CETS



PMC-592

Cost Effective Solution for High-Density Multi-Circuit Power Monitoring

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Typical Applications



High-Density Branch Circuits Monitoring



BEMS Building Energy Management Systems

Cost Allocation by Virtual & Sub-Metering for Commercial Buildings



PDU Monitoring for Internet, Financial & Telecom Data Centers





LV Distribution Board Monitoring for High-Tech Manufacturing

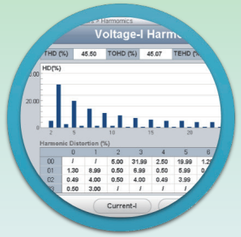
Power Quality Monitoring

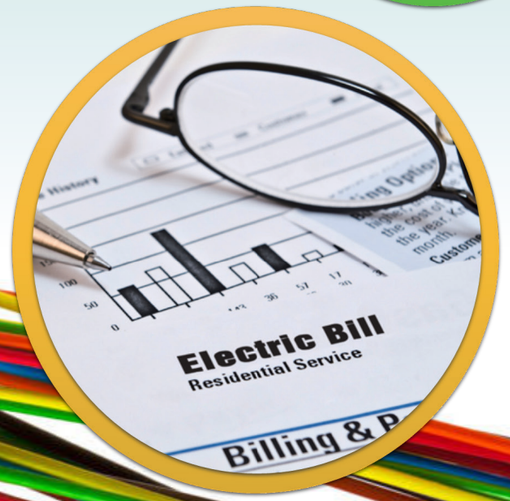


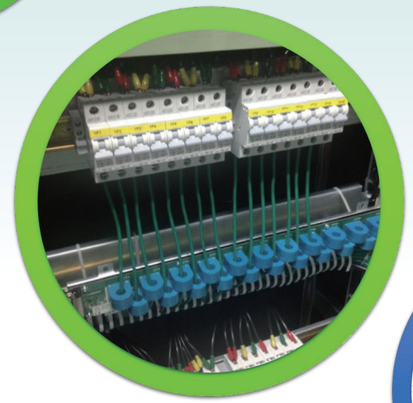


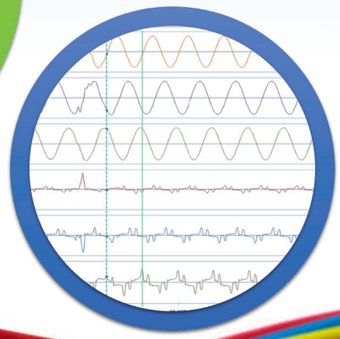
Pad-Mount Substation Demand Monitoring for Asset Management











Features Summay

- Monitor **2 Mains Circuits** and up to **84 Branch Circuits**
- Support **100A Solid-Core** and **Split-Core Branch CTs** for PDU applications
- Support **5A Solid-Core Branch CTs** for LVDB applications
- **1-Ø, 2-Ø and 3-Ø Sub-Metering**
- **Flexible configuration for 2-Ø and 3-Ø Sub-Metering Grouping**
- Support **Branch Power calculation** based on Phase or Line Voltages
- **Interval Energy Recording** for all Virtual & Sub-Meters
- **Programmable Data Recording** for Real-Time Parameters
- **1GB Non-Volatile Log Memory**
- Perform basic measurements at **1-second update rate**
- **Dip/Swell Monitoring** based on IEC 61000-4-30
- **Waveform Recording @ 64 samples/cycle**
- THD and individual harmonics up to **31st order**
- Digital Inputs for **Status Monitoring**
- Digital Outputs for **Control and Alarming**
- RTD Inputs for Hot and Cold Isle **Temperature Monitoring**
- **Modbus** RTU/TCP and **SNMP Protocol** Support
- **Embedded Web Interface** for complete data access and configuration
- Optional support for up to two **7" Touch-Screen HMIs** per PMC-592
- A single PMC-592 can be used to **monitor two PDUs**, each with one Mains and 42 Branch Circuits

