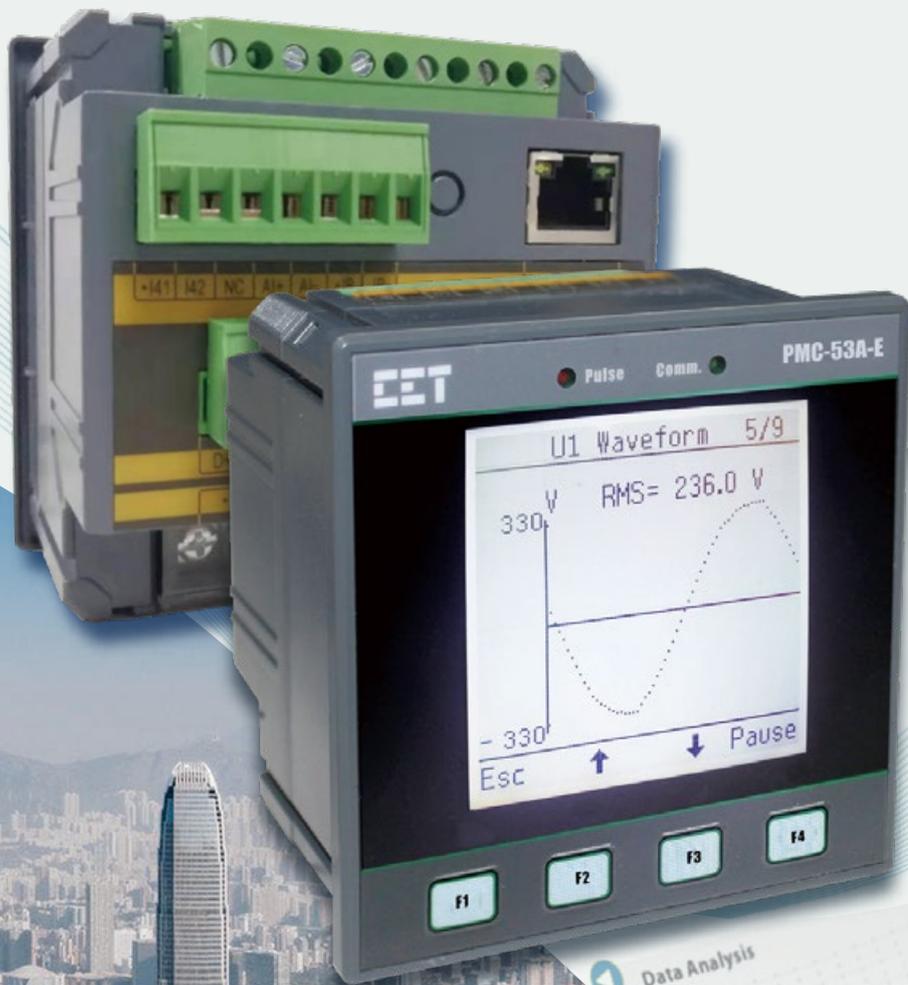


# PMC-53A-E

*Ethernet Multifunction Meter*



# Ethernet

**PMC-53A-E** Ethernet Multifunction Meter is CET's latest offer for the digital power/energy metering market. Housed in a standard DIN form factor measuring 96x96x88mm, it is perfectly suited for industrial, commercial and utility applications requiring direct Ethernet connectivity. The PMC-53A-E features quality construction, multifunction measurements and a large, backlit, Dot-Matrix LCD that is easy to navigate and user friendly. Compliance with the IEC 62053-22 Class 0.5S and ANSI C12.20 Class 0.2 Standards, it is a cost-effective replacement for analog instrumentation and is capable of displaying 4 measurements at once. It also optionally provides an I4 input for Neutral Current Measurement, one 0/4-20mA Analog Input for measuring external transducer signal as well as an Ir Input for Residual Current Measurement. With a standard 100BaseT Ethernet Port and an RS-485 port supporting multiple protocols, the PMC-53A-E can be easily integrated into Energy Management Systems as well as Building and Utility Automation Systems. The on-board password protected Web Server provides user-friendly access to its data and supports the configuration for most of the Setup parameters via a standard web browser.

