Ceiec
Electric
Technology

# PMC-660
## Advanced Power Quality Monitor


- Advanced PQ Monitoring
- Sag/Swell and Transient Capture
- WF Recording @ 256 samples/cycle
- IEC 62053-22 Class 0.2S Compliant
- 4MB Log Memory
- High-speed Data Recording
- Setpoint Alarms
- Energy Log, PQ Log, SOE Log
- Standard Dual RS-485 ports
- I4 Monitoring
- Large, Bright, Backlit LCD Display with Wide Viewing Angle
- Extensive I/O Capabilities
- Extended Warranty
- Extended Temperature Range
- Industrial Grade Components
- Standard Tropicalization
- Metal Enclosure with No Openings
- IP52 Rated
- DIN96x96

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The PMC-660 is CET's latest offer for the advanced power quality monitoring of incomers and critical feeders for utilities, data centers, high-tech manufacturing facilities and heavy industries. Housed in an industry-standard DIN form factor measuring 96mmx96mmx125mm, the PMC-660's compact size is perfectly suited for today's space restricting installations. The PMC-660 features quality construction with metal enclosure, advanced power quality and revenue-accurate measurements, high-resolution waveform recording capabilities, comprehensive data logging, extensive I/O and an easy-to-read LCD display, capable of displaying 3-phase measurements at once. With standard dual RS-485 ports and Modbus protocol support, the PMC-660 becomes a vital component of an intelligent Power Quality Monitoring System.

## *Typical Applications*

- Class 0.2S Revenue Metering
- Power quality monitoring of main incomer or critical feeder
- Waveform recording at 256 samples per cycle
- Extensive logging capability with 4MB on-board memory
- Utility, industrial and commercial metering
- Substation, building and factory automation
- Low, medium and high voltage applications
- Analog meter replacement
- I4 monitoring

## *Features Summary*

### Ease of use

- Large, backlit, easy to read LCD display with wide viewing angle
- Password protected setup via front panel or free PMC Setup software
- Easy installation with mounting slide bar, no tools required

### Basic Measurements (1 second update)

- 3-phase voltage, current and power measurements
- Neutral current (I4) and Frequency
- Bi-directional energy measurements
- Voltage and Current phase angles

### High-speed Measurements

- 3-phase voltage @ ½ cycle
- 3-phase current, neutral current (I4) @ 1 cycle
- 3-phase power and power factor @ 1 cycle

### Power Quality

- Fundamental RMS measurements for 3-phase voltage, current, power, PF, and I4
- Voltage and Current Unbalance based on Sequence Components
- Voltage and Frequency Deviation
- THD, TOHD, TEHD, K-Factor and Displacement PF
- Individual harmonics to 63$^{rd}$ on-board, 127$^{th}$ via communications
- Sag/Swell Detection and Transient Capture
- PQ LOG with 1000 entries

### Sliding Window and Predicted Demands

- 3-phase voltage, current, power, PF, I4, Frequency, V and I Unbalance, and THD
- Max/Min values per demand interval
- Demand synchronization with DI
- Peak Demands for This Month and Last Month

### Setpoints

- 16 standard setpoints with extensive monitoring sources
- 8 high-speed setpoints with high-speed measurements and DI
- Configurable thresholds and time delays
- 6 Logical Modules supporting AND/OR/NAND/NOR operations
- WF Recording, Data Recorder, DO, and Email Alarm trigger

### Log memory

- 4MB on-board memory
- Dynamic allocation for Data Recorder Logs, Waveform Recorder Logs and Interval Energy and Demand Logs

### Waveform Recorder Log

- 2 independent groups of waveform recorders with a combined total of 32 entries
- Simultaneous capture of 3-phase voltage and current signals
- Programmable formats and pre-fault cycles from 256X20 to 16X320
- Support FIFO recording mode

