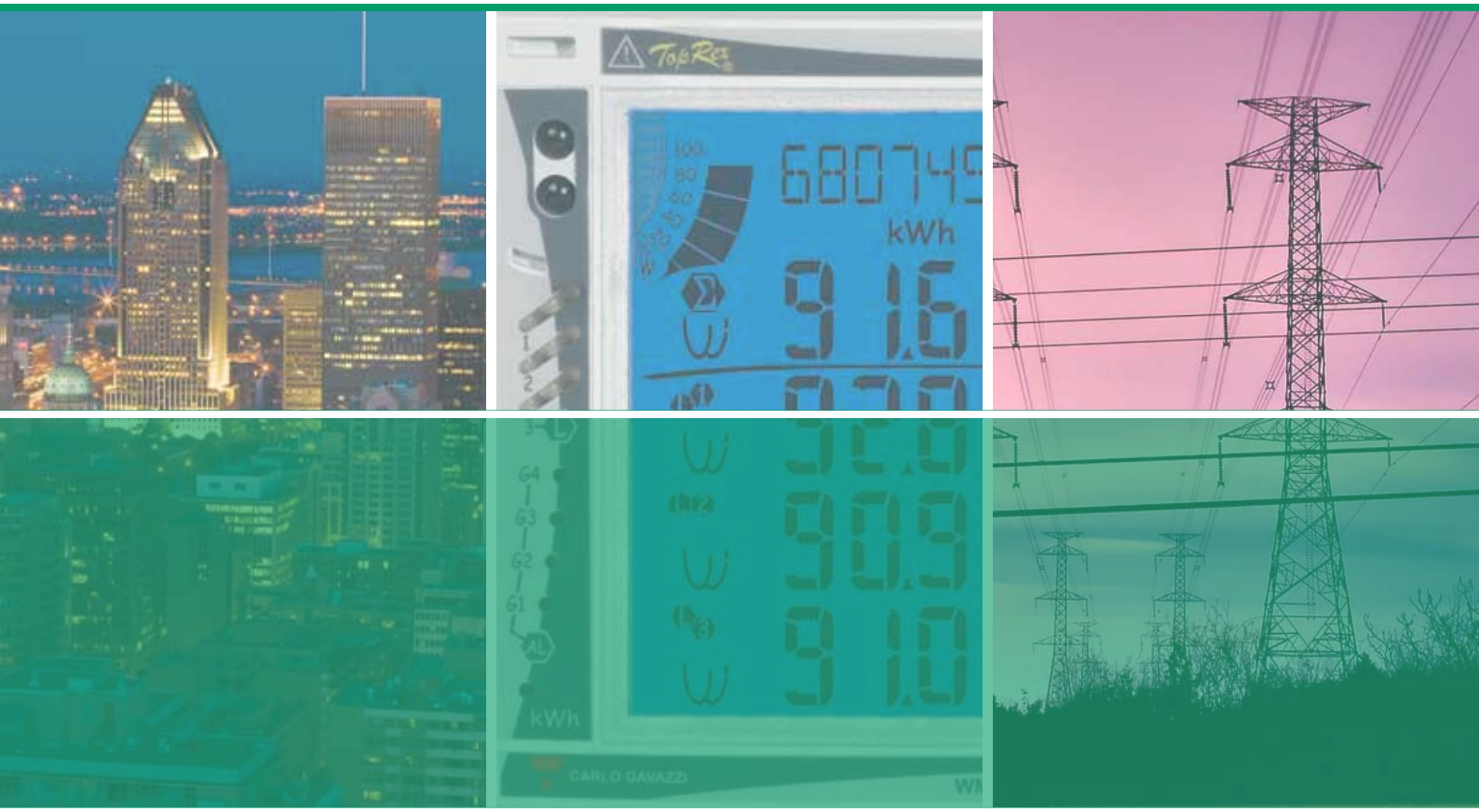
CARLO GAVAZZI
Automation Components

CARLO GAVAZZI



Innovation for Energy Management

Controls

Energy Management: the solution

Today, global warming due to the green house effect is affecting all our lives and the economy. The oil supply may be close to depletion, leading, along with the geo-political situation, to high final prices. In addition, after the Japanese earthquake, nuclear power generation has once again shown its weak points, indicating that this energy source may not be the answer. The Earth needs alternative energy sources, and very soon, but firstly a rational and conscious use of the available ones is more than necessary.

Measure, Know, Act and Save

Carlo Gavazzi is one of the first multinationals to understand this situation and foresee its consequences, providing a comprehensive series of instruments to measure, analyse, understand and predict the energy consumption of our customers, thus facilitating savings in terms of money and energy resources.
Nowadays it is not admissible nor acceptable to pay for the energy measured by non-certified meters, or to provide energy paid at a flat rate, or to be unaware of one's own consumption, or to ignore the different coast of each production step or of each department of a company.

Carlo Gavazzi provides solutions for every energy management challenge, supported by more than ten years of experience of providing applications used all over the world. We are constantly focusing on searching for more innovative products to satisfy our valuable customers.

The Evolution of Energy Management by Carlo Gavazzi

Year 2000

WM3-96 introduces the modular concept in panel mounting analyzers.

Year 2002

EM4-DIN uses the modular concept in DIN-rail analyzers and energy meters.

Year 2005

WM5-96 adds family new advanced control and data retransmission features to the modular family.

Year 2006

EM24 DIN energy analyzer allows the measurement of up to 65A as a direct connection in the most compact housing. Its unique application-oriented programming procedure allows easy and fast installation.
CPT-DIN achieves a new dimension in the world of 3-phase advanced power transducers.

Year 2007

EM26 96 with joystick and shortcut display page selector, together with 2-colour back light alarm warning, revolutionizes the field of panel mounting energy analyzers.

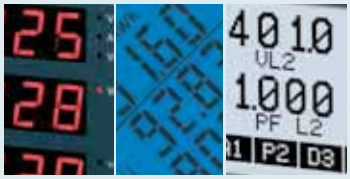
Year 2008

EM21 72D: the only combined meter on the market with a detachable display. One product, three installation modes: DIN-rail mounting, energy meter, panel mounting energy meter and transducer.

Year 2010

WM30 and WM40 revolutionise the modular concept introducing sandwich like module mounting, providing maximum flexibility in the minimum space.

Energy Applications Map

	Fiscal metering for cost allocation	Power quality analyzer for load control
Modularity 		WM3 96 WM30 96  WM5 96 WM40 96
Direct Connection 	 EM10DIN EM23DIN EM24DIN EM33DIN	
Extended Communication 	 EM26 96	 WM5 96 WM40 96
Double-housing feature 	 EM21 72D	
Eye-catching display 	 EM26 96	 WM3 96 WM5 96 WM40 96

The right features for every application

Multi function meters for basic measurements	Transducers for Building Management Systems (BMS)	Field bus communication and energy metering for Building Automation
	 PQT H	 EM4 DIN EM3 DIN WM22 DIN
 WM10DIN  VMU E VMU X		 EM3 DIN EM4 DIN WM22 DIN
	 CPT DIN  CPT DIN Advanced	 EM24DIN
EM21 72R 		
WM12DIN  WM14 96 WM14DIN  WM14 96		

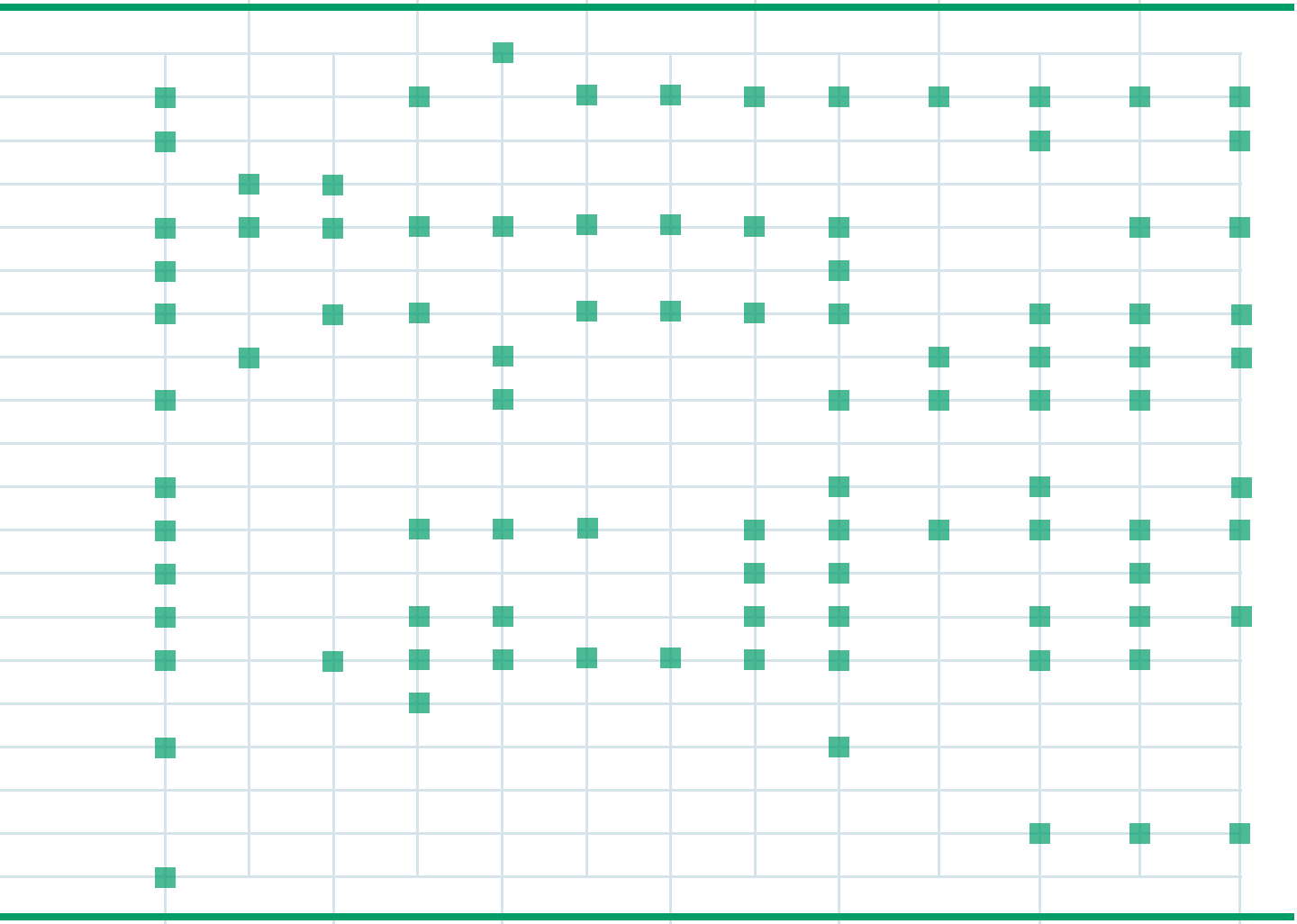
Energy
Characteristics Map

	EM10 DIN	EM21 72D	EM33 DIN	EM26 96	WM5 96
	Pag. 9	Pag. 9	Pag. 10	Pag. 11	Pag. 14
DC Energy Metering					
AC Energy Metering	■	■	■	■	■	■	■	■	■
Gas and Water Metering				■	■		■
Multi Function Metering							
Variables Analysis		■	■	■	■	■	■	■
Power Quality Analysis					■	■	■	■
CT connections			■	■	■	■	■	■
Direct high-current connections	■	■	■	■	■				
Modular housing						■	■	■
Graphic Display						■	■	
Digital Inputs				■	■	■	■	■
Pulse Outputs	■	■	■	■	■	■	■	■	■
Analogue Outputs						■	■	■
Alarm Outputs		■		■	■	■	■	■
Serial Communication			■	■	■	■	■	■	■	■
Profibus DP									
Internet-Ethernet Communication							■	■
GSM/SMS Management									
Dupline									
Optical communication port							■		

	EM11 DIN	EM23 DIN	EM24 DIN	WM3 96	WM30 96
	Pag. 9	Pag. 10	Pag. 11	Pag. 13	Pag. 17

The right feature in every instrument

WM10 DIN	WM14 DIN WM14 96	EM21 72R	CPT DIN Advanced	EM3 DIN	WM22 DIN
					
Pag. 21	Pag. 22	Pag. 23	Pag. 25	Pag. 29	Pag. 30



Pag. 18	Pag. 21	Pag. 22	Pag. 25	Pag. 26	Pag. 29	Pag. 31
						
WM40 96	WM12 DIN WM12 96	VMU E VMU X	CPT DIN basic	PQT H	EM4 DIN	EM24 DIN Dupline

Energy

Fiscal Metering for cost sharing

Deregulation in the energy market and the constant increase in electrical costs, also in countries where they were traditionally very low, have resulted in a fast growing demand for fiscal metering.
A flat rate for the energy consumption of each shop in a shopping mall, for each tenant in a residential building, for each boat in a marina, or even for each caravan in a campsite, has now become non-acceptable. Either the provider or the user would lose money, so both of them want a "certified" value of the energy actually used.
In 2006 the European Union released a Measuring Directive (called MID), dealing with a number of metering issues, from energy to water, from taximeters to exhaust gas meters, with the aim to provide common rules for metering within the European territory.

Certified measurements for a non-disputable bill

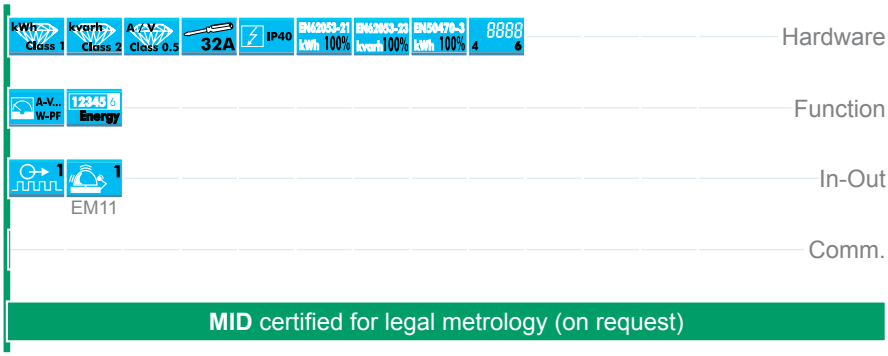
Carlo Gavazzi provides MID certification with a wide range of energy meters covering single or 3-phase systems, without any communication or including pulsating output or serial port, for DIN-rail and/or panel mounting.
The success of this series has led to the implementation of MID certification being applied within our laboratory in Belluno, Italy. This is one of the first internal labs in Italy, improving our service to the customers.

Main advantages:
- Wide range of certified solutions
- The parameters can be programmed once the unit is installed: no need to know in advance all the installation details before ordering
- Terminal covers included for easy and quick final sealing by the National verification body

OPC FOUNDATION

The new freeware OPC server is available for driver-less integration to SCADA or HMI.
Compatible, in this chapter, to:
EM2172D, EM24DIN, EM2696.

EM10 DIN and EM11 DIN, MID energy meters



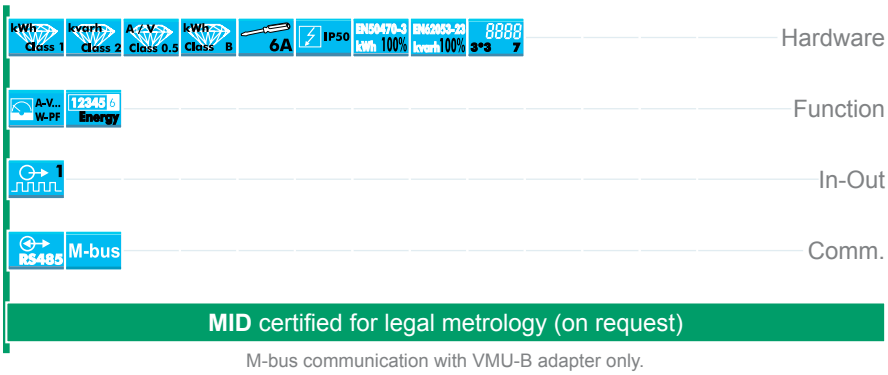
EM10 DIN is a simple energy meter while EM11 DIN is an ultra compact Energy Analyzer for one-phase systems, the first on the market which introduces the basic features of a power analyzer into an energy meter for one-phase applications.

On request:
- MID Annex B+D (option "PF") certification for legal metrology.

The main advantages
- Better variable readability thanks to a wide LCD display.

Only EM11-DIN:
- In addition to the usual active and reactive energy consumption information, the status of the power supply is also available, giving the user an overview of all the electrical parameters.
- Active power alarm notifying an overload condition by means of a relay output (e.g. activating an external buzzer).
- Variable control with alarm activation on any available variable.
- Switching off a non priority load (with a relay output), thus preventing overload and avoiding the trip of the overload protection downstream the official watt-hour meter.

EM21 72D, MID energy meters



M-bus communication with VMU-B adapter only.

EM21-72D is an innovative, cost-effective and compact energy meter: it is the first on the market to have a detachable display, allowing it to be mounted either on a panel of just 72x72 mm or on a DIN-rail in only 4 modules with no adaptor or external accessory.

On request:
- MID Annex B+D (option "PF") certification for legal metrology.

The main advantages:
- Detachable (patented) display allowing three installation modes: DIN-rail energy meter, panel mounting energy meter and transducer.
- Space saving on panel boards by means of its compact housing.
- Energy measurement fulfilling both the new European standard EN50470-3 and international standards IEC62053-21 and IEC62053-23.
- Time saving installation system using self-power supply, automatic phase detection and application oriented programming procedure.
- Pulsing output for easy and quick data transmission to PC/PLC for full load control.
- RS485 communication port for full BMS integration.
- Compatible with VMU-B M-bus adapter.

EM23 DIN, MID energy meters

MID certified for legal metrology (on request)

EM23-DIN is a very simple, compact and easy-to-install energy meter, the most compact on the market allowing a 3-phase direct connection up to 65A.