## Typical Applications

- Industrial, Commercial and Utility Substation Metering
- Building, Factory and Process Automation
- Sub-metering and Cost Allocation
- Retrofit Applications with optional Class 0.5 Split-Core CTs

## Features Summary

### Basic Measurements

- ULN, ULL per Phase and Average with Neutral-to-Ground Voltage (Ung)
- Current per Phase and Average with calculated Neutral
- P, Q, S, PF per Phase and Total
- kWh, kvarh Import/Export/Net/Total and kVAh Total
- Frequency
- Device Operating Time (Running Hours)
- Optional Neutral Current and Residual Current Measurement

### Advanced Measurements

- 1-cycle Real-time U & I Waveform Display @ 1s update rate
- U and I THD, TOHD, TEHD and Individual Harmonics up to 31<sup>st</sup>
- Current TDD, TDD Odd, TDD Even, K-Factor and Crest Factor
- U and I Unbalance and Phase Angle, Displacement PF
- Fundamental U, I and P per Phase
- Total Fundamental P & Total Harmonic P
- U and I Symmetrical Components
- kvarh Q1-Q4
- Interval Energy for kWh/kvarh Imp/Exp and kVAh
- Present, Predicted and Maximum Demands for ULN, ULL, I per Phase and Average as well as P/Q/S Total with Timestamp for This Month & Last Month (or Since Last Reset & Before Last Reset)
- Two TOU schedules, each providing 8 Tariffs for per Phase and Total Energy as well as Max. Demand recording, 12 Seasons, 20 Daily Profiles (each with 12 periods in 15-minute interval) and 90 Holidays or Alternate Days

## Event and Data Recording

### SOE Logs

- 100 events time-stamped to  $\pm 1$ ms resolution
- Setup changes, Setpoint, DI status changes and DO operations

### Max./Min. Log

- Max./Min. Log with Timestamp for Real-time measurements such as Voltage, Current, In, I4, Ir, Freq., P, Q, S, PF, Unbalance, K-Factor, Crest Factor and THD
- Configurable for This Month & Last Month (or Since Last Reset & Before Last Reset)

### Freeze Logs

- 60 Daily Freeze Logs for kWh/kvarh/kVAh Total and P, Q, S Maximum Demands with Timestamps
- 36 Monthly Freeze Logs for kWh/kvarh/kVAh Total and P, Q, S Maximum Demands with Timestamps

### Data Recorder (DR)

- 5 Data Recorders of 16 parameters each for Real-time measurements, Harmonics, Energy, Demand, TOU, Pulse Counters, etc.
- Recording interval from 1 minute to 40 days
- Configurable capacity up to a max. of 1,145 days at 15-minute interval for 1 Data Recorder with 16 parameters for HK BEC 2021 Compliant Recording

## Inputs and Outputs

### Digital Inputs

- 4 channels, volt 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
- Tariff switching based on DI status

### Digital Outputs

- 2 Form A Mechanical Relays for alarming and general purpose control

### Pulse Outputs (Optional)

- 2 Form A Solid State Relays for kWh and kvarh pulsing

### Analog Inputs (Optional)

- I4 Current Input for Neutral Current measurement
- Ir Input for Residual Current measurement (CT not included)
- 0/4-20mA DC input with programmable zero and full scales

## Diagnostics

- Frequency Out-of-Range, Loss of Voltage/Current
- P Direction per Phase and Total, Possible incorrect CT Polarity
- Incorrect U & I Phase Sequence
- Disconnection of Residual Current Input

## Real-Time Clock

- Battery-backed Real-time Clock with 6ppm accuracy (<0.5s per day)

## System Integration

- Supported by CET's PecStar® iEMS
- Easy integration into Building Automation Systems with BACnet MS/TP or Modbus RTU and Utility Substation Automation with DNP 3.0
- The on-board password protected Web Server allows complete access to its data and supports the configuration for most of the Setup parameters via a standard web browser

