Datasheet

PMM

Power Meter Monitor

THREE-PHASE ELECTRICITY METER

Model: PMM1221
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DECLARATION OF CONFORMITY

This device is designed for use in business environments where it may generate, use, and radiate radio frequency energy. If not installed and used in strict accordance with the instructions, it may cause harmful interference to radio communications.

Although every effort is made to minimize interference, there is no guarantee that interference will not occur in a particular installation. If this device causes interference in radio or television reception, the user may mitigate the issue by applying one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the distance between the device and the receiver.
3. Connect the device's power supply to a separate power circuit than that of the receiver.

TECHNICAL SUPPORT AND SERVICE

For technical support and service, please visit **pmm-usa.us** to access FAQs and additional resources.

Before contacting support, users should prepare the following information:

- Product name, model, and serial number.
- Installed software details (operating system, version, and applications).
- Complete description of the issue.
- Detailed error information and any observed conditions.

SAFETY INSTRUCTIONS

Only trained and qualified personnel should install, operate, or maintain this device. Failure to follow safety precautions may result in damage to the equipment and personal injury.

Key safety guidelines include:

- Carefully read all safety instructions and heed warning labels before installation.
- Do not use liquids or spray cleaners; ensure the device is completely disconnected from power before cleaning.
- Take precautions to prevent the device from dropping during transport or installation.
- Ensure input voltage and power match device specifications before connecting to the power source.
- Keep cables properly routed and protected.
- If the device is not used for an extended period, disconnect power to prevent transient overvoltage damage.
- Do not allow liquids to enter the device to avoid fire hazards or short circuits.
- Recommended storage temperature **-40°C to +85°C**.

PMM is not liable for consequences arising from failure to comply with safety standards, regulations, or codes related to design, production, and equipment usage

WARNINGS & CAUTIONS

⚠ **Warning**

- Read the power source and device inlet specifications carefully before connecting.
- Always handle the device with both hands.
- Clean and maintain the device only with safe, recommended methods.

⚠ **Caution**

Unauthorized modifications, settings changes, or repairs without **PMM approval** will void the user's rights to operate or control this

PRODUCT OVERVIEW

The PMM1221 is a three-phase, four-wire, multifunction smart electricity meter designed for residential, commercial, and industrial applications. The meter supports prepayment and post-payment modes, Advanced Metering Infrastructure (AMI), and bi-directional energy measurement for renewable energy systems.

The PMM1221 provides high-accuracy metering, cyber-secure communications, power quality monitoring, and remote firmware upgrade capabilities. It complies with international standards including IEC 62052-11, IEC 62053-21/22/23, IEC 62056 (DLMS/COSEM) and IEC 61000.

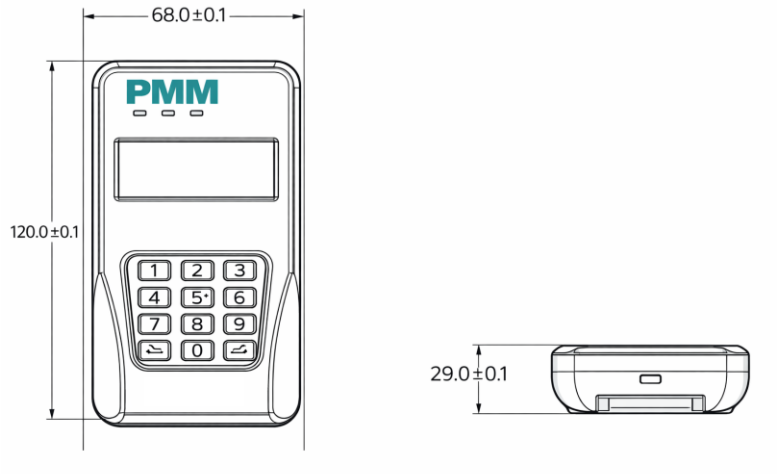
KEY FEATURES

Feature	Details
Multi-Tariff	Supports multiple tariff configurations for flexible billing
DLMS / COSEM	Fully compliant with international communication standards Green Book Suite 2
STS Encryption	20-digit STS-compliant prepayment encryption
Tamper Detection	Detects and records of events such as terminal cover opening
Import & Export Measurement	Measures bi-directional energy flow (grid & solar)
LCD Display	Readable without mains power (battery or super-capacitor supported)
Communication Interfaces	Optical port (IEC 62056-21), RS-485, PLC, RF, LoRa / LoRaWAN, Wi-SUN, 2G / 3G / 4G cellular, eSIM with NB-IoT support, Mbus, Wireless Mbus
	Automatic fallback between communication media Modular plug-and-play communication modules DLMS/COSEM application layer (IEC 62056-5-3) Remote configuration and diagnostics Remote modem diagnostics
Load Management	Disconnects on overload and low/zero credit
Programmable Limits	Configurable power limit & low-credit warning
Dual Power Source	Automatic swap between grid and solar supply
Maximum Demand	Demand measurement & load profiling (on request)

