Remote Power Management Module

Operation

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About This Manual

This manual describes the Remote Power Management Module which is available with the optional PM800 Digital Power Meter or the Multi Circuit Monitor (MCM) monitoring systems. These monitoring systems are equipped with serial communication ports. The description will include button operation, status parameters, display menu structure, alarm lists and user configuration. Included are startup procedures for the Remote Power Management Module, preventive maintenance and troubleshooting guidance.

Companion Manuals

For additional information about the Remote Power Management Module, see the following document:

- Remote Power Management Module^2 Installation – 990–3987–001

Find Updates to this Manual

You can check for updates to this manual on www.apc.com. Look for the latest letter revision (A, B etc.) of the manual.

Monitoring Systems

This section describes the two different monitoring systems available for the Remote Power Management Module. These monitoring systems are equipped with serial communication ports:

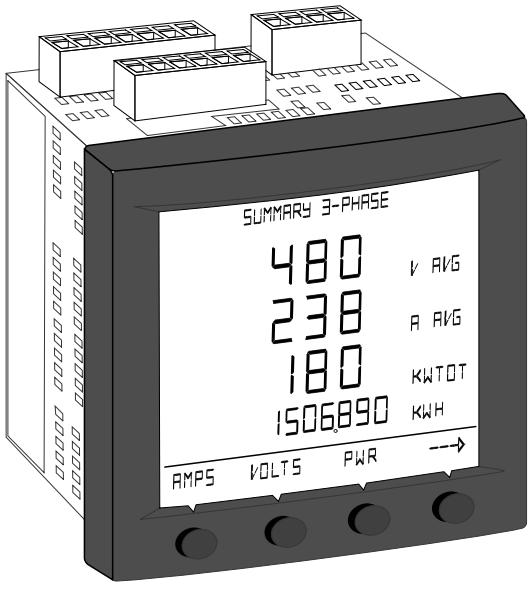
- PM800 Digital Power Meter (optional)
- Multi Circuit Monitor (MCM) (optional)

Additional details can be found in the manuals for the respective meters. Go to www.powerlogic.com.

PM800 Digital Power Meter (Not Available for Separate Input)

The MGE PM800 is a digital power meter that provides true RMS measurements and highly accurate readings for nonlinear loads. Metered values plus minimum and maximum data can be viewed from the display or from the RS485 port. When power is applied, the meter will display a three phase summary screen. Four values of information (V, A, KWTOT, KWH) are shown below.

The power meter is equipped with a large, back-lit LCD display. It can display up to five lines of information plus a sixth row of menu options. The RS485 port is used for communications with a monitoring and control system. This port can be daisy-chained to multiple devices.

