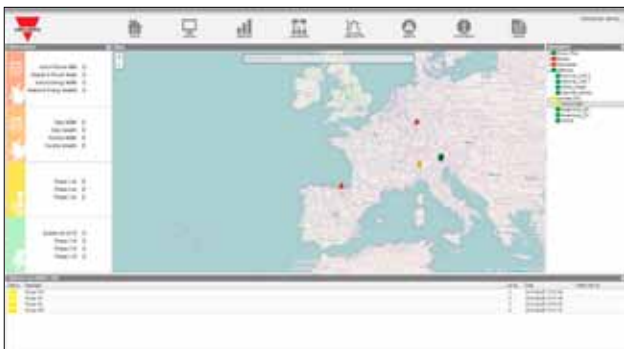


# Em<sup>2</sup>-Server: Cloud solution for multi-site monitoring



## Home page

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



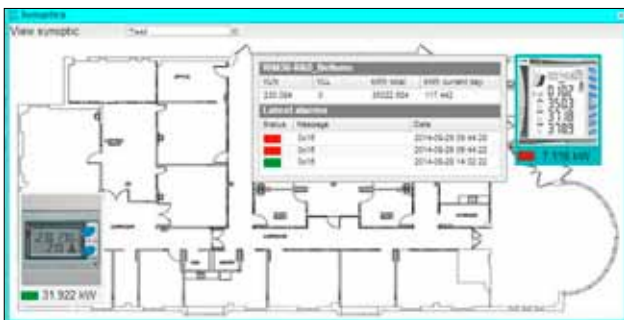
## Monitoring and analysis tool

- 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 Synoptics 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

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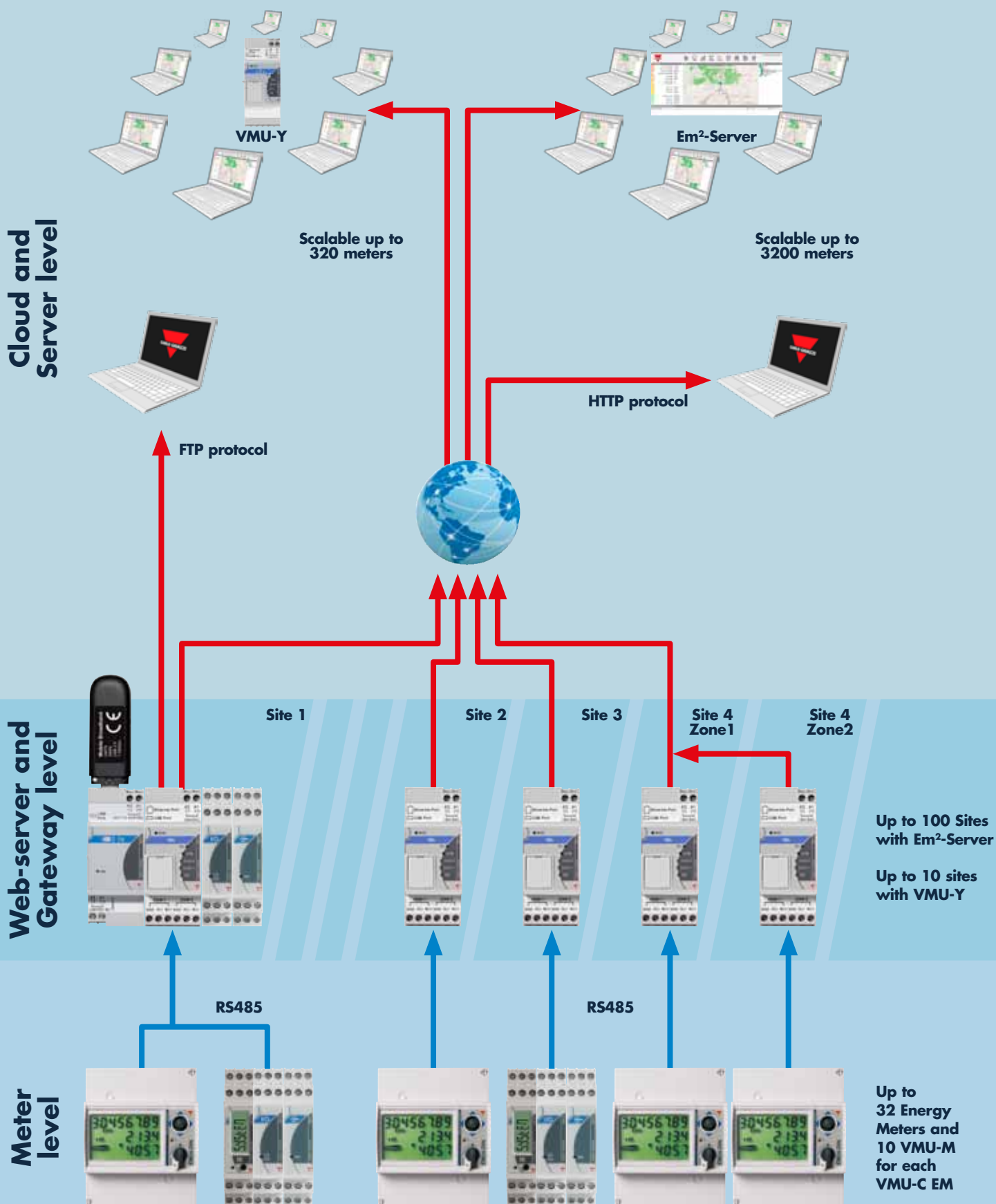