PMC-592 At-A-Glance



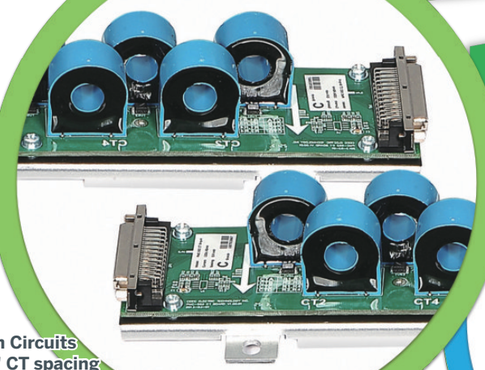
Base Unit

2xMains Inputs, each with 3-phase Voltages and 4-phase Currents
Up to 4 CT Branches with a maximum 21 CTs per Branch
2xDI, 2xRO, 2xRTD Inputs
1xRS-422/485 & 1xRS-485 with Modbus RTU
1x100BaseT with Modbus TCP and SNMP
Power Supply: 95-277VAC/VDC ± 10%, 47-440 Hz
Burden: <5W



Optional HMI

7" Color Touch-Screen TFT
LCD with LED Backlight
Power Supply: 24VDC ± 20%
Burden: <10W



CT Strip

Up to 4 Branch Circuits
with 3/4" or 1" CT spacing

Option I:
- 12x100A or 21x100A Solid-Core
- 100A maximum
- Starting Current: 100mA
- Overload: 500A for 1s
- Burden: < 0.5VA per phase

Option II:
- 12x5A or 21x5A Solid-Core CTs
- 5A nominal, 10A maximum
- Programmable CT Ratio: 400 maximum
- Starting Current: 10mA
- Overload: 100A for 1s
- Burden: < 0.5VA per phase



Branch Split Core CT

For retrofit applications
100A maximum
Starting Current: 100mA
Overload: 500A for 1s
Burden: < 0.5VA per phase



Branch Circuit Cable

High Quality, Rugged and Reliable
Cable Length: 0.4m, 1.8m, 6m, 10m



Adapter Board

Split-Core CT Adapter Board
to simplify wiring termination



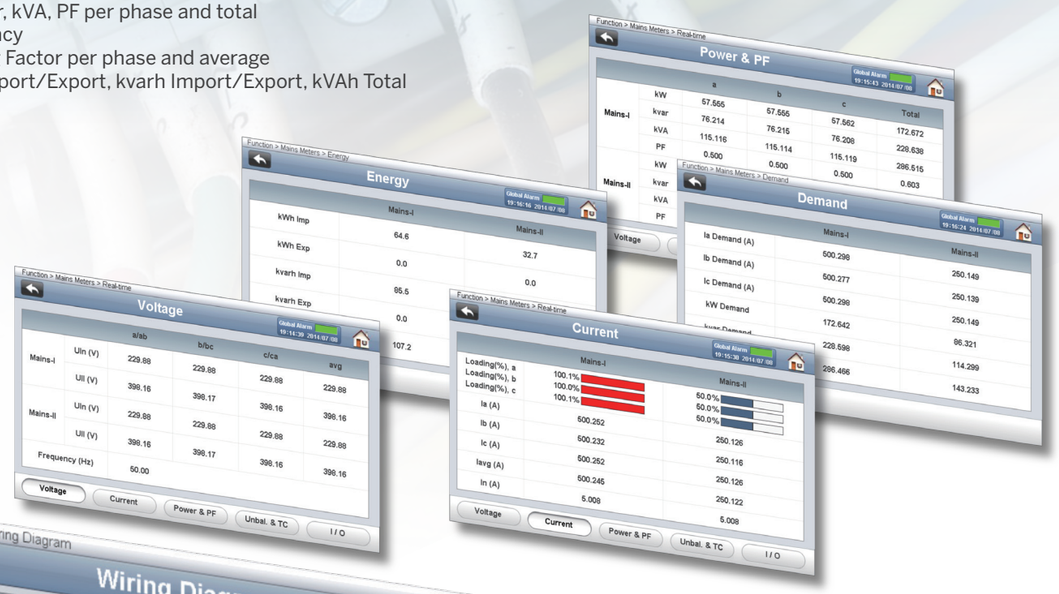
PMC-592 in a typical PDU Panel with one Mains and 42 Branch Circuits