On request:
- MID Annex B+D (option "PF") certification for legal metrology

The benefits are:
- Compact size, only 4-DIN modules, for space saving also in panel boards.
- Direct connection up to 65 A to save the cost of three external current transformers.
- Energy measurement fulfilling both the new European standard EN50470-3 and the international standards IEC62053-21 and IEC62053-23.
- Displaying of system is active and reactive power and of single phase currents for immediate consumption analysis.
- No programming required and warning message in case of reverse phase sequence, for an easy and fast installation.
- Pulsing output for an easy and quick energy retransmission to a PLC for a load priority management program.
- RS485 communication port for full BMS integrator.

EM33 DIN, MID energy meters

MID certified for legal metrology (on request)

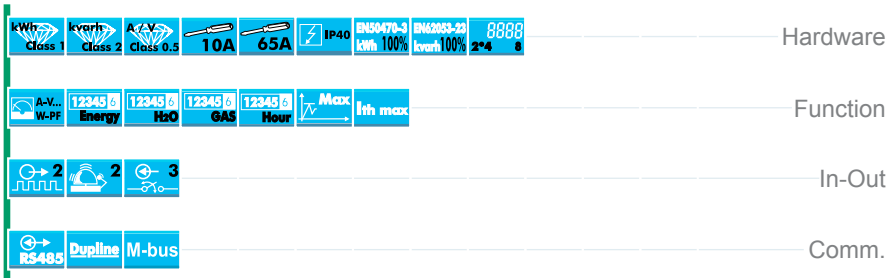
M-bus communication with VMU-B adapter only.

EM33-DIN is a version of EM23 for serial communication data retransmission, allowing a 3-phase direct connection up to 32A.

On request:
- MID Annex B+D (option "PF") certification for legal metrology

The benefits are:
- Compact size, only 4-DIN modules, for space saving also in panel boards.
- Direct connection up to 32 A to save the cost of three external current transformers.
- Energy measurement fulfilling both the new European standard EN50470-3 and the international standards IEC62053-21 and IEC62053-23.
- Display of system's active and reactive power and of single phase currents for immediate consumption analysis.
- No programming required (except for serial address) and warning message in case of reverse phase sequence, for an easy and fast installation.
- RS485 communication port for full BMS integrator.
- Compatible with VMU-B M-bus adapter, with full secondary address managemet.

EM24 DIN, MID energy analyzer



MID certified for legal metrology (on request)

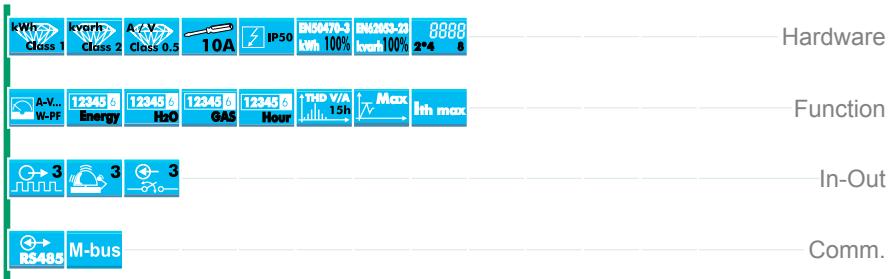
M-bus communication with VMU-B adapter only.

EM24 DIN is a compact Energy Analyzer for three phase unbalanced systems. Although it is in one of the most compact housings, this meter is capable of measuring not only traditional active and reactive energies but also gas, hot-water and cold-water remote heating consumption as well as the pulses coming from existing kWh-meters.

On request:
- MID Annex B+D (option "PF") certification for legal metrology.

The main advantages:
- Space saving on panel boards by means of its compact housing.
- Wide angle variable readability by means of a sharp LCD display (STN technology).
- Energy measurements fulfilling both the new European standards EN50470-3 and the international standard IEC62053-23.
- Gas, hot-water and cold-water, remote heating and external kWh-meter measurements thanks to its three digital inputs.
- Extended energy measurements using total/partial or total/multi-tariff metering.
- Money saving by means of the integrated current transformers allowing the user to measure currents up to 65A.
- Extended alarm control on any available variable by means of up to two digital outputs.
- Time saving installation system using self-power supply, automatic phase detection and application oriented programming structure.
- Easy variable scrolling by means of the front joystick.
- Wide interfacing capability using up to 2 pulse outputs or the RS485 communication port.
- Compatible with VMU-B M-bus adapter.

EM26 96, MID energy analyzer



MID certified for legal metrology (on request)

EM26 96 is a panel mounting Energy Analyzer for three phase unbalanced systems, capable of performing not only an extended consumption analysis but also keeping under control all the electrical parameters, harmonics included.

On request:
- MID Annex B+D (option "PF") certification for legal metrology.

The main advantages:
- Suitable for mounting on any switch or control-gear, requiring only 46 mm behind the panel.
- Wide angle variable readability by means of a sharp and two-colour back lighted LCD display (STN technology).
- Better and more reliable energy measurements fulfilling the new European standards EN50470-3 and EN62053-23.
- Gas, hot-water, cold-water and remote heating and external kWh-meter measurements thanks to its three digital inputs.
- Extended energy measurements using total/partial or total/multi-tariff metering.
- Extended alarm control on any available variable by means of up to three digital outputs with display warning based on back light colour changing.
- Load failure prevention thanks to harmonic analysis and control.
- Easy programming using the application oriented programming structure.
- Easy variable scrolling by means of the front joystick.
- Wide interfacing capability using up to 3 pulse outputs or the RS485 communication port.
- Compatible with VMU-B M-bus adapter.

Energy

Power quality analysis for full control

In large and heavy industries as well as in airports, hospitals or installations such as water treatment or distribution plants, it is of fundamental importance to have powerful control of the mains, since medium voltage systems and very high currents are involved. Because of the type of loads, a low content of harmonics is crucial to let the installation work in a reliable way. Stops in production should be avoided because they significantly impact on the finances of the company or on the level and safety of the service.
Therefore, the monitoring of mains and the operation of the most important loads with local power analyzers and data logging systems is crucial to allow continuous load control which, with communication capability, alerts service staff as soon as an abnormal condition occurs.
The solution proposed by Carlo Gavazzi involves two modular series of power quality analyzers, which can be tailored according to the particular requirements of each installation, offering many I/O combinations with PLC-like AND/OR

Mains and load are now totally under control

output logic, serial, Ethernet, or optical ports, different protocols (such as Modbus or BacNet), integrated datalogger, detailed harmonic analysis and multi-tariff management.
All this can be easily integrated into any SCADA or BMS system or managed by our software solution, PowerSoft.

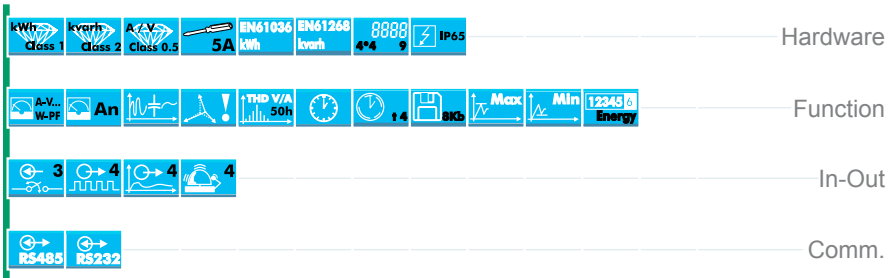
Advantages of modular system:

- PLUG and PLAY modules common to all models; maximum in-field flexibility.
- Possibility of increasing the number and the kind of outputs according to new application needs without replacement of the instruments in-field.
- Small number of models in-house, with a complete range of possible combinations at the same time.
- Investment in the instrumentation can be limited to present needs with the possibility of increasing it in the future for any additional requirements.

OPC FOUNDATION

The new freeware OPC server is available for driver-less integration to SCADA or HMI.
Compatible, in this chapter, to:
WM5 96, WM30 96, WM40 96.

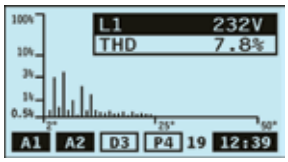
WM3 96, modular power quality analyzer



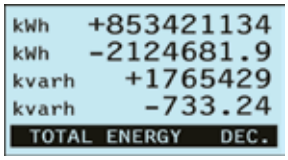
FFT analysis up to the 50th harmonic

WM3 96 is a modular analyzer of power quality that, thanks to a 32-bit µ-Processor, allows the operator to continuously and completely monitor the mains. All measurements with a direct connection up to 830VAC (phase-phase), up to 600kV (VT connection) and up to 30kA (CT connection) allow the operator to use WM3 96 in any kind of installation. WM3 96 is a flexible and powerful instrument that can be used in every situation, thanks to its mechanical and electrical features, such as 0.5 accuracy class, 10 samplings/second, FFT analysis up to the 50th harmonic, tariff management and automatic logging of the alarms, together with the availability of any kind of input/output interfaces.
The already powerful performance of WM3 96 becomes outstanding with the addition of the RS232+RTC module.

Graphic display, complete and easy to read



- Histogram display of the harmonic contents relating to every single phase for A and V.
- Complete harmonic analysis up to the 50th harmonic.
- Numerical display as an absolute and percentage value of the single harmonic.
- Four-quadrant display of the harmonic phase with source detection (generated harmonics and imported harmonics).

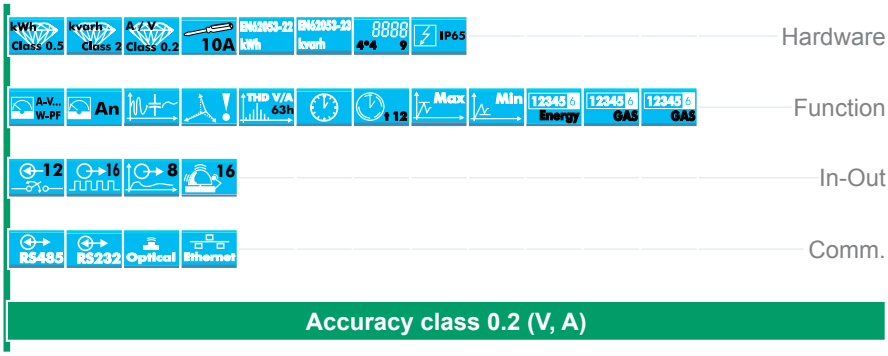


- Energy consumption storage. The RS232+RTC module allows the storage of the energy consumption of the previous two months.

Variables that can be monitored and displayed

Main variables	System	Single ph	Average	Max	Min	Alarm Out	RS485	Pulse	Analogue out
VLL, VLN	■	■		■	■	■	■		■
V asymmetry	■			■	■	■	■		■
A		■		■	■	■	■		■
An	■		■	■	■	■	■		■
Hz	■			■	■	■	■		■
VA	■	■	■	■	■	■	■		■
var	■	■		■	■	■	■		■
W	■	■	■	■	■	■	■		■
PF	■	■	■	■	■	■	■		■
+kWh	■						■	■	
-kWh	■						■	■	
+kvarh	■						■	■	
-kvarh	■						■	■	
THD (A-V)		■		■	■	■	■		■
THD even (A-V)		■		■	■	■	■		■
THD odd (A-V)		■		■	■	■	■		■
Single harmonic		■					■		

WM5 96, modular power quality analyzer



WM5 96 is a Smart Power Quality Analyzer powered with ARM technology which significantly improves signal processing and communication speed compared to any other standard analyzer. The superior features of this instrument are the right answer to those applications where performance and high accuracy are a MUST. WM5 96 is modular and flexible so it is suitable for the most demanding applications.

It offers many advantages and solutions:

- Revenue grade and revenue approval to be used also for billing purposes thanks to the 0.2 accuracy class and the compliance with ANSI/IEEE C12.20-1998 and CAN3-C17-M84;
- Real cost control: complex and complete tariff management (12 tariffs by 24 time periods/day);
- Extended load or line control with asymmetry, phase sequence and phase loss functions: on up to 16 selected variables linkable to up to 16 independent or OR/AND/OR+AND logic controlled alarms;
- Complete interfacing capability: up to 12 digital inputs, up to 16 pulse outputs, up to 8 analogue outputs, RS232, RS485, or optical communication.

Analysis of power quality and control of electrical parameters

The problems which must frequently occur in electrical systems with inverters and power converters, switching power supplies for computer and communication systems applications are the following:

- failures on compensation capacitors;
- blowing of capacitor fuses;
- overheating of power supply transformers with a load current below the rated value;
- overheating of motors and frequent failures;
- high neutral conductor currents;
- problems on electronic motor controls.

These are mainly due to the harmonic content of currents and voltages.

The best solution is WM5 96, which allows continuous monitoring of the harmonic contents (up to the 63rd harmonics) of currents and voltages, together with all other electrical parameters.

The control of up to 16 different electrical parameters by means of alarm set-points with a specific logic (OR/AND) and automatic recording of up to 10,000 events (alarm, min, max, digital input status, reset) allows the operator to monitor any anomaly of the installation and of the loads in real time, so as to promptly decide and plan any maintenance action, thus avoiding possible damage to the loads and/or expensive stopping of the machinery.

Easy and fast communication

A front optical communication port based on ANSI C12.18 and Modbus protocols can be used to carry out easy and fast communication with a PC or laptop. The correct Wm5Soft software allows the user, through a multi level login procedure, to:

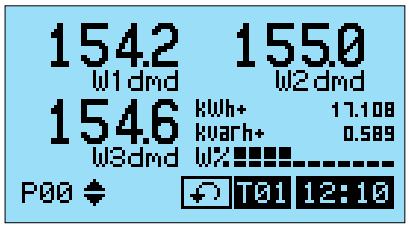
- Read the measurement data and show it as a matrix on the monitor;
- Program all the parameters to quickly and easily adapt the instrument to the application needs;
- Download the stored events (alarm, min, max, digital input status, reset) in an XLS format to easily build up an installation history;
- Recalibrate the instrument, when needed, directly from a local support;
- Upgrade the instrument firmware, improving its characteristics and thus adding more and more value.

Variables that can be monitored and displayed

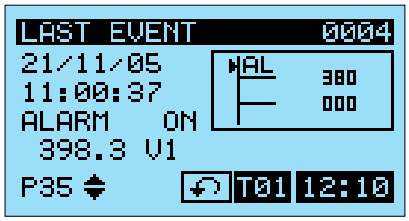
Main variables	System	Single ph	Average	Max	Min	Alarm Out	RS485	Pulse	Analogue out
VLL, VLN	■	■		■	■	■	■		■
V asymmetry	■			■	■	■	■		■
A		■		■	■	■	■		■
An	■		■	■	■	■	■		■
Hz	■			■	■	■	■		■
VA	■	■	■	■	■	■	■		■
var	■	■		■	■	■	■		■
W	■	■	■	■	■	■	■		■
PF	■	■	■	■	■	■	■		■
+kWh	■						■	■	
-kWh	■						■	■	
+kvarh	■						■	■	
-kvarh	■						■	■	
THD (A-V)		■		■	■	■	■		■
THD even (A-V)		■		■	■	■	■		■
THD odd (A-V)		■		■	■	■	■		■
Single harmonic		■					■		

ARM® processor. WM5 96 is a synergy of digital components that, coordinated by an ARM® processor, allows to perform class 0.2 measurements for current and voltage, together with the management of 3 serial ports, 8 analogue and digital outputs, 12 digital inputs, 16 virtual alarms and a complete and functional management of the energy meters tariffs. The ARM® -based microprocessors are used in the up-to-date technology such as the palmtop computers: this makes of WM5 96 a real computer at the service of the electrical parameters analysis and of the electrical tariff management, even the ones with the most complex time schedules.

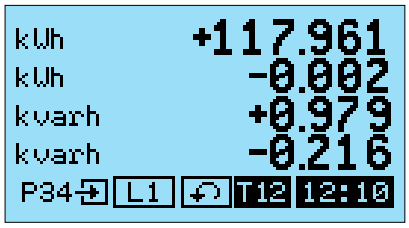
Graphical display, complete and easy to read



Configurable home page showing the variables chosen by the user. In addition, the total active and reactive energy meters are displayed, together with the bargraph of used instantaneous power compared with the installed one. Therefore all the desired variables and the situation of the plant, are available at a glance.



It is possible to record up to 10,000 events, which can be the combination of alarms, diagnostics, minimum and maximum values, digital input status, reset, with reference to: date, time and variable being controlled.



Extremely flexible tariff management, thanks to the 12 tariffs applicable in each of the 24 hours of the day. Up to 100 time periods with a different tariff structure can be defined during a single year.

WM30 96 and WM40 96, smart power analyzers

Carlo Gavazzi's latest improvement to its range of modular power analyzers is the WM30-96 and WM40-96 series smart power analyzers.
These instruments are the result of over ten years' experience in designing, manufacturing and selling Power analyzers and Energy Meters.

- The use of the latest in component technology offers the benefit of 70% less behind panel space when compared to most products available on the market.
- The development of flat "plug and play" modules based on a sandwich concept provides better space utilization, adding all the benefits of a modular analyzer easily and quickly adaptable to both the measurement and control needs of the application.
- Easy and safe connection between the optional modules.

The modules advantages

1. LEDs to check the status of the communication port.
2. Anti-tamper feature: all the module can be sealed to the box.

3. Detachable connectors for simplified wiring.

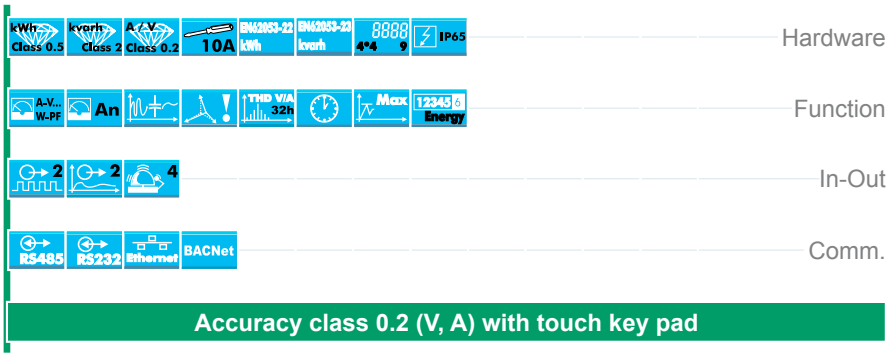
Advanced display backlight

The white backlight and wide viewing angle assure good visibility of the data.

