



VMU-C EM



Web Server system for energy
monitoring

Instruction manual

Version 1.0.0

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1 INSTALLATION

1.1 PRELIMINARY REMARKS

This manual provides a comprehensive guide to VMUC-C EM (WebServer) installation, configuration and commissioning; it is addressed to technical staff members having an average knowledge of IT and of TCP/IP networking basic principles.

VMUC is a web server and provides a comprehensive monitoring system for devices like power analysers (WM series), electric power meters (EM series), water/gas meters and environmental sensors.

The software and all the components needed for panel operation require no installation of additional software components.

1.2 PACKAGE CONTENT

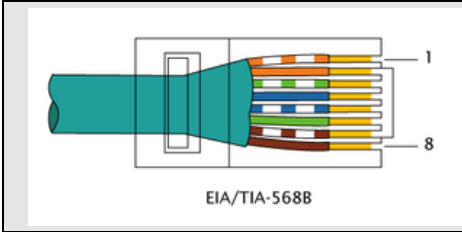
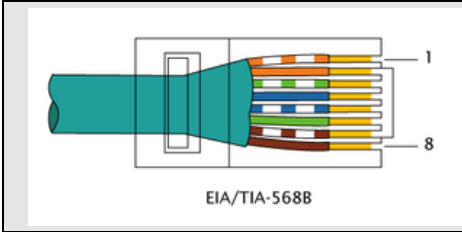
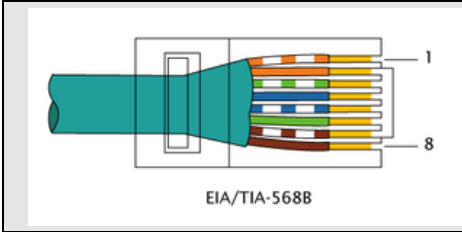
VMU-C EM is supplied in its package, along with the following items:

- VMUC
- First installation manual

1.3 TECHNICAL FEATURES

VMUC-EM is micro PC, totally fanless and without any moving components, providing WebServer functions; thanks to the use of industrial hardware, to its extremely small size and to its low energy consumption it is ideal for monitoring applications requiring features like sturdiness and reliability along time; it can be installed in both technical and residential environments, without requiring any special caution during installation, usage and maintenance.

The following table provides a summary list of the product characteristics:

<p>Ports and connections</p>	<p>1 X 12 to 28Vdc power supply (A1+ and A2-) 2 X RS-485 (COM1 and COM2) :</p> <table border="1"> <tr> <td rowspan="3">COM1</td> <td>Data - (A-)</td> </tr> <tr> <td>Data + (B+)</td> </tr> <tr> <td>GND</td> </tr> <tr> <td rowspan="3">COM2</td> <td>Data - (A-)</td> </tr> <tr> <td>Data + (B+)</td> </tr> <tr> <td>GND</td> </tr> </table> <p>1 X RJ-45 connector for 10/100 Base-T Ethernet [Communication] [Communication port – Default IP: 192.168.1.110]</p> <table border="1"> <tr> <td rowspan="4">  </td> <td>Pin 1 TX+</td> </tr> <tr> <td>Pin 2 TX-</td> </tr> <tr> <td>Pin 3 Rx+</td> </tr> <tr> <td>Pin 6 Rx-</td> </tr> </table> <p>1 X standard USB 1 X mini USB (through a dedicated driver it allows to access the system through the IP address 192.168.254.254) 1 X slot for micro SD or SDHC memory card</p>	COM1	Data - (A-)	Data + (B+)	GND	COM2	Data - (A-)	Data + (B+)	GND		Pin 1 TX+	Pin 2 TX-	Pin 3 Rx+	Pin 6 Rx-
COM1	Data - (A-)													
	Data + (B+)													
	GND													
COM2	Data - (A-)													
	Data + (B+)													
	GND													
	Pin 1 TX+													
	Pin 2 TX-													
	Pin 3 Rx+													
	Pin 6 Rx-													
<p>Absorption</p>	<p>5W Max.</p>													
<p>Operating conditions</p>	<p>-25°C to 40°C</p>													
<p>COM port termination</p>	<p>Both COM ports are internally terminated with a value of 150Ω and polarised with two 511Ω resistors (from “B+” to +5V and from “A-” to GND). As a consequence no other external connection is required.</p>													

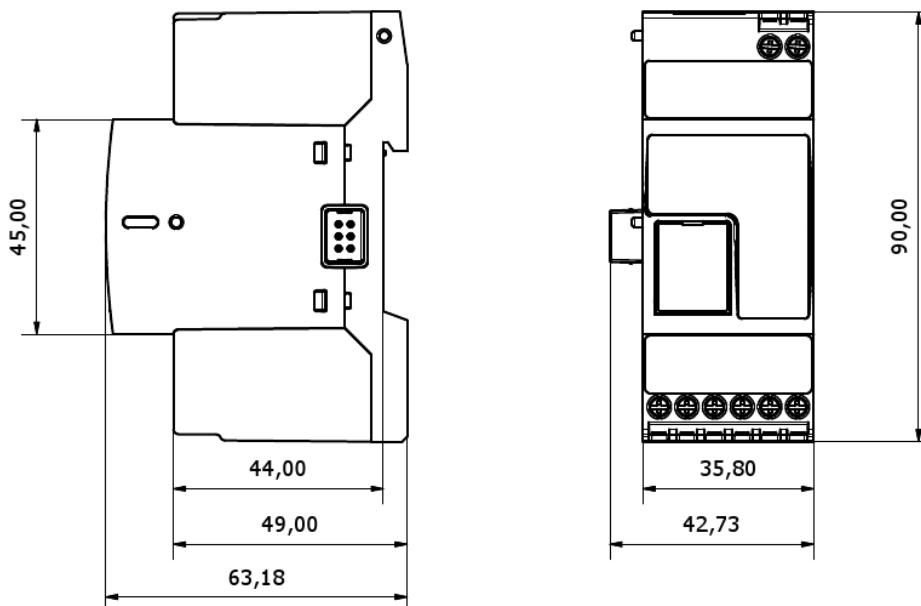


Fig. 1 – Eos-Box dimensions

1.4 INSTALLATION AND CONNECTIONS

To install VMU-C EM you need to perform the following steps:

- Connect the DC 24Vdc power supply (12Vdc to 28Vdc) through an appropriately sized feeder (recommended feeders: CG, SPM or SPD series)
- COM1: communication port for the connection to the RS-485 bus for VMUM-EM temperature measurement master devices (Pt100 or Pt1000; 2 or 3 wires), analogue inputs (mV or mA) or for digital input status monitoring (open/closed).

You may connect up to 10 VMU-M M systems with the relevant VMU-P EM and/or VMU-O EM modules.

All the VMU-M EM devices connected to the COM1 port will have to be set to the same baud rate.

- COM2: communication port for the connection on RS-485 bus of the electric power meters. The cascade-connected devices can communicate at different baud rates (communication speeds) while using different communication addresses.

You may connect up to 32 instruments (meters and/or analysers).

The following figure lists the compatible instruments as of the current date:

Available driver list			
Brand	Driver	Version	Instrument
CARLO GAVAZZI	EM21	2.2	Energy Meter
CARLO GAVAZZI	EM21_PF	2.2	Energy Meter
CARLO GAVAZZI	EM23_AV2_AV9	1.0	Energy Meter
CARLO GAVAZZI	EM24_AV0	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV5	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV5_PF	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV6	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV9_AV2	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV9_AV2_PF	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV5	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV5_PF	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV6	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV6_PF	2.3	Energy Meter
CARLO GAVAZZI	EM33	2.1	Energy Meter
CARLO GAVAZZI	WM30	2.2	Energy Meter
CARLO GAVAZZI	WM40	2.3	Energy Meter

Fig. 2 – List of the available energy meter drivers

*The log data recorded throughout the day shall be available to be shown in graphical form for 6 months.
The daily data, that is the summary values of each day shall be available to be shown in graphical form for 10 years.*

- Connect the system to the data network through a standard Ethernet cable, using the LAN communication port configured with the default static IP address 192.168.1.110
- Connect the GPRS/EDGE/UMTS/HSDPA modem by means of the VMU-W module through inner bus (optional).

Once power is supplied to the VMU-C EM, the following LEDs will light up on the front panel: green “ON” LED (indicating the machine is powered), orange “BUS” LED (indicating inner BUS activity), orange “COM1” and COM2 LEDs (indicating COM door activity), blue “USB” LED (indicating the presence of an USB device) and red “AL” LED (indicating the presence of any alarm condition); when connecting the network cable, the Ethernet port LEDs will light up as well.

After connecting and powering the VMU-C, access its configuration Web pages as described in the next chapter.

2 GENERAL OVERVIEW

2.1 VMU-C EM

VMU-C is an electric power monitoring Web server based on Web technology. Once properly set up, the VMU-C EM software can be used through the net – both LAN and Internet – through any PC or device equipped with a common Internet browser.

As VMU-C EM is based on the Web technology, it can be used as an ordinary Web site; the data and status display function for the devices installed in the plant (analysers, meters, environmental sensors) is based on the innovative AJAX technology, allowing to send and receive information without having to reload the graphical pages.

2.2 ACCESS TO THE SYSTEM

To access the system, you first need to establish a network connection between your PC and VMU-C EM, using the LAN port existing on the device; you have the following options:

- Directly connect the two devices (VMU-C EM and PC) through a network cable
- Connect both devices (VMU-C EM and PC) to your local network
- Directly connect the two devices (VMU-C EM and PC) through a USB/mini-USB cable.

The VMU-C EM default address is **192.168.1.110**; in any connection configuration; this implies that, in order to be able to communicate with VMU-C, your PC must belong to the same sub-network; that means its IP address must be “192.168.1.x”, where “x” must be a number ranging between 1 and 254, other than 100.

Technical support operators can also communicate with the VMU-C EM through the same LAN port, using the address 192.168.253.254 (this address is fixed and cannot be changed).

If using a mini-USB cable to connect the devices, use the address 192.168.254.254.

If your network setting is different (the first 3 number are not the prescribed ones) you need to temporarily modify your network setting as specified above; then, as described below, after accessing the software you can modify the VMU-C EM network parameters, to ensure that it is compatible with your network, and finally restore your original network setting.

After configuring your IP address, open an Internet browser and type the following address:

<http://192.168.1.110>

The system will display the following access page:

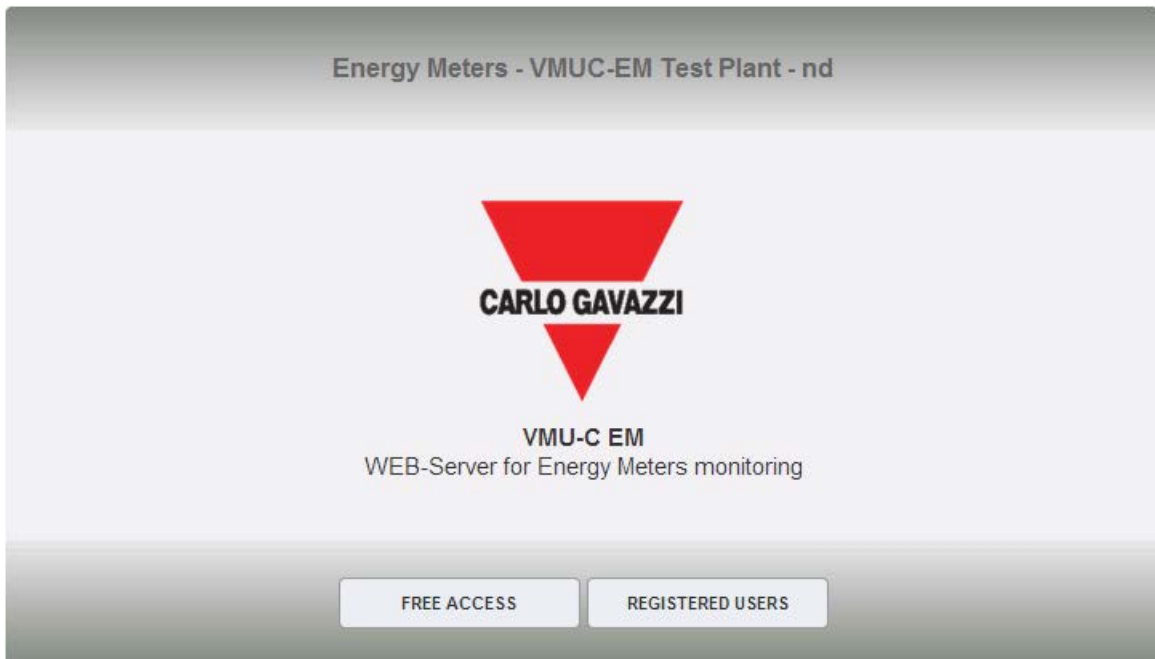


Fig. 3 – System access page

Clicking the “REGISTERED USERS” button will access the Login page:

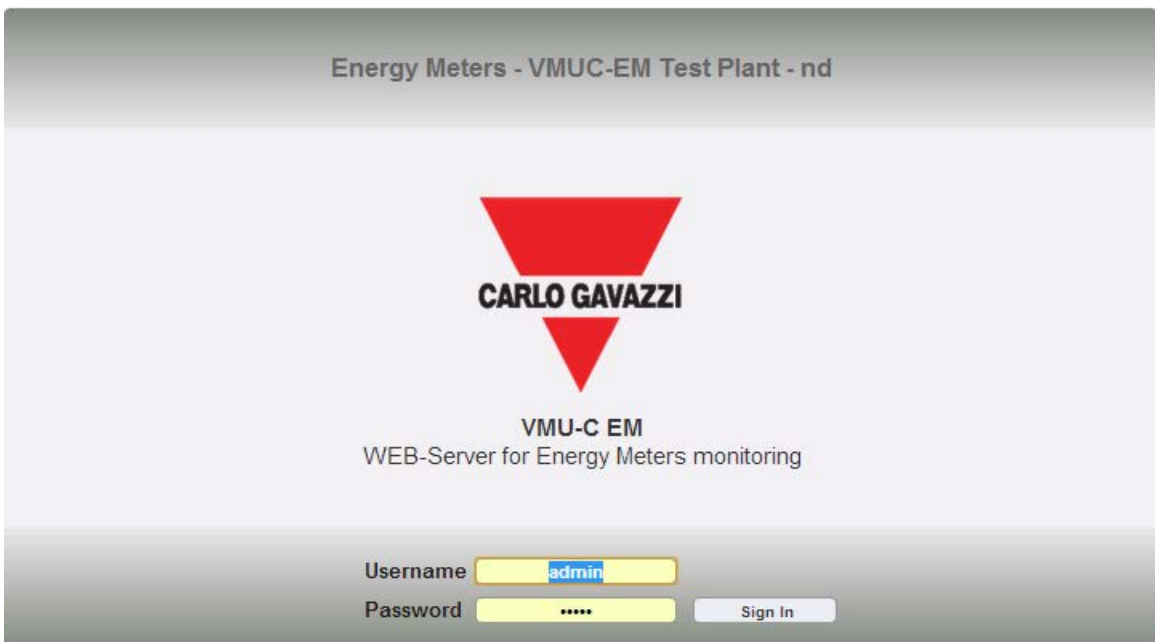


Fig. 4 – Login page

The following are the default username and password:

Username	Password	Name	Level
admin	admin	admin	administrator

To prevent any unwanted access to the system, we recommend that you change the default password, particularly if you use Internet connectivity.

2.3 MAIN SCREEN

The figure below shows the VMU-C EM home page:

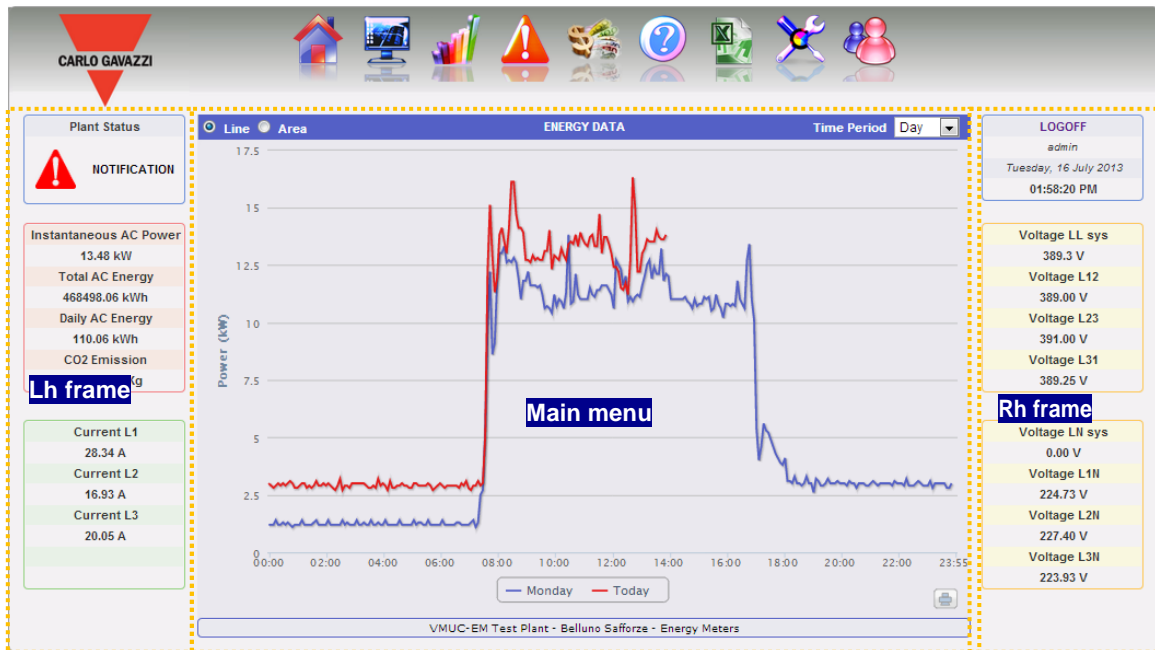
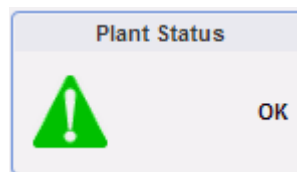


Fig. 5 – Home Page

In particular, we have highlighted the following items, which are always available while using the software:

- a) **Main Menu:** it includes the "Navigation Menu" (Para. 2.3.1)
- b) **Lh frame:** starting from the top:
 - Plant status. The system may display two messages:
 - 1) OK – There are NO active Alarms or Anomalies



- 2) PRESENCE OF NOTIFICATIONS – There are some active Alarms or Anomalies. The window inner triangle will display the colours Red (top priority), Orange, Grey or Green (minimum priority).



Clicking on a message will display a history list of all the alarms that have occurred in the system, sorted chronologically in descending order.

If the "End Date" is not available for one or more Alarms, the system will display the Status message shown above. As described below you can mask the alarms, thus preventing them from generating the NOTIFICATION message.

- Production data (automatic data update).

Instantaneous AC Power
13.98 kW
Total AC Energy
468498.41 kWh
Daily AC Energy
110.41 kWh
CO2 Emission
248772.66 Kg

1) Instantaneous AC Power – Instant power (kW) measured by the energy meter. The piece of data comes from the reference Energy meter (real or virtual), depending on the settings included in the "Energy Meters Configuration".

2) Total AC Energy – Total Energy measured by the energy meter. The piece of data comes from the reference Energy meter (real or virtual), depending on the settings included in the "Energy Meters Configuration".

3) Daily AC energy – Energy measured by the meter since the beginning of the day. The piece of data is supplied by the reference Energy meter (either real or virtual), depending on the settings included in the "Energy Meters Configuration".

- Reference meter current values (L1, L2, L3).

Current L1
28.97 A
Current L2
17.38 A
Current L3
19.29 A

Current value for each phase. These values concern the reference instrument (real or virtual). If the reference instrument is virtual, it represents the sum of "x" real instruments with the option "Contribution to the Virtual Instrument" enabled. If the reference instrument is virtual, each current value shown to the side is calculated as the sum of all the phase currents of the real instruments set as contribution.

Example:
L1 current = $L1(st1) + L1(st2) + L1(st3) + L1(st\dots)$
L2 current = $L2(st1) + L2(st2) + L2(st3) + L2(st\dots)$
L3 current = $L3(st1) + L3(st2) + L3(st3) + L3(st\dots)$

Where **L1, L2, L3 current** represent the values displayed in the green frame. **L1(st1)** represents the phase1 current of instrument 1, **L1(st2)** the phase1 current of instrument 2, **L2(st3)** represents the phase2 current of instrument 3 and so on ...

Rh frame: from the top:

- Log-off button Click the button to log off of the VMU-C EM and return to the access page.
- Username
- PC's time.
- Values of the line voltages for the reference instrument (orange frame). In this frame data are continuously updated.

Voltage LL sys
389.8 V
Voltage L12
389.00 V
Voltage L23
391.50 V
Voltage L31
389.75 V

Value of the line voltages for the system and for phase12, phase23 and phase31. These values concern the reference instrument (real or virtual). If the reference instrument is virtual, each voltage value shown to the side is calculated as the average of all the phase-phase currents of the real instruments set as contribution.

Example:
LLsys Voltage= $[VLLsys(st1)+VLLsys(st2)+VLLsys(st3)+VLLsys(st\dots)]/n$
LL12 Voltage = $[VLL12(st1)+VLL12(st2)+VLL12(st3)+VLL12(st\dots)]/n$
LL23 Voltage = $[VLL23(st1)+VLL23(st2)+VLL23(st3)+VLL23(st\dots)]/n$
LL31 Voltage = $[VLL31(st1)+VLL31(st2)+VLL31(st3)+VLL31(st\dots)]/n$

Where **LLsys, LL12, LL23 and LL31 Voltage** represent the values displayed in the green frame. **LL12(st1)** represents the phase12 voltage of instrument 1, **LL23(st2)** the phase23 voltage of instrument 2, **LL31(st3)** represents the phase31 voltage of instrument 3 and so on ... "n" represents the amount of instruments set as "**contribution**".

- Values of the star voltages for the reference instrument (lower orange frame). In this frame data are continuously updated.

Voltage LN sys	0.00 V
Voltage L1N	225.03 V
Voltage L2N	226.88 V
Voltage L3N	223.78 V

Value of the star voltages for the system and for phase1n, phase2n and phase3n. These values concern the reference instrument (real or virtual). If the reference instrument is virtual, each voltage value shown to the side is calculated as the average of all the phase-neutral currents of the real instruments set as contribution (see the example below).

Example:

LNsys Voltage = $[VLNsys(st1)+VLNsys(st2)+VLNsys(st3)+VLNsys(st...)]/n$

L1N Voltage = $[VL1N(st1)+VL1N(st2)+VL1N(st3)+VL1N(st...)]/n$

L2N Voltage = $[VL2N(st1)+VL2N(st2)+VL2N(st3)+VL2N(st...)]/n$

L3N Voltage = $[VLN3(st1)+VLN3(st2)+VLN3(st3)+VLN3(st...)]/n$

Where **LNsys**, **L1N**, **L2N** and **L3N Voltage** represent the values displayed in the green frame. **LN1(st1)** represents the phase1-neutral voltage of instrument 1, **L2N(st2)** the phase2-neutral voltage of instrument 2, **L3N(st3)** represents the phase3-neutral voltage of instrument 3 and so on ... "n" represents the amount of instruments set as "contribution".

- c) **Main Menu:** this area displays the selected variables in graphic form. The type of chart/displayed variables can change according to the selected icon (see navigation menu) and to the variable the user wishes to display. In the bottom section, besides, there is a frame displaying some information about the plant (name, location, ...).

2.3.1 NAVIGATION MENU

Hover your mouse over the different icons to display the relevant meaning in text form. Click on the icon to access the relevant section which will be displayed in the Main Frame.



Home

It allows to return to the main page.



Monitor

It allows to display in graphic form the main reference instrument data, like currents, voltages (VLL and VLN), power (kW and kvar), power factor (PF) and, if available, the analogue variables (°C and/or mA and/or mV).



Plant

It allows to display in graphical form all the acquired system data.



Alarms

It allows to display the alarms that have been raised in the plant.



Money

It allows to display in graphic form the economic countervalues from consumption monitoring.



Information

A tab displaying the plant characteristics.



Export

It allows to stored data to xls format.



Configuration (Only available for Administrator users)

It allows to access the system configuration menu.



Account (Only available for Administrator users)

It allows to access the Account management question.

3 CONFIGURATION



Click on the “Configuration” icon in the Navigation Menu (Fig. 6) to access the whole system Configuration section.



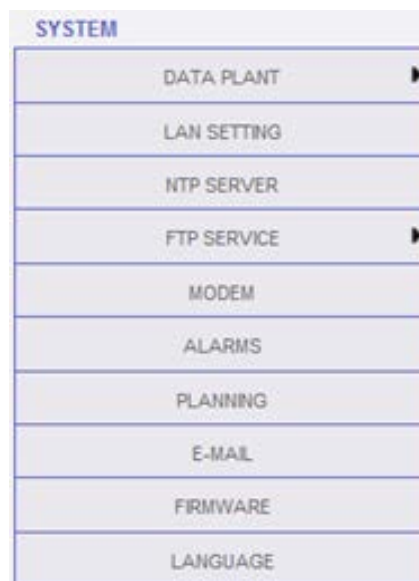
Fig. 6 – System Configuration

Three main configuration menus (*SYSTEM*, *PLANT* and *OTHER VARIABLES*) will be displayed on the screen:



3.1 SYSTEM CONFIGURATION

Clicking on the “SYSTEM” menu will display the following sub-menus:



3.1.1 PLANT DATA SETTING

Accessing the “*PLANT DATA*” menu will open the plant description page:



3.1.2 DESCRIPTION SETTING

Clicking on the “DESCRIPTION” menu will display the main page providing a plant description:

Plant Description						
Plant Name		VMUC-EM Test Plant				
Plant Location		Belluno Safforze				
Plant Property		Carlo Gavazzi Controls SPA				
Installer		PSS				
VMU-C Installation Date		2013-04-01 yyyy-mm-dd			Currency	€
Contract highlights						
	Fixed Monthly Costs	kWh Unit Cost	kvarh Unit Cost	Wmax Monthly Cost	Max Contractual Peak	
Tariff 1	10.0 €	2.15 €	0.75 €	5.75 €	25.0 kW	
Tariff 2	10.0 €	0.250 €	0.75 €	6.95 €	15.0 kW	
Save Setting						
Tariff Calendar Configuration						
		T1 Start 1	T1 End 1		T1 Start 2	T1 End 2
Tariff T1 Interval	Working Day	07	12		13	18
Holidays	<input type="checkbox"/> Mon	<input type="checkbox"/> Tue	<input type="checkbox"/> Wen	<input type="checkbox"/> Thu	<input checked="" type="checkbox"/> Fri	<input checked="" type="checkbox"/> Sat
All period outside tariff T1 range, are automatically included in the tariff T2. All holidays are included into tariff T2.						
Save Setting						

Fig. 7 – Plant Data Configuration

The “**Plant description**” section (see the hatched area “A”) allows to enter the general plant data (name, location, date of installation, ...) to simplify the management of the plant itself. In the “Currency” box the user can specify the reference currency for VMU-C EM (€, £, \$, ...).

The “**Contract highlights**” section (see the hatched area “B”) displays information of a more economic nature, concerning the type of contract signed with the energy provider utility (fixed costs, unit costs, contractual limits, etc.). These data must be edited using the point “.” as decimal mark (should you use the comma“,” edited data will not be saved).

Note: when configuring the economic data (see frame “B”) we recommend that you refer to the contract signed with the relevant utility.

In section “**Tariff Calendar Configuration**” (see the hatched area “C”) the user can define which weekdays shall be considered as **holidays** (by exclusion, non-selected days shall be considered as **working days**).

For working days, besides, the user will be able to define two tariffs (T1 and T2) for which the individual kWh cost will be different. Within the working day the user will be able to define two periods to be associated with tariff “T1”.

Note: any rime periods not included in tariff “T1” will be automatically included in tariff T2. For holidays, the T2 tariff shall always be used.

Press “Save setting” to store the data into VMU-C EM.

3.1.3 LAN SETTING

Clicking on “LAN SETTING” will grant access to the page shown in Fig. 8.

Fig. 8 – Network setting

This page consists of three sections:

1) Network setting

To configure the LAN port, you can choose between two options:

- **Get an IP address automatically (DHCP)** (see “A” area) : the address is automatically acquired when switching on the VMU-C EM from a DHCP server, which must exist inside the network the device is connected to. The IP address will be dynamic and not known in advance. In this case you can reach VMU-C from within the same network by typing on the browser the Machine Name assigned to it (e.g. VMU-C01).
- **Use the following IP address (Static routing)** (see “B” area): you need to manually specify an IP address along with a network mask and a default gateway.

