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EQUOBOX RTU1T
Datalogger for meters with M-Bus/W. M-Bus protocol

User Guide

Rev 1.8

This manual refers to the versions starting from:
Firmware 5.07.49 / Web 2.15.15 / Hardware 2.0

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1. INTRODUCTION

1.1 Purpose of the document

This document is a guide to the installation, configuration, and commissioning of the *EQUOBOX RTU, code SIN.EQRTU1T, hereinafter referred to as RTU1T (or RTU)*. This document is intended for technical personnel with an average knowledge of electrical engineering, IT, basic TCP/IP principles, and M-Bus systems.

The RTU has an embedded web server and is a datalogging and consumption monitoring system for heating and cooling systems equipped with meters that communicate using the M-Bus and W. M-Bus 868MHz protocol.

Please read carefully the following notes
• Place the system Firewall under covered and isolate it from the corporate network • For remote access to the machine, we recommend the use of secure technologies such as Virtual Private Networks (VPNs), recognizing VPN in the most secure way to connect to the device

The first section of this guide is dedicated to the description of the technical specifications of the RTU1T and its commissioning. We will describe how to commission the plant, scanning and adding meters. Then, we will describe the advanced configuration via web interface and, finally, how to generate consumption reports and plans.

1.2 Content of the packaging

The RTU1T packaging contains:

- RTU1T datalogger
- Remotable antenna (1.5 mt of cable) metal support for installation
- Installation leaflet

2. RTU1T TECHNICAL DATA

RTU1T is a hardware device with no moving parts, made in compliance with industrial standards, which can be DIN-rail mounted inside an electrical panel. The main technical specifications of the device are shown below:

- Operating temperature range: [-20.. / +55 °C]
- Storage temperature range: [-25 / +65 °C]
- Protection Rating: IP20 (EN60529)
- Fastening: 35mm DIN bar (EN60715)
- Dimensions: 4 DIN modules (90x72x64.5)
- Power Supply: 24Vdc +/- 10%, 24Vac (min 20Vac, max 40Vac)
- Power consumption: Max 7,5W

3. RTU1T APPEARANCE

3.1 Description of the RTU1T

The main functional features described in this document are summarised below:

- Web server-based datalogger
- Manages up to 500 wireless/wired M-Bus meters, max of 250 wired
- Data logfile of daily synthetic data for up to 10 years
- Daily reading logfile for 1 year
- Data logging interval between 15 minutes and 1 month
- Remote system management, meters reading, report sending, alarm management, event management
- 3 digital inputs for logic control and remote control
- 2 relay outputs for logic control and remote control
- OLED display for local consultation and configuration
- 6-key membrane keyboard

3.2 RTU1T device

An image of the RTU1T with its main functional parts is shown below:

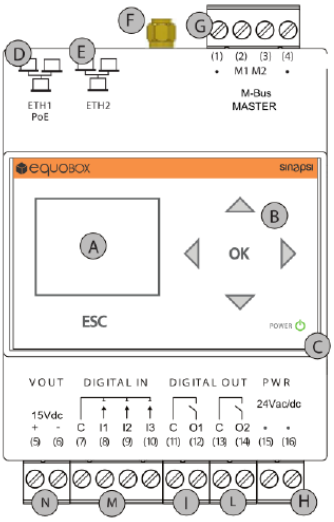


Figure 1 - View of the RTU1T

A. Display
B. 5-key navigation keyboard (UP-DOWN-LEFT-RIGHT-OK)
C. LED power supply
D. Ethernet Port 1 (PoE)
E. Ethernet Port 2
F. SMA antenna connector
G. M-Bus connector (max 20 meters)
H. Power supply connector
I. Relay 1 connector
L. Relay 2 connector
M. Digital input connector
N. Auxiliary output voltage connector

4. GENERAL INFORMATION ON THE SYSTEM

4.1 Overview of the system

RTU1T is a consumption monitoring and metering system based on a standard wired M-Bus communication protocol (EN13757-2 [Physical Layer], EN13757-3 [Application Layer] and W. M-Bus 868MHz ((EN13757-4[Physical Layer], EN13757-3 [Application Layer]). All the meters that use this communication protocol can be connected and will be managed by the system with all the functions it features.

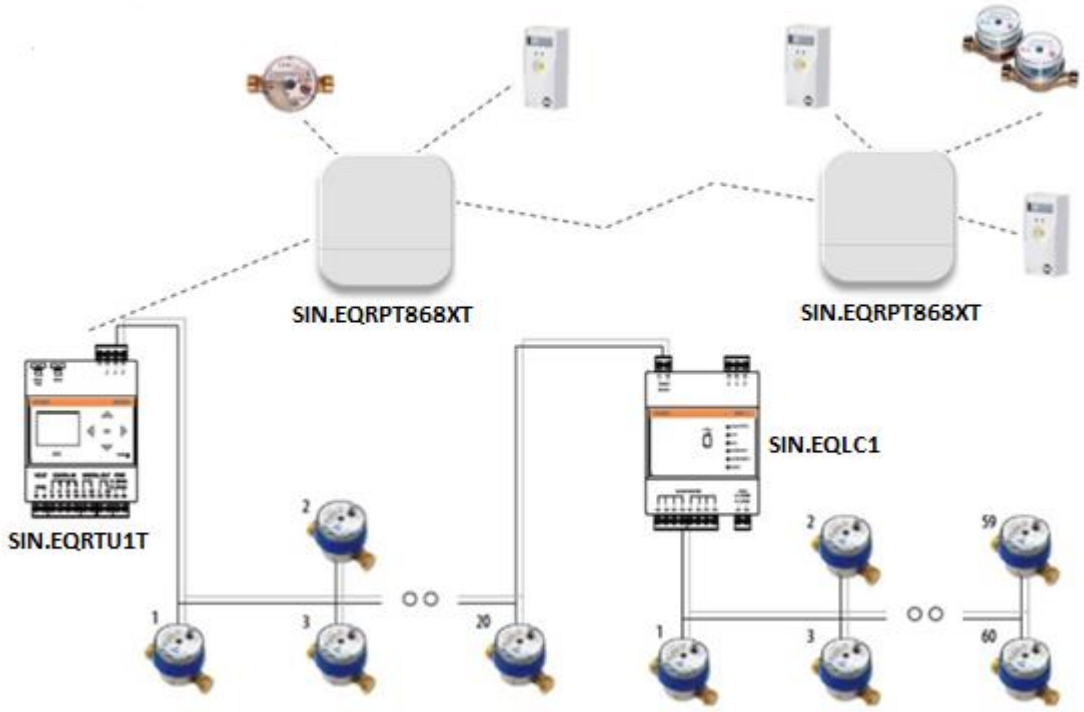


Figure 2 - System architecture

RTU1T can manage up to a maximum of 500 meters, maximum 250 wired. RTU1T has an integrated communication port that supports up to 20 M-Bus meters. It is possible to extend the number of wired connected meters (up to 250) through the use of level converter (reference code in SINAPSI catalogue: SIN.EQLC1 - hereinafter called LC) with integrated repeater functionality (see Fig.2) .A single LC is able to manage up to a maximum of 60 M-Bus nodes. If in the system there were more than 20 M-Bus nodes to manage with the same RTU one or more LC in repeater mode can be used. For W. M-Bus devices, it is necessary to use one or more gateways SIN.EQRPT868XT, they are able to receive signals received by the W. M-Bus meters that communicate with this protocol and send these signals to the RTU , which performs data logging. The advantage of this architecture is the ability to extend the network of repeater up to very large areas. In effect, the cover is creating in a completely automatic and transparent to the operator, a radio network that connects all gateways with the RTU, in the case where a radio is out of range (too far or with obstacles) to the RTU, this will seek to achieve the RTU through another gateway, as the mesh networks. This network, dynamic, is reconfigured automatically whenever is necessary. For example, in the case where a new obstacle is interposed between the gateways or between gateways and RTU, the isolated gateway automatically will seek a new partner to rely on to reach the RTU.

4.2 M-Bus system

M-Bus (Meter-Bus) is a European standard (EN 13757-2 [phisical and link layer], EN 13757-3 [application layer]) for remote reading of water, heat, gas or electricity meters. M-Bus is also usable for other types of consumption meters. The M-Bus interface is designed to communicate on two wires,

for which ensures enormous convenience. A variant radio M-Bus (W. M-Bus) is also indicated in EN 13757-4. The M-Bus protocol has been developed to have available a system for remote reading and management of meters networks of utilities, for example to measure the consumption of gas or water in the house. This bus meets the special requirements of systems remotely and/or battery powered, including meters usually prepared from utilities at consumers.

The advantages of the M-Bus system are

- High level of data transmission security
- Low wiring costs
- Long distances without requiring repeaters
- Large number of central units
- Detection of both battery-powered and mains-powered devices
- Automatic device recognition
- Vast array of systems and components available
- Different types of bus topology: linear, star, and tree

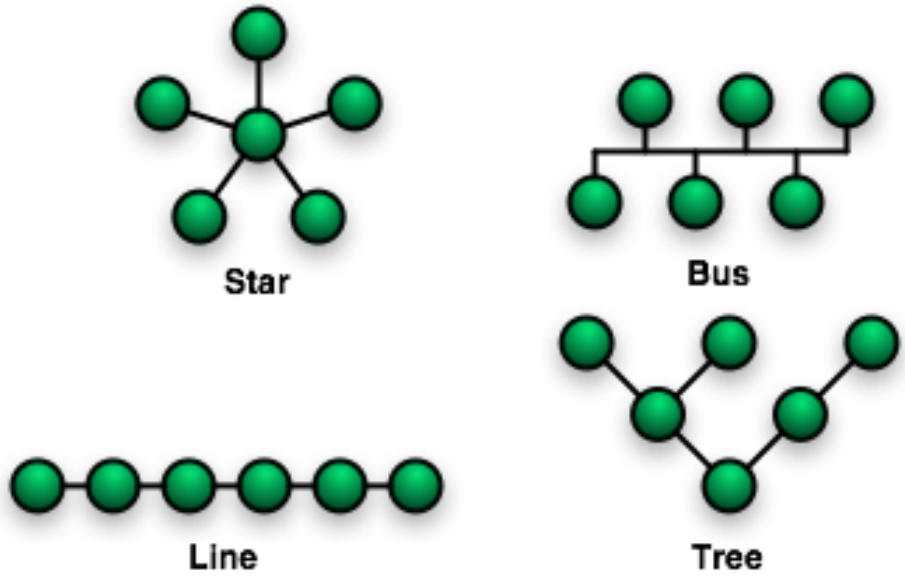


Figure 3 - Bus topologies

4.3 Addressing

The M-Bus protocol provides two types of addressing modes to detect and communicate with the devices connected to the bus

- *Primary addressing*: up to 250 primary addresses can be allocated within an M-bus system (hexadecimal format). The primary address is normally allocated while setting up the units.
- *Secondary address*: the secondary address consists of 8 bytes and allows the allocation of any number between 00000000 and 99999999. By default, the secondary address of the devices is the same as the manufacturer serial number. Readouts by secondary address while scanning the bus allow the acquisition of the meters that support the “Wildcard” logic, the same that enables the selection of a group of devices based on the section of their serial number.

4.4 Sizing the M-Bus System

Follow the instructions provided in the table to size the M-Bus system

Type of plant	Maximum distance	Overall cable length	Cross-section mm^2	Number of devices (slaves)	Max. transmission rate
Small residential buildings	350 m	1000 m	0.8 mm	250	9600 Baud
Large residential buildings	350 m	4000 m	0.8 mm	250	2400 Baud
				64	9600
Small complex	1000 m	4000 m	0.8 mm	64	2400 Baud
Large complex	3000 m	5000 m	1.5 mm^2	64	2400 Baud
Medium neighbourhood	5000 m	7000 m	1.5 mm^2	16	300 Baud
Point-to-point connection	10000 m	10000 m	1.5 mm^2	1	300 Baud

4.5 BUS signal specifications for SIN.EQRTU1T

M-Bus system	Designation	Condition	Minimum	Typical	Maximum	Measurement unit
Number of devices per segment	n	SIN.EQRTU1T	0		20	
Transmission rate	T	$C_{segment} \leq 382nF$	300	2400	9600	Bd
Bus voltage	U	IM=0...400mA	12		42	V
Bus Voltage (Master)	U_M	IM=0...400mA	24	40	42	V
Bus Voltage (slave)	$U_{S,R}$	$I_S \leq 1.5mA$	±21		±42	V
Bus current	$I_{M,V}$	SIN.EQRTU1T	0		90	mA
DC Bus current	$I_{M,K}$	SIN.EQRTU1T	130	500	160	mA
Current (slave)	$I_{S,R}$	US=21...42V	0.75	1.2	1.2	mA
Transmitted current (slave)	$I_{S,S}$	US=21...42B	11		20	mA

5. INSTALLATION

Carefully follow these instructions to install the device, in order to be able to commission the system in the best possible way. The device must be installed by qualified personnel, specialised in the installation of electrical equipment.

5.1 Mechanical assembly

This device has been designed to be DIN-rail mounted; therefore, no other mounting options are allowed. The DIN-rail mount consists of the following steps:

- Fasten the DIN rail to the bottom of the electrical panel (if it is not already provided with it)
- Remove all the terminals of the device before hooking it on the DIN rail
- Connect the antenna only after fastening the device to the DIN rail
- Place the recess at the bottom of the device on the upper part of the DIN rail, keeping it at a 45° angle with the rail. Turn the device until it engages with the rail.

Carefully read the following notes
To prevent mechanical stress on the terminals, which could damage the device, it is important to wire the terminals disconnected from the device. Follow these instructions: • Remove the terminals from the device pulling outwards • Tighten the cables to the removed terminal complying with the right polarity • Reinsert the terminal with the cables placing it in its correct position

5.2 Electrical installation

Verify the following before commissioning the device:

- Ensure that the electrical panel where the device is installed is powered off
- Verify the presence of power supply protection devices (fuses, circuit breakers, differential switches)
- Ensure that the supply voltage is within the operating limits of the device and that the supply power is enough to ensure the proper operation of all the devices connected to it, verifying the maximum power consumption of each one of them
- If you opt for a PoE (Power Over Ethernet), ensure that the network cable is connected to Eth1 and that the PoE switch is suitable for the device.
- Ensure that the modem router (if any) is installed according to the instructions of the manual
- In the event of data connection, ensure that the Ethernet cable is crimped properly and connected to Eth1 or Eth2

5.3 Serial connection to the LC

Before connecting the device to the LC (SIN.EQLC1), ensure that the latter is installed correctly, according to the instructions in the installation manual.

Connect the RTU1T to the LC as shown in the figure:

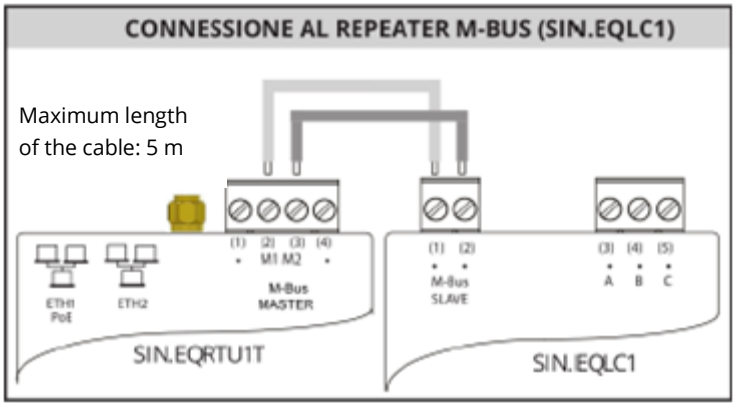


Figure 4 - Type of connection

If the serial connection to the LC is correct, the TX LED on the front of the LC will start blinking in synch with every communication with the M-Bus devices connected to it.

5.4 Connection to a local PC via Ethernet (LAN)

The device is equipped with two Ethernet ports ETH1 and ETH2 to connect it to a PC either connected to a LAN network or directly via an Ethernet cable.

The default RTU1T network settings are:

- IP address: **192.168.1.110**
- Netmask: **255.255.255.0**
- IP allocation: **Static**

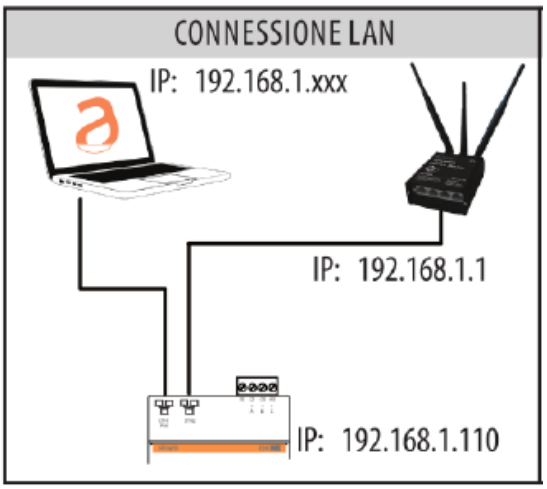


Figure 5 - LAN connection

To connect the device directly or via the LAN network of a PC, follow the instructions below:

- Use a standard T568A or T568B Ethernet cable (straight through or crossover) to connect the ETH1 or ETH2 port of the RTU to the Ethernet port of the computer or to an existing LAN socket. If you use an existing LAN, connect the computer to another LAN socket
- Verify the RTU IP address from the display by accessing the RTU INFO menu (Chapter 8.4) and ensure that that the ETH icon corresponding to the Ethernet connection indicates that the cable is connected properly

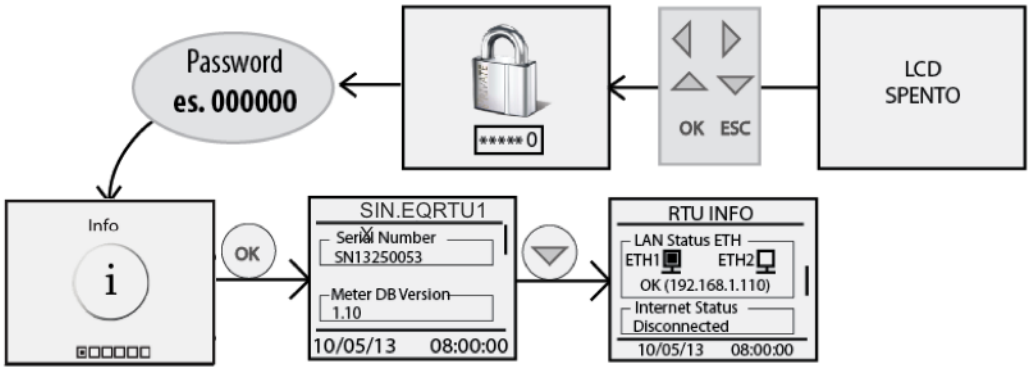


Figure 6 - LAN configuration

- Configure the PC network interface with an IP address that belongs to the same subnet as the RTU. The example in the figure shows that, in order for the computer to communicate via Ethernet with the RTU, you must configure the IP address of the computer network adapter to which the RTU is connected:
- IP address: **192.168.1.XXX (With XXX being a number ranging between 1 and 254 and different than 110)**
- Netmask: **255.255.255.0**
- IP allocation: **Static**
- To change the IP address of the computer network adapter, refer to the user manual of the Operating System of your PC

- In the event that the PC and the RTU are connected via an existing LAN (company or domestic network), make sure not to allocate the IP address of the RTU or of the PC
- For instructions on how to change the IP address of your PC, refer to your current OS

5.5 Connection to a GPRS-UMTS modem/router

A data connection to access the Internet ensures remote consultation of the web server, sending of consumption reports, and monitoring of the system. Should a LAN/ADSL connection not be available, you must use a modem/router supplied as an option of the RTU.

The default settings of the RTU and SIN.ROUTER allow the connection of the two devices without having to change their network parameters. The router is configured to use a TIM (Telecom Italia Mobile) SIM. In this case, the user must carry out the following operations:

- Power off the router.
- Remove the front panel where the place to insert the SIM is indicated
- Ensure that the SIM PIN is disabled
- Insert the data SIM in the right direction
- Close the front panel
- Fasten the two GSM MAIN and AUX antennas to ensure sufficient transmission signal
- Wait for the router to connect to the mobile network
- Use a network cable to connect port LAN1 of the router to port ETH1 or ETH2 of the RTU
- Verify on display in INFO section chap 8.4 that the internet connection is OK

Should a TIM SIM not be available, the operator will have to change some router settings:

- Verify whether it is a Machine-To-Machine (M2M) SIM
- It is enabled for GPRS/UMTS traffic
- Check with the operator that it is bidirectional. i.e. that it allows access to port 80 for web server consultation
- Change the APN of the router with the one provided by the operator (e.g. ibox.tim.it / m2mbis.vodafone.it)

Refer to the Appendix (Chapter 19) for in-detail information on router settings

5.6 Connecting the digital inputs to voltage free contacts

Follow the instructions below to connect the digital inputs to the device with voltage free contacts, such as switches, interface relays, or anything else that does not require voltage:

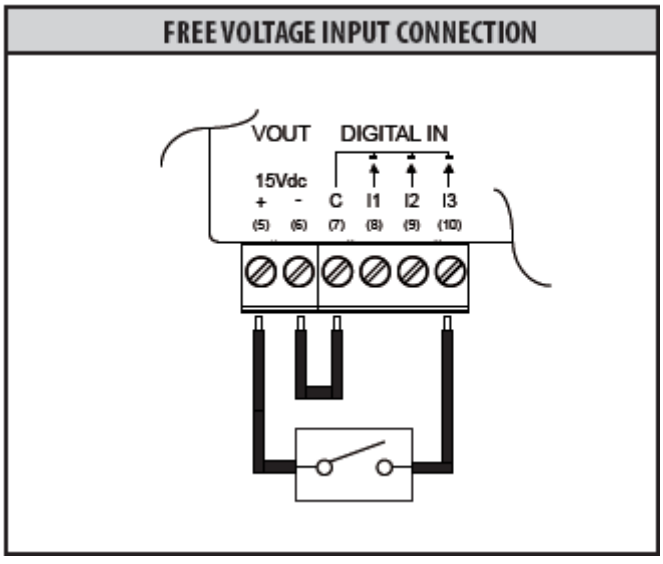


Figure 7 - Digital input connection

- Connect the digital input common (7) to the Vout terminal (6)
- Connect the Vout (+15Vdc) terminal (5) to one of the poles of the contact you want to connect
- Connect the other pole to the desired digital input: (8) for I1, (9) for I2 e (10) for I3

5.7 Connecting the digital inputs to positive voltage contacts

Follow the instructions below to connect the digital inputs to the device with positive voltage (in the event of closed contacts) and voltage free contacts (in the event of open contact):

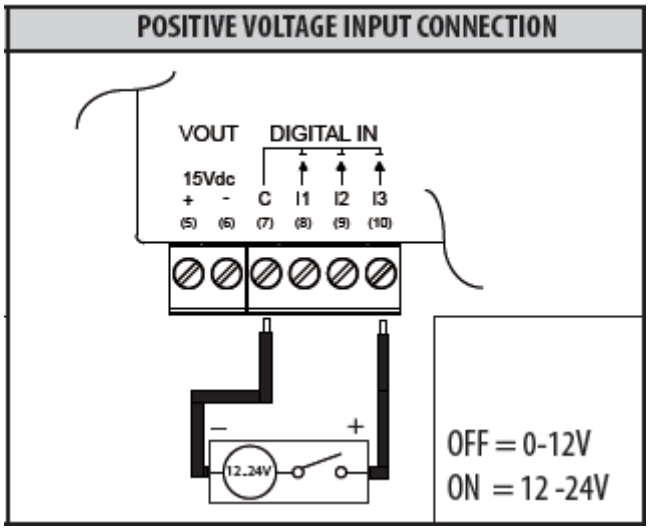


Figure 8 - Positive voltage digital input connection

- Connect the common pole (negative) of the contact to the common terminal (7) of the device
- Connect the positive pole of the contact to terminal (8)/(9)/(10) for inputs I1/I2/I3

When the voltage at the ends of the connected input – for example between (7) and (10) – ranges between 0V and 12V, the RTU input is considered open (OFF). When the voltage value ranges between 12V and 24V, it is considered closed (ON).

5.8 Connecting the digital inputs to negative voltage contacts

Follow the instructions below to connect the digital inputs to the device with negative voltage (in the event of closed contacts) and voltage free contacts (in the event of open contact):

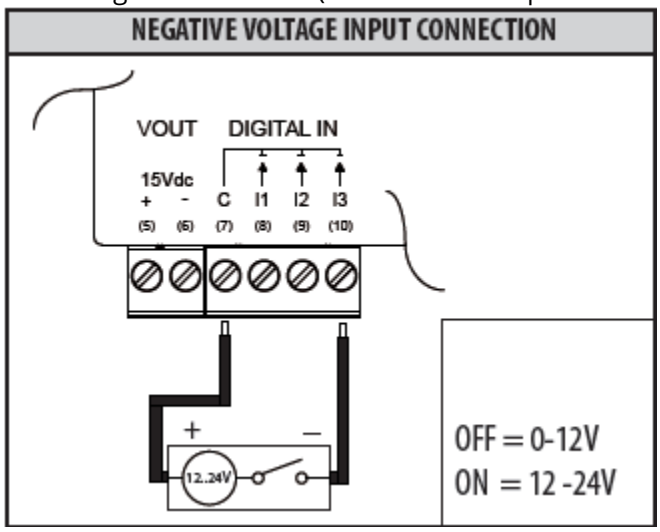


Figure 9 - Negative voltage digital input connection

- Connect the common pole (positive) of the contact to the common terminal (7) of the device
- Connect the negative pole of the contact to terminal (8)/(9)/(10) for inputs I1/I2/I3

When the voltage at the ends of the connected input – for example between (7) and (10) – ranges between 0V and 12V, the RTU input is considered open (OFF). When the voltage value ranges between 12V and 24V, it is considered closed (ON).

5.9 Digital output connection

The RTU is equipped with two relays that can be used as digital outputs. You can connect a load to them or use them to activate other systems. Outputs O1 and O2 can be controlled both remotely and via web server (Ref. Chapter 11.10). For connection to electrical loads follow the model in Figure 10 and the maximum values for each relay shown below:

- 5A@30Vdc (Resistive Load)
- 2A@30Vdc (Inductive Load cosfi=0.4; L/R=7ms)

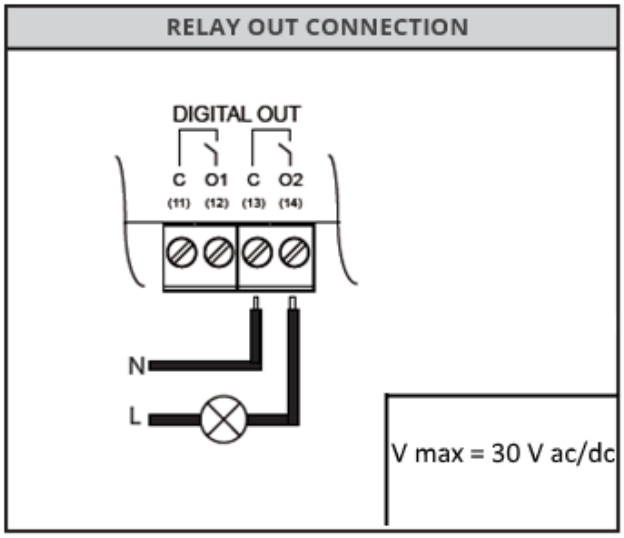


Figure 10 - Digital output connection

6. COMMISSIONING

Commissioning includes all the activities that allow full operation of the RTU connected to the M-Bus system. Upon completing the installation and verifying that all the connections have been made properly, the system can be commissioned following the instructions below:

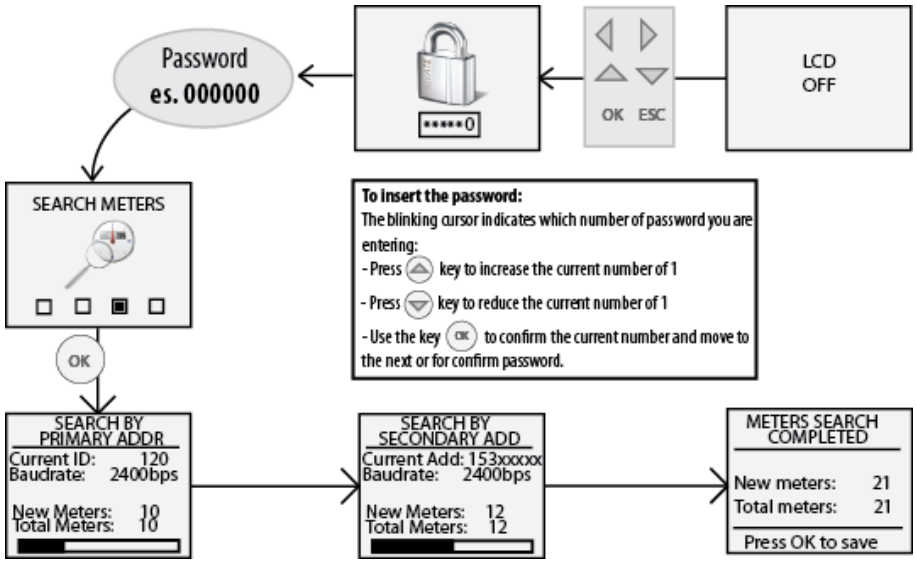
1
Verify M-Bus
(REQUIRED)

Ensure that the M-bus Ready LED lights up on the LC (SIN.EQLC1) and the M-bus error LED is off.

Use a multimeter to verify that the voltage at terminals (6) and (7) of the LC (SIN.EQLC1) ranges between 24Vdc and 42Vdc

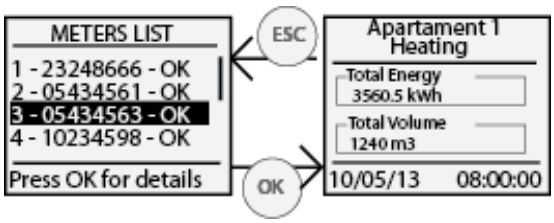
2
Start meter search
(REQUIRED)

Start the meter search by clicking on OK on the SEARCH icon:



3
Verify wired Meters
(REQUIRED)

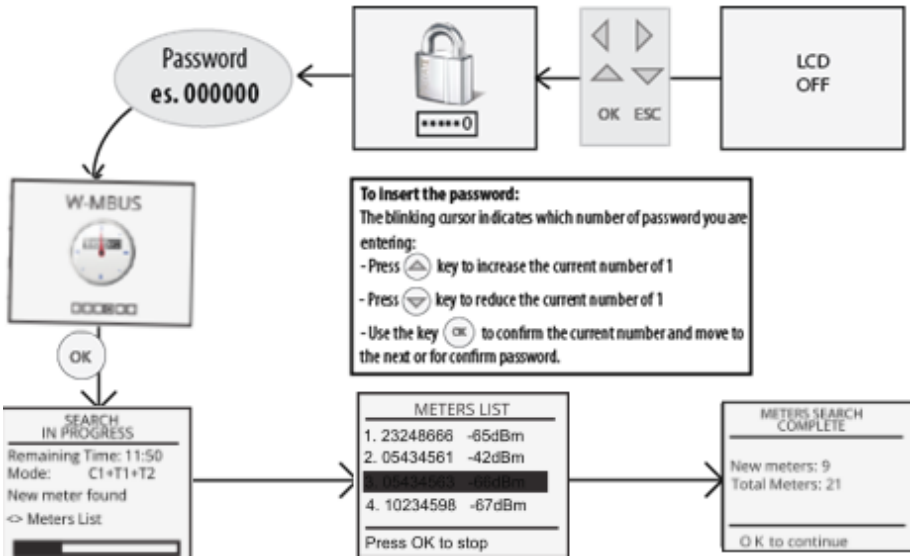
Once the search is complete, the list of meters is displayed together with the communication status (OK or ERROR), as shown in the figure:



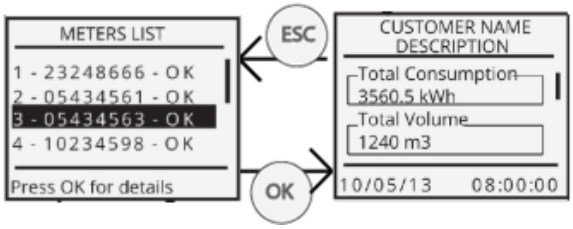
Press OK in correspondence of a meter to access the latest reading performed.

4
Verify wireless Meters
(REQUIRED)

Start the meter search by clicking on OK on the SEARCH icon:



	At the search end a list of wireless meters inserted in the system is shown with indication of the communication state (OK or ERROR) as shown below:
5 **Verify wireless Meters** **(REQUIRED)**	Pressing OK in correspondence with a meter it is possible to access the last reading performed. In the case where the number of expected wireless meters not coincide with those found it is possible: To install a standard W. M-Bus 868 (EN13757-2) extender (reference code in SINAPSI catalog: SIN.EQRPT868X) between the gateway RPT868XT and meters that are not detected by the system and verify if in that way the meters are detected. (The range of coverage can be extended only once by using extender above. SINGLE-HOP mode) Change the position of the gateway or the same RTU1T, placing it in a more receptive place and repeat the procedure described in previous step.
6 **Access to Web server** **(RECOMMENDED)**	After two scanning phases described above, we recommend accessing the RTU's web server to complete the configuration, adding the plant database and allocating the meters and settings to send the reports. Use a network cable to connect the RTU to the computer, as described in Chapter 4.4 Open your web browser, such as Chrome, Safari, Firefox (We recommend Google Chrome) Type in the RTU's IP address, indicated on the display, in the address bar, as described in 4.4 (e.g. 192.168.1.110) and press "Enter"
7 **Meter name allocation** **(RECOMMENDED)**	To ensure easy consultation of the consumption through the reports or on the RTU display, the user should assign at least a Device Name to identify a meter with its utility, for example Apartment 1 or Apartment 12. • See Chapter 11.10 allocate the name and add the description of the meters
8	The plant database includes information on the property and location of the plant



Plant Database (RECOMMENDED)	These are shown in the heading of the reports generated by the datalogger. • See Chap. 11 to set the plant database
9 **Email settings** (RECOMMENDED)	To allow the datalogger to notify reports/events or anomalies/errors in a plant, we recommend setting the Email section carefully. • See Chapter 11.8 for the email settings
10 **Display/Web server password changes** (HIGHLY RECOMMENDED)	Before completing the commissioning stage, we highly recommend changing the default password to access the display and web server. • See Chapter 17 for instructions to change the password to access the display • See Chapter 17 for instructions to change the password to access the web server

7. SELECTING THE LANGUAGE

The language selection can be done both via RTU keyboard and via RTU web interface.
In the former case, upon entering the password in the main menus, such as RTU INFO, METERS, SEARCH, and SETTINGS, all you have to do is press the arrows ▲ or ▼ to change the language. The available languages are English and Italian.
Refer to Chapter 11.1 for instructions to change the language via the Web.

8. BUTTONS AND DISPLAY

8.1 Button description

The RTU is equipped with 6 navigation buttons, which allow browsing through the menus on the display. The functions of the buttons may change according to the context of the displayed menu; in general, we can summarise them as follows:

OK — Button to confirm field and value changes
Button to access the submenus

ESC — Button to cancel field and value changes
Button to exit the submenus

◀ — Left: for main menu / data cursor

▶ — Right: for main menu / data cursor

▲ — UP:
To scroll pages up
Change/add letters from A to Z or numbers from 0 to 9
Changes the language between Italian and English in the RTU INFO, WIRED METERS, WIRED METERS SEARCH, WIRELESS METERS, WIRELESS METERS SEARCH, and SETTINGS menus

▼ — Down:
To scroll pages down
Change/add letters from A to Z or numbers from 0 to 9
Changes the language between Italian and English in the RTU INFO, WIRED METERS, WIRED METERS SEARCH, WIRELESS METERS, WIRELESS METERS SEARCH, and SETTINGS menus

8.2 Display

The RTU is equipped with a 96x128 pixel resolution OLED display (16-level greyscale), which allows the consultation of the Readouts and basic settings of the RTU. To minimise electricity consumption, the display turns off automatically after 10 minutes of inactivity. To turn it on again, simply press one of the navigation buttons.

8.3 Display – Main menu

To access the main menu when the display is off, press any button and the screen to enter the LCD password will be displayed. Enter the password (default:000000) using the UP and DOWN buttons to set the number between 0 and 9 on the position indicated by the blinking cursor; press OK to confirm the current position and proceed to the next one, until all the six numbers are entered.

