

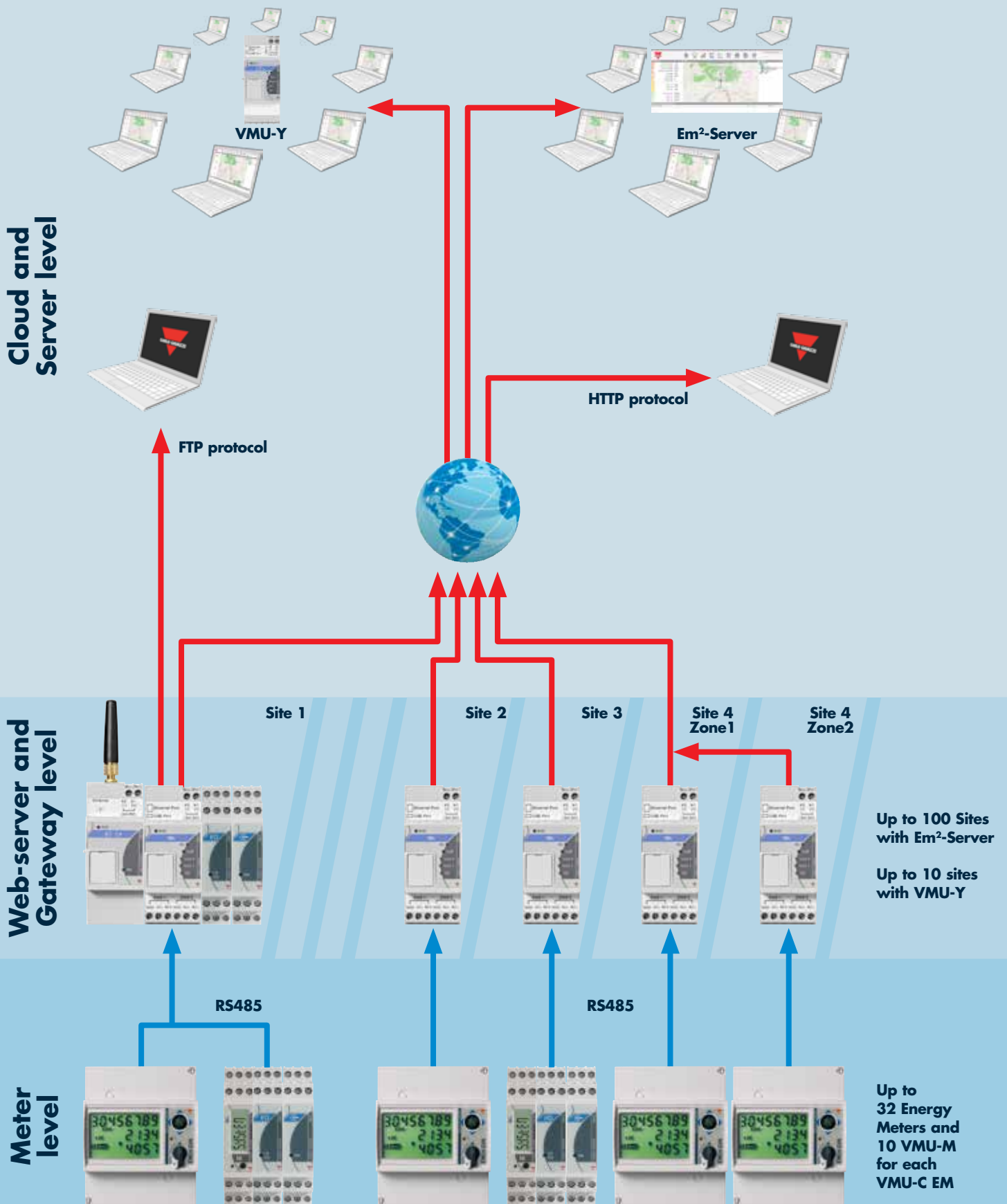


## Overview

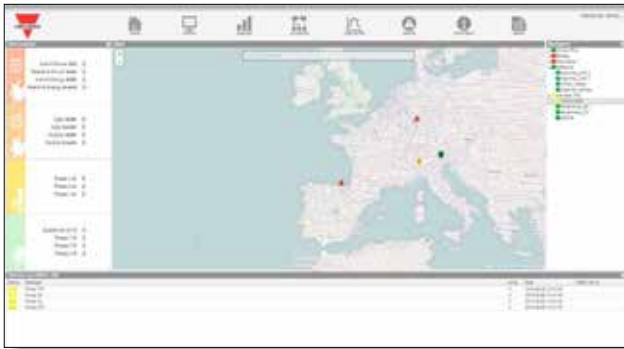
# Energy Management

# Overview

## The diagrams

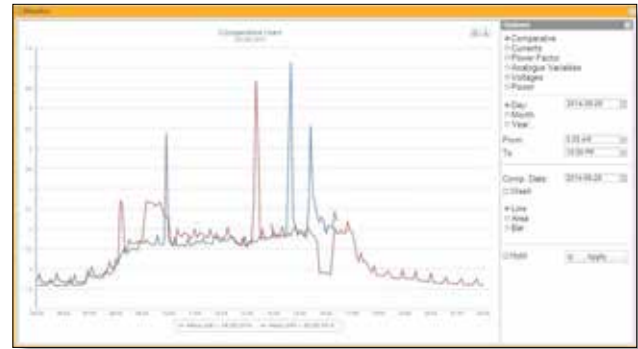


# Em<sup>2</sup>-Server: Cloud solution for multi-site monitoring



## Home page

- Integrated MAP view
- Hierarchical tree to navigate data with ease
- Movable and resizable views fitting the needs of a control room



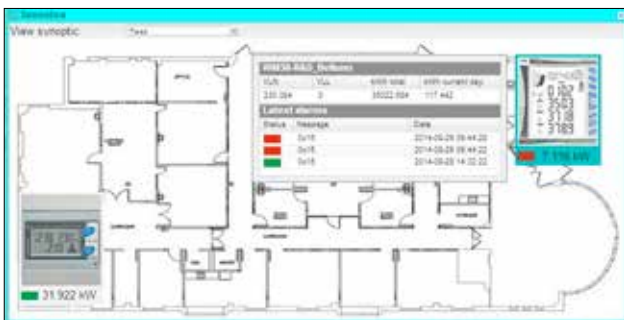
## Monitoring and analysis tool

- Historical data analysis tools
- Graphical monitoring features
- Comprehensive data exporting tools (standard XLS format)



## Login page

- Multilingual web based user interface
- User rights management
- Concurrent data access from multiple locations



## Synoptics tool

- User defined background
- Active iconized energy meters showing real time variables and status
- Multiple Synoptic views may be created



## Load profile tool

- Load profile statistical analysis based on actual data
- Profiles may be exported as Excel files or represented as charts
- Calculation of average, median, maximum and statistical confidence range

# Overview

## Energy management

Wound primary CT	CT for cable or bus-bar	CT for cable or bus-bar	CT for cable or bus-bar	CT for cable or bus-bar
