

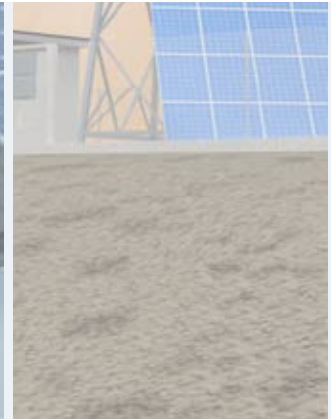
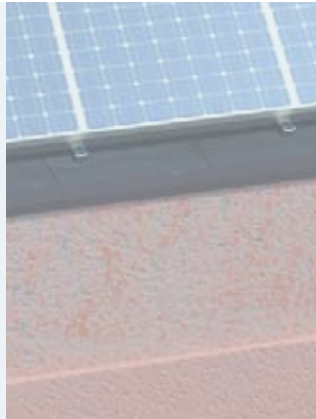


## **Solutions**

# **Renewable Energy**

# Renewable Energy

## Solutions for



**Photovoltaic parks**

**Photovoltaic small business, commercial and tracking systems**

**Photovoltaic residential systems**

**Off-grid systems**

### ABOUT CARLO GAVAZZI

Carlo Gavazzi Automation is an international group active in designing, manufacturing and marketing electronic equipment targeted at the global markets of industrial and building automation.

Our history is full of firsts and our products are installed in a huge number of applications all over the world. With more than 80 years of successful operation, our experience is unparalleled.

We have our headquarters in Europe and numerous offices around the world.

Our R&D competence centres and production sites are located in Denmark, Italy, Lithuania, Malta and the People's Republic of China.

We operate worldwide through 22 of our own sales companies and also selected representatives in more than 65 countries, from the United States in the West to the Pacific Rim in the East.

Our core competence in automation spans four product lines: Sensors, Switches, Controls and Fieldbuses.

Our wide array of products includes sensors, monitoring relays, timers, energy management system, solid state relays, safety devices and fieldbus systems.

We focus our expertise on offering state-of-the-art product solutions in selected market segments.

Our customers include original equipment manufacturers of packaging machines, plastic injection moulding machines, food and beverage production machines, conveying and material handling equipment, door and entrance control systems, lifts and escalators, as well as heating, ventilation and airconditioning devices.



## DESIGNED TO MEET MARKET REQUIREMENTS

The increasing demand for energy, the availability and cost of oil and issues of pollution make alternative sources of renewable energy essential.

Sun and wind energy can be transformed into electricity that can be used directly or fed into the grid according to national regulations.

Renewable energy, in combination with energy efficiency, is the basis for sustainable development and respect for the environment in which we all live.

Carlo Gavazzi's wide expertise is focused on developing and offering

a package of products and devices for the Renewable Energy market, specifically photovoltaic power plants.

The growing development of cost effective solar energy technology has great potential to benefit our world. Solar technologies diversify the energy supply, reduce our dependence on fossil fuels, improve air quality and offset greenhouse gas emissions.

Carlo Gavazzi offers complete and modular solutions to monitor and control the efficiency of photovoltaic plants.

Our PV monitoring solution consists of Eos-Array, Eos-Web devices and Eos-Server and VMU-Y aggregating

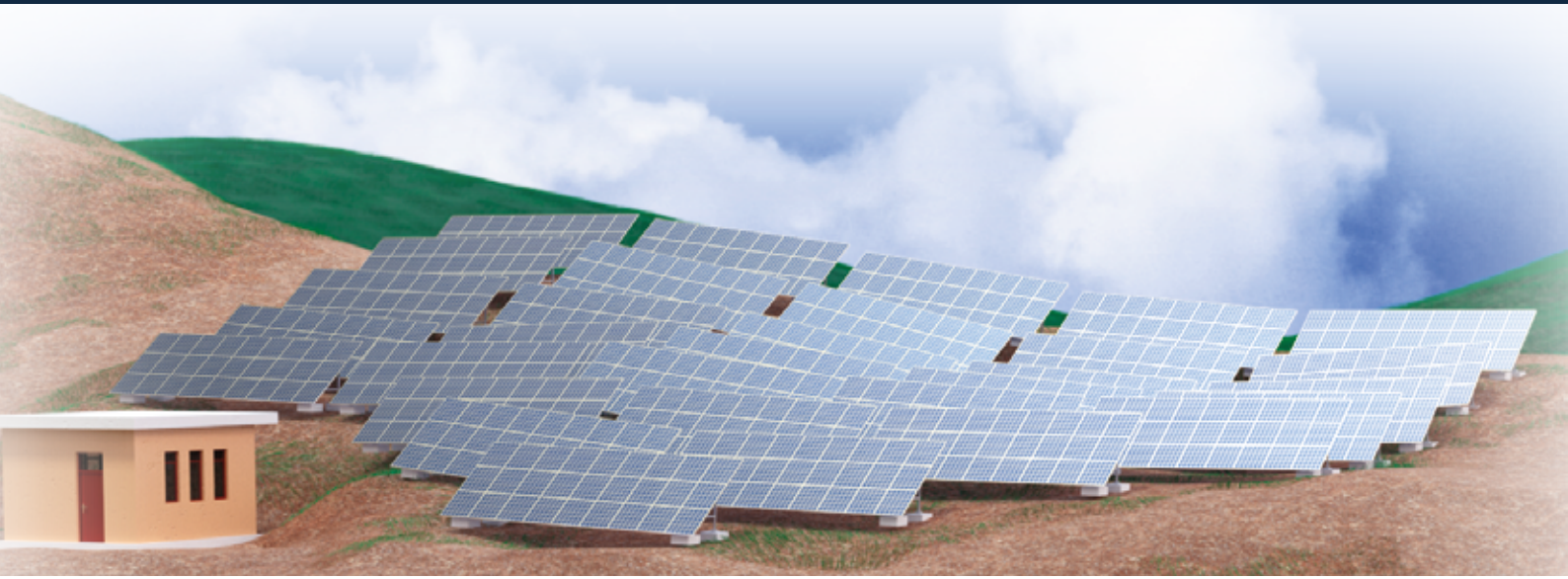
solutions, depending upon the requirements and complexity of the photovoltaic plant.