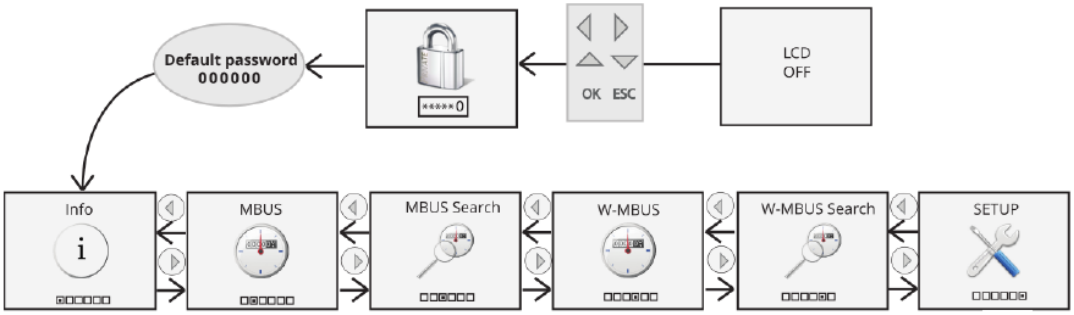


Figure 11 - Display navigation

If you enter the correct password, the main menu will be displayed:

- RTU INFO: summarises all the information pertaining to the RTU (see Par. 6.4)
- WIRED METERS: shows the list of all the wired meters and allows access to the reading (see Chap. 6)
- SEARCH WIRED: starts searching the wired meters according to the last settings saved (see Chap. 6)
- WIRELESS METERS: shows the list of all the wireless meters and allows access to the reading (see Chap. 6)
- SEARCH WIRELESS: starts searching the wired meters according to the last settings saved (see Chap. 6)
- SETTINGS: allows access to the “settings” menu, through which you can change the main RTU parameters (see Chap. 6)

8.4 INFO

Press OK in the RTU INFO menu to access the submenu that displays the network parameters as shown in the figure:

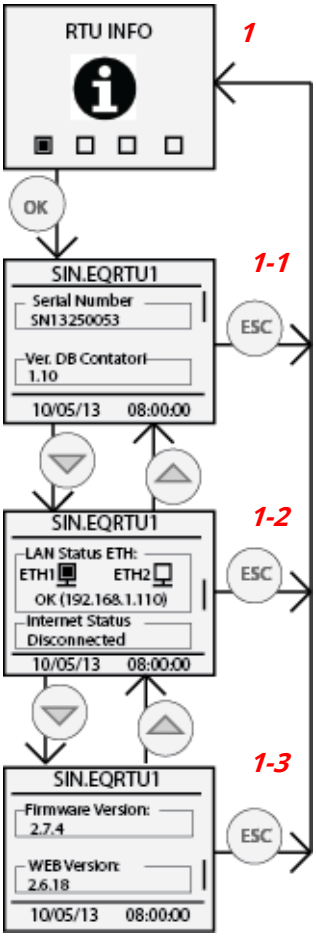


Figure 12 - RTU INFO

Each page, **1-1**, **1-2**, and **1-3** shows the model of the device and the current date and time. As for the content of the single sections, we have:

- ***1-1***
  - *Serial Number*: Shows the serial number to be indicated in the event of technical support
  - *Meter DB Ver.;* Shows the version of the meter database installed in the datalogger
- ***1-2***
  - *LAN ETH status:* Indicates the connection status of Ethernet ports ETH1 and ETH2. In the event at least one of the two ports is connected, it shows the IP address of the network interface
  - *Internet status:* Indicates whether the RTU can connect to the Internet or not. If an Internet connection is available, the public IP address, with which the RTU can be viewed remotely, is displayed
- ***1-3***
  - *Firmware version:* Indicates the current firmware
  - *WEB version:* indicates the current version of the web interface

8.5 M-Bus wired meters

Press OK in the WIRED METERS menu to access the submenu that allows you to view the list of all the wired meters and the latest reading performed. The following figure shows the possible steps that can be taken in the WIRED METERS menu:

- ***2-1***: shows the list of the previously saved meters identified with the first 8 numbers of the meter's serial number (e.g. 05434563). The communication status of every meter is shown indicating OK if the last reading was carried out correctly or ERROR in the event of a communication error during the last reading
  Use navigation buttons UP and DOWN to scroll through the list of all the meters, highlighting the one you want to select to access the values of the last reading
- ***2-2***: press OK in correspondence of a meter in the list to view the values of the last reading (if any). The first frame, indicated in Figure 13, is common to all three meters, as it is a summary of the main information pertaining to the meter, such as the M-bus status byte value, meter reading value, and the full serial number. If the M-Bus status byte is different from zero, it indicates possible meter anomalies. In the event that a meter is included in the datalogger database, you can identify an anomaly by accessing the web server and consulting the Devices page in the Settings menu. In the event that the meter is not included in the datalogger database, refer to the meter user guide to identify the anomaly corresponding to the number indicated in the M-Bus status Byte
- ***2-3/2-n***: use navigation buttons UP and DOWN to consult the value of the meter fields pertaining to the date and time of the reading. For every field, the following information is shown:

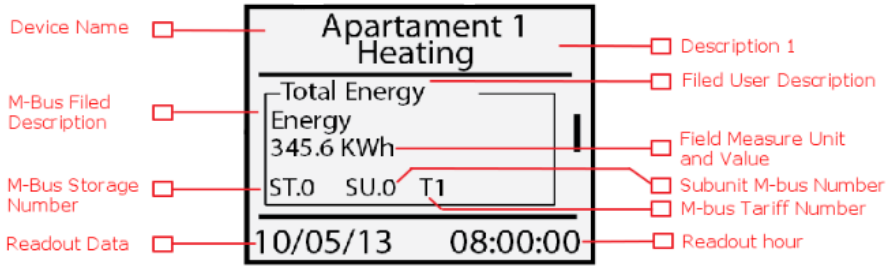


Figure 13 – Wired meter data reading

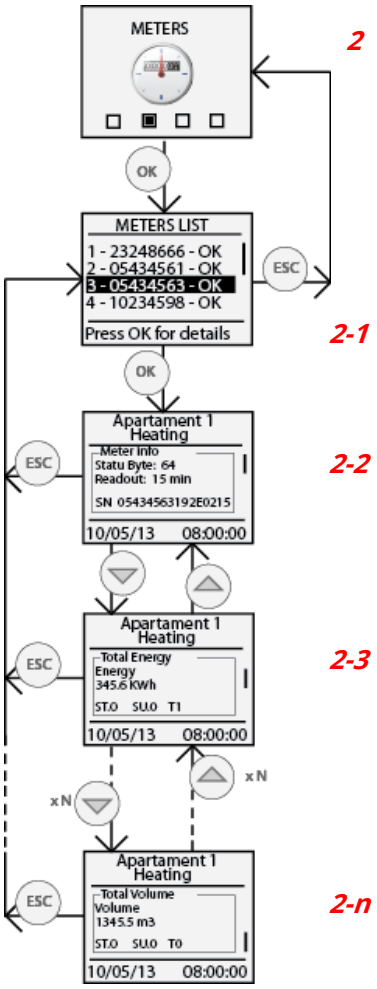


Figure 14 – Wired meters display

Carefully read the following notes

The display shows only the meter fields where the "**Display Data**" option is active in the "***Meter Data Setup***" section of the "***Devices***" page in the "***Settings***" menu (see Par. 11.10)

- *Device Name:* Shows the reference of the meter specified in the Device Name in the Devices page in the Settings menu. Refer to Chapter 11.10 to change the meter reference
- *Description 1:* Shows the value entered in *Description 1* in the Devices page in the Settings menu. Refer to Chapter 11.10 to change the meter reference
- *Field User Description:* Indicates the detailed description of the displayed field entered by the user or included in the meter database
- *Field M-Bus Description:* Shows the field description as defined in the M-Bus protocol.
- *Field value and measurement unit*: Indicates the value and measurement unit of the field displayed with reference to the reading being viewed
- *M-bus Storage Number:* Indicates the Storage Number of the displayed field. Refer to the meter manual guide for further information
- *M-bus Subunit Number:* Indicates the Subunit Number of the displayed field. Refer to the meter manual guide for further information

- *M-bus Tariff Number:* Indicates the Tariff Number of the displayed field. Refer to the meter manual guide for further information
- *Reading Date:* Indicates the date of the reading being viewed
- *Reading Time:* Indicates the time of the reading being viewed

8.6 M-Bus wireless meters

Press OK in the WIRELESS METERS menu to access the submenu that allows you to view the list of all the wired meters and the latest reading performed. The following figure shows the possible steps that can be taken in the WIRELESS METERS menu:

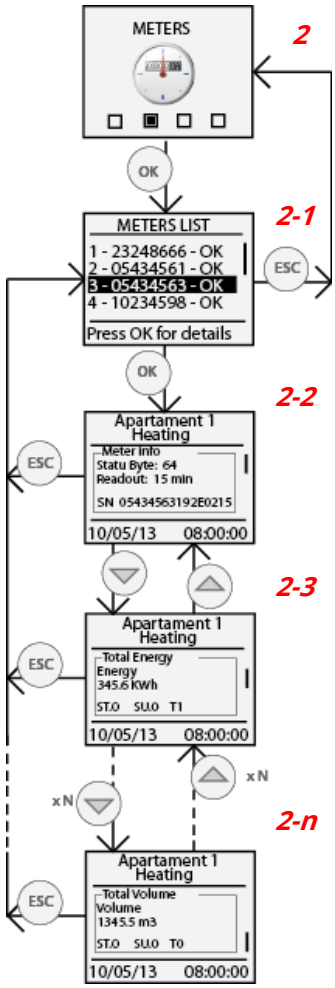


Figure 15 – Wireless meters display

- ***2-1***: shows the list of the previously saved meters identified with the first 8 numbers of the meter's serial number (e.g. 05434563). The communication status of every meter is shown indicating OK if the last reading was carried out correctly or ERROR in the event of a communication error during the last reading

Carefully read the following notes
A power level of 0 dBm corresponds to a power of 1 milliwatt. An increase of 3 dB level is approximately equivalent to the doubling of power, which means that a level of 3 dBm corresponds to approximately a power of 2 mW. For every 3 dB decrease in level, the power is reduced by about half, making -3 dBm corresponds to a power of about 0.5 mW.

Use navigation buttons UP and DOWN to scroll through the list of all the meters, highlighting the one you want to select to access the values of the last reading

- ***2-2***: press OK in correspondence of a meter in the list to view the values of the last reading (if any). The first frame, indicated in Figure 15, is common to all three meters, as it is a summary of the main information pertaining to the meter, such as the M-bus status byte value, meter reading value, and the full serial number. If the M-Bus status byte is different from zero, it indicates possible meter anomalies. In the event that a meter is included in the datalogger database, you can identify an anomaly by accessing the web server and consulting the Devices page in the Settings menu. In the event that the meter is not included in the datalogger database, refer to the meter user guide to identify the anomaly corresponding to the number indicated in the M-Bus status Byte
- ***2-3/2-n***: use navigation buttons UP and DOWN to consult the value of the meter fields pertaining to the date and time of the reading. For every field, the following information is shown:

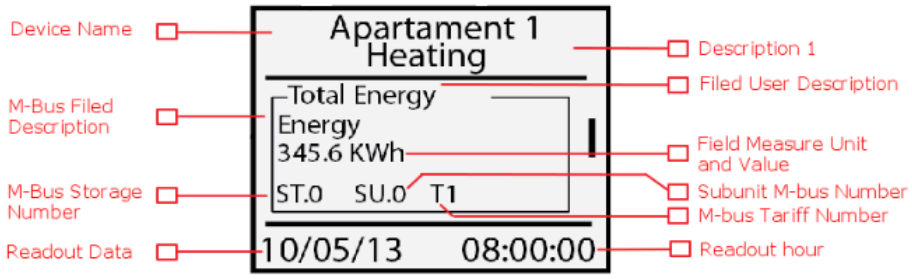


Figure 16 – Wireless meter data reading

Carefully read the following notes
• The display shows only the meter fields where the "**Display Data**" option is active in the "**Meter Data Setup**" section of the "**Devices**" page in the "Settings" menu (see 11.12)

- *Device Name:* Shows the reference of the meter specified in the Device Name in the Devices page in the Settings menu. Refer to Chapter 11.10 to change the meter reference
- *Description 1:* Shows the value entered in *Description 1* in the Devices page in the Settings menu. Refer to Chapter 11.10 to change the meter reference
- *Field User Description:* Indicates the detailed description of the displayed field entered by the user or included in the meter database
- *Field M-Bus Description:* Shows the field description as defined in the M-Bus protocol. *Field value and measurement unit*: Indicates the value and measurement unit of the field displayed with reference to the reading being viewedd
- *M-bus Storage Number:* Indicates the Storage Number of the displayed field. Refer to the meter manual guide for further information
- *M-bus Subunit Number:* Indicates the Subunit Number of the displayed field. Refer to the meter manual guide for further information
- *M-bus Tariff Number:* Indicates the Tariff Number of the displayed field. Refer to the meter manual guide for further information
- *Reading Date:* Indicates the date of the reading being viewed
- *Reading Time:* Indicates the time of the reading being viewed

8.7 SETTINGS

The Display Settings section is divided into five subsections

- ***General***
- ***M-Bus***
- ***W-M-Bus***
- ***Network***
- ***Password***

Refer to Chapter 8 (Buttons and Display) and to Figure 17 to consult the various items.

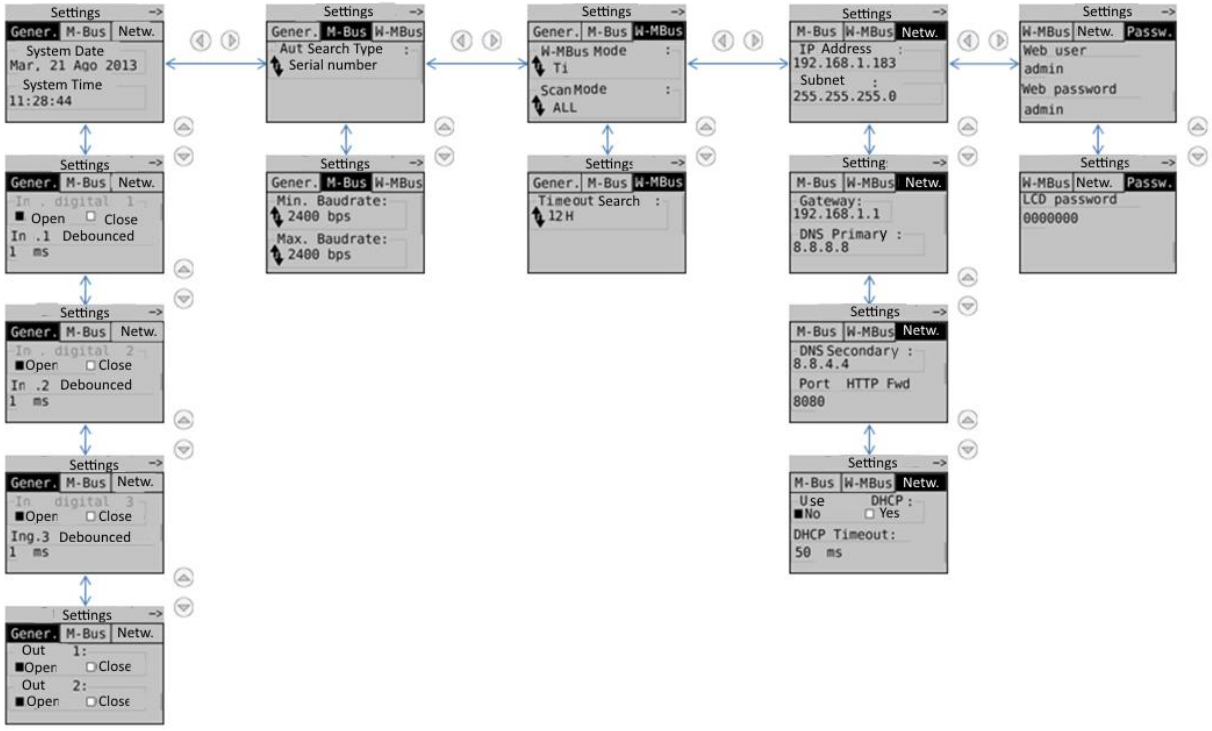


Figure 17 - SETTINGS structure

Press OK for every field reached via the navigation buttons to select the fields to be modified and then press OK again to change the values to enter using the navigation arrows, as shown in Chapter 8.

8.8 WIRED METER SEARCH

Press OK in correspondence of the SEARCH WIRED icon to start scanning the bus and acquire the connected meters. The search settings are those that have been previously saved as shown in Chapter 6.

The default search settings are:

- Transmission rate: 2400bps
- Type of search: Primary ID + Secondary ID
- Primary ID scanning interval 1-250

The figure below shows a typical bus scan with the default settings indicated above:

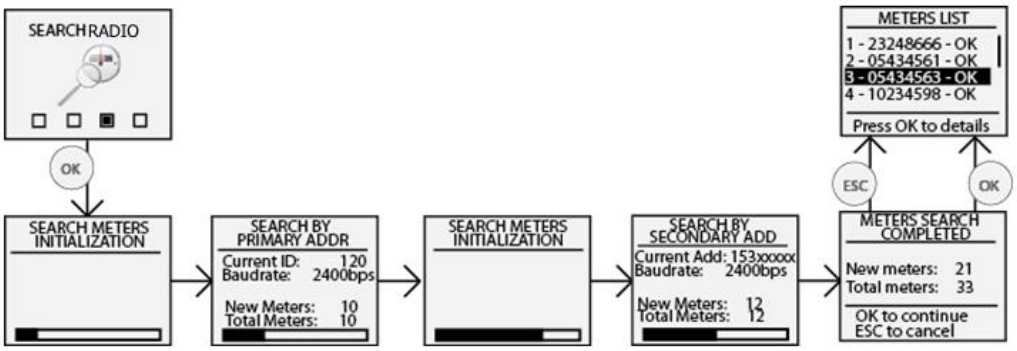


Figure 18 - Searching wired meters

Upon completing the meter search, second last block, press OK to save all the meters found; otherwise, press ESC if you do not want to save any of the meters found. Refer to the WEB section (Chapter 11.11, 11.12, 11.14) to change or complete the settings of the meters found in this section.

8.9 WIRELESS METER SEARCH

Press OK in correspondence of the SEARCH WIRELESS icon to start scanning the bus and acquire the connected meters. The search settings are those that have been previously saved as shown in Chapter 6.

The default search settings are:

- Transmission rate: 2400bps
- Type of search: Primary ID + Secondary ID
- Primary ID scanning interval 1-250

The figure below shows a typical bus scan with the default settings indicated above:

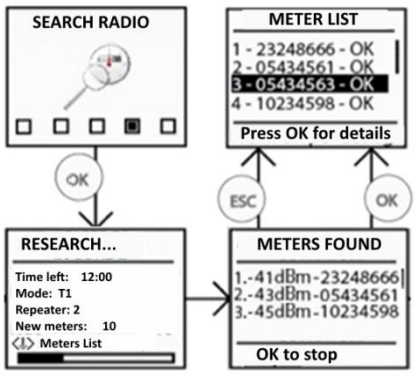


Figure 19 - Searching wireless meters

Upon completing the meter search, second last block, press OK to save all the meters found; otherwise, press ESC if you do not want to save any of the meters found. Refer to the WEB section (Chapter 11.11, 11.12, 11.14) to change or complete the settings of the meters found in this section.

9. CONNECTING THE RTU1T TO THE PC

Connect the RTU either to ETH1 or ETH2 using a T568A or T568B (straight through or crossover) Ethernet cable as shown in Figure 20

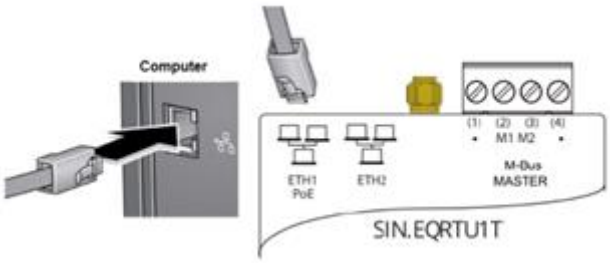


Figure 20 - LAN connection

Set the network adapter of your PC in such a way as to allow communication between the two devices. Below is a description of a possible configuration of the LAN between the two devices in the event that the RTU IP address has not been changed, as shown in Chapter 5.4**,** 8.4

Carefully read the following notes

In order for the RTU and PC to communicate, the two devices must have an IP address within the same subnet.

The default RTU network settings are:

- IP address: **192.168.1.110**
- Netmask: **255.255.255.0**
- IP allocation: **Static**

In order for the computer to communicate with the RTU via Ethernet, the IP address of the computer's network adapter must be set as follows:

- IP address: **192.168.1.XXX (With XXX being a number ranging between 1 and 254 and different than 110)**
- Netmask: **255.255.255.0**
- IP allocation: **Static**

To change the IP address of your computer' network adapter, refer to its Operating System user guide.

In the event that the PC and the RTU are connected via an existing LAN (company or domestic network), make sure not to allocate the IP address of the RTU or of the PC.

In the event that the default IP address of the RTU has been changed, you can consult the current IP address as described in Chapters 5.4**,** 8.4.

10. GATEWAYS INSTALLATION PROCEDURE

10.1 Procedure for installing gateways

The following are best practices for installation and configuration of RTU1T and their gateways SIN.EQRPT868XT, the first procedure involves importing a list of meters already completed (list.rpt); in this way the RTU will filter gauges received than those in the list imported. The second procedure does not provide for the use of this list.

10.2 Procedure for the acquisition by list

1. Supply SIN.EQRTU1T, waiting to boot, connect to the web interface as Administrator.
2. Navigate to the Settings-> Wireless Devices -> Wireless Setup and enter the configuration parameters of the wireless network.
3. Upload the list of meters / H.C.A. installed in the field through the file list.rpt downloadable and editable:

   Settings-> Wireless Devices -> Device Installation, using "Choose File" and verify that the number in the "devices list" is that expected
4. Start scanning devices by clicking on the START button.
5. Power up the first device SIN.EQRPT868XT to install and move to a minimum distance of 5 meters from SIN.EQRTU1T. At this stage it is advisable to supply the SIN.EQRPT868XT via mini USB port for better mobility during the search for the best ratio "signal/number of meters received". The blue LED SIN.EQRPT868XT flashes to indicate the status of the search SIN.EQRTU1T. Once connected, the blue LED stops flashing and the SIN.EQRPT868XT shows the quality of the network through the lighting of the front led green: 1 = poor reception, 2 = average, 3 = good, 4 = excellent. Warning: the front led green light up only in Capture Mode
6. Place the SIN.EQRPT868XT in a place which fulfills the conditions of the signal value ≥ 2 green LEDs. Warning: once positioned, the SIN.EQRPT868XT must remain powered during positioning of any subsequent in order to propagate the network connection to the SIN.EQRTU1T.
7. Open the check list from the web interface and verify that all meters / H.C.A have the serial number highlighted in green or alternatively by checking the box "show only devices not found" verify that the list is empty.
8. Repeat steps 5 and 6 until the fulfillment of conditions described in paragraph 7.
9. Complete the installation of SIN.EQRPT868XT following the instructions given in the relevant quick start guides. Power devices with voltage 100..240Vac.
10. Check via the web interface of SIN.EQRTU1T still be in acquisition mode, otherwise restart the acquisition through the START button and click on the button CLEAR. The system will reset your device list and re-run a full scan. Double check that all meters/H.C.A. present in the list have the serial number highlighted in green.
11. Exit the acquisition mode by clicking STOP.
12. Expand the "HOP 0" by clicking on the circled number in BLUE and select the devices that you want to save by checking the checkbox. Then click the ADD button.
13. Wait for the process and click OK when prompted.
14. The data will be accessible at the end of the affiliation process whose progress is shown on the top right of the interface in WEB "devices affiliates".

10.3 Procedure for acquisition without list

1. Supply SIN.EQRTU1T, waiting to boot, connect to the web interface as Administrator.
2. Navigate to the Settings-> Wireless Devices -> Wireless Setup and enter the configuration parameters of the wireless network.
3. Start scanning devices by clicking on the START button.
4. Power up the first device SIN.EQRPT868XT to install and move to a minimum distance of 5 meters from SIN.EQRTU1T. At this stage it is advisable to supply the SIN.EQRPT868XT via mini USB port for better mobility during the search for the best ratio "signal/number of meters received". The blue LED SIN.EQRPT868XT flashes to indicate the status of the search SIN.EQRTU1T. Once connected, the blue LED stops flashing and the SIN.EQRPT868XT shows the quality of the network through the lighting of the front led green: 1 = poor reception, 2 = average, 3 = good, 4 = excellent. Warning: the front led green light up only in Capture Mode
5. Place the SIN.EQRPT868XT in a place which fulfills the conditions of the signal value ≥ 2 green LEDs. Warning: once positioned, the SIN.EQRPT868XT must remain powered during positioning of any subsequent in order to propagate the network connection to the SIN.EQRTU1T.
6. Complete the installation of SIN.EQRPT868XT following the instructions given in the relevant quick start guides. Power devices with voltage 100..240Vac.
7. Check via the web interface of SIN.EQRTU1T still be in acquisition mode, otherwise restart the acquisition through the START button and click on the button CLEAR. The system will reset your device list and re-run a full scan. Double check that all meters/H.C.A. present in the list have the serial number highlighted in green.
8. Exit the acquisition mode by clicking STOP.
9. Expand the "HOP 0" by clicking on the circled number in BLUE and select the devices that you want to save by checking the checkbox. Then click the ADD button.
10. Wait for the process and click OK when prompted.
11. The data will be accessible at the end of the affiliation process whose progress is shown on the top right of the interface in WEB "devices affiliates".

11. SETTINGS

The items that can be selected are:

- System
  - Plant Database
  - System settings
  - Maintenance
- Network
  - General Setup
  - Advanced Setup
  - Email Setup
  - DynDNS
- Wired Devices
  - Meter Setup
  - Search Setup
- Wireless Devices
  - Devices
  - Wireless Setup
  - Devices commissioning
- Events
  - I/O Events
  - M-Bus Events
- Events
  - Groups
  - Definition

11.1 SETTINGS - SYSTEM

Below the SETTINGS - SYSTEM menu items are shown.

11.2 Plant Database

You can add only one plant for every RTU

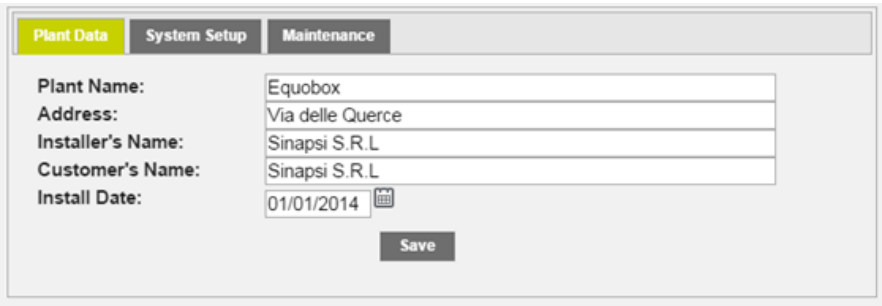


Figure 21 - Plant data settings

Enter the plant data:

- Plant Name: enter the name of the plant
- Plant Address: enter the address of the plant
- Installer name: enter the name of the installer
- Customer Name: enter the name of the client
- Installation Date: if not entered, the RTU will enter the current date by default

11.3 System settings

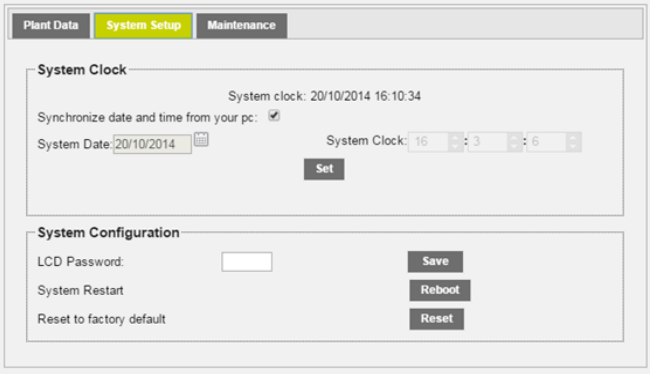


Figure 22 - System settings

The System Settings screen has two sections:

1. Date and Time: choose between the manual and automatic setting for the date and time, synchronising them with your PC
2. System configuration:
   - LCD Password: allows changing the password to access the controls on the device display. The default password is 000000
   - System Restart: allows you to restart the RTU
   - Reset to factory default: allows you to initialise the device according to the default settings

Selecting Reset to factory default will be reset the RTU configurations under the System and Network sections. For to delete all the historical devices data you have to delete manually delete all previously configured devices.

11.4 Maintenance

This page allows you to update and/or restore the RTU

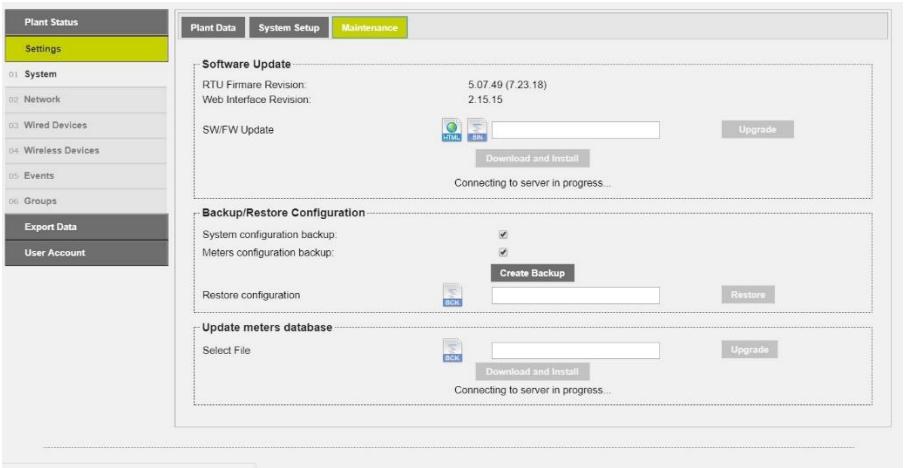


Figure 23 - Service Settings

The Service screen consists of:

1. Software update
   - RTU Firmware Version: shows the RTU's current firmware version
   - Web Interface Version: shows the RTU's current web interface version

- SSW/FW Update: allows for manual or automatic online update; you need to have the binary file. This update will involve both the software and the web interface; the name of the update is equobox_rtu.bin

The system transmits information relating to the update status specifying, if available, the ability to download a new one (the system must be connected to the Internet in order to use the service).

AFTER A SYSTEM UPDATE REFRESH THE WEB PAGE.

2. Backup/Restore Configuration:
   - System Configuration Backup: select if you want to create a system backup. Press Create Backup to complete the operation. See Figure 24
   - Meter Configuration Backup: select if you want to create a meter configuration backup. Press Create Backup to complete the operation See Figure 24
   - Restore Configuration: select it if you want to restore the configuration of the meters and/or the previously meters configured; this operation can only be carried out if you have the backup file
3. Update meter database: allows you to update the RTU database. This operation can only be carried out if you have the update file.

The system transmits information relating to the update status specifying, if available, the ability to download a new one (the system must be connected to the Internet in order to use the service).

Figure 24 - Creating a backup

11.5 SETTINGS – NETWORK

Below the SETTINGS - NETWORK menu items are shown.

11.6 General settings

This section is dedicated to the RTU network settings

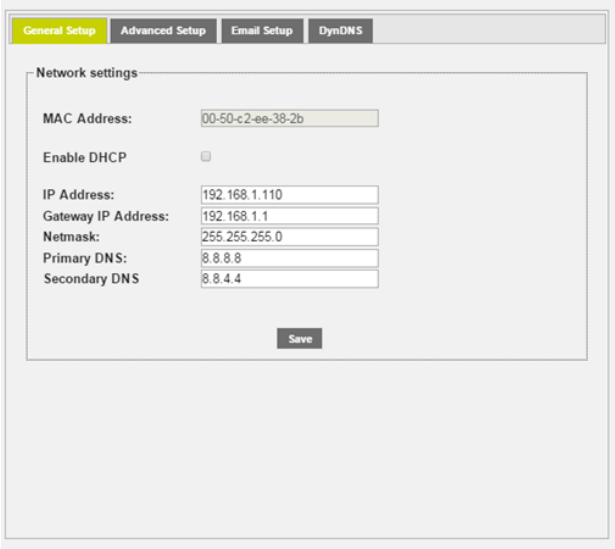


Figure 25 - Network settings

The fields to be filled out are:

- MAC Address: shows the RTU's MAC-Address
- Enable DHCP: select if you want to use the DHCP protocol
- IP Address: sets the machine's static LAN address
- Gateway address: sets the address of the LAN Gateway
- Network Mask: sets the LAN subnet mask
- Primary DNS: sets the primary DNS address
- Secondary DNS: sets the secondary DNS address

Pay particular attention to the insertion/modification of LAN parameters. Always refer to a home or corporate network administrator for information on the LAN class and related data for a proper configuration.

11.7 Advanced Setup

This section is dedicated to the advanced parameters for the RTU system configuration. The parameters shown below should be managed by qualified personnel.

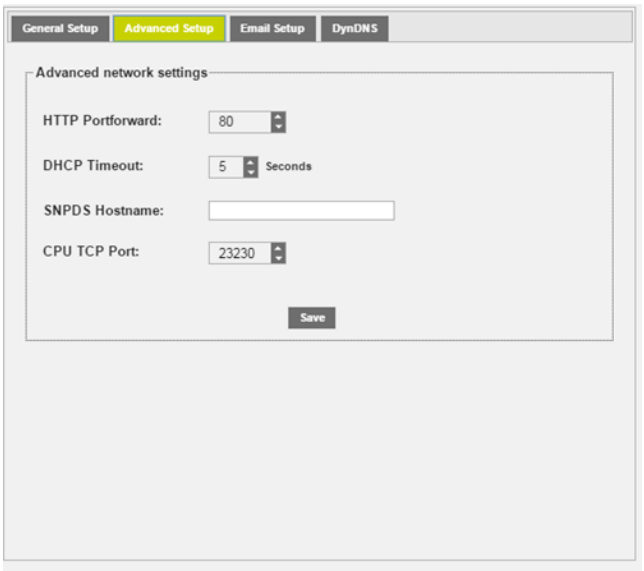


Figure 26 - Advanced network settings

The fields to fill out in this section are:

- HTTP Portforward: defines the external HTTP port if configured differently from 80, to ensure that emails are sent correctly. See Figure 27
- DHCP TimeOut: enter a timeout beyond which, the destination will be declared unreachable
- SNPDS Hostname: enter, if used, the remote address of the SNPDS service
- CPU TCP Port: enter, if used, the communication port of the SIN.EQCPU unit

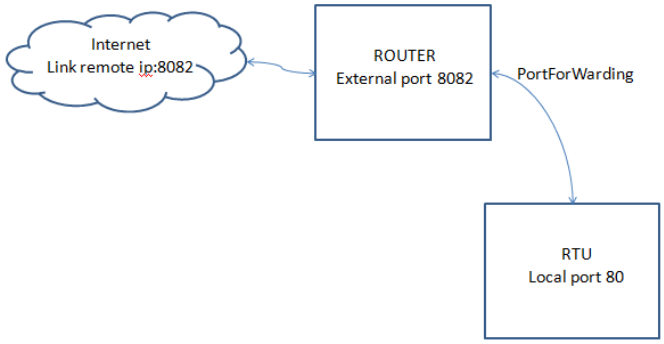


Figure 27 - Network infrastructure

11.8 Email Setup

This section allows you to configure the email management parameters in the RTU.

You can set the sending of mail in 2 ways: with the attached report or with the link to connect to in order to save the report. In the first mode it is sufficient to set the sender's name and the destination address.

Instead, in the second mode the data relating to the server and the destination account must also be completed.

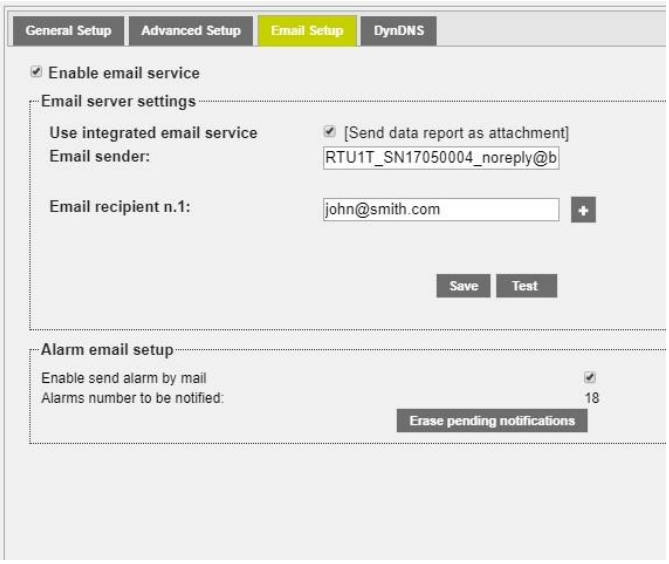


Figure 28.a - Email settings

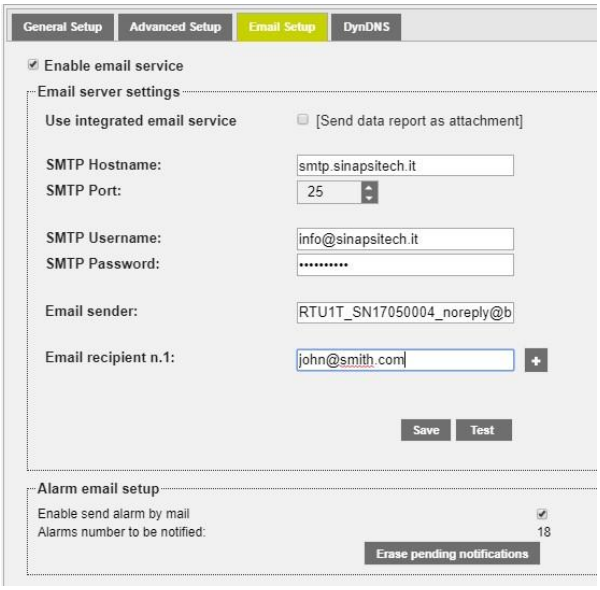


Figure 29.b - Email settings

The page is divided into:

1. Email server settings
    - SMTP Hostname: enter the address of the SMTP server you want to use
    - SMTP Port: set the communication port for the SMTP server
    - SMTP Username: enter the username to access the SMTP server
    - SMTP password: enter the password to access the SMTP server
    - Email Sender: enter an email address to define the sender

- Email Recipient n.1: enter the recipients of the email. Press ➕ to add a recipient. Do not add more than 4 recipient addresses.

Press Save to save the configuration. Press Test to verify whether the entered parameters are operating properly; if not, refer to Chapter 11.7

2. Alarm Email management
   - Enable alarm email notification: Enable email notification upon alarm present in plant and acquired by the RTU device. The system will also manage an automatic signalling of alarm ***communication error*** if one or more devices in the field do not respond correctly the RTU queries. It will be sent an email when the alarm ceases. All notifications will always be consulted under Plant Status, System Status → Events Reports, see Chap. 18.2
   - Number of alarms waiting to for notification: shows the number of alarms waiting to be notified. Press Delete pending notifications to delete the alarms that are yet to be notified by the RTU and verify the network and email management configurations.

11.9 DynDNS

This section is dedicated to the configuration/activation of the DynDNS service

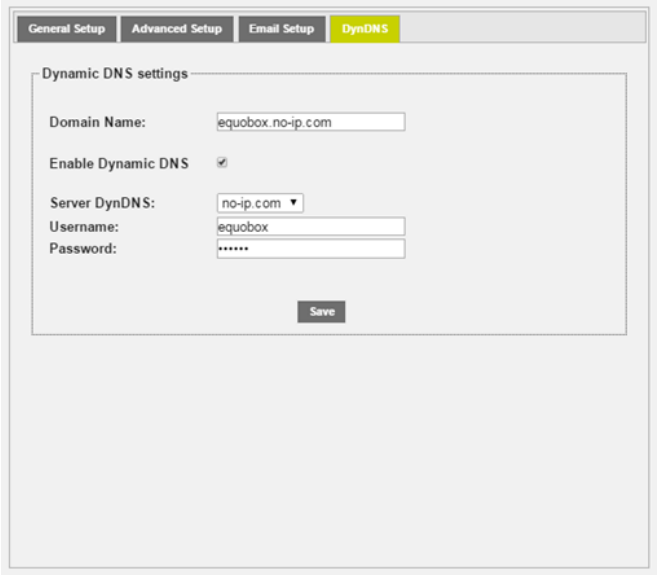


Figure 30 - DNS service settings

Enter:

- Domain Name: Enter the domain name provided by the no-ip.com service
- Enable Dynamic DNS: allows you to enable Dynamic DNS service. Actually works properly only the noip.com
- Server DynDNS: currently only noip.com
- Username: Enter the username to access the DynDNS service
- Password: Enter the password to access the DynDNS service

Press Save to save the configuration

11.10 SETTINGS – WIRED DEVICES

This section allows you to configure/search the meters in the plant.

11.11 Search Setup

To search the meters go to Meters → Search Meter. This section provides two types of search: manual and automatic. We recommend opting for the automatic search. Use the manual search only in the event that one or more devices are not recognised by the automatic search. This can occur in the event of collisions during the automatic search, which prevents the devices in the field from being retrieved automatically or in the event of devices with a non-standard baudrate (always refer to the meter datasheet for this information).

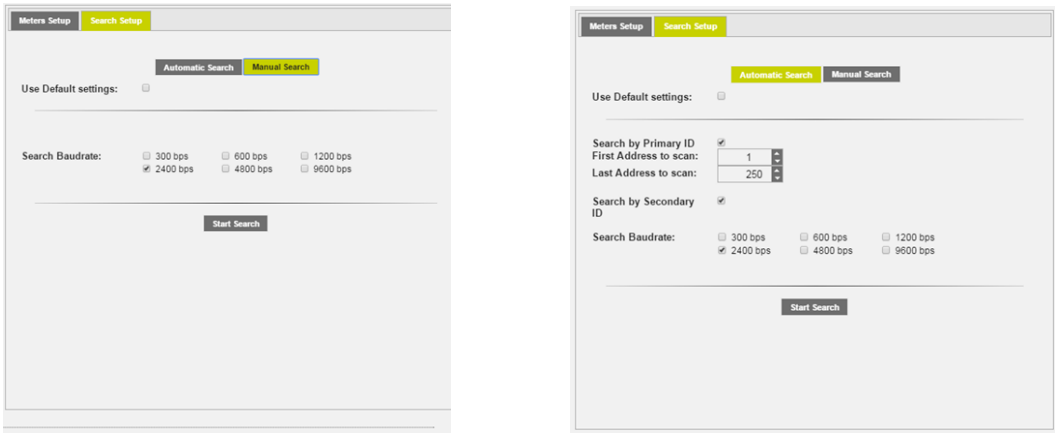


Figure 31 - Meter setup

1. Automatic search
   - Uses default settings:
     - If selected, it searches the meter by Serial number and ID with Baudrate equal to 2400bps.
     - If not selected, you can choose among:
       - Search by Primary ID: select this item if you want to search the meters by primary ID
       - First Address to scan: enter the value to start the search
       - Second Address to scan: enter the value to end the search
       - Search by Secondary ID: select this item if you want to search the meters by secondary ID (serial number)
       - Baudrate Search: enter the search baudrate
       - Press Start to start the search
2. Manual search: use this option only in the event that one or more devices are not recognised during the automatic search.
   - Use default settings: if selected, it automatically sets the baudrate to 2400; otherwise you can also select the baudrate for the search.
   - Baudrate Search: set the non-standard communication speed with which you want to query the devices that were not automatically recognised. Always refer to the meter datasheet to set the right non-standard baudrate.

Upon defining the transmission rate, press Start to start the search At this point, you can choose whether to set the search by primary ID (if set in the meter) or secondary ID (8-digit serial number of the meter). This type of search allows you to search one device at a time, as shown in Figure 31.

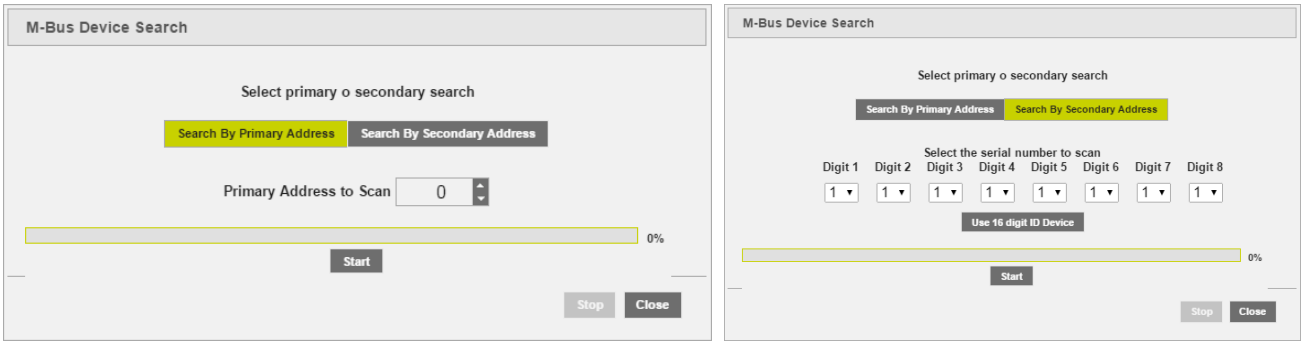


Figure 32 - Searching devices in manual mode

Upon starting the search, a window will appear, as shown in Figure 33. In this particular example, the devices were searched by primary/secondary address. You can interrupt the search at any time by pressing Stop.

