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|------------------------------|-------------------|----------------------|
| 1 Voltage Input Terminals | 5 TFT LCD Display | 9 Ethernet Port |
| 2 Front Panel | 6 CT Clamp Inputs | 10 Earthing Terminal |
| 3 Power Input | 7 SD Card | 11 Buttons |
| 4 Battery Charging Indicator | 8 USB Port | |

- 512 samples/cycle
- 16GB Removable SD Card
- IEC 62053-22 Class 0.5S Compliant
- IEC 61000-4-30 Class A
- IEC 61000-4-15 Flicker
- IEC 61000-4-7 Harmonics
- Comprehensive Data Recording
- PQDIF & COMTRADE Support
- Industrial Grade Components
- Extended Warranty
- 5.7" TFT Color LCD Display @ 640x480
- Dip/Swell, Transient and Flicker
- Disturbance Waveform Recording
- Statistical Data Recording (SDR)
- IEC61850 for Smart Grid
- 10/100BaseT Port with RJ45
- Modbus TCP, SNTP&IEC61850
- Firmware Upgrade via Ethernet or USB
- Standard Tropicalization
- Extended Temperature Range

Designed For Reliability

Manufactured To Last



The PMC-690 Portable Power Quality Analyzer is CET's latest offer to assist engineers to diagnose the PQ events at site as it provides advanced functionality by combining Class 0.1 accuracy and advanced PQ features in a portable lightweight handheld form with a large, high-resolution, backlit, color TFT LCD display. It is compliant with the standards as IEC 62053-22 Class 0.5S, IEC 61000-4-30 Class A, IEC-61000-4-15, IEC 61000-4-7 and IEC 61850. What's more, it supports 4 channels each of voltage inputs and current inputs and comes up with a large logging capacity of 16GB on-board memory with data recording in COMTRADE and PQDIF file format which is downloadable via USB port and compatible with PQ View software. With these features, the PMC-690 Power Quality Analyzer becomes the most advanced and convenient diagnostic tool at site.

Typical Applications

- PQ Check-up at HV, MV and LV Utility Substations
- Site investigation & diagnosis for PQ problems, industrial & Commercial
- Electrical Testing and Recording
- Fault investigation and identification
- No Load and Full Load Test
- Mains and Critical feeder Dips, Swells, Transients, Flickers and Disturbance monitoring
- Harmonics Monitoring

Features Summary

Basic Features

- 5.7" Backlit Color LCD Display @ 640x480
- Light weight (1.16kg) – for easy transport
- Simple configuration for quick measurement setup
- Low power consumption with 8 hours battery
- PQ Insight™ for capturing Waveforms for 3-phase Voltages and Currents in "Scope Mode"
- Communications - 10/100BaseT with RJ45 connector
- Protocol - Modbus TCP, SNTP & IEC 61850
- Industrial Grade Components
- Standard Tropicalization
- Extended Temperature Range
- Extended Warranty
- Weatherproof Carrying Case (Optional)

Key Measuring Features

- 3-phase Voltages, Current, Power, P.F. and Phase Angles
- Disturbance Detection - Transients, Dips, Swells, Interruptions, Rapid Voltage Changes
- Disturbance Waveform Recording - 512 samples/cycle max.
- Harmonic analysis up to 63rd order
- Statistical Data Recorders & Monitor Logs (16GB Removable SD Card for storage)
- In-rush Current Monitoring
- Setpoints - PQ Setpoints, 24 Control & 16 High-Speed Setpoints

Power Quality Features

- IEC 61000-4-30 Class A
- IEC 61000-4-7, IEC 61000-4-15
- Transients, Dips, Swells, Interruptions, Rapid Voltage Changes (RVC) and In-rush Current monitoring
- Harmonic analysis up to 63rd on-board
- Disturbance Waveform Recording (DWR)
- Downloadable waveform records in COMTRADE format via SD Card
- Trending and Statistical Reporting
- Up to 1024 PQ Logs
- PQ Insight™ for capturing Transient Waveforms for 3-phase Voltages and Currents in "Scope Mode".

