

Monitoring system for Energy Management

Control

VMU-C EM

A revolution in Energy Management

The increasing lack of natural fossil resources and consequent increase in energy costs are indications that a rational and conscious use of available energy is now a "must".

We at Carlo Gavazzi have more than 15 years of experience in providing a comprehensive portfolio of devices to measure, analyse, understand and predict the energy trends of our customers' plants or buildings, thus making it easier for them to save money and safeguard the environment.

The VMU-C EM is the ideal web-server-based solution for monitoring small to medium installations. With its specific integrated web-service functionality, it is capable of automatically transferring the data via FTP to a remote server, where a SCADA, BMS or other specific database software is running.

The VMU-C EM gathers data from:

- Energy meters
- Power analysers
- VMU Series input/output modules

The VMU-C EM provides information in a quick and automatic way via the internet, so the data is available wherever you are.



Monitoring system for Energy Management

VMU-C EM

Integrated web-server-based unit able to monitor up to 32 meters and to manage the following data:

- Energy (kWh, kvarh) and instantaneous variable data (V, A, P, Q, PF, Hz) with setpoint and datalogger
- Temperature, analogue and pulse rate inputs (with scaling capability)
- Digital input status
- Alarms via email or SMS
- Dual tariff
- Reports in CSV format

All the data of the monitored plant is available via:

- HTTP web surfing
- HTTP on-demand data-polling
- FTP scheduled data-pushing
- Modbus TCP protocol (slave function)

VMU-W

If a wired Internet connection is not available, a compact modem can easily be linked to the main unit providing:

- Compatibility with quad-band GSM-GPRS-EDGE standards
- Compatibility with dual-band UMTS-HSPA standards

ENERGY METERS and POWER QUALITY ANALYSERS

Carlo Gavazzi provides a full range of instruments to be used in conjunction with the VMU-C EM.

- Mounting: both DIN-rail or panel mounting available
- Compact size
- Current measurement: direct up to 65 A, by 5A current transformers, by 0.333 V current sensors
- Optional digital inputs for utility (gas, water) metering, pulse outputs or relay outputs available
- MID certified versions available for fiscal metering

CURRENT TRANSFORMERS

Carlo Gavazzi also provides a full range of current transformers (both solid and split-core) and miniature split-core current sensors

VMU SERIES OPTIONAL MODULES

Additional modules can be added, providing further information:

- Temperature measurements
- Scalable analogue and pulse rate inputs
- Digital inputs and digital outputs

Why the VMU-C EM is the ideal Energy Management solution

How much money will you lose if your plant stops because of electrical problems?

To ensure everything is running effectively, you need a monitoring solution.

The electrical installation is one of the most important systems in any facility, from a production plant to a commercial building.

An unexpected fault can lead to serious damage and/or to a very expensive stop in production.

You can protect your business if:

- you meet the installation limits;
- you know the system is working properly;
- you identify any decrease in performance so as to plan any maintenance before a fault occurs.

How much money will you save if your utility contract is based on your actual needs?

To ensure you optimise your electrical contract you need a monitoring solution.

The electrical utility contract should be tailored to the exact needs of your facility. In order to avoid excessive expense, or penalties for exceeding

the limits of the contract, you can negotiate a well calibrated contract if :

- you know the details of your consumption by production load, time, season, etc.
- you identify in detail where the consumption takes place within your plant
- you are able to not exceed the contractual terms (maximum power demand, etc.)



Advantages

- No need for a dedicated PC for monitoring
- No crash problems which lead to data loss
- No compatibility problems due to different operating systems, different languages, libraries, etc.
- Polling device, datalogger, Ethernet gateway in a single, very compact, unit
- Modular concept for additional input/output whenever needed
- Optional modular modem for wireless Ethernet connection



The VMU-C EM and its optional I/O modules: just to make it easier



The VMU-C EM is modular and the VMU series modules can be added by connecting them via their internal bus: up to one environment variable unit (VMU-P) and up to three I/O units (VMU-O).

If some of the VMU modules are needed remotely, up to ten new arrays

can be connected via RS485 using a master module, VMU-M. All the web-server functionalities are ready on your browser if wired internet is available. A further module, the VMU-W (GPRS-EDGE-UMTS-HSPA modem) can be added if the internet is wireless.