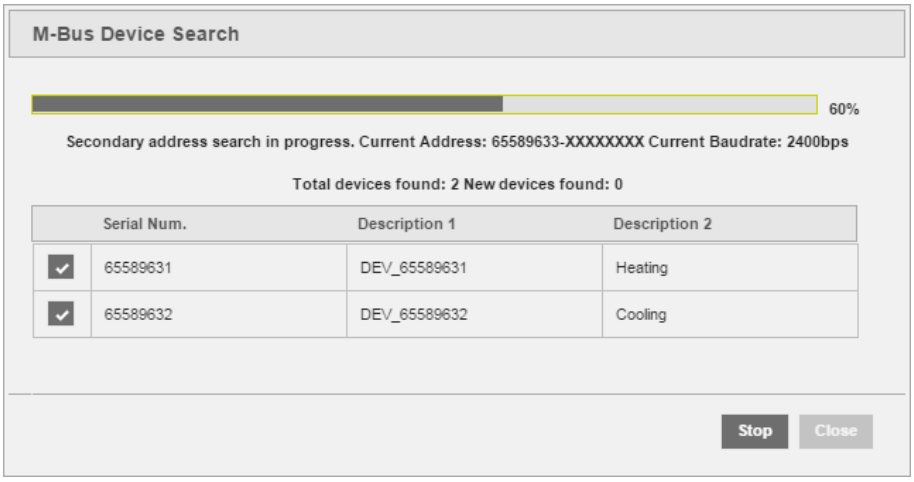


Figure 33 - Searching devices

At the end of the search, you can select the meters found. See Figure 34:

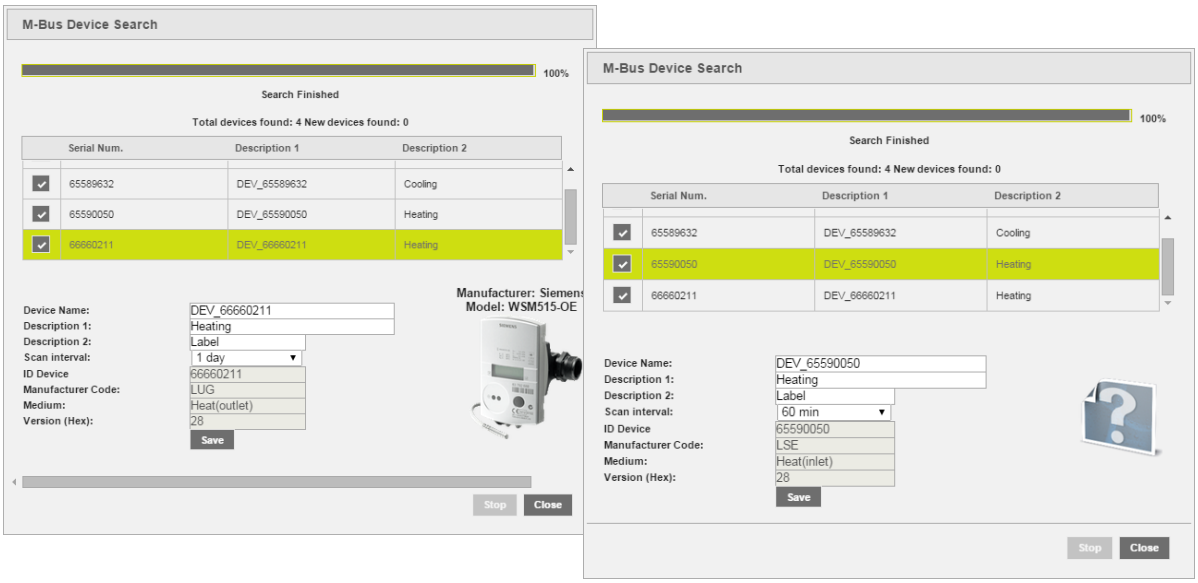


Figure 34 - Saving the meters

At the end of the research we will have two types of devices:

- ✓ A device built into RTU Database equipped with image, Chap. 11.12
- ✓ A device not built into RTU Database not equipped with image, Chap. 11.14

The following data will always be shown for every meter found:

- Serial number: shows the serial number of the selected meter
- Description 1: description of the meter
- Description 2: description of the meter

You can fill out the first four fields, such as:

- Device Name (modifiable): indicates the name of the device automatically connected by RTU
- Description 1 (modifiable): if not already entered, add a first description to identify the meter
- Description 2 (modifiable): if not already entered, add a first description to identify the meter
- Scan interval (modifiable): interval with which Readouts are performed: 15 minutes, 1 hour, 6 hours, 12 hours, 1 day, 1 month.
- ID Device: indicates the serial number of the selected meter
- Manufacturer Code: indicates the manufacturer's name in the event that the meter in the database is identified by the RTU.
- Medium: indicates the type of value read by the meter
- Version (HEX): indicates the version of the meter.
- Manufacturer: indicates the manufacturer's name in the event that the meter in the database is identified by the RTU.
- Model: indicates the meter model in the event that the meter in the database is identified by the RTU.
- Press Save to add the meter.

To change the previously saved meters, access Meter setup, Chapter 11.12

11.12 Meter Setup

In this section you have access to the list of wired meters saved. At first use, the section will appear empty. The system allows the management of the meters according to two different types:

1. Meter integrated into the database (see 11.13)
2. Meter not integrated into the database (see 11.14)

11.13 Meters built into RTU Database

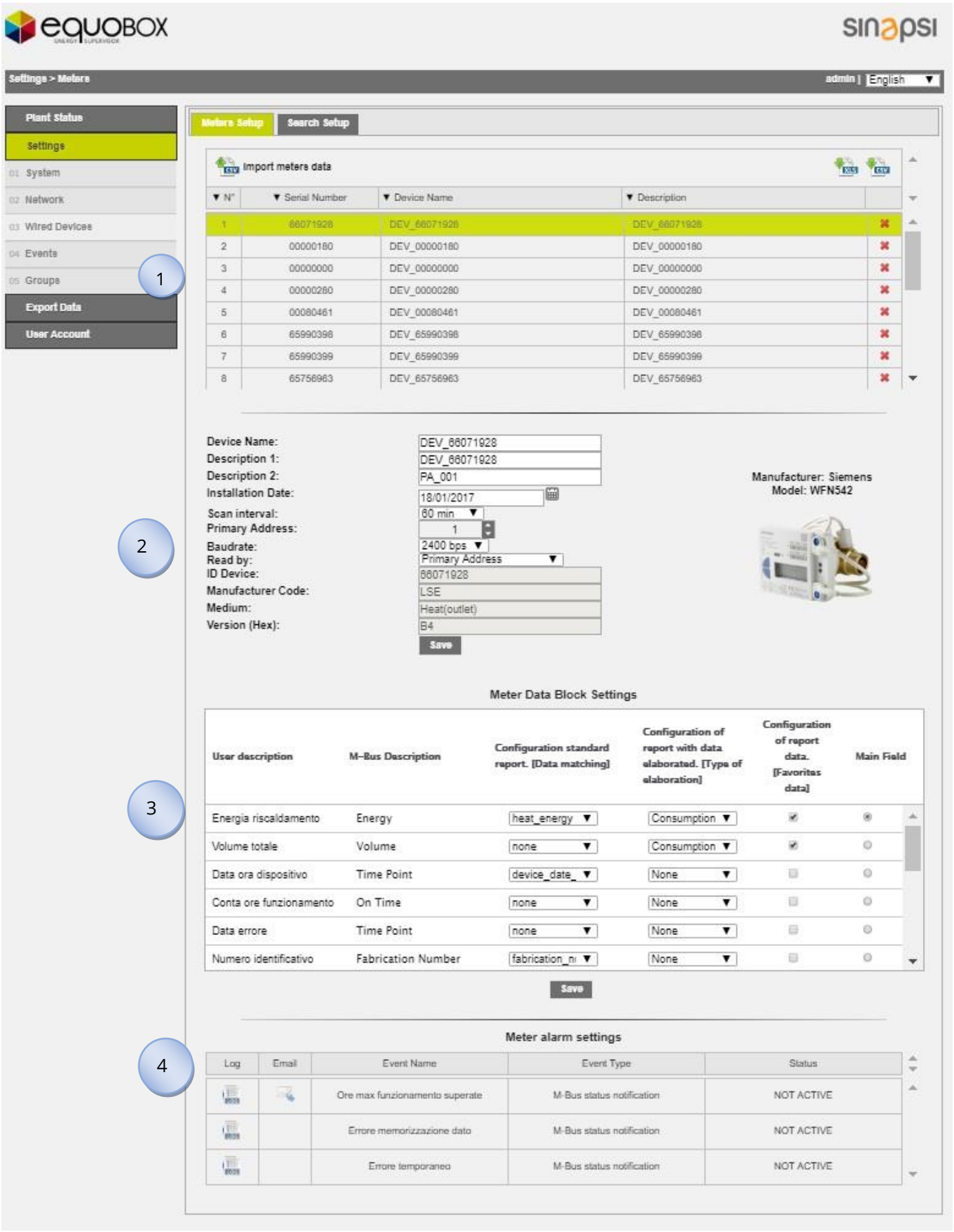


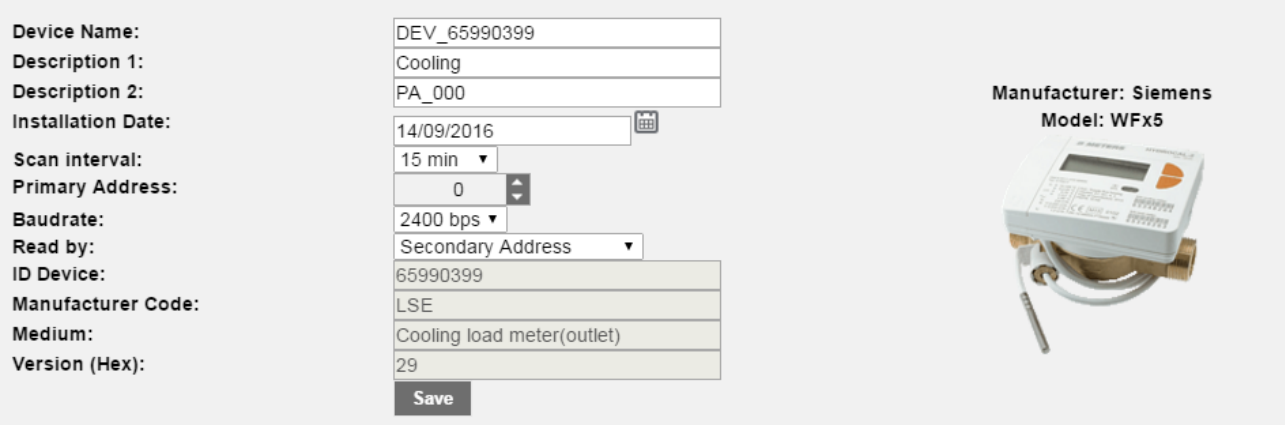
Figure 35 - Meter setup

The screen is divided as follows:

1. Meter table

- **Import meters data** Import CSV with affiliate counters description. If the file contains devices other than those saved, the descriptions of the meters in the table of saved devices (affiliates) are copied.
- downloading a file (.CSV or .XLS) with the meter list.
- Model: shows the serial number of the selected meter
- Device Name: name of the meter
- Description: description of the meter
- Delete: click on the symbol to delete the meter

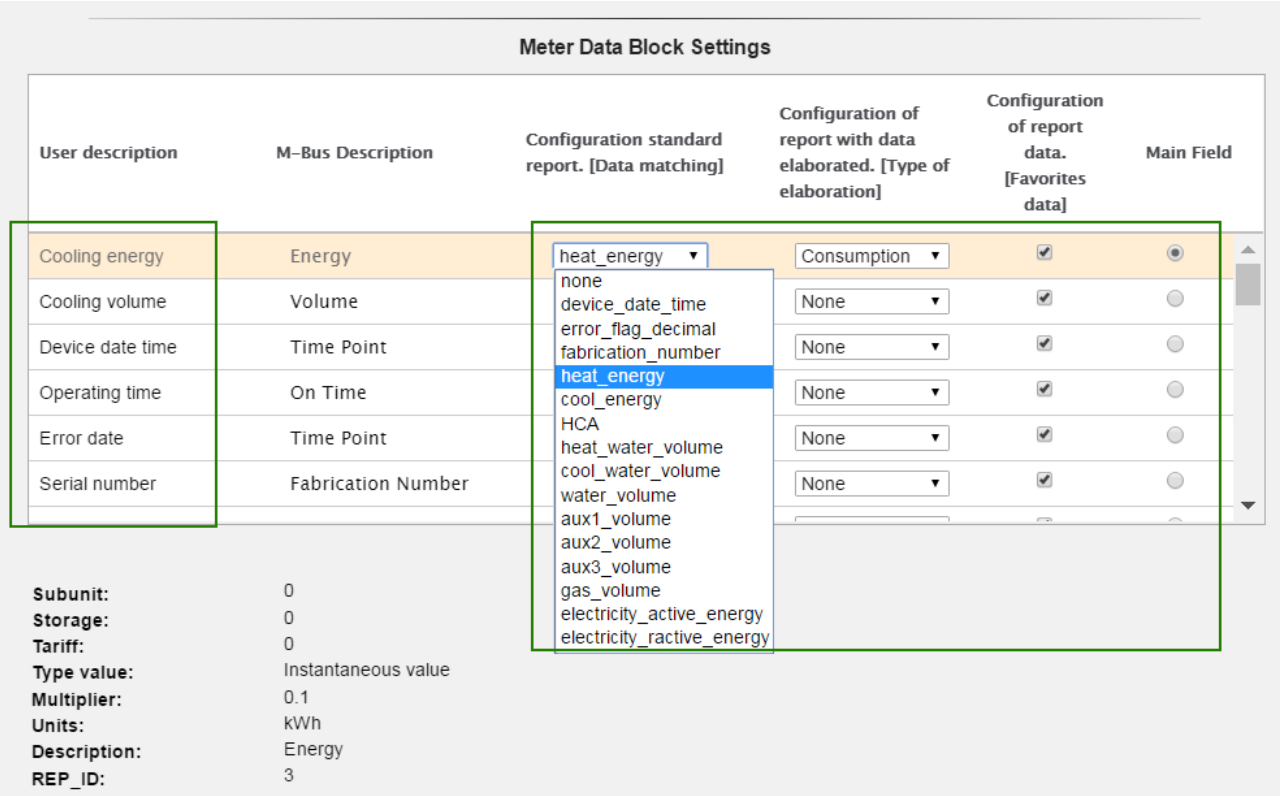
2. Meter data: the white cells are modifiable



- Device Name: indicates the name of the device
- Description 1: if not inserted enter the first description for the identification of the meter
- Description 2: if not inserted enter the second description for the identification of the meter
- Installation date: indicates when the meter was installed. This is set automatically upon saving the meter as described in the previous chapter.
- Scan interval: interval with which Readouts are performed: 15 minutes, 1 hour, 6 hours, 12 hours, 1 day, 1 month.
- Primary Address: indicates the address of the meter. The addresses can range between 1 and 250 (not modifiable)
- Baudrate: Indicates the speed with which the meter communicates with the RTU. Check the meter manual to verify the communication speed.
- Read by: allows you to perform a reading by primary or secondary address
- ID device: indicates the serial number of the selected meter (not modifiable)

- Manufacturer Code: indicates the manufacturer's code, according to FLAG MANUFACTURERS ID DLMS standard (not modifiable)
- Medium: indicates the type of value read by the meter (not modifiable)
- Version (HEX): indicates the version of the meter (not modifiable)
- Save: to save any changes

3. Meter setup: the cells highlighted in green are modifiable



- User description: data coming from the device according to the protocol standard, modifiable
- M-Bus description: data coming from the device according to the protocol standard, modifiable
- Configuration Standard Report. [Data Association]: bind the data to a particular column of the report in standard format.
  The association also has an effect on the XML report. In particular, the selected field is the property of the tag datapoint rep_id

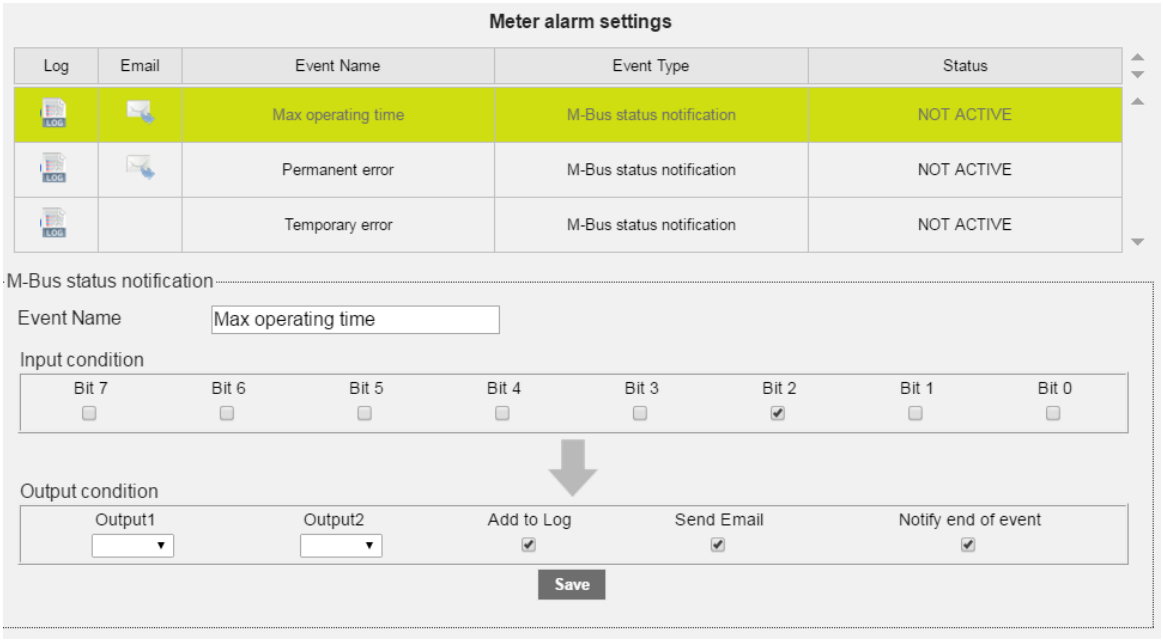
```
<?xml version="1.0" encoding="UTF-8"?>
- <content version="1" xsi:noNamespaceSchemaLocation="content.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  - <custom>
      <datalogger model="SIN.EQRTU1T " fw_rev="5.07.29" current_time="14:30:57" current_data="2016-09-27" sn="SN15030002"/>
      <plant total_wmbus_dev="5" total_mbus_dev="33" name="Name"/>
    </custom>
  - <device version="04" read_interval="604800" medium="07" manuf="3265" id="00001234" bus="0" prog="0">
    - <readouts>
      - <readout errordate="every month" fabnr="05685095" dev_date="2016-04-20" dev_time="11:09:00" status="255" sys_timestamp="1474979300">
        - <datapoints>
            <datapoint value="0.010" rep_id="8" maindb="1" tolog="1" description="Volume attuale" unit="m3" field_id="0C14"/>
            <datapoint value="006724" maindb="0" tolog="1" description="Conta ore funzionamento" unit="hours" field_id="0B22"/>
            <datapoint value="20" rep_id="0" maindb="0" tolog="1" description="Data e ora correnti" unit="date e time" field_id="046D"/>
            <datapoint value="every month" maindb="0" tolog="1" description="Data errore" unit="date" field_id="326C"/>
            <datapoint value="05685095" rep_id="2" maindb="0" tolog="1" description="Matricola" field_id="0C78"/>
            <datapoint value="05685095" maindb="0" tolog="1" description="Indirizzo secondario" field_id="0CFD10"/>
            <datapoint value="2199023322098" maindb="0" tolog="1" description="Model / Version" field_id="06FD0C"/>
            <datapoint value="AEW31" maindb="0" tolog="1" description="Parameter set identification" field_id="0DFD0B"/>
            <datapoint value="every year" maindb="0" tolog="1" description="Data ora storico" unit="date" field_id="42EC7E"/>
            <datapoint value="0.010" maindb="0" tolog="1" description="Volume anno precedente" unit="m3" field_id="4C14"/>
            <datapoint value="31/12/2015" maindb="0" tolog="1" description="Giorno di riferimento" unit="date" field_id="426C"/>
            <datapoint value="37FD1700000000000000000027A350002783500" maindb="0" tolog="0" description="Dati costruttore" field_id="0F "/>
          </datapoints>
```

- Configuration of report with data elaborated. [Type of elaboration]: Select the type of elaboration to the figure reported in the raw data reports. ***Any changes in the Configuration of report with data elaborated section involves the switching of all the data already stored in the RTU***.
- It is possible to select between:

- None: any data is shown
- Consumption: it generates the data as maximum period and delta equivalent
- Minimum: generates data as minimum value of the period
- Maximum: generates the data as maximum value for the period
- Mean: generates the data as mean value of the period

- Configuration of report data. [Favorite Data]: tick the data to see in reports where there is the lettering [favorite data] and in System Status menu > 02 Wired Devices> [Device]
- Main field: it is the Main field to be displayed in the System Status menu > 02 Wired Devices> [Device]
- Save: to save any changes

4. Meter alarm settings: every meter has a series of errors that can be set individually. All the alarms managed by the RTU are shown in the following table. For every alarm, you can set the configurations described below. By default, all the checkmarks are disabled for every alarm. See "Max operating time", for example. After selecting an alarm will open the page of details.



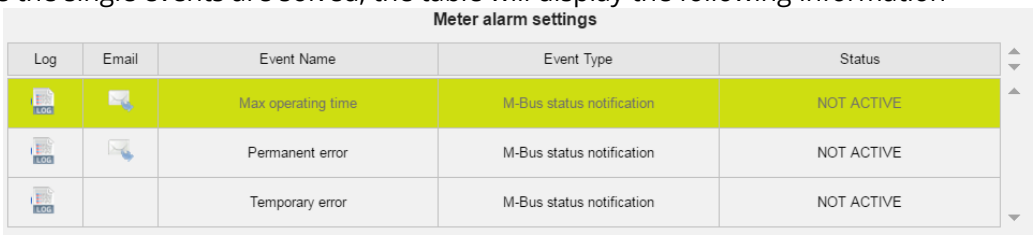
For every alarms well be reported the alarm name (modifiable), the bit configuration for the alarm identification (not modifiable). In the lower part, you can choose whether to enable the digital outputs or not when an event occurs (Ref. 5.9)

- Output 1: the alarm occurrence will be able to activate the O1 digital output:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Output 2: the alarm occurrence will be able to activate the O2 digital output:

- Open: commands to open
- Closed: commands to close
- Pulse: generates a pulse

- Add to Log: stores the meter alarm in the data log
- Send Email: sends an email notification in the event of an alarm (Ref. Chapter 5.4, 8.4.)
- Event closure notification: sends an email notification when an event is closed.

Once the single events are solved, the table will display the following information



- Log: shows if the alarm logging section is active
- Email: shows if the alarm email notification is active
- Event name: shows the alarm name. Data coming from the device according to the standard protocol and modifiable.
- Event type: shows the type of event. Data coming from the device according to the standard protocol and modifiable.
- Status: shows the alarm status (activated or deactivated). Data coming from the device according to standard protocol and modifiable

After making all the changes confirm them through the appropriate window, see image below. Any changes you make will not be saved in the RTU without confirmation.

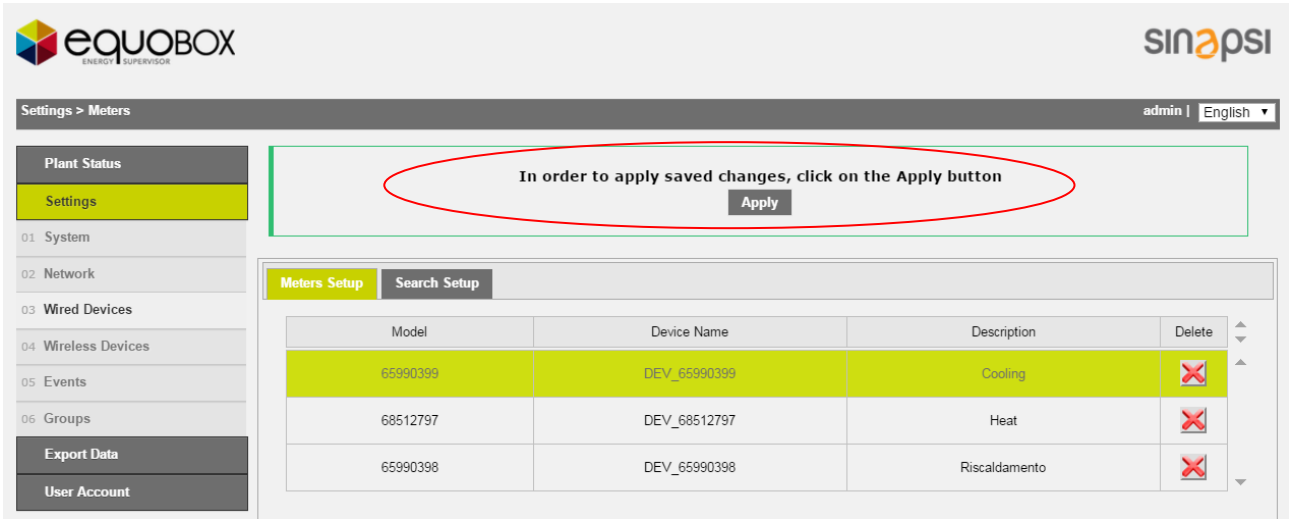


Figure 36 - Notification of changes application wired devices

11.14 Meter Setup – Meters not built into RTU Database

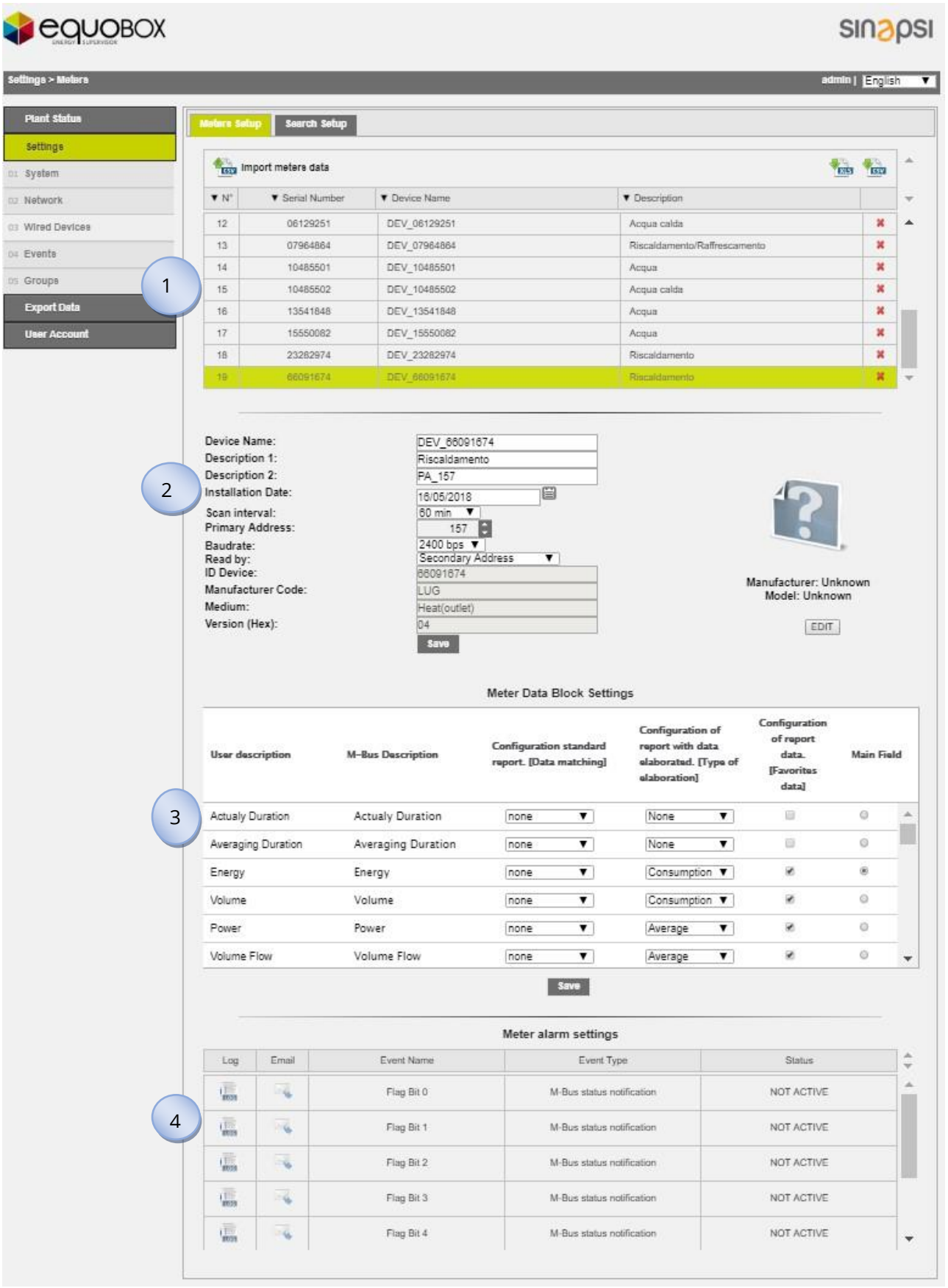


Figure 37 - Meter setup

The screen is divided as follows:

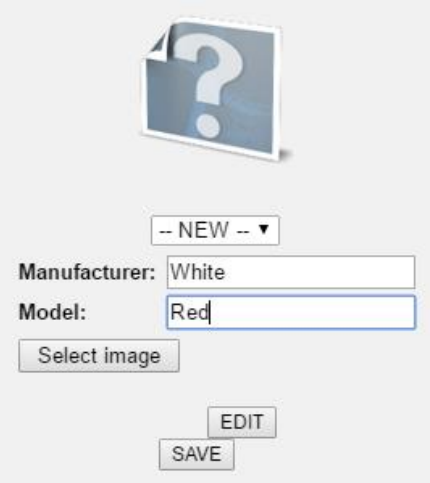
1. Meter table

- **Import meters data** Import CSV with affiliate counters description. If the file contains devices other than those saved, the descriptions of the meters in the table of saved devices (affiliates) are copied.
- downloading a file (.CSV or .XLS) with the meter list.
- Model: shows the serial number of the selected meter
- Device Name: name of the meter
- Description: meter description
- Delete: click on the symbol to delete the meter

2. Meter data: the white cells are modifiable

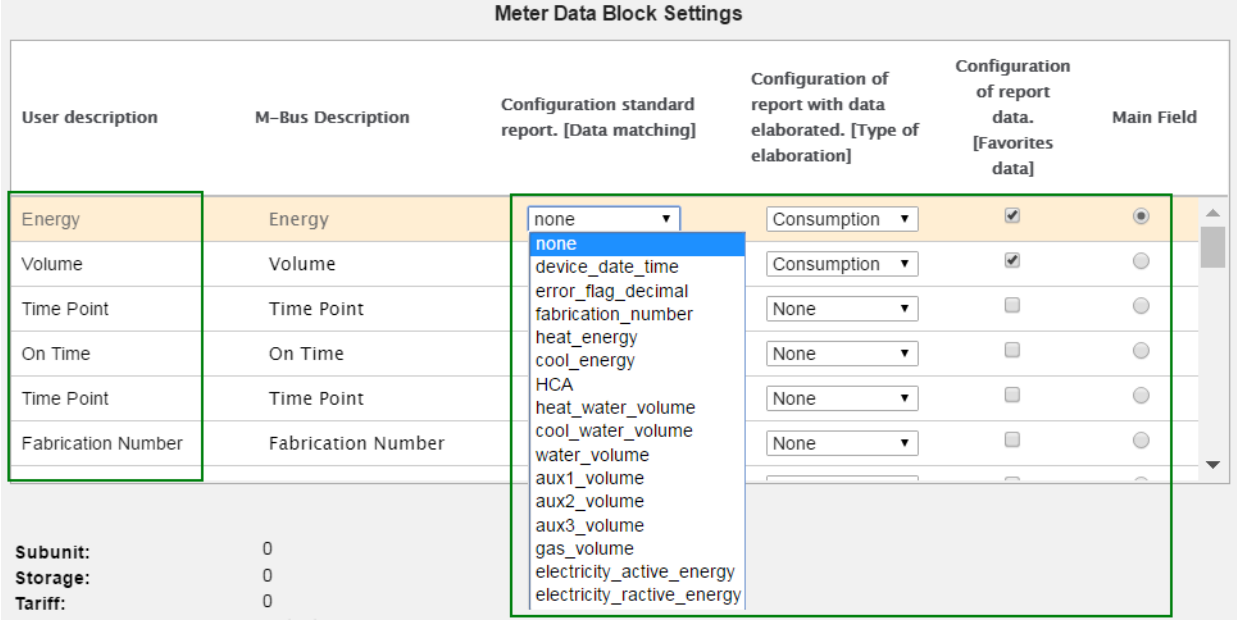
- Device Name: indicates the name of the device
- Description 1: if not inserted enter the first description for the identification of the meter
- Description 2: if not inserted enter the second description for the identification of the meter
- Installation date: indicates when the meter was installed. This is set automatically upon saving the meter as described in the previous chapter.
- Scan interval: interval with which Readouts are performed: 15 minutes, 1 hour, 6 hours, 12 hours, 1 day, 1 month.
- Primary Address: indicates the address of the meter. The addresses can range between 1 and 250 (not modifiable)
- Baudrate: Indicates the speed with which the meter communicates with the RTU. Check the meter manual to verify the communication speed.
- Read by: allows you to perform a reading by primary or secondary address
- ID device: indicates the serial number of the selected meter (not modifiable)

- Manufacturer Code: indicates the manufacturer code, according to FLAG MANUFACTURERS ID DLMS standard (not modifiable)
- Medium: indicates the type of value read by the meter (not modifiable)
- Version (HEX): indicates the version of the meter (not modifiable)
- Manufacturer: unknown, editable via EDIT
- Model: unknown, editable via EDIT
- EDIT: pushing the EDIT button will be possible insert
  - Manufacturer: insert the manufacturer name
  - Model: insert the model
  - Select Image: insert an image .gif, 150x150
  - SAVE: press SAVE to save any changes



- Save: to save any changes

3. Meter setup: the cells highlighted in green are modifiable

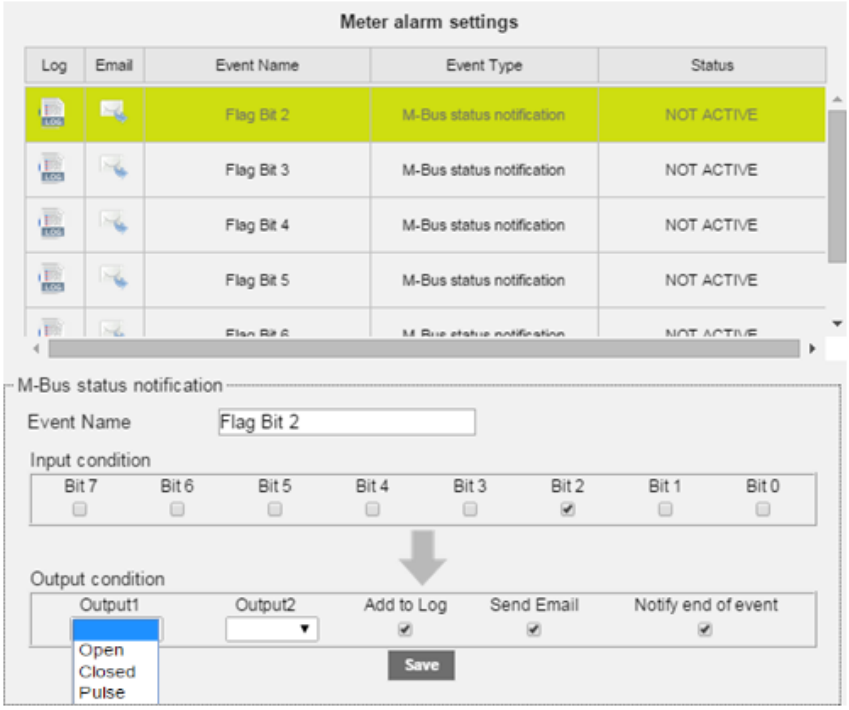


- User description: data coming from the device according to the protocol standard, modifiable
- M-Bus description: data coming from the device according to the protocol standard, not modifiable
- Configuration Standard Report. [Data Association]: bind the data to a particular column of the report in standard format
- Configuration of report with data elaborated. [Type of elaboration]: Select the type of elaboration to the figure reported in the raw data reports. ***Any changes to the summary data will change all the other data already stored in the RTU.***
  You can select among:
  - Disable: no data displayed

- None: any data is shown
- Consumption: it generates the data as maximum period and delta equivalent
- Minimum: generates data as minimum value of the period
- Maximum: generates the data as maximum value for the period
- Main: generates the data as Main field for the period

- Configuration of report data. [Favorite Data]: tick the data to see in reports where there is the lettering [favorite data] and in System Status menu > 02 Wired Devices> [Device]
- Main field: it is the Main field to be displayed in the System Status menu > 02 Wired Devices> [Device]
- Save: to save any changes

4. Meter alarm settings: in this case we will refer to the STATUS BYTE defined by the M-Bus protocol and can be defined by associating alarms from bit 2 to bit 7. The alarms must be set manually by referring to the datasheet of the meter. The definition of alarms to be set according to binary logic by associating to each and every bit an alarm***. Require the integration of the product***.

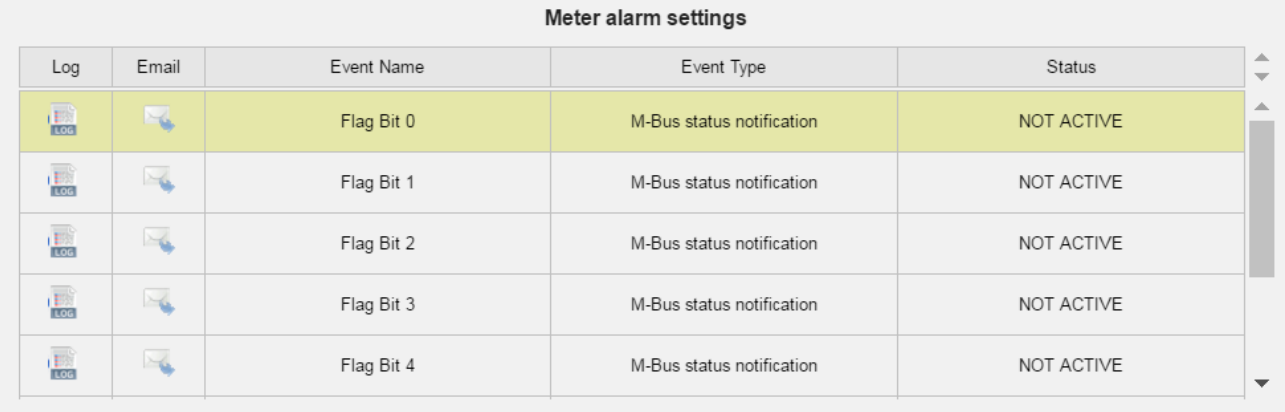


For each alarm will be associated a FlagBit identifier and can be changed in the Event Name field. In the lower part, you can choose whether to enable the digital outputs or not when an event occurs (Ref. 5.9)

- Output 1: the alarm occurrence will be able to activate the digital output O1, such as:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse

- Output 2 the alarm occurrence will be able to activate the digital output O2, such as:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Add to Log: stores the alarm in the meter's log
- Send Email: sends an email notification in the event of an alarm (Ref. Chapter 5.4, 8.4.)
- Event closure notification: sends an email notification when an event is closed.

Once the single events are solved, the table will display the following information



- Email: shows if the alarm email notification is active
- Event name: shows the name of the alarm. Data coming from the device according to the protocol standard, modifiable
- Event type: shows the type of event. Data coming from the device according to the protocol standard, modifiable
- Status: shows the alarm status (activated or deactivated). Data coming from the device according to the protocol standard, not modifiable

After making all the changes confirm them through the appropriate window, see image below. Any changes you make will not be saved in the RTU without confirmation.

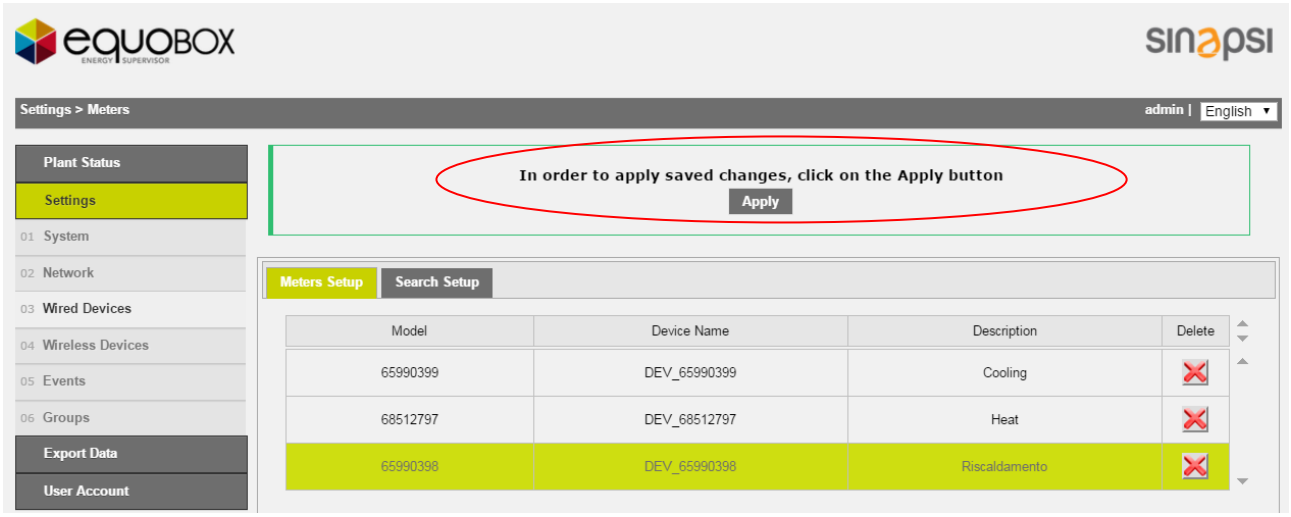


Figure 38 - Notification of changes application wired devices

11.15 SETTINGS – WIRELESS DEVICES

Section dedicated to the description/configuration of parameters/tools provided by the system to search wireless devices in the system.