## Overview

# Energy management

# Overview

## Diagrams



# 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
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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)
- IEC61869-2
- 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)
- IEC61869-2
- 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)
- IEC61869-2
- 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 power analysers	3-phase power quality analysers	3-phase power quality transducers	3-phase power transducers
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**WM20**

- Dimensions: 96x96mm
- Installation: panel mounting
- Accuracy 0.2% (voltage, current)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- cULus approved
- Modular housing to build the instrument according to the real application needs
- Modbus and BACnet (both RS485 or Ethernet), and Profibus DPVO communication port available



**WM30 / WM40**

- Dimensions: 96x96mm
- Installation: panel mounting
- Accuracy 0.2% (voltage, current)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- cULus approved; Solar California listed
- 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
- 16-alarm PLC logic and digital inputs for utility metering (WM40)
- Built-in datalogger for instantaneous variables, dmd profiles and events (WM40)



**PQT-H**

- Dimensions 90x90mm
- Installation: DIN rail
- 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

## 1-phase energy meters up to 45A



### EM110

- Dimensions: 1 DIN module
- Installation: DIN-rail
- Electromechanical totalizer
- Bi-directional energy metering, 7 digits cl. B (EN50470)
- Measuring inputs: 115/230 VAC, 45A
- Self-powered
- Pulse output
- Sealable terminal covers
- CE, MID (PFB)

## 1-phase energy analysers up to 45A



### EM111

- Dimensions: 1 DIN module
- Installation: DIN-rail
- Backlit touch LCD
- Measurement of voltage, current, power, power factor and frequency
- Bi-directional energy metering, 7 digits cl. B (EN50470)
- Measuring inputs: 115/230 VAC, 45A
- Self-powered
- Dual tariff management
- Pulse output or RS485 Modbus or M-Bus port
- Sealable terminal covers
- CE, MID (PFA and PFB)

## 1-phase energy analysers 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
- Bi-directional energy metering, 8 digits, cl. B (EN50470)
- Measuring inputs: 115/230 VAC, 100 A
- Self-powered
- Dual tariff management
- Pulse output or RS485 Modbus or M-Bus port
- Sealable terminal covers
- CE, MID (PFA and PFB)

## 3-phase energy analysers 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, 3x 8-digit, cl. B (EN50470)
- Measuring inputs: 208 to 400 VLL AC, 65A
- Self-powered
- Dual tariff management
- Pulse output or RS485 Modbus or M-Bus port
- Sealable terminal covers
- CE, MID (PFA and PFB)