VMU-C EM

A revolution in Energy Management

An integrated wired or wireless Web-Server and Web-Service solution

Micro SD memory



Since plant data is very important, the VMU-C EM also provides a specific micro SD slot to host, up to 16GB back-up memory. The following functions are also available:

- plant configuration and database and events export download;
- XML driver (energy meters), plant configuration and firmware upgrade upload.

Mini USB plug



The mini USB device can be connected to a PC to perform a firmware upgrade and other service functions.

Memory stick



The USB "host" with hot swap capability can house a memory stick providing download and upload functions.

Mobile Modem

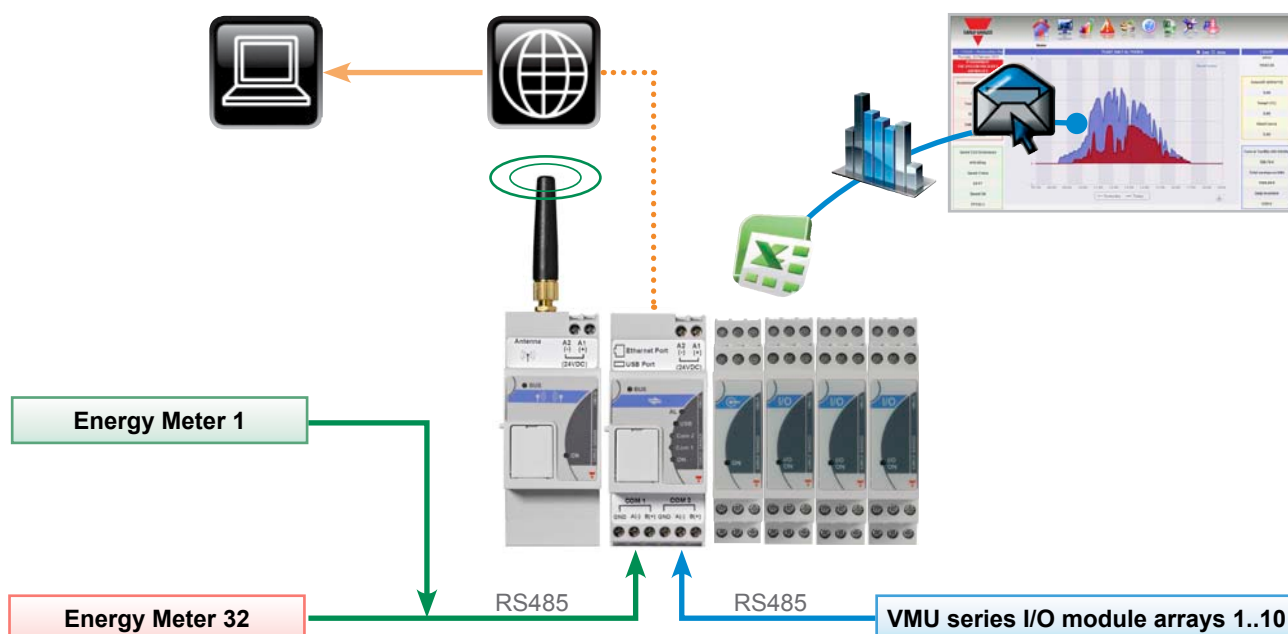


Where wired Internet access is not available, Carlo Gavazzi provides a specific mobile modem, the VMU-W, to be added to the VMU-C which transforms the system into the ideal monitoring solution for any remote application.

