



- IEC 62053-22 Class 0.2S
- **True RMS Measurements**
- Sag/Swell and Transient Capture
- WF Recording @ 256 samples/cycle
- Built-in 4MB Log Memory
- Energy Log, PQ Log, SOE Log
- **High-Speed Data Recording**
- **Multi-Tariff TOU**
- **Setpoint Alarms**
- **I4 and Residual Current Monitoring**

- Large, Bright, Backlit LCD Display
  - with Wide Viewing Angle
- **Extensive I/O Capabilities**
- Dual RS-485, optional 100BaseT •
- Metal Enclosure with No Openings
- **IP52** Rated
- **Standard Tropicalization**
- **Industrial Grade Components**
- **Extended Temperature Range**
- **Extended Warranty** •





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 with 4MB memory, extensive I/O and an easy-to-read LCD display, capable of displaying 5 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
- Utility, Industrial and Commercial Metering
- Substation, Building and Factory Automation
- Low, Medium and High Voltage applications
- Neutral (I4) and Residual Current (Ir) 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), Calculated Residual Current (Ir) and Frequency
- kWh, kvarh Import / Export / Net / Total and kVAh Total
- . kvarh Q1-Q4
- Interval Energy
- Voltage and Current Phase Angles
- Device Operating Time (Running Hours)

#### **High-speed Measurements**

- 3-Phase Voltage @ ½ cycle
- 3-Phase Current and Neutral Current (I4) @ 1 cycle
- 3-Phase Power and Power Factor @ 1 cycle

#### **Power Quality**

- Waveform Recording at 256 samples per cycle
- . Fundamental RMS measurements for 3-Phase Voltage, Current, Power. PF and I4
- Voltage and Current Unbalance and Symmetrical Components
- Voltage and Frequency Deviation
- THD, TOHD, TEHD, K-Factor and Displacement PF
- Individual harmonics up to 63rd
- Sag/Swell Detection and Transient Capture
- PQ LOG with 1000 entries

#### **Sliding Window and Predicted Demands**

- Demands and Predicted Demands for 3-Phase Voltage, Current, Power, PF, I4, Frequency, U and I Unbalance and THD
- . Peak Demands with Timestamp for This Month (or Since Last Reset) and Last Month (or Before Last Reset)
- Max/Min values per demand interval
- Demand synchronization with DI

## **PMC-660 Advanced Power Quality Monitor**

#### Setpoints

- 16 standard setpoints with extensive list of monitoring parameters including Voltage, Current, Power, Demands and THD, ... etc.
- 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, 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

#### Multi-Tariff TOU capability

- Two independent sets of TOU Schedules
  - Up to 12 Seasons
  - 90 Holidays or Alternate Days
  - 20 Daily Profiles, each with 12 Periods with minimum 15mins interval
  - 8 Tariffs, each providing information of kWh/kvarh Import/Export and kVAh
- Switch between two TOU schedules according to programmable time and stored as SOE logs

#### **Interval Energy Log**

- Interval recording of kWh/kvarh Import/Export and kVAh Total
- Support FIFO or Stop-When-Full Recording Mode

#### Data Recorder Log

- 12 Standard Data Recorder Logs and 4 High-Speed Data Recorder Logs
- Recording Interval from 1s to 40 days for Standard DR and 1 to 60 cycles for High-Speed DR
- 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 measurements such as Voltage, Current, Frequency, kW, kvar, kVA, PF, Unbalance, K-factor, THD and Ir with Timestamp for This Month (or Since Last Reset) and Last Month (or Before Last Reset)

#### **Digital Inputs**

- 6 channels, volts free dry contact, 24VDC internally wetted
- 1000Hz sampling for status monitoring with programmable debounce
- Pulse counting with programmable weight for each channel for
- collecting WAGES (Water, Air, Gas, Electricity, Steam) information Demand Synchronization
- Tariff switching based on DI status

#### **Digital Outputs**

Up to 3 channels Form A Mechanical Relays for alarming and control

#### Analog Input (Optional)

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

#### Analog Output (Optional)

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



#### Communications

#### RS-485 (Port 1 and Port 2)

- Optically isolated RS485 ports .
- Baud rate from 1200 to 38,400bps .
- Modbus RTU protocol

#### **Ethernet (Optional)**

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

#### Real-time clock

Equipped with a battery-backed Real-Time Clock with 6ppm accuracy (<0.5s per day)