- 3 possible backlight selection (white and blue colours or no backlight).
- White and blue alternating backlight

to let the alarm be visible from a distance.

WM30 96, smart power analyzer



WM30-96 is an innovative device providing, application-oriented solutions by means of its special features and smart functions.

- All necessary information is available at a glance on the home screen, which is configurable by the user.
- Actual power vs. installed power is constantly visible to have immediate evidence of power overload.
- High energy metering resolution together with ten-digit total energy counting, provide the ideal solution for medium and high voltage applications.
- An innovative front touchpad is a significant improvement on the commonly used membrane push buttons. It allows the user to easily enter into one of the four main variable areas: energy metering, variable reading, power and harmonic analysis.

WM30-96 modules advantages

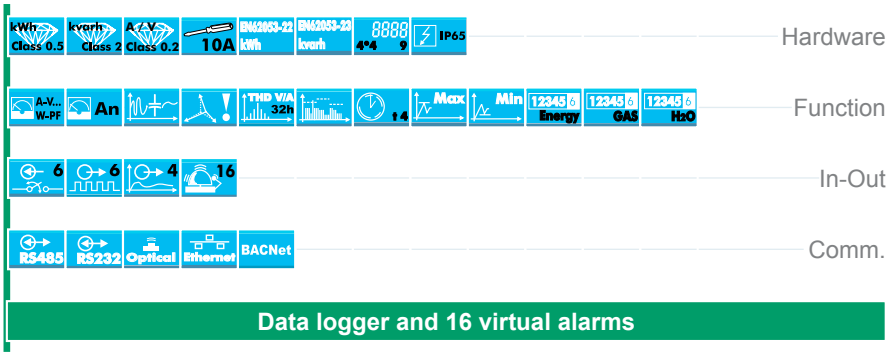
Thanks to its plug in modules that can easily be added to the streamlined module's basic unit to satisfy customer requirements exactly, WM30-96 is an extremely flexible solution that can be used in countless numbers of application.

Digital Outputs
- 2 relay outputs
- 2 opto mosfet outputs

Analogue Outputs
- 2 10VDC analogue outputs
- 2 20mA analogue outputs

Communication
- RS485/232 (Mod Bus)
- Ethernet (Mod Bus)
- BACNet IP
- BACNet MS/TP

WM40 96, smart power analyzer



WM40-96 is the result of a synthesis of the latest in today's cutting edge technology, providing many distinctive features which offer unparalleled benefits to the user.

- An ANSI type 2 optical port is a standard feature on the front, allowing for communication with a PC or a laptop in an easy and fast way.
- Simple connection with the unit without opening the panel door in order to read or modify its programming parameters or to download the stored data and information.
- The level of each single phase displayed variable is immediately evident by means of the bar-graphs which, by means of 3-colour LEDs, provide an intuitive picture of the variable values compared with the relevant full-scale.
- All necessary information is available at a glance on the home screen, which is configurable by the user.
- Actual power vs. installed power is constantly visible to have immediate evidence of power overload.
- High energy metering resolution together with ten-digit total energy counting, provide the ideal solution for medium and high voltage applications.
- An innovative front touchpad is a significant improvement on the commonly used membrane push buttons. It allows the user to easily enter into one of the four main variable areas: energy metering, variable reading, power and harmonic analysis.

WM40-96 modules advantages

With its innovative basic unit and plug in modules, WM40-96 can be adapted to any possible application requirement, at the same time allowing space to be saved on the back of control doors and switchgears.

Digital Outputs
- 4 relay outputs
- 6 opto mosfet outputs
- 6 digital inputs

Analogue Inputs/Outputs
- 4 10VDC analogue outputs
- 4 20mA analogue outputs
- 1 20mADC input
- 1 °C/°F (Pt100, Pt1000) input

Communication
- RS485/232 (+ memory data logger)
- Ethernet (Mod Bus + memory data logger)
- BACNet IP (+ memory data logger)
- BACNet MS/TP (+ memory data logger)

Accessories to complete the WM40-96 solution

OPTOUSB1 is the ANSI type 2 probe to interface WM40-96 optical port utilizing infra-red light. Connected to a PC through its USB standard “A” plug (USB1.1 and USB 2.0 compliant), it permits galvanic isolated communication to WM40, for reading or programming parameters through the dedicated software Wm40Soft, maintaining at the same time an IP65 front protection degree. Virtual serial port drivers are included for operating systems up to Windows 7.

WM30 and WM40: features and functions comparison

Function and Features	WM30	WM40
Class 0.5 (kWh) according to EN62053-22	■	■
Class C (kWh) according to EN50470-3	■	■
Class 2 (kvarh) according to EN62053-23	■	■
Energy measurements acc. to ANSI C12.20, CA 0.5, ANSI C12.1 (revenue grade)	■	■
Accuracy ±0.2% RDG (current/voltage)	■	■
Instantaneous variables readout: 4x4 DGT	■	■
Energies readout: 9+1 DGT	■	■
System variables: VLL, VLN, A, VA, W, var, PF, Hz, phase-sequence, asymmetry and loss	■	■
Single phase variables: VLL, VLN, AL, An (calculated) VA, W, var, PF	■	■
Average and max values of all the system and single-phase variables	■	■
Average, min and max values of all the system and single-phase variables		■
Direct neutral current measurement (on request)		■
Four quadrant power measurements	■	■
Total harmonic distortion (THD) and total demand distortion (TDD) calculation		■
Gas, cold water, hot water, remote heating measurements (on request)		■
K-factor (North America) and factor K (Europe) calculation		■
Harmonic analysis (FFT) up to the 32nd h. with harmonics source detection	■	■
Runnig hours counter (8+2 DGT)	■	■
Real time clock function	■	■
Application adaptable display and programming procedure (Easyprog function)	■	■
Universal power supply (19 to 60VAC, 21.6 to 60VDC and 90 to 265VAC/VDC)	■	■
RS232 or RS485 port	■	■
MODBUS TCP/IP Ethernet port	■	■
BACnet IP over Ethernet port	■	■
BACnet SM/TP	■	■
Data stamping of up to 10,000 events		■
Optical front communication port (ANSI type 2)		■
Programming software	■	■
AND/OR logic on virtual alarm		■
Digital inputs		6
Static outputs	2	6
Relay outputs	2	4
Freely configurable virtual alarms	4	16
Analogue outputs (+20mA, +10VDC)	2	4

Energy
Multi function meters for basic measurement

In the past, simple measuring systems like current-voltage-power and power factor were available to control the mains. More complex solutions were available as well, but in many cases these required higher investment. Nowadays more and more sophisticated machines and loads like computers, switching-mode power supplies and drives are used in production facilities, thus significantly increasing the complexity of loads and thus of potential problems.

Simple while saving space and money

Carlo Gavazzi can provide different levels of solutions:

- Simple multimeters to replace the ordinary set of three ammeters, one voltmeter, and one rotary switch, offering in addition the benefits of serial communication or alarm management.
- Energy analyzers for both DIN-rail and panel mounting, also supplied as a kit with three split-core current sensors or dual 3-phase current transformers.
- Energy meters for DC measurements, which nowadays are meeting more and more application requirements.

WM14 96, in its basic version is a power analyzer available with Profibus SP-V0 communication port.

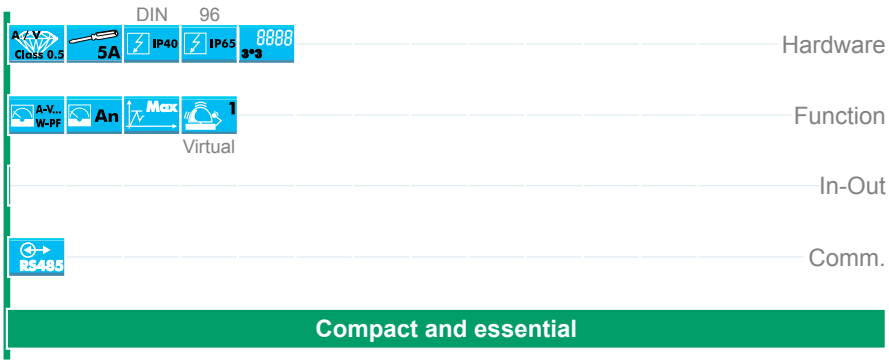
WM10 DIN, 3-phase multifunction meter

WM10-DIN is a 3-phase multifunction meter which is: simple, easy to install and extremely compact, allowing a direct connection up to 65A in only 4-DIN modules. It measures and monitors all the parameters of an electrical installation, line or load.

The main advantages:

- Space saving on panel boards.
- The three external current transformers are not needed because of the high-current direct connection.
- Measurement of the main system and single phase variables to perform full load control.
- Time saving installation system (just connect it, and it measures) and no programming required.

WM12 96 and WM12 DIN, 3-phase multifunction meter

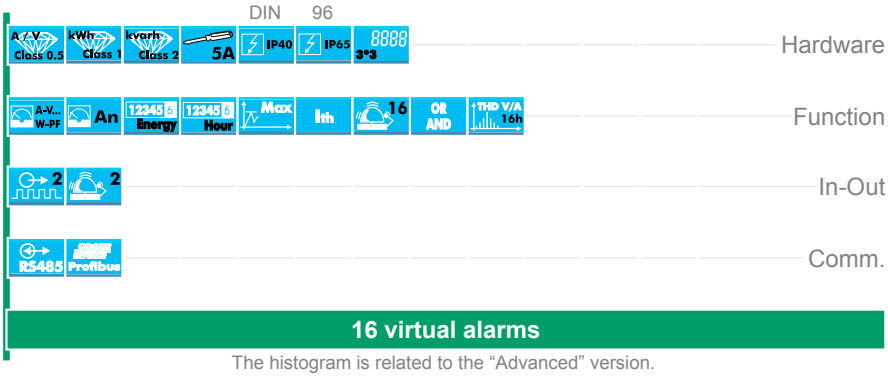


WM12 DIN and WM12 96 are general purpose multi function meters that monitor all the mains parameters of an electrical line or load. The compact housings, combined with a complete selection of measurements, allow the instruments to be mounted in all the switch and control gears as local indicators, instead of the classic single function analogue or digital panel meters.

The unit is provided with some unique installation visual status functions:

- The window control of the mains 3-phase voltage notifies the user, at a glance, if the mains exceed the permitted tolerance.
- The neutral current control immediately shows any load or installation anomaly, due to high harmonic distortion or load insulation loss (high earth leakage current).

WM14 96 WM14 DIN



The histogram is related to the "Advanced" version.

WM14 DIN and WM14 96, available as Basic and Advanced power analyzers, can be used in all applications where it is necessary to measure and control the main electrical parameters and to transmit them by pulses, by serial communication or Profibus DP to a PLC or a PC.

Main features:

- Metering of both total and partial active and reactive energies with pulse outputs in order to survey not only the typical load parameters but also consumption.
- Measurement of the thermal current, by single phase, and recording of the maximum demands. This information will let the maintenance staff know if the over current protection (fuses, automatic switches, etc.) is adequately preset and, in case of trip, what their real current is.
- Hour counter meter function. On a machine or a generating-set, the instrument shows how long the machine is being used, saving the cost of an external classic hour counter meter. A correct "machine usage" cost and/or mechanical maintenance can be estimated and planned.
- OR/AND control of up to 16 selected variables so to grant an extended load or line control through 2 digital outputs.

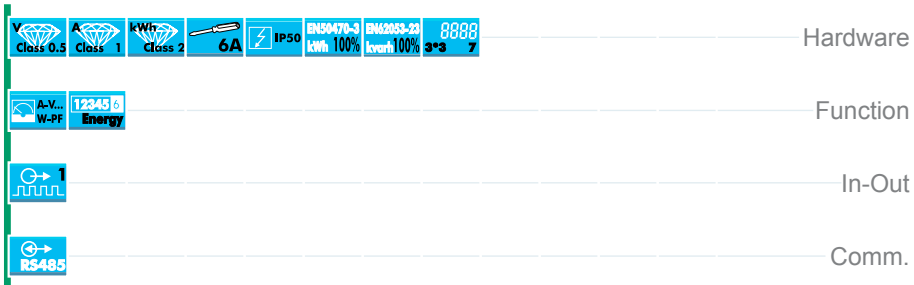
VMU-E and VMU-X, DC energy analyzer

This energy analyzer is a modular combination of two modules VMU-E and VMU-X, for DC V, A, W and kWh metering. VMU-E is provided with a 6 digit LCD display and one front push-button for easy parameter programming. VMU-X is the power supply unit which also provides the VMU-E unit, according to the module, with either a RS485 serial communication port or a digital output. The output works as a pulse retransmission output proportional to the energy being measured or an alarm output.

The main advantages:

- Compact size: 1+1 DIN module.
- Measurement of direct current up to 20A; or by means of an external shunt up to 1000A.
- Universal AC/DC power supply.
- Easily connected to a PLC or local alarm by means of digital output.
- Quick data transmission to remote acquisition system by means of the RS485 port.
- Local variable control by means of the alarm digital output.

EM21 72R, energy meter for retrofit applications



Hardware

Function

In-Out

Comm.

Kit package ready to use

EM21-72R is an innovative, cost-effective and compact energy meter for retro-fit applications. It is the world's first compact energy meter with detachable display, dual mounting technology and multiple display applications. Its compact size of only 72 x 72mm makes it ideal for panel mounting or 4-DIN wide for DIN-rail mounting. Current measurements are carried out by means of external miniature split-core current sensors (included). When dealing with old buildings where energy efficiency and cost allocation issues were not so important at the time of construction, there is no solution other than retrofitting the distribution boards with energy measuring systems. The EM21-72R is a complete retrofit solution which requires minimal modification to the existing wiring. It is possible to obtain the current measurement by simply clipping the relevant split core current sensors onto the phase wires.

Main features:

- Accuracy ±0.5% RDG (V), ±1% RDG (A)
- Instantaneous variables readout: 3 DGT
- Energies readout: 6+1 DGT
- Pre-programmed primary current value
- System variables: W, var, PF, Hz, Phase-sequence
- Single phase variables: VLL, VLN, A, PF
- Energy measurements: total kWh and kvarh
- TRMS measurements of distorted sine waves
- Protection degree (front): IP50
- Self power supply.

The dedicated split core CTs

The EM21 72R is provided with 3 miniature current sensors with split core technology: no wiring modification and no cable disconnection are required.

The CTs come in 3 different types:

250A, hole diameter 24mm

150A, hole diameter 16mm

90A, hole diameter 10mm

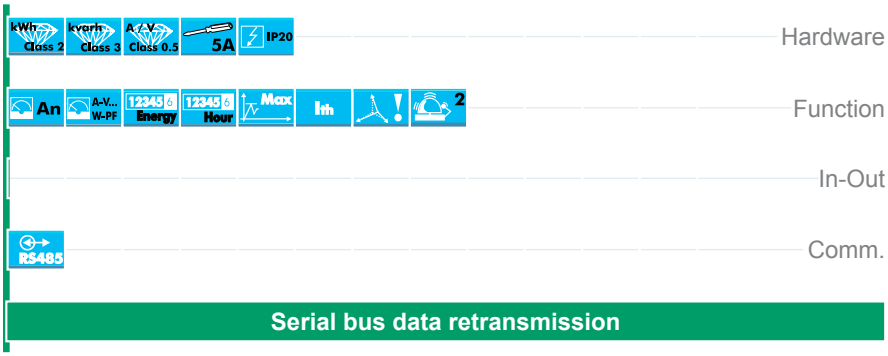
Energy
Power transducer for monitoring system

Since the cost pressure on products is higher than ever, the energy consumption measured by production type allows for allocating and controlling the costs in a proper and more accurate manner.
Carlo Gavazzi's power transducer family, together with PowerSoft or in combination with the system managing the facility (e.g. a BMS, a SCADA, a DCS), is able to supply all the necessary information for a correct and effective energy cost allocation program.
Installed in the on-board panel or in the switch gears supplying the various machinery, the transducers are able to measure and transmit via serial communication all the energy consumptions and the most important electrical parameters. The latter can also be used to check the plant efficiency, plan periodic maintenance or indicate the need for immediate staff intervention in case of any alarm.

The best way to provide reliable data

Advantages:
- Provide data and measurements to BMS, SCADA and DCS
- Power Quality transducers available
- Compact models for DIN-rail serial versions
- Modular models tailored to the customer's needs
- Simple transducers or advanced versions with different I/O capability

CPT DIN basic, compact power transducer

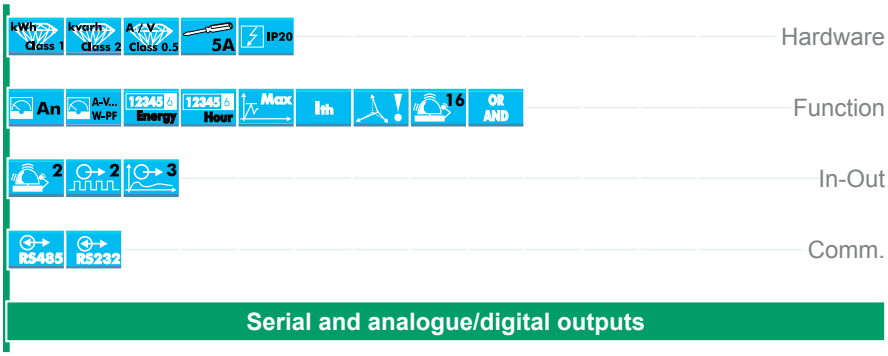


CPT DIN is a basic compact transducer available for measurement and data retransmission. This unit, for 3-phase or single-phase systems, is recommended for the measurements of both main electrical variables in electrical distribution systems and on board machines as working survey equipment.

The most important benefits are:

- Metering of all the electrical data in order to survey both load parameters and consumptions.
- Hour counter function for machine maintenance planning.
- RS485 communication port (with iFIX SCADA compatibility) for data transmission to PC.