Front Panel Display

- Real-time, Harmonic Power and Energy measurements
- PQ Log and Waveform displays
- Harmonic & Interharmonic histogram and Phasor diagrams
- Statistical Trending
- SOE Log
- Device configuration
- Diagnostics

Metering

Basic Measurements (1-second update)

- 3-phase Voltage, Current, Power, PF and Phase Angles
- kWh, kvarh Import/Export/Net/Total and kVAh Total
- U4, I4, Frequency

High-speed Measurements (½ cycle update)

- 3-phase Voltages and Currents, U4, I4, Power, PF, Frequency

Demands

- 3-phase Voltage, Current, Power, PF, U4, I4, Frequency
- Predicted Demands
- Present Peak Demands, and Max. Demand of Last Time

Power Quality Metering

PQ Parameters as per IEC 61000-4-30 Class A

- Power Frequency
- Magnitude of the Supply Voltage
- Flicker
- Supply Voltage Dips (Sags) and Swells
- Voltage Interruptions
- Transient Voltages
- Supply Voltage Unbalance
- Voltage Harmonics and Interharmonics
- Rapid Voltage Changes
- Measurement of Underdeviation and Overdeviation parameters

Harmonic and Interharmonic measurements

- K-Factor for Current, Crest Factor for Current and Voltage
- V and I THD, TOHD, TEHD
- V and I Individual Harmonics (%HD) from 2nd to 63rd #
- V and I Individual Interharmonics (%IHD) from 1 to 63rd #
- Harmonic kW, kvar, kVA and PF from 2nd to 63rd in RMS
- Fundamental V, I, kW, kvar, kVA, PF and Phasor
- Fundamental kWh, kvarh Import/Export/Net/Total
- Total harmonic kWh, kvarh Import/Export/Net/Total
- Total Harmonic kWh, kvarh Import/Export from 2nd to 63rd

* %HD and %IHD can be configured as % of Fundamental, % of U/I nominal or % of RMS

Symmetrical Components and Unbalances

- Zero, Positive and Negative Sequence Components
- U and I Unbalance based on Zero and Negative Sequence Components

Transient and Dip/Swell Recording

- Transients capture as short as 40us at 512 samples @ 50Hz for sub-cycle disturbances such as capacitor switching and resonance phenomena
- Dips and Swells detection @ 10ms (½ cycle at 50Hz)

Designed For Reliability

Manufactured To Last

- Trigger for Data Recording and High-Speed Data Recording, WF Recording, Disturbance Waveform Recording, PQ Log and Buzzer Alarm

Rapid Voltage Changes (RVC)

- Detection of a quick transition in RMS voltage between two steady state Voltage conditions

In-rush Current Monitoring

- Monitoring of the ½ cycle RMS Current and capturing of the Current waveforms associated with events such as motor starting and transformer being energized

Waveform Capture (WFC) and Waveform Recorder (WFR)

- Real-time Waveform Capture via front panel display
- Waveform Recorder with 500 entries
- Simultaneous capture of 3-phase Voltage and Current inputs
- # of Cycles x Samples/Cycles with programmable # of pre-fault cycles
 - 640x16, 320x32, 160x64
 - 80x128, 40x256, 20x512
- Extended recording for up to a maximum of 4 consecutive captures
- COMTRADE file format, downloadable via SD Card

Disturbance Waveform Recorder (DWR)

- Disturbance recording of all Voltage and Current up to 500 entries
 - Initial state: Up to 35 cycles @ 512 samples/cycle
 - Steady State: 3-Up to 150 cycles@16 samples/cycle
Up to 18,000 cycles@1sample/cycle
 - Ending Stage: Up to 15cycles @ 512 samples/cycle

Metering

Basic Measurements (1-second update)

- 3-phase Voltage, Current, Power, PF, V4, I4, Frequency and Phase Angles
- kWh, kvarh Import/Export/Net/Total and kVAh Total
- U4, I4, Frequency

High-Speed Measurements

3-phase Voltages and Currents, U4, I4, Power, Frequency

Data and Event Recorders

Log Memory

- 16GB Removable SD Card (SanDisk Extreme Class 10 @ 45MB/s)

