Overview

Energy management
Overview

Diagrams

Cloud and On-Premise

Web-server and gateway

Meters and sensors

Em² Server, multi-language and multi-site

CARLO GAVAZZI Automation Components. Specifications are subject to change without notice. Illustrations are for example only.
Em² 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

<table>
<thead>
<tr>
<th>Wound primary CT</th>
<th>CT for cable or bus-bar</th>
<th>CT for cable or bus-bar</th>
<th>CT for cable or bus-bar</th>
<th>CT for cable</th>
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<tbody>
<tr>
<td>TADK/TADK 2</td>
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<tr>
<td>Wound primary</td>
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<tr>
<td>Primaries: 1 A to 40 A (TADK)</td>
<td>1 A to 250 A (TADK 2)</td>
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<tr>
<td>Secondary: 5 A (standard) 1 A (available upon request)</td>
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<tr>
<td>Sealable terminal covers</td>
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<tr>
<td>CE</td>
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<tr>
<td>CTD 1X/2X/3X/4X</td>
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<tr>
<td>For cable or bus-bar</td>
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<tr>
<td>Cable: Ø23 mm to Ø51 mm</td>
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<tr>
<td>Bar: 20x5 mm to 64x20 mm or 51x43 mm</td>
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<td>Sealable terminal covers</td>
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<tr>
<td>Primaries from 50 A to 1600 A</td>
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<tr>
<td>Secondary: 5 A (standard) 1 A (available upon request)</td>
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<tr>
<td>CTD 5S/6S</td>
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<tr>
<td>Split-core for cable or bus-bar</td>
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<tr>
<td>Cable: Ø26 mm to Ø50 mm</td>
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<tr>
<td>Bar: 26x32 mm, 50x52 mm</td>
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<td>Sealable terminal covers</td>
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<tr>
<td>Primaries from 100 A to 1000 A</td>
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<tr>
<td>Secondary: 5 A (standard) 1 A (available upon request)</td>
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<td>CTV 1X/2X/3X/4X</td>
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<td>Split-core current sensor for cable</td>
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<tr>
<td>Cable: Ø9.6 mm to 20 mm</td>
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<td>Primaries from 60 A to 400 A</td>
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<td>Secondary: 0.333 VAC</td>
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<tr>
<td>CE, cURus</td>
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</table>

3-phase power analyzers

WM20
- Dimensions: 96 x 96 mm
- Installation: panel mounting
- Accuracy 0.2% (voltage, current)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- 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
- Configuration software (PC or Android app)
- cULus

WM30 / WM40
- Dimensions: 96 x 96 mm
- Installation: panel mounting
- Accuracy 0.2% (voltage, current)
- Universal power supply
- Front protection degree IP65, NEMA4X, NEMA12
- 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, trend profiles and events (WM40)
- Configuration software (PC or Android app)
- cULus, Solar California listed

WM50 and TCD12
- Dimensions: 96 x 96 mm
- Installation: panel mounting
- Up to 96 channels, 32 A, 65 A max (8x TCD12)
- Accuracy 0.2% (voltage, current), 0.5% (branch currents)
- Modbus communication port available (RS485 or Ethernet)
- Up to 6 digital outputs (static or relay) and 6 digital inputs or temperature and analogue input
- 96 channel alarms, freely settable set point for load monitoring
- Built-in datalogger for variables and events
- Configuration software (PC or Android app)
- cULus

Communication interface OptoProg

OptoProg
- Bluetooth and USB interface for meters and analysers with optical port
- Compatible with WM20, WM30, WM40, WM50 and ET100, ET300 families
- Compatible with UCS PC software and UCS Mobile Android APP
- Battery powered
- CE, FCC, IC, Bluetooth

3-phase power quality analyzers

3-phase branch circuit power analyzers
## Energy management

### 1-phase energy meters for 32A

**EM110**
- Dimensions: 1 DIN module
- Installation: DIN-rail
- Electromechanical totalizer
- Bi-directional energy metering, 7 digits cl. B (EN50470)
- Measuring inputs: 115/230 VAC, 32 A (max 45 A)
- Self-powered
- Pulse output
- Sealable terminal covers
- CE, MID (PFA and PFB), cULus (115 V)

### 1-phase energy analyzers for 32A

**EM111**
- Dimensions: 1 DIN module
- Installation: DIN-rail
- 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 (max 45 A)
- Self-powered
- Dual tariff management
- Pulse output or RS485 Modbus or M-Bus port
- Sealable terminal covers
- CE, MID (PFA and PFB), cULus (115 V)