In the absence of a network administrator who can provide the correct network parameters, assign an address belonging to the same class as those of the other devices existing on the same network, and indicate “255.255.255.0” as the network mask.

The default gateway is only mandatory if you plan to access VMU-C EM through the Internet using the LAN connection; in this case, indicate in this field the IP address of the ADSL router.

- Finally, you can manually specify the addresses of the preferred and alternative DNS servers to be used to access the Internet by selecting

(Use the following DNS server addresses) (see “C” area); as an alternative, if the LAN port is set to DHCP mode, you can allow VMU-C EM to acquire the DNS server address from the DHCP server, by enabling the option **(Get DNS server address Automatically)**.

Press the “**Save setting**” button to store the network setting. To apply the new settings, VMU-C needs a restart, which is performed automatically; wait until the count-down is over; then you'll routed back to the home page.

The system requires to have access to the Internet for the following services:

- To send e-mails to the configured SMTP server.
- To synchronise the date and time settings through the NTP service (if configured).

Note: to ensure that VMU-C EM is accessible from the outside through a LAN connection, it needs to be appropriately re-routed to the ADSL Modem or Router (NAT- Port forwarding) to which it is connected. **The ports to be re-routed are: 80 and 52325.**

2) Dynamic public IP address management

Should you not have at your disposal a static public IP address allowing to reach the VMU-C from the Internet, but should you have to use any public IP addresses dynamically assigned by your ISP (Internet Service Provider), you may resort to DNS server managers keeping the dynamic public IP address constantly synchronised with a domain name (see “D” area). The managers used by VMU-C EM are *DynDns.org*, *DynDns.it* and *No-ip.com*. To access the service you need to connect to <http://www.dyndns.org/> (or <http://www.dyndns.it/> or <http://www.No-ip.com/>), register by creating an account and finally create a new “Dynamic DNS host”. The term "Dynamic DNS host" indicates a domain address which shall then be typed into the browser's address bar to reach VMU-C. (E.g. VMUC.No-ip.com). When registering to DynDNS.org (or to an equivalent site), please provide a Username and a Password that VMU-C will use to authenticate with the server.

To enable the management of the dynamic public IP address you need to:

- Check “Enable dynamic DNS”.
- Type the name of the chosen Dynamic DNS host.
- Type the Username and Password provided during account registration.
- Click on “Save setting”

Dynamic IP Address Management	
<input checked="" type="checkbox"/> Enable Dynamic DNS	Server Dynamic DNS DynDns.it
Hostname	carlogavazzi-vmuc.com
Username	vmucem
Password	xxxxxxxx
Save Setting	

Fig. 9 – Dynamic public IP address management

The service will be available after about 6 minutes.

Note: Resorting to this service is often necessary when the Internet connection is established through a GPRS/UMTS modem or when you don't have any static IP address on your ADSL line. Mobile providers typically don't provide a static IP address.

3.1.4 NTP SERVER SETTING

Clicking on “NTP SERVER” will grant access to the page shown in Fig. 10.

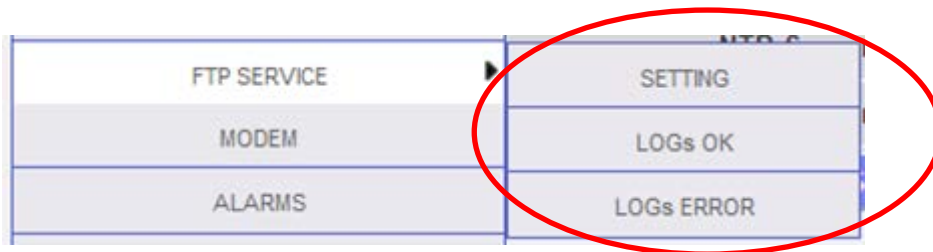
Clock Synchronisation	
Enabling Network Clock Synchronisation	<input checked="" type="checkbox"/>
NTP Server 1 :	<input type="text" value="ntp1.inrim.it"/>
NTP Server 2 :	<input type="text" value="ntp2.inrim.it"/>
<input type="button" value="Save Setting"/>	

Fig. 10' – NTP Server

You can set up to two NTP servers. Enabling this server type allows to constantly synchronise the DATE and TIME data; this service also allows the VMU-C EM to recognise the geographic area in which it has been installed.

3.1.5 FTP SERVICE SETTING

Clicking on “FTP SERVICE” will display 3 sub-menus:



3.1.5.1 SETTING

Click the “SETTING” item to access a page allowing to set the parameters for data transfer from VMU-C EM to the server used by the customer. You need to fill in all the fields included in the mask shown below:

FTP SERVICE	
Enable FTP Service	<input checked="" type="checkbox"/>
Server Address	88.32.230.xxx
Remote Directory	vmucem_data
Server User	vmuc_test
Server Password
Client User	test_client
Client Password
Upload Time Interval	00 - 10 (hh:mm)
Alarms Flag	<input checked="" type="checkbox"/>
Measurement Flag	<input checked="" type="checkbox"/>
First Delivery (Date / Time)	21 - 02 - 2013 10 : 55 : 00
<input type="button" value="Save Setting"/>	
<input type="button" value="Test Connection"/>	

Fig. 11 – FTP SERVICE

Fill in the fields according to the following specifications:

- “Enable FTP SERVICE”: check the relevant box to enable this function (for both **PUSH** and **PULL** mode).

If you choose to work in PUSH mode (FTP-Server: scheduled operation) VMUC itself will send the data stored in its internal memory according to the rules defined in the configuration page shown above (Fig. 11). To this purpose you need to fill in the following fields:

- “Server address”: address of the server to which VMUC_EM will send the data
- “Remote directory”: folder in which data shall be saved.
- “Server user”: username; it shall match the one set on the server
- “Server password”: password required to access the server in safe mode
- “Upload time interval” (hours: minutes): time which must elapse between two consecutive PUSH operations (the system cannot manage any time intervals exceeding 24 hours)
- “Alarms flag”: check this box if you wish to receive the list of all the events representing an alarm status change in the latest above-defined time interval.
- “Measurement flag”: check this box if you wish to receive the list of all the measurements performed in the latest above-defined time interval.

VMU-C

- “*First delivery*” (Date/time): date and time of the first data forwarding from VMUC to the server (in PUSH mode).

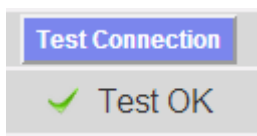
In PULL mode (HTTP-Client: upon request), when receiving a request for data from the PC, the VMU-C EM will answer by providing the requested data (previously stored in the VMUC internal memory). Fill in the following fields:

- “*Client user*”: it defines the username to be specified to ensure that VMU-C EM acknowledges and accepts the data sending request.
- “*Client password*”: it defines the password to be specified to ensure that VMU-C EM acknowledges and accepts the data sending request.

Press “Save setting” key to store settings.

Press the “Test connection” button to check that the FTP-PUSH settings described above have been properly entered.

If configuration is correct, the following message will be displayed:



3.1.5.2 LOGs OK

Clicking on the “LOGs OK” menu will display the following screen, listing all the logs that have been successful:

LOGs OK				
Date / Time	IP address	File	Details	
1 2013-07-16 13:40:03	10.1.5.9	VMU-C_BN0250021001H_ALARM_2013-07-16-13-40-03_S.csv		
2 2013-07-16 13:35:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-16-13-35-17_S.csv		
3 2013-07-16 13:10:03	10.1.5.9	VMU-C_BN0250021001H_ALARM_2013-07-16-13-10-03_S.csv		
4 2013-07-16 13:05:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-16-13-05-17_S.csv		
5 2013-07-16 12:40:02	10.1.5.9	VMU-C_BN0250021001H_ALARM_2013-07-16-12-40-02_S.csv		
6 2013-07-16 12:35:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-16-12-35-17_S.csv		
7 2013-07-16 12:10:02	10.1.5.9	VMU-C_BN0250021001H_ALARM_2013-07-16-12-10-02_S.csv		
8 2013-07-16 12:05:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-16-12-05-17_S.csv		
9 2013-07-16 11:40:02	10.1.5.9	VMU-C_BN0250021001H_ALARM_2013-07-16-11-40-02_S.csv		
10 2013-07-16 11:35:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-16-11-35-17_S.csv		

3.1.5.3 LOGs ERROR

Clicking on the “LOGs ERROR” menu will display the following screen, listing all the logs that haven't been successful:

LOGs ERROR				
	Date / Time	IP address	File	Details
1	2013-07-04 18:05:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-18-05-17_S.csv	Empty VAR file
2	2013-07-04 17:35:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-17-35-17_S.csv	Empty VAR file
3	2013-07-04 17:05:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-17-05-17_S.csv	Empty VAR file
4	2013-07-04 16:35:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-16-35-17_S.csv	Empty VAR file
5	2013-07-04 16:05:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-16-05-17_S.csv	Empty VAR file
6	2013-07-04 15:35:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-15-35-17_S.csv	Empty VAR file
7	2013-07-04 15:05:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-15-05-17_S.csv	Empty VAR file
8	2013-07-04 14:35:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-14-35-17_S.csv	Empty VAR file
9	2013-07-04 14:05:18	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-14-05-18_S.csv	Empty VAR file
10	2013-07-04 13:35:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-13-35-17_S.csv	Empty VAR file
11	2013-07-04 13:05:17	10.1.5.9	VMU-C_BN0250021001H_VAR_2013-07-04-13-05-17_S.csv	Empty VAR file

3.1.6 MODEM CONFIGURATION

To connect the Modem (VMU-W) to VMU-C EM you will have to perform the following steps:

- Make sure the VMU-C EM and the VMU-W are not powered.
- Connect the VMU-W to the VMU-C EM through the auxiliary bus on the left side of the VMU-C EM.
- Make sure the **SIM is not protected by a PIN code** (should that be the case, disable the protection).
- Insert the SIM into the VMU-W modem through the special slot.
- Connect the antenna and put it in a place assuring proper signal reception.
- Restore the power supply of both devices (VMU-C EM and VMU-W).
- Make sure that both devices are located in a dry place, protected against rain and dust.

On the surface of VMU-W there are two LEDs, whose meaning is the following:

Green LED: *Steadily on:* the equipment is powered.

Blue LED: *Off:* the equipment isn't powered.

Fast blinking: searching for the cover signal / not registered / switching off.

Slow blinking: Service is registered and signal is available.

Steadily on: communication under way.

Clicking on “MODEM” will grant access to the configuration page of the parameters which will allow the communication through the MODEM (VMUW). You need to fill in all the fields included in the mask shown below:

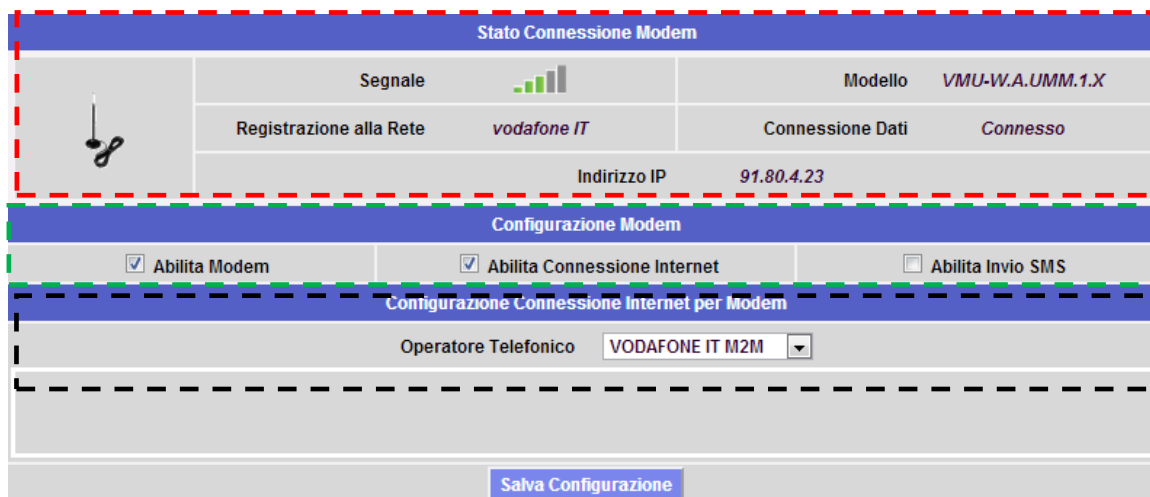


Fig. 12 – Modem configuration

The red-hatched area displays the connection status information:

- Signal = level of modem reception signal
- Model = full modem code (VMUW...)
- Network registration = network to which the modem is connected.
- Data connection = data transmission connection status.
- IP address = IP address

Specify in the green-hatched area the functions you wish to enable:

- Enable modem: click to enable modem usage
- Enable Internet connection: click to enable the Internet connection for data transmission
- Enable SMS sending: click to enable the sending of SMS messages in case of alarm.

In the black-hatched area specify the telephone provider used for modem connection to the Internet.



3.1.7 ALARM SENDING CONFIGURATION

Clicking on “ALARMS” will grant access to the page shown in Fig. 13.

SYSTEM	PLANT	OTHER VARIABLES
Configuring Alarming - Group 1		
Recipients Addresses	info@email.com	
Object	alarms and events VMUC-EM	
Action	<input checked="" type="checkbox"/> Send Mail	<input type="checkbox"/> Send SMS
	Phone Number	
Send for:	<input checked="" type="checkbox"/> Alarms	<input checked="" type="checkbox"/> Anomalies
	<input checked="" type="checkbox"/> Events	
Configuring Alarming - Group 2		
Recipients Addresses	info1@email.com	
Object	anomalies VMUC-EM	
Action	<input checked="" type="checkbox"/> Send Mail	<input type="checkbox"/> Send SMS
	Phone Number	
Send for:	<input type="checkbox"/> Alarms	<input type="checkbox"/> Anomalies
	<input type="checkbox"/> Events	
<input type="button" value="Save Setting"/>		

Fig. 13 – Outgoing mail address configuration mask

When any alarm conditions arise in the plant and/or when an event is detected, VMU-C EM can send e-mails or SMS messages to one or more receivers, according to the predefined rules. The configuration page allows to create up to two different user groups to which the notifications (e-mails and/or SMS messages) shall be sent. In “Send for” you can filter the type of alarm message to be sent to the relevant receivers.

Fill in the fields in both screens according to the following specifications:

- “*Recipients addresses*”: e-mail addresses of receivers the alarm messages are sent to.

Note: You may specify multiple addresses; in that case addresses must be separated by a semicolon (;) without any space.

- “*Phone number*”: Specify the phone number (complete with international prefix) to which the message shall be sent when an event occurs.
- “*Object*”: the subject of the e-mail to be sent (e.g. *Alarm from Plant xx*).
- “*Action*”:
 - “*Send Mail*”: Check to enable e-mail sending.
 - “*Send SMS*”: Check to enable SMS sending.

Note: To be able to send any e-mail, the outgoing mail server must be appropriately configured in the system. (See paragraph “*E-MAIL*”)

- “*Test Mail*”: Press this key to receive a test e-mail at the email addresses specified in “*Recipients addresses*” field.
- “*Test SMS*”: press this key to receive a test text message (SMS) at the phone number specified in the “*Phone number*” field.

Note: If the e-mail is not received, check outgoing mail server settings, recipient address, VMU-C EM reachability from Internet.

Note: Should the SMS fail to be received, check that the specified cell phone number is correct. Also check that the international prefix has been entered correctly.

- “Send for”: Selections allow to select and filter the alarm type the e-mail and/or the SMS is to be sent for. If not sent, the event is anyway stored and visible on monitor from Alarms list. Details of alarm types:
 - “Alarms”: high-priority alarms
 - “Anomalies”: low-medium priority alarms
 - “Events”: opening/closing of digital Inputs and Outputs, or change in configuration parameters.

For further details on alarm types, refer to “Alarm display” paragraph. Press “Save setting” key to store settings.

3.1.8 PLANNING CONFIGURATION

Clicking on “PLANNING” will grant access to the page shown in Fig. 14.

SYSTEM	PLANT	OTHER VARIABLES
Scheduling Sending data via Mail		
Recipients Addresses	<input type="text" value="info@email.com"/>	
Action	<input checked="" type="checkbox"/> Send Mail	<input type="button" value="Test Mail"/>
Send Plant Data	<input checked="" type="checkbox"/> Daily	<input checked="" type="checkbox"/> Weekly
	<input checked="" type="checkbox"/> Monthly	<input checked="" type="checkbox"/> Yearly
<input type="button" value="Save Setting"/>		

Fig. 14 – Planning configuration

- Scheduling sending data via Mail

VMU-C allows scheduling an e-mail sending with a .xls file attached, containing the system production data for the period selected in "Send Plant Data". The e-mail can be sent to more receivers at the same time.

Note: to be able to send any e-mail, the outgoing mail server must be appropriately configured in the system. (See paragraph 3.1.6)

Fill in the fields in both screens according to the following specifications:

“**Recipients addresses**”: E-mail addresses of receivers the production data are sent to.

Note: Addresses must be separated by semicolon (;) with no space.

“**Action**”: Enable/disable schedule:

- “**Send Mail**”: Check to enable e-mail sending.

Note: to be able to send any e-mail, the outgoing mail server must be appropriately configured in the system. (See the previous paragraph)

- “**Test Mail**”: Press this key to receive a test e-mail at the email addresses specified in “Recipients addresses” field.

Note: if the e-mail is not received, check outgoing mail server settings, recipient address, VMU-C EM reachability from Internet.

“**Send Plant Data**”: Check email sending period.

- “**Daily**”: every day at 11:59 p.m., a .xls file is sent with daily consumption data. The file will have the following structure:

Date 2013-05-16	Energy on period (read from energy meters) (kWh)	Instantaneous Power (read from energy meters) (kW)	Energy on period (read from energy meters) (kvarh)	Instantaneous Power (read from energy meters) (kvar)
07:45	1.00	12.30	0.50	0.10
07:50	1.20	12.40	0.40	-0.20
07:55	0.60	8.60	0.50	-3.30
08:00	0.80	8.90	0.40	-3.70
08:05	0.70	9.80	0.30	-3.60
08:10	0.90	10.50	0.50	-3.70
08:15	1.00	10.90	0.60	-3.90

“Daily” file format

- “**Weekly**”: an .xls file containing the consumption data of each day of the week that just ended is sent at 11:59 p.m. of each Sunday. The file will have the following structure:

Date 2013-05-19	Energy on period (read from energy meters) (kWh)	Instantaneous Power (read from energy meters) (kW)	Energy on period (read from energy meters) (kvarh)	Instantaneous Power (read from energy meters) (kvar)
07:45	0.20	2.50	0.10	1.00
07:50	0.20	2.50	0.10	1.00
08:25	0.20	2.50	0.10	0.90
08:30	0.20	2.50	0.10	0.90
08:35	0.20	2.50	0.10	0.90
08:40	0.20	2.50	0.10	0.90
08:45	0.20	2.50	0.00	0.90
.....
Date 2013-05-18	Energy on period (read from energy meters) (kWh)	Instantaneous Power (read from energy meters) (kW)	Energy on period (read from energy meters) (kvarh)	Instantaneous Power (read from energy meters) (kvar)
.....
07:45	0.50	5.20	0.20	-1.00
07:50	0.50	5.40	0.30	-0.80
07:55	0.30	5.20	0.30	-0.90
08:00	0.50	5.30	0.30	-0.90
08:05	0.40	5.80	0.40	-0.60
08:10	0.60	5.50	0.30	-0.80
08:15	0.50	5.60	0.30	-0.70
.....
Date 2013-05-17	Energy on period (read from energy meters) (kWh)	Instantaneous Power (read from energy meters) (kW)	Energy on period (read from energy meters) (kvarh)	Instantaneous Power (read from energy meters) (kvar)
.....
07:40	0.40	5.20	0.20	1.50
07:45	1.10	12.20	0.50	1.50
07:50	1.00	12.30	0.40	-0.60
07:55	1.00	12.00	0.30	-2.20
08:00	1.00	12.80	0.40	-2.10
08:05	1.10	13.60	0.30	-1.90

“Weekly” file format

- **“Monthly”**: on the last day of the month at 11:59 p.m., a .xls file is sent with detailed consumption data (daily definition) for every day of the month. The file will have the following structure:

Date	Energy on period (read from energy meters) (kWh)	Instantaneous Power (read from energy meters) (kW)	Energy on period (read from energy meters) (kvarh)	Instantaneous Power (read from energy meters) (kvar)
06-01-2013	54,5	2,27	38	-1,15
06-02-2013	33,9	1,42	18,8	-0,68
06-03-2013	145,3	6,06	69,9	-1,88
06-04-2013	149,2	6,18	68,7	-1,79
06-05-2013	150,9	6,29	69,2	-1,68
06-06-2013	163	6,76	72,2	-1,65
06-07-2013	124,7	5,61	60,4	-1,51

“Monthly” file format

- **“Yearly”**: on December 31st at 11:59 p.m., a .xls file is sent with the consumption data (individual month definition) for every day of the year.

Date	Energy on period (read from energy meters) (kWh)	Instantaneous Power (read from energy meters) (kW)	Energy on period (read from energy meters) (kvarh)	Instantaneous Power (read from energy meters) (kvar)
gen-12	654,0	27,2	456,0	-13,8
feb-12	406,8	17,0	225,6	-8,2
mar-12	1743,6	72,7	838,8	-22,6
apr-12	1790,4	74,2	824,4	-21,5
mag-12	1810,8	75,5	830,4	-20,2
giu-12	1956,0	81,1	866,4	-19,8
lug-12	1616,4	67,3	700,8	-15,6

“Yearly” file format

3.1.9 E-MAIL (OUTGOING MAIL SERVER) CONFIGURATION

Clicking on the “E-MAIL” item will grant access to the page shown in Fig. 15.

SYSTEM	PLANT	OTHER VARIABLES
Configuring Outgoing Mail Server		
Sender Address	<input type="text" value="vmuc.ponte@gmail.com"/>	
Sender Name	<input type="text" value="VMUC-EM"/>	
Server SMTP	<input type="text" value="smtp.gmail.com"/>	
Username Server SMTP	<input type="text" value="vmuc.ponte"/>	
Password Server SMTP	<input type="password" value="*****"/>	
<input type="button" value="Save Setting"/>		

Fig. 15 – Outgoing mail server configuration screen

The outgoing mail server configuration is necessary to send alarm or history data e-mails from the plant. If configuration is incomplete or incorrect, VMU-C EM cannot send any communications by e-mail.

Fill in the fields according to the following specifications:

- **“Sender address”**: e-mail address associated with VMU-C EM. If the address is invalid, the e-mails sent by VMU-C EM might be considered as SPAM.
- **“Sender name”**: sender name. (From)
- **“Server SMTP”**: Address of SMTP server for outgoing mail.
- **“Username Server SMTP”**: username for access authentication to SMTP server.
- **“Password Server SMTP”**: password for access authentication to SMTP server.

Press “Save setting” key to store settings.

Note: to ensure proper operation of email message sending, refer to “Alarm configuration” paragraph.

Note: should you use a mail server not requiring the configuration of the “UserName” and “Password” fields, when configuring VMU-C the two fields in question shall not be filled in.

3.1.10 VMU-C FIRMWARE

Clicking on “FIRMWARE” will grant access to the following page (Fig. 16):

SYSTEM	PLANT	OTHER VARIABLES
VMU-C Firmware Update		
A	VMU-C Serial Number	BN0250021001H
	MAC Address	00-19-EE-10-02-4E
	Installed Firmware Version	Ver. B10_A1
	VMU-C Update	<input type="button" value="Browse..."/> <input type="button" value="Load"/>
Remote Reboot		
B	VMU-C Reboot	<input type="button" value="Reboot"/>
	Setting VMUC-EM's Date and Time - VMU-M EM's Synchronization	
C	VMU-C's Date <input type="text" value="16-07-2013"/> <input type="button" value="..."/>	VMU-C's Time <input type="text" value="14"/> <input type="text" value="12"/> <input type="text" value="00"/> hh:mm:ss
	<input type="checkbox"/> Synchronize with PC's time	<input type="button" value="Adjust"/>
System Data Reset		
Password <input type="text"/>	Confirm Password <input type="text"/>	
	Data Reset	<input type="button" value="Reset"/>
	Events Reset	<input type="button" value="Reset"/>
D	Reset Data and Plant Settings	<input type="button" value="Reset"/>
	Restore Factory Settings	<input type="button" value="Reset"/>

Fig. 16 - Firmware update

The page includes four masks:

- VMU-C EM firmware update (“A” area)
 - Remote reboot (“B” area)
 - Setting VMUC-EM’s date and time - VMU-M EM’s synchronization of the date/time with the PC date/time (see “C” area)
 - System data reset for RESET command management (“D” area).
- **VMU-C EM firmware update (“A” area)**

The field “*Installed firmware version*” displays the firmware version installed on VMU-C EM, the serial number of the VMU-C EM itself and the MAC address of the installed network adapter. Select the firmware update file through the “Browse” button; VMU-C EM will display again the screen shown above, replacing the “Browse” caption with the “OK” indication (the update file must be requested of the Carlo Gavazzi technical support service).

VMU-C Update	<input type="button" value="OK"/> <input type="button" value="Load"/>
--------------	---

Pressing the “Load” button will open a window prompting you to confirm the firmware update operation. As soon as the update operation is confirmed, the system will prompt you to confirm the operation under way (Fig. 17):

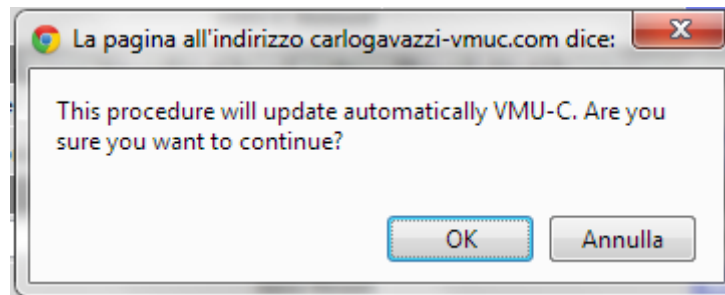


Fig. 17 – Firmware update confirmation

As soon as the firmware update operation is confirmed, the system will display the screen shown below:



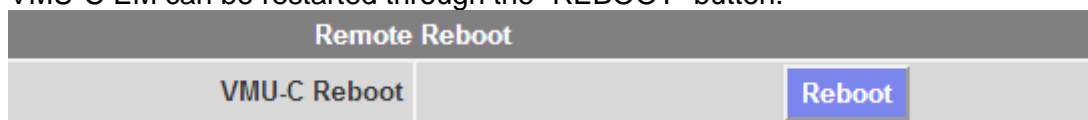
Wait for a couple of minutes until VMU-C EM is restarted and the new version is installed.

Note: the time necessary to the system for loading the update depends on the speed of the Internet/LAN connection between the PC and VMU-C EM and could last for many minutes, particularly in case of cell modem connection. Wait for the report to confirm that download was successful.

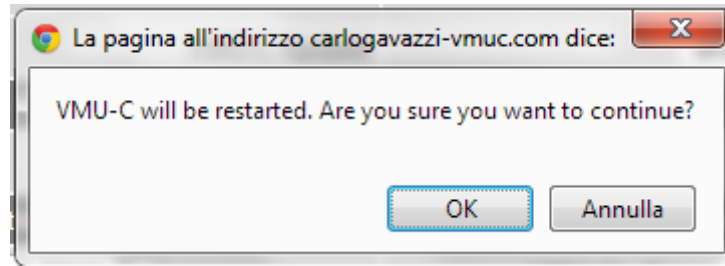
Note: the update operation cannot be interrupted after launching the Update command. Do not launch a new update before the system has completed the first one.

- **VMU-C EM reboot** (“B” area)

VMU-C EM can be restarted through the “REBOOT” button.



After issuing the command, the user will be prompted to confirm it.



Once the count-down has elapsed you will be rerouted to the “Home Page” (Fig. 18).

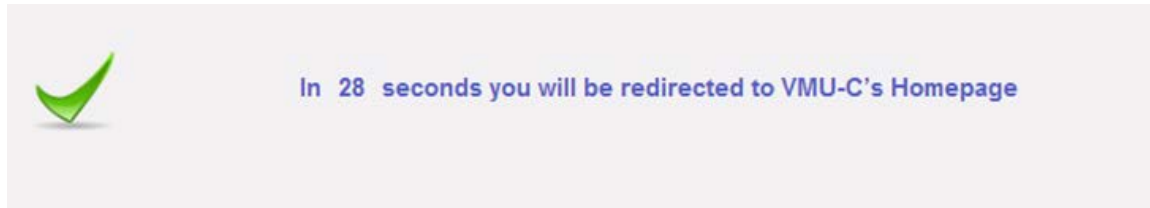


Fig. 18 – VMU-C reboot

Note: during update and restart, web pages can show error messages as VMU-C cannot be temporarily reached. Wait for a few seconds; connection will be restored.

