



INSTALLERS' MANUAL

INDEX

Introduction	5
1 DEVICE CONFIGURATION	5
1.1 ADD GROUP	6
1.2 ADD X-METER.....	7
1.2.1 Software Configuration.....	7
1.2.2 Hardware Configuration	15
1.2.3 Various Operations.....	32
1.3 ADD NG9.....	34
1.4 ADD EASY 4 HALL	37
1.5 ADD CM2-SOLAR	37
1.6 ADD GSL-IT-DA SOLARIMETER	39
1.7 ADD MULTI ES	41
1.8 ADD RWU	43
1.9 ADD EXTERNAL VALUES	44
1.10 ADD A LINK	46
1.11 ADD DAY SHIFT	47
1.12 ADD TOTALIZERS.....	48
1.13 ADD PROFILE	49
1.14 ADD WEATHER STATION.....	51
1.15 ADD BUS.....	52
1.15.1 ET-Pro TCP.....	53
1.15.2 ET-Pro 485.....	54
1.15.3 RTU Modus.....	55
1.15.4 Modbus RTU Over TCP	56
1.15.5 TCP Modbus.....	56
1.16 ADD END-POINT	57
1.16.1 End-Point Modem.....	57
1.16.2 End-Point Ethernet.....	58
1.16.3 End-Point Seriale	59
1.17 ADD MATH MODULE	60
1.17.1 Sum.....	60
1.17.2 Multiplication	61
1.17.3 Cos phi.....	61
1.17.4 4 channels Cos Phi	61
1.17.5 Sum of products	61
1.17.6 Sum divided by sum	62
1.17.7 Average.....	62
1.17.8 Corrected gas	62
1.17.9 Ideal Photovoltaics Power.....	64
1.17.10 Dew Point.....	65
1.17.11 Thermal power	66
1.17.12 Saturated Vapour.....	67
1.17.13 Integral	67
1.17.14 OR expression.....	67
1.17.15 AND expression.....	68
1.17.16 Personalised expression	68
1.17.17 PES.....	69
1.17.18 Economic Calculus.....	69
1.17.19 Air's thermal energy.....	70
2 POLLING.....	72
2.1 X-METER POLLING CONFIGURATION	73
2.2 X-METER MODULES ONLINE READING POLLING CONFIGURATION.....	75
2.2.1 Polling configuration for "historical" X-Meter's modules data	78
2.2.2 X-Meter clocks synch polling configuration	79
2.2.3 X-Meter's totalizers Polling configuration (optional)	80

2.3	NG9 POLLING CONFIGURATION	82
2.4	CM2-SOLAR, EASY 4 HALL GSL-IT-DA SOLAR METER POLLING CONFIGURATION	84
2.5	MULTI ES – RWU POLLING CONFIGURATION	88
3	ALARM CONFIGURATION	89
3.1	COMMUNICATION ERROR	90
3.2	THRESHOLD COMMUNICATION ERROR	92
3.3	GENERIC CONTACT ERROR	93
3.4	GENERIC THRESHOLD ERROR	94
3.5	MOBILE THRESHOLD ERROR.....	95
3.6	RELATIVE THRESHOLDS	96
3.7	GENERAL COMPARISON	97
3.8	LOG STATUS EDIT	99
3.9	CONNECTION STATUS.....	99
3.10	STRINGS COMPARISON – REAL TIME (FOR PV PLANTS)	100
3.11	STARTING INVERTER (FOR PV PLANTS)	101
3.12	PANELS TEMPERATURE (FOR PV PLANTS).....	101
3.13	INVERTER ERROR (FOR PV PLANTS)	102
3.14	INVERTER POWER (FOR PV PLANTS)	102
3.15	SYSTEM LOG.....	103
3.16	FREE SPACE.....	103
3.17	STRINGS COMPARISON - HISTORICAL (FOR PV PLANTS)	104
3.18	PHV EFFICIENCY (FOR PV PLANTS)	104
3.19	ETL SITES IMPORT (FOR SITES MAP SYSTEM)	105
4	UTF CONFIGURATION	106
4.1	MANAGEMENT OF THE REGISTER COUNTERS.....	107
5	SYSTEM CONFIGURATION.....	109
5.1	ACCESSES CONFIGURATION (PERMISSIONS)	109
5.1.1	<i>Users management.....</i>	<i>110</i>
5.1.2	<i>Users menu Management.....</i>	<i>110</i>
5.1.3	<i>Groups Menu Management.....</i>	<i>111</i>
5.1.4	<i>Groups Management.....</i>	<i>112</i>
5.1.5	<i>Roles Management.....</i>	<i>112</i>
5.1.6	<i>Report Permissions</i>	<i>113</i>
5.2	ACTIVITY PLANNING.....	114
5.2.1	<i>(Creation of a Task).....</i>	<i>114</i>
5.2.2	<i>Summary E-mail for PV Plant</i>	<i>114</i>
5.2.3	<i>Reports sending.....</i>	<i>114</i>
5.2.4	<i>Daily check Profile</i>	<i>115</i>
5.2.5	<i>Export XML file with Real Time data, historical data, channels list, PV Plant, UTF list, UTF Historical Data, Alarms List, Log Alarms, devices tree structure. Replicate database for Real Time/Historical data.</i>	<i>115</i>
5.3	TELEMETERING.....	116
5.4	STOP THE SYSTEM.....	119
5.5	GENERAL CONFIGURATION	119
5.5.1	<i>SMTP Default Configuration.....</i>	<i>119</i>
5.5.2	<i>Default Language Configuration.....</i>	<i>120</i>
5.5.3	<i>Default Configuration GSM.....</i>	<i>120</i>
5.5.4	<i>Network configuration</i>	<i>121</i>
5.5.5	<i>Import activation file.....</i>	<i>121</i>
5.5.6	<i>Clock.....</i>	<i>122</i>
5.5.7	<i>Bands Import.....</i>	<i>122</i>
5.5.8	<i>“Ping” Function.....</i>	<i>123</i>
5.5.9	<i>Bands Configuration.....</i>	<i>123</i>
5.5.10	<i>Calendars configuration.....</i>	<i>127</i>
5.6	FORCED RESTART.....	129
5.7	BACKUP MANAGEMENT.....	129
5.7.1	<i>Backup via Ftp - (Optional).....</i>	<i>130</i>

5.8	SYSTEM LOG.....	132
5.9	SYSTEM POOL	133
5.10	MODBUS TCP SLAVE (OPTIONAL MODULE).....	135
6	DASHBOARD (optional)	137
6.1	COMPONENTS LIST.....	142
6.2	PROPERTIES LIST	144
6.2.1	General features”	144
6.2.2	“Background” Property	145
6.2.3	Property “Border”	146
6.2.4	“Font Style” Property.....	147
6.2.5	“Text” Property	148
6.2.6	“Channel” Property	149
6.2.7	“Channels” properties.....	150
6.2.8	“Timers” properties	151
6.2.9	“ON, OFF, Error” Property	152
6.2.10	“Period” Property.....	153
6.2.11	Property “Link to Page”	154
6.2.12	“Alarm” Property	155
6.2.13	“Alarm-Not in Alarm Status” Property.....	157
6.2.14	“Quiet” Property.....	158
6.2.15	Property “feature type 1”	159
6.2.16	Property “Feature type 2”	161
6.2.17	Property “Feature type 3”	162
6.2.18	Property “Feature type 4”	163
6.2.19	Property “Feature type 5”	164
6.2.20	Property “Feature type 6”	165
6.2.21	Property “Feature type 7”	167
6.2.22	Property “Feature type 8”	168
7	CONFIGURATION IMPORT DATA.....	169
7.1	CONFIGURATION IMPORT XML FROM X-METER	169
7.2	CURRENT ACTIVITY	171
7.3	HISTORICAL LOG	172
8	PV Plants Configuration	173
9	Efficiency Calculation (for PV Plants).....	177
10	Economic Calculation (for PV Plants).....	179
11	Types of panel (for PV Plants).....	181
12	Performance Ratio (for PV plants)	182
12.1.1	Data Used by the System	182
12.1.2	Use and Configuration of the Module	183
13	Change Password.....	187
14	User Preferences	187
15	Appendices.....	188
15.1	CRON EXPRESSION.....	188

Introduction

This second “Energy Sentinel WEB” manual is particularly addressed to installers since, rather than showing, as the users’ manual does, how to view the plant and all parameters, it describes in details, other functions that can guide the installer through the configuration of the plant and the setting of all technical parameters.

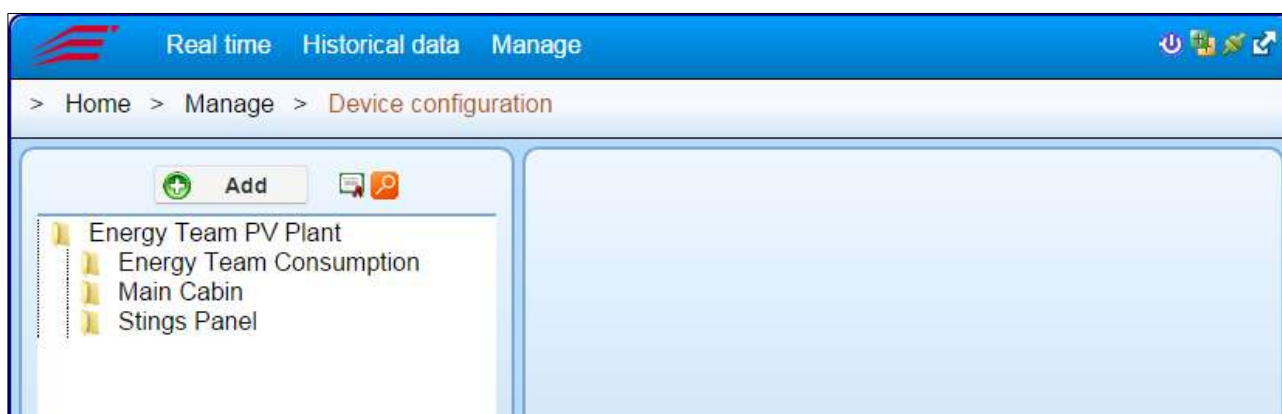
Let us now see the functions that allow setting the structure of the plant, those mentioned at the end of the Users’ Manual when referring to configuration menus.

With the functions explained in the manual it will be possible to set the structure creating groups, subgroups, devices, devices channels, communication vectors, mathematical modules, reports, alarm and everything the system can perform.

1 DEVICE CONFIGURATION

With this menu, the user can build according to their needs, a tree-like structure and set all devices/channels of which the system will then record all parameters. This structure will be visible in all other menus.

To access this menu select “**Device Configuration**” from the “**Manage**” menu on the toolbar.



Double click on the main node (“ENERGY TEAM PV Plant.” in our case), to view a field that will let you change the name of the node itself.

Single left button click on selected folder (i.e. “Main Cabin”), will let you view the whole tree-like structure previously created. Use the same process to view groups and subgroups up to single channels.

Once the tree-like structure of the plant is shown, double click on the item of interest (group, subgroup, channel, etc.) to see all related details in the side window.

To add a new node, double click on the point where you intend to create it and then select “**Add**”; this will make a drop down menu appear from which it will be possible to insert new elements to the tree-like structure.

The possible choices are (varying on the licence purchased):

Add Groups: allows creating different groups and subgroups to manage all downstream devices.

Add CM2-Solar: allows adding a new specific peripheral device for Photovoltaics plants monitoring (optional function for PV systems).

Add X-Meter: allows adding an analysing device with digital inputs.

Add Bus: allows adding a pretend device by which it will be possible to set a BUS (Serial or LAN).

Add math module: allows adding a pretend device from which it will be possible to select desired interesting parameters like Power, Voltage, Energy, etc. Select each function to view its related setting menu.

Add GSL-IT-DA Solar meter: allows adding a “wired” solar meter setting the connection functions viewed on the side.

Add Easy-4 Hall: allows adding and enable the Easy-4 Hall module for string current measurement of a Photovoltaic plant.

Add Multi ES: allows adding a “Multi ES” module, basically similar to the X-Meter except with 2 digital inputs.

Add Rwu: the module that’s added is similar to a control unit and has 6 digital inputs.

The remaining entries allow adding other devices or pretend functions that can be describes subsequently.

1.1 Add Group

The following mask will appear:



Name: insert the name of the group; it can be the one identifying the Company, the cabinet or the panel, etc.

Search keys: although not indispensable, a keyword can be inserted for a possible search.

When finished, click **Save** to store all settings or **Cancel** to exit without saving.

1.2 Add X-Meter

This device is designed and made by Energy Team S.p.A.; it was born to be a three-phase network analyser and it also has 4 outputs, 8 digital inputs and 8 alarms freely settable. The X-Meter can be equipped with an internal network card (XM5 module) or a GSM/GPRS modem (XM4 module); it has a calendar and it can file, in its internal memory, all parameters from 1 to 60 minutes.

For this device, there are 2 settings available, a Software and a Hardware one. The first setting lets you decide which real time data make the WEB Server read and, above all, what to “store” as historic data. The Hardware configuration, on the other hand, is the “on board” setting of the instrument and it regards, as we’ll see later, all settings that the device is able to manage starting from the mere T.A./T.V. report to the setting of alarms on board of the device.

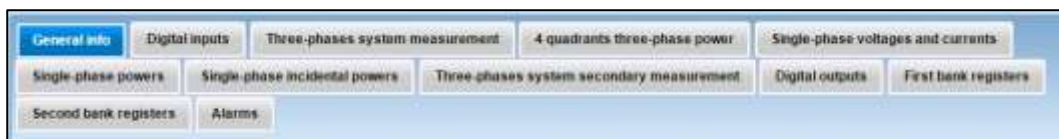
Once the instrument is fully configured, it is necessary to set a [BUS](#), or an [End-Point](#) to be able to communicate with the device. Afterward, it will be possible to set the [Polling](#) or the [telemetry](#) module to start the automatic data download from the server.

In case of the device sending XML files with FTP protocol, it will be only necessary to set the [File import](#) module.

In the next chapter the first of the two settings is explained; that is the Software configuration.

1.2.1 Software Configuration

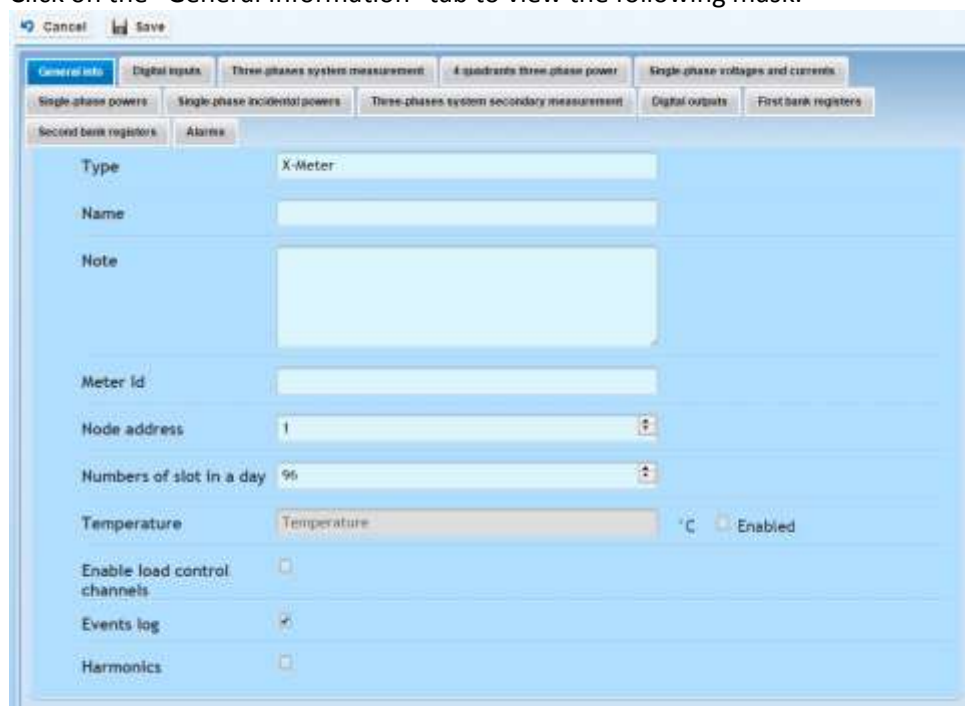
Double click on a node/folder to select it and then add X-Meter, a main screen with various tabs will appear; each one of the tabs corresponds to a certain Mask (all of them explained here below) from which the user, by filling them in, can enable the channel which they intend to analyse and/or store data into the server from.



Menus description:

1.2.1.1 General Info

Click on the “General Information” tab to view the following mask:



Name: Insert device’s name. Generally the name of the monitored line or the meter’s. In Multi-Site plants it is advisable to insert a name that can identify, unambiguously, the site where the appliance is installed. This will consent a more efficient search in case of failure or other kinds of search.

Note: Empty field, available for any note.

Meter ID: Set this ID correct in case of the X-Meter device sending data to the Server (see [Configuration of XML import from X-Meter](#)). Insert a random name and number for all other cases.

Node address: Insert the module’s network address from 1 to 253.

Number of slots in a day: Allows setting the desired number of slots wishing to file during one day. This sets the number of recordings you wish to acquire, each one of them within a certain set period of time

i.e.: Selecting 96 would mean that, during one day, 96 recordings will happen, each one of them lasting 15 minutes. 4 recordings per hour, 96 per day.

Temperature: this is the internal temperature of the instrument. Tick the first box to activate the field and enable the measuring.

Events log: to enable the download of the events currently on the device’s memory. This LOG is indispensable for consulting Micro-Interruptions recorded by the instruments. Upon the creation of a new instrument, this LOG will appear already selected because, in any case, all X-Meter’s record information during the LOG (i.e. time synchronisation, switch off for disconnection, etc.)

Harmonics: to enable data download from the harmonics, until the 25°.


1.2.1.2 Digital Inputs

Clicking on the “Digital Inputs” Tab will make appear a mask that allows activate and set all connected digital inputs.



Input	Input Name	Unit	Meter/Counter	Enabled
Input 1		W	<input type="checkbox"/>	<input type="checkbox"/>
Input 2		W	<input type="checkbox"/>	<input type="checkbox"/>
Input 3		W	<input type="checkbox"/>	<input type="checkbox"/>
Input 4		W	<input type="checkbox"/>	<input type="checkbox"/>
Input 5		W	<input type="checkbox"/>	<input type="checkbox"/>
Input 6		W	<input type="checkbox"/>	<input type="checkbox"/>
Input 7		W	<input type="checkbox"/>	<input type="checkbox"/>
Input 8		W	<input type="checkbox"/>	<input type="checkbox"/>

Enabled: tick the box next to it to enable the corresponding digital input connected, this will activate the measuring of the quantity.

Input 1÷Input 8: digital inputs of the X-Meter's inputs. After having enabled the connected ones, insert in the field next to them, the name of the quantity you wish to measure (i.e. "Water Temperature", "Building's active Power" etc.). Click on the following button  to open a drop down menu and select the desired quantity.

Meter/Counter: Tick the box if the X-Meter has been set to work in meter mode.

Enable all: This is a quick way to enable all digital inputs instead of ticking a box at the time.

1.2.1.3 Three-phase system measurements

Select "Three-phase system measurements" to open a mask referring to quantities directly measured (and calculated) on the Voltmetric and Amperometric inputs of the X-Meter:



Quantity	Quantity Name	Unit	Meter/Counter	Enabled
Three-phases active power	P. active	W	<input type="checkbox"/>	<input type="checkbox"/>
Three-phases reactive power	P. reactive	VAr	<input type="checkbox"/>	<input type="checkbox"/>
Three-phases power factor	Cosphi	Number (Average)	<input type="checkbox"/>	<input type="checkbox"/>
Three-phases phase-neutral voltage	V. starry	V	<input type="checkbox"/>	<input type="checkbox"/>
Three-phases phase-phase voltage	V. concatenated	V	<input type="checkbox"/>	<input type="checkbox"/>
Three-phases current	C. three-phases	A	<input type="checkbox"/>	<input type="checkbox"/>

To view the amount of the desired quantity, tick the **"Enabled"** box, the system will automatically suggest the name previously inserted as general information. Once the channel has been enabled, it will be possible to change every channel's name. Click on **"Enable all"** to enable all channels and avoid ticking on box at the time.

Note: since the device has to store all data in to its internal memory, historic data regarding these channels, will be available only if the instrument's setting is correct (see [Hardware Configuration](#)).

1.2.1.4 4 quadrants three-phase power

Click on the “4 quadrants three-phase power” to open the mask regarding the power calculated on voltage and current previously measured on the X-Meter’s Voltmetric and Amperometric inputs.



Channel Name	Unit	Enabled
Active power imported	W	<input checked="" type="checkbox"/> Enabled
Active power exported	W	<input checked="" type="checkbox"/> Enabled
Inductive reactive power imported Q1	Var	<input checked="" type="checkbox"/> Enabled
Capacity reactive power exported Q2	Var	<input checked="" type="checkbox"/> Enabled
Inductive reactive power exported Q3	Var	<input checked="" type="checkbox"/> Enabled
Capacity reactive power imported Q4	Var	<input checked="" type="checkbox"/> Enabled

As previously seen, to view the amount of the desired quantity, tick the “**Enabled**” box and insert the name you wish to associate with said quantity.

Click on “**Enable all**” to enable all channels and avoid ticking on box at the time.

Note: since the device has to store all data in to its internal memory, historic data regarding these channels, will be available only if the instrument’s setting is correct (see [Hardware Configuration](#)).

1.2.1.5 Single phase Current and Voltage

Click on the “single phase current and Voltage” to open the mask regarding Voltage and Current measured on the X-Meter’s Voltmetric and Amperometric inputs.



Channel Name	Unit	Enabled
Voltage L1-N	V	<input checked="" type="checkbox"/> Enabled
Voltage L2-N	V	<input checked="" type="checkbox"/> Enabled
Voltage L3-N	V	<input checked="" type="checkbox"/> Enabled
Voltage L1-L2	V	<input checked="" type="checkbox"/> Enabled
Voltage L2-L3	V	<input checked="" type="checkbox"/> Enabled
Voltage L3-L1	V	<input checked="" type="checkbox"/> Enabled
Current L1	A	<input checked="" type="checkbox"/> Enabled
Current L2	A	<input checked="" type="checkbox"/> Enabled
Current L3	A	<input checked="" type="checkbox"/> Enabled

As previously seen, to view the amount of the desired quantity, tick the “**Enabled**” box and insert the name you wish to associate with said quantity.

Click on “**Enable all**” to enable all channels and avoid ticking on box at the time.

Note: since the device has to store all data in to its internal memory, historic data regarding these channels, will be available only if the instrument’s setting is correct (see [Hardware Configuration](#)).

1.2.1.6 Single phase Power

Click on the “Single phase Power” tab to view the mask for active and reactive Power of every phase, together with the power factor. These quantities are calculated on voltage and current previously measured on the X-Meter’s Voltmetric and Amperometric inputs.

✓ Enable all		
Active power L1	Active L1	W <input type="checkbox"/> Enabled
Active power L2	Active L2	W <input type="checkbox"/> Enabled
Active power L3	Active L3	W <input type="checkbox"/> Enabled
Reactive power L1	Reactive L1	VAr <input type="checkbox"/> Enabled
Reactive power L2	Reactive L2	VAr <input type="checkbox"/> Enabled
Reactive power L3	Reactive L3	VAr <input type="checkbox"/> Enabled
Power factor L1	Power factor L1	Number (Average) <input type="checkbox"/> Enabled
Power factor L2	Power factor L2	Number (Average) <input type="checkbox"/> Enabled
Power factor L3	Power factor L3	Number (Average) <input type="checkbox"/> Enabled

As previously seen, to view the amount of the desired quantity, tick the “**Enabled**” box and insert the name you wish to associate with said quantity.

Click on “**Enable all**” to enable all channels and avoid ticking on box at the time.

Note: since the device has to store all data in to its internal memory, historic data regarding these channels, will be available only if the instrument’s setting is correct (see [Hardware Configuration](#)).

1.2.1.7 Single phase incidental power

Click on the “Single phase accessory power” to view mask regarding apparent and distorting power for each phase. These quantities are calculated on voltage and current previously measured on the X-Meter’s Voltmetric and Amperometric inputs.

✓ Enable all		
Apparent power L1	Apparent L1	VA <input type="checkbox"/> Enabled
Apparent power L2	Apparent L2	VA <input type="checkbox"/> Enabled
Apparent power L3	Apparent L3	VA <input type="checkbox"/> Enabled
Distorting power L1	Distorting L1	VA <input type="checkbox"/> Enabled
Distorting power L2	Distorting L2	VA <input type="checkbox"/> Enabled
Distorting power L3	Distorting L3	VA <input type="checkbox"/> Enabled

As previously seen, to view the amount of the desired quantity, tick the “**Enabled**” box and insert the name you wish to associate with said quantity.

Click on “**Enable all**” to enable all channels and avoid ticking on box at the time.

Note: since the device has to store all data in to its internal memory, historic data regarding these channels, will be available only if the instrument’s setting is correct (see [Hardware Configuration](#)).

1.2.1.8 Three phase system, secondary measurements

Click on the “Three phase system, secondary measurements” to open the mask showing other quantities (both directly measured and calculated) that can be useful for plants monitoring, as follows:



Measurement	Unit	Enabled
Frequency	Hz	<input checked="" type="checkbox"/> Enabled
Star center voltage	V	<input checked="" type="checkbox"/> Enabled
Neutral current	A	<input checked="" type="checkbox"/> Enabled
Three-phases distorting power	VA	<input checked="" type="checkbox"/> Enabled
Three-phases apparent power	VA	<input checked="" type="checkbox"/> Enabled

As previously seen, to view the amount of the desired quantity, tick the “**Enabled**” box and insert the name you wish to associate with said quantity.

Click on “**Enable all**” to enable all channels and avoid ticking on box at the time.

Note: since the device has to store all data in to its internal memory, historic data regarding these channels, will be available only if the instrument’s setting is correct (see [Hardware Configuration](#)).

1.2.1.9 Digital outputs

The user can enable these channels to read digital outputs’ statuses. Should the X-Meter’s output be set as “telemetry”, the user can manually work the output, i.e. the lights’ or engines’. As shown in the “Form” here below, it’s possible for the user to give each output a name, with the same procedure explained above, it’s possible to enable the desired outputs and give them a name.



Output	Enabled
Out 1	<input checked="" type="checkbox"/> Enabled
Out 2	<input checked="" type="checkbox"/> Enabled
Out 3	<input checked="" type="checkbox"/> Enabled
Out 4	<input checked="" type="checkbox"/> Enabled

Please note that “historic” data for these channels will not be read by the instrument’s memory but the Server’s and the value will be the average of all samples normally read in 15 minutes.

Note: the output’s status is, by all means, a channel and it can be used as well in the Server’s alarms configuration “manager”.

1.2.1.10 First and Second Banks

X-Meters’s bear on-board Energy totalizers for every measurement regarding either electricity (made by means of C.T. and V.T.), and the 8 digital inputs. Every X-Meter is equipped with two totalizers; the first one is resettable with the keyboard with no need for a PIN code while, the second can be reset inserting a PIN code (default code 1234).

Please note that of the digital inputs on-board totalizers, it only works the first one (the second totalizer being a mere predisposition). These on-board totalizers can be viewed both on the instrument's display and via the Energy sentinel WEB (a bit like standing in front of the instrument reading data straight from it)

Reading the logbooks, and with a properly set [polling](#), it is possible to put together all historic data.

Usually, an exact reading of the totalizer is set every 15 minutes, the system will then calculate (between a reading and the next one), the energy Delta with the previous reading.

Even in case of faulty communication, the Server is able to calculate Average Power values that should have been maintained to consume all the period's energy.



The screenshot displays a configuration window with a light blue background. At the top, there is a checkbox labeled "Enable all" which is checked. Below this, the settings are organized into several sections:

- Active energy imported:** A text input field containing "Active imported", a unit dropdown set to "Wh", and an "Enabled" checkbox.
- Active energy exported:** A text input field containing "Active exported", a unit dropdown set to "Wh", and an "Enabled" checkbox.
- First quadrant reactive energy:** A text input field containing "Reactive Q1", a unit dropdown set to "VARh", and an "Enabled" checkbox.
- Second quadrant reactive energy:** A text input field containing "Reactive Q2", a unit dropdown set to "VARh", and an "Enabled" checkbox.
- Third quadrant reactive energy:** A text input field containing "Reactive Q3", a unit dropdown set to "VARh", and an "Enabled" checkbox.
- Fourth quadrant reactive energy:** A text input field containing "Reactive Q4", a unit dropdown set to "VARh", and an "Enabled" checkbox.
- Input 1 through Input 6:** Each input has a text field, a unit dropdown (all set to "W"), a "Counter" checkbox, and an "Enabled" checkbox. All "Enabled" checkboxes are checked.

1.2.1.11 Alarms

X-Meters can manage up to 8, freely settable, alarms (see [Hardware Configuration](#) chapter). Via the Web Server, it is possible to read the instrument's on-board alarm status.



Alarm	Status	Action
Alarm 1	<input type="text"/>	Enabled
Alarm 2	<input type="text"/>	Enabled
Alarm 3	<input type="text"/>	Enabled
Alarm 4	<input type="text"/>	Enabled
Alarm 5	<input type="text"/>	Enabled
Alarm 6	<input type="text"/>	Enabled
Alarm 7	<input type="text"/>	Enabled
Alarm 8	<input type="text"/>	Enabled

Basically, for every Alarm status, the user can enable the reading of every single status and name it.

Please note that “historic” data for these channels will not be read by the instrument's memory but the Server's and the value will be the average of all samples normally read in 15 minutes.

Note: the output's status is, by all means, a channel and it can be used as well in the Server's alarms configuration “manager”.

You are now ready to associate this X-Meter to a [ET-Pro TCP](#) BUS (in case of LAN connection) or [ET-Pro 485](#) (in case of direct Serial connection), and, subsequently, setting the [Polling](#) configuration.

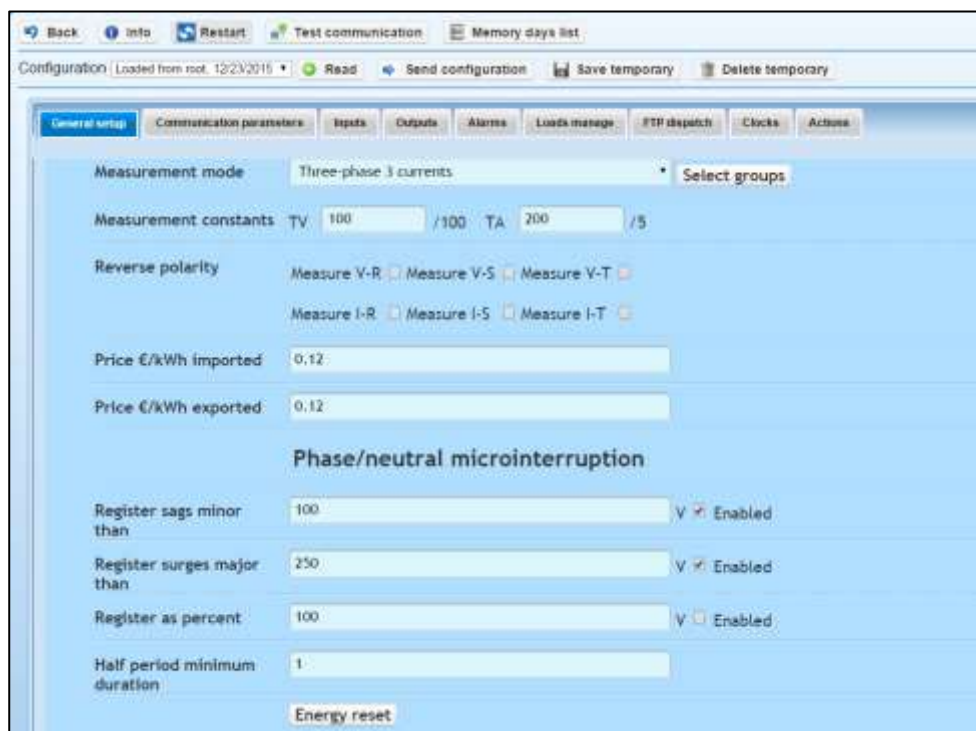
1.2.2 Hardware Configuration

This function lets you set the X-Meters to modify and recalibrate the instrument and its settings.

To access this function, first configure the instrument on the WEB Server with the Software Configuration (see previous chapter), set then a BUS/END-POINT to finally be able to configure the instrument.

Double click on the desired instrument and click on the  button to access the menu.


The following configuration mask will show:

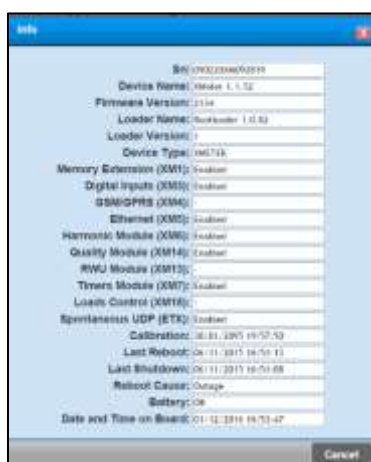


The screenshot shows the 'Hardware' configuration page of the Energy Team web interface. The page has a top navigation bar with buttons: Back, Info, Restart, Test communication, and Memory days list. Below this is a configuration bar with buttons: Read, Send configuration, Save temporary, and Delete temporary. The main content area has tabs: General setup, Communication parameters, Inputs, Outputs, Alarms, Loads manage, FTP dispatch, Clocks, and Actions. The 'General setup' tab is active, showing various configuration options:

- Measurement mode: Three-phase 3 currents (with a 'Select groups' button)
- Measurement constants: TV 100 /100 TA 200 /5
- Reverse polarity: Measure V-R, Measure V-S, Measure V-T, Measure I-R, Measure I-S, Measure I-T (each with a checkbox)
- Price €/kWh imported: 0,12
- Price €/kWh exported: 0,12
- Phase/neutral microinterruption section:
 - Register sags minor than: 100 V [x] Enabled
 - Register surges major than: 250 V [x] Enabled
 - Register as percent: 100 V [x] Enabled
 - Half period minimum duration: 1
- Energy reset button at the bottom.

The system will upload (for the first access only), a Default configuration. Every time the system sends or receives a new configuration from the instrument, it will be automatically saved, together with the date and the user that realized it either from or to the device.

The  button will put the server in contact with the instrument (in case of GSM, a manual connection will activate) and it will give all information regarding the instrument (see image below)





The screenshot shows the 'Info' window, which displays detailed information about the instrument. The information includes:


- Serial Number (SN): 0002234400010
- Device Name: Module L 1.12
- Firmware Version: 2.14
- Loader Name: Loader 1.12
- Loader Version: 1.12
- Device Type: 06718
- Memory Extension (XM1): Loaded
- Digital Inputs (XM3): Loaded
- GSM/GPRS (XM4): Loaded
- Ethernet (XM2): Loaded
- Harmonic Module (XM6): Loaded
- Quality Module (XM14): Loaded
- RWU Module (XM13): Loaded
- Timers Module (XM7): Loaded
- Loads Control (XM16): Loaded
- Spontaneous UDP (ETX): Loaded
- Calibration: 06/11/2015 16:57:59
- Last Reboot: 06/11/2015 16:58:13
- Last Shutdown: 06/11/2015 16:58:08
- Reboot Cause: Outage
- Battery: OK
- Date and Time on Board: 01/12/2016 16:51:47

 A 'Cancel' button is located at the bottom right of the window.

Thanks to this FORM it is possible to retrieve information such as the instrument's registration number, Hardware/Firmware version, installed options, time and date.

The  button will start a reboot of the instrument to give an OK or ERROR message back depending on the success or not in sending the command.

The  button will start a connection test between the Server and the Instrument to give an OK or ERROR message back depending on the success or not of the communication.

The  button will start a scan of available days on board of the instrument from the more recent; the user can then select the days they intend to download and, selecting “Data retrieve”, the server will immediately download all selected data.

Only in case of the operation being successful, the system will give an OK message.

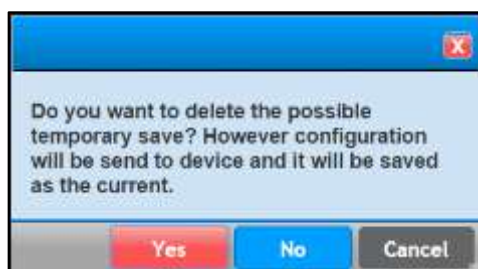
Note: for data download, the correct polling must be configured.

The commands “Read” and “Send Configuration” will let you download or send the configuration.

It is also possible to save or delete a temporary configuration.



The picture above shows how the system keeps track of the user that successfully ended a configuration sending or downloading. Clicking “send configuration” the system will ask:



Selecting “Yes” will send the configuration and, if successfully completed, the temporary configuration will be removed to save the “current” configuration instead.

Please note that if the configuration does not undergo any change, a new one will not be recorded in to the Database and the previous one will be kept current.

Selecting “No” will send the configuration anyway and, in successfully completed, the temporary configuration will be kept. For the rest, refer to the above paragraph.

Select “Cancel” to go back to the previous menu without applying any changes.

For the instrument’s on-board configuration, there is a series of dedicated Tabs



See the following chapters for details on setting each of them:

1.2.2.1 General Setup

Measurement mode	Three-phase 3 currents		Select groups
Measurement constants	TV	100 /100	TA 200 /5
Reverse polarity	Measure V-R <input type="checkbox"/> Measure V-S <input type="checkbox"/> Measure V-T <input type="checkbox"/> Measure I-R <input type="checkbox"/> Measure I-S <input type="checkbox"/> Measure I-T <input type="checkbox"/>		
Price €/kWh imported	0.12		
Price €/kWh exported	0.12		

Phase/neutral microinterruption	
Register sags minor than	100 V <input checked="" type="checkbox"/> Enabled
Register surges major than	250 V <input checked="" type="checkbox"/> Enabled
Register as percent	100 V <input type="checkbox"/> Enabled
Half period minimum duration	1
Energy reset	

Here it is possible to:

- Select measurement mode. i.e.
 - THREE-PHASE 3 CURRENTS is used for all Three phase lines with a neutral (with 3 C.T.'s)
 - THREE-PHASE 2 CURRENTS is used for Three phase lines without a neutral (with 2 C.T.'s)
 - TRIPLE 1 CURRENT is used for those lines with just 1 C.T. making the X-Meter multiply by 3 the measurement made by the only C.T. (thus making it an inaccurate system)
- Programme the constant measures, T.V. and T.A.'s.
- Invert the voltage and current's polarities. This solution allows a 180° inversion of the sine line of the voltage or the current.
- Insert the price expressed in €/kWh to view, straight on the display, the cost of sold or bought energy.

How to set (only with the XM14 Quality module), the threshold for micro-interruptions:

- **Register sags minor than:** if the effective value of the half-period is lower than the threshold value, it will be recorded as a micro-interruption. The value is intended between Phase and Neutral. Should the Neutral be missing, a grounding connection will be necessary.

- **Register surges major than:** if the effective value of the half-period is higher than the threshold value, it will be recorded as overvoltage. The value is intended between Phase and Neutral. Should the Neutral be missing, a grounding connection will be necessary.
- **Record as percentage:** Insert a reference value. The device will then record the measured value as a percentage of the reference one.

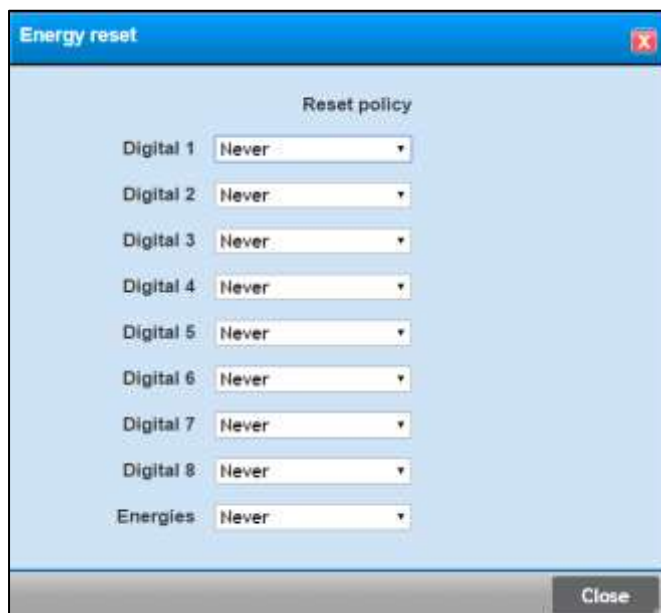
The “Select Groups” command will let you set what to store in the instrument’s on-board memory. Clicking this button will lead to the configuration FORM here below



Group	Integration period
Single-phase voltage and current	15
Single-phase power	Not store
Single-phase incidental power	Not store
Three-phase system measurement	15
Three-phase system secondary measurement	15
Three-phase power (4 Quad.)	15
Digital inputs measurement	15
Harmonic voltages: V L123	15
Harmonic currents: I L123	15
Harmonic THD	15

Select the integrating period you wish to set. Choose among: 1, 5, 10, 15, 30 e 60 minutes.

With the “Energy Reset” button, it is possible to set the on-board totalizers to be reset at a certain time of day.



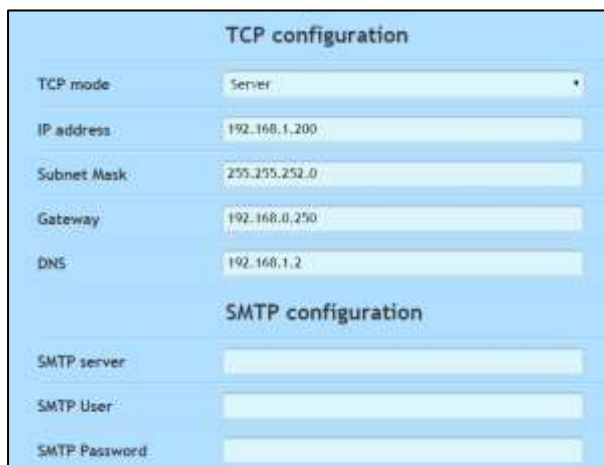
Reset policy
Digital 1
Digital 2
Digital 3
Digital 4
Digital 5
Digital 6
Digital 7
Digital 8
Energies

It is basically possible to set a reset time for each digital input and Energy. This function would be particularly useful when dealing with methane, since a 6AM energy reset is required to manage the threshold alarms.

If the server gets historic data with a polling, it is advisable not to ever reset the totalizers.

1.2.2.2 Communication Parameters

This menu lets you set a whole series of parameters you see in the picture below.



the X-Meter is equipped with an XM4 GPRS Module, it is possible to insert a SMS service centre (not used by our mobile providers anymore) and set the APN that changes depending on the network provider.

Here you can find information regarding the setting of 485 mode, speed, PIN code and Modbus address. These last information can only be downloaded from the instrument.

It is not possible the remote setting of these parameters.

This FORM lets you set IP address, Subnet mask, Gateway and DNS Server. It is possible to manage these settings straight from the keypad of the instrument.

It is also possible to set the SMTP Server.

The instrument can send emails using a SMTP server and, the communication port is the number 25.

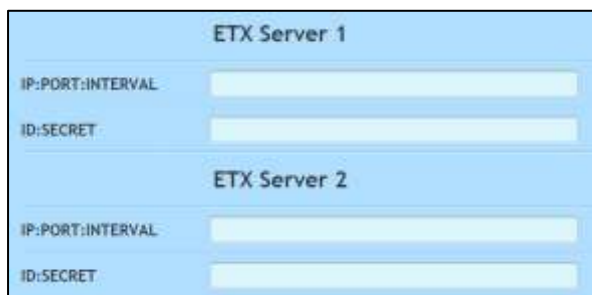
For the time being, there is no support for TLS.

The device must be equipped with XM5 (or network card) and XM4 (GPRS card) internal modules.



If

be



to set IP address, port and sending intervals, secret ID to send data to.

ETX is a particular function that allows sending UPD's packs (containing all instantaneous data of the instrument) on a LAN network.

To use the function it is necessary for the instrument to have an ETH network card (XM5 module) and that the function is enabled on the instrument.

With the FORM pictured here on the side, it is possible

1.2.2.3 Digital Inputs (XM3 optional module)

Via the digital inputs it is possible to acquire various kinds of quantities such as Temperature, Pressure, gas flow/volume, Power/energy of existing metres, etc. Open this menu to access this configuration.



The “Auxiliary inputs” buttons from 1 to 8, let you access each input’s configuration.

The other menus are:

Max impulsive period (s) : time in which the instrument calculates, on the display, real time data. The maximum time settable is 65 seconds, should the distance between two pulses be longer than this value, real time data will not be calculated and the measure will be forced to “0”.

This value also affects data historicization even for those inputs set as physical quantity. In all other cases, this parameter only affects Real-time data.

Divisor: it’s a whole number considered by the instrument only for those inputs set as “Meter with Divider”. Real time data is calculated between pulses groups (not as

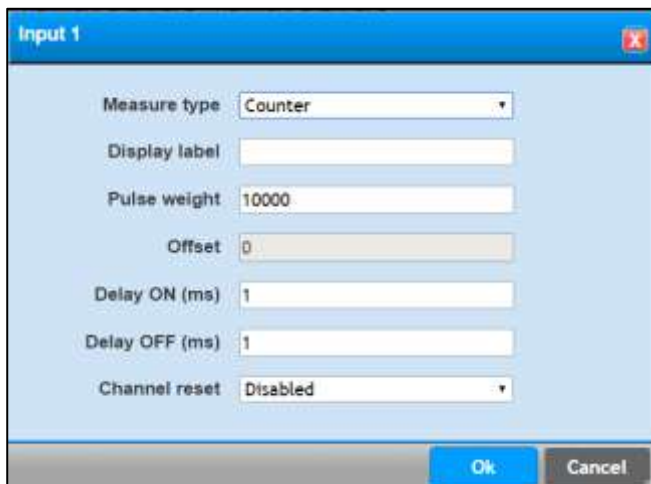
single pulse). This setting is to be used in case of “trains” of pulses and, the given pulse is not emitted in a proportion to the energy (it is instead provided as “trains” of pulses).

Synchronism input: enabling the related input will make it possible to sync the on-board clock with an external signal. The synchronization happens when, passing from logic level “0” to “1”.

Both sides: enabling the appropriate input will sync the clocks of both fronts (ascending and descending) with an external signal.

Synchronism window: usually 15 minutes, it means that, if the external signal varies, the instrument’s clock is sync to the closest quarter of an hour.

How to set single inputs. The following FORM shows an example of all settings of a set input.



Measure type: to choose from the drop-down menu among “Disabled”, “Count”, “Physical quantity”, “Normally closed alarm”, “Seconds counter ON”, “Seconds counter OFF”, “Meter”, “Counter with divider”, “Delayed shutdown”.

Let’s see the different options:

1. **Disabled:** the input is disabled.
2. **Count:** this mode is particularly used as “piece counter”. Insert as Pulse’s weight, the value used to increase certain pulses. The “Offset” field is disabled.
3. **Physical quantity:** this mode is typically used when the instrument acquires physical quantities such as temperature or a 4/20 mA signal, data via an analogic/digital converter (i.e. the XM8 module). Here you can enable the fields “Pulse’s weight” and “Offset”. It is, in this case, necessary to insert as “Pulse’s weight”, the value of the measure at 1Hz frequency, and set the eventual Offset value. Please note that the distance between pulses will be higher than the set “Max period per pulse (mms)”: the first pulse WILL NOT be filed and it won’t affect the historic accounting. This solution consents forcing the measure to “0” when close to the minimum threshold. This parameter can be set according to needs.
4. **Normally open alarm:** typically used to manage switches’ alarm statuses. OFF will show on the display if the contact is open while, it’ll show ON when it’s closed.
5. **Normally closed alarm:** this is exactly the contrary of the previous point.
6. **Seconds counter ON:** when this mode is on, closing an input contact, the instrument will automatically generate a frequency of 1Hz. Setting the weight to 1, the instrument will count the seconds while, setting it to 1/60 it’ll count the minutes instead or, hours, setting it to 1/3600. It is possible to set different weights according to needs.
7. **Seconds counter OFF:** this is exactly just like the previous setting. Only difference is that the instrument generates a 1Hz frequency when the contact is OPEN.
8. **Meter:** this mode is pretty much like the “Physical quantity” one with the difference that all pulses acquired get historicised. It is also not possible to set an offset so, the measures can only start from “0”. Be reminded that the pulse’s weight value to be set is the one at 1Hz frequency.
9. **Counter with divider:** this set is pretty much like the previous one except that real time data is not calculated by measuring the time between 2 pulses but by measuring the distance between 2 groups of n. pulses. The n. value is to be set in the “Divider” field (see previous page).

10. Delayed shutdown: use this mode to delay the shutdown of a digital output set with a timer.

Display label: insert a label to display on the instrument's screen. It is possible to insert a unit of measure by typing ":" after the label (i.e. Label:W).

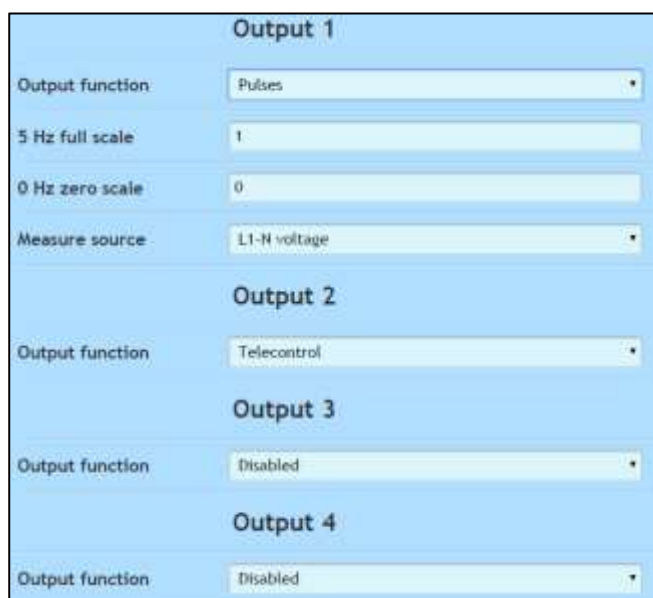
Delay ON and OFF (ms): it is possible to set a delay interval in which to consider valid the logic levels "0" and "1" (default value is 10 milliseconds). The minimum value settable is 1 millisecond.

Reset Channel: it is possible to set a different input that, when active "disables" the acquisition from the selected input.

1.2.2.4 Digital Outputs

Via the digital outputs it is possible to obtain contacts that vary proportionally depending on the measure, an alarm, a manual control for loads management with a time setting or power management within the integration period.

It is possible to set the output as "disabled", "pulses", "Alarm", "Telemetry", "Clock", "Loads management", "Loads management alarm", "Overload management", "reserved Loads management".



