



## **Solutions**

# **Conventional Energy**

# Conventional Energy

## Solutions for



**Power plants and substations**

**Generator sets**

**Large and heavy industries**

**Commercial buildings**

**Residential buildings**

### ABOUT CARLO GAVAZZI

Carlo Gavazzi Automation is a multinational electronics group active in the design, manufacture and marketing of electronic equipment targeted at the global markets of industrial and building automation.

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

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

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

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

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

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

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

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





## DESIGNED TO MEET MARKET REQUIREMENTS

Energy has always been a crucial element of human life, economic growth and technological progress. Until recently, its reserves have seemed endless. Today this is no longer the case. To achieve the objectives of better provision and use of energy it is fundamental to meet the needs of today, optimising them without compromising the ability of future generations to satisfy their own needs.

More and more the best use of resources, power control and reduction and optimization of consumption are playing a decisive role in contemporary geopolitics and industrial development.

Therefore a well considered use of energy from different sources is not only possible, but absolutely necessary.

Carlo Gavazzi is one of the first companies to deal with this, providing a complete series of meters to measure and analyse the power distributed across the network and to predict and calculate the related energy consumption. We provide comprehensive solutions for energy monitoring, metering and management, utilising many years of experience and multinational expertise.

Carlo Gavazzi's products for applications in the conventional energy market comprise energy meters, power quality and energy analysers, current-voltage-frequency monitoring relays, digital panel meters, timers and current

transformers. The range is completed with energy monitoring systems. The accurate measurement of energy consumption (by MID certified energy meters) provides billing information for operators who are sub-billing the energy. The energy analysers help the operators to identify consumption trends and take corrective action. The power quality analysis improves on-site efficiency and eases negotiation with utility companies.

Without doubt Carlo Gavazzi makes a major contribution to optimising energy use in residential and commercial buildings and in all kinds of industries and infrastructures, improving efficiency, saving costs and reducing CO<sub>2</sub> emissions.

# Conventional Energy

## Power plants and substations



### Multifunction meters

**WM14  
WM12  
WM10**

### Energy analysers

**EM26**

### Power transducers

**PQT-H  
CPT-DIN**

### Power quality analysers

**WM40  
WM30  
WM5**

### Web servers

**VMU-C EM**

Carlo Gavazzi offers solutions for any size of power plant. In the case of mini- or micro-hydroelectric systems, a full control solution is available using our wide power analyser range, while the mechanical variables can be monitored by relays and digital panel meters. The most basic plants are equipped with a monitoring

relay, such as the DPC02, which controls both the voltage and the frequency levels at the same time. The more advanced plants add the monitoring of the alternator temperature by means of the DTA01 or DTA02 and of the reservoir water level by means of the DLA71, which can control the water acting on the pumps or on the motors

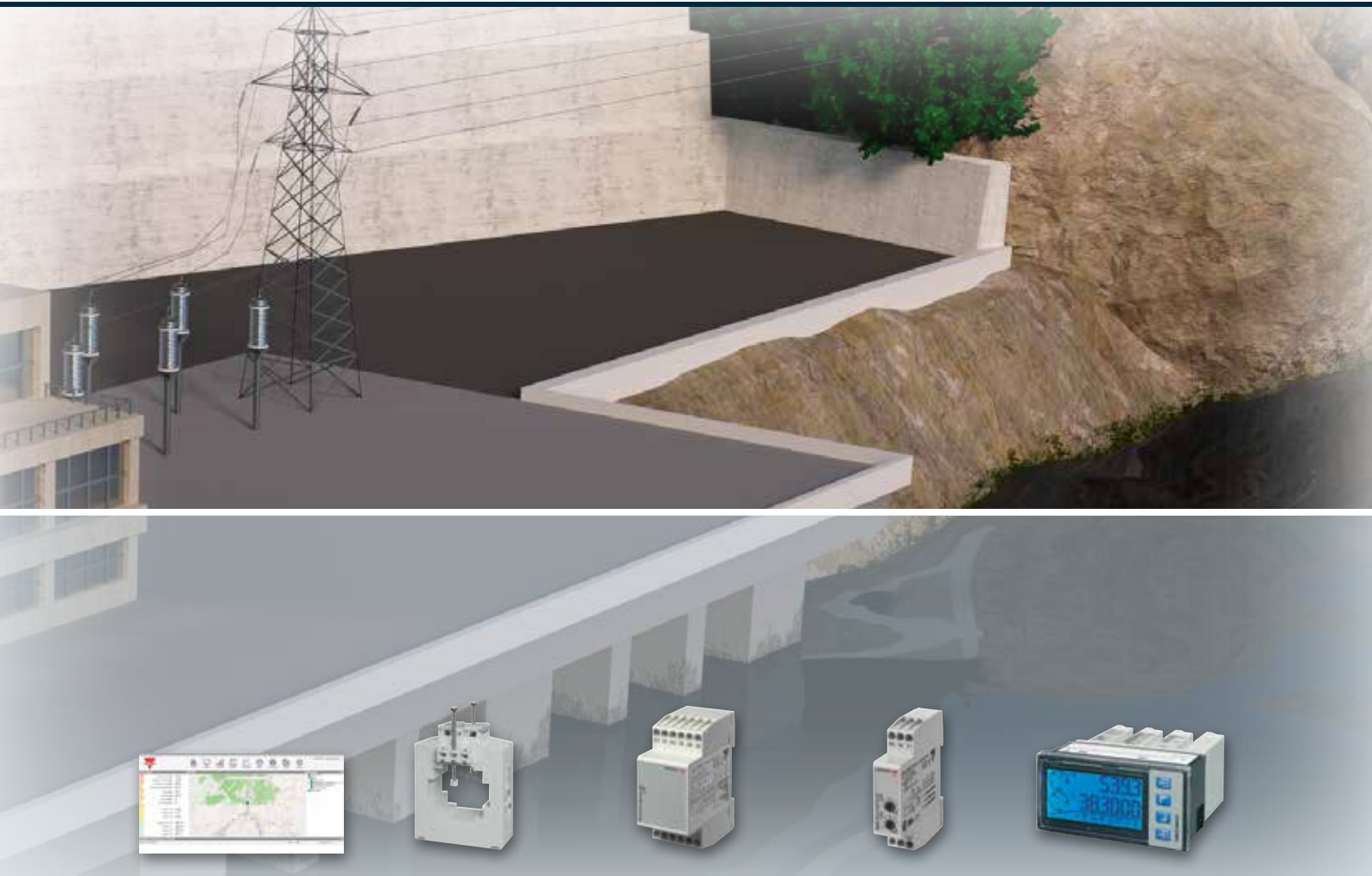
of the floodgates, to empty them or fill them to the right level. The shaft rotation speed can be monitored, displayed and serially retransmitted to a supervisor system (PLC or SCADA) by using the UDM60, the modular digital panel meter "DPM" for tachometer measurements.