11.16 Devices setup

This section lists the devices saved at the end of the search operation. At first use, the section will appear empty. The system allows the management of the meters according to two different types:

1. Meter integrated into the database (refer to Paragraph 11.17)
2. Meter not integrated into the database (refer to Paragraph 11.18)

11.17 Meters built into the Database

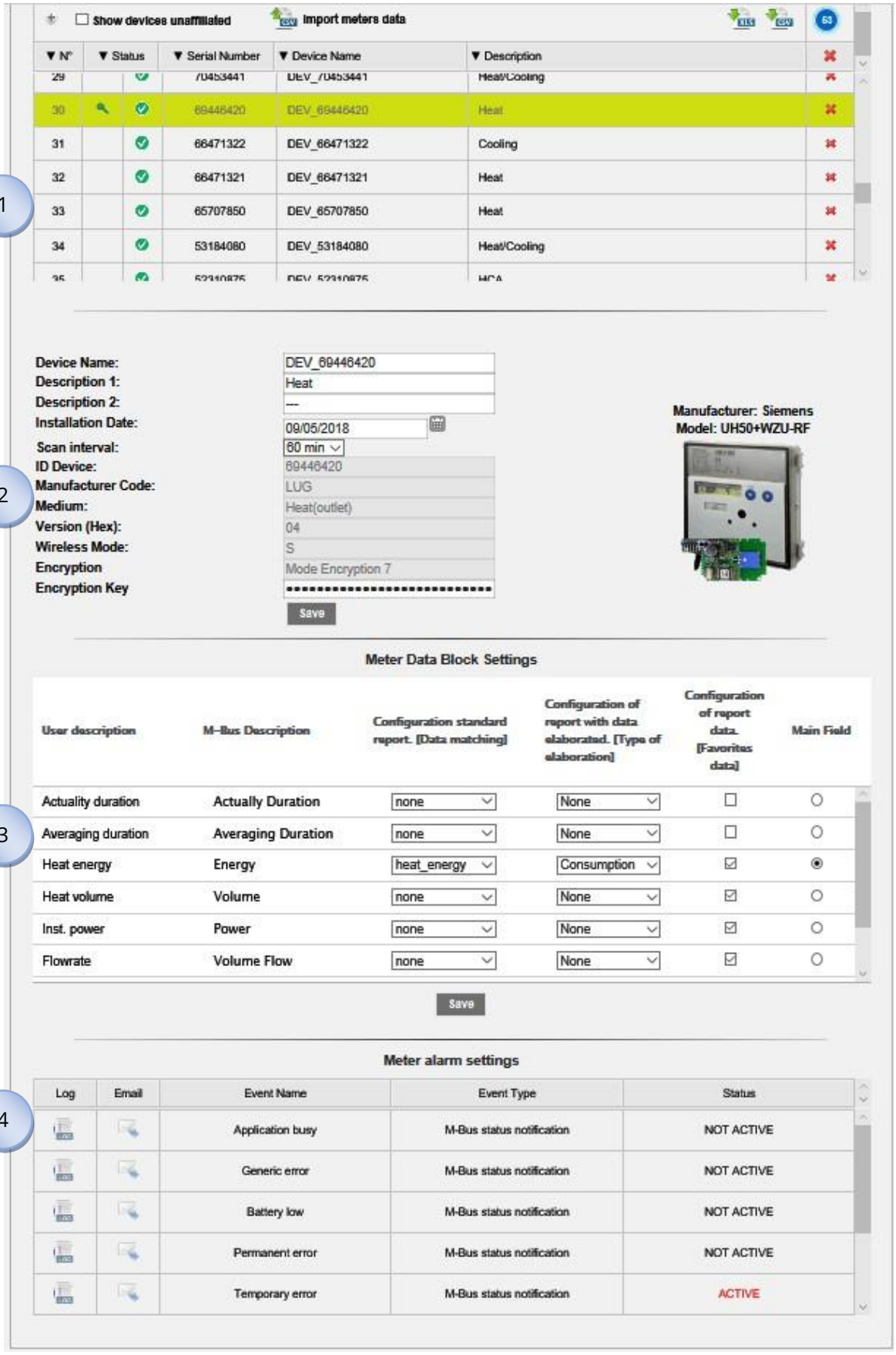
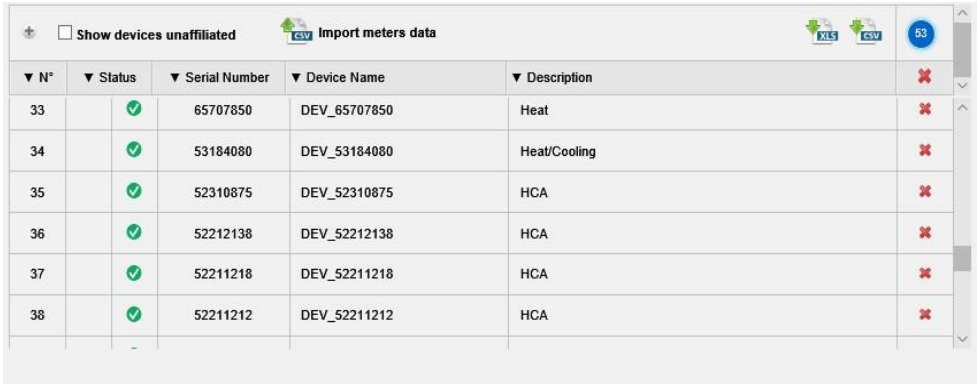


Figure 39 - Meter setup

The screen is divided as follows:

1. Meter table

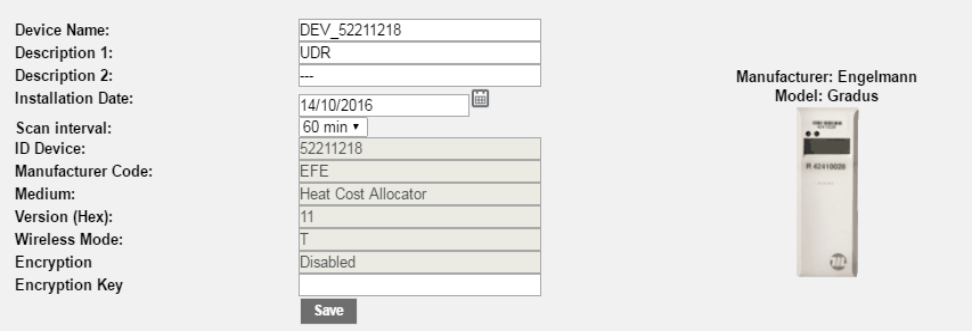


- Heading:
  - enlarges the display window until it contains all the meters
  - Show devices unaffiliated displays only the unaffiliated meters
  - Import meters data Import CSV with affiliate counters description. If the file contains devices other than those saved, the descriptions of the meters in the table of saved devices (affiliates) are copied.
  - downloading a file (.CSV or .XLS) with the meter list
  - number of meters in list and affiliate percentage
- N°: meter progressive number
- State:
  - left column:
    - correct Encryption Key
    - incorrect Encryption Key
    - not yet verified Encryption Key
  - right column:
    - affiliated device
    - unaffiliated device
    - device affiliation in progress
- Serial Number: meter serial number
- Device Name: meter name
- Description: meter description
- : click on the symbol to delete the meter

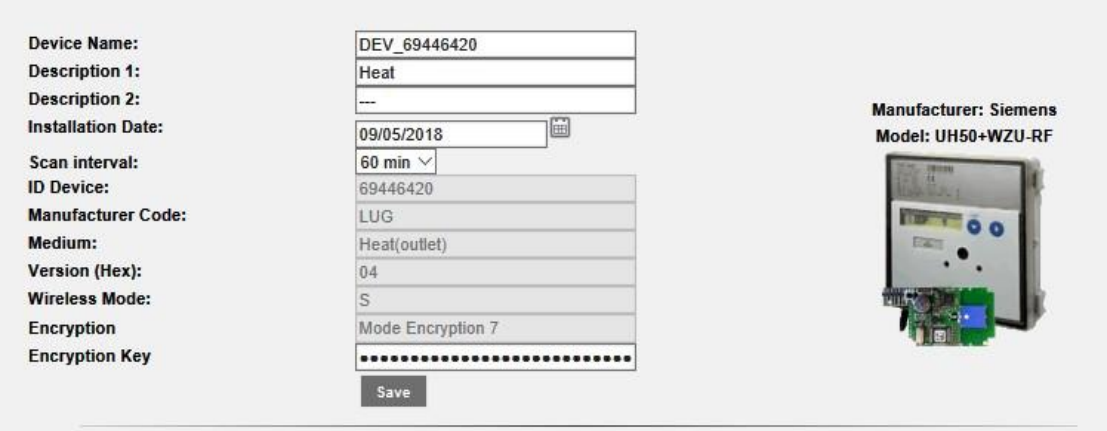
Note: clicking on the symbol in the headings clears all the meters of the table.

Note: clicking on the names of the heading columns ▼ N° ▼ Sta, you can sort the rows of the table to N °, state, serial number, device name and description.

2. Meter data: the white cells are modifiable

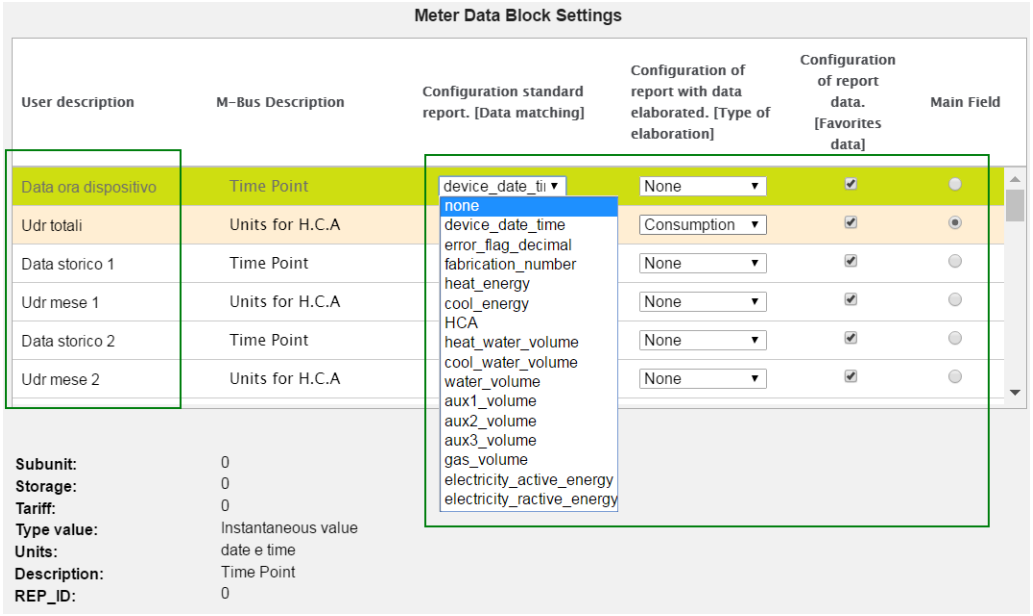


- Device Name: indicates the name of the device
- Description 1: if not inserted enter the first description for the identification of the meter
- Description 2: if not inserted enter the second description for the identification of the meter
- Installation date: indicates when the meter was installed. This is set automatically upon saving the meter as described in the previous chapter.
- Scan interval: interval with which Readouts are performed: 15 minutes, 1 hour, 6 hours, 12 hours, 1 day, 1 month.
- ID device: indicates the serial number of the selected meter (not modifiable)
- Manufacturer Code: indicates the manufacturer code, according to FLAG MANUFACTURERS ID DLMS standard (not modifiable)
- Medium: indicates the type of value read by the meter (not modifiable)
- Version (HEX): indicates the version of the meter (not modifiable)
- Wireless Mode: indicates the W. M-Bus communication mode supported by device (not modifiable).
- Encryption: indicates the type of encryption supported by the device (not modifiable)
- Encryption Key: insert the specific encryption key of the device, if different from the one of the two global encryption keys (see next paragraph).
  Two cryptographic modes are supported: Mode Encryption 5 and Mode Encryption 7.



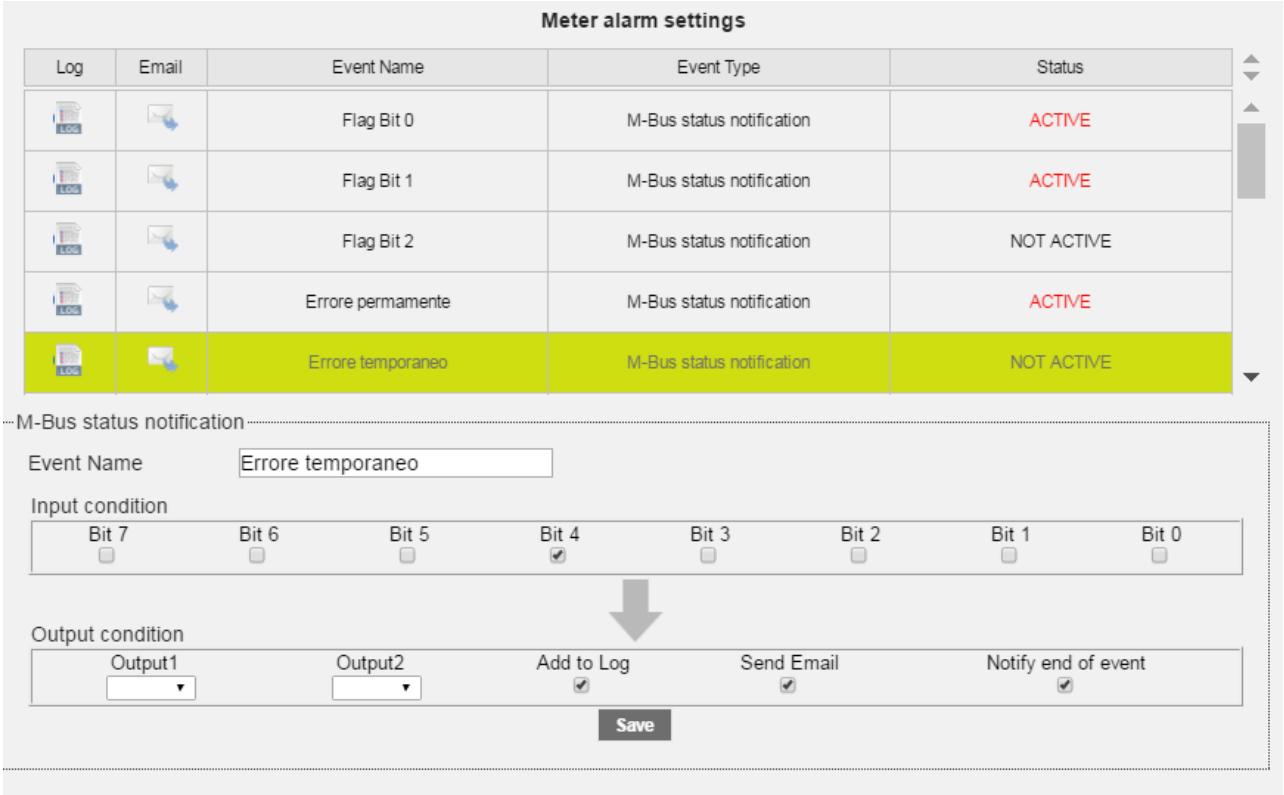
- Save: to save any changes

3. Meter setup: the cells highlighted in green are modifiable

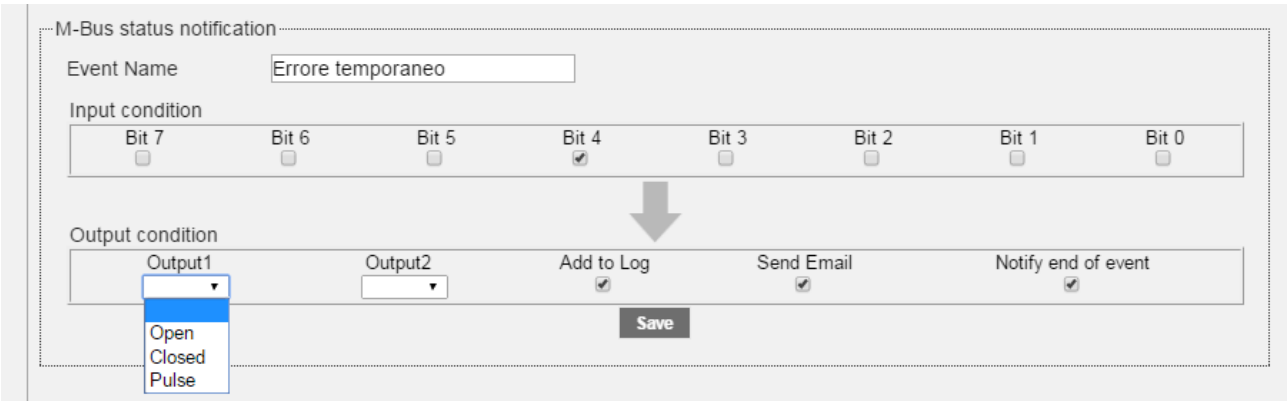


- User description: data coming from the device according to the protocol standard, modifiable
- M-Bus description: data coming from the device according to the protocol standard, not modifiable
- Configuration Standard Report. [Data Association]: bind the data to a particular column of the report in standard format
- Configuration of report with data elaborated. [Type of elaboration]: Select the type of elaboration to the figure reported in the raw data reports. ***Any changes to the summary data will change all the other data already stored in the RTU.***
  You can select among:
  - Disable: no data displayed
  - None: any data is shown
  - Consumption: it generates the data as maximum period and delta equivalent
  - Minimum: generates data as minimum value of the period
  - Maximum: generates the data as maximum value for the period
  - Main: generates the data as Main field for the period
- Configuration of report data. [Favorite Data]: tick the data to see in reports where there is the lettering [Favorite Data] and in System Status menu > 02 Wireless Devices> [Device]
- Main field: it is the Main field to be displayed in the System Status menu > 02 Wireless Devices> [Device]
- Save: to save any changes

4. Meter alarm settings: every meter has a series of errors that can be set individually. All the alarms managed by the RTU are shown in the following table. For every alarm, you can set the configurations described below, and for each alarm will be possible to customize its management. By default, all the checkmarks are disabled for every alarm. See “Low Battery”, for example. After selecting an alarm will open the page of details.

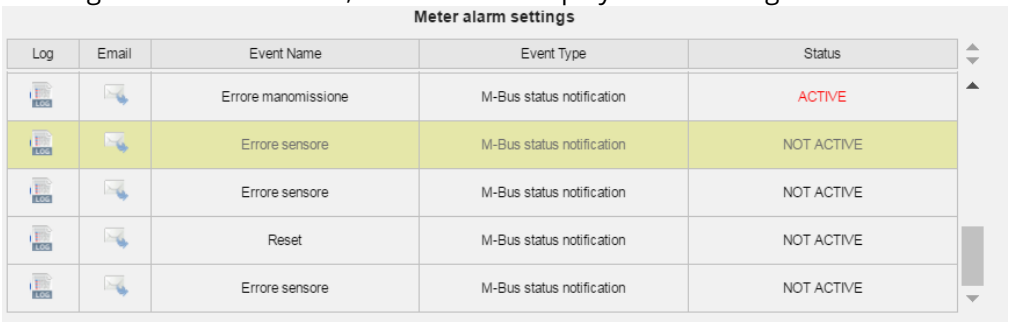


For every alarm well be reported the alarm name (modifiable), the bit configuration for the alarm identification (not modifiable). In the lower part, you can choose whether to enable the digital outputs or not when an event occurs (Ref. 5.9)



- Output 1: the alarm occurrence will be able to activate the digital output O1: such as:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Output 2: the alarm occurrence will be able to activate the digital output O2, such as:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Add to Log: stores the alarm in the meter's log
- Send Email: sends an email notification in the event of an alarm (Ref. Chapter 5.4, 8.4.)
- Event closure notification: sends an email notification when an event is closed.

Once the single events are solved, the table will display the following information



- Log: shows if the logging status is activated
- Email: shows if the alarm email notification is active
- Event name: shows the name of the event. Data coming from the device according to the protocol standard, modifiable
- Event type: shows the type of event. Data coming from the device according to the protocol standard, not modifiable
- Status: shows the alarm status (activated or deactivated). Data coming from the device according to the protocol standard, not modifiable

After making all the changes confirm them through the appropriate window, see image below. Any changes you make will not be saved in the RTU without confirmation.

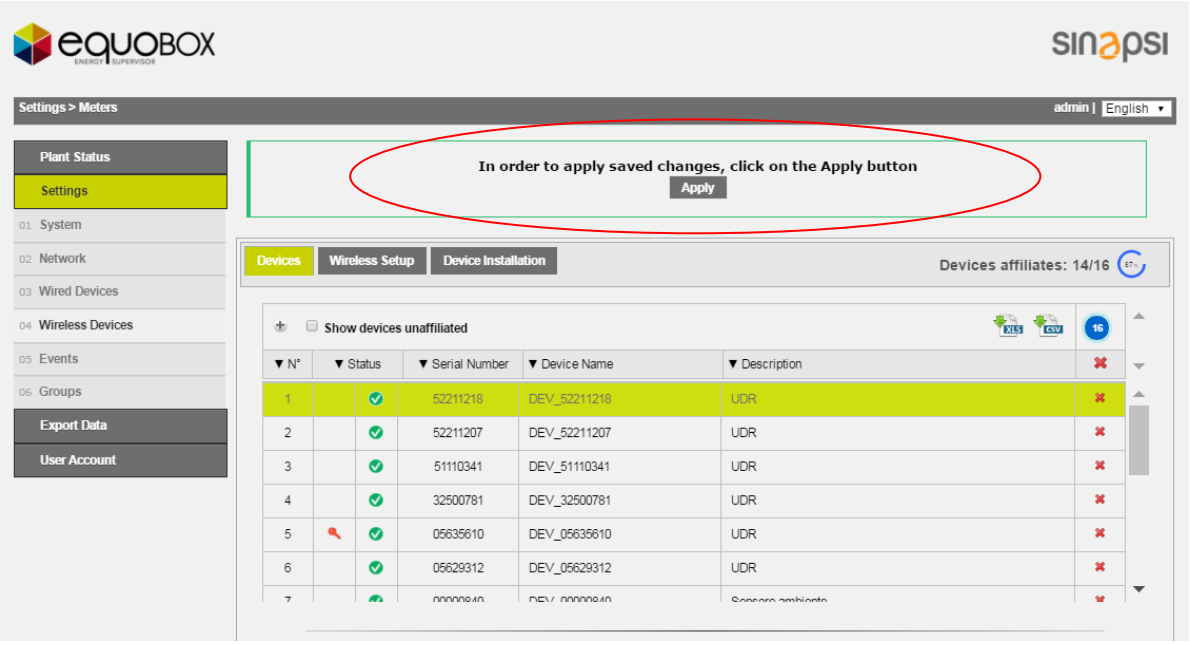


Figure 40 - Notification of changes application wireless devices

11.18 Meter Setup – Meters not built into RTU Database

This section shows the devices acquired at the end of the search operation. At first use, the section will appear empty.

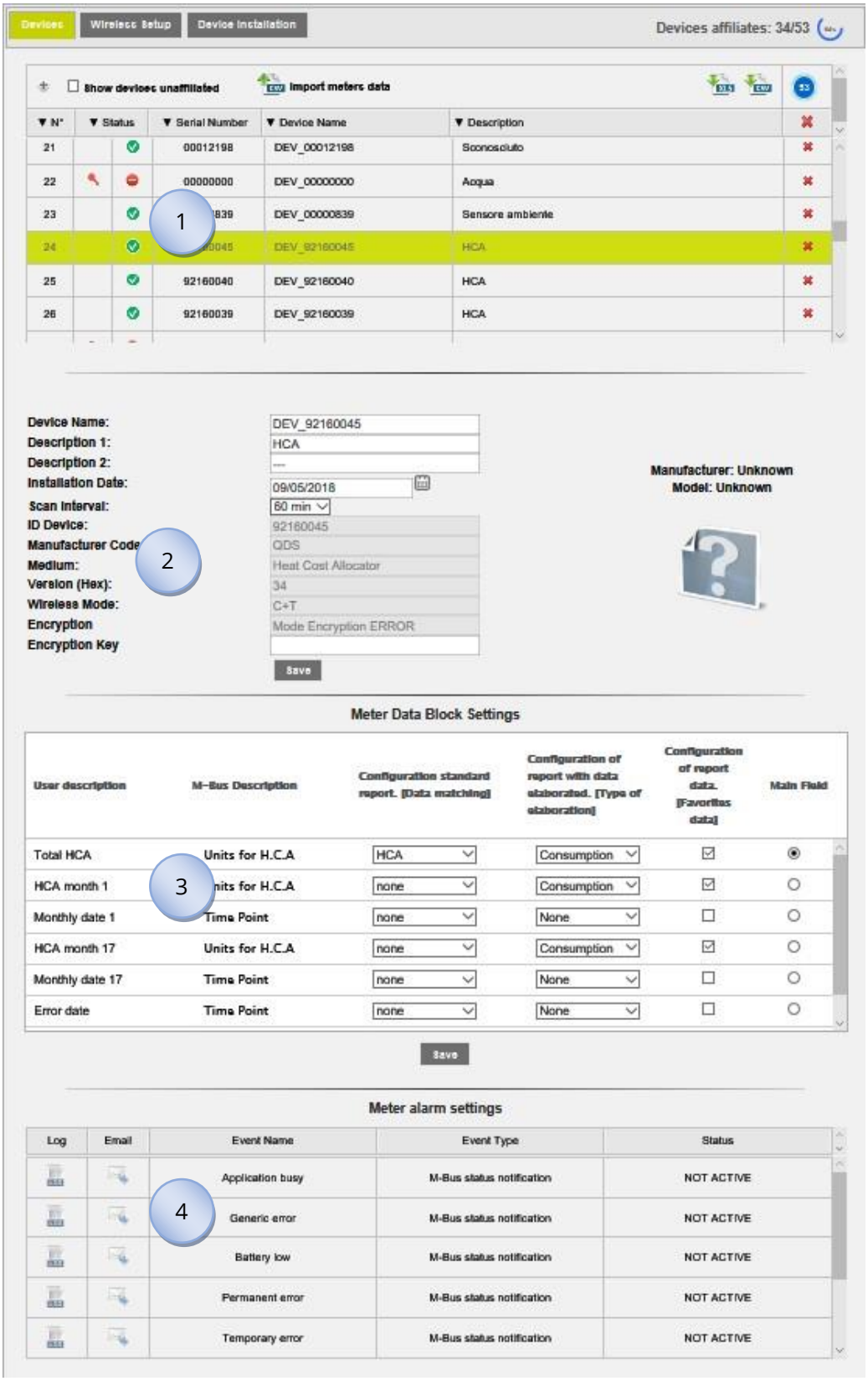
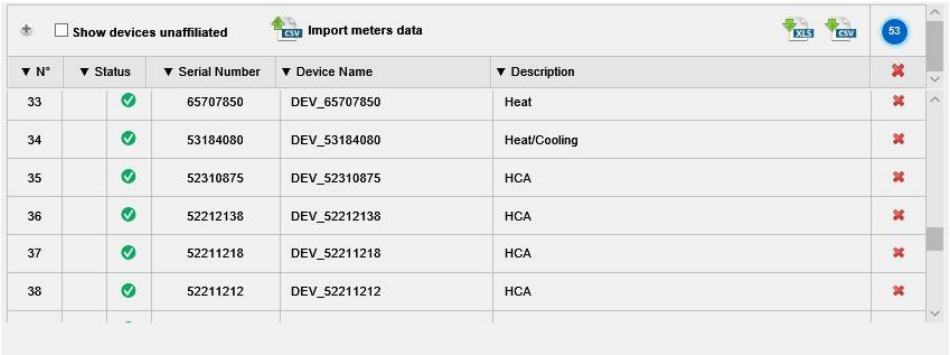


Figure 41 - Meter setup

The screen is divided as follows:

1. Meter table

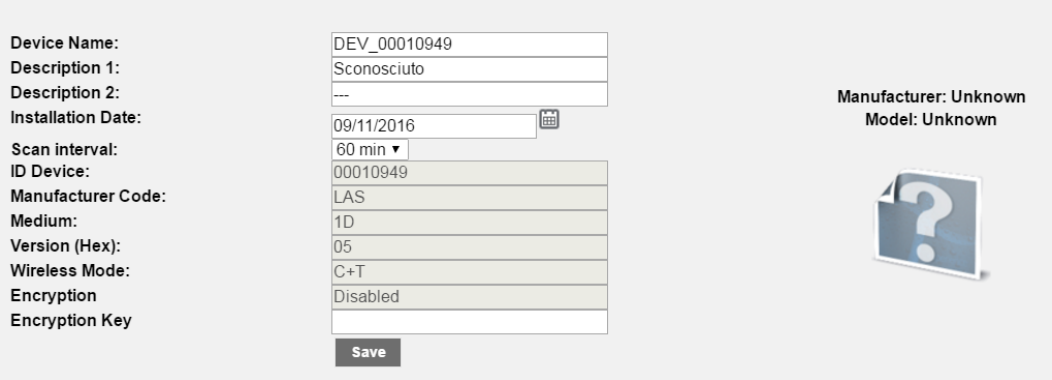


- Heading:
  - enlarges the display window until it contains all the meters
  - Show devices unaffiliated displays only the unaffiliated meters
  - Import meters data Import CSV with affiliate counters description. If the file contains devices other than those saved, the descriptions of the meters in the table of saved devices (affiliates) are copied.
  - downloading a file (.CSV or .XLS) with the meter list
  - 53 number of meters in list and affiliate percentage
- N°: meter progressive number
- State:
  - left column:
    - correct Encryption Key
    - incorrect Encryption Key
    - not yet verified Encryption Key
  - right column:
    - affiliated device
    - unaffiliated device
    - device affiliation in progress
- Serial Number: meter serial number
- Device Name: meter name
- Description: meter description
- : click on the symbol to delete the meter

Note: clicking on the symbol in the headings clears all the meters of the table.

Note: clicking on the names of the heading columns ▼ N° ▼ Sta, you can sort the rows of the table to N °, state, serial number, device name and description.

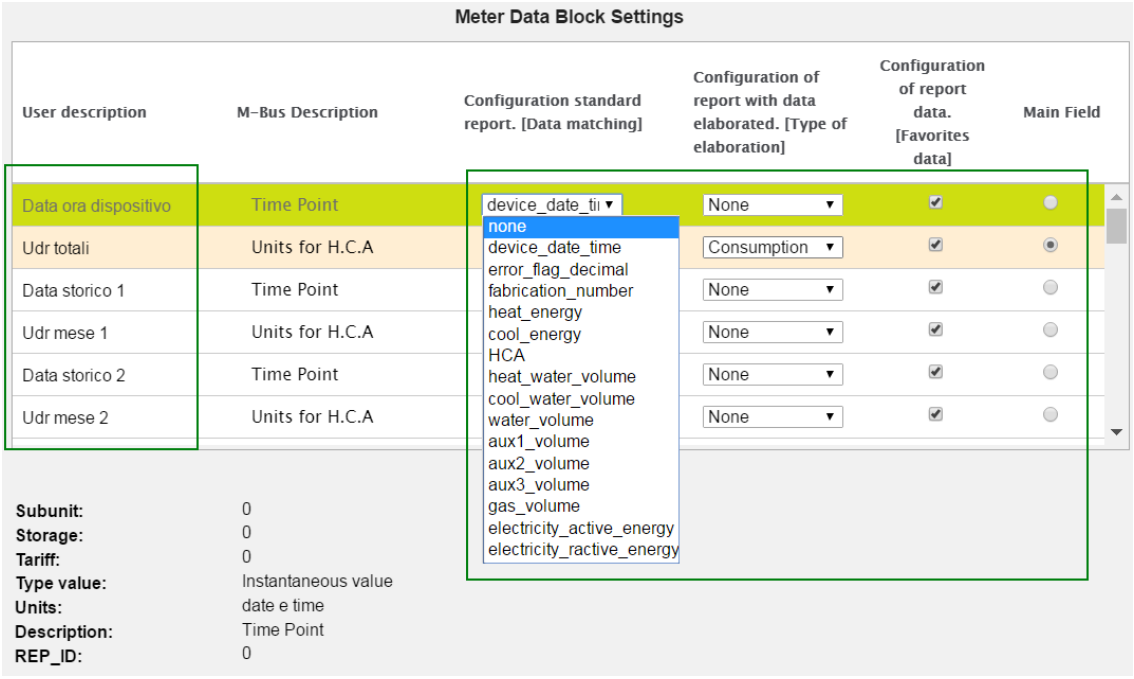
2. Meter data: the white cells are modifiable



- Device Name: indicates the name of the device.
- Description 1: if not inserted enter the first description for the identification of the meter.
- Description 2: if not inserted enter the second description for the identification of the meter.
- Installation date: indicates when the meter was installed. This is set automatically upon saving the meter as described in the previous chapter.
- Scan interval: interval with which Readouts are performed: 15 minutes, 1 hour, 6 hours, 12 hours, 1 day, 1 month.
- ID device: indicates the serial number of the selected meter (not modifiable).
- Manufacturer Code: indicates the manufacturer code, according to FLAG MANUFACTURERS ID DLMS standard (not modifiable).
- Medium: indicates the type of value read by the meter (not modifiable).
- Version (HEX): indicates the version of the meter (not modifiable).
- Wireless Mode: indicates the W. M-Bus communication mode supported by device (not modifiable).
- Encryption: indicates the type of encryption supported by the device (not modifiable).
- Encryption Key: insert the specific encryption key of the device, if different from the one of the two global encryption keys (see next paragraph).
  Two cryptographic modes are supported: Mode Encryption 5 and Mode Encryption 7.

- Save: to save any changes.
-

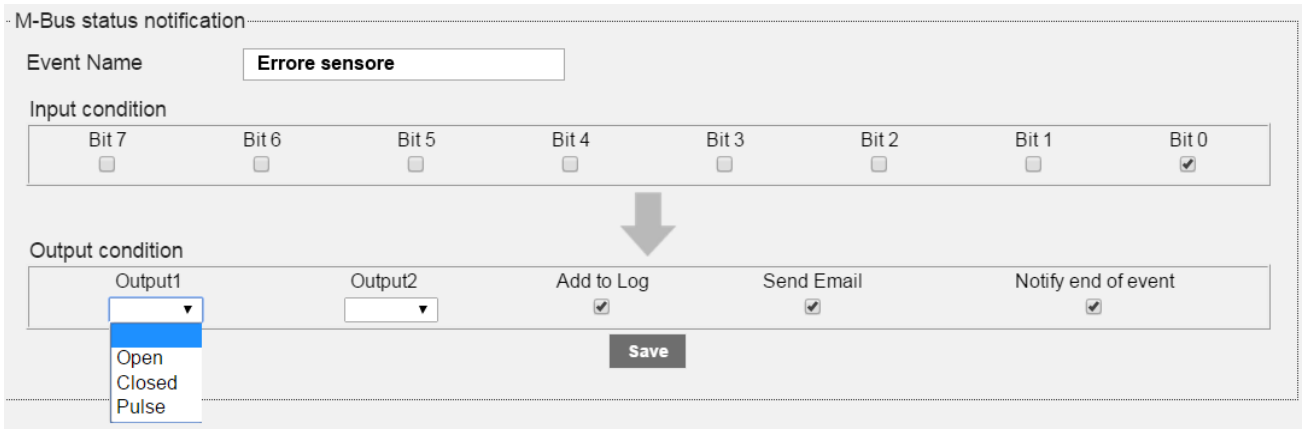
3. Meter setup: the cells highlighted in green are modifiable



- User description: data coming from the device according to the protocol standard, modifiable
- M-Bus description: data coming from the device according to the protocol standard, not modifiable
- Configuration Standard Report. [Data Association]: bind the data to a particular column of the report in standard format
- Configuration of report with data elaborated. [Type of elaboration]: Select the type of elaboration to the figure reported in the raw data reports. ***Any changes to the summary data will change all the other data already stored in the RTU.***
  You can select among:
  - Disable: no data displayed
  - None: any data is shown
  - Consumption: it generates the data as maximum period and delta equivalent
  - Minimum: generates data as minimum value of the period
  - Maximum: generates the data as maximum value for the period
  - Main: generates the data as Main field for the period
- Configuration of report data. [Favorite Data]: tick the data to see in reports where there is the lettering [Favorite Data] and in System Status menu > 02 Wireless Devices> [Device]
- Main field: it is the Main field to be displayed in the System Status menu > 02 Wireless Devices> [Device]
- Save: to save any changes

4. Meter alarm settings: in this case we will refer to the STATUS BYTE or to the ERROR FLAG defined by the M-Bus protocol and the alarms can be defined by associating them to the first eight bits (status byte) or all sixteen bits (error flag). The alarms must be set manually by referring to the datasheet of the meter. The definition of alarms to be set according to binary logic by associating an alarm to each bit***. Require the integration of the product***.

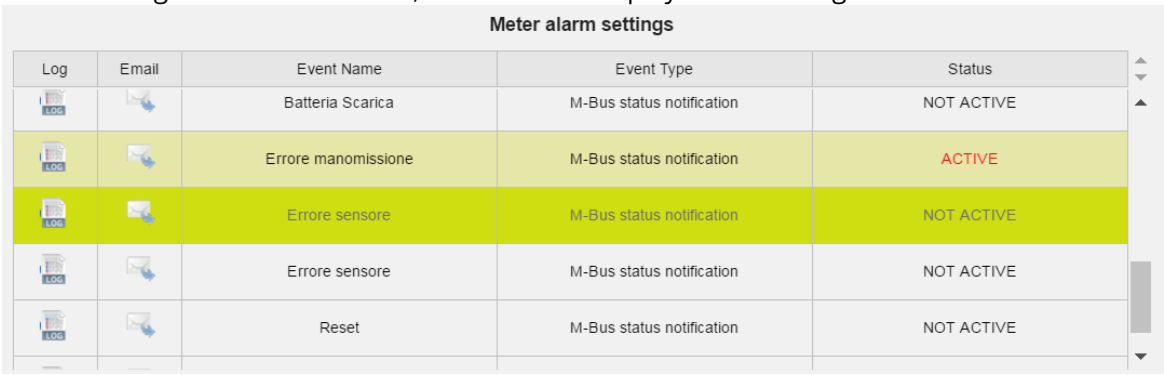
For each alarm will be associated a Flag Bit identifier and the Event Name field can be changed. In the lower part, you can choose whether to enable the digital outputs or not when an event occurs (Ref. 5.9)



- Output 1: the alarm occurrence will be able to activate the digital output O1, such as:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Output 2 the alarm occurrence will be able to activate the digital output O2, such as:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Add to Log: stores the alarm in the meter's log
- Send Email: sends an email notification in the event of an alarm (Ref. Chapter 5.4, 8.4.)

- Event closure notification: sends an email notification when an event is closed.

Once the single events are solved, the table will display the following information



- Log: shows if the logging status is activated
- Email: shows whether the alarm email notification is active
- Event name: shows the name of the event Data coming from the device according to the protocol standard, modifiable
- Event type: shows the type of event. Data coming from the device according to the protocol standard, not modifiable
- Status: shows the alarm status (activated or deactivated). Data coming from the device according to the protocol standard, modifiable.

After making all the changes confirm them through the appropriate window, see image below. Any changes you make will not be saved in the RTU without confirmation.