Output 1	
Output function	Pulses
5 Hz full scale	1
0 Hz zero scale	0
Measure source	L1-N voltage
Output 2	
Output function	Telecontrol
Output 3	
Output function	Disabled
Output 4	
Output function	Disabled

In details:

Disabled: the output is disabled

Pulses: the output is proportional to the measure selected in the "Measure source". The user will then select the measures corresponding to initial and end scale, that is 0-5Hz

Measure source can be all 49 measures that the instrument can perform:

Voltage L1-N; V-Voltage L2-N; V – Voltage L3- N; V – Voltage L1-L2; V

Voltage L2-L3; V – Voltage L3-L1; V – Current L1; A – Current L3; A – Current L3; A

Active L1; W – Active L2; W – Active L3; W - Reactive L1; VAr - Reactive L2; VAr

Reactive 3; VAr - PF L1 - PF L2 - PF L3 - Apparent L1; VA - Apparent L2; VA

Apparent L3; VA - Distorting L1; VA - Distorting L2; VA - Distorting L3; VA

Three-phase Y Voltage; VA - Three-phase Delta Voltage; V - Three-phase Current; A - Active Three-phase; W

Reactive Three-phase; VAr – Three-phase Power Factor; - Frequency; Hz – Neutral Voltage; V

Neutral Current; A - Three-phase Distorting; VA - Three-phase Apparent; VA

Imported Active Three-phase; W – Exported Active Three-phase; W – Imported inductive Reactive; VAr

Reactive capacity exported power; VAR - Reactive inductive exported power; VAR
 Reactive capacity imported power; VAR – Pulse 1 input – Pulse 2 input – Pulse 3 input
 Pulse 4 input - Pulse 5 input - Pulse 6 input - Pulse 7 input
 Pulse 8 input

Alarm: lets you use the selected output in the configuration of on-board alarms. See [next chapter](#).

Telemetry: lets you use this output as “remote control”. With a manual control, the user can manage the output (switch loads on and off).

Clocks: lets you use this output when setting the on-board programming clocks. See [“Clocks”](#).

1.2.2.5 Alarms

This function lets you set all 8 on-board alarms. See, here below, the user’s interface for all functions.

Alarm	1	2	3	4	5	6	7	8
Event ID	B.Micro-Interrupt	B.Over Volts	Over Potenza	L1 Over 240	L2 Over 240	L3 Over 240	Microsberr	
Mode	Maximum	Maximum	Maximum	Maximum	Maximum	Maximum	Maximum	Off
Quantity	QUOS: dips	QUOS: surges	Three-phase active	L1-N voltage	L2-N voltage	L3-N voltage	QUOS: dips	L1-N voltage
Min threshold	0.5	0.5	25000	235	235	235	0.5	0
Max threshold	0.5	0.5	26000	240	240	240	0.5	0
Delay ON	1	1	900	1	1	1	1	10
Delay OFF	60	60	60	1	1	1	300	10
LOG	OR	OR	OR	OR	OR	OR	OR	
MAIL 1	-	-	-	-	-	-	-	-
MAIL 2	-	-	-	-	-	-	-	-
MAIL 3	-	-	-	-	-	-	-	-
SMS 1	-	-	-	-	-	-	-	-
SMS 2	-	-	-	-	-	-	-	-
SMS 3	-	-	-	-	-	-	-	-
OUT 1	-	-	-	-	-	-	-	-
OUT 2	-	-	-	-	-	-	-	-
OUT 3	-	-	-	-	-	-	-	-
OUT 4	-	-	-	-	-	-	-	-

Set SMS/Email

- **Event ID:** short description that identifies the alarm.
- **Mode:** choose the desired mode from:
 - OFF: disables the alarm
 - Minimum: the alarm goes off if the measure goes below a certain threshold. It stops when the measure goes over said threshold.
 - Maximum: the alarm goes off if the measure goes over a maximum threshold set by the user. It stops when the measure goes below the minimum value.
 - External Band: if the measured value is outside the two values set by the user, it is considered in state of alarm.
 - Internal Band: If the measured value is between the lower and upper limit (defined by the user), the measure goes in state of alarm.

- **Quantity:** select from the 49 measurements that the instrument can perform or one of the on-board totalizers. It is also possible to select voltage or current's THD and to detect micro-interruptions.
- **Min. Threshold:** insert minimum threshold
- **Max. Threshold:** insert Maximum threshold. The SW will check whether this value must be higher or equal to the minimum threshold value.
- **Delay ON:** delay in seconds. It indicates the shortest time that must pass to make the alarm status switch to ON. The shortest time settable is 1 second.
- **Delay OFF:** delay in seconds. It indicates the shortest time that must pass to reset the alarm status. The shortest time settable is 1 second.
- **LOG:** to file the event on the internal memory. Insert "-" (none), OR or AND. It is then possible to manage a OR or AND logic for all other 7 alarms.
- **MAIL (1,2,3):** to send an email to a group of receivers set in Mail 1, 2 or 3. Insert "-" (none), OR or AND. It is then possible to manage a OR or AND logic for all other 7 alarms. To use this function the instrument must be equipped with a GPRS/ETH module (XM4/XM5 modules)
- **SMS (1,2,3):** to send a TEXT MESSAGE to a group of receivers set in SMA 1, 2 or 3. Insert "-" (none), OR or AND. It is then possible to manage a OR or AND logic for all other 7 alarms. To use this function the instrument must be equipped with a GPRS module (XM4 module).
- **OUT 1, 2, 3, 4:** select the active output to set. To set the output it must be set in "alarm" mode. Insert "-" (none), OR or AND. It is then possible to manage a OR or AND logic for all other 7 alarms.

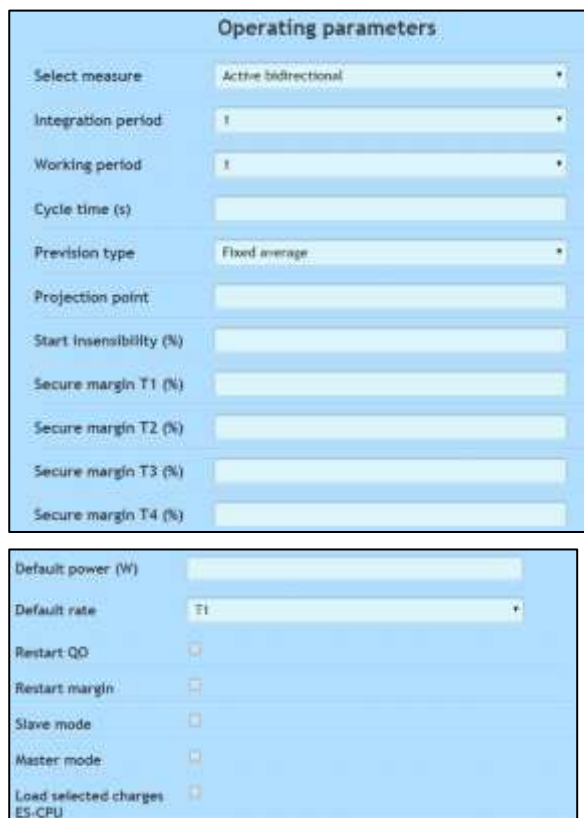
The "Set SMS/Email" button will open an interface where you can set receivers' numbers for SMS's and addresses for Emails.



1.2.2.6 Loads management (XM18 optional module)

This function aims to manage energy within the integration time. Should it be necessary, the instrument intervene to detach those loads the user decided to manage to avoid them exceeding their contract average power. Please note that the instrument does not manage instant Power but Average Power (or energy) within the integrated period.

Use this interface to set the instrument:



Operating Parameters:

- **Select Measure:** to select the Measure you intend to manage.
- **Integration period:** select the desired integration period.
- **Working period:** it is usually set to 60 and it represents how many minutes you wish the loads to work within 1 hour. For each load, you can set a percentage value of the set one.
- **Cycle time:** the instrument checks and sets (if necessary) the outputs every 30 seconds.
- **Prevision type:** can be Fix Average or Mobile Average. In the first case, the clock is the same as in an Electricity Meter (since it's synchronised with an external signal). In the second case there is no external sync signal therefore, a mobile average is made.
- **Projection point:** not yet implemented.
- **% Start insensibility:** lets you set a percentage value referred to the energy available within the integration period below which the system does not intervene with detaching the loads. Only after having used the energy available for the integration period will the system intervene and detach the loads:

i.e. with a contract Power of 1000kW, there is 250kWh energy available every 15 minutes. Setting 10% as value, the system will not intervene until the user would not use up 25 kWh in the current 15 minutes.

- **Safety margin T1, T2, T3, T4 %:** percentage value of the contract value. The user tells the X-Meter only to use i.e. 99% of the energy available. This helps avoiding undesired excesses.
- **Default Power (Watt):** lets you set a value (in Watts) for the “Counter/Value” you wish to “use/keep” with the X-Meter. This value is used only when the device has no time profile or when said profile comes to the end of the calendar management.
- **Default rate:** this tariff is used only when there is no time profile uploaded in the device or when said profile comes to an end.
- **Restart margin Quarters of Hour:** the user can force all loads to be set on ON at the beginning of every Quarter of Hour.
- **Restart margin:** forced reboot of the load if there is enough energy left within the current quarter of hour.
- **Slave Mode:** this function is particularly useful when there is more than one X-Meter managing the loads.
- **Master mode:** this function is particularly useful when there is more than one X-Meter managing the loads.
- **ES-CPU loads selected charges:** it represents the 2 different algorithms in the selection of the loads to detach.

Managed loads				
	Load 1	Load 2	Load 3	Load 4
Power low (W)	0	0	0	0
Power high (W)	0	0	0	0
Minimum operating time (s)	0	0	0	0
Minimum rest time (s)	0	0	0	0
Priority T1	0	0	0	0
Priority T2	0	0	0	0
Priority T3	0	0	0	0
Priority T4	0	0	0	0
Work T1 %	0	0	0	0
Work T2 %	0	0	0	0
Work T3 %	0	0	0	0
Work T4 %	0	0	0	0
Test input	Disabled	Disabled	Disabled	Disabled
Force input ON	Disabled	Disabled	Disabled	Disabled
Force input OFF	Disabled	Disabled	Disabled	Disabled
Virtual load				

- **Power low (Watts):** lets you insert, for each “load” (output) the value (Watt) of the power when disconnected from the electrical network.

Load 1: clamps 13-17

Load 2: clamps 14-17

Load 3: clamps 15-17

Load 4: clamps 16-17

- **Power high (Watt):** lets you insert, for each load (output), the value (in Watts) of the Power that will actually be reinserted.
- **Minimum operating time (Seconds):** lets you insert a guaranteed “Minimum time” of functioning after the reboot.

- **Minimum rest time (Seconds):** lets you insert a “minimum time” for switching off right after the detach. Once the load is switched off, it is possible to set a minimum detaching time below which it won’t be possible to power the load.
- **T1-T2-T3-T4 priority:** this lets you insert, in assigned fields, a number for the priority given to loads’ detach. The load with the higher number will be the one to be detached first.
- **Working time T1%-T2%-T3%-T4%:** lets you set a percentage value referred to the guaranteed working time within the integration period.
- **Test input:** lets you insert a verification related to one of the inputs. Select one of the inputs to manage the load in relation to the actual status of the input.
- **Forced Input ON:** lets you set a forced load from one of the 8 inputs. Selecting one of the inputs, it is possible to force the status of the load as “ON”.
- **Forced Input OFF:** lets you set a forced load from one of the 8 inputs. Selecting one of the inputs, it is possible to force the status of the load as “OFF”.
- **Virtual load:** not implemented yet

1.2.2.7 FTP Dispatch

The X-Meter can generate an XML file with historic data and send them via “File Transfer Protocol”, to an FTP Server. To do this the instrument must be equipped with an XM4 (GPRS) or XM5 (Ethernet) module.

With the mask shown below, it is possible to plan/schedule, the transmission frequency and which data to send.



The screenshot shows a web-based configuration interface for FTP Dispatch. It includes sections for 'Check delivery', 'Started dispatch', 'Daily dispatch', 'Dispatch max days', 'Attempts', 'Periodic dispatch', 'Select data', 'FTP reference', and 'Events'.

Check delivery

Started dispatch

Daily dispatch: ☒ Enabled

Dispatch max days:

Attempts: 1: 00:00 2: 00:00 3: 00:00

Periodic dispatch

☐ 03:00 ☐ 06:00 ☐ 09:00 ☐ 12:00 ☐ 15:00 ☐ 18:00 ☐ 21:00

Select data

Channel Id	Measure	Period
	L1-N voltage	Not active
	L1-N voltage	Not active
	L1-N voltage	Not active
	L1-N voltage	Not active
	L1-N voltage	Not active
	L1-N voltage	Not active
	L1-N voltage	Not active
	L1-N voltage	Not active
	L1-N voltage	Not active
	L1-N voltage	Not active

Events: ☐ Trd ☒ Harmonics ☐ Counters


FTP reference

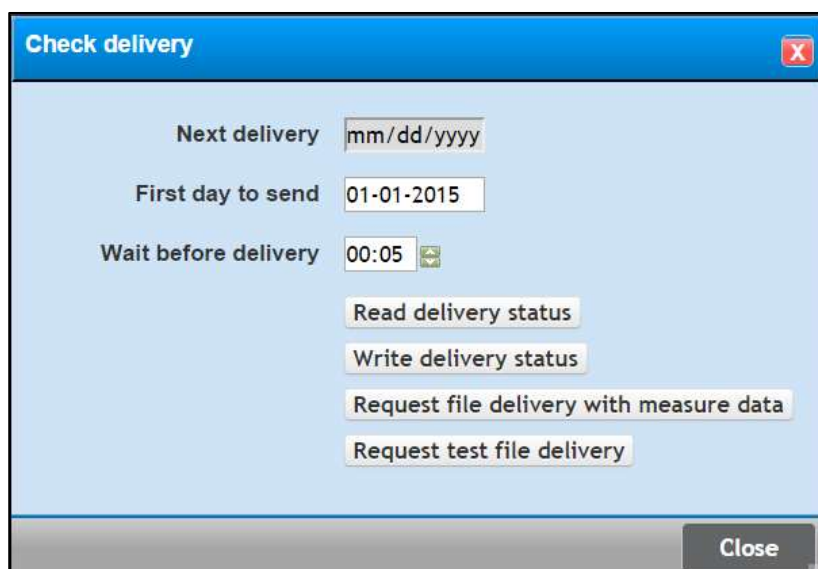
IP address:

User:Password:

Point Id:

- **Daily transmission:** tick the box to enable it.
- **Maximum number of days per transmission:** insert the maximum number of days you wish the instrument to send per each data connection.
- **Attempts:** the instrument will try maximum 3 daily attempts. Insert transmission time that must be consequent one to the other. The instrument will know if the transmission has been successful and, if failing all 3 attempts, all data will be sent the following day.
- **Periodic transmission:** it is possible to set a regular periodic transmission at regular intervals (max. 3 hours). Tick the box corresponding to the time of the transmission.
- **Data selection:** the instrument can send up to 12 measures. Each one of them with its ID, measure's source and aggregation period. It is also possible to send events LOG, THD, harmonics (up to the 25th) and on board totalizers.
- **FTP references:** to access FTP server fill in the fields with FTP server's IP address, User ID and Password and Point's ID (name and contents of the file to be sent and recognised by the receiving server).

Click on the  button to access the interface here below:



The dialog box titled "Check delivery" contains the following fields and buttons:

- Next delivery:** A text field with the placeholder "mm/dd/yyyy".
- First day to send:** A text field containing "01-01-2015".
- Wait before delivery:** A text field containing "00:05" with a small calendar icon to its right.
- Buttons:**
 - Read delivery status
 - Write delivery status
 - Request file delivery with measure data
 - Request test file delivery
- Close:** A button at the bottom right of the dialog.

This form gives information about the sending' status and here, it also possible to schedule the date of the first sending. You could even "force" the sending with actual or test data to test the success of the configuration. This action is indispensable during the start-up of new devices.

1.2.2.8 Clocks (XM7 optional module)

This function allows using the X-Meter as a Timer to plan automatic switching ON and OFF of the loads. It is then possible to set the 4 outputs as scheduling clocks.

Users can set up to 12 profiles with 8 daily status changes each. Set "00:00" as "Change" to ignore the status change.

Each one of the profiles can be associated to an output set as "clock" (see [digital inputs](#)) for every day of the week. It is also possible to force the load as "Always ON" or "Always OFF". Set to "none" to not to have any Clock related automatic output management.

It is possible to set up to maximum 2 special periods (i.e. for summer break) and 20 special days.

The WEB interface here below shows how to set all possible configurations; you can also use an Excel model.

Associated profiles

Period	Load 1	Load 2	Load 3	Load 4
1	None	None	None	None
2	None	None	None	None
3	None	None	None	None
4	None	None	None	None
5	None	None	None	None
6	None	None	None	None
7	None	None	None	None
8	None	None	None	None

Profiles definition

Profile	Start	Change 1	Change 2	Change 3	Change 4	Change 5	Change 6	Change 7	Change 8
1	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
2	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
3	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
4	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
5	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
6	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
7	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
8	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
9	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
10	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
11	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
12	Off	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00

Special periods

Period	Start	End	Load 1	Load 2	Load 3	Load 4
1	01-14-2016	01-14-2016	None	None	None	None
2	01-14-2016	01-14-2016	None	None	None	None

Special days

Day	Date	Load 1	Load 2	Load 3	Load 4
1	01-14-2016	None	None	None	None
2	01-14-2016	None	None	None	None
3	01-14-2016	None	None	None	None
4	01-14-2016	None	None	None	None
5	01-14-2016	None	None	None	None
6	01-14-2016	None	None	None	None
7	01-14-2016	None	None	None	None
8	01-14-2016	None	None	None	None
9	01-14-2016	None	None	None	None
10	01-14-2016	None	None	None	None
11	01-14-2016	None	None	None	None
12	01-14-2016	None	None	None	None
13	01-14-2016	None	None	None	None
14	01-14-2016	None	None	None	None
15	01-14-2016	None	None	None	None
16	01-14-2016	None	None	None	None
17	01-14-2016	None	None	None	None
18	01-14-2016	None	None	None	None
19	01-14-2016	None	None	None	None
20	01-14-2016	None	None	None	None

NOTE: once the configuration is complete, click on “Send Configuration” to apply the desired changes.

Please note that the WEB interface will check all data inserted; it is not possible a change of status at a time earlier than the one of the previous change. Should that happen, a red frame will appear around the cell and the Clocks tag at the top.



The image below shows the Excel file with the same setting information you find in the WEB interface.

Ver. 2.0

Configuration Sheet Watches

A - Define the daily profiles									
available Profiles	State on time: 00:00	Change 1 at time:	Change 2 at time:	Change 3 at time:	Change 4 at time:	Change 5 at time:	Change 6 at time:	Change 7 at time:	Change 8 at time:
PR-01	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-02	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-03	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-04	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-05	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-06	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-07	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-08	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-09	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-10	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-11	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
PR-12	OFF	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00

Legend:

ON

OFF

INACTIVE

ERROR: the set time is less than the previous

B - Associating Profiles outputs, and days of the week				
DAY	Profile Output 1	Profile Output 2	Profile Output 3	Profile Output 4
Sunday	PR-00	PR-00	PR-00	PR-00
Monday	PR-00	PR-00	PR-00	PR-00
Tuesday	PR-00	PR-00	PR-00	PR-00
Wednesday	PR-00	PR-00	PR-00	PR-00
Thursday	PR-00	PR-00	PR-00	PR-00
Friday	PR-00	PR-00	PR-00	PR-00
Saturday	PR-00	PR-00	PR-00	PR-00

C - Define the extra periods (optional)						
	From:	To:	Profile Output 1	Profile Output 2	Profile Output 3	Profile Output 4
1	01/01/2014	02/01/2014	PR-00	PR-00	PR-00	PR-00
2	03/01/2014	04/01/2014	PR-00	PR-00	PR-00	PR-00

D - Define extra days from 1 to 10 (optional)					
	Day	Profile Output 1	Profile Output 2	Profile Output 3	Profile Output 4
1	01/01/2008	PR-00	PR-00	PR-00	PR-00
2	02/01/2008	PR-00	PR-00	PR-00	PR-00
3	03/01/2008	PR-00	PR-00	PR-00	PR-00
4	04/01/2008	PR-00	PR-00	PR-00	PR-00
5	05/01/2008	PR-00	PR-00	PR-00	PR-00
6	06/01/2008	PR-00	PR-00	PR-00	PR-00
7	07/01/2008	PR-00	PR-00	PR-00	PR-00
8	08/01/2008	PR-00	PR-00	PR-00	PR-00
9	09/01/2008	PR-00	PR-00	PR-00	PR-00
10	10/01/2008	PR-00	PR-00	PR-00	PR-00

D - Define extra days from 11 to 20 (optional)					
	Day	Profile Output 1	Profile Output 2	Profile Output 3	Profile Output 4
11	11/01/2008	PR-00	PR-00	PR-00	PR-00
12	12/01/2008	PR-00	PR-00	PR-00	PR-00
13	13/01/2008	PR-00	PR-00	PR-00	PR-00
14	14/01/2008	PR-00	PR-00	PR-00	PR-00
15	15/01/2008	PR-00	PR-00	PR-00	PR-00
16	16/01/2008	PR-00	PR-00	PR-00	PR-00
17	17/01/2008	PR-00	PR-00	PR-00	PR-00
18	18/01/2008	PR-00	PR-00	PR-00	PR-00
19	19/01/2008	PR-00	PR-00	PR-00	PR-00
20	20/01/2008	PR-00	PR-00	PR-00	PR-00

1.2.2.9 Actions

With this menu you can:



Reset energy (measured made with CT and VT) and Counter 1 and Counter2 digital inputs. Select one of the first 4 fields to insert a “pre-set” if the on-board totalizers.



Users can decide whether to insert a Value or reset.

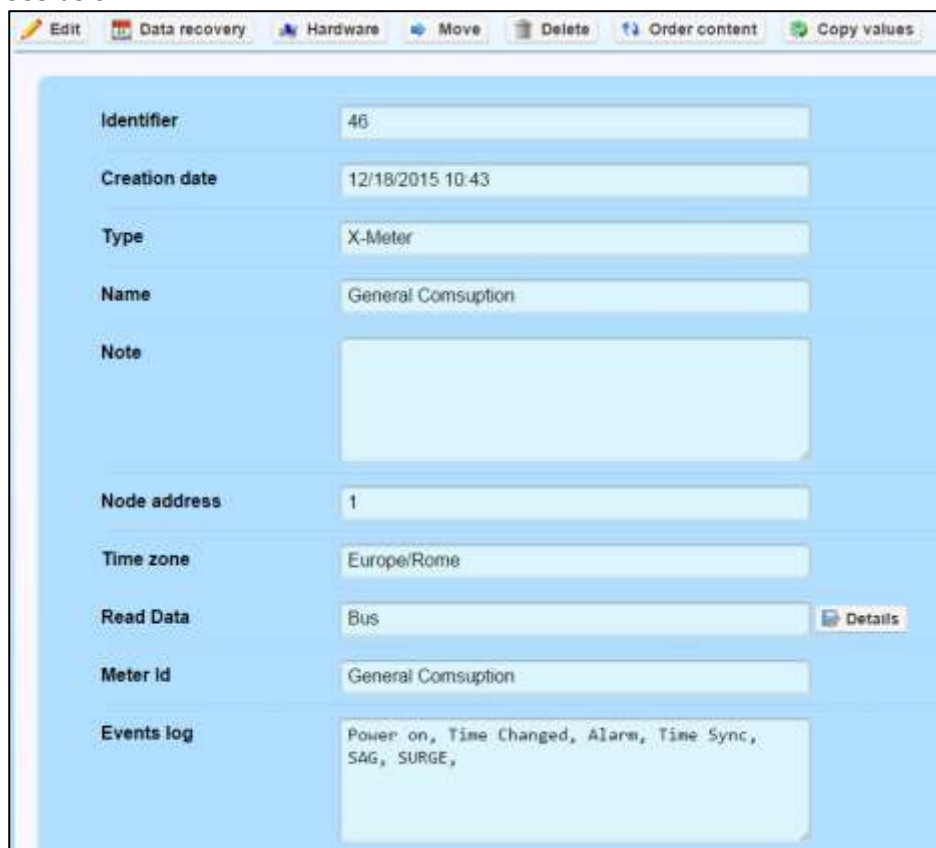
Click on “Delete all Archives” to completely erase all on board memory. Be very careful with this button, as it will not be possible to retrieve historic data from the instrument. Historic data will be still stored in the Server.

Click on “Clocks Synchronisation” to sync on-board time with the Server’s.

1.2.3 Various Operations

Double click on X-Meter from the Devices settings menu to open a mask where you can manage various operations.

See below:



The screenshot shows a configuration window for an X-Meter. At the top, there is a toolbar with icons for Edit, Data recovery, Hardware, Move, Delete, Order content, and Copy values. The main area contains several input fields and a text area:

- Identifier:** 46
- Creation date:** 12/18/2015 10:43
- Type:** X-Meter
- Name:** General Consumption
- Note:** (Empty text area)
- Node address:** 1
- Time zone:** Europe/Rome
- Read Data:** Bus (with a Details button next to it)
- Meter id:** General Consumption
- Events log:** Power on, Time Changed, Alarm, Time Sync, SAG, SURGE,

- **Edit:** to access Software configuration menu.
- **Data recovery:** it is possible to manually download the data. Once selected, the user must insert start and end dates, the server will then try to retrieve data for the selected period. Even though the system shows “operation complete”, since it’s a long procedure, it will go on in time, getting in line with the other operations in the communication’s BUS.
- **Hardware:** to access hardware configuration menu.
- **Move:** to move the selected instrument to a different folder/group of the tree like structure. For a correct Permits management, it is not advisable to move the device to a different management group (see [Permits](#)).
- **Delete:** the system will ask if you are sure to proceed with deleting the device. Please note that once an instrument is eliminated, the server will proceed and erase all historic data from the system as well. Should a device be deleted by mistake, the only way to restore all data is via the system’s backup. In this case, it is necessary to contact Energy Team’s technical assistance centre.
- **Order Content:** it is possible to sort all channels according to a personal order. This change will be for all users.
- **Copy Values:** this option lets you copy all data from an X-Meter instrument to another. The system is supposed to “Copy” all data from an X-Meter with archiving set to 15 minutes and “Paste” them on to another X-Meter with archiving set every minute. It being a quite long operation, the server will say it was successful but the operation will still be in process for a little longer. To signal the successful conclusion of the operation, a message will show in the System Log menu.

- **Data reading:** with this window it is possible to know whether the instrument is connected to a BUS or END point. Click on “details” to know the ID of the BUS, its IP and which are the Pollings where the device is set. Here, it is also possible to delete all polling operations.

Details

Bus communication

Bus Id

5

Name

192.168.1.200:9000

Type

Ethernet TCP

Polling

Name	Polling type	Cycle time [ms]	Scheduling	Status	
Consumi Energy Team - On-Line X-Meter	Normal	30000		Enabled	
Consumi Energy Team - Storico X-Meter	Cron	30000	0 5/15 * * * ?	Enabled	
X-Meter Sincro	Cron	30000	0 40 0 ? * MON	Enabled	
Xmeter - Totalizzatore energia	Priority cron	30000	0 0/15 * * * ?	Enabled	

Reboot modified polling

Cancel

1.3 Add NG9

This instrument is particularly indicated to perform up to 9 Mono-phase measures or 3 Three-phase measures. Its strong point is its easy installation, done with micro CT's or Rogowski coils.

This ease of installation make NG9 the most cost efficient instrument among high-end solutions on the market. Another one of its strong points is the Modbus communication Protocol that makes it very flexible and compatible with different Software from Energy Sentinel WEB/PV.

Double click on the folder where you wish to insert the instrument, click on add and insert an NG9. A mask like the one below will appear:



5 tabs will appear: General information, Common Measures and the 3 Three-phase measurement group ones.

General information lets you set:

- **Name:** insert the name you wish to give your instrument.
- **Note:** not compulsory field to insert comments.
- **Node Address:** insert Modbus node's address as set in the instrument.
- **Slot number per day:** represents how many samples you wish to store within the day. 96 is the minimum option available and corresponds to 15 minutes.
- **Energy Data:** choose between average Power and Totaliser. This setting lets you

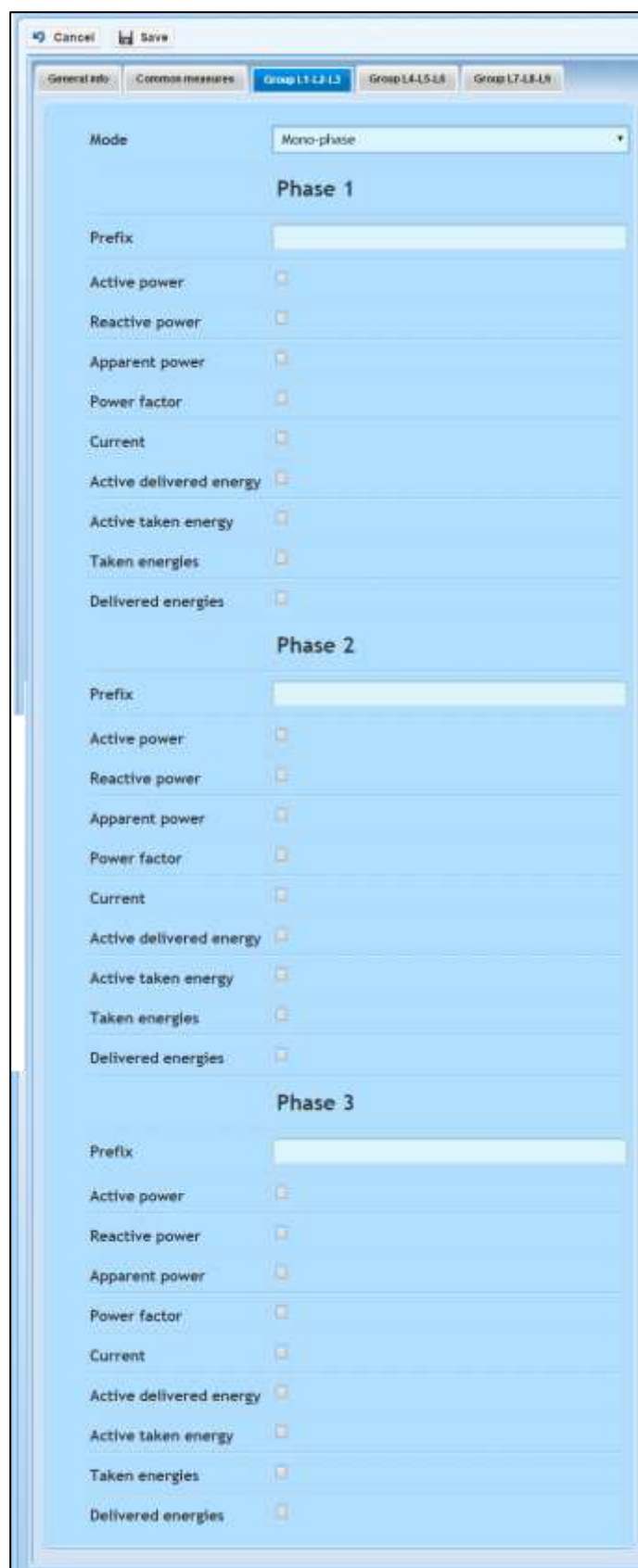
identify the unit of measure of the on board Totalisers. Select "Average power" if the device is set on telemetering with Energy sentinel WEB/PV "pollings".

Common Measures represents all those measure mainly related to voltage. Users can insert a prefix keeping in mind that this name will show in the tree-like structure on the left hand side.

Tick the measures you intend to store as historical data.



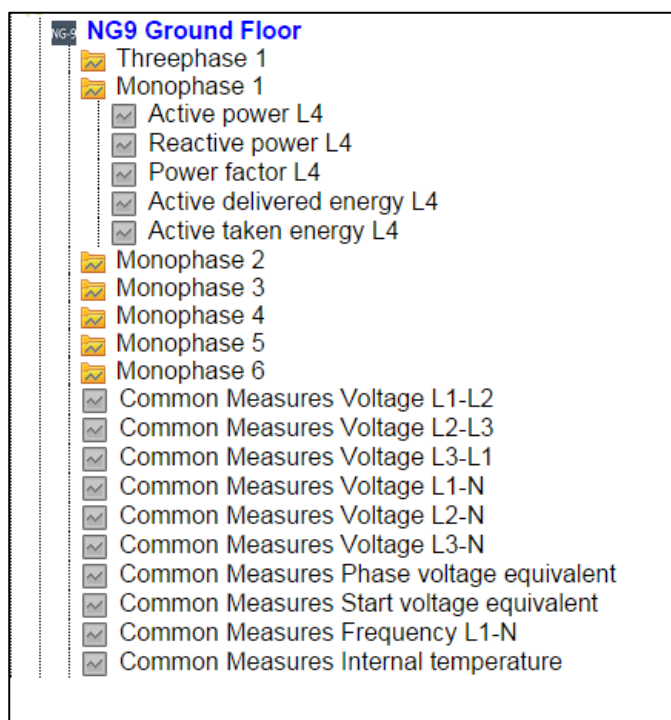
The Group L1-L2-L3 tab (just like L4-L5-L6 and L7-L8-L9) lets you select if the measure is Three- phase or Mono-phase.

Depending on the selection made by the user, the mask will change (see images above), if dealing with a Three-phase measure, insert just one prefix (usually the line's name), and then tick the channels you intend to file data from.

If the measure is Mono-phase, the mask will change again and it will ask the user to insert a prefix (again, the line's name) for each Mono-phase measure. Then, as well, tick the channels you intend to file data from.

Save the changes once the setting is complete. In the tree-like structure, a new peripheral will appear as shown below:



It is now time to set the communication BUS ([Modbus RTU](#), if directly connected via 485 or [Modbus RTU over TCP](#) if connected to an ETH/RS485 convertor i.e. MOXA module).

Once the BUS is set, configure the [Polling](#).

1.4 Add Easy 4 Hall

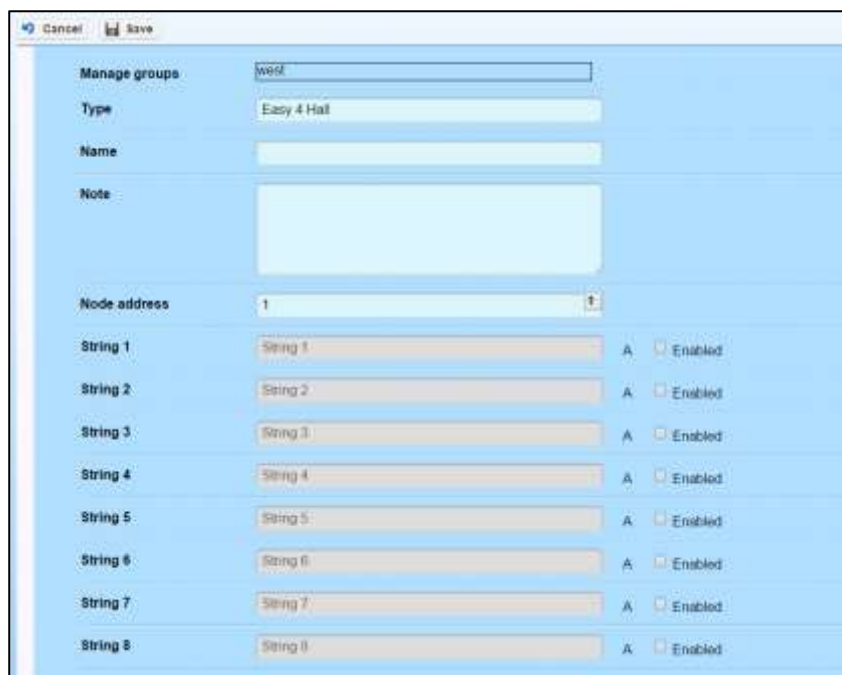
This device is set to use measure photovoltaic plants' string currents.

Easy 4 Hall is an openable device, thus making it particularly **suitable to be installed in pre-existing photovoltaic plants without altering the electrical connections of the strings.**

The device is designed for the outdoor and its communication protocol (Modbus RTU) makes it extremely flexible and easily incorporated in to platforms different from Energy Sentinel WEB.

Double click on the folder you intend to insert the new device in, select Add and then "add Easy 4 Hall".

A mask like the one here below will appear.



The user can assign a new name to the device; insert notes, the 485 node address and enable the various strings giving each one a name.

It is quite important to name each string to easily spot them in case of malfunction or breakdown.

Click Save to store the setting or Cancel to exit without saving the setting.

Please note that the system automatically adds the internal temperature channel.

It is now time to set the communication BUS ([Modbus RTU](#), if directly connected via 485 or [Modbus RTU over TCP](#) if connected to an ETH/RS485 convertor i.e. MOXA module).

Once the BUS is set, configure the [Polling](#).

1.5 Add CM2-Solar

This device is used to measure strings current of photovoltaics plants.

It is equipped with 9 DIN modules, 8 measuring channels for 8 string currents, 2 digital inputs, 3 status input, 1 DC voltage measuring input (with XM20 module) and 2 digital outputs.

CM2 Solar's particular communication protocol (RTU Modbus) makes it extremely flexible and easily incorporated into platforms different from Energy Sentinel WEB.

Double click on the folder you intend to insert the new device in, select Add and then "add Easy 4 Hall".

A mask like the one here below will appear.



- **Name:** insert the name you wish to give your instrument in relation to a certain PV plant.
- **Note:** not compulsory field to insert comments.
- **Point's ID:** not yet implemented. Insert any random number or word.
- **Node Address:** insert network's address as set in the instrument (1 to 99)
- **Slot number per day:** represents how many samples you wish to store within the day. 96 is the minimum option available and corresponds to 15 minutes, 4 recordings per hour.

Strings 1÷8: tick the first box to enable the measuring of the strings connected to the CM2, insert then the string's name in the corresponding field. Give the strings unambiguous names for a correct set-up.

Voltage input: to measure voltage, with an XM20 module (if present and correctly named).

Inputs 1÷3: refers to the CM2's 3 status inputs for alarm contacts management. Enable this input if present and give it a name to identify it.

Output 1, Output 2: function not yet implemented. This function will make it possible to manage contactors, detaching, etc.

Digital input 1, Digital input 2: refers to the 2 CM2's inputs that collect pulses from XM8 and XM9 modules (analogic/digital converters). Enable the desired input if present and give it a name to identify it.

Click Save to save the desired settings or Cancel to exit without saving. After saving, repeat the procedure to add other CM2 peripheral devices connected the same downstream group or sub-group.

It is now time to set the communication BUS ([Modbus RTU](#), if directly connected via 485 or [Modbus RTU over TCP](#) if connected to an ETH/RS485 convertor i.e. MOXA module).

Once the BUS is set, configure the [Polling](#).

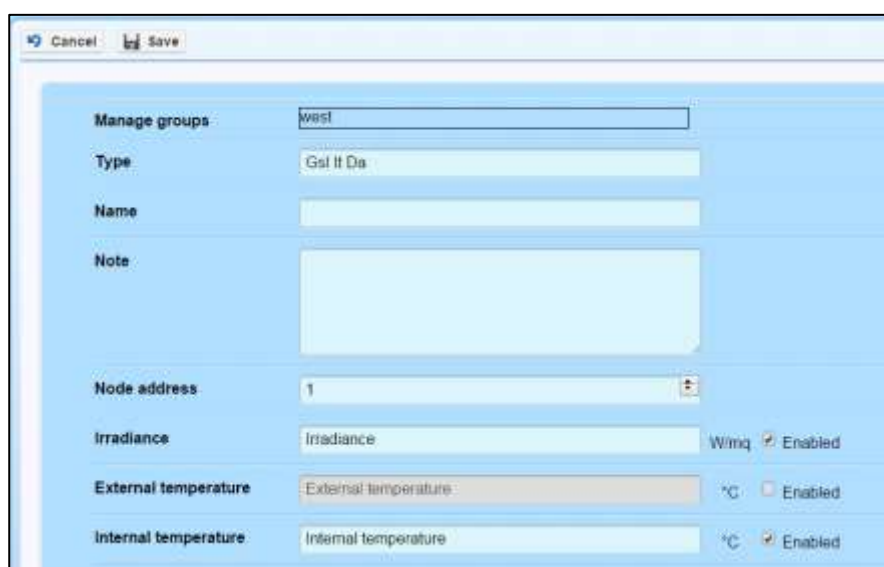
1.6 Add GSL-IT-DA Solarimeter

This instrument measures irradiation and temperature of photovoltaic panels.

Its main use is for PV plants monitoring. Solarimeters usually emit pulses then connected to a CM2 or X-Meter module but they can dialogue straight with the modules with RS485 serial or RTU Modbus protocol. Please note that this device does not have an on-board memory, making only real time data available.

Double click on the folder you intend to insert the new device in, select Add and then “add Gsl It Da solarimeter”.

A mask like the one here below will appear.



Type: default showing the name of the solar meter.

Name: insert the name you wish to give the device; it's generally the name of the exposure monitored.

Note: not compulsory field to insert comments.

Node Address: insert network's address as set in the instrument (1 to 99).

Irradiation: tick the first box “Enabled” to activate the reading of irradiation values. Insert then, the name in the corresponding field.

External Temperature: tick the first box “enabled” to activate the reading of external temperature values read by the temperature sensor (PT100). This probe usually measures panels' temperature. Insert then, the name in the corresponding field.

Internal Temperature: this function lets you know the temperature within the solar meter. Tick the first box “enabled” to activate the reading, insert then, the name in the corresponding field.

Click Save to store the setting or Cancel to exit without saving the setting.

It is now time to set the communication BUS ([Modbus RTU](#), if directly connected via 485 or [Modbus RTU over TCP](#) if connected to an ETH/RS485 convertor i.e. MOXA module).

Once the BUS is set, configure the [Polling](#).

1.7 Add Multi ES

This instrument is equipped with an on-board memory. It also has 2 digital inputs as well as 2 digital outputs. The mask below shows how to set all the channels that can be read by the instrument. The on-board configuration can only be done with the configuration Software ES3.

Double click on the folder you intend to insert the new device in, select Add and then “add Multi ES”.

A mask like the one here below will appear.



Name: identify the name of the Multi ES device; it is usually the name of the monitored line.

Note: not compulsory field to insert comments.

Node Address: insert network module’s address, 1 to 253.


Number of slots per day: represents how many samples you wish to store within the day. 96 is the minimum option available and corresponds to 15 minutes.

It is possible to monitor total Power values (Active and Reactive, absorbed and released, inductive and capacitive). To activate the desired power channel, tick the box “**Enabled**” and insert, in the corresponding field, its specific name.

Tension 1÷ Tension 3: tick the two corresponding boxes to view the voltage between each phase and the neutral.

Current 1÷ Current 3: tick the “**Enabled**” box next to the “**Current1**” field to view the three current values on the phases.

Power factor: it is the total plant's. Here as well, tick the “Enabled” box to activate.

Channel 1, Channel 2: digital inputs. Activate by ticking the “Enabled” box then insert, in the corresponding field, the name of the quantity desired (Water Temperature, etc.). Press on this button  and select, from the drop down menu, the desired unit of measure.

As you would with a meter, it is possible to monitor Total Absorbed and Sold Energy, both Active and Reactive.

Tick the “Enabled” boxes to activate the desired channels and give them names.

Voltage 1	<input type="text" value="Voltage 1"/>	V	<input type="checkbox"/> Enabled	Voltage F-R
Voltage 2	<input type="text" value="Voltage 2"/>	V		
Voltage 3	<input type="text" value="Voltage 3"/>	V		
Current 1	<input type="text" value="Current 1"/>	A	<input type="checkbox"/> Enabled	
Current 2	<input type="text" value="Current 2"/>	A		
Current 3	<input type="text" value="Current 3"/>	A		
Power factor	<input type="text" value="Power factor"/>	Number (Average)	<input type="checkbox"/> Enabled	
Channel 1	<input type="text"/>	W	<input type="checkbox"/> Enabled	
Channel 2	<input type="text"/>	W	<input type="checkbox"/> Enabled	
Absorbed active energy counter	<input type="text" value="Absorbed active energy counter"/>	Wh	<input type="checkbox"/> Enabled	
Sold active energy power	<input type="text" value="Sold active energy power"/>	Wh	<input type="checkbox"/> Enabled	
Absorbed reactive energy counter	<input type="text" value="Absorbed reactive energy counter"/>	VWh	<input type="checkbox"/> Enabled	
Sold reactive energy counter	<input type="text" value="Sold reactive energy counter"/>	VWh	<input type="checkbox"/> Enabled	

Click Save to store the setting or Cancel to exit without saving the setting.

It is now time to set the communication BUS ([ET-Pro 485](#) or [ET-Pro TCP](#)).

Once the BUS is set, configure the [Polling](#).

1.8 Add RWU

RWU central unit is a 6 digital channels. It is equipped with on board memory, RS232 and RS485 serial ports and it can be integrated with an Ethernet or GSM/GPRS modules.

Double click on the folder you intend to insert the new device in, select Add and then “add RWU”.

A mask like the one here below will appear.




Name: insert the name of the RWU device.

Note: not compulsory field to insert comments.

Node Address: insert network module’s address, 1 to 253.

Number of slots per day: represents how many samples you wish to store within the day. 96 is the minimum option available and corresponds to 15 minutes

Input 1÷Input 6: digital inputs. Activate by ticking the “Enabled” box then insert, in the corresponding field, the name of the quantity desired (Water Temperature, etc.). Press on this button  and select, from the drop down menu, the desired unit of measure. The second field is for Pulses’ Weight; insert the weight value and unit of measure (i.e. to measure electric Power with Pulses’ weight of 0,1Wh, insert 0,1 in the value field).

Click Save to store the setting or Cancel to exit without saving the setting.

It is now time to set the communication BUS ([ET-Pro 485](#) or [ET-Pro TCP](#)).

Once the BUS is set, configure the [Polling](#).

1.9 Add External Values

Use this module to import external data in the WEB/PV system or configure a set period of time within which get data and distribute them with set rules.

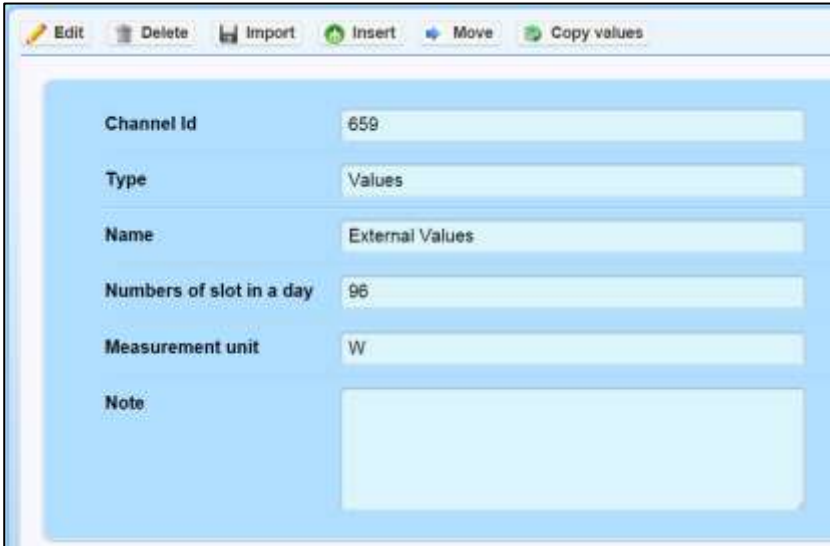
Proceed with these steps to configure the module:

1. Double click on the folder in which you intend to add the virtual peripheral device.
2. At “management groups” assign the desired groups (see [Permits Management](#)).
3. The “Type” field is not editable
4. Fill in the “Name” field to assign a name to the device created.
5. “Slots number per day” is for setting the integration period you wish to apply: 96 is the standard value (filing every 15 minutes) used for traditional settings
6. “Unit of measure”: select the desired one.
7. “Note”: not compulsory field to insert comments.
8. Click “Save”
9. The software will give a message saying the operation’s been successful.



MODULE'S PROGRAMMING

Double click on the peripheral device just created will send you to the following buttons:



“Edit”: lets you edit the fields configured during the creation of the module itself (i.e. the name).

“Delete”: to delete the selected device

“Import”: gives you access to a new window where, selecting the desired “kind of file”, you can proceed with its configuration. The selectable file, is, as per now, “CSV, days per line”

“Insert”:

1. “Start and end date” indicate dates of beginning and end of the period in which to insert the desired values.
2. Tick the “Enable Minutes” box if you wish to insert values from a period of time different from a day.
3. “Value” indicates the value you wish to spread within the period previously given.
4. “Aggregation” is connected to three sub-menus:

Constant Value: to assign, to each slot of the desired period. Data will be treated, depending on the unit of measure associated, as Total/Integral values.

Distribute: this function is for spreading all slots on the desired period, the value previously selected, dividing it in equal parts.

i.e. to spread the value within 2 days, in a module with 96 slots (typical for 15 minutes), this value will be divided by the number of samples in that period (192 slots). The result for this operation will be given every 15 minutes.

Hourly derivative distribution: this function is for assigning the value previously inserted as Total / Integration of the desired period.

i.e. spreading a value on 2 days it will divide it by the number of hours in that period (48). The result for this operation will be given every 15 minutes.


i) Click on “Insert” to insert data

ii) The software will give save the changes.

“Move”: lets you change the “source” of the new virtual peripheral device added.

“Copy Values”: this function lets you copy all values generated by a virtual module, to paste them on a channel of any other device. Be very careful with the period you insert as the software overwrites existing data with the danger of losing important data.

1.10 Add a Link

Links, with the symbol , are connections to other channels. Measuring quantities such as steam, PH or generic quantities, the measures are often spread among various instruments in the tree like structure while this function lets you group them all in one folder. With this function it is possible to show a certain user of a managing group, a channel of a device of which the group does not possess the permits. This “channel” can be selected from “Real Time” and “Historical” data.

To add a link, double click on the folder you wish to insert the link in and select “Add link”; a User form like the one here below will open:




Now set:

- Eventual managing groups (see [permits](#))
- Name
- Note; not compulsory field to insert comments.
- Click “Select Channel” to configure the channel to link
- Click “Save”

Once saved, it will be possible to change, delete or copy the values to another channel.

1.11 Add Day Shift

Day Shift module , is a channel only visible in the Real Time menu. This virtual “channel” lets you visualise a channel’s real time data (i.e. Active power) of previous days.

Here’s an example:



The image above shows instant measure (20,12 kW) and the same measure from the same channel, from the day before.

The server can manage these values via the [mobile threshold alarm](#) that lets the user know of differences between a set utility’s consumption in different days.


Double click on the folder you wish to insert the module in and select “Add Day Shift”.

Now set:

- Eventual managing groups (see [permits](#))
- Names
- Note; not compulsory field to insert comments.
- Click “Add / Change” to configure the channel to link.
- Offset: insert the number of days to go back to. Inserting 1 would get values from the day before.
- Click “Save” or “Cancel” without saving the changes

Once saved, it will be possible to change, delete or copy the values to another channel.

1.12 Add Totalizers


Totalizer modules represented by the icon , are channels only visible from the menu Real Time→View measures. This virtual “channel” let you view total real time values (i.e. produced energy) of a certain period that can be set according to needs.

Double click on the folder you wish to insert the totalizer in and select “Add Totalizer”.

Now set:

- Eventual managing groups (see [permits](#))
- Name
- Note; not compulsory field to insert comments.
- Select “Add/Change” to set the channel to connect.
- “M” or “Q”: these parameters, if applied to the original data will apply a constant (M) or add/delete an Offset.
- Unit of measure.
- Period: the user can select a period among: last n. hours, current day, last n. days, current week, last n. weeks, current month, last n. months, current year, from a set day.
- The last field at the bottom changes according to the period selected.
- Click “Save” or “Cancel” without saving the changes

Once saved, it will be possible to change, delete or copy the values.



1.13 Add Profile

Introduction

The user can create and manage profiles to compare measured data to the virtual estimated ones. The server can automatically manage all data and it is also possible to receive a notification should them shift over a set threshold. This function lets the user observe eventual anomalies in the plant's efficiency or variations from the estimated data that can be caused by unexpected factors.