- **Setting VMUC-EM’ s date and time - VMU-M EM’s synchronization (“C” area)**

Pressing the “**Adjust**” button will allow to set the VMU-C EM internal date and time on all the VMU-M.EM devices connected to the VMU-C EM itself. If the function “*Synchronise with PC’s time*” is selected, the date and time sent to the VMU-C EM and thus to the VMU-M.EM connected to it will be those of the PC in use (Fig. 19).

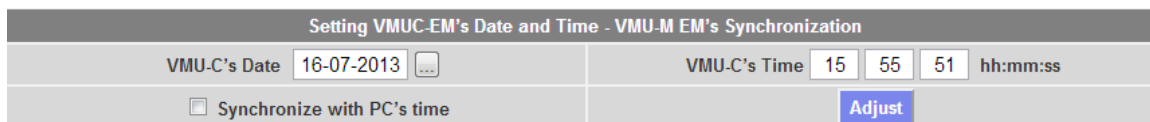


Fig. 19 – Setting date and Time

- **System data reset (“D” area)**

The VMU-C EM provides 4 different Reset functions (Fig. 20)

Note: to be able to execute any of the reset functions described below, you first need to enter the Administrator level “Password” data.

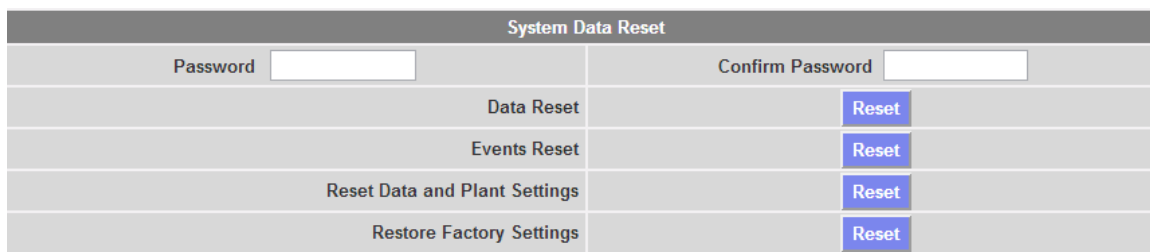


Fig. 20 – Resetting system data

- 1) **Data reset:** all plant data will be deleted and stored into the internal memory of VMUCEM and into the VMU-M EM devices connected to it (if a memory card has been installed in VMU-C EM, it will not be affected by the Reset command).
- 2) **Events reset:** all the events recorded in VMU-C EM will be deleted and recorded in the VMU-M EM devices connected to it (if a memory card has been installed in VMU-C EM, it will not be affected by the Reset command).
- 3) **Reset data and plant settings:** this command combines the two reset commands described above; even the plant configuration will be deleted (the function will not delete the IP address data, the SMTP mail server data and any previously entered mail addresses).
- 4) **Restore factory settings:** the reset will affect the items described at point 3, as well as all the settings like IP address, SMTP server and alarm management by e-mail (if a memory card has been installed in VMU-C EM, it will not be affected by the Reset command). The default factory data will be reloaded.

3.1.11 SETTING THE LANGUAGE

Hovering the mouse cursor over “SYSTEM” will display a drop-down menu; click on “LANGUAGE”; the relevant section will be displayed, as shown in Fig. 21. From the drop-down menu select the desired language. The system will also display the date and time formats currently in use.


Language	
Language Seleccion	English UK 
Engineering Units	
Date Format	Day - Month - Year
Time Format	Hours : Minutes : Seconds AM/PM
Time Zone	
Area	Location
Europe	Rome
<input type="button" value="Apply"/>	

Fig. 21 – Language configuration

You will also have to provide the following information:

- Geographic area
- City

This information is required for time management inside VMU-C EM.

4 PLANT INSTALLATION

Hovering the mouse cursor over “PLANT” will display a drop-down menu consisting of three items: “COM SETUP” , “DRIVER” and “SETTING” (Fig. 22).



Fig. 22 – Plant setting

4.1 COM SETUP

Hovering the mouse cursor over “COM SETUP” will grant access to the page shown in Fig. 23. The configuration data in this page only refer to the COM 1 communication port.

The configuration of the “COM 2” port must be carried out during the configuration of the energy meters connected to VMU-C EM.

COM Port Setup	
COM1 (VMU-M EM)	
Baud Rate	9600 ▾
Parity	None ▾
Data bits	8 ▾
Stop bits	1 ▾
<input type="button" value="Save Setting"/>	

Fig. 23 – Plant setting

Note: The communication port RS485 (COM 1) is specifically designed for the communication with the VMU-M EM belonging to the system and controlled by VMU-C EM.

Define the following parameters in this page:

- **Baud-rate** (selectable values are: 9600, 19200, 38400 and 115200 bps)
- **Parity** (selectable values are: none, odd or even)
- **Data bits** (selectable values are 8 or 7 bits)
- **Stop bits** (selectable values are 1 or 2 bits)

Press “Save setting” to store data.

4.2 DRIVERS

Hovering the mouse cursor over “DRIVERS” will display two items: LIST and IMPORT.

- Clicking the LIST item will grant access to the page shown in Fig. 24, listing (in alphabetical order) all the drivers of the compatible energy meters in VMU-C EM.

Available driver list			
Brand	Driver	Version	Instrument
CARLO GAVAZZI	EM21	2.2	Energy Meter
CARLO GAVAZZI	EM21_PF	2.2	Energy Meter
CARLO GAVAZZI	EM23_AV2_AV9	1.0	Energy Meter
CARLO GAVAZZI	EM24_AV0	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV5	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV5_PF	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV6	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV9_AV2	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV9_AV2_PF	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV5	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV5_PF	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV6	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV6_PF	2.3	Energy Meter
CARLO GAVAZZI	EM33	2.1	Energy Meter
CARLO GAVAZZI	WM30	2.2	Energy Meter
CARLO GAVAZZI	WM40	2.3	Energy Meter

Fig. 24 – Driver list

- Clicking on the “IMPORT” item will grant access to the page shown in Fig. 25, allowing to add new drivers which will be supplied along time by “Carlo Gavazzi Controls”. Once the new driver(s) loading procedure is completed, press the “Activate” button to actually enable the driver and make it usable.

Driver Import Procedure	
Select the file using the "Browse" button	<input type="button" value="Browse..."/>
Press the "Load Driver" key to load the selected driver	<input type="button" value="Load Driver"/>
Confirm New Driver Activation	<input type="button" value="Activate"/>

Fig. 25 – Driver import

4.3 PLANT SETTING

Hovering the mouse cursor on “SETTING” will display two items: WIZARD and SAVE CONFIGURATION (Fig. 26) .

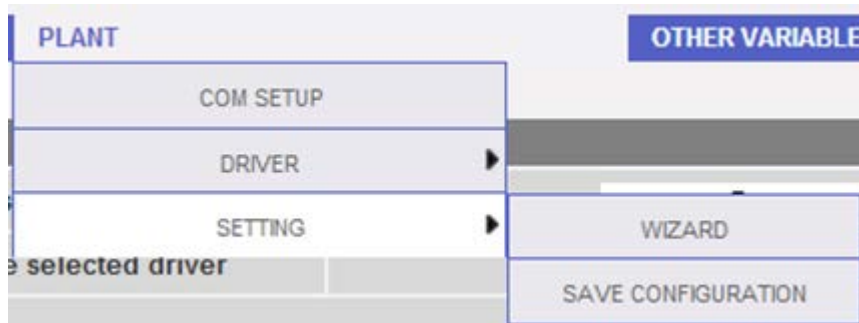


Fig. 26 – VMU-C EM setting

- If the VMU-C EM configuration has already been completed, clicking on the SAVE CONFIGURATION item will allow to export it as a FILE having a “DB” extension (Fig. 27) and to save it on a PC; the user will then be able to import it into the VMU-C EM or into a new machine.



Fig. 27 – VMU-C EM setup file

- Clicking on the SETUP WIZARD item will grant access to the page shown in Fig. 28, displaying four new sub-menus:
 - Find connected VMU-C EM
 - Manual Setup
 - Resume Configuration
 - Import

VMU-C Settings	
Autoscan Devices Connected to VMU-C	Find Connected Vmu-m
Perform the manual configuration of the devices connected to the VMU-C	Manual Setup
Resume Configuration	Resume Configuration
Load Configuration from File	Import

Fig. 28 – VMU-C EM setting

- Clicking on the item “Find connected VMU-C EM” will grant access to the page shown in Fig. 29; through the “Start scanning” command, the page allows to launch the procedure for the detection of the modules connected to the auxiliary bus of VMU-C EM and of the devices connected to the COM1 communication port (VMU-M EM and relevant modules).

Note: before starting the configuration procedure described below, you need to assign the relevant Mod-BUS address to all the VMU-M EM modules (Mod-BUS node number). There may be no two devices having the same node number on the same communication bus.

Note: the scanning operation can only detect the devices which are properly connected and powered. The automatic detection operation only refers to the COM1 communication bus. Any devices existing on COM2 shall be input later and configured manually.

Autoscan Devices Connected to VMU-C		
	VMU-C	COM 1
Modbus Address	---	---
Found Devices	---	---
Scan Status	---	---
<input type="button" value="Start Scan"/>		

Fig. 29 – VMU-C setting

Once the procedure for the automatic detection of the connected devices is completed, the system will display the page shown in Fig. 30, listing the amount of the devices detected for the COM1 port and for the COM Aux port of the VMU-C EM. If all the devices connected to the ports (COM1 e COM Aux) have been detected, you can stop the automatic scanning procedure through the “*Stop scanning*” command.

Autoscan Devices Connected to VMU-C		
	VMU-C	COM 1
Modbus Address	1	1
Found Devices	0	0
Scan Status	Terminate	Terminate
<input type="button" value="Save Configuration"/> <input type="button" value="Cancel"/>		

Fig. 30 – VMU-C EM setting

If the scanning procedure has been successfully completed, save the resulting information by pressing the “*Save Configuration*” button (Fig. 31).

Scan Status	Terminate	Terminate
<input type="button" value="Save Configuration"/> <input type="button" value="Cancel"/>		

Fig. 31 – VMU-C EM setting

- Clicking on the “*Save Configuration*” item will grant access to the page shown in Fig. 32.

Clicking on the “*Manual setup*” item (Fig. 28) will grant access to the manual configuration section shown below (Fig. 32). From now on the configuration of the whole system will start.

Note: the user will be able to ADD, MODIFY or REMOVE any VMU-M EM devices even after they have been automatically detected.

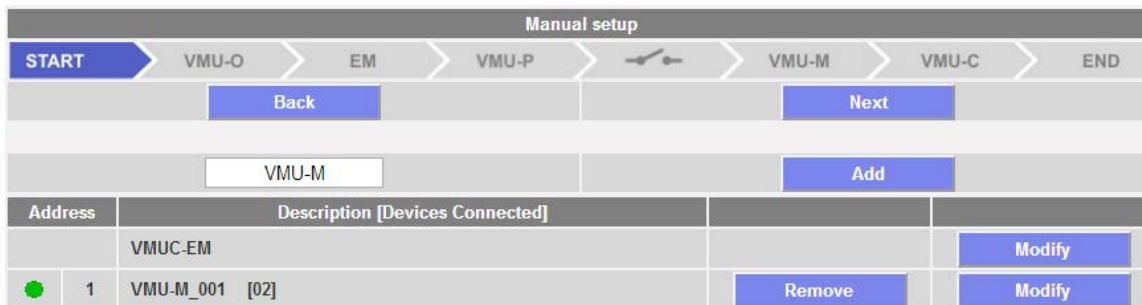


Fig. 32 – Manual setup

Note: The LED on the left in figure 32 can take on 3 different colours, having the following meanings:

- **GREEN:** configuration OK and serial communication enabled
- **YELLOW:** configuration OK but serial communication not enabled.
- **RED:** error in configuration data. Communication with the relevant module will be impossible.

- Clicking on the “Modify” button allows to display and modify the structure of the VMU-C EM and of each individual VMU-M EM (Fig. 33), adding or removing any VMU-x modules.
- You can modify the serial communication address of the specific VMU-M EM module.
- You can assign a specific group description (this way it might be easier to identify the board during monitoring)
- You can also associate a further descriptive note with the specific VMU-M EM module.
- The command “Enable VMU-M EM COM1 communication” allows to enable the communication between the VMU-C EM master and the relevant VMU-M EM. Should communication be disabled, during the scanning procedure the master VMU-C EM will not query the specific VMU-M EM.

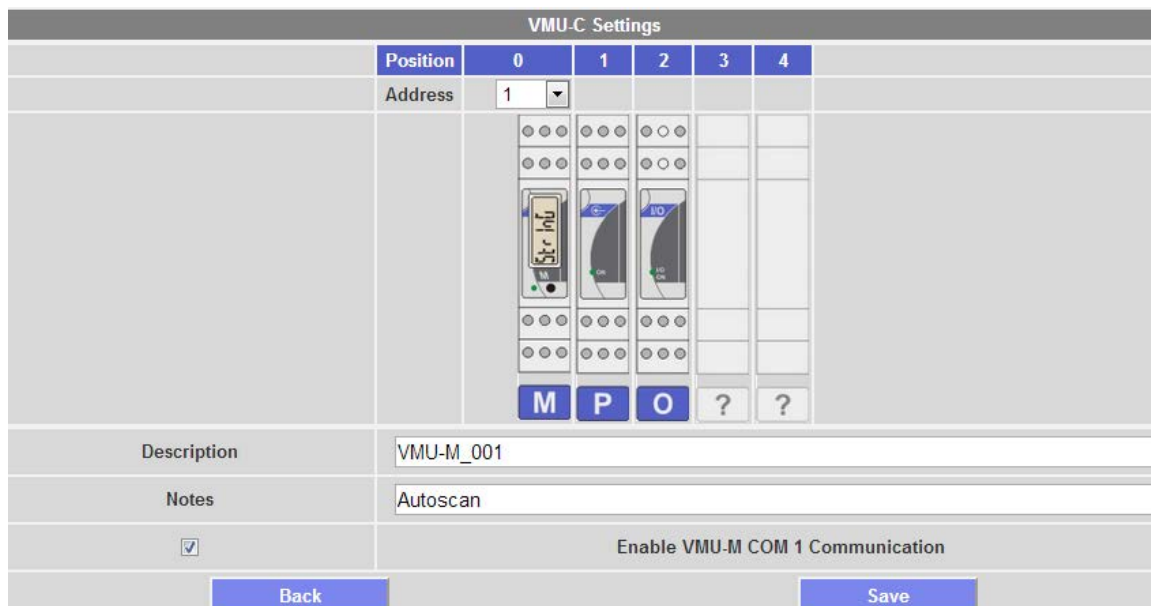


Fig. 33 – VMU-C EM setting

- Clicking on the “Next” button from the “Manual setup” page (Fig. 32) will grant access to the configuration of the individual devices, like energy meters, VMU modules and relevant sensors.

5 CONFIGURATION OF THE VMU-O MODULES (VMU-O EM)

If during the “device auto-detection” stage one or more VMU-O modules have been identified (there may be up to 3 VMU-O modules for each VMU-C EM e/o VMU-M EM), the system will display the screen shown in Fig. 34.

The procedure for the auto-detection of the modules connected to COM1 scans all the devices existing on this port, stores their position and displays the current configuration.

Fig. 34 – VMU-O module configuration mask

In the area marked by the dots the system will automatically display the information concerning the source base module (VMU-C EM or VMU-M EM) and the location of the VMU-O module within the system.

Indicate for each of the two outputs (Output1 and Output2) the function to be applied - "Remote", "Alarm", "Timer" (Fig. 35):

Fig. 35 – VMU-O usage mode configuration mask

- "Remote": Activation and deactivation are performed by means of a special command sent by the operator through VMU-C EM.
- "Alarm": the output is associated with an alarm condition. This selection also allows to define the initial state of the relay (Normally closed or Normally open).
- "Timer": Activation and deactivation are carried out at the time set in VMU-C EM.

Clicking on the “Next” button from the “Manual setup” page (Fig. 32) will grant access to the EM (Energy Meter) configuration page - see Fig. 36.

Manual setup							
START	VMU-O	EM	VMU-P		VMU-M	VMU-C	END
Back		Next					
Base Module	VMU-C	VMUC-EM (Addr. 1)			VMU-O Position	2	
VMU-O "I2R2"							
Output 1	Output 2						

Fig. 36 – Manual setup

6 ENERGY METER CONFIGURATION

Clicking on the “Next” button again from the “Manual setup” page will grant access to the Energy Meter configuration page - (Fig. 37).

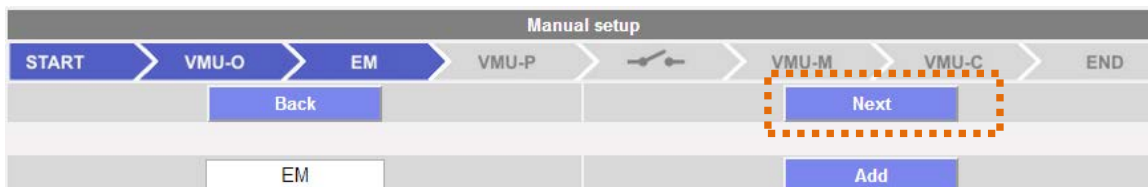


Fig. 37 – Manual setup

6.1 ENERGY METER ADDITION

Clicking on the “Add” button will display the mask allowing to select the configuration model (Fig. 38).

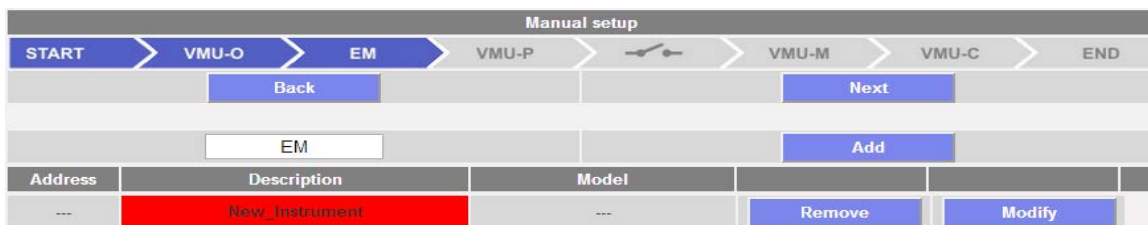


Fig. 38 – Manual setup

Click on the “Modify” button to access the detailed Energy Meter configuration (Fig. 39).

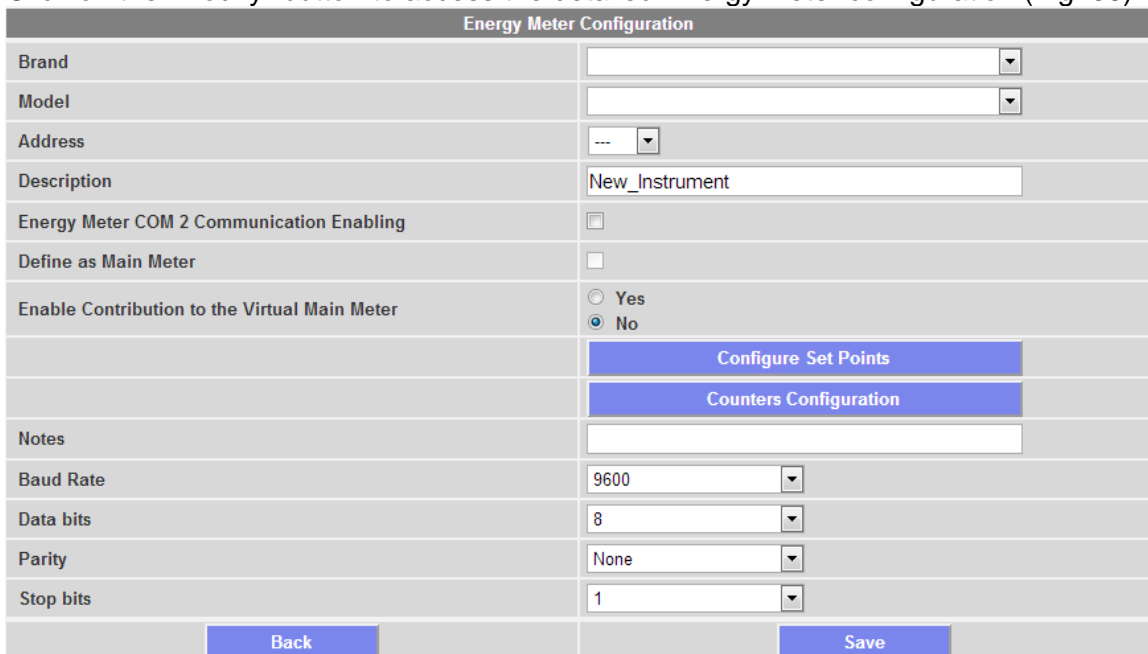


Fig. 39 – Energy meter configuration

Through the drop-down menu of the “Brand” field select the name of the Energy Meter manufacturer (Fig. 40)

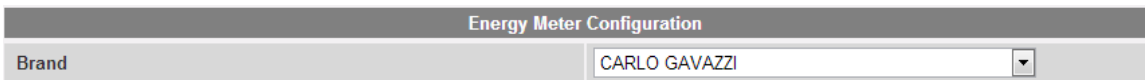


Fig. 40 – List of compatible Energy Meters

Note: at present only the Carlo Gavazzi energy meters are compatible with the VMU-C EM system.

Select the specific model of the energy meter you are configuring through the drop-down menu of the “Model” field (Fig. 41).

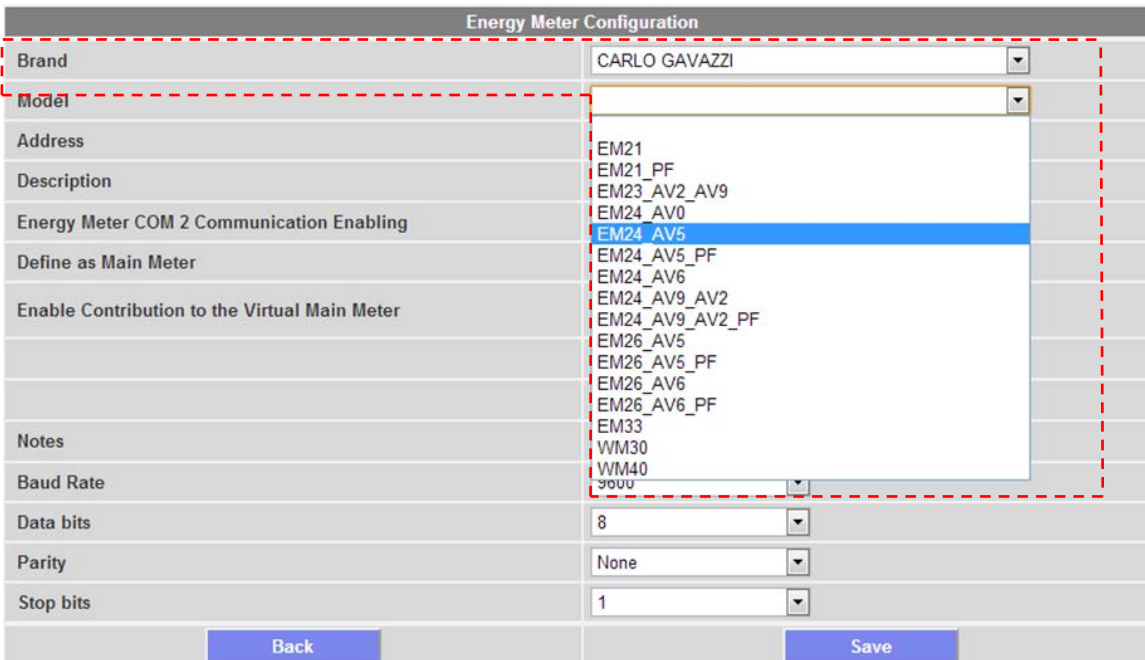


Fig. 41 – Compatible model list

Complete the Energy Meter configuration by configuring the following fields:

- a) **Address** (Modbus): specify the address configured on the Energy Meter.

Note: within the same RS-485 network there may be no two energy meters (or other devices) having the same address. The presence of two or more instruments having the same address prevents communication with them.

- b) **Description:** label to be assigned to the Energy Meter. We recommend that you name instruments in progressive order to easily identify them during data or alarm search.

Note: we recommend that you assign a different “Description” to the instruments.

- c) **Energy meter COM 2 communication enabling:** it enables the serial communication of the instrument with VMU-C EM
- d) **Define as main meter:** the instrument being configured will be considered as the reference instrument (whether real or virtual).
- e) **Enable contribution to the virtual main meter:** if no main instrument has been defined (from the configured instrument list), VMU-C EM will automatically create

a virtual instrument. It will represent the sum of all the real instrument having this option enabled.

- f) **Notes:** notes field.
- g) **Baud rate** (bps): specify the communication rate (9600, 19200, 38400 or 115200) previously set on the instrument.
- h) **Data bits:** specify the data format used by the instrument (7 or 8 bits).
- i) **Parity:** specify the communication parity type (no parity, even parity, odd parity); it shall match the values set on the instrument.
- j) **Stop bits:** specify the number of stop bits (1 or 2 bits); it shall match the values set on the instrument.

Pressing the “Save” button will add the energy meter to the list (Fig. 42).

EM		Add	
Address	Description	Model	
1	New_Instrument	EM24_AV5	Remove Modify

Fig. 42 – Inverter insertion screen

Note: the “Description” field box can take on 3 different colours, having three different meanings:

- **GREY** : configuration OK and serial communication enabled
- **YELLOW**: configuration OK but serial communication not enabled.
- **RED**: error in configuration data. Communication with the relevant module will be impossible.

Click on the “Add” button (Fig. 42) again to add other energy meters.

6.1.1 CONFIGURE SET-POINTS

Press the “Configure Set-Points” button (Fig. 43) to access the alarm configuration page.

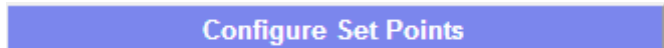


Fig. 43 – Button granting access to the alarm configuration page

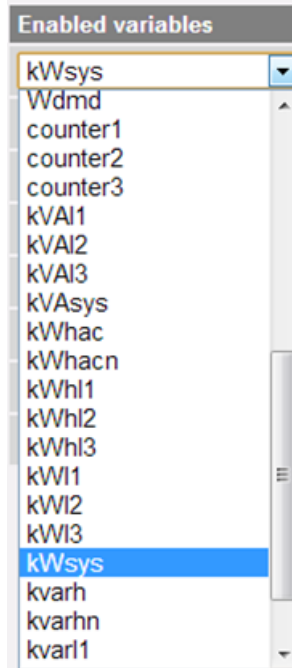
It grants access to the configuration page (Fig. 44), allowing to configure up to 8 different alarms for each instrument.

Energy Meter Configuration				
				General Setting
Enabled variables	Set-Point 1	Set-Point 2	On-Time Delay (s)	Alarm Type
kWsys	0.5	0.1	5	Virtual
---	0.0	0.1	0	Disabled
---	0.0	0.1	0	Disabled
---	0.0	0.1	0	Disabled
---	0.0	0.1	0	Disabled
---	0.0	0.1	0	Disabled
---	0.0	0.1	0	Disabled
---	0.0	0.1	0	Disabled

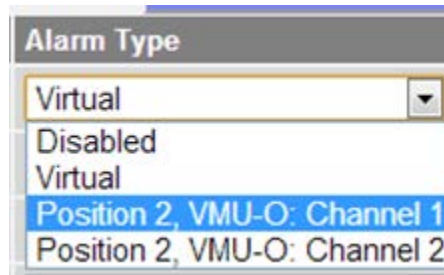
Fig. 44 – Button granting access to the alarm configuration page

The following fields need to be configured for each alarm:

- Enabled variables: from the drop-down menu you can choose a variable among the ones included in the list displayed by the system:



- **Set-Point1**: it indicates the alarm activation value (MAXIMUM alarm with Set-Point1 \geq Set-Point2; MINIMUM alarm with Set-Point1 $<$ Set-Point2)
- **Set-Point2**: specify the alarm activation value. (MAXIMUM alarm with Set-Point1 \geq Set-Point2; MINIMUM alarm with Set-Point1 $<$ Set-Point2)
- **On-time delay (s)**: specify the delay in seconds associated with the alarm activation (waiting time during which the variable stays above or below the Set-Point1 value before the alarm condition is signalled).
- **Alarm type**: specify the type of alarm you wish to manage. Up to three options may be available: Disable, Virtual or Real.
 - Disabled**: though configured, the overstepping of the set threshold will not generate any message or alarm action.
 - Virtual**: the overstepping of the set threshold will generate an alarm message which will not result in the activation of any digital outputs.
 - Position**: this option will only be available when there is at least a VMU-O module connected to the internal bus of the VMU-C EM and at least one of the two available outputs is set for remote control. When the alarm threshold is overstepped, the alarm message will be sent, and in addition the status of the selected digital output will change.