#### System Integration

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

#### **Device View and Dimensions**









## **PMC-660 Advanced Power Quality Monitor**

### Accuracy

Parameters	Accuracy	Resolution
Voltage	±0.1%	0.001V
Current	±0.1%	0.001A
14 Measured	±0.1%	0.001A
Ir Calculated	±0.1% F.S.	0.001A
kW, kvar, kVA	±0.2%	0.001k
kWh, kVAh	IEC 62053-22 Class 0.2S	0.01kXh
kvarh	IEC 62053-24 Class 0.5S	0.01kvarh
P.F.	±0.2%	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 (I1-I3)	1-6,000 (5A) or 1-30,000 (1A)		
I4 Ratio	1-10,000		
Overload	2xIn continuous, 20xIn for 1s		
Burden	<0.25VA @ 5A		
Power Supply (L+, N-)			
Standard	95-415VAC/VDC ± 10%, 47-440Hz		
Burden	<6W		
Digital Inputs (DI1, DI2, DI3, DI4, DI5, DI6, DIC)			
Туре	Dry contact, 24VDC internally wetted		
Sampling	1000Hz		
Hysteresis	1-1,000ms programmable		
Digital Outputs (DO11, DO12, DO21, DO22, DO31, DO32)			
Туре	Form A Mechanical Relay		
Loading	8A@250VAC / 8A@24VDC for DO1		
	5A@250VAC / 5A@30VDC for DO2 and DO3		
LED Pulse Outputs (kWh, kvarh)			
Туре	Optical		
Pulse Constant	1000/3200/5000/6400/12800 imp/kxh		
A	nalog Input (141, 142)		
Туре	0-20 / 4-20 mA		
Overload	24 mA maximum		
Analog Output (AO+, AO-)			
Туре	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 <sup>°</sup> x3.62 <sup>°</sup> )		
Unit Dimensions	96x96x125 mm (3.78 <sup>°</sup> x3.78 <sup>°</sup> ×4.92 <sup>″</sup> )		
Shipping Dimensions	1/0x145x155 mm (6.69 X5./1 ×6.10 )		
IP Rating	52		
Shipping Weight	1.1 kg		



#### Standards of Compliance

Safety Requirements			
LVD Directive 2014 / 35 / EU	EN61010-1: 2010		
	EN61010-2-030: 2010		
Electrical safety in low voltage	IEC 61557-12: 2008 (PMD)		
distribution systems up to 1000Vac			
and 1500 Vdc			
Insulation	IEC 62052-11: 2003		
AC Voltage: 4kV @ 1 minute			
Insulation resistance: >100M $\Omega$			
Impulse Voltage: 6kV, 1.2/50µs			
Electromagnetic Compatibility			
EMC Directive 2004/108/EC (EN 61326: 2006)			
Immunity Id	ESTS		
Electrostatic Discharge	IEC 61000-4-2: 2008 Level III		
Radiated Fields	IEC 61000-4-3: 2010 Level III		
Surges	IEC 61000-4-5: 2005 Level IV		
Magnetic Fields	IEC 61000-4-6. 2008 Level III		
Voltago Dips and Interruptions	IEC 61000-4-11: 2004 Level III		
Oscillatory wayos	IEC 61000-4-11: 2004 Level III		
Padio Disturbancos	CISPR 22:2006 Lovel R		
Kaulo Disturbances CISPR 22:2006, Level B			
Limits and methods of measurement			
of electromagnetic disturbance			
characteristics of industrial. scientific	EN 55011: 2009 + A1: 2010		
and medical (ISM) radio-frequency	(CISPR 11)		
equipment			
Limits and methods of measurement	EN EE022, 2010, AC, 2011		
of radio disturbance characteristics of	EN 35022. 2010+AC. 2011		
information technology equipment	(CISPR 22)		
Limits for harmonic current emissions	EN 61000-3-2: 2006+41:		
for equipment with rated current ≤16	2009+A2:2009		
A			
Limitation of voltage fluctuations and			
flicker in low-voltage supply systems	EN 61000-3-3: 2008		
for equipment with rated current $\leq 16$			
A Emission standard for residential			
commorcial and light industrial	EN 61000-6-4: 2007+41: 2011		
environments	EN 81000-8-4. 2007+A1. 2011		
Testing and measurement techniques			
- Ring wave immunity test.	EN 61000-4-12: 2006		
Mechanical Tests			
Spring Hammer Test	IEC 62052-11: 2003		
Vibration Test	IEC 62052-11: 2003		
Shock Test	IEC 62052-11: 2003		

## **PMC-660 Advanced Power Quality Monitor**

#### **Ordering Guide**



" I4 is not available with AI Option "A"



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