CPT DIN advanced, compact power transducer



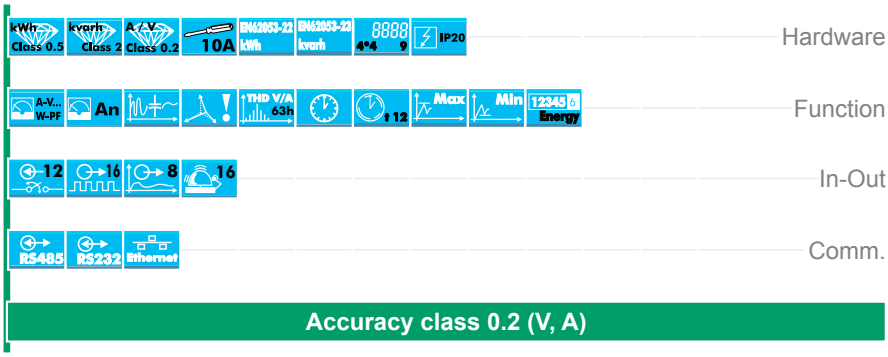
CPT DIN Advanced is the more powerful version of the compact power transducer, equipped with many kinds of outputs and PLC type control functions, suitable for use also for critical applications. This unit, for 3-phase or single-phase systems, is recommended for the measurements of both main electrical variables in electrical distribution systems and on board machines as working survey equipment.

Moreover, it represents an excellent compromise between price, value and features.

The most important benefits in the advanced version are:

- Integrated and extended AC and DC power supply for full application coverage.
- Metering of both total and partial active and reactive energies in order to survey both load parameters and consumptions.
- Hour counter function for machine maintenance planning.
- RS485 communication port (with iFIX SCADA compatibility) for data transmission to PC, or pulse or analogue outputs to PLC, for remote monitoring and control of the variables.
- OR, AND, OR+AND control of up to 16 selected variables to allow together with the asymmetry, phase sequence and phase loss functions an extended load or line control by means of 2 digital outputs.
- Combination of RS485 port and 1 digital output.

PQT H, smart power quality transducer



Accuracy class 0.2 (V, A)

PQT H is a Smart Power Quality transducer powered by ARM technology which significantly improves signal processing and communication speed compared to any other standard transducer. The superior features of this new meter is the perfect answer for those applications where performance and high accuracy are a MUST. PQT H is modular and flexible so as to be suitable for the most demanding applications. It offers many advantages and solutions:

Revenue grade and revenue approval to be used also for billing purposes thanks to their 0.2 accuracy class and the compliance to ANSI/IEEE C12.20-1998 and CAN3-C17-M84.

- Real-time effective cost control: complex and complete tariff management (12 tariffs by 24 time periods/day).
- Extended load or line control with asymmetry, phase sequence and phase loss functions: on up to 16 selected variables linkable to up to 16 independent or OR/AND/OR+AND logic controlled alarms.
- Complete interfacing capability: up to 12 digital inputs, up to 16 pulse outputs, up to 8 analogue outputs, RS232, RS485, or optical communication.

The ARM® processor

PQT H is a synergy of digital components that, coordinated by an ARM® processor, allows to perform class 0.2 measurements for current and voltage, together with the management of 3 serial ports, 8 analogue and digital outputs, 12 digital inputs, 16 virtual alarms and a complete and functional management of the energy meters tariffs. The ARM® -based microprocessors are used in the up-to-date technology such as the palmtop computers: this makes of PQT H a real computer at the service of the electrical parameters analysis and of the electrical tariff management, even the ones with the most complex time schedules.

Analysis of power quality and control of electrical parameters

The problems which must frequently occur in electrical systems with inverters and power converters, switching power supplies for computer and communication systems applications are the following:

- failures on compensation capacitors;
- blowing of capacitor fuses;
- overheating of power supply transformers with a load current below the rated value;
- overheating of motors and frequent failures;
- high neutral conductor currents;
- problems on electronic motor controls.

These are mainly due to the harmonic content of currents and voltages.

The best solution is PQT H, which allows continuous monitoring of the harmonic contents (up to the 63rd harmonics) of currents and voltages, together with all other electrical parameters.

The control of up to 16 different electrical parameters by means of alarm set-points with a specific logic (OR/AND) and automatic recording of up to 10,000 events (alarm, min, max, digital input status, reset) allows the operator to monitor any anomaly of the installation and of the loads in real time, so as to promptly decide and plan any maintenance action, thus avoiding possible damage to the loads and/or expensive stopping of the machinery.

Variables that can be monitored and transmitted

Main variables	System	Single ph	Average	Max	Min	Alarm Out	RS485	Pulse	Analogue out
VLL, VLN	■	■		■	■	■	■		■
V asymmetry	■			■	■	■	■		■
A		■		■	■	■	■		■
An	■		■	■	■	■	■		■
Hz	■			■	■	■	■		■
VA	■	■	■	■	■	■	■		■
var	■	■		■	■	■	■		■
W	■	■	■	■	■	■	■		■
PF	■	■	■	■	■	■	■		■
+kWh	■						■	■	
-kWh	■						■	■	
+kvarh	■						■	■	
-kvarh	■						■	■	
THD (A-V)		■		■	■	■	■		■
THD even (A-V)		■		■	■	■	■		■
THD odd (A-V)		■		■	■	■	■		■
Single harmonic		■					■		

Easy and fast communication

PqtHSoft for software allows the user, through a multi level login procedure, to:

- Read the measurement data and show it as a matrix on the monitor;
- Program all the parameters to quickly and easily adapt the instrument to the application needs;
- Download the stored events (alarm, min, max, digital input status, reset) in an XLS format to easily build up an installation history;
- Recalibrate the instrument, when needed, directly from a local support;
- Upgrade the instrument firmware, improving its characteristics and therefore adding extra value.

Energy metering in Field bus system

Creating the most efficient use of energy is one of the main factors in developing any successful energy saving program. At time, fan extractors lights and heating systems remain on even when a room or building is unoccupied. Nowadays, in new construction, it is absolutely necessary to have a building management system (BMS) that provides more comfort to the tenants/workers, but also uses energy in a wise and waste free manner. This efficiency can be tested and regularly controlled by means of the energy meters, possibly connected to the BMS as a unique system. Carlo Gavazzi's solution is Dupline, a field- and installation-bus that offers unique solutions for a wide range of applications in building automation, water distribution, energy management, railway systems and many other areas. The system is capable of transmitting multiple digital and analog signals over several km, via an ordinary 2-wire cable.

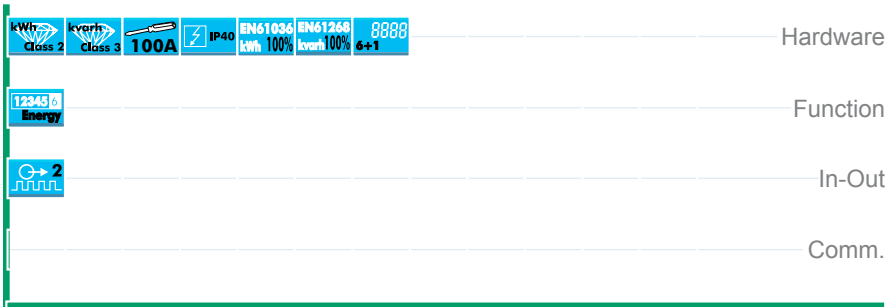
Meters and Dupline join and integrate

A range of energy meters and power analyzers are able to communicate directly through the Dupline bus, simply by connecting the relevant twisted pair and getting all the required info. The combination of energy meters and Dupline is also an ideal solution in very noisy industrial plants, because of the robustness of the Dupline bus when compared with the traditional serial communication buses.

Main advantages:

- Free topology for a fast, flexible and easy to build step-by-step installation; the system can easily be adapted to new or unexpected requirements.
- User friendly: easy to code addresses and function, easily accessible data from a PC/PLC.
- High electrical noise immunity; no shielded cables are needed, therefore existing cable/conduit/pipe can be utilised.
- Data communication up to 10 km; no signal repeaters are needed.
- Integration of the metering system with the Dupline door-light-intrusion-remote controls and load switching.
- Cost-effective solution when compared with ordinary systems.

EM3 DIN, energy meter



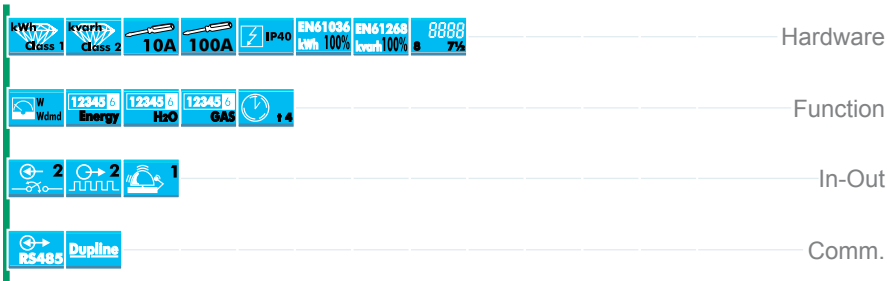
100A direct connection

EM3 DIN is an energy meter that has been developed to meet the requirements of those applications where a very simple and reliable instrument is needed.

The main advantages:

- Electromechanical display allowing the user to read the energy consumed even when the load or the meter is not power supplied.
- Easy installation, avoiding any programming set-up.
- Self power supply making the installation easier and quicker.
- Direct connection up to 100A allowing the user to save the costs of external current transformers and of relevant wiring.
- Dual pulse output, transmitting to a PLC or other equipment the active and reactive energy simultaneously.
- Wall mounting, avoiding any other protective enclosure.

EM4 DIN, energy meter



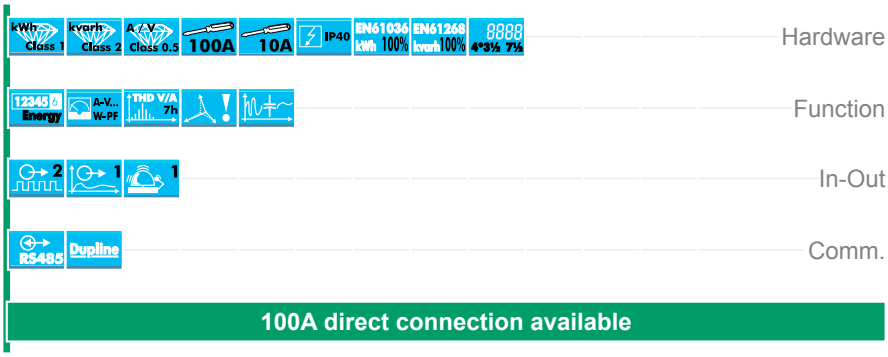
100A direct connection and Dupline port

EM4 DIN is an advanced utility meter capable of measuring not only the usual consumed energies but also gas and water by means of the optional dual contact input module. The optional Dupline module allows the energy pulses to be transmitted via the Dupline fieldbus.

The main advantages

- High accuracy and resolution for a detailed cost calculation.
- Simultaneous indication of both active and reactive energy allowing the user to read the variables at a glance.
- Display of the active power demand with manual or external synchronisation. The fixed power supply costs are calculated with the same system used by the electricity board.
- Management of the pulses from gas and water meters based on single or dual tariff calculation and energy multi-tariff management (by means of two selection contact inputs) giving more flexibility and meeting specific application needs.
- Metering of energy, water and gas by means of the same instrument allowing the data transmission by means of the same communication port. Now available also via Dupline.
- Effective control of phase sequence, serial communication and wrong connection of the current inputs status, making the instrument installation: easy, fast and free of wiring errors.
- Self power supply working even in the case of one phase line failure, granting continuous metering of energy.

WM22 DIN, power analysis



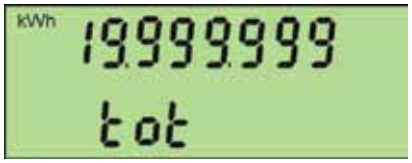
100A direct connection available

WM22 DIN is a modular power analyzer that allows all the mains parameters of an electrical line or load to be monitored and one of them to be controlled. The design of the housing, combined with outstanding performances, makes WM22 DIN an instrument to be used in all applications up to 5000A and up to 200kVLL.
The optional Dupline module allows the energy pulses to be transmitted via the Dupline fieldbus.

The remarkable features of WM22 DIN
- Direct measurement of up to 100A: no external current transformer needed.
- Simultaneous display of four variables: information available at a glance.
- A full range of measurements available: everything under control.
- Plug and play output modules: easy interfacing to external devices.
-

The main advantages
- Total harmonic analysis of both current and voltage, notifying potential load failures.
- Phase asymmetry control, notifying line failures.
- Dual pulse output, analogue output, RS485 or Dupline port providing communication to PLCs, to PCs and to Dupline building automation systems.
- Serial communication and status indication of wrong connection of the current input make installation easy, fast and free of wiring errors.
- Self power supply working even in the case of one phase line failure, granting the measurement of all the variables at all times.

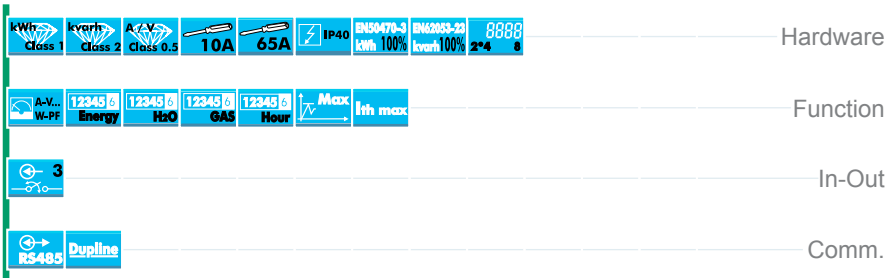
All information available at a glance
Example of variables displayed with serial communication diagnostics: r.t (Rx/Tx).



Example of 7 1/2 digit energy display.

100A available connections for cables with cross-section area from 6 to 35mm² instead of by-passing types, assuring “contactor type” wiring and connection protection.

EM24 DIN Dupline, energy analysis



MID certified for legal metrology (on request)

EM24 DIN is a compact Energy Analyzer for three phase unbalanced systems equipped with a dedicated Dupline field-bus port. Despite its compact housing, this meter is capable of measuring the traditional active and reactive energies, as well as gas, hot water, cold water and remote heating consumption, then retransmit up to 8 meters and up to 6 analogue values through the Dupline bus, where other distributed I/O flows simultaneously.

On request:
- MID Annex B+D (option “PF”) certification for legal metrology

The main advantages:
- Space saving on panel boards by means of its compact housing.
- Wide angle variable readability by means of a sharp LCD display (STN technology).
- Energy measurements fulfilling both the new European standards EN50470-3 and the international standard IEC62053-23.
- Gas, hot-water, cold-water, remote heating measurements thanks to its three digital inputs.
- Extended energy measurements using total/partial or total/multi-tariff metering.
- Money saving by means of the integrated current transformers, allowing the measurement of currents up to 65A.
- Time saving installation system using self-power supply, automatic phase detection and application oriented programming structure.
- Easy variable scrolling by means of the front joystick.
- Full integration with the Dupline Fielbus. By connecting the Dupline 2 wires, the configured data is available remotely.

Easy variables scrolling by means of the front joystick.
Time saving installation system using self-power supply and automatic phase detection. Direct variable page access by means of the front four position selector, programmable by the user.

Application oriented programming structure
Selection of eight different applications:
- Basic domestic
- Shopping malls
- Advanced domestic
- Multi domestic (also camping and marinas)
- Solar
- Industrial
- Advanced industrial
- Advanced industrial for power generation, providing only the necessary programming parameters and the display variables thus simplifying the installation and the display readout.

Energy
Accessories

To complete the offer of Energy Management products, Carlo Gavazzi supplies a range of accessories which include user interfaces (Software) or adaptors for serial communications and for measurement, which are the current transformers. The software proposal includes configuration software to set all the parameters of the instrumentation in an easy and fast way and an Energy Management suite, called Powersoft.

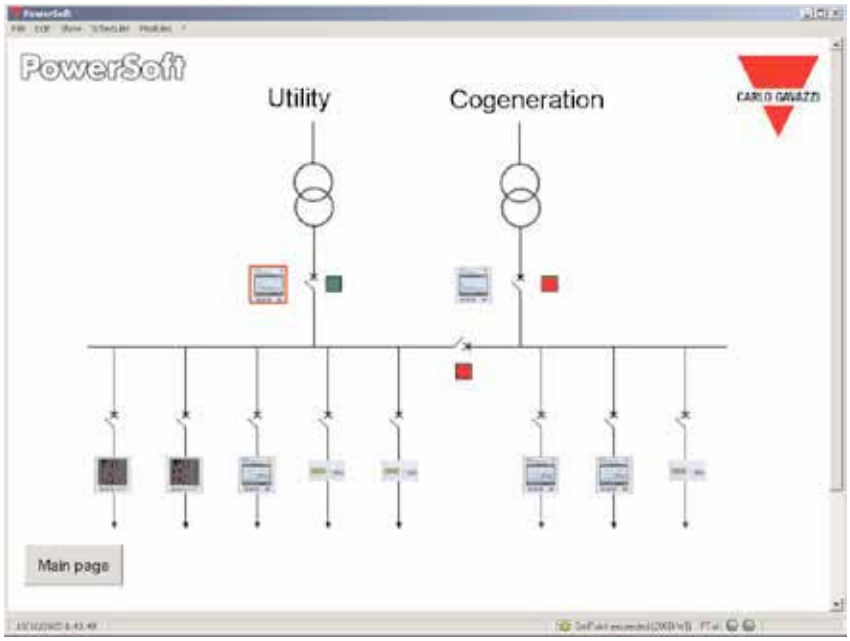
Software, adaptors, transformers

A range of adaptors (from RS485 serial communication to Ethernet and vice versa) is available to help the users realise their own complete solution with Carlo Gavazzi instruments and software.