6.1.2 COUNTERS CONFIGURATION

Press the “Counters configuration” button (Fig. 45) to access the page allowing to configure the digital input meters (of any) of the energy meters.



Fig. 45 – Button granting access to the meter configuration page

You will access the configuration page (Fig. 46) allowing to set for each digital input a description, the engineering unit, the amount of digits after the decimal point and the relevant enabling.

Description	Engineering Units	Decimal Position	Enabled
GAS	m3	####	Enabled
Cold water	L	###.#	Enabled
Hot water	m3	##.##	Enabled

Fig. 46 – Digital input meter configuration page

- **Description:** label to be assigned to the Meter (like GAS Meter, WATER Meter, etc.) for easier searching.
- **Engineering units:** the engineering unit referring to the digital input meters.
- **Decimal position:** number of digits after the point. The point position is defined by the instrument.
- **Enabled:** it specifies whether the meter is enabled or disabled. If it is not enabled, the value and the label will not be displayed.

Press the “Save” button to confirm the newly entered settings.

6.2 ENERGY METER DELETION

Press the “Remove” button (Fig. 47) to delete an instrument from the list of the configured energy meters.

EM		Add	
Address	Description	Model	
1	Main_meter	EM24_AV5	Remove Modify

Fig. 47 – Energy Meter insertion/removal mask

The system will display a message prompting to confirm the operation (Fig. 48).

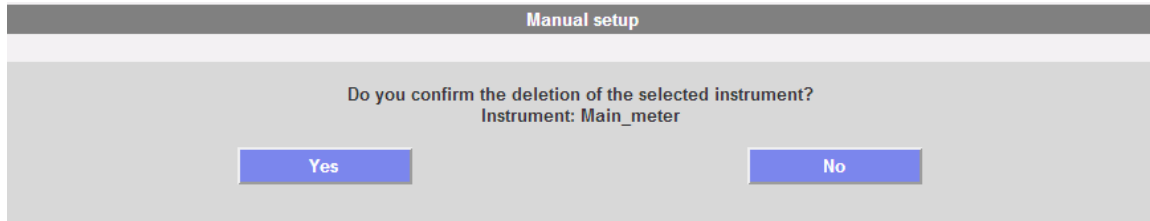


Fig. 48 – Energy Meter deletion mask

Press 'YES' to confirm deletion or "NO" to cancel. If you press "YES" the Energy Meter will be removed from the Inserted Meter list. All data acquired from VMU-C EM up to that moment on the deleted Energy Meter will be definitively eliminated.

Note: energy meter insertions, modifications and deletions will come into effect only after the new plant configuration is sent through the specific command. The machine doesn't need to be restarted.

7 VMU-P MODULE CONFIGURATION

if one or more VMU-P modules are identified during the “auto-detection” procedure, the system will display the screen shown in Fig. 49 (for each VMU- M EM there may be no more than 1 VMU-P module; VMU-C EM can manage up to 11 VMU-P modules). The procedure for the auto-detection of the VMU-M EM scans all the devices existing on the COM1 port, stores their position and displays the current configuration.

The screenshot displays the 'Manual setup' configuration interface for a VMU-P module. At the top, a progress bar indicates the current step is 'VMU-P', with previous steps (START, VMU-O, EM) and subsequent steps (VMU-M, VMU-C, END) shown. Navigation buttons for 'Back' and 'Next' are present. The configuration area is titled 'VMU-P (mV)' and includes the following fields and sections:

- Base Module:** VMU-C
- VMU-P Module Position:** 1
- Temperature Measure:** Temperature ch.1 and ch.2
- Probe Type:** Pt100 3-Wire
- Analogue Input Measure:** Enabled
- Pulse Rate Input Measure:** Enabled
- Error Management:**
 - Alarm Type: Virtual
 - Alarm Set-point 1 (°C): 150.0
 - Alarm Set-point 2 (°C): 120.0
 - Alarm Activation Delay Filter (seconds): 10

Fig. 49 – VMU-P module configuration mask

In the area marked by the dots the system will automatically display the information concerning the source base module (VMU-C EM or VMU-M EM) and the location of the VMU-P module within the system.

Specify for each module which temperature measurements shall be monitored (Temperature of channel1, of channel 2 or both) and the type of sensor to be used (Pt100 or Pt1000 probes, 3 wires or 2 wires).

For each module you can also enable (or disable) the measurements from the analogue inputs and from the frequency input (pulse input).

7.1 ALARM CONFIGURATION ON VMU-P MODULES

Each VMU-P module can manage specific alarms for each of the monitored dimensions (Fig.50):

- Channel 1 temperature
- Channel 2 temperature
- Analogue input (mV or mA)
- Pulse rate input

Temperature ch.2	Temperature ch.1	Analogue Input	Pulse Rate Input	Error Management
Alarm Type				Virtual
Alarm Set-point 1 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)				150.0
Alarm Set-point 2 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)				120.0
Alarm Activation Delay Filter (seconds) (On-Time Delay)				10

Fig. 50 – VMU-P alarm configuration mask

For each alarm you can define the activation thresholds and the relevant usage mode:

- Rising alarm: Threshold1 ≥ Threshold2
- Dropping alarm: Threshold1 < Threshold2

Each alarm can be disabled, or be enabled as a Virtual Alarm, or you can link each individual alarm to a digital output (Fig. 51)

Temperature ch.2	Temperature ch.1	Analogue Input	Pulse Rate Input	Error Management
Alarm Type				Virtual
Alarm Set-point 1 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)				Disabled
Alarm Set-point 2 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)				Virtual
Alarm Activation Delay Filter (seconds) (On-Time Delay)				10

Fig. 51 – VMU-P alarm configuration mask

Each alarm can be associated with a different “Alarm activation delay filter” value (a value expressed in seconds, which can range between 0 and 3600).

To configure the alarm triggered by the “analogue input” and by the frequency input (pulse input), besides the alarm thresholds Threshold1 and Threshold2 you also need to set the data specific to the installed sensor:

- Electric scale – Minimum Value (mV): parameter related to the electrical input (minimum value of the input signal).
- Electric scale – Maximum Value (mV): parameter related to the electrical input (maximum value of the input signal).
- Displayed scale – Minimum Value: Minimum value (expressed in the engineering unit specified above) at the minimum input value (mV).
- Displayed scale – Maximum value (expressed in the engineering unit specified above) at the maximum input value (mV).

Temperature ch.2	Temperature ch.1	Analogue Input	Pulse Rate Input	Error Management
Electrical Scale - Min. Value (mV)		0.0	Electrical Scale - Max. Value (mV)	100.0
Display Scale - Min. Value		0	Display Scale - Max. Value	1000
Engineering Units	L/min			
Decimal Position	###.#			
Alarm Type	Virtual			
Alarm Set-point 1 (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	850			
Alarm Set-point 2 (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	750			
Alarm Activation Delay Filter (seconds) (On-Time Delay)	20			

Fig. 52 – Analogue input alarm configuration mask

- Maximum value of measuring electric scale (Hz): conversion parameter used to obtain the measurements from the frequency input (pulse input). This value represents the maximum frequency value the sensor can generate.
- Maximum value of displayed scale (expressed in the engineering unit specified above): Scaled value corresponding to the maximum value of the frequency signal.

Temperature ch.2	Temperature ch.1	Analogue Input	Pulse Rate Input	Error Management
Maximun Value of Measuring Electric Scale (Hz)			300.0	
Maximun Value of Display Scale			30.0	
Engineering Units	m/s			
Decimal Position	###.#			
Alarm Type	Disabled			
Alarm Set-point 1 (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	0.0			
Alarm Set-point 2 (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	0.0			
Alarm Activation Delay Filter (seconds) (On-Time Delay)	0			

Fig. 53 – Pulse rate input (pulse input) alarm configuration mask

You can also set the activation of an alarm in case of errors in the operation of the module itself. Each alarm is associated with one or more error conditions on the module. You can associate the managed errors with an output to be activated. The list allowing to select the Output associated with the alarm shall include the output of the VMU-O modules existing in the group with the Alarm setting (Fig. 54).

Temperature ch.2	Temperature ch.1	Analogue Input	Pulse Rate Input	Error Management
Error description: Error in the programmed parameters				No Alarm
Error description: Short circuit on probe channel 1; Probe disconnected on channel 1; Short circuit on probe channel 2; Probe disconnected on channel 2				No Alarm Position 2, VMU-O: Channel 2

Fig. 54 – Configuration mask for error management in case of error

8 VMU-O MODULE OUTPUT MANUAL COMMAND CONFIGURATION

Pressing the “NEXT” button again will grant access to the screen allowing to configure the manual commands of the relay outputs on the VMU-O modules (Fig. 55). Through this function, by using a manual command, you'll be able to remotely activate or deactivate (via Ethernet/through the Internet) the digital outputs of the VMU-O modules installed on-field.

Note: To be able to use this function, the outputs on the VMU-O modules must be set to REMOTE control.

Note: you can create up to 20 manual commands.

Command	Description	Base Module
1	Remote comand on VMUC	---
2	Remote comand on VMUM	VMU-M_001 (Pos. 2 Ch 1)
3		---
4		---
5		---
6		---
7		---
8	A	B
9		---
10		---

Fig. 55 – VMU-O output manual command configuration mask

- In the “A” column you can associate each command with a label identifying the function the command in question will activate (for example “Outdoor lighting switch-on”).
- The “B” column allows to associate the descriptive label (see the above paragraph) with the digital output defined for the purpose. Opening the drop-down menu will display the list of all the outputs previously set to REMOTE command (Fig. 56)

Command	Description	Base Module
1	Opening GATE NORTH	VMU-M_001 (Pos. 2 Ch 1)
2	Opening GATE SOUTH	---
3		VMU-M_001 (Pos. 2 Ch 1)

Fig. 56 – VMU-O output manual command configuration mask

9 CONFIGURATION OF THE VMU-M EM MODULES

Pressing the “NEXT” button again will grant access to the screen allowing to configure the VMUM-EM modules connected to VMU-C EM (Fig. 57).

Manual setup	
START	END
VMU-O	VMU-C
EM	VMU-M
VMU-P	
Back	Next
Base Module VMU-M	
VMU-M_001 (Addr. 1) A	
VMU-M	
Inputs	Other Alarms Group 1
Channel Function	Probe on inputs 1 and 2
Temperature Probe	Pt100 3-Wire
Temperature 1 - Alarm Working Mode	Virtual
Alarm Set-point 1 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	100.0
Alarm Set-point 2 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	80.0
Alarm Activation Delay Filter (Seconds) (On-Time Delay)	10
Temperature 2 - Alarm Working Mode	None
Alarm Set-point 1 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	0.0
Alarm Set-point 2 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	0.0
Alarm Activation Delay Filter (Seconds) (On-Time Delay)	0

Fig. 57 – VMU-M module configuration mask

- Besides the label defined above (Fig. 33), the section marked with “A” displays the ModBus address for the specific VMU-M EM module.
- Section “B” is used for the configuration of the digital or temperature inputs and for other general alarms. Two sections are described below:

A. Inputs:

Define the use of the inputs existing on the VMU-M EM module:

- ⇒ NONE: the module inputs will have no use.
- ⇒ For TEMPERATURE reading (on one or two channels; probe type: Pt100 or Pt1000, 2 or 3 wires).
- ⇒ DIGITAL: digital input “1” shall be used to read the status (Open/Closed) of a digital contact (for example to detect whether the DC protection has tripped or not).

Note: when inputs are used for temperature reading, define whether you wish to manage the ALARM function for each channel.. In this case to set the values of “Threshold 1” and of “Threshold 2” (for values of “T1” exceeding or equal to those of “T2” you will get a MAXIMUM alarm; for values of “T1” lower than those of “T2” you will get an alarm with MINIMUM operation). You also have to define whether the alarm must be VIRTUAL or REAL (associated with a relay output of VMU-O) (Fig. 58).

Base Module	VMU-M	VMU-M_001 (Addr. 1)
VMU-M		
Inputs	Other Alarms Group 1	
Channel Function	Probe on inputs 1 and 2	
Temperature Probe	Pt100 3-Wire	
Temperature 1 - Alarm Working Mode	Virtual	
Alarm Set-point 1 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	100.0	
Alarm Set-point 2 (°C) (S1 >= S2 Up Alarm; S1 < S2 Down Alarm)	80.0	
Alarm Activation Delay Filter (Seconds) (On-Time Delay)	10	

Fig. 58 – Mask for alarm configuration on VMUM-EM module

B. Other alarms group:

Set the use of a further alarm managed by VMU-M EM (Fig. 59):

VMU-M	
Inputs	Other Alarms Group 1
Incoherent Programmed Parameters	<div style="border: 1px solid black; padding: 2px;"> No Alarm No Alarm Position 2, VMU-O: Channel 2 </div>

Fig. 59 – Other alarms group configuration mask

Note: should VMU-C EM find that the VMU-M EM programming is inconsistent with the modules connected to it, you may choose whether the error should not be managed or whether an alarm should be activated on a physical output.

Note: repeat the VMU-M EM MODULE CONFIGURATION procedure for each of the VMU-M EM modules connected to the VMU-C EM.

10 CONFIGURATION OF THE VMU-C EM MODULE

Pressing the “NEXT” button again will grant access to the screen allowing to fully configure the VMU-C EM module (Fig. 60).

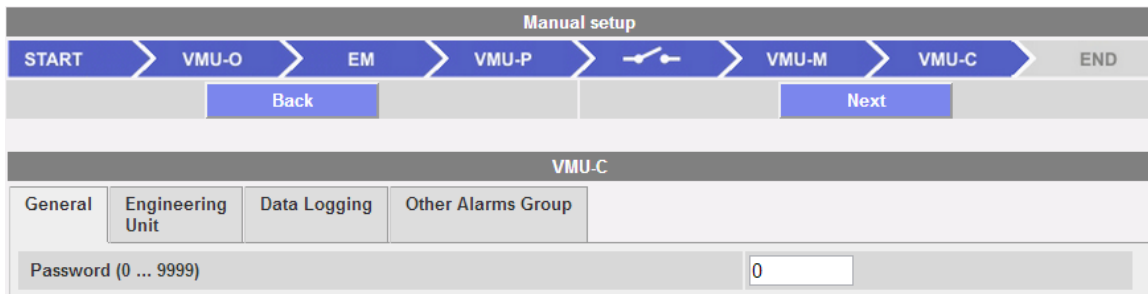


Fig. 60 – VMU-C EM configuration mask

The paragraphs below describe the individual pages allowing to configure the available functions:

- **GENERAL:** it allows to set a password whose function is protecting the device against unwanted configuration changes or reset commands.

Note: the password described above refers to all the VMU-M EM modules connected to the “COM1” communication port. It shall be identical and shared by all the connected VMU-M EM modules.

- **ENGINEERING UNIT:** it allows to set the engineering units for temperature measurements (°C or °F).

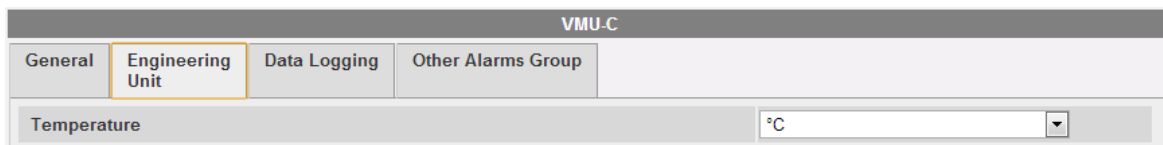


Fig. 61 – Engineering unit configuration mask

- **DATA LOGGING:** It allows to activate the Data Logging function and to define the relevant storage interval (Fig. 62).

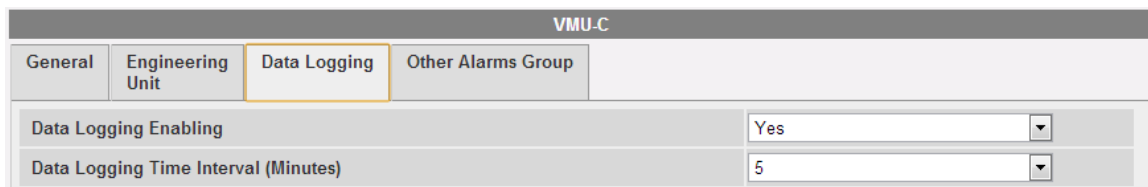


Fig. 62 – Data logging time configuration mask

Note: available values for the storage interval range between 5 and 60 minutes. Intervals may be: 5min – 10min – 15min – 30min – 60 min.

VMU-C

- **OTHER ALARMS GROUP (VMU-C EM):** this section allows to configure the *Other general alarms* (Fig. 63):
 - *Communication Alarm on Port COM1 and/or COM2:* should a device connected to the COM1 and/or COM2 communication ports stop communicating for more the 30 sec. (if set), the system will trigger the alarm.



The image shows a software configuration window titled "VMU-C". It has a tabbed interface with four tabs: "General", "Engineering Unit", "Data Logging", and "Other Alarms Group". The "Other Alarms Group" tab is selected and highlighted with a yellow border. Below the tabs, there is a configuration area for "Communication Alarm on Port COM1 and/or COM2". A dropdown menu is visible, currently showing the word "Virtual".

Fig. 63 – Other alarms group configuration mask

Note: To be able to associate a physical output with these *Other alarms*, the VMU-O module must belong to the VMU-C EM group.

11 SENDING THE SYSTEM CONFIGURATION

Once system configuration is completed, the system will display the relevant screen (Fig. 64): all data can be loaded into the MASTER VMU-C EM module. Only after the user has issued the “Send plant data” command shall the data be operational.

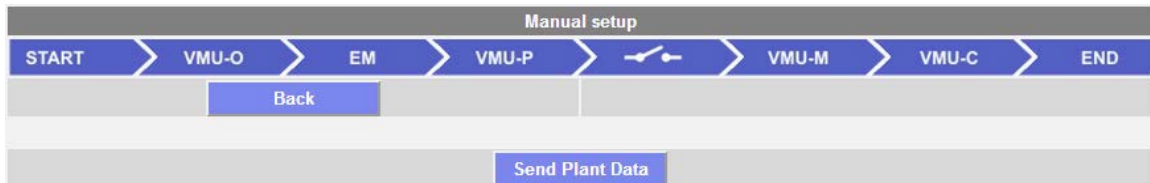


Fig. 64 – Configuration has been completed and is ready to be sent to VMU-C EM

While the configuration transfer is under way, the system will display the screen shown in Fig. 65:

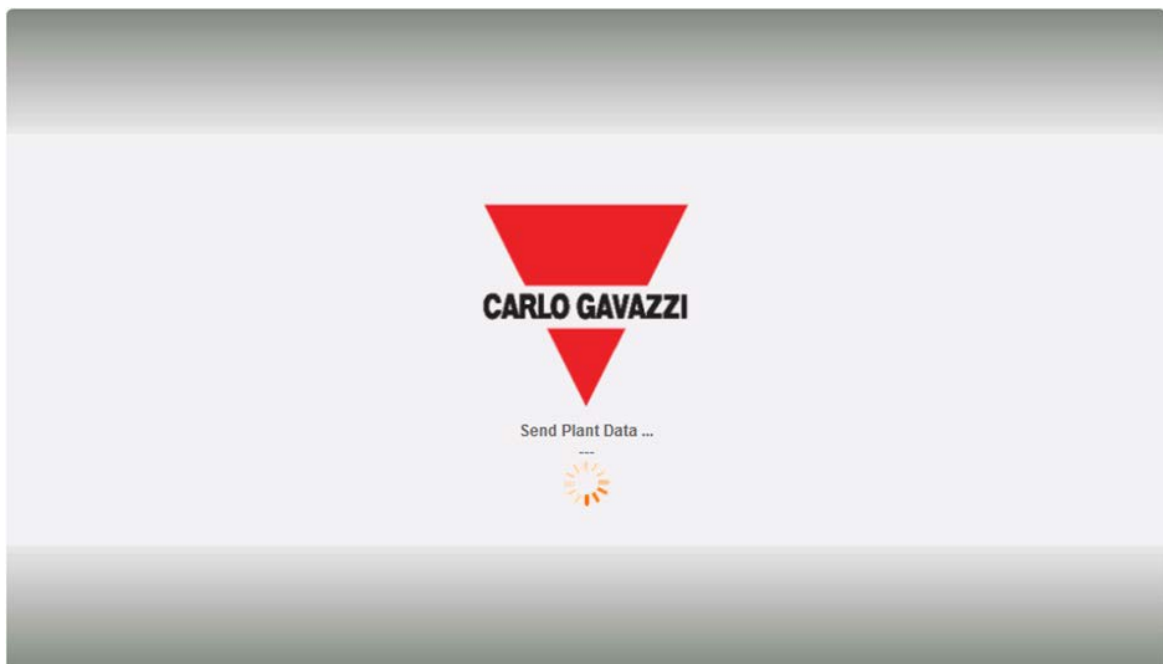


Fig. 65 – The configuration is being loaded into VMU-C EM

Once data transfer is completed the system will display a confirmation message (Fig. 66).

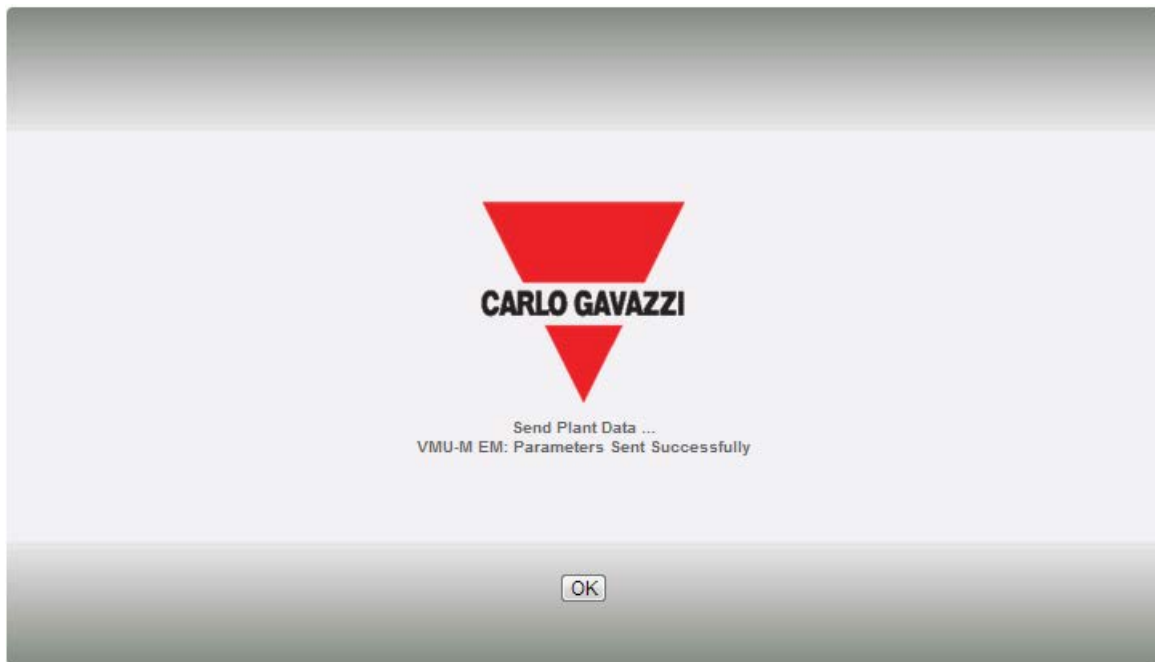


Fig. 66 – Configuration has been successfully completed

Press the “OK” command to return to the “Home Page” (Fig. 67):

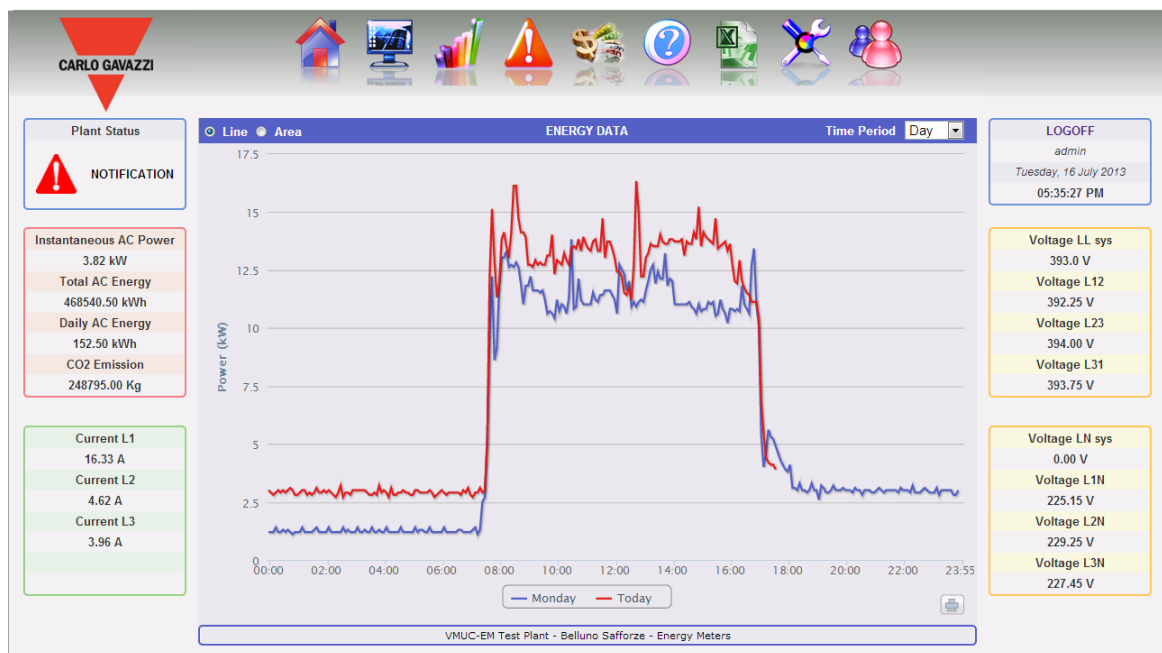


Fig. 67 – Home page

11.1 RESUME (SYSTEM) CONFIGURATION

If you exit the setup wizard before it is completed, you'll be able to resume the procedure through the “Resume configuration” command (Fig. 68).

VMU-C Settings		
Autoscan Devices Connected to VMU-C		Find Connected Vmu-m
Perform the manual configuration of the devices connected to the VMU-C		Manual Setup
Resume Configuration		Resume Configuration
Load Configuration from File		Import

Fig. 68 – Resume configuration

11.2 IMPORT (System Configuration)

If the configuration of a plant has been exported using the “SAVE CONFIGURATION” command (Fig. 69) (also see chapter 4.3),

SYSTEM	PLANT	OTHER VARIABLES
	COM SETUP	
	DRIVER	
Autoscan Devices Connected to VMU-C	SETTING	WZARD
Perform the manual configuration of the devices connected to the VMU-C		SAVE CONFIGURATION
Resume Configuration		Resume Configuration
Load Configuration from File		Import

Fig. 69 – Configuration export command

you can import the configuration using the “IMPORT” command (Fig. 70), then you can reload it into the same system or into a new one, thus avoiding having to re-enter all the configuration data.