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**TADK/TADK-2**

- Wound primary
- Primaries: 1A to 40A (TADK)  
1A to 250A (TADK-2)
- Secondary: 5A (standard)  
1A (available upon request)
- Sealable terminal covers
- CE



**CTD-1X/2X/3X/4X**

- For cable or bus-bar
- Cable: Ø23mm to Ø51mm
- Bar: 20x5mm to 64x20mm or 51x43mm
- Sealable terminal covers
- Primaries from 50A to 1600A
- Secondary: 5A (standard)  
1A (available upon request)
- IEC60044-1
- CE, cURus



**CTD-5S/6S**

- Split-core for cable or bus-bar
- Cable: Ø26mm to Ø50mm
- Bar: 26x32mm, 50x52mm
- Sealable terminal covers
- Primaries from 100A to 1000A
- Secondary: 5A (standard)  
1A (available upon request)
- IEC60044-1
- CE, cURus



**CTD-8/9/10/11 S,V,H,Q**

- Solid or split-core for cable or bus-bar
- Bar: 31x81mm (vertical), 81x31mm (horizontal) to 38x127mm
- Sealable terminal covers
- Primaries 150A to 4000A
- Secondary: 5A (standard)  
1A (available upon request)
- IEC60044-1
- CE, cURus



**CTV-1X/ 2X/ 3X/ 4X**

- Split-core current sensor for cable
- Cable: Ø9.6mm to 20mm
- Primaries from 60A to 400A
- Secondary: 0.333VAC
- CE, cURus