Features

Mains Measurements

The PMC-592 features high-accuracy measurements for two Mains Inputs, each supporting 3 Voltage and 4 Current Inputs with the following measurements

- VLN and VLL per phase and average
- I per phase and average, measured Neutral Current
- kW, kvar, kVA, PF per phase and total
- Frequency
- Loading Factor per phase and average
- kWh Import/Export, kvarh Import/Export, kVAh Total



Branch Measurements

Each Branch Current Input provides the following measurements:

- I, kW, kvar, kVA, PF, Loading Factor, kWh, kvarh, kVAh and Peak Demand with timestamp

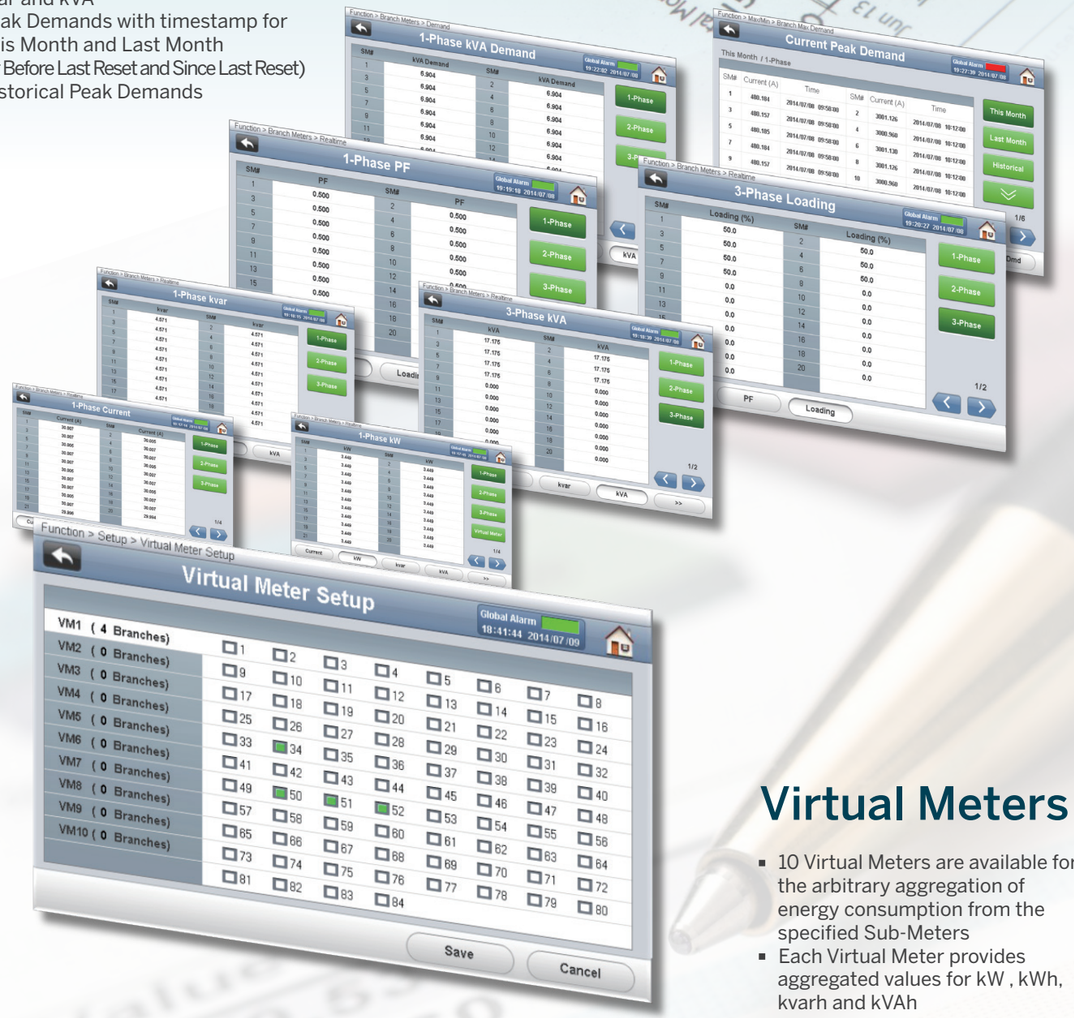
Billing and Cost Allocation

PMC-592 can be used to monitor energy usage for individual tenants, departments, pieces of equipment or other loads to account for their actual energy usage

Sub-Meters

Each Sub-Meter (1-Ø, 2-Ø and 3-Ø) provides the following information

- I Average, Loading Factor, kW, kvar, kVA, PF Total, and their respective Max/Min values
- kWh Import, kvarh Import and kVAh
- Demand values for I Average, kW, kvar and kVA
- Peak Demands with timestamp for This Month and Last Month (or Before Last Reset and Since Last Reset)
- Historical Peak Demands



Virtual Meters

