



CET
Electric
Technology

PMC-53A-E Ethernet Multifunction Meter



- IEC 62053-22 Class 0.5S
- ANSI C12.20 Class 0.2
- True RMS Measurements
- THD with 31 Ind. Harmonics
- K-Factor, Crest Factor and TDD
- Unbalance & Phase Angle
- Demands and Max. Demands
- Max./Min. Logs with Timestamp
- 8MB Non-volatile Log Memory
- Freeze Logs and SOE Logs
- 5xDR Logs @ 16 parameters each
- Multi-Tariff TOU and 9 Setpoints
- Large, Backlit Dot-Matrix LCD
- 1-Cycle Real-Time WF Display
- Optional 40mA SCCT Inputs
- 1xEthernet & 1xRS-485
- Modbus RTU, BACnet MS/TP, DNP 3.0
- Modbus TCP, HTTP, SMTP, SNTP, TFTP
- 4xDI, 2xDO, 1xI4, 1xIr and 1xAI
- IP65 Enclosure with No Openings
- Standard Tropicalization
- Industrial Grade Components
- Extended Temperature
- Extended Warranty

Designed For Reliability

Manufactured To Last



The 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 a 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.

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 (I4) and Residual Current (Ir) Measurement

Advanced Measurements

- 1-cycle Real-time U & I Waveform Display @ 1s update
- U and I THD, TOHD, TEHD and Harmonics analysis up to 31st
- Current TDD, TDD Odd, 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 Imp/kWh Imp, %kvarh Exp/kWh Imp for Last Day & Last 30 Days
- 12 Monthly Logs of kWh, kvarh Imp/Exp/Tot/Net, kVAh and 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
 - 12 Seasons
 - 20 Daily Profiles, each with 12 Periods in 15-minute interval
 - 90 Holidays or Alternate Days
 - 8 Tariffs, each providing the following information
 - Total and 3-phase kWh/kvarh Imp/Exp, kVAh
 - P/Q/S Max. Demands

Ease of use

- Large, backlit, Dot-Matrix LCD display with wide viewing angle
- Intuitive user interface
- LED indicators for Energy Pulsing and Communication activities
- Password protected setup via Front Panel, Web Server or PMC Setup
- Easy installation with mounting clips, no tools required

Setpoints

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

SOE Logs

- 100 events time-stamped to ± 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, Frequency, 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 Max. Demands
- 36 Monthly Freeze Logs for kWh/kvarh/kVAh Total and P/Q/S Max. Demands with Timestamp

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 1145 days (> 3 years) at 15-minute interval for 1 Data Recorder with 16 parameters for HK **BEC2018**

Compliant Recording

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

Communications

- 1x100BaseT Ethernet Port with RJ45 connector
- 1xoptically 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

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

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



Technical Specifications

Voltage Inputs (V1, V2, V3, VN)	
Standard Un	400ULN/690ULL
Range	10V to 1.2Un
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	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, $\pm 10\%$, 47-440Hz
Optional	20-60VDC
Burden	<3W
Overvoltage Category	CAT III up to 300VLN
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 (1.3N.m)
Power Supply, Voltage Inputs, RS-485 and I/O	5lb-in (0.5 N.m)
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
Altitude	< 2000m
Pollution Degree	2
Location / Mounting	For indoor use only
Mechanical Characteristics	
Panel Cutout	92x92 mm (3.62"x3.62")
Unit Dimensions	96x96x88 mm
IP Rating	IP65 (Front Panel), IP30 (Body)

Accuracy

Parameters	Accuracy		Resolution
Voltage	$\pm 0.2\%$		0.001V
Current	$\pm 0.2\%$		0.001A
I4 (measurement)	$\pm 0.2\%$		0.001A
Ir (measurement)	$\pm 0.5\%$		0.001A
P, Q, S	$\pm 0.5\%$		0.001kX
kWh, kVAh	5A/1A Option	IEC 62053-22 Class 0.5S ANSI C12.20 Class 0.2	0.1kXh
	SCCT Option	IEC 62053-21 Class 1	
kvarh	5A/1A Option	IEC 62053-24 Class 0.5S IEC 62053-23 Class 2	0.1kvarh
	SCCT Option	IEC 62053-24 Class 1 IEC 62053-23 Class 2	
PF	$\pm 0.5\%$		0.001
Frequency	$\pm 0.02\text{Hz}$		0.01Hz
THD	IEC 61000-4-7 Class B		0.001%
K-Factor	IEC 61000-4-7 Class B		0.001
Phase Angle	$\pm 1^\circ$		0.1°