Statistical Data Recorder (SDR) Log

- Recording of the Max., Min., Avg. and 95th percentile of statistical measurements including V, I, Freq., Flicker, Harmonics & Unbalances
- Recording interval from 1 to 60 minutes
- 5 recorders (64 parameters/recorder)
- FIFO mode with configurable depth
- PQDIF file format, downloadable via the USB port

Max/Min Recorder (MMR) Log

- 4 records (20 parameters/recorder) with timestamp
- Logging of Max./Min. values for real-time measurements such as V, I, kW, kvar, kVA, PF, Freq., Unbalance, K-factor, THD
- Two log transfer modes:
 - o Manual: Max./Min. Since Last Reset/Before Last Reset
 - o Automatic: Max./Min. of This Month/Last Month

Monitor Log

- 1024 FIFO entries time-stamped to ±1ms resolution
- Transient, Dip/Swell, Interruption, Rapid Voltage Change, In rush Current, Setpoint events

Device Log

- 1024 FIFO events time-stamped to ±1ms resolution
- Setup changes, System events, Setpoint events

Setpoints

PQ Setpoints

- Transients
- Dips/Swells
- Rapid Voltage Changes
- In-rush Current
- Harmonics
- Trigger SOE Log, Data Recording, WFR or DWR

Control Setpoints

- 24 Control Setpoints and 16 High-Speed Setpoints
- Extensive monitoring sources
- Configurable thresholds and time delays
- Trigger SOE Log, RMS Recorder, WFR or DWR

Communications

Ethernet Port

- 100BaseT TCP/IP Ethernet Ports with RJ45 connector
- Simultaneous connection for 10xModbus TCP and 12xIEC61580 clients
- Protocols
 - Modbus TCP
 - IEC61850
 - SMTP
- Firmware upgrade via Ethernet port

SD Card

- 16GB Capacity
- Removable SD Card for easy data transfer to PC
- Solid State technology that is immune from mechanical breakdown

USB Port

- For Data transfer to USB storage device
- User friendly interface for transferring data/waveform through USB port

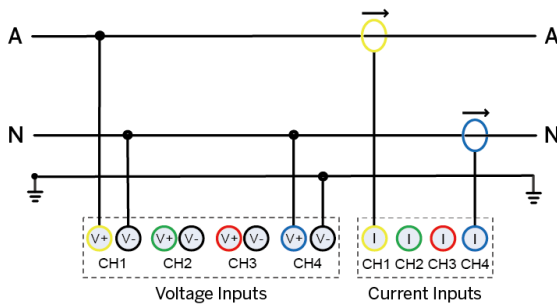
Time Synchronization

- Battery-backed real-time clock @ 6ppm(≤ 0.5s/day)
- Time Sync. via Modbus SNTP

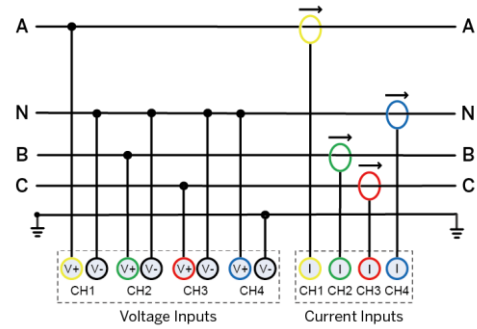
Accuracy

Parameters	Accuracy	Resolution
Voltage (U)	±0.1%	0.01V
Current (I)	±0.1% + CT Clamps Accuracy	0.001A
kW, kVA	±0.2% + CT Clamps Accuracy	0.001kX
kWh, kVAh	IEC 62053-22 Class 0.5S	0.1kXh
kvar, kvarh	±0.2% + CT Clamps Accuracy	0.001kvar
P.F.	IEC 62053-23 Class 2	0.1kvarh
Frequency	±0.5%	0.001
Harmonics	±0.005 Hz	0.001Hz
K-Factor	IEC 61000-4-7 Class A	0.01%
Phase angles	IEC 61000-4-7 Class A	0.01
Symm. Components	±0.2°	0.1°
Voltage Unbalance	±0.1%	0.01%
Current Unbalance	±0.1%	0.01%
Pst, Plt	±0.5%	0.01%

