



PMC-592

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

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 Summary

- Monitor **2 Mains Circuits** and up to **84 Branch Circuits**
- Support **Solid-Core & Split-Core CTs** for up to 800A branch current monitoring
- 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 IEC61000-4-30
- Configurable Waveform Resolution, up to **maximum 64 samples/cycle**
- THD and individual harmonics up to **31st order**
- 2 DIs and 2 DOs for **Monitoring and Control**
- 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 \pm 10%, 47-440 Hz
 Burden: <5W



Optional HMI

7" Color Touch-Screen TFT
 LCD with LED Backlight
 Power Supply: 24VDC \pm 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: 200mA
 Overload: 500A for 1s
 Burden: < 0.5VA per phase

Option II:
 12x5A or 21x5A Solid-Core CTs
 5A nominal, 10A maximum
 Programmable CT Ratio
 Starting Current: 20mA
 Overload: 100A for 1s
 Burden: < 0.5VA per phase



Branch Split-Core CT

100A, 200A, 400A, 800A and 1600A CTs
 I_{max}: 120% I_n
 Starting Current: 0.2% I_{max}
 Burden: <0.05VA per phase



Branch Circuit Cable

High Quality, Rugged and Reliable
 Cable Length: 0.4m, 1m, 1.8m, 3m, 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