3-phase multi function meters	3-phase multi function meters	3-phase energy analyser for retro-fit	3-phase energy analyser for 5A CT
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**WM10**

- 3-phase multifunction meter with direct connection
- Direct connection up to 65 A
- Dimension 4-DIN rail module housings
- Accuracy 0.5%
- Display 3 variables at a time
- Direct measurement in a very compact housing to save space
- Measurement of both system and single phase variables
- Easy installation: no parameters programming needed



**WM12DIN/WM14DIN WM1296/WM1496**

- Dimensions: 6 DIN modules or 96x96mm
- Installation: DIN-rail or panel mounting
- 3 red LED displays
- Measurement of voltage, current, power, power factor and frequency, energy (WM14)
- Energy metering, 9 digits, cl. 2
- Measuring inputs: 230VAC, 5A
- Power supply: 90-260VDC/AC
- Pulse or relay outputs
- RS485 Modbus
- CE, cULus



**EM21 72R EM21 72V**

- Dimensions: 4 DIN modules or 72x72mm
- Installation: DIN-rail or panel mounting
- LCD with two installation options.
- Measurement of voltage, current, power, power factor and frequency
- 7-digit energy metering, EM21 72R: cl. 2 (EN62053-21), EM21 72V: cl. 1 (EN62053-21)
- Voltage inputs: 3x230(400)VAC split-core current sensors: 90A, Ø10mm (VV23), 150A Ø16mm (VV33), 250A Ø24mm (VV53) EM21 72V: 0.333mV from CTV-xX sensors
- Self-powered
- Pulse outputs, RS485 Modbus RTU
- CE, cULus



**EM210**

- Dimensions: 4 DIN modules or 72x72mm
- Installation: DIN-rail or panel mounting
- Two instrument formats in a single product: LCD with two installation options
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering on 2 8-digit counters, cl. B (EN50470)
- Self-powered
- Pulse output 1
- RS485 Modbus RTU, high speed (up to 115kbps)
- Sealable terminal covers
- CE, cULus

# Energy management

## 1-phase energy meter/ analyser up to 45A



### EM110/EM111

- Dimensions: 1 DIN module
- Installation: DIN-rail
- Electromechanical counter (EM110) or backlit LCD (EM111)
- Measurement of voltage, current, power, power factor and frequency with touch display (EM111)
- Bi-directional energy metering, cl. B (EN50470)
- Measuring inputs: 230VAC, 45A
- Self-powered
- Pulse output or as an alternative (EM111): RS485 Modbus, M-Bus
- Sealable terminal covers
- CE, cULus

## 1-phase energy meter/ analyser up to 100A



### EM112

- Dimensions: 2 DIN modules
- Installation: DIN-rail
- Backlit touch LCD
- Display backup by supercapacitor
- Measurement of voltage, current, power, power factor and frequency
- Measuring inputs: 230VAC, 100A
- Self-powered
- Bi-directional energy metering, 8 digits, cl. B (EN50470)
- Pulse output or as an alternative: RS485 Modbus, M-Bus
- Sealable terminal covers
- CE, cULus

## 3-phase energy analyser for 5A CT



### EM330

- Dimensions: 2 DIN modules
- Installation: DIN-rail
- Backlit touch LCD
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering on 2 8-digit counters, cl. B (EN50470)
- Measuring inputs: 3x230(400)VAC, 5A
- Power supply: 12-60VAC/DC or 90-260VAC/DC
- Inputs: 1 for double tariff system setting
- Pulse output or as an alternative: RS485 Modbus or M-Bus
- Sealable terminal covers
- CE, cULus

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



### EM340

- Dimensions: 3 DIN modules
- Installation: DIN-rail
- Backlit touch LCD
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering on 2 8-digit counters, cl. B (EN50470)
- Measuring inputs: 3x230(400)VAC, 65A
- Self-powered
- Inputs: 1 for double tariff system setting
- Pulse output or as an alternative: RS485 Modbus or M-Bus
- Sealable terminal covers
- CE, cULus

