in the Z-KEY-MBUS section) and install the Seneca Discovery Device software.

***STEP 3: SEARCH FOR THE DEVICE***
Run the software and press the “SCAN” button: the software will search for the Ethernet devices in the network. Locate the Z-KEY-MBUS device (factory default 192.168.90.101):

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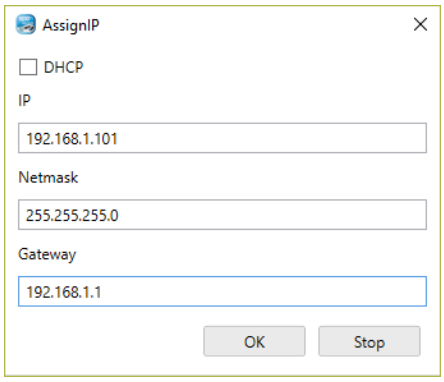

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The software works at Ethernet Layer 2 level and it is therefore not necessary to have an Ethernet configuration compatible with the device you are looking for.

### *STEP 4 CHANGE OF IP ADDRESS*

Select the device and press the “Assign IP” button, set a configuration compatible with your PC, for instance:




Confirm with OK. Now the device can be reached via Ethernet from your PC.

### *STEP 5 ACCESS TO THE CONFIGURATION WEBSERVER*

Wait for the device to restart and press the “Open Webserver” button.
ENTER your access credentials:
user: admin
password: admin

**WARNING!**

**THE WEB BROWSERS THAT ARE TESTED WITH THE DEVICE ARE:**
**MOZILLA FIREFOX AND GOOGLE CHROME.**
**SO, FUNCTIONING WITH OTHER BROWSERS IS NOT ASSURED**

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# 5. WEBSERVER DEVICE CONFIGURATION

**WARNING!**

**THE WEB BROWSERS THAT ARE TESTED WITH THE DEVICE ARE:
MOZILLA FIREFOX AND GOOGLE CHROME.
SO, FUNCTIONING WITH OTHER BROWSERS IS NOT ASSURED**

For further information on the access to the webserver of a new device, please refer to chapter 4.

## 5.1. ACCESS TO THE WEBSERVER

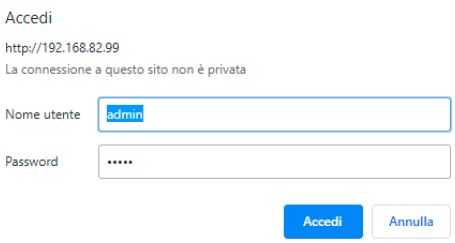
Access to the web server takes place using a web browser and entering the IP address of the device.
To find out the IP address of the device, use the "search" function of the "Seneca Discovery Device" software (see chapter 5).

On first access the user name and password will be requested.
The default values are:

User Name: admin
Password: admin

**ATTENTION!**

**AFTER THE FIRST ACCESS CHANGE USER NAME AND PASSWORD IN ORDER TO PREVENT ACCESS TO THE DEVICE TO UNAUTHORIZED PEOPLE.**




**ATTENTION!**

**IF THE PARAMETERS TO ACCESS THE WEBSERVER HAVE BEEN LOST, TO ACCESS IT, IT IS NECESSARY TO GO THROUGH THE PROCEDURE TO RESET THE FACTORY-SET CONFIGURATION (SEE CHAPTER 8)**

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## 5.2. WEBSERVER SECTIONS

The Webserver is divided into pages (sections) representing the various gateway functions:




***Status***
It is the section that displays the values of the configured tags in real time.

***Setup***
It is the section that allows the device basic configuration.

***M-Bus Devices***
It is the section that allows adding/modifying the M-bus devices connected to the gateway.

***Scan M-Bus***
It is the section that allows scanning and automatically adding the M-bus devices to the gateway.

***Setup Tag***
It is the section that allows adding/modifying the tags (that is the variables) of the M-bus devices connected to the gateway.

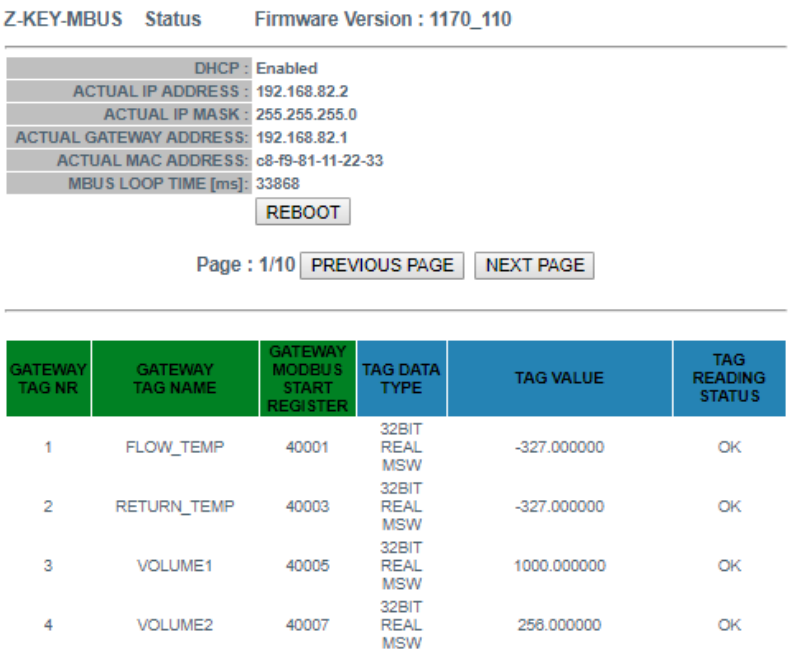
***Update***
It is the section that allows updating the firmware and database for the manual addition of the M-BUS meters.