- 10 Virtual Meters are available for the arbitrary aggregation of energy consumption from the specified Sub-Meters
- Each Virtual Meter provides aggregated values for kW , kWh, kvarh and kVAh

Power Quality

The growing use of switch-mode power supplies, VSDs/VFDs, electronic ballasts, LED lightings and Inverter AC has made us aware of the effects of harmonics, which in turn cause control malfunction, capacitor failure, motor overheating and the overloading of neutral conductor.

Equipment and machinery can be damaged or even fail when subjected to power quality anomalies. Short-duration voltage dips or surges can bring businesses down for hours or days.

Not only can the PMC-592 help detect voltage dips/swells, as well as recording high-resolution waveforms on the Mains Inputs, it can also perform 64 samples/cycle (3200Hz@50Hz, 3840Hz@60Hz) on both Mains and Branch Circuits to measure THD up to 31st order.

$$THD_V = \frac{\sqrt{\sum_{n=2} V_n^2}}{V_1}$$

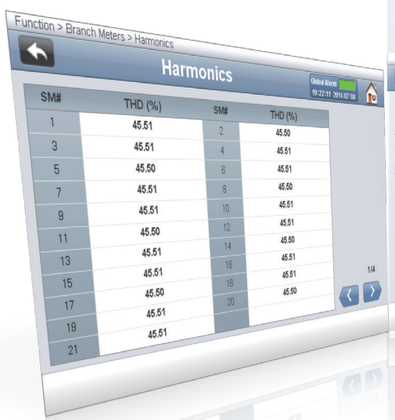
$$THD_I = \frac{\sqrt{\sum_{n=2} I_n^2}}{I_1}$$

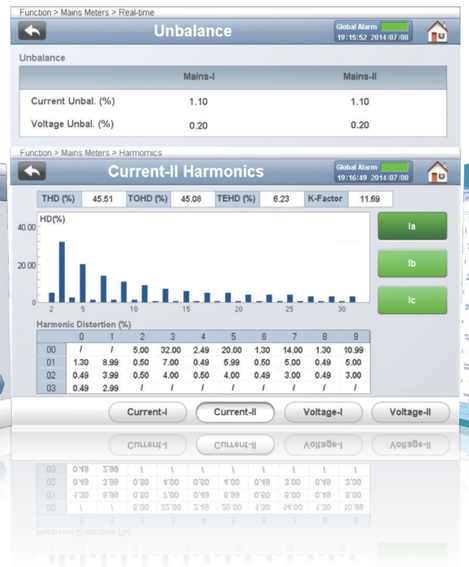
Mains

- V and I Unbalance based on Sequence Components
- THD, TOHD, TEHD and Individual harmonics to 31st
- TDD and Crest Factor