The water flow or any other process variables, can also be monitored and displayed, correctly scaled in the original engineering unit, by means of the UDM40, belonging to the same DPM family.

When the plant is privately owned, production needs to be measured by a certified meter, in order to be correctly paid by the public grid authorities. The EM26 with MID certification is the right solution and can be connected to the same serial







**Web servers**

**Em<sup>2</sup>-Server  
VMU-Y EM**

**Current transformers**

**CTD  
TADK**

**Monitoring relays**

**DLA71  
DTA/PI-DIN  
DPC02/DPC72**

**Timers**

**DAA  
DMB  
HAA**

**Digital panel meters**

**UDM60  
UDM40  
USC**

bus of the above-mentioned control devices in order to allow complete remote-plant supervision. Medium and large power plants (hydro, thermal, nuclear), as well as substations, are controlled by sophisticated DCSs, whose electrical input data (relevant to the different systems composing the whole plant) can be provided by Carlo Gavazzi's power quality analysers, such as the WM30, WM40 or WM5, via the serial port, by using the Modbus RTU or TCP protocol, or through an OPC server. If communication is interrupted for any reason, the WM40 can, if required, be equipped with a datalogger module, allowing the system to recover the missing information. The flexible and comprehensive ability of these meters to manage the information and

convert it into alarms or warnings - thanks to their PLC-like AND/OR logic - allows money and space to be saved, as all the features of any additional components are implemented in our hardware. When dealing with single distribution-gear, control-gear or switch-gear (present not only in generation facilities but also in

production sites and other infrastructures), whereas in the past 3 analogue ammeters and a voltmeter (whose input was selected by a rotary switch) were used, the target is to replace these with a single multifunction meter or more high-performing digital meters. This results in the saving of both space and money.



# Conventional Energy

## Generator sets



Multifunction meters	Energy analysers	Power/energy transducers	Power quality analysers	Web servers	Monitoring relays	DC UPS
WM14 WM12	EM210 EM210 MV EM26	CPT-DIN ET112 ET340	WM20 WM30 WM40	VMU-C EM VMU-Y EM Em <sup>2</sup> -Server	DWA01/DFC PTA01/02/PI-DIN DPC02/DPC72	SPUBC SPUC

Generator sets must offer reliability, low maintenance and long life wherever they are installed: construction sites, infrastructures, industries, agriculture. In generator sets it is necessary to measure, display and control all the main variables relevant to the power produced, including harmonic distortion. The "Advanced" version of the 3-phase power analyser WM14 and of the correspondent transducer model CPT-DIN, are the optimum for this application. The PLC-type alarm control on 16 variables allows the anomalies to be divided into two groups: critical problems (phase loss, under-voltage, frequency, with OR logic) can automatically lead to the disconnection of the generator

set, with a horn or lamp warning; non-priority anomalies can be transmitted to the supervisor system via the serial port. The WM14 and CPT "Advanced" give the possibility of counting the generation hours and to monitor different parameters (from the current to harmonic distortion), also storing the peak and trough values. The most critical gen-set applications need an even more sophisticated control system: the modular power quality analysers carry out this task perfectly, also with data-logging capabilities in the case of the WM40. When all the control functions are carried out by the supervisory system, the ET energy transducers are the ideal solution to retransmit via Modbus all the

electrical variables and energy data. The simplest generators can be monitored by temperature, frequency, and/or voltage relays while co-generation systems feeding the public grid need an interface protection, capable of disconnecting the generator from the grid in case of mismatching of the main electrical parameters. The interface protection relay is approved according to National standards when required, as are our monitoring relay types DPC02, DPC72 and PI-DIN0126.



# Large and heavy industries



## Energy analysers

**EM26  
EM24 DUPLINE®**

## Power transducers

**PQT-H  
CPT-DIN**

## Power quality analysers

**WM40  
WM30  
WM5**

## Web servers

**VMU-Y EM  
VMU-C EM  
Em<sup>2</sup>-Server**

## Monitoring relays

**DPA53  
DPB51  
DIA/DIB**

## Timers

**DMB/DAA  
FMB/FAA**

## Contactless power analysers

**CPA050  
CPA300**

In the large and heavy industry markets, as well as in airports, or other large installations, it is important to have effective control of the mains, since medium voltage systems and high currents are involved. Because of the type of loads, a low level of harmonics is crucial to allow the installation to work in a correct and reliable way. The solution proposed by Carlo Gavazzi involves two modular series of power quality analysers, which can be tailored according to requirements, offering many I/O combinations with PLC-like AND/OR logic, serial, Ethernet, or optical ports, different protocols (such as Modbus, BACnet or Ethernet/IP), integrated data logger, harmonic

analysis and multi-tariff management. All this can be integrated into any SCADA or BMS system or managed by our monitoring solution, VMU-C EM: it allows all the installation parameters to be monitored and controlled by a local or remote (via e-mail or SMS) warning to the maintenance staff. By means of its logging and analysis functions, the operator is able to program regular maintenance or to introduce additional maintenance. Nowadays all manufacturing companies need to have a cost control system in their production sites. Efficient cost allocation can be achieved by using energy analysers such as the EM26, which provides all the data from each department.

Cost and consumption forecasts are also available, in a user-friendly way, even in the case of multi-site applications, by using the VMU-C EM, which pushes the data to a VMU-Y EM or Em<sup>2</sup>-Server, able to aggregate and centralise all the information in the main control area. Carlo Gavazzi meters and analysers can be used in combination with the Dupline® fieldbus, achieving the ideal solution in very noisy industrial plants, by exploiting the robustness of the Dupline® bus when compared with the traditional serial communication buses. The CPA family is the ideal solution to be used in industrial processes in order to monitor AC or DC variables.