## 5.3. "STATUS" SECTION

In the status section, it is possible to view the tag values in real time together with their fail/ok status:

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Z-KEY-MBUS Status Firmware Version : 1170_110

| | |
|---|---|
| DHCP : | Enabled |
| ACTUAL IP ADDRESS : | 192.168.82.2 |
| ACTUAL IP MASK : | 255.255.255.0 |
| ACTUAL GATEWAY ADDRESS: | 192.168.82.1 |
| ACTUAL MAC ADDRESS: | c8-f9-81-11-22-33 |
| MBUS LOOP TIME [ms]: | 33868 |

REBOOT

Page : 1/10 PREVIOUS PAGE NEXT PAGE

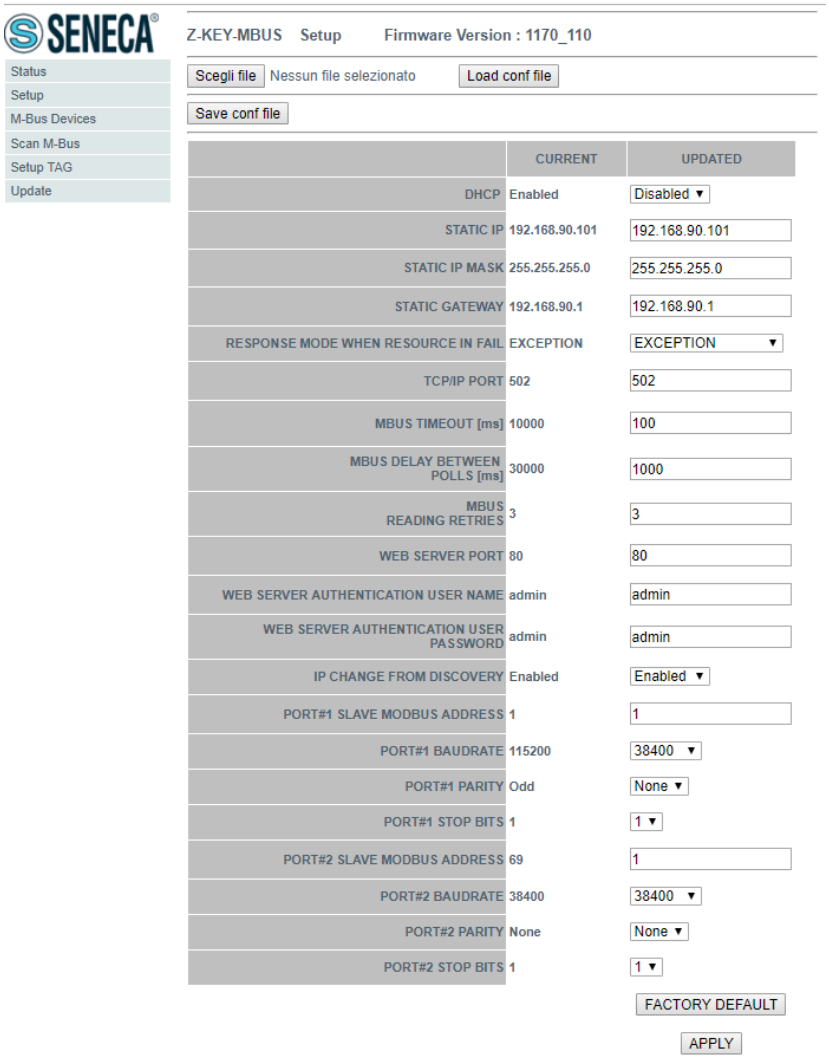
| GATEWAY TAG NR | GATEWAY TAG NAME | GATEWAY MODBUS START REGISTER | TAG DATA TYPE | TAG VALUE | TAG READING STATUS |
|---|---|---|---|---|---|
| 1 | FLOW_TEMP | 40001 | 32BIT REAL MSW | -327.000000 | OK |
| 2 | RETURN_TEMP | 40003 | 32BIT REAL MSW | -327.000000 | OK |
| 3 | VOLUME1 | 40005 | 32BIT REAL MSW | 1000.000000 | OK |
| 4 | VOLUME2 | 40007 | 32BIT REAL MSW | 256.000000 | OK |

50 tags per page maximum can be displayed, the maximum number of pages is 10.
Some basic information among which the device interrogation loop time is displayed in the top part of the page.

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## 5.4. "SETUP" SECTION




***DHCP (ETH) (default: Disabled)***

Sets the DHCP client to get an IP address automatically.

