

**MGE UPS SYSTEMS, INC.**  
**REMOTE POWER MANAGEMENT MODULE (RPMM)**  
**Separate Input Models**

**GUIDE SPECIFICATIONS**

**1.0 GENERAL**

**1.1 SUMMARY**

This specification covers the electrical characteristics and general requirements for computer power distribution equipment, hereafter referred to as the RPMM. The RPMM is designed primarily for distribution of electrical power in a computer room; however its design shall also permit its use in office, factory, and other applications as well. The RPMM provides distribution, control and optional monitoring of AC power, and will properly interface the building's AC power source with sensitive electronic loads.

**1.2 STANDARDS**

The following standards and documents apply to the specified equipment to the extent defined herein:

- A. UL Certification
- B. CSA Standard 950
- C. NEMA AB1 - Molded Case Circuit Breakers
- D. NEMA PB1 – Panelboards
- E. NFPA 70 - National Electric Code
- F. ISO 9000 - International Organization for Standardization

**1.3 SUBMITTALS**

Submittals shall contain the following documentation:

- A. **Installation Package:** Complete electrical characteristics and connection requirements. Provide detailed equipment outlines with cabinet dimensions and spacing requirements; location of conduit entry/exit paths; location of floor/seismic mounting; all cabinet weights; heat rejection and air flow requirements; single-line diagram; control and external wiring.
- B. **Product Data:** Provide catalog sheets and technical data sheets to indicate physical data and electrical performance, electrical characteristics, and connection requirements.
- C. **Manufacturer's Installation Instructions:** Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product. Include equipment installation outline, connection diagram for external cabling, internal wiring diagram, and written instruction for installation.

## 1.4 FINAL SUBMITTALS

Upon delivery of the RPMM, the following submittals shall be included:

- A. A complete set of installation drawings showing all the information stated in section 1.3.
- B. An owner's manual showing safe and correct operation of all RPMM functions.

## 1.5 QUALIFICATIONS & QUALITY ASSURANCE

- A. **Manufacturer's Certification:** The manufacturer shall specialize in manufacturing of Remote Power Management Modules (RPMM) specified in this document, with a nationwide first party service organization. The manufacturer shall be ISO 9001 certified and shall design to internationally accepted standards.
- B. **Factory Testing:** Prior to shipment the manufacturer shall complete a documented test procedure to test all functions of the RPMM, and guarantee compliance with the specification. The factory test shall be performed in the presence of the customer providing the manufacturer receives adequate prior notice. The manufacturer shall provide a copy of the test report upon request.
- C. **Materials and Assemblies:** All materials and parts comprising the RPMM shall be new, of current manufacture, and shall not have been in prior service, except as required during factory testing. All active electronic devices shall be solid state and not exceed the manufacturer's recommended tolerances for temperature or current to ensure maximum reliability. All semiconductor devices shall be sealed. All relays shall be provided with dust covers. The manufacturer shall conduct inspections on incoming parts, modular assemblies, and final products.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. All products shall be packaged in a manner to prevent penetration by debris and to allow safe delivery by all modes of ground transportation and air transportation where specified.
- B. Prior to shipping all products shall be inspected at the factory for damage.
- C. Equipment shall be protected against extreme temperature and humidity and shall be stored in a conditioned or protected environment.

## 1.7 ENVIRONMENTAL REQUIREMENTS

- A. **Temperature:**
  - Operating:** -10°C to +40°C (14°F to 104°F)
  - Non-operating:** -40°C to +60°C (-40°F to 140°F)
- B. **Relative Humidity:**
  - Operating:** 10% to 90% non-condensing
  - Non-operating:** 10% to 70% condensing
- C. **Altitude:**
  - Operating:** 500 feet below to 7,000 feet above sea level
  - Non-operating:** 500 feet below to 25,000 feet above sea level

## 1.8 WARRANTY

The RPMM shall be covered by a full parts and labor warranty from the manufacturer. The warranty period shall be for twelve (12) months from date of installation and start-up or eighteen (18) months from date of shipment from the manufacturer, whichever occurs first.

## 2.0 PRODUCT DESCRIPTION

### 2.1 APPROVED MANUFACTURERS & PRODUCT DESCRIPTION

- A. **Approved Manufacturer(s):** The specified equipment shall be manufactured by MGE UPS SYSTEMS or approved equal.
- B. **Product Description:** This specification covers the electrical characteristics and general requirements for computer power distribution equipment, hereafter referred to as the RPMM. The RPMM is designed primarily for distribution of electrical power in a computer room; however its design shall also permit its use in office, factory, and other applications as well. The RPMM provides distribution, control and optional monitoring of AC power, and will properly interface the building's AC power source with sensitive electronic loads.