# PMC-53A-E

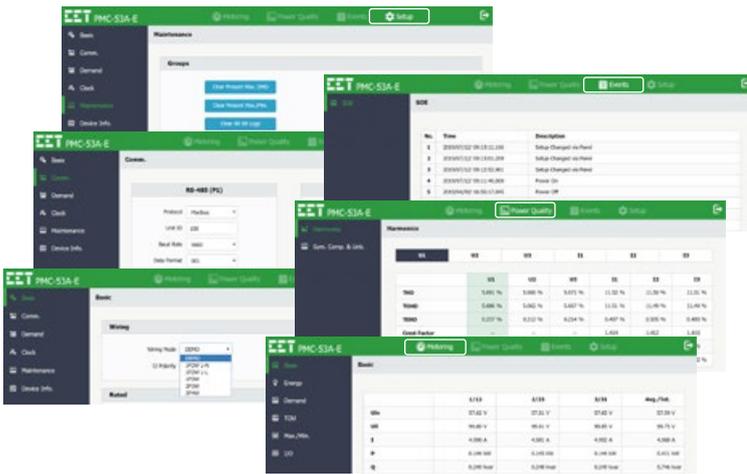
## Communications

- 1x100BaseT Ethernet Port with RJ45 connector
- One optically isolated RS-485 port with baud rate from 1.2kbps to 38.4kbps
- Built-in Web Server for easy data viewing and setup configurations
- Protocol supported: Modbus TCP/RTU, BACnet MS/TP, DNP 3.0, HTTP, SMTP, SNMP, TFTP and Ethernet Gateway

## Setpoints

- 9 user programmable setpoints with extensive monitoring parameters including Voltage, Current, Power, Demand and THD, etc.
- Configurable thresholds, time delays, DO and Alarm Email triggers

## Web Interface



## Front Panel Display



## Technical Specifications

Voltage Inputs (V1, V2, V3, VN)	
Standard Un	400ULN/690ULL
Range	10V to 1.2xUn
Overload	1.2xUn continuous, 2xUn for 1s
Burden	<0.02VA per phase
Measurement Category	CAT III up to 600ULL
Frequency	45-65Hz

Current Inputs (-I11, I12, -I21, I22, -I31, I32)	
Standard In	5A (Optional 1A)
SCCT Options	100A/200A/400A/800A/1600A to 40mA Output
Range	0.1% to 200% In
Starting Current	0.1% In
Overload	2xIn continuous, 20xIn for 1s
Measurement Category	CAT III up to 600ULL
Burden	<0.15VA per phase @ 5A

Power Supply (L/+, N/-)	
Standard	95-250VAC/DC, ±10%, 47-440Hz
Optional	20-60VDC
Burden	<3W
Overvoltage Category	OVC III up to 300ULN

Digital Inputs (DI1, DI2, DI3, DI4, DIC)	
Type	Dry contact, 24VDC internally wetted
Sampling	1000Hz
Hysteresis	1ms minimum

Digital Outputs (DO11, DO12, DO21, DO22)	
Type	Form A Mechanical Relay
Loading	5A @ 250VAC or 30VDC
Load Type	Resistive

Optional SS Pulse Outputs (E1+, E1-, E2+, E2-)	
Type	Form A Solid State Relay
Isolation	Optical
Load Type	Resistive
Output	Optocoupler output as ON-OFF
Max. Load Voltage	50VDC
Max. Forward Current	50mA

Optional I4 Input (-I41, I42)	
In	5A (5A/1A Auto-Scaling)
Range	0.1% to 120% In
Starting Current	0.1% In

Optional Residual Current Input (-IR, IR)	
In	0.5mA
Range	2% to 500% In
CT Type	Solid-Core or Split-Core Residual Current CT

Optional Analog Input (AI+, AI-)	
Type	0-20/4-20 mA
Overload	24 mA maximum

Installation Torque	
Current Inputs	12lb-in (1.3 N.m)
Power Supply, Voltage Inputs, RS-485 and I/O	5lb-in (0.5 N.m)

# Multifunction

## Accuracy

Parameters	Accuracy	Resolution
Voltage	±0.2%	0.001V
Current	±0.2%	0.001A
I4 (measurement)	±0.2%	0.001A
I <sub>r</sub> (measurement)	±0.5%	0.001A
P, Q, S	±0.5%	0.001kX
kWh, kVAh	5A/1A Option IEC62053-22 Class 0.5S ANSI C12.20 Class 0.2	0.1kXh
	SCCT Option IEC62053-21 Class 1	
kvarh	5A/1A Option IEC62053-24 Class 0.5S IEC62053-23 Class 2	0.1kvarh
	SCCT Option IEC62053-24 Class 1 IEC62053-23 Class 2	
PF	±0.5%	0.001
Frequency	±0.02Hz	0.01Hz
THD	IEC61000-4-7 Class II	0.001%
K-Factor	IEC61000-4-7 Class II	0.001
Phase Angle	±1°	0.1°