***STATIC IP* (default: 192.168.90.101)**

Sets the device static address. Careful not to enter devices with the same IP address into the same network.

***STATIC IP MASK (default: 255.255.255.0)***

Set the mask for the IP network.

***STATIC GATEWAY (default: 192.168.90.1)***

Set the gateway address.

***RESPONSE MODE WHEN RESOURCE IN FAIL (default: EXCEPTION)***

Selects what answer to give if the M-BUS meter connected does not answer the requests. It is possible to choose between:

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Exception: The response to the modbus request of the tag in fail will be an exception.

Last Value Read: The response to the modbus request of the tag in fail will the last valid value.
Max: The response to the tag modbus request will be the maximum value that can be represented by the type of data.
Min: The response to the tag modbus request will be the minimum value that can be represented by the type of data.
Zero: The response to the tag modbus request will be 0.

***TCP-IP PORT (default: 502)***
Sets the communication port for the Modbus TCP-IP server protocol.

***MBUS TIMEOUT [ms] (default 10000 ms)***
Sets the waiting time for a request to be considered in timeout.

***MBUS CYCLE PAUSE [s] (default 5 s)***
Sets the waiting time after completing a round of requests on all M-BUS devices.

***MBUS READING RETRIES (default 3)***
Sets the number of request retries before considering a tag in fail.

***WEB SERVER AUTHENTICATION USER NAME (default: admin)***
Sets the user name to access the web server.

***WEB SERVER PASSWORD (default: admin)***
Sets the password to access the web server and to read/write the configuration (if enabled).

***WEB SERVER PORT (default: 80)***
Sets the communication port for the web server.

***IP CHANGE FROM DISCOVERY (default: Enabled)***
Selects whether or not the device accepts the IP address change from the Seneca Discovery Device software.

***PORT #1 SLAVE MODBUS ADDRESS (default: 1)***
Selects the Modbus slave station address of the COM #1 port (on IDC10 connector).

***PORT #1 BAUDRATE (default: 38400 baud)***
Selects the communication speed of the COM #1 serial port (on IDC10 connector).

***PORT #1 PARITY (default: None)***
Sets the parity for the COM #1 serial communication port (on IDC10 connector).

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***PORT #1 STOP BIT (default: 1)***
Sets the number of stop bits for the COM #1 serial communication port (on IDC10 connector).

***PORT #2 SLAVE MODBUS ADDRESS (default: 1)***
Selects the Modbus slave station address of the COM #2 port (on terminal).

***PORT #2BAUDRATE (default: 38400 baud)***
Selects the communication speed of the COM #2 serial port (on terminal)

***PORT #2 PARITY (default: None)***
Sets the parity for the COM #2 serial communication port (on terminal).

***PORT #2 STOP BIT (default: 1)***
Sets the number of stop bits for the COM #2 serial communication port (on terminal).

In addition, a configuration can be exported / imported via the webserver.

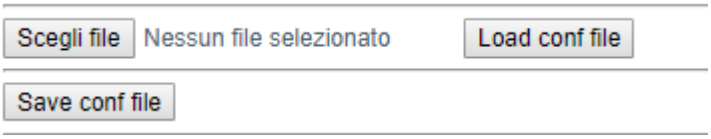
### 5.4.1. SAVING A CONFIGURATION ON A FILE

A configuration that includes:

CONFIGURATION
M-BUS DEVICE
TAG

It can be saved to a file this way:

Go to the Setup section and select the file to save, press the "Save config" button




### 5.4.2. IMPORTING A CONFIGURATION FROM A FILE

A configuration that includes:

CONFIGURATION
M-BUS DEVICE
TAG

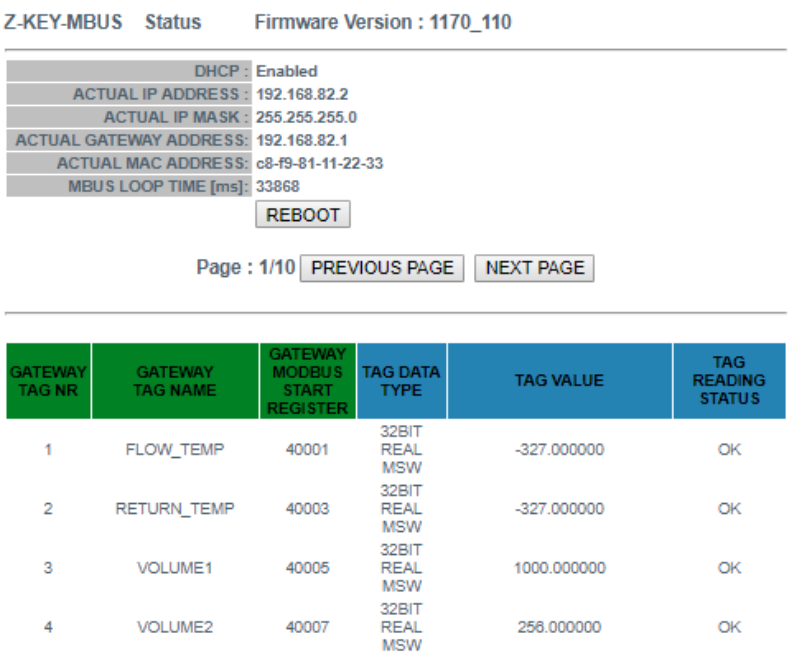
It can be imported from a file in this way:

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Go to the Update section and select the file to load, press the "Load config" button




| GATEWAY TAG NR | GATEWAY TAG NAME | GATEWAY MODBUS START REGISTER | TAG DATA TYPE | TAG VALUE | TAG READING STATUS |
|---|---|---|---|---|---|
| 1 | FLOW_TEMP | 40001 | 32BIT REAL MSW | -327.000000 | OK |
| 2 | RETURN_TEMP | 40003 | 32BIT REAL MSW | -327.000000 | OK |
| 3 | VOLUME1 | 40005 | 32BIT REAL MSW | 1000.000000 | OK |
| 4 | VOLUME2 | 40007 | 32BIT REAL MSW | 256.000000 | OK |

## 5.5. "M-BUS DEVICES" SECTION

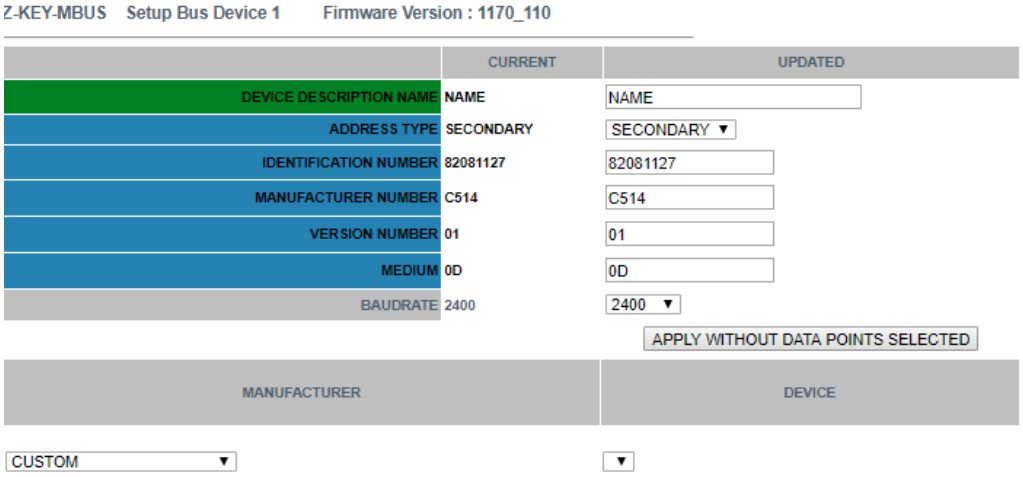
This section shows the M-BUS devices added in the gateway.
It is possible to delete all the tags related to a device by deleting the device from the list of devices.

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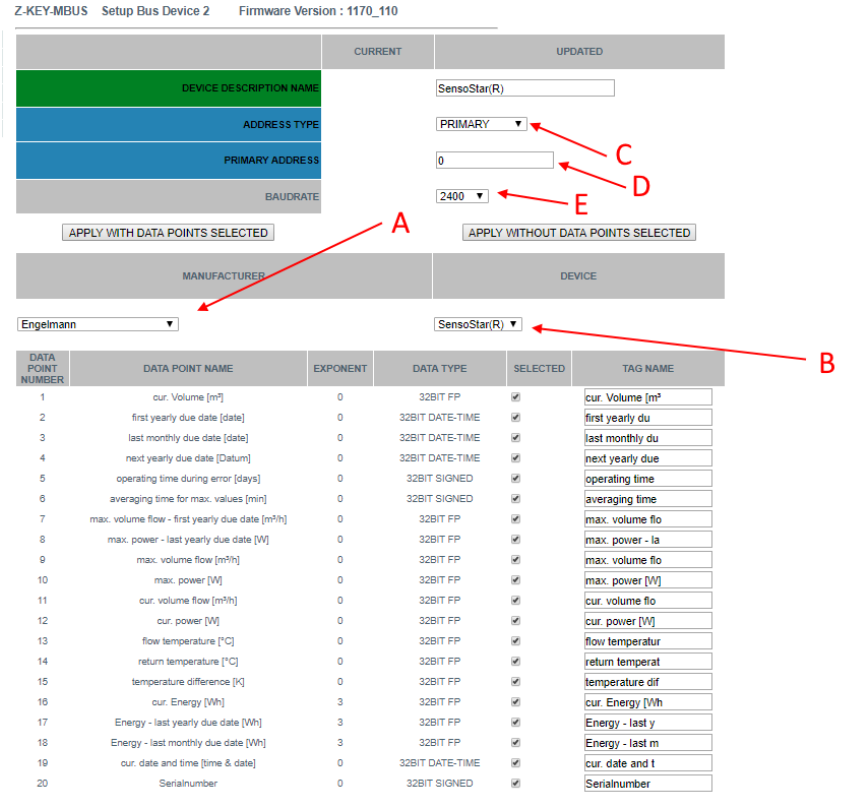
### 5.5.1. REPLACEMENT OF AN M-BUS DEVICE

It is also possible to change the address (for example in case of replacement) using the "MODIFY" button:




### 5.5.2. MANUAL ADDITION OF AN M-BUS DEVICE

By means of the "ADD" button, instead, it is possible to access the addition of an M-BUS device in manual mode. Z-KEY-MBUS has a continuously growing database with the devices of the main brands.