The Eos-Array and Eos-Array Lite are modular systems, providing efficient local string control to the PV plant.

The Eos-Web is a web-server suitable for controlling and supervising small to medium installations as a stand-alone solution, also large plants and portfolios when used together with the Eos-Server and VMU-Y devices.

# Renewable Energy

## Photovoltaic parks



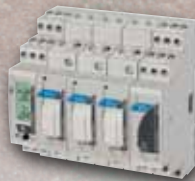
**Embedded aggregation servers**

**VMU-Y PV**



**Cloud multi-site aggregation servers**

**Eos-Server**



**Solar monitoring solutions**

**Eos-Array**



**Surge arresters**

**DSF  
DSB  
DSC**



**Current transformers**

**CTD  
TADK**

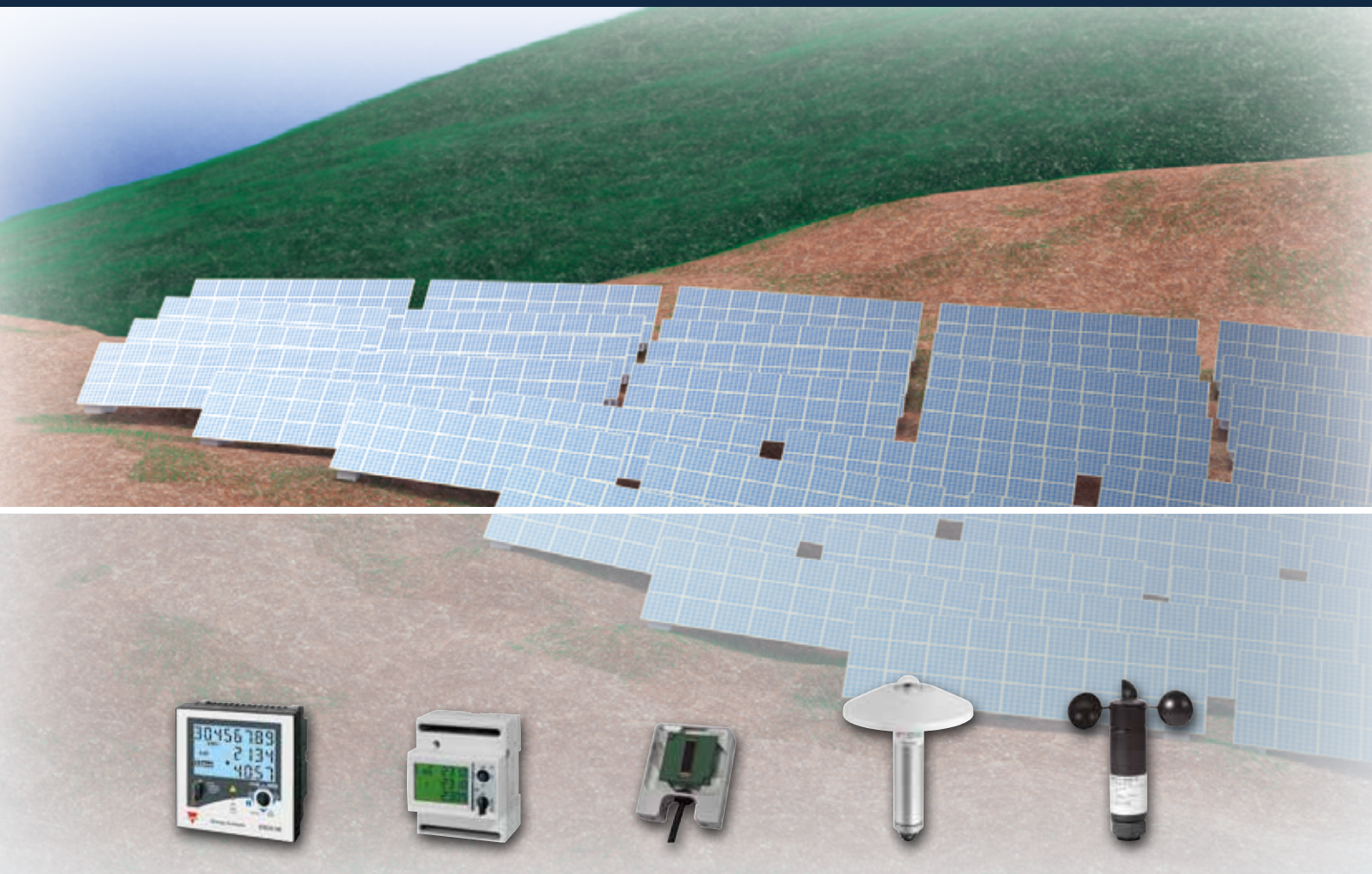
In terms of scale and accessibility, solar parks represent the most economical option as regards planning and construction. Carlo Gavazzi products ensure an important contribution to the maximum capacity utilization of the solar electricity produced in photovoltaic power plants - both fixed

plants or plants with tracking systems, with 1 or 2 axes.

To complement photovoltaic modules, Carlo Gavazzi provides many components for a photovoltaic installation, especially for surge protection and plant monitoring. Systems and devices to monitor and

control the efficiency of photovoltaic parks are essential to ensure that the solar investment is a solid and efficient one. The Eos-Web is the ideal solution for installations up to 1 MW, while the Eos-Server is designed to control huge installations, in single and multiple locations.