### 1-phase energy analyzers 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), cULus (115 V)

### 3-phase energy analyzers for current via 5A CT

**EM330**
- 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: 400 to 480 V AC, 5(6) A current input via current transformer
- Auxiliary power supply
- Dual tariff management
- Pulse output or RS485 Modbus or M-Bus port
- Sealable terminal covers
- CE, MID (PFA and PFB), cULus

### 3-phase energy analyzers 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 VU AC, 65 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 transducers

**ET112 / ET330 / ET340**
- Dimensions: 2 DIN (ET112); 3 DIN (ET330, ET340) modules
- Installation: DIN-rail
- Backlit touch LCD
- 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 (ET112); 208 to 400 VU AC, 5(6) A current input via current transformer (ET330); 65 A (ET340)
- Self-powered
- RS485 Modbus port (screw, 2x R45)
- Optical port
- Sealable terminal covers
- CE

### 3-phase energy analyzers

**EM24**
- Dimensions: 4 DIN modules
- Installation: DIN-rail
- Meter for energy from CT 5 A or for direct energy 65 A. 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: 5 A, 65 A
- 115-230 VAC power supply or self-powered
- 3 inputs for external dimension counting (IS)
- Pulse or relay output: RS485 (Modbus RTU), Ethernet (Modbus TCP), M-Bus
- Sealable terminal covers
- CE, MID (PF), cULus (5 A and Ethernet ver.)

**EM26**
- Dimensions: 96 x 96 mm
- 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: 5 A
- Power supply 90-260 VDC/AC
- 3 inputs for external dimension counting (IS)
- RS485 Modbus RTU, pulse or relay
- Sealable terminal covers
- CE, MID (PF), cULus
**Energy management**

<table>
<thead>
<tr>
<th>Quick-fit 3-phase energy analyzers</th>
<th>3-phase CT for EM270 for cable or bus-bar</th>
<th>Multiple miniature split-core current sensor for EM271</th>
<th>Multiple current transformer block for EM280</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EM270 / EM271 / EM280</strong></td>
<td><strong>TCD 1X/TCD 2X/TCD 3X</strong></td>
<td><strong>TCD M</strong></td>
<td><strong>TCD06 BX / TCD06 BS</strong></td>
</tr>
<tr>
<td>Dimensions: 4 DIN modules or 72x72 mm</td>
<td>Dimensions (LxWxH): TCD-1X: 74.84x27.2x66.80 mm, TCD-2X: 105x27.2x50 mm, TCD-3X: 135x27.2x50 mm</td>
<td>Equivalent to Class 1 (currents) of IEC6186-9-2, Primary: 60 A (TCD0A), 100 A (TCD1A), 200 A (TCD2A), 400 A (TCD3A), Hole size: 9.6 mm (TCD0A), 15.5 mm (TCD1A), 15.5 mm (TCD2A), 20.5 mm (TCD3M), Cable length: 1.8 m (TCD0M), 1.5 m (TCD1A and TCD2M), 2.0 m (TCD3M), Auto-detection of the primary current rated value by the EM271 energy meter, TCO M head for wall and DIN-rail mounting, Umbilical connection (80 cm) from TCD M head to EM271 energy meter through RJ11</td>
<td>Equivalent to Class 0.5 (BX) and 1 (BS) (current) of IEC6186-9-2, Solid core (BX) or split core (BS), Primary current: 32 A, Hole size: 7 mm (BX) or 8.5 mm (BS), Hole centre distance: 17.5 mm, R11 cable length: 80, 150 or 200 cm, Auto-detection of the primary current rated value by the EM280 energy meter, CE, UL (with EM280)</td>
</tr>
<tr>
<td>Installation: DIN-rail or panel mounting</td>
<td>Bus-bar sizes: TCD-1X: 15.90x30.48 mm, TCD-2X: 21.26x25.26 mm, TCD-3X: 31.25x31.25 mm</td>
<td>Automatic recognition of CT ratios, Measurement of voltage, current, power, power factor and frequency</td>
<td>CE, UL (with EM280)</td>
</tr>
<tr>
<td>Two 3-phase energy analyzers with sum function</td>
<td>Centres-to-centre distance: TCD-1X: 25 mm, TCD-2X: 35 mm, TCD-3X: 45 mm</td>
<td>Measurement of voltage, current, power, power factor and frequency</td>
<td>CE, UL (with EM280)</td>
</tr>
<tr>
<td>Current measurement by triple CT, solid core (EM270), split-core (EM271) with RJ plug, 6 transformers block (EM280)</td>
<td>Primary: TCD-1X: 160 A, TCD-2X: 250 A, TCD-3X: 630 A</td>
<td>Energy metering, cl. 1</td>
<td>CE, UL (with EM280)</td>
</tr>
<tr>
<td>Quick installation through RJ connectors</td>
<td>Energy metering, cl. 2</td>
<td>Energy metering, 9 digits, cl. 2</td>
<td>CE, UL (with EM280)</td>
</tr>
<tr>
<td>Automatic recognition of CT ratios</td>
<td>Direct connection to EM210 MV energy analyzer</td>
<td>Measuring inputs: 230 VAC, 5 A</td>
<td>CE, ULs</td>
</tr>
<tr>
<td>Measurement of voltage, current, power, power factor and frequency</td>
<td>No power supply or external integrator required</td>
<td>Power supply: 90-260 VDC/AC</td>
<td>CE, UlUs</td>
</tr>
<tr>
<td>Inputs: 3x230(400)VAC, current range according to the TCD accessories</td>
<td>Coloured label on the cable for error-free connection check</td>
<td>Pulse or relay outputs</td>
<td>CE, UlUs</td>
</tr>
<tr>
<td>Outputs: 2 pulse (loads 1 and 2)</td>
<td>RS485 Modbus RTU</td>
<td>RS485 Modbus</td>
<td>CE, UlUs</td>
</tr>
<tr>
<td>RS485 Modbus RTU</td>
<td>Self-supply</td>
<td>Power supply: 18-60 or 90-260 VDC/AC</td>
<td>CE, UlUs, CSA</td>
</tr>
<tr>
<td>CE, UlUs</td>
<td>Pulse output 1, RS485 Modbus RTU, high speed (up to 115 kbps)</td>
<td>Outputs: 3 analogue 20 mA, or 3 10 VDC, 2 relays for alarms</td>
<td>CE, UlUs, CSA</td>
</tr>
<tr>
<td>Sealable terminal covers</td>
<td>Sealed terminal covers</td>
<td>RS485 Modbus RTU</td>
<td>CE, UlUs, CSA</td>
</tr>
</tbody>
</table>