A = Select the brand of the device to insert

B = Select the model of the device to insert

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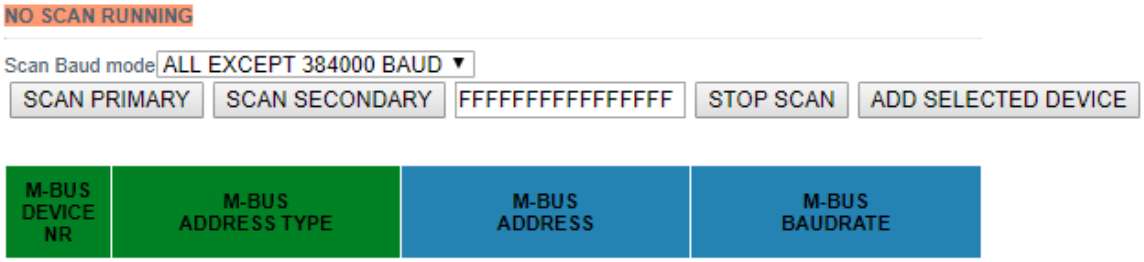
C = Select if the device must be interrogated via primary or secondary address
D = Device address
E = Device Baud rate

If you only want to insert the device without the tags, press the "APPLY WITHOUT DATA POINTS SELECTED" button
If you only want to insert both the device and the selected tags, press the "APPLY WITH DATA POINTS SELECTED" button

## 5.6. "SCAN M-BUS" SECTION

### 5.6.1. SCANNING THE M-BUS

In the SCAN M-BUS section it is possible to automatically scan the bus.




If you do not know the primary address nor the baudrate of the M-BUS devices, we recommend you perform a secondary scan at all baud rates (it may take several minutes).
If a priori it is known that there are no conflicts of primary address it is possible to carry out a scan by primary address.

As devices are found they appear on the screen, for example:

| M-BUS DEVICE NR | M-BUS ADDRESS TYPE | M-BUS ADDRESS | M-BUS BAUDRATE |
|---|---|---|---|
| 1 | SECONDARY | 00008431614C0402 | 2400 |
| 2 | SECONDARY | 00008432614C0402 | 2400 |
| 3 | SECONDARY | 00008434614C0402 | 2400 |
| 4 | SECONDARY | 00008435614C0402 | 2400 |
| 5 | SECONDARY | 00008436614C0402 | 2400 |
| 6 | SECONDARY | 00008441614C0402 | 2400 |
| 7 | SECONDARY | 00008444614C0402 | 2400 |
| 8 | SECONDARY | 00008446614C0402 | 2400 |
| 9 | SECONDARY | 00008449614C0402 | 2400 |
| 10 | SECONDARY | 00008454614C0402 | 2400 |
| 11 | SECONDARY | 00008458614C0402 | 2400 |

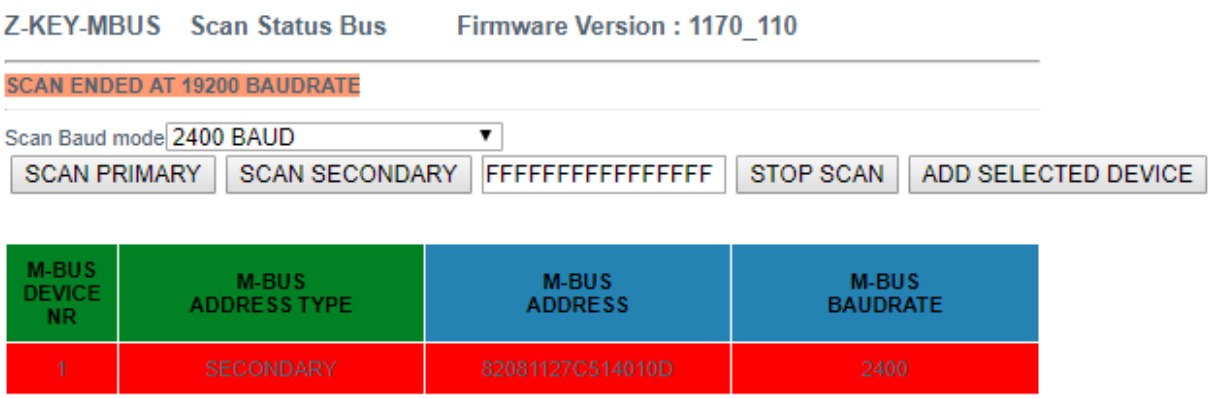
The scan remains saved in the flash memory of the device until a new scan is requested.