**3-phase  
energy analysers**

**EM26 96  
EM24 DIN**

**Interface  
protections**

**PI-DIN  
PI96**

**Environmental  
sensors**

**PVS-1  
TEMPSOL  
IKE2000**

**Pyranometers**

**PVS-2A**

**Anemometers  
Wind vanes**

**DWS-V  
DWS-D**

The Eos-Web is a web server gathering data from string monitoring units such as the Eos-Array, inverters and energy meters. All plant information is available simply by using the PC web browser and any Internet connection. The Eos-Array is a comprehensive string control system, suitable for

being integrated into both Eos-Web based solutions and standard SCADA software packages.

Based on glass optical fibre, the SIUFO is the solution for reliable communication where a traditional RS485 network cannot guarantee the correct level of immunity from

electromagnetic emissions from inverters, substations or power wiring. The installation of the VMU-O AT module ensures anti-theft control of PV modules by means of dedicated plastic optical fibre loops wired through the frame of the PV modules.

Carlo Gavazzi's flexible and modular PV monitoring architecture allows all the needs of investors, PV plant installers and maintenance services to be satisfied. Carlo Gavazzi application engineers and product specialists with solid expertise provide complete support, starting from project planning up to start up.



# Renewable Energy

## Photovoltaic small business, commercial and tracking



### Surge arresters

**DSF  
DSB  
DSC**

### Solar monitoring solutions

**Eos-Array**

### Aggregation servers

**VMU-Y PV  
Eos-Server**

### Web server modules

**VMU-C  
VMU-D**

Carlo Gavazzi provides everything for PV plant monitoring.

Eos-Array and Eos-Array Lite are systems composed of individual modular elements interacting with one another, providing efficient local control to the solar plant and ensuring effective information management in

medium or high power plants.

Carlo Gavazzi provides the Eos-Web, where the VMU-C unit is a local web-based data management system which gathers measurements and status information from one or more inverters to your PC or to a centralised cloud monitoring solution based on the Eos-

Server. With some rented roofs, wired internet is not available, but VMU-D solves this problem by using diffuse mobile communication.

Carlo Gavazzi energy meters and analysers measure the energy produced and provided to the grid or locally consumed.





**Current transformers**

**CTD  
TADK**

**3-phase energy analysers**

**EM24 DIN  
EM26 96  
EM210**

**Interface protections**

**PI96  
PI-DIN  
DPC02/DPC72**

**Environmental sensors**

**PVS-1  
PVS-2A  
TEMPSOL**

**Anemometers**

**DWS-V**

These meters can be supplied with MID certification (Annex D).

The energy produced at low voltage by a PV plant can be measured with a MID approved meter such as the EM210, EM24 or EM26.

When supplying energy to the grid, it is necessary to use a protection device

installed between the generator and the power grid in order to grant the required voltage and/or frequency control.

Carlo Gavazzi's interface protections are the most compact solutions currently available on the market.

DPC72, PI-DIN and PI96 protection

add a control function to frequency derivative and event recording and are equipped with a large display for local information readout and a serial port for remote readout.

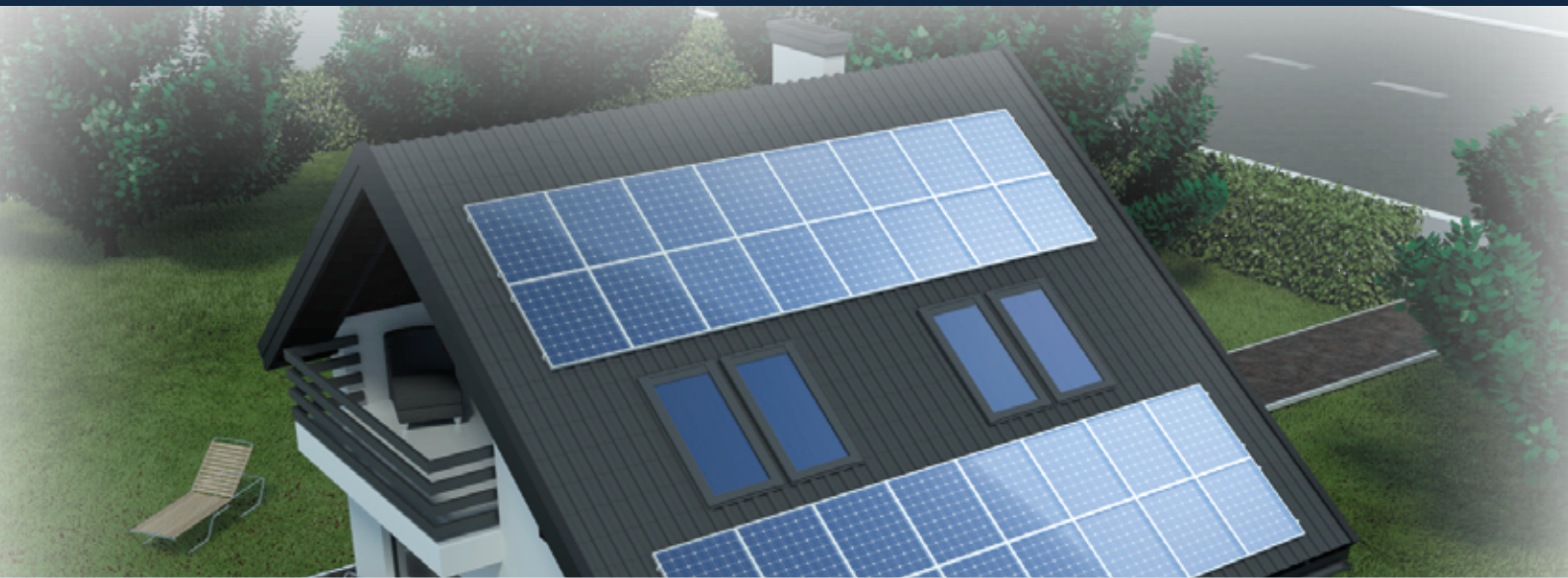
The PI96, in addition to the interface protection functions, also provides an integrated energy meter with which it is possible to read: AC energy, active power, reactive power, AC currents,  $\cos\phi$  etc.