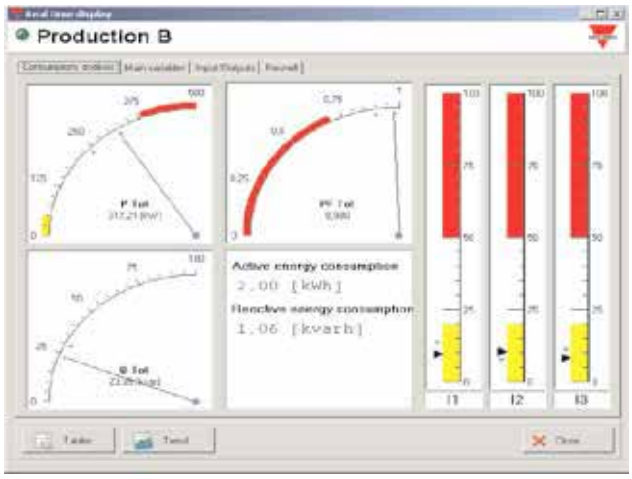
One of the most important components of any energy management system is the current transformer. A wide range of both fix- and split-core CTs completes the Carlo Gavazzi portfolio, offering numerous benefits such as double screw terminals, isolated fixing screws, DIN-rail mounting kit, removable panel fixing clips and saleable terminal block covers.

Powersoft, the Energy Management Software

PowerSoft is an analysis platform suitable for Win 98, 98SE, XP, Vista and Win 7, which has been specifically developed to interface, by means of the Modbus protocol (RTU and TCP/IP), with the Carlo Gavazzi products for Energy Management. Consisting of a main core and of a series of optional plug-in modules, it allows correct and efficient management of an electrical distribution system, mainly considering cost reduction. This aim is achieved monitoring the consumptions, checking the demanded power peaks and adopting accurate analysis and data processing tools.

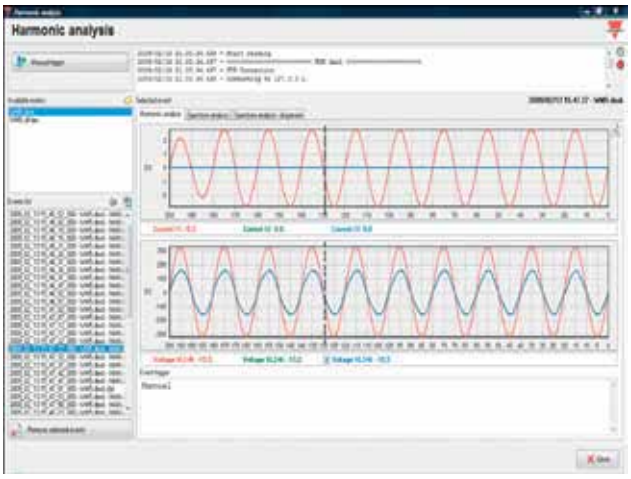


Interactive synoptics
A fully customisable set of animated interactive synoptics allows the user to browse the monitored electrical distribution system and to see any alarm condition at a glance. A series of links allows access to the real time data of each instrument or to pass on to other synoptics.

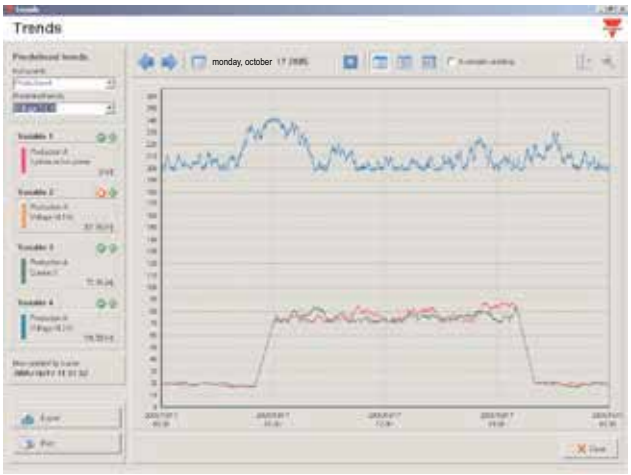


Real time display
Each instrument has a dedicated section where its real time data can be examined in different ways: as analogue indicators; analytically in complete tables including all the variables and the utility meters; by means of a Fresnell diagram. It is possible to check the status of the digital inputs and check or switch the digital output for test purposes or to remotely act on an external device. Also available is a table, which simultaneously displays all the data from up to five instruments per page, thus allowing the user to carry out a simple and immediate data comparison.

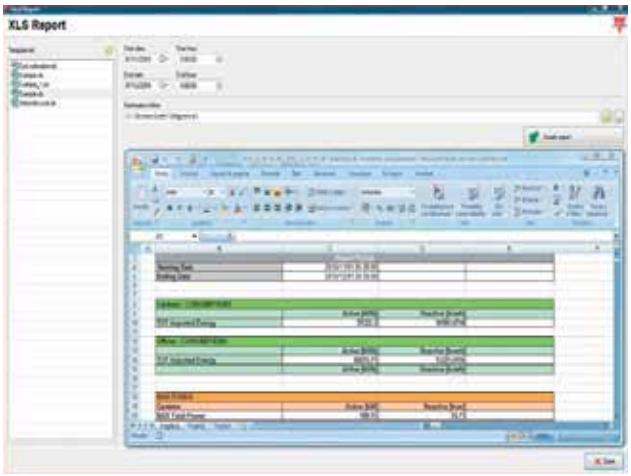
Powersoft, the Energy Management Software



The Waves and harmonics module
When connected to a WM5 power quality analyzer, via its Ethernet port, PowerSoft displays the waveforms (relevant to all the 3-phase currents and voltages) of the last 10 cycles before the trigger signal. This module also allows the display of the harmonic spectrum (up to the 63rd harmonics) in two different modes: the average spectrum of the 10 cycles and the relevant dispersion graph (overlapping of the 10 spectra of each single cycle). The trigger can be manually or automatically generated. The manual trigger can be either single shot or continuous (10-cycle data available every second), while the automatic one is generated by an alarm condition detected by the instrument. In this way it is possible to carry out a detailed analysis of what happened in the monitored system just before the event that caused the alarm. Each set of 10-cycle data is stored as a file in the PowerSoft folder and can be recalled and analysed at any time.



Trends and reports.
A selectable set of variables (different for each instrument) can be stored in the PowerSoft database with a selectable time interval so as to build up a history of the installation. All the data can be analysed later in both graphical and analytical format and exported in various formats (wmf, csv, xls).

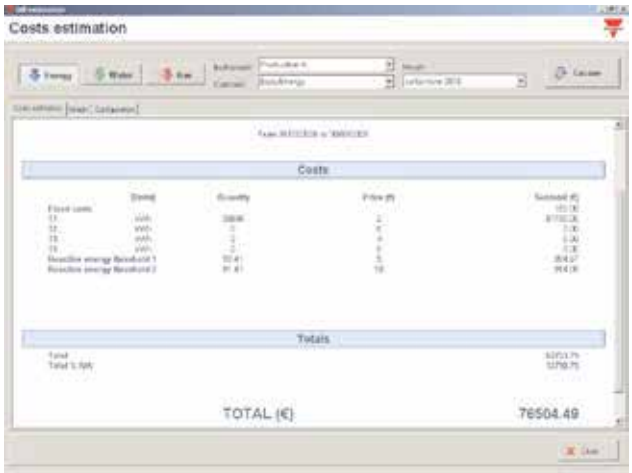


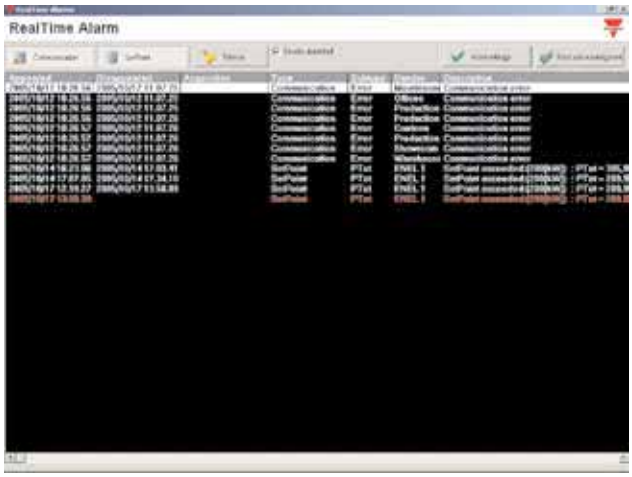
Up to 4 variables (from the same or from different instruments) can be displayed and compared at the same time, using intuitive zoom and cursor tools. PowerSoft can also automatically load any Excel file with data extracted from its database, allowing the user to access any kind of report in just a click.

Powersoft, the Energy Management Software

Cost estimation

The software provides a means to estimate the costs, relevant to a selected period based on the energy, water and gas consumption. This is useful for cost allocation between the monitored lines, to display the daily trend of the consumption or to identify the reasons for any penalty.
The above features are structured to manage a complex multitariff contract. The different tariffs during the day and the distribution of the typical-days in the year can be set according to the supplier tariff regulations in a very easy and extremely flexible way. Up to 12 tariffs, 24 tariff changes per day and 365 different typical-days per year can be simply configured.

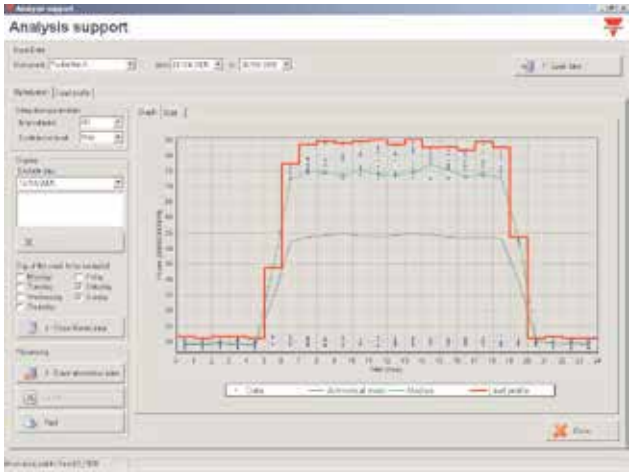




Alarms and events

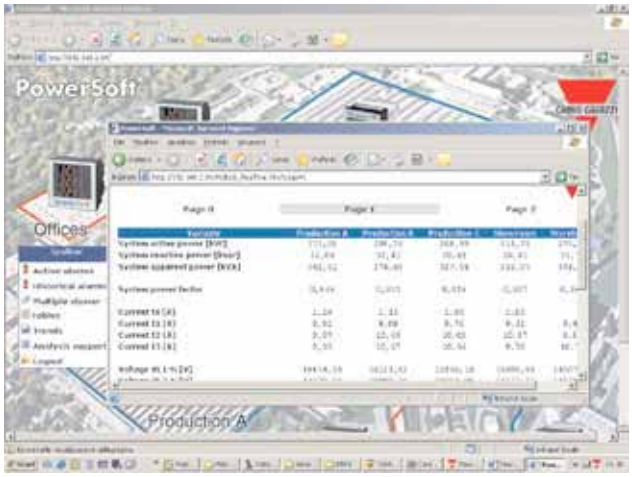
An active alarms window (which automatically pops up in any case of alarm) advises the user if a setpoint has been exceeded or if a communication error is present; it allows the authorised users to acknowledge the selected alarm. A database allows the list of the events (login, logout, startup, alarm acknowledgment, etc.) to be accessed and of the alarms (setpoints, communication errors, missing data storage, etc.) and filter-based searches to be carried out. The setpoint alarms can be associated to both an up and a down threshold on all the variables measured by all the instruments of the network. The alarm can be software, displayed in the Active alarms windows and stored in the Alarms and events log, or hardware-based, stored as above and switching the digital output of the instrument which is pointing out the anomaly. This powerful tool allows the operator to monitor any anomaly of the installation and of the loads in real time, so as to promptly decide and plan any maintenance actions, thus avoiding possible damage to the loads and/or expensive stopping of the machinery.

Powersoft, the Energy Management Software



Statistical analysis
PowerSoft carries out statistical analysis on the power trends and energy consumption by extrapolating the demand of each day of the week, the week-based consumption trends and the estimation of the ideal installed power for each tariff, calculated with a selectable confidence level. All this information is aimed to build-up an optimised load profile, to provide the data to negotiate a better contract. To improve the reliability of the analysis, any data with abnormal consumption due to external events can be filtered and removed, as well as the weekends and the holidays.

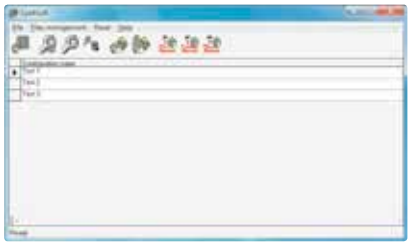
Internet connectivity
PowerSoft can manage an automatic e-mailing module, capable of notifying the electrical system's status to one or more e-mail addresses. The e-mailing can be carried out on a regular basis and/or as a consequence of a defined alarm or event. In cost-sharing applications, the energy/utility bill of each final user can be sent to his e-mail box, while the administrator can receive the consumption summary of all the users. The web-server module provides a means to remotely access PowerSoft, using a standard browser without additional licenses, in order to access all the realtime information and historical data from any location.



Configuration Software

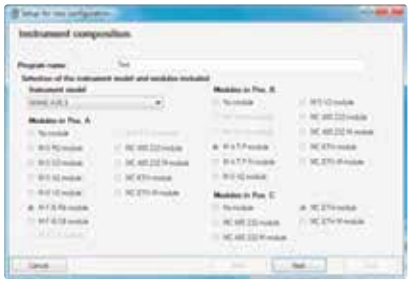
CptBSoft, CptASoft, Wm14ASoft, Em21Soft, Em2426Soft, Wm5Soft, PqtHSoft, WM3040Soft.

These user-friendly specific instrument software provides guidance to set-up the relevant power analyzers or transducers in a quick and reliable way. All the available parameters can be saved into a specific configuration file, so as to be easily downloadable from the PC to the instrument/transducer or to be up-loadable from the instrument/transducer to the PC. Such a procedure is a cost effective solution, which can also be used to build up an instrument set-up archive where each single file, if needed, can be sent as an e-mail attachment to whoever is in the field for installation or maintenance purposes, making the job easier and faster.



CptBSoft and CptASoft

have been developed to program the parameters and read in real-time mode the variables of the compact power transducer (Basic and Advanced version respectively). The CPT transducers are equipped with an auxiliary serial port (RJ12 connection) in order to easily configure all the models.



WM3040Soft

helps the user to configure all the numerous parameters of WM30 and WM40. In the latter case it can be effectively used by mean of the optical port and allow the data logger download.

Wm14ASoft, Em21Soft and Em2426Soft,

connected via RS485 to a WM14 Advanced, an EM24-DIN, an EM21-72D, or an EM26-96, allow the instruments to be fully configured and the realtime data acquired by all the meters of the connected network to be read.

Communication adaptor

Types	SIU-PC2	SIU-PC3	SIU-TCP2	VMU-B
				
Description	RS422/RS485 to RS232 converter	RS422/RS485 to USB converter	Ethernet to RS232/485 Modbus Gateway	RS485 to M-Bus adaptor
Housing	Front: 100x67mm	Front: 60x37.5mm	Front: 78x65mm	Front: 90x17.9mm
Port1	RS232	USB type A	Ethernet, 10/100Mbps	RS485
Port1 connections	9-pole, female		RJ45	Screw terminals
Port2	RS422, RS485	RS422, RS485	RS232, RS485	M-Bus
Port2 working mode	2-wire and 4-wire communication	2-wire communication	2-wire and 4-wire communication	2-wire communication
Port2 connections	Screw terminals	Screw terminals (with adaptor)	9 pole, male	Screw terminal
Baud rate	MAx 230.4 kBaud	Max 921.6 kBaud	Max 230.4 kBaud	300 to 9600 bits/s
Protection	Port 1/Port 2/Power Supply	Port 1/Port 2	LAN/serial	RS485/M-Bus/Power supply
Indication (by means of LEDs)	Power-on, Tx, Rx	Power-on, Tx, Rx	Power on, link, ready	Power on,working communication
Insulation	Port1/Port2: 2kV (option I) Port1/Port2 and power supply: 2kV (option I)	Port1/Porta: not insulated	LAN/serial: 1.5kV	Power supply/RS485, M-Bus port: 4kV
Operating temperature	-20 to +60 °C (R.H. 90% to 95% N.C.)	0 to +55 °C (R.H. 5% to 95% N.C.)	0 to +55 °C (R.H. 90% to 95% N.C.)	-25 to +55 °C (R.H. 90% to 95% N.C.)
Storage temperature	-20 to +85 °C (R.H. 90% to 95% N.C.)	-20 to +70 °C (R.H. 5% to 95% N.C.)	-20 to +85 °C (R.H. 90% to 95% N.C.)	-30 to +70 °C (R.H. 90% to 95% N.C.)
Included set	DIN-rail mounting kit, wiring diagrams	screw/ 9-pole connector adapter	DIN-rail mounting kit, 9-pole serial cable, power supply adaptor, null modem 9-pole adaptor, software, quick guide	DIN-rail mounting
Other characteristics	ESD protection for serial signals: 15kV; power reverse protection; wall mountable; reverse conversion capability	Self power supply from USB. ESD protection for serial signals: 15kV.	ESD protection for serial signals: 15kV; wall mountable; reverse conversion capability UK and US versions available	Compatible with EM21, EM24, EM26, EM33
Power supply input	12 to 30 VDC Suggested adaptor: SPD12-101 (120 to 240VAC/DC)	Not needed	9 to 30 VDC. AC/DC power adaptor (on request)	18 to 260 VAC/DC
Approvals	CE, FCC	CE, FCC	CE	CE
Protection degree	IP30	IP30	IP30	IP40

Current transformers

Types	TADK	TADK2	CTD-1X	CTD-2X
				
Class	0.5	0.5	0.5	0.5
Bus-bar size/Cable diam		25x5mm	max ϕ 23mm	max 32x5mm; ϕ 24mm
Dimension (HxWxD)	115.5x75x44mm	115.5x75x44mm	65x44x44mm	86x56x42mm
Standards	IEC60185 / EN60185	IEC60185 / EN60185	IEC60044-1	IEC60044-1
Accuracy class depending on the burden output	Burden (VA)	Burden (VA)	Burden (VA)	Burden (VA)

Accuracy class	TADK Class	TADK 0.5	TADK2 Class	TADK2 0.5	CTD-1X Class	CTD-1X 0.5	CTD-1X 1	CTD-1X 3	CTD-2X Class	CTD-2X 0.5	CTD-2X 1	CTD-2X 3
	1A	10	1A	10	50A		1	1.25	40A			1.25
	5A	10	5A	10	60A		1	1.245	50A			1.5
	60A	10	60A	10	70A		1.5	1.75	60A			2
	10A	10	10A	10	75A	1	1.25	1.75	70A			2.5
	15A	10	15A	10	80A	1.25	1.5	2	75A		1.75	2.5
	25A	10	25A	10	100A	1.5	1.75	2.25	80A		2	2.75
	40A	10	40A	10	120A	1.75	2	2.5	100A		2.5	3
			50A	10	125A	2	2.25	2.75	120A		2.75	3.75
			60A	10	150A	2.25	2.5	3	125A	2	2.75	3.75
			80A	10	160A	2.5	2.75	3.25	150A	3	4	5
			100A	10	200A	3	3.25	3.75	160A	3	4	5
			150A	10	250A	4.5	4.75	5.25	200A	4	5	6.5
			200A	10	300A	5	5.5	6	250A	5.5	7	8
			250A	10					300A	7	8.5	9.5
									400A	12	13.5	14.5
									500A	14	15.5	16.5
									600A	17.5	19	20

Accuracy class depending on the burden output. Primary current at rated output current of 1A/5A

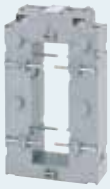
NOTE: Cable/Bus–bar type AC current transformers; operating frequency: 48 to 62 Hz; max system voltage: 0.72 kV; rated insulation level: 3kV/1min @ 50Hz; security factor: ≤5; rated secondary current: 5A standard (1A on request); DIN–rail or panel mounting.
All the products are CE marked. The primary ranges with ☐ are cRUus marked.