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### 5.6.2. ADDITION OF AN M-BUS DEVICE AND YOUR TAGS

Once the bus has been scanned, it can be added to the list of M-BUS devices by selecting it from the list and pressing the "Add Selected Device" button:




At this point you can choose which device tags to add to the Z-KEY-MBUS:

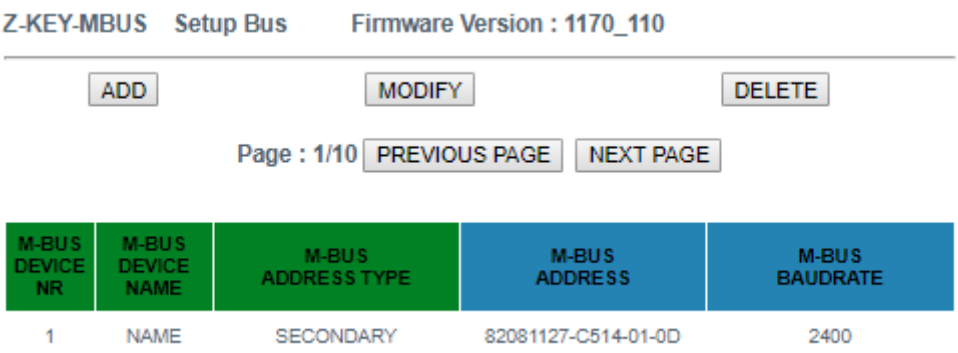





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**ATTENTION!**
**IF NO TAG IS SELECTED, THE SYSTEM WOULD ADD TO THE LIST ONLY THE M-BUS DEVICE.**

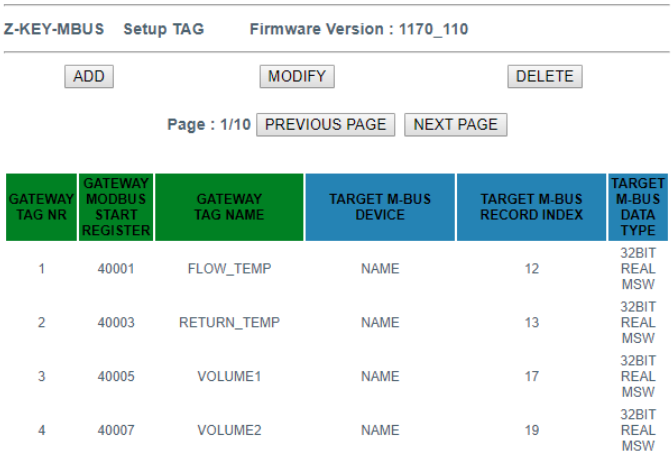
It is also possible to enter a mnemonic name of the tag.
Now press the "ADD DEVICE WITH DATA POINT SELECTED" button, at which point the tags and the device are automatically added to the Z-KEY-MBUS / R-KEY-MBUS list.
To verify the addition of the M-BUS device you are automatically returned to the M-BUS DEVICES section:




Added tags can be seen in the instant view (Status section) and/or in the Tag Setup section.

## 5.7. "TAG SETUP" SECTION

In this section it is possible to modify the tags manually:




With the ADD button it is possible to add a new tag related to an M-BUS device.
***It is possible to delete all the tags related to a device by deleting the device itself from the list in the M-BUS Devices section.***

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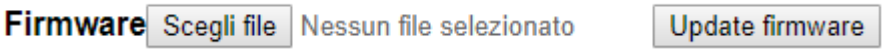

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## 5.8. "UPDATE" SECTION

### 5.8.1. FIRMWARE UPDATE

In order to improve, add, optimize the functions of the product, Seneca releases firmware updates on the device section on the www.seneca.it website

Then select the new firmware file and press the "Update firmware" button




**ATTENTION!**
**DO NOT REMOVE THE POWER SUPPLY DURING THE FIRMWARE UPDATE OPERATION BECAUSE THE DEVICE CAN BE DAMAGED.**

### 5.8.2. DATABASE UPDATE

Seneca releases new updated Database tool files on the device section of the website www.seneca.it.
The Database is used when a new M-BUS device is entered in manual mode.
To update the database, select the file and press the "Update Database" button.
The device is already updated at the factory with the most recent database at the time of production

# 6. SUPPORTED MODBUS COMMUNICATION PROTOCOLS

The Modbus communication protocols supported are:

- Modbus RTU Slave (from #1 and #2 serial ports and from the USB port)
- Modbus TCP-IP Server (from the Ethernet port) 8 simultaneous clients max.

For more information on these protocols, see the website:
http://www.modbus.org/specs.php.

## 6.1. SUPPORTED MODBUS FUNCTION CODES

The following Modbus functions are supported:

- Read Holding Register (function 3)
- Write Single Register (function 6)

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**ATTENTION!**
**All 32-bit values are contained in 2 consecutive registers**

# 7. MODBUS REGISTER MAPPING

Z-KEY-MBUS / R-KEY-MBUS provides two different data areas accessible via Modbus RTU / Modbus TCP-IP protocol: The TAG area and the Diagnostic area.
In the Tag area, the values coming from the M-BUS are contained, in the diagnostic area the fail/ok statuses of the tags are contained:

| | |
|---|---|
| REGISTER 40001 (4x 0001) (offset 0) | TAG AREA START |
| …. | … |
| … | … |
| REGISTER 41001 (4x 1001) (offset 1000) | TAG AREA END |
| REGISTER 41002 (4x 1002) (offset 1001) | Reserved Area start |
| …. | … |
| REGISTER 49000 (4x 9000) (offset 8999) | Reserved Area end |
| REGISTER 49001 (4x 9001) (offset 9000) | DIAGNOSTIC AREA START |
| …. | … |
| REGISTER 49032 (4x 9032) (offset 9031) | DIAGNOSTIC AREA END |