## 3-phase energy analyser



### EM24

- Dimensions: 4 DIN modules
- Installation: DIN-rail
- Meter for energy from CT 5A or for direct energy 65A. External pulse counting
- Measurement of voltage, current, power, power factor and frequency. Metering from external sources and 4-tariff management
- Bi-directional energy metering on 2 8-digit counters, cl. B (EN50470-3)
- Voltage inputs: 3x230(400)VAC
- Current inputs: 5A, 65A
- 115-230VAC power supply or self-powered
- 3 inputs for external dimension counting (IS)
- Pulse or relay output: RS485 Modbus RTU, M-Bus
- Sealable terminal covers
- CE, MID (PF), cULus

## 3-phase energy meters



### EM23 / EM33

- 3-phase energy meter with direct connection
- Direct connection up to 32A (EM33) or 65A (EM23)
- Dimensions: 4-DIN rail module housings
- Class 1 (kWh) acc. to EN62053-1
- Serial RS485 or open collector (EM23) output

## 3-phase power quality analysers/transducers



### WM5

- Dimensions: 96x96mm panel;
- Accuracy 0.2% (voltage, current)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- cULus approved, Measurement Canada certified
- 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

## 3-phase energy analyser



### EM26

- Dimensions: 96x96mm
- Installation: panel mounting
- Energy meter, metering from external inputs, THD measurement.
- Measurement of voltage, current, power, power factor and frequency. Metering from external sources and 4-tariff management
- Bi-directional energy metering on 2 8-digit counters, cl. B (EN50470-3)
- Voltage inputs: 3x230 or 3x100(400)V
- Current inputs: 5A
- Power supply 90-260VDC/AC
- 3 inputs for external dimension counting (I3)
- RS485 Modbus RTU, pulse or relay
- Sealable terminal covers
- CE, MID (PF), cULus

# Energy management

**Double 3-phase (or six 1-phase) energy meter**

**3-phase CT for EM270 for cable or bus-bar**

**Double 3-phase (or six 1-phase) energy meter**

**Multiple miniature split-core current sensor for EM271**



**EM270**

- Dimensions: 4 DIN modules or 72x72mm
- Installation: DIN-rail or panel mounting
- Meter with specific three-phase TCD CT
- Quick installation through RJ connectors
- Automatic recognition of CT ratios
- Measurement of voltage, current, power, power factor and frequency, energy metering, cl. 1.
- Inputs: 3x230(440)VAC, 150A(TCD-1X), 250A (TCD-2X), 630A (TCD-3X).
- Outputs: 2 pulse (meter 1 and 2)
- RS485 Modbus RTU
- CE



**TCD-1X/TCD-2X/TCD-3X**

- Dimensions (LxHxP)mm:  
TCD-1X: 74.84x72x66.80  
TCD-2X: 105x72x50  
TCD-3X: 135x78x50
- Bus-bar sizes (mm):  
TCD-1X: 15.90x30.48  
TCD-2X: 21.26x25.26  
TCD-3X: 31.25x31.25
- Centre-to-centre distance (mm):  
TCD-1X: 25  
TCD-2X: 35  
TCD-3X: 45
- Primary:  
TCD-1X: 160A  
TCD-2X: 250A  
TCD-3X: 630A
- CE



**EM271**

- Dimensions: 4 DIN modules or 72x72mm
- Installation: DIN-rail or panel mounting
- Meter with specific three-phase TCD CT
- Quick installation through RJ connectors
- Automatic recognition of CT ratios
- Measurement of voltage, current, power, power factor and frequency, energy metering, cl. 1
- Inputs: 3x230 (440)VAC, 150A (TCD-1X), 250A (TCD-2X), 630A (TCD-3X)
- Outputs: 2 pulse (meter 1 and 2)
- RS485 Modbus RTU
- CE



**TCD\_M**

- Equivalent to Class 1 (currents) of EN60044-1
- Primary: 60A (TCD0M), 100A (TCD1M), 200A (TCD2M), 400A (TCD3M)
- Hole size: 9.6mm (TCD0M), 15.5mm (TCD1M), 15.5mm (TCD2M), 20.5mm (TCD3M)
- Cable length: 1.8m (TCD0M), 1.5m (TCD1M and TCD2M), 2.0m (TCD3M)
- Auto-detection of the primary current rated value by the EM271 energy meter
- TCD\_M head for wall and DIN-rail mounting
- Umbilical connection (80cm) from TCD\_M head to EM271 energy meter through RJ11