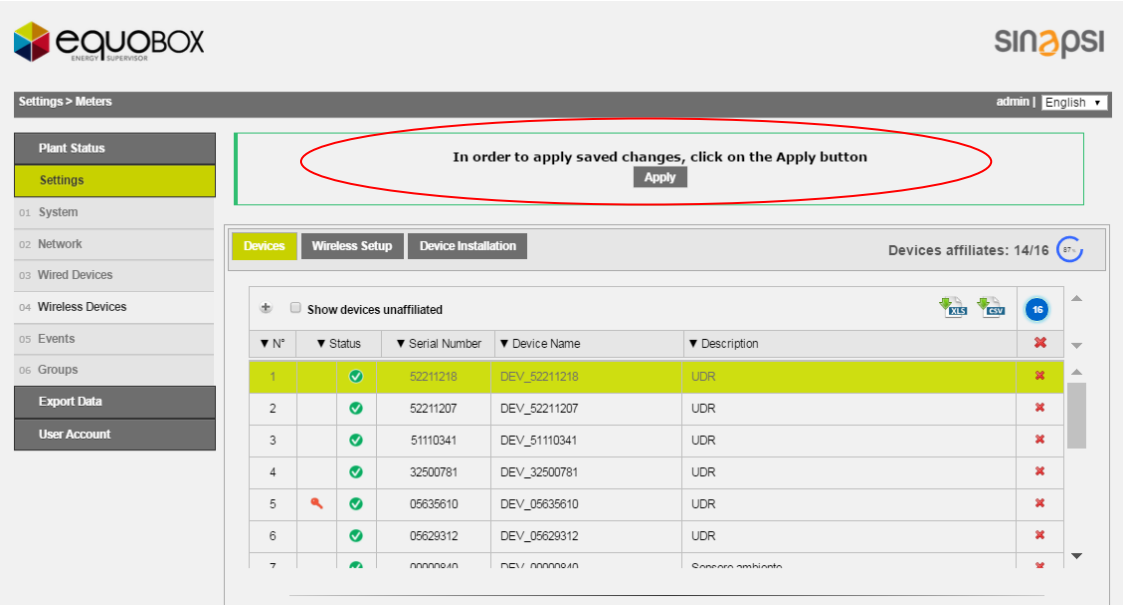


Figure 42 - Notification of changes application wireless devices

11.19 Setup W. M-Bus

From this section you can define the W. M-Bus network setup parameters of the device. The settings of this section need to be performed before starting the research phase of wireless devices (see Figure 43).

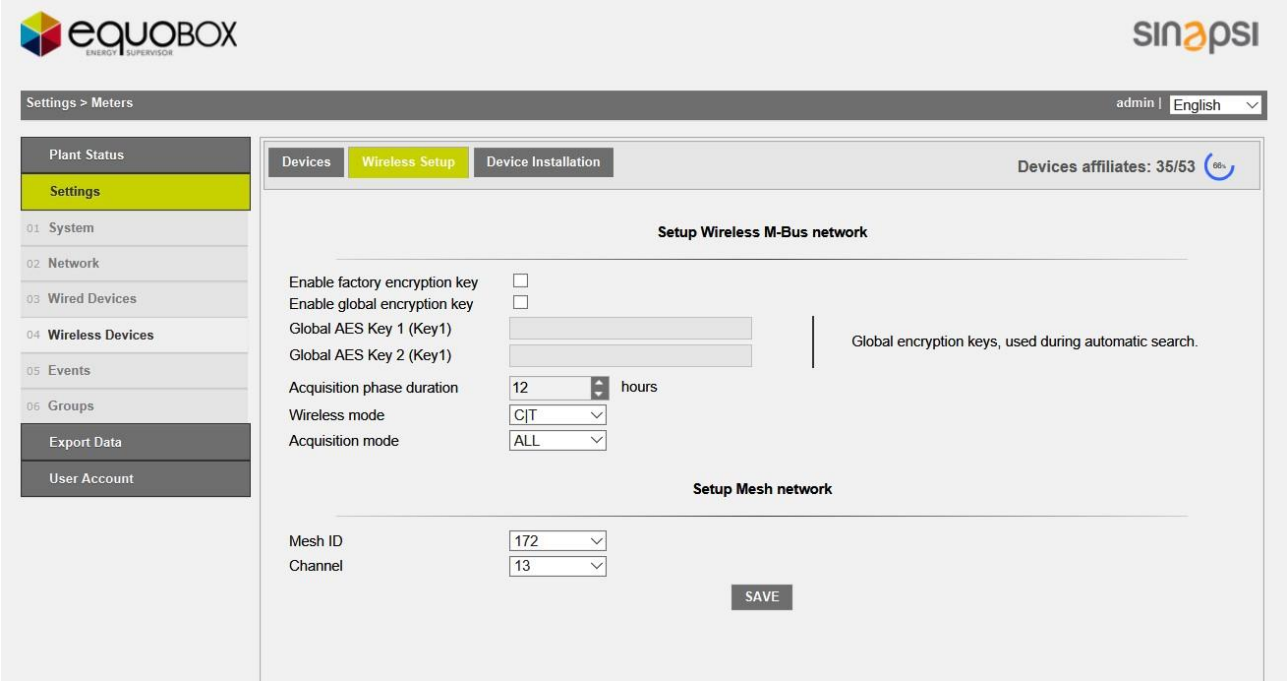


Figure 43 – Setup wireless

- Enable factory keys: check if you want to use cryptographic keys provided by the manufacturer of a given device.
- Enable Global keys: tick if you want to use encryption key global shared by all devices that the system must acquire. The system is able to support up to two encryption keys in the research stage (Key 1/2). If the system has to manage devices for a total number greater than 2 of encryption keys, these will have to be set between the reference characteristics of the individual read wireless device (See paragraph wireless devices → devices)
- AES Global 1 Key (Key1): Enter encryption key 1 (Mode Encryption 5/7)
- AES Global 2 Key (Key2): Enter encryption key 2 (Mode Encryption 5/7)
- Duration of step acquisition: Select from the menu the duration of the wireless acquisition phase. After this phase, the system automatically exits from the research phase. From this moment on, the system will no longer be able to find new devices, except to start a new search phase.
- Wireless mode: Select from the menu the *operating mode* in which you want the system works (See Appendix for description of W. M-Bus Operating Mode):
  - S + C|T
  - S
  - T
  - C|T

  In case a mixed *operating mode* is selected (marked by the presence of both S and T), the system automatically will manage the acquisition of data in a *time sharing* mode, optimizing time slots in relation to the *operating mode* selected.

- Acquisition mode: Select from the menu one of the two voices
  - ALL
  - SND_IR
- Save: to save any changes.

11.20 Setup rete Mesh

Before you can create a network of repeaters you must ensure that they have all the same network id and communicate on the same channel. These settings must be repeated also on the RTU so that it is connected to the repeaters network.

- Mesh Network ID: Enter the correct network id (default: 1)
- Mesh Network Channel: enter the channel used by the radio (default 13)

To change these settings to the gateways, please consult the SIN.EQRPT868XT product documentation.

11.21 Devices installation

From this page you can manage the data acquisition phase.

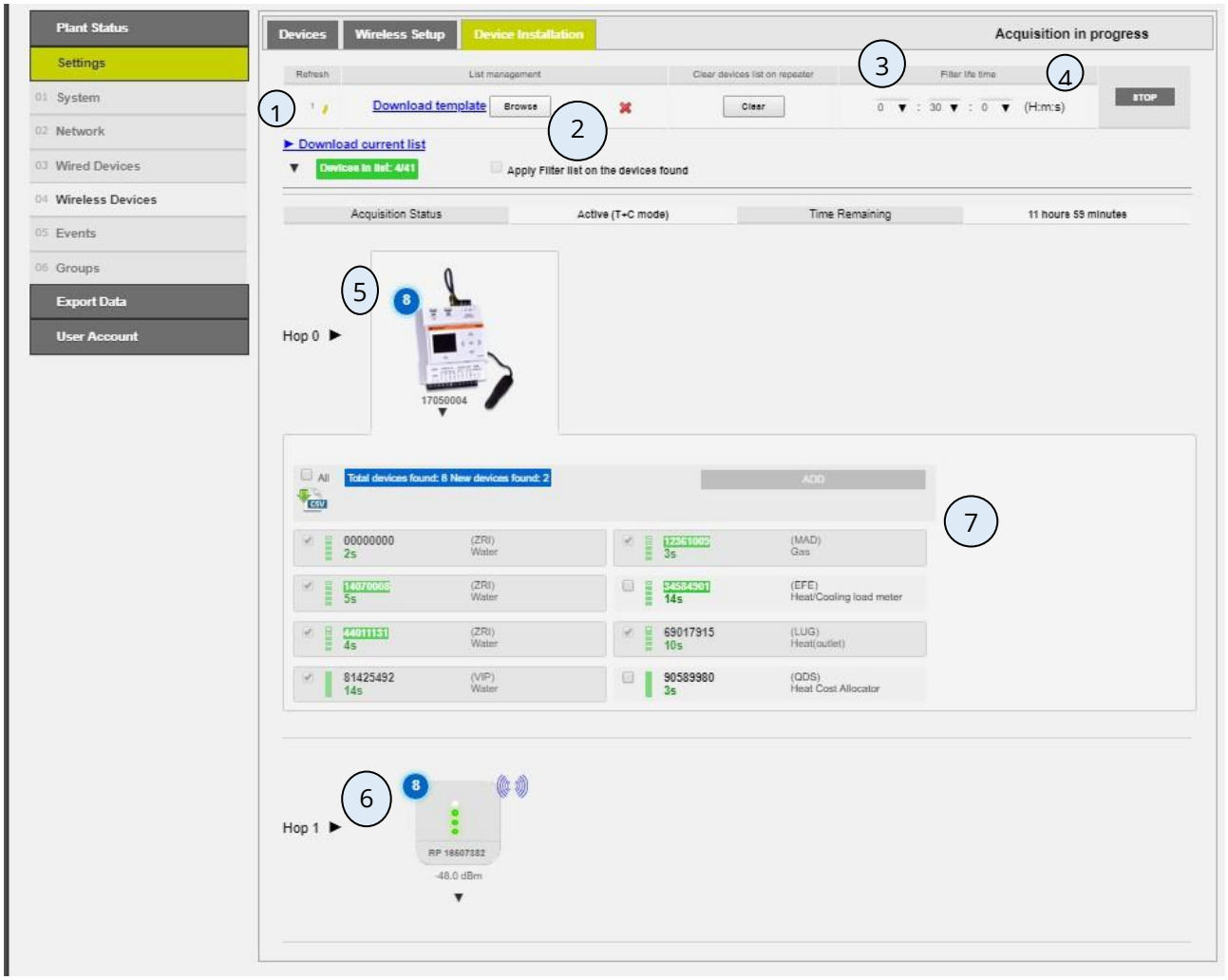


Figure 44 – Devices Installation

The screen is divided:

1. Update:
    - Provides information on the refresh status in the page
    - Clicking on the indicator an immediate update is forced
    - The update takes place when the circle is completed

Figure 45 – Page Update

2. List management:
    - Allows importing a list of devices. This list is typically compiled during installation of the devices in the field. The file list is a common text file in which you have the following columns:
        - ID; HCA Serial; Notes; Street; Address; Surname; Name; City

The fields must be separated by ";". The file must be saved with the extension ".rpt". This file allows having, during the research phase, useful information for installation time optimization of data acquisition system (see "commissioning procedure with the device list").

- To import the list file, click the button Select file, select the list file previously prepared and finally click on the Upload File button. The system returns a notification of the proper (or not) of the import file.
- If successfully imported, the system notifies the presence of a list allowing the access to the following information:

Figure 46 – Device List options

a) The number of devices in it

:

- 0/498 indicates that in the list there are 498 devices and none has yet been found (this parameter will not change until the research phase will begin and radio signals will be received from the meters)
- clicking on the "devices list button" a table is opened where in (a) that summarizes all the information associated with the various devices included in the file list
- in case where a device is detected in the field, its serial number will be highlighted in green in real time.
- the possible presence of duplicate serial in list ⚠
- the indicator appears only at anomaly presence of duplicated serial
- clicking on the icon (c) a table is opened that disclosed IDs and serial numbers of the duplicate devices.

- Display of devices not found: by checking the checkbox (d) in table (a) will display only the devices not found (compared to those in the file list)
- Display of devices found: By ticking the checkbox (c) you can view the list of devices seen by RTU only the meters and found on the list (see "Description 5")
- It can also delete the list imported can also be deleted via the icon .

3. Data Life time:
   - It is a filter, user-editable in hours, minutes, seconds fields, allowing you to highlight those devices for which data are not received by the system more of that time period. A device whose data is not received by more than the value defined by the "filter life given" parameter, is highlighted in red in the views presented by the system on this page during the various phases of work.

4. START/STOP:

   Clicking on the AVVIO button the search phase starts. The RTU at this phase provides information about used operating mode and the remaining time before the end of the acquisition phase (see "Wireless Setup"). It also shows the CLEAR button that allows you to delete the devices found during the scan. Cancellations must be made by the installer once you fix the antennas in their final positions. After clearing the devices, the system remains in scanning and it will acquire new meters in the radio range. Wait until the scan or the reception of all the meters in order to make sure that it acquired the entire system, then add the meters with the button ADD.
   - This phase can be suspended by clicking the ARRESTA button

5. HOP 0:
   - Provides information about the devices interfaced by the system during and after the research phase. The image gives information on the serial number of the RTU and the number of found devices by the system during search phase

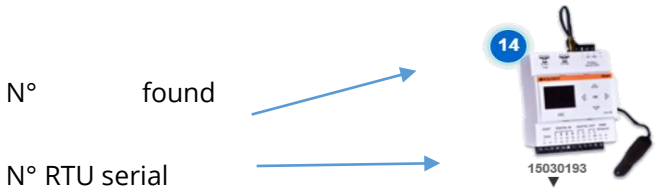


Figure 47 – Hop 0

Clicking on the number of found devices, a window is opened where there are details of these devices. The number of found devices is shown and how many of these are new (a device is considered new if it has not been found in a previous scan). The number of devices shown depends on checkmarks checkbox (c) and (d) (see point 2 - list management).

For each found device are also described:

- Level of the received signal (by positioning the mouse over the indicator, the value of the signal in db with tip strip comes out)
- Device serial number
- Life time of the data (in seconds [s], minute [m], hours [h]). It is shown in red at the time when it is greater than the value set in the "life time given" filter
- M-Bus manufacturer code
- Description of measured meter

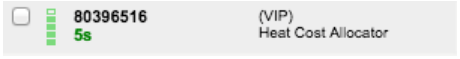
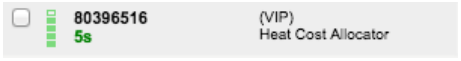


Figure 48 – Info W. M-Bus found device

In the event that the area of the detailed information of the meter should be gray and with the checkbox already checked, it means that the meter has been already present in the RTU as a result of a previous scan, and successive addition and then it is automatically included in the devices that will be added via the button ⑦. This button is gray (disabled) in the event that meters were not detected and not yet present in the RTU.



6. HOP 1..n:
   - Provides information regarding the gateways devices connected to the RTU. The devices listed in the HOP 1 are directly connected to the RTU, while those on following HOP are connected to the RTU through previous HOP.

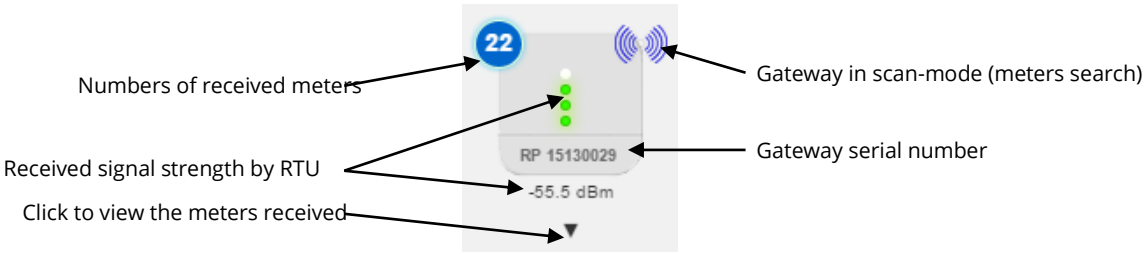


Figure 49 – HOP 1..n

Clicking on the number of devices found, the list of the meters with detailed information is opened:

- Level of the received signal (by positioning the mouse over the indicator, the value of the signal in db with tip strip comes out)
- Device serial number
- Life time of the data (in seconds [s], minute [m], hours [h]). It is shown in red at the time when it is greater than the value set in the "life time given" filter.

7. "ADD" button ④:

This button lets you add the devices found during the scan, devices with the checkbox checked will be only added and they will appear in the Devices section (see 11.16). The system will record only the data of the meters added. After pressing the "ADD" button also the process of affiliation will begin. The process of affiliation can last a few hours, during this period you can use the RTU but you can't view the consumption data. The button CSV where the profile of all the detected devices can be downloaded is displayed.

12. SETTINGS - EVENTS

12.1 I/O Events

This section allows you to set up to four conditions to control the actuators. Ref. 5.9. With reference to that described in Chapter 5.9, the device is equipped with three digital inputs, I1, I2, and I3 and two digital outputs O1 and O2. Figure 50 shows an example of programmable logic.

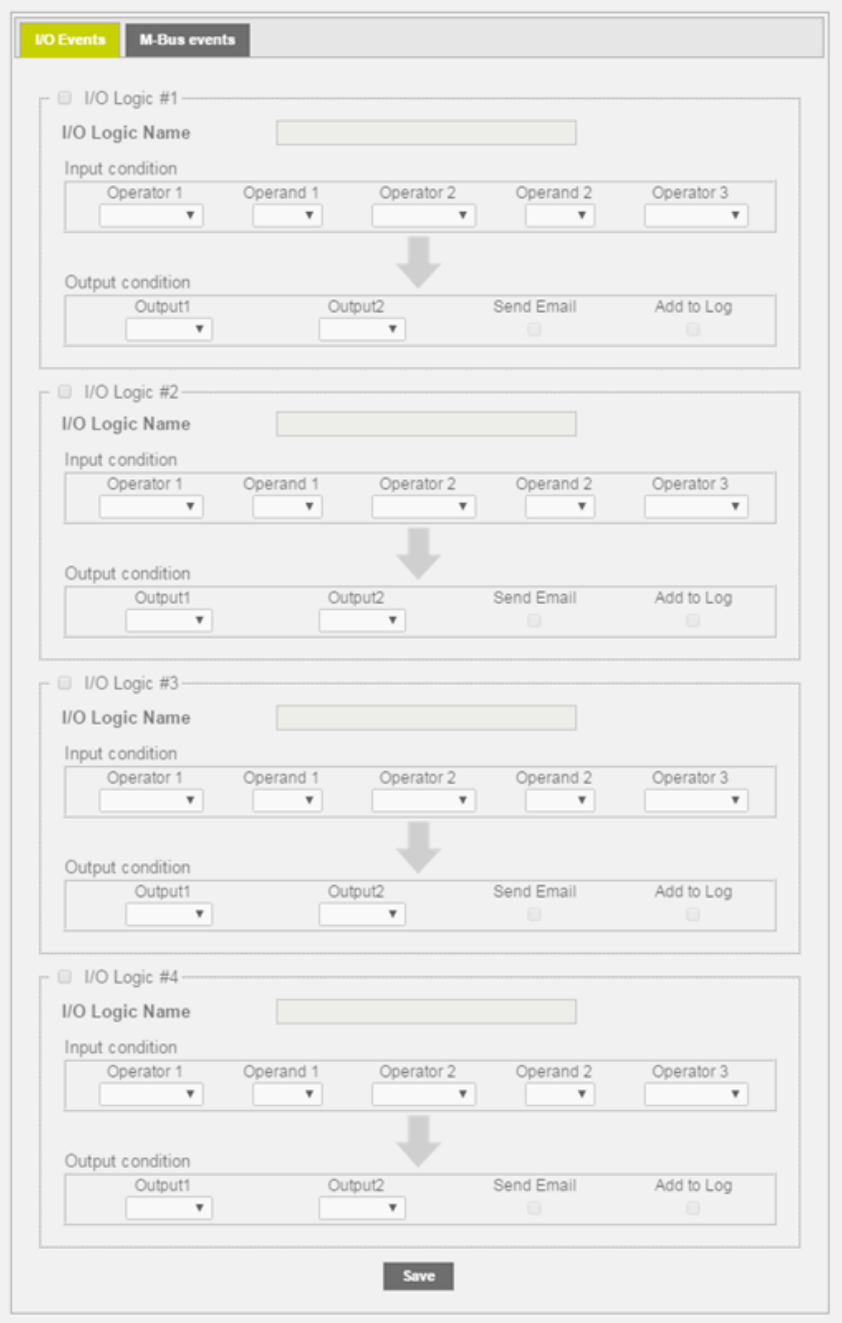


Figure 50 – Logic

Let's assume we want to set a logic, according to which O1 commands an opening and O2 sends a pulse when IN1=ON and IN2=OFF or IN3=OFF. The logic is based on Boolean algebra.

(IN1=ON) AND (IN2=OFF) OR (IN3=OFF)

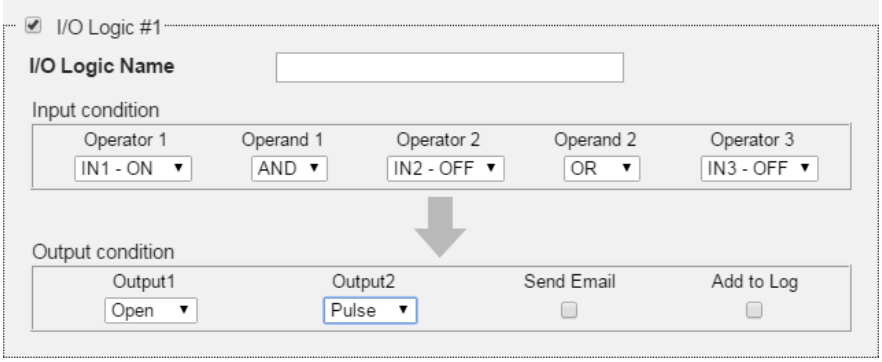


Figure 51 - Programming the logic

The logic settings allow you to select:

- Send email: sends an email to the recipients set in section 11.8
- Add to Log: adds the item to the Log after an event. See Chapter 18.2
- Press Save to save the settings.

12.2 M-Bus events

This section allows you to set the conditions with data coming from the meters in the plant to control outputs O1 and O2. Press the "New Event" button, as shown in Figure 52 to generate a new event

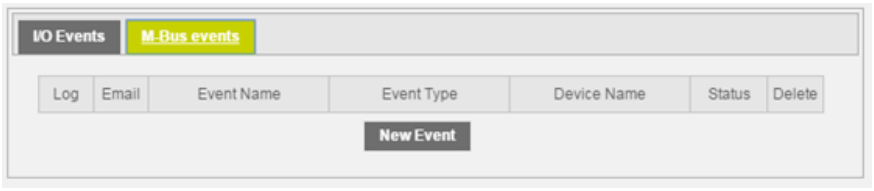


Figure 52 - Creating a new event

Select a meter from which you want to obtain data to set the event.

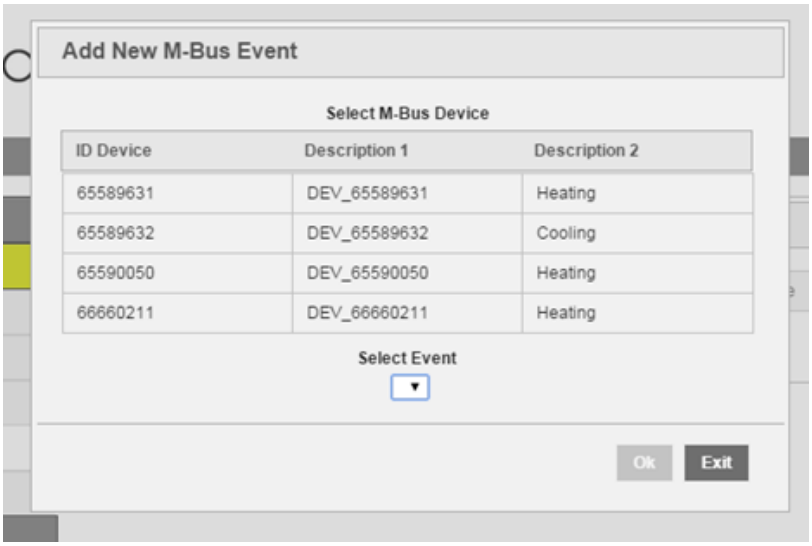


Figure 53 - Selecting a meter

Upon selecting the meter, specify the condition, among:

- Max Value: condition set according to the maximum value acquired by the data
- Min Value: condition set according to the minimum value acquired by the data
- Out of range: condition set according to the range acquired by the data
- M-bus status notify: condition set according to the creation of a new event. Always refer to the meter's documentation to activate this condition.

The next paragraphs will show in detail the parameters to configure the above.

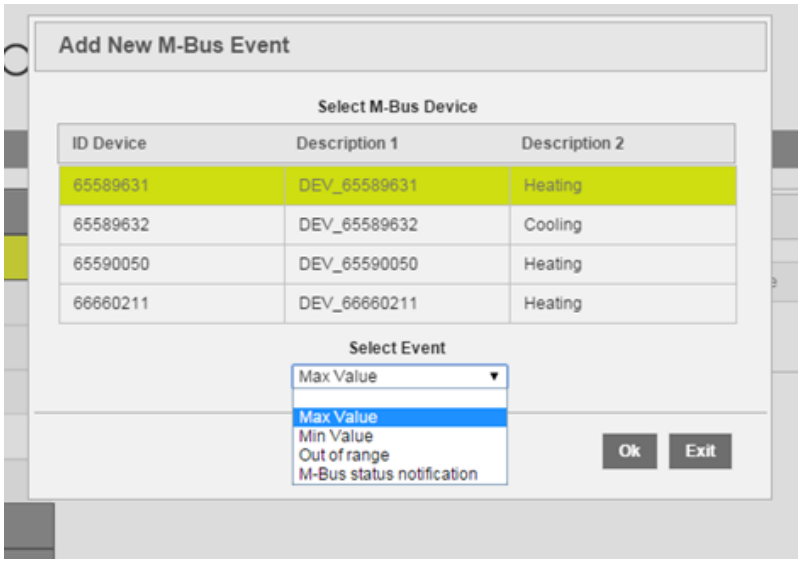


Figure 54 - Selecting an event

12.3 Condition set according to the maximum value acquired

Select Max Value.

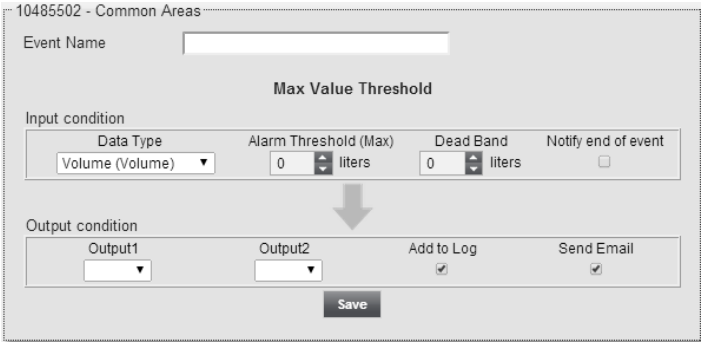


Figure 55 - Completing the creation of an event

The cells to be filled out are:

- Event Name: enter the name of the event being created
- Data Type: select the type of meter data. The data you can select are those that have already been set for every single meter. For more information, refer to Chapter 11.12, 11.14
- Alarm threshold (Max): select an alarm threshold. The value can be both positive or negative
- Dead band: enter the value for which the condition does not occur. This feature allows the system to react with a certain delay to the actions to be taken based on the values measured beforehand

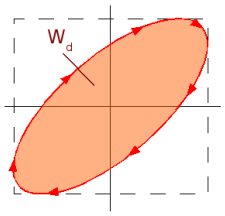


Figure 56 – Dead band

- Event closure notification: sends an email notification whenever an event is closed
- Output 1: when an event occurs, you can enable an operation according to the device connected to Output 1, such as:

  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Output 2: when an event occurs, you can enable an operation according to the device connected to Output 2, such as:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Add to Log: stores the alarm in the meter's log
- Send Email: sends an email notification in the event of an alarm (Ref. Chapter 5.4, 8.4.)
- Save: Press Save to save the configuration

12.4 Condition set according to the minimum value acquired

Select Min Value.

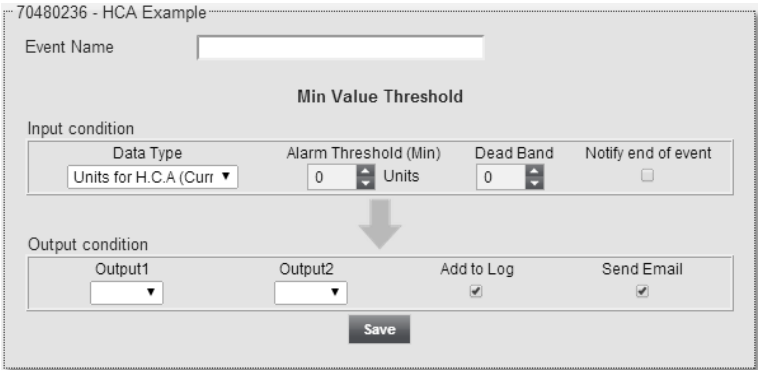


Figure 57 - Completing the creation of an event

The cells to be filled out are:

- Event Name: enter the name of the event being created
- Data Type: select the type of meter data. The data you can select are those that have already been set for every single meter. For more information, refer to Chapter 11.12, 11.14
- Alarm threshold (Min): select an alarm threshold. The value can be both positive or negative
- Dead band: enter the value for which the condition does not occur. This feature allows the system to react with a certain delay to the actions to be taken based on the values measured beforehand

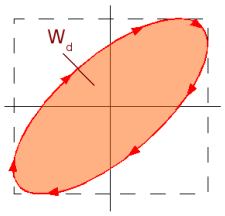


Figure 58 – Dead band

- Event closure notification: sends an email notification whenever an event is closed
- Output 1: when an event occurs, you can enable an operation according to the device connected to Output 1, such as:
  - Open: commands to open
  - Closed: commands to close
  - Pulse: generates a pulse
- Output 2: when an event occurs, you can enable an operation according to the device connected to Output 2, such as:
  - Open: commands to open
  - Closed: commands to close

    - Pulse: generates a pulse
- Add to Log: stores the alarm in the meter's log
- Send Email: sends an email notification in the event of an alarm (Ref. Chapter 5.4, 8.4.)
- Save: Press Save to save the configuration

12.5 Condition set according to the value out of range

Select the Out of range item.

Figure 59 - Completing the creation of an event

The cells to be filled out are:

- Event Name: enter the name of the event being created
- Data Type: select the type of meter data. The data you can select are those that have already been set for every single meter. For more information, refer to Chapter 11.12, 11.14
- Lower threshold: select the lower alarm threshold. The value can be both positive or negative
- Upper threshold: select the upper alarm threshold. The value can be both positive or negative
- Dead band: enter the value for which the condition does not occur. This feature allows the system to react with a certain delay to the actions to be taken based on the values measured beforehand

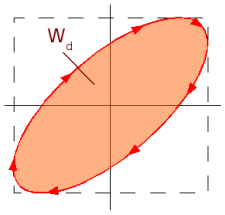


Figure 60 – Dead band

- Event closure notification: sends an email notification whenever an event is closed
- Output 1: when an event occurs, you can enable an operation according to the device connected to Output 1, such as:
    - Open: commands to open
    - Closed: commands to close
    - Pulse: generates a pulse
- Output 2: when an event occurs, you can enable an operation according to the device connected to Output 2, such as:
    - Open: commands to open
    - Closed: commands to close
    - Pulse: generates a pulse
- Add to Log: stores the alarm in the meter's log
- Send Email: sends an email notification in the event of an alarm (Ref. Chapter 5.4, 8.4.)
- Save: Press Save to save the configuration

12.6 Condition set according to the M-Bus status

Select the M-Bus status notify item.

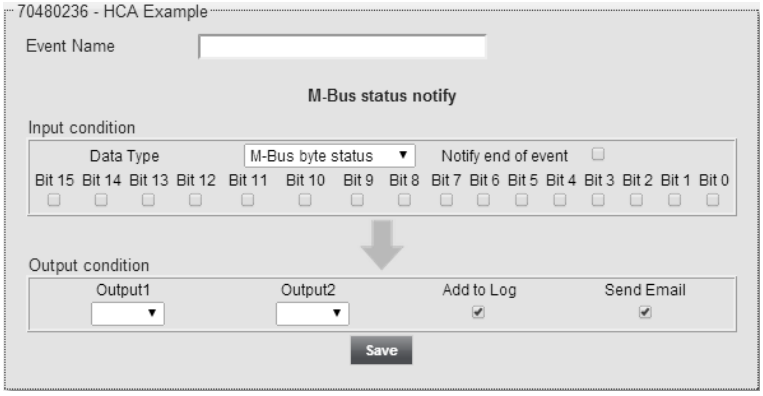


Figure 61 - Completing the creation of an event

The cells to be filled out are:

- Event Name: enter the name of the event being created
- Data Type: select the type of meter data. The data you can select are those that have already been set for every single meter. For more information, refer to Chapter 11.12, 11.14
- Event closure notification: sends an email notification whenever an event is closed
- Word Definition: define a 16bit word to configure the new event to be created. Always refer to the meter's documentation for this type of configuration.
- Output 1: when an event occurs, you can enable an operation according to the device connected to Output 1, such as:
    - Open: commands to open
    - Closed: commands to close
    - Pulse: generates a pulse
- Output 2: when an event occurs, you can enable an operation according to the device connected to Output 2, such as:
    - Open: commands to open
    - Closed: commands to close
    - Pulse: generates a pulse
- Add to Log: stores the alarm in the meter's log
- Send Email: sends an email notification in the event of an alarm (Ref. Chapter 5.4, 8.4.)
- Save: Press Save to save the configuration

13. SETTING - GROUPS

Section dedicated to the creation and monitoring of virtual groups. It will be possible to manage up to a maximum of 250 distinct groups. Each group may have a minimum of one device up to a maximum of 250 devices, as many as the RTU supports.

The section in divided into:

- Groups: section dedicated for the groups creation
- Definition: section dedicated for the group definition. Definition is mean the inclusion, inside the groups, of the devices previously configured in the RTU

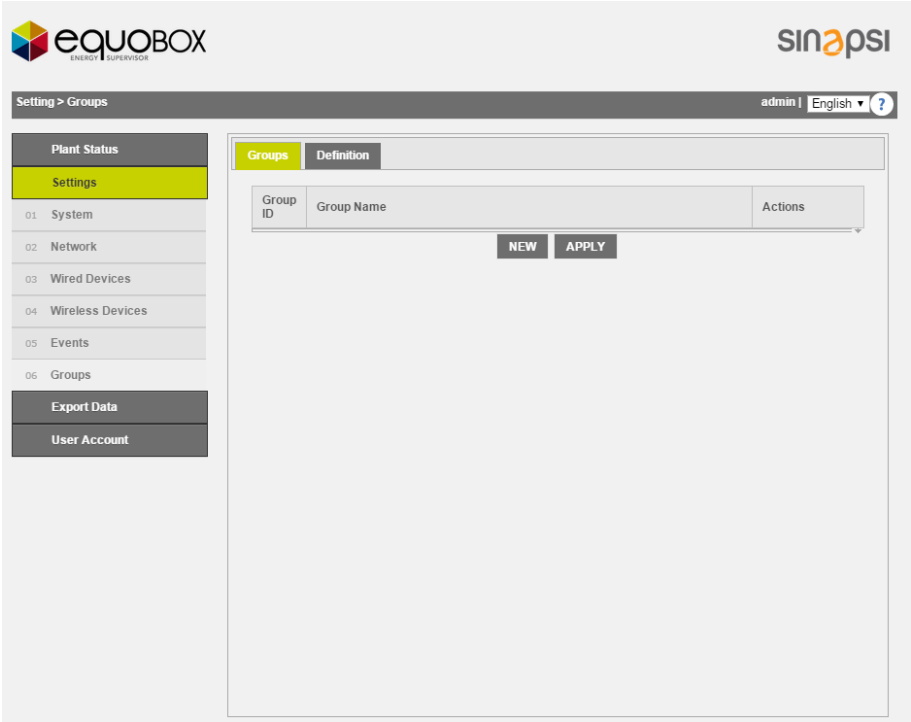


Figure 62 - Groups management

13.1 Group creation

To create a group just select NEW, associate a name and press OK:

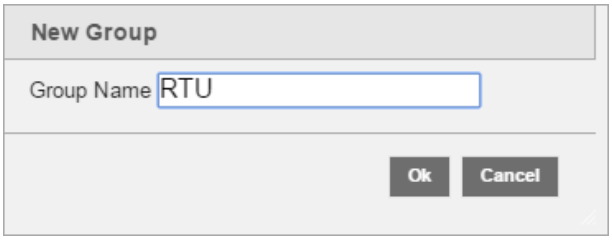


Figure 63 - Group creation

Following the creation of the group, press APPLY. Once you have created the group will be displayed in tabular form.

Figure 64 - Groups list

Fro every group is possible

- - modify the group name
- - -delete the group

At the end of the operations always press the APPLY button to set the changes.

13.2 Group definition

Once you create a group, Chap Ref. 0, it will be possible to define the components of the group. The window is divided into two separate boxes:

a. Left boxe: displays all prevously configured devices in the RTU
b. Right boxe: shows all the devices configured nell'RTU and already forming part of a selected group

A single device can be placed in either the right boxe or the left boxe through the directional arrows placed between the two boxes.

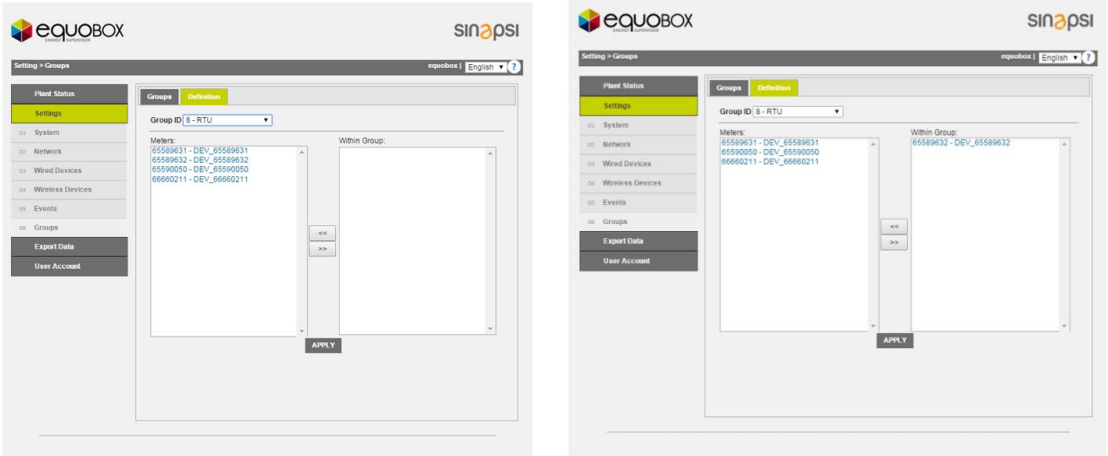


Figure 65 - Group definition

1. Select the group of interest in the Group ID box
2. Select the device you want to include in the group
3. Press the left arrow to include it

At the end of the operations always press the APPLY button to set the changes. Refer to Chap. 16.1 for the use of the Group.