Branch Circuits

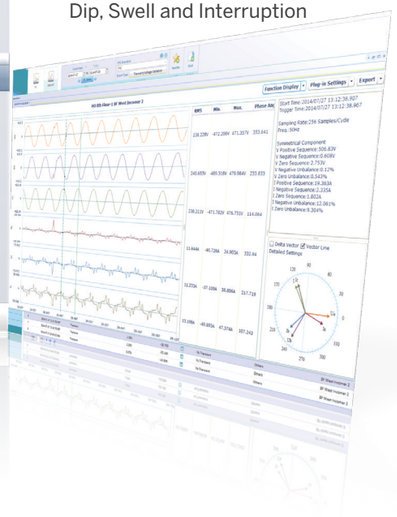
- Current THD per Branch Circuit





Waveform Recorder for Mains Inputs

- Programmable resolutions (samples/cycle x # of cycles) at 64x150, 64x75, 32x300, 32x150, 16x600 and 16x300
- Triggered by the following alarms: Dip, Swell and Interruption



Interval Energy and Programmable Data Recording

Collect actionable energy information for pattern analysis, process control, load shifting to avoid demand charges, building performance optimization as well as efficiency management.

1GB Non-Volatile Log Memory

Interval Energy Recorder

- Complete energy profiling of the two Mains, 1-Ø, 2-Ø and 3-Ø Sub-Meters as well as Virtual Meters
- Mains: kWh Import/Export, kvarh Import/Export and kVAh
- Sub-Meters and Virtual Meters: kWh Import, kvarh Import and kVAh
- Programmable Interval at 5, 10, 15, 30 or 60 minute intervals
- Fixed Log Depth at 10,000 entries, enough to record:
  a. 1 month @ 5-minute
  b. 2 months @ 10-minute
  c. 3 months @ 15-minute
  d. 6 months @ 30-minute
  e. 12 months @ 60-minute

Programmable Data Recorders

- 10 Recorders of 64 parameters each
- Real-time parameter recording for trend analysis
- Programmable Log Depth: 65535 max.



Monitoring and Control

The PMC-592 provides Digital I/Os for status monitoring, control, alarming as well as temperature monitoring. These signals can also be integrated into BAS for building automation.

Temperature Monitoring

- 2 Channels for PT100 sensor (sensor not included)
- Range from -40 to 200 °C
- Hot and Cold Isle monitoring



Digital Inputs

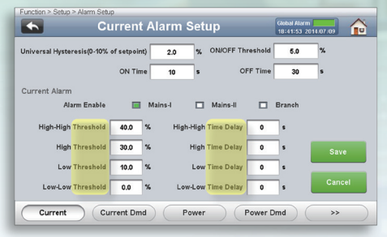
- External status monitoring with programmable de-bounce
- 2 Channels, volts free dry contact, 24VDC internally wetted

Digital Outputs

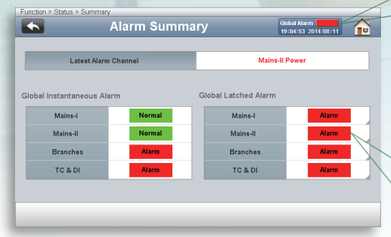
- 2 Channels for external control and alarm
- 5A @ 250VAC/30VDC
- Facilitates Setpoint Control

SOE Log & Alarm Monitoring

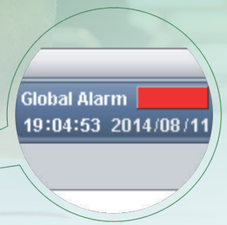
The PMC-592 provides powerful alarming functions for the Mains and Branch Inputs as well as for different parameters. It supports 4 Alarm Levels (High-High, High, Low and Low-Low) to raise awareness and help differentiate critical conditions.