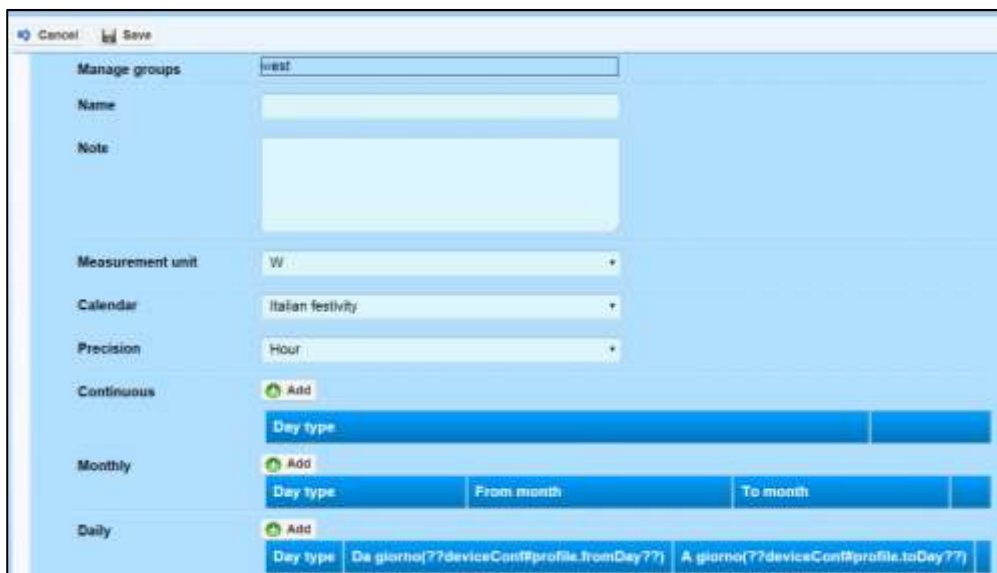
Access the "Device Configuration" section from the "Manage" menu to create a profile. The tree-like structure previously set will appear. Double click on the folder you wish to insert the new profile in and click "Add"; select "Add profile" from the drop-down menu.

Profile settings

A configuration form will appear on the left side of the monitor; fill it in with:

- **Name**
- **Note**, not compulsory field to insert comments.
- Select the desired unit of measure
- Calendar: the user can decide whether to stick to the "default" calendar or set the "No festivities" one. A calendar bearing the festivities of the user's Country can be set.
- Accuracy:
 - "Day": insert a single value that will appear as constant over 24 hours.
 - "Hour": to insert values corresponding to each hour within the day.
 - "Quarter of an hour": to insert values every 15 minutes, 96 per day.

See an example here below showing the "Hour" set (24 values per day).



The profile lets you set 3 main periods “Perennial”, “Per month” and “Per day”:

- **Perennial:** using this setting, the system will have perennial data. Select “Add” then, from the menu that will appear, select:
 - **No Days:** no values will be inserted for this period
 - **All Days:** the user can select a set profile for each day of the week and each holiday.
 - **5 working days:** the user can set a profile for the working days of a week (Monday to Friday) and for the weekend (Saturday, Sunday).
 - **6 working days:** the user can set a Monday to Friday profile, a different one for Saturdays and yet a different one for Sundays.
 - **The same everyday:** the user can set a profile for every day of the week.

Once the profile is set, click on “Edit” to insert the values.

It is possible to copy-paste the values if they’re separated by semicolons. After inserting the values, the profile can be saved. Select add to activate the profile.

- **Monthly:** all data inserted for this period are perennial and will be valid for all selected months of previous and future years. This profile bears the same days-related features as the perennial mode. Use this profile to set, for example, wintertime and summertime profiles.
- **Daily:** this is not a perennial setting but, all data of this profile will be valid from a set day of the year to another. This profile bears the same days-related features as the perennial mode. This profile is most indicated for a tailored profile i.e. summer / winter holidays break.

Once the setting of the periods is complete, it is possible to save the entire configuration on your Server.

It is now possible to insert some Special Days i.e. for extraordinary openings/closings.

The hierarchy of the set profiles is, from more to less important, “special Days”, “Daily”, “Monthly” and “Perennial”.

Once the setting is complete, it is possible to view real time data of the profile or historic data to check if the actual load is compatible with the profile.

From the Alarm configuration menu it is possible to set alarms to warn the user via email or SMS, in case of threshold exceeded.

From the “Plan Activity” menu, it is possible to set a check by the Server at a certain time of day to verify whether the measured “Historic” data is within the fixed thresholds. If it is not, the user will receive a warning via email.

1.14 Add Weather station

This function lets the Server know and file all weather related data such as temperature, pressure, humidity, etc. **from a set website.**

This function is particularly useful when solar panels, solar meters and all outdoor devices are installed. It is necessary to know all meteorological parameters regarding the area and a certain period of time during the day.



To create a new weather station it is necessary to insert a “Name”, fill the eventual “note” field in, choose the frequency of data collecting and, finally, insert exact coordinates of the place you wish to monitor.

It is obviously necessary to enable the channels you wish to monitor.

It is possible to insert, on a single Server, more than one weather stations.

Note: data accuracy depends on the service by your internet provider so it might not be extremely precise.

1.15 Add Bus

The selected bus module identifies the connection mode (LAN/serial) of the devices connected to the same RS485 serial. Even though this module can be inserted in any folder of the tree-like structure, it is better to insert it in the same group/subgroup of the devices connected to it.

Select Device configuration from the Manage menu and double click on the folder you wish to insert the new BUS in on tree-like structure. Select, in the form on the right hand side, the kind of BUS to insert.

Note: all communication BUS's are visible within the tree-like structure, only when in device setting mode. They will not be visible in all other pages and to all users in viewing mode.

Once the BUS is set, double click on the desired BUS to access the menu to:



The screenshot shows a configuration window for a BUS. At the top, there is a toolbar with icons for Edit, Connect device, Delete, Move, Clear bus queue, Ping, and Activity. Below the toolbar, the configuration fields are as follows:

Bus Id	12
Name	ETH-Switch_192.168.4.153:9000
Type	Ethernet TCP
Ip	192.168.4.153
Port	9000
Timeout (ms)	9000
Request timeout (ms)	3000
Address	254
Subnet	0

- **Edit:** to change the settings previously configured when creating the BUS. The mask will change according to the kind of BUS set. It is not possible to change the kind of BUS (in this case it is necessary to create a new BUS).
- **Combine Devices:** once the BUS is created, it is necessary to couple it with the devices previously set. This way, the server will know the instruction to follow to connect to the device. In this menu it is possible to connect devices that are not yet connected to any other BUS (to not to make mistakes).
- **Delete:** after confirming, it eliminates the BUS from the tree-like structure.
- **Move:** to move the BUS within the tree-like structure.
- **Clear BUS queue:** to eliminate all operations queueing in the BUS.
- **Ping:** only visible for TCP BUS's. This function is useful as diagnosis to know if the IP responds to the PING towards the server.
- **Activity:** to know the number of the activities in the queue, the last operation and the eventual operation in progress. It is important to set the system as to not to overload the BUS with operations. In case of saturation of the BUS (max 1.000 operation queueing), the system will notify it as "SYSTEM LOG" alarm.

1.15.1 ET-Pro TCP

This BUS is selected when the X-Meter's are connected to a network adapter such as the ETH module XM5 or similar. Selecting "ET-Pro TCP" as BUUS type will open a form like the one below:

Bus Id	12
Name	ETH-Switch_192.168.4.153:9000
Type	Etpro TCP
Ip	192.168.4.153
Port:	9000
Timeout (ms)	9000
Request timeout (ms)	3000
Address	254
Subnet	0

IP: insert the static IP (it can be given by the operator that configured the X-Meter)

Port: default set on 9000

Timeout: default set on 9000

Address: default set on 254

Subnet: default set on 0

Click **Save** when the setting is complete.

Select now, from the tree-like structure, the new module by double clicking on it, select then "**join device**". This function allows associating all devices connected downstream from the BUS module, like the X-Meter's. you can also delete the module or, even move it within the tree-like structure. Be very considerate when moving or deleting.

1.15.2 ET-Pro 485

This BUS is selected when a device is directly connected via RS485 serial, to a PCBOX (with an XM2 interface, that is USB-RS485).

Selecting “ET-Pro 485” as BUS will open a mask like the one below:



This module identifies the ET-Pro communication (Energy Team Protocol) of the devices that are part of the same RS485 serial.

- **Name:** insert the name you wish to give your BUS.
- **Kind:** identifies the kind of BUS you intend to configure (ET-Pro 485)
- **Serial Port:** insert the COM port actually used by the server.
- **Baud-rate:** set the same speed as the devices' connection.
- **Data Bit:** it is usually 8 and it's a parameter that has to be the same for all devices connected to the same serial.
- **Equality:** A parameter has to be the same for all devices connected to the same serial.
- **Stop Bit:** it's a parameter that has to be the same for all devices connected to the same serial.
- **Address:** leave the default setting (254).
- **Subnet:** leave the default setting (with the ET-Pro protocol is possible to use subnetworks).
- **Timeout:** Maximum response time in milliseconds (default 9000).
- **Request timeout:** minimum time between two requests (in milliseconds). It is the shortest time that needs to pass to send a new request.

1.15.3 RTU Modus

Modality used to read ModBus devices that communicate with RS485 serial, directly connected to a PC-BOX via a USB-RS485 converter (XM2 module).

Select “ModBus RTU” as kind of BUS to open the mask shown below:

Type	Modbus RTU
Serial port	
Baud Rate	1200
Data bits	8
Parity	None
Stop bits	1
Encoding	RTU
Echo	<input type="checkbox"/>
Timeout (ms)	3000

Serial Port: to insert the kind of port. Set COMxxx (replace x’s with the number of the port used by the concentrator) if using Windows as operative system.

Baud-rate: to set the devices’ speed of communication (bits per second). i.e. setting 1200 would make the device send 1200 bits per second.

Data bit: it’s a word’s length in bits, that is the number of bits that make a word. The default setting is 8.

Equality: default set as “None”. Set the correct equality of the serial.

Stop Bit: default set on 1. Insert your serial’s BIT number.

Encoding: technical detail about signal coding. Select RTU as default

Echo: possible, though not used, communication mode for Modbus. Not active as default.

Timeout: set at 3000 by default (delay in the communication in milliseconds).

NOTE:

Within a mixed network, all devices must communicate at the same speed.

1.15.4 Modbus RTU Over TCP

This modality is used for reading devices that use RTU ModBus protocol connected via an Ethernet network adapter. Select “ModBus RTU over TCP” as BUS and fill in the form that will open.

Manage groups	west
Name	
Type	Modbus RTU over TCP *
Ip	
Port:	1
Timeout (ms)	3000

IP: insert destination’s IP address.

Port: insert the communication’s port number.

Timeout (ms): default set on 3000 (delay in the communication in milliseconds).

Click **Save** to store the settings or **Cancel** to undo.

1.15.5 TCP Modbus

This modality is used for reading devices that use TCP ModBus protocol. Select “TCP ModBus” as BUS type and fill in the form that will open.

Type	Modbus TCP ▼
Ip	
Port:	502
Timeout (ms)	9000

IP: insert a static IP address.

Port: default set on 502, insert the correct one.

Timeout: default set on 9000. It is the port’s waiting time in milliseconds (ms). 9000 is to say that, once the device receives a start signal, it will then respond in 9 seconds.

1.16 Add END-POINT

The End Point module is quite similar to the BUS except the BUS is typically used for telemetering towards GSM devices. All instruments connected to an End Point can't be configured in a Polling.

Even though this module can be inserted in any folder of the tree-like structure, it is better to insert it in the same group/subgroup of the devices connected to it.

Select Device configuration from the Manage menu and double click on the folder you wish to insert the new BUS in on tree-like structure. Select, in the form on the right hand side, the kind of End Point you wish to add.

1.16.1 End-Point Modem

This is the Kind of End Point to use when the device to be connected is GSM. Set [modem pool](#) before configuring this kind of module, this way, the desired pool will contact the set GSM. This setting allows larger savings.

Once the kind of "modem" is inserted, you can set:

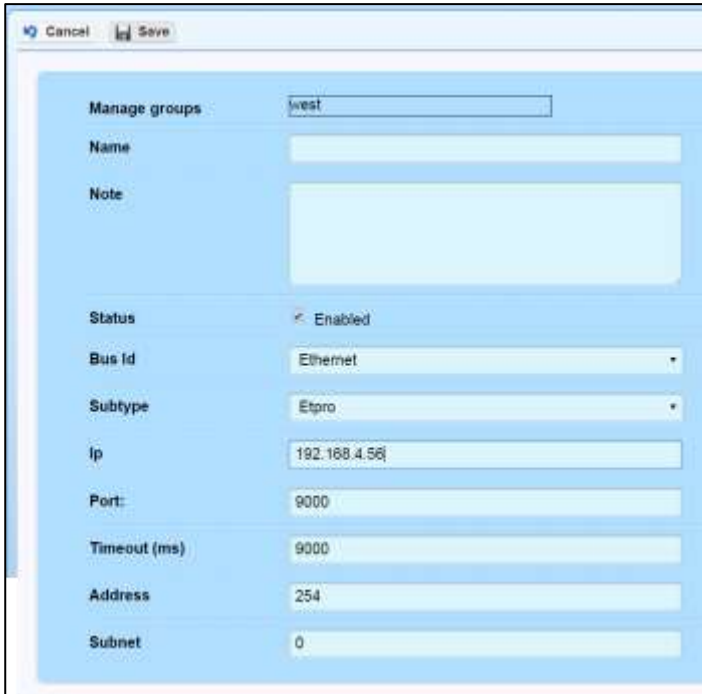


- **Name:** insert the name you wish to give your End Point.
- **Note:** to insert notes.
- **Status:** default "enabled". Set on disabled" if needed.
- **Subtype:** identifies the communication protocol, in this case it's "ET-pro" (Energy Team protocol).
- **Telephone:** insert GSM number to contact.
- **Pool:** select [Modem Pool](#) previously set.
- **Timeout:** (default set on 9000) in milliseconds, it's the maximum response time.
- **Address:** default set on 254, leave this setting.
- **Subnet:** leave default setting (with ET-pro protocol there is the chance of using different subnetworks).

1.16.2 End-Point Ethernet

Use this End-Point setting when contacting a device with an IP address.

Once it's selected, you can set:



- **Name:** insert the name you wish to give your End-Point.
- **Note:** to insert notes.
- **Status:** default “enabled”. Set on disabled” if needed.
- **Subtype:** identifies the communication protocol, in this case it’s “ET-pro” (Energy Team protocol).
- **Timeout:** (default set on 9000) in milliseconds, it’s the maximum response time.
- **Address:** default set on 254, leave this setting.
- **Subnet:** leave default setting (with ET-pro protocol there is the chance of using different subnetworks).

1.16.3 End-Point Seriale

Use this End-Point setting when contacting a device that's connected to the Server via USB/RS485 module (XM-2 module).

Once it's selected, you can set:



- **Name:** insert the name you wish to give your End-Point.
- **Note:** to insert notes.
- **Status:** default "enabled". Set on disabled" if needed.
- **Subtype:** identifies the communication protocol, in this case it's "ET-pro" (Energy Team protocol).
- **Serial Port:** insert the COM port used by the device.
- **Baud-rate:** set the same speed as the devices' connection.
- **Data Bit:** it is usually 8 and it's a parameter that has to be the same for all devices connected to the same serial.
- **Equality:** it's a parameter that has to be the same for all devices connected to the same serial.
- **Stop Bit:** it's a parameter that has to be the same for all devices connected to the same serial.
- **Address:** leave the default setting (254).
- **Subnet:** leave the default setting (with the ET-Pro protocol is possible to use subnetworks).
- **Timeout:** Maximum response time in milliseconds (default 9000).

1.17 Add Math Module

Use this math module to create virtual channels (i.e. to calculate pretend utilities not directly measured), group series of measures by costs centres, calculate efficiency and some utility's performance etc.

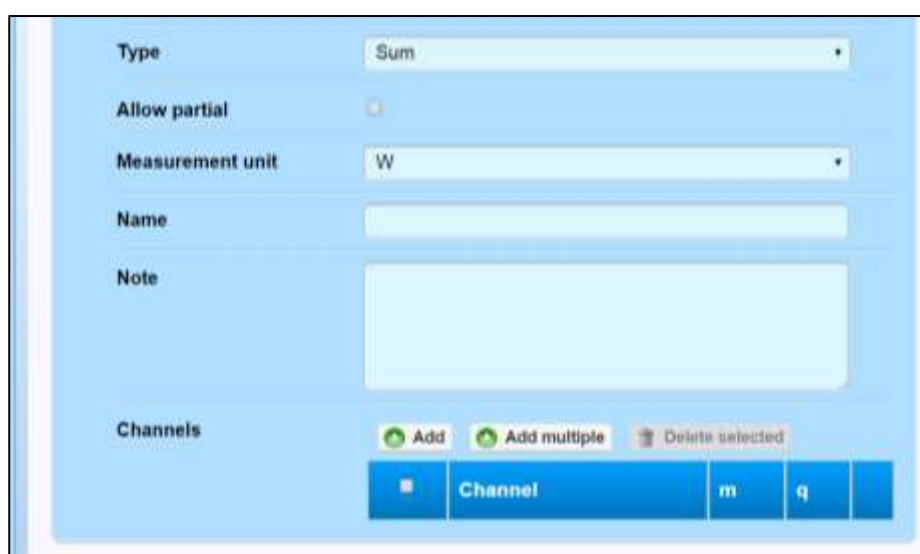
Double click on the folder you wish to insert the new Math Module from the "Device configuration" menu. Select, "Add" and then "Add Math module".

See here below some "ready made" modules to help the user create their own.

1.17.1 Sum

This kind of module allows making Algebraic sums, (sum and subtraction) of measures' "portions" as well.

Select this module will make a form like the one below open:



Partial: not selected by default because, to calculate a math module, all data from all channels must be present. Should the user select "partial", they accept the fact that, for certain channels, there might not be any data available. The system will consider it as "0" and calculate it anyway with the data available.

Unit of measure: select the unit of measure you wish for the result of your operation.

Name: name to give to the function.

Note: to insert notes.

Add: Allows selecting the desired channel. Selectin Add will open a sub-menu where to "select channel" and access the tree-like structure of the plant up to the single channel.

Click Save to save the setting that will be then viewed as a new line in the "Channel" box below. The following factors have been introduced to correct and adjust the values.

m: 1 by default. It multiplies the value of the quantity selected. It is possible to insert different values (i.e. 0,5 sum will add 50% of the selected measure), or negative numbers.

g: 0 by default. It is basically an offset and gets added to the value of the selected quantity.

Add multiple: the procedure is the same as the previous one. The advantage of this new function lies in a quicker selection of the quantities corresponding the plant.

They will be viewed as single lines of the Channels box.



To open the menu and start editing.



To delete the line (after having selected it first)

Click Save to save the setting or Cancel.

1.17.2 Multiplication

The menu and all their parameters are the same as the previous one. The only difference is that, with this function, quantities get multiplied.

1.17.3 Cos phi

With this math module, knowing Active and Reactive power of an electric line, it is possible to calculate the " $\cos\phi$ " value.

Selecting this module will open a new menu with the same functions as the previous one plus a few new ones:

Active: click on "Select channel" to access the tree-like structure of the plant and select the channel corresponding to the active power of the line you intend to calculate the $\cos\phi$ of.

Reactive: click on "Select channel" to access the tree-like structure of the plant and select the channel corresponding to the reactive power of the line you intend to calculate the $\cos\phi$ of.

Click Save to save the setting or Cancel.

1.17.4 4 channels Cos Phi

With this math module, knowing Active and Reactive power of an electric line with bidirectional measure, it is possible to calculate the " $\cos\phi$ " value.

Selecting this module will open a new menu with the same functions as the previous one plus a few new ones:

Acquired Active: to measure the total acquired Active Power of the plant. Click on "Select channel" to select the channel related to the instrument.

Sold Active: use the previous procedure to select the "sold Active" channel.

Acquired Reactive: use the previous procedure to select the "Acquired Reactive" channel.

Sold Reactive: use the previous procedure to select the "Sold Reactive" channel.

Click Save to save the setting or Cancel.

1.17.5 Sum of products

This function allows the selection of couples of quantities and have an automatic product of them to be summed to others.

Selecting this module will open a new menu with the same functions as the previous one plus a few new ones.

Click "Add" will open the mask here below:



Channel A: click “Select channel” to access the tree-like structure and select the quantity correspondent to the desired channel.

Channel B: click “Select channel” to access the tree-like structure and select another quantity that will be multiplied by the one selected in Channel A.

m: 1 by default. It multiplies the value of the quantity selected by a set value.

q: 0 by default. It is basically an offset and gets added to the value of the selected quantity.

Click “Save” to save the couple of quantities that will be both viewed on the same line of the chart and multiplied.

Repeat the procedure for as many couple as you have.

Click Save to save the setting or Cancel.

1.17.6 Sum divided by sum

The main fields are the same as the ones already described for the previous functions. There are only a few new ones:

Add Numerator: click here to access the menu where to select the channels corresponding to the quantities to be summed (refer to [Sum](#) for full procedure). Click on **Add denominator** and use the same procedure to select values and calculate a denominator.

Click Save to save the setting or Cancel.

The system will now proceed dividing: numerator by denominator.

General function: $S = (A_1 + A_2 + A_3 + \dots A_N) / (B_1 + B_2 + B_3 + \dots B_N)$

1.17.7 Average

All fields, submenus and procedures for values selection are the same as the previous function's ([Sum](#)).

This function is to calculate average value of all selected quantities.

Click Save to save the setting or Cancel.

1.17.8 Corrected gas

This function is particularly indicated in those plants where there is a gas corrector to accurately determine, the measure of standard equivalent cubic meters starting from those measured under certain temperature and pressure conditions.

The main fields (kind, Partial, Unit of measure, Name, Note, “n” and “q” values) are the same as the ones already described for the previous functions. There are only a few new ones:

Select “Flowmeter”, from the drop down menu in the **Type** field (the one above “Flow”) if that's the instrument that's installed.

Flow (mc/h): to measure gas's flow (cubic metres per hour). Click on “Select channel” and then the flow channel linked to the instrument with the connected measuring probes. Name the channel using the corresponding field.

Pressure (bar): use the same procedure as the Flow's, select the gas pipe's pressure channel.

Temperature (°C): use the same procedure as the Flow's, select the gas temperature channel.

Calculated Temperature (°C): insert the value related to the standard condition of the gas' square meters.

Click Save to save the setting or Cancel.

The algorithm made by the math module in case of Volumetric meter is the following one:

Corrected Volume = Volume (not corrected) * pressure * [Temperature 1 + Kelvin_const]

Note:

Not corrected Volume= the measured one

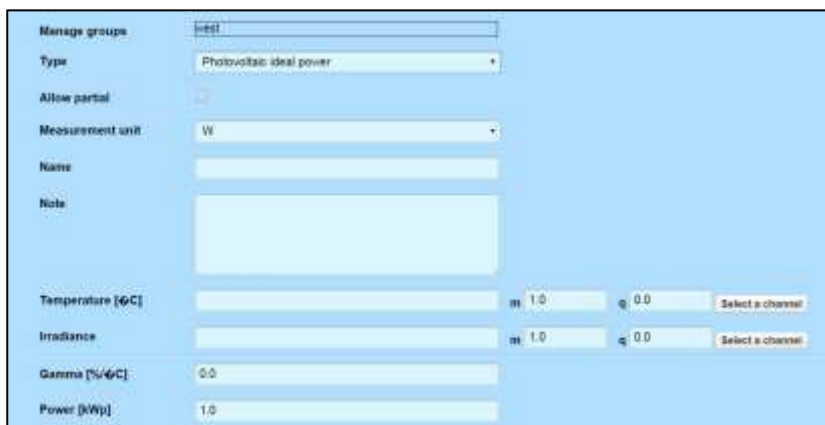
Pressure= the measured one

Temperature 1= the measured one

Temperature 2= calculated Temperature (0 or 15°C so, NMC or SMC): KELVIN CONST being 273,15°C

1.17.9 Ideal Photovoltaics Power

NOTE: This function is specific for Photovoltaic plants.



Partial: ticking the box will make the system keep calculating automatically considering as “0” all channels with no data.

Name: insert the name you wish to give function.

Note: to insert notes.

Temperature and Irradiation: access, from the tree-like structure, the specific channels for Temperature and Irradiance measurement on a set String. If these channels are selected, they are used to calculate the multiplication to determine the Photovoltaic plant’s ideal Power.

Range (% / °C): corresponds to the Temperature’s coefficient variation rate; it varies according to the kind of panel (see panel’s technical characteristics).

Power [kWp]: related to peaks’ KW.

Select **Save** to save the configuration that will be viewed as a new icon in the tree-like structure, within the plant.

1.17.10 Dew Point

Dew-point is the temperature where the Air-Vapour mix becomes saturated with steam.



Partial: ticking the box will make the system keep calculating automatically considering as “0” all channels with no data.

Unit of Measure: the proposed one is Degree Celsius (°C).

Name: insert the name you wish to give the function.

Note: to insert notes.

Temperature [°C]: click on “Select Channel” to select the desired instrument’s Temperature channel from the tree-like structure.

Humidity [0-1]: click on “Select Channel” to select the desired instrument’s Humidity channel from the tree-like structure. In this case, the measure will be between 0 and 1. Insert 0,01 as m value should the measure be between 0 and 100%.

The following corrective coefficients can apply to this math module as well:

m: by default set on 1. It multiplies the selected measure’s value.

q: by default set on 0. It is basically an offset and gets added to the value of the selected quantity.

Click Save to save the setting or Cancel.

The algorithm is the following one:

$$T_d = \frac{b * \left(\frac{a * T}{b + T} + \ln U_R \right)}{a - \left(\frac{a * T}{b + T} + \ln U_R \right)}$$

$a = 17,27 \text{ } ^\circ\text{C}$
 $b = 237,7 \text{ } ^\circ\text{C}$
 $\ln \rightarrow$ logaritmo naturale (non in base 10)
 T (temperatura misurata): $0 \text{ } ^\circ\text{C} < T < 60 \text{ } ^\circ\text{C}$
 U_R (umidità relativa): $0,01 < RH < 1,00$ (non in %)
 T_d (punto di rugiada): $0 \text{ } ^\circ\text{C} < T_d < 50 \text{ } ^\circ\text{C}$

1.17.11 Thermal power

Measuring the fluid's inlet and outlet temperature, this function is particularly useful to define produced thermal power/energy i.e. from a cogeneration plant.

All values are acquired by specific probes, installed on certain instruments that can be selected from the tree-like structure.



The main fields (kind, Partial, Unit of measure, Name, Note, “n” and “q” values) are the same as the ones already described for the previous functions. There are only a few new ones:

Density [Kg/mc]: insert the plant's liquid's temperature (by default set on water's density).

Thermal capacity [Wh/Kg°K]: the coefficient for the liquid's thermal capacity (as Wh/kg°K).

Flow [mc/h]: to calculate the flow's value. Click on Select channel to select one from the tree-like structure and select the flow channel of the desired instrument.

Inlet Temperature [°K]: using the same procedure as the Flow's, select the Temperature channel that is measured on the inlet pipe.

Outlet Temperature [°K]: using the same procedure as the Flow's, select the Temperature channel that is measured on the outlet pipe.

Click Save to save the setting or Cancel.

The formula for the calculus is the following one:

Thermal Power= Flow * Density * Thermal capacity * (Inlet Temperature + Outlet Temperature)

1.17.12 Saturated Vapour

This is useful when monitoring thermodynamic plants such as thermal power or heating plants or when in need of determining the enthalpy of a mass of saturated vapour to find its inner energy.

The main fields (kind, Partial, Unit of measure, Name, Note, “n” and “q” values) are the same as the ones already described for the previous functions. There are only a few new ones:

Kind: select Temperature [°C] or Pressure [bar] depending on the quantity measured. Starting from this quantity, measures by the instrument, **Enthalpy**, **Steam Density** or **Thermal Power** are calculated (select one from the dropdown menu in the **Calculate** field).

The field where to select the channel will change its name depending on the quantity selected from “Temperature” [°C] to “Pressure” [bar].

Click on “Select Channel” to open the tree-like structure and select the desired instrument and the channel of the measured quantity.



Click Save to save the setting or Cancel.

1.17.13 Integral

This module calculates the measure’s integral such as the Active Power. In this case, the module will return Active Energy’s value.

The main fields (kind, Partial, Unit of measure, Name, Note, “n” and “q” values) are the same as the ones already described for the previous functions. There are only a few new ones:

Channels: click “Add” after filling in all the main fields; click then on “Select a channel” to open a submask from which it is possible to access the tree-like structure of the plant. Insert, if needed, correction coefficient “m” and “q”.

Click Save to save the setting that will be then viewed as a new line in the chart below. It is still possible to edit  or delete  the channel selected.

Click Save to save the setting or Cancel.

1.17.14 OR expression

It’s one of the Boolean functions. It can be used to monitor logic ON/OFF statuses of some sensors that are installed in a plant.

Select two or more parameters which logic results get combined according to OR logic. This math module can be used for alarms management like [“Generic Contact Error”](#).

The main fields (kind, Partial, Unit of measure, Name, Note, “n” and “q” values) are the same as the ones already described for the previous functions. There are only a few new ones:

Unit of measure: after having filled in all the main fields, select BoolAH from the dropdown menu if output 1 corresponds to logic level High; if “negative logic” was chosen, and output 0 corresponds to logic level High, select BoolAL from the dropdown menu.

Channels: click on “Add multiple” to select, from the tree-like structure, the channels corresponding to the ON/OFF statuses desired. Select two or more to have an OR combination. Click “Add” to confirm. The channels will now appear as new lines in the chart. The “Add” button allows adding one channel at the time.

Click Save to save the setting or Cancel.

1.17.15 AND expression

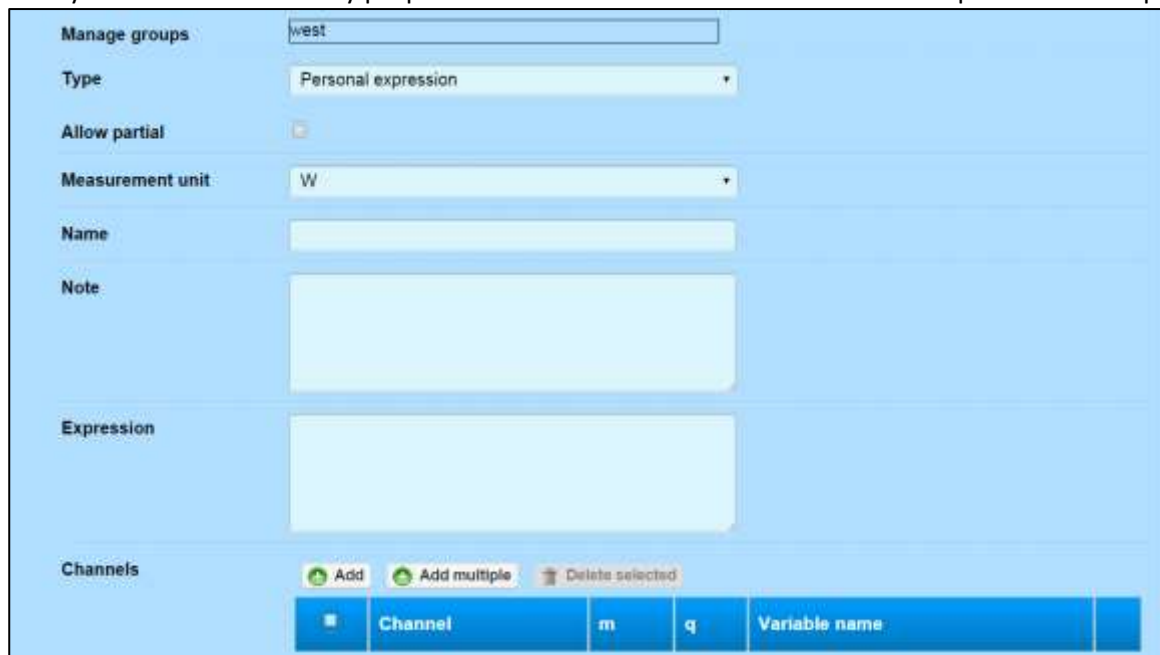
This function works just like the previous one except for the final result that will be based on the AND logic.

1.17.16 Personalised expression

This module allows the user to write their own algorithm, thus making it a very “powerful” one.

Select the kind of math module, click “Add” or “Add multiple” to select all channels to use in the expression.

The system will automatically propose names for all the variables and write the personalised expression.



The has already got a few set variables such as:

- **Time** (seconds from the beginning of the day)
- **Day** (day of the month)
- **Month** (current month i.e. 1 for January)
- **Year** (current year)
- **Week** (day of the week i.e. 1 for Monday)

For special cases and further information see [this website](#) or contact our technical assistance calling +39 0248405033.

This math module can be used for [alarms](#) management on a Server.

1.17.17 PES

This math module allows measuring overall performance of cogeneration plants.

The “variables” that can be measured are the following ones:

- Combustion energy
- Electricity
- Thermal energy



The screenshot shows a configuration window for a PES (Partial Efficiency System) module. The interface is light blue with white text. At the top, there is a 'Type' dropdown menu set to 'Pes'. Below it are fields for 'Allow partial' (a checkbox), 'Measurement unit' (a dropdown menu set to '%'), 'Name' (a text input field), and 'Note' (a larger text input area). Further down, there are three rows of efficiency and energy settings. Each row has a label (Electrical efficiency, Thermal efficiency, Combustion energy, Electrical energy, Thermal energy) followed by a numerical input field (all set to 1.0). To the right of these fields are two columns of input fields labeled 'm' and 'q', both set to 0.0. Below each 'm' and 'q' field is a 'Select a channel' button and an 'Integral' checkbox.

This math module uses Combustion energy as denominator and the sum of thermal and electrical performances. The result will be the cogeneration plant’s overall efficiency (in percentage).

1.17.18 Economic Calculus

This math module lets the user apply set costs for each “Tariff” band. The system lets the user personalise the bands (see [bands configuration](#)) to apply different costs to different working shifts.

The main fields (kind, Partial, Unit of measure, Name, Note, “n” and “q” values) are the same as the ones already described for the previous functions. There are only a few new ones:

Unit of measure: depending on the user’s needs choose between Euro and US Dollar.

Band: choose, from the dropdown menu the kind of band to use, the number of daily bands is included.

1.17.19 Air's thermal energy

This math module lets calculate air's thermal energy.

The main measures to perform are:

- Inlet temperature
- Inlet humidity
- Outlet temoerature
- Outlet humidity
- Air's flow

See, here below, the full algorithm used for this math module.

Input data from the instrument:

$$\left\{ \begin{array}{l} T_{DB1\ i} [^{\circ}C] \\ UR_{1\ i} [\%] \\ T_{DB2\ i} [^{\circ}C] \\ UR_{2\ i} [\%] \\ Q_{2m} [\frac{kg}{s}] \end{array} \right. \quad i = 1 \div 96 \text{ (dato } \forall 1/4h \text{ giorno)}$$

Data (costants):

$$\left\{ \begin{array}{l} p_{0m} = 101325 \text{ Pa} \\ T_0 = 273.15 \text{ K} \\ C_{p\ da} = 1.006 \frac{kJ}{kg} ^{\circ}C \\ C_{p\ wv} = 1.82 \frac{kJ}{kg} ^{\circ}C \\ R_{da}/R_{wv} = 0.62198 \\ MM_{da} = 28.965 \frac{g}{mol} \\ R_U = 8314.5 \frac{J}{kg} ^{\circ}C \\ h_{Gwv_0} = 2500.8 \frac{kJ}{kg_{wv}} \\ \rho_{std} = 1.225 \frac{kg}{m^3} \\ z = \text{quota localit\`a sito [m]} \end{array} \right.$$

Calculated physical properties:

$$\left\{ \begin{array}{l} p_z = p_{0m} * (1 - 2.2577 * 10^{-5} z)^{5.2559} \\ \rho_{1\ i} = \frac{MM_{da} * p_z}{R_U * (T_{DB1\ i} + T_0)} \\ \rho_{2\ i} = \frac{MM_{da} * p_z}{R_U * (T_{DB2\ i} + T_0)} \end{array} \right.$$

Flows properties:

$$\begin{cases} Q_{1m} = Q_{2m} \\ Q_{1vi} = Q_{1m} * \rho_{1i} \\ Q_{2vi} = Q_{2m} * \rho_{2i} \end{cases}$$

Temperature (K):

$$\begin{cases} T_{DB1iK} = T_{DB1i} + T_0 \\ T_{DB2iK} = T_{DB2i} + T_0 \end{cases}$$

Hyland & Wexler constants for p_{wvs} calculus:

$$\begin{cases} C_8 = -5800.2206 \\ C_9 = 1.3914993 \\ C_{10} = -0.048640239 \\ C_{11} = 0.000041764768 \\ C_{12} = -0.000000014452093 \\ C_{13} = 6.5459673 \end{cases} \quad \begin{cases} C_1 = -5674.5359 \\ C_2 = 6.3925247 \\ C_3 = -0.009677843 \\ C_4 = 0.00000062215701 \\ C_5 = 2.0747825E - 09 \\ C_6 = -9.484024E - 13 \\ C_7 = 4.1635019 \end{cases}$$

$$p_{wvs_pos} = e^{(C_8/T_{DBj\ i_K} + C_9 + C_{10} * T_{DBj\ i_K} + C_{11} * T_{DBj\ i_K}^2 + C_{12} * T_{DBj\ i_K}^3 + C_{13} \ln T_{DBj\ i_K})}$$

$$p_{wvs_neg} = e^{(C_1/T_{DBj\ i_K} + C_2 + C_3 * T_{DBj\ i_K} + C_4 * T_{DBj\ i_K}^2 + C_5 * T_{DBj\ i_K}^3 + C_6 * T_{DBj\ i_K}^4 + C_7 \ln T_{DBj\ i_K})}$$

Calcoli:

$$\begin{cases} se\ T_{DBj\ i} < T_0 \Rightarrow p_{wvs_i} = p_{wvs_pos} \\ se\ T_{DBj\ i} > T_0 \Rightarrow p_{wvs_i} = p_{wvs_neg} \end{cases} \quad j = 1 \div 2$$

Calculus:

$$X_{in\ i} = \left(\frac{R_{da}}{R_{wv}} \right) * UR_{1\ i} * \frac{p_{wvs_i}}{(p_z - UR_{1\ i} * p_{wvs_i})}$$

$$X_{out\ i} = \left(\frac{R_{da}}{R_{wv}} \right) * UR_{2\ i} * \frac{p_{wvs_i}}{(p_z - UR_{2\ i} * p_{wvs_i})}$$

$$h_{in\ i} = C_{p\ da} * T_{DB1\ i} + X_{in\ i} * [h_{Gwv0} + C_{p\ wv} * T_{DB1\ i}]$$

$$h_{out\ i} = C_{p\ da} * T_{DB2\ i} + X_{out\ i} * [h_{Gwv0} + C_{p\ wv} * T_{DB2\ i}]$$

$$\Delta h_i = |h_{out\ i} - h_{in\ i}|$$

$$W_{h\ i} = \Delta h_i * Q_{2vi}$$

$$\begin{cases} se\ T_{DB1\ i} < T_{DB2\ i} \Rightarrow W_{risc_tot} = \sum_{i=1}^n W_{h_i} \quad con\ n = numero\ 1/4h\ T_{DB1\ i} < T_{DB2\ i} \\ se\ T_{DB1\ i} > T_{DB2\ i} \Rightarrow W_{raff_tot} = \sum_{i=1}^m W_{h_i} \quad con\ m = numero\ 1/4h\ T_{DB1\ i} > T_{DB2\ i} \end{cases}$$

2 POLLING

This function (cyclic interrogation) is crucial for online cyclic readings, historic data, clocks synch, etc.

The server proceeds with cyclic interrogation 24/7 even when no user is connected to the Web interface.

This configuration is necessary not only for data download but for historic data values and eventual users' alarms as well (via the Server's on board [alarms](#)).

Select Polling from the Manage menu. A mask like the one here below will show.



	Polling id	Cycle time [ms]	Polling type	Name	Status	Scheduling
	11	30000	Normal	Energy Team - On-Line	Enabled	

Click on **New** to start the configuration; fill in the fields of the submenu according to the following parameters:

Kind of Pollings

Select, from the dropdown menu one of the following parameters:

- **Normal:** this “polling” is made in cycles depending on the time set (usually set on 30 Seconds). It is usually used for instruments' online readings. Set polling at “0” to deactivate it.
- **Scheduled:** this polling is made according to the schedule set. The time cycle will be ignored (except for “0” that would deactivate it). It is usually used for readings of historic data from the instruments.
- **Priority:** the settings of this polling are just like Normal's only difference being its higher priority. Set polling at “0” to deactivate it.
- **Scheduled priority:** the settings of this polling are just like Scheduled's only difference being its higher priority. This polling is usually used for instruments' on board Totalizers historicisation readings.

All other items and their fields to fill in will be fully explained in the following chapter.

For ease of use, the “Device Polling Configuration” was implemented. This allows creating all correct operations for various pollings depending on the device. This makes it possible, for users with no specific technical knowledge, to configure the module.

2.1 X-METER polling configuration

Create (if not yet existing) 4 pollings. Click then “New” to configure as follows:

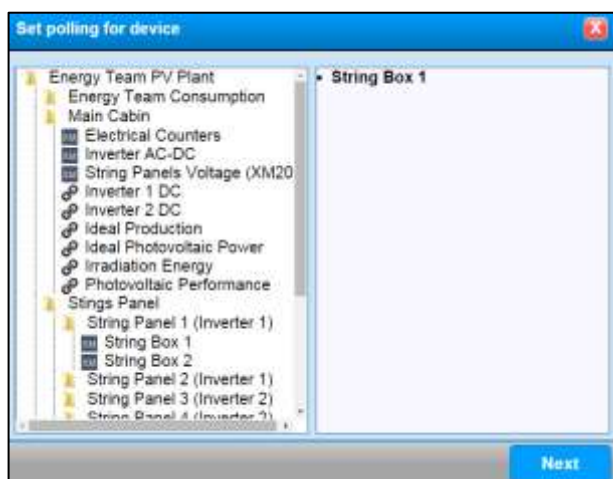
- **X-Meter – Online:** activities in this polling are for real time data readings. This polling has to be the “Normal” kind and have a typical cycle time of 30 seconds. The name that’s set is optional.
- **X-Meter – Historical:** activities in this polling are for the instrument’s on board historic data reading. This polling has to be the “Scheduled” kind with a 0-5/15 * * * ? scheduling. These operations will be made on the 5th minute of each quarter of an hour.
- **X-Meter – Clock:** this activity is used for synchronising the instrument’s on board clock. This polling has to be the “Scheduled” kind with a 0 40 0 ? * MON scheduling. This expression indicates that the operation will be made every Monday night at 00:40.
- **X-Meter – Totalizers:** this is an optional activity that is used for reading the instrument’s on board totalizer exactly every 15 minutes. This polling’s purpose is to “reconstruct” historical data starting from readings from the X-Meter’s on board totalizer. This polling has to be the “Scheduled priority” kind with a 0 0/15 * * * ? scheduling time. This expression means that the operation will be made with high priority exactly every quarter of an hour.

Once all operation are created, a mask like the one here below will open:



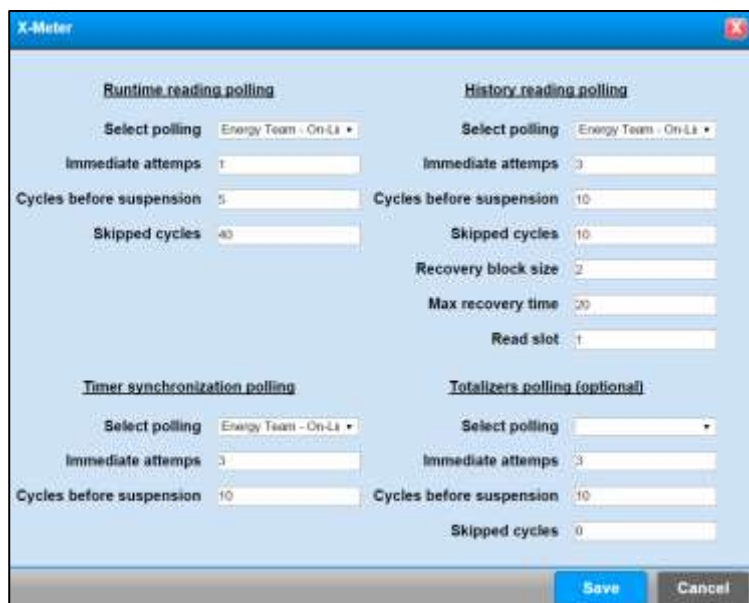
	Polling id	Cycle time [ms]	Polling type	Name	Status	Scheduling	
	11	30000	Normal	Energy Team - On-Line	Enabled		
	12	30000	Cron	X-Meter - Clock	Enabled	0 40 0 ? * MON	
	13	30000	Cron	X-Meter - Historic	Enabled	0 5/15 * * * ?	
	14	30000	Cron	X-Meter - Totalizer	Enabled	0 5/15 * * * ?	

Click on “Set polling per device” to open the tree-like structure and select all X-Meter’s you wish to insert.



Note: users can select devices of the same kind so, if the first one selected is an X-Meter, the system will only let them pick other X-Meter’s.


Click “Next” to access a mask like the one here below:



From this mask select the polling previously created. All other default values are pre-set and generally correct and, in case of special needs, the user can edit them.

The aim of this “Semi-automatic” configuration is to automatically create operations, for each configured X-Meter and associate them to all Pollings’ operations.

This operation will allow even less experienced users to be able to configure this module.

Click now on this  button to restart all pollings to activate (deactivate if cycle time is set on “0”) the communication towards the devices.

The polling is now fully configured.

For further information contact Energy Team technical department (+39 0248405033)

NOTE:

If after configuring a Polling you wish to add some other channel of an existing device, you’d need to add by hand the operation of the new channel in the various Pollings. To avoid all problems that might come from a wrong configuration of the module, it is advisable to remove from the “Device Configuration” menu, all existing operations on that device in all pollings, repeat then all operations in this chapter.

2.2 X-Meter modules online reading polling configuration

Here below the parameters to set:

Kind of Polling: Normal


Cycle time: by default set on 30000 (milliseconds), at the end of which the system will repeat values readings and calculations.

This time will have to grow depending on the number of devices connected and serial bus speed.

Name: insert a name, it will appear in the main menu.

Note: to insert notes.

Click **Save** at the end of the procedure.

Click on this button  to associate **X-Meter** devices.

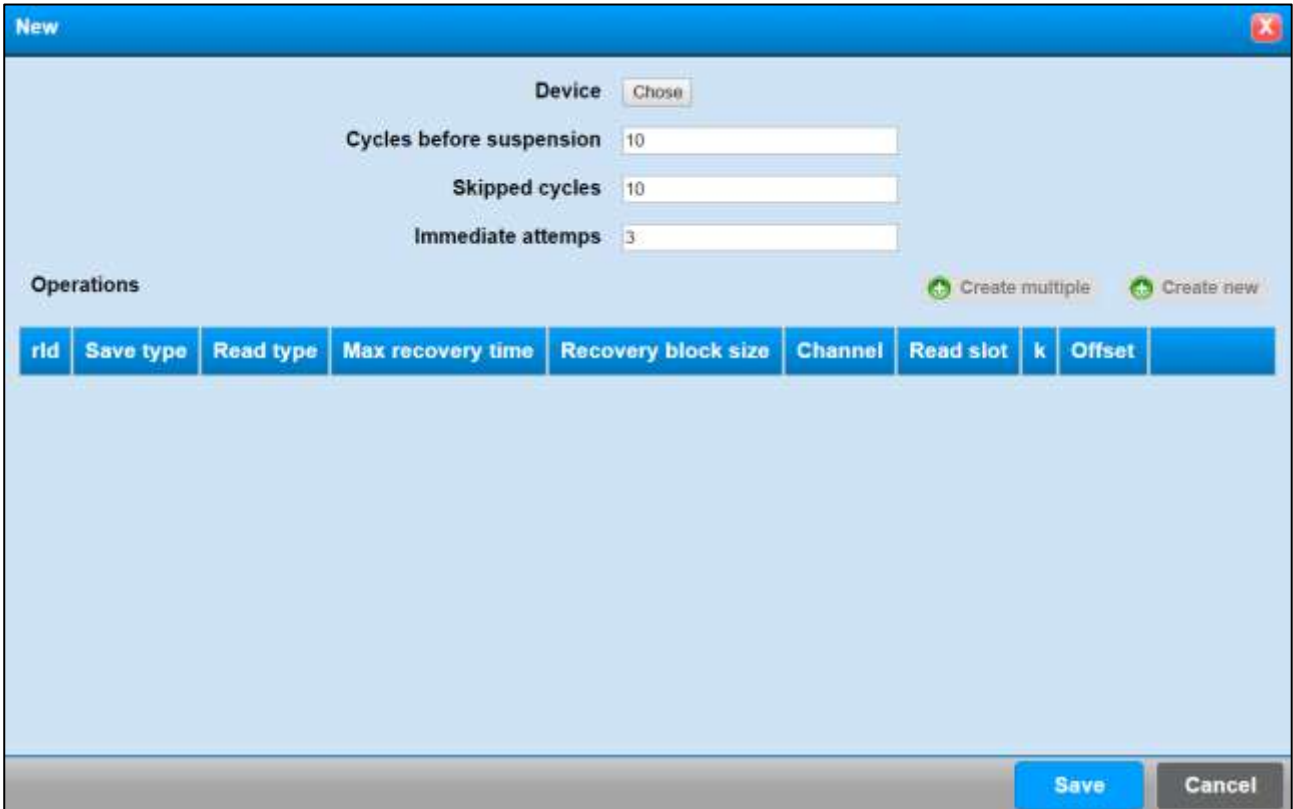


From here it is possible to:

- Go back
- Reboot the polling, useful when changing some operations.
- Create a new operation (to select a single device).
- Create multiple operations (to create multiple operations on more devices).
- Delete operations previously created (after selecting them).

Click "**Create New**" to configure a single device or "**Create Multiple**" to configure more devices at once.

Clicking "**Create New**" will open the menu here below:



Choose the device, click on **“Create New”** to create a single operation or **“Create Multiple”** for operations on more channels.

Clicking “Create New” will open a configuration form like the one here below:

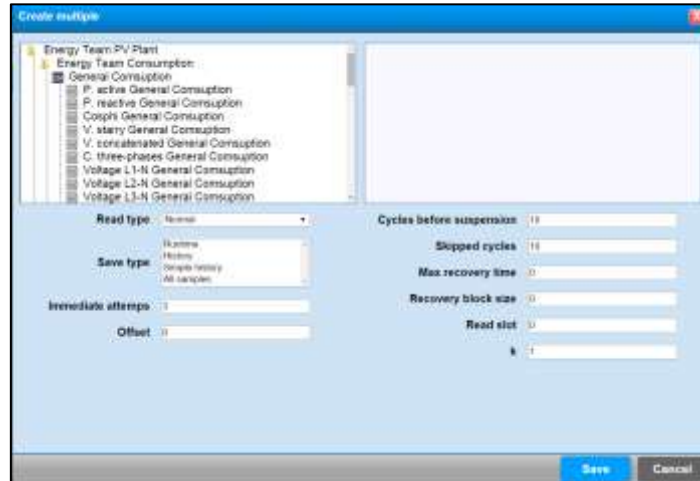


For this polling, set, “Normal” reading and “Real time” writing.