# Conventional Energy

## Commercial buildings



Multifunction meters	Energy meters / analysers	MID energy analysers	Quick-fit energy analysers	Web servers	BACnet controller	DC UPS
WM14 WM12 WM10	EM340/EM110 EM111/EM112 EM210 MV	EM24 EM24 DUPLINE® EM26	EM280 EM270/EM271 TCD	Em <sup>2</sup> -Server VMU-Y EM VMU-C EM	SB2WEB24	SPUBC SPUC

Deregulation in the energy market and the constant increase in electrical energy costs have led to a fast growing demand for fiscal metering. A flat rate of energy consumption for each shop in a shopping mall, or for each tenant in a residential building, has become unacceptable: either the provider or



the user could lose money, so both of them require a "certified" value of energy used. In 2006 the European Union released a Measuring Instrument Directive (called MID), involving a number of metering issues. The scope of this directive was to guarantee users a high level of safety and reliability in the measuring instruments, protected against data corruption, whilst at the same time ensuring the free circulation of certified measuring instruments within the EU.

For years Carlo Gavazzi has been providing a whole range of MID-certified energy meters, for all requirements in any 1-phase or

3-phase application, either by direct current measurement or by current transformers. These range from the simple, compact single phase EM110 and EM111 up to the advanced EM24 and EM26 for 3-phase systems.

Carlo Gavazzi is one of the first energy meter manufacturers to have an internal MID-approved Test Laboratory, from which the meters are supplied, certified and sealed, ready for installation.

All the data can be aggregated and therefore analysed and shared among the tenants using the new web-server solutions for energy management: VMU-C EM, VMU-Y EM and Em<sup>2</sup>-Server.



# Residential buildings



## Energy meters / analysers

**EM111/EM110  
EM112/EM340  
EM210 MV**

## MID energy meters

**EM23**

## MID energy analysers

**EM24 DUPLINE®  
EM26**

## Web servers

**VMU-C EM  
VMU-Y EM  
Em<sup>2</sup>-Server**

## Quick-fit energy analysers

**EM280  
EM270/EM271  
TCD**

## Surge arresters

**DSF A/P  
DSB A/P  
DSB51xxDP**

## Home automation controller

**SH2WEB24**

In new constructions, it is absolutely essential to achieve maximum energy efficiency and to avoid situations where a load (a fan, a light or a heating system) is working whenever is not needed. This is also the goal of building automation systems. Carlo Gavazzi offers its energy management products, connected to the Dupline® field- and installation-bus, together with its home automation system, as a unique control solution capable of transmitting multiple digital and analogue signals over long distances via the Dupline® 2-wire bus. The controller connects to Carlo Gavazzi energy meters via Modbus RS485, and Dupline® pulse count input modules are also available as a general solution

for interfacing with meters measuring consumption of energy, water, gas, heat etc.

However, it is a different situation when dealing with old buildings which are completely lacking in building automation or in monitoring systems. In this case the best and cheapest solution is retrofitting the various switch gears with the implementation of a specifically developed energy measuring system, like the EM210 MV and EM271 "Retrofit" versions.

By using these energy meters, it is possible to obtain the current measurement simply by installing the split-core current sensors onto the wires, without disconnecting them or switching off the mains.

The meter can be mounted in any type of panel frame, being extremely compact and suitable both for panel mounting (72x72 mm) and for DIN-rail mounting (only 4-DIN modules).

When several loads are to be controlled, the EM270 and the EM280 energy meters provide a complete monitoring solution, which is very compact and easily installed, saving 90% of the installation time when compared to a traditional monitoring system.

In new installations, the EM100/300 series provides different metering solutions, both 1- and 3-phase, and different communication capability on-board, including Modbus and M-bus protocols.

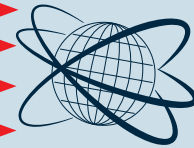
# Conventional Energy Diagrams

Cloud and Server level

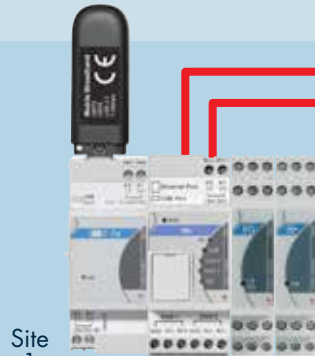


FTP protocol

HTTP protocol

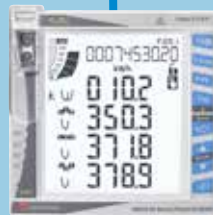


Web-server and Gateway level



Site 1

Meter level



RS485 protocol

## VMU-C EM in an Energy Monitoring structure

## VMU-C EM

The VMU-C EM is the core solution for effective Energy Monitoring in applications of all sizes. It collects measurements from energy meters through the fieldbus; it stores information (variables and alarms) in its local database and displays it through its web-based graphical user interface.