Load Configuration from File	Import
------------------------------	--------

Fig. 70 – Configuration has been successfully completed

12 “OTHER VARIABLES” SETTING

When hovering the mouse over “OTHER VARIABLES” the system will display a drop-down menu showing the list of the variables which can be managed by VMU-C EM through the VMUP-EM module(s) (Fig. 71):

- ANALOGUE INPUT measurements (“mV” and/or “mA”); 1 channel
- TEMPERATURE measurements (from Pt100 and/or Pt1000, 2 or 3 wires); 2 channels
- Measurements from PULSE RATE INPUT (from pulse input for speed or flow measurements)

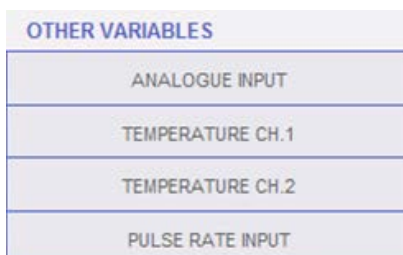
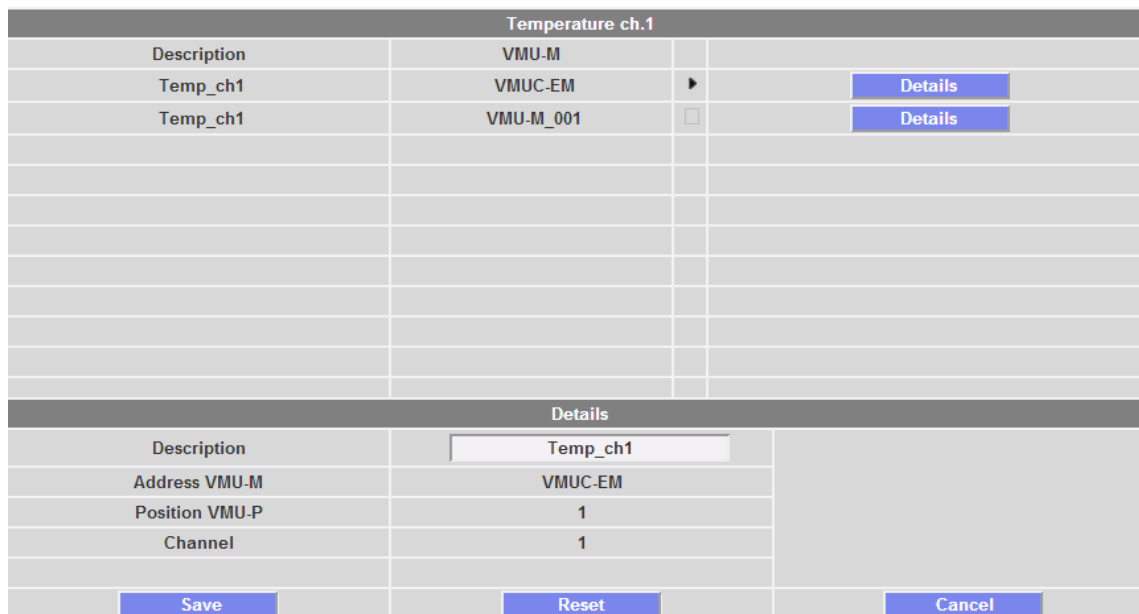


Fig. 71 – “Other variables” configuration

VMU-C EM can, through the VMUP-EM module, manage three different measurement types:

- Analogue output sensors, “120mV” and “20mA”
- Temperature sensors (Pt100 and Pt1000, 2/3 wires)
- Speed or flow measurement sensors

Clicking on one of the buttons corresponding to the individual types of managed sensors (Analogue, Temperature or frequency input), you can display more information about each sensor type:



VMU-C

You can define for each sensor a description which will help you identify, during reading, the sensor from which the measurement comes. The system will also display the following details:

- *VMU-M address* (or VMU-C address): ModBus address of the VMU-M or VMU-C module the sensor is connected to;
- *VMU-P position*: it indicates the position of the VMU-P module within the group;
- *Channel*: it indicates the position of the sensor inside the VMU-P module;

Press the “**Reset**” button to cancel the newly entered changes; you can also press “**Cancel**” to cancel the newly entered changes; unlike the “**Reset**”; with this operation the user shall exit the “Sensor details page”. Save the newly specified sensor settings by pressing the “Save” button.



13 HOME PAGE

Clicking on the “Home” icon in the Navigation menu will grant access to the screen showing the trend of power absorbed by the system during the current and the previous days, with a 5-minute sample resolution.

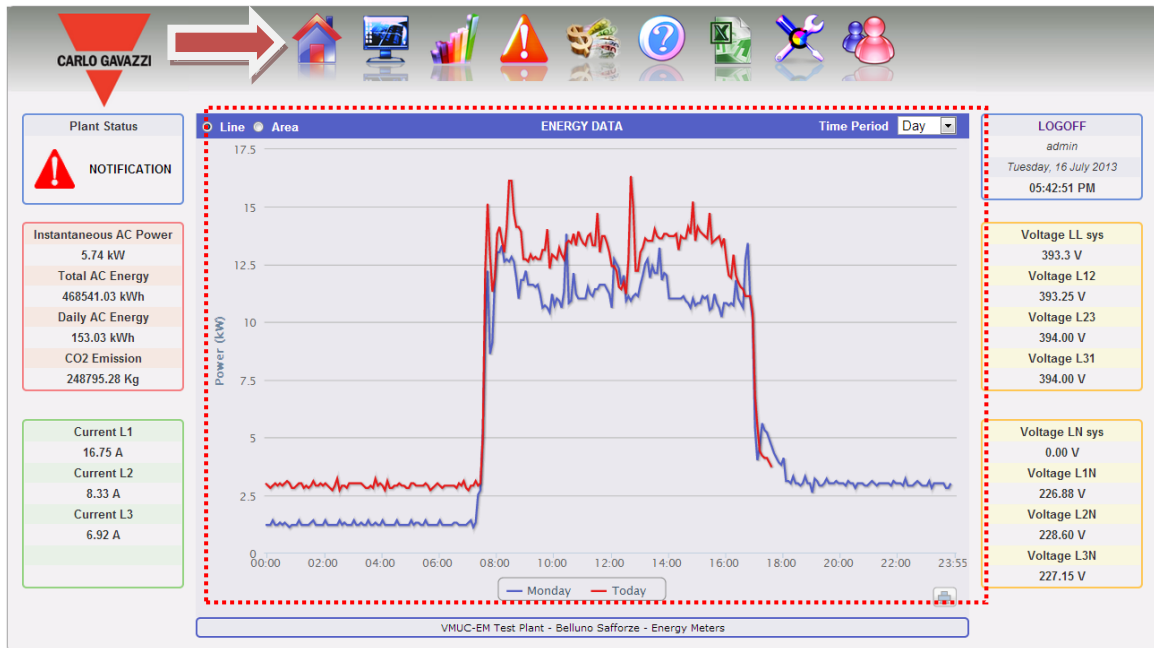
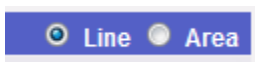


Fig. 72 – System daily “AC” power

The chart can be displayed in “Line” or “Area” mode



by selecting the option buttons in the upper left corner (Fig. 73 and 74).

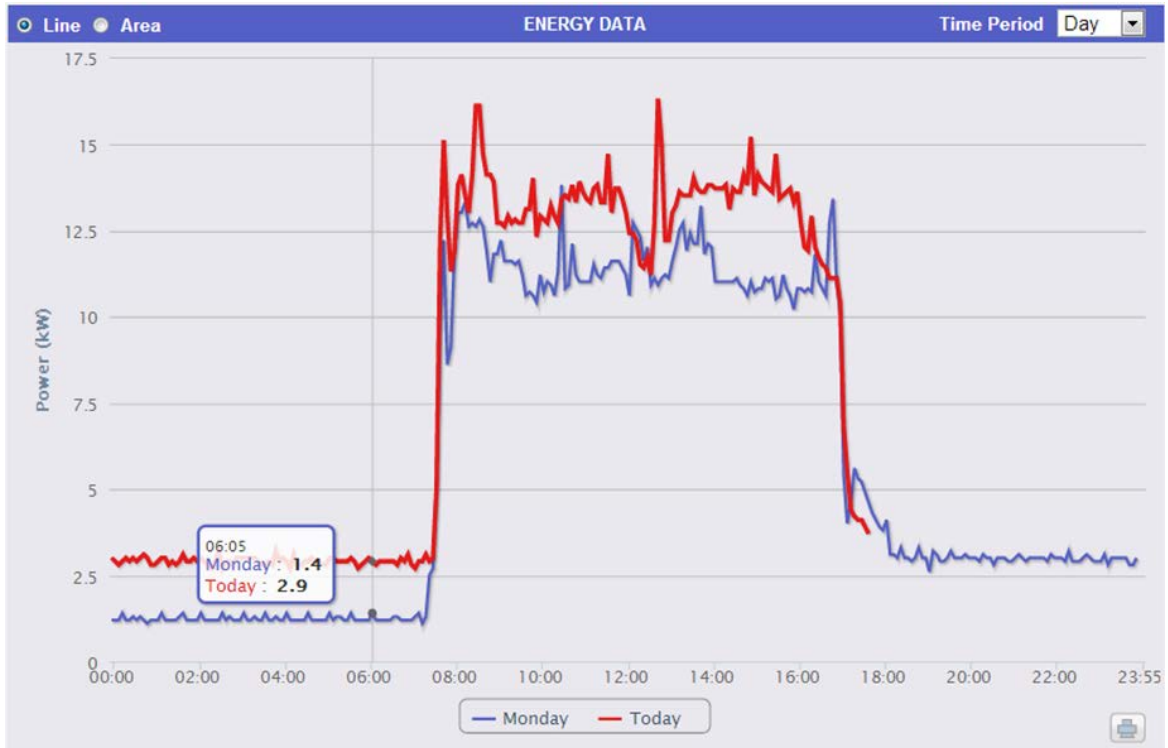


Fig. 73 – System daily “AC” power; graphic mode: Line

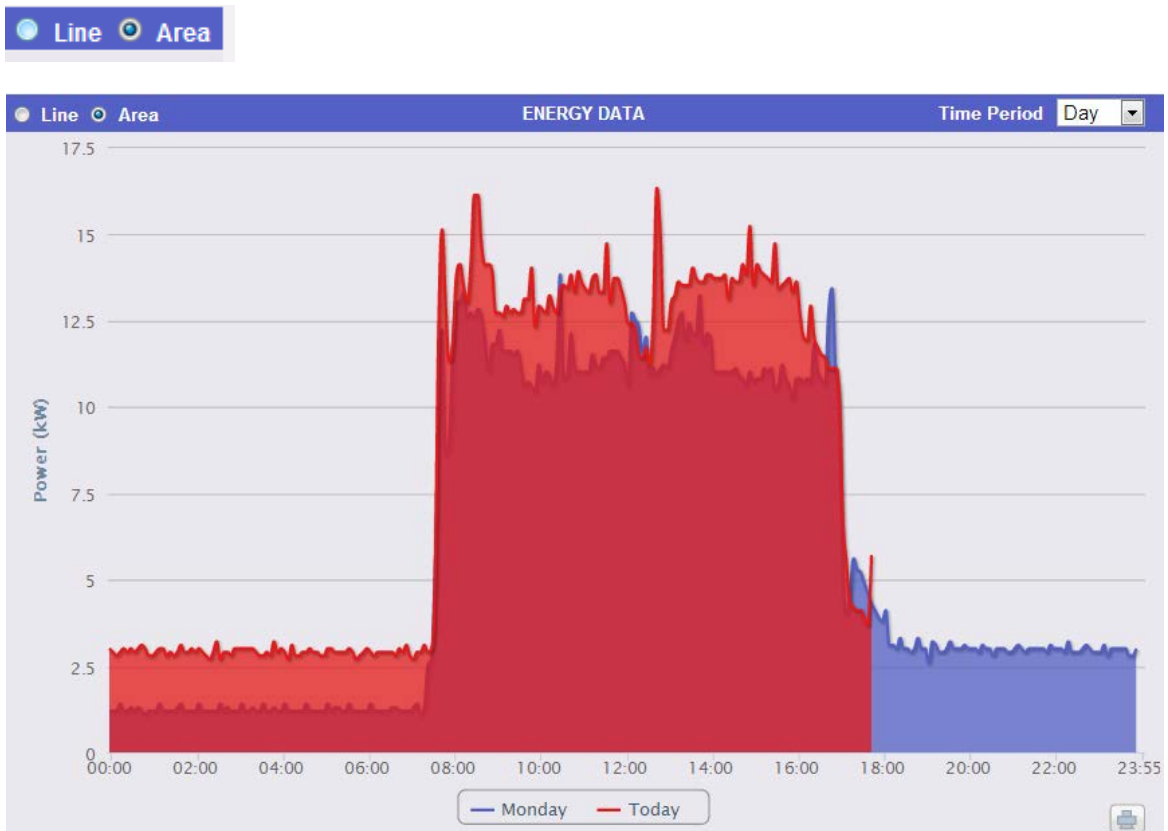


Fig. 74 – System daily “AC” power; graphic mode: Area

On the abscissa axis the chart displays the hours of the day from 00:00 to 23:55, while on the ordinate axis it displays the power in kW; the maximum ordinate value is set automatically by an autorange function.

The chart is automatically updated every 5 minutes. Hovering the mouse cursor over the chart area will display the relevant power value (Fig. 73 and 74).

You can also select 3 different chart types:

- *On a daily basis (DAY)*: the system displays the charts referring to the trend of the current day and of the previous one.
- *On a weekly basis (WEEK)*: the system displays the histograms referring to the trend of the current week and of the previous one (always from Monday to Sunday) (Fig. 75).
- *On a monthly basis (MONTH)*: the system displays the histograms referring to the trend of the current month and of the previous one (always from the first to the last day of the month) (Fig. 76).

- **Note:** for the daily chart you can choose between line or area display. Only histogram display is available for weekly and monthly charts.



Fig. 75 – System weekly “AC” power



Fig. 76 – System monthly "AC" power

- *Print chart*

By clicking on the Print button (Fig. 77)

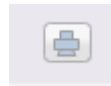


Fig. 77 – "Print" button

located in the lower right corner of the chart area (Fig. 76), you can select which printer shall be used to print the chart.

14 PRODUCTION DATA ANALYSIS



This section is devoted to production data analysis and allows to display in the main chart the trend of the main variables, like Current/Power Factor for each individual phase, System voltage (star and line), Power (active and reactive system power), analogue variables like Temperature, signal from pulse and analogue input (when available and anyway coming from VMU-P EM modules). Click on the “Monitor” icon in the Navigation menu to access the screen shown in Fig. 78 (red-hatched area).

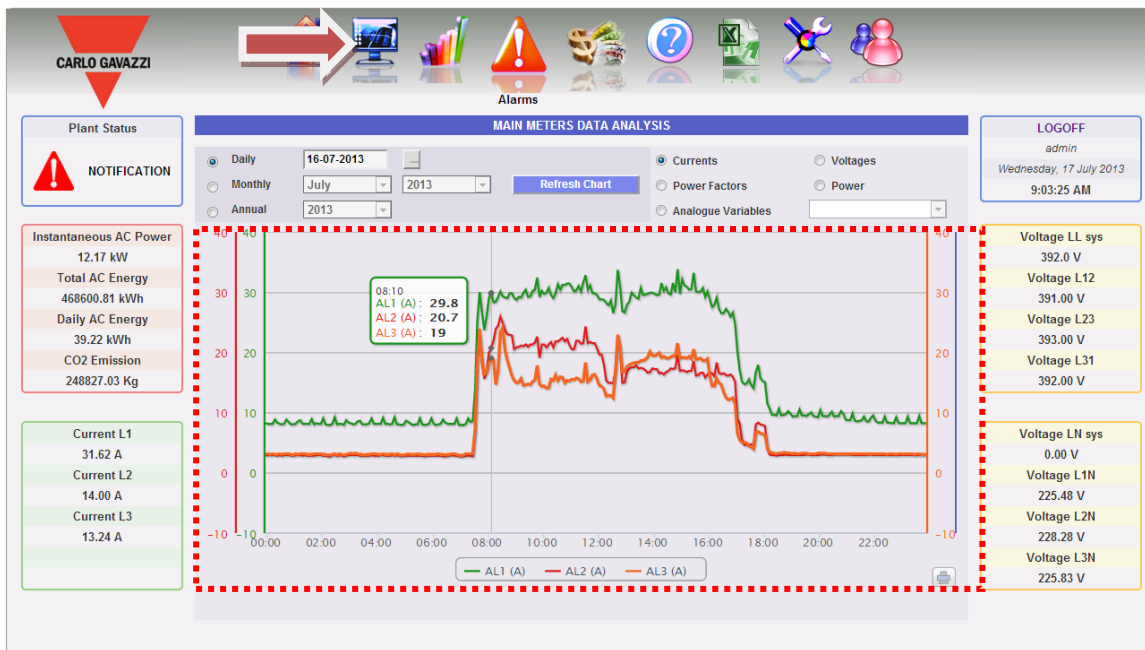


Fig. 78 – Production data analysis

The analysis includes five different types of variables which can be accessed through the “buttons” in the top bar:

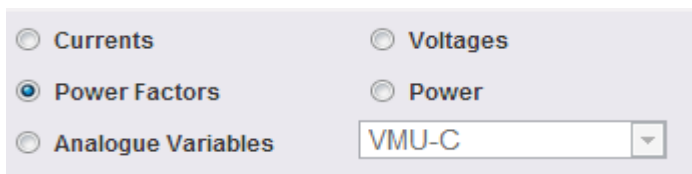


Fig. 79 – Analysis type

1. “**Currents**” – the system displays the three tracks referring to the three phase currents (AL1, AL2 and AL3).
2. “**Power factors**” – the system displays the three tracks referring to the three individual phase power factors (PF1, PF2 and PF3).
3. “**Power**” – the system displays the two tracks referring to the system powers (active and reactive system power).
4. “**Voltages**” – the system displays the two tracks referring to the system voltages (star and line system voltage).
5. “**Analogue variables**” - variables like Channel1 temperature, Channel2 temperature, signal from pulse and analogue input (mA or mV). These variables can only be monitored if the VMU-P EM module is installed and appropriately connected and configured.

a) *Graphic functions*

Charts consist of an X-axis, showing day hours from 00:00 a.m. to 11:55 p.m., and of as many Y-axes as the number of dimensions to be shown. Each Y axis has a scale of its own, automatically sized according to the magnitude it refers to. To enable or disable (hide) a track, just click on the variable name (located under the X axis). The curve is displayed or removed right away, without having to refresh the page.

Hovering the mouse cursor over the chart area will open a window showing the numerical value of each displayed variable.

- *Print chart*

Clicking on the “Print” button (Fig. 80) located in the bottom right of the chart area you can specify which printer shall be used to print the chart .



Fig. 80 – Chart printing

b) Data searching and graphic display

Data stored in a file are searched for and displayed by using the calendar. Press the key close to the date field, on top bar, to view the calendar (Fig. 81)

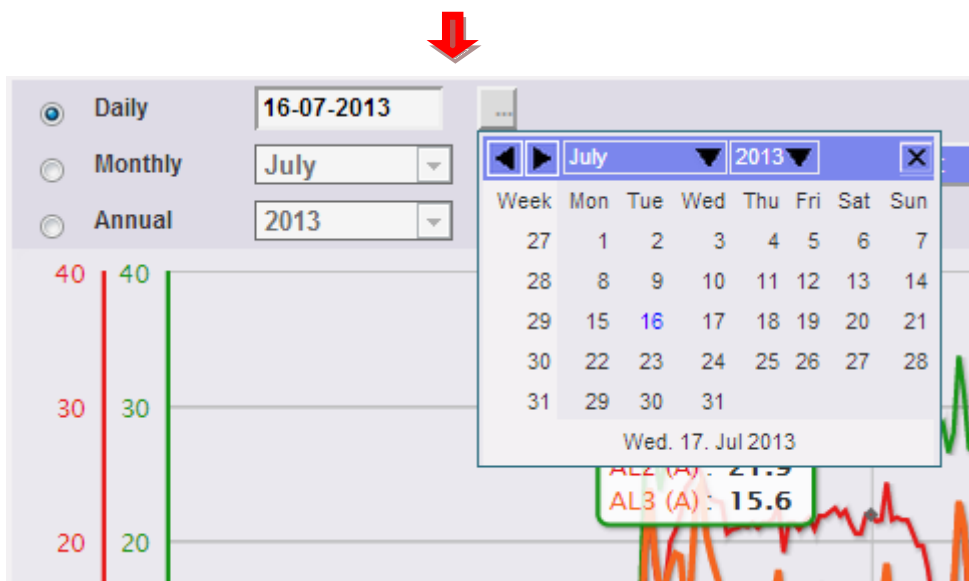


Fig. 81 – Data searching by date

Select the desired day and press “Refresh chart” button.

Note: the date field cannot be edited; date can only be selected through the relevant calendar.

Note: If chart is not displayed and a white area with the caption “No data to display” appears, it means that no data is available for the selected day.

14.1 "CURRENTS" CHART

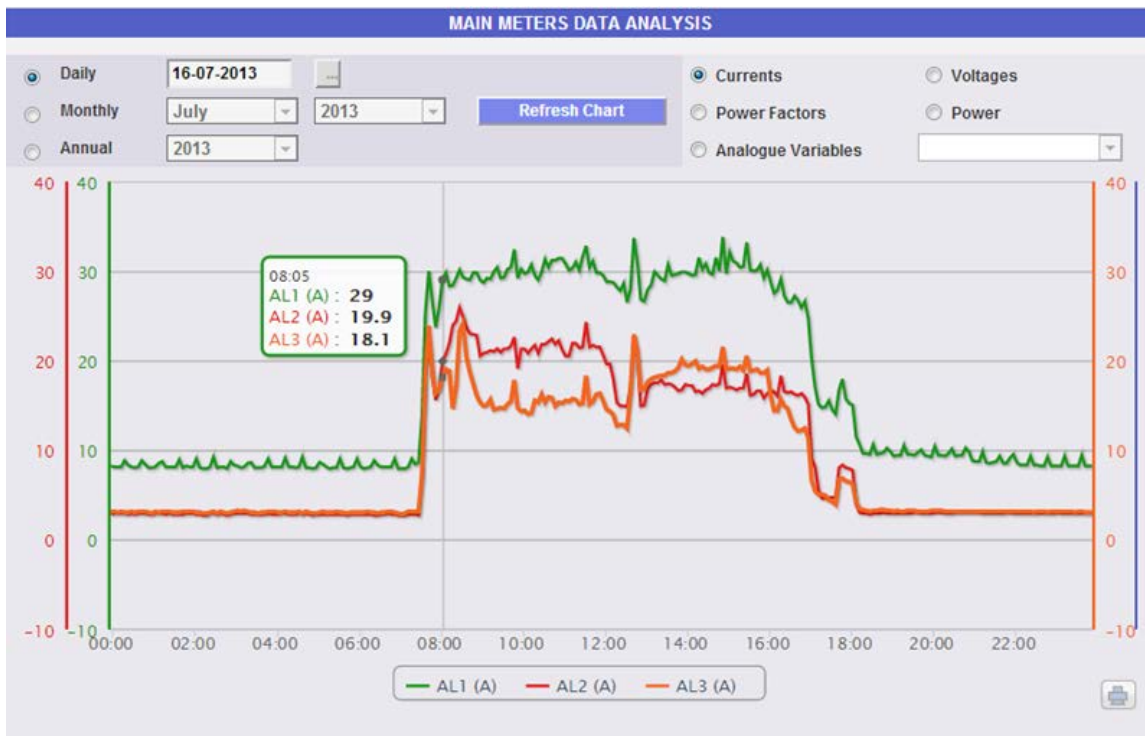


Fig. 82 – Main meter Currents chart (AL1, AL2 andAL3)

The chart displays the three phase currents. These currents refer to the main instrument (real or virtual according to the system configuration settings). Data may be displayed on a daily, monthly or yearly basis.

Note: in charts the sampling frequency (current values for each phase), depends on the storage interval set on VMU-C, which must be equal to 5,10,15,30,60 minutes.

14.2 “POWER FACTORS” CHART

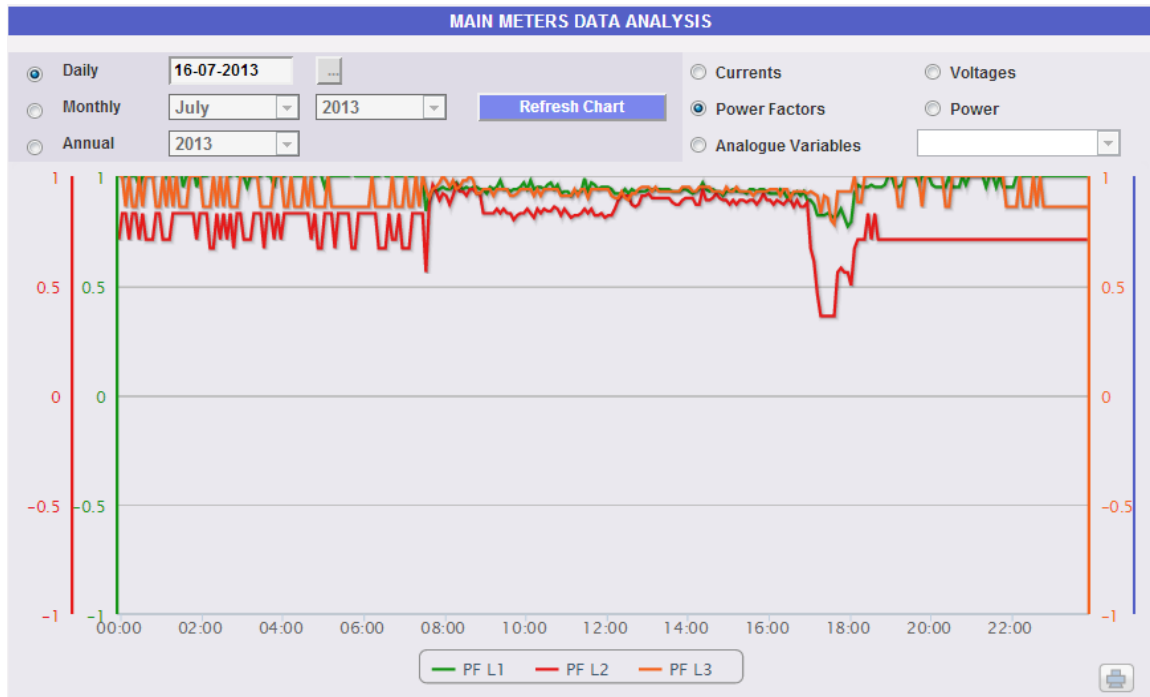


Fig. 83 – Power factors chart (for each individual phase)

The Chart allows to compare the 3 individual phase Power Factors (PF1, PF2 and PF3). These values refer to the main instrument (real or virtual according to the system configuration settings).

Data may be displayed on a daily, monthly or yearly basis.

Note: in charts the sampling frequency (current values for each phase), depends on the storage interval set on VMU-C, which must be equal to 5,10,15,30,60 minutes.

14.3 "VOLTAGES" CHART

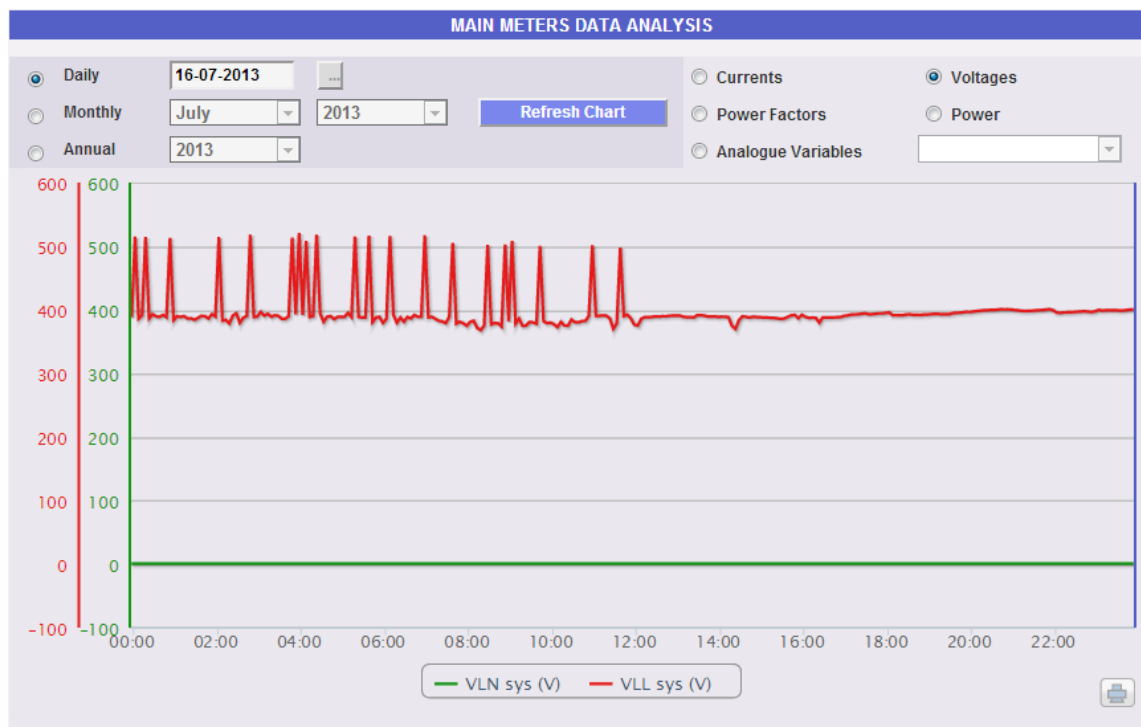


Fig. 84 – Voltage trend chart

The Chart compares the 2 System voltage data (VLNsys: star system voltage and VLLsys: line system voltage).