## Environmental and Mechanical Specifications

Environmental Conditions	
Operating Temperature	-25°C to 70°C
Storage Temperature	-40°C to 85°C
Humidity	5% to 95% non-condensing
Atmospheric Pressure	70 kPa to 106 kPa
Altitude	< 2000m
Pollution Degree	2
Location/Mounting	For indoor use only

Mechanical Characteristics	
Panel Cutout	92x92mm (3.62"x3.62")
Unit Dimensions	96x96x88mm
IP Rating	IP65 (Front Panel), IP30 (Body)

Mechanical Tests	
Spring Hammer Test	IEC62052-11: 2003
Vibration Test	IEC62052-11: 2003
Shock Test	IEC62052-11: 2003

## Safety Standards

Safety Requirements	
CE LVD 2014/35/EU	EN61010-1: 2010 EN61010-2-030: 2010
cULus Listed	UL 61010-1 Ed. 3 CAN/CSA C22.2 NO. 61010-1-12 Ed. 3 UL 61010-2-201 Ed. 2 CSA C22.2 NO. 61010-2-030:18 Ed. 2 UL 61010-2-201 Ed. 2 CSA C22.2 NO. 61010-2-201 Ed. 2
Electrical Safety in Low Voltage Distribution Systems up to 1000Vac and 1500Vdc	IEC61557-12: 2018 (PMD)
Insulation AC Voltage: 2kV @ 1 minute Insulation Resistance: >100MΩ Impulse Voltage: 6kV, 1.2/50μs	IEC62052-11: 2003 IEC62053-22: 2003

## Electromagnetic Compatibility

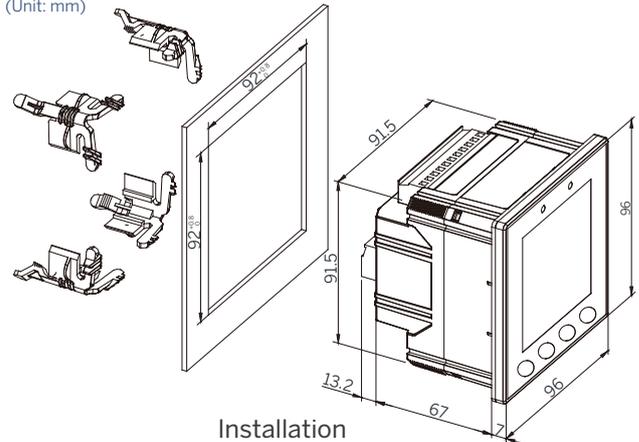
CE EMC Directive 2014/30/EU (EN61326: 2013)

Immunity Tests	
Electrostatic Discharge	EN61000-4-2: 2009
Radiated Fields	EN61000-4-3: 2006 +A1: 2008 +A2: 2010
Fast Transients	EN61000-4-4: 2012
Surges	EN61000-4-5: 2014 +A1: 2017
Conducted Disturbances	EN61000-4-6: 2014
Magnetic Fields	EN61000-4-8: 2010
Voltage Dips and Interruptions	EN61000-4-11: 2004 +A1: 2017
Ring Wave	EN61000-4-12: 2017

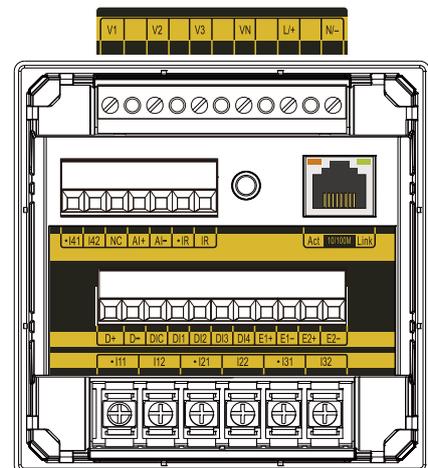
Emission Tests	
Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment	EN55011: 2016
Electromagnetic Compatibility of Multimedia Equipment-Emission Requirements	EN55032: 2015
Limits for Harmonic Current Emissions for Equipment with Rated Current ≤16A	EN61000-3-2: 2014
Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤16A	EN61000-3-3: 2013
Emission Standard for Industrial Environments	EN61000-6-4: 2007 +A1: 2011
Radiated Emissions	FCC 47CFR 15.109 Class B
Conducted Emissions	FCC 47CFR 15.107 Class B