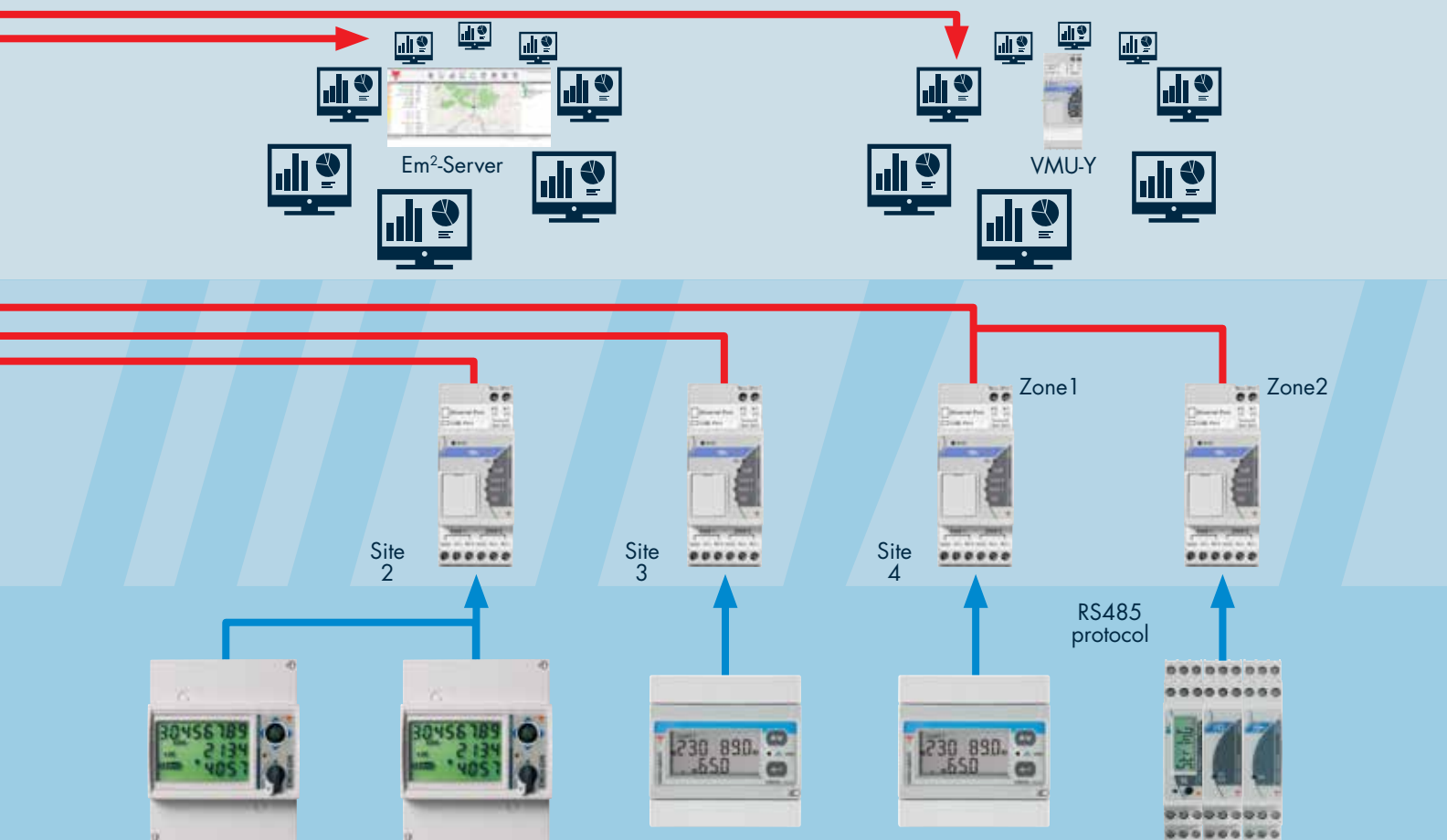
The whole system set-up and operation is possible via the VMU-C's web interface, without any external software.

The VMU-C EM can exchange data with other systems by means of standard FTP/HTTP communication. Multi-site applications can be managed by adding either the Em<sup>2</sup>-Server or the VMU-Y EM to the VMU-C EM powered installations.



- No crash or compatibility problems due to different operating systems, different languages, libraries, etc.
- Improved IT security
- Application-focused software embedded inside industrial grade hardware: no need for a dedicated PC for monitoring
- On-site database
- Polling device, data-logger and Ethernet gateway in a single compact unit
- Modular solution for additional inputs/outputs
- Optional modular modem for wireless Ethernet connections
- Scalability to multi-site applications by means of VMU-Y + Em<sup>2</sup>-Server solutions





### Em<sup>2</sup>-Server multi-site solution

- Multi-site management software based on Virtual Machine concept
- Flexible operation and set-up
- Reliable data communication with VMU-C EM
- Up to 100 geographically different sites can be managed with a single unit
- A single supplier for energy meters, gateways and data management solutions
- Scalable solution up to 3200 meters



### VMU-Y EM multi-site solution

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

# Conventional Energy

## Our product range

### Web server and data logger



#### VMU-C EM

- Micro PC with Web-server and Web service capability
- Data and event logging capability
- Internal 4GB memory and 16GB SDHC card back-up memory
- Variables shown as graphs and numbers in formatted tables
- All data exports on HTML format compatible with Excel or other spread sheets
- Management up to 32 Energy Meters and 11 remote I/O module groups

#### MAIN FEATURES

- Energy analysis of each single load
- Energy bill evaluation
- Virtual main meter
- Alarms control with automatic e-mailing and SMS management

### USB dongle connection modules



#### VMU-D

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

#### MAIN FEATURES

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

### Embedded aggregation server



#### VMU-Y EM

- 2-DIN size; DIN-rail mounting
- Multi-site monitoring management
- Power supply 24 VDC ( $\pm$  20%)
- 2 USB ports (data /connection backup)
- 1 SD port (backup)

#### MAIN FEATURES

- Data analysis and benchmark
- Data and event logging
- All data exported in format compatible with Excel or other spread sheets
- Tariffs and single contract management
- Alarms management
- Database replication from up to 10 VMU-C EM

### Cloud multi-site aggregation server



#### Em<sup>2</sup>-Server

- Software for energy data management
- Multi-site monitoring management
- Flexible and scalable architecture
- VMware® technology compatibility

#### MAIN FEATURES

- Load profile management
- Data analysis and benchmark
- Data and event logging
- Customizable graphical synoptic
- All data exported in format compatible with Excel or other spread sheets
- Tariffs and multi contract management
- Alarms management
- Database replication from up to 100 VMU-C EM

### 3-phase multifunction meters



#### WM10

- 4-DIN rail module housings
- 3-phase multifunction meter with direct connection
- Direct connection up to 65 A
- Accuracy 0.5%
- Display 3 variables at a time

#### MAIN FEATURES

- Direct measurement in a compact housing to save space
- Measurement of both system and single phase variables
- Easy installation: no parameters programming needed

### 3-phase multifunction meters



#### WM12 / WM14

- 6-DIN rail module or 96 x 96 mm panel mounting housings
- 3-phase multifunction indicator (WM12) or analyser (WM14)
- Accuracy 0.5 % (voltage, current)
- Front protection degree IP65, NEMA4X, NEMA12

#### MAIN FEATURES

- Available models from as a simple indicator up to an advanced analyser
- Allows the serial re-transmission of the main parameters to a PLC for full control of the system
- Suitable for DIN-rail or panel mounting



# Our product range

## 1-phase energy meters /analysers



### EM110 / EM111

- 1 DIN size; DIN-rail mounting
- Electromechanical totalizer (EM110) or backlit touch LCD (EM111)
- Measurement of voltage, current, power, power factor and frequency (EM111)
- Bi-directional energy metering, 7 digits, cl. B (EN50470)
- Measuring inputs: 115/230 VAC, 45 A