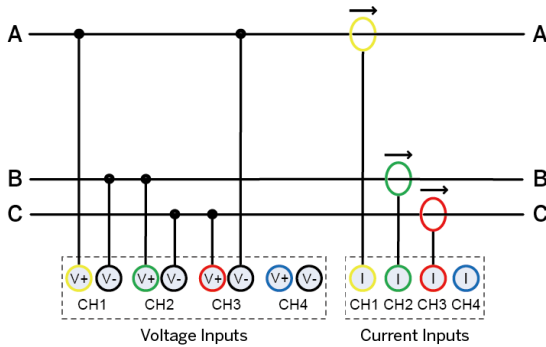
Typical Wiring



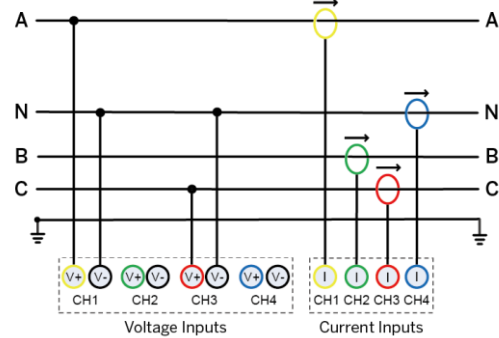
Single-Phase 2-Wire Connection



3-Phase 4-Wire Wye Connection

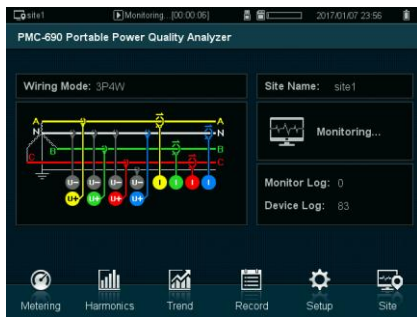


3-Phase 3-Wire Delta Connection

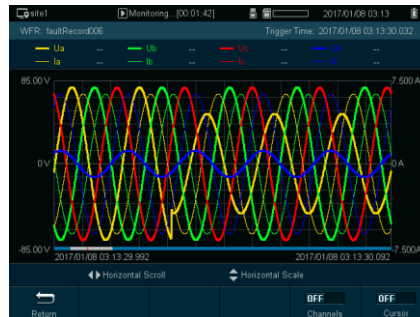


3-Phase 4-Wire 2.5E-2PT Connection

Front Panel User Interface



Main Display



SOE Log



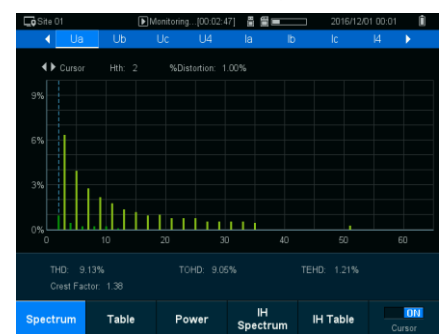
Power Quality



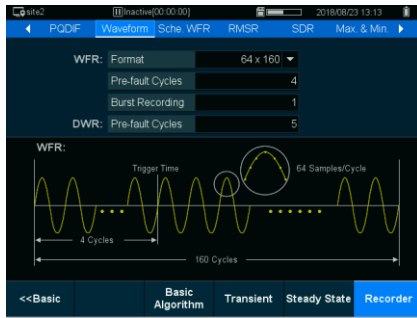
Real-time Data Recording



Demand



Harmonics



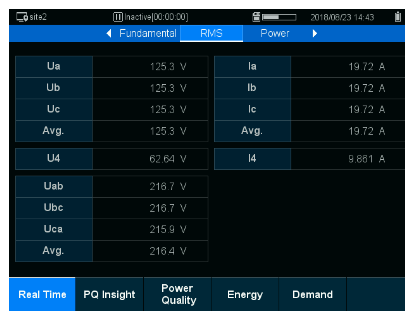