The surge arresters for direct and indirect lightning discharge complete the Carlo Gavazzi portfolio for the photovoltaic market.



# Renewable Energy

## Photovoltaic residential systems



### Solar monitoring solutions

**Eos-Array Lite**

### 1-phase energy meters

**EM10 DIN  
EM11 DIN  
EM111/EM112**

### 3-phase energy analysers

**EM23 DIN/EM24 DIN  
EM210/EM340**

### Touch screens / Data loggers

**SmartHUB**

PV plants in residential areas are mostly grid connected installations.

Modules are set on roofs and the energy produced by the PV modules is delivered to the inverters and then fed into the public grid. Carlo Gavazzi offers a wide range of devices and components for the configuration of the electrical solar plant. Separate interface protection can be achieved with our wide range of monitoring relays such as the PI-DIN, PI96, DPC and DPC02, according to national norm requirements.

For energy metering you can use the EM1xx single-phase energy meter series or the EM2xx and EM3xx series for 3-phase PV residential system applications, all with LCD data display.

The real-time energy usage measurements, made via our touch screen and data logger SmartHUB, will lead to more efficiency in energy consumption needs, resulting in significant energy savings. The system reads and logs the energy consumption of the whole installation or of a single load. Data can be accessed anytime by means of a web-server/web-app and shown as instantaneous values, or in the form of graphs and/or diagrams.

For protection against surges and overvoltages it is possible to use the DSB or DSF surge arresters for both DC and AC lines. In the case of direct lightning discharge protection, the DSC series can be used.





# Off-grid systems



**Surge arresters**

**DSC**

**Surge arresters**

**DSB  
DSF**

**3-phase energy analysers**

**EM23 DIN/EM24 DIN  
EM210/EM340**

**Anemometers  
Wind vanes**

**DWS-V  
DWS-D**

**Digital modular indicators**

**UDM60**



In remote areas renewable energy systems are gaining popularity, using stand-alone, off-grid plants with or without battery storage.

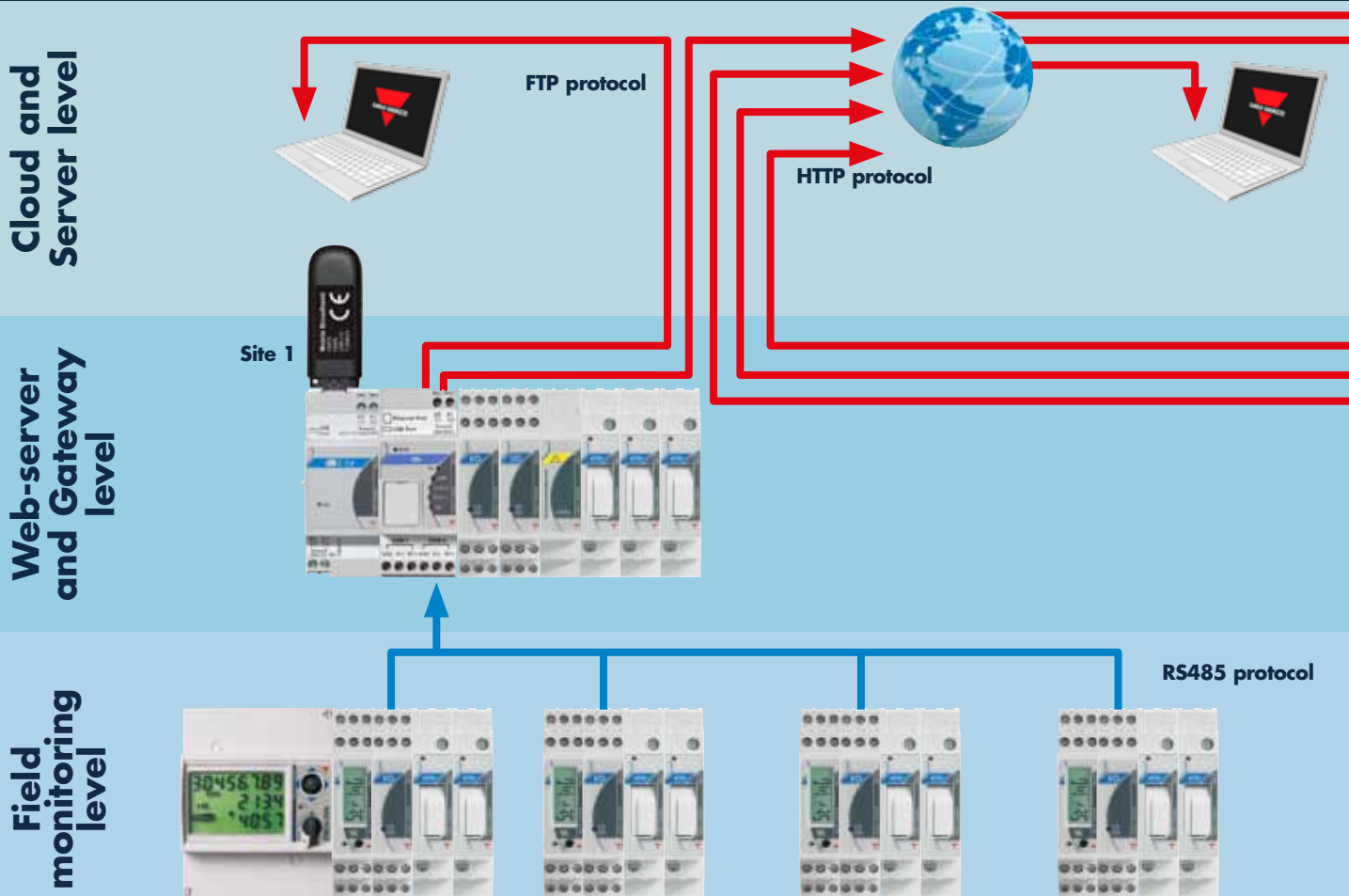
Carlo Gavazzi provides some additional components that can play an important role in such installations. DSC surge arresters provide protection for PV installations where an LPS (Lightning Protection System) is installed, hence subject to direct lightning strikes. This device is Type 1 and Type 2 approved.