#### MAIN FEATURES

- Self-powered
- Pulse output or as an alternative: RS485 Modbus, M-Bus (EM111)
- Sealable terminal covers
- Approvals/Marks: CE, MID (PFB, PFA only EM111), cULus (only 115V)

## 1-phase energy analysers



### EM112

- 2 DIN size; DIN-rail mounting
- Backlit touch LCD
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering, 8 digits, cl. B (EN50470)
- Measuring inputs: 115/230 VAC, 100 A

#### MAIN FEATURES

- Self-powered
- Pulse output or as an alternative: RS485 Modbus, M-Bus
- Sealable terminal covers
- Approvals/Marks: CE, MID (PFA and PFB), cULus (only 115V)

## 3-phase energy analysers for 5A or 0.333mV CTs



### EM210 / EM210 MV

- 4 DIN modules or 72 x 72 mm
- LCD with two installation options
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering, 3 x 3-digit or 8-digit readout, cl. B (EN50470)
- Voltage inputs: 3x230(400) VAC; Current inputs: 5 A CT (AV version) or 0.333mV from CTV-xX sensors (MV version)

#### MAIN FEATURES

- Self-power supply (230-400V aux power supply in MID version)
- Pulse output and optionally: RS485 Modbus RTU, high speed (up to 115 kbps)
- Sealable terminal covers
- Approvals/Marks: CE, cULus, MID (only 5A, aux power supply version)

## Quick-fit 3-phase energy analysers



### EM270 / EM271 + TCD X / TCD M

- 4-DIN rail module or 72 x 72 mm housing
- Two 3-phase energy analysers with sum function
- Current measurement by triple CT, solid core (EM270), split-core (EM271) with RJ plug
- Equivalent to class 1 (kWh)
- Two pulse open collectors and serial RS485 outputs

#### MAIN FEATURES

- Save 90% of the installation time
- Voltage and serial bus daisy chain connection
- Fast and error-proof CT connection with CT ratio self-recognition

## Quick-fit 3-phase energy analysers



### EM280 + TCD06BX/BS

- 4 DIN modules or 72 x 72 mm
- 6-channel energy meter
- Current measurement by 6-channel CT blocks with RJ plugs: solid core (TCD06BX), split core (TCD06BS)
- Equivalent to class 1 (kWh)
- Two pulse open collectors and serial RS485 outputs

#### MAIN FEATURES

- Branch monitoring in new and retrofit applications, saving 90% of the installation time
- Voltage and serial bus daisy chain installation
- Multichannel retrofit up to 6 x 32 A
- Fast and error-proof CT connection with CT ratio self-recognition

## 3-phase energy meters



### EM23 / EM33

- 4-DIN rail module housings
- 3-phase energy meter with direct connection
- Direct connection up to 32 A (EM33) or 65 A (EM23)
- Class B (EN50470)
- Serial RS485 or open collector output

#### MAIN FEATURES

- Direct measurement in a very compact housing to save space
- Allows local energy allocation for cost allocation purposes
- On request, MID annex D certification available

# Conventional Energy

## Our product range

### 3-phase energy analysers



#### EM24 / EM24 DUPLINE®

- 4-DIN rail module housings
- 3-phase energy meter with direct connection
- Direct connection up to 65 A
- Class B (EN50470)
- Optional serial port (Modbus, M-bus and Dupline®), digital input and outputs

#### MAIN FEATURES

- Direct measurement in a very compact housing to save space
- On request, MID annex D certification available
- Allows integration of energy management in the Dupline® fieldbus system
- Dupline® port for energy and inst. variable retransmission (optional)

### 3-phase energy analysers



#### EM26 96

- 96 x 96 mm housing, only 45 mm behind the panel
- 3-phase energy meters with CT/VT connection
- Primary current input: 5 A
- Class B (kWh) acc. to EN50470
- Pulse/alarm outputs
- Modbus communication port

#### MAIN FEATURES

- Energy analyser in a very compact housing to save space
- Suitable to measure generated and consumed energy
- Approvals/Marks: CE, MID, cULus

### 3-phase energy analysers for direct current up to 65A



#### EM340

- 3 DIN modules
- Backlit touch LCD
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering, 3x 8-digit, cl. B (EN50470)
- Measuring inputs: 230 to 400 V<sub>LL</sub> AC, 65A

#### MAIN FEATURES

- Self-powered
- Dual tariff management
- Pulse output or RS485 Modbus or M-Bus port
- Sealable terminal covers
- Approvals/Marks: CE, MID (PFA and PFB)

### 3-phase power analysers



#### WM20

- 96 x 96 mm panel mounting housing
- Accuracy 0.2 % (voltage, current)
- Class 0.5S (kWh)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- cULus approved

#### MAIN FEATURES

- Provides installation data to a SCADA to manage the whole system
- Modular housing to build the instrument according to the real application needs
- Modbus, Ethernet, Profibus, BACnet (IP and MS/TP) communication ports

### 3-phase power quality analysers



#### WM30 / WM40

- 96 x 96 mm panel mounting housing
- Accuracy 0.2 % (voltage, current)
- Class 0.5S (kWh)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- Optional analogue and digital outputs
- Optional analogue and digital inputs (WM40)
- cULus approved

#### MAIN FEATURES

- Built-in datalogger for instantaneous variables, dmd profiles and events (WM40)
- Modular housing to build the instrument according to the real application needs
- Modbus and BACnet (both RS485 or Ethernet), Profibus DPVO, and EtherNet/IP communication port available

### 3-phase power quality analysers/transducers



#### WM5 / PQT-H

- 96 x 96 mm panel (WM5); 90 x 90 mm DIN-rail (PQTH)
- Accuracy 0.2 % (voltage, current)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- Approvals/Marks: cULus approved, Measurement Canada certified (WM5)

#### MAIN FEATURES

- 16-alarm PLC logic, digital inputs for utility metering, 12 tariffs, event data stamping
- Modular housing to build the instrument according to the real application needs
- Modbus RS485 and Ethernet communication ports available



# Our product range

## 3-phase power transducers



### CPT-DIN

- 83.5 x 45 x 98.5 mm DIN-rail housing
- Accuracy 0.5 % (voltage, current)
- Measurement by CT and VT
- Front protection degree IP20
- Analogue, digital, pulse or serial outputs available