For certain channels such as internal Temperature (one of X-meter’s channels), it is necessary to select both “Real Time” and “Simple Historical”.

Click **“Create Multiple”** will open a mask like the one here below with the tree-like structure where to select the instrument(s) desired.

The system will insert the instruments in the box on the right hand side.



Fill in the fields with the information required:

Kind of reading: Normal

Kind of writing: Real Time

Immediate attempt: 1 by default

Cycles before suspension: 10 by default

Skipped Cycles: 5 by default

Days to recover: 0 by default



Days for recover: 0 by default

Slots to read: 0 by default

K: by default set on 1 since a different value would change the reading, multiplying the values.

Offset: 0 by default

Click Save to save the setting or Cancel.

Click now on this  button to activate the polling or  to immediately activate the polling without waiting for any cycle (in this case there is no difference)

The polling is now fully configured.

For further information contact Energy Team technical department (+39 0248405033)

NOTE:

If after configuring a Polling you wish to add some other channel of an existing device, you'd need to add by hand the operation of the new channel in the various Pollings. To avoid all problems that might come from a wrong configuration of the module, it is advisable to remove from the "Device Configuration" menu, all existing operations on that device in all pollings, repeat then all operations in this chapter.

2.2.1 Polling configuration for “historical” X-Meter’s modules data

Back to the main menu, click on “New” to open a submenu to fill in with the following information:

Kind of polling: select “Scheduled” for historical data and virtual archives readings.

Cycle time: by default set on 30000. Leave it this way.


Name: insert the name that will appear on the main menu.

Note: to insert notes.

Scheduling: “0-5/15 * * * ?” leave it this way. This means that the reading of the X-Meter’s historical data will be made every fifth minutes of every quarter of an hour.

Click Save to save the setting.

Follow the same path as before:

Click on this  button to associate X-Meter’s devices.

In the menu that will open there is the chance to associate X-Meter modules creating “Multiples” of each one of them to quicken the insertion of all its active channels.

Click on “Create multiple” to open the submenu like the previous one, select the desired modules and fill in the fields with their specific parameters:

Kind of Reading: Historical

Kind of Writing: Historical

Immediate attempt: 1 by default

Cycles before suspension: 10 by default

Skipped Cycles: 10 by default

Days to recover: 20



Days for recover: 1

Slots to read: 1; it reads the previous slot, the one corresponding to the quarter of an hour that’s just finished.

K: by default set on 1 since a different value would change the reading, multiplying the values.

Offset: 0 by default

Click Save to save the setting or Cancel.

Click now on this  button to activate the polling or  to immediately activate the polling without waiting for any cycle (in this case there is no difference)

The polling is now fully configured.

For further information contact Energy Team technical department (+39 0248405033)

NOTE:

If after configuring a Polling you wish to add some other channel of an existing device, you’d need to add by hand the operation of the new channel in the various Pollings. To avoid all problems that might come from a wrong configuration of the module, it is advisable to remove from the “Device Configuration” menu, all existing operations on that device in all pollings, repeat then all operations in this chapter.

2.2.2 X-Meter clocks synch polling configuration

Back to the main menu, click on “New” to open a submenu to fill in with the following information:

Kind of polling: “Scheduled”.


Cycle time: by default set on 30000. Leave it this way.

Name: insert the name that will appear on the main menu.

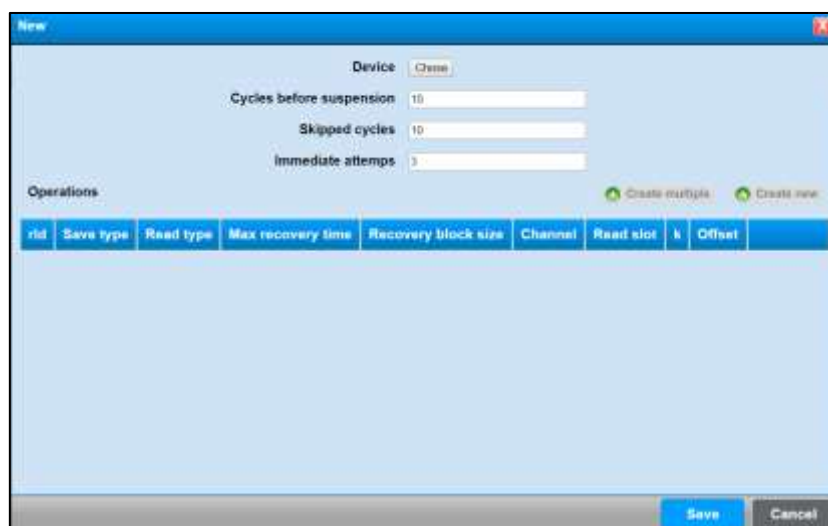
Note: to insert notes.

Scheduling: 0 40 0 ? * MON. it has to be set for the day and time when you want your clocks to be synchronised. This combination indicates that the operation will be made every Monday night at 00:40.

Click Save to save the setting.

Click on this  button to associate X-Meter’s devices.

In the menu that will open there is the chance to associate X-Meter modules creating “Multiples” of each one of them to quicken the insertion of all its active channels.



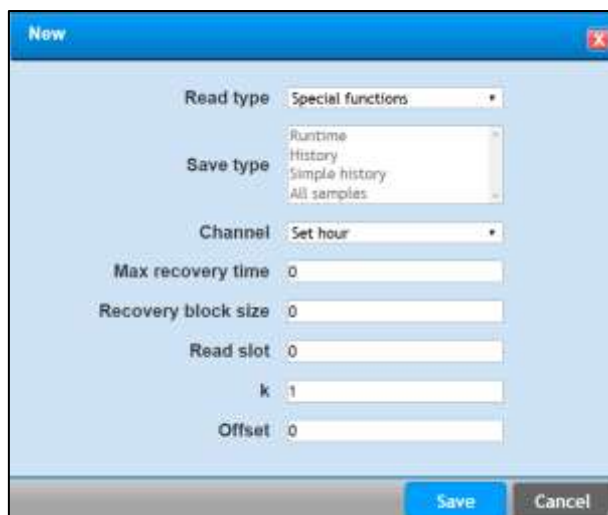
Click “**Select**”, next to “**Device**” to open a menu with the tree-like structure of the plant, select the desired modules and fill in the fields with their specific parameters:

Cycles before suspension: 10

Skipped Cycles: 0

Immediate attempts: 1 by default

Click “Create New” to open a mask like the one here below.



Select first “Kind of reading”, from the dropdown menu and then “Special features”. Set the synch time in the “Channel” field.

Fill in the remaining fields as follows:

Days to recover: 0



Days for recover: 0

Slots to read: 0

K: by default set on 1 since a different value would change the reading, multiplying the values.

Offset: 0 by default

Click Save to save the setting or Cancel. This configuration will appear as a new line in the menu.

Click now on this  button to activate the polling or  to immediately activate the polling without waiting 00.40 of the next Monday.

2.2.3 X-Meter’s totalizers Polling configuration (*optional*)

This function makes the Server recreate the load curve chart with the aid of the readings from X-Meters’ on board totalizers.

This is useful for readings from Energy Team’s as well as other manufacturers’ devices that do not have built-in memory.

This function makes it possible to regularly read the on board totalizer and calculate the Average Power between readings. This will allow recreating the load curve while keeping the instrument’s precision class.

Set this polling as follows:

Kind of polling: “Scheduled priority”.

Cycle time: by default set on 30000. Leave it this way.

Name: insert the name that will appear on the main menu.

Note: to insert notes.

Scheduling: “0 0/15 * * * ?” scheduling. This expression means that the operation will be made exactly every quarter of an hour.

See here below an example showing the final setting of an X-Meter with 2 reading totalizers.

Edit

Device

Consumi Elettrici Energy Team -> Laboratorio MT -> MidTech-Ambientale

Close

Cycles before suspension

10

Skipped cycles

10









Immediate attempts

3

Operations

Create multiple

Create new

rid	Save type	Read type	Max recovery time	Recovery block size	Channel	Read slot	k	Offset	
1048576	History;	History	20	2	Tensione L1-N MidTech-Ambientale	1	1	0	 
1048577	History;	History	20	2	Tensione L2-N MidTech-Ambientale	1	1	0	 
1048578	History;	History	20	2	Tensione L3-N MidTech-Ambientale	1	1	0	 
1048579	History;	History	20	2	Tensione L1-L2	1	1	0	 

Save

Cancel

NOTE:

If after configuring a Polling you wish to add some other channel of an existing device, you'd need to add by hand the operation of the new channel in the various Pollings. To avoid all problems that might come from a wrong configuration of the module, it is advisable to remove from the "Device Configuration" menu, all existing operations on that device in all pollings, repeat then all operations in this chapter.

2.3 NG9 Polling configuration

Create (if not existing yet), two Pollings. Click “New” and configure as follows:

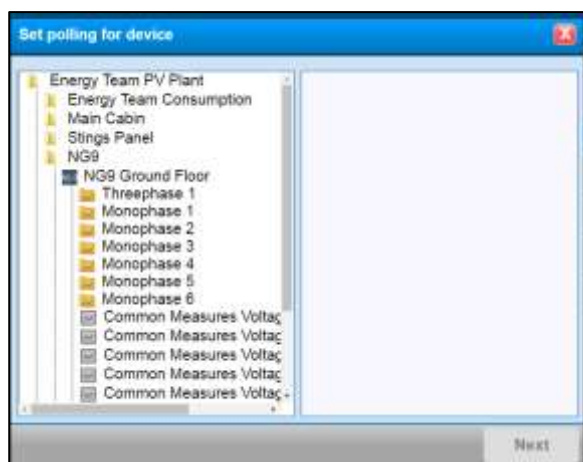
- **NG-9 – Online:** all activities within this polling are for real time data readings. It will have to be set as “Normal” with a cycle time of 30 seconds. The name you find pre-set is optional.
- **NG-9 – Totalizers:** to read the on-board totalizers at exactly every 15 minutes. This polling is for historical data “reconstruction” from the NG-9 on board totalizers. This polling has to be the “Scheduled priority” kind with a 0 0/15 * * * ? scheduling time. This expression means that the operation will be made with high priority exactly every quarter of an hour.

Once the pollings are created, a mask like the one here below will appear:



	Polling id	Cycle time [ms]	Polling type	Name	Status	Scheduling	
	11	30000	Normal	Energy Team - On-Line	Enabled		
	12	30000	Cron	X-Meter - Clock	Enabled	0 40 0 ? * MON	
	13	30000	Cron	X-Meter - Historic	Enabled	0 5/15 * * * ?	
	14	30000	Cron	X-Meter - Totalizer	Enabled	0 5/15 * * * ?	

Click now on “Set polling per device”




Note: users can select devices of the same kind so, if the first one selected is an NG-9, the system will only let them pick other NG-9's.

Click Next, select the correct pollings and then Save.



The aim of this “Semi-Automatic” configuration is to automatically create operations for all channels of every NG-9 previously configured and pair it with pollings operations. This operation allows even less experienced users to easily configure the module.



Click  to restart all pollings and activate the communication to the devices (deactivate in case of cycle time set on 0).

NOTE:

If after configuring a Polling you wish to add some other channel of an existing device, you’d need to add by hand the operation of the new channel in the various Pollings. To avoid all problems that might come from a wrong configuration of the module, it is advisable to remove from the “Device Configuration” menu, all existing operations on that device in all pollings, repeat then all operations in this chapter.

2.4 CM2-Solar, Easy 4 Hall GSL-IT-DA Solar meter Polling Configuration

Create (if not existing yet), two Pollings. Click “New” and configure as follows:

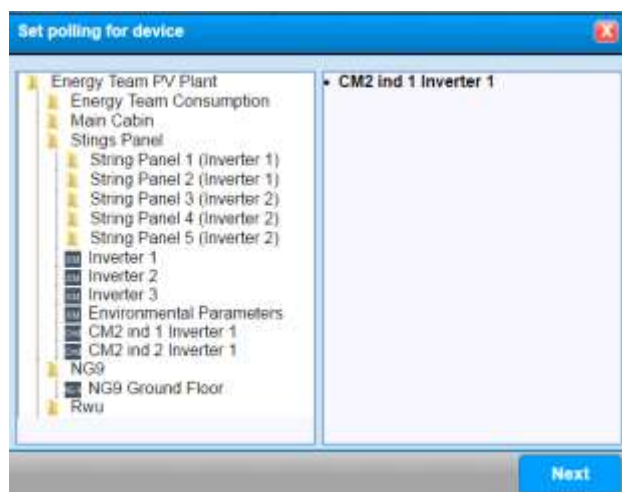
- **Energy Team – Online:** all activities within this polling are for real time data readings. It will have to be set as “Normal” with a cycle time of 30 seconds. The name you find pre-set is optional. The historical data will be an average value of all sample readings within the quarter of an hour.

Once the pollings are created, a mask like the one here below will appear:



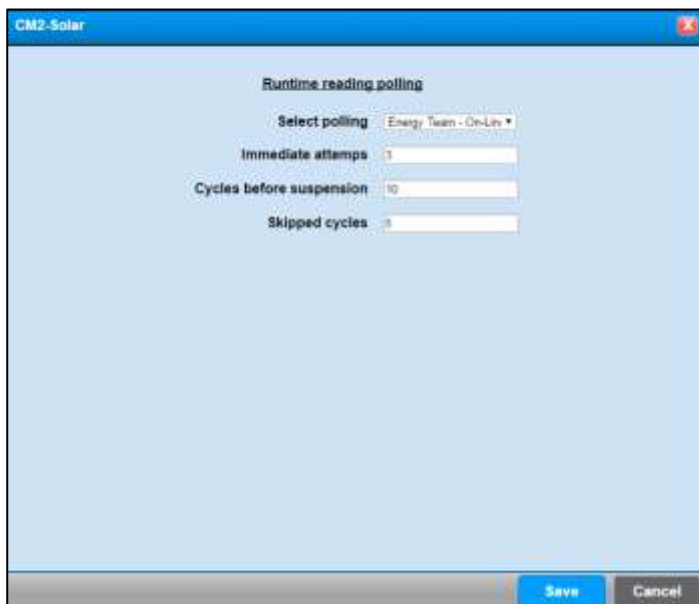
	Polling id	Cycle time [ms]	Polling type	Name	Status	Scheduling	
	11	30000	Normal	Energy Team - On-Line	Enabled		
	12	30000	Cron	X-Meter - Clock	Enabled	0 40 0 ? * MON	
	13	30000	Cron	X-Meter - Historic	Enabled	0 5/15 * * * 7	
	14	30000	Cron	X-Meter - Totalizer	Enabled	0 5/15 * * * 7	

Click now on “Configure polling per device”




Note: users can select devices of the same kind so, after the first one (CM2 or other) is selected, the system will only let them pick other devices of the same kind and no different ones.

Click Next, select the correct pollings and then Save.



The aim of this “Semi-Automatic” configuration is to automatically create operations for all channels of every NG-9 previously configured and pair it with pollings operations. This operation allows even less experienced users to easily configure the module.



Click  to restart all pollings and activate the communication to the devices (deactivate in case of cycle time set on 0).

NOTE:

If after configuring a Polling you wish to add some other channel of an existing device, you’d need to add by hand the operation of the new channel in the various Pollings. To avoid all problems that might come from a wrong configuration of the module, it is advisable to remove from the “Device Configuration” menu, all existing operations on that device in all pollings, repeat then all operations in this chapter.

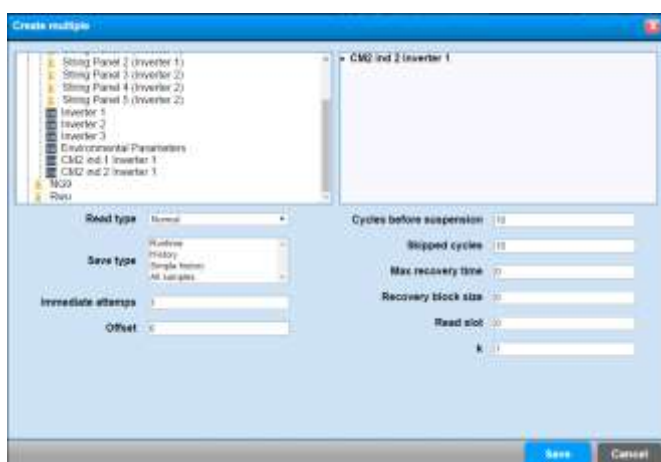
The polling is now fully configured.

For further information contact Energy Team technical department (+39 0248405033)

Click  to associate **CM2-Solar** devices.

A menu will appear that will allow associating more devices creating a “Multiple” for each one of them; this will speed up the process of inserting all the devices’ configured channels.

Click “**Create Multiple**” and fill in the mask that will open:



Select the channel, from the tree-like structure in the box on the left hand side. Double click on the CM2 devices you wish to be part of the Polling.

Fill in the fields as follows:

Kind of polling: select “Scheduled” for historical data and virtual archives readings.

Cycle time: by default set on 30000. Leave it this way.


Name: insert the name that will appear on the main menu.

Note: to insert notes.

Scheduling: “0-5/15 * * * ?” leave it this way. This means that the reading of the X-Meter’s historical data will be made every fifth minutes of every quarter of an hour.

Click Save to save the setting.

Follow the same path as before:

Click on this  button to associate X-Meter’s devices.

In the menu that will open there is the chance to associate X-Meter modules creating “Multiples” of each one of them to quicken the insertion of all its active channels.

Click on “Create multiple” to open the submenu like the previous one, select the desired modules and fill in the fields with their specific parameters:

Kind of Reading: Normal

Kind of Writing: Real-Time + Simple Historical

Immediate attempt: 1 by default

Cycles before suspension: 10 by default

Skipped Cycles: 10 by default

Days to recover: 0 (it determines historic data reading, do not set different from 0 as the device does not store data).



Days for recover: 0 by default (it determines, how many days to recover per each cycle, do not set different from 0 as the device does not store data).

Slots to read: 0 (do not set different from 0 as the device does not store data).

K: by default set on 1 since a different value would change the reading, multiplying the values.

Offset: 0 by default

Click Save to save the setting or Cancel.

Click now on this  button to activate the polling or  to immediately activate the polling without waiting for any cycle (in this case there is no difference)

NOTE:

If after configuring a Polling you wish to add some other channel of an existing device, you'd need to add by hand the operation of the new channel in the various Pollings. The Polling will not be automatically updated.

2.5 Multi ES – RWU Polling Configuration

3 ALARM CONFIGURATION

Alarm management is indispensable to keep an eye on Energy consumption/production to quickly intervene in case of anomalies that would otherwise be missed during ordinary maintenance.

Alarms can be “Real Time” or “Historical”. The first ones use “Real Time” data read by the system and the control “Task” happens every 30 seconds. “Historical” alarms use historical data controlling once a day (usually at 00:30).

Each alarm’s event can be filed in a “LOG DB” (Historical Database) or managed via SMS or e-mail. For the management via SMS it is necessary to purchase and connect a modem to your PCBOX/Server; SMS will be sent using the users’ own sim card (it is necessary to remove the PIN number).

For the e-mail sending management, the Server will have to contact via LAN network, a SMTP server that has to be configured by a Systems Engineer; it might require login ID and Password other than SMTP server’s IP address. See “[system configuration](#)” for further information on SMTP server configuration.

Select “Alarm Configuration” from the “Management” menu to set a new alarm.

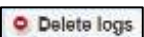
Click “New Alarm” to create a new one

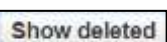


ID	Name	Severity	Type	Subtype	Log DB	Log SMS	Log Email	
12	Communication Error	Error	Real time	Communication error	Exit only	Disabled	Disabled	
17	Communication Threshold Error	Error	Real time	Communication threshold error	Exit only	Disabled	Disabled	
16	Relative Threshold	Error	Real time	Relative threshold	Exit and return	Disabled	Disabled	
13	System Error	Error	Historical data	System log	Exit only	Disabled	Disabled	
14	Threshold Error	Error	Real time	General threshold error	Exit and return	Disabled	Disabled	

The following buttons will let you:

- Edit an alarm previously configured.
- Delete an alarm previously configured.
- Delete only a specific alarm’s LOG from the database. Before deleting, the server will ask for a beginning and end date; after the confirmation, the system will then delete all the alarm’s LOGs within said period.

Click  to delete all alarms’ LOGs. Select a period’s beginning and end dates within which the server will “clean” all logs. Please note that the system will automatically erase all logs older than 6 months.

Click  to view all alarms previously configured and then deleted from the system.

It is NOT possible to definitively erase data from the system since there will always be a “trace” left by the user when modifying a certain alarm.

When clicking on the button all previously deleted alarm will appear.



The screenshot shows the 'Alarm configuration' page in the EnergyTeam software. It features a table with columns: Id, Name, Severity, Type, Subtype, Log DB, Log SMS, Log Email, and a set of icons for editing and deleting. The table lists four configured alarms:

Id	Name	Severity	Type	Subtype	Log DB	Log SMS	Log Email
12	Communication Error	Error	Real time	Communication error	Exit only	Disabled	Disabled
17	Communication Threshold Error	Error	Real time	Communication threshold error	Exit only	Disabled	Disabled
18	Generic contact error	Error	Real time	Generic contact error	Exit only	Disabled	Disabled
15	Relative Threshold	Error	Real time	Relative threshold	Exit and return	Disabled	Disabled

See here below all kinds of alarms that can be configured:

Real time alarms	Historical data alarms
Communication Error	System Log
Generic contact Error	Free Space
Generic threshold Error	Strings Comparison (for PV plants)
Mobile threshold Error	PHV Efficiency (for PV plants)
Relative thresholds	Sites Import ETL (for PV plants)
Generic Comparison	
Communication Error with threshold	
Status change Log	
Connection status	
Strings Comparison (for PV plants)	
Inverter - Start (for PV plants)	
Panels Temperature (for PV plants)	
Inverter - Error (for PV plants)	
Inverter - Power (for PV plants)	

3.1 Communication Error

This alarm allows the user to monitor all devices' actual communication. The server contacts all peripheral devices previously configured in the [polling](#) and, should any device not respond, they'll be "suspended" and notified as "NOT communicating". The alarm will be activated only after the polling's skipped cycles (see polling configuration). When configuring an alarm, it is possible to "ignore" some devices, suspending them from the polling's cyclic interrogation. This setting is particularly suitable for all those devices that are switched off at night (and therefore send a communication error). In this case, it is necessary to manage the right communication with the [error communication with threshold](#) alarm. This alarm can be set only for the entire plant.

Click **New alarm**. Insert "Real time" in the **Type** field and "Communication error" as **Subtype**. Fill now the following fields:

- **Name:** insert the name you wish to give the new alarm.
- **Note:** to insert eventual notes or a short description.
- **Gravity:** this setting is for managing the alarms "gravity". It is only useful if the Web Server works as central data collection system. The data sending to the central system is usually scheduled each

hour and it can be modified based on the alarm's gravity up to not waiting the usual hourly schedule for particularly grave alarms. Select, from the dropdown menu, the gravity level of the alarms that managed alarms.


- **Info:** is a low gravity alarm.
 - **Error:** all alarms are considered as Errors. This alarm is graver than the "Info" one.
 - **Warn:** all alarms are considered as Warnings. This alarm is graver than the "Error" one.
 - **Critical:** all alarms are considered as Critical. This alarm is graver than the "Warn" one.
 - **Fatal:** all alarms are considered as Fatal Errors. This alarm is graver than the "Critical " one and is the gravest of all.
- **DB Log:** tick this box to file the alarm in the right Database; select "Historical alarms" from the "Historical Data" menu.
- **Log SMS:** tick this box to receive a text when the alarm is activated. The following fields will show:
 - **Numbers:** insert the mobile numbers you wish to send the text to. To insert more than one number, separate them with commas.
 - **Text:** insert the text for the SMS (151 characters max).
 - **Maximum SMS's per day:** select a number from the dropdown menu.
- **Log Email:** tick this box to receive an email when the alarm is activated. The following fields will show:
 - **To:** insert the email address(es) you wish to send the email to. To insert more than one address, separate them with commas.
 - **Cc:** insert any address you wish to Cc to the email.
 - **Bcc:** insert any address you wish to Bcc to the email.
- **Language:** select a language among the available ones.

Ignored Devices: this function allows selecting eventual devices you wish to exclude from the alarm; this way, eventual apparent anomalies will not be taken into account.

Once finished with the setting, click **Save** or **Cancel** to exit without saving.

3.2 Threshold communication error

This alarm allows to check the real communication of devices which are typically switched off at night. This kind of devices are usually in PV plants and they go into communication error. This alarm allows to define a condition when it exists, the system checks the right communication towards all the listed configured devices. Below, we list only the new displayed fields:



Selected equipment: click **Add/edit** to select the device with the desired channels.

Threshold type: select the most suitable threshold: "Less than" or "Greater than".

Threshold: put the numeric value assigned to the threshold according to the measured quantity.

Channel: by pressing **Add/edit** button, select the channel which "actives" the inspection, from the chosen device.

In the example above, it has been configured the communication control of Inverter n° 1, n° 2 and n° 3, only when the irradiation threshold exceeds 50 W/mq (if there's light, the plant must work and as a consequence, the communication should exist, because the inverter is switched-on).

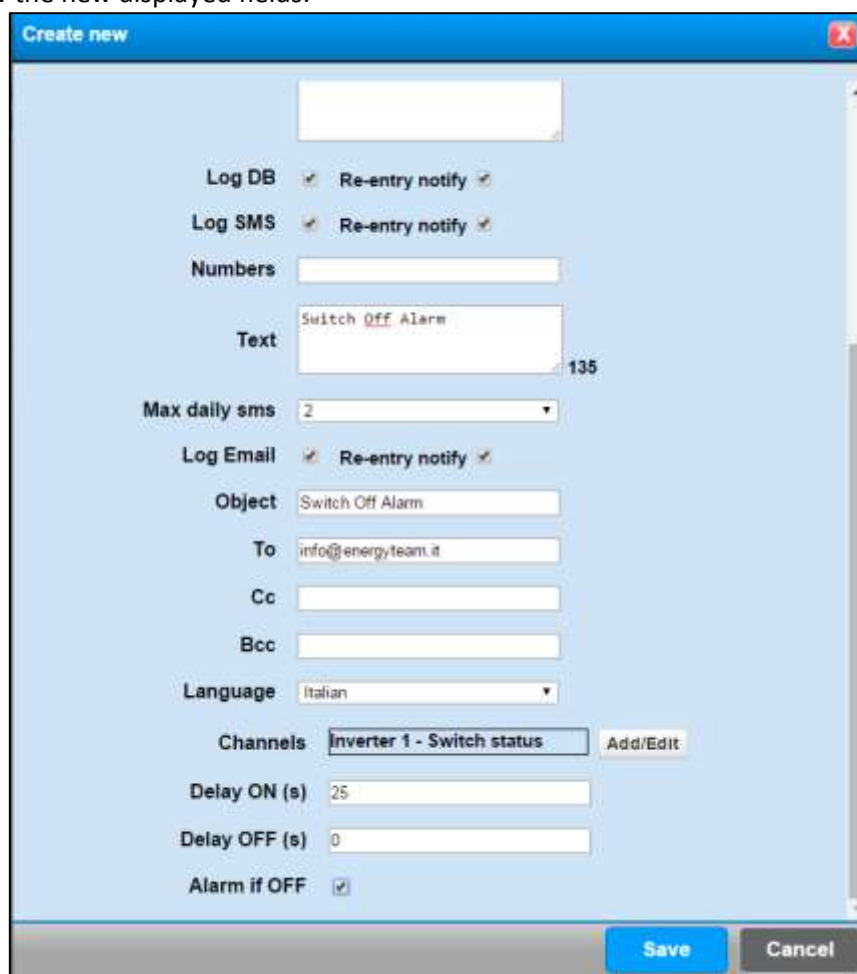
3.3 Generic contact error

This alarm warns the user in case of status changing, i.e. the contact of a switch status or the device alarm status.

Click on the button **New alarm**. From the above mentioned menu, put the voice “Real Time” in the field **Type** and select “Generic Contact Error” in **Subtype**.

Log DB, Log SMS and Log Email are the same ones of the previous paragraph, but in this case the user can be warned also when the alarm condition is over.

Please find below the new displayed fields:



Channels: By pressing **Add/edit** you can select the desired contact of the panel in which you need to monitor the status, from the tree structure of the plant, for example, in this case it can be a switch status. It's possible to use mathematical modules (for example logics management in OR or in AND), and to put more than a channel. In this case the system will make the logic in OR.

Delay ON (s): If the checked channel is in alarm for the set period, the Server will inform user about this breakdown, and the same one will be recorded in LOG Database.

Delay OFF (s): It allows to configure the minimum time needed beyond which you can go out from the alarm condition.

OFF in alarm: It's considered as an alarm status if the system reads “OFF” status (as for example the status of a switch). By unselecting it, the system reads “ON” as alarm status.

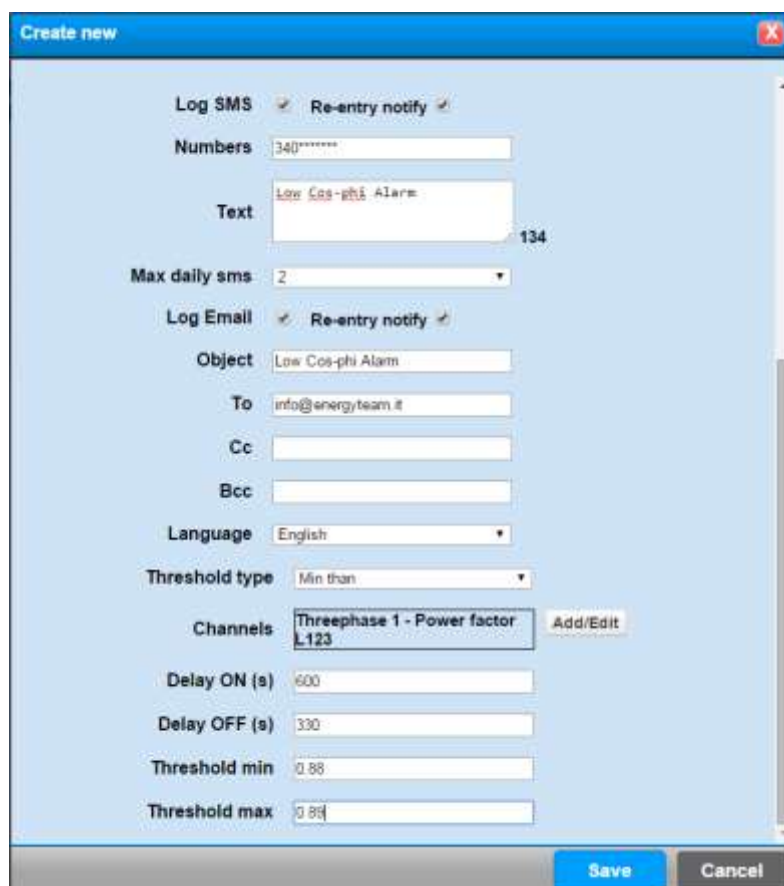
After the setup, press the button **Save** to store all the parameters or **Cancel** to go out without saving it.

3.4 Generic Threshold Error

This alarm warns the user if one or more channels exceed a set threshold value. For example the system can check if there's a low Cos-phi value, or if the instantaneous consumption of a certain user is over the threshold or out of the range values.

Click on the button **New alarm** to set up a new alarm. From the above mentioned menu, put "Real Time" under the field **Type** and select "Generic Threshold Error" in **Subtype**.

All the fields which appear in the menu are the same ones of the previous one; for any kind of explanation please refer to these sub-paragraphs. Here below the new fields:



Channels: the button **Add/edit** allows to display the tree structure of the plant and to select the channel/s we want to check.

Threshold Type: From the dropdown menu you can select one of the following different types:

- Greater than: the alarm starts if the instantaneous measure of one or more selected channels is greater than the value set in the field **max. threshold**. The alarm stops if the measured instantaneous value is lower than the set value in the field **min. Threshold**.
- Lower than: the alarm starts if the instantaneous measurement of one or more selected channels is lower than the set value in the field **min. Threshold**. The alarm stops if the measured instantaneous value exceeds the value set in the field **max. Threshold**.
- Internal Band: the alarm starts if the instantaneous measurement of the selected channel/s is between **min.** and **max. Threshold** values. The alarm stops if the measurement is NOT between these thresholds.
- External Bands: the alarm starts if the instantaneous measurement of the selected channel/s is NOT between **min.** and **max. Threshold** values. The alarm stops if the measurement is between these thresholds

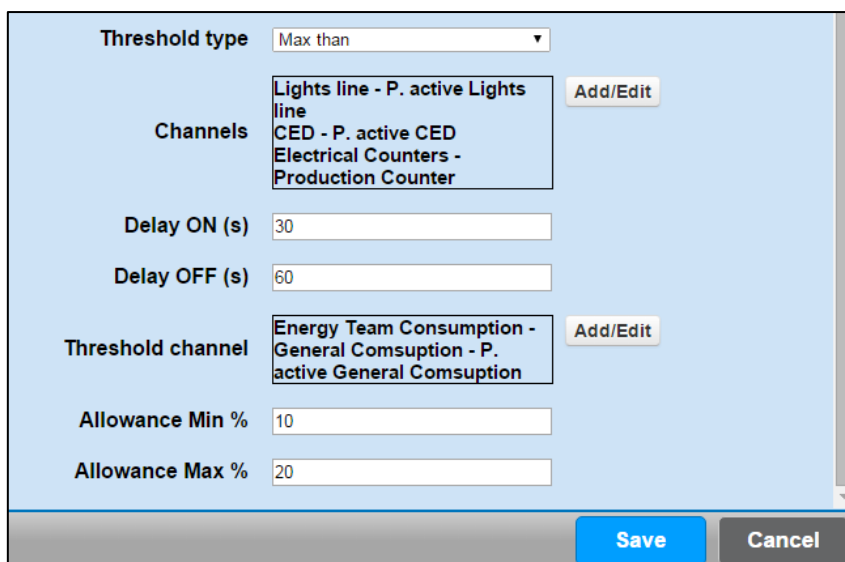
If you select more channels, the alarm will start when one of these measurements is in alarm (in OR logic). The alarm will stop only if all measurements are in “stopped alarm”. In this case, the SMS will show the text that will be written in the appropriate field, while the E-mail will show also which channel went wrong.

Delays: For the real input/output in an alarm status, the condition of anomaly must persist for all the set time expressed in seconds. Anyway, the setting:

- Delay ON: sets the minimum time necessary to consider the measurement in an alarm status
- Delay OFF: sets the minimum time necessary to consider the measurement in a state of stopped alarm (Status of “Normal Functioning”)

3.5 Mobile threshold error

This alarm is like [“General Threshold Error”](#) of the previous paragraph, however the threshold is NOT a fix value anymore, but it is a mobile value set in a profile.



The fields “Min% Tolerance” and “Max. %” represent “**Min. and Max. Threshold**” values. For example: the profile value corresponds to 100. If we set *Min. Tolerance* of 10% equal to 10%, it means that the minimum threshold value is 90 (100-10%). If we set *Max. tolerance* at 20%, it means that the max. threshold value will be 120 (100+20%).

All the other fields will have got the same function of the previous alarm.

3.6 Relative Thresholds

Relative thresholds alarm has got the purpose to check that the absolute value of channels algebraic sum doesn't exceed or isn't less than a set threshold value.



Name	k
General Consumption - P. active General Consumption	1
Lights line - P. active Lights line	1

Threshold type: Max than

Threshold: 50000

Delay ON (s): 0

Delay OFF (s): 0

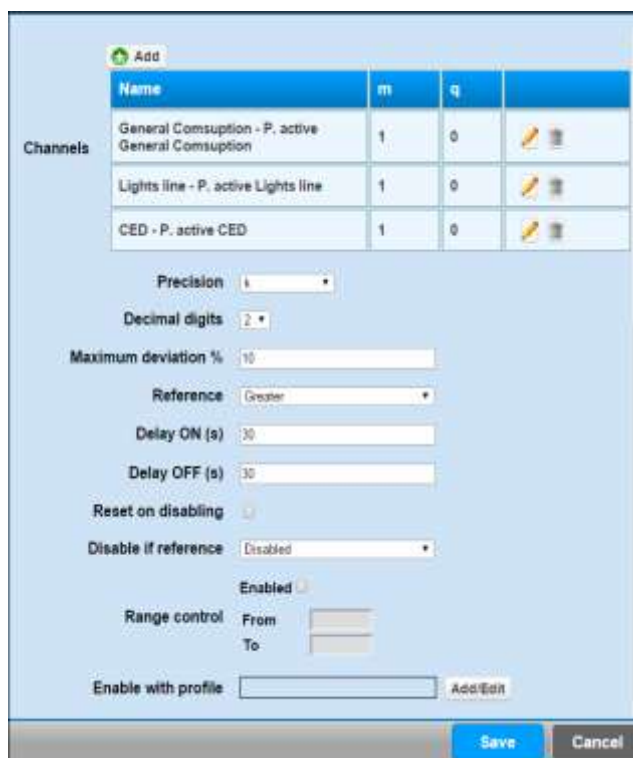
This example, shows the algebraic sum absolute value, (Active power channel X-meter Master – Active power channel X-meter Air, does not exceed the threshold value of 50000).







If the result of this algebraic sum turns to be a negative number, for example -80000, this alarm will start anyway, since the one verified is the absolute value.

3.7 General Comparison

This alarm allows to compare the instantaneous measurements of different channels and to check if they match each other. Imagine to have three co-generators and to check if the production of 3 co-generators would be more or less the same. In case a co-generator produce, for example 15% less than the other ones, the system inform us about this condition.

Click on the button **New Alarm** to set up a new alarm. Put in the field **Type** the voice “Real Time” and in **Subtype** select “general comparison”. All the fields which appear in the menu are the same ones of the previous ones; for any kind of explanation please refer to these sub-paragraphs. Here below, the new fields:



Name	m	q	
General Consumption - P. active General Consumption	1	0	 
Lights line - P. active Lights line	1	0	 
CED - P. active CED	1	0	 

Precision:

Decimal digits:

Maximum deviation %:

Reference:

Delay ON (s):

Delay OFF (s):

Reset on disabling: ☐

Disable if reference:

Enabled: ☒

Range control: From To

Enable with profile:

- **Channels:** if you press the button add, it's possible to configure all the channels that we want to compare. The usual parameters “m” and “q” represent multiplying factor and an offset which has to be applied on a measured record.
- **Precision and decimal numbers:** In the alarm displaying (example in the e-mail), it's possible to set decimal accuracy of the record.
- **Maximum Gap:** All the channels with a different value (in this case of 10%, than the reference value) are considered in alarm.
- **Reference:** from the drop down menu it's possible to select “smaller, bigger or medium”. The referred value will be the smallest or the bigger one, on the other hand the system will make the average of all the measured values.
- **ON and OFF delay:** It is expressed in seconds and it represents the minimum time necessary to consider measurement whether in alarm condition or not.

- **Reset on disabling:** if the alarm check would be temporarily disabled (see below), the system can reset alarm status of eventual channels. For example, if one of the 3 channels failed, the user decides if, following to the check disabling, there can be an alarm status or not. As a consequence, during the check rehabilitation, if the channel is in alarm, the user won't receive any kind of notification, on the contrary, it will receive it.
- **Disable if reference:** From the drop down menu you can select:
 - o **Higher than:** If the reference value is higher than the set threshold value, the inspection will be "suspended/disabled"
 - o **Less than:** If the reference value is less than the set threshold value, the inspection will be "suspended/disabled"
 - o **Internal band:** If the reference value is between the 2 set threshold values, the inspection will be "suspended/disabled"
 - o **External band:** If the reference value is NOT between the 2 set threshold values, the inspection will be "suspended/disabled"
- **Range control:** you can enable the control within the desired range of time.
- **Enable with profile:** you can enable or disable the check through a channel or a profile. The profile will have to include 2 values, "0" (check disabled) or "1" (check enabled).
You can enable or disable the alarm by reading the status of a digital input, for example a switch manually operated, that enables/disables a check.

3.8 Log Status Edit

This function allows tracking all the status changes made by a switch status or by an Inverter functioning status. In this case you can't be informed by e-mail or by SMS, in fact the status change is pointed out in the history of alarms.

Press the button **"New Alarm"** to configure a new alarm. From the above mentioned menu, put in the field **Type** the voice "Real Time" and please select "Log edit status" in the voice **Subtype**. The fields displayed are the same as the ones already described. It's possible to select them as a channel of the contacts ON/OFF connected to the device or as channels which identify a status by pressing **Add/Change** button.

3.9 Connection status

This alarm aims to monitor how ADSL line is working. You can get this goal by making a "ping" towards an IP address or a Name (example www.google.it). If the ping doesn't reply, the alarm sounds. Please find below only the new displayed fields:

Language: Select the language for warning, among the ones available in the Server.

Control Frequency (min): select how often you have to send a ping towards the desired host.

Address: Put URL or IP web site address

Port: Put the port number

Activation delay (min): put the number of minutes beyond which the alarm intervenes when there is a lack of connection.

Disabling delay (min): put the number of minutes beyond which the alarm intervenes if the connection disabling shouldn't work.

Max number of notifications per day: Put the max number of warnings displayed during a day where the alarm is repeated.

N.B.: This alarm notification should be made by SMS, because if there's not ADSL line, the system won't be able to send E-mail. Anyway, these ones will be sent when ADSL line will be restored.

3.10 Strings Comparison – Real Time (for PV plants)

Strings control it's important in a PV plant. The system checks all the strings of a plant/subfield, and it takes as reference the most productive one. All the strings that produce a current lower than a certain configurable threshold value, will be notified to the user as error string.

The alarm configuration is simple, because it's related to the previous one which have been configured during [PV Plants Configuration](#). You should simply click on "new alarm" and you have to put the voice "Real Time" under the field **Type**, and you have to select "Strings comparison" under **Subtype** field.



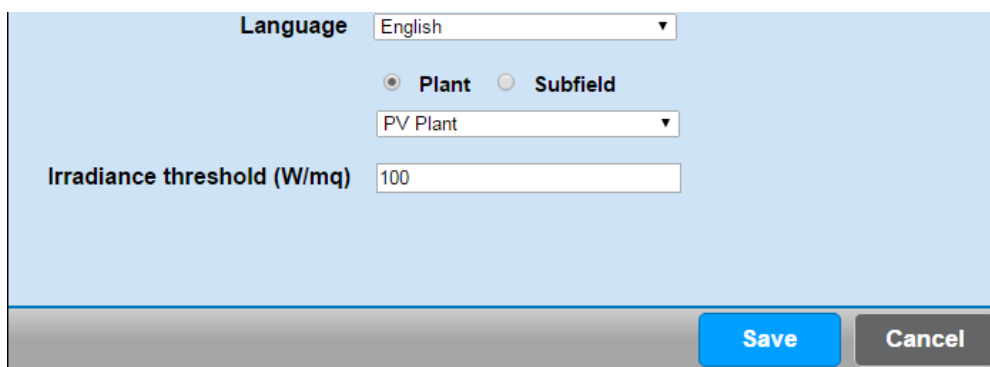
As you can see from the configuration form, the system checks the plant or the subfield and from the drop down menu, you can select only the plants or the subfields previously configured.

So you can configure the following parameters:

- **Maximum gap%:** represents the referred threshold value. For example if in a plant/subfield the more performing string measures 6 A, the threshold value below which the string would be in error will correspond to 3 A.
- **Minimum delay:** the strings must be in error for at least this delay, expressed in minutes, which has to be in declared / notified to the user.
- **Minimum value:** the most performing string of the plant/subfield must exceed this threshold value, to enable control. If this condition occurs, the check will be done, if the most performing string is under this value, the check will be disabled. .
- **Control range:** It's possible to put a range of time where enabling the control. You should not check the plant during the maximum sun exposure hours.
- **Check per Inverter:** The subfield has got normally one exposure and the type of panel is the same one over all the subfield, therefore you don't need to make this control. Sometimes this condition is not true in particular plants and it could be useful comparing the strings connected to the same inverter.
- **Ignored Strings:** from the error notifications, it's possible to ignore some strings, and for each string you can put an "exclusion" hour from the check. This function is useful for those strings which go regularly into a shadow zone in a certain time band.

3.11 Starting Inverter (for PV Plants)

This alarm warns the user if the inverter has got problems during the switch on. The configuration of this alarm is simple because it's related to the "Connection status" channel of the logic inverter configured in the PV Plant. Click on "New Alarm" and put in the field **Type** the voice "Real Time" and in select "Inverter Start" from the usual menu in the field **Subtype**

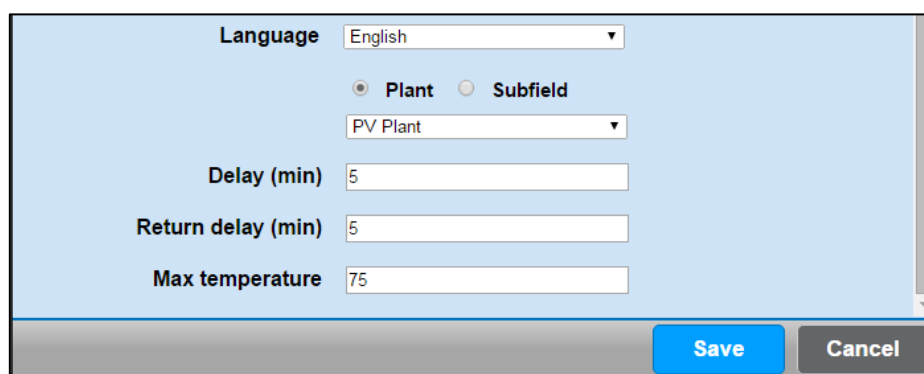


You have to set only the plant or the subtype to be monitored and the minimum radiation threshold beyond which you have to check if the inverter is connected to the network.

The radiation channel and the contact which identifies the inverter connection status must be configured in the "logic" inverter of PV plant.

3.12 Panels temperature (for PV Plants)

This alarm checks the temperature of the panel. This configuration is simple too because it's related to PV Plant configuration. You simply have to click on "new alarm" and you have to put the voice "Real Time" in the field **Type** and in **Subtype** you have to select "panels temperature", from the usual menu.

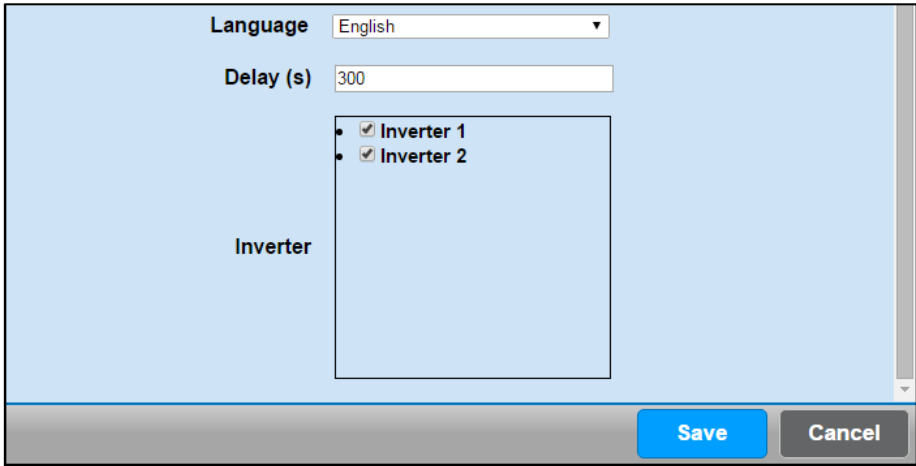


You have to set only the plant or the subtype to be monitored, the delay expressed in minutes beyond which you have to report the fault status and the alarm temperature.

The temperature channel must be set in the "logic" panel of [PV Plant](#). It is normally configured the internal temperature sensor of [CM2 Solar](#) module or of [Easy 4 hall](#) module. In this case the temperature limit permitted by Energy Team is 75°C, beyond which the module can be permanently damaged.

3.13 Inverter Error (for PV Plants)

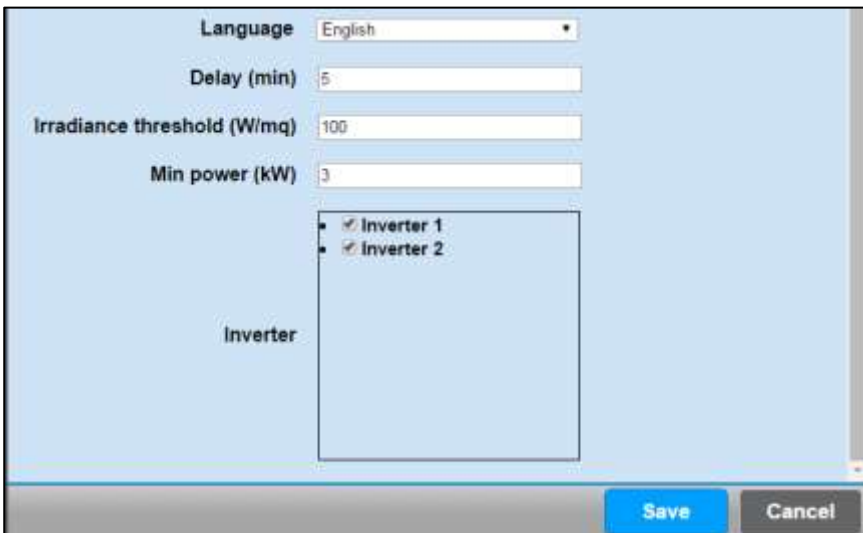
This alarm warns the user if an inverter fails. This configuration is simple because it is related to “errors” channel of the logic inverter configured in [PV Plants](#). Press the button “new alarm”, put the voice “Real time” in the field **Type** and select “Inverter Error” from the usual menu in the field **Subtype**



We will have to set up also the inverter to be monitored. The system suggests all the inverter set up in the different plant facilities.

3.14 Inverter power (for PV Plants)

With this alarm you can check if there’s a minimum electric production of the inverter in case of radiation. This configuration is simple too because is related to the PV plant layout. You’ll have to click on “New Alarm” and put the voice “Real time” in the field **Type** and you have to select “Inverter Power” in the field **Subtype** from the usual menu.



In addition you have to set up the following parameters:

- **Delay**: how long the inverter should stay in error to be considered “failing”.

- **Radiation Threshold:** when you measure a radiation value higher than the one which has been set up, the control is activated. In case of a lower radiation the control will stop.
- **Minimum power:** in kW, all the selected inverter, in case of minimum radiation, will have to produce at least the configured power.

If each inverter does not produce at least 3 kW with 100W/mq radiation, an error status will be notified.

3.15 System Log

This alarm warns you if there are some problems with the Server. The application sends notifications at system level according to the importance of problems, Warning, Error or Fatal; if you can't do backup, if some channels used by mathematical modules have been erased, or if a BUS communication queue is full and so on.

If there is any problem at system level, you can be warned about this, by entering the system to check the menu "System Log" and to understand if something is wrong. This kind of configuration is extremely easy: you have to click on the button **New Alarm**. You have to put the voice "Historical data" in the field **"Type"** and select "System Log" in the field **Subtype**.

All these fields are the same ones of the previous menu, so please refer to these sub-paragraphs for any kind of explanation or clarification you'd need.

The only field we have to fill in is **Gravity**. From this menu you can select 3 different options which represent alarm levels.