These values refer to the main instrument (real or virtual according to the system configuration settings).

Should the reference instrument be virtual, the voltages shown in the chart represent the average value of the voltages measured by each individual real instrument.

Data may be displayed on a daily, monthly or yearly basis.

Note: in charts the sampling frequency (current values for each phase), depends on the storage interval set on VMU-C, which must be equal to 5,10,15,30,60 minutes.

14.4 “POWER” CHART

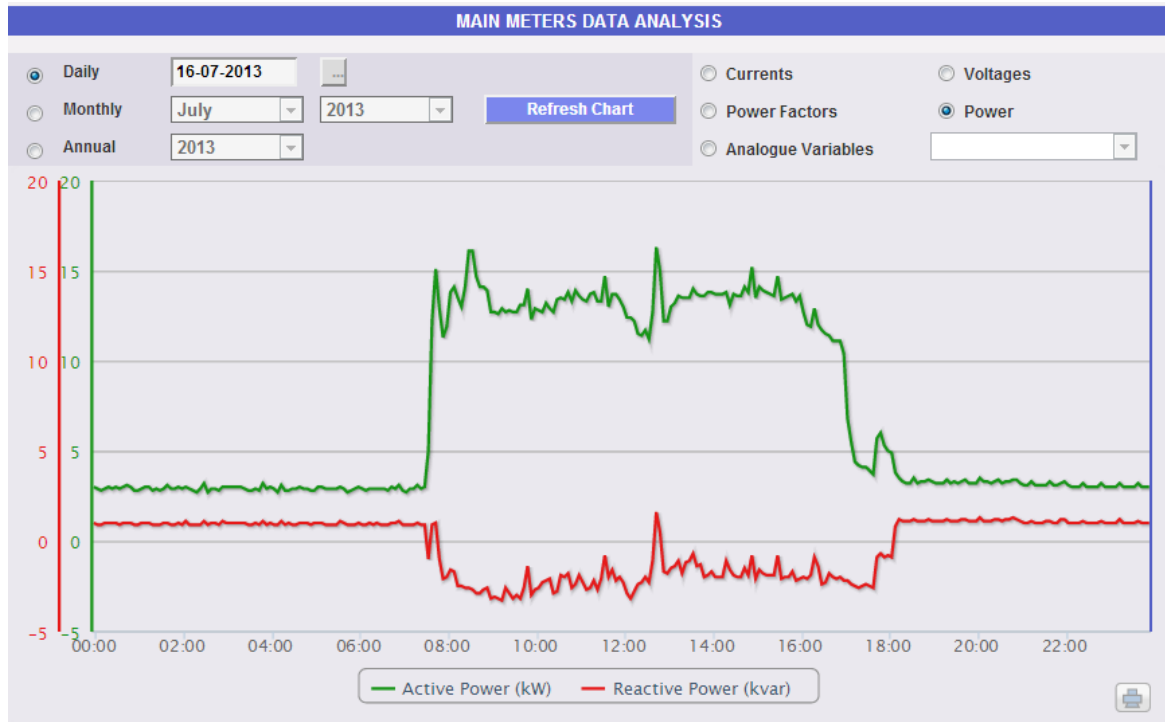


Fig. 85 – System power trend chart (kW and kvar)

The chart compares the 2 system power magnitudes (kW: active system power; kvar: reactive system power).

These values refer to the main instrument (real or virtual according to the system configuration settings).

Should the reference instrument be virtual, the powers shown in the chart represent the sum of the system powers (kW and kvar) measured by each individual real instrument.

Data may be displayed on a daily, monthly or yearly basis.

Note: in charts the sampling frequency (current values for each phase), depends on the storage interval set on VMU-C, which must be equal to 5,10,15,30,60 minutes.

14.5 “ANALOGUE VARIABLES” CHART

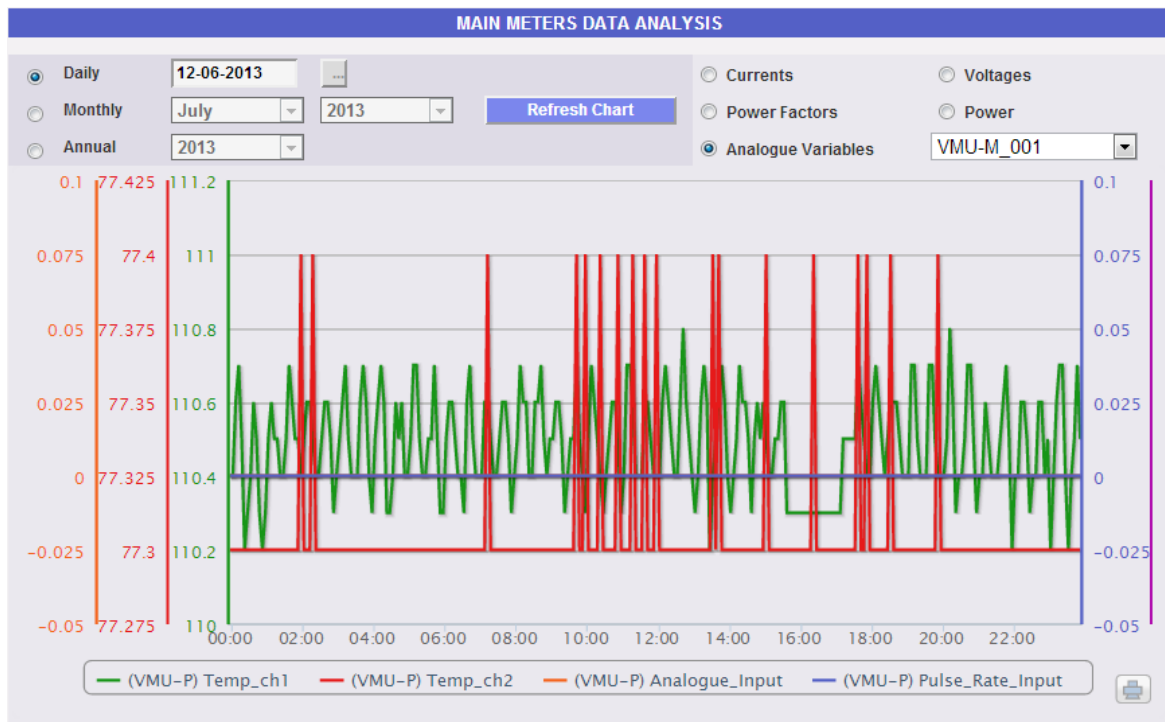


Fig. 86 – Analogue input data analysis chart

By selecting “Analogue variables” you can display the 4 magnitudes listed below:

- a. “Temperature 1 (channel 1 of the VMUP) °C”
- b. “Temperature 2 (channel 2 of the VMUP) °C”

Note: these inputs (channel 1 and 2) for temperature measurement can read data from “Pt100” or “Pt1000” probes with 2 or 3 wires.

- c. “Pulse rate input (VMUP pulse input)”

Note: the pulse frequency input allows to measure a frequency signal for flow or speed measurements.

- d. “Analogue input (analogue input “mV” or “mA” of the VMUP)”

Note: the “mV” type analogue input is available on the module VMUP2TIWXSEM The “mA” type input is available on the module VMUP2TCWXSEM.

The box shown below (Fig. 87) allows to select the master to which the VMUP is connected:



Fig. 87 – VMUP master selection menu

This selection allows to set whether the displayed variables (Fig. 88) belong to the VMU-P directly connected to the VMU-C EM or to one of the VMU-M EM connected by RS485 to the VMU-C EM itself.

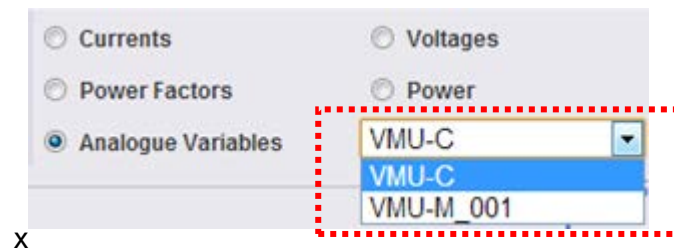


Fig. 88 – VMUP master selection menu

Note: the sampling frequency in charts (analogue variables, temperature and pulse signal), depends on the storage interval set on VMU-C, which may be equal to 5,10,15,30,60 minutes.

15 PLANT DATA CHARTS

This section displays in graphical form all the data acquired by VMU-C EM and read by the different devices (energy meters and VMU-P modules for analogue variables). Click on the “Plant” icon in the Navigation menu to access the following page (Fig. 89):

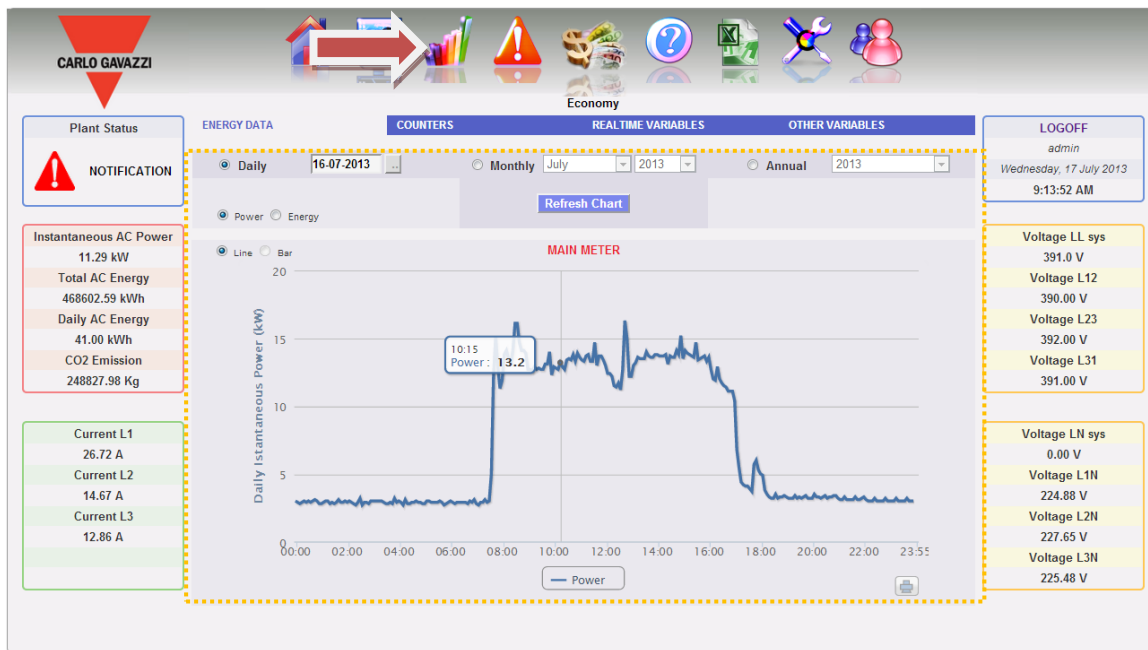


Fig. 89 – Production data charts

At the top there is the menu allowing to access the following sections (Fig. 90):

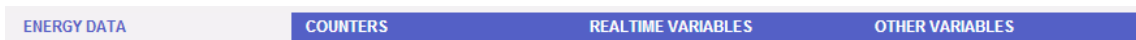


Fig. 90 – Plant data charts menu

1. **“ENERGY DATA”**: section devoted to the reading (in graphical form) of the energy and power value from the Energy Meters (EM).
2. **“COUNTERS”**: section devoted to the reading (in graphical form) of the values from external meters, like water meter, gas meter, etc, collected by the Energy Meters (EM) through pulse inputs.
3. **“REAL-TIME VARIABLES”**: section devoted to the real-time reading of the variables read through the Energy Meters (EM).
4. **“OTHER VARIABLES”**: section devoted to the reading (in graphical form) of the analogue values (temperature, speed/flow, generic from analogue input) read through the VMU-P EM modules.

15.1 ENERGY DATA

Hovering the mouse cursor over “ENERGY DATA” will display the items “MAIN METER” and “ENERGY METERS” (Fig. 91).

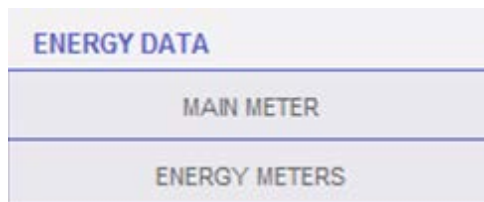


Fig. 91 – Selection of Main meter / Partial meters

15.1.1 MAIN METER

The power/energy curve (Fig. 94) represents the sum of all the contributions from the energy meters (EM) monitored by the system in the selected time interval. In building this curve the system only takes into account the instrument which is identified as “Main meter” (see Fig. 92)



Fig. 92 – Main meter setting

If the “Main meter” is of virtual type (being the result of the contribution of multiple real instruments, Fig. 93) the displayed curve will be built as the sum of all the instruments whose contribution to the virtual instrument has been enabled.



Fig. 93 – Virtual meter setting

Note: if no instrument has been set as “Main meter” and at the same time none of the installed instruments has been set to contribute to the virtual instrument, the page “Main meter” will include no chart.

Note: in charts the sampling frequency (for Power and Energy), depends on the storage interval set on VMU-C. It can be: 5,10,15,30,60 minutes.



Fig. 94 – Main meter chart

This page consists of two sections:

- A. **Section A** for search and selection (in the top section of the page) display type selection buttons:
 - **Daily:** it shows the daily trend of power or energy on the selected day. (To choose the day use the special calendar which can be accessed through the button next to the date field)
 - **Monthly:** it shows the average daily power or the total measured energy, for each day of the selected month. To choose the month and year use the special selection menus next to the field.
 - **Annual:** it shows the average monthly power or the total measured energy, for each month of the selected year. To choose the year use the special selection menu next to the field.

Note: only the line view is available for the daily Power and Energy charts. In the monthly and yearly view, the Power trend chart can be displayed both in line and bar (histogram) form; the energy chart can only be displayed in bar form (histograms).

Note: in daily charts the sampling frequency depends on the storage interval set on VMU-C. It can be: 5,10,15,30,60 minutes.

- The (A) section also includes the buttons allowing to select the variable to be displayed: Energy (kWh) or Power (kW).

B. Section B.

On the abscissa axis (X) the chart displays time. The relevant resolution (hours, days, months) will depend on the selected view type (daily, monthly, yearly). On the ordinate axis(Y) the chart displays the power value in **kW** or the energy value in **kWh**, with an automatically sized scale (with auto-range function).

In the top left of this section there is a menu allowing to select the graphical display mode: "Line" (a continuous line) or "Bar" (for histograms).

Note: we recommend that you use the "Line" display for the daily Power data and the "Bar" mode (for histograms) for the monthly and yearly energy data.

- *Displaying a value in the chart*

Hovering the mouse cursor over the chart area will open a window with the relevant variable value (Fig. 95).



Fig. 95 – Displaying of a value

- *Print chart*

Clicking on the "Print" icon (Fig. 96) located in the bottom right corner of the chart area you can select the printer you wish to use.



Fig. 96 – Chart printing command

15.1.2 ENERGY METERS (PARTIAL)

Hovering the mouse cursor on “ENERGY DATA” and selecting the “ENERGY METERS” item will grant access to a window (Fig. 97) displaying the daily trend of the power measured by each energy meter of the plant. Each curve has a different colour and can be identified by legend on chart bottom. Use the “Energy meter name” menu to display the production curve of a specific instrument, as well.

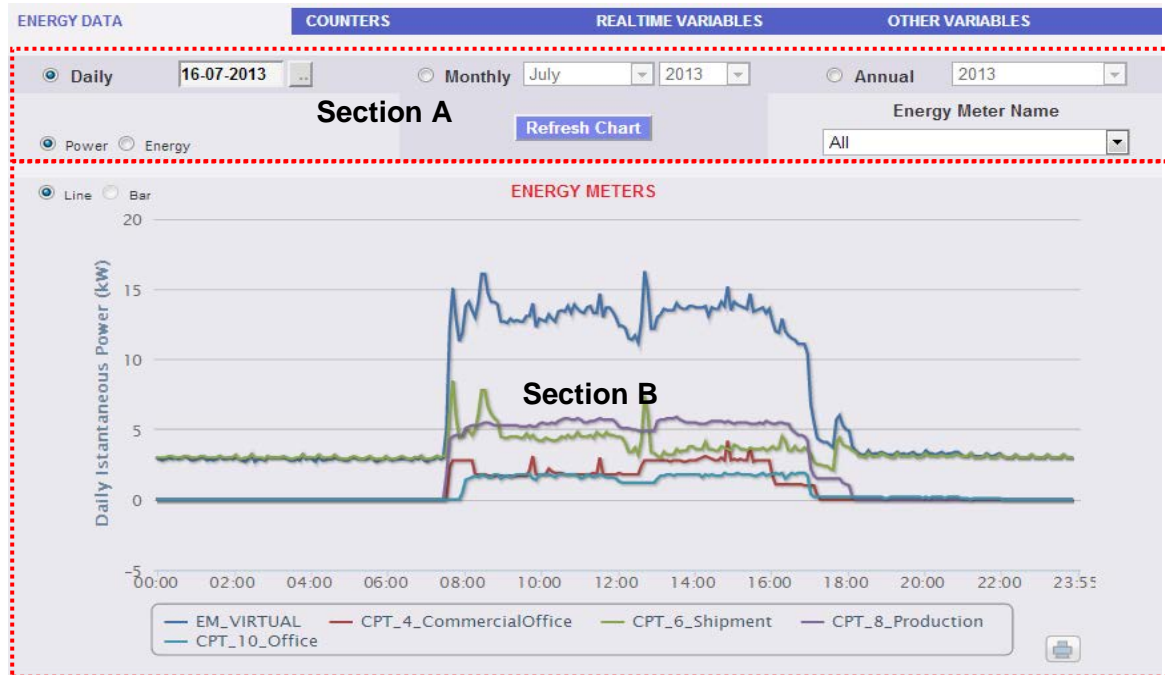


Fig. 97 – ENERGY METERS – PARTIAL METERS chart

This page is divided into two sections:

A. **Section A**, for search and selection.

It allows to select the display type, using the dark grey buttons:

- **Daily:** daily trend of power or energy on the selected day. To select the day use the calendar, which can be accessed by pressing the button next to the date field.
- **Monthly:** average daily power or total produced energy, for each day of the selected month. To select the day use the calendar, which can be accessed by pressing the button next to the date field.
- **Annual:** average daily power or total produced energy, for each month of the selected year. To select the day use the calendar, which can be accessed by pressing the button next to the date field.

After selecting the display type press the “Refresh Chart” button.

The light grey buttons on the left you can select the type of magnitude to be shown: **Power** or **Energy**.

The energy meter selection menu is displayed in light grey. The list contains:

- The list of all the names assigned to the energy meters included in VMU-C EM; when selecting an individual meter, only the relevant curve will be displayed.
- The “ALL” item, allowing to simultaneously display all the energy meters configured and existing in the plant.
- The “EM_VIRTUAL” item displays the data associated with the virtual instrument, which, depending on the configuration page settings, represents the sum of two or more real instruments (or anyway of all the instruments for which the check box “contribution to the virtual instrument” has been enabled).

Note: comparing the trends of the measurements of the different energy meters allows to easily identify any anomalies in the consumptions of the individual plant instruments.

Note: all keys and selections outside the dark grey area do not need the “Refresh chart” function. After a few moments the chart will refresh automatically.

B. “Section B” contains the chart(s).

On the abscissa axis (X) the chart displays the time references; the resolution (hours, days, months) depends on the selected display type (daily, monthly, yearly). On the ordinate axis(Y) the chart displays the power value in kW or the energy value in kWh, with an automatically sized scale (with auto-range function).

In the top left of this section there is a menu allowing to select the graphical display mode: “Line” (a continuous line) or “Bar” (for histograms).

On the abscissa axis (X) the chart displays time; the resolution (hours, days, months) depends on the selected display type (daily, monthly, yearly). On the ordinate axis (Y) the chart displays power in kW or energy in kWh, with a scale automatically sized according to the plant peak power.

Note: we recommend that you use the “Line” or “Area” display for the daily Power data and the “Bar” display (for histograms) for the monthly and yearly energy data.

15.2 COUNTERS (GENERIC FROM DIGITAL INPUTS)

Hovering the mouse cursor on “COUNTERS” and then clicking on the “ENERGY METERS” item will grant access to the generic meter screen (counting the pulses collected by the digital inputs of the Energy meters installed on the system, Fig. 98).



Fig. 98 – Generic counter (H2O, GAS, ...) access selection

As soon as the user accesses the page, the system displays the daily trend of the monitored meters installed in the specific plant. To simplify the identification of each individual track, every individual curve/line has a different colour and can be identified

through the legend in the bottom section of the chart. The “Description” menu allows to select and display the meter trend from the specific instruments.

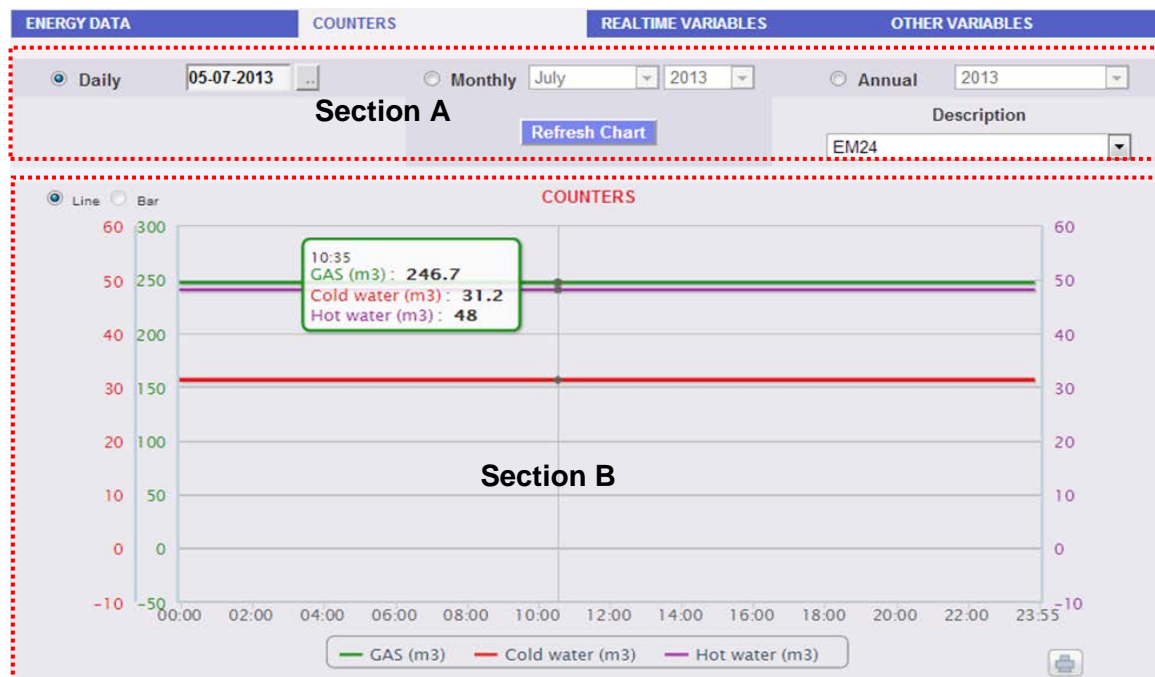


Fig. 99 – Generic meters (H2O, GAS, ...)

This page consists of two sections:

"Section A" for search and selection (in the top section of the page)

It allows to select the display type, using the dark grey buttons:

- **Daily:** it displays the daily trend of the meters for the selected day. To choose the day use the special calendar which can be accessed through the button next to the date field.
- **Monthly:** it displays the daily average of the meters, for each day of the selected month. To choose the month and year use the special selection menus next to the field.
- **Annual:** it displays the meter trend (on a monthly basis) for each month of the selected year. To choose the year use the special selection menu next to the field.

After selecting the display type press the “Refresh Chart” button.

On the right there is a menu allowing to select the Energy Meter the digital inputs refer to. The list includes all the instruments, with the enabled meters from digital instruments.

Note: all keys and selections outside the dark grey area do not need the “Refresh chart” function. After a few moments the chart will refresh automatically.

- C. “Section B”, displaying in graphical form the trend of the different meters from the digital inputs.

On the abscissa axis (X) the chart displays the time references; the relevant resolution (hours, days, months) depends on the selected display type (daily, monthly, annual). On the ordinate axis (Y) the chart displays the numerical references (automatically scaled) for each meter.

For this type of view only the “Line” track is available (the “bar” button is not enabled).

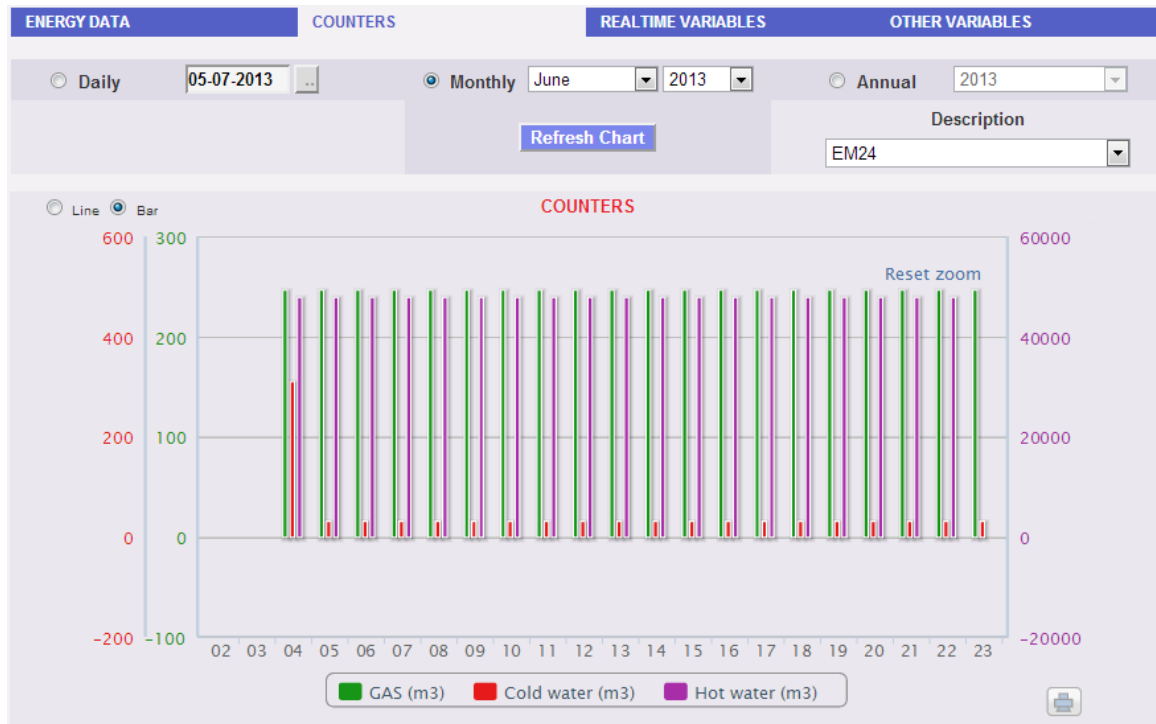


Fig. 100 – Generic meters (H2O, GAS, ...) - monthly display

Note: for monthly and yearly data we recommend that you use the “Bar” display (for histograms).