**3-phase power quality analysers**

**3-phase power quality analysers**

**3-phase Smart modular power transducer**

**3-phase power transducer**



**WM30**

- Dimensions: 96x96mm panel mounting housing
- Accuracy 0.2% (voltage, current)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- cULus approved; Solar California listed
- Provides installation data to a SCADA to manage the whole system
- Modular housing to build the instrument according to the real application needs
- Modbus and BACnet (both RS485 or Ethernet), and Ethernet/IP communication port available



**WM40**

- Dimensions: 96x96mm panel mounting housing
- Accuracy 0.2% (voltage, current)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- cULus approved; Solar California listed
- 16-alarm PLC logic and digital inputs for utility metering
- Modular housing to build the instrument according to the real application needs
- Modbus and BACnet (both RS485 or Ethernet), and Ethernet/IP communication port available
- Built-in datalogger for instantaneous variables, dmd profiles and events



**PQT-H**

- Dimensions 90x90mm DIN rail housing
- Accuracy 0.2% (voltage, current)
- Universal power supply
- Event data stamping and 12-tariff energy management
- cULus approved
- 16-alarm PLC logic and digital inputs for utility metering
- Modular housing to build the instrument according to the real application needs
- Modbus RS485 and Ethernet communication ports available



**CPT-DIN**

- Dimensions: 45x83.5x98.5mm
- Installation: DIN-rail
- Programmable one-, two- and three-phase measurement transducer
- Measurement of voltage, current, power, power factor, frequency and energy
- Energy metering, 9 digits
- Measuring inputs 3x230(400)VAC, 5A
- Power supply: 18-60 or 90-260VDC/AC
- Outputs: 3 analogue 20mA, or 3 10VDC, 2 relays for alarms
- RS485 Modbus RTU
- CE, cURus, CSA

# Energy management

## Web server and datalogger



### VMU-C EM

- Micro PC with datalogger function
- Web Server, Push and API Pull
- Modbus TCP Slave function
- Data display (charts and tables)
- Data export to HTML compatible with Excel and other spreadsheets
- 4GB internal memory, Back-up memory on micro SDHC and USB
- Energy analysis of each individual load
- Invoicing simulation
- Virtual meter with sum function
- VMU-W alarm management (e-mail or SMS)
- Power supply: 24VDC
- 1 RS485 for 32 Energy meters, 1 RS485 for VMU-M EM, RJ45 for Ethernet connection
- CE, cULus

## 3G Modem for VMU-C EM



### VMU-W

- Dimensions: 2 DIN modules
- Installation: DIN-rail
- It allows to publish the data logger on the Web if no cable connectivity is available.
- Modem for VMU-C EM
- 3G network support: GSM, GPRS, EDGE, UMTS, HSPA
- Automatic dual band or quad band setting (850-900MHz, 1800-1900/2100MHz)
- VMU-C EM SMS management service
- Power supply: 24VDC
- CE, cULus

## Modules for VMU-C EM



### VMU-P EM

- Dimensions: 1 DIN module
- Installation: DIN-rail
- Connection to VMU-C EM, directly or through VMU-M EM, on RS485 for measurement and state acquisition
- Measuring inputs: Temperatures, PT100 or PT1000, 1 for current 0-20mA
- Power supply: from the local bus or from VMU-M EM
- Proprietary communication with VMU-C EM or VMU-M EM
- CE, cULus

## Modules for VMU-C EM



### VMU-O EM

- Dimensions: 1 DIN module
- Installation: DIN-rail
- Connection to VMU-C EM, directly or through VMU-M EM, on RS485 for measurement and state acquisition
- Power supply: from the local bus or from VMU-M EM
- 2 digital inputs
- 2 relay outputs
- Proprietary communication with VMU-C EM or VMU-M EM
- CE, cULus

## Embedded aggregation server



### VMU-Y EM

- 2-DIN size; DIN-rail mounting
- Multi-site monitoring management
- Power supply 24VDC ( $\pm 20\%$ )
- 2 USB ports (data /connection backup)
- 1 SD port (backup)
- 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 contract management
- Alarms management
- Database replication from up to 10 VMU-C EM

## Cloud solution for multi-site monitoring



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

- Virtual machine for energy data management
- Multi-site monitoring management
- Flexible and scalable architecture
- VMware® technology compatibility
- 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 contract management
- Alarms management
- Database replication from up to 100 VMU-C EM

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