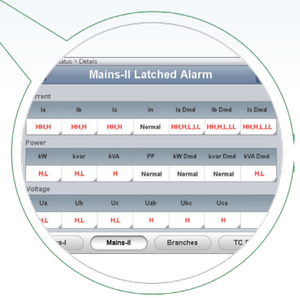
- Configurable Threshold and Time Delay for each circuit



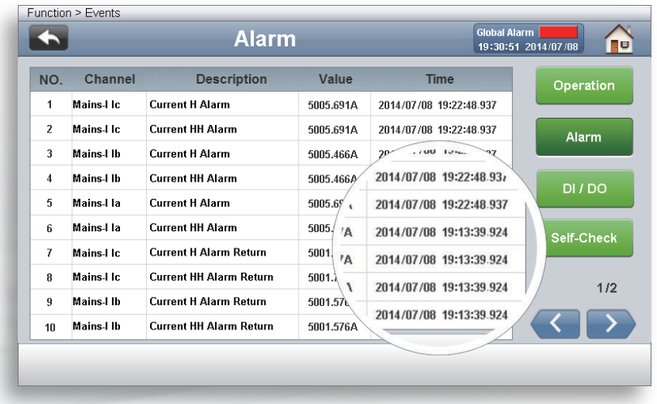
- Alarm Summary At-A-Glance



- Global Alarm Output



- 4 Alarm Levels: HH, H, L and LL



- All alarms are recorded in the SOE Log
- 1000 events time-stamped to ±1ms resolution

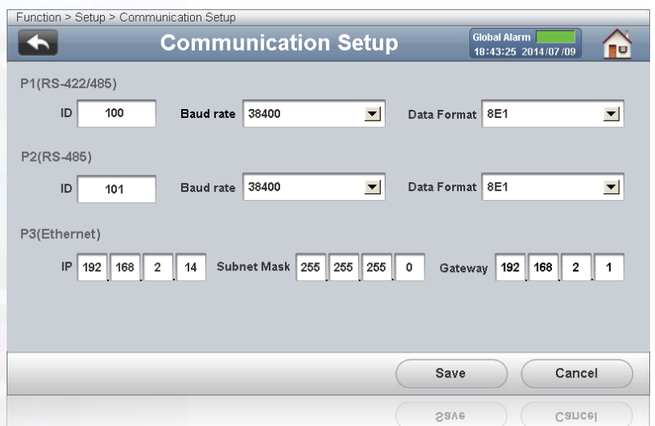
Communications and Protocols

Port 1 - RS-485/422, Port 2 - RS-485

- Optically isolated
- 1200 to 38,400 bps
- Modbus RTU
- Support up to two HMIs simultaneously

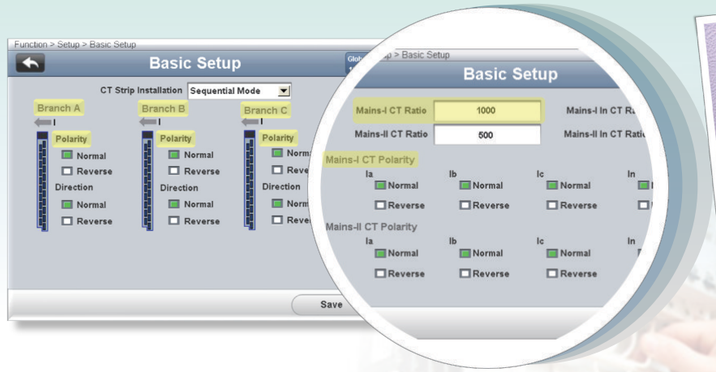
Port 3 - Ethernet

- 10/100BaseT
- Modbus TCP
- HTTP, SMTP, SNTP, SNMP



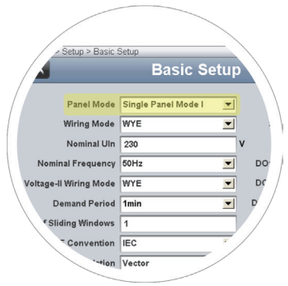
Flexible Configuration

PMC-592 is designed to facilitate flexible installation in a compact and high-density environment with programmable CT Ratio and Polarity, Phase or Line Reference Voltage, 2-Ø and 3-Ø Sub-Meter Grouping, CT Strip Installation Mode and Orientation as well as the following features to make site installation a breeze.