WFR Setup



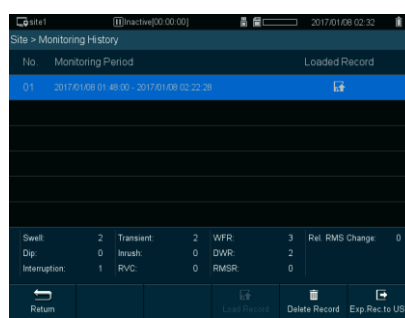
Qualification THD Log



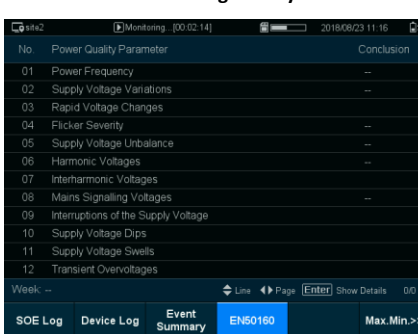
Advanced Setup



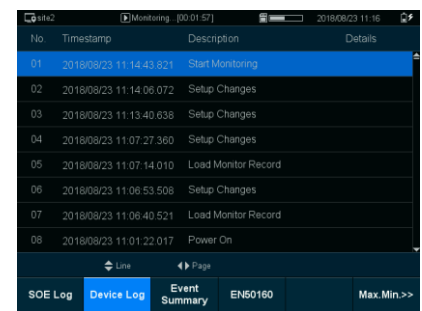
Real-time Capture



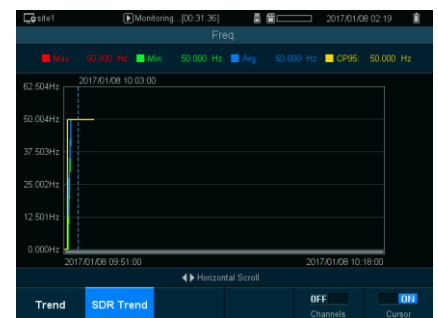
Monitoring History



EN50160 Report



Device Log

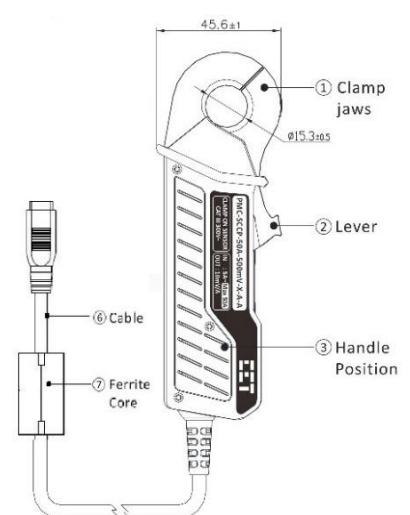
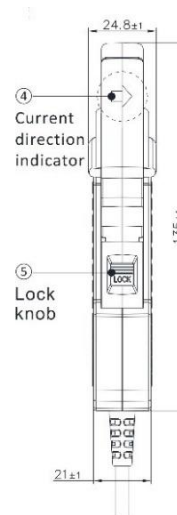


SDR Trend

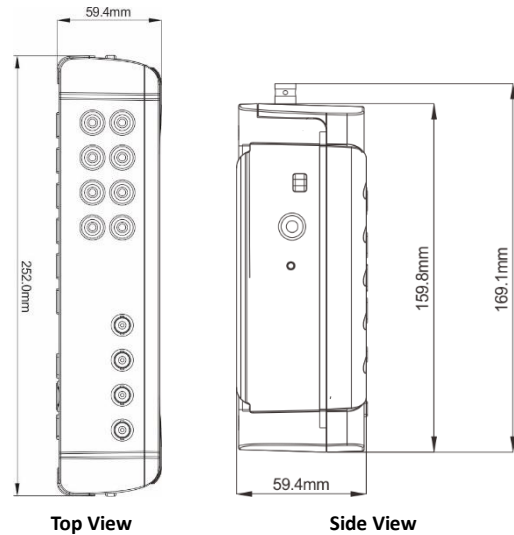


Rapid Voltage Changes

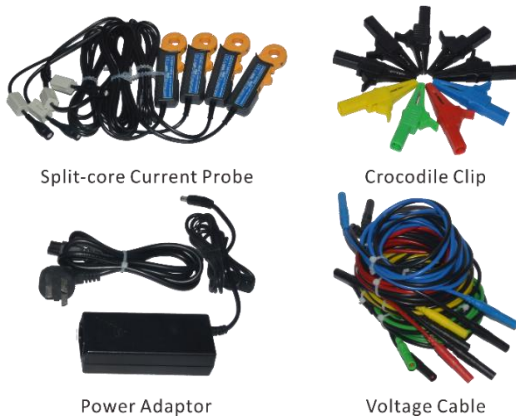
Standard 5A (50A Max.) CATIII Split-Core Current Probe