15.3 REAL TIME VALUES

Hovering the mouse cursor over “REALTIME VARIABLES” and then over “ENERGY METERS” will grant access to the following screen:

ENERGY DATA	COUNTERS	REALTIME VARIABLES	OTHER VARIABLES
Energy Meter Name <input type="text" value="EM24"/> Section A		Refresh Time <input type="text" value="10 s"/>	
Realtime Readings	System	L1 (A)	L2 (B)
Active Power (kW)	0.00	0.00	0.00
Reactive Power (kvar)	0.00	0.00	0.00
Apparent Power (kVA)	0.00	0.00	0.00
Power Factor	-1.00	-1.00	0.00
Frequency (Hz)	50.0		
Current (A)		0.00	0.00
Phase-phase Voltage (V)	50.30	0.00	75.40
Phase-to-neutral Voltage (V) Section B	200.00	225.10	225.60
Inported (Exported) Active Energy	0.0		
Inported (Exported) Reactive Energy	0.0		
THD Current (%)		0.00	0.00
THD Voltage (%)		0.00	0.00
Counters	GAS (m3)	Cold water (m3)	Hot water (m3)
	246.7	31.17	47.996

Fig. 101 – Page for real-time variable reading

This page consists of two sections:

- A. “Section A”, allowing to make searches and to select the refresh time.
 - **Energy meter name:** select the instrument from which you wish to read the variables in real time.
 - **Refresh time:** select the refresh time for the displayed data (5, 10, 30 or 60 seconds).
- B. “Section B”, displaying all the values refreshed according to the interval selected above.

Note: The “Energy meter name” item allow to select a different instrument through the drop-down menu; the relevant data will then be immediately updated.

15.4 OTHER VARIABLES

Hovering the mouse cursor over “OTHER VARIABLES” will display the following screen:

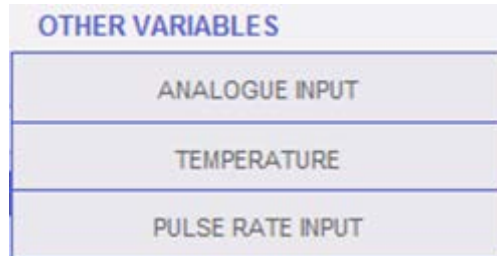


Fig. 102 – “Other variables” menu

15.4.1 ANALOGUE INPUT

As soon as the user accesses the “ANALOGUE INPUT” page, the system will display the data from the VMU-P EM modules, and more precisely from the “mV” or “mA” inputs of the module itself.

Accessing this page will display the daily trend of the variable monitored by the above-mentioned analogue input.

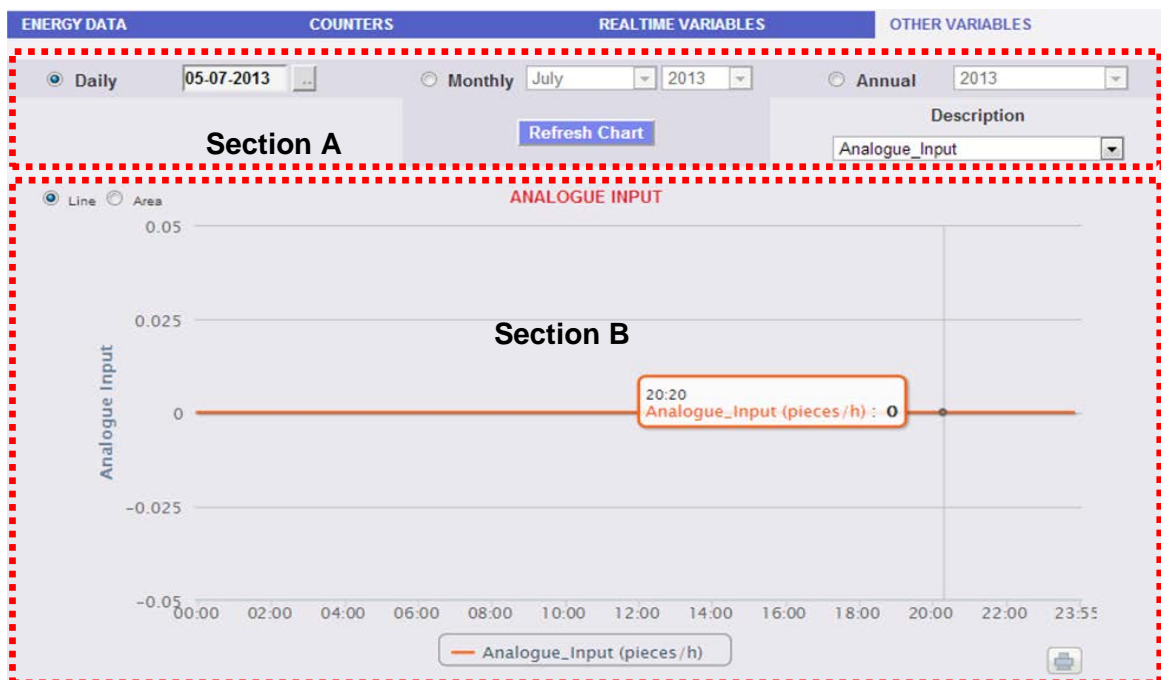


Fig. 103 – Analogue input variable trend

This page consists of two sections:

"**Section A**" for search and selection (in the top section of the page).

It allows to select the display type, using the dark grey buttons:

- **Daily**: it displays the daily trend of the variable for the selected day. To choose the day use the special calendar which can be accessed through the button next to the date field.

- **Monthly:** it displays the daily average of the value monitored by the analogue input, for every day of the selected month. To choose the month and year use the special selection menus next to the field.
- **Annual:** it displays the trend of the average (monthly) value monitored by the analogue input, for each month of the selected year. To choose the year use the special selection menu next to the field.

After selecting the display type press the “Refresh Chart” button.

On the right there is the menu allowing to select the analogue input. The list shall include all enabled analogue inputs.

Note: all keys and selections outside the dark grey area do not need the “Refresh chart” function. After a few moments the chart will refresh automatically.

- D. “**Section B**” displays in graphical form the trend of the selected variable.

On the ordinate axis (Y) the chart shows the scaled value for the monitored value (with auto-range function).

Two display types are available: “Line” track or “Area” track.

Note: in daily charts the sampling frequency depends on the storage interval set on VMU-C EM; it can be: 5,10,15,30,60 minutes.

15.4.2 TEMPERATURE

As soon as the user accesses the “TEMPERATURE” page, the system displays the data coming from the VMU-P EM modules, and more precisely from the inputs for temperature measurement (from Pt100 and/or Pt1000) of the module itself. Accessing this page will display the daily trend of the variable monitored by the above-mentioned analogue input.

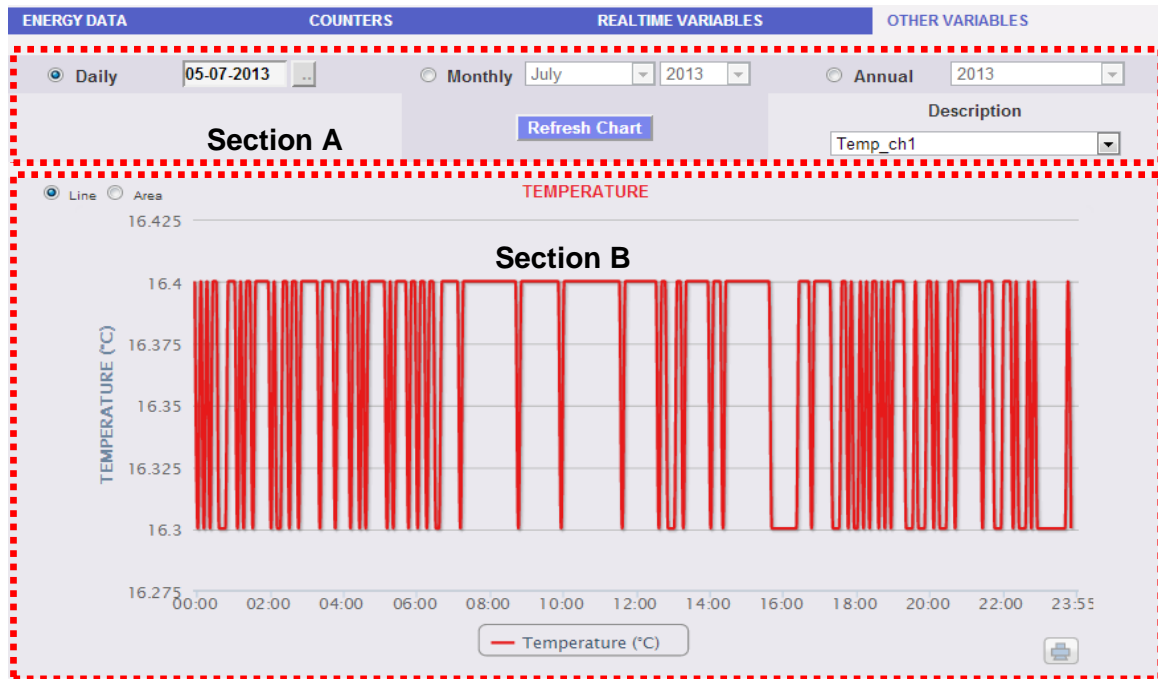


Fig. 104 – Temperature input variable trend

This page consists of two sections:

“**Section A**” for search and selection (in the top section of the page)

It allows to select the display type, using the dark grey buttons:

- **Daily:** it displays the daily trend of the variable for the selected day. To choose the day use the special calendar which can be accessed through the button next to the date field.
- **Monthly:** it displays the daily average of the value monitored by the temperature input, for every day of the selected month. To choose the month and year use the special selection menus next to the field.
- **Annual:** it displays the trend of the average (monthly) value monitored by the temperature input, for each month of the selected year. To choose the year use the special selection menu next to the field.

After selecting the display type press the “Refresh Chart” button.

On the right there is the menu allowing to select the temperature input. The list shall include all enabled inputs.

Note: all keys and selections outside the dark grey area do not need the “Refresh chart” function. After a few moments the chart will refresh automatically.

- E. **“Section B”** displays in graphical form the trend of the selected variable.
On the ordinate axis (Y) the chart shows the scaled value for the monitored value (with auto-range function).

Two display types are available: “Line” track or “Area” track.

Note: in daily charts the sampling frequency depends on the storage interval set on VMU-C EM. It can be: 5,10,15,30,60 minutes.

15.4.3 PULSE RATE INPUT

As soon as the user accesses the “PULSE RATE INPUT” page, the system displays the data coming from the VMU-P EM modules, and more precisely from the inputs for digital input measurement (for frequency/speed measurement) of the module itself. Accessing this page will display the daily trend of the variable monitored by the above-mentioned digital input.



Fig. 105 – Digital input variable trend

This page consists of two sections:

“Section A” for search and selection (in the top section of the page)

It allows to select the display type, using the dark grey buttons:

- **Daily:** it displays the daily trend of the variable for the selected day. To choose the day use the special calendar which can be accessed through the button next to the date field.
- **Monthly:** it displays the daily average of the value monitored by the digital input, for every day of the selected month. To choose the month and year use the special selection menus next to the field.

- **Annual:** it displays the trend of the average (monthly) value monitored by the digital input, for each month of the selected year. To choose the year use the special selection menu next to the field.

After selecting the display type press the “Refresh Chart” button.

On the right there is the menu allowing to select the digital input. The list shall include all enabled inputs.

Note: all keys and selections outside the dark grey area do not need the “Refresh chart” function. After a few moments the chart will refresh automatically.

- F. **“Section B”** displays in graphical form the trend of the selected variable.


On the ordinate axis (Y) the chart shows the scaled value for the monitored value (with auto-range function).

Two display types are available: “Line” track or “Area” track.

Note: in daily charts the sampling frequency depends on the storage interval set on VMU-C EM. It can be: 5,10,15,30,60 minutes.

16 ZOOM FUNCTION

The zoom can be used in any chart display page, and allows to magnify a given chart area.

For example, should you wish to magnify the area highlighted by the orange dots (Fig. 106), you should place the pointer  in point "A" then, holding the left mouse button pressed, drag the pointer to point "B" (Fig. 106).

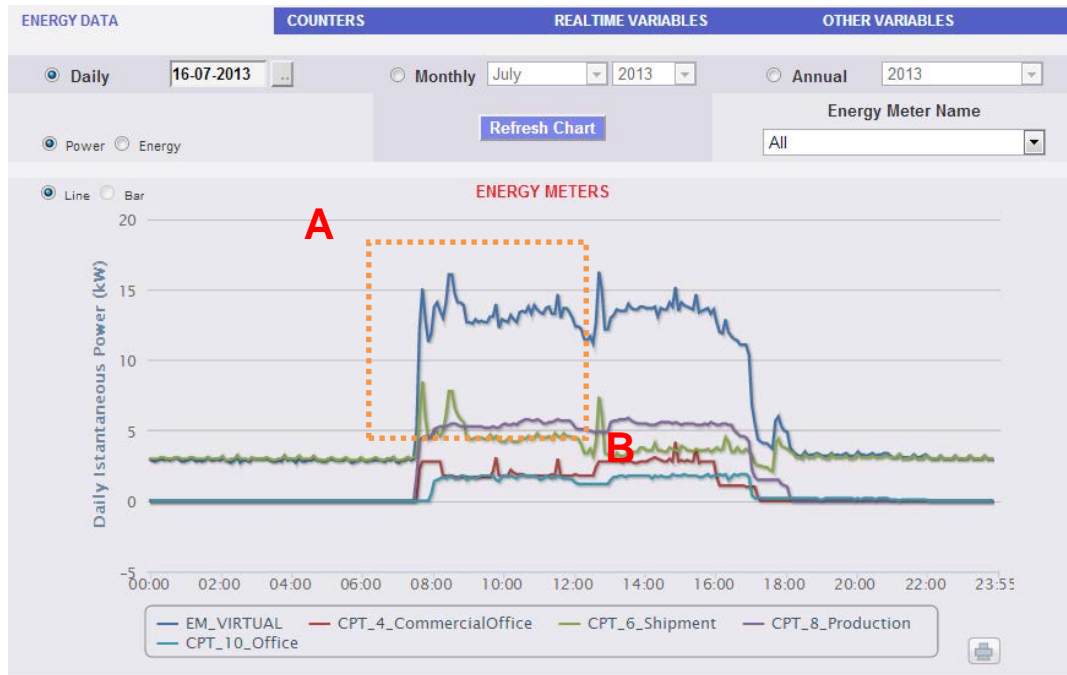


Fig. 106 - Zoom function

As soon as the left mouse button is released, the zoomed area will be highlighted (Fig. 107) and you'll be able to analyse in greater detail the chart trend

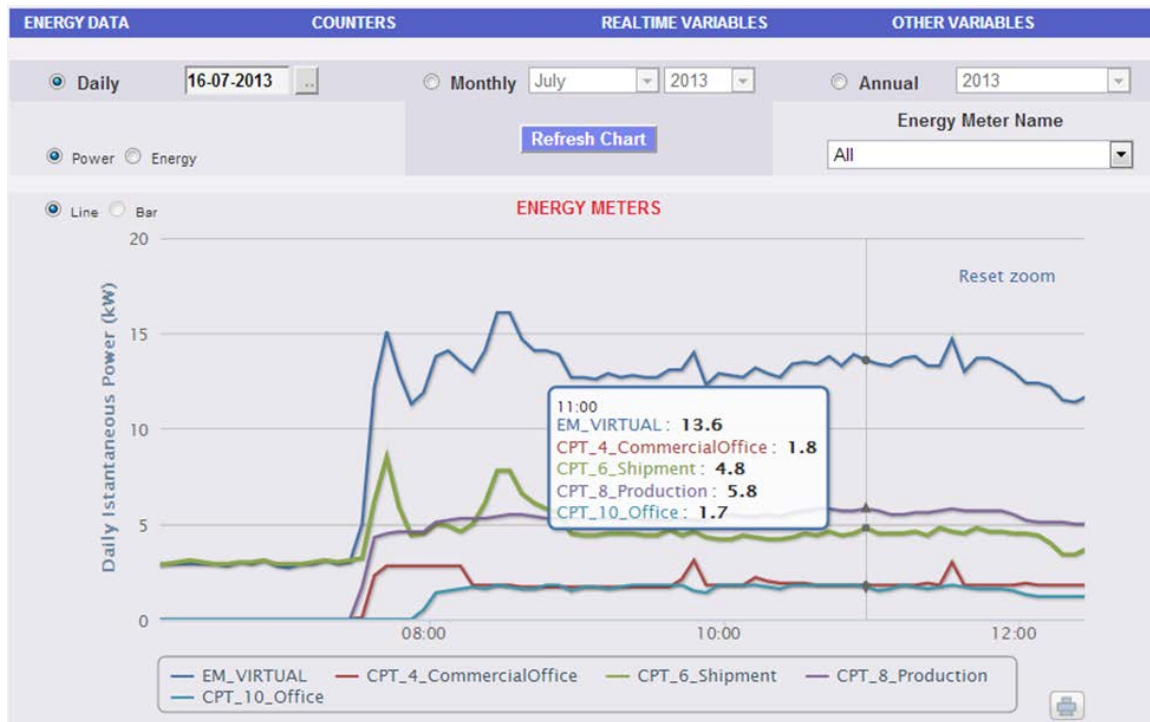


Fig. 107 - Zoomed area

The zoom function is available for all chart formats, whether histograms or areas. Clicking on “ **Reset zoom** ” will restore the chart to its original size.



17 ALARMS

This section is devoted to the management and display of the alarms which have occurred during installation. Clicking on the “Alarm” icon in the Navigation menu will grant access to the content of Fig. 108 (red-hatched area).

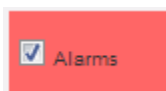
ID	Message	Description	Module	Start Date	Start Time	End Date	End Time	Hide
470	kWays > 0.50 kW	CPT_8_Production	EM	11-07-2013	07:27:24 AM	11-07-2013	06:10:11 PM	<input type="checkbox"/>
469	Wrong Modules Configuration	VMUC-EM	VMU-C	10-07-2013	12:22:05 PM			<input type="checkbox"/>
468	Wrong Modules Configuration	VMUC-EM	VMU-C	10-07-2013	12:22:05 PM			<input type="checkbox"/>
467	Wrong Modules Configuration	VMUC-EM	VMU-C	10-07-2013	12:22:04 PM			<input type="checkbox"/>
466	Wrong Modules Configuration	VMUC-EM	VMU-C	10-07-2013	12:22:04 PM			<input type="checkbox"/>
465	kWays > 1.00 kW	CPT_10_Office	EM	10-07-2013	07:31:27 AM	10-07-2013	05:00:08 PM	<input type="checkbox"/>
464	kWays > 1.00 kW	CPT_10_Office	EM	09-07-2013	07:28:55 AM	09-07-2013	05:00:00 PM	<input type="checkbox"/>
463	kWays > 0.50 kW	CPT_8_Production	EM	08-07-2013	07:27:40 AM	10-07-2013	06:07:09 PM	<input type="checkbox"/>
462	kWays > 1.00 kW	CPT_10_Office	EM	08-07-2013	07:21:06 AM	08-07-2013	05:00:39 PM	<input type="checkbox"/>
461	kWays > 1.00 kW	CPT_10_Office	EM	05-07-2013	04:58:08 PM	05-07-2013	04:58:31 PM	<input type="checkbox"/>

Fig. 108 – Plant alarms

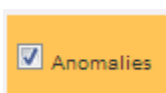
This table shows the list of alarms stored in VMU-C EM in chronological order, starting from the most recent.

Note: alarm classification cannot be changed by user.

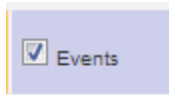
Alarms are divided into three categories, each one with a different colour assigned to it.



“**Alarms**” include all the warnings associated with the temperature measurements and with the measurements from analogue and digital inputs (from the VMU-M EM and/or VMU-P EM). Any alarm due to the overstepping of the thresholds set in the VMU-C EM for the energy meter instruments causes a warning inside the “ALARM” category. This type of event generally inform the user of a situation which needs to be resolved quickly in the monitored system.



“**Anomalies**” include all the statuses from the monitored devices and signalling an incorrect operation of the temperature probes (short-circuited or disconnected probe), or any notifications of communication problems on the internal bus or on one of the two RS485 buses (should a device installed and enabled for communication on bus RS485 fail to communicate for over 30 seconds, an “Anomaly” message will be generated). Anomalies generally inform the user of a situation which needs to be resolved quickly in the monitored system.



“**Events**” include all the status changes of digital inputs, the power supply status change (on/ff) and all the changes in the configuration of the instruments or modules connected and monitored by the VMU-C EM.

- *Filter application on alarm table view*

Using the menu shown in Fig. 108 – “**A**” Area you can display specific alarm categories only. Select categories required by checking the relevant case aside.

- *Navigation buttons*

The table bottom includes the navigation buttons shown in Fig. 109.



Fig. 109 – Table navigation buttons

Click on the outer buttons to display the first or last page; the inner arrows allow to display the next or previous page.

Alternatively, access directly to a specific page by writing the page number required on left field and press send.

- *“Alarms” table fields*

The Alarms table shows the following fields:

1. “**ID**”: Event identification number (Alarm or Anomaly or Event). This meter is only reset when all existing messages have been deleted.
2. “**Message**”: alarm description.
3. “**Description**”: name assigned to the device during configuration.
4. “**Module**”: address of the primary device (VMU-C EM or relevant VMU-M EM or Energy Meter) and position of the secondary device (VMU-P or VMU-O) in alarm.
5. “**Start date**”: date on which the alarm occurred.
6. “**Start time**”: time at which the alarm occurred.
7. “**End date**”: date on which the alarm ceased. If alarm still exists, the field will be blank.
8. “**End time**”: time at which the alarm ceased. If alarm still exists, the field will be blank.
9. “**Hide**”: if checked, the alarm row will be automatically hidden.

Note: To view all alarms, including the hidden ones, check “Show all” in the top right section of the screen. If the option is selected, a hidden alarm can be viewed again by simply unchecking “Hide”.



18 ECONOMIC ANALYSIS

This section is devoted to the economic analysis of the installation. It allows to calculate the costs of the consumed energy.

Clicking on the “Economy” icon in the Navigation menu will grant access to the content of Fig. 110 (red-hatched area).

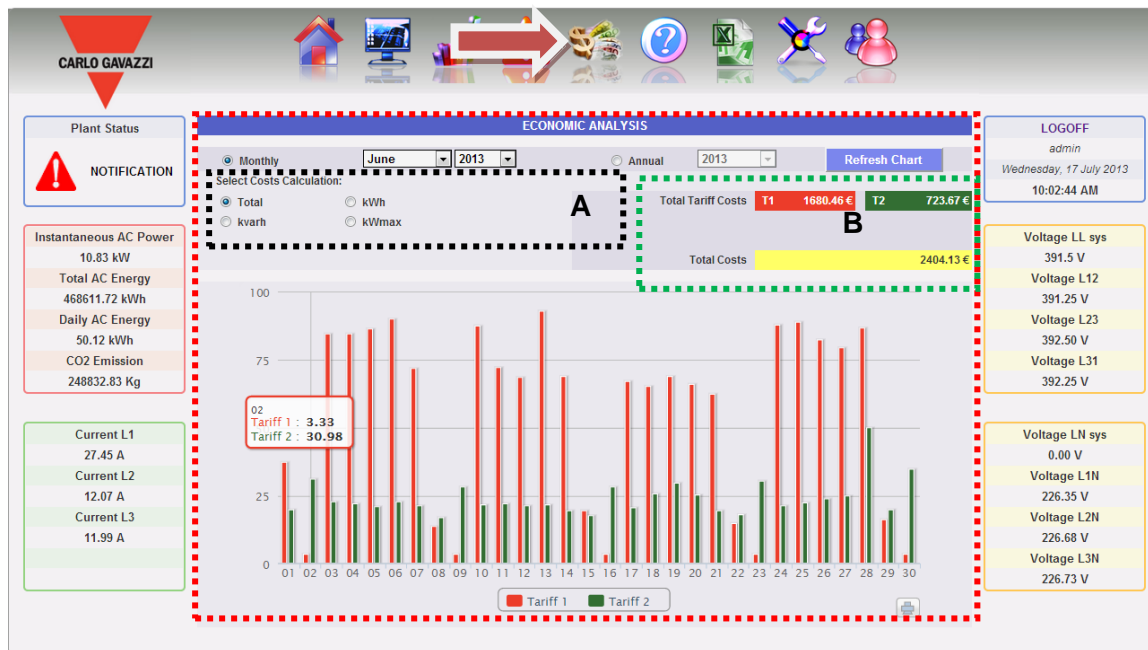


Fig. 110 – Economic analysis

As soon as the user accesses the page, the chart displays, for the current month (with a daily resolution), the total cost in € of the amount of energy consumed, taking into account the two tariffs (T1 and T2) previously set by the user. To select another month or a yearly time interval, use the dark grey section on top and press the “Refresh chart” button.

The chart displayed above provides 4 different selections (Section “A”), referring to the total energy consumption in the selected month, or just to the active or reactive energy. A further selection is also available to display, for each tariff, the date on which the highest consumption has occurred.

- **Total:** each histogram represents the total consumption (for each tariff) of the day. The value takes into account both the consumed active energy value (kWh) and the reactive component (kvarh). The fixed monthly cost is also considered in calculating the daily values.
- **kWh:** each histogram represents the total consumption (for each tariff) of the day. The value only takes into account the consumed active energy value (kWh).
- **kvarh:** each histogram represents the contribution (for each tariff) due to the reactive energy (kvarh) injected into the network for the day.
- **kWmax:** this chart allows to identify the day of the month in question on which the maximum power absorption (kWmax for each time band) has occurred. This value is only displayed in case it should exceed the contract power threshold previously set by the user. The value is expressed in the currency set in the setup page.

Note: for the four chart types described above, the value expressed on the Y axis must always refer to the cost expressed in the currency set during programming.

In the “**B**” section area, with reference to the selections made in section “**A**”, the system will display the total values for each time band (T1 and T2) and the relevant total.



19 PLANT CHARACTERISTICS

This section displays the data and characteristics of the monitored plant. Clicking on the “Information” icon in the Navigation menu will grant access to the content of Fig. 111.

The screenshot shows the 'PLANT CHARACTERISTICS' page in the VMU-C software. The interface includes a navigation bar at the top with various icons, a left sidebar with 'Plant Status' and 'NOTIFICATION' sections, and a main content area with several data sections:

- Plant Identification:** Plant Name (VMUC-EM Test Plant), Plant Location (Belluno Safforze), Plant Property (Carlo Gavazzi Controls SPA), Installer (Carlo Gavazzi), and VMU-C Installation Date (2013-01-01).
- Contract Highlights:** A table showing costs for two tariffs.

	Fixed Monthly Costs	kWh Unit Cost	kvarh Unit Cost	Wmax Monthly Cost	Max Contractual Peak
Tariff 1	100.0 €	0.2 €	1.0 €	1.0 €	1.0 kW
Tariff 2	90.0 €	0.16 €	1.2 €	1.3 €	1.4 kW
- Tariff Calendar Configuration:** A table for defining tariff intervals.

Tariff T1 Interval	Working Day	T1 Start 1	T1 End 1	T1 Start 2	T1 End 2
		08	12	--	13
Holidays	<input type="checkbox"/> Mon <input type="checkbox"/> Tue <input type="checkbox"/> Wen <input type="checkbox"/> Thu <input type="checkbox"/> Fri <input type="checkbox"/> Sat <input checked="" type="checkbox"/> Sun	All period outside tariff T1 range, are automatically included in the tariff T2. All holidays are included into tariff T2.			
- Energy and Power Summary (Left Sidebar):**
 - Instantaneous AC Power: 10.98 kW
 - Total AC Energy: 468611.81 kWh
 - Daily AC Energy: 50.22 kWh
 - CO2 Emission: 248832.88 Kg
 - Current L1: 27.19 A
 - Current L2: 13.82 A
 - Current L3: 12.67 A
- Voltage Levels (Right Sidebar):**
 - Voltage LL sys: 391.0 V, 390.25 V, 392.00 V, 392.00 V
 - Voltage LN sys: 0.00 V, 225.90 V, 226.45 V, 226.23 V

Fig. 111 – Plant characteristics

This page consists of three sections:

1. “*Description*”: it displays the plant identification data (name, place and date of installation, etc. ...).
2. “*Contract highlights*”: for each tariff the section specifies the fixed costs, the unit cost for both active (kWh) and reactive (kvarh) energy, the maximum contract power value for each individual tariff, and finally any additional cost (for each kW), should the maximum contract power be exceeded.
3. “*Tariff calendar configuration*”: it displays the start/end time for each tariff. It also specifies the week days which shall be considered as holidays.

Note: any time periods not included in tariff “T1” are automatically included in tariff “T2”. Days defined as “holidays” shall be entirely counted in tariff “T2”.