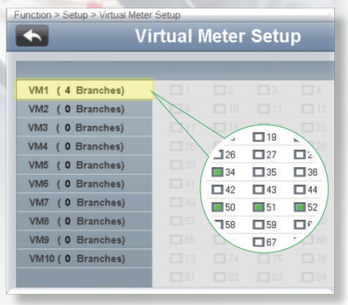




- Flexible Configuration of CT Ratio and Polarity Facilitates Site Installation



- Support common panel arrangements such as Single Panel Mode, Dual Panel Mode and 1-Phase 3-Wire configuration
- A single PMC-592 can be used to monitor two PDUs, each with one Mains and 42 Branch Circuits



- Any Branch Current Input can be paired with any Phase or Line Voltage
- Flexible configuration for 2-Ø and 3-Ø Sub-Meter Grouping to eliminate wiring mistakes at site that would cause the complete breakdown of sub-meter calculations due to rigid ordering for 2-Ø and 3-Ø Sub-Meter wiring offered by other competitors.

System Integration



Not only can the PMC-592 be used as a stand-alone piece of intelligent equipment with its on-board Web Interface, optional Touch-Screen Color HMI and the free Log Viewer software for the Interval Energy and Data Recorders, it can also be easily integrated with CET's PecStar® iEMS and iEEM as well as other EMS, BMS, SCADA or Management systems via Modbus RTU/TCP and SNMP.

Accuracy

Parameters	Accuracy	Resolution
Mains Voltage	±0.5%	0.01V
Mains I1 - I4	±0.5%	0.001A
kW, kvar, kVA	IEC 62053-21 Class 1	0.001k
kWh, kVAh	IEC 62053-21 Class 1	0.01kXh
kvarh	IEC 62053-23 Class 2	0.01kvarh
P.F.	1%	0.001
Frequency	±0.01Hz	0.01Hz
Harmonics	IEC 61000-4-7 / 30 Class B	0.01%
K-Factor	IEC 61000-4-7 / 30 Class B	0.1
RTD	±1°	0.1°

Electromagnetic Compatibility

EMC Directive 2004/108/EC (EN 61326: 2006

Immunity Tests	
Electrostatic Discharge	IEC 61000-4-2: 2008 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
Electromagnetic Emission	IEC 60255-25: 2000

Emission Tests	
Limits and methods of measurement of electro-magnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment	EN 55011: 2009 (CISPR 11)
Limits and methods of measure-ment 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 fluctua-tions 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

Safety and Environmental

Safety Requirements	
LVD Directive 2006 / 95 / EC	EN 61010-1-1: 2001
Insulation	IEC 60255-5: 2000
Dielectric Test	2kV @ 1 minute, 50/60Hz
Insulation Resistance	>100MΩ
Impulse Voltage	5kV, 1.2/50μs

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	II
Installation Category	CAT III

Mechanical Specification

Mechanical Tests		
Vibration Test	Response	IEC 60255-21-1: 1988 Level I
	Endurance	IEC 60255-21-1: 1988 Level I
Shock Test	Response	IEC 60255-21-2: 1988 Level I
	Endurance	IEC 60255-21-2: 1988 Level I
Bump Test		IEC 60255-21-2: 1988 Level I

Mechanical Characteristics	
Enclosure	Galvanized Steel
Unit Dimensions	260.5*154*55.5
IP Rating	20

Contact us

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