14. DATA SAMPLING

14.1 Defining sampling frequency and RAW data (M-Bus cable)

This section analyses how the RTU samples the values. Figure 66 shows a curve sampled with $F_C = 1/T_C$ equal to one hour throughout the entire day. The RTU manages five sampling periods, which are:

- 15 minutes → 96 daily samples
- 1 hour→ 24 daily samples
- 6 hours→ 4 daily samples
- 12 hours→ 2 daily samples
- 1 day → 1 daily sample
- 1 month → 1 monthly sample

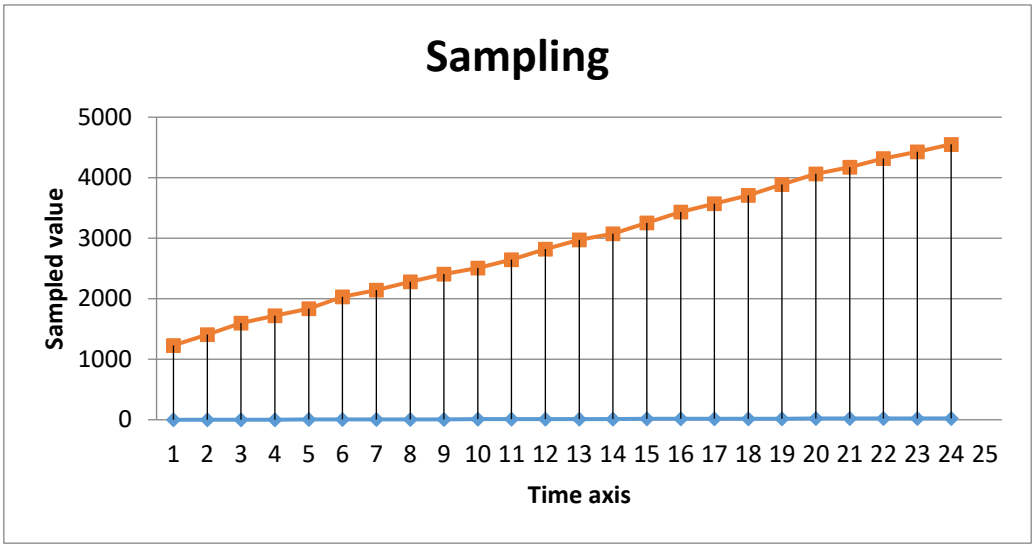


Figure 66 - Sampling

The samples stored in the RTU according to the sampling frequency are defined as RAW samples. ***RAW samples will always refer to the consulted day and you can store up to 96 samples for every day of the year for 250 devices. The samples of the previous year will be cyclically deleted from the RTU mass memory (Ref. Chapter 16.1).*** Pay special attention to the documentation of the devices before configuring the RTU sampling frequency. If the sampling value is too high, it can cause:

- no response from the devices in the field following the exhaustion of the possible responses from the unit.
- early device battery depletion compared to that declared in the datasheet

14.2 Definition Sampling and RAW data (M-Bus wireless)

This section will analyze the sample type supported by RTU. In Figure 67 shows a curve sampled with $F_C = 1/T_C$ equal to an hour throughout the day. The RTU operates five sampling frequency that are

- 15 minutes → 96 daily samples
- 1 hour→ 24 daily samples
- 6 hours→ 4 daily samples
- 12 hours → 2 daily samples

- 1 day→ 1 daily sample
- 1 month → 1 monthly sample

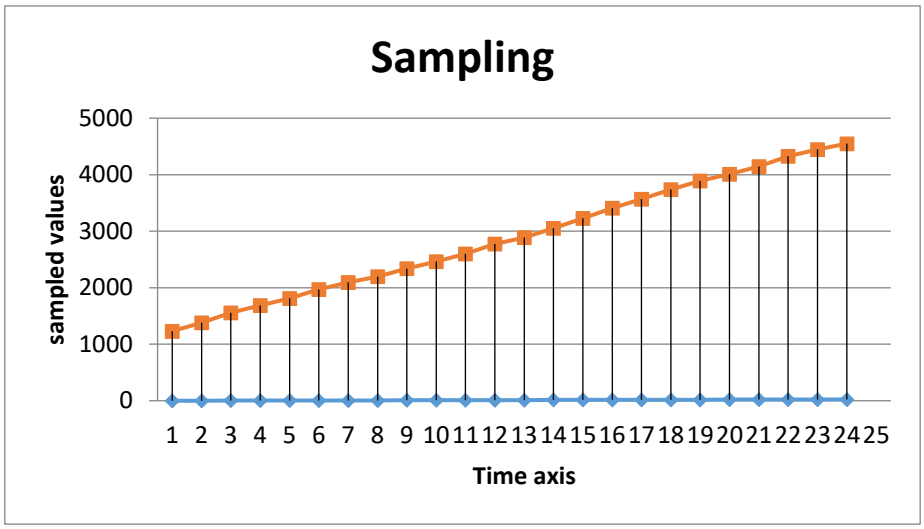


Figure 67 - Sampling

Depending of the frequency sampling, the samples stored in RTU are defined RAW sample. ***RAW samples will always regarding the consulted day and you can memorize up to 96 samples for every day a year to 250 devices after which the champions of the past year will be eliminated cyclically mass memory RTU (Ref. Chap . 19.1).*** Pay particular attention to the documentation of the devices in the field before setting up the sampling RTU frequency. A sampling value too high could cause:

- lack of response from the devices in the field as a result of the exhaustion of the possible responses from the device questioned
- exhaustion of the battery of the device in the field with minor timing from that stated in the datasheet

15. DEFINING SUMMARY DATA

The definition of Summary Data generated by the RTU is described in Figure 66. ***The RTU manages four types of summary data for up to 10 years for 250 devices.*** Regardless of the choice of the summary data during configuration, the RTU will generate all four summary values (11.12, 11.14); this way, any data change will change the entire logfile of the summary data generated up to that moment. ***Changing any type of data involves regenerating all the data in the logfile of the data already generated in the RTU.*** The summary data are:

- None: no data displayed
- Consumption: generates data as the maximum value at the end of the day and corresponding delta
- Minimum: generates data as the minimum value of the day
- Maximum: generates data as the maximum value of the day
- Average: generates data as the average value of the day

15.1 Summary Data – None

No summary data displayed in relation to the sampled data

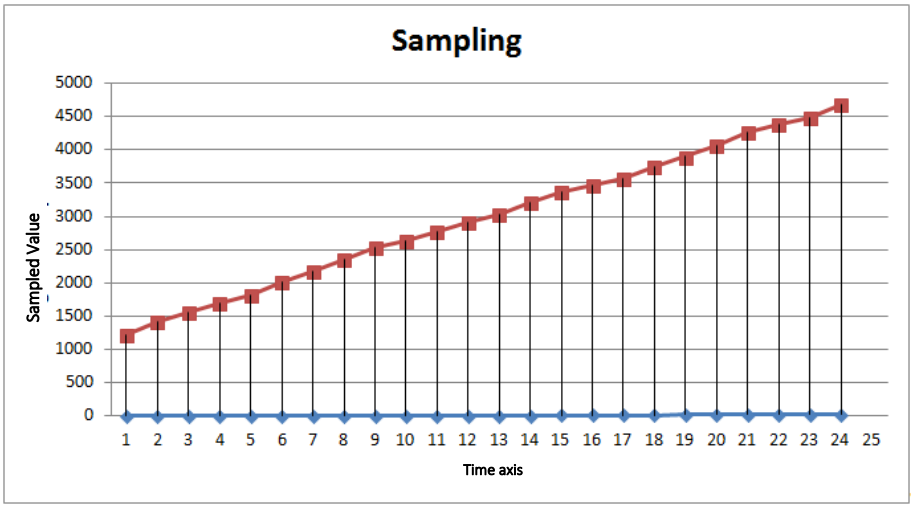


Figure 68 - Summary Data – None

15.2 Summary Data – Consumption

Summary data related to Consumption provide the maximum value logged during the day and the delta during the day

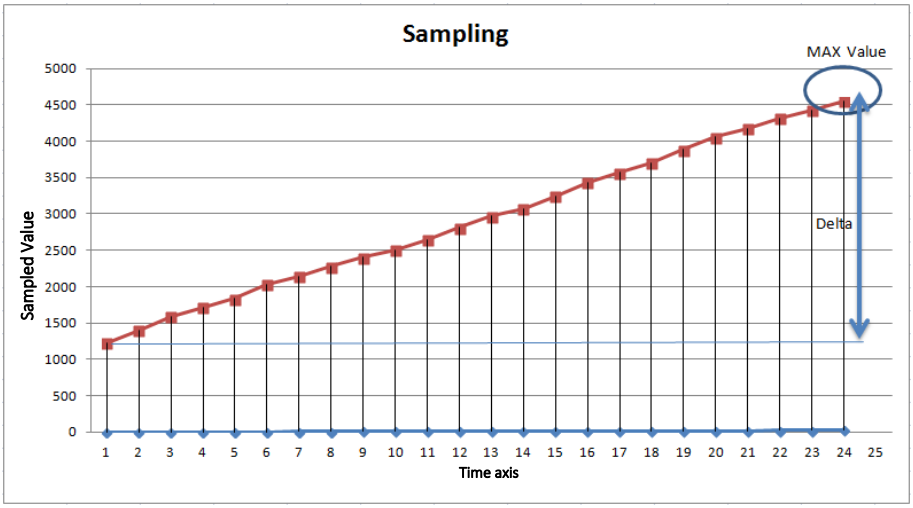


Figure 69 - Summary data - Consumption

15.3 Summary Data – Maximum

Summary data related to Maximum provide the maximum value logged during the day

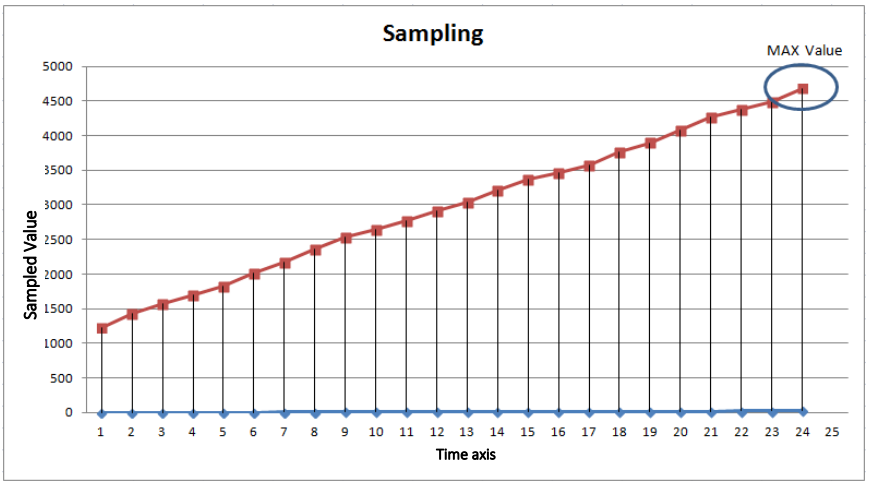


Figure 70 - Summary data – Maximum

15.4 Summary Data – Minimum

Summary data related to Minimum provide the minimum value logged during the day

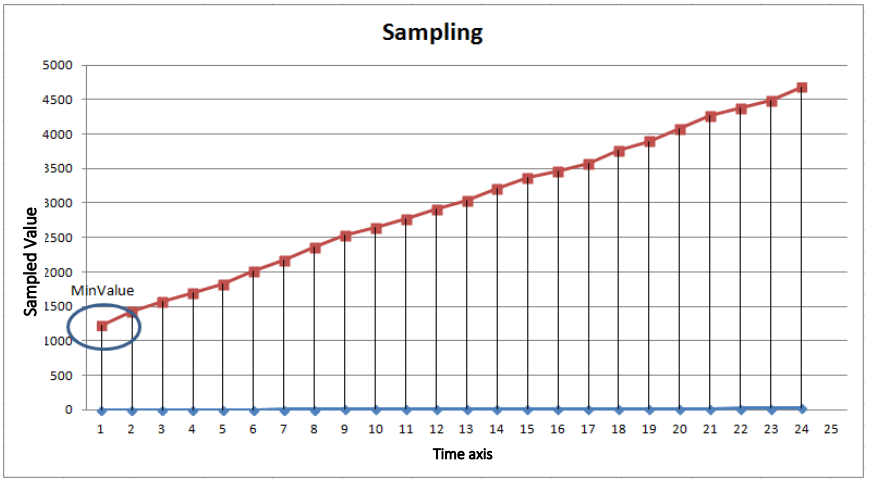


Figure 71 - Summary data - Minimum

15.5 Summary Data – Average

Summary data related to Average provide the averaged value logged during the day

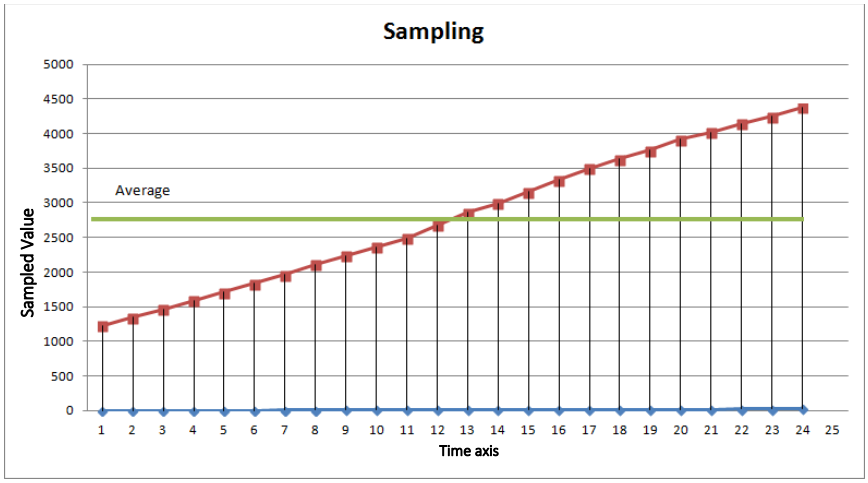


Figure 72 - Summary data - Average

16. EXPORTING DATA

This section allows you to process/export the data logged in the RTU. The data logged in every single meter are defined as shown in Chapter 11.13, 11.14 and in Chapters 14 and 15. The items that can be selected are:

- Create Reports: Meters - Groups
- Planning
- Repository

Every item will be described separately.

16.1 Create Reports - Meters

The pages to Create Reports - Meter are described below

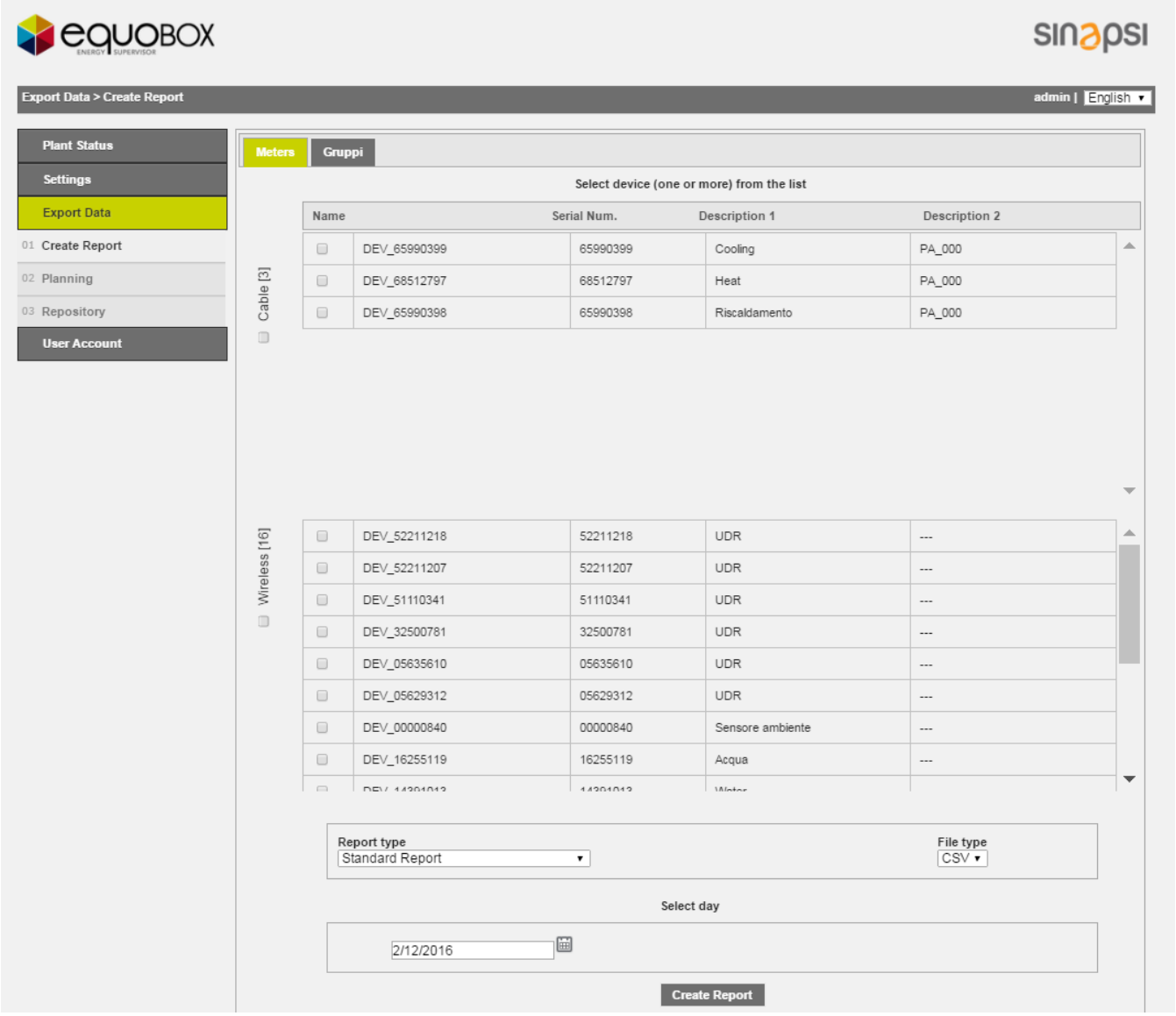


Figure 73 - Creating a report

Select one or more devices from the list. For this option, all you have to do is select the box on the top left of the table. See Figure 74

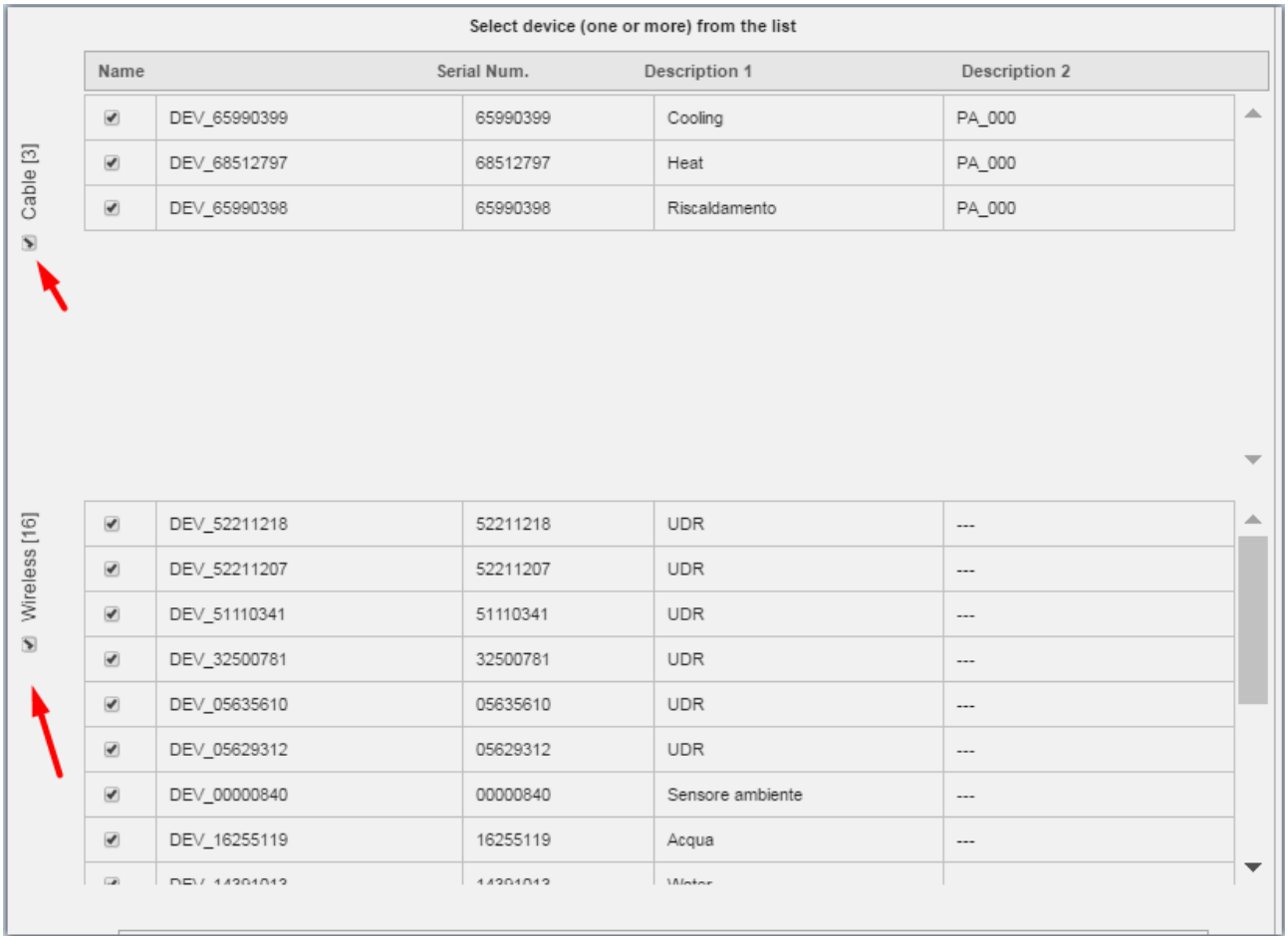


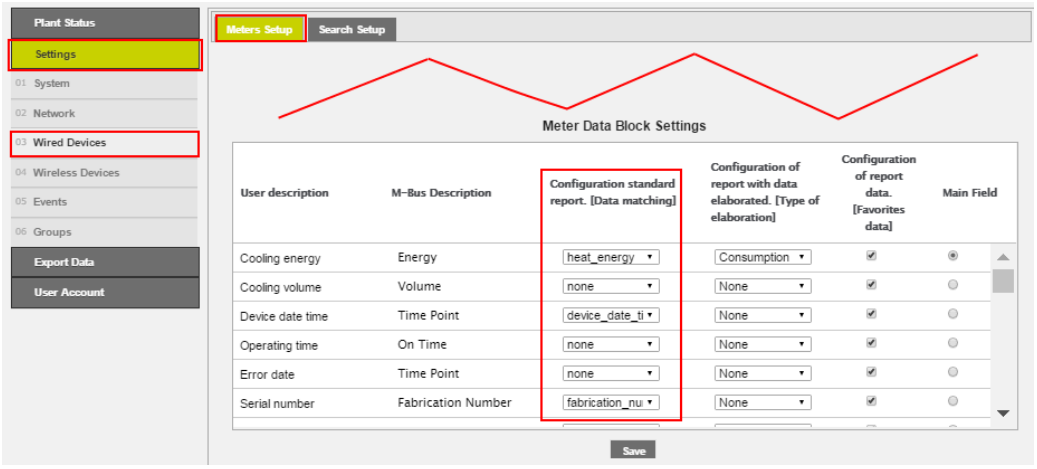
Figure 74 - Selecting the devices

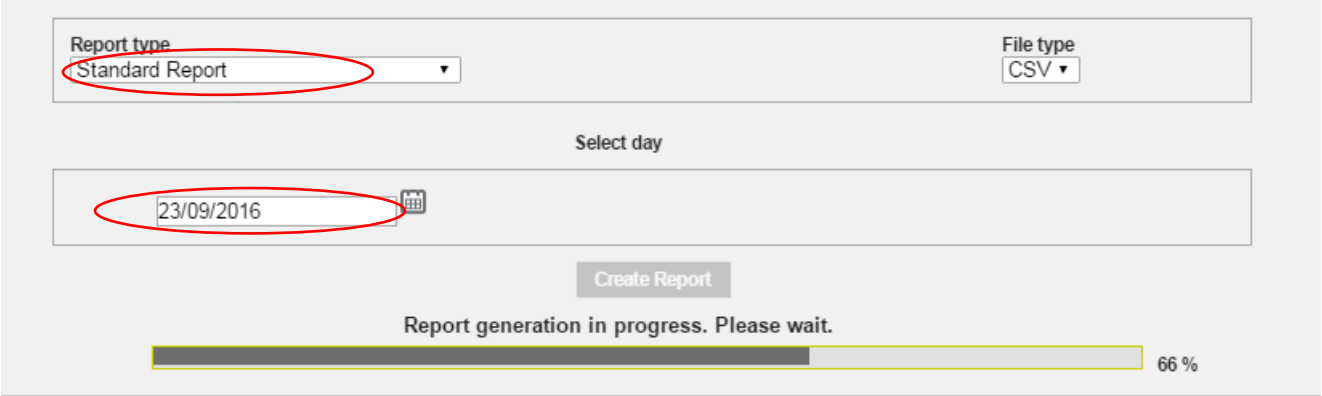
The Create report menu is divided as follows:

1. Device data:
   - Name: Name allocated to the meter
   - Serial Number: Serial Number of the meter
   - Description 1: Description 1 associated to the meter. See Chapter 11.13, 11.14
   - Description 2: Description 2 associated to the meter. See Chapter 11.13, 11.14
2. Data to be exported: you can choose between six types of export:

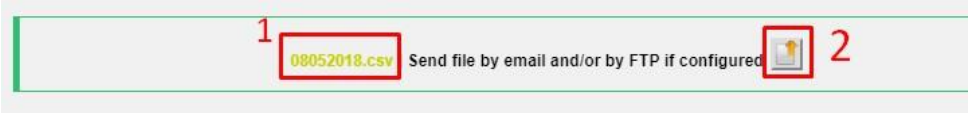
a) ***Standard report***

It generates a file in the CSV format with the data of the selected meters about the latest reading performed until the selected day. **Note:** The image below shows where you can set the association between the data and the related descriptions of each meter.





- Select the day: select the day to be exported.
- CSV format: to export a .CSV file (only available option).
- Press Create Report to generate the data files.
- The file name will be created automatically and it will refer to the selected date (1).
- Move to the name of the file you just created and click to open it.
- You can send the report via email and/or FTP if they're configured (2).



The standard report file looks like in the picture:

file_name	report_date	report_time	plant_reference	sw_version	total_devices_cable	total_devices_wireless	rtu_serial
23092016.csv	02/12/2016	16:11:41	Name	5.07.30	3	16	SN15030232

count	primary_address	device_serial_number	name_customer	device_description	device_detail	device_measure_hex	bus_type	model_id	readout_date	readout_time	communication_status	mbus_status	device_date_time	error_flag_decimal	fabrication_number	heat_energy
0	0	65990399	DEV_65990399	Cooling	PA_000	0A|Cooling	0	177	23/09/2016	23:45:07	OK	0	23/09/2016 22:43	0	56043895	0
1	0	68512797	DEV_68512797	Heat	PA_000	04|Heat	0	11	23/09/2016	23:45:10	OK	16	23/09/2016 17:41	-	68512797	0
2	0	65990398	DEV_65990398	Riscaldamento	PA_000	04|Heat	0	0	23/09/2016	23:45:13	OK	0		-	-	-

Report heading

- file_name: file name
- report_date: generation date of the report
- report_time: report generation time
- plant_reference: plant name
- sw_version: version of the RTU software
- total_devices_cable: total number of wired devices
- total_devices_wireless: total number of wireless devices
- rtu_serial: serial number of the RTU

Devices section:

- count: device serial number in the report
- primary_address: primary address of the device
- device_serial_number: serial number of the device
- name_customer: device name
- device_description: description 1 of the device
- device_detail: description 2 of the device
- device_measure_hex: type of measured variable coded with hexadecimal number
- bus_type: bus type; 0 = wired, 1 = wireless
- model_id: ID number assigned to the model in the database

Readouts section:

- readout_date: date of the last reading of the device
- readout_time: time of the last reading of the device
- communication_status: communication status; OK = correct, Error = the device has not never been read by the RTU

Data section:

- mbus_status: mbus status
- device_date_time: date and time of the device
- error_flag_decimal: error code according mbus standards
- fabrication_number: serial number of the device
- heat_energy: heat
- heat_energy_units: heat unit
- cool_energy: cold
- cool_energy_units cold unit
- HCA: Heat Cost Allocator / allocation unit
- heat_water_volume: ACS volume
- heat_water_units: ACS unit
- cool_water_volume: cold water volume
- cool_water_volume_units: cold water volume measuring unit
- water_volume: water volume
- water_volume_units: water volume measuring unit
- aux1_volume: auxiliary input 1 volume
- aux1_volume_units: auxiliary input 1 volume units
- aux2_volume: auxiliary input 2 volume
- aux2_volume_units: auxiliary input 2 volume units
- aux3_volume: auxiliary input 3 volume
- aux3_volume_units: auxiliary input 3 volume units
- gas_volume: gas volume
- gas_volume_units: gas volume unit
- electricity_active_energy: active electrical energy
- electricity_active_energy_units: active electrical energy measuring unit
- electricity_ractive_energy: reactive electrical energy

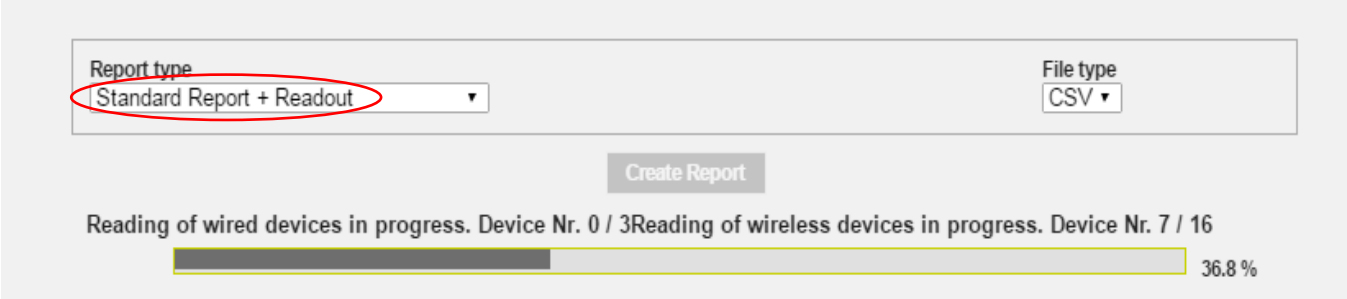
- electricity_ractive_energy_units: reactive electrical energy measuring unit

b. Standard report + Readout

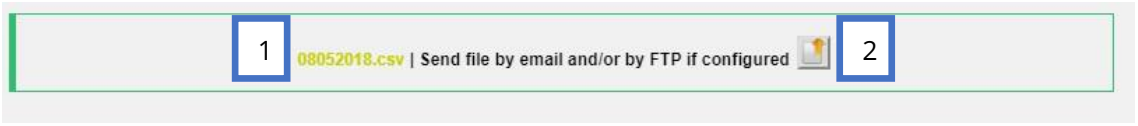
It makes a reading of the selected meters and generates a file in the CSV format very similar to that of standard reports.

Note: If in the time of a reading is done some meters do not work or do not communicate with the RTU, the report will miss the data related to the above meters.

Note: For wireless devices, the read operation is not performed. The entered data in the report will be reported to that closer of the selected day.



- CSV format: to export a .CSV file (only option available).
- Press Create Report to generate the data files.
- The file name will be created automatically and will refer to the selected date (1).
  Note: the read operation and report generation may take several minutes.
- Move to the name of the file you just created and click to open it (1).
- You can send the report via email and/or FTP if they're configured (2).



The standard report + readout file looks like in the picture:

file_name	report_date	report_time	plant_refe	sw_versio	total_devi	total_devices_wireless	rtu_serial
05122016.csv	05/12/2016	10:49:34	Name	5.07.30	3	16	SN15030232

count	primary_addres	device_serial	name_cus	device_de	device_de	device_measure_hex	bus_type	model_id	readout_date	readout_ti	communic	mbus_stat	device_date_time	error_flag_decimal	fabrication_number	heat_energy
0	0	65990399	DEV_6599	Cooling	PA_000	0A|Cooling	0	177	05/12/2016	10:50:15	ERROR	-	-	-	-	-
1	0	68512797	DEV_6851	Heat	PA_000	04|Heat	0	11	05/12/2016	10:50:16	ERROR	-	-	-	-	-
2	0	65990398	DEV_6599	Riscaldam	PA_000	04|Heat	0	0	05/12/2016	10:50:17	ERROR	-	-	-	-	-
3	-	52211218	DEV_5221	UDR	---	08|HCA	1	124	05/12/2016	10:49:34	OK	11	05/12/2016 10:48	8	-	-
4	-	52211207	DEV_5221	UDR	---	08|HCA	1	124	05/12/2016	10:49:34	OK	11	05/12/2016 10:50	8	-	-
5	-	51110341	DEV_5111	UDR	---	08|HCA	1	124	05/12/2016	10:49:34	OK	0	05/12/2016 10:48	0	-	-
6	-	32500781	DEV_3250	UDR	---	08|HCA	1	65	05/12/2016	10:49:34	OK	0	-	2	-	-
7	-	5635610	DEV_0563	UDR	---	08|HCA	1	-	05/12/2016	10:50:22	ERROR	-	-	-	-	-
8	-	5629312	DEV_0562	UDR	---	08|HCA	1	179	05/12/2016	10:49:35	OK	4	05/12/2016 11:54	0	-	-
9	-	840	DEV_0000	Sensore ar	---	1B|Room sensor	1	128	05/12/2016	10:49:35	OK	0	-	0	-	-
10	-	16255119	DEV_1625	Acqua	---	07|Water	1	213	05/12/2016	10:49:35	OK	0	05/12/2016 10:47	16641	1122334455	-
11	-	14391013	DEV_1439	Water	---	07|Water	1	133	05/12/2016	10:50:26	ERROR	-	-	-	-	-
12	-	11054	DEV_0001	Sensore ar	---	1B|Room sensor	1	-	05/12/2016	10:50:27	ERROR	-	-	-	-	-
13	-	10951	DEV_0001	Sensore ar	---	1B|Room sensor	1	-	05/12/2016	10:49:35	OK	0	-	-	-	-
14	-	10952	DEV_0001	Sensore ar	---	1B|Room sensor	1	217	05/12/2016	10:45:48	OK	0	-	-	-	-
15	-	10949	DEV_0001	Sconosciut	---	1D|Unknown	1	-	05/12/2016	10:49:36	OK	0	-	-	-	-
16	-	51110369	Verdi Paol	HCA	Sala	08|HCA	1	-	05/12/2016	10:50:31	ERROR	-	-	-	-	-
17	-	80396516	Verdognol	HCA	Test AES	08|HCA	1	-	05/12/2016	10:50:32	ERROR	-	-	-	-	-
18	-	120003	DEV_0012	Water	---	07|Water	1	-	05/12/2016	10:49:36	OK	16	-	-	-	-

Report heading:

The heading of the standard + reading report is equal to that of the standard reports previously described.

Devices section:

The section of the report standard + reading devices is equal to that of the standard reports previously described.

Readout section:

- readout_date: date of the device reading (when the generation of the report starts).

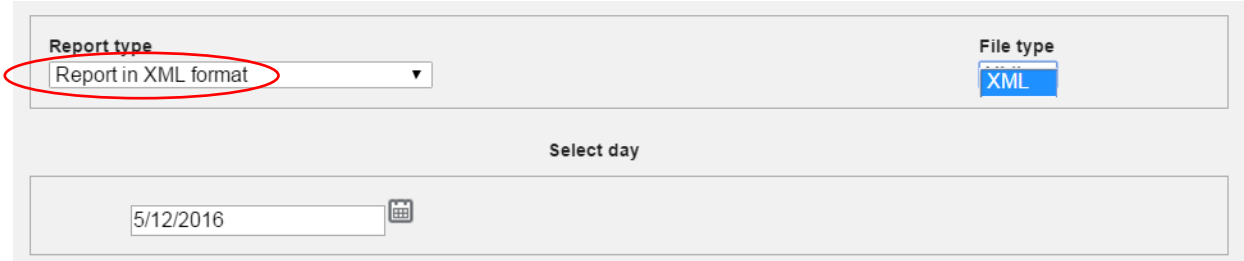
- readout_time: time of the device reading (when the generation of the report starts).
- communication_status: communication status; OK = correct, Error = the device has not been read by the RTU after the start of the reporting).

Data section:

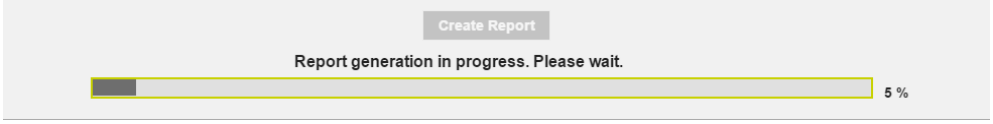
The section of the standard + reading report data is equal to that of the standard reports previously described.

c. ***XML reports***

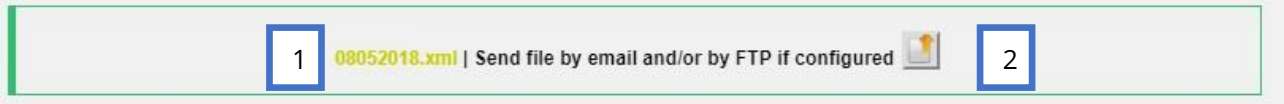
It generates a file in XML format with the data of the selected counters for the selected day.



- Select the day: select the day for which you want to generate the report.
- XML format: to export an XML file (only option available).
- Press Create Report to generate the data files.



- The file name will be created automatically and will refer to the selected date (1)
- Move to the name of the file you just created and click to open it.
- You can send the report via email and/or FTP if they're configured (2).



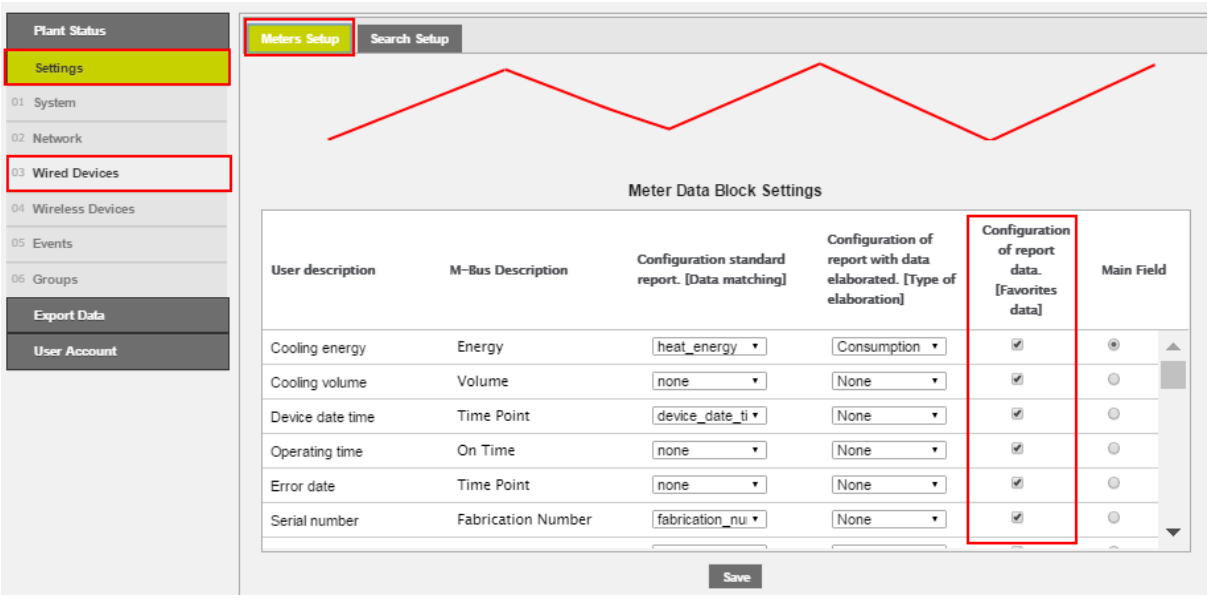
In the figure a portion of the report file in XML format:

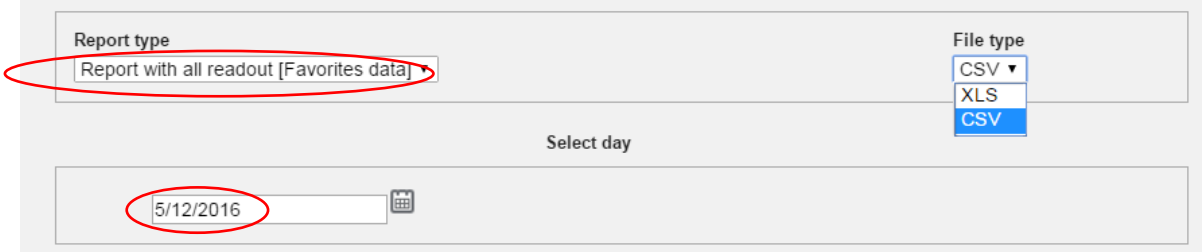
```
<?xml version="1.0" encoding="UTF-8"?>
- <content version="1" xsi:noNamespaceSchemaLocation="content.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  - <custom>
      <datalogger model="SIN.EQRTU1T " fw_rev="5.07.30" current_time="10:54:42" current_data="2016-12-05" sn="SN15030232"/>
      <plant total_wmbus_dev="16" total_mbus_dev="3" name="Name"/>
    </custom>
  - <device version="29" read_interval="900" medium="0A" manuf="3265" id="65990399" bus="0" prog="0">
    - <readouts>
      - <readout errordate="every month" fabnr="56043895" dev_date="2016-11-13" dev_time="00:00:00" status="0" sys_timestamp="1478995210">
        - <datapoints>
            <datapoint value="0.000" rep_id="3" maindb="1" tolog="1" description="Cooling energy" unit="kWh" field_id="0C05"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Cooling volume" unit="m3" field_id="0C13"/>
            <datapoint value="13" rep_id="0" maindb="0" tolog="1" description="Device date time" unit="date e time" field_id="046D"/>
            <datapoint value="007860" maindb="0" tolog="1" description="Operating time" unit="hours" field_id="0B22"/>
            <datapoint value="every month" maindb="0" tolog="1" description="Error date" unit="date" field_id="326C"/>
            <datapoint value="56043895" rep_id="2" maindb="0" tolog="1" description="Serial number" field_id="0C78"/>
            <datapoint value="2267742797844" maindb="0" tolog="1" description="Model / Version" field_id="06FD0C"/>
            <datapoint value="MHM51" maindb="0" tolog="1" description="Parameter set identification" field_id="0DFD0B"/>
            <datapoint value="56043894" maindb="0" tolog="1" description="Customer data" field_id="0CFD10"/>
            <datapoint value="0" rep_id="1" maindb="0" tolog="1" description="Error flag" field_id="32FD17"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Flowrate" unit="m3/h" field_id="033B"/>
            <datapoint value="18.300" maindb="0" tolog="1" description="Flow temperature" unit="°C" field_id="025A"/>
            <datapoint value="18.400" maindb="0" tolog="1" description="Return temperature" unit="°C" field_id="025E"/>
            <datapoint value="-100.000" maindb="0" tolog="1" description="Temperature difference" unit="mK" field_id="0262"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Inst. power" unit="kW" field_id="042B"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy last year" unit="kWh" field_id="4C05"/>
            <datapoint value="31/12/2015" maindb="0" tolog="0" description="Due date last year" unit="date" field_id="426C"/>
            <datapoint value="31/10/2016" maindb="0" tolog="0" description="Monthly date" unit="date" field_id="820A6C"/>
            <datapoint value="13" maindb="0" tolog="0" description="Size of storage block" field_id="8904FD22"/>
            <datapoint value="01" maindb="0" tolog="1" description="Storage interval" field_id="8904FD28"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 13 previous month" unit="kWh" field_id="8C0405"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 12 previous month" unit="kWh" field_id="CC0405"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 11 previous month" unit="kWh" field_id="8C0505"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 10 previous month" unit="kWh" field_id="CC0505"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 9 previous month" unit="kWh" field_id="8C0605"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 8 previous month" unit="kWh" field_id="CC0605"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 7 previous month" unit="kWh" field_id="8C0705"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 6 previous month" unit="kWh" field_id="CC0705"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 5 previous month" unit="kWh" field_id="8C0805"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 4 previous month" unit="kWh" field_id="CC0805"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 3 previous month" unit="kWh" field_id="8C0905"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy 2 previous month" unit="kWh" field_id="CC0905"/>
            <datapoint value="0.000" maindb="0" tolog="1" description="Energy previous month" unit="kWh" field_id="8C0A05"/>
            <datapoint value="027AAD000278AD00" maindb="0" tolog="0" description="Manufacturer data" field_id="0F "/>
        </datapoints>
      </readout>
```


Note: For details about the file format, refer to specific document "XML RTU Data Reports Technical Specification document " (MOD 05 B RTU XML API SPEC REVx.pdf).