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## Energy management

### Monitoring gateway and controller

- **VMU MC / VMU OC**
  - Dimensions 1 DIN modules
  - VMU MC: MODBUS output
  - VMU MC: LCD display
  - VMU MC: 24 VDC power supply
  - VMU MC: modular solution (from 2 to 11 S0 inputs)
  - VMU MC: extension module for VMU-MC
  - Configuration by UCS Software
  - Compatible with Utility meters with S0 output

- **UWP 3.0**
  - Dimensions: 4 DIN modules
  - USB port to supply dongle modems
  - Battery power supply
  - Indoor or outdoor installation (IP67)
  - 12 years battery lifetime
  - Compatible with SIU-MBM-02 concentrator
  - Wireless M-Bus T1 mode, 868 MHz

### USB dongle connection modules

- **CPA050 / CPA300**
  - Dimensions: 63 x 46 x 25 mm
  - USB port to supply dongle modems
  - Battery power supply
  - Voltage range: 800 VAC, 1000 VDC
  - Current range: CPA050: 50 AAC, 50 ADC
  - CPA300: 300 AAC, 400 ADC

- **SIU MBC**
  - Dimensions: 105 x 27 x 60 mm
  - Pulse counter (2 pulse inputs)
  - Battery power supply
  - Voltage range: 800 VAC, 1000 VDC
  - Current range: CPA050: 50 AAC, 50 ADC
  - CPA300: 300 AAC, 400 ADC

- **SIU MBM-01 / SIU MBM-02**
  - Dimensions: 95 x 71 x 60 mm
  - M-Bus input
  - M-Bus and wireless M-Bus scan feature
  - M-Bus and wireless M-Bus concentrable devices
  - M-Bus and wireless M-Bus devices
  - Setup by UCS software

### Pulse counter concentrator + extension

- **SIU MBM-01 / SIU MBM-02**
  - Dimensions: 95 x 71 x 60 mm
  - M-Bus input
  - M-Bus and wireless M-Bus scan feature
  - M-Bus and wireless M-Bus concentrable devices
  - M-Bus and wireless M-Bus devices
  - Setup by UCS software

### Cloud solution for multi-site monitoring

- **Em² 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 spreadsheets
  - Tariffs and contract management
  - Alarms management
  - Database replication from up to 100 VMU-C EM

### Quick-fit 3-phase energy transducer

- **ET272 + VMU C EM**
  - Dimensions: 4 DIN modules
  - Installation: DIN-rail mounting
  - Two 3-phase energy transducers in one
  - Current measurement by split-core 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: 3 x 230 (440) VAC, current range according to the TCD accessories
  - Outputs: 2 pulse (loads 1 and 2)
  - RS485 Modbus RTU
  - Self addressing function by means of VMU C EM
  - CE, cULus

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