#### MAIN FEATURES

- Compact size power transducer
- Provides electrical variables set to a PLC to manage compressors and other loads
- Suitable for on-board panel installation

## 1-phase energy transducers



### ET112

- 2 DIN size; DIN-rail mounting
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering, 2 tariffs, cl. 1 (EN62053-1)
- Measuring inputs: 115/230 VAC, 100 A

#### MAIN FEATURES

- Self-powered
- RS485 Modbus port (screw, 2x RJ45)
- Optical port
- Sealable terminal covers
- Approvals/Marks: CE

## 3-phase energy transducers



### ET340

- 3 DIN size; DIN-rail mounting
- Measurement of voltage, current, power, power factor, frequency
- Bi-directional energy metering, 2 tariffs, cl. 1 (EN62053-1)
- Measuring inputs: 208 to 400 V<sub>L-L</sub> AC, 65 A

#### MAIN FEATURES

- Self-powered
- RS485 Modbus port (screw, 2x RJ45)
- Optical port
- Sealable terminal covers
- Approvals/Marks: CE

## Contactless power analysers



### CPA050

- 63 x 46 x 25 mm (without connectors); DIN rail and panel mounting
- Power analyser
- 1-phase AC (from 1 to 400 Hz) or DC
- Power supply from 9 to 30 VDC

#### MAIN FEATURES

- Contactless Hall effect sensing for current (15 mm hole diameter)
- True RMS AC and DC monitoring
- Voltage range: 800 VAC, 1000 VDC
- Current range: 50 AAC, 50 ADC

## Contactless power analysers



### CPA300

- 99 x 89 x 30 mm (without connectors); DIN rail and panel mounting
- Power analyser
- 1-phase AC (from 1 to 400 Hz) or DC
- Power supply from 9 to 30 VDC

#### MAIN FEATURES

- Contactless Hall effect sensing for current (33 mm hole diameter)
- True RMS AC and DC monitoring
- Voltage range: 800 VAC, 1000 VDC
- Current range: 300 AAC, 400 ADC

## Current transformers



### CTD / TADK

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

#### MAIN FEATURES

- Wound primary / solid core or split-core
- Compliance with IEC 60185, VDE 0414-1 regulations
- Removable DIN-rail mounting holder
- Approvals/Marks: CE, cULus

# Conventional Energy

## Our product range

### Current sensors



#### CTV

- Split-core current sensors
- Primary currents: 60 to 800 A
- Secondary output: 0.333 VAC
- Accuracy class: 1
- Approvals/Marks: CE, cURus approved

#### MAIN FEATURES

- Very compact split-core sensors ideal for retrofit applications
- Suitable for use with EM210 MV energy meter

### 3-phase monitoring relays



#### DPA51

- 81 x 17,5 x 67,2 mm DIN-rail housing
- Phase sequence and loss relay
- 3 phase AC (own power supply); regenerated voltage
- Power supply from 208 to 480 VAC
- Approvals/Marks: CE, UL, CSA and CCC approved

#### MAIN FEATURES

- Compressor protection from reverse running and phase loss
- 17.5 mm width: the smallest in the market
- Plug and play: no settings needed

### 3-phase monitoring relays



#### DPA53

- 81 x 17,5 x 67,2 mm DIN-rail housing
- Phase sequence, loss and undervoltage relay
- 3 phase AC (own power supply)
- Power supply from 208 to 480 VAC (2 models)
- Approvals/Marks: UL, CSA and CCC approved

#### MAIN FEATURES

- Motor protection from reverse running and wrong phase voltage
- 17.5 mm width: the smallest in the market
- Plug and play: only undervoltage threshold to be set

### 3-phase monitoring relays



#### DPB51

- 81 x 17,5 x 67,2 mm DIN-rail housing
- TRMS 3-phase over/under voltage, phase sequence and loss relay
- 3-phase AC (own power supply)
- Power supply from 208 to 480 VAC
- Approvals/Marks: UL and CSA approved

#### MAIN FEATURES

- Detects the phase-phase or phase-neutral voltage
- 17.5 mm width: the smallest in the market
- Independent voltage setpoints and built-in delays

### 3-phase fully programmable monitoring relays



#### DPD

- 22,5 mm DIN rail mounting Enclosure
- 120 to 480 VAC Delta & Star mains
- Voltage and frequency monitoring
- 2 SPDT 8 A relay outputs
- NFC programming
- Approvals/Marks: UL, CSA and CCC

#### MAIN FEATURES

- Up to 10 configurable set points
- Apps for Android and Windows PC programming

### Monitoring relays



#### DPC02/DPC72

- DIN-rail mounting 45 mm (DPC02); 4 DIN Modules (DPC72)
- 208 to 690 VAC, 50 Hz or 60 Hz mains monitoring
- Output, 1 programmable DPDT or 2 SPDT (DPC02); 1 x DPDT (DPC72)
- Serial Port RS485/Modbus, JBUS protocol on DPC72
- Approvals/Marks: CE, UL and CSA approved

#### MAIN FEATURES

- 1-phase or 3-phase voltage and frequency monitoring
- Output is active when voltage/ frequency are within the Set windows
- Programming: DPC02 by means of DIP switch, DPC72 directly on the display or via serial line



# Our product range

## 3-phase interface protection relays



### PI-DIN0126

- 90 x 71.6 x 66.3 mm; DIN-rail housing
- 1 and 3-phase interface protection relay
- Auxiliary power supply 230 VAC or 24 VDC
- 2 digital inputs, 2 relay outputs
- Approved according VDE V 0126-1 Norm

#### MAIN FEATURES

- Energy production plants protection (VDE V 0126-1 Norm)
- Data logger with events logging
- RS485 communication
- Dual passive and anti islanding detection

## Current monitoring relays



### DIA / DIB

- 80 x 22.5 x 99.5 mm; DIN-rail housing
- Over or under current relay
- 1 phase AC or DC
- Power supply from 24 to 48 VAC/DC or 115/230 VAC
- Approvals/Marks: UL and CSA approved

#### MAIN FEATURES

- Detects any variation of the desired current level
- Direct connection, by CT or by external shunt
- Latch and inhibit functions, TRMS measurement (DIB)