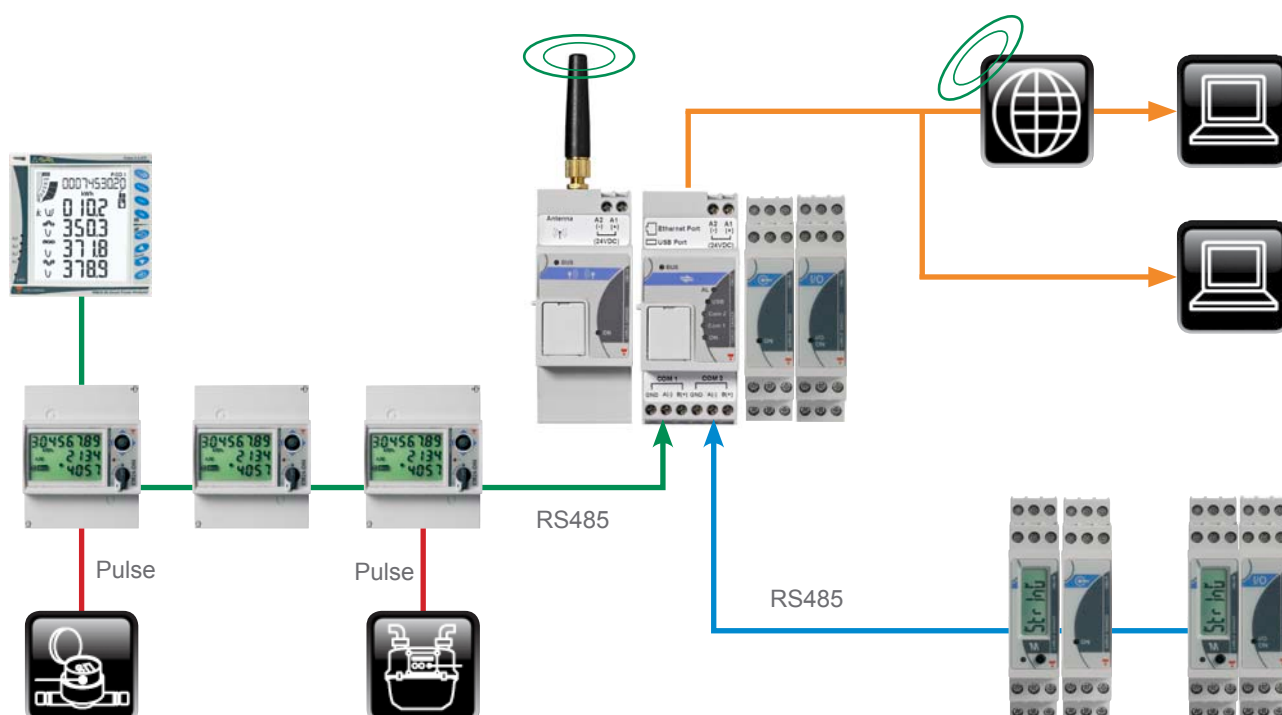
Typical application diagrams

Monitoring solution based on web-server communication capability

Example of communication architecture with wired Internet access (only with “VMU-C”) unit or, where wired Internet, is not available, with additional mobile GPRS-EDGE-UMTS-HSPA “VMU-W” plug-in unit.



Example of measurement and data management architecture



Web -server communication

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- electrical plant information such as total power, daily and total energy consumption;
- CO₂, equivalent emissions;
- instantaneous variables of the plant, such as voltages and currents;

The screenshot shows the 'CARLS GRAZS' website interface. At the top, there is a navigation bar with various icons representing different systems or components. Below this, the 'Plant Status' section is visible, featuring a 'NOTIFICATION' area on the left and a main data display area. The main display area contains a bar chart titled 'Daily Consumed Energy' for the period from 2015-01-01 to 2015-01-31. The chart shows energy consumption in kWh per day, with a peak around 2015-01-25. To the right of the chart, there are several data points for 'Voltage' and 'Energy'.