## 7.1. MAPPING OF THE TAG AREA (HOLDING REGISTERS)

Measurement variables from M-BUS are converted into tags accessible from the Modbus bus. The Seneca product will add the new tags in the area as new M-BUS devices or new tags are entered.
Each variable coming from M-BUS can occupy 1 or 2 Modbus registers depending on the type of conversion that is carried out (for further details see the following table):

| ***TYPE OF M-BUS DATA*** | ***CONVERSION MODBUS RTU/TCP-IP (AUTOMATIC)*** | ***NUMBER OF MODBUS REGISTERS OCCUPIED*** |
|---|---|---|
| SIGNED 8-BIT INTEGER | SIGNED 16-BIT INTEGER | 1 |
| SIGNED 16-BIT INTEGER | SIGNED 16-BIT INTEGER | 1 |
| SIGNED 32-BIT INTEGER | SIGNED 32-BIT INTEGER | 2 |
| SIGNED 48-BIT INTEGER | REAL 32 BIT (MSW FIRST) | 2 |
| SIGNED 64-BIT INTEGER | REAL 32 BIT (MSW FIRST) | 2 |
| FLOATING POINT 32 BIT | REAL 32 BIT (MSW FIRST) | 2 |
| DATE / HOUR | 32-BIT DATE/TIME TYPE | 2 |
| BCD (BINARY CODED DECIMAL) FROM 2 TO 12 FIGURES | REAL 32 BIT (MSW FIRST) | 2 |

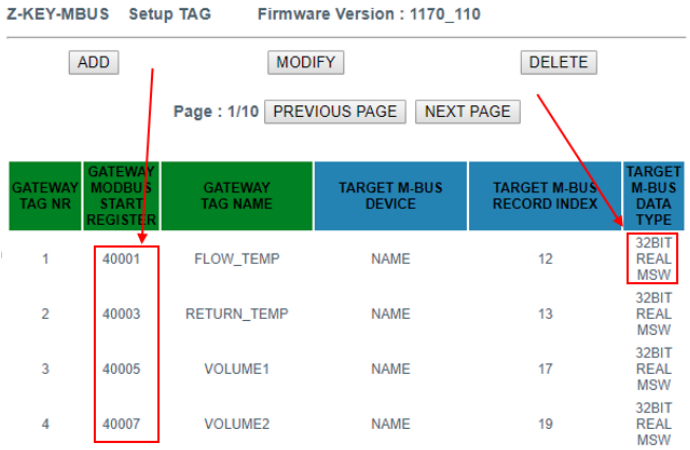
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**ATTENTION!**

**When converting to a 32-bit Floating Point data type, precision losses may occur.**
**This conversion, in fact, can lead to differences between the readings on the M-BUS device and those converted on Modbus.**

The Modbus register for which the tag is found and the type of data is automatically calculated by Z-KEY-MBUS / R-KEY-MBUS, it is however possible to modify it in the "Setup Tag" section:




The types of data converted automatically are:

| ***16-BIT INTEGER DATA TYPE*** | |
|---|---|
| RANGE | -32768 / +32767 |
| NUMBER OF HOLDING REGISTER MODBUS REGISTERS | 1 |

| ***32-BIT INTEGER DATA TYPE*** | |
|---|---|
| RANGE | -2147483648 / +2147483647 |
| NUMBER OF HOLDING REGISTER MODBUS REGISTERS | 2 |

Occupying 2 modbus registers, the data is represented as follows:

| | |
|---|---|
| REGISTER n | Most significant part |
| REGISTER n+1 | Least significant part |

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| *REAL 32-BIT MSW DATA TYPE (FLOATING POINT IEEE-754)* | |
|---|---|
| RANGE | 1.175495e−38 / 3.40282346e+38 |
| NUMBER OF HOLDING REGISTER MODBUS REGISTERS | 2 |

Occupying 2 modbus registers, the data is represented as follows:

| | |
|---|---|
| ADDRESS REGISTER n | Most significant part |
| ADDRESS REGISTER n+1 | Least significant part |

For further information on the type of 32-bit Real data, refer to the following website:
https://en.wikipedia.org/wiki/IEEE_754

For online conversion tools, refer to the website:
https://www.h-schmidt.net/FloatConverter/IEEE754.html

| *DATE/TIME DATA TYPE* | |
|---|---|
| RANGE | 01 January 2000 / 31 December 2127 |
| NUMBER OF HOLDING REGISTER MODBUS REGISTERS | 2 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADDRESS REGISTER n | BIT 16 | BIT 15 | BIT 14 | BIT 13 | BIT 12 | BIT 11 | BIT 10 | BIT 9 | BIT 8 | BIT 7 | BIT 6 | BIT 5 | BIT 4 | BIT 3 | BIT 2 | BIT 1 |
| | HOURS | | | | | | | | MINUTES: | | | | | | | |
| ADDRESS REGISTER n+1 | BIT 16 | BIT 15 | BIT 14 | BIT 13 | BIT 12 | BIT 11 | BIT 10 | BIT 9 | BIT 8 | BIT 7 | BIT 6 | BIT 5 | BIT 4 | BIT 3 | BIT 2 | BIT 1 |
| | YEAR | | | | | | | MONTH | | | | DAY | | | | |