## 3-phase monitoring relays



### DWA01

- 83 x 22.5 x 99.5 mm; DIN-rail housing
- Cos  $\phi$  monitoring relays
- 3 phase AC (own power supply)
- Power supply from 208 to 240 VAC or from 380 to 480 VAC
- Approvals/Marks: UL and CSA approved

#### MAIN FEATURES

- Detects any potentially dangerous change of the cos phi
- Direct current connection or by CT
- Easy setup

## 1-phase monitoring relays



### DFB / DFC

- 80 x 22.5 x 99.5 mm; DIN-rail housing
- Over or under frequency relay
- 1 phase, 50 or 60 Hz
- Measuring range from 24 to 240 VAC
- Approvals/Marks: UL and CSA approved

#### MAIN FEATURES

- Detects any variation of the frequency
- 2 Hz or 10 Hz selectable alarm window
- 2 independent delays and SPDT out (DFC)

## Motor thermistor relays



### DTA71 / DTA72

- 35 mm Mini-DIN housing
- Motor thermistor relay
- PTC Open and PTC Short detection
- Universal power supply from 24 V to 240 VAC/DC
- Approvals/Marks: UL and CE approved

#### MAIN FEATURES

- Multicolour LED with alarm discrimination
- Auto or manual, local or remote reset, test function (DTA72)
- Ready for reset function (DTA72)

## Monitoring relays



### DLA71

- 81 x 35,5 x 67,2 mm; DIN-rail housing
- Pump alternating relay for 2 or 3 pumps
- Galvanically separated power supply, 24/48 or 115/230 VAC
- 2x or 3x 5 A SPST output
- Approvals/Marks: UL and CSA approved

#### MAIN FEATURES

- Built-in function for automatic rotation of the pumps
- Built-in delay for the second or third pump in case of simultaneous activation is required
- Built-in function for automatic rotation of the pumps

# Conventional Energy

## Our product range

### Timers



#### DAA51 / DMB51

- 81 x 17,5 x 67,2 mm; DIN-rail housing
- Delay on operate function (DAA), multifunction (DMB)
- Combined AC and DC power supply
- Repeatability: < 0.2%
- Approvals/Marks: UL, CSA, RINA approved

#### MAIN FEATURES

- Delay on operate/release; interval (manual/automatic start)
- Double interval; symmetrical recycler (ON or OFF first)
- Timing range from 0.1 s to 100 h

### Timers



#### DBA52

- 81 x 17,5 x 67,2 mm; DIN-rail housing
- Delay on release function
- Power supply 24 VDC or from 24 to 240 VAC
- Repeatability: < 0.2%
- Approvals/Marks: UL and CSA approved

#### MAIN FEATURES

- Extended delay-on-release time, selectable from 0.1 s to 100 h
- 5 A SPDT relay

### Timers



#### HAA

- 21.5 x 28 mm housing for 8-pin or 14-pin blade socket
- Multifunction timer with 4 functions
- DPDT or 4PDT output
- Universal power supply
- Approvals/Marks: cUR and CSA approved

#### MAIN FEATURES

- Front knob adjustable time setting
- Selectable time ranges from 0.1 s to 100 h
- Delay on operate, symmetrical recycle, ON or OFF first interval

### BACnet controller



#### SB2WEB24

- BACnet controller for HVAC and lighting systems
- Drives up to 7 Dupline® 2-wire networks
- Each Dupline® network can manage 7 DALI Masters
- Data points from Dupline® and EM's are converted to BACnet objects
- Dimension: 2-DIN housing

#### MAIN FEATURES

- Simple and flexible system for a significant reduction in installation cost
- Easy interfacing to the building management system via BACnet/IP
- Easy-to-use PC-based configuration and commissioning tool

### Home automation controller



#### SH2WEB24

- Home automation functions and energy data logging configurable by software
- Modbus RS485 port for connecting to energy meters
- Dimension: 2-DIN housing

#### MAIN FEATURES

- Data logging of signals and energy values
- Web-server user interface for monitoring of energy consumption

### Dupline® decentral analog I/O modules



#### SHPINxxx / SHPOUTxxx

- Dupline® analog I/O modules
- Pt1000/Ni1000/10K3 Thermistor/10K potentiometer, 4-20 mA, 0-10 VDC inputs, 0-10 VDC outputs
- Small dimension housing for decentral installation in wall boxes
- Bus-powered or 15-30 VDC (various types)

#### MAIN FEATURES

- Interface for standard temp/CO<sub>2</sub>/humidity/pressure sensors and heating valves/damper actuators
- Flexible decentral installation
- Easy and fast multi-drop installation of bus-cable from module to module



# Our product range

## Dupline® decentral counter modules



### SHPINCNTxx4

- Pulse counter module with 4 count inputs
- Built-in counters for local pulse counting on each input
- Count values are stored in non-volatile memory
- Counts up to 99999999 with automatic roll-over
- Count frequency up to 100 Hz

#### MAIN FEATURES

- Bus-powered
- Small-dimension for easy integration in existing installations
- Each input can be used for counting or as input

## Dupline® decentral I/O modules



### BDA-RE13A-U

- Dupline® relay module
- 1 x 16 A relay output
- Inrush current: Up to 130 A
- Bus-powered
- Small dimension housing for de-central installation in wall-boxes etc.

#### MAIN FEATURES

- De-central relay for installation at the position of the load
- Easy and fast installation with Dupline® 2-wire bus
- High inrush current suitable for lighting loads
- Cost effective

## Dupline® decentral I/O modules



### BDx-INCONx-U

- Dupline® input module
- 4 or 8 x contact inputs
- Bus-powered
- Small dimension housing for de-central installation in wall-boxes etc.