Category	Value
Current 1.1	30.7 A
Current 1.2	32.0 A
Current 1.3	33.0 A
Voltage 1.0	302.7 V
Voltage 1.1	302.7 V
Voltage 1.2	302.7 V
Voltage 1.3	302.7 V
Voltage 1.4	302.7 V
Voltage 1.5	302.7 V
Voltage 1.6	302.7 V
Voltage 1.7	302.7 V
Voltage 1.8	302.7 V
Voltage 1.9	302.7 V
Voltage 2.0	302.7 V
Voltage 2.1	302.7 V
Voltage 2.2	302.7 V
Voltage 2.3	302.7 V
Voltage 2.4	302.7 V
Voltage 2.5	302.7 V
Voltage 2.6	302.7 V
Voltage 2.7	302.7 V
Voltage 2.8	302.7 V
Voltage 2.9	302.7 V
Voltage 3.0	302.7 V
Voltage 3.1	302.7 V
Voltage 3.2	302.7 V
Voltage 3.3	302.7 V
Voltage 3.4	302.7 V
Voltage 3.5	302.7 V
Voltage 3.6	302.7 V
Voltage 3.7	302.7 V
Voltage 3.8	302.7 V
Voltage 3.9	302.7 V
Voltage 4.0	302.7 V
Voltage 4.1	302.7 V
Voltage 4.2	302.7 V
Voltage 4.3	302.7 V
Voltage 4.4	302.7 V
Voltage 4.5	302.7 V
Voltage 4.6	302.7 V
Voltage 4.7	302.7 V
Voltage 4.8	302.7 V
Voltage 4.9	302.7 V
Voltage 5.0	302.7 V
Voltage 5.1	302.7 V
Voltage 5.2	302.7 V
Voltage 5.3	302.7 V
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Voltage 6.2	302.7 V
Voltage 6.3	302.7 V
Voltage 6.4	302.7 V
Voltage 6.5	302.7 V
Voltage 6.6	302.7 V
Voltage 6.7	302.7 V
Voltage 6.8	302.7 V
Voltage 6.9	302.7 V
Voltage 7.0	302.7 V
Voltage 7.1	302.7 V
Voltage 7.2	302.7 V
Voltage 7.3	302.7 V
Voltage 7.4	302.7 V
Voltage 7.5	302.7 V
Voltage 7.6	302.7 V
Voltage 7.7	302.7 V
Voltage 7.8	302.7 V
Voltage 7.9	302.7 V
Voltage 8.0	302.7 V
Voltage 8.1	302.7 V
Voltage 8.2	302.7 V
Voltage 8.3	302.7 V
Voltage 8.4	302.7 V
Voltage 8.5	302.7 V
Voltage 8.6	302.7 V
Voltage 8.7	302.7 V
Voltage 8.8	302.7 V
Voltage 8.9	302.7 V
Voltage 9.0	302.7 V
Voltage 9.1	302.7 V
Voltage 9.2	302.7 V
Voltage 9.3	302.7 V
Voltage 9.4	302.7 V
Voltage 9.5	302.7 V
Voltage 9.6	302.7 V
Voltage 9.7	302.7 V
Voltage 9.8	302.7 V
Voltage 9.9	302.7 V
Voltage 10.0	302.7 V
Voltage 10.1	302.7 V
Voltage 10.2	302.7 V
Voltage 10.3	302.7 V
Voltage 10.4	302.7 V
Voltage 10.5	302.7 V
Voltage 10.6	302.7 V
Voltage 10.7	302.7 V
Voltage 10.8	302.7 V
Voltage 10.9	302.7 V
Voltage 11.0	302.7 V
Voltage 11.1	302.7 V
Voltage 11.2	302.7 V
Voltage 11.3	302.7 V
Voltage 11.4	302.7 V
Voltage 11.5	302.7 V
Voltage 11.6	302.7 V
Voltage 11.7	302.7 V
Voltage 11.8	302.7 V
Voltage 11.9	302.7 V
Voltage 12.0	302.7 V
Voltage 12.1	302.7 V
Voltage 12.2	302.7 V
Voltage 12.3	302.7 V
Voltage 12.4	302.7 V
Voltage 12.5	302.7 V
Voltage 12.6	302.7 V
Voltage 12.7	302.7 V
Voltage 12.8	302.7 V
Voltage 12.9	302.7 V
Voltage 13.0	302.7 V
Voltage 13.1	30

In the same section information acquired by pulses from the gas, water or remote heating meters, and also the analogue and environmental variables acquired by the VMU modules, can be displayed and analysed.