## 1 and 3-phase energy transducers



### ET112 / ET340

- Dimensions: 2 DIN (ET112); 3 DIN (ET340) modules
- Installation: DIN-rail
- Measurement of voltage, current, power, power factor and frequency. THD (V, A) ET340
- Bi-directional energy metering, 2 tariffs, cl. 1 (EN62053-1)
- Measuring inputs: 115/230 VAC, 100 A (ET112); 208 to 400 VLL AC, 65 A (ET340)
- Self-powered
- RS485 Modbus port (screw, 2x RJ45)
- Optical port
- Sealable terminal covers
- CE

## 3-phase energy analysers



### 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 (5A version)

## 3-phase energy analysers



### 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

## 3-phase power quality analysers/transducers



### WM5

- Dimensions: 96x96mm
- Installation: panel mounting
- 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

# Energy management

## Quick-fit 3-phase energy analysers



### EM270 / EM271

- Dimensions: 4 DIN modules or 72x72mm
- Installation: DIN-rail or panel mounting
- Two 3-phase energy analysers with sum function
- Current measurement by triple CT, solid core (EM270), split-core (EM271) with RJ plug
- 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, current range according to the TCD accessories
- Outputs: 2 pulse (loads 1 and 2)
- RS485 Modbus RTU
- CE, cULus

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



### 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, UL (with EM270)

## Multiple miniature split-core current sensor for EM271



### TCD\_M

- Equivalent to Class 1 (currents) of IEC61869-2
- 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
- CE, UL (with EM271)

## Quick-fit 3-phase energy analysers



### EM280

- Dimensions: 4 DIN modules or 72x72mm
- Installation: DIN-rail or panel mounting
- Six 1-phase or two 3-phase energy analysers with sum function
- Current measurement by six channels, solid core CT block with RJ plugs
- Quick installation through RJ connectors
- Automatic recognition of CT ratio
- Measurement of voltage, current, power, power factor and frequency,
- Energy metering, cl. 1.
- Inputs: 3 x 230(440)VAC, 6 x 32A
- Outputs: 2 pulse (loads 1 and 2)
- RS485 Modbus RTU
- CE, cULus

## Multiple current transformer block for EM280



### TCD06BX / TCD06BS

- Equivalent to Class 0.5 (BX) and 1 (BS) (current) of IEC61869-2
- Solid core (BX) or split core (BS)
- Primary current: 32A
- Hole size: 7mm (BX) or 8.5mm (BS)
- Hole centre distance: 17.5mm
- RJ11 cable length: 80, 150 or 200cm
- Auto-detection of the primary current rated value by the EM280 energy meter
- CE, UL (with EM280)

## 3-phase energy analysers for 5A, CTV or ROG4K



### EM210

- 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
- Bi-directional energy metering, 3 x 3-digit or 8-digit readout, cl. B (EN50470)
- Voltage inputs: 3x230(400)Vac; Current inputs: 5A CT (AV version) or 0.333mV from CTV-xX sensors (MV version) or ROG4K coils (MV version)
- Self-power supply
- Pulse output 1, RS485 Modbus RTU, high speed (up to 115kbps)
- Sealable terminal covers
- CE, cULus

## Rogowski coil for EM210



### ROG4K

- Flexible current sensor (Rogowski coil) for EM210
- Primary current from 20 to 4000 A
- Extended accuracy range +/-1%
- Internal diameter from 115 mm to 275 mm
- User-friendly and safe coil closing system
- Direct connection to EM210 MV energy analyser
- No power supply or external integrator required
- Coloured label on the cable for error-free connection check

## 3-phase multi function meters



### 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

# 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

## USB dongle connection modules



### VMU-D

- Dimensions: 2 DIN modules
- Installation: DIN-rail
- Compatible with Carlo Gavazzi approved 3G/4G USB modems
- Power supply 24 VDC (+/- 20%)
- Suitable for use with VMU-C and VMU-Y
- 3G or 4G Mobile Internet connectivity
- SMS alerting
- SMS commands
- 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

- Dimensions: 2-DIN module;
- Installation: 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

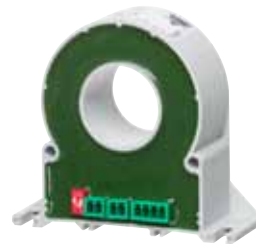
## Contactless power analysers



### CPA050

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

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