DSB and DSF surge arresters can be used either on wind turbines or on PV installations. They are available for DC and AC networks and are Type 2, suitable for indirect lightning protection.

Wind speed and direction are extremely important parameters. Accurate measurements are necessary to keep the wind turbine structure under control. The Carlo Gavazzi anemometer DWS-V, with opto electronic detection, measures speed from 2 to 30 m/s. The sensor is designed with a dust and humidity seal, which makes the sensor impervious to all weather conditions. The micro-processor-based digital panel meter (UDM60), with its dual 6-dgt LCD indicator, displays the wind speed by measuring the input from the anemometer, while the energy produced is measured by a 3-phase energy analyser (EM23, EM24, EM210 or EM340).

# Renewable Energy

## The diagrams



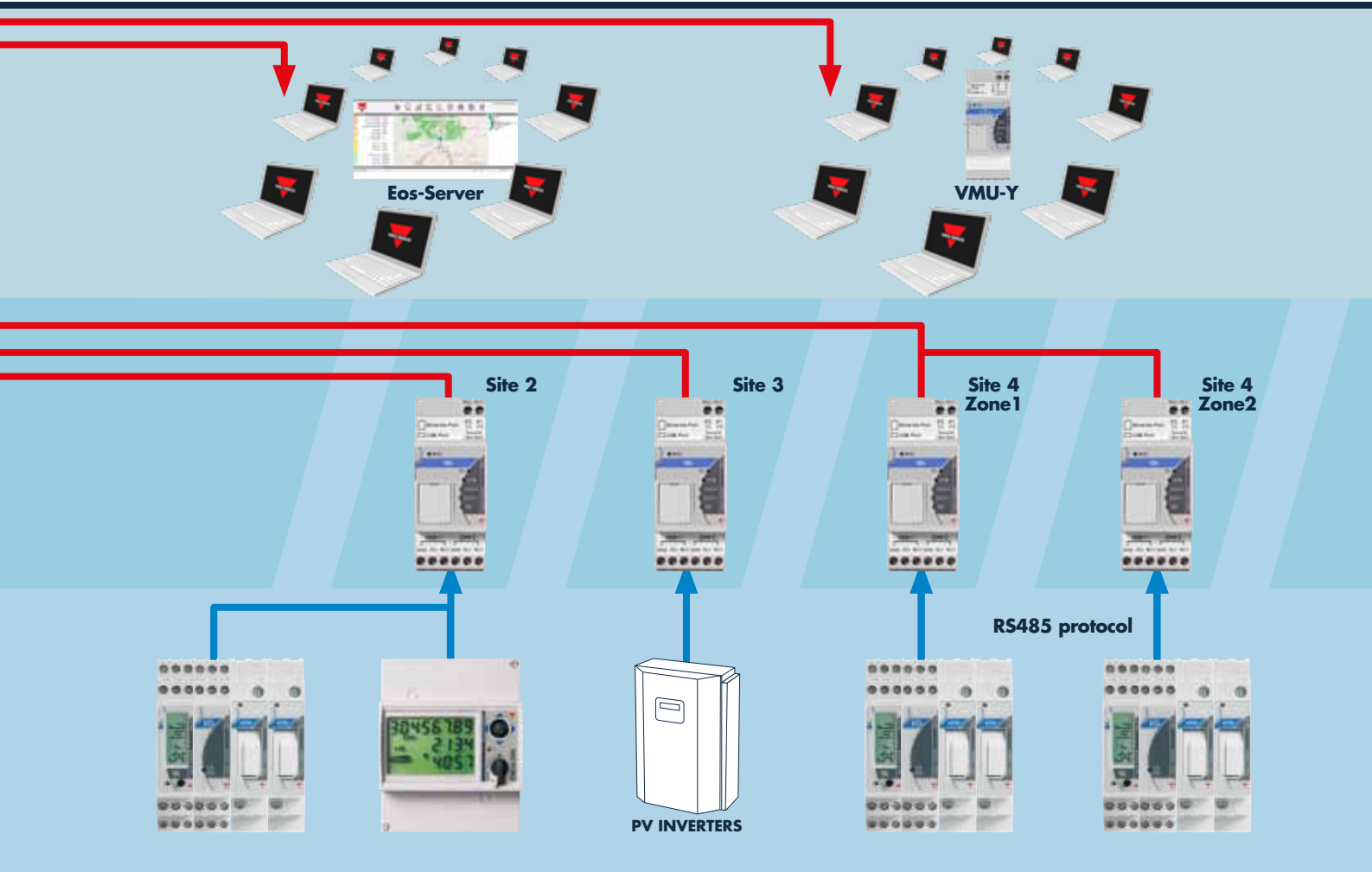
**VMU-C PV into a Photovoltaic Monitoring architecture**

**VMU-C PV at a glance**

The VMU-C PV is the core solution for effective Photovoltaic Monitoring in applications of all sizes. It collects measurements from Eos-Array string control units, energy meters and inverters; it stores information (variables and alarms) in its local database and displays it through its web-based graphical user interface. The whole system set-up and operation is possible via the VMU-C's web interface, without any external software. The VMU-C PV can exchange data with other systems by means of standard FTP/HTTP communication. Multi-site applications can be managed by adding either the Eos-Server or the VMU-Y PV to the VMU-C PV powered installations.