#### MAIN FEATURES

- De-central interface for light switches
- De-central interface for doors and windows contacts
- Easy and fast installation with Dupline® 2-wire bus
- Cost effective

## Dupline® environmental sensors



### SHSUxxxx

- Bus-powered Temperature / CO<sub>2</sub> / Humidity sensors for wall mounting
- Available in different combinations with optional display or traffic light LED
- Temperature measuring range: -20°C to +50°C (-4 to 122°F)
- CO<sub>2</sub> measuring range: 0 to 2000 ppm
- Humidity measuring range: 0 to 100 %RH

#### MAIN FEATURES

- Bus communication and power on the same two wires
- Easy and fast installation with bus-cable multi-dropped from module to module
- High flexibility for changes and enhancements of an installation

## Dupline® sensors



### SHSQP360L

- Dupline® passive infrared detector
- Detection angle: 360°
- Operating distance: 2.5 – 4.0 m
- Ceiling mount or Euro-box

#### MAIN FEATURES

- Detects presence of people in rooms
- Used for energy saving by switching not needed loads of (lighting, heating etc)
- Easy and fast installation with Dupline® 2-wire bus
- Cost effective

## Digital panel meters



### USC

- 48 x 96 mm DIN-rail Mounting (no display)
- Multi Input Modular Controller
- AC/DC current and voltage, C & F temperature, resistance, frequency measurement
- Serial Port RS485/ RS232 Modbus, JBUS protocol
- Approvals/Marks: CE, UL and CSA approved

#### MAIN FEATURES

- Particularly indicated for process control
- Up to 4 independent alarms and set points
- Linearization of V, A inputs up to 16 points.

# Conventional Energy

## Our product range

### Digital panel meters



#### UDM40

- Panel mounting 48 x 96 mm
- Multi Input Modular 4DGT LED Meter & Controller
- AC/DC current and voltage, C & F temperature, resistance, frequency measurement
- Serial Port RS485/RS232 Modbus, JBUS protocol
- Approvals/Marks: CE, UL and CSA approved

#### MAIN FEATURES

- Particularly indicated for process control
- Up to 4 independent alarms and set points
- Linearization of V, A and Hz inputs up to 16 points.

### Digital panel meters



#### UDM60

- Panel mounting 48 x 96 mm
- Dual 6 DGT LCD uP Meter and Controller, digital and analog reading
- Dual rate, speed, frequency and period measurement
- 20 mA or 10 V optional analog output
- Approvals/Marks: UL, CSA and CCC approved

#### MAIN FEATURES

- Particularly indicated for process control
- Up to 4 independent alarms and set points
- Linearization of inputs up to 16 points.

### Surge arresters



#### DSF A/P

- Suitable for all single phase (A) and three phase (P) utilities
- Available for MCO V 300 V, 385 V, 460 V and 550 V
- 20 kA Inom, 40 kA Imax per pole
- Dimensions depending to modules according to DIN standard
- Approvals/Marks: CE, UL and CSA. Category IEC / EN Class II / Type 2

#### MAIN FEATURES

- Optional remote monitoring contact
- Patented topology, no backup fuse required
- Socket with replaceable cartridge

### Surge arresters



#### DSB A/P

- Suitable for all single phase (A) and three phase (P) utilities
- Available for 275 V, 385 V and 440 V
- 20 kA Inom, 40 kA Imax per pole
- Dimensions depending to modules according to DIN standard
- Approvals/Marks: CE, Category IEC / EN Class II / Type 2

#### MAIN FEATURES

- Optional remote monitoring contact
- 4 MOVs or 3 MOVs + 1GDT topology
- Socket with replaceable cartridge

### Surge arresters



#### DSB51XXDP

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

#### MAIN FEATURES

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

### DC UPS controllers



#### SPUC

- Up to 30 A UPS controller
- 12 V and 24 V versions
- Outputs for Device OK, Battery OK and Battery Low
- DIN rail battery accessory available up to 7.2 A/h
- Approvals/Marks: CE and UL approved

#### MAIN FEATURES

- To be used in addition to 12 or 24 V power supply
- Front 30 A replaceable fuse
- Plug and play: no settings needed

# Our product range

## DC UPS battery charger



### SPUBC

- Power supply, UPS and battery charger "All in one"
- 24 VDC 5A output
- Power boost up to 2 times rated output, permanent
- Built in battery diagnosis
- Approvals/Marks: CE and UL approved

#### MAIN FEATURES

- Power supply independent from charger
- Remote indication for battery operation and battery low
- "Start from battery" and "Empty battery charging" features

## Low profile DIN battery charger



### SPM5BC

- 12 V or 24 V output
- Universal 90 Vac to 264 Vac
- Short circuit and battery polarity protection
- From -25°C to +60°C operation w/out derating
- Approvals/Marks: cURus and CE approved

#### MAIN FEATURES

- Particularly indicated for process control
- Up to 4 independent alarms and set points
- Linearization of inputs up to 16 points

## DIN rail switch mode power supplies



### SPD

- DIN rail housing
- 1-phase (5-480 W), 2-phase (100 W), 3-phase (120-960 W)
- Rated input voltage: 85-264 VAC (1-phase), 380-575 VAC (2-phase), 340-575 VAC / 480-820 VDC (3-phase)
- Approvals/Marks: CE, TÜV, cULus, UL1310 Class 2 (<92W), ISA12.12.1 Class I, Div 2

#### MAIN FEATURES

- Power Factor Correction (PFC)
- Parallel connection
- DC OK output

## Mini DIN power supplies



### SPM

- Mini DIN housing
- Universal input 90-264 VAC / 120-370 VDC
- Output powers from 7.5 W to 100 W
- Approvals/Marks: CE, TÜV, cULus Listed, UL1310 Class 2 (<92W), ISA12.12.1 Class I, Div 2

#### MAIN FEATURES

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

## Switch mode power supplies



### SPDM Plastic

- Output from 24W to 72W
- Low consumption
- Compact dimension
- Universal input voltage AC and DC
- Approvals/Marks: CE, TÜV, UL and UL1310 Class 2

#### MAIN FEATURES

- Screw or spring loaded terminals
- DC OK LED indication

## DIN rail power supplies



### SPDC 120W

- 12 or 24 VDC, 120 W Output
- 32 mm width, high compactness
- Very high efficiency
- Operating temp from -25° to +70° C
- Universal input 90 VAC ~ 264 VAC / 127 VDC ~ 370 VDC

#### MAIN FEATURES

- DC OK relay output and LED indication
- PFC
- Parallel connection selection switch

## DIN rail power supplies



### SPDC 240W

- 24 VDC, 240 W output
- 45 mm width, high compactness
- 94% maximum efficiency
- Operating temp from -25° to +70° C
- Universal input 90 VAC ~ 264 VAC / 127 VDC ~ 370 VDC

#### MAIN FEATURES

- DC OK relay output and LED indication
- PFC > 0.95
- Parallel connection selection switch





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