### 2.2 SYSTEM DESCRIPTION

- A. **Input Characteristics**
  - 1. Voltage: 208/120 VAC, 3 phase, 4 wire plus ground
  - 2. Frequency: 60 Hz
  - 3. Current: 225A per panelboard
- B. **Output Characteristics**
  - 1. Voltage: 208/120 VAC, 3 phase, 4 wire plus ground
  - 2. Frequency: 60 Hz
  - 3. Current: 225 A per panelboard

### 2.3 MODES OF OPERATION

- A. **Normal Operation:** The RPMM shall provide provides distribution, control and monitoring (optional) of AC power. A 208 VAC source is connected to the input terminal blocks. Terminal block feeds power to each of the 225A sub main breakers. Each sub main breaker shall feed a 42 pole panelboard. Load circuits can be controlled manually from distribution panelboards.

## 2.4 COMPONENT DESCRIPTION

- A. The RPMM is provided with output distribution panelboards, each with the following characteristics and/or features (panelboards will be matched with main CB):

### 1. Branch Circuit Panelboard

NEMA PB1, Square D type Universal (Plug-in or Bolt-on)  
NQOM442L225CUNLB  
panelboard accepting QOB or QOB-VH bolt-on (standard) or plug-in (QO)  
circuit breakers.

Pole Capacity:	42 poles, capable of accepting 1, 2, 3-pole circuit breakers
Bus Rating:	225 Amperes
Copper Ground bus:	42 terminals
Copper Neutral Bus:	Rated for 200% of nominal phase current (450 Amps)
Circuit Breakers:	Up to 150 Amp circuit breakers.

### 2. Panelboard Main Breaker

The RPMM has one panelboard main circuit breaker per 42 pole distribution panelboard (described below). The panelboard main CB provides thermal/magnetic overload and short-circuit protection for each panelboard, and allows manual on/off control.

Rating:	225 Amperes
Interrupting Capacity:	25,000 AIC
Voltage Rating:	240V AC maximum
Model Type:	QD (For 380V: QBL)

Grounding:

A main grounding bus bar is provided and is effectively bonded to the unit frame. The panelboard shall have a ground bus located below (or above for top entry) the panelboard, with wire connections for up to 42 wires. Lug range shall be 4 to 14AWG. The panelboard ground bus shall be mounted in a fashion to allow easy access.

## 3.0 SYSTEM CONTROLS AND INDICATORS

- A. **Monitoring:** The RPMM shall have no monitoring capability. When advanced monitoring is selected, the RPMM shall be equipped with advanced multi-function meter options that encompass additional metering and monitoring features (see section 4.0.E).

## 3.1 MECHANICAL DESIGN AND VENTILATION

- A. **Enclosure:** The RPMM shall be housed in a free standing NEMA-1 enclosure with hinged dead front construction and a hinged lockable front door. The RPMM shall accommodate bottom feed cables only. The system monitor panel (optional), output circuit breakers, and all customer power and control connection points are accessible from the front or side of the RPMM. Rear access shall not be required for "normal" maintenance. All circuit breakers are protected with

“hinged dead front” panels to prevent access without a tool. Doors and outside panel color is light gray, textured, dry epoxy finish, designed to resist scratching. The cabinet shall be secured to a wall column or bolted to the floor or floor stands.

- B. **Conduit Landing:** One conduit plate shall be provided for every two panelboards with each plate having a combination of (84) ½”, and (2) 1-1/2” knockout(s).
- C. **Ventilation & Heat Rejection:** The RPMM shall be convection cooled and have nominal heat rejection.
- D. **Termination:** All power wiring shall be suitably terminated using UL acceptable pressure (crimp) or screw-type lug assemblies. Belleville-type washers and lock washers shall be used on all associated studs or bolt-stacks. Control instrumentation, PC board, and interconnection-wiring terminations shall conform to the UL standard.
- E. **Power Wiring:** All internal wiring shall be stranded copper with PVC, Neoprene or Silicon insulation with a minimum operating voltage of 600 volts RMS. All wires shall be appropriately marked UL and CSA recognized as being suitable for the application. Minimum insulation temperature rating shall be no less than 105°C, and in no case is less than that required by the location/application of the wiring.
- F. **Control Wiring:** All control and instrumentation wiring used in this application shall be tinned, stranded copper with a temperature rating of at least 75°C. Insulation type is to be at least 125% of anticipated continuous load (3 hours or longer). Voltage rating is no less than required per UL and NEC. In areas where either primary or secondary AC voltages are present, PC board wiring and interconnect wiring will conform to the requirements of UL Standard 1950 for the application and location of the wiring.

G. **Dimensions and Weights**

The standard dimensions of the 84 pole two panelboard system enclosure in inches shall be 14.0” deep x 29.5” wide x 72.2” high. The weight shall not exceed 500 lbs.