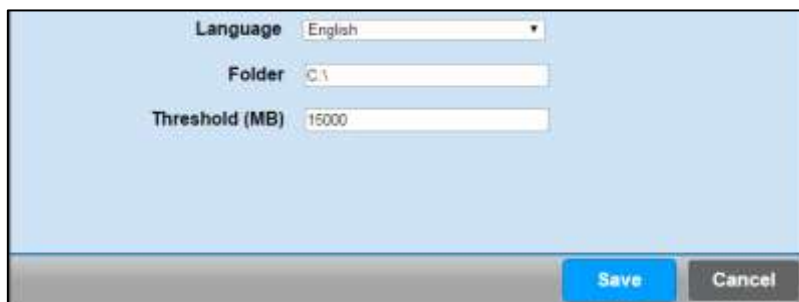
You can make the check once a day (at 00:30, default time) or for the best system management you should be informed when there are Warnings.

You can force the sending by selecting the option e-mail, in this way the system will send the e-mail to inform the user that the system is well working, even if there isn't any problem.

3.16 Free space

This alarm is particularly useful to understand if the free space on the hard disk is under a configurable threshold value.

Press the button **"New alarm"** to make the configuration. Put the voice "Historical data" in the field **Type** and in the field **Subtype** select the voice "Free Space".

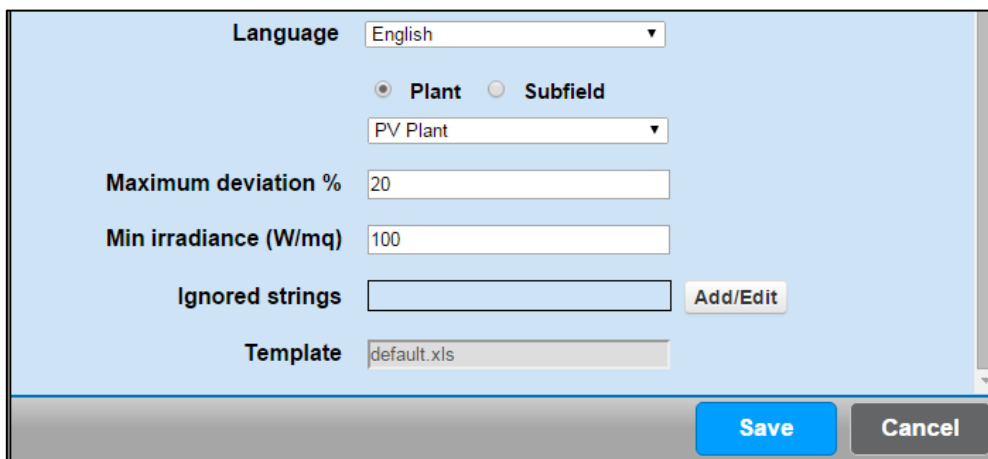


The configuration folder identifies the disk which has to be checked (the path depends on the operating system used in the Server).while the threshold identifies the space available on the Server.

3.17 Strings Comparison - Historical (for PV plants)

This alarm allows to compare the mathematical averages of all strings daily production values and to understand if the average of a string or more strings are different than the performing one of a percentage value.

Select the option “**New Alarm**” with a double click, put the voice “Historical” in the field **Type** and in the field **Subtype** select “strings comparison” from the usual menu



The user will have to configure:

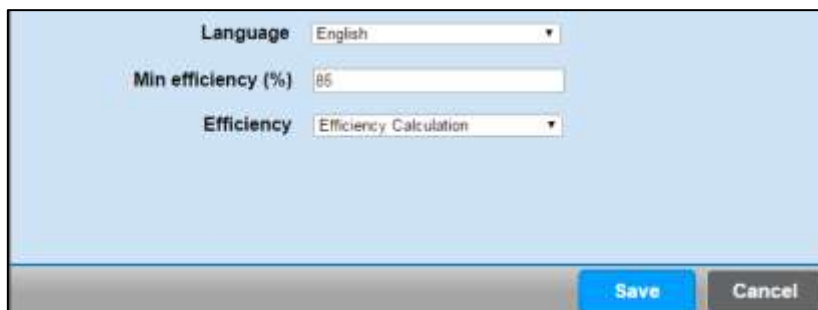
- **The plant or the sub-field** to be monitored
- **Maximum difference:** all the strings which usually produce a value under the one which has been set up (compared to the more performing string), will be considered errors.
- **Minimum radiation:** They will be considered only data production created beyond the radiation threshold which has been set.

You can also ignore eventual faulty strings.

We remind you that this kind of check will be made once a day, and during the e-mail sending, you can force daily sending, even when there's no failure.

3.18 PHV Efficiency (for PV Plants)

Double click “**New Alarm**” to start checking, put “historical” in the field **Type** and in the field **Subtype** select “PHV efficiency”.



The parameters to be set should be the following ones: minimum efficiency, below which the failure is signaled, and the efficiency calculation. In the drop down menu, there will be all the efficiencies configured by the menu “Efficiency calculation”.

You will have to set up the following parameters: minimum efficiency below which the failure is signaled and the Efficiency Calculation. In the drop down menu you'll see all the efficiencies configured from the menu "Efficiency Calculation"

NOTE: You can force a daily sending during E-mail forwarding. Then, it will be notified the efficiency value which has been calculated. If this one will be 0%, it means that during the previous day there were not minimum weather conditions to calculate efficiency. If the weather conditions were good it means that the solarimeters were damaged, in this case please contact our technical area.

3.19 ETL Sites import (for Sites Map System)

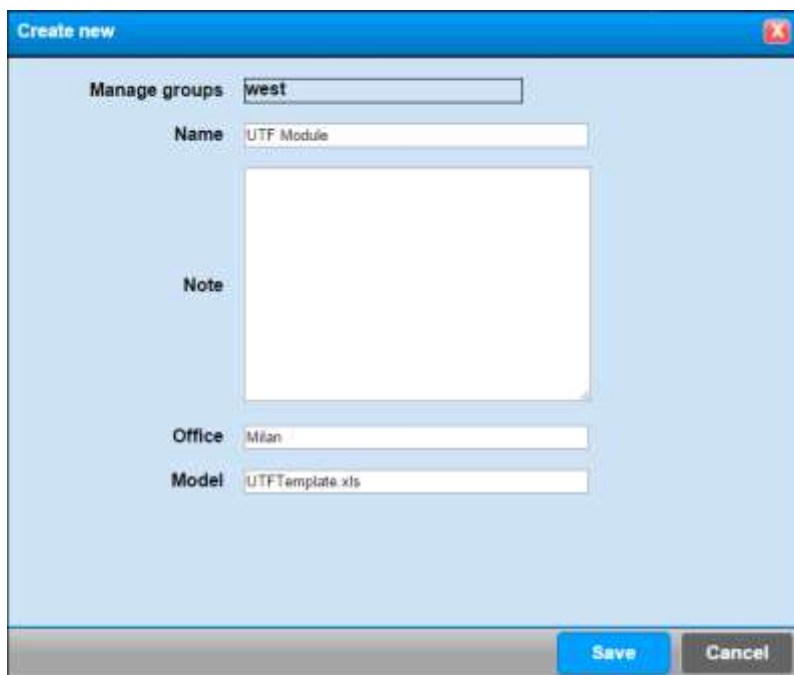
This system allows to receive the files containing alarms from different concentrators and to display "green" status on a map (no alarm for that site), or "red" (there are some alarms to be managed for that site). This alert informs the user about the right acquisitions of the alarms from some Servers.

More concentrators send the alarm file to the "Sites map" system, several times a day. If there's no sending, the central system understands that this site has not acquired any record. The customer is informed if any record hasn't been received, (referred always to the alarms) from the site "X".

4 UTF CONFIGURATION

The configuration of this menu allows to manage the modules which appear in “**Display UTF**” from the menu “Historical Data”. The compilation of this menu generates a sheet in excel divided into months and days, in which they will be calculated the counters shot values. This function is useful for UTF records compilation.


From the main toolbar click on the voice **Management** and select **UTF Configuration** by the drop down menu. Then push the button “**New**” and you’ll see the following screenshot:





Set up the “Name” which will be the same of the excel file, complete the eventual Note Box and put the country of the referred Customs Bureau. The Model suggested by the system is the name of the “Template” used by itself. After the fields compilation, click on “Save” to save the module on the Server. Then, you’ll see the following screenshot with our model already saved:



Module Id	Name	Office	Note	
0	UTF Module	Milan		  


The button  allows to edit the settings already given, thus it leads to the previous screenshot.

The button  allows to manage the register counters as it follows.

The button  allows to cancel the module (and the referred counters) from the system.

The system can point out who deleted the module, but you can’t cancel it definitively.

4.1 Management of the Register Counters

Press the button  to manage register counters that you are looking for. You'll see a new screenshot where there are the counters, if they've been already configured.



Name	K	Counter serial	Channel	Ranges	Max value	Decimals	Note	
UTF Counter	1230	967654321	Electrical Counters - Production Counter	Falce 123	1000000	3		 
ENEL Export	1230	1234567890	Electrical Counters - Issued Counter	Monofase	1000000	3		 

To add the first counter, click on the button **Create New**. You'll see a submenu easy to understand, with the following fields:

- **Name:** Put the name you want to associate to this record (company name/plant).
- **K:** it's the counter constant reading, put the K ratio. The Constant Reading is obtained by multiplying KTA for KTV.
- **Counter Serial number:** Put the serial number of the counter, which is indicated in Excel file.
- **Channel:** if you click on the button **Select channel** you have to associate the reference channel from the tree structure.
- **Notes:** Optional, available for eventual notes.
- **Bands:** Associate the counter to an available tariff band previously uploaded on the menu "**Bands Import**". If the counter has got a unique numerator and it doesn't consider the bands, select "Single Band", or select the same tariff band actually used by the fiscal counter.
- **Maximum Value:** Set up numerator units (in this case the restart will be managed automatically).

Example: if the numerator has got 6 numbers, at 999999 there will be a reset, and the value to be put in will be 1.000.000


- **Decimals:** Please say how many decimals are there after the comma.

Press the button **Save** to store settings. Repeat these operations to add other plants.

Once you create the new counters, you have to synchronize, at least for the first time, all the counters by introducing the actual reading of the concerned counter.

In the above example, there are 2 counters, and the file Excel shows the extraction order, so the 1st one will be the "**Production UTF counter**" and the 2nd one will be "**Enel Transfer**"

You can change at any time the extraction order by dragging the counter with the left button in a different position. So press the button "**Save order**" to give confirmation.

With the button  you can select the "Preset" reading start and you can synchronize the counter in the future, when you have to level the actual reading with the one declared by the system. By selecting the date of start about the eventual resynchronization, you will enter the menu which shows the numerators status, see the picture below:

Synchronize counter

Counter

UTF Counter

Channel

Electrical Counters - Production Counter

Select date

10-10-2015

Values currently present

Day	ef1	ef2	ef3	ef4	f1	f2	f3	f4

f1

2731.580

f2

587.759

f3

600.507

f4

0.00

Note

Save

Cancel

You can add new “Preset” beside each band putting the reading at midnight of the selected day. Anyway the system suggests the data which have been calculated by itself, so add the new readings and press the button “Save”. The system will set all the previous readings as “static” and it will recalculate data at each extraction starting from the date after the one which has been synchronized.

The Web-Server makes a “reconstruction” of the board totalizator according to the energy that is counted daily. They are allowed discrepancies between the real counter reading and the one declared.

5 SYSTEM CONFIGURATION

In this menu you can enable different functions that can be managed by the system, as for example, the accesses check, planning activities (report sending or profile control, simple configurations as the remote reading or SMTP server configuration). All these functions will be shown in the following pages:

5.1 Accesses Configuration (Permissions)

This function allows to configure some users ("Account") which can enter the system, establishing if the user is an administrator or simply a viewer.

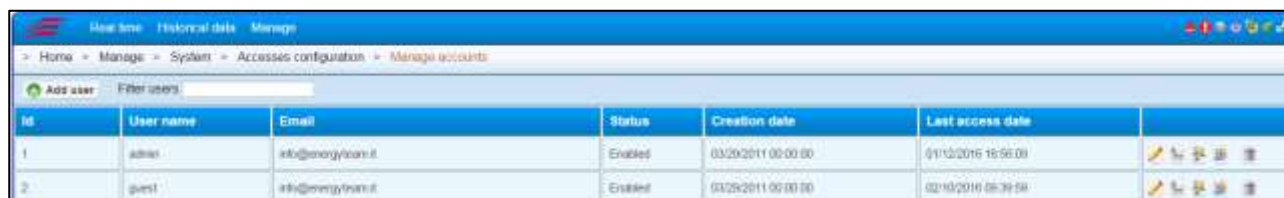
Please find below the process to create groups and permissions management:



- Create a User
- Assign to the User a menu group
- Create a management group and then associate a "root" node, defining " The top of the tree structure" which must be unique.
- For each management group the system always creates 5 default roles (with the name of that group): **Viewer; Manager; Installer; Configurator; Operator**. If a user has got all these roles is an "Administrator" of that group.
- Then, one or more roles must be assigned to the User. Now the configuration is done.

The programmer must guarantee the "tree" structure of that group, it should have just one tip.

5.1.1 Users management

This function allows to create new Users (“account”) for the access. To enter this menu, click on **Management** from the main toolbar; select **Accesses Configuration** from the drop down menu; finally select **Users Management**. You’ll see the following screenshot with the default users:



Id	User name	Email	Status	Creation date	Last access date	
1	admin	info@energyteam.it	Enabled	03/09/2011 00:00:00	01/10/2016 16:56:08	  
2	guest	info@energyteam.it	Enabled	03/09/2011 00:00:00	02/10/2016 06:39:58	  

Root: It is an “**Administrator User**” that is to say, “admin” user which is generally used by the service center of Energy Team to enter the system.

Admin: “Administrator”, has got the same privileges of the root.

Guest: he can only see all the tree structure.

Press the button **Add user** to add a new user enabled to enter the software through the main screen. From the displayed menu put the user name and his password, confirming it in the field below, finally his email shown in the screenshot. The email is not used currently in the system, it will be used during the next SW release for the recovery management password . At the end, press the button **Save** to store settings or **Cancel Entry** to go out from the menu without saving.

NOTE:

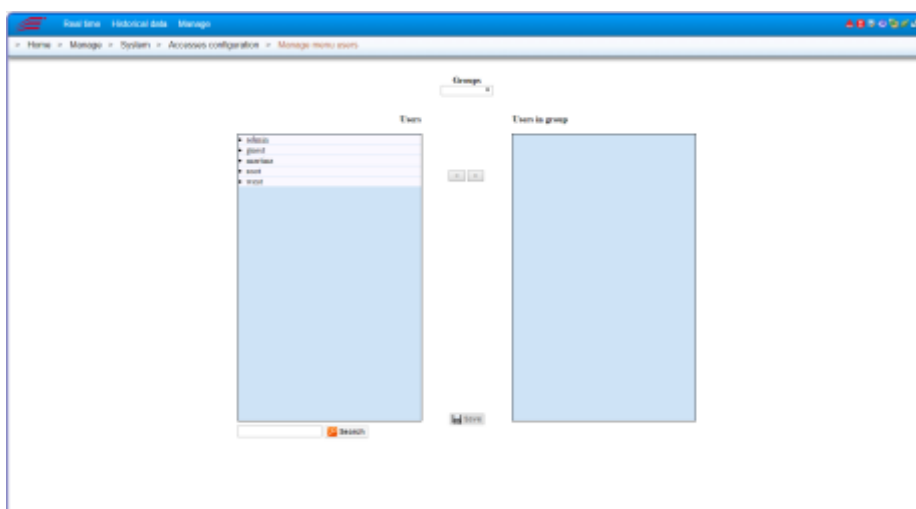
It’s possible to reset the password of a User by selecting “**Password Change**”. Of course, the user with which the access has been done must have permissions of user whose password has to be erased.

5.1.2 Users menu Management

This function allows to associate the created user to a menu group.

Click on “**Management**” from the main toolbar; from the drop down menu select **System**; from the second drop down menu select **Accesses Configuration**; finally select **Menu Users Management**

You’ll find the following screenshot:



Now select the name of the group menu (which is similar to that of the user)

Select the user name from the box “Users” which needs to be part of that group. After selecting it press “>” to add it in the menu group. It will appear in the box “Users in the group”. select and press “<” to cancel it. Finally press on “**Save this menu**” to store settings.

Example: the user associated to the menu group “admin” has got all the names which appear in the system.

NOTE:

The User can take part only to one menu group. These menu groups can be customized through the menu Groups Management”.

You can select the following menu groups:

Admin: the User belonging to this group can use all the menus in the system.

Viewer: he can use “Real Time” and “Historical Data” menu, while he can use only the function “Change Password” and “User Preferences” in “Management” menu.

Installer: he can use only “Management” menu, he can’t display the “Historical Data”.

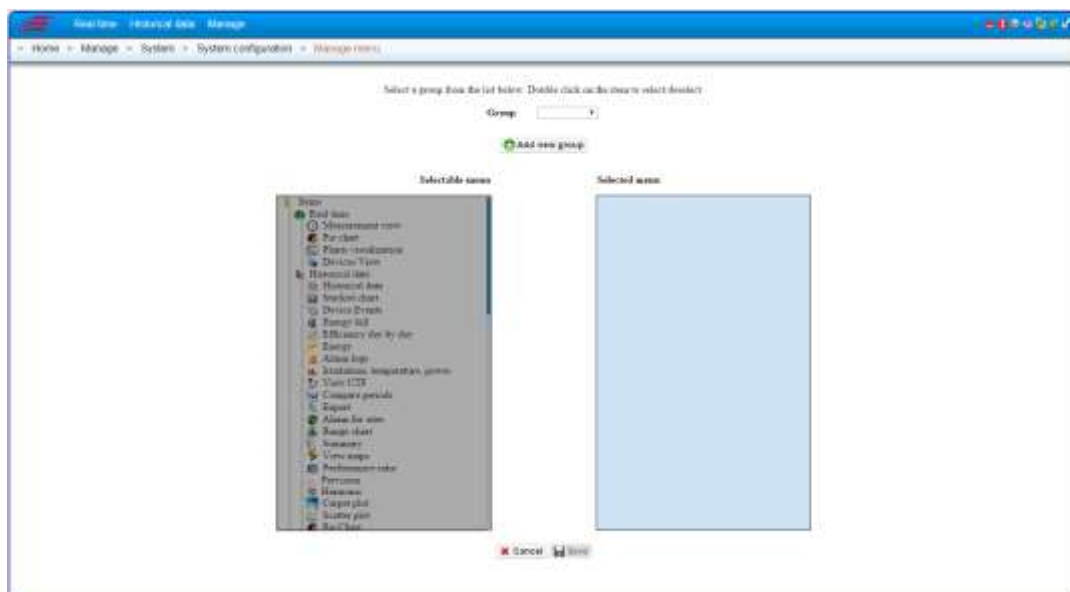
Manager: he can use only the submenu “System” and he can change password.

Configurator: he can use “Management” menu, the complete menu of the system, he can access the complete menu except the following options: “devices Configuration”; “Summary Periods” and “Polling”.

5.1.3 Groups Menu Management

This function allows to customize the menus viewable for one or more users.

From the main toolbar click on **Management**; from the drop down menu select **System**; select **System Configuration** from the second drop down menu; finally select **Management menu**. It appears the following screenshot:



Press the button “add new group” to add a new group, save with a name. Then select the new group menu in the drop down menu.

From the box **“Selectable Menus”** select the desired menu, which has to be displayed by all the users associated to that group. Press **“>”** and you will find it in the box **“Selected Menus”**. If you want to cancel it, select it and press **“<”**.

Finally click **“Save”** to store settings, or **“Cancel”** to go out without saving them.

NOTE: You can't change the Default configurations, the user can change the menu groups only after having created new groups.

5.1.4 Groups Management

This function allows to add Management groups and to limit permissions only to some branches of the tree structure. Click on **Management** from the main toolbar; select **System** from the drop down menu; from the second drop down menu select **Accesses Configuration**, finally select **Groups Management**. You'll see the following screenshot:



Group id	Name	Status	Type	Subtype
1	Default			
2	west			

Pressing the button **Add group** and you'll see a menu with the following fields:


Name: Put the name group.

Laong Name: Put an eventual complete name of the group.

Root node: You can select the desired node from the tree structure by pressing the button **Select**.

Propagate permissions: this function allows to propagate the permissions also to all the sub-branches.


Finally, push the button **Save** to store settings.

The button  allows to change the settings of this menu.

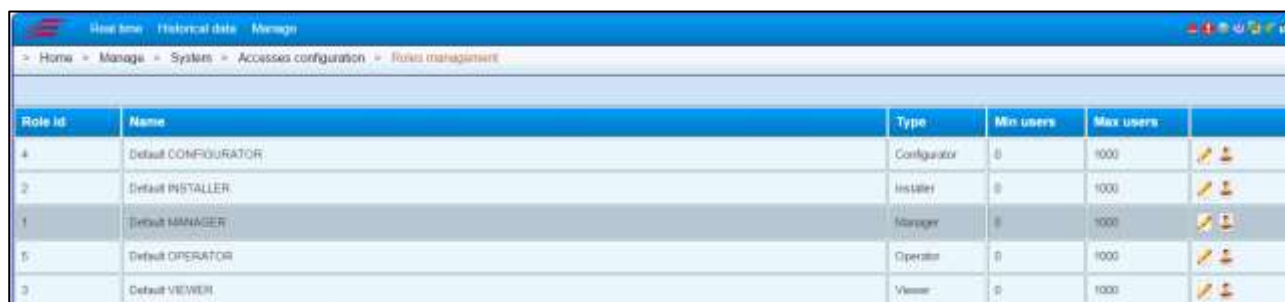
5.1.5 Roles Management

For each management group there are n. 5 roles. The user which has got all the roles, will be an administrator of that management group. The roles are the following ones: “Configurator”; “Installer”; “Manager”; “Viewer”; “Operator”.


There are two ways to enter this menu:

1. Click on the button **Management** from the main toolbar; select **System** from the drop down menu; select **Accesses Configuration** from the second drop down menu; finally select **Roles Management**. In this case you'll see all the roles of all the groups.
2. From the previous menu, that is to say ;**Management-> System-> Accesses Configuration-> Groups Management** press  you can enter only the roles of the selected groups.

Then you'll see the following screenshot:



Role id	Name	Type	Min users	Max users	
4	Default CONFIGURATOR	Configurator	0	1000	
2	Default INSTALLER	Installer	0	1000	
1	Default MANAGER	Manager	0	1000	
5	Default OPERATOR	Operator	0	1000	
3	Default VIEWER	Viewer	0	1000	

Pressing  (change users) it appears a new screenshot where you can find all the users associated to that specific role. In the screenshots, you can add all the desired users.

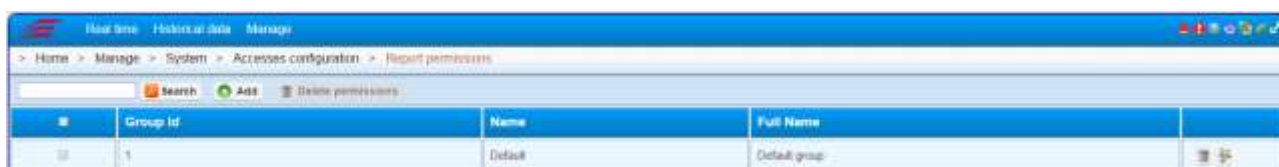
The role “**Viewer**” allows only to display data; on the other hand you are an Administrator if you have got the following roles: **Configurator**, **Manager**” and “**Operator**”

Finally, press the button **Save** to store the settings or **Cancel/edit** to go out without saving them.

5.1.6 Report Permissions

“Report Permissions” are assigned to the roles of the Management groups. The user must be an “Installer” of the “Management Group”, to create a report “Cost Centers Costs”; in this way the user can create the report in his menu “**Historical Data -> Report**”. The report is “**private**” and it can be used only by the User, but he can decide to share it with other Users. (See the Manual Viewer).

Click on **Management** from the main toolbar to enter this menu; from the drop down menu; select **System**; from the second drop down menu select **Accesses Configuration**; finally select **Report permissions**, you’ll see the following screenshot:



	Group Id	Name	Full Name	
<input type="checkbox"/>	1	Default	Default group	

Press the button **Add** to associate specific permissions to the management group.

In the box “**Selectable**”, select the groups to which the established permissions have to be assigned; then press “>” to confirm the selection, these ones will be displayed in the box “**Selected**”. Press “**Next**”.

In the new screenshot there are 5 roles for each management group, in the box “**Selectable**”. Select a group and press “**Next**”.

In this way the user who has got this permission could create the report displayed in the menu “**Select record types**”. As above, you can select it and press “>”, or you can select it directly with a double click. You’ll see it in the box “**Selected**”. Press “**End**” to confirm.

You’ll see a new line showing the new Management group with the assigned permissions, in the above mentioned screenshot.

Tick the first box to the left and press “**Remove Permissions**” to remove permissions associated to a certain group; you’ll see a warning panel, press “**Yes**” to confirm, press “**No**” to go out without cancelling permissions.

5.2 Activity Planning

Thanks to this function the Server can schedule tasks, for example, it makes checks on the recorded historical data, it can fill external database, it can upload data in .xml format with FTP protocol, create an e-mail including PV plant production summary or it can send reports. The following functions have currently been developed, but the system could be expanded with additional functions according to customer request. This function programming is made by the menu Management, System, Activity Planning.

5.2.1 (Creation of a Task)

Firstly, you have to create an executing “task”, then click on “new” and add the name to this POP-UP, then add [CRON Expression](#), that is to say how often they will be made the operations which are going to be configured. Thanks to the function “enable” you can “enable” or “disable” the whole “task” and it will be possible to add notes. Then press the button “Save”.

By selecting the activity management icon, the user accesses a sub-menu where it’s possible to configure the operations which have to be made by the server.

Currently, there are the following functions:

1. Summary e-mail of the PV plant
2. Reports sending
3. Daily check profile
4. Repeat Real Time and Historical Data database
5. File XML export with Real time data, historical data, channels list, PV plant, UTF list, UTF Historical Data, Alarms List, Alarms Log, Tree structure devices. Let’s see how to configure the different functions:

5.2.2 Summary E-mail for PV Plant

This function allows to get an e-mail with the plants data and the produced, acquired sold and radiation energy. All the data have been reported for each subfield or exposure, except for the sold and the acquired energy. Pressing the button “new activity”, it appears a Pop-Up where you have to put a name, some notes, you can enable or disable the activity. With the field “if error” you can stop the following activities or you can continue with these ones. The “type” identifies which kind of activity should be made by your Server. Now select “PV Plant Summary e-mail”, enter the Mail subject, add recipients, by using a “comma” separator between a recipient and the other. Finally select the language and the plants configured within the system. Select “Save”, since then, the server will perform such activity according the “Task” scheduling. It’s possible to force the immediate execution by pressing the button “Play now”. In this case you can also select the date referred to the data to be received.

5.2.3 Reports sending

The purpose of this function is to send automatically a report previously created. The user, of course, will have to select the referred period which have to be extracted by the server. You can send a report towards a FTP server, towards an e-mail recipient or you can put it on a server network/local hard disk.

5.2.4 Daily check Profile

This function allows to check if the final consumption data referred to the previous days, meet the user requirements. If the recorded data are different from the defined profile, the system will send an e-mail containing the information about the channel which presented this difference and the relative timetables..

Select “profile daily check” from “type” menu, to update automatically the configuration FORM and to add previous days total number, to indicate the type of threshold - which can be greater than, less than, or Difference – to set a tolerance, to point out the minimum duration to get the warning; the integral check is useful for the verification of integrated data, select “add/edit” to set up the profile. You’ll see a window showing the devices tree structure, so select the profile which can be only one. Then select “add/change” to choose one or more channels, that the user wants to check.

After the channels configuration, add language, enter the Mail subject and recipients, by using a “comma” separator between a recipient and the other. Select “Save”, since then, the server will perform such activity according to the “Task” scheduling. It’s possible to force the immediate execution by pressing the button “Play now”. In this case you can also select the date of check.

5.2.5 Export XML file with Real Time data, historical data, channels list, PV Plant, UTF list, UTF Historical Data, Alarms List, Log Alarms, devices tree structure. Replicate database for Real Time/Historical data.

If you select xml Export “type”, from the same submenu , you can configure an extraction towards a server FTP which contains all the sending information, or if the type is “Replicate database”, it’s possible to complete an external Database with the information referred to Historical/Real Time data.

It’s possible to force the execution of an activity by pressing the button “Play now”.

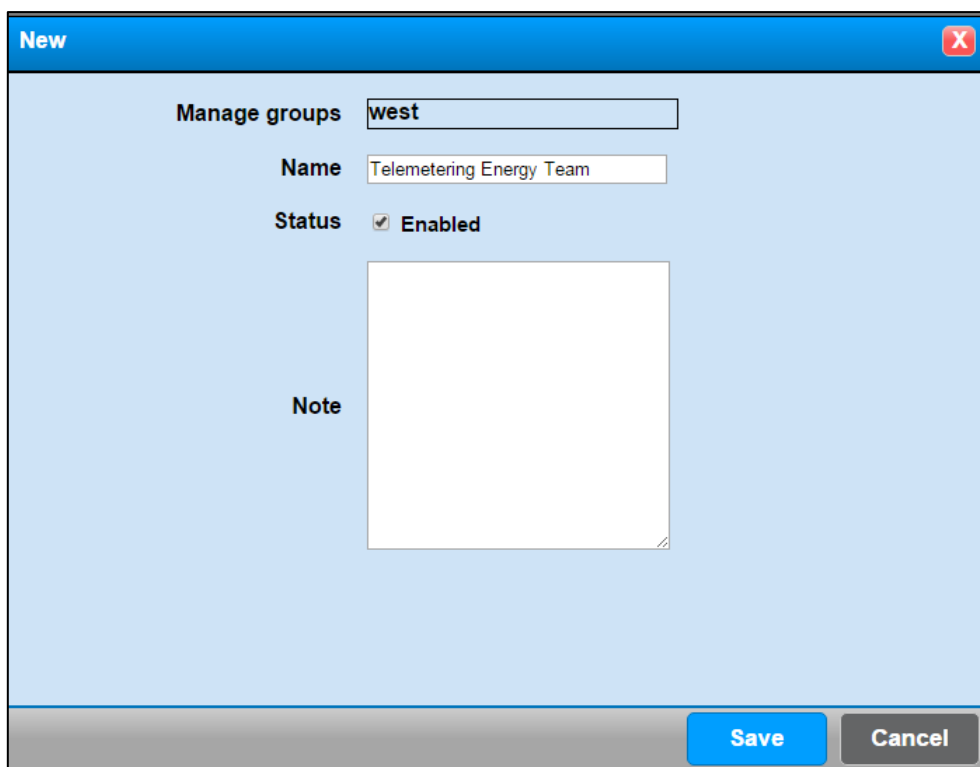
For further information concerning XML data format and data replication an External Database, please contact customer technical service in Energy Team and ask for technical details.

5.3 Telemetry

This module allows to download data from devices with memory (as for example X-Meter). The telemetry can be started-up a few times per day and it represents the only way to download data from GSM devices (this operation can't be made through Polling module).

Please select **Management-> System-> Remote Readings** to access this configuration.

In the form you can see all the telemetry previously configured, otherwise the page will be blank. Please press the button **"new"** to configure a new telemetry. You'll see the following screenshot:

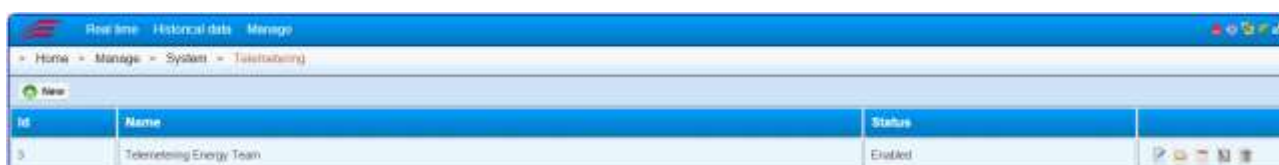


The screenshot shows a 'New' dialog box with the following fields:

- Manage groups:** A text input field containing 'west'.
- Name:** A text input field containing 'Telemetry Energy Team'.
- Status:** A checkbox labeled 'Enabled' which is checked.
- Note:** A large empty text area for additional notes.

At the bottom right of the dialog are two buttons: 'Save' and 'Cancel'.


Add a name and press save. After that you'll be back on the home page and we'll see that a new remote reading has been configured as it follows:



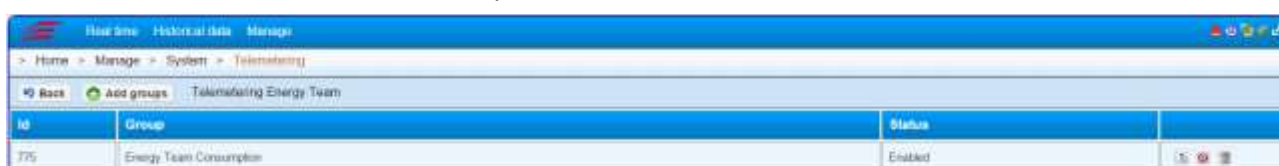
ID	Name	Status
3	Telemetry Energy Team	Enabled

Now we'll have to configure:

1. The folder of the tree structure we want to read by remote.
2. [CRON Expression](#), that is to say how often the activities should be made by the server.




For the configuration of the 1st point, please select the icon  ("manage telemetry groups"). You can access a sub-page and add a new telemetry group. Click on this button and the system will open the tree structure and you can select the desired folder. The folders can be more than one.


After the selection of the desired folder, you'll see this screenshot:

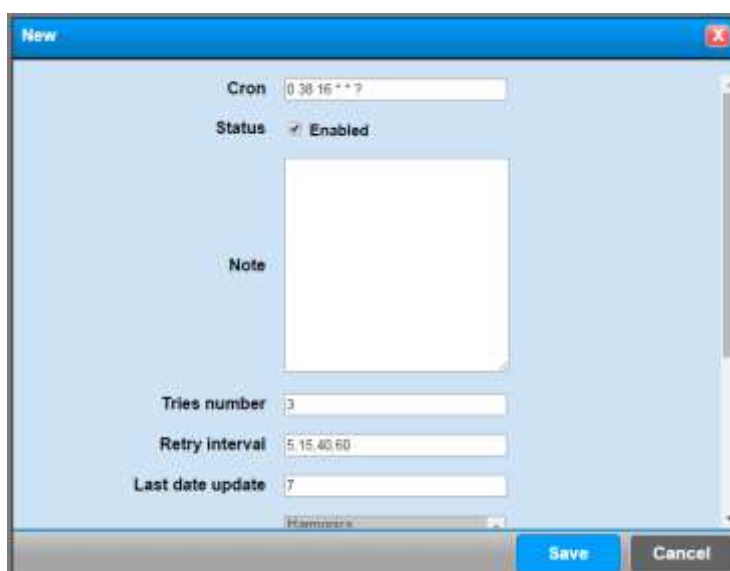


ID	Group	Status
775	Energy Team Consumption	Enabled

The operation is over and:

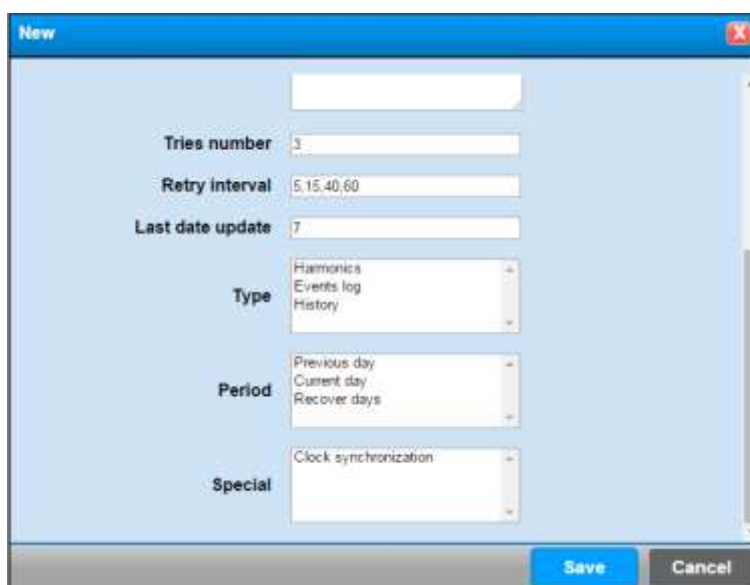
- The icon  allows to disable/enable the folder reading
- The icon  allows to exclude the devices which are in the selected folder.
- The icon  allows to cancel all the telemetering group.

Turn back to the home page of telemeterings and configure the cron expression by pressing the button . Then click on the button “add scheduling”. You’ll see the following screenshot:



The screenshot shows a 'New' dialog box with the following fields and options:

- Cron:** A text field containing the expression '0 30 16 * * ?'.
- Status:** A checkbox labeled 'Enabled' which is checked.
- Note:** A large empty text area for additional notes.
- Tries number:** A text field containing the value '3'.
- Retry interval:** A text field containing the values '5, 15, 40, 60'.
- Last date update:** A text field containing the value '7'.
- Hammonia:** A dropdown menu currently showing 'Hammonia'.
- Buttons:** 'Save' and 'Cancel' buttons at the bottom right.



This screenshot shows the same 'New' dialog box but with additional configuration options visible below the previous ones:

- Tries number:** A text field containing the value '3'.
- Retry interval:** A text field containing the values '5, 15, 40, 60'.
- Last date update:** A text field containing the value '7'.
- Type:** A dropdown menu with options: 'Hammonia', 'Events log', and 'History'.
- Period:** A dropdown menu with options: 'Previous day', 'Current day', and 'Recover days'.
- Special:** A dropdown menu with the option 'Clock synchronization'.
- Buttons:** 'Save' and 'Cancel' buttons at the bottom right.

- In the field [CRON](#), put the desired hour for telemetering.
- The field Status, shows that the scheduling has been started-up.
- Add eventual notes.
- Number of attempts, that is to say the maximum quantity of attempts made by telemetering if the device doesn't reply or if data telemetering hasn't been finished. This type of errors may occur if the connection is in GSM.
- Interval attempts: quantity of minutes between an attempt and another one
- Date of the last change: days (in this case n° 20 days back) where the server checks the real presence of data. If you select "recover days", the system will make a check on the existing data related to all the telemetering devices, and in this case the server will try the recovery.
- Type: it represents the type of data that the system will have to read, that is to say Harmonics, the board events LOG about X-Meter and Historical Data. Click on **Crtl** to select them all in blue color. You can select more voices.
- Period: the server can download only the current day or the previous one and the check can be activated on the last days. .
- Special: only one option: you can synchronize the device clock.

Finally press **SAVE** to save all the settings

Now you can change or cancel the scheduling, for each reading group, you can configure more than a scheduling

Note: After saving all the configurations, the Server will make all the required operations without any restart.

5.4 Stop the System

These options allow to turn off or to start the concentrator, so it can be controlled by remote. From the main toolbar, click on **Management** to enter this menu. Select **System** from the drop down menu; from the second drop down menu select **Stop the System**; You can enter a sub menu where you can stop or start the system. Add a causal and send. Now wait for system automatic shutdown or restart.

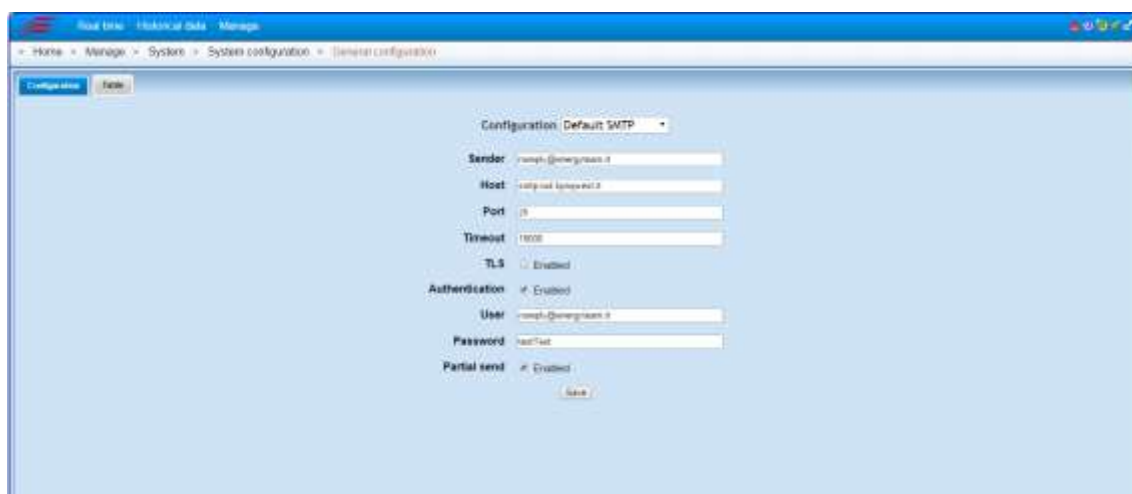
Note: The restart of a PC BOX can last more or less 3/5 minutes.

5.5 General Configuration


This function allows to manage the system configurations for e-mail and SMS sending. From the main toolbar, click on **Management** to enter this menu; select **System** from the drop down menu; from the second drop down menu select **system Configuration**; finally select **general Configuration**. You'll see a first screenshot where you can configure SMTP mailing server or you can set up the server language of default. Afterwards you will find the main settings.

5.5.1 SMTP Default Configuration

As we told you in the previous chapter, from the menu **Home-> Management-> System-> System configuration-> General Configuration**, you can find the following mask, where you can set up the parameters of server SMTP useful for the e-mail sending.

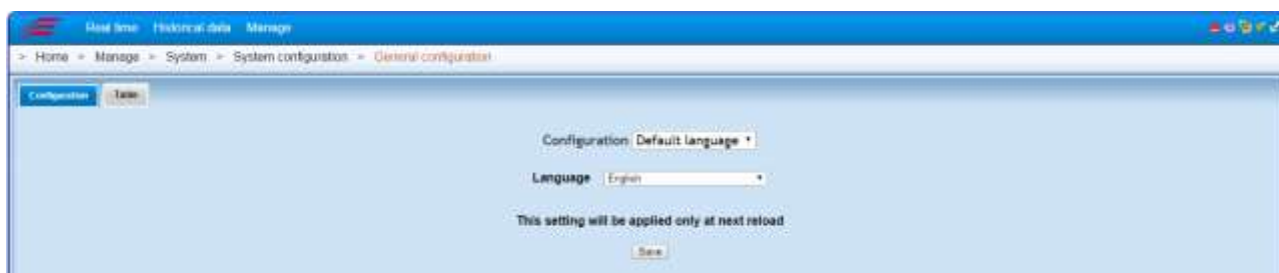


When all the parameters have been set up, you can make a test by sending an e-mail by the menu "[Forced restart](#)" under the menu **Management-> System**

By selecting the table, you can enter a menu where you can set up "advanced settings" and in correspondence with the interested key, with a click on the button  it's possible to access the configuration of the parameters, where you have to change only the content shown in the column **Value**. For these types of settings, please contact our Customer Care at +39 0248405033.

5.5.2 Default Language Configuration

As we told you in the previous chapter, from the menu **Home-> Management-> System-> System Configuration-> General configuration**, select the field “Default language” in “configuration” and you will see the following mask:



Select the desired language and restart the server

5.5.3 Default Configuration GSM

From the menu **Home-> Management-> System-> System configuration-> General configuration**, first of all, select “Table” and then, put the filter with GSM voice. The main screenshot will show all the possible parameters useful for messages and alarms sending via GSM:

Please find below all the types of **Key** and **Value** to be put in **New Item menu** referred to each voice of the main screenshot (after you’ve been selected it by a double click) for the groups of default concerning the messages sending:

Selected voice	Key	Value
serial.stopBits	serial.stopBits	1
serial.dataBits	serial.dataBits	8
sms.sleepBetweenSms	sms.sleepBetweenSms	5000
serial.flowControl	serial.flowControl	False
serial.port	serial.port	/dev/ttyS1 (Linux) COMx (Windows)
sms.senderJobCron	sms.senderJobCron	0 0/1 * * * ?
serial.waitms	serial.waitms	10000
serial.baudRate	serial.baudRate	9600

NOTE:

Don’t change the settings. For eventual changes contact our Customer Care.

5.5.4 Network configuration

This function allows to associate an IP address to the concentrator. Click on **Management** from the main toolbar to access this menu; from the drop down menu select **System**; from the second one, select **System Configuration**; finally select **Network Configuration**. You'll see the following mask:



The image shows a network configuration form with the following fields and a button:

- Ip address:
- Netmask:
- Ip gateway:
- DNS:
- Save configuration:

In the fields of easy understanding, add:
 concentrator IP address (**Ip address**); Network mask (**Netmask**); Gateway IP address (**Ip Gateway**) and the address if DNS server which manages the correspondence name-numeric address – routing (**DNS**).
 Finally, press **Save configuration** to store settings.

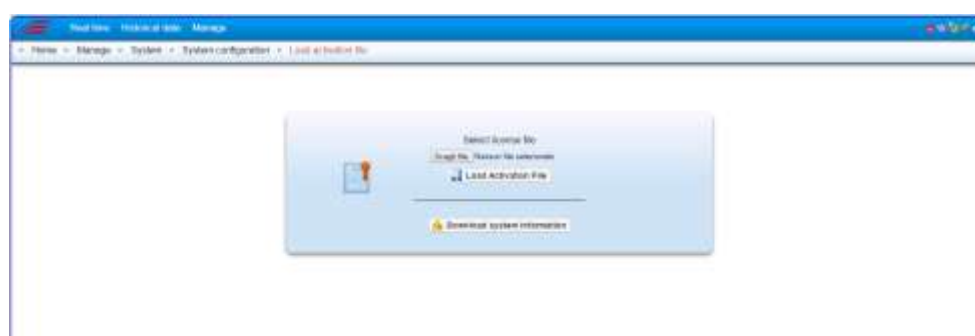
NOTE:

The parameters set by the technician during the start-up, are shown in the report of the start up. Before you proceed to the variation of IP addresses, consult your EDP and/or CED.

5.5.5 Import activation file

This function allows to manage the license activation. The file related to the licenses is created exclusively by Energy Team technical service and you can't reproduce it.

Click on **Management** from the main toolbar to enter this menu; from the drop down menu, select **System**; from the second one, select **system Configuration**; finally select **Import Activation file**.



Pressing the button "Download information system" you'll download a file containing some useful information. Sometimes it can be required by the technical service itself.

You have to click on the field "browse", select the file and then press "upload activation file". Once you got the positive outcome by the server, you have to restart the server to take charge of the new license.

5.5.6 Clock

This clock allows to synchronize manually the concentrator in the following ways.

From the main toolbar click on **Management** to enter this menu; from the drop down select **System**; from the second drop down menu select **System Configuration**; finally select **Clock**. You'll see the following mask:



You'll have to complete the following fields.

Server Timetable: Working date and hour in the concentrator
(example: 12/01/2011 14:16:50)

Date: Date and time of the PC connected to the concentrator.

By changing parameters and by pressing **Synchronize Clock** button you can transfer the information to the concentrator. After this step, as indicated, you have to synchronize again immediately the peripherals by the menu "**Polling**" and through the button



"play now", in order to set up the new timetable of the server to each device.

Basically, you can synchronize the timetable with your PC, with a server NTP or it's possible to synchronize (in this case automatically) the server hour with the one of a device.

Anyway the used operating system (Windows o Linux) WON'T HAVE to synchronize automatically the server clock. Here, the operating system services must be disabled, otherwise you can generate errors, for example "FAILED Synchronization", or "Internal Error".

5.5.7 Bands Import

Thanks to this function you can import tariff bands into ES WEB software, these bands are important for UTF tables management.

Click on **Management** from the main toolbar to enter this menu; from the drop down menu select **System**; from the second drop down menu, select **System configuration**; finally select **Bands Import**. Click on **Browse** to import the bands and search in the path where you can find the files which have been saved. The bands file are generated by Energy Team Customer Service.

Note: *These bands will be disabled during next releases, since they have been implemented configurable bands directly by the user. However UTF tables will use again these bands for backward compatibility reasons.*

5.5.8 “Ping” Function

This function allows to check if a device is on the web (with its IP address) and it replies correctly to the requests that it receives.

From the main menu, click on **Management** and on **System**; then select **System Configuration** and finally **Ping**. You’ll see the following menu:



The screenshot shows a web-based configuration interface for the Ping function. It has a light blue background with a white border. The fields are as follows:

- Address:** A text input field.
- Attempts number:** A text input field with the value '4'.
- Timeout (s):** A text input field with the value '3'.
- Range (s):** A text input field with the value '2'.
- Continuous cycle:** A checkbox that is currently unchecked.
- Buttons:** Two buttons labeled 'Start' and 'Stop' at the bottom center.

Address: put IP address of the module (the one which is “examined”).

Number of attempts: If the module doesn’t reply to the data sending, the system will repeat the attempt. Put the maximum number of the attempts necessary before interrupting definitively the communication in case of non-response.

Timeout (s): Put the interval in seconds between an attempt and another one.

Interval (s): This function is enabled if the box **Continuous Cycle** has been checked. Every time the system sends data to the module, add the time in seconds between a send and another one.

When the fields are completed, press **Start** to start the above mentioned automatic procedure, press **Stop** to interrupt it.

5.5.9 Bands Configuration

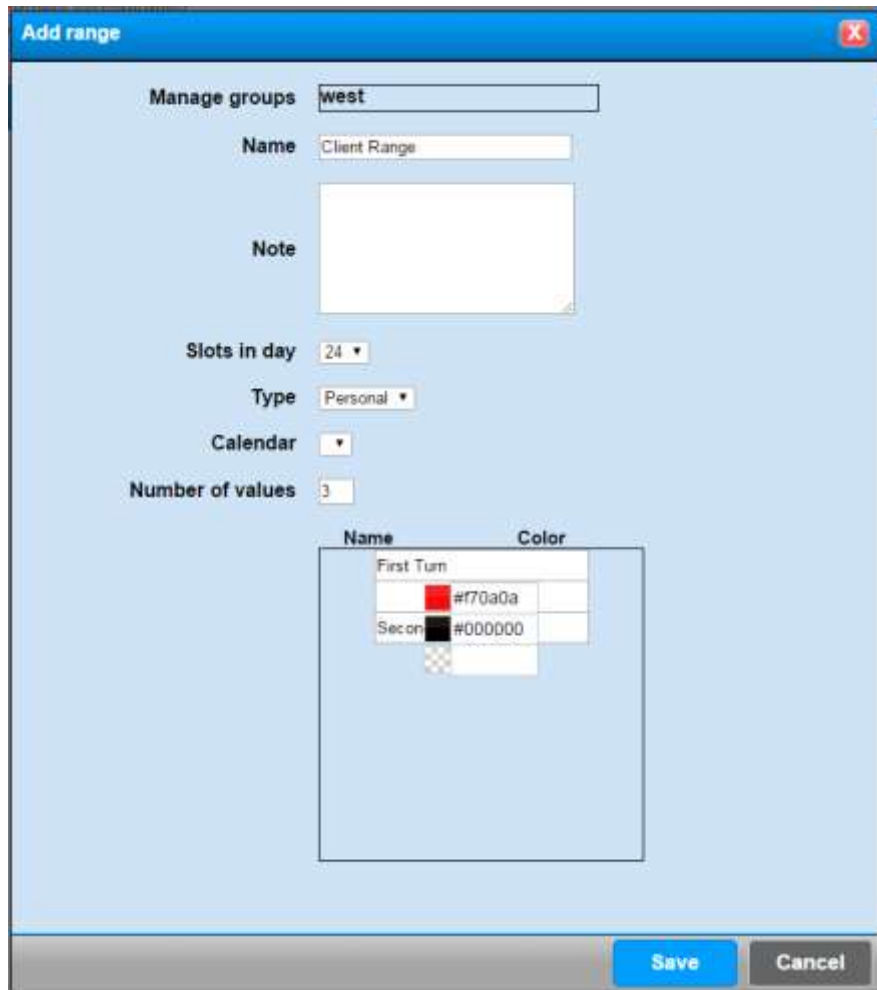
This function allows to configure bands. In this way you can meet any customer requirement, for example, you can divide the consumptions according to your work shifts.