- No crash or compatibility problems due to different operative systems, different languages, libraries, etc.
- Improved IT security
- Application-focused software embedded inside industrial grade hardware: no need for a dedicated PC for monitoring
- On-site database
- Polling device, data-logger and Ethernet gateway in a single compact unit
- Modular solution for additional inputs/outputs
- Optional modular modem for wireless Ethernet connections
- Scalability to multi-site applications by means of VMU-Y + Eos-Server solutions



**Eos-Server multi-site solution at a glance**

- Multi-site management software based on Virtual Machine concept
- Flexible operation and set-up
- Reliable data communication with VMU-C PV
- Up to 100 geographically different sites can be managed with a single unit
- A single supplier for energy meters, gateways and data management solutions
- Scalable solution



**VMU-Y PV multi-site solution at a glance**

- Multi-site management software embedded in compact hardware
- Plug and play operation and set-up
- Reliable data communication with VMU-C PV
- Up to 10 geographically different sites can be managed with a single unit
- A single supplier for energy meters, gateways and data management solutions

# Renewable Energy

## Our product range

### Solar monitoring solutions

### Web servers and dataloggers

### USB dongle connection modules



#### Eos-Array / Eos-Array Lite

- Modular local monitoring system for PV plant
- Up to 16 DIN module configuration
- Eos-ArraySoft, freeware configuration software
- Eos-Array can manage in addition to VMU-M unit up to: 1 VMU-P, up to 15 VMU-S and up to 7 VMU-O for a total of maximum 15 units

#### MAIN FEATURES

- The Eos-Array solution can be composed of: VMU-M, the master unit and data logger; VMU-S, the string controller; VMU-P, the environment variable unit and VMU-O, the I/O unit
- Eos-Array Lite is the answer to those photovoltaic applications where a less sophisticated monitoring solution is needed



#### VMU-C PV (Eos-Web)

- Dimensions: 2 DIN modules
- Micro PC with web server and web service capability
- Data and event logging capability
- Internal 4GB memory and 16GB SDHC card back-up memory (on request)
- Variables shown as graphs and numbers in formatted tables
- All data exports on HTML format compatible with Excel or other spread sheets
- Management up to 11 Eos-Array, 11 inverters and 11 energy meters

#### MAIN FEATURES

- Efficiency calculation and control on different levels: string, BOS and Performance ratio and Yield indices
- Alarms control with automatic e-mailing and SMS management by means of VMU-D



#### VMU-D

- Dimensions: 2 DIN modules
- Compatible with Carlo Gavazzi approved 3G/4G USB modems
- Power supply: 24 VDC (+/- 20%)
- Suitable for use with VMU-C and VMU-Y

#### MAIN FEATURES

- 3G or 4G Mobile Internet connectivity
- SMS alerting
- SMS commands

### Embedded aggregation servers

### Cloud multi-site aggregation servers

### Touch screens / Data loggers



#### VMU-Y PV

- 2-DIN size; DIN-rail mounting
- Multi-site PV monitoring management
- Power supply from 24 VDC (+/- 20%)
- 2 USB ports (for data backup and connection backup)
- 1 SD port (for backup)
- UL approved

#### MAIN FEATURES

- Photovoltaic plant/portfolio management
- Data analysis and benchmark
- Data and event logging
- Data aggregation in plants and virtual plants
- All data exported in format compatible with Excel or other spread sheets
- Alarms management
- Database replication up to 10 VMU-C PV



#### Eos-Server

- Software solution for photovoltaic plant management
- Multi-site PV monitoring management
- Flexible and scalable architecture
- VMware® Technology compatibility – in-house or cloud installation

#### MAIN FEATURES

- Photovoltaic plant/portfolio management
- Data analysis and benchmark
- Data and event logging
- Data aggregation in plants and virtual plants
- All data exported in format compatible with Excel or other spread sheets
- Alarms management
- Database replication up to 100 VMU-C PV



#### SmartHUB

- Energy data logging from meters and PV inverters
- Colour touch screen 7" (BTM-T7) and 4.3" (BTM-T4)
- Remote access through web browsers
- Alarms management

#### MAIN FEATURES

- Wide screen display, 64 K colours
- 2 Ethernet port with integrated switch
- SD memory card slot
- USB host port
- Multistandard Modbus RTU serial communication port (selectable: RS485, RS422 or RS232)

# Our product range

## 1-phase energy meters



### EM10 DIN / EM11 DIN

- Dimensions: 1 DIN module
- Single-phase energy meters with direct connection
- Current input up to 32 A
- Class 1 (kWh) acc. to EN62053-1
- Pulse open collector output

#### MAIN FEATURES

- Direct measurement in a very compact housing to save space
- Suitable for measuring generated energy
- MID Annex D certification available

## 1-phase energy analysers



### EM111 DIN

- Dimensions: 1 DIN module
- Backlit touch LCD
- Measurement of voltage, current, power, power factor and frequency
- Measuring inputs: 230 VAC, 45 A
- Bi-directional energy metering, 7 digits, cl. B (EN50470)

#### MAIN FEATURES

- Self-powered
- Pulse output or as an alternative: RS485 Modbus, M-Bus
- Sealable terminal covers
- MID Annex D certification available
- CE