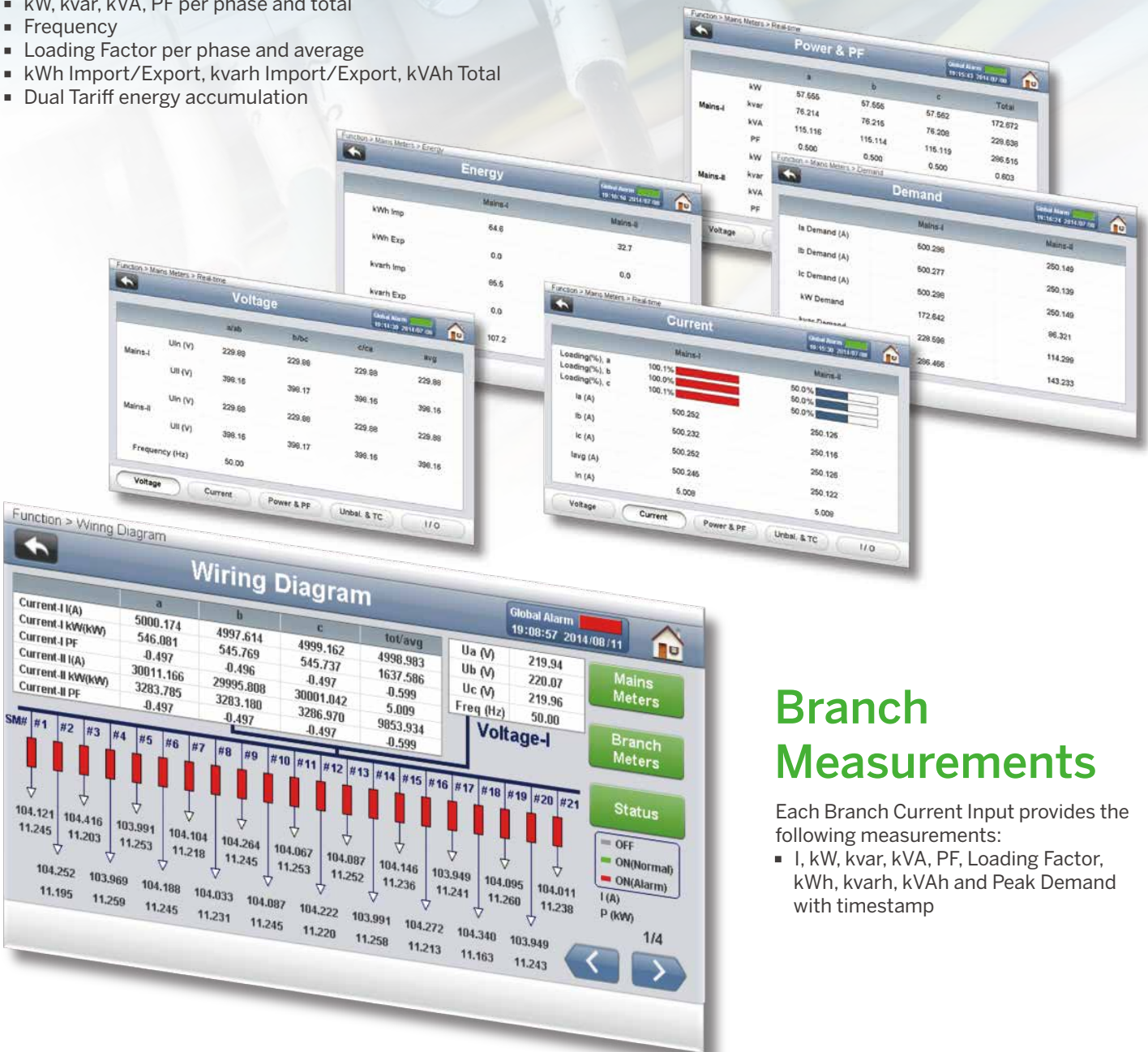


Features

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

- ULN and ULL 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
- Dual Tariff energy accumulation