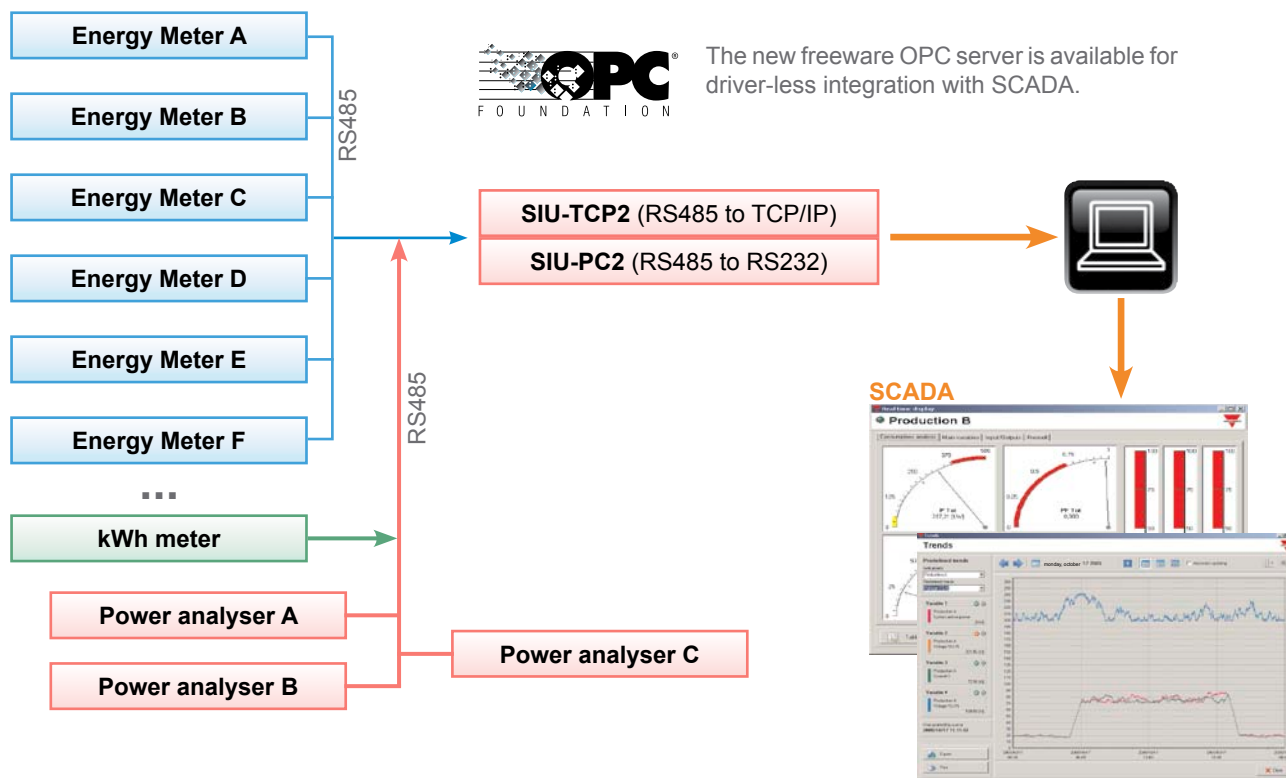
The variables can be monitored by specific setpoints. In the case of problems or faults, it is possible to analyse the plant's history before the event, so as to understand the relevant reasons and act accordingly.

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The OPC server link

Monitoring solution based on the System Integrator's own SCADA software



- Architectural freedom
- Measurement features depending on the selected meter or analyser

- Free communication protocols available on request.

SIU-FO: the solution for an electrically-disturbed environment

This unit converts the standard Mod-Bus communication from the RS485 wired to the fibre-optic type, with the aim to increase the communication distance and providing extremely high communication immunity in the case of an electrically -disturbed environment.

Features

- RS485 to glass fibre optic adaptor.
- Two way communication capability (wire to fibre optics and fibre optics to wire).
- Fibre optic single loop communication (cascade connection: communication loss in the case of loop cut).
- Fibre optic dual loop communication (dual cascade connection: partial communication loss in the case of

one loop cut).

- Fibre optic dual loop communication (redundant communication: no communication loss in case of one loop cut).
- 10 to 24VDC/12 to 18VAC power supply.
- DIN-rail mounting type.

Fibre type and communication distances

- Single-mode and multimode glass fibre optic compatibility.
- Point to point distance of up to 800m with 50/125 μm multimode fibre.
- Point to point distance of up to 2000m with 62.5/125 μm multimode fibre.



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