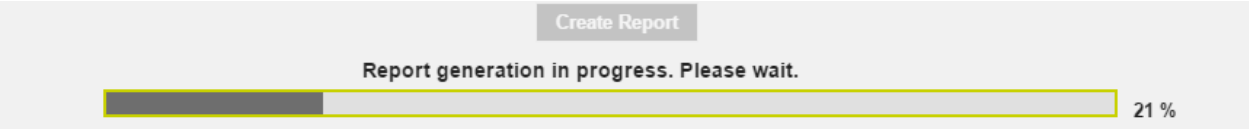
d. Report with all Readouts [Favorite Data]

It generates a file in XLS or CSV format with preferred data for each selected meter relative to all the Readouts taken on the selected day. **Note:** The image below shows where you can set your favorite data for each meter]



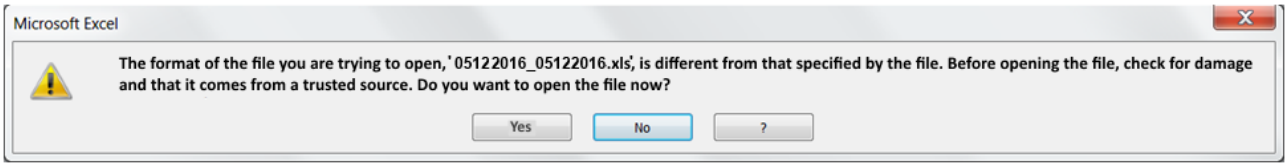


- Select the day: select the day for which you want to generate the report
- XLS format (Single Sheet) to export a .XLS file
- CSV format: to export a .CSV file
- Press Create Report to generate the data file

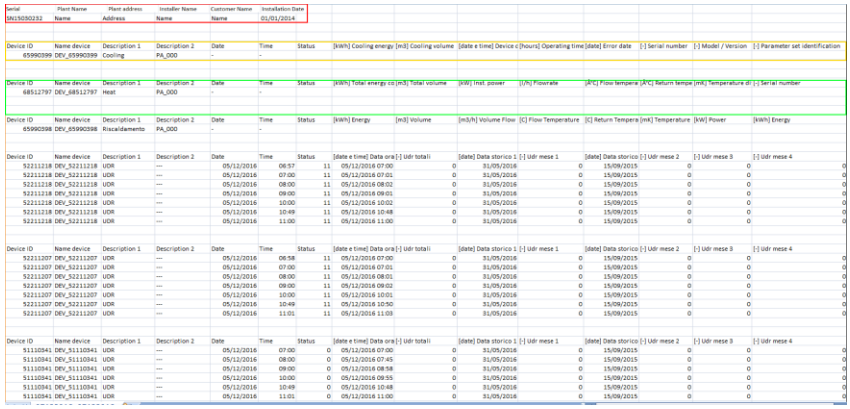


- The file name will be automatically created and will refer to the selected date (1)
- Move to the name of the file you just created and click to open it.
- You can send the report via email and/or FTP if they're configured (2).

When you open a file generated with .XLS format the message is displayed as below; press yes for proper viewing.



The report file with all the favorite Readouts data is presented as below:



Report heading:

- Datalogger serial number
- Plant name
- Plant address
- Installer name
- Customer name
- Date of Installation

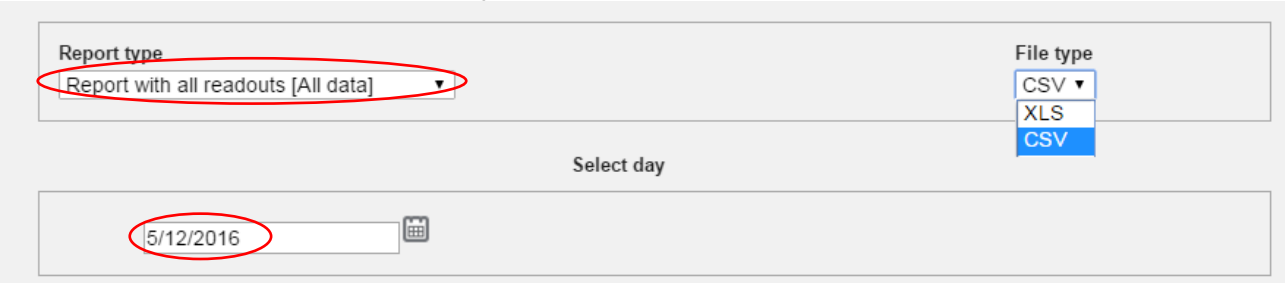
Heading and Readouts taken on the selected day of the first device.

Heading and Readouts taken on the selected day of the second device.

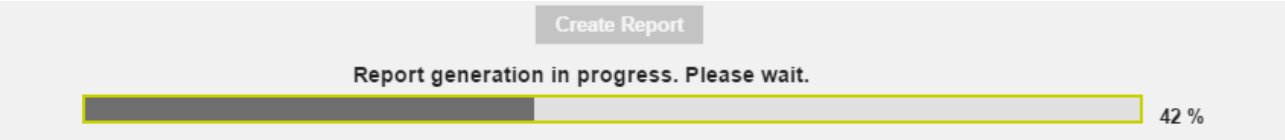
Heading and Readouts taken on the selected day of the third, fourth … yet another device.

e. ***Report with all Readouts [All data]***

It generates a file in XLS or CSV format with all the data for each selected meter relative to all the Readouts taken on the selected day.

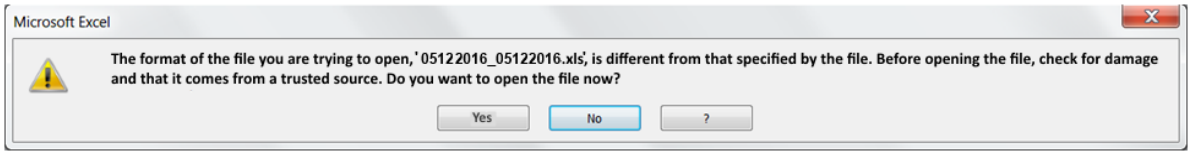


- Select the day: select the day for which you want to generate the report
- XLS format (Single Sheet) to export a .XLS file
- CSV format: to export a .CSV file
- Press Create Report to generate the data file



- The file name will be automatically created and will refer to the selected date (1)
- Move to the name of the file you just created and click to open it
- You can send the report via email and/or FTP if they're configured (2).

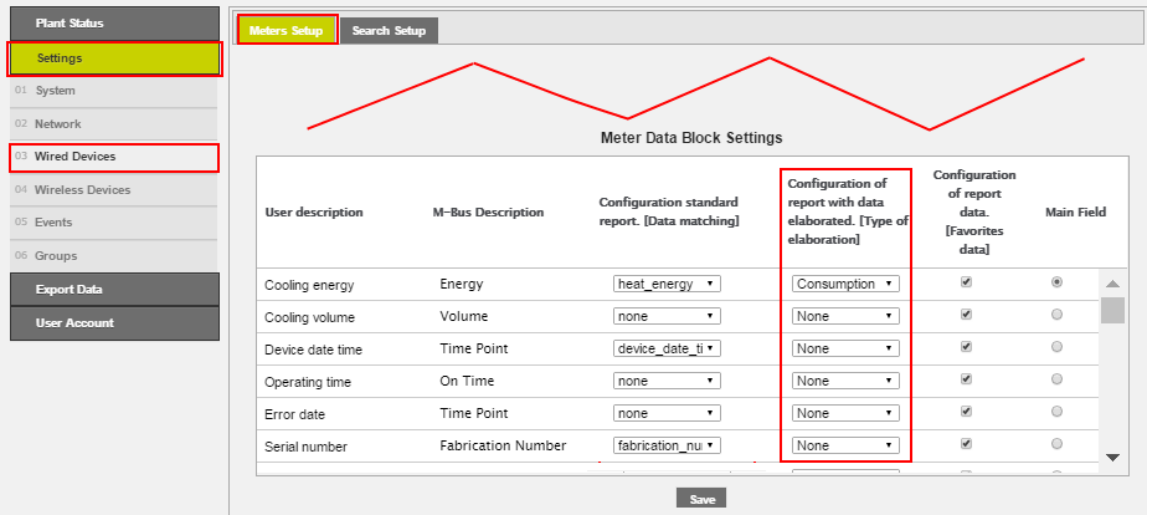
When you open a file generated with .XLS format the message is displayed as below; press Yes for proper viewing.



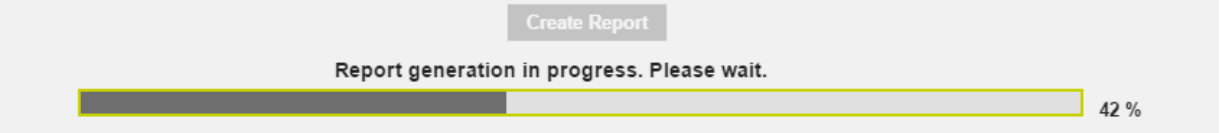
The report file with all the Readouts of all data is the same as the report with all the Readouts of the favorite data described above, except that it includes all the data instead of the preferred data only.

f. ***Report with processed data***

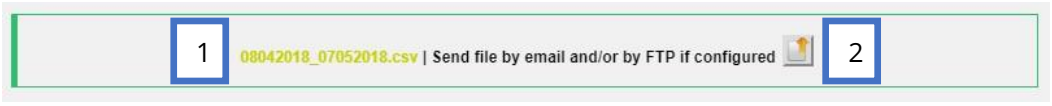
It generates a file in XLS or CSV format with all the processed data of each selected meter relative to a selected time (From dd / mm / yyyy ÷ To dd / mm / yyyy). **Note:** The image below shows where you can set the type of elaboration to be performed on each data of each meter.



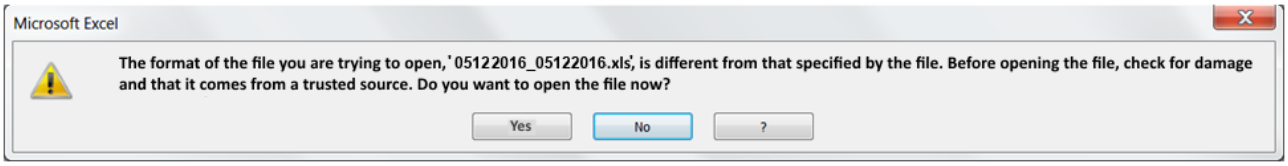
- From: Select the start day of the interval time
- To: select the end day of the interval time
- CSV format: to export a .CSV file
- XLS format (Single Sheet) to export a .XLS file
- Press Create Report to generate the data files



- The file name will be automatically created and will refer to the dates of the beginning and ending of the selected time (1).
- Move to the name of the file you just created and click to open it.
- You can send the report via email and/or FTP if they're configured (2).



When you open a file generated with .XLS format the message is displayed as below; press Yes for proper viewing.



The report file with the Readouts of the data processed appears as shown here:

Serial	Plant Name	Plant address	Installer Name	Customer Name	Installation Date					
SN15030232	Name	Address	Name	Name	01/01/2014					
Device ID	Name device	Description 1	Description 2	Date	Time	Status	[0.000 kWh] Cooling energy			
65990399	DEV_65990399	Cooling	PA_000	05/11/2016	00:00	0	0			
65990399	DEV_65990399	Cooling	PA_000	13/11/2016	00:00	0	0			
Device ID	Name device	Description 1	Description 2	Date	Time	Status	[0.000 kWh] Total energy consumption			
68512797	DEV_68512797	Heat	PA_000	04/11/2016	00:00	16	0			
68512797	DEV_68512797	Heat	PA_000	18/11/2016	00:00	16	0			
Device ID	Name device	Description 1	Description 2	Date	Time	Status	[0.000 kW	[0.000 m3	[0.000 kW	[0.000 kW
65990398	DEV_65990398	Riscaldamento	PA_000	07/11/2016	00:00	0	0	0	0	0
Device ID	Name device	Description 1	Description 2	Date	Time	Status	[0.000 -] Udr totali			
52211218	DEV_52211218	UDR	---	04/11/2016	06:59	11	0			
52211218	DEV_52211218	UDR	---	02/12/2016	06:57	11	0			
Device ID	Name device	Description 1	Description 2	Date	Time	Status	[0.000 -] Udr totali			
52211207	DEV_52211207	UDR	---	04/11/2016	06:59	11	0			
52211207	DEV_52211207	UDR	---	02/12/2016	06:58	11	0			
Device ID	Name device	Description 1	Description 2	Date	Time	Status	[0.000 -] Udr totali			
51110341	DEV_51110341	UDR	---	04/11/2016	07:01	0	0			
51110341	DEV_51110341	UDR	---	02/12/2016	07:00	0	0			

Report heading:

- Datalogger serial number
- Plant name
- Plant address
- Installer name
- Customer Name
- Date of Installation

Heading and processed data of the first device:

- Device serial number
- Device name
- Device description 1
- Device description 2
- Reading Date
- Reading time
- M-Bus status
- Processed data, refer to the selected time of the device

row of the first available read, in the selected interval time, of the first device:

- ...
- Date of the first available reading of the device
- Time of the first available reading of the device
- M-Bus status
- Processed data, refer to the first available reading of the device

row of the last available read, in the selected interval time, of the second device:

- ...
- Date of the last available reading of the device
- Time of the last available reading of the device
- M-Bus status
- Processed data, refer to the last available reading of the device

Section relative to the second device

Section concerning the third, fourth … yet another device.

NB: the extrapolated data from the system provide

- ***Use of dot for the separation of thousands***
- ***Use of comma for the separation of tenths***

16.2 Planning

From section you can:

1. plan, for each device, the period of reporting, available later in the Report Archive.
2. set the type of report to be generated and the file type to generate the report
3. enable FTP transfer (File Transfer Protocol) data to an external server

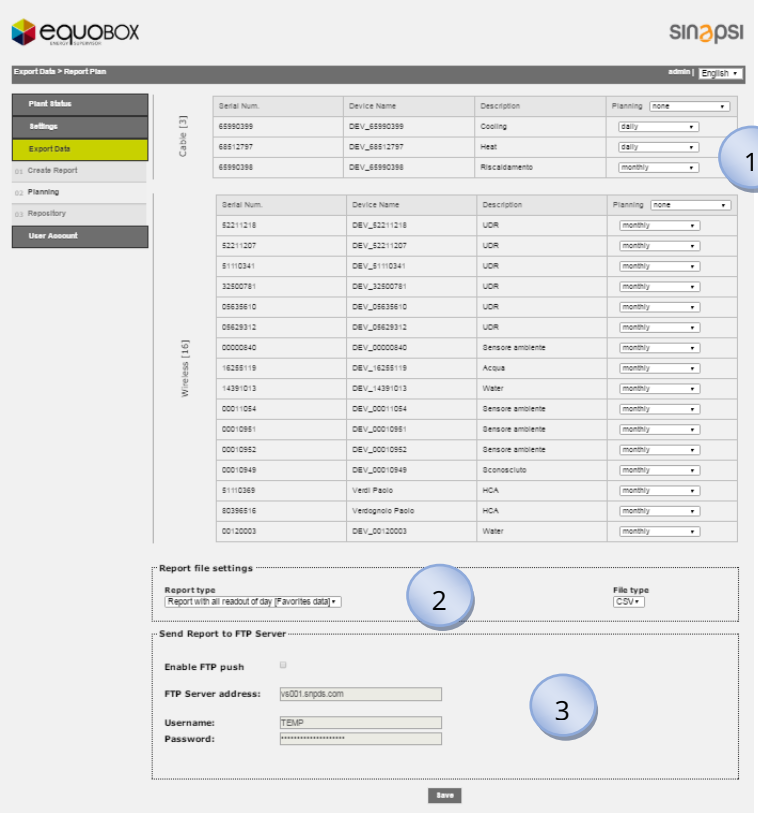
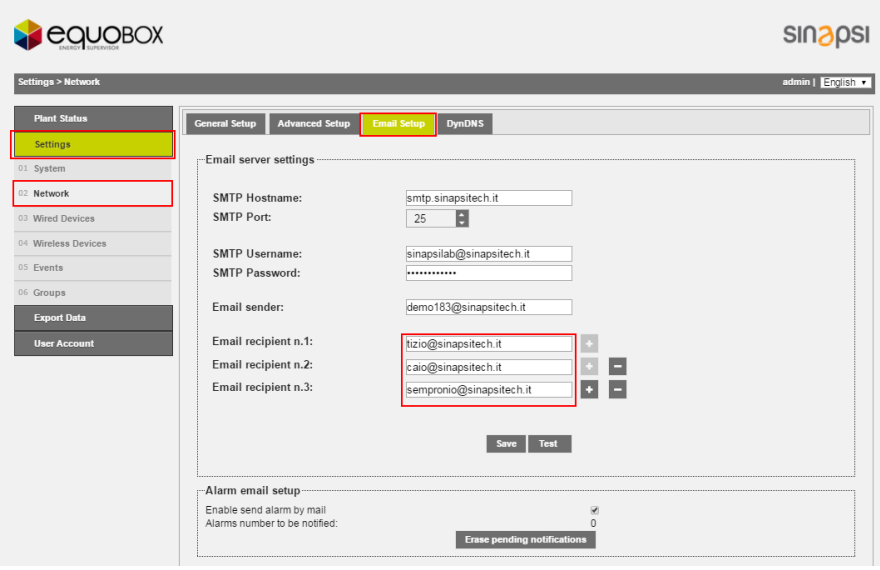


Figure 75 – Planning

Note: each time a report is generated, automatically a link is sent to download the same report to e-mail addresses set in the corresponding menu.



Planning refers to each individual device and the created document will always be available under the section Report Archive Chap 16.3..

To program a device planning select

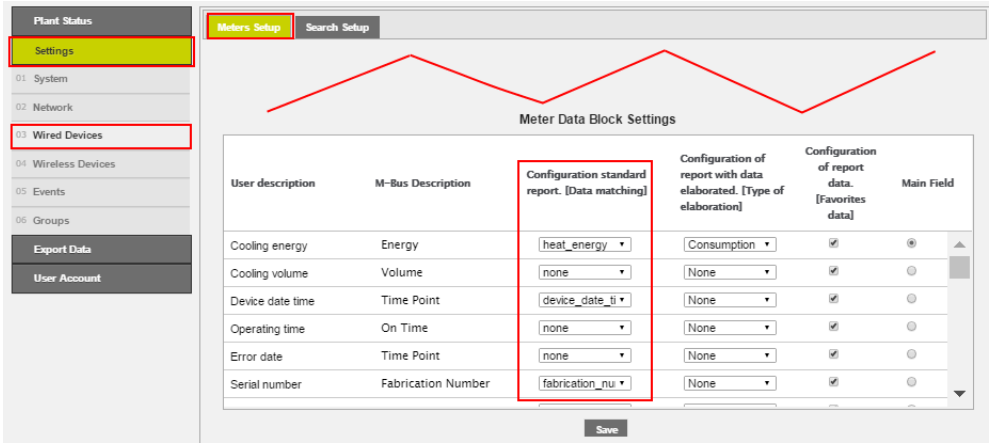
Figure 76 – Programmed Planning

1. Planning
   - None: doesn't enable the planning
   - Daily: enables daily schedule at 08:10 AM every day
   - Weekly: enables weekly schedule at 08:10 AM on the last day of the week
   - Monthly: enables monthly schedule at 08:20 AM on the last day of the month
   - Every two months: enables bimonthly schedule to 8:30 AM the last day of two months
   - Every three months: enables quarterly schedule at 08:40 AM the last day of the trimester
   - Every four months: enables quarterly schedule at 08:50 AM the last day of the quarter
   - Every six months: enables half-year planning at 09:00 AM the last day of the half year
   - Annual: enables annual planning at 09:10 AM on the last day of the year
2. Setting the type of report and file type
   - Standard Report + Reading

This selection anticipates the operation of sending a reading operation for the acquired cable devices. It is possible to select start time. The generated file has CSV format (only available option).

Note: If the time when the reading is done some meters do not work or do not communicate with the RTU, in the report the data related to the above meters will miss.

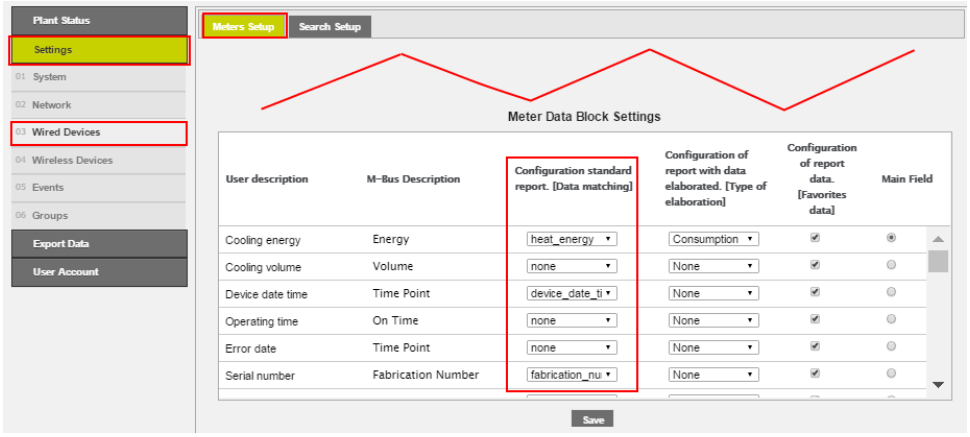
Note: The image below shows where you can set the association between the data and the related descriptions of each meter.



- Standard Report

It generates a standard report to a file in CSV format (only option available).

Note: The image below shows where you can set the association between the data and the related descriptions of each meter.



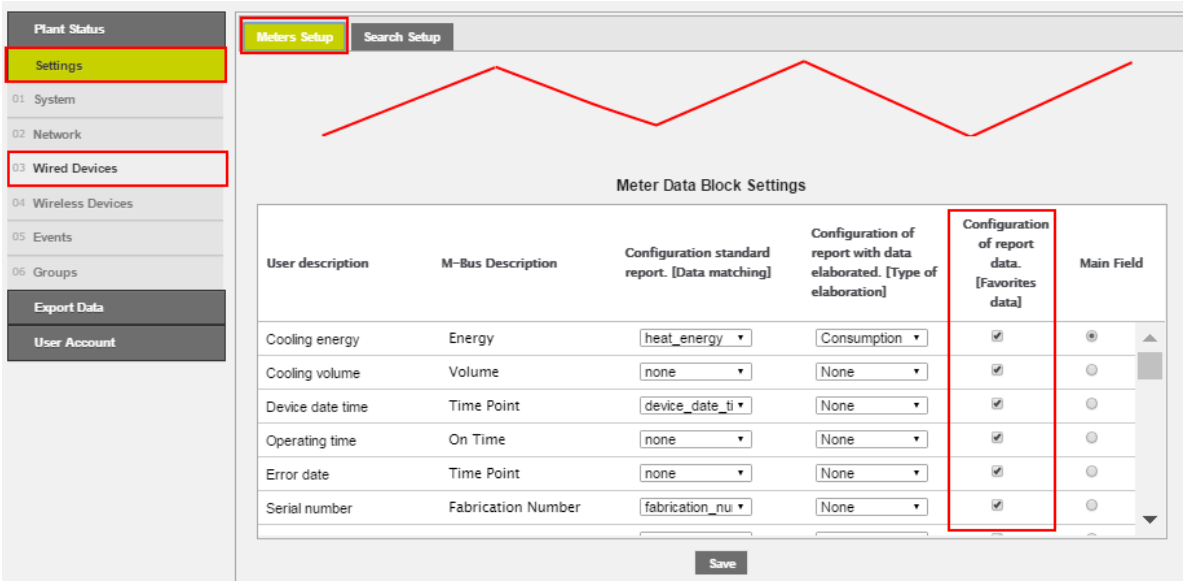
- Report in XML format

Generates a report to a file in XML format (only option available).

- Report with all the day's Readouts [Favorite Data]

It generates a report with all the Readouts of the day, only of the favorite data from each meter, in a file in the XLS or CSV format.

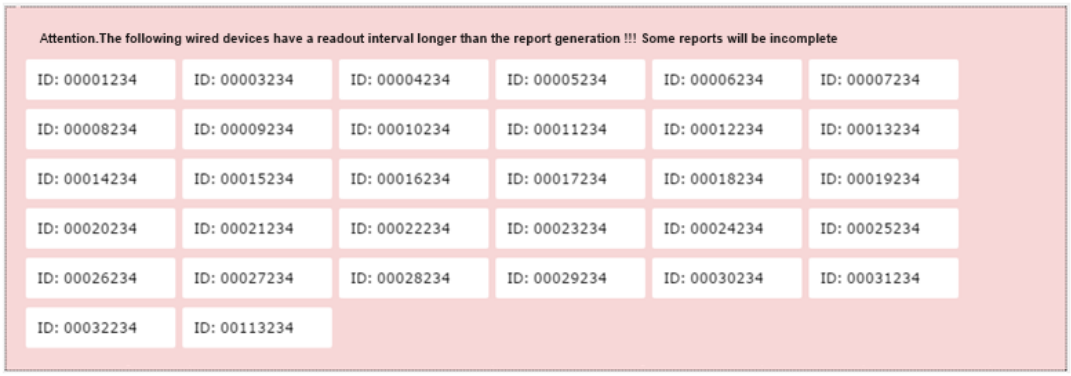
Note: The image below shows where you can set your favorite data for each meter.



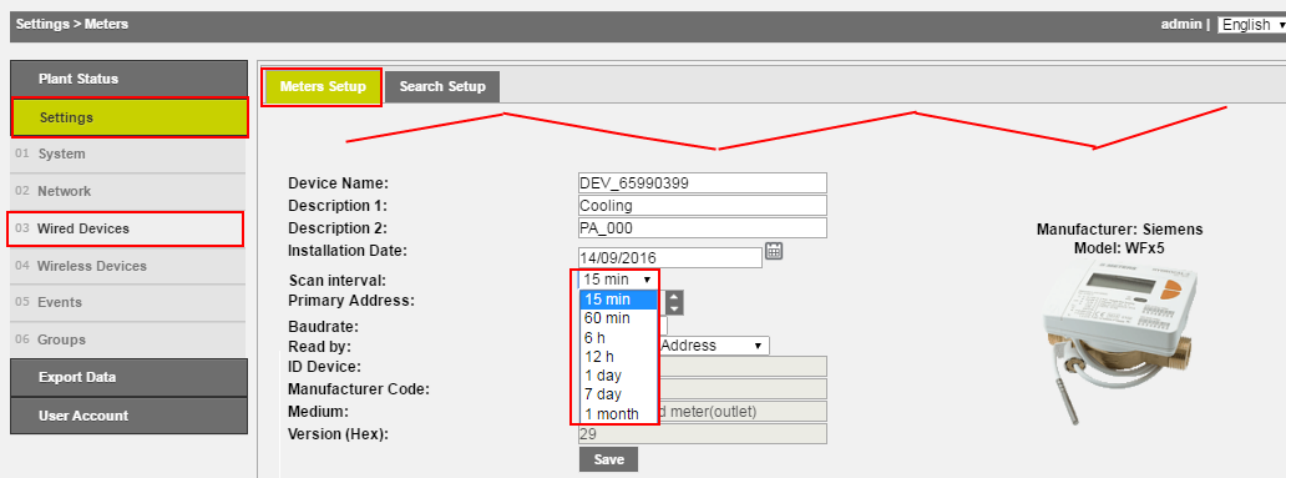
- Report with all the day's Readouts [All data]

It generates a report with the first reading of the day, with all the data for each meter in a file in the XLS or CSV format.

Note: except for the Standard Report + Readout, in all other cases and only for the individual wired meters, if the set planning period is lower than the Scan interval for each meter, a window is displayed with a warning: the generated reports will miss data relating to the meters on which the serial number is displayed in the same window**.**



Note: The image below shows where you can set the intervals of each meter.



The Scan interval of each meter is set in the Settings > Wired Device > Meters Setup > Scan interval.

3. FTP file transfer (File Transfer Protocol)

Figure 77 – FTP activation

- Enable FTP sending: check to enable the FTP service
- FTP Server Address: enter the server address for the FTP service
- Username: enter the username for access to the FTP server
- Password: enter the password for access to the FTP server

To conclude the settings, press Save to save the configuration entered.

ATTENTION: The FTP access to the server is only available in "not sure" mode.
No TLS / SSL or SFTP transfers connections are managed.
The available port is 21 port and it can not be changed
The FTP server address can not contain references to paths or subfolders

16.3 Report Archive

The section Report Archive is a repository of all documents created manually or according to planning (Ref. Ch. 16.1). Selecting any file for its consultation, its download will be automatically activated.

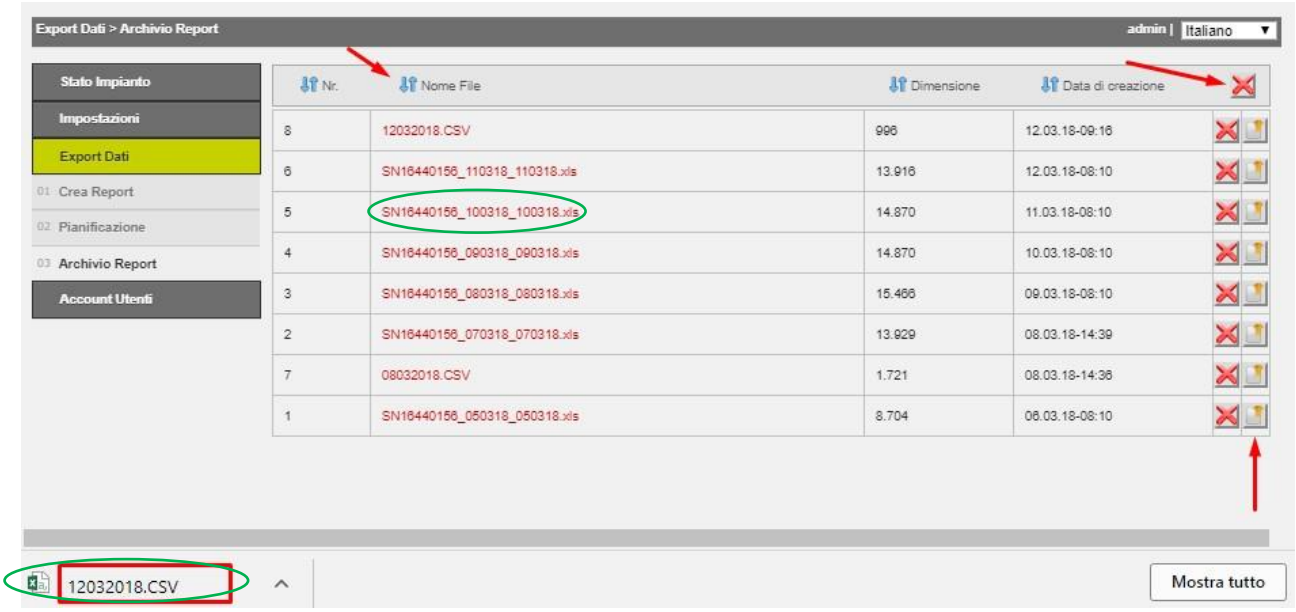


Figure 78 – Report Archive

To delete one or all the records from the list, press the appropriate button .

It is possible to send file by e-mail and/or FTP if configured .

It is also possible to sort the order of the archive reports differently .

Once the file download is completed, select the file in the lower section of the browser page. Automatically a confirmation window of opening of the selected file is opened. Press Yes to open the file.

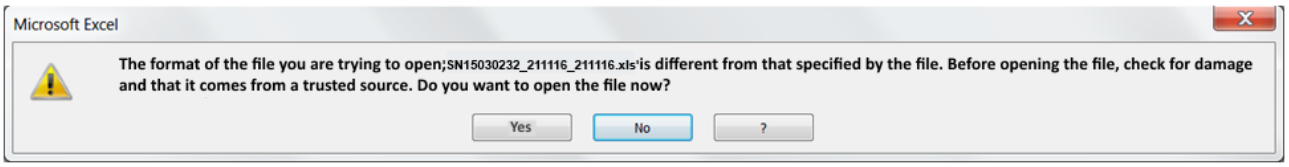


Figure 79 – Excel

To delete a record press the button .

17. USER ACCOUNT

The User Account section allows you to change the data to access the web server account. You can use two types of account: admin and user.

The user account only allows you to view the data contained in the RTU

The admin account allows you to view and change all the data contained in the RTU

The default access data for the User are:

- Username: user
- Password: user
- Retype password: user
- Press Save to save the configuration

The default access data for the Admin user are:

- Username: admin
- Password: admin
- Retype password: admin
- Press Save to save the configuration

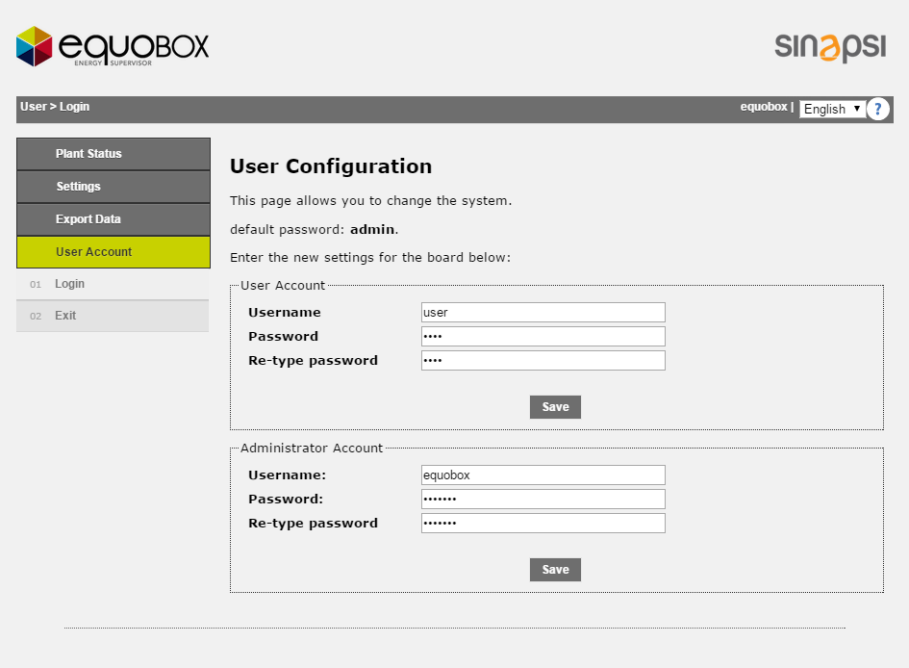


Figure 80 - Account configuration

18. PLANT STATUS

This section allows you to view the plant status. The items that can be selected are:

- Plant Status
  - System Status
  - Event Reports
- Wired Devices
- I/O Devices
- Groups
  - All
  - Errors Only

18.1 Plant Status – System Status – System Status

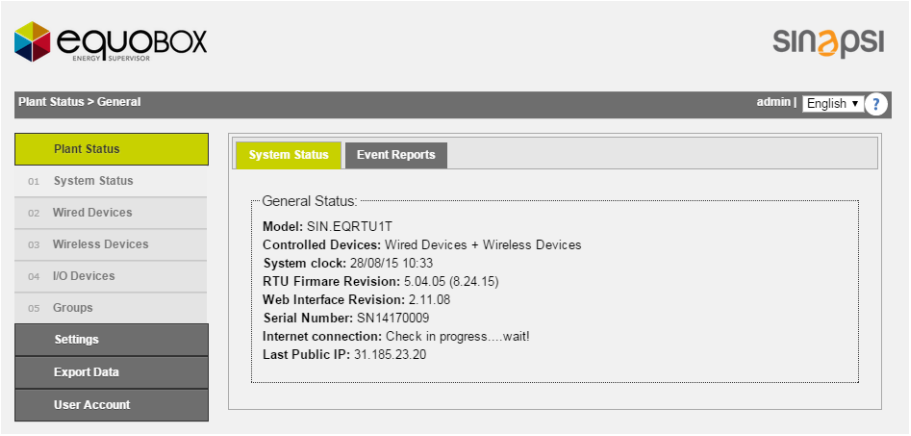


Figure 81 - Plant status

The “Devices” screen is divided into:

- Model: shows the RTU model
- Controlled Devices: shows the type of devices controlled by RTU
- System clock: shows the current date and time of the RTU
- RTU Firmware Version: shows the firmware version
- Web Interface Version: shows the web interface version
- Serial number: shows the serial number of the machine
- Internet connection: shows the Internet connection status
- Last public IP: shows the public address acquired by the RTU

18.2 Plant Status – System Status – Event Reports

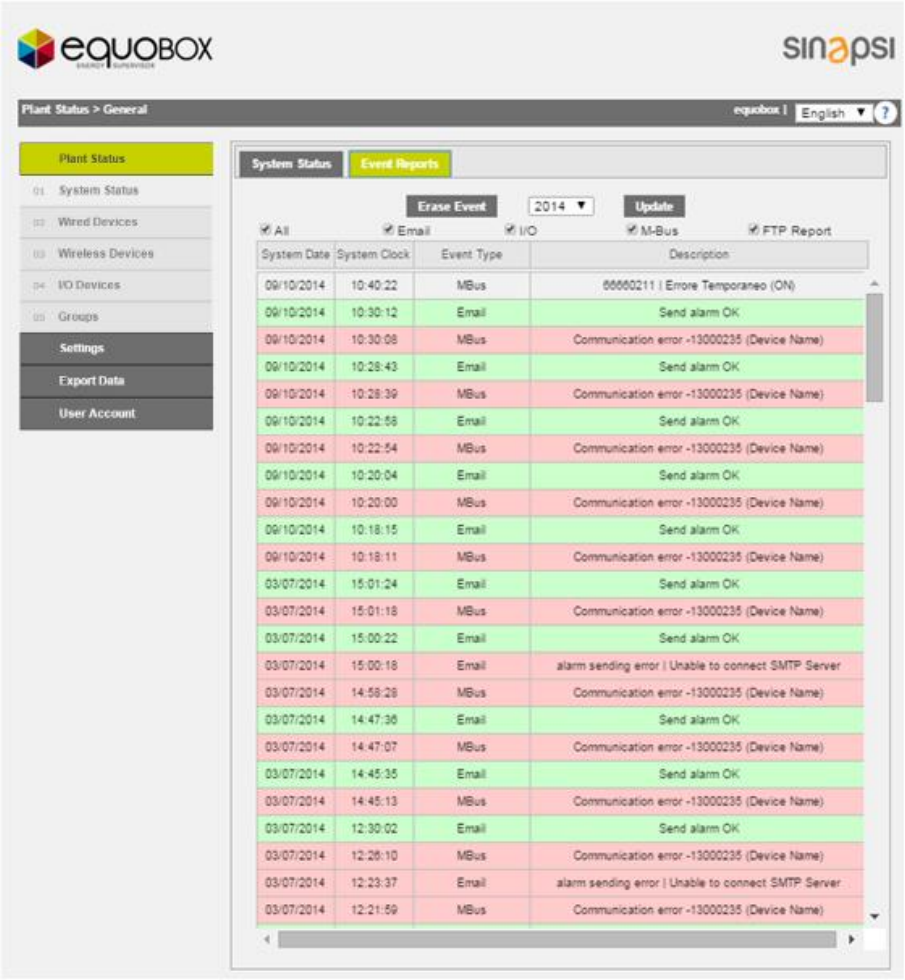
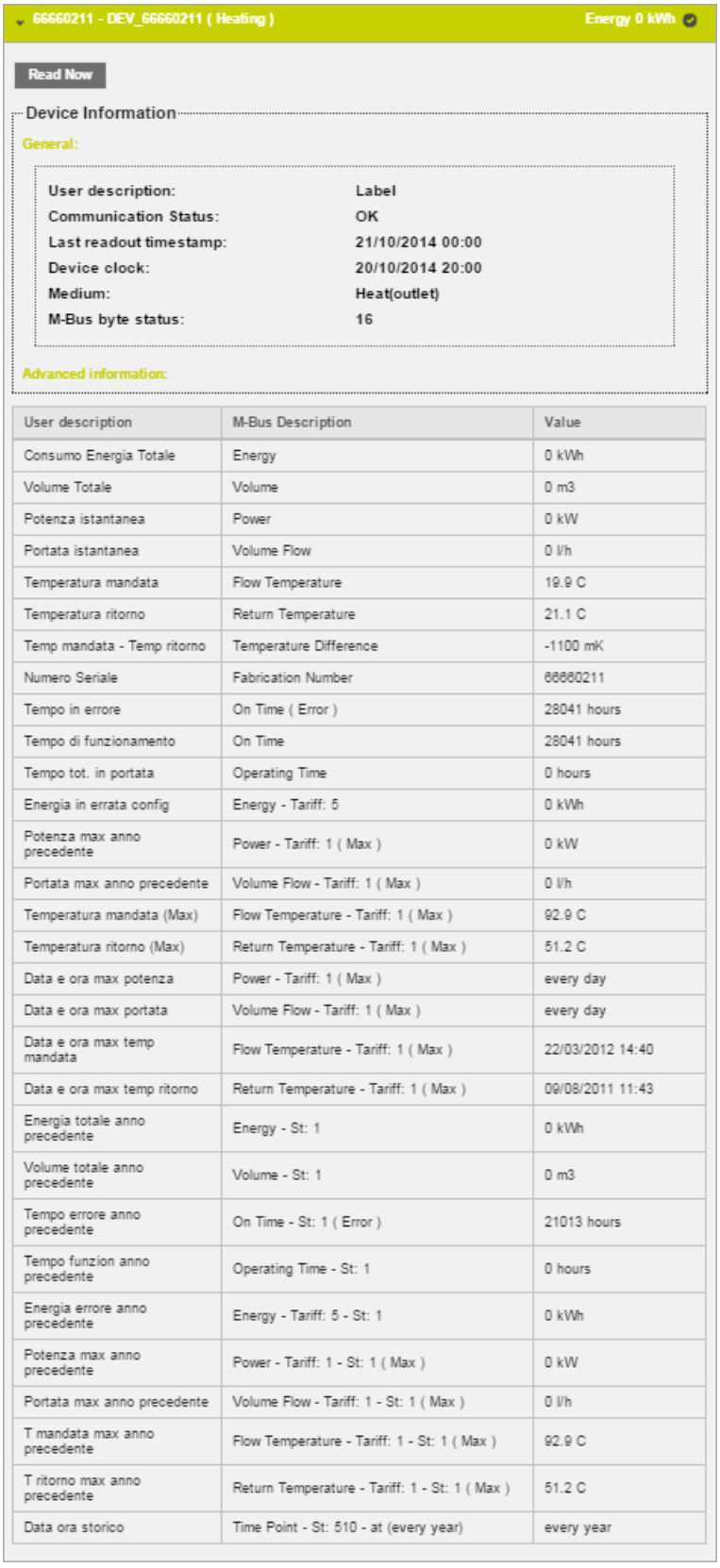