Please enter this menu to configure bands:

Home-> Management-> System-> System Configuration->Bands Configuration

The menu will include all the system bands, and they CAN’T be changed.

Pressing the button “Add Band”, you’ll find the following mask:




- **Management Groups:** the customer can define which management groups can see this band (see permissions chapter)
- **Name:** add the NAME, which will appear in all those menus using bands.
- **Notes:** Eventually put the field Notes
- **Slots per day:** they are 24 by default, you can define time slots (for example from 8:00am to 6:00pm, etc. You can add a daily band (one band per day) or 96 daily values, in this case you can define a band for each ¼ hour.
- **Type:** forced choice, currently it could be only “customized”
- **Calendar:** You can choose a calendar including Italian or foreign holidays, or not. Through “Calendars Configuration” menu, you can customize a calendar with your festivities.
- **Number of values:** the number you have put, it represents the tariff band. In this example you’ll see number 3, so, in the window below, they have been automatically enabled the voices to be put. In this case we assume n° 3 work shifts. The user can choose the desired color beside its name.

At the end, press “Save”.

You’ll get the following result:

Range configuration					
Range id	Name	Type	Slots in day	Number of values	
4	Client Range	Personal	24	3	 
2	PT23 Italy	System	24	3	 
1	Nova	System	1	1	 
3	Pop Italy	System	24	2	 

Now, we have to associate our bands to each day. Press  to do that. After this, (associate types days) you'll see an empty "screenshot", press **"Create new"** and you'll see the following screenshot:

Edit

Name

Workdays

Note

Calendar type days selectable

Saturday

Sunday

Calendar type days selected

Monday

Tuesday

Wednesday

Thursday

Friday

Slots in day 24

00:00

Turn 3

01:00

Turn 3

02:00

Turn 3

03:00

Turn 3

04:00

Turn 3

05:00

Turn 3

06:00

Turn 1

07:00

Turn 1

08:00

Turn 1

09:00

Turn 1

10:00

Turn 1

11:00

Turn 1

12:00

Turn 1

13:00

Turn 1

14:00

Turn 2

15:00

Turn 2

16:00

Turn 2

17:00

Turn 2

18:00

Turn 2

19:00

Turn 2

20:00

Turn 2

21:00

Turn 2

22:00

Turn 3

23:00



Turn 3

Save





Cancel

Give a name, for example **"Workdays"** and select the days of the week, with a double click, to add the desired days. You can put the desired band for each "hour", among the previous ones already configured.

When all the fields have been completed, you can save and create a new "group" of bands (for example Saturday and Holidays), to end the configuration. The configurator should create complete bands and he should not associate the same day of the week in more groups.

Every time you save a "group" of bands, it's possible to edit (through the button ) or to delete (through the button )

After creating a band, you'll see the following icons on the main menu:

-  This button allows to handle management groups, you can basically define which management groups can see this band.
-  Press this button to set how to view the bands, in Scatter Plot, chart bands and Periods Summary.
-  Press the button to cancel the band
-  Press this button to enter the same configuration form. It allows to edit all the settings given during the bands creation.

5.5.10 Calendars configuration

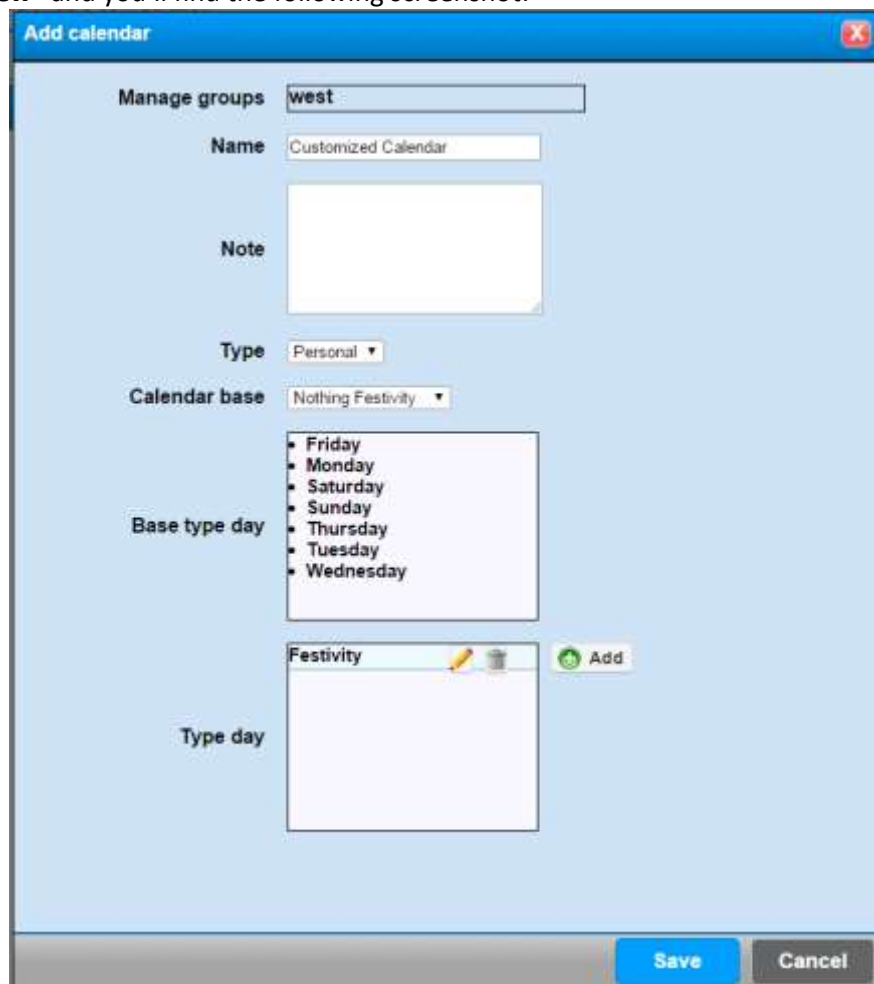
Thanks to this menu you can “create” a calendar, to use it in the bands. This operation allows you to add your “festivities”, to manage correctly the band according to your needs.

To access this menu:

Home-> Management-> System-> System Configuration-> Calendars Configuration

Now, you’ll find 2 system calendars by default (they CAN’T BE CHANGED) which are the ones with no festivities, or with Italian festivities.

Press “Create new” and you’ll find the following screenshot:



Add a name, select “base of the calendar”, you’ll find “from Monday to Sunday” by default. The button “add” allows to add customized days, for example “holiday”.



Once you’ve finished the settings, press “Save”, wait a few moments and the Server will give a positive result.

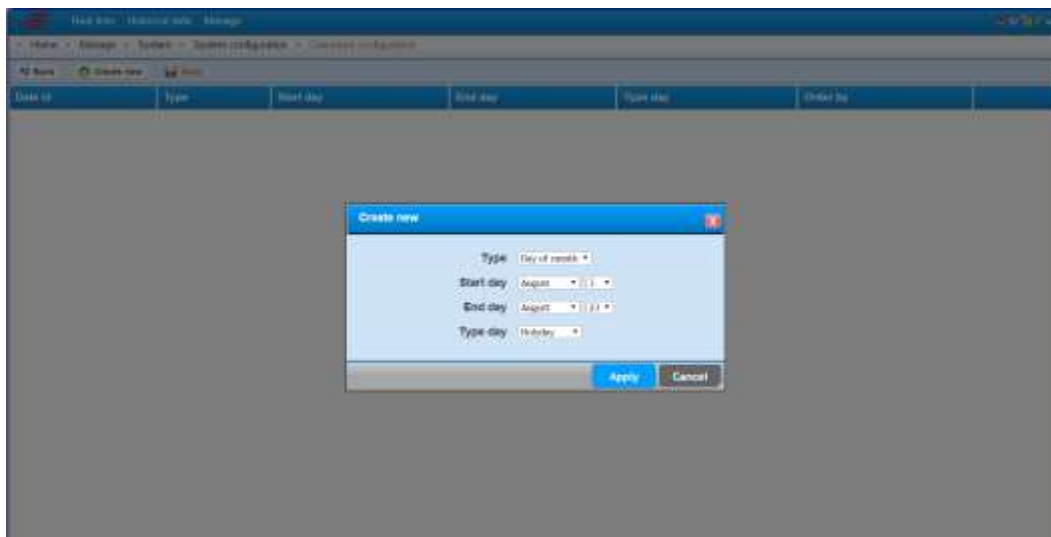
You’ll see the final results it follows:





Calendar id	Name	Type	Calendar base	
3	Customized Calendar	Personal	Nothing Festivity	  
1	Italian Festivity	System	Italian Festivity	
2	No festivity	System	Nothing Festivity	

Please find below the functions of the buttons:

-  This button allows to handle management groups, you can define which management groups can see this band.
-  this button allows to configure periods where you want to change the calendar, for example the period from August, 3rd to August 23rd, the special day will be a holiday. Press “create new” to make the configuration and select the desired period from the pop-up configuration, now add the desired day, as it follows:



The selectable periods are: Correct day; Day of the month (it identifies a configurable period), or month. After pressing “apply” the server will save its settings. We remind you that you can add different periods, and you have to pay attention not to overlap the same periods in more than a setting.

-  Press the button to cancel the band
-  Press this button to enter the same configuration form. It allows editing all the settings given during the bands creation.

5.6 Forced restart

Click on **Management** from the main toolbar to access this menu; from the drop down menu, select **System**; from the second drop down menu, select **Forced restart**. You'll see a screenshot displaying 4 icons: "Send e-mail test"; "Start historicizing"; "Send sms test"; "Perform complete backup".

Then you can start **historicizing**. All the data older than the current month and older than the previous one, are moved from the database in binary files of the Hard Disk. This process starts automatically by the system every night.

5.7 Backup Management

The system makes automatically the configurations of all backup and about all data, and, where expected, the same ones are saved in a flash card of the PC BOX. The automatic backup will be 2 for MySQL database. There will be n° 1 script for tables retrieval concerning the configuration, while the 2nd script (which it's usually the bigger one), it allows the retrieval of tables concerning historical data. If the server shows data older than the current and previous month, it will be created a file with extension. TAR.GZ, containing all the historical data. This file will be annual and it will contain only 1 year data. There will be automatic backup only referred to the current year. For all the previous years, you need to make a complete backup from the menu "forced restart". This operation is necessary only during the system start-up.

They can be created the files.TAR.GZ concerning LOG Events of the devices, and of the Harmonics. These files will contain always 1 year data.

The system maintains usually the last 5 backup, in fact, every night, when the automatic backup operation starts, the 6th file will be removed. Sometimes, for reasons of space in the flash-card, the maximum number of backup is decreased by the technicians authorized by Energy Team S.p.A.

All the backup can be downloaded, from the following interface:

Home-> Management-> System-> Backup Management




File name	Dimension	Date file	
DHG2015_2015-02-10_06-18-22 tar.gz	1.38 K	02/10/2015 00:16:22	📄 ⚙️
DHG2015_2015-02-10_06-18-21 tar.gz	28.11 K	02/10/2015 00:16:22	📄 ⚙️
HRC2015_2015-02-10_06-18-16 tar.gz	6.61 K	02/10/2015 00:16:21	📄 ⚙️
PHG2015_2015-02-10_00-07-42 tar.gz	45.71 K	02/10/2015 00:16:15	📄 ⚙️
HM4_history_2015-02-10_00-10-00 ssp	100.97 K	02/10/2015 00:11:42	📄 ⚙️
configurations_2015-02-10_00-10-00 ssp	2.98 K	02/10/2015 00:10:00	📄 ⚙️
HRC2015_2015-02-09_06-18-22 tar.gz	6.61 K	02/09/2015 00:16:26	📄 ⚙️
DHG2015_2015-02-09_06-18-28 tar.gz	28.11 K	02/09/2015 00:16:26	📄 ⚙️
DHG2015_2015-02-09_06-18-28 tar.gz	1.38 K	02/09/2015 00:16:26	📄 ⚙️
PHG2015_2015-02-09_00-07-47 tar.gz	45.71 K	02/09/2015 00:16:22	📄 ⚙️
HM4_history_2015-02-09_00-10-00 ssp	100.97 K	02/09/2015 00:11:42	📄 ⚙️
configurations_2015-02-09_00-10-00 ssp	2.98 K	02/09/2015 00:10:00	📄 ⚙️

If you click on **Import Backup File** you can upload manually a backup file.

If you click on **Start Backup now** the system makes the backup of all the current data

If you click on **Reload** the user will refresh the web page

The button , allows the user to download backup file on its PC. The ones who use PC-BOX or a virtual machine supplied by Energy Team, can access the backup by using windows network resources. After you log with:

User: backup

Password: backup2010

You can access the flash-card content or the place where automatic backup are made. In this way you can arrange the backup file download by using network resources.

Here below the names of file .TAR.GZ:

- **FH2015_2015-08-19_00-18-56.tar.gz** ; historical data of year 2015, created on August, 19th 2015 at 00:18
- **HH2015_2015-08-19_00-19-09.tar.gz** ; historical data of the harmonics year 2015, created on August, 19th 2015 at 00:19
- **DH2015_2015-08-19_00-19-10.tar.gz** ; historical data year 2015 of events, created on August, 19th 2015 at 00:19

You need ALL back files to recover a “virgin system”, this operation can be made only by the technical staff authorized by Energy Team.

5.7.1 Backup via Ftp - (Optional)

You can also send a backup file towards a server FTP (*File Transfer Protocol*). To send Backup file with FTP protocol, you need simply to configure a file with the name “*backupPostAction.properties*” and you have to put it in the following file: (valid only for LINUX Operating System and minimum release of the application - 1.0.280)

/opt/tomcat/webapps/ROOT/WEB-INF/conf/toLoad

The file “*backupPostAction.properties*” is made up by the following information:

```
conf.postActionClass = it.energyTeam.components.backup.postActions.FTPPostAction
conf.postAction.ftp.localStoreDir = /home/tomcat/backupTemp
conf.postAction.ftp.repeatGap = 20
conf.postAction.ftp.maxRetry = 100
conf.postAction.ftp.host = 192.168.3.208
conf.postAction.ftp.port = 21
conf.postAction.ftp.username = fly
conf.postAction.ftp.pwd.plain = testMatteo
conf.postAction.ftp.additionalRemotePath = /
conf.postAction.ftp.maxHistoryFiles = 5
#conf.postAction.ftp.skip = 2
```

```
history.postActionClass = it.energyTeam.components.backup.postActions.FTPPostAction
history.postAction.ftp.localStoreDir = /home/tomcat/backupTemp
history.postAction.ftp.repeatGap = 20
history.postAction.ftp.maxRetry = 100
history.postAction.ftp.host = 192.168.3.208
history.postAction.ftp.port = 21
history.postAction.ftp.username = fly
history.postAction.ftp.pwd.plain = testMatteo
history.postAction.ftp.additionalRemotePath = /
history.postAction.ftp.maxHistoryFiles = 5
#history.postAction.ftp.skip = 2
```

You'll need to change the following settings during the start-up: IP address, port, User Name and Password of FTP server.

You can manage automatically the maximum number of files included in FTP server (in this configuration there won't be more than 5 files in FTP server, so the oldest one will be deleted automatically). If we put "0", anything will be deleted.

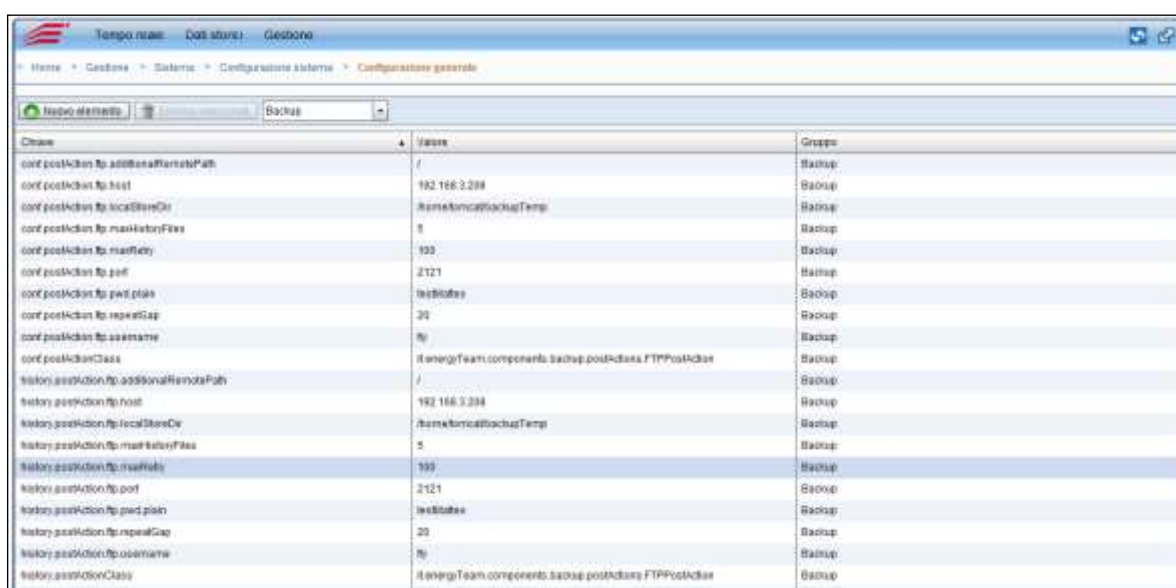
You can "skip" Backup file sending, for example, if you have to send Backup file once every three days, you have to enable "Skip" (Last line about the configuration of each Backup file). You'll have to remove "#" and add how many times you need to skip Backup files sendings.

Once the file is uploaded, you MUST restart the Tomcat or the PC-BOX. The file will be automatically "Moved" in the following path:

/opt/tomcat/webapps/ROOT/WEB-INF/conf/toLoad/loaded

After this, you can eventually reprogram the configuration directly from WEB interface or repeat the same operations listed previously.

Here below a screenshot of the WEB interface:



Class	Value	Group
conf.postAction.additionalRemotePath	/	Backup
conf.postAction.host	192.168.3.288	Backup
conf.postAction.localStoreDir	/home/tomcat/backupTemp	Backup
conf.postAction.maxHistoryFiles	5	Backup
conf.postAction.maxHistory	100	Backup
conf.postAction.port	2121	Backup
conf.postAction.protocol	testStatus	Backup
conf.postAction.repeatGap	20	Backup
conf.postAction.repeatName	By	Backup
conf.postActionClass	it.energyTeam.components.backup.postActions.FTPPostAction	Backup
history.postAction.additionalRemotePath	/	Backup
history.postAction.host	192.168.3.288	Backup
history.postAction.localStoreDir	/home/tomcat/backupTemp	Backup
history.postAction.maxHistoryFiles	5	Backup
history.postAction.maxHistory	100	Backup
history.postAction.port	2121	Backup
history.postAction.protocol	testStatus	Backup
history.postAction.repeatGap	20	Backup
history.postAction.repeatName	By	Backup
history.postActionClass	it.energyTeam.components.backup.postActions.FTPPostAction	Backup

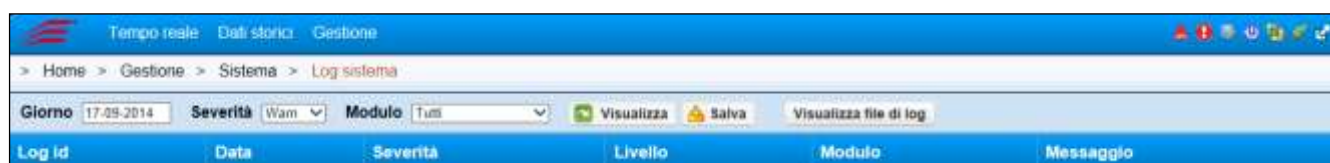
If you select the menu:

"Management → System → System Configuration → General Configuration

You don't need to upload the File again, but you can make the reprogramming from this point, after any modification, you have to restart the service Tomcat or the PC-BOX.

5.8 System Log

This page allows to understand if the system is well – working. For example, if the system CAN'T create a backup file, there will be a Warning (a red line) in the alarms list, indicating the failure in the backup file creation. Other typical errors can be the following ones: in a mathematical module there's no physical channel because it has been deleted, so you have to reprogram the polling. The events are grouped according to the following types: "Debug"; "Info"; "Warn"; "Error"; "Fatal". Click on **Management** from the main toolbar to access this menu; from the drop down menu, select **System** and finally **System Log**, you'll see the following screenshot:



You can display all the events that have occurred during the working and in the software, including errors and how much they are important; warning messages failure notices etc. From the above mentioned menu, you can select the events to be shown and the following fields:

Day: For events occurred on a certain day

Severity: For events with a certain feature; for example errors, warning messages, backup notices and so on. .

Module: For the part of the system where the desired files are stored.

Display: Press this button to display the events after you've selected the ones you want to see.

Save: You can save the descriptions displayed on a table, with a file.

Display log file: To display the complete description of all the events with serial recording (the last 100 lines). This kind of displaying is typically used by our technical staff.

The "System log" is connected to the current LOG, in this way you'll know if the system contains faults.

5.9 System Pool

This module allows to configure all GSM modules which will be used by the system to manage the calls or the data recovery from/towards GSM devices. In this menu you can configure more than a pool about a modem and every pool can contain more modems.

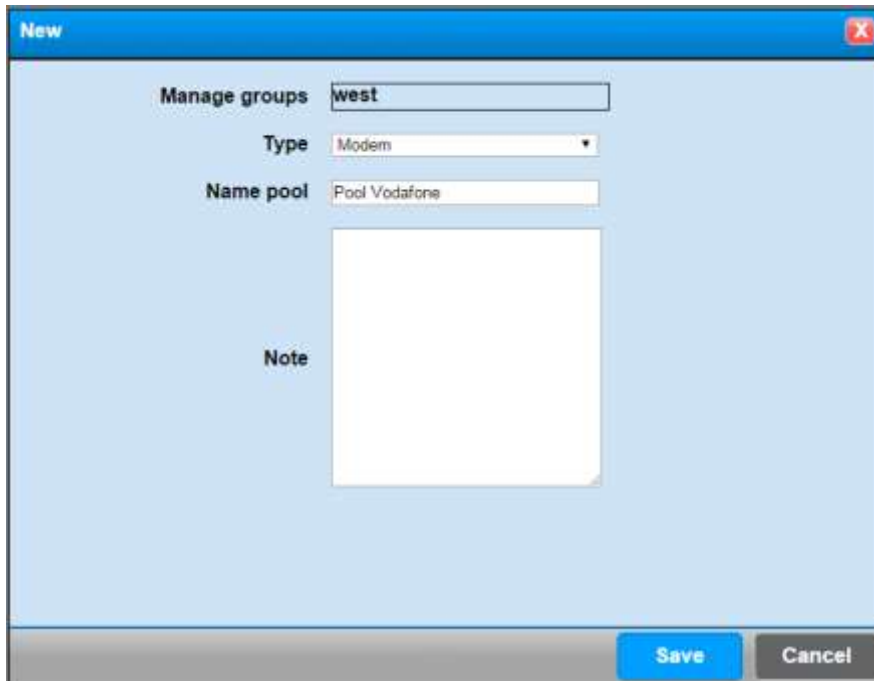
The system will make calls towards some recipients, by using the modem pool which has been chosen, you need to configure at least a modem pool to configure an [“end-point modem”](#).

In addition, the system will use cyclically all the modems (in this way, all the calls will be spread over the SIM cards).

You'll have to choose the following path to access this configuration:

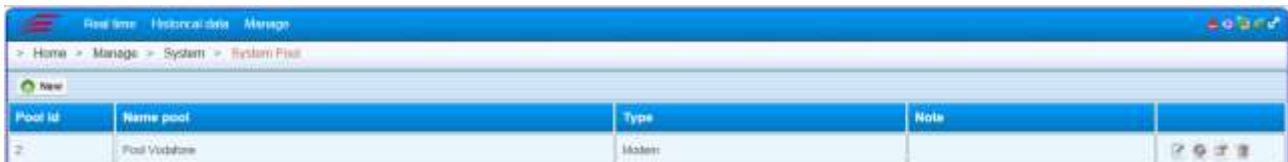
Home-> Management-> System-> System pool

Once the access has been done, you'll find an empty screenshot, if it hasn't been previously configured, so press “new” and you'll see the following one:





Give a name to the pool and save.



Here below the final result:




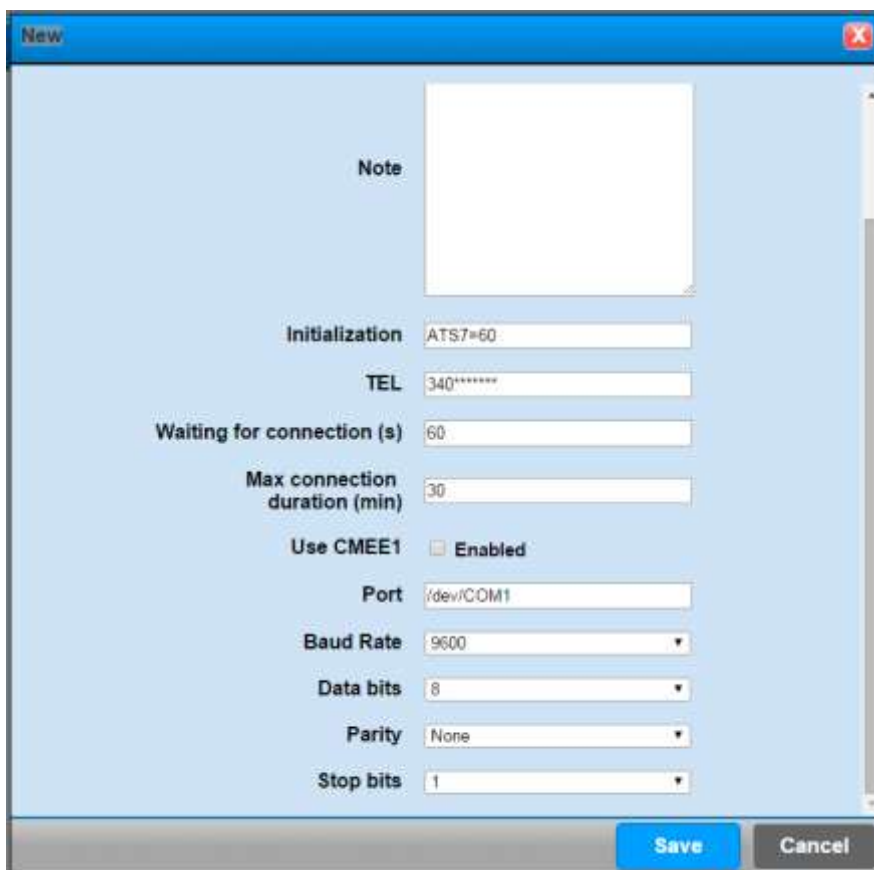
Pool Id	Name pool	Type	Note
2	Pool Vodafone	Modem	

You'll see the following icons::

-  **“Edit”**: you'll see the previous screenshot, and you can change for example, the name of the pool.
-  **“Manage resources”**: you'll access a sub-menu, where you can configure all the modems connected to this pool.

-  **"Display objects status"**: You'll access a sub-menu, where you can display the status of all the modems. The states can be "out of service", "available", or "in use". The system checks the communication between server and modem every 30 minutes, and if it were "out of service", the same one will be reintegrated in the system and it will be available. If the modem were "in use", it means that since that moment there will be a connection.
-  **"cancel"**: it allows to cancel the modem pool

After the modem pool configuration, press the button  **"manage resources"** to configure all the modems which have to be connected to our pool. Press "new" and you'll access the following screenshot:



Everything has been already pre-selected, now you need to put a SERIAL or ETHERNET modem.

The mask will change according to the type of selected modem, anyway put the name (to recognize the modem physically), in the field TEL put the number of the SIM Card contained in the modem and if it's a SERIAL one, configure properly the parameters of the serial, if it's ETHERNET, you'll have to configure only IP address and the communication port.

5.10 Modbus TCP Slave (Optional Module)

This function allows the third parties to access real time data read by the system. This Software provides all the desired real time data on registers configurable by the user, through the “standard” MODBUS TCP Slave protocol (the Master is represented by the object of the customer).

This function is particularly interesting since that the system can work also as a protocol converter. The system “communicates” with the devices on field through the owner protocol, while all the data will be provided through a standard protocol.

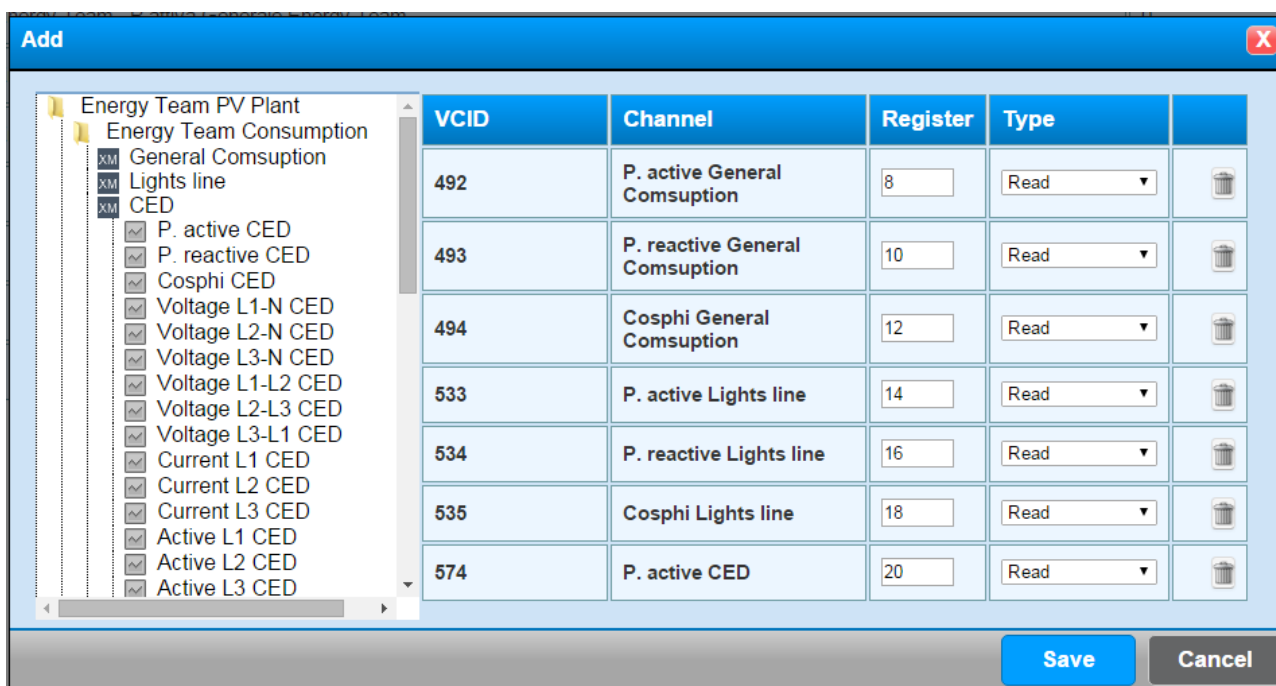
The system can work also as a concentrator, while the server communicates with all the configured devices, the customer system can dialogue only with our Server.

As described below, real –time data are available with **Modbus TCP protocol**. The reading of the configurable registers, is made by the command Holding Register (type 3) **and the data is in Float IEEE754 byte and word swap format** (which occupies 2 consecutive Modbus registers).

You have to follow this path to access the menu:

Home-> Management-> System-> Modbus TCP slave

After you pressed “**add**”, you’ll access to the usual tree structure, select the desired channels by a double click. You’ll see the following mask:




VCID	Channel	Register	Type	
492	P. active General Consumption	8	Read	
493	P. reactive General Consumption	10	Read	
494	Cosphi General Consumption	12	Read	
533	P. active Lights line	14	Read	
534	P. reactive Lights line	16	Read	
535	Cosphi Lights line	18	Read	
574	P. active CED	20	Read	

With this configuration, the Active Power of our general switch will be register 0, while the reactive one will be n. 2 and so on.

During the insertion, the system will try to configure the first couple of free registers in the system (to avoid errors of registers overlap), but if the user wants to configure a set of predefined registers, after having configured the desired register value, in the last channel, the following ones, (if they are free) will be added to the one which has been entered manually.

You’ll have a “**Reading Register**” or a “**Remote register**”.

The only configurable registers are Channels . At the moment, you CAN’T configure mathematical modules , profiles or links. Anyway, you can associate the same channel more times with more registers.

After having pressed “**Save**”, and the positive confirmation of the Server, the final result will be the following one:



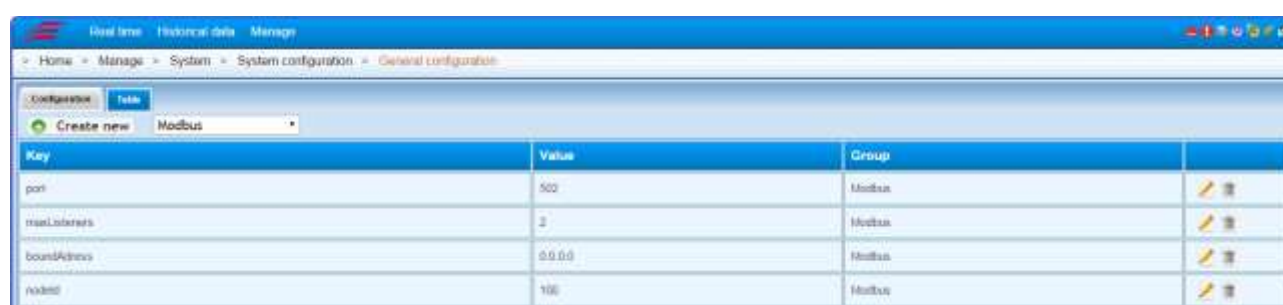
#	VCID	Channel	Register	Type	
<input type="checkbox"/>	482	General Corruption - P. active General Corruption	8	Read	
<input type="checkbox"/>	483	General Corruption - P. inactive General Corruption	10	Read	
<input type="checkbox"/>	484	General Corruption - Output General Corruption	12	Read	
<input type="checkbox"/>	525	Lights line - P. active Lights line	14	Read	
<input type="checkbox"/>	524	Lights line - P. inactive Lights line	16	Read	
<input type="checkbox"/>	526	Lights line - Output Lights line	18	Read	
<input type="checkbox"/>	574	CEO - P. active CEO	20	Read	
<input type="checkbox"/>	575	CEO - P. inactive CEO	22	Read	
<input type="checkbox"/>	576	CEO - Output CEO	24	Read	

For each configured channel/register you can change or delete the single register, or through the Check Box of the first column, you can select massively more than a channel/register to be deleted. Once you've been configured the registers, press **"restart"**, to start-up the configuration or the change which has just been made.

The button **"Save"**, allows to save in .CSV format the whole table, so as to extract in a unique file all the registers configuration which has been made.

The server has got a further configuration, typically made during the start-up of our technical staff, that is to say, in the menu **"general configuration"** you can configure the following settings:

- **Communication Port:** the standard defines the communication port 502, but this one can be modified. In Linux area, all the ports are under 1024, and they can't be used, if necessary you have to configure IPTables, the System operating Firewall. For this kind of operation please contact our Customer Care.
- **Max Listener:** You can limit the maximum number of Master connected to the Server. If it is set on "0", the number is infinite.
- **Bound Address:** You can limit the Master to 1 IP, so the server accepts the connection only from 1 IP. If it is set as 0.0.0.0, it means that the server accepts the connection from everyone.
- **Node ID:** it represents the server address node. The server has got address n. 100 by default.

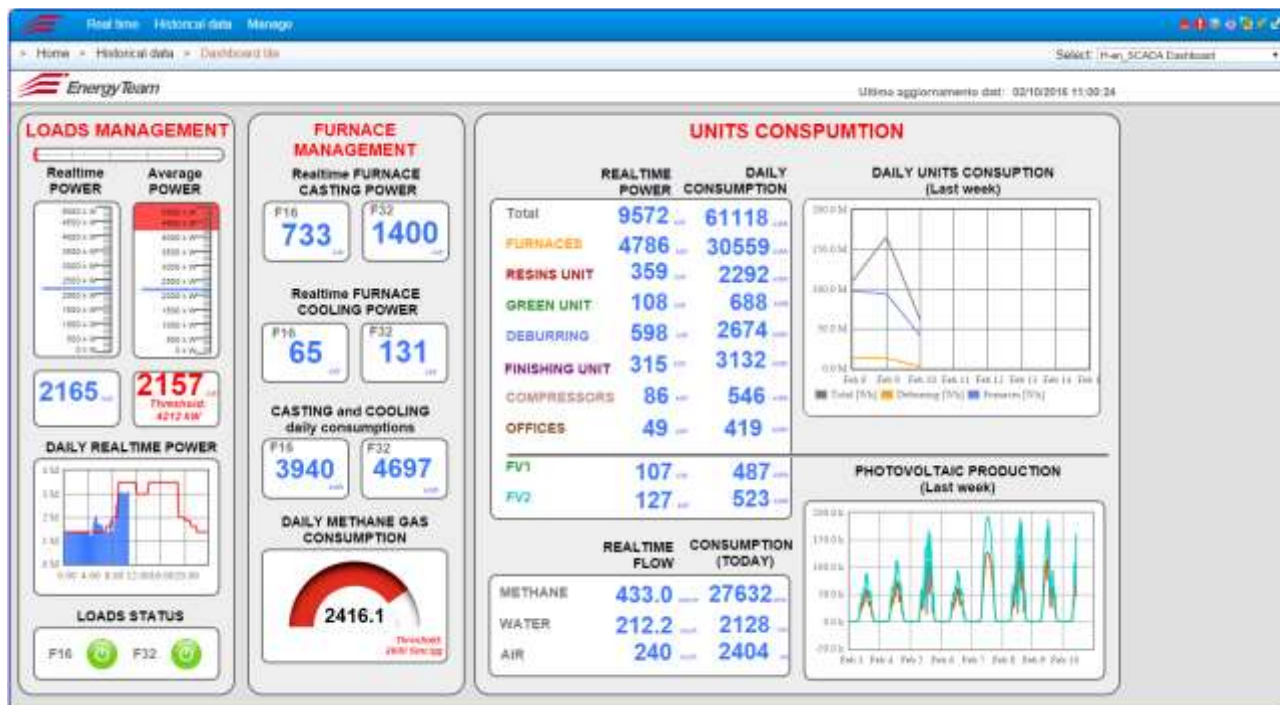


Key	Value	Group	
port	502	Modbus	
maxListeners	2	Modbus	
boundAddress	0.0.0.0	Modbus	
nodeId	100	Modbus	

6 DASHBOARD (optional)

This module is very user friendly, in fact everyone can create synoptic pages showing instantaneous and historical data, alarm status, custom images etc.. it allows to meet any type of request.

Here below an example of a page created by an inexperienced user:



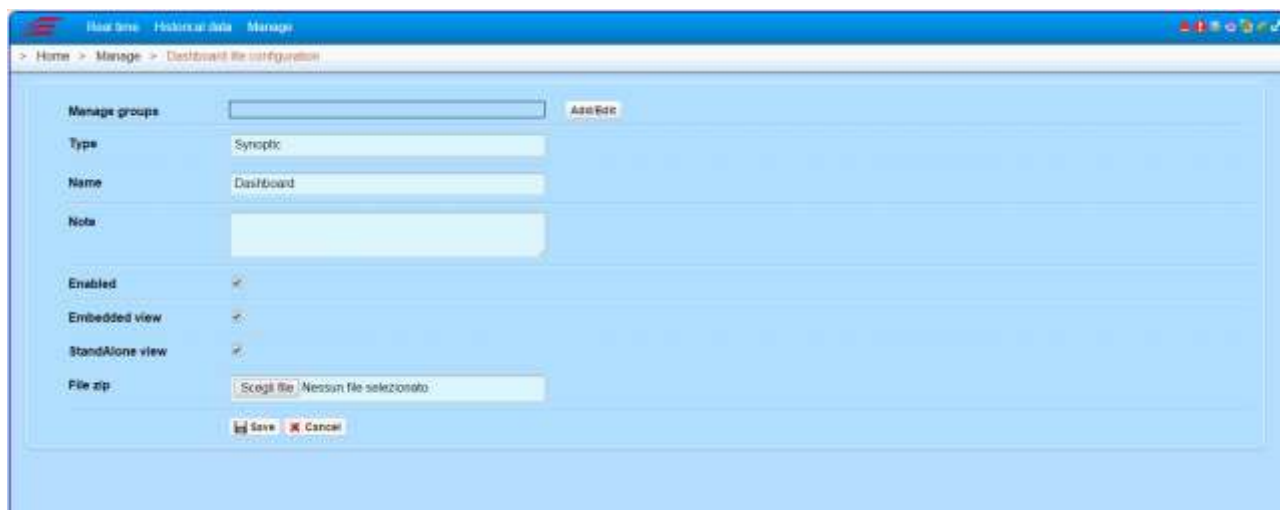
In the example above the user understands immediately the plant pattern and, for this reason, this module is extremely effective for the energy management.

These synoptic modules can be shown as it follows: from the menu **“Home-> Historical Data-> Dashboard”**, or by a **“player”** supplied by Energy Team that will make the Log-in automatically in the Server and it allows to display the synoptic with “full screen”

To see the configuration you have to enter:

Home-> Management-> Dashboard lite Configuration

After pressing the button “New Dashboard” and after selecting “synoptic” type you’ll see the following screenshot:



Give a name, add eventual notes and the status Enabled, preselected by default, it allows to enable or disable the synoptic. The other 2 flags can enable the synoptic in the historical data menu while the second flag, enables the use through an external player.





During the creation you can Upload a file .ZIP containing all the images that can be used in the synoptic. This operation can be made later.

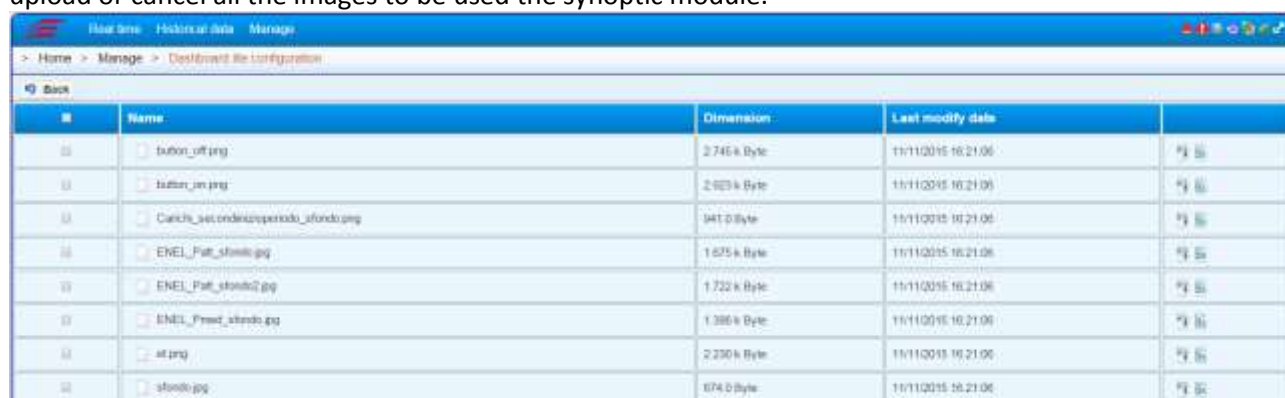
After pressing “Save”, you’ll see the module which have been already created, among the list of the synoptic modules:




















Dashid	Name	Type	Enabled	
1	1_SynopticDemo	Synoptic	Yes	   

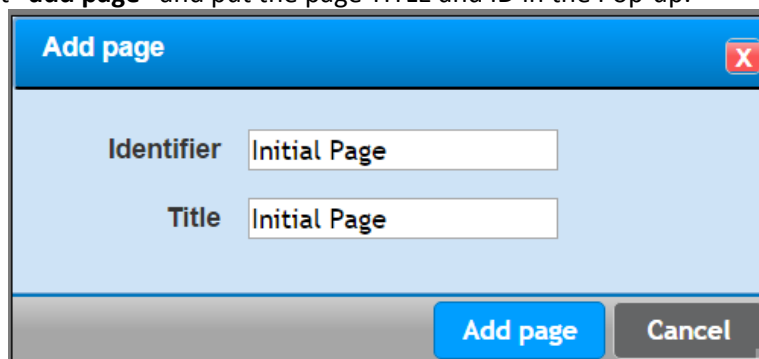
You’ll find some icons on the right:

-  **“Edit”**: You can enter the same screenshot of the synoptic creation. You can change name, management permissions and enable or disable the synoptic in the different modules.
-  **“Cancel”**: this function allows to delete all the dashboard by the server (after confirmation).
-  **“Duplicate”**: It makes a copy of the whole synoptic.
-  **“Manage files”**: by pressing this button, you’ll enter a submenu, where you can download, upload or cancel all the images to be used the synoptic module.



#	Name	Dimension	Last modify date	
01	button_off.png	2746 k Byte	11/11/2015 16:21:06	 
02	button_on.png	2929 k Byte	11/11/2015 16:21:06	 
03	Canche_serieendeciperiodo_sifondo.png	9410 Byte	11/11/2015 16:21:06	 
04	ENEL_Paie_sifondo.png	1675 k Byte	11/11/2015 16:21:06	 
05	ENEL_Paie_sifondo2.png	1722 k Byte	11/11/2015 16:21:06	 
06	ENEL_Paie_sifondo3.png	1386 k Byte	11/11/2015 16:21:06	 
07	at.png	2230 k Byte	11/11/2015 16:21:06	 
08	sifondo.png	6740 Byte	11/11/2015 16:21:06	 

-  **“Manage Pages”**: this task allows to create “physically” the synoptic page. In the lower part of Browser, select **“add page”** and put the page TITLE and ID in the Pop-up:



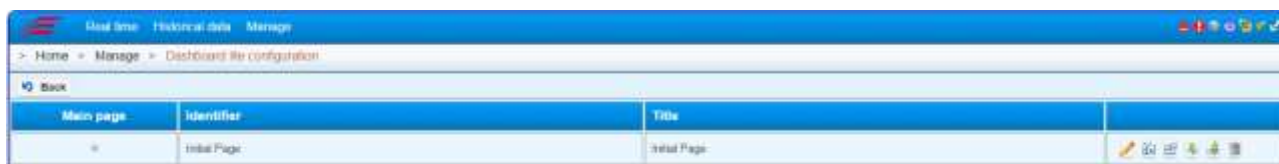
Add page

Identifier







Title

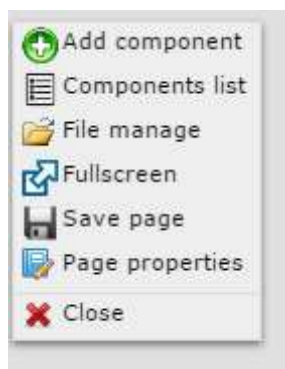
Add page **Cancel**

Press **“add page”** and you’ll see the following screenshot:

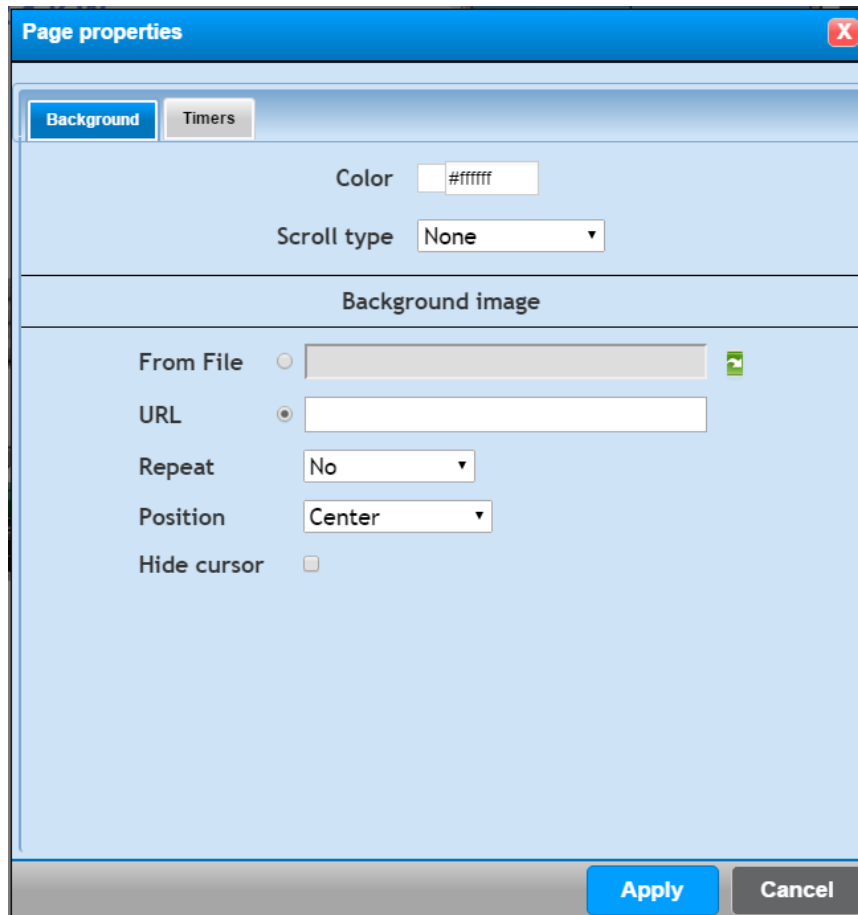


As you can see, a new page of the server has been configured and there you can find the following icons:

-  **“edit”**: this function allows to access the same screenshot of the synoptic page creation. You can change ID and name of the page.
-  **“Duplicate”**: This button allows to create a copy of the whole synoptic page.
-  **“Cancel”**: it allows to delete the whole page by the server, after confirmation.
-  **“Import configuration”**: This icon allows to import a XML file containing all the synoptic page configuration.
-  **“Export configuration”**: This button allows you to export a XML file containing all the synoptic page configuration.
-  **“Manage contents”**: this function allows to access the “effective” configuration of the synoptic page. By pressing this button you’ll see a second page of the browser in “full screen” mode where the user can configure its page according its needs, by using the mouse right button. Once you access the contents of the page, you’ll see the following menu, by pressing any area of the Browser:



- **Add component**: this function allows to add a single component. Then, we’ll list all the possible components that can be configured.
- **Components list**: This function allows to see the list of all the components drawn in our synoptic page.
- **Manage file**: The user can enter a page which allows to manage all the images used in this synoptic.
- **Full screen**: It allows to maximize the synoptic configuration page in a full screen mode.
- **Save page**: The user must save its page, otherwise the system WON’T save automatically the synoptic page modifications/configurations.
- **Page properties**: You enter a submenu, where you can configure the background of the synoptic page. As you can see you can define the background color, set an eventual scroll in X and Y axis, add an image with the relative position and hide or not the mouse pointer.