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

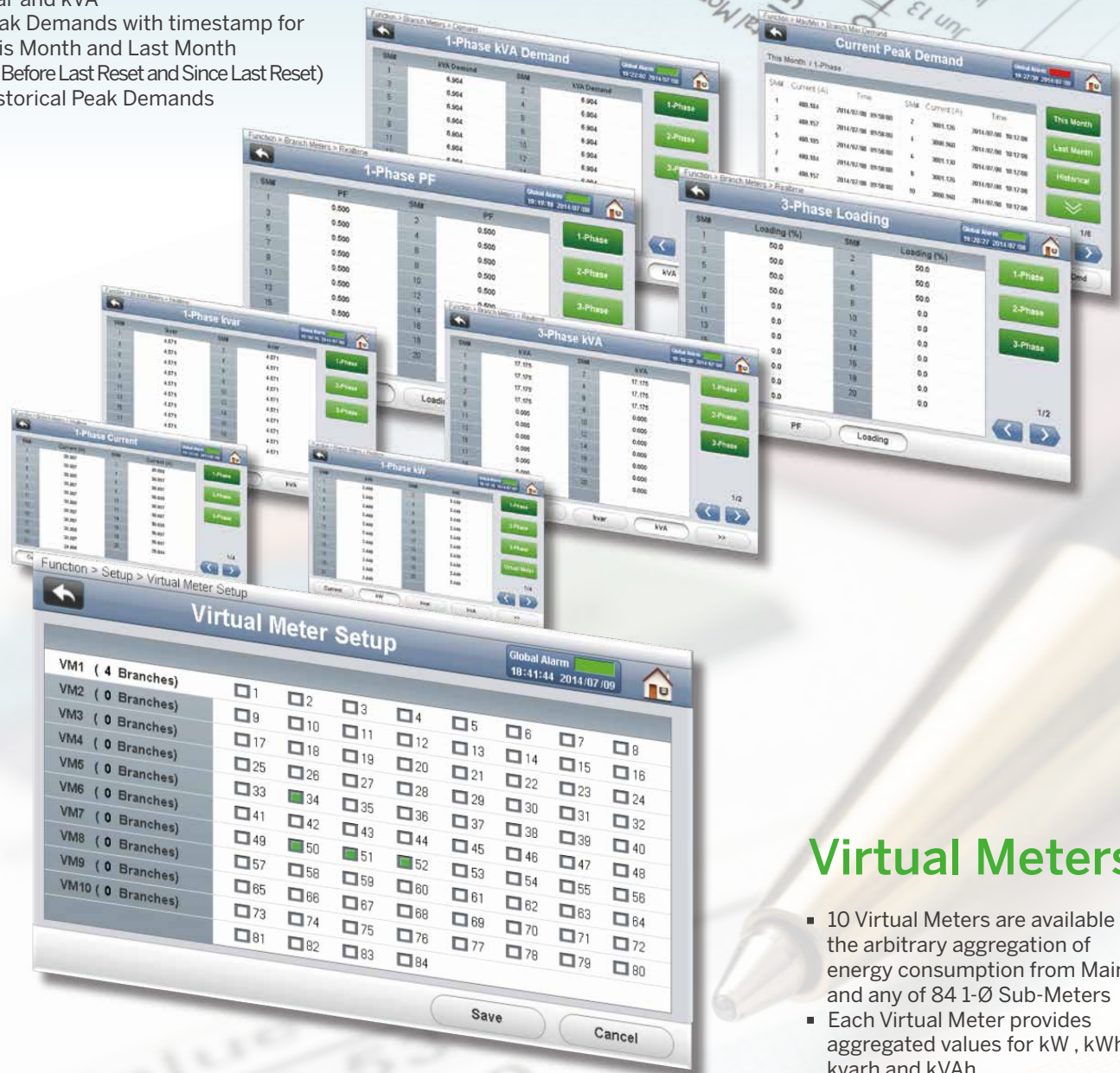
Billing and Cost Allocation

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 Mains and any of 84 1-Ø Sub-Meters
- Each Virtual Meter provides aggregated values for kW , kWh, kvarh and kVAh

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 two Mains, 1-Ø, 2-Ø and 3-Ø Sub-Meters and Virtual Meters for Tariffs T1 and T2
- 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:
 - 1 month @ 5-minute
 - 2 months @ 10-minute
 - 3 months @ 15-minute
 - 6 months @ 30-minute
 - 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 °C to 200 °C
- Hot and Cold Aisle monitoring

Digital Inputs

- External status monitoring with programmable debounce
- 2 Channels, volt 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

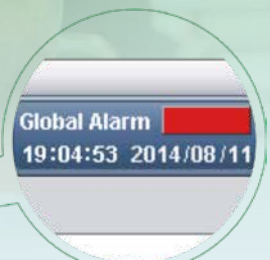
The PMC-592 provides powerful alarming functions for the Mains and Branch Inputs as well as for different parameters. It supports 4 Alarm Levels (High-High, High, Low and Low-Low) to raise awareness and help differentiate critical conditions.



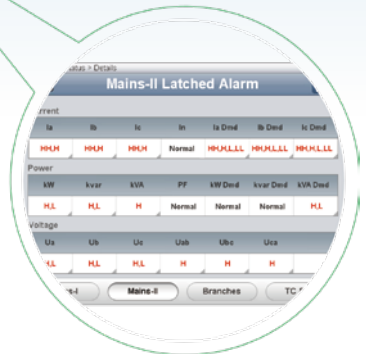
- Configurable Threshold and Time Delay for each circuit



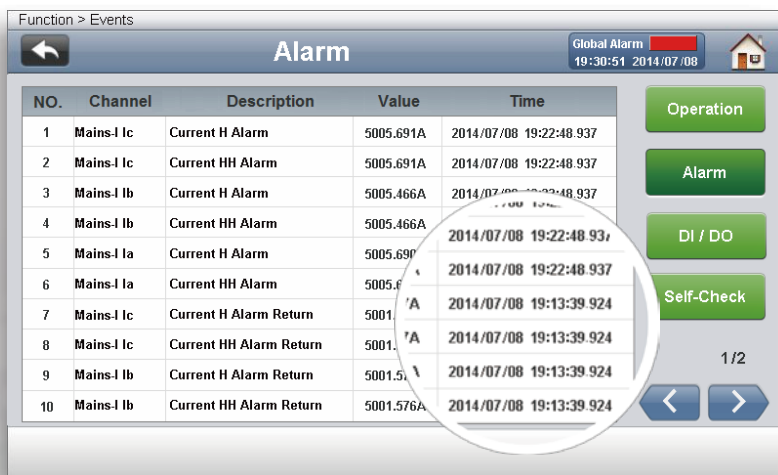
- Alarm Summary At-A-Glance



- 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 - HMI-DB9 Connector

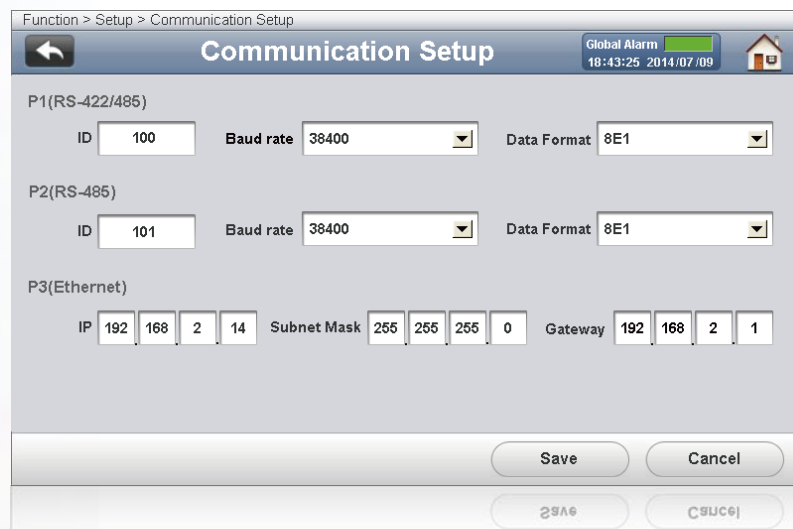
- Modbus RTU
- Compatible with RS-232/422/485
- 1,200 to 38,400 bps