## 1-phase energy analysers



### EM112

- Dimensions: 2 DIN modules
- Backlit touch LCD
- Measurement of voltage, current, power, power factor and frequency
- Measuring inputs: 230 VAC, 100 A
- Bi-directional energy metering, 8 digits, cl. B (EN50470)

#### MAIN FEATURES

- Self-powered
- Pulse output or as an alternative: RS485 Modbus, M-Bus
- Sealable terminal covers
- MID Annex D certification available
- CE

## 3-phase energy analysers



### EM26 96

- Dimensions: 96 x 96 mm housing, only 45 mm behind the panel
- 3-phase energy meters with CT/VT connection
- Primary current input: 5 A
- Class 1 (kWh) acc. to EN62053-1
- Modbus communication port

#### MAIN FEATURES

- Energy analyser in a very compact housing to save space
- Suitable for measuring generated and consumed energy
- MID Annex D certification available

## 3-phase energy meters/analysers



### EM23 DIN / EM24 DIN

- Dimensions: 4 DIN modules
- 3-phase energy meters/analysers with direct connection
- Current input for direct connection up to 65A or external CT connection
- Class 1 (kWh) acc. to EN62053-1
- Pulse open collector output
- Modbus communication port

#### MAIN FEATURES

- Direct or external CT measurement in a very compact housing to save space
- Suitable for measuring generated and consumed energy (EM24)
- MID Annex D certification available

## 3-phase energy analysers



### EM340

- Dimensions: 3 DIN modules
- Backlit touch LCD
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering on 2 8-digit counters, cl. B (EN50470)
- Measuring inputs: 3 x 230 (400)VAC, 65 A
- Power supply: Self-powered

#### MAIN FEATURES

- Pulse output or as an alternative: RS485 Modbus, M-Bus
- Sealable terminal covers
- CE

# Renewable Energy

## Our product range

### 3-phase energy analysers



#### EM210

- Dimensions: 4 DIN modules or 72x72mm
- Installation: DIN-rail or panel mounting in a single product
- 3-phase energy meters with CT/VT connection
- Measurement of voltage, current, power, power factor and frequency
- Self-powered (MID version: 230 Vac power supply)
- Pulse output
- RS485 Modbus RTU, high speed (up to 115kbps)

#### MAIN FEATURES

- CE, cULus
- MID Annex D certification available
- Sealable terminal covers
- Very compact housing to save space

### Current transformers



#### CTD / TADK

- CTD: currents from 40 to 4000 A
- TADK2: 1-250 A
- Removable panel fixing clips
- DIN rail and panel mounting facility (TAD...)
- Double screw terminals (CTD)
- Sealable covers
- Case: ABS, self-extinguishing level UL 94 V-0
- Precision class: 0.5

#### MAIN FEATURES

- Wound primary (TADK2)/ solid core or split-core (CTD)
- Compliance with EN60044-1 regulations
- Removable DIN rail mounting holder

### Digital modular indicators



#### UDM60 / UDM40 / USC

- Dimensions: 48 x 96 x 105 mm
- Modular Controller for pulse signals (UDM60)
- Dual 6-DGT
- 0.001% RDG basic accuracy
- NPN, PNP, NAMUR, TTL, Pick-up, free of voltage contacts and AC signal inputs
- Multi-input modular instrument (UDM40, USC)
- 4-DGT three colour LED
- 0.1% RDG basic accuracy
- Dual rate, speed, frequency and period measurement (0.001 Hz to 50 kHz)

#### MAIN FEATURES

- Digital panelmeter for current, voltage, temperature, resistance, rate, frequency, speed and period measurements

### Interface protections



#### PI96

- Dimensions: 96 x 96 mm panel mounting housing
- Inputs for local/remote control, alarms and aux.
- Outputs for DDI and backup relay
- Measure V, A, Hz, kWh, kVAh
- Auxiliary power supply AC and DC

#### MAIN FEATURES

- Menu and logger navigation by touch pad
- Self-protection components, "Power Save" mode for limit consumption
- Certified according to CEI 0-21 2012-06 technical norm
- Possibility of other recommendation/implementation

### Interface protections



#### PI-DIN

- Dimensions 90 x 71 x 66 mm
- Interface protection monitoring relay for 1-phase or 3-phase systems with or without neutral
- Voltage and frequency protection
- 4 inputs (CEI-021) or 2 inputs (VDE4105), 2 outputs
- Measure V, Hz
- Auxiliary power supply 230 VAC or 24 VDC
- Data logger with 10 last events logging

#### MAIN FEATURES

- Settings, menu and logger navigation by means of front joystick
- Password protected settings, Dual Function Alarm LED
- Certified according to Italian CEI 0-21 2012-06 and V1:2012-12 and German VDE-AR-N-4105:2011-0
- Anti-islanding on VDE model

### Interface protections



#### DPC02DM...B005

- Dimensions: 45 x 80 x 99.5 mm
- DIN rail mounting
- Power: 208 to 240 VAC or 380 to 415 VAC
- Protection degree: IP20
- Output: programmable relays 2 SPDT N.E. or 1 DPDT N.E.

#### MAIN FEATURES

- One-phase and three-phase relays for monitoring maximum and minimum voltage and frequency, phase sequence and phase failure. It checks that frequency and voltage are within the limits set by the utility

# Our product range

## Interface protections



### DPC72DM

- Dimensions: 90 x 71 x 65 mm, 4 DIN module
- DIN rail mounting – sealable housing
- Values and intervention time programming
- Serial port RS485 Modbus RTU
- Protection degree: IP50
- Output: 1 DPDT N.E.