Page properties

Background Timers

Color

Scroll type

Background image

From File ☐ 

URL ☒

Repeat

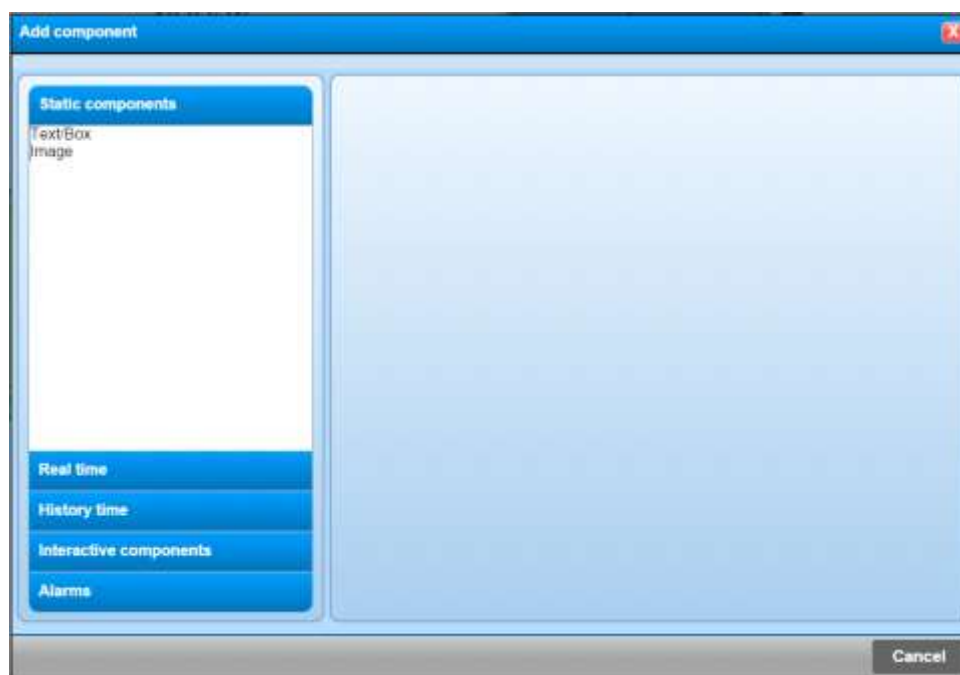
Position

Hide cursor ☐

Apply Cancel

- **Close:** This button allows to close the configuration page. The user is warned to save the page, otherwise the modifications will be lost.

Click in any part of the synoptic page with the mouse right button, to add a component and then select the function **“add component”** with the left button. You will see the following screenshot:



On the left side there are “groups” of components called **Static Components**, **Real Time**, **Historical**, **Interactive Components** and **Alarms**.

Each group contains different **“subgroups”**: as you can see in the above image, each static component contains 2 subgroups called **“texts/boxes”** and **“image”**. The desired components will be uploaded on the right side of the pop-up, by selecting with a single click the required group, and by selecting with a double click the desired subgroup. The group **“Static components”**, includes 3 components which belong to the Subgroup **“texts/boxes”**. Once the desired component has been chosen, please select it with a click.

Please find below all the tasks of the single components:

6.1 Components List

This table shows all the components of the system:

GROUP	SUBGROUP	COMPONENTS LIST
Static Components	Texts/boxes	Simple box
		Latest update
		Simple text
	Image	Image
		Sequence of images
Real Time	Texts/Graphics	Value only
		ON/OFF Image
		Graphic Trend
		Pie chart
		Linear 1
Historical	Radial indicators	Radial 1
	Graphic texts	Totalizer
		Simple graphic
	Telemetry	ON/OFF
		Button ON/OFF
Interactive components	Navigation	Link to page
		Sequence of pages
	Dashboard alarms	Go to page
		Fixed threshold alarm

Simple box: with the following properties: General features, Background, [Rim](#)

Latest Update: with the following properties: General features, [Font Style](#), Text

Simple text: with the following properties: General features, [Font Style](#), Text

Image: with the following properties: Background

Sequence of images: with the following properties: General features, Feature 1

Value only: with the following properties: General features, Channel, Font Style, [Timers](#)

Image ON/OFF with the following properties: General features, Channel, ON-OFF-Error, [Timers](#)

Trend Graphic: with the following properties: General features, Background, Border, Channel, Feature 2, [Timers](#)

Pie chart: with the following properties: General features, Background, Border, Channel, [Feature 3](#), [Timers](#)

Linear 1: with the following properties: General features, background, Border, Channel, [Feature 4](#), [Timers](#)

Radial 1: with the following properties: General features, Background, Border, Channel, [Feature 5](#), [Timers](#)

Totalizer: with the following properties: General features, Channel, Period, [Font Style](#), [Timers](#)

Simple graphic: with the following properties: General features, Background, Border, Channels, [Feature 6](#), Period, [Timers](#).

ON/OFF: with the following properties: General features, Channel, ON-OFF-Error, [Timers](#)

ON/OFF Button: with the following properties: General features, ON-OFF-Error, Background, Border, Timers

Link to page: with the following properties: General features, [Font Style](#), Text, Link to page

Sequence of pages: with the following properties: General features, [Feature 7](#)

Go to page: with the following properties: General features, Background, Border, [Feature 8](#)

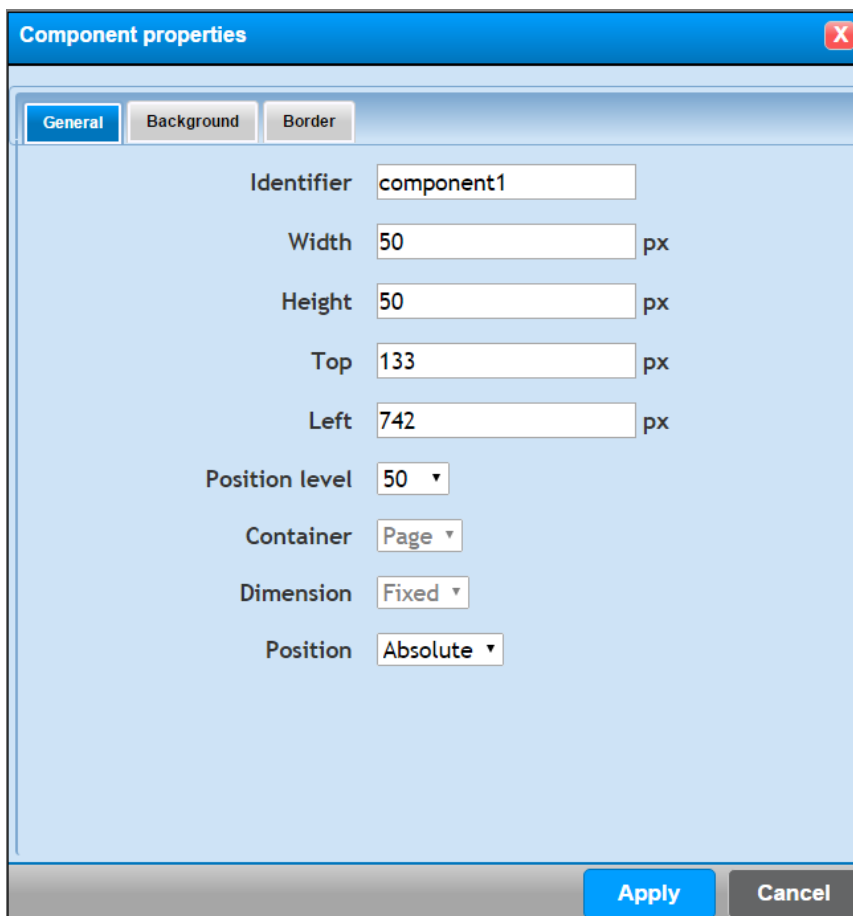
Fix threshold alarm: with the following properties: General features, Channel, Alarm, Status Alarm-Not Alarm, [quiet](#), [Timers](#)

Now let's see how to put and configure all the components with their properties.

These ones are shared among the different components, for this reason all the properties will be described in a common part.

6.2 Properties list

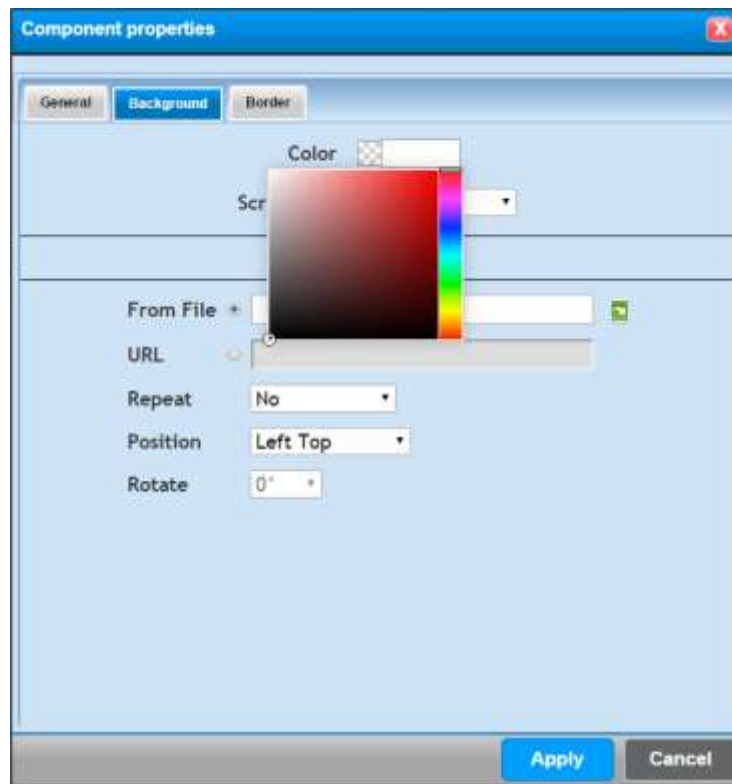
6.2.1 General features”



In “General Features” you can:

- Give a name for identification, this property is very useful when you have to add different components in a synoptic page and it facilitates the search/maintenance when acronyms are used.
- Define exactly the number of Pixel which must be large or high, the component and the distance (always measured in pixel) from the top and from the left. This operation can be done directly by dragging with the mouse on the component.
- The placement level represents the axis Z. Each synoptic page has got 100 placement levels of the axis Z (which represents the depth axis). The level 50 is halfway. The drawn component on the level 49 is behind with respect to a component drawn on the level 50.
- The component placement can be absolute or referred to another component. If a component is moved, they will move also the other ones related to it.

6.2.2 “Background” Property

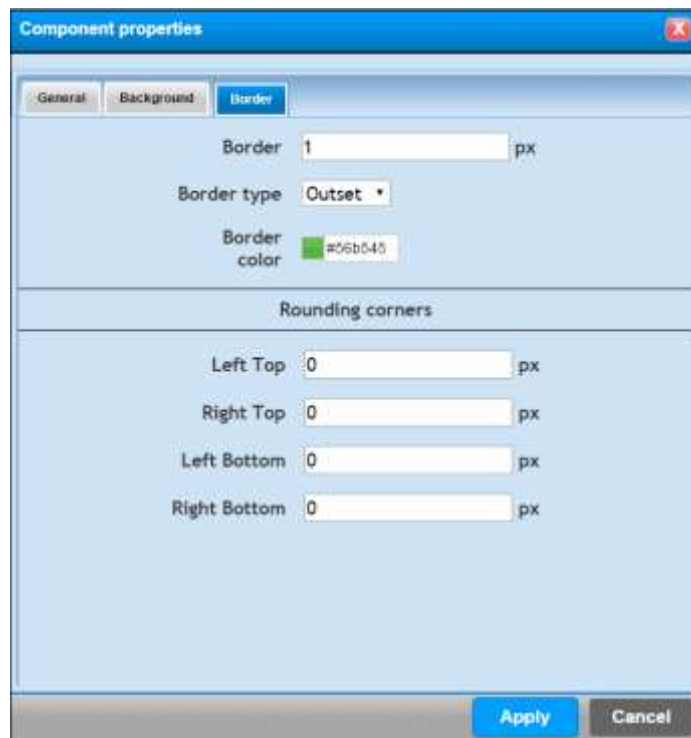


Here you can

- Define the background color, acting directly on the color scale and by selecting the desired color with the mouse left button. Otherwise you can write (or copy) the alphanumeric value.
- Enable or disable the type of scroll.
- Set an image in the background, which could be selected among the ones previously uploaded on the server, or the client will download the image from a proper configurable URL. You can decide to repeat the image, in the drawn area, and the related position. Finally you can rotate the image.

N.B. The uploaded image can't be resized automatically according to the size of the component itself, so, if the image size is bigger than the component one, the image will be cut.

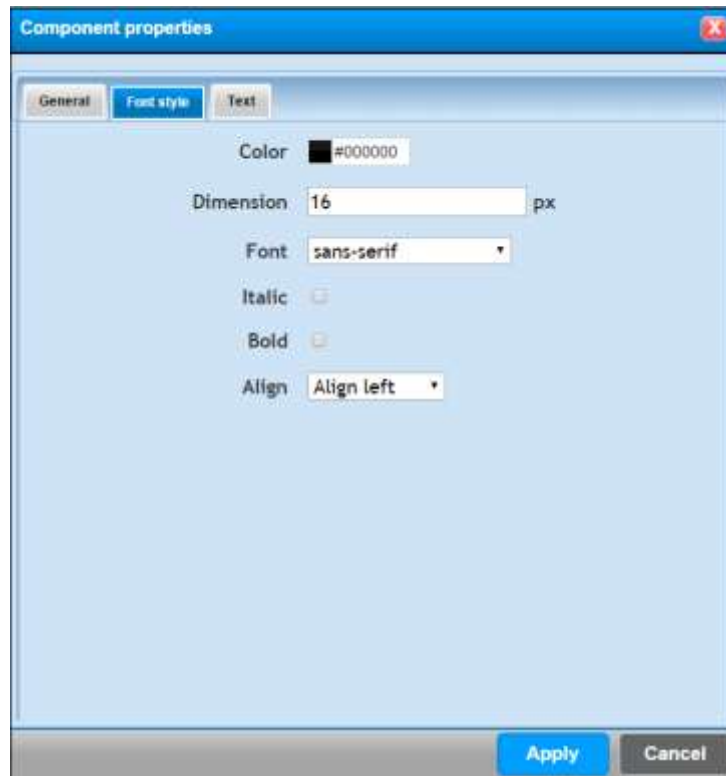
6.2.3 Property “Border”



Here you can:

- Define the number of thickness pixel referred to the border.
- Define the type of border, which could be: Solid, double, dotted, with lines, in relief, nestled, embossed.
- Define the color border, acting directly on the color scale and by selecting the desired color with the mouse left button. Otherwise you can write (or copy) the alphanumeric value.
- Set the rounding of 4 corners, defining the number of pixel.

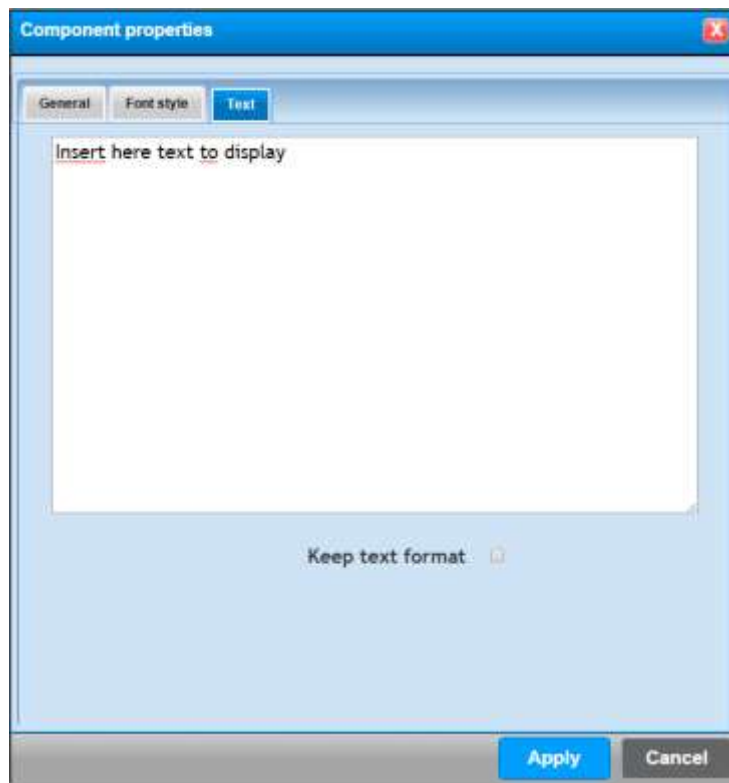
6.2.4 “Font Style” Property



Here you can:

- Define the color of the text. By selecting the box on the right you can choose the desired color. Automatically you'll see the color code that you can copy in other windows.
- Define the font size. You'll see 16 pixel by default, set the desired size.
- Define the font type. You can choose the desired font among the ones you'll see, by selecting "Italic" and/or "Bold".
- Set the text alignment in the drawn component

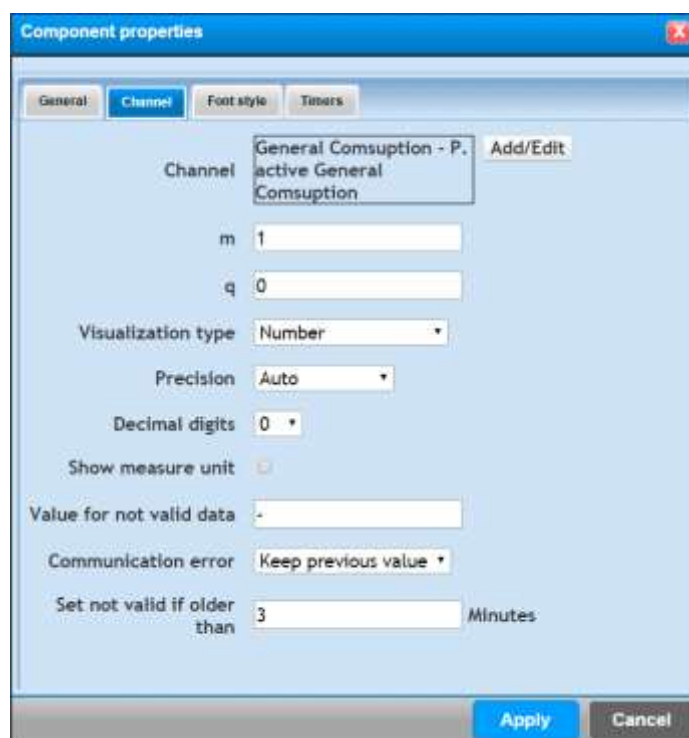
6.2.5 “Text” Property



Here you can:

- Write the text you want to display in the component. In the writing box you can wrap a text and the function “Keep formatting” allows you to keep the same formatting of the writing box or not.
- The check box “**Display minutes**”, will be visualized only in some components. It allows to enable or not the hour, minutes and seconds of the components (if provided).

6.2.6 “Channel” Property



Here you can:

- Select the channel you want to use in the component. Press the button add/edit to select the desired channel. You can also select a mathematical module.
- **m and q parameters** you can apply a coefficient and an offset to the “raw” data read by the physical channels.
- **Type of visualization**, it can be “number”, “Fixed number”, and finally “ON/OFF”. The user decides how to display data, if it is a number, the user will establish the precision and the number of decimals; if it is a “Fixed number”, the user will decide exclusively the number of the total digits; if it is “ON/OFF” the system displays ON or OFF status according to the logic level 0 or 1 (to be connected with a Status channel).
- **Accuracy**: you can set the accuracy to display data. For example the system put automatically the letter k or M according to the measure size, or the user can force the measure display with the normal value (referred to the measure unit of the International system) or he can force it in KW or MW etc.
- **Decimal digits**: You can set the desired number of decimal digits.
- **Display the measure unit**: the user decides if he has to display the measure unit or not.
- **Value for not valid data**: the user can define the font to be displayed in case the instantaneous one wouldn't be available.
- **Communication Error**: the user defines if showing the latest valid data or the error status.
- **Consider not valid...**: if the latest measure is older than “x” minutes, the erroneous status will be notified (if desired).

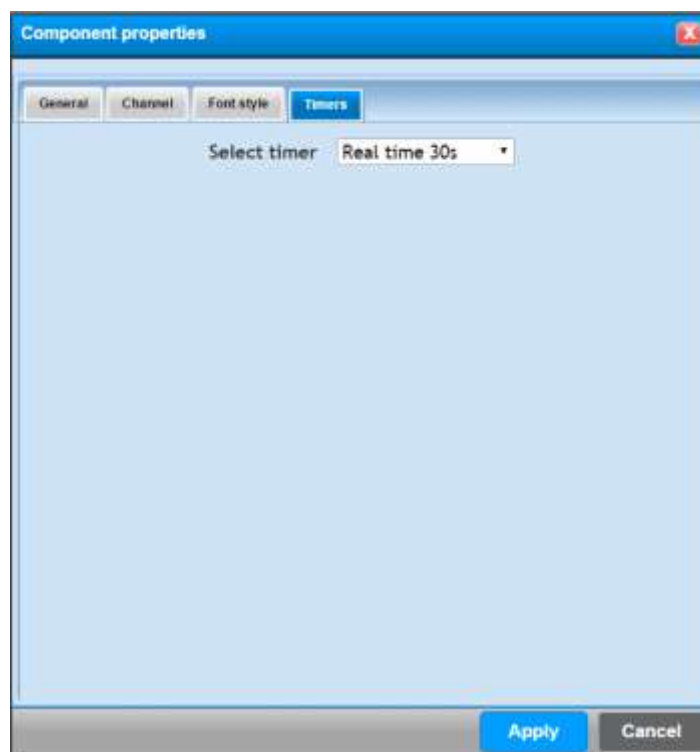
Note: Certain fields could not be visible in some components, because unusable. .

6.2.7 “Channels” properties



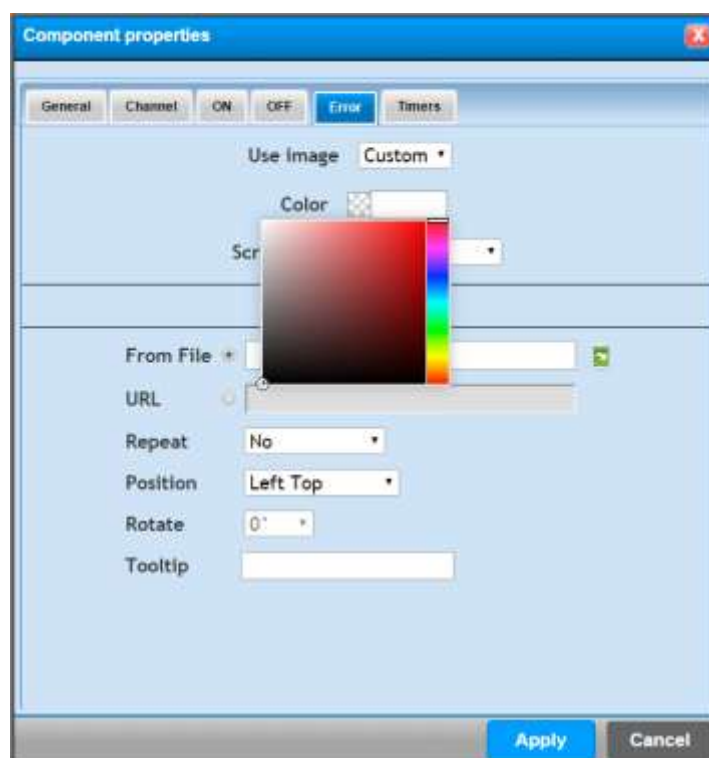
Here you can configure all the channels that will be part of the configured components. You have to press the button “add channels” and select by a double click all the channels you want to put in the component. After that, you’ll see the list of the selected channels, as shown above. After its configuration a channel can be edited or deleted.

6.2.8 “Timers” properties



This TAB allows to set the update frequency of the component. Actually, timing has been already pre-selected by the same components, because currently there are only 2 Timers, one for real time components (update every 30 seconds) and one for historical data (updating every 5 minutes). The TAB has been provided because the Timers programming can be configurable by the user in the future.

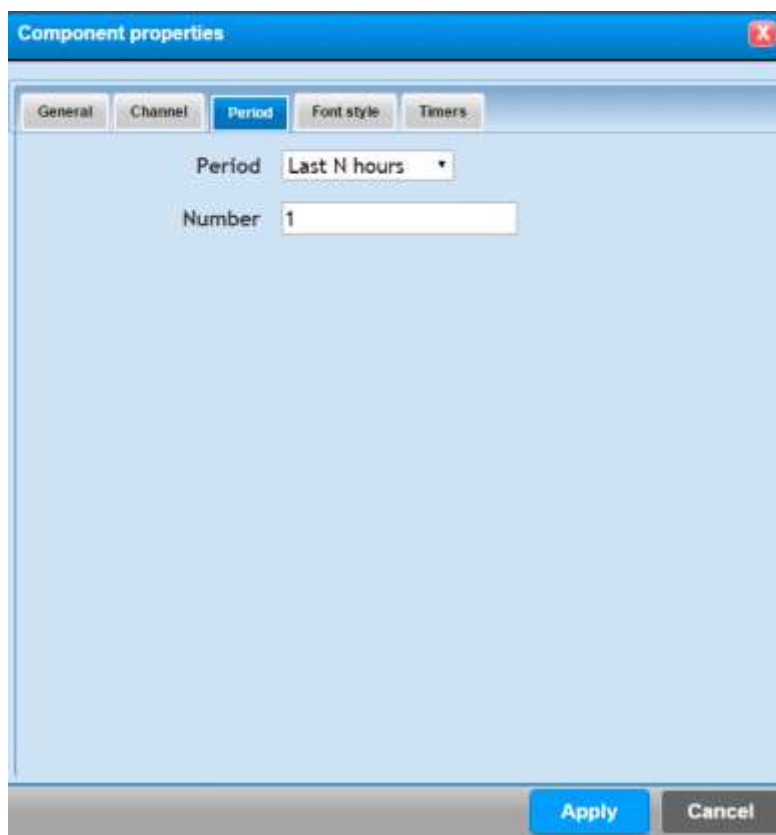
6.2.9 “ON, OFF, Error” Property



In this TAB you can associate an image to each status.

The component provides default images but the image can be customized (to be imported into the server according to the proceeding previously described).

6.2.10 “Period” Property



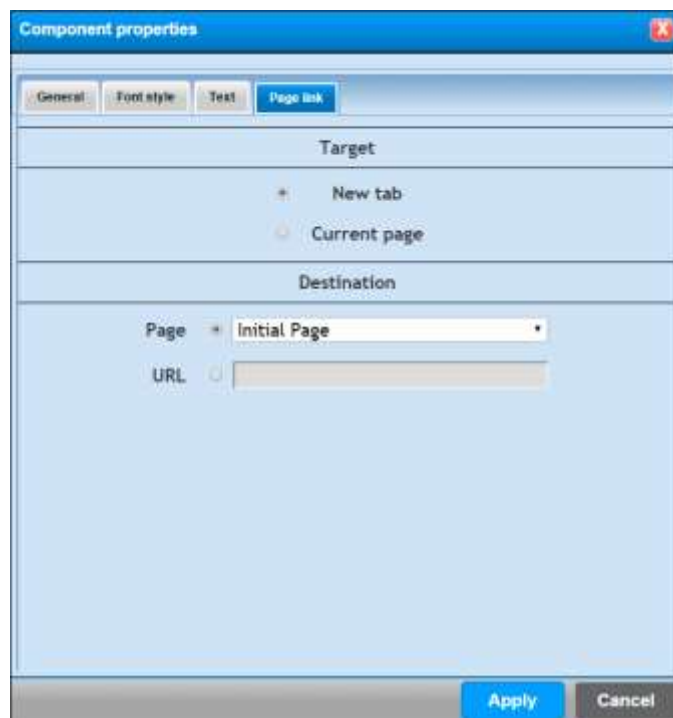
Here you can define a specific range of time chosen by the customer, so that you can select the last period of data you want to publish on the component.

You can choose among: Latest N Hours, Current Day, Latest N Days, Current Week, Current month, Current year, from the day.

All these possibilities can vary according to the selected component, so the above mentioned combinations may not exist.

The user could also define the N. period, always according to the selected period. The configuration mask will change automatically according to the desired time period.

6.2.11 Property “Link to Page”

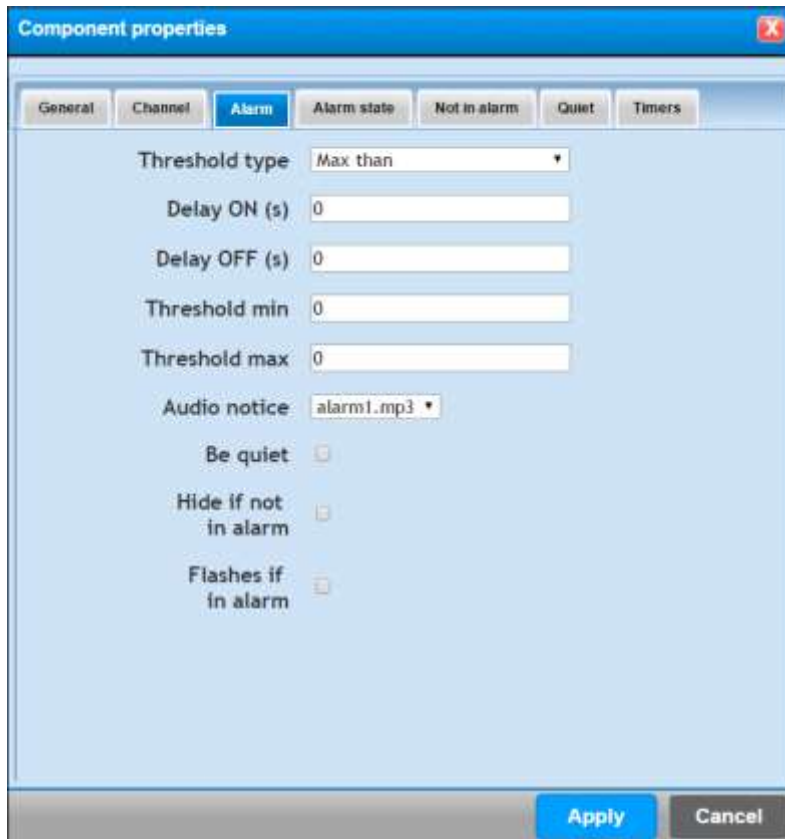


Here you can configure a connection to another page of the synoptic. The system doesn't provide a limit of configurable pages in the same synoptic, so this component defines to which page you have to make a connection with the Mouse left button.

In Target area, the user decides if maintaining the same Browser card or if he has to open a new one.

After the configuration, change the TAB or press “Apply” to enable modifications.

6.2.12 “Alarm” Property



Here you can configure the type of alarm managed by the synoptic.

Please find below the possible settings:

Type of Threshold: From the drop down menu you can select one of the following types:

- Greater than: The alarm occurs if the instantaneous measurement of the selected channel (in the feature channel) is greater than the value set in the field **Max. Threshold**. The alarm stops if the measured instantaneous value is lower than the value set in the field **Min. Threshold**.
- Less than: The alarm occurs if the instantaneous measurement is lower than the value set in the field **Min. Threshold**. The alarm stops if the measured instantaneous value overcomes the value set in the field **Max. Threshold**.
- Internal Band: The alarm occurs if the instantaneous measurement of the selected channel is between **min. Threshold** and **max. threshold**. The alarm stops if the measurement IS NOT between these thresholds.
- External band: The alarm occurs if the instantaneous measurement of the selected channel IS NOT included between **min. Threshold** and **max. Threshold**. The alarm stops if the measurement is included between these thresholds.

ON and OFF delay: they're both expressed in seconds, this range of time represents the minimum interval useful to start or stop an alarm condition.

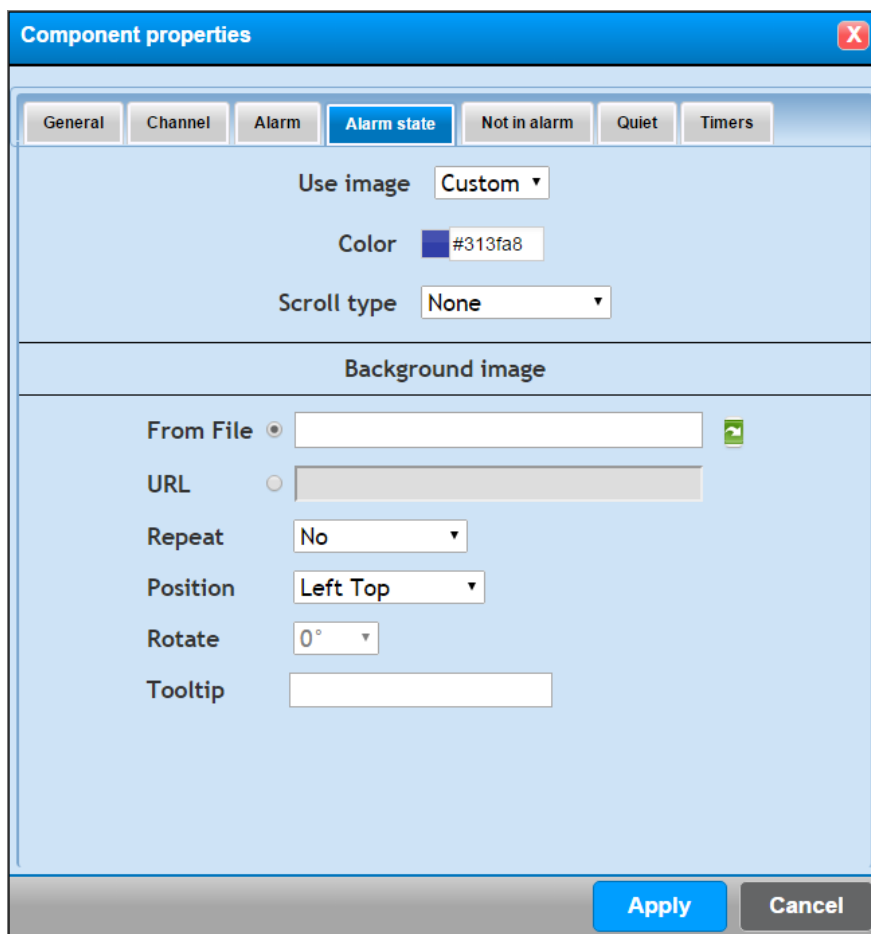
Sound Alert: You can select or not a sound alert

Quiet: you can silence the alarm by a click with the mouse left button

Hide if not in alarm: If it is selected and there is not alarm, the component will be hidden.

Blink if there is an alarm: If it is selected, the alarm status figure will blink and you'll see an alarm condition. On the other hand, the figure will be "static".

6.2.13 “Alarm-Not in Alarm Status” Property



Component properties


General Channel Alarm **Alarm state** Not in alarm Quiet Timers

Use image Custom ▾

Color #313fa8

Scroll type None ▾

Background image

From File ☒ 

URL ☐

Repeat No ▾

Position Left Top ▾

Rotate 0° ▾

Tooltip

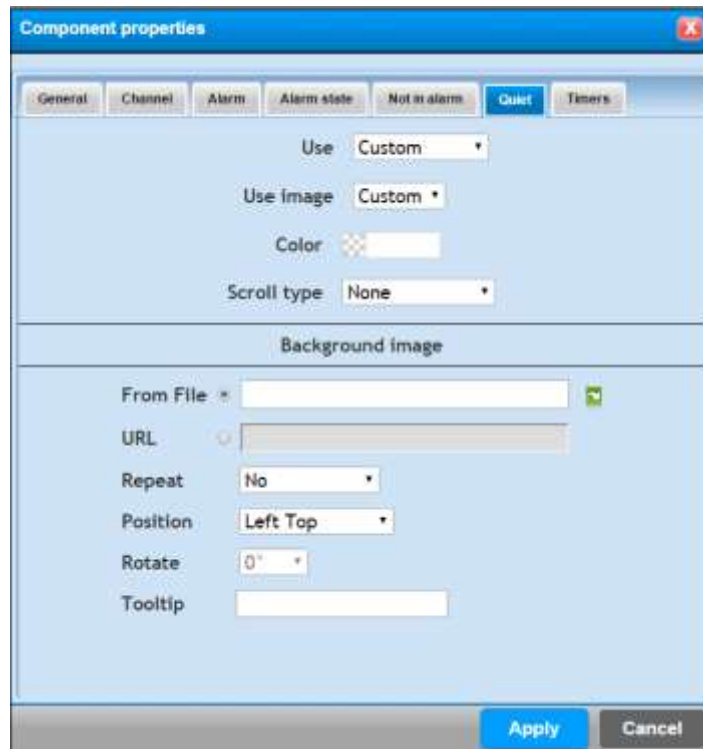
Apply Cancel

Here you can configure the image to be displayed when you are in a condition of “Alarm” or “Not alarm”.

The system will propose an image of default, or a customized type. In this case you can select a background color, an image, the relative positioning and you can configure the “tooltip”, that is to say what to write when the operator moves the mouse indicator on the component.

When the configuration is done, change the configuration TAB or press “Apply” to enable modifications.

6.2.14 “Quiet” Property



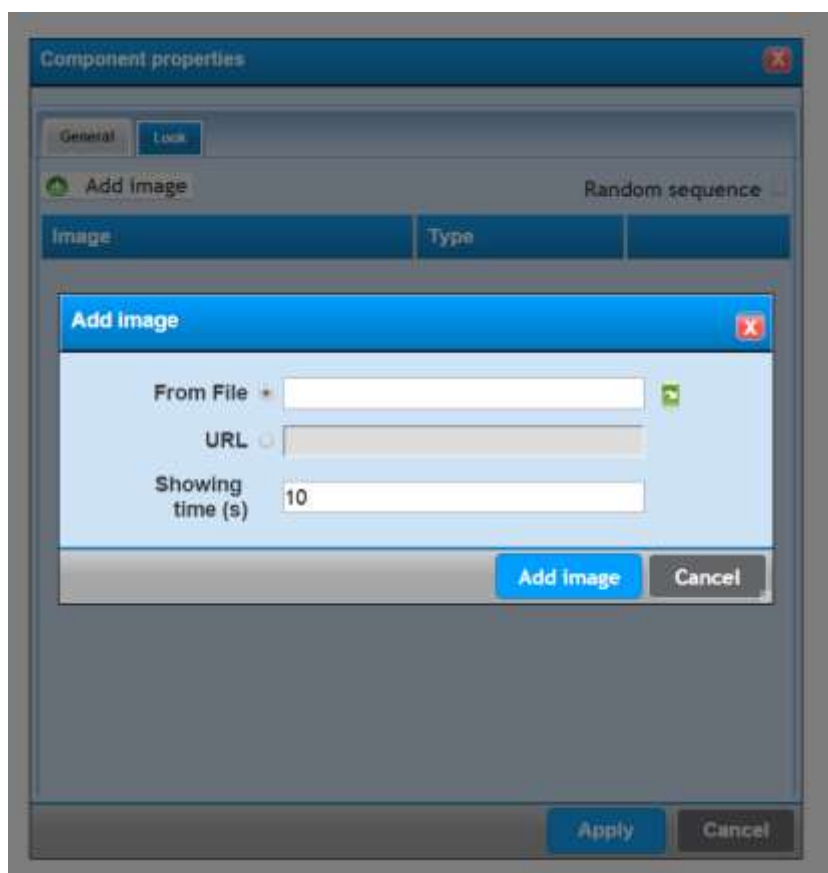
This property is referred to an alarm status notified to the operator.

In this case the user can use the same image of the alarm/not alarm status, an image of default or a customized image. In this case you can select a background color, an image, the relative positioning and you can configure the “tooltip”, that is to say what to write when the operator moves the mouse indicator on the component.

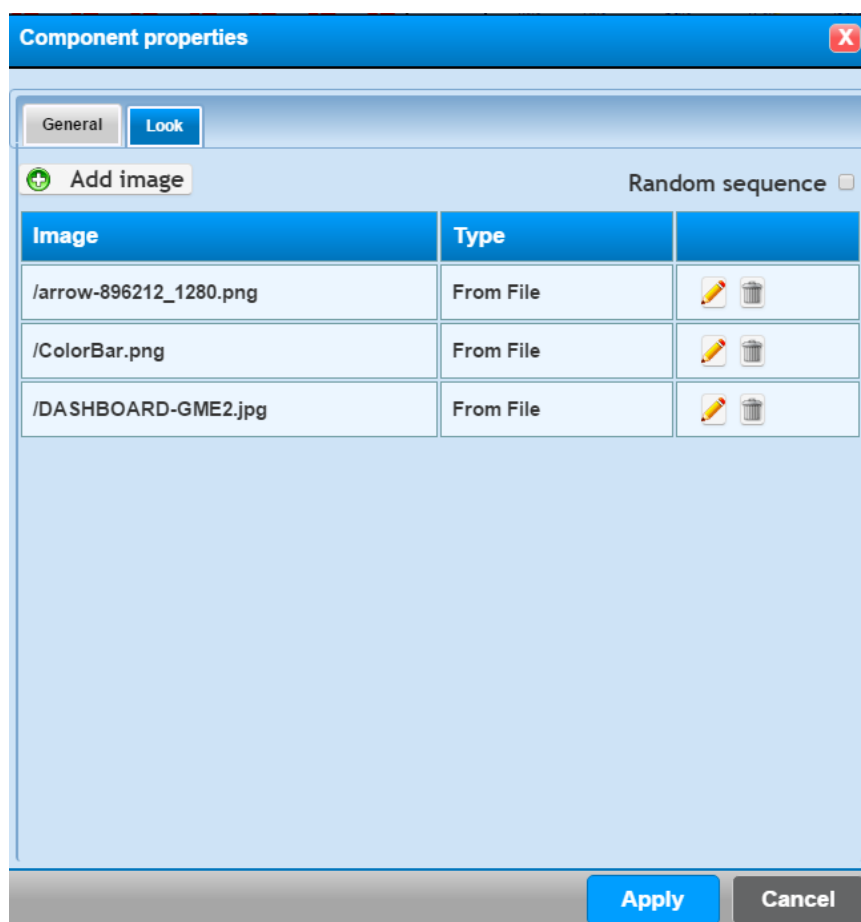
When the configuration is done, change the configuration TAB or press “Apply” to enable the modifications.


6.2.15 Property “feature type 1”

In this TAB you can configure a sequence of images.

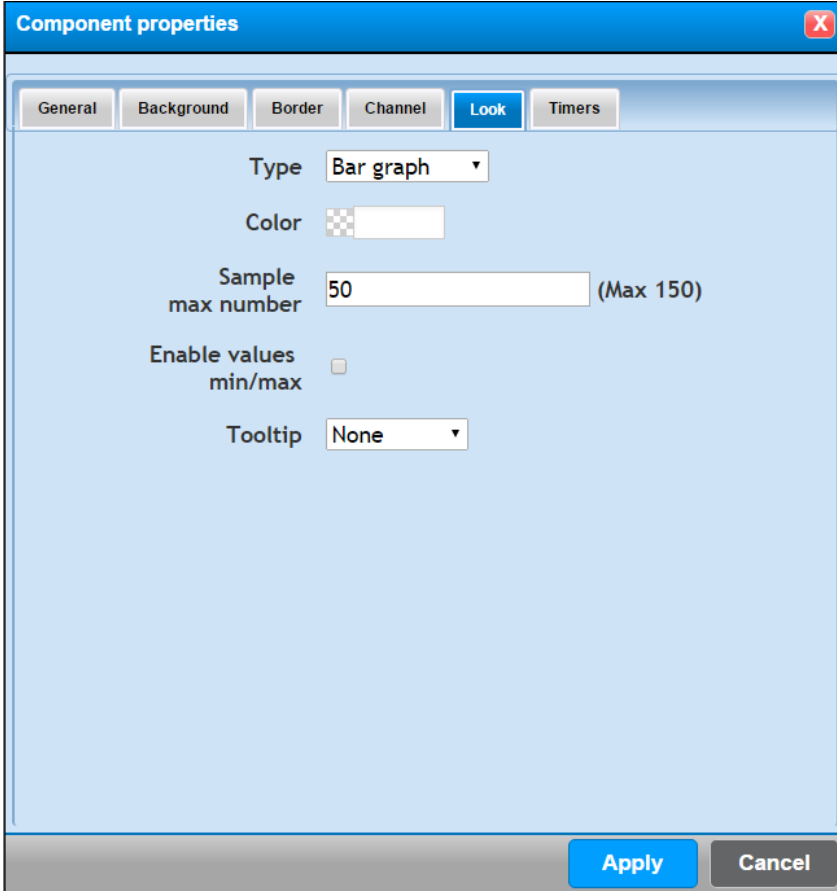


If you press the button **“Add image”** you can add all the images that we want to display in the component, (it can be an image of the server, or you can configure a URL of destination. Then, for each additional image, the user decides which is the time of visualization (time expressed in seconds).



Once the configuration of all the images has been made, you can edit the single image (by pressing the button ), or you can delete the image from the component. In addition you can set a random sequence of the images visualization.

6.2.16 Property “Feature type 2”



Component properties

General Background Border Channel **Look** Timers

Type: Bar graph

Color: ☐

Sample max number: 50 (Max 150)

Enable values min/max: ☐

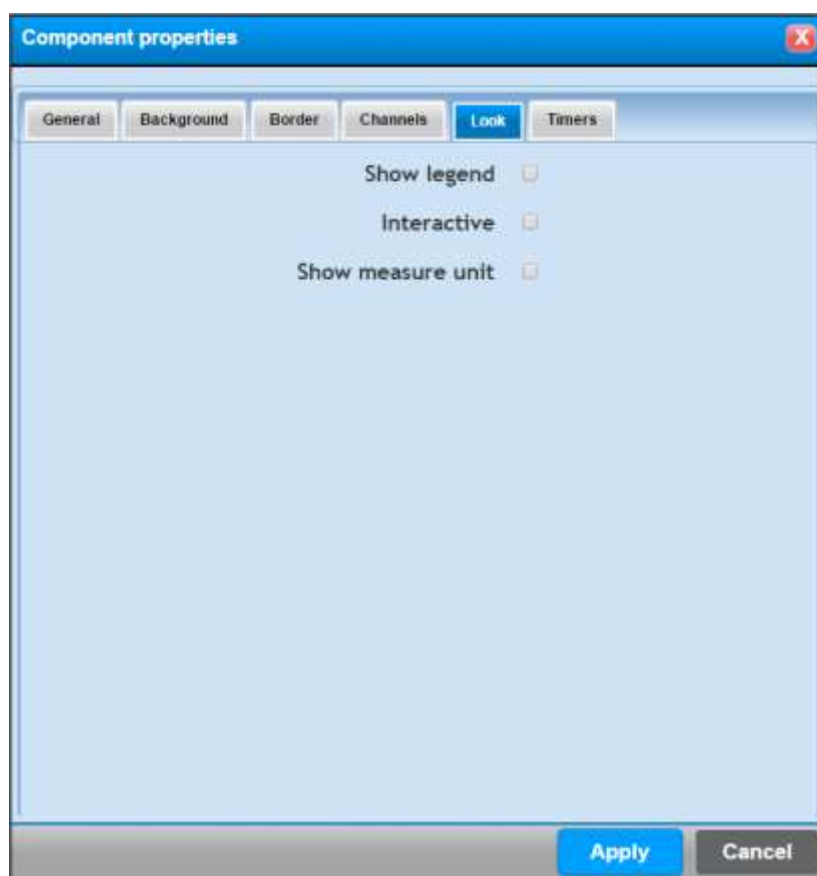
Tooltip: None

Apply Cancel

Here you can configure:

- The type of graph: line graph or bar chart
- Color
- How many samples there will be in the graph, all the real time data will be displayed in this graph. For example, once you’ve displayed 50 samples, the oldest one will be removed from the visualization. You’ll see a graph scrolling forward maintaining the latest 50 samples of the instantaneous measurement.
- You can enable a minimum or maximum value
- You can add a tooltip and put the text you want to display when the mouse is moved into the component area.

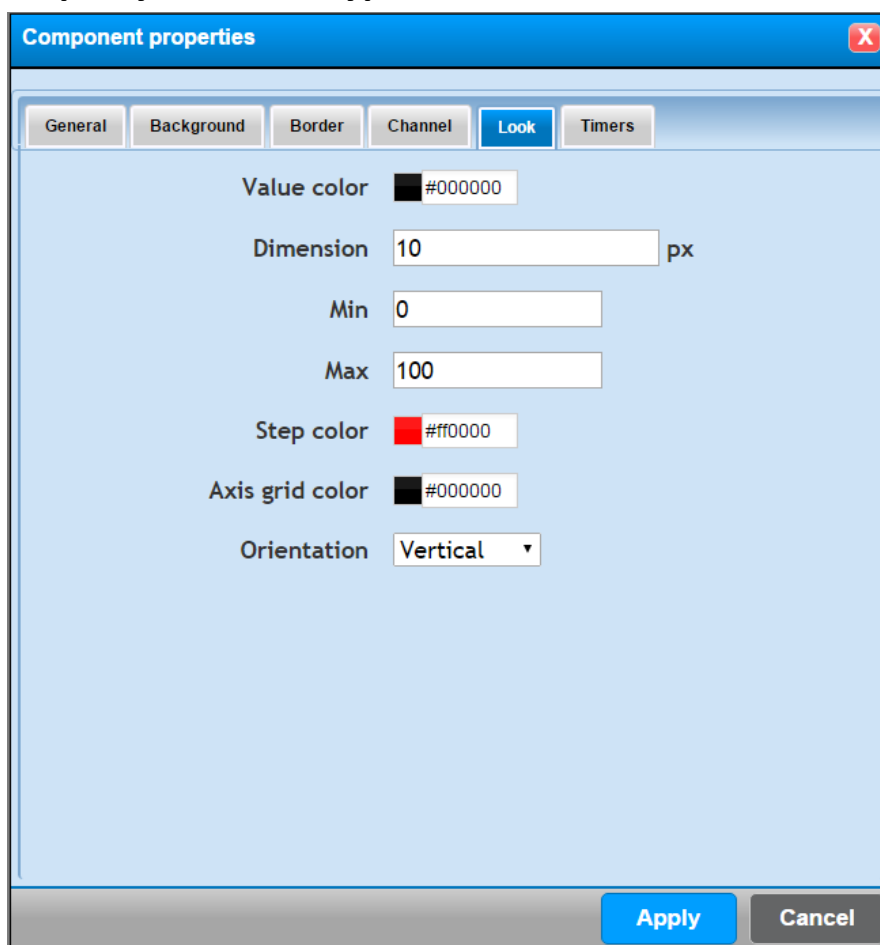
6.2.17 Property “Feature type 3”



Here you can:

- Show the legend
- Interactive, it enables the visualization of additional information if the mouse is moved in the component area.
- Display the unit of measure

6.2.18 Property “Feature type 4”



Component properties

General Background Border Channel **Look** Timers

Value color #000000

Dimension px

Min

Max

Step color #ff0000

Axis grid color #000000

Orientation Vertical ▾

Apply Cancel

Here you can set:

- Color of the value
- Size of the value expressed in pixel
- Minimum and maximum value
- Indicator color
- Scale color
- Orientation orientation of the component (horizontal or vertical)

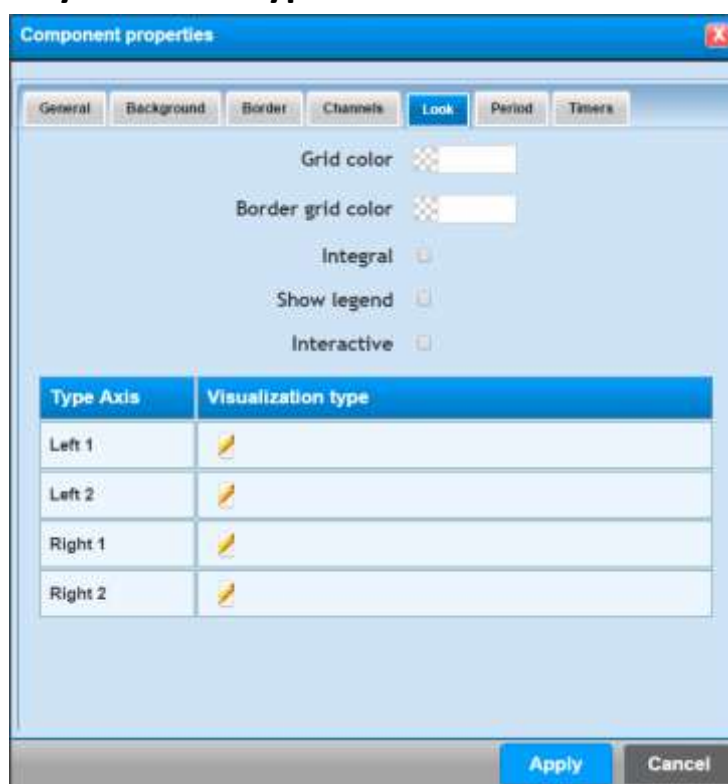
6.2.19 Property “Feature type 5”



Here you can set:

- Color of start/end scale, and the color of the Value. The color of the component will gradually change according to the measured size.
- Maximum and minimum value
- Indicator background color
- A title if desired
- The component shadow and animation

6.2.20 Property “Feature type 6”



Here you can set:

Grid color: you can configure the color of the graph and grid color

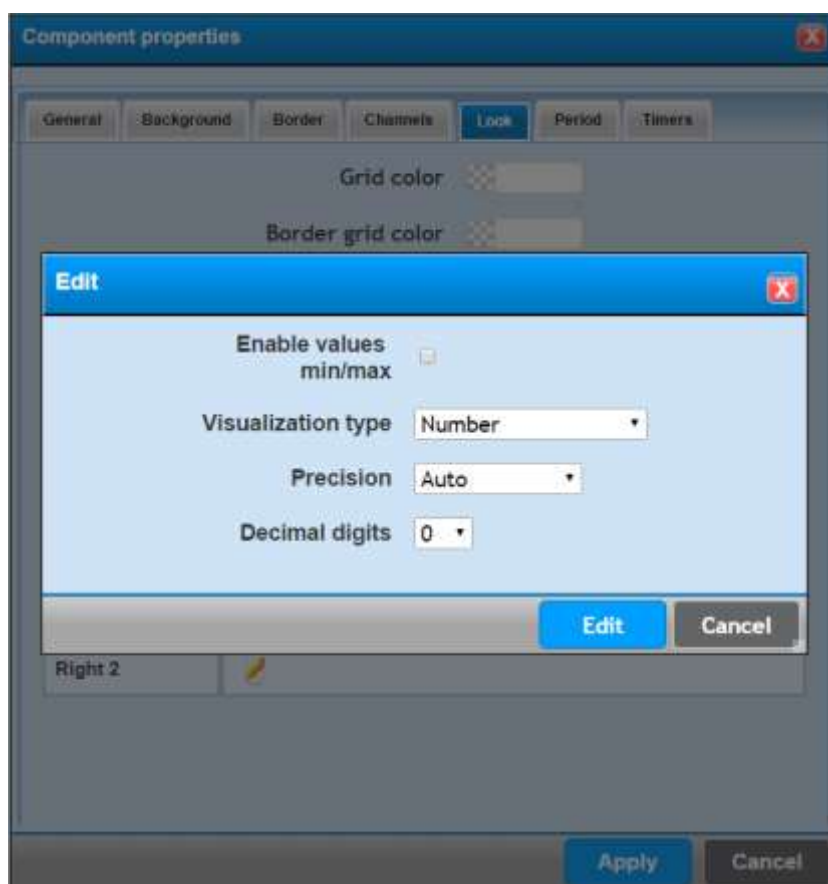
Color of the grid border: you can set also this function

Integral: the displayed data will be integrated, so if the channel were a power (with unit measure “W”), the declared data will be expressed in energy.