The standard dimensions of the 168 pole four panelboard back to back enclosure in inches shall be 27.8” deep x 29.5” wide x 72.2” high. The weight shall not exceed 1000 lbs.

The standard dimensions of the 168 pole four panelboard side by side enclosure in inches shall be 57.5” deep x 29.5” wide x 72.2” high. The weight shall not exceed 1000 lbs.

#### 4.0 OPTIONAL ACCESSORIES

- A. **Shunt Trip Panelboard Main Breakers:** Panelboard main breakers shall be equipped with a 120V UV shunt trip which, when activated, shall cause the breaker to open.
- B. **Branch Circuit Breakers:** Optional molded case Square-D QO type, NEMA AB1 bolt thermal magnetic trip circuit breakers with common trip handle for all poles.

C. **Panelboard Isolated Ground Bus:** An additional "isolated ground" bus bar shall be provided that is dedicated for termination of "isolated ground" receptacles with connections for up to 42 wires and a lug range of 4 to 14AWG. The isolated ground bus is bonded to the main grounding bus bar.

D. **Power Monitoring:**

1. **Multi-Circuit Monitor (MCM):** The optional Multi-Circuit Monitor system monitors for metering and display of the RPMM output parameters. The monitor shall display the output / load side voltage, current, kVA, kW and frequency and other parameters defined below. All measured values will be displayed on a large format Single LCD display mounted on the front of RPMM. The meter shall also be equipped with LED alarm status indication and shall have an RS232 and RS485 serial interface operating on ModBus protocol.

**Metering:** All metered values will be in "true RMS" values with 0.35% accuracy. The monitor shall include a keypad allowing for the viewing of different selected values. The monitor shall display the following values and alarm conditions:

**Data Output**

- Kwh Energy Consumption
- KW Real Power
- kVAR Reactive Power
- kVA Apparent Power
- Power Factor Total
- Voltage, L-L, average of 3 phases
- Voltage, L-N, average of 3 phases
- Current, average of 3 phases
- kW Real Power, phase A, B, C
- Power Factor, phase A, B, C
- Line to Line Voltage, phase A-B
- Line to Line Voltage, phase B-C
- Line to Line Voltage, phase A-C
- Line to Neutral Voltage, phase A-N
- Line to Neutral Voltage, phase B-N
- Line to Neutral Voltage, phase C-N
- Current, phase A, B, C
- KW Average
- KW Minimum
- Frequency (measured from phase A)

**Modbus Alarms**

- Overvoltage
- Undervoltage
- Overcurrent
- Undercurrent
- Over kVA
- Under kVA
- Phase Loss A
- Phase Loss B
- Phase Loss C

**Controls and Communications:** The user shall be able to control and communicate with the RPMM via the following interfaces:

- a) RS-232 or RS485 serial communications interface
- b) Infrared communication with a Palm OS PDA (only when serial port is disabled)

**2. MGE Branch Circuit Current Monitor (optional with MCM meter only):**

- Monitors current on individual branch circuit breakers (50A max)
- Alarms when current exceeds a preset threshold

The MGE Branch Multi Circuit Monitor monitors the current individually on all 42 branch circuit breakers on a standard SQ-D NQ panel board. In the event the current exceeds a threshold (custom programmable on every pole for pre-alarm/summary alarm and vital alarm thresholds), the alarm (audible and LED) will be activated to alert the operator to an overcurrent condition. Alarm parameters and currents are available via the MCM LCD display, serial output, or can be downloaded to a PDA via the IR port on the MCM display (serial port is disabled if IR port is enabled).

## **5.0 FIELD QUALITY CONTROL & SERVICE ORGANIZATION**

### **5.1 FIELD SERVICE ENGINEER QUALIFICATIONS**

The manufacturer must employ a 7 X 24 nation wide (international where applicable) field service organization with rapid access to all regions of the nation. The responding service professionals must be factory-trained engineers with an accredited and proven competence to service RPMM equipment.

### **5.2 OPTIONAL SPARE PARTS**

Spare parts kits are designed to provide replacement spares which will solve: 50% of problems encountered (Level "50"), 75% of problems encountered (Level "75"), or 90% of problems encountered (Level "90").

### **5.3 MAINTENANCE TRAINING**

The manufacturer shall make available to the customer various levels of training ranging from basic RPMM operation to RPMM maintenance.

### **5.4 MAINTENANCE & SERVICE CONTRACTS**

The manufacturer shall offer additional preventative maintenance and service contracts covering the RPMM. Accredited professional service engineers employed exclusively in the field of critical power systems service shall perform all maintenance and service. The manufacturer shall also offer extended warranty contracts.

**END OF SECTION**