Split Configuration for Increased Revenue Protection

The meter consists of two parts: the MCU (Metering & Control Unit) and the CIU (Customer Interface Unit). The MCU and CIU are linked via a galvanically-isolated 2-wire communication cable, with RF communication available upon request.

The CIU is installed inside the consumer's home for prepaid token entry and information display, while the MCU is installed in a secure meter cabinet away from consumers.



TARGET APPLICATION

Application Area	Examples / Use Cases
Commercial & Industrial	Factories, workshops, malls, supermarkets, warehouses with 3-phase loads
Residential & Compounds	Villas, apartment buildings, gated communities using 3-phase service
Utility Prepayment Systems	STS-compliant prepaid metering, CIU/MCU split installation, revenue protection
Renewable Energy Systems	Grid-tied solar plants, hybrid systems, import/export metering
Sub-Metering & Embedded Networks	Hotels, resorts, industrial parks, tenant billing applications

TECHNICAL SPECIFICATION

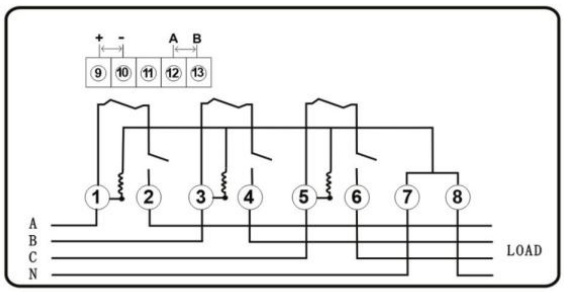
Parameter	Specification
Electrical Parameters (Voltage / Frequency / Current)	
Nominal Voltage (Un)	3×230 / 240 V
Voltage Range (Variation)	-40% to +30% (60% – 120% Un)
Frequency	50 / 60 Hz ±5%
Basic Current (Ib)	5 A
Maximum Current (Imax)	100 A
Starting Current	0.4% Ib
Energy Constant	1000 imp/kWh
Accuracy	
Active Energy (IEC 62053-21)	Class 0.5s
Reactive Energy (IEC 62053-23)	Class 2.0
Burden (Power Consumption)	
Voltage Circuit	< 0.5 W / < 5 VA
Current Circuit	< 4 VA
Temperature Range	
Operating Temperature	–25°C to +70°C
Storage Temperature	–40°C to +85°C
Insulation	
Insulation Level	4 kV RMS for 1 min
Impulse Withstand Voltage	8 kV (1.2/50 µs)
Electrostatic Discharges / Electromagnetic Compatibility (EMC)	
Contact Discharge	8 kV
Air Discharge	15 kV
Electromagnetic RF Fields	
27 MHz – 500 MHz	10 V/m
100 kHz – 1 GHz	30 V/m
Fast Transient Burst Test	4 kV
Mechanical Requirements	
Meter Shell Protection	IP54
Insulation System Classification	Protective Class II
Maximum Cable Size	10 mm

ENCLOSURE DIMENSIONS

Parameter	Value
Height	244 mm
Width	165 mm
Depth	79 mm
Weight	~1.2 kg (typical)
Mounting Method	Wall-mounted / Meter box
Material	Polycarbonate / Flame-retardant ABS
Protection Rating	IP54 (MCU enclosure)

Wiring / Terminal Description Table

Terminal No.	Description
1	Line Phase A – Input
2	Line Phase A – Output
3	Line Phase B – Input
4	Line Phase B – Output
5	Line Phase C – Input
6	Line Phase C – Output
7	Neutral – Input
8	Neutral – Output



INSTALLATION NOTES

- Install the MCU in a secure meter cabinet away from consumer access.
- CIU should be mounted at an accessible indoor location for customer interaction.
- Maintain correct phase sequence (A–B–C) to ensure accurate metering.
- Ensure all terminals are tightened to the recommended torque (1.2 Nm typical).
- Allow adequate clearance around the meter for ventilation and wiring.
- Follow local utility regulations for sealing, tamper protection, and wiring color codes.