Current transformers

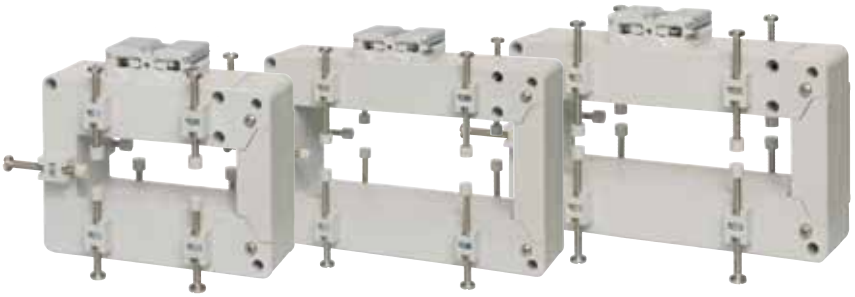
Types	CTD-3X				CTD-4X				CTD-8V CTD-8H				CTD-8Q	
														
Class	0.5				0.5				0.5				0.5	
Bus-bar size/Cable diam	max 51x15mm; ϕ 41mm				max 64x20mm; ϕ 51mm				max 81x31mm				max 55x100mm	
Dimension (HxWxD)	109x77x42mm				113x90x42mm				132.9x87x60mm				144x129x55mm	
Standards	IEC60044-1				IEC60044-1				IEC60044-1				IEC60044-1	
Accuracy class depending on the burden output	Burden (VA)				Burden (VA)				Burden (VA)				Burden (VA)	
	Class	0.5	1	3	Class	0.5	1	3	Class	0.5	1	3	Class	0.5
Accuracy class	50A			1.75	150A		2.5	5	150A			2	1000	15
	60A			2	200A		3.25	6	200A			4	1500	15
	70A			2.5	250A	2.5	4.5	2	250A			5	2000	15
	75A			3	300A	3	4	3	300A		2	6	2500	15
	80A			3	400A	6	9	3	400A	3	5	8	3000	15
	100A		2	3.5	500A	10	12.5	4	500A	5	7	0	4000	15
	120A		2.25	4	600A	11	13.5	4	600A	6	0	2		
	125A		2.5	4.5	700A	12.5	15	5	700A	6	0	2		
	150A	2.25	3	6	750A	13	15.5	5	750A	8	2	5		
	160A	2.5	3.5	6.5	800A	14	16.5	5	800A	8	2	5		
	200A	3	4.5	8.5	1000A	17.5	20	6	1000A	0	5	20		
	250A	3.5	6.5	10.5	1200A	20	22.5	6	1200A	2	5	20		
	300A	7	10	13	1250A	20	22.5	6	1250A	2	5	20		
	400A	9	14	17	1500A	27.5	30	8	1500A	5	20	25		
	500A	14	18	21	1600A	27.5	30	8	1600A	5	20	25		
	600A	17	21	24					2000A	20	25	30		
	700A	22	26	29					2500A	25	30	40		
	750A	24	28	31										
	800A	25	29	32										
	1000A	35	39	42										
	1200A	40	44	47										

Accuracy class depending on the burden output. Primary current at rated output current of 1A/5A
NOTE: Cable/Bus–bar type AC current transformers; operating frequency: 48 to 62 Hz; max system voltage: 0.72 kV; rated insulation level: 3kV/1min @ 50Hz; security factor: ≤5; rated secondary current: 5A standard (1A on request); DIN–rail or panel mounting.
All the products are CE marked. The primary ranges with ▭ are cRUus marked.

Current transformers

Types	CTD-9V CTD-9H				CTD-10V CTD-10H				CTD-11V CTD-11H		CTD-12V CTD-12H	
												
Class	0.5				0.5				0.5		0.5	
Bus-bar size/Cable diam	126x36mm				126x51mm				125x35mm		125x53mm	
Dimension (HxWxD)	177.9x91.7x60mm				177.9x106.7x60mm				178x98x55mm		178x125x60mm	
Standards	IEC60044-1				IEC60044-1				IEC60044-1		IEC60044-1	
Accuracy class depending on the burden output	Burden (VA)				Burden (VA)				Burden (VA)		Burden (VA)	
	Class	0.5	1	3	Class	0.5	1	3	Class	0.5	Class	0.5
Accuracy class	400A		3	6	400A	1	7	10	1000A	15	1000A	15
	500A	2	4	8	500A	3	10	14	1500A	15	1500A	15
	600A	4	6	10	600A	5	12	17	2000A	15	2000A	15
	700A	4	8	10	700A	8	15	20	2500A	15	2500A	15
	750A	4	8	10	750A	10	15	20	3000A	15	3000A	15
	800A	4	8	10	800A	10	15	20	4000A	15	4000A	15
	1000A	6	10		1000A	12	20	25				
	1200A	8	12		1200A	15	25	30				
	1250A	8	12		1250A	15	25	30				
	1500A	10	15		1500A	20	30	40				
	1600A	10	15		1600A	20	30	40				
	2000A	15	20		2000A	25	40	50				
	2500A	20	25		2500A	30	50	60				
	3000A	25	30		3000A	30	50	60				
	3200A	25	30		3200A	30	50	60				

Accuracy class depending on the burden output. Primary current at rated output current of 1A/5A
NOTE: Cable/Bus–bar type AC current transformers; operating frequency: 48 to 62 Hz; max system voltage: 0.72 kV; rated insulation level: 3kV/1min @ 50Hz; security factor: ≤5; rated secondary current: 5A standard (1A on request); DIN–rail or panel mounting.
All the products are CE marked. The primary ranges with ☐ are cRUus marked.



Split Core Current transformers

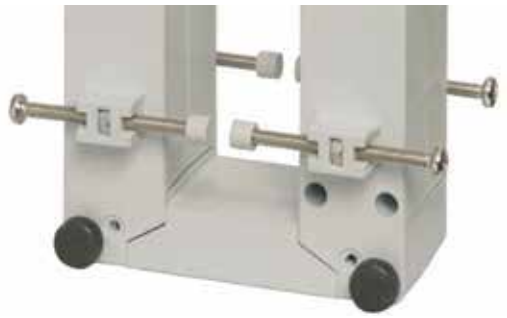
Types	CTD-5S			CTD-6S			CTD-8S		
									
Class	1			1			1		
Bus-bar size/Cable diam	27x32mm			52x51mm			81x31mm		
Dimension (HxWxD)	93.9x83x60mm			113.9x107x60mm			132.9x87x60mm		
Standards	IEC60044-1			IEC60044-1			IEC60044-1		
Accuracy class depending on the burden output	Burden (VA)			Burden (VA)			Burden (VA)		
	Class	1	3	Class	1	3	Class	1	3
Accuracy class	100A		1.5	150A		1.5	150A		1.5
	125A	1	1.5	200A	1.5	2	200A		1.5
	150A	1.5	2.5	250A	1.5	3.75	250A		2
	200A	1.5	5	300A	1.5	5	300A		2
	250A	1.5	5	400A	2.5	5	400A	3	5
	300A	2.5	7.5	500A	5	10	500A	5	7
	400A	5	10	600A	7.5	15	600A	6	10
				700A	7.5	15	700A	6	10
				750A	7.5	15	750A	8	12
				800A	10	15	800A	8	12
				1000A	10	15	1000A	10	15
							1200A	12	15
							1250A	12	15
							1500A	15	20
							1600A	15	20
							2000A	20	25
							2500A	25	30

Accuracy class depending on the burden output. Primary current at rated output current of 1A/5A
NOTE: Cable/Bus–bar type AC current transformers; operating frequency: 48 to 62 Hz; max system voltage: 0.72 kV; rated insulation level: 3kV/1min @ 50Hz; security factor: ≤5; rated secondary current: 5A standard (1A on request); DIN–rail or panel mounting.
All the products are CE marked. The primary ranges with ▭ are cRUus marked.

Split Core Current transformers

Types		CTD-9S			CTD-10S	
						
Class		1			1	
Bus-bar size/Cable diam		126x36mm			126x51mm	
Dimension (HxWxD)		177.9x91.7x60mm			177.9x106.7x60mm	
Standards		IEC60044-1			IEC60044-1	
Accuracy class depending on the burden output		Burden (VA)			Burden (VA)	
	Class	1	3	Class	1	3
Accuracy class	400A		3	400A	1	7
	500A	2	4	500A	1	10
	600A	4	6	600A	3	12
	700A	4	8	700A	5	15
	750A	4	8	750A	8	15
	800A	4	8	800A	10	15
	1000A	6	10	1000A	10	20
	1200A	8	12	1200A	12	25
	1250A	8	12	1250A	15	25
	1500A	10	15	1500A	15	30
	1600A	10	15	1600A	20	30
	2000A	15	20	2000A	20	40
	2500A	20	25	2500A	25	50
	3000A	25	30	3000A	30	50
	3200A	25	30	3200A	30	50

Accuracy class depending on the burden output. Primary current at rated output current of 1A/5A
NOTE: Cable/Bus–bar type AC current transformers; operating frequency: 48 to 62 Hz; max system voltage: 0.72 kV; rated insulation level: 3kV/1min @ 50Hz; security factor: ≤5; rated secondary current: 5A standard (1A on request); DIN–rail or panel mounting.
All the products are CE marked. The primary ranges with ▭ are cRUus marked.

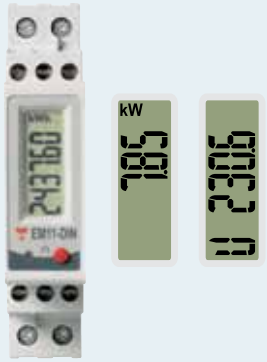


Energy

Our Energy Management range

Technical Characteristics

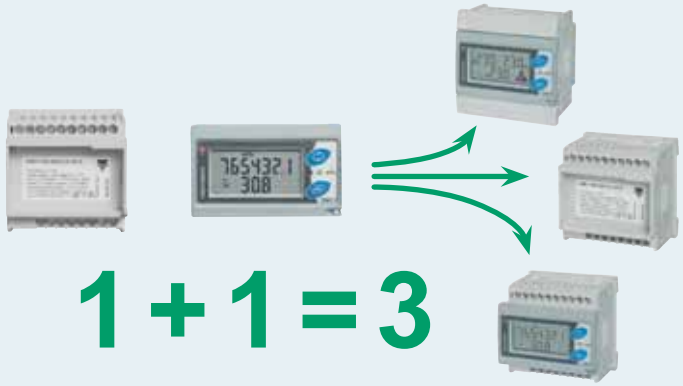
	DC Energy Meter	Energy Meter	Energy Analyzer
Types	**VMU-E/VMU-X**	**EM10 DIN**	**EM11 DIN**
			
Dimension (mm) HxWxD	90 x 18 x 67	90 x 18 x 67	90 x 18 x 67
Description	Modular DC energy analyzer	1-DIN module 1-phase energy meter kWh	1-DIN module 1-phase energy analyzer
Function	V, A, W, kWh	kWh	VLN, A, Hz, W, Wdmd, var, PF, kWh, kvarh. TRMS method
Input specifications			
Range	0 to 400VDC 0 to 20ADC (0 to 120mV/0 to 1000A with external shunt)	120 VAC 230 VAC Ib: 5 A, Imax: 32 AAC; 1-phase	120 VAC 230 VAC Ib: 5 A, Imax: 32 AAC; 1-phase
Accuracy	±0.5% RDG (V, A)		±0.5% RDG (V, A)
Active energy	Class 1 (kWh)	Class 1 (EN62053-21) Class B (EN50470-3)	Class 1 (EN62053-21) Class B (EN50470-3)
Reactive energy			Class 2 (EN62053-23)
Display	4 DGTs (inst. variable) 5+1 DGTs (energy) LCD	5+1 DGT (energy), LCD	4 DGT (inst. variables) 5+1 DGT (energies), LCD
Output specification			
Out 1 (Pulse)	1 static opto-mosfet	1-open collector	1-open collector
Out 2 (Alarm)			1-relay
Out 2 (Serial com)			
Inputs			
General specification			
Power supply	38 to 265 VAC/DC (VMU-X)	Self power supply	Self power supply
Approvals/Marks	CE	CE - cULus - MID certification	CE - cULus - MID certification



EM11 DIN
Power analyzer features in an ultra compact energy meter.
A new solution providing full parameters control, saving space in small switch panels. Relay output to switch OFF a non priority load, thus preventing a line overload condition.

Technical Characteristics

	Energy Meter	Energy Meter	Multifunction Meter
Types	**EM21 72D**	**EM21 72R**	**WM10 DIN**
			
Dimension (mm) HxWxD	72 x 72 x 65	72 x 72 x 65	71 x 90 x 64.5
Description	3-phase energy analyzer	3-phase energy analyzer with included split core CTs	3-phase multifunction meter
Function	Double mounting capability, panel and DIN rail, W, var, PF, Phase-sequence, VLL, VLN, A TRMS method	Double mounting capability, panel and DIN rail, W, var, PF, Phase-sequence, VLL, VLN, A TRMS method	W, var, PF, Hz, A, VLN, VLL TRMS method
Input specifications			
Range	120/230 VAC, 400 VAC In: 5 A; Imax: 6 A 3-phase	120/230 VAC, 400 VAC In: 90, 150, 250AAC 3-phase	400 VLLAC Ib: 10 A; Imax 65 A 3-phase
Accuracy	±0.5% RDG (V, A)	±0.5% RDG (V) ±1% RDG (A)	±0.5% RDG (V, A)
Active energy	Class 1 (EN62053-21) Class B (EN50470-3)	Class 2 (EN62053-21)	
Reactive energy	Class 2 (EN62053-23)		
Display	3 DGT (inst. variables) 6+1 DGT (energies), LCD	3 DGT (inst. variables) 6+1 DGT (energies), LCD	3 x 3 DGT (inst. variables)
Output specification			
Out 1 (Pulse)	1 static opto-mosfet	1 static opto-mosfet	
Out 2 (Alarm)			
Out 2 (Serial com)	RS485 (2-wire, Modbus) M-BUS by means of VMU-B	RS485 (2-wire, Modbus) M-BUS by means of VMU-B	
Inputs			
General specification			
Power supply	Self power supply	Self power supply	Self power supply
Approvals/Marks	CE	CE	CE



EM21 72D
One product, 3 different installation modes.
Detachable display to carry out up to 3 installation modes from the same instrument: DIN-rail, panel mounting or transducer.

Technical Characteristics

	Energy Meter	Energy Meter	Energy Analyzer
Types	**EM23 DIN,**	**EM33 DIN**	**EM24 DIN**
			
Dimension (mm) HxWxD	71 x 90 x 64.5	71 x 90 x 64.5	90 x 71 x 65
Description	4 DIN modules, 3-phase energy analyzer	4 DIN modules, 3-phase energy analyzer	4 DIN modules, 3-phase energy analyzer
Function	W, var, A, kWh, kvarh TRMS method	W, V, A, kWh TRMS method	Sys: VLL, VLN, , var, VA, Wdmd, W, VAdmd, Hz, kWh, kvarh, hour counter, gas and water Max: Admd, Wdmd, VAdmd. Single-phase: VLL, VLN, A, W, var, VA, PF, Admd, kWh, kvarh. TRMS method
Input specifications			
Range	400 VLLAC Ib: 10 A; Imax 65A, 3-phase	400 VLLAC Ib: 10 A; Imax 32 A, 3-phase	120/208VL-L; 400VL-L In: 1/5A, Imax: 10AAC; 120/208VL-L; 230VL-L 400VL-L; Ib: 10A, Imax: 65AAC; 3-phase
Accuracy	±0.5% RDG (V, A)	±0.5% RDG (V, A)	±0.5% RDG (V, A)
Active energy	Class 1 (EN62053-21) Class B (EN50470-3)	Class 1 (EN62053-21) Class B (EN50470-3)	Class 1 (EN62053-21) Class B (EN50470-3)
Reactive energy	Class 2 (EN62053-23)	Class 2 (EN62053-23)	Class 2 (EN62053-23)
Display	3 x 3 DGT (inst. variables) 6+1 DGT (energies) LCD	3 x 3 DGT (inst. variables) 6+1 DGT (energies) LCD	3x4 DGT (inst. variables) 8 DGT (energies), LCD
Output specification			
Out 1 (Pulse)	1-open collector		2-open collector/relay
Out 2 (Alarm)			2-relay/open collector
Out 2 (Serial com)	RS485, 2-wire	RS485, 2-wire	RS485 (2-wire) M-BUS by means of VMU-B
Inputs			3 digital input
General specification			
Power supply	Self power supply	Self power supply	Self power supply [X]. Auxiliary power supply: 18 to 60VAC/DC [L], 115/230VAC [D], according to the model
Approvals/Marks	CE - MID certification	CE - MID certification	CE - MID certification - cULus

EM24 DIN tamper proof and revenue approval for billing purpose.
Tamper proof capability using special covers, thus protecting all input/output screw terminals.
Lockable programming access using a password and a seal on the front selector.