### Interval Energy and Demand Log

- TOU capability without complicated tariff programming
- Interval recording of kWh, kvarh Import/Export and kVAh Total
- Interval recording of Demands and associated Min/Max values per demand interval
- Support FIFO or stop-when-full recording mode

### Data Recorder Log

- 12 standard Data Recorder Logs
- 4 high-speed Data Recorder Logs (1 cycle interval)
- Recording interval from 1s to 40 days for standard and 1 to 60 cycles for high-speed
- Programmable sources include almost all real-time, harmonics, unbalance and demand values
- Configurable depth and recording offset
- Support FIFO or stop-when-full recording mode

### SOE Log

- 512 events time-stamped to ±1ms resolution
- Setup changes, Setpoint events and I/O operations

### PQ Log

- 1000 entries time-stamped to ±1ms resolution
- Sag/Swell and Transient detection or other PQ events

### Max/Min Log

- Logging of Max/Min values for real-time measurements such as Voltage, Current, Frequency, kW, kvar, kVA, PF, Freq, Unbalance, K-factor, THD of This Month and Last Month

### Digital Inputs

- 6 channels, volts free dry contact, 24VDC internally wetted
- External status monitoring with programmable debounce
- Pulse counting with programmable weight for each channel for collecting WAGES information
- Demand Synchronization
- 1000Hz sampling

### Digital Outputs

- 3 channels standard without the optional AO
- 2 channels only with the optional AO
- Form A Mechanical relays

### Analog Input (Optional)

- 0-20 / 4-20mA DC input
- Can be used to measure external transducer signal
- Programmable zero and full scales

### Analog Output (Optional)

- 0-20 / 4-20mA DC output
- Can be "keyed" to any measured quantity
- Programmable zero and full scales

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### Communications

#### Port 1 and Port 2

- Optically isolated RS485 port
- Baud rate from 1200 to 38400bps
- Modbus RTU protocol

#### Ethernet (Optional)

- 10/100BaseT Ethernet with RJ45 connection
- Modbus RTU over TCP/IP, Modbus TCP, Ethernet Gateway, HTTP, SMTP, SNTP

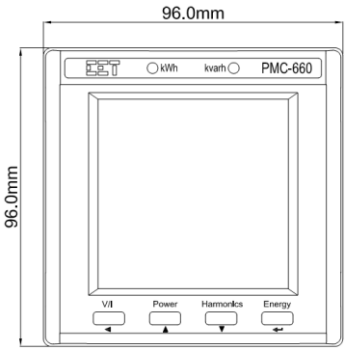
#### Real-time clock

- 6ppm battery-backed real-time clock (<0.5s per day)

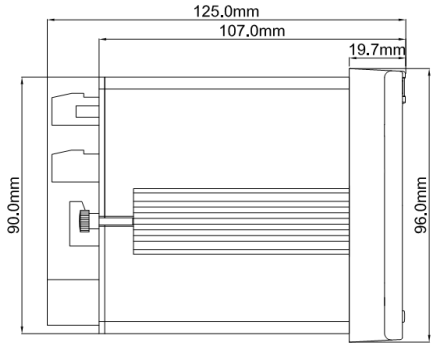
#### System Integration

- Supported by our PecStar® iEMS and iPQMS
- Easy integration into other Automation or SCADA systems via Modbus RTU and Modbus TCP protocols