20 EXPORT DATA

This section allows to export the data stored in VMU-C EM to an Excel file. Clicking on the “Export” icon in the Navigation menu grants access the following screen

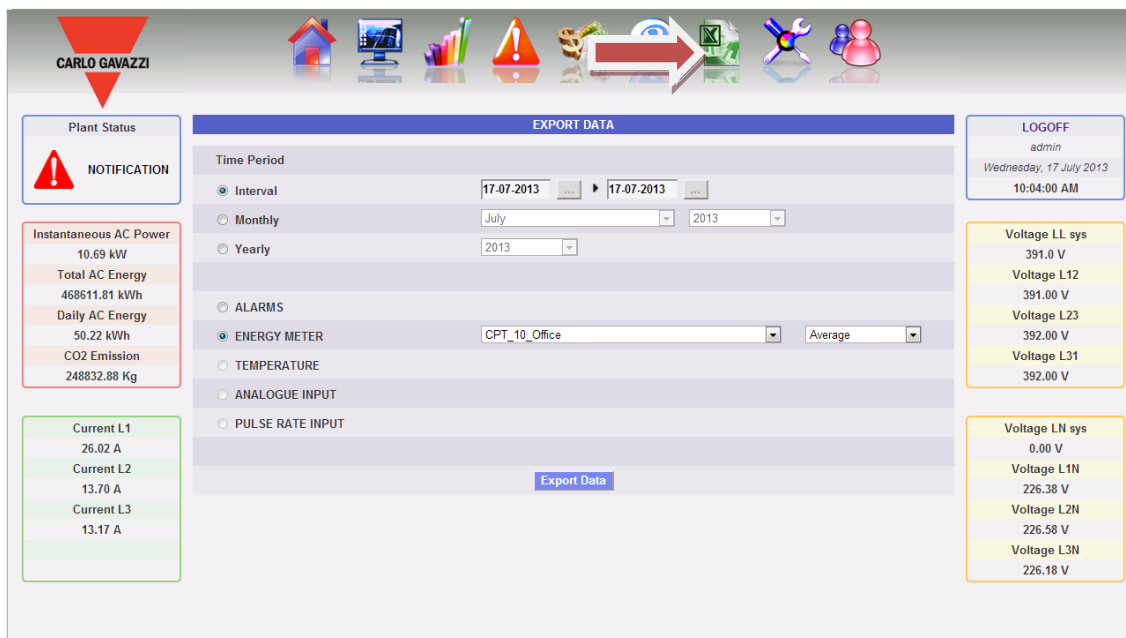


Fig. 112 – Exporting stored data

This area allows to choose the type of data to be exported and the relevant period. To generate the file press the “Export data” button. File can be open or saved on one's own PC.

Data can be exported according to three different time frames:

- **Interval:** it allows to define the first and last day of the data export period. The period cannot exceed 8 days.
- **Monthly:** it allows to define the month for data export.
- **Yearly:** it allows to define the year for data export.


The types of data which can be exported to an EXCEL file are:

- **“Alarms”:** A .xls file is generated, containing the history of all alarms which have occurred in the system, organized according to the same graphic layout as the “Alarms” web section. The saved file name will be of the following type: “ALARMS_dd_mm_yyyy.xls”
- **“Energy meter”:** the system will export the electric values acquired by the instruments connected to the VMU-C EM. The instrument whose values have to be exported must be selected from the relevant drop-down menu (Fig. 113); also define the type of data to be exported (Average, Maximum or Minimum):



Fig. 113 – Data export from EM instruments

The generated Excel files contains the main values from the selected instrument. The saved file name will be of the following type:

 Contatore_Energia_01-06-2013_[AVG]_EM_VIRTUAL.xls

The generated file will have the following structure:

A	B	C	D	E	F
Date	Time	[AVG] Energy Meter EM_VIRTUAL (kWh)	[AVG] Energy Meter EM_VIRTUAL (kWs/sys)	[AVG] Energy Meter EM_VIRTUAL (kvarh)	[AVG] Energy Meter EM_VIRTUAL (kvarsys)
16/07/2013	09:00:00	468431,4	12,7	280078,8	-3,2
16/07/2013	09:05:00	468432,6	12,7	280079,4	-3,1
16/07/2013	09:10:00	468433,6	12,6	280079,8	-3,2
16/07/2013	09:15:00	468434,7	12,9	280080,4	-3,3
16/07/2013	09:20:00	468435,9	12,7	280080,8	-2,6
16/07/2013	09:25:00	468436,9	12,8	280081,3	-2,9
16/07/2013	09:30:00	468437,9	12,7	280081,8	-3,2
16/07/2013	09:35:00	468439,1	12,7	280082,2	-3
16/07/2013	09:40:00	468440,3	13,1	280082,9	-3,2
16/07/2013	09:45:00	468441,2	13,1	280083,2	-2,6
16/07/2013	09:50:00	468442,5	14	280083,8	-1,4
16/07/2013	09:55:00	468443,6	12,3	280084,3	-3

Fig. 114 – Exported data table - data from EM instrument

- “**Temperature**”: the selection allows to export the temperature values of all system sensors configured as active (“Enable”). In the generated Excel file, the first two columns contain the date and time; they are followed by as many columns as the amount of temperature sensors (for each individual recording interval, the file shall provide for each probe the average value calculated over the time interval).

The generated file will have the following structure:

A	B	C	D	E	F
Date	Time	TEMPERATURE VMU-P [VMU-M_001] T1 °C	TEMPERATURE VMU-P [VMUC-EM] T1 °C	TEMPERATURE VMU-P [VMU-M_001] T2 °C	TEMPERATURE VMU-P [VMUC-EM] T2 °C
08/07/2013	10:00:00	110,3	16,4	77,3	18,7
08/07/2013	10:05:00	110,3	16,4	77,3	18,7
08/07/2013	10:10:00	110,3	16,4	77,3	18,6
08/07/2013	10:15:00	110,3	16,3	77,3	18,6
08/07/2013	10:20:00	110,3	16,3	77,3	18,6
08/07/2013	10:25:00	110,3	16,4	77,3	18,6
08/07/2013	10:30:00	110,2	16,4	77,3	18,6
08/07/2013	10:35:00	110,3	16,4	77,3	18,6
08/07/2013	10:40:00	110,3	16,4	77,3	18,6
08/07/2013	10:45:00	110,3	16,4	77,3	18,6
08/07/2013	10:50:00	110,3	16,4	77,3	18,6

- “**Analogue input**”: the selection allows to export the values measured through the analogue inputs “mV” and/or “mA”. In the generated Excel file, the first two columns contain the date and time; they are followed by as many columns as the amount of analogue inputs configured as active (Enable). For each recording interval and for each analogue input, the file shall provide the average value calculated over the time interval.

The generated file will have the following structure:

A	B	C	D
Date	Time	VMU-P [VMU-M_001] Analogue Input (L/min)	VMU-P [VMUC-EM] Analogue Input (pieces/h)
08/07/2013	14:45:00	0	0
08/07/2013	14:50:00	0	0
08/07/2013	14:55:00	0	0
08/07/2013	15:00:00	0	0
08/07/2013	15:05:00	0	0
08/07/2013	15:10:00	0	0
08/07/2013	15:15:00	0	0
08/07/2013	15:20:00	0	0

- **“Pulse rate input”**: the selection allows to export the speed and/or flow values measured through the digital inputs of the VMU-P modules. The first two columns of the generated Excel file will contain the date and time; they will be followed by as many columns as the amount of digital inputs enabled for this function.

The generated file will have the following structure:

Date	Time	VMU-P [VMU-M_001] Pulse Rate Input (m/s)	VMU-P [VMUC-EM] Pulse Rate Input ()
08/07/2013	04:45:00	0	0
08/07/2013	04:50:00	0	0
08/07/2013	04:55:00	0	0
08/07/2013	05:00:00	0	0
08/07/2013	05:05:00	0	0
08/07/2013	05:10:00	0	0
08/07/2013	05:15:00	0	0
08/07/2013	05:20:00	0	0

21 ACCOUNT



Clicking on the “Account” icon in the Navigation menu will grant access to the Account configuration section (Fig. 115), devoted to users management for access to system.

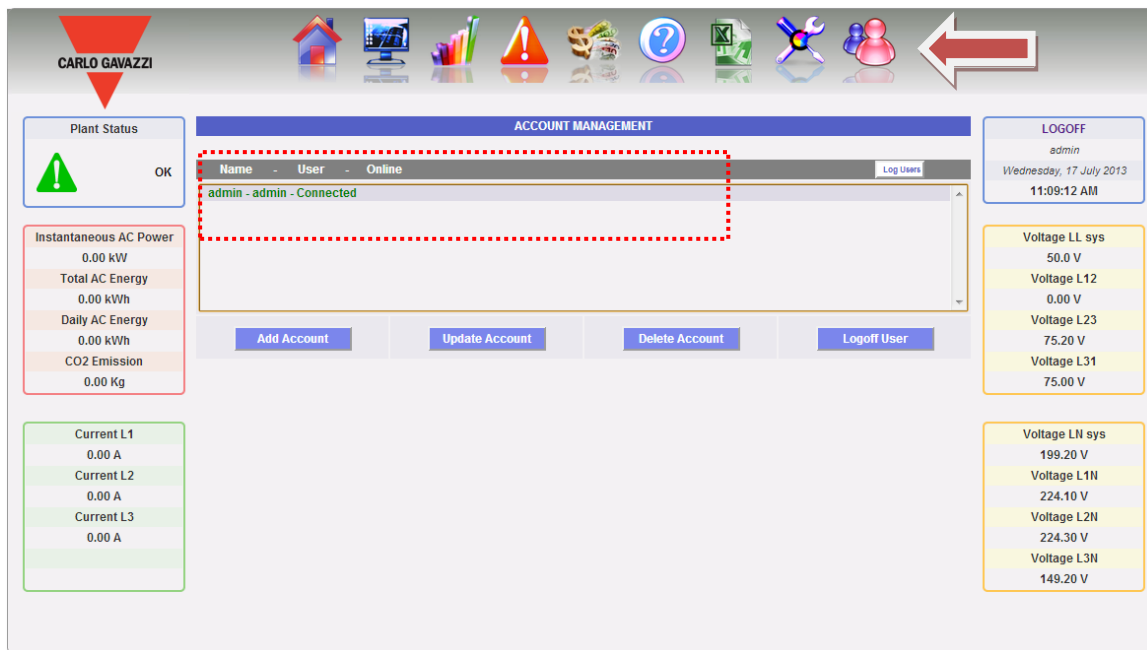


Fig. 115 – Account management

21.1 ACCOUNT MANAGEMENT

Accesses to the system are managed by creating two user types with different privileges.

- A. The “**Administrator**” type account has access to all software areas: “System configuration”, “Account configuration”, “Data display”.
- B. The “**User**” type account is only allowed to access the “Data display” area.

The system has a default Administrator type user, with these characteristics:

Username	Password	Name
admin	admin	Administrator

It is recommended to modify the default user during the first configuration.

Note: An *Administrator* type user must always exist in the system; in its absence, access to System configuration and Account configuration areas will no longer be allowed. To restore the Administrator user, contact Carlo Gavazzi technical assistance.

To know which users are online just refer to the list displayed in the dotted area in Fig. 115. Logged-in users are shown in green and are marked with “Logged-in”; other users are shown in red and are marked with “Not logged-in”.

21.2 ADDING A NEW ACCOUNT

Press the “Add account” button. The following screen will be displayed in the bottom section of the page:

Fig. 116 – Account insertion screen

Fill in the fields according to the following specifications:

- “Name”: Name of the user.

Note: We recommended that you never assign the same “Name” to two different users.

- “USERNAME”: Username for access to the system.

Note: Two users with the same “Username” cannot be entered.

- “PASSWORD”: Password for access to the system.
- “LEVEL”: user level: User/Administrator.

Press “Reset” key to delete the contents of various fields; “Cancel” to cancel operation. Press “Add” key to enter account and add it to the list.

21.3 UPDATING AN ACCOUNT

Select the account to be modified from the “Inserted accounts” list (Fig. 115). Press the “Update account” button. The following screen will be displayed in the bottom section of the page:

Fig. 117 – Account update screen

Modify the settings as already described in paragraph "New account insertion" above, taking into account that the Username field cannot be edited. Press the "Reset" button to cancel the modifications; "Cancel" to cancel the operation. Press the "Save" button to modify the account.

21.4 DELETING AN ACCOUNT

Select the account to be deleted from the list shown in Fig. 150. Press the "Delete account" button. The confirmation message appears on the centre of the page. Press "OK" key to confirm deletion or "Cancel operation" to cancel.

21.5 LOGGING OFF AN ACCOUNT

The administrator user can disconnect a user included in the list by a forced log-off operation. To disconnect a user, displayed in green and with the "Logged-in" indication next to it, press the "Log-off user" button. All the users connected with that Username will be disconnected and re-routed to the home page.

21.6 HISTORY OF ACCESSES TO THE SYSTEM

Clicking on "Users Log" (Fig. 118) will open a window containing the history of the accesses to VMU-C-Box, including date and time (Fig. 119). Rows in green show the users which are currently online.

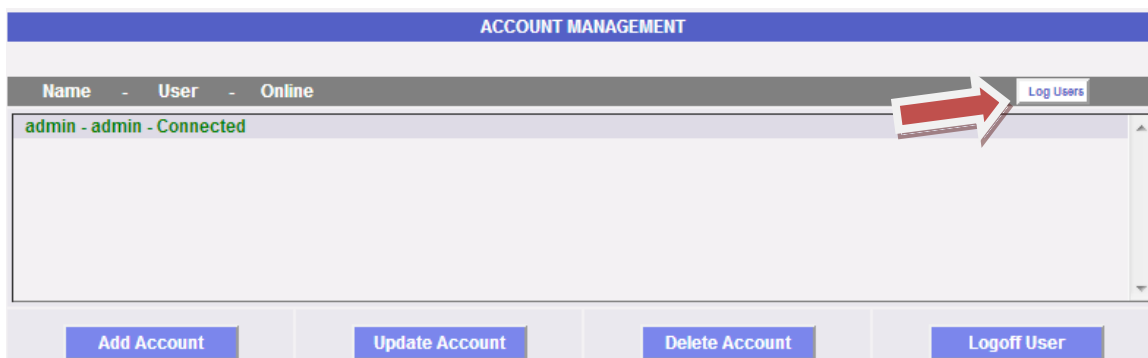


Fig. 118 – System access list button

The chronology keeps access data for a week; date and time refer to login phase.

User	Logged	IP	Last Login
user	Connected	135.196.166.34	17-07-2013
user	Not Connected	135.196.166.34	17-07-2013
admin	Connected	192.168.2.55	17-07-2013
user	Not Connected	135.196.166.34	17-07-2013
admin	Not Connected	135.196.166.34	17-07-2013
user	Not Connected	135.196.166.34	17-07-2013
admin	Connected	192.168.2.211	17-07-2013

Fig. 119 – System accesses list

Click on the captured IP address to find the user's origin area.

22 DATA BACK-UP

- *Data back-up on external memory (optional)*

Using a “Micro SD” or “SDHC” memory card appropriately inserted in the relevant slot (Fig. 154) or a PenDrive directly connected to the USB port (Fig. 155), you can back up the data existing in the VMU-C EM database.

Note: the Micro SD card is not supplied with VMU-C. VMU-C supports Micro SD or PenDrive cards whose capacity doesn't exceed 16GB.

- *Micro SD installation*

1. Open the flap located on the front section of VMU-C EM. Identify the slot specifically designed for the insertion of the “Micro SD” memory (Fig. 120).

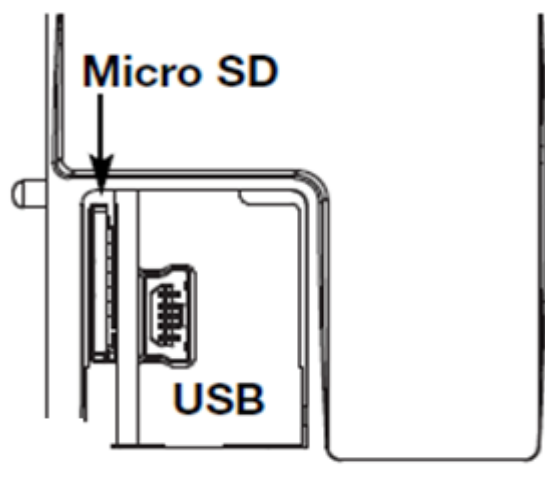


Fig. 120 – Slot for Micro SD memory card and mini-USB port

2. Insert the Micro SD card, making sure it is not write-protected and it is properly formatted (FAT32).
3. Close the flap back. Warning: if the flap is not properly closed VMU-C EM will not enable any writing or reading operation (flap closing is controlled by a micro switch located under the flap).
4. As soon as the flap is closed, VMU-C EM will install the newly inserted memory card and transfer the BACK-UP data. As long as the installation and writing operations are under way, the front “ON” LED (green) will blink. Warning: opening the flap during the writing stage will stop the data transfer process and might damage the Micro SD memory.

▪ Pen-drive installation

1. Identify the USB port specifically designed for the insertion of the “Pen Drive” memory (Fig. 121),

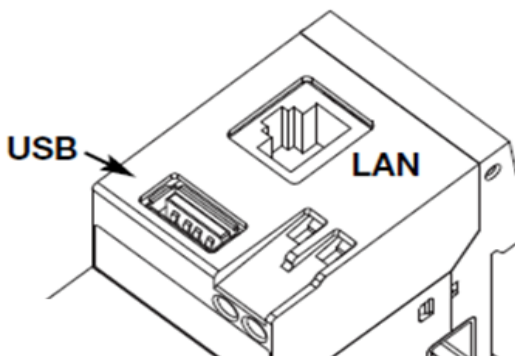


Fig. 121 – USB Slot for Pen Drive

2. Insert the Pen-drive, making sure it is not write-protected and it is properly formatted (FAT32).
3. As soon as you have inserted the Pen-drive, VMU-C EM will install the memory and transfer the BACK-UP data. As long as the installation and writing operations are under way, the front “USB” LED (blue) will blink. **Warning:** disconnecting the Pen-drive during the writing stage will stop the data transfer process and might damage the memory.

The Back-up operation starts as soon as the memory device (micro SD or Pen Drive) is inserted. At the end of the operation, the memory device will contain a folder named VMUC_”VMU-C name” (fig. 122), whose content is described below:

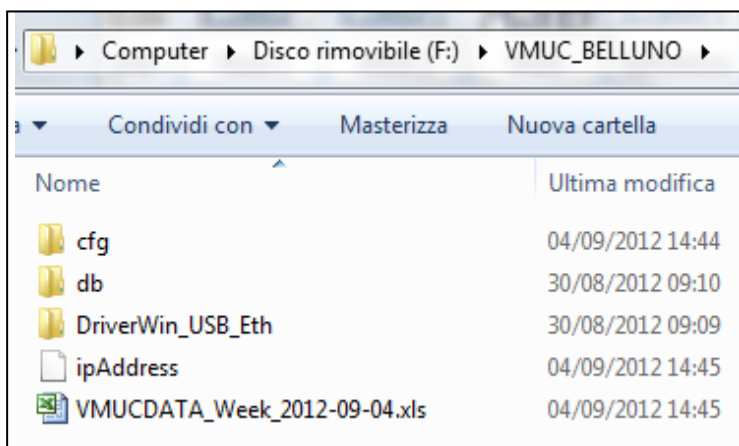


Fig. 122 – VMU-C EM folder content

Note: The name of the folder VMU-C EM automatically creates at switch-on (or when the memory device is inserted) consists of a fixed part “VMU-C, automatically followed by the name assigned to the VMU-C itself. For example, the folder name might be something like VMUC_BELLUNO. This operation, which VMU-C EM performs automatically, will prevent the databases of different VMU-C from being overwritten.

- Folder “**cfg**”
- Folder “**db**”
- Folder “**DriverWin_USB_Eth**”
- File “**ipAddress**”
- EXCEL file “**VMUCDATA week_.....**”

The “**cfg**” folder contains two files:

- 1) EWgeneral.db: it contains the general system configuration, the IP address, the scheduled operations, the e-mail addresses for the sending of scheduled messages or in case of alarm, etc.
- 2) EWplant.db: it contains the plant configuration (the system configuration, installed modules, RS485 network addresses, threshold settings, etc.).

The “**db**” folder contains the whole VMU-C EM database. This folder contains all the data stored in VMU-C EM and updated as of 24:00 of the previous day. Should the VMU-C EM get damaged and have to be replaced, this folder allows to move the whole Database and the relevant configuration from the damaged instrument to the new one through a “**Disaster-Recovery**”-type function.

“**DriverWin_USB_Eth**” folder it contains a Windows driver allowing to connect the VMU-C EM to the PC through the mini USB communication port. In this case the reference address (fixed and not editable) is 192.168.254.254. To access the VMU-C EM through the mini USB port use a USB => mini USB cable and type through the browser in use the address 192.168.254.254; the log-in page will be displayed again.

“**ipAddress**” file: it contains the IP addresses of the connected devices.

Note: we recommend that you use “Notepad” to display this file.

EXCEL file “**VMUCDATA week_.....**”: a file containing all the data logged by VMUC_EM in the last 7 days. The file (Fig. 123) will contain the following variables:

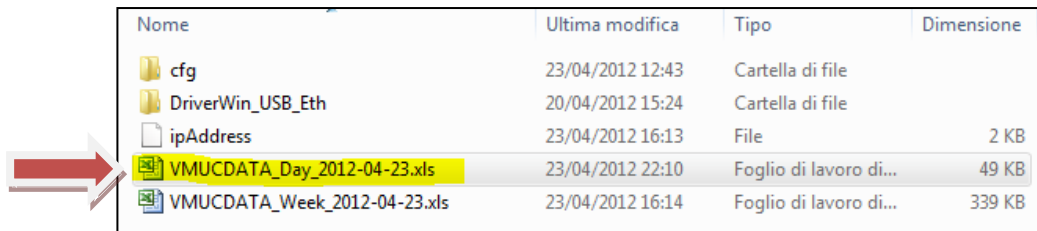
- Total active energy read by the reference energy meter (kWh)
- Average active power over the period read by the reference energy meter (kW)
- Total reactive energy read by the reference energy meter (kvarh)
- Average reactive power over the period read by the reference energy meter (kvar)

Note: For all the variables mentioned above, the period corresponds to the logging interval set on VMU-C. This interval can be of: 5,10,15,30,60 minutes.

	A	B	C	D	E
1	Date 2013-07-07	Energy on period (read from energy meters) (kWh)	Instantaneous Power (read from energy meters) (kW)	Energy on period (read from energy meters) (kvarh)	Instantaneous Power (read from energy meters) (kvar)
2	00:00	0	0	0	0
3	00:05	0	0	0	0
4	00:10	0	0	0	0
5	00:15	0	0	0	0
6	00:20	0	0	0	0
7	00:25	0	0	0	0
8	00:30	0	0	0	0
9	00:35	0	0	0	0

Fig. 123 – Content of the back-up Excel file

If the memory device (micro SD or Pen Drive) is left inserted into VMU-C EM, at 12:00 a.m. o'clock VMU-C adds on a daily basis a new file (fig. 124) containing the data of the just expired day (with the same formatting as the previous file).



Nome	Ultima modifica	Tipo	Dimensione
cfg	23/04/2012 12:43	Cartella di file	
DriverWin_USB_Eth	20/04/2012 15:24	Cartella di file	
ipAddress	23/04/2012 16:13	File	2 KB
VMUCDATA_Day_2012-04-23.xls	23/04/2012 22:10	Foglio di lavoro di...	49 KB
VMUCDATA_Week_2012-04-23.xls	23/04/2012 16:14	Foglio di lavoro di...	339 KB

124 – New daily back-up file

22.1 RESTORING THE CONFIGURATION FROM BACK-UP (FROM FILE)

If the VMU-C configuration has previously been saved on a PC, it can be re-imported by simply following the procedure described below:

- Click on the “*SETUP*” icon => Click on the “*PLANT*” button => Click on the “*SETTING*” button => Click on the “*WIZARD*” button => Click on the “*IMPORT*” button

The system will display the “Load configuration from file ...” mask (Fig. 125).

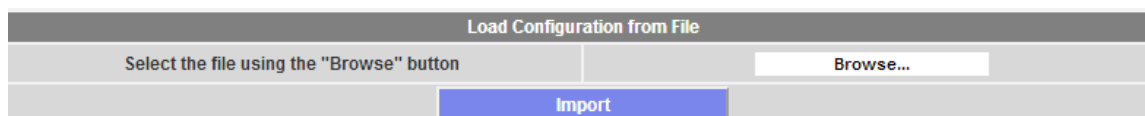


Fig. 125 – Setting import from FILE

To select the file you wish to import, use the “**Browse**” button to retrieve the configuration file previously saved on the PC.

As soon as the file has been selected (Fig. 126), the “**Import**” item will be enabled.

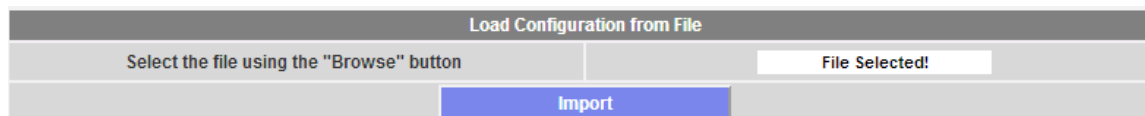


Fig. 126 – Setting import from USB or micro-SD

22.2 RESTORING THE DATA-BASE FROM BACK-UP (DISASTER RECOVERY)

If a memory pen or a micro SD memory card was inserted in VMU-C the following screen will be displayed:

SYSTEM	PLANT	OTHER VARIABLES
Load Configuration from File		
Select the file using the "Browse" button		File Selected!
Import		
Import Configuration from USB		
VMUC_VMUC-EM		
<input checked="" type="radio"/> Import Plant Configuration	<input type="radio"/> Disaster Recovery	
Import		
Import Configuration from microSD		
VMUC_VMUC-C		
<input checked="" type="radio"/> Import Plant Configuration	<input type="radio"/> Disaster Recovery	
Import		

Fig. 127 – Configuration and/or Database import (Disaster Recovery function)

The screen in question (Fig. 127) allows to access two distinct operations:

- Import Plant Configuration
- Disaster Recovery

22.2.1 IMPORT PLANT CONFIGURATION

Performing this operation is equivalent to “Restoring the configuration from back-up”. When an external memory device (Pen-drive or micro-SD) is inserted into VMU-C EM, a copy of the system configuration (Arrays modules and Energy Meters) is automatically created; the copy in question can then be imported through a special command.

Import Configuration from USB		
VMUC_VMUC-EM		
<input checked="" type="radio"/> Import Plant Configuration	<input type="radio"/> Disaster Recovery	
Import		
Import Configuration from microSD		
VMUC_VMUC-C		
<input checked="" type="radio"/> Import Plant Configuration	<input type="radio"/> Disaster Recovery	
Import		

Fig. 128 – Import configuration from USB or micro-SD

22.2.2 DATABASE IMPORT (Disaster Recovery)

This operation allows to import into a VMU-C EM the Database of an other VMU-C EM (this function can be very useful in case the device should have to be replaced as a consequence of a failure). The “Disaster Recovery” function imports into the new device all the data previously saved in the VMU-C EM which has failed (data-logger + events). This function is only available if the back-up memory (Pen-drive or micro-SD) remains constantly inserted into the VMU-C EM.

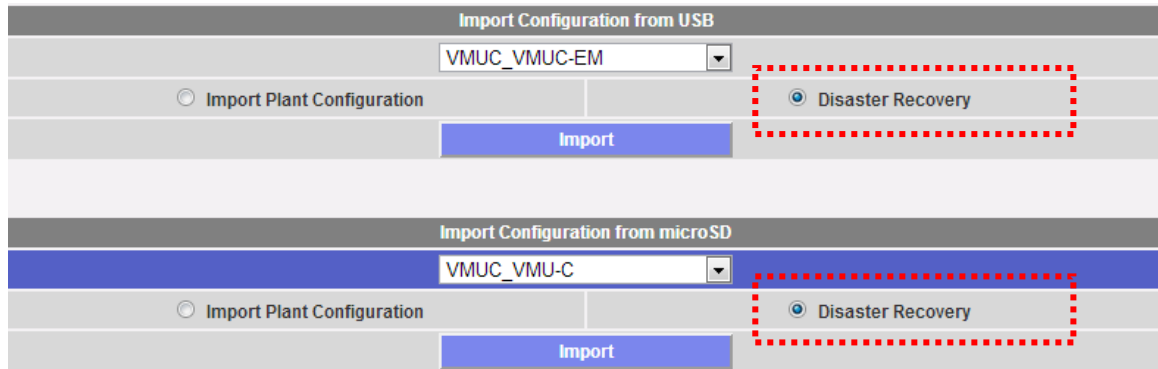


Fig. 129 – Database import from USB or micro-SD