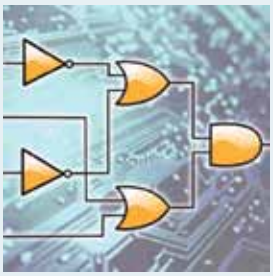
Technical Characteristics

	Energy Meter	Energy Meter	Power Analyzer
Types	**EM3 DIN**	**EM4 DIN**	**WM22 DIN**
			
Dimension (mm) HxWxD	90 x 162.5 x 63	90 x 162.5 x 63	90 x 162.5 x 63
Description	Modular 3-ph energy meter	Modular 3-ph energy meter	Modular 3-ph energy meter
Function	2-phase, 3-phase unbalanced 3 or 4 wires energy meter. Direct connection up to 100 A. 6+1 digits electromechanical display.	3-phase energy meter. Direct connection up to 100 A. Back-lighted LCD display. 31/2 digits istantaneous variables read out, 8+ 7½ dgt energy read out. Measurement of system and phase variables, energy by timeperiods, m3 H2O and m3 GAS.	3-phase power analyzer. Direct connection up to 100 A. Back-lighted LCD display. 4 x 31/2 digits istantaneous variables read out, 7½ digits energy read out. Measurement of system and phase variables. Measurement of THD.
Input specifications			
Range	208 VL-L, 220 VL-L, 400 VL-L, 660 VL-L / 20(00) AAC. 3-phase unbalanced load [3]	100 VL-L, 208 VL-L, 400 VL-L, 660 VL-L 5(10) AAC; 208 VL-L, 220 VL-L, 400 VL-L, 660 VL-L 20(100) AAC;	100 VL-L, 208 VL-L, 400 VL-L,660 VL-L 5(10) AAC; 208 VL-L, 400 VL-L [AV1], 220 VL-L [AV2] 660 VL-L [AV3] 20(100) AAC
Accuracy			±0.5% RDG (A,V)
Active energy	Class 2: (EN61036)	Class 1: (EN61036)	Class 1: (EN61036)
Reactive energy	Class 3: (EN61268)	Class 2: (EN61268)	Class 2: (EN61268)
Display	6+1 digits (electromechanical)	3½-digit backlighted LCD (8-digit for energy)	3½-digit backlighted LCD (8-digit for energy)
Output specification			
Out 1 (Pulse)	Dual pulse outputs (NPN transistor)	Dual pulse output module (NPN trans.)	Dual pulse output module (NPN trans.)
Out 2 (Alarm)		1 alarm output module (NPN trans.) 30 VDC/100 mA Max.	1 alarm + 1 pulse output module (NPN tr) 30 VDC/100 mA Max.
Out 2 (Serial com or analogue out)		RS422/485 serial port	RS422/485 serial port 1 analogue output : 0 to 20 mADC, or 0 to 10 VDC
Inputs		2 digital inputs module	
General specification			
Power supply	Self power supply: 400 VAC, 208 VAC VL-L, Auxiliary power supply: 230 VAC, 115 VAC	Self power supply: 400 VAC, 208 VAC, 220 VAC VL-L, Auxiliary power supply: 230, 115, 48, 24VAC, 18 to 60 VDC, 77 to 143 VDC	Self power supply: 400 VAC 208 VAC VL-L, Auxiliary power supply: 230, 115, 48, 24VAC, 18 to 60, 77 to 143 VDC
Approvals/Marks	CE	CE	CE

EM3, EM4 and EM22
The advantages of the modularity
All the DIN-rail models benefit from common plug and play modules, leading to the maximum flexibility even when the units are already mounted.

Technical Characteristics

	Multifunction Meter	Power analyzer	
Types	**WM12 DIN**	**WM14 DIN**	**WM14 DIN Advanced**
			
Dimension (mm) HxWxD	90 x 107.8 x 64.5	90 x 107.8 x 64.5	90 x 107.8 x 64.5
Description	3-phase multifunction power indicator	3-phase power analyzer	3-phase power analyzer
Function	System: VLL, VLN, An, VA, VAdmd, Wdmd, W, var, PF, Hz. Max: A, Wdmd. Single phase: VLL, VLN, A, VA, W, var, PF	System: VLL, An, PF, W, var, VA, Wdmd, VAdmd, Hz, kWh, kvarh, hour meter; Max: A, Admd, Wdmd; Single phase: VLL, VLN, A, Admd, PF, W, var, VA.	System: VLL, VLN, An, PF, W, var, VA, Wdmd, VAdmd, Hz, kWh, kvarh, hour meter; Max: Wdmd, VAdmd. Single phase: VLL, VLN, A, Admd, PF, W, var, VA, THD (A,V); Max: VLN, A, Admd, W. Min: VLN, A, PF.
Input specifications			
Range	400/660 VL-L/5(6) AAC 100/208 VL-L/5(6) AAC	400/660 VL-L/5(6) AAC 100/208 VL-L/5(6) AAC	400/660 VL-L/5(6) AAC, 100/208 VL-L/5(6) AAC
Accuracy	±0.5% FS (V, A)	0.5% FS (V, A)	0.5% FS (V, A)
Active energy		1 (kWh)	1 (kWh)
Reactive energy		2 (kvarh)	2 (kvarh)
Display	LED, 3x3-digit	LED, 3x3-digit, 8+1-digit (energies)	LED, 3x3-digit, 8+-digit (energies)
Output specification			
Out 1 (Pulse)			2 (open collector)
Out 2 (Alarm)			2 (relays) with PLC-type control function on 16 variables (AND/OR)
Out 2 (Serial com)	RS485 port (on request)	RS485 port (on request)	RS485 port (on request)
Inputs			
General specification			
Power supply	24 VAC, 48 VAC, 115 VAC, 230 VAC, 18 to 60 VDC	24 VAC 48 VAC 115 VAC 230 VAC 18 to 60 VDC	18 to 60 VAC/DC, 90 to 260 VAC/DC
Approvals/Marks	CE - cURus	CE - cURus - cCSAus	CE - cURus



WM14 and CPT Advanced AND/OR alarm logic.
The advanced versions of WM14 and CPT feature a smart and flexible PLC-like alarm management to achieve a better, extended and more efficient load control. This is possible by means of up to 16 virtual alarms (freely configurable, available for any variable by up, down or windows setpoints) with OR, AND and OR+AND logic linkable to 2 digital outputs.

Technical Characteristics

	Multifunction Meter	Power Analyzer	
Types	**WM12 96**	**WM14 96 Basic/Profibus**	**WM14 96 Advanced**
			
Dimension (mm) HxWxD	96 x 96 x 46	96 x 96 x 46	96 x 96 x 46
Description	3-phase multifunction indicator	3-phase power analyzer	3-phase power analyzer
Function	System: VLL, VLN, A, An, VA, VAdmd, W, Wdmd, var, PF, Hz. Max: A, Wdmd Single phase: VLL, VLN, A, VA, W, var, PF	System: VLL, An, PF, W, var, VA, Wdmd, VAdmd, Hz, kWh, kvarh, hour meter; Max: A, Admd, Wdmd; Single phase: VLL, VLN, A, Admd, PF, W, var, VA	System: VLL, VLN, An, PF, W, var, VA, Wdmd, VAdmd, Hz, kWh, kvarh, hour meter; Max: Wdmd, VAdmd. Single phase: VLL, VLN, A, Admd, PF, W,var, VA, THD (A,V); Max: VLN, A, Admd, W. Min: VLN, A, PF.
Input specifications			
Range	400/660 VL-L / 5(6) AAC, 100/208 VL-L / 5(6) AAC	400/660 VL-L / 5(6) AAC, 100/208 VL-L / 5(6) AAC	400/660 VL-L / 5(6) AAC, 100/208 VL-L / 5(6) AAC
Accuracy	0.5% FS (V, A)	0.5% FS (V, A)	0.5% FS (V, A)
Active energy		1 (kWh)	1 (kWh)
Reactive energy		2 (kvarh)	2 (kvarh)
Display	LED, 3x3-digit	LED, 3x3-digit, 8+1-digit (energies)	LED, 3x3-digit, 8+1-digit (energies)
Output specification			
Out 1 (Pulse)			2 (open collector)
Out 2 (Alarm)			AND/OR control of up to 16 selected variables
Out 2 (Serial com)	RS 485 port (on request)	RS 485 port (on request) Profibus DP port (on request)	RS422/485 (on request)
Inputs			
General specification			
Power supply	24 VAC 48 VAC 115 VAC 230 VAC 18 to 60 VDC	24 VAC, 48 VAC, 115 VAC, 230 VAC, 18 to 60 VAC/DC*, 90 to 260 AC/DC* (*: SG or DG version only)	18 to 60VAC/DC, 90 to 260VAC/DC
Approvals/Marks	CE - cURus - cCSAus	CE - cURus (no DG version)	CE - cURus

WM14 96 Profibus.
Power analyzer compatible with Profibus SP-V0.
WM14 96 is suitable to work with a Profibus bus, which can be connected both in a 9 pins terminal and in a screw terminal block. The first instrument can therefore be connected by the specific Profibus cable, while the other analyzer can be linked using a standard shielded cable.

Technical Characteristics

	Energy analyzer	Modular power quality analyzer	
Types	**EM26 96**	**WM30 96**	**WM40 96**
			
Dimension (mm) HxWxD	96 x 96 x 61	96 x 96 x 50	96 x 96 x 50
Description	3-phase energy analyzer	3-phase modular power quality analyzer	3-phase modular power quality analyzer
Function	Sys: VLL, VLN, An, var, VA, W, Wdmd, VAdmd, VA, Hz, %THD-V, %THD-A, kWh, kvarh, hour counter, gas and water Max: Admd, Wdmd, VAdmd. Single-phase: VLL, VLN, A, W, var, VA, PF, Admd. kWh, kvarh; TRMS method	System: VLN, VL , VA, W, var, PF, Hz, THD total/partial kWh and kvarh Single phase: VLN, VLL, VA, AL, An, W, var, PF, THD; Phase-sequence-asymmetry loss	System: VLN, VLL, VA, W, var, PF, Hz, THD. Total/partial kWh and kvarh (multi-tariff), K-factor Single phase: VLN, VLL, VA, AL An (calculated or measured),W, var, PF, THD, TDD; Phase sequence-asymmetry-loss Load profile, event stamping, data log-ger, utility and hour counters
Input specifications			
Range	120/208 VL-L, 400/660 VL-L In: 1/5A, Imax: 10AAC 3-phase unbal. load	400/690 VLL AC1(2)A 400/690 VLL AC5(6)A 100/208 VLL AC5(6)A 100/208 VLL AC1(2)A	400/690 VLL AC1(2)A 400/690 VLL AC5(6)A 100/208 VLL AC5(6)A 100/208 VLL AC1(2)A
Accuracy	±0.5% RDG (V, A)	±0.2% RDG (V, A)	±0.2% RDG (V, A)
Active energy	1 (kWh)	Class C (kWh), EN50470-3	Class C (kWh), EN50470-3
Reactive energy	2 (kvarh)	Class 2 (kvarh), EN62053-23	Class 2 (kvarh), EN62053-23
Display	3x4-digit (inst. variables) 8-digit (energies) LCD	4x4-digit backligh. LCD 9+1-digit (energies)	4x4-digit backligh. LCD 9+1-digit (energies).
Output specification			
Out 1 (Pulse)	3-open collector/ 2 relay	Up to 2 digital output modules	Up to 8 digital outputs
Out 2 (Alarm)	2-relay/ open collector	Up to 4 freely configuration virtual alarms	Up to 16 freely configuration virtual alarms
Out 2 (Analogue)		Up to 2 analogue outputs	Up to 4 analogue outputs
Communication	RS485 (2-wire)	RS485 port/RS232 port + RTC Ethernet port, BACNet-IP, BACNet MS/TP	RS 485 port/ RS232 port + RTC.Opti-cal port (ANSI type 2) Ethernet port, BACNet-IP, BACNet MS/TP
Inputs	3 digital inputs		Up to 6 digital inputs
General specification			
Power supply	18 to 60VAC/DC 90 to 260VAC/DC*	18 to 60 VAC/DC 90 to 260 VAC/DC	18 to 60 VAC/DC 90 to 260 VAC/DC
Approvals/Marks	CE - cULus (only *)	CE - cULus “Listed”	CE - cULus “Listed”

GO solar CALIFORNIA

WM30 and WM40 are now Eligible System Performance Meters for Go Solar California and meet Performance Based Incentive program eligibility with certificate documenting accuracy to less than 2%.

Technical Characteristics

	Modular power quality analyzer and PQT transducers		
Types	**WM3 96**	**WM5 96 and PQT H**	**PQT H**
			
Dimension (mm) HxWxD	96 x 96 x 124	96 x 96 x 124	90 x 90 x 140
Description	3-phase modular power quality analyzer	Modular smart power quality analyzer	Modular smart power quality transducer
Function	System: VLN, VLL, An, VA, VAdmd, W, Wdmd, var, PF, Hz, THD, total/ partial kWh, kvarh (4 tariff) Single phase: VLN, VLL, A, W, var, PF, THD	System:VLN, VLL, An, W, var, VA, PF, Hz, kWh, kvarh, Single-phase: VLN, VLL, A, W, var, VA, PF, THD-V, THD-A.THD and single H up to the 63rd H (V, A).	System:VLN, VLL, An, W, var, VA, PF, Hz, kWh, kvarh, Single-phase: VLN, VLL, A, W, var, VA, PF, THD-V, THD-A.THD and single H up to the 63rd H (V, A).
Input specifications			
Range	433 VAC-1/5 AAC 690 VAC-1/5 AAC	120/208VL-L, 400/690VL-L In: 1/5A, Imax: 10AAC	120/208VL-L, 400/690VL-L In: 1/5A, Imax: 10AAC
Accuracy	±0.5% RDG (V, A)	±0.2% RDG (V, A)	±0.2% RDG (V, A)
Active energy	1 (kWh)	Class 0.5 (EN62053-22)	Class 0.5 (EN62053-22)
Reactive energy	2 (kvarh)	Class 2 (EN62053-23)	Class 2 (EN62053-23)
Display	4x4-digit backligh. LCD 4x9-digit (energies).	4x4-digit backlighted LCD 4x9-digit (energies)	
Output specification			
Out 1 (Pulse)	Up to 2 single/dual open collector or relay modules	Up to 16, by: single dual or quadruple open collector or relay modules	Up to 16, by: single dual or quadruple open collector or relay modules
Out 2 (Alarm)	Up to 2 single/dual open collector or relay modules	Up to 16, by: single/dual or quadruple open collector or relay modules	Up to 16, by: single/dual or quadruple open collector or relay modules
Out 2 (Analogue)	Up to 2 single/dual analog output modules	Up to 8, by single/dual (mA/V) output modules	Up to 8, by single/dual (mA/V) output modules
Communication	RS 422/485 port RS232 port + RTC	RS422/485, RS232+RTC modules. Optical port (ANSI C12.18/Modbus) Internet/Ethernet comm.	RS422/485, RS232+RTC modules. Internet/Ethernet comm.
Inputs	Up to 3 digital inputs	Up to 12 (Wdmd, VAdmd sync.; tariff, contact status reading)	Up to 12 (Wdmd, VAdmd sync.; tariff, contact status reading)
General specification			
Power supply	18 to 60 VAC/DC 90 to 260 VAC/DC	18 to 60 VAC/DC, 90 to 260 VAC/DC	18 to 60 VAC/DC, 90 to 260 VAC/DC
Approvals/Marks	CE - cURus - CSA	CE - cURus - CSA	CE - cURus - CSA

WM3, WM5. Controlling the harmonic distortion.
The total harmonic distortion (THD) is the deviation from the reference sine wave at normal frequency. It is one of the most important factor to define a good or poor power quality. These analyzers, as well as WM14 Advanced, WM30, WM40 and EM26 are able to measure, display and control the THD.