#### MAIN FEATURES

- One-phase and three-phase relays for monitoring maximum and minimum voltage and frequency, phase sequence and phase failure. It checks that frequency and voltage are within the limits set by the utility
- Record of the last 10 events (date, time and reason for the event)

## Switching power supplies



### SPM

- DIN rail housing
- Universal input 90-264 VAC / 120- 370 VDC
- Single phase and battery charger versions available
- Approvals/Marks: UL, cUL listed and TÜV/CE approved

#### MAIN FEATURES

- Operating temperature w/o derating -25°C to +60°C
- Short circuit and Overload protection
- High efficiency (up to 89%)

## Surge arresters



### DSC

- Dimensions: 90 x 72 x 70 mm
- Class I and II
- Protective element: High Energy MOV
- High surge discharge rating: Iimp = 12.5 kA per pole
- Housing: compact design

#### MAIN FEATURES

- Specifically designed for PV installations with or without LPS (Lightning Protection System)
- Location of use: photovoltaic system - PV module side

## Surge arresters



### DSB / DSF

- Dimensions: 90 x 36 x 72 mm
- Class II
- Available for PV and AC installations
- Models for communication lines
- Optional remote monitoring
- For DIN rail mounting

#### MAIN FEATURES

- NO backup fuse required
- Appr. Acc. to IEC61643-11 and UTE C61-740-51
- Complies with prEN50539-11

## Surge arresters



### DSB51XXDP

- Dimensions: 90 x 12 x 71.5 mm DIN-rail housing
- 15 VDC nominal voltage
- 10 kA Inom, 20 kA Imax
- Rated spark overvoltage 184V to 276V
- C1/C2/C3 according to IEC 61643-21

#### MAIN FEATURES

- Designed for Dupline® communication lines
- Three stage topology with dual GDT
- Socket with replaceable cartridge

## DIN rail DC/DC converters



### DCC 24151K-D

- DIN rail mounting
- Ultra wide input: 100 ~ 1000 VDC
- 24VDC output 15W
- High efficiency up to 80%
- Wide temperature range -40 to +70° C
- Output over voltage and short circuit protection
- Reverse input protection

#### MAIN FEATURES

- Widely used in Photovoltaic power generation with high voltage inverters
- It provides stable operating voltage to low voltage DC equipment

# Renewable Energy

## Our product range

### Temperature sensors



#### TEMP SOL / IKE20001K

- Temperature Pt100 or Pt1000 (TEMP SOL)
- Temperature Pt1000 (IKE20001K)
- $\pm 0.3^{\circ}\text{C}$  connection type
- 2 wire connection type

#### MAIN FEATURES

- Specifically design to measure the temperature of PV panels (TEMP SOL)
- For air temperature measurement in PV plants (IKE20001k)

### Irradiation sensors



#### PVS-1

- Dimensions: 57 x 48 x 15 mm (not including clamp)
- Sensor type: crystalline silicon cell
- No need for external power supply (self-powered)
- Long lasting 3% accuracy, thanks to a special antiageing treatment
- Calibration process according to IEC 60904-2 and 60904-4
- Two available versions: 4-20 mA output / 0-80 mV output

#### MAIN FEATURES

- Long life rugged aluminium case
- UV resistant resin encapsulation
- Fast installation, thanks to the clamping system designed to easily fit the photovoltaic module's frame

### Pyranometers



#### PVS-2A

- Dimensions: 162 x 215 x 40 mm (not including clamp)
- 2nd class thermopile pyranometer
- 4-20 mA output for reliable connections
- Calibration certificate according to ISO 9847

#### MAIN FEATURES

- Compact and rugged IP67 aluminium case
- Compliant with WMO (World Meteorological Organization) for environmental monitoring
- Compliant with ISO9060 and IEC17025 for photovoltaic monitoring

### Anemometers / Wind vanes



#### DWS-D / DWS-V

- Rotor size: 145 mm
- PNP & NPN open collector output in one unit
- Rotor: black painted stainless steel
- Wind vane for relative wind direction (0 and 90 degree internals -DWS-D-DAC13) (+/- 7 degree of wind direction, left/right wind indication DWS-D-DDC13)
- Anemometer with opto-electronic detection (DWSV...)
- Measuring range 2 to 30 m/s
- Current source output 10 to 28 VDC supply

#### MAIN FEATURES

- Opto-electronic detection
- All inputs and outputs are protected against reverse polarity and transients
- Dust sealed stainless steel ball bearing

### Accessory modules



#### SIUFO

- 4-DIN size; DIN-rail mounting
- SIUFO1: RS485 to single loop fibre optic conversion
- SIUFO2: RS485 to double loop fibre optic conversion
- Power supply from 12 to 18VAC or from 10 to 24VDC

#### MAIN FEATURES

- MODBUS/JBUS(RTU) compliant
- Wire to optical fiber and optical fiber to wire conversion
- Status LED
- Compatible with Multimode Optical fiber
- Up to 160 transceivers on the same bus
- Up to 247 Modbus addresses, automatically managed
- Baudrate and RS485 parameters selectable by dip-switches

### Accessory modules



#### VMU-O AT/VMU-AT

- Eos-Array standard expansion I/O module (VMU-O AT)
- Plastic optical fiber sensor (VMU-AT)
- Up to 3 VMU-AT modules per VMU-O AT
- Up to 1 VMU-O AT per Eos-Array

#### MAIN FEATURES

- Plastic optical fiber loops (up to 200 m) to protect PV modules
- Plug'n play set-up (optical fiber cutter included)
- Anti-theft alarm events integrated in the Eos-Array and VMU-C PV solutions
- 3 digital inputs, 1 relay output (VMU-O AT)
- 1 optical fiber loop, digital output (VMU-AT)









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## OUR COMPETENCE CENTRES AND PRODUCTION SITES

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### MALTA

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### ITALY

Carlo Gavazzi Controls SpA  
Belluno

### LITHUANIA

Uab Carlo Gavazzi Industri Kaunas  
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