MECHANICAL SPECIFICATIONS

Parameter	Specification
Meter Type	Three-phase, four-wire
Case Material	Flame-retardant polycarbonate
Terminal Block	Fire-resistant
Protection Class	IP54
Mounting	Wall-mounted / Meter box
Terminal Material	Brass or copper
Terminal Bore Diameter	10 mm

DISPLAY

Parameter	Specification
Display Type	Illuminated LCD
Digits	≥ 9
OBIS Codes	Supported
Vector Diagram	Supported
Power Direction Symbols	Supported
Language	English, Arabic
Instantaneous Values	V, I, PF
Energy	Import / Export
Max Demand	Supported
Credit Level	Supported
Time & Date	Supported
Relay Status	Supported
Battery Status	Supported
Tamper Status	Supported

FIRMWARE

Parameter	Specification
Dual Firmware Image	Yes
OTA Upgrade	Yes
Local Upgrade	Optical Port
Upgrade Scheduling	Yes
Integrity Check	Yes

In addition to:

- Scheduled firmware activation
- Firmware execution at defined date & time
- Firmware self-check after update
- Firmware update event logging

CYBERSECURITY

Parameter	Specification
Encryption (Private Network)	AES-256 CBC/GCM
Encryption (Public Network)	ECC-256 + AES-256
Firmware Encryption	Yes
Dual Firmware Image	Yes
Authentication	LLS & HLS
DLMS Suite	Green Book Suite 2
Remote Key Management	Supported
Secure Token Transfer	Supported

RENEWABLE ENERGY

Parameter	Specification
Bi-Directional Metering	Supported
Import / Export Registers	Supported
Distributed Generation	Supported
Absolute active energy	Supported
Export enable/disable configuration	Supported

POWER QUALITY

Parameter	Specification
Harmonics	Up to 50th order
THD	Supported
Sag / Swell / Dip	Supported
Flicker	PLT & PST
Compliance	IEC 61000
Under-voltage and over-voltage event recording	Yes
Programmable voltage thresholds	Yes
Power cut detection (short and long duration)	Yes
Event time-stamping	Yes
Remote event retrieval	Yes

RELAY SPECIFICATIONS

Parameter	Specification
Relay Type	Latching relay
Poles	3-pole
Max Switching Voltage	400 V
Max Switching Current	120 A
Min Switching Power	25,000 VA
Switching Time	≤ 20 ms
Mechanical Life	≥ 100,000 cycles
Electrical Life	≥ 10,000 cycles
Dielectric Strength	≥ 2 kV

TIME & CLOCK

Parameter	Specification
RTC	Built-in
Clock Drift	< 30 s/month
Battery Backup	≥ 10 years
Battery Monitoring	Yes
Change Battery Alarm	Yes
Time synchronization with HES	Yes
Periodic automatic clock sync	Yes

LOAD PROFILE

Parameter	Specification
Channels	≥ 8 programmable
Interval	1 – 60 minutes
Storage	≥ 60 days
Time Stamp	Yes
Retrieval	Local & Remote

PAYMENT MODES

Parameter	Specification
Prepayment	STS compliant
Post-payment	Supported
Mode Switching	Remote or Local
Friendly Hours	Supported
Weekend	Supported
Holidays	Supported
Low Credit Warning	Yes
Load Limiting	Yes
Two-Stage Demand Limiting	Yes

ACCESSORIES

Accessory	Description	Availability
CIU (Customer Interface Unit)	Indoor keypad & display for prepaid token entry	Standard (Prepaid)
User Manual	Installation & operation guide	Standard
Test Certificate	Type test & accuracy cert	Standard
Sealing Kit	Utility ferrules & wires	Standard
Mounting Bracket	Wall-mount / meter box plate	Standard
Terminal Cover	Transparent terminal cover	Standard
RTC Backup Battery	≥ 10-year battery	Standard
NB-IoT / eSIM Module	Cellular communication module	Optional
LoRaWAN Module	Long-range RF module	Optional
Wi-SUN Module	FAN mesh module	Optional
External Antenna	Outdoor antenna for RF / cellular	Optional
Optical Probe	IEC 62056-21 optical probe	Optional
Surge Protection Device	External SPD	Optional

COMPLIANCE STANDARDS

IEC 62052-11, IEC 62053-21, IEC 62053-22, IEC 62053-23, IEC 62055, IEC 62056 (DLMS/COSEM), IEC 61000, EN 50470, IEC 60068, IEC 60529, IEC 62054 (RTC), STS.

CONTACT INFORMATION

For direct inquiries or any customized orders, contact us on: **info@pmm-usa.us**.