Figure 82 - Summery Event window

The items that can be selected are:

- Erase Event: allows you to permanently delete the events occurred during the year selected from the drop-down menu
- Update: updates the display of events according to the selected items described below
- All: shows, if selected, all the events
- Email: shows/hides, if selected, the events with email notification
- I/O: shows/hides, if selected, the input/output events
- M-Bus: shows/hides, if selected, the M-Bus events
- FTP Report: shows/hides, if selected, the FTP events

18.3 Plant Status – Wired Devices



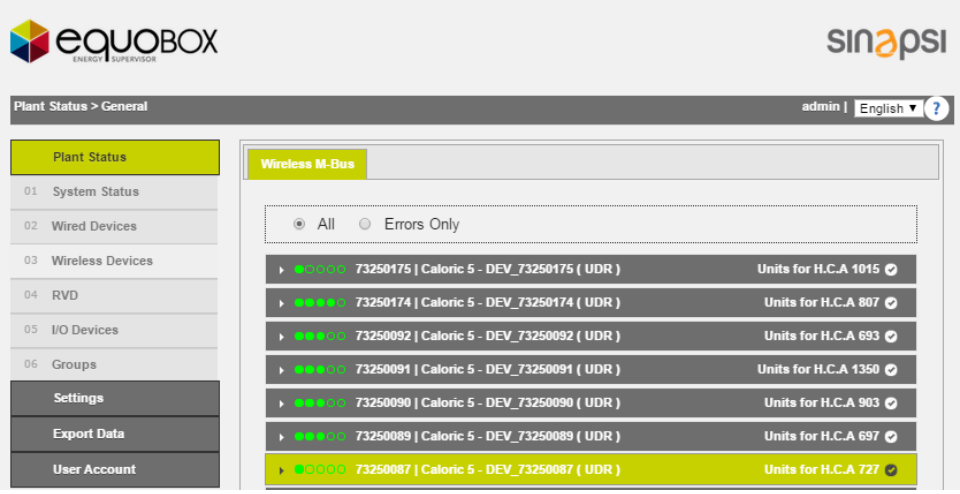
User description	M-Bus Description	Value
Consumo Energia Totale	Energy	0 kWh
Volume Totale	Volume	0 m3
Potenza istantanea	Power	0 kW
Portata istantanea	Volume Flow	0 l/h
Temperatura mandata	Flow Temperature	19.9 C
Temperatura ritorno	Return Temperature	21.1 C
Temp mandata - Temp ritorno	Temperature Difference	-1100 mK
Numero Seriale	Fabrication Number	66660211
Tempo in errore	On Time (Error)	28041 hours
Tempo di funzionamento	On Time	28041 hours
Tempo tot. in portata	Operating Time	0 hours
Energia in errata config	Energy - Tariff: 5	0 kWh
Potenza max anno precedente	Power - Tariff: 1 (Max)	0 kW
Portata max anno precedente	Volume Flow - Tariff: 1 (Max)	0 l/h
Temperatura mandata (Max)	Flow Temperature - Tariff: 1 (Max)	92.9 C
Temperatura ritorno (Max)	Return Temperature - Tariff: 1 (Max)	51.2 C
Data e ora max potenza	Power - Tariff: 1 (Max)	every day
Data e ora max portata	Volume Flow - Tariff: 1 (Max)	every day
Data e ora max temp mandata	Flow Temperature - Tariff: 1 (Max)	22/03/2012 14:40
Data e ora max temp ritorno	Return Temperature - Tariff: 1 (Max)	09/08/2011 11:43
Energia totale anno precedente	Energy - St: 1	0 kWh
Volume totale anno precedente	Volume - St: 1	0 m3
Tempo errore anno precedente	On Time - St: 1 (Error)	21013 hours
Tempo funzion anno precedente	Operating Time - St: 1	0 hours
Energia errore anno precedente	Energy - Tariff: 5 - St: 1	0 kWh
Potenza max anno precedente	Power - Tariff: 1 - St: 1 (Max)	0 kW
Portata max anno precedente	Volume Flow - Tariff: 1 - St: 1 (Max)	0 l/h
T mandata max anno precedente	Flow Temperature - Tariff: 1 - St: 1 (Max)	92.9 C
T ritorno max anno precedente	Return Temperature - Tariff: 1 - St: 1 (Max)	51.2 C
Data ora storico	Time Point - St: 510 - at (every year)	every year

Figure 83 - Wired Device

Shows all the meters previously configured in the RTU. Every meter is displayed with its serial number, model, device name, description, and Main field (Ref. Chapter 11.12, 11.14). Select a line corresponding to a meter and a window with all the relative information will be displayed as shown in Figure 83. If

highlighted in Red, it means there is an Error. ***Checked the Error entry it displays only the meters that are in a state of communication error.***

18.4 Plant Status – Wireless Devices

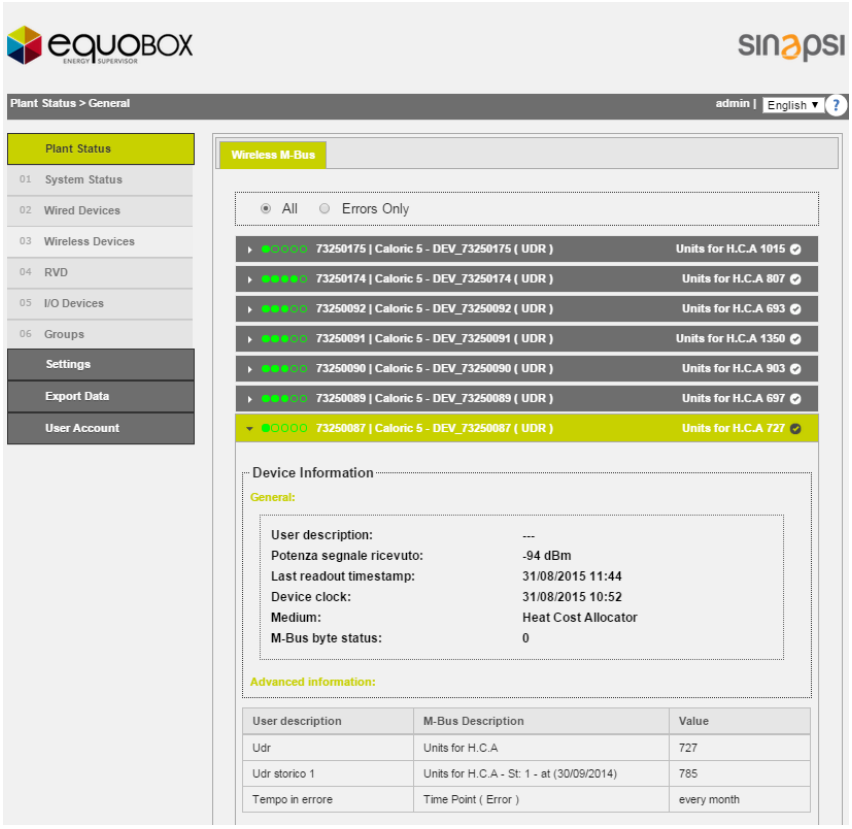


This section shows all the wireless devices in loading at the data logger, the received signal strength, the type of measured value and the last value received.

The signal strength (RSSI) is graphically expressed with 5 indicators:

1) None green indicator: no Signal
2) A single green indicator: poor signal, insufficient
3) Two green indicators: signal but weak enough
4) Three green indicators: sufficient signal
5) Four green indicators: good signal
6) Five green indicators: good signal

The symbol on the right end of the table indicates the communication status of the meter. Clicking on the name of the device, the detail on the measured values and status are opened:



18.5 Plant Status – I/O Devices

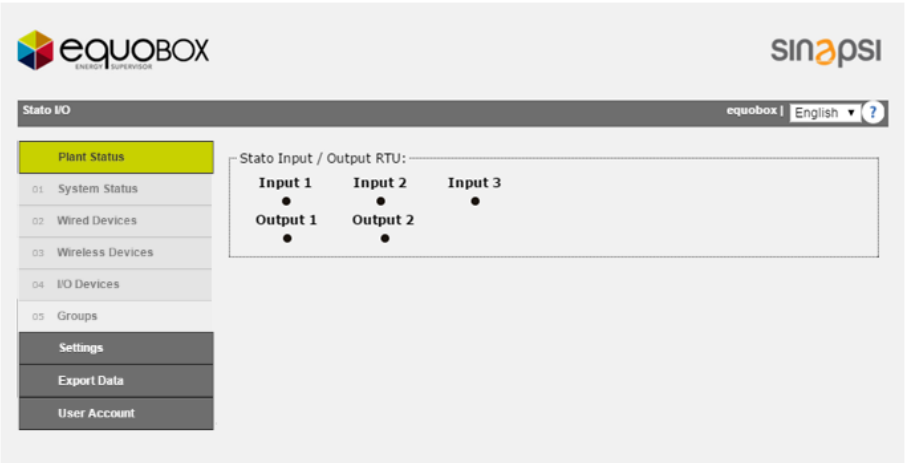


Figure 84 - Detailed information

Returns the current state of digital devices in relation to the configuration. Rif. Chap.12

18.6 Plant Status - Group

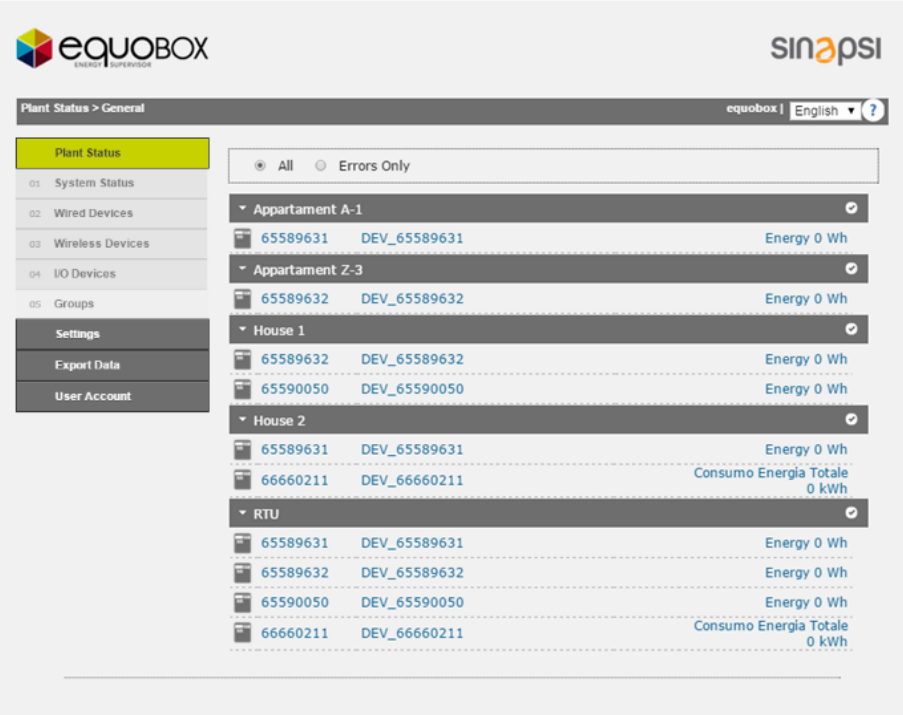


Figure 85 - Groups

Shows all groups previously configured in the RTU. For each group is given the name and the underlying devices to the group, Ref. Chap. 16. ***Checked the Error entry displays only the group that contains meters that are in a state of communication error.***

19. APPENDIX

19.1 ROUTER Configuration

The router is provided with an operating configuration. Should you need to change the parameters, proceed as follows:

- activation of a flat contract with a traffic threshold greater or equal to 500Mb monthly and suppression / bandwidth limitation if the threshold upper limit is exceeded
- insert the SIM ensuring that it is PIN free
- connect the router to the power supply
- user a crossover cable to connect the router to the LAN port of a PC
- connect the antenna to the “GSM MAIN” output
- type in the following address in your browser: http://192.168.1.1
- You will be prompted to enter your access data:
    - Username: admin
    - Password: admin01

Upon accessing for the first time, a configuration wizard will help you to quickly set the basic information to ensure router operation. Check the connection status to ensure the presence of a signal. From the menu at the top, press Status followed by Network Information. A window will appear, as shown in Figure 86.

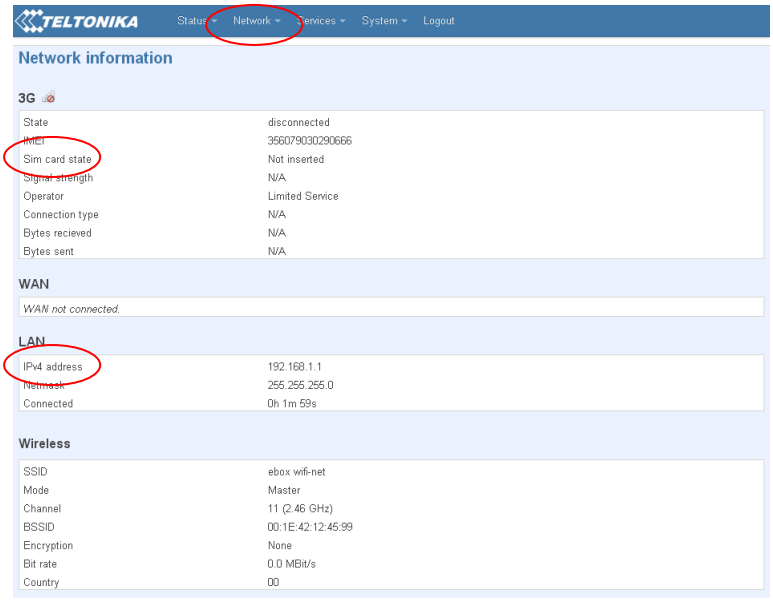


Figure 86 - Network Information

For an acceptable Internet connection which allows internet browsing, you need to have at least two green bars on the Signal Strength line. If not, connect the second antenna provided with the router to the GSM AUX output. A strong enough signal allows for Internet connection. Having a signal with the above requirements provides an internet connection suitable to the service to provide, the absence of an IP address in the IP Address line involves failure to network connection.

The Network section includes the sections in the initial wizard together with other functions. The following screen refers solely to the 3G area. Figure 87 shows the 3G CONFIGURATION submenu to enter the APN. For each service provider is associated an APN.

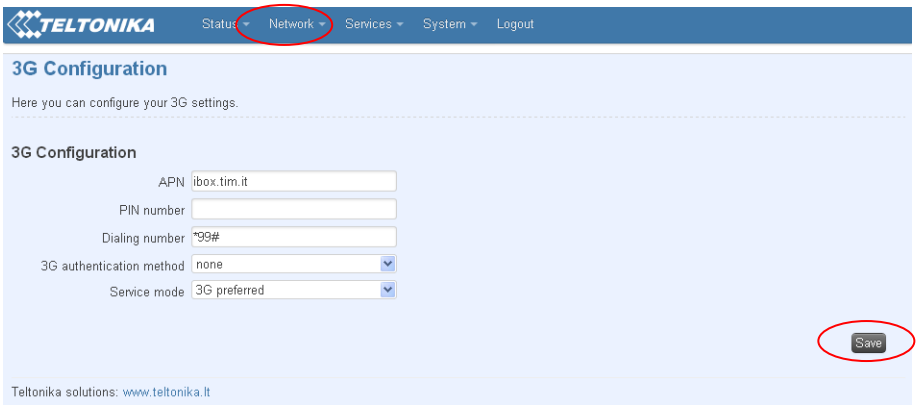


Figure 87 - 3G Configuration

- Tim: ibox.tim.it
- Vodafone: m2mbis.vodafone.it
- Wind: internet.wind

We recommend the activation of a flat contract with a traffic threshold greater or equal to 500Mb monthly and suppression / bandwidth limitation if the threshold upper limit is exceeded. Insert the

APN related to your service provider (if the provider does not correspond to those listed above please contact the respective customer service to get detailed information), the authentication method and any username and password. Remember for every operation to select the Save button located at the bottom right of each configuration page.

The screen below shows the LAN submenu, which is also part of the Network section. (Figure 88)

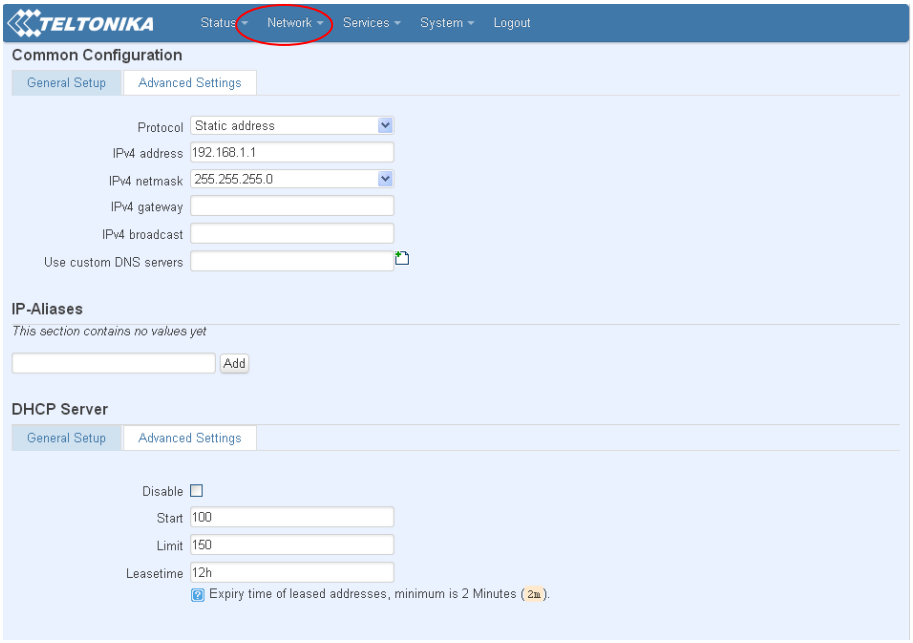


Figure 88 - Common Configuration

It 'possible to change the IP address of the router and eventually enable the DHCP service by inserting the range of active ports, in this case from 100 to 150 included.

In case it's necessary activate a wireless configuration, enter the Wireless, menu Network Figure 89. To activate the Wi-Fi section *do not flag* the Hide ESSID. It 'possible to give a name to the connection for an immediate recognition. In this case is ebox wifi-net.

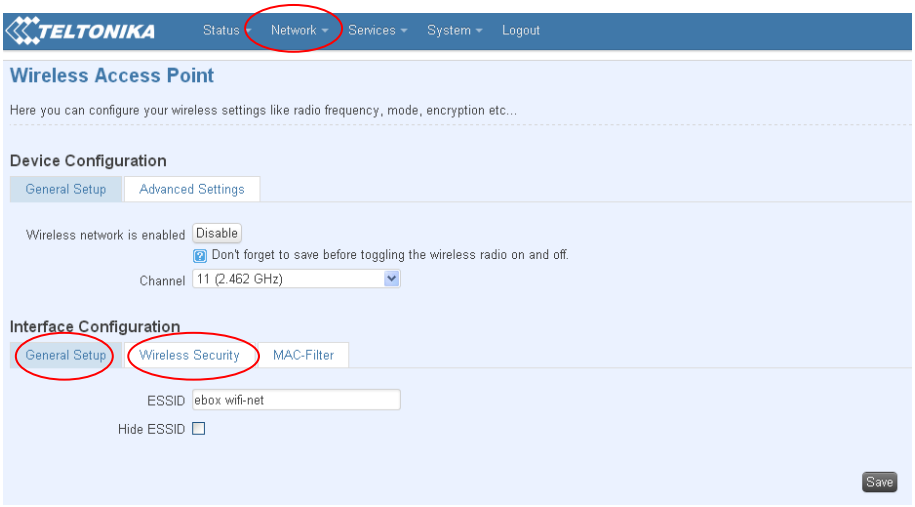


Figure 89 - Wireless Access Point

For security reasons we always recommend activate the Encryption in the Wireless Security subsection. Select the type of key generator to protection and enter a password. Click Save to save the settings. See Figure 90

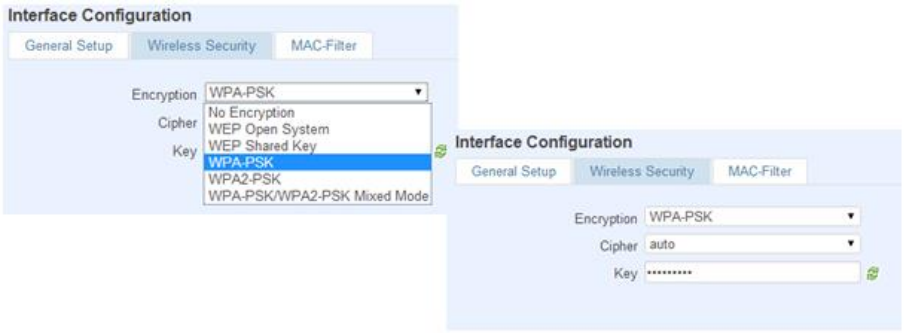


Figure 90 - Security

To use Port Forwarding rules, press Network from the main menu and then Firewall. From the submenu that will be displayed, you can access the Port Forwarding section and set its rules. (Figure 91)

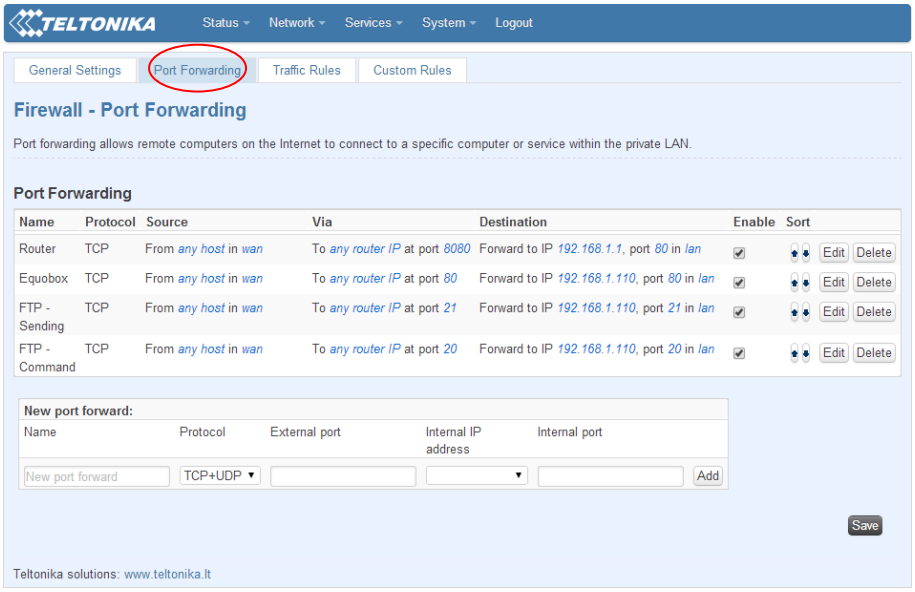


Figure 91 – Port Forwarding

Select Port Forwarding, menu Network, Firewall

In computer networks port forwarding is the process that allows the transfer of data (forwarding) from one computer to another over a specific communications port. This technique can be used to allow an external user to reach a host with a private IP address (within a LAN) through a public IP port of the same. To do this you need a router that can perform an automatic translation of network addresses, known as NAT. The port forwarding allows external computers to connect to a specific computer on the local network, depending on the port used for the connection.

Operationally, the user's browser to your PC with a "http:// router IP" access to the configuration options of the router, in which he states that a synchronization between a port on the router and the corresponding internal device.

Because the router to recognize your computer, you need to create a static LAN IP address.

By defaults the rules in the router are:

- Router: external port 8080
- Equobox: external port 80
- FTP Sending: external port 21
- FTP Command: external port 20

Press Firewall from the menu at the top and then Traffic Rules to set security functions, such as addresses to be filtered, set HTTP addresses or asymmetric cryptographic protocols to manage the transfer of confidential information (Figure 92).

In the General Settings area, you will find DMZ Zone, which is a connection between a public address and a machine address. Remember to select Enable and, if necessary, press Save.

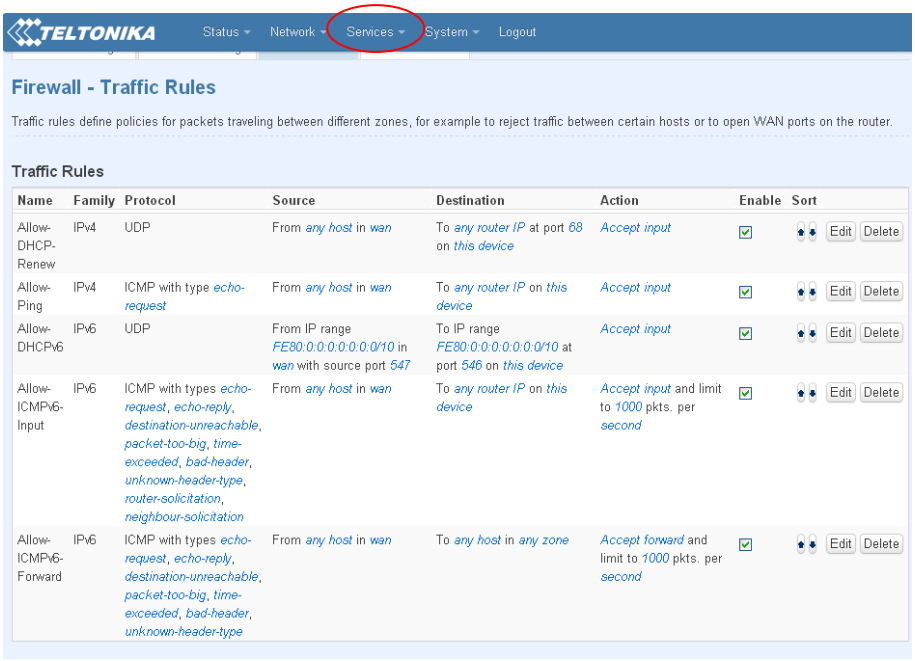


Figure 92 - Traffic Rules

Should you wish to use the SMS service to receive the router status or reboot if from your cell phone, you can enter your phone number and select the Enable box (Figure 93). You can perform the two operations shown in the figure by sending a message from your telephone to the number of the board inserted in the router. The content of the message must be identical to that in the SMS text field (e.g. reboot). You will receive an SMS confirming that the operation has been carried out. Go under Service, SMS Utility

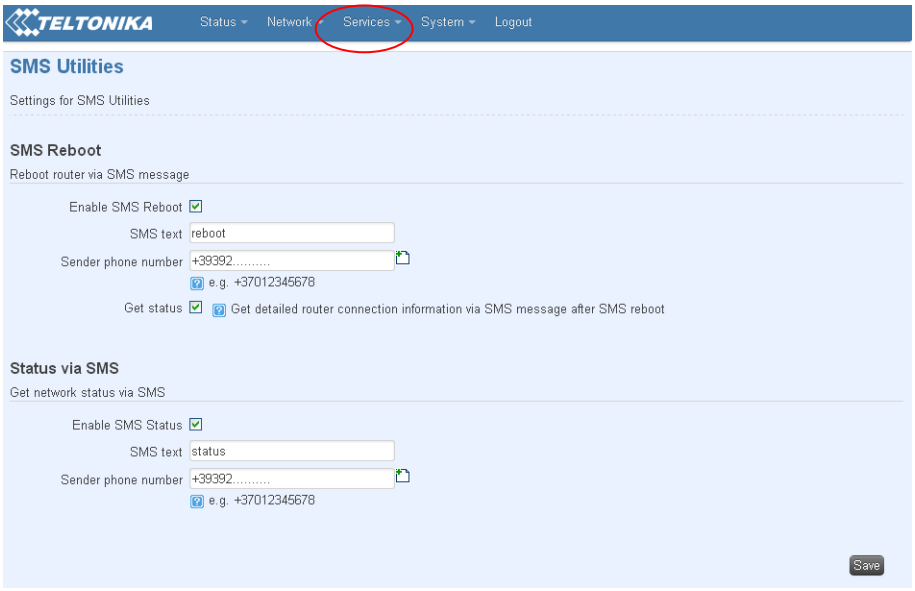


Figure 93 - SMS Utility

By default is active the Ping Reboot, System section, Ping Reboot. The ping reboot is an automatism of the router to restart itself if the same has no answers to ping request in a configurable time interval. The standard parameters are shown in Figure 94

- Enable Ping Reboot: flag
- Reboot router if no echo received: flag
- Interval between pings: 15 minutes
- Ping timeout (sec): 10 seconds
- Packet Size: 54 byte
- Retry count: 5
- Server to ping: 208.67.222.222

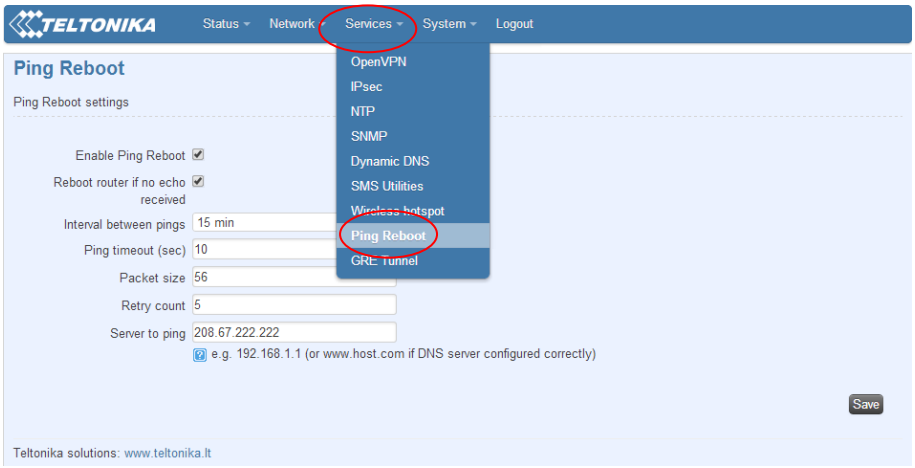


Figure 94 - Ping Reboot

To change the system password, access the System section from the main menu and click on the Administration submenu (Figure 95). You can upgrade the Firmware or upload a previous configuration from Backup and Firmware in the System submenu (Figure 96).

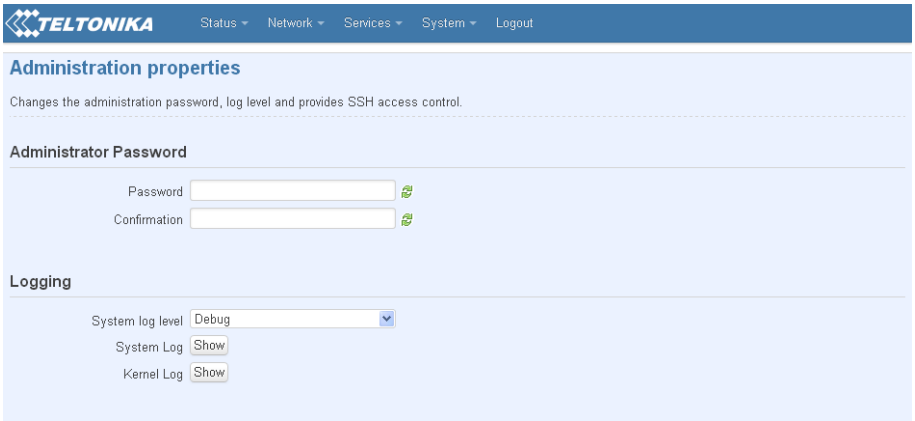


Figure 95 - Administration properties

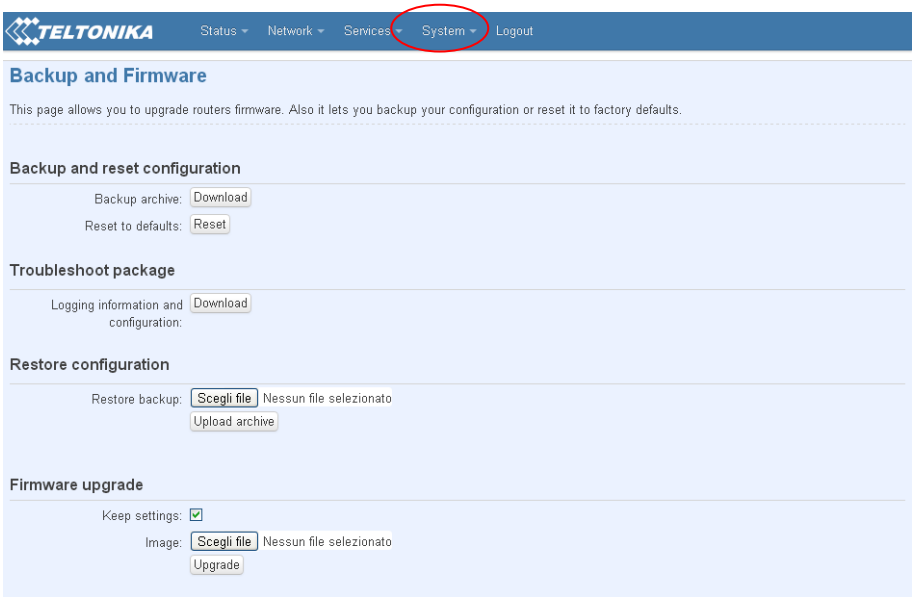


Figure 96 - Backup and Firmware

To set up the Dynamic DNS service go to menu Services, Dynamic DNS. Figure 97

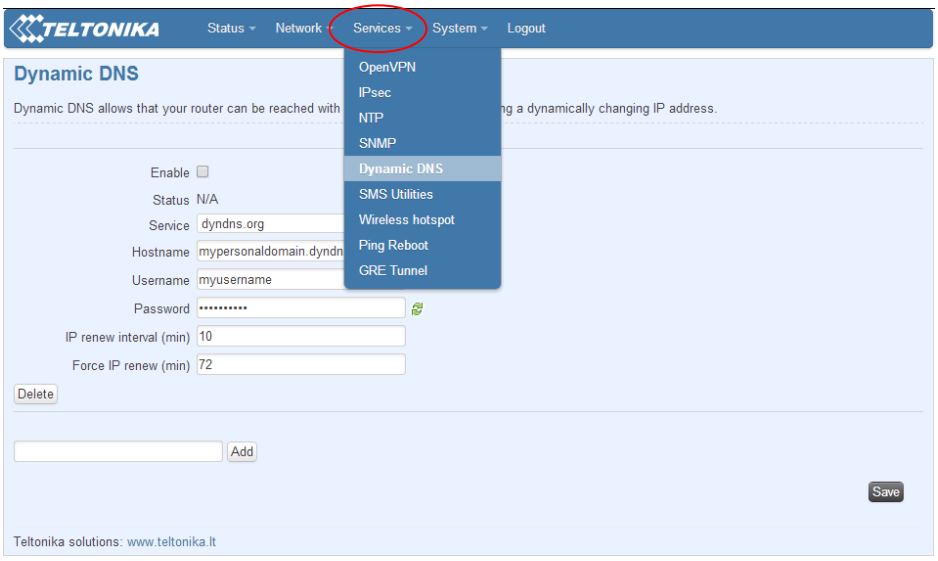
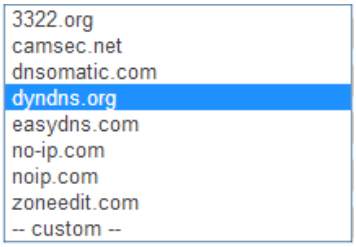


Figure 97 - Dynamic DNS service activation

Select from the following service



Upon completion of insert check Enable and populate fields. See Figure 98

- Service: select the service from those offered
- Hostname: enter the Hostname of the service
- Username: enter the username for access to desired service
- Password: enter the password for access to desired service
- IP renew interval (min): enter a time interval for the renewal of IP. If not specifically requested leave the default value

- Force IP renew (min): enter a time interval to force the renewal of the IP. If not specifically requested leave the default value

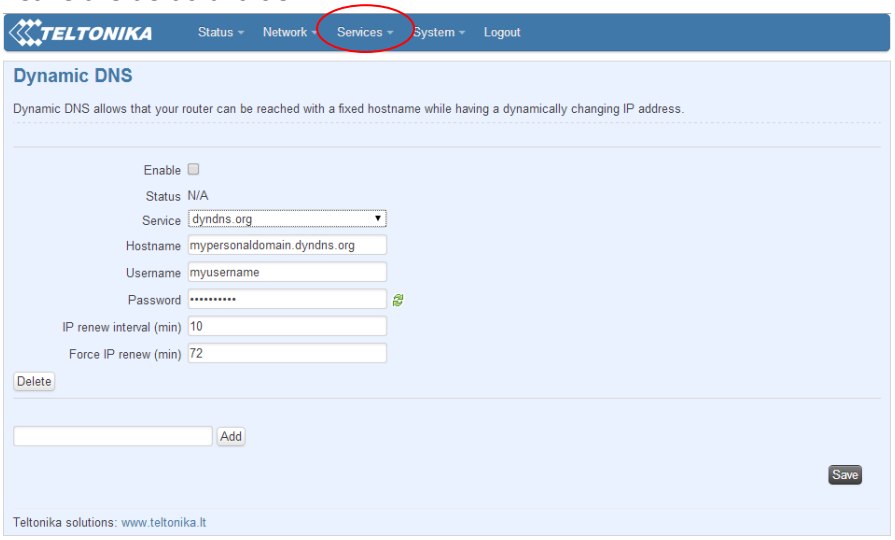


Figure 98 – Access parameter configuration for Dynamic DNS

To obtain the data for the correct filling of the fields refer to the following link

1. http://dyn.com/support/
2. http://www.noip.com/support/

19.2 W. M-Bus Operating Mode

Below operating procedures used standard W. M-Bus are defined:

Mode	Communication	Description
S1	Unidirectional	The measuring devices send their data several times a day, the bandwidth used is: 868.30 MHz to 32,768 kcps with Manchester encoding
S2	Bidirectional	Bi-directional mode of S1
T1	Unidirectional	The measuring devices send their data several times a day, with a configurable range from several seconds to several minutes. the bandwidth used is: 868.95 MHz a 100 kcps encoding “3-out-of-6”
T2	Bidirectional	Bi-directional mode of T1
C1	Unidirectional	Compact mode, compared to AT1 devices can send the same data with less energy. The bandwidth used is 868.95 MHz, 100 kcps, Coding NRZ
C2	Bidirectional	Bi-directional mode of the C1