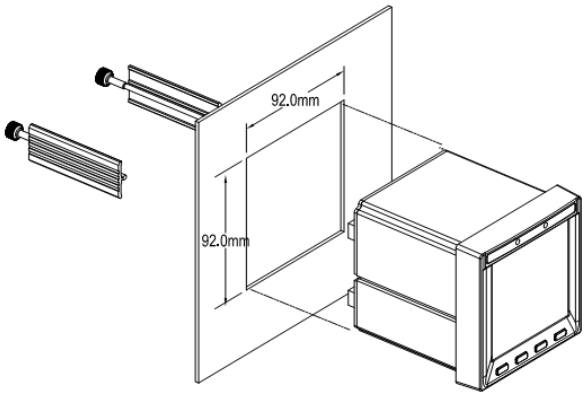
## Device View and Dimensions




**Front View**




**Side View**




**Panel Cutout**

## Accuracy

| Parameters | Accuracy | Resolution |
|---|---|---|
| Voltage | ±0.1% reading | 0.01V |
| Current | ±0.1% reading + 0.05% F.S. | 0.001A |
| I4 Measured | ±0.1% reading + 0.05% F.S. | 0.001A |
| I4 Calculated | 0.5% F.S. | 0.001A |
| kW, KVA | IEC 62053-22 Class 0.2S | 0.001k |
| kWh, kVAh | IEC 62053-22 Class 0.2S | 0.01kXh |
| kvar, kvarh | IEC 62053-23 Class 2 | 0.001k / 0.01kvarh |
| P.F. | IEC 62053-22 Class 0.2S | 0.001 |
| Frequency | ±0.01 Hz | 0.01Hz |
| Harmonics | IEC 61000-4-7 Class A | 0.01% |
| K-Factor | IEC 61000-4-7 Class A | 0.1 |
| Phase angles | ±1° | 0.1° |
| AI | ±0.5% F.S. | - |
| AO | ±0.5% F.S. | - |

## Technical Specifications

| | |
|---|---|
| **Voltage Inputs (V1, V2, V3, VN)** | |
| Standard (Un) | 240VLN/415VLL |
| Optional (Un) | 69VLN/120VLL, 400VLN/690VLL |
| Range | 10% to 120% Un |
| PT Ratio | 1-10,000 |
| Overload | 1.2xUn continuous, 2xUn for 10s |
| Burden | <0.5VA @ 240V |
| Frequency | 45-65Hz |
| **Current Inputs (I11, I12, I21, I22, I31, I32, I41, I42)** | |
| Standard (In / Imax) | 5A / 10A |
| Optional (In / Imax) | 1A / 2A |
| Range | 0.1% to 200% In |
| CT Ratio | 1-6,000 (5A) or 1-30,000 (1A) |
| Overload | 2xIn continuous, 20xIn for 1s |
| Burden | <0.25VA @ 5A |
| **Power Supply (L+, N-)** | |
| Standard | 95-415VAC/VDC ± 10%, 47-440Hz |
| Burden | <5W |
| **Digital Inputs (DI1, DI2, DI3, DI4, DI5, DI6, DIC)** | |
| Type | Dry contact, 24VDC internally wetted |
| Sampling | 1000Hz |
| Hysteresis | 20-2,000ms programmable |
| **Digital Outputs (DO11, DO12, DO21, DO22, DO31, DO32)** | |
| Type | Form A Mechanical Relay |
| Loading | 8A@250VAC / 8A@24VDC, 5A@30VDC for DO1<br>5A@250VAC / 5A@30VDC for DO2 and DO3 |
| **LED Pulse Outputs (kWh, kvarh)** | |
| Type | Optical |
| Pulse Constant | 1000/3200/5000 imp/kxh |
| **Analog Input (I41, I42)** | |
| Type | 0-20 / 4-20 mA |
| Overload | 24 mA maximum |
| **Analog Output (AO+, AO-)** | |
| Type | 0-20 / 4-20 mA |
| Loading | 500 Ω maximum |
| Overload | 24 mA maximum |
| **Environmental Conditions** | |
| Operating Temp. | -25°C to 70°C |
| Storage Temp. | -40°C to 85°C |
| Humidity | 5% to 95% non-condensing |
| Atmospheric Pressure | 70 kPa to 106 kPa |
| Pollution Degree | 2 |
| Measurement Category | CAT III |
| **Mechanical Characteristics** | |
| Enclosure | Aluminum Alloy |
| Panel Cutout | 92x92 mm (3.62″x3.62″) |
| Unit Dimensions | 96x96x125 mm (3.78″x3.78″×4.92″) |
| Shipping Dimensions | 170x145x155 mm (6.69″x5.71″×6.10″) |
| IP Rating | 52 |
| Shipping Weight | 1.1 kg |