Port 2 - RS-485

- Optically isolated
- 1200 to 38,400 bps
- Modbus RTU
- Optional connection with up to 4 external DI Modules

Port 3 - Ethernet

- 10/100BaseT, HTTP, SMTP, SNMP
- Modbus TCP and Modbus RTU over TCP protocols
- Firmware upgrade via Ethernet port
- Configurable IP Port Number for Modbus TCP and HTTP



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.

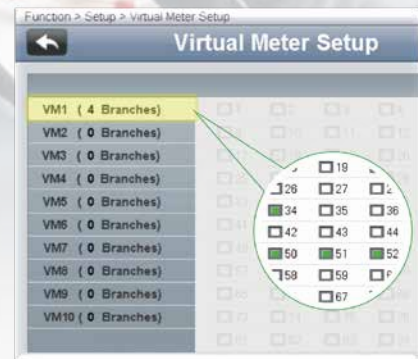


- Flexible Configuration of CT Ratio and Polarity Facilitates Site Installation



- 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	± 0.2%	0.01V
Mains I1-I4	± 0.2%	0.001A
kW, kVA	IEC62053-22 Class 0.5S for Mains IEC62053-21 Class 1 for Branches (IEC61557-12 Compliance)	0.001kX
kWh, kVAh		0.1kXh
kvar, kvarh	IEC62053-23 Class 2 (IEC61557-12 Compliance)	0.01kvar/kvarh
PF	1%	0.001
Frequency	± 0.02Hz	0.01Hz
Harmonics	IEC61000-4-7 Class B	0.01%
K-Factor	IEC61000-4-7 Class B	0.01
RTD	± 1°	0.1°

Electromagnetic Compatibility

EMC Directive 2004/108/EC (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
Oscillatory Waves	EN61000-4-12: 2017

Emission Tests

Limits and Methods of Measurement of Electro-Magnetic 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 ≤ 16 A	EN61000-3-2: 2014
Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤ 16 A	EN61000-3-3: 2013
Emission Standard for Industrial Environments	EN61000-6-4: 2007 +A1: 2011

Safety and Environmental

Safety Requirements

LVD Directive 2014 / 35 / EU	EN61010-1: 2010 EN61010-2-030: 2010
Electrical Safety in Low Voltage Distribution Systems up to 1000Vac and 1500 Vdc	IEC61557-12: 2018 (PMD)
Insulation AC Voltage Insulation Resistance Impulse Voltage	3.5kV @ 1 minute >100MΩ 6kV, 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	2
Installation Category	CAT III

Mechanical Specification

Mechanical Tests

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

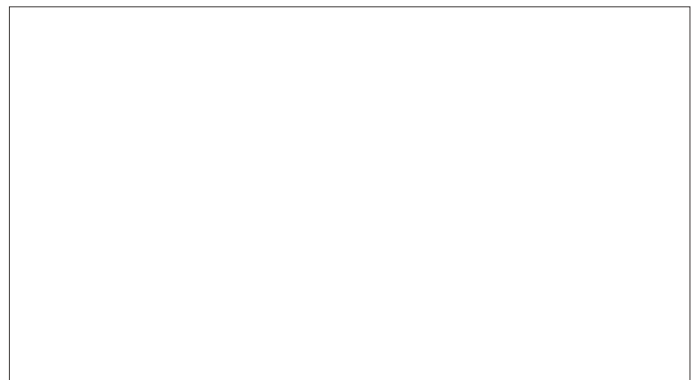
Mechanical Characteristics

Enclosure	Galvanized Steel
Unit Dimensions	260.5*154*55.5
IP Rating	50

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