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It is possible to change the type of data selected automatically by Z-KEY-MBUS / R-KEY-MBUS in the "TAG Setup" section.
In particular it is possible, for instance, to change the data type from Real 32 BIT MSW to LSW (Reverse Real):

| *REAL 32-BIT LSW DATA TYPE (FLOATING POINT IEEE-754)* | |
|---|---|
| RANGE | 1.175495e−38 / 3.40282346e+38 |
| NUMBER OF HOLDING REGISTER MODBUS REGISTERS | 2 |

Occupying 2 modbus registers, the data is represented as follows:

| | |
|---|---|
| ADDRESS REGISTER n | Least significant part |
| ADDRESS REGISTER n+1 | Most significant part |

## 7.2. MAPPING OF THE DIAGNOSTIC AREA (HOLDING REGISTERS)

A diagnostic bit is available in the holding registers for each tag.
For example, in the 16-bits register 49001 (offset 9000) the statuses of the first 16 tags are contained in this way:

| *BIT 16* | *BIT 15* | *BIT 14* | *BIT 13* | *BIT 12* | *BIT 11* | *BIT 10* | *BIT 9* | *BIT 8* | *BIT 7* | *BIT 6* | *BIT 5* | *BIT 4* | *BIT 3* | *BIT 2* | *BIT 1* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAG 16 | TAG 15 | TAG 14 | TAG 13 | TAG 12 | TAG 11 | TAG 10 | TAG 9 | TAG 8 | TAG 7 | TAG 6 | TAG 5 | TAG 4 | TAG 3 | TAG 2 | TAG 1 |

Where the meaning of the bit is the following:
Bit = 0 M-BUS TAG READ TIMEOUT
Bit = 1 M-BUS TAG READ TIMEOUT

| *ADDRESS* | *ADDRESS (4x)* | *OFFSET* | *REGISTER* | *W/R* | *REGISTER TYPE* |
|---|---|---|---|---|---|
| 49001 | 4x9001 | 9000 | DIAGNOSTIC TAG 1..16 | RO | UNSIGNED 16 BIT |
| 49002 | 4x9002 | 9001 | DIAGNOSTIC TAG 17..32 | RO | UNSIGNED 16 BIT |
| ... | ... | ... | ... | ... | ... |
| 49031 | 4x9031 | 9031 | DIAGNOSTIC TAG 481..496 | RO | UNSIGNED 16 BIT |
| 49032 | 4x9032 | 9032 | DIAGNOSTIC TAG 497..500 | RO | UNSIGNED 16 BIT |

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# 8. RESETTING THE DEVICE TO ITS FACTORY CONFIGURATION (Z-KEY-MBUS)

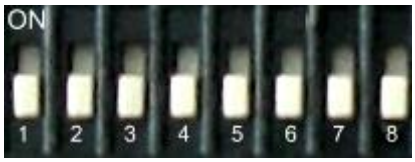
If the credentials to access the webserver are lost, it is always possible to return the device to its factory conditions:
Static IP 192.168.90.101
user: admin password: admin

this way:

1) Switch Z- KEY- MBUS off
2) Turn all dip switches ON:




3) Switch Z- KEY- MBUS on
4) Wait at least 10 seconds
5) Switch Z- KEY- MBUS off
6) Turn all dip switches OFF:




When Z-KEY-MBUS / R-KEY-MBUS is switched on again, it will start with its factory configuration.

N.B. The configuration of the tags and M-BUS meters entered must be cancelled manually.

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## 9. RESETTING THE DEVICE TO FACTORY CONFIGURATION (R-KEY-MBUS)

If the credentials for accessing the webserver are lost, it is always possible to reset the device to factory conditions:
Static IP 192.168.90.101
user: admin  password: admin

like this:

Switch off R-KEY-MBUS

1. Portare ad “ON” tutti i dip switch di SW1:




a.

2. Accendere R-KEY-MBUS
3. Wait at least 10 seconds
4. Switch off R-KEY-MBUS
5. Set all dip switches of SW1 to "OFF":




The next time the R-KEY-MBUS is switched on, it will start with the factory configuration.

## 10. COPY OF MBUS COMMUNICATION VIA USB (ONLY Z-KEY-MBUS)

From firmware revision 127 it is possible to copy the meterbus communication via the USB port of the Z-KEY-MBUS.
To activate the function of copying the Meterbus communication to USB follow the following procedure:

1) Switch off the device
2) Set dip 3 to ON and all other dips to OFF.
3) Switch the device on

Use hyperterminal-type software to acquire communication on a PC.
Seneca recommends downloading Putty (you can download it at the following link):
https://www.putty.org/

For normal use, turn dip 3 back to OFF and restart the device.

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