Technical Characteristics

	Compact power transducer		Transducer
Types	**CPT DIN**	**CPT DIN Advanced**	**CVT DIN**
			
Dimension (mm) HxWxD	45 x 83.5 x 98.5	45 x 83.5 x 98.5	89 x 71.5 x 58.5
Descriotion	3-phase compact power transducer.	3-phase compact power transducer.	Single phase transducer
Function	4-digit data format instantaneous variable, 8+1-digit format energy variables, 5+2-digit data format hours. TRMS method. Sys: VLL, An, PF, W, var, VA, Wdmd, VAdmd, Hz, kWh, kvarh, hour meter; Max: Wdmd; Single-ph: VLL, VLN, A, Admd, PF, W, var, VA.	4-digit data format instantaneous variable, 8+1-digit format energies, 5+2-digit format hours. TRMS method. Sys: VLL, VLN, An, PF, W, var, VA, Wdmd, VAdmd, Hz, kWh, kvarh, hour; Max: Wdmd, VAdmd. Sing. ph: VLL, VLN, A, Admd, PF, W, var, VA; Max: VLN, A, Admd, W. Min: VLN,A, PF.	1-phase AC, DC. Measurements V, A, Hz.
Input specifications			
Range	120/208VAC, 400/690VAC, 1AAC and 5AAC	120/208VAC, 400/690VAC, 1AAC and 5AAC	1 A/100 VAC, 60 mVDC/ 10 VDC, 5 A/100 VAC, 5 A/500 VAC, 200VDC/ 1ADC, 45 to 55Hz, 55 to 65Hz, 350 to 450Hz
Accuracy	±0.5% RDG (A,V)	±0.5% RDG (A,V)	0.5% FS
Active energy	kWh: class 1	kWh: class 1 (EN62053-21)	
Reactive energy	kvarh: class 2	kvarh: class 2 (EN62053-23)	
Dispaly			
Output specification			
Out 1 (Pulse)		2 (open collector)	
Out 2 (Alarm)		2 (relays) with PLC-type control function on 16 variables (AND/OR)	
Out 2 (Analogue)		Up to 3: 20mA, 10VDC	0 to 20 mA, 4 to 20 mA, 0 to 10 V, 0 to ±1 V
Out 2 (Serial com)	RS422/485, RS232	RS422/485, RS232	
Inputs			
General specification			
Power supply	18 to 60VAC/DC, 90 to 260VAC/DC	18 to 60VAC/DC, 90 to 260VAC/DC	24 VAC, 48 VAC, 115 VAC, 230 VAC
Approvals/Marks	CE - cURus - CSA	CE - cURus - CSA	

List of modules: Modular Panel Mounting

Description	Channel	WM3 96	WM5 96	PQT H	Part Number
WM3-96 base		■			AD1016H
WM5-96 base with optical port			■		AD2001
WM5-96 base without optical port			■		AD2000
PQT H base				■	AD2020
240/415V-1/5AAC input for WM3		■			AQ1018
400/690V-1/5AAC input for WM3		■			AQ1019
240/415V-1/5AAC (10A) input for WM5, PQT H			■	■	AQ2030
120/208V-1/5AAC (10A) input for WM5, PQT H			■	■	AQ2031
18-60VAC/DC power supply		■	■	■	AP1021
90-260VAC/DC power supply		■	■	■	AP1020
20mADC analogue output	1	■			AO1050
10VDC analogue output	1	■			AO1051
±5mADC analogue output	1	■			AO1052
±10mADC analogue output	1	■			AO1053
±20mADC analogue output	1	■			AO1054
±1VDC analogue output	1	■			AO1055
±5VDC analogue output	1	■			AO1056
±10VDC analogue output	1	■			AO1057
20mADC analogue output	2	■			AO1026
10mADC analogue output	2	■			AO1027
±5mADC analogue output	2	■			AO1028
±10mADC analogue output	2	■			AO1029
±20mADC analogue output	2	■			AO1030
±1VDC analogue output	2	■			AO1031
±5VDC analogue output	2	■			AO1032
±10VDC analogue output	2	■			AO1033
20mADC analogue output	2		■	■	AO2050
10mADC analogue output	2		■	■	AO2051
±5mADC analogue output	2		■	■	AO2052
RS485 port	1	■	■	■	AR1034
RS485 port 115.2kbps	1		■	■	AR2040
Relay output (pulse/alarm)	1	■	■	■	AO1058
Relay output (pulse/alarm)	2	■	■	■	AO1035
Open collector output (pulse/alarm)	1	■	■	■	AO1059
Open collector output (pulse/alarm)	2	■	■	■	AO1036
Open collector output (pulse/alarm)	4	■	■	■	AO1037
Digital inputs	3	■	■	■	AQ1038
Digital inputs + aux	3		■	■	AQ1042
RS232 port + RTC	1	■	■	■	AR1039
Internet/Ethernet port	1		■	■	AR1061

List of modules: WM30 96 and WM40 96

Description	Channel	WM30 96	WM40 96	Part Number
WM30-96 base, input 400/690VLL AC 1(2)A. Power Supply: 90 to 260VAC/DC (48 to 62Hz)		■		WM30AV43H
WM30-96 base, input 400/690VLL AC 1(2)A. Power Supply: 18 to 60VAC/DC (48 to 62Hz)		■		WM30AV43L
WM30-96 base, input 400/690VLL AC 5(6)A. Power Supply: 90 to 260VAC/DC (48 to 62Hz)		■		WM30AV53H
WM30-96 base, input 400/690VLL AC 5(6)A. Power Supply: 18 to 60VAC/DC (48 to 62Hz)		■		WM30AV53L
WM30-96 base, input 100/208VLL AC 5(6)A. Power Supply: 90 to 260VAC/DC (48 to 62Hz)		■		WM30AV63H
WM30-96 base, input 100/208VLL AC 5(6)A. Power Supply: 18 to 60VAC/DC (48 to 62Hz)		■		WM30AV63L
WM30-96 base, input 100/208VLL AC 1(2)A. Power Supply: 90 to 260VAC/DC (48 to 62Hz)		■		WM30AV73H
WM30-96 base, input 100/208VLL AC 1(2)A. Power Supply: 18 to 60VAC/DC (48 to 62Hz)		■		WM30AV73L
WM40-96 base, input 400/690VLL AC 1(2)A. Power Supply: 90 to 260VAC/DC (48 to 62Hz)			■	WM40AV43H
WM40-96 base, input 400/690VLL AC 1(2)A. Power Supply: 18 to 60VAC/DC (48 to 62Hz)			■	WM40AV43L
WM40-96 base, input 400/690VLL AC 5(6)A. Power Supply: 90 to 260VAC/DC (48 to 62Hz)			■	WM40AV53H
WM40-96 base, input 400/690VLL AC 5(6)A. Power Supply: 18 to 60VAC/DC (48 to 62Hz)			■	WM40AV53L
WM40-96 base, input 100/208VLL AC 5(6)A. Power Supply: 90 to 260VAC/DC (48 to 62Hz)			■	WM40AV63H
WM40-96 base, input 100/208VLL AC 5(6)A. Power Supply: 18 to 60VAC/DC (48 to 62Hz)			■	WM40AV63L
WM40-96 base, input 100/208VLL AC 1(2)A. Power Supply: 90 to 260VAC/DC (48 to 62Hz)			■	WM40AV73H
WM40-96 base, input 100/208VLL AC 1(2)A. Power Supply: 18 to 60VAC/DC (48 to 62Hz)			■	WM40AV73L
Dual relay output (SPDT)	2	■	■	M O R2
Dual static output (AC/DC Opto-Mos)	2	■	■	M O O2
Dual analogue output (+20mADC)	2	■	■	M O A2
Dual analogue output (+10VDC)	2	■	■	M O V2
RS485 / RS232 port module		■	■	M C 485 232
Ethernet/TCP IP port module		■	■	M C ETH
BACNet-IP port module		■	■	M C BAC IP
BACNet MS/TP port module		■	■	M C BAC MS
Combined digital inputs (6) and Relay (4) outputs (SPDT)	10		■	M F I6 R4
Combined digital inputs (6) and Static (6) outputs (AC/DC Opto-Mos)	12		■	M F I6 O6
RS485 / RS232 port module with integrated Memory			■	M C 485 232 M
Ethernet port module with integrated Memory			■	M C ETH M
BACnet over IP port module with integrated Memory			■	M C BAC IP M
BACnet MS/TP port module with integrated Memory			■	M C BAC MS M
Temperature + Process signal measurements (°C/°F)			■	M A T P
Direct neutral current measurement + Temperature + Process signal measurements (°C/°F)			■	M A T P N

List of modules: Modular Panel Mounting

Description	EM3 DIN	EM4 DIN	WM22 DIN	Part Number
EM3 400VLL / 100AAC, self power supply	■			AE2000
EM3 208VLL / 100AAC, self power supply	■			AE2001
EM3 660VLL / 100AAC, 115VAC -15+10%	■			AE2002
EM3 660VLL / 100AAC, 230VAC -15+10%	■			AE2003
EM4 400VLL / 100AAC, self power supply		■		AG2200
EM4 208VLL / 100AAC, self power supply		■		AG2201
EM4 400VLL / 100AAC, 230VAC, 50-60Hz		■		AG2202
EM4 208VLL / 100AAC, 230VAC, 50-60Hz		■		AG2203
EM4 660VLL / 100AAC, 230VAC, 50-60Hz		■		AG2204
EM4 400VLL / 100AAC, 115VAC, 50-60Hz		■		AG2205
EM4 208VLL / 100AAC, 115VAC, 50-60Hz		■		AG2206
EM4 660VLL / 100AAC, 115VAC, 50-60Hz		■		AG2207
EM4 400VLL / 10AAC, 230VAC, 50-60Hz		■		AG2214
EM4 208VLL / 10AAC, 230VAC, 50-60Hz		■		AG2215
EM4 660VLL / 10AAC, 230VAC, 50-60Hz		■		AG2216
EM4 400VLL / 10AAC, 115VAC, 50-60Hz		■		AG2217
EM4 208VLL / 10AAC, 115VAC, 50-60Hz		■		AG2218
EM4 660VLL / 10AAC, 115VAC, 50-60Hz		■		AG2219
EM4 100VLL / 10AAC, 230VAC, 50-60Hz		■		AG2226
EM4 100VLL / 10AAC, 115VAC, 50-60Hz		■		AG2227
EM4 400VLL / 100AAC, 18-60VDC		■		AG2230
EM4 400VLL / 10AAC, 18-60VDC		■		AG2233
EM4 100VLL / 10AAC, 18-60VDC		■		AG2236
WM22 400VLL / 100AAC, self power supply			■	AF2100
WM22 208VLL / 100AAC, self power supply			■	AF2101
WM22 400VLL / 100AAC, 230VAC, 50-60Hz			■	AF2102
WM22 208VLL / 100AAC, 230VAC, 50-60Hz			■	AF2103
WM22 660VLL / 100AAC, 230VAC, 50-60Hz			■	AF2104
WM22 400VLL / 100AAC, 115VAC, 50-60Hz			■	AF2105
WM22 208VLL / 100AAC, 115VAC, 50-60Hz			■	AF2106
WM22 660VLL / 100AAC, 115VAC, 50-60Hz			■	AF2107
WM22 400VLL / 10AAC, 230VAC, 50-60Hz			■	AF2114
WM22 208VLL / 10AAC, 230VAC, 50-60Hz			■	AF2115
WM22 660VLL / 10AAC, 230VAC, 50-60Hz			■	AF2116
WM22 400VLL / 10AAC, 115VAC, 50-60Hz			■	AF2117
WM22 208VLL / 10AAC, 115VAC, 50-60Hz			■	AF2118
WM22 660VLL / 10AAC, 115VAC, 50-60Hz			■	AF2119
WM22 100VLL / 10AAC, 230VAC, 50-60Hz			■	AF2126
WM22 100VLL / 10AAC, 115VDC, 50-60Hz			■	AF2127
WM22 400VLL / 100AAC, 18-60VDC			■	AF2130
WM22 400VLL / 10AAC, 18-60VDC			■	AF2133
WM22 100VLL / 10AAC, 18-60VDC			■	AF2136
0-20mADC analogue output, 1 channel			■	AO2920
0-10VDC analogue output, 1 channel			■	AO2921
Open collector output (pulse/ alarm), 2 channels	■	■	■	AO2900
One relay+one o. collector (pulse/al.), 2 channels	■	■	■	AO2910
Digital inputs + AUX, 2 channel		■		AQ2940
RS485 port		■	■	AR2950

Icon legend

Icon	Description
A-V Class 0.5	Accuracy of the main variables
EN61036 kWh 100%	Standard-compliant energy metering
IP65	Housing front protection degree
100A	Max measured current in case of direct connection
8888 2*4 8	Display digit-number
THD V/A 50h	Harmonic analysis
!	Asymmetry control
Max	Max and/or minimum signal detection and storage
8Kb	Data logging
	Internal clock
t 4	Energy metering by time period
	Load profile displaying and recording
	Digital filter with action on display and signals output
12345 6 GAS	Energy, gas, water metering, hour counter
A-V... W-PF / An	Instantaneous variables metering
Ith	Thermal current
2	Digital inputs for gas/water metering or Wdmd synchronisation
4	Pulse outputs for energy retransmission
4	Analogue outputs for variable retransmission
4	Alarm outputs for variable control
RS232	Communication port
OR AND	Logic control on alarms

OUR SALES NETWORK IN EUROPE

AUSTRIA - Carlo Gavazzi GmbH
Ketzergasse 374, A-1230 Wien
Tel: +43 1 888 4112
Fax: +43 1 889 10 53
office@carlogavazzi.at

BELGIUM - Carlo Gavazzi NV/SA
Schaarbeeklei 213/3, B-1800 Vilvoorde
Tel: +32 2 257 4120
Fax: +32 2 257 41 25
sales@carlogavazzi.be

DENMARK - Carlo Gavazzi Handel A/S
Over Hadstenvej 40, DK-8370 Hadsten
Tel: +45 89 60 6100
Fax: +45 86 98 15 30
handel@gavazzi.dk

FINLAND - Carlo Gavazzi OY AB
Petaksentie 2-4, FI-00661 Helsinki
Tel: +358 9 756 2000
Fax: +358 9 756 20010
myynti@gavazzi.fi

FRANCE - Carlo Gavazzi Sarl
Zac de Paris Nord II, 69, rue de la Belle Etoile, F-95956 Roissy CDG Cedex
Tel: +33 1 49 38 98 60
Fax: +33 1 48 63 27 43
french.team@carlogavazzi.fr

GERMANY - Carlo Gavazzi GmbH
Pfnorstr. 10-14
D-64293 Darmstadt
Tel: +49 6151 81000
Fax: +49 6151 81 00 40
info@gavazzi.de

GREAT BRITAIN - Carlo Gavazzi UK Ltd
7 Springlakes Industrial Estate,
Deadbrook Lane, Hants GU12 4UH,
GB-Aldershot
Tel: +44 1 252 339600
Fax: +44 1 252 326 799
sales@carlogavazzi.co.uk

ITALY - Carlo Gavazzi SpA
Via Milano 13, I-20020 Lainate
Tel: +39 02 931 761
Fax: +39 02 931 763 01
info@gavazziacbu.it

NETHERLANDS - Carlo Gavazzi BV
Wijkermeerweg 23,
NL-1948 NT Beverwijk
Tel: +31 251 22 9345
Fax: +31 251 22 60 55
info@carlogavazzi.nl

NORWAY - Carlo Gavazzi AS
Melkeveien 13, N-3919 Porsgrunn
Tel: +47 35 93 0800
Fax: +47 35 93 08 01
post@gavazzi.no

PORTUGAL - Carlo Gavazzi Lda
Rua dos Jerónimos 38-B,
P-1400-212 Lisboa
Tel: +351 21 361 7060
Fax: +351 21 362 13 73
carlogavazzi@carlogavazzi.pt

SPAIN - Carlo Gavazzi SA
Avda. Iparraguirre, 80-82,
E-48940 Leioa (Bizkaia)
Tel: +34 94 480 4037
Fax: +34 94 480 10 61
gavazzi@gavazzi.es

SWEDEN - Carlo Gavazzi AB
V:a Kyrkogatan 1,
S-652 24 Karlstad
Tel: +46 54 85 1125
Fax: +46 54 85 11 77
info@carlogavazzi.se

SWITZERLAND - Carlo Gavazzi AG
Verkauf Schweiz/Vente Suisse
Sumpfstrasse 32,
CH-632 Steinhausen
Tel: +41 41 747 4535
Fax: +41 41 740 45 40
info@carlogavazzi.ch

OUR SALES NETWORK IN NORTH AMERICA

USA - Carlo Gavazzi Inc.
750 Hastings Lane,
USA-Buffalo Grove, IL 60089,
Tel: +1 847 465 6100
Fax: +1 847 465 7373
sales@carlogavazzi.com

CANADA - Carlo Gavazzi Inc.
2660 Meadowvale Boulevard,
CDN-Mississauga Ontario L5N 6M6,
Tel: +1 905 542 0979
Fax: +1 905 542 22 48
gavazzi@carlogavazzi.com

MEXICO - Carlo Gavazzi Mexico S.A. de C.V.
Calle La Montaña no. 28, Fracc. Los Pastores
Naucalpan de Juárez, EDOMEX CP 53340
Tel & Fax: +52.55.5373.7042
mexicosales@carlogavazzi.com

OUR SALES NETWORK IN ASIA AND PACIFIC

SINGAPORE - Carlo Gavazzi Automation Singapore Pte. Ltd.
61 Tai Seng Avenue
#05-06 UE Print Media Hub
Singapore 534167
Tel: +65 67 466 990
Fax: +65 67 461 980

MALAYSIA - Carlo Gavazzi Automation (M) SDN. BHD.
D12-06-G, Block D12,
Pusat Perdagangan Dana 1,
Jalan PJU 1A/46, 47301 Petaling Jaya,
Selangor, Malaysia.
Tel: +60 3 7842 7299
Fax: +60 3 7842 7399

CHINA - Carlo Gavazzi Automation (China) Co. Ltd.
Unit 2308, 23/F.,
News Building, Block 1,1002
Middle Shennan Zhong Road,
Shenzhen, China
Tel: +86 755 83699500
Fax: +86 755 83699300

HONG KONG - Carlo Gavazzi Automation Hong Kong Ltd.
Unit 3 12/F Crown Industrial Bldg.,
106 How Ming St., Kwun Tong,
Kowloon, Hong Kong
Tel: +852 23041228
Fax: +852 23443689

OUR COMPETENCE CENTRES AND PRODUCTION SITES

Carlo Gavazzi Industri A/S
Hadsten - **DENMARK**

Carlo Gavazzi Automation (Kunshan) Co., Ltd.
Kunshan - **CHINA**

Carlo Gavazzi Ltd
Zejtun - **MALTA**

Carlo Gavazzi Controls SpA
Belluno - **ITALY**

Uab Carlo Gavazzi Industri Kaunas
Kaunas - **LITHUANIA**

HEADQUARTERS

Carlo Gavazzi Automation SpA
Via Milano, 13 - I-20020
Lainate (MI) - **ITALY**
Tel: +39 02 931 761
info@gavazziautomation.com

Printed on 100% recycled paper produced usig post consumer de-inked waste.

CARLO GAVAZZI
Automation Components

Energy to Components!

www.gavazziautomation.com

CARLO GAVAZZI

8028197 BRO Energy Management ENG 05-2012