Show the legend: you’ll see the legend of the channels displayed in the graph

Interactive: by enabling the tick, you’ll get the graph visualization in the interactive mode.

By selecting the button  available for each vertical each, you’ll see the following screenshot:

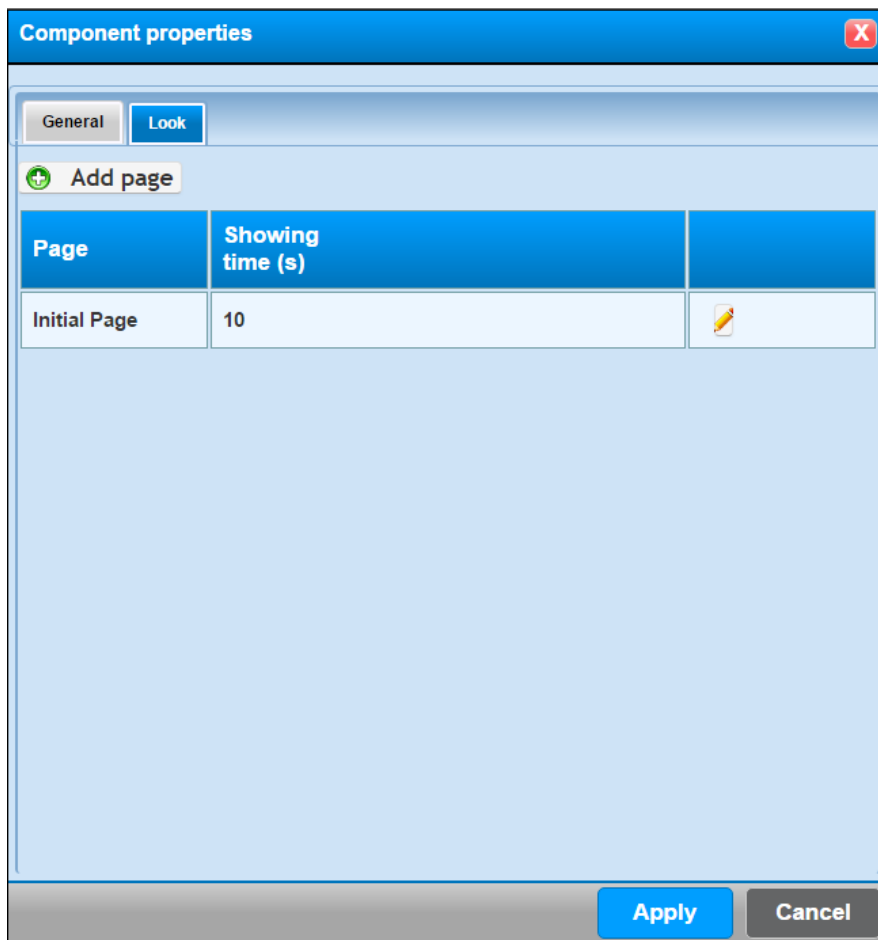



Here you can:

- Enable a minimum and maximum value
- Select the type of visualization (number, or number in fixed digits)
- Set the accuracy of visualization (Automatic, normal value, K, M, etc.)
- Set decimal digits.


After you've defined such settings, click on edit.


6.2.21 Property “Feature type 7”



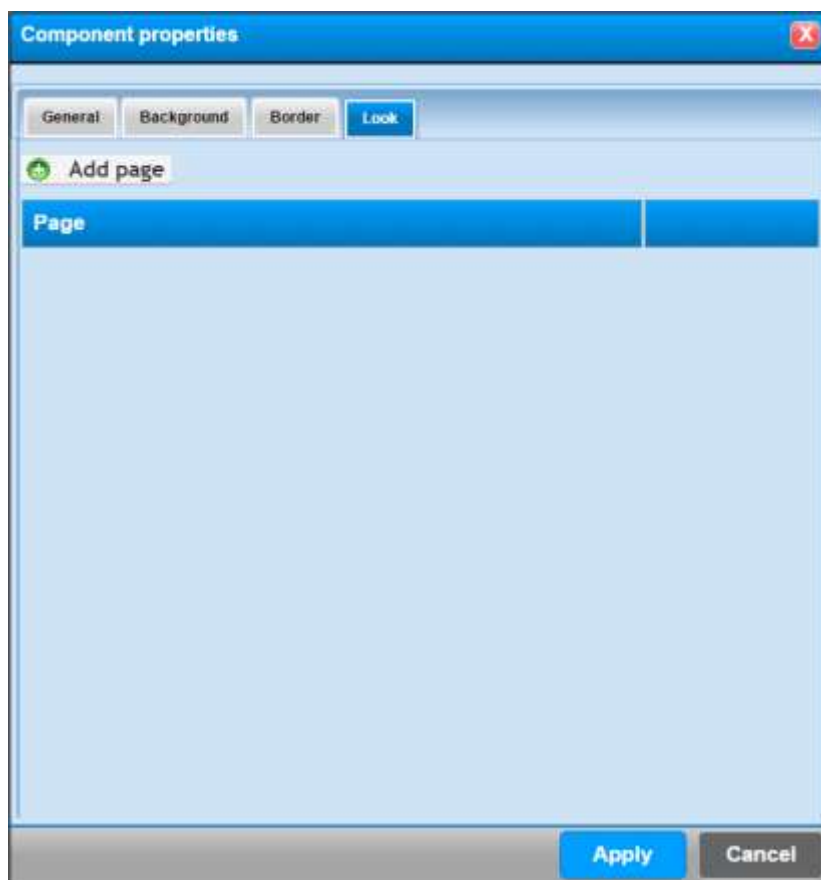
Page	Showing time (s)	
Initial Page	10	

This function allows to set the visualization time of each desired page. Press the button “*add page*” to add a new page in the sequence and you can define the desired duration expressed in seconds for each one.

The button  allows to edit the visualization time.

The button  allows to delete the page from the sequence. You can’t delete the page where the component has been added.

6.2.22 Property “Feature type 8”



Here the user defines all the pages that can be selected by the operator. Press the button “*add page*” to add all the pages that must be managed by the component.

The button  deletes the management of the page previously added.

At the end of settings, select another TAB or press “Apply” to confirm them.

7 CONFIGURATION IMPORT DATA

7.1 Configuration Import XML from X-Meter

This function allows to import automatically data through a File XML. The X-meter generates automatically a compatible format (the X-Meter can generate XML file and it can send it to a server with FTP protocol towards a server).

Once you configured date sending via FTP on the server (opening ports, User and Password), you have to implement the “management of the file “xml”.

You’ll have to access the following menu:

[Management](#) → [File import](#) → [Configuration](#)

Click on **Create New** and add the values as shown below:



Inbox: Enter the route where the files will be sent, in case of PC BOX and of its FTP server enter the route: `/opt/etFtp/res/dest`

Outbox: in case of a PC BOX enter the route: `/home/tomcat/fileReading/out`

Work: in case of a PC BOX enter the route: `/home/tomcat/fileReading/work`

Type of file: Open the drop down menu and select X-Meter

Polling time: 00:15 – the server checks the presence of files to be processed in the defined directory (example `/opt/etFtp/res/dest`), every 15 minutes.

Max days in the Future: Leave 0

Max days in the Past: Put 365 days

These are the “minimum” information to let the system working. After you’ve entered these routes, you have to restart the application (the PCBox).

If the application must see data acquisition, you should configure the following part and if the file doesn't arrive, Energy Sentinel WEB/PV will make a call to get in contact with the device and to request the datum. In this case you have to configure correctly the BUS or END-POINT and you have to associate the instrument, then you'll have to configure the fields below:

Time of sending: Tick the function "Enabled" and enter the time corresponding to the sending hour by the X-Meter.

Hour of the recovery beginning: Enter the time "limit" beyond which the server will make the data recovery in case the device doesn't generate any file XML to be processed.

Max recovery attempts: Enter a number, typically n° 3, which represent the number of maximum attempts of the day to try the data download.


PARTIAL SENDING

The device X-Meter can make a daily sending (with the complete data of the previous day), or up to 7 partial sendings (with the data of the current day) with intervals of 3 hours (3:00 o'clock, 6:00, 9:00, 12:00, 15:00, 18:00, 21:00). In the FORM above, you can enable the "check" on the actual data acquisition and the system will make the recovery if there isn't any XML to be processed. After that, if you want to enable this function you have to configure:

Partial sending: put the flag in correspondence of the sending to be checked

Max sending delay (minutes): example n° 15, put the number of minutes beyond which the system will make the recovery if the file hasn't been received.

Max recovery attempts: enter the max number of attempts that the server will make to recover data.

After all the parameters have been set, click **Save**. Now we are ready for the devices configuration press the button, "manage  the device" and then press "**Create New**": from the "tree structure" of the plant, select the meters to check real data acquisition. Once you've finished, click on **Save**.

Please find below an example:



Device	Enabled	Max days in the future	Max days in the past
ONE ENEL	True	0	300

According to the time of sendings, you need to "recalibrate" some parameters of default such as the recalculation of:

- **Mathematical Module,**
- **Efficiency Calculation**
- **Energy bill calculation**
- **Alarms**

You can make this operation from the menu:

[Home-> Management -> System -> System Configuration -> General Configuration](#)

7.2 Current Activity

Page under construction

7.3 Historical Log

Page under construction

8 PV Plants Configuration

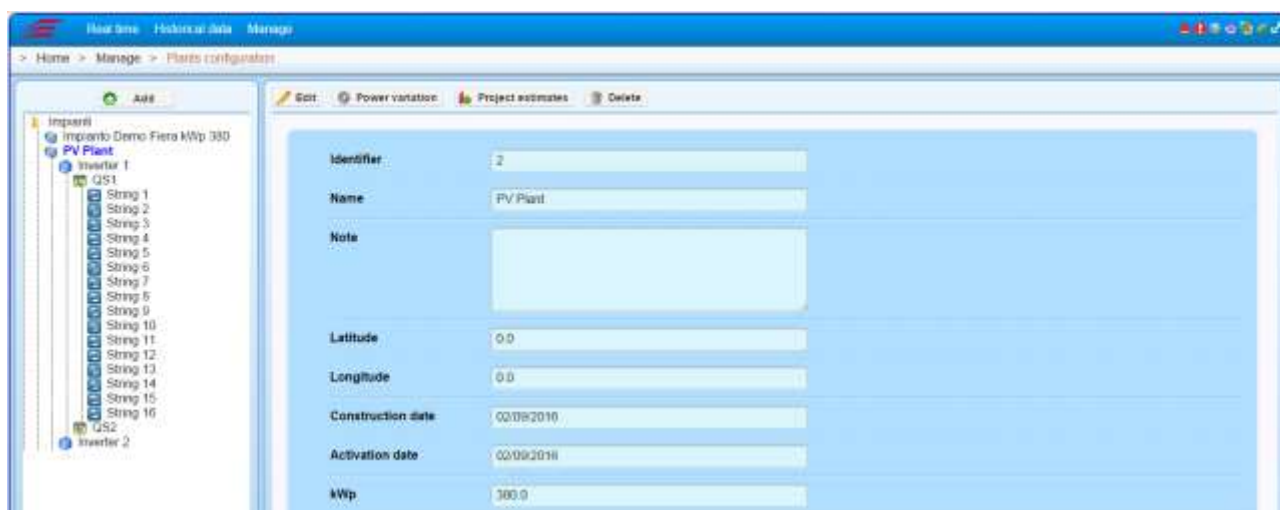
This kind of menu is suitable for PV plants management.

Please enter the following route to reach the above mentioned menu:

Home-> Management-> Plants Configuration

You can add or edit the plant structure by using the tree on the left. By a double click with the mouse on an element of the tree structure (excluding the root), you can see the details. The selection of an element allows you to add a further one, pressing the proper button. Pressing the button add you'll see a menu showing the list of the possible reachable elements.

Here below an example:



Please select the plants “folder”, then move to the button “Add”, to configure a plant shown in the example above. You’ll see a drop down menu where you can put a new “plant”. Once you’ve finished the plant configuration, select the plant previously created and the dropdown menu of the button add/edit, in fact, there could be more subfields or more “Inverter” downstream. Downstream a “Subfield” there could be more “Inverter”. Downstream an “Inverter” there could be more “Strings” which represent the lowest level of the tree structure.

The structure must be created according to your PV plants.

Add “**Plant**” :

- **Name:** put the name of your plant.
- **Notes:** for eventual notes
- **Latitude:** you can add the coordinates if you need.
- **Longitude:** you can add the coordinates if you need.
- **Construction date:** you can add the date of construction of your Plant
- **START-UP date:** you can add the date of START-UP of your Plant
- **KWp:** add the value nominal KWp about the plant. This information will be used by the system for [the efficiency calculation](#).
- **Type of Panel:** Add the type of panel with which the plant has been built. The [panel configuration](#) must be done in the suitable menu.

- **Produced Power Channel:** press the button “Select” to choose the channel of the device which stores the values of Produced Power. This channel will be used in the PR or efficiency calculation.
- **Sold Power channel:** press the button “Select” to choose the channel of the device which stores Sold Power values.
- **Bought power channel:** press the button “Select” to choose the channel of the device which stores Bought Power values.
- **Radiation Channels:** press the button “Select” to choose the channel of the device which stores Radiation values. This channel will be used in the PR or efficiency PR or efficiency calculation.
- **Room temperature:** press the button “Select” to choose the channel of the device which stores the Room Temperature values. Any efficiency calculation module won’t use this channel etc. etc.
- **Direction/intensity/wind:** press the button “Select” to choose the channel of the device which stores Dir./Intensity/wind values

Save and repeat the operation according to the quantity of the monitored plants.

Add “**Subfield**”:

- **Name:** point out the name of your subfield.
- **Note:** eventual notes.
- **KWp:** add the plant’s KWp nominal value. This information will be used by the system for [the efficiency calculation](#)..
- **Type of Panel:** Add the type of panel with which the plant has been built. The [panel configuration](#) must be done in the suitable menu.
- **Channel of Produced Power:** press the button “Select” to choose the channel of the device which stores the values of Produced Power. This channel will be used in the PR or efficiency calculation.
- **Radiation Channels:** press the button “Select” to choose the channel of the device which stores the Radiation values. This channel will be used in the PR or efficiency calculation.
- **Room temperature:** press the button “Select” to choose the channel of the device which stores the Room Temperature values. Any efficiency calculation module won’t use this channel etc. etc.
- **Direction/intensity/wind:** press the button “Select” to choose the channel of the device which stores Dir./Intensity/wind values
- Save and repeat the operation according to the quantity of the monitored plants.

N.B. Each exposure identifies the subfield and you need to measure irradiance, panel temperature and produced power/energy for each subfield/exposure, in order to calculate efficiency

Add "Inverter" :

- **Name:** Point out the name of the Inverter.
- **Notes:** eventual notes
- **Nominal Power:** Put the ideal value of the Inverter Nominal Power. This information won't be used in any calculation.
- **Solarimeter:** pressing the button "Select" choose the channel of the device which measures the exposure irradiance to which the inverter is connected. This channel will be used for the "[performance ratio](#)" and for the alarm "[Power inverter](#)".
- **Error:** Pressing the button "Select" choose the channel of the device which measures input NC/NO for inverter error.
- **Connection Status:** Pressing the button "Select" choose the channel of the device which measures the input NC/NO for inverter connection.
- **Instantaneous Power:** Press the button "Select", choose the channel of the device which measures instantaneous power produced by the inverter.
- **Output voltage:** Press the button "Select", choose the channel of the device which measures output voltage, that is to say AC side.
- **Output current:** Press the button "Select", choose the channel of the device which measures output current, that is to say AC side.
- **Output frequency:** Press the button "Select", choose the channel of the device which measures output frequency.
- **Inputs:** Press the button "Add ", select the channel/s of the eventual inputs in direct current, that is to say DC side.
- **AC Discharger:** Press the button "Select", choose the channel of the device which measures NC/NO input.
- **DC Discharger:** Press the button "Select", choose the channel of the device which measures NC/NO input.
- **AC switch:** Press the button "Select", choose the channel of the device which measures NC/NO input
- **DC switch:** Press the button "Select", choose the channel of the device which measures NC/NO input
- **DC insulation:** Press the button "Select", choose the channel of the device which measures NC/NO input.

Save and repeat the operation according to the quantity of the inverters.

Add "Panel" :

- **Name:** point out the name of your Parallel Panel
- **Notes:** eventual notes.
- **Parallel voltage:** Press the button "Select", choose the channel of the device which stores the DC voltage value.
- **Panel temperature:** Press the button "Select", select the channel of the device which stores the panel temperature value.

Save and repeat the operation according to the quantity of the monitored parallel panels.

Add "String":

You can create strings directly from the parallel panel pressing the button **“Create strings”**. In this way the configuration of the strings of a PV plant will be faster.

- **Name:** point out the name of the string. Anyway, the system “suggests” the same name which has been given during the creation of the physical channel in the devices configuration. The name choice is important because it must identifies the string field and it must be unique. In this way the maintainer identifies univocally the damaged string in the field.
- **Note:** eventual notes.
- **Number of Panels:** Point out the number of panels which belong to this string.
- **DC Current:** Press the button “Select”, choose the channel of the device which stores DC current value.
- **DC Voltage:** Press the button “Select”, choose the channel of the device which stores DC voltage value.
- **Panel temperature:** Press the button “Select”, choose the channel of the device which stores the panels panels temperature value. You have to set the panel temperature only in the first string of each subfield. This channel is used for the efficiency or the Performance Ratio calculation.

Save and repeat the operation according to the quantity of strings referred to the parallel panel.

Notes: Some above mentioned fields are required. Some associations however are not. By saving in each submenu, it's pointed out (red frame) what are the fields to be filled in obligatorily.

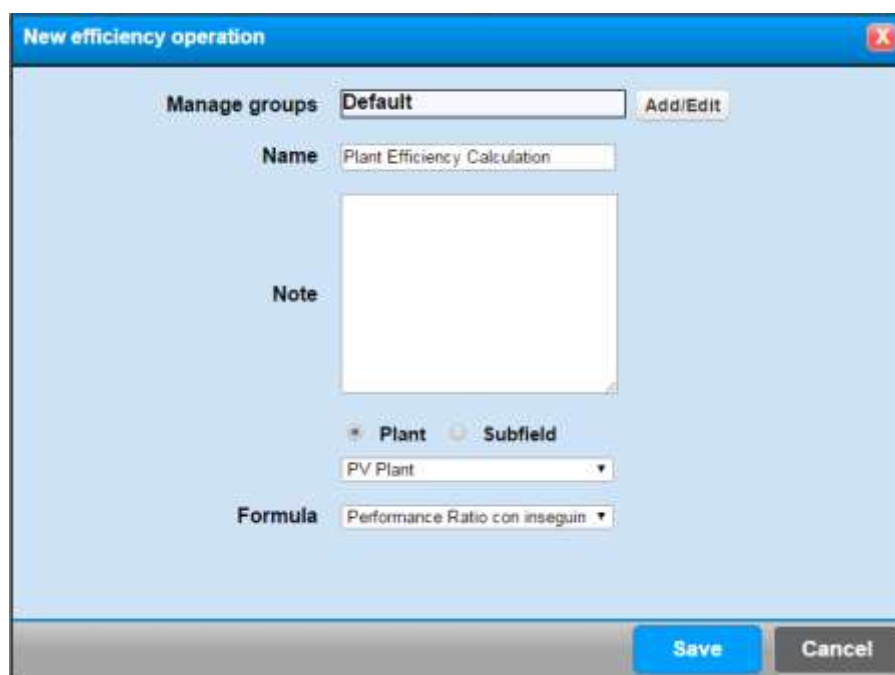
9 Efficiency Calculation (for PV Plants)

This module allows to calculate the efficiency value of each plant/subfield monitored by the system, daily. All the data are available in the menu “Daily Efficiency” / Historical Data.

Please go the route below to configure a new calculation or to change parameters of the one you’ve already made.

Home-> Management-> Efficiency Calculation

Pressing the button “new Efficiency Calculation”, you access this configuration form:



Put a name, complete the eventual notes field and select the desired plant/subfield.

There are 2 calculation formulas

The basic formula made by the system is the following one:

$$PR = \frac{E}{P_{nom}} * \frac{I_{stc}}{H} * 100$$

Where:

- PR is the of the period expressed in percentage
- E is the energy (Wh) measured by the fiscal meter (with accuracy better than 2%) produced during the period.
- Istc is the reference standard radiation and it is about 1000 W/mq
- H is the solar energy (Wh/mq) of the period measured with the same azimuth and tilt of the panels.
- P_{nom} is the nominal power of the PV generator.

Note: Measurements are counted only if there is an average radiation in the ¼h of at least 60 W/mq (settable value)

The second calculation formula makes the temperature compensation. If the average temperature of the panels (measured on their back side) in ¼h is higher than 40°C (settable value), you can make the correction in temperature for those measurements.

Therefore the PR of the period will be calculated as average of the PR of the single samples (¼h):

$$PR = \frac{\sum PR_t}{n_t}$$

Where:

- PR represents the period performance ratio expressed in percentage
- PR_t represents the single sample (¼h) performance ratio
- n_t is the number of samples (¼h) considered

The single sample performance ratio (¼h) is calculated according to the following formulas:

$$PR_t = \frac{E}{P_{nom_corretta}} * \frac{I_{stc}}{H} * 100$$

$$P_{nom_corretta} = (1 - P_{tpv} - \frac{C_{perdite}}{100}) * P_{nom}$$

$$P_{tpv} = (T_{med} - 25) * \frac{\gamma}{100}$$

Where:

- $P_{nom_correct}$ is the nominal power for the single period (¼h)
- P_{tpv} points out the PV generator thermal losses
- T_{med} represents the average temperature of the single period (¼h) of the cells
- γ represents the coefficient of the supplied power temperature expressed in %/°C by the panel builder
- C_{losses} represents the coefficient for non -thermal losses (optics, resistive, diodes, etc) in %. The default value is 0% (settable value)

Once the configurations are made, you can see the following screenshot:



Id	Name	Plant/Subfield	Formula	
1	Calcolo Efficienza Impianto	Impianto Demo Fara kWp 360	Performance Ratio con inseguimento meccanico	  
2	Efficienza compensata in T	Impianto Demo Fara kWp 360	Performance Ratio con compensazione temperatura	  
3	Efficiency Calculation	PV Plant	Performance Ratio con inseguimento meccanico	  

The icons on the right allow to change, or to recalculate the efficiency in the previous periods and at the end, it allows to delete a calculation.

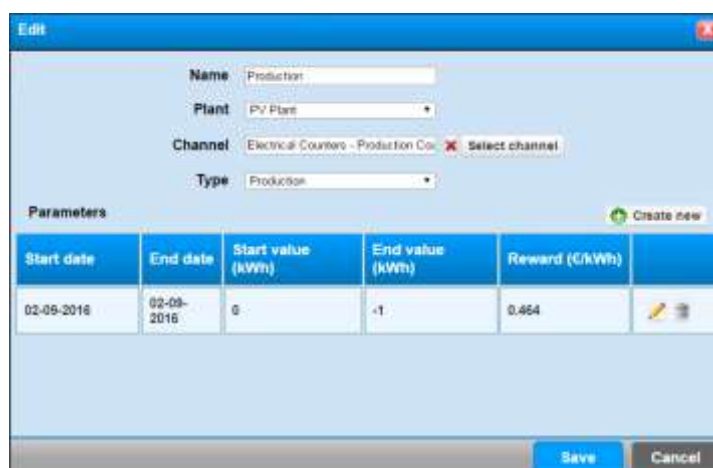
10 Economic Calculation (for PV Plants)

This module allows the user to monitor his investment, checking his gains in the menu Energy Account / Historical Data.


Please enter the following route to make the configuration:

Home-> Management-> Economic Calculation

Pressing the button “Economic Calculation” the following parameters will be configured:



The screenshot shows a software window titled 'Edit' with a blue header. Inside, there are several input fields: 'Name' (set to 'Production'), 'Plant' (set to 'PV Plant'), 'Channel' (set to 'Electrical Counters - Production Co.' with a red 'X' icon and a 'Select channel' button), and 'Type' (set to 'Production'). Below these fields is a 'Parameters' section with a 'Create new' button. It contains a table with the following data:

Start date	End date	Start value (kWh)	End value (kWh)	Reward (€/kWh)	
02-09-2016	02-09-2016	0	-1	0.464	

At the bottom of the window are 'Save' and 'Cancel' buttons.

- **Name:** give a name to the new economic calculation
- **Plant:** PV Plant Configuration. This setting is useful also for the permissions management.
- **Channel:** Press the button “Choose” (you’ll see a mask with the devices configuration) and select which kind of energy channel will be used for the economic calculation (We should typically consider the channels referring to fiscal meters, Transfer and Production).
- **Type:** It can be Production, purchase or sale. The table elaborated in Historical Data > Energy Account will be different according to the selected setting.
- **Parameters:** In this menu you can set different remunerations according to the area where you are during the reference period. For example you can configure a period from January, 1st 2016 to December, 31st 2016 and different areas. The first 50000 kWh produced in 2016 they will be remunerated € 0,75, between 50000 kWh and 150000 they will be remunerated € 0,50, between 150000 kWh and 200000 kWh they will be remunerated € 0,25 and over 200000 kWh they will be remunerated € 0,1. (When the “Value(kWh)” is “-1” it means that there’s no maximum limit in kWh produced until the date of the final period. In this case December, 31st 2016).

In this case the remuneration is done only during year 2016, but of course, there’s the chance to put other dates with additional areas.

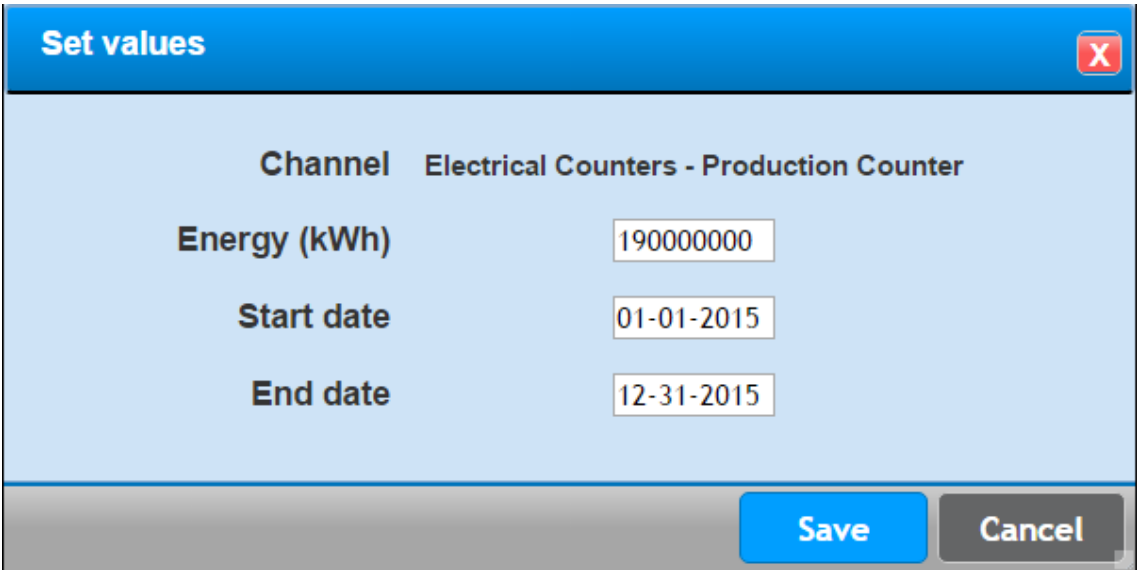
Once the operations have been finished, press the button Save to come back to the following menu:

Note: Press the button (Recalculate) and select the period to calculate to operationalize the display,

It’s possible to add historical data (for example missing historical data), pressing the button “add values”.

This function should be used **“VERY CAREFULLY”**, because they “are generated” new historical data which overwrite the previous ones (if available).

Please have a look at the example below:



Channel	Electrical Counters - Production Counter
Energy (kWh)	190000000
Start date	01-01-2015
End date	12-31-2015

Save Cancel

Here we assumed to add 190 000 000 kWh spread in 2015 in the production meter.

Once it has been set, press the button “Save” and wait for the server reply, then start the historicizing if the set period is older than the last two months.

Please select **Management->System-> Forced start** to begin the historicizing

Once you start the historicizing, please turn back to the “Management” Menu “Economic Calculation” (see fig. 3.9.1), select the button (Recalculate). Of course, you’ll have to see both the period and the remuneration to calculate the Economic Account for the energy which has been set manually.

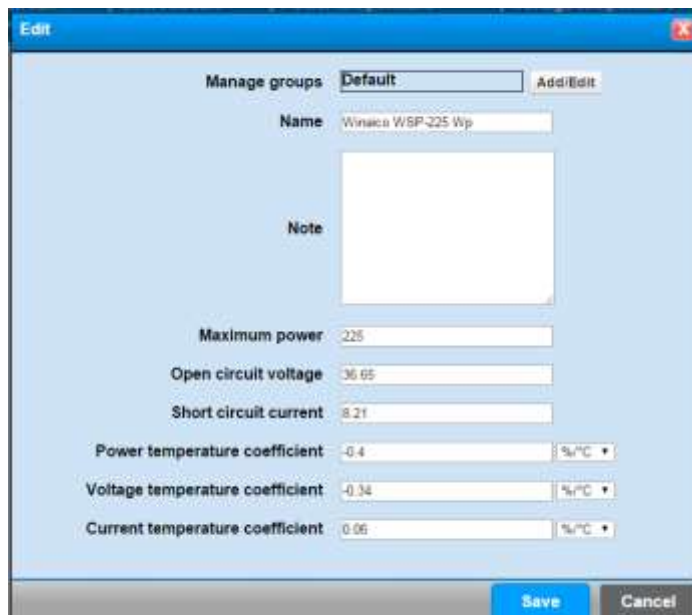
11 Types of panel (for PV Plants)

This module allows to calculate the efficiency considering the technical features of the PV panel.

To enter this menu you have to follow this route:

Home-> Management-> Types of panel

After you pressed the button “New”, you’ll see the following User Form to be filled in with the technical features of the PV module datasheet:



All the fields are in every datasheet of each PV module.

Once you pressed the button Save, you can proceed with the association of the panel and the PV plant in [plants configuration](#).

12 Performance Ratio (for PV plants)



Here above you can see the icon which allows to configure (or to request) “PERFORMANCE RATIO” that is to say the calculation which allows to display efficiency of PV plant. This calculation is made both globally and on “a single inverter”.

2 calculation methods have been implemented to better adapt the current SW to the needs of the different plants:

- **1st Method: the system uses the programmed data concerning Plant/Subfield**
- **2nd Method: the system uses the programmed data concerning the String Panel**

The first one is more suitable for Standard PV plants, because it is generally used for a single type of panel (1 maximum deliverable power and only 1 value “ γ ” or loss of performances according to the temperature).

The second one is more used when a PV plant is made “different” types of PV panels.

Let’s see which are the data used by the system and where they have to be programmed in “*plant configuration*”

12.1.1 Data Used by the System

The system needs the following data:

1. **Active Power Generated by the PV Plant**, or by the relative “subfield” (that is to say the Production Meter)
2. **Active Power Generated by the Single Inverter**
3. **Irradiation**, this information is given by the solarimeter installed with the same inclination of PV modules.
4. **Panel Temperature**, this information is generally given by a temperature probe installed behind and in the centre of the PV panel.
5. **Panels Technical Features**, it’s important to know *the maximum deliverable power* and the value “ γ ” that is to say the loss of performances (which is the maximum power reduction) according to the temperature.

All the data used by the system must be programmed in “*plant configuration*” . With each Calculation method you will have to configure:

- **Active Power Generated by the PV Plant** must be configured in the field “*Generated Power Channel*” of the plant or of the Subfield.
- **Active Power Generated by the Single Inverter** must be programmed in the “*Instantaneous Power*” of the inverter.

- **Panels Tehcnical Features:** you should add them in the menu Management / Types of Panel. Complete all fields and give the name to the different types of panels. Then you can select the panel name by the plant configuration.

Irradiation, Type of Panel and **Temperature Panel** channels will be configured in different points according to the calculation method we want to use. Here below you'll see how to make the configuration:

- In the **first Calculation Method:**
 - **Irradiation:** you need to configure it/them in the irradiation channels of the plant/Subfield (you can have more solarimeters and in that case it's made an average of the read values) .
 - **Type of Panel:** it is to be configured in the plant/subfield.
 - **Temperature panel sensor:** it can be configured only in the first string of the first panel of the PV plant (the system sends automatically this information to all the strings referred to the plant/subfield).
- In the **second Calculation Method:**
 - **Irradiation:** it should be configured within each inverter present in the plant/Subfield.
 - **Type of panel:** it should be configured in each string panel present in a plant
 - **Panel Temperature Sensor:** it should be configured in the first string of each panel of a plant,

Once all the channels have been configured, the module can be programmed and it can be used.

12.1.2 Use and Configuration of the Module

You'll find the above mentioned icon in "Management" menu and in "Historical Data" Menu. From the menu "Management" you can create, edit, delete and require this calculation to this system and by the Menu "Historical Data" you can ask only for the PR calculation.

To configure such calculation, enter "Management" menu, select the above mentioned icon and finally press the button "Add", you'll see the following screenshot:

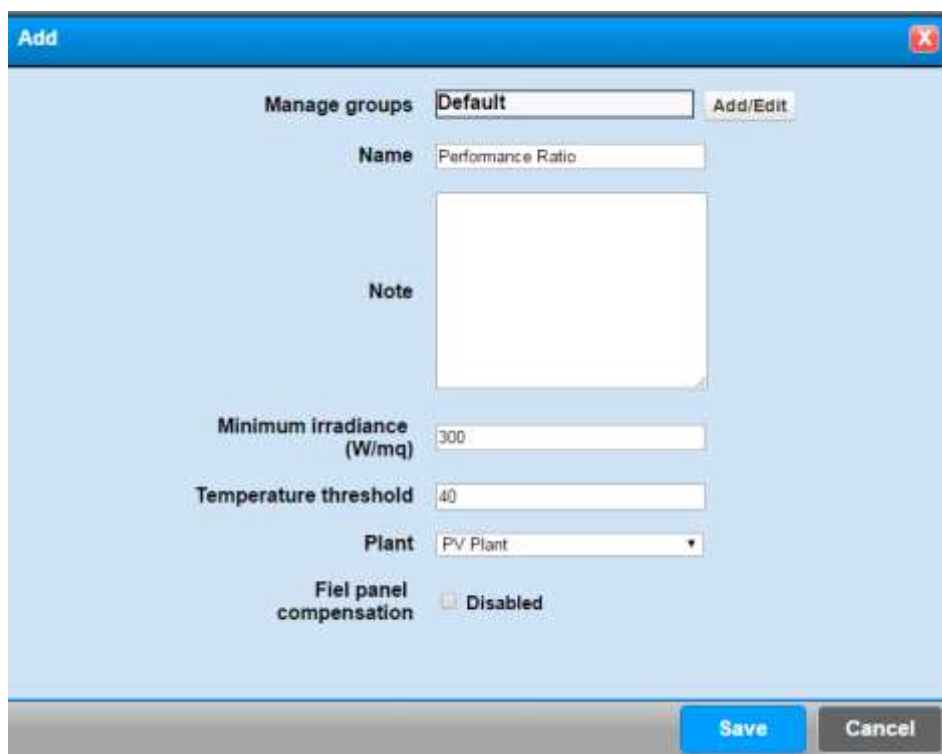


fig. 1.1

As you can see in the picture 1.1, you have to put:

- **Name:** Put the name. You can configure different modules.
- **Minimum Irradiation:** it has been set an average minimum irradiation of 300W/mq
- **Threshold Temperature:** it has been set at 40 °C. If the average temperature of the integration period (that is to say 15 minutes), exceeds this threshold value, the system will make a “compensation” according to the PV modules technical features.
- **Plant ID:** it identifies the plant to be examined. You will have to enter in “Plants configuration” to know which number you have to put (to which plant you have to associate the calculation), select the plant and see the ID. If it has been configured only 1 plant, this number will be ID=1.
- **Compensation for parallel panel:** this flag allows to select which calculation method you have to use (If the flag is not there, the system uses the calculation module n.1 previously described).

Once you put the data you can “save” and select the Yellow icon here below:



fig. 1.2

The first icon on the left allows to “reprogram” the parameters added previously (picture 1.1), while the 3rd icon delete the programmed calculation after the confirmation.

As above mentioned, once you’ve selected the yellow icon, the system asks the user the period to be examined and, after it has been set, the browser will download the file in Excel on the customer PC. Here below an example of export from October, 1st 2011 to October, 8th 2011

Impianto Demo ENERGY TEAM kWp 360									
PRODUZIONE DAL 01/10/2011 AL 08/10/2011									
Energia prodotta kWh	15561		PR CALCOLATO	95.81%					
Energia conteggiata kWh	13113								
Inverter	Potenza AC (kW) nominale	Potenza DC (kW) nominale	Solarimetro	Irraggiamento kWh/mq	Sonda temperatura	Temperatura media	Energia ideale kWh	Energia effettiva kWh	Efficienza %
Inverter 1	150.0	144.0	Irraggiamento	39.7	Temperatura Pannelli	36.4	5474.52	5343.89	97.61%
Inverter 2	220.0	216.0	Irraggiamento	39.7	Temperatura Pannelli	36.4	8211.78	8100.48	98.64%
TOTALE	370	360.0		79.5		36.4	13686.30	13444.37	98.23%

fig. 1.3

The PV plant considered the following features:

- A total power of 360 kWp with a single exposure
- A production meter, whose the system detects measurement
- N° 2 Inverter, whose the system detects production measurement of both the inverters
- N° 1 Solarimeter (which measures the irradiation and it has got the same inclination of PV panels)
- N° 1 Panel temperature sensor
- We know the number of panels (1600) and their technical features, in particular, the peak power of the single panel (225Wp) and the coefficient “T” on the Power (-0,4%).

See the data shown in picture 1.3 published “only” for Inverter 1.

. As you can see, it's pointed out the information of the Inverter power (in this case the Inverter n. 1 corresponds to 150 kW). This information is not used in the PR calculation.

The next cell shows the peak power data of the PV field, in this case we've got 144 kWp of panels which are actually connected (and configured) to the inverter.

Then it's calculated the Actual energy radiation invested by the solarimeter (by the whole PV plant). This energy share is calculated to the net of irradiances lower than the average of 300 w/mq that is to say 75Wh/mq in ¼ hour. Such value is programmable and settable at the beginning (see picture 1.1). In this case the radiation energy registered in that period will be about 39,7 kWh.

All the other data are considered if the average radiation of a quarter of hour exceeds 300 W/mq (that is to say 75 Wh/mq in a quarter of hour). All the temperatures and energies values referring to a lower irradiation are rejected.

The next field is the average temperature of the panels registered during the period, in this case 39,7 °C.

The Ideal Energy is the energy share that the plant should have produced if the same one would be Ideal

The Actual Energy is the one measured in the inverter output, at the net of irradiances lower than the average of 300 w/mq (75Wh/mq in a quarter of hour). All the rejected share will be then deducted from the Production meter.

Now the PR is calculated by dividing the Actual Energy with the Ideal Energy. In the figure 1.3 the result is about 97,61 %.

The sheet shows the total of the Produced Energy detected by the production meter. In this case the meter registered a total real production about 15561 kWh.

"Counted energy" is calculated deducting from the "Produced Energy" all the energy share which has been rejected by the single inverters because it represents a share of produced energy with an average irradiation lower than 300 W/mq. So the difference will be the sum of the produced energies by the 2 inverters with an average irradiation lower than 300 W/mq (15561 – 13113 = 2448 kWh). The calculated PR will be the relationship between "Counted Energy" and the sum of "Ideal Energues", in the fig. 1.3 the result is about 95,81%. Here below the mathematical calculation

$$(13113/13686,3 \times 100 = 95,81\%)$$

Please notice that if the plant is configured in subfields (this type of configuration must be done when there are more production meters), it will be generated a unique excel file, but it will be made a certain number of sheets and one for the summarize, see picture 1.4 below:

IMPIANTO ENERGY TEAM				
PRODUZIONE DAL 01/10/2011 AL 08/10/2011				
Sottocampo / cabina	Potenza DC nominale (kW)	Energia DC ideale (kWh)	Energia AC (kWh)	PR %
Impianto A	19.32	410.66	393.38	95.79%
Impianto B	19.32	410.66	392.10	95.48%
Impianto C	19.32	410.66	389.53	94.85%
TOTALE	57.96	1231.99	1175.01	95.37%

fig. 1.4

This summarize shows a plant with 3 Subfields (3 production meters). In the same file there are other 3 sheets named: "Plant A", "Plant B" and "Plant C" containing the same information (the same calculations) shown in picture n. 1.3.

You can edit easily the DC power installed under each inverter. This function is very importanti f for any reason or for a period defined by the user, the number of panels connected to the ivnerter are not the same configured in the original plant (For example after an electrical damage or a fire etc.)

There are 2 points to edit this value according the type of the desired calculation . In the first method calculation, to edit this value you will have to go in "Desired Configuration" , select the inverter that you want to change and select "Power Variation". In the second calculation method, you will have to select the "string panel" and select "Power Variation". In both cases you'll see the following situation:

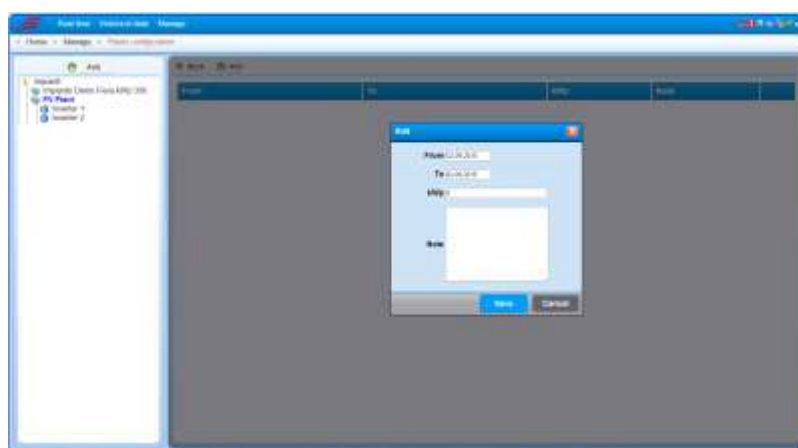


fig. 1.5

You will have simply to select the period and set how many kWp are currently connected to that inverter/string panel. The PR calculation will make all the calculations considering the new power peak installed during the period.



fig. 1.6

In the picture 1.6 shown above we expected a power variation at 50 kWp for the period which goes from 19/10/2011to 27/10/2011. It's always possible to edit, delete or to add other values to have an historical of the variations made.

13 Change Password

This function allows to change the password to the software we are using. From the main toolbar, click on **Management** to access this menu; from the drop down menu select **Change Password**

You will see a small mask with the following fields:

Old password: Add the current password.

New password: Add the new password.

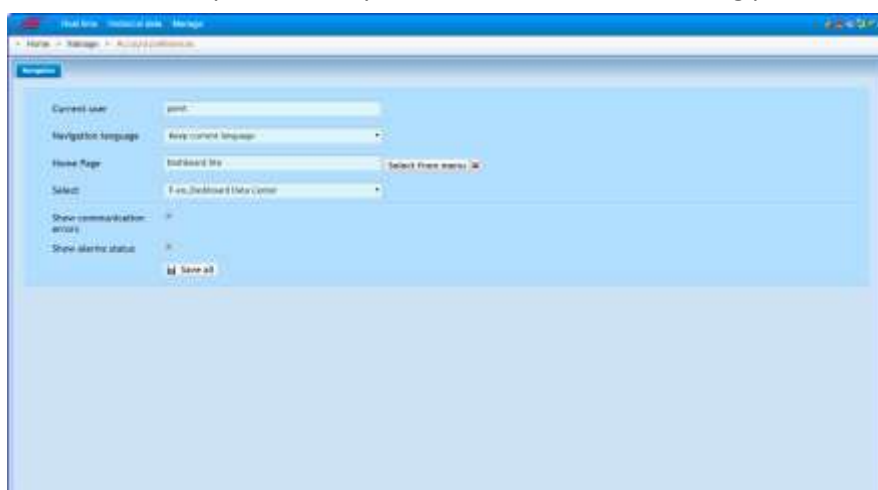
Type again the new password: Add again the new password.


At the end, press **Save** to store settings.

We remind you that the Password is "case Sensitive", that is to way it considers both capital and small letter.

14 User Preferences

From Management Menu -> User preferences you can customize the following parameters:



- After the user login, it's possible to change automatically the Server default language.
- You can customize your Home Page, by pressing Energy Team banner  in the top left
- On the top right, you can enable the alarm icons which point out eventual communication errors or active alarms.

15 Appendices

15.1 Cron Expression

Cron Expressions are made of 6 required fields and an optional one.

The fields are described here below

Field name	Allowed values	Special fonts
Seconds	0-59	- * /
Minutes	0-59	- * /
Hours	0-23	- * /
Day of the month	1-31	- *? W / L
Month	1-12 o JAN-DEC	- * /
Day of the Week	1-7 o SUN-SAT	- *? / L #
Year (optional)	1970-2099	, - * /

'*' is used to specify all values.

i.e. "every minute" (in the field minute)

'?' is allowed for day-of-month and "Day of the week" fields. It is used to specify "no value specified"

'-' is used to specify time intervals.

i.e. "10-12" in the hour field corresponds to "10 to 12".

"," is used to list values.

i.e. "MON, WED, FRI" in the day field means " Monday, Wednesday and Friday".

'/' is used to specify increases.

i.e. "0/15" in the seconds field means "0, 15, 30, e 45". E "5/15"

For each field of the expression, there is a certain set of numbers which can be activated or disabled. Numbers go from 0 to 59 for seconds and minutes, 0 to 23 for hours, 0 to 31 for days of the month from and 1 to 12for months.

"/" allows switching on every "umpteenth" value in the set of data.

'L' is allowed for day-of-month and day of the week.

This font means "lastly", but it has got different meanings in each of the two fields.

i.e. when used in the day of the month field, it means the last day of the month while, in the week field, it will mean "7" or "Sat". If put after another value, it means "the last day xxx of the month"- for example "6L" will mean "the last Friday of the month".

When the option 'L' is used, there is no need to specify values ranges, otherwise there won't be a clear results.

The font 'W' is allowed for the field "day of the month". This font is used to specify the day of the week (Monday-Friday), closest to the chosen day. For example, if you specify "15W" as the value for the field "day-of-the-month", the meaning will be: "day of the week closest to the 15th day of the month".

If the 15th day will be on Saturday, the trigger will start on Friday, 14th. If the 15th is on Sunday the trigger will start on Monday, 16th.

If you specify "1W" as the value for the field "day-of-the-month", and the first one is on Saturday the trigger will start on Monday, 3rd, because it doesn't "jump" over the limit of the days-of-the-month.

The font 'W' can be specified only when the month day-of-an only day,

Il carattere 'W' può essere specificato solo quando il mese giorno-di-un solo giorno, non un intervallo o un elenco di giorni.

The fonts "L" and "W" can be also combine for the expression of a day-month to produce 'LW', which it corresponds to "the last day of the week of the month".

The font '#' is allowed for the field day of the week. This font is used to specify "umpteenth" xxx day of the week. For example, the value A of "6 # 3" in the field day of the week the third Friday of the month (day 6 = Friday is "# 3" = the third one of the month).

Other examples: "2 # 1" = the first Monday of the month will be "4 # 5" = the fifth Wednesday pf the month.

If you specify "# 5" and this value doesn't exist in the day of the week of the month, that month will not occur. If it is used the font '#', there can be only one expression in the field of day of the week ("3 # 1,6 # 3" is not valid, because there are two expressions).