## Dimensions and Installations

(Unit: mm)



Installation



Back View

# Ordering Information

Product Code										Description
PMC-53A-E Ethernet Multifunction Meter										
Basic Function		E			Dot-Matrix LCD, Monthly & Daily Freeze Log, Data Recorder, 8MB Memory, 1x100BaseT Ethernet Port and 1xRS-485 (Modbus RTU, BACnet MS/TP and DNP 3.0)					
Input Current	5		5A/1A Auto-Scaling (Class 0.5S for 5A and Class 1 for 1A)							
	1		1A (Class 0.5S)							
	4 <sup>^</sup>		For use with 100A, 200A, 400A, 800A and 1600A to 40mA Split-Core CTs							
Input Voltage		9			400ULN/690ULL					
Power Supply	2		95-250 VAC/DC, 47-440Hz							
	3		20-60VDC							
Frequency		5			45Hz-65Hz					
I/O	A		4xDI + 2xDO (Mechanical Relay)							
	B		4xDI + 2xSS Pulse Output							
Analog Inputs	X		None							
	A* <sup>^</sup>		I4 (5A/1A Auto-Scaling) +AI (0/4-20mA) +Ir (0-0.5mA)							
Language		E			English					
PMC-53A - E 5 9 2 5 A X E										PMC-53A-E-5925AXE (Standard Model)

\*Additional charges apply

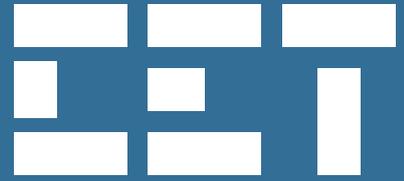
<sup>^</sup> The Analog Inputs Option A is not available for the Input Current Option 4

## Accessories

Residual Current CT	
Load Current (Solid-Core)	160A (CT517203, Ø=46mm)
	400A (CT517403, Ø=80mm)
	630A (CT519703, 220x50mm)
	1000A (CT517603, Ø=120mm)
Load Current (Split-Core)	160A (CT553203, Ø=48mm)
	225A (CT553303, Ø=68mm)
Primary Input	1A (Residual Current)
Secondary Output	0.5mA
Range	2-500%
Overload	44A (Residual Current)
Accuracy	Class 0.5 (Solid Core), Class 3 (Split Core)
Frequency	50/60Hz
Dielectric Strength	3kV rms @ 1 minute
Operating Temperature	-25°C to +70°C (Solid-Core)
	-12°C to +45°C (Split-Core)
Storage Temperature	-40°C to +85°C (Solid-Core)
	-25°C to +70°C (Split-Core)

Split-Core CT	
Models	100A (PMC-SCCT-100A-40mA-16-A, Ø=16mm)
	200A (PMC-SCCT-200A-40mA-24-A, Ø=24mm)
	400A (PMC-SCCT-400A-40mA-35-A, Ø=35mm)
	800A (PMC-SCCT-800A-40mA-A, 80x50mm)
	1600A (PMC-SCCT-1600A-40mA-A, 130x55mm)
Primary Input	100A/200A/400A/800A/1600A
Secondary Output	40mA
Range	0.15%-120%In
Accuracy	Class 0.5
Frequency	50/60Hz
Operating Temperature	-20°C to +50°C

# Our Services



CET has a team of dedicated and proficient Engineering Services personnel who are ready to provide expert assistance for your system deployment needs. We are committed in helping our customers create a more secure and reliable, energy conserving and environmentally friendly electrical power system. Our team of experts is prepared to provide customized solutions for your different application needs with timely and efficient services. Please do not hesitate to contact our sales office or your local representative for more information.

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Your Local Representative



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