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## Standards of Compliance

| Safety Requirements | | |
|---|---|---|
| LVD Directive 2006/95/EC | | EN61010-1-1-2001 |
| Insulation | | IEC 60255-5-2000 |
| Dielectric test | | 2kV @ 1 minute |
| Insulation resistance | | >100MΩ |
| Impulse voltage | | 5kV, 1.2/50μs |
| **Electromagnetic Compatibility EMC Directive 2004/108/EC (EN 61326: 2006)** | | |
| **Immunity Tests** | | |
| Electrostatic discharge | | IEC 61000-4-2: 2008 Level III |
| Radiated fields | | IEC 61000-4-3: 2008 Level III |
| Fast transients | | IEC 61000-4-4: 2004 Level IV |
| Surges | | IEC 61000-4-5: 2005 Level IV |
| Conducted disturbances | | IEC 61000-4-6: 2008 Level III |
| Magnetic Fields | | IEC 61000-4-8: 2009 Level IV |
| Oscillatory waves | | IEC 61000-4-12: 2006 Level III |
| Electromagnetic Emission | | IEC 60255-25: 2000 |
| **Emission Tests** | | |
| Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment | | EN 55011: 2009 (CISPR 11) |
| Limits and methods of measurement of radio disturbance characteristics of information technology equipment | | EN 55022: 2006+A1: 2007 (CISPR 22) |
| Limits for harmonic current emissions for equipment with rated current ≤16 A | | EN 61000-3-2: 2006+A1: 2009 |
| Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤16 A | | EN 61000-3-3: 2006 |
| Emission standard for residential, commercial and light-industrial environments | | EN 61000-6-3: 2007 |
| Electromagnetic Emission Tests for Measuring Relays and Protection Equipment | | IEC 60255-25: 2000 |
| **Mechanical Tests** | | |
| Vibration Test | Response | IEC 60255-21-1:1998 Level I |
| | Endurance | IEC 60255-21-1:1998 Level I |
| Shock Test | Response | IEC 60255-21-2:1998 Level I |
| | Endurance | IEC 60255-21-2:1998 Level I |
| Bump Test | | IEC 60255-21-2:1998 Level I |

## Ordering Guide

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*Version 20110804*

| Product Code | Description |
|---|---|
| PMC-660 Power Quality Monitor | |
| **Basic Function** | |
| 256 samples per cycle, Class 0.2S Compliant, 3-Phase Metering, Demands, Peak Demands, Min/Max, SOE Log, Ind. Har to 63rd, 4MB Log Memory, 16 Data Recorders, High-Speed Recording, WF Recording, Sag/Swell and Transient Detection | |
| **Display Screen** | |
| A | Integrated LCD Screen |
| **Input Current (I1, I2, I3, I4#)** | |
| 5 | 5A |
| 1 | 1A |
| **Input Voltage (V1, V2, V3)** | |
| 1 | 69V/120V |
| 3 | 240V/415V |
| 9* | 400V/690V |
| **Power Supply** | |
| 2 | 95-415VAC/DC, 47-440Hz |
| **System Frequency** | |
| 5 | 50Hz |
| 6 | 60Hz |
| **DI/DO/AO** | |
| A | 6DI + 3DO |
| B* | 6DI + 2DO + 1AO (0-20mA or 4-20mA) |
| **AI** | |
| X | No |
| A* | 1 Analog Input (0-20mA or 4-20mA)# |
| **Communications** | |
| B | 2 RS-485 ports |
| D* | 1 10/100BaseT Ethernet port + 1 RS-485 port |

| PMC-660 | - | A | 5 | 3 | 2 | 5 | A | X | B | PMC-660-A5325AXB (Standard Model) |
|---|---|---|---|---|---|---|---|---|---|---|

* Additional charges apply

# With AI option A , I4 is not available


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