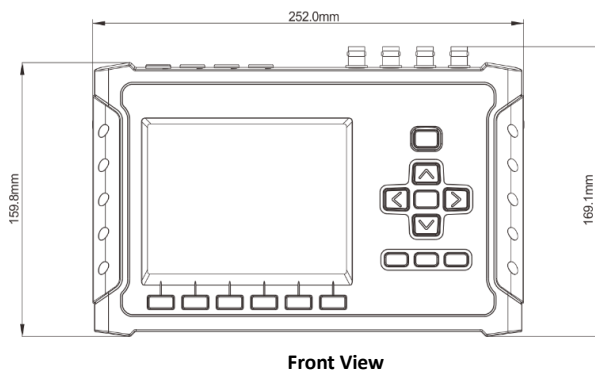
Device Appearance Views and Dimensions



Accessories



Device



Technical Specifications

Voltage Inputs (CH1, CH2, CH3, CH4)	
Voltage Range	5V to 600V
Burden	<0.1VA per phase
PT Ratio	
Primary	1-1,000,000V
Secondary	1-690V
V4 Primary	1-1,000,000V
V4 Secondary	1-400V
Frequency	40Hz-60Hz @ 50Hz 48Hz-72Hz @ 60Hz
CT Clamps Current Inputs (CH1, CH2, CH3, CH4)	
Input Range	550mV max.
CT Ratio	
Primary	1-30,000A
Secondary	1-50A
I4 Primary	1-30,000A
I4 Secondary	1-50A
Power Supply (L+, N-, G)	
Power Adaptor	100-240VAC± 10%, 47-63 Hz
Rated Output	12VDC/3A, Eff. > 75%
Burden	<2.5W
Battery	
Capacity	7.2V, 4400mAh, Lithium
Battery Life	8 hours (Backlit on) 16 hours (Backlit off)
Charge Time	3.5 hours
LCD Display	
Type	Color TFT LCD, Industrial Grade
Resolution	640x480
Viewing Area	115x86mm
Environmental Conditions	
Operating Temp.	-10°C to 55°C
Storage Temp.	-20°C to 60°C
Humidity	5% to 95% non-condensing
Atmospheric Pressure	70kPa to 110kPa
Pollution Degree	2
Measurement Category	CAT IV
Mechanical Characteristics	
Unit Dimensions	252x160x59 mm
IP Rating	51

Standards of Compliance

Power Quality	
Voltage characteristics of electricity supplied by public distribution systems	EN 50160
General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto	IEC 61000-4-7
Flicker meter - Functional and design specifications	IEC 61000-4-15
Testing and measurement techniques - Power quality measurement methods	IEC 61000-4-30
Safety Requirements	
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: 2009 Level IV
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
Voltage Dips, Short Interruptions & Voltage Variation	IEC 61000-4-11: 2004
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: 2008
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 Endurance
Shock Test	Response Endurance
Bump Test	

SCCP Ordering Guide

Model No.	Specification	Output Voltage	Accuracy	Diameter	Cable Length	Appearance
PMC-SCCP-50A-500mV-B-A-B	5A (50A I _{max})	AC 10mV/A	±0.3%rdg.±0.02%f.s.	Φ15mm	3m	
PMC-SCCP-130A-500mV-B-A-A	100A (130A I _{max})	AC 1mV/A	±0.3%rdg.±0.02%f.s.	Φ15mm	3m	
PMC-SCCP-9661	500A (550A I _{max})	AC 1mV/A	±0.3%rdg.±0.01%f.s.	Φ46mm	3m	
PMC-SCCP-9667	500A/5000A (5500A I _{max})	AC 500mV f. s.	±2.0%rdg.±1.5mV	Φ254mm	3m	

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