Standards of Compliance

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 61010-2-030, Ed.2 CSA C22.2 NO. 61010-2-030:18, Ed.2 UL 61010-2-030, Ed.2 CSA C22.2 NO. 61010-2-201 Ed.2
Electrical Safety in Low Voltage Distribution Systems up to 1000Vac and 1500 Vdc	IEC 61557-12: 2018 (PMD)
Insulation	IEC 62052-11: 2003 IEC 62053-22: 2003
AC Voltage: 2kV @ 1 minute Insulation Resistance: >100M Ω Impulse Voltage: 6kV, 1.2/50 μ s	
Electromagnetic Compatibility CE EMC Directive 2014 / 30 / EU (EN 61326: 2013)	
Immunity Tests	
Electrostatic Discharge	EN 61000-4-2: 2009
Radiated Fields	EN 61000-4-3: 2006+A1: 2008+A2: 2010
Fast Transients	EN 61000-4-4: 2012
Surges	EN 61000-4-5: 2014+A1: 2017
Conducted Disturbances	EN 61000-4-6: 2014
Magnetic Fields	EN 61000-4-8: 2010
Voltage Dips and Interruptions	EN 61000-4-11: 2004+A1: 2017
Ring Waves	EN 61000-4-12: 2017
Emission Tests	
Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment	EN 55011: 2016
Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements	EN 55032: 2015
Limits for Harmonic Current Emissions for Equipment with Rated Current ≤ 16 A	EN 61000-3-2: 2014
Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤ 16 A	EN 61000-3-3: 2013
Emission Standard for Industrial Environments	EN 61000-6-4: 2007+A1: 2011
Mechanical Tests	
Spring Hammer Test	IEC 62052-11: 2003
Vibration Test	IEC 62052-11: 2003
Shock Test	IEC 62052-11: 2003
Radiated Emissions	FCC 47CFR 15.109 Class B
Conducted Emissions	FCC 47CFR 15.107 Class B



Ordering Information



Version 20200826

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^	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*^	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)

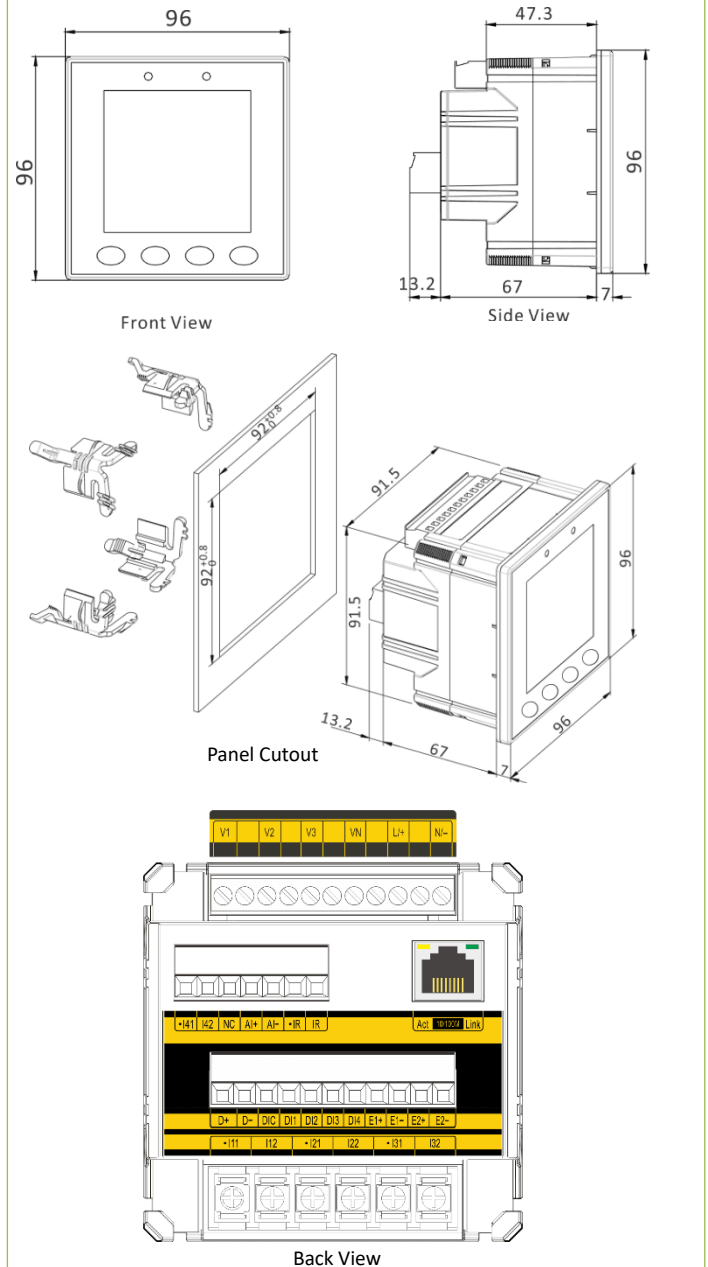
* Additional charges apply

^ 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

Device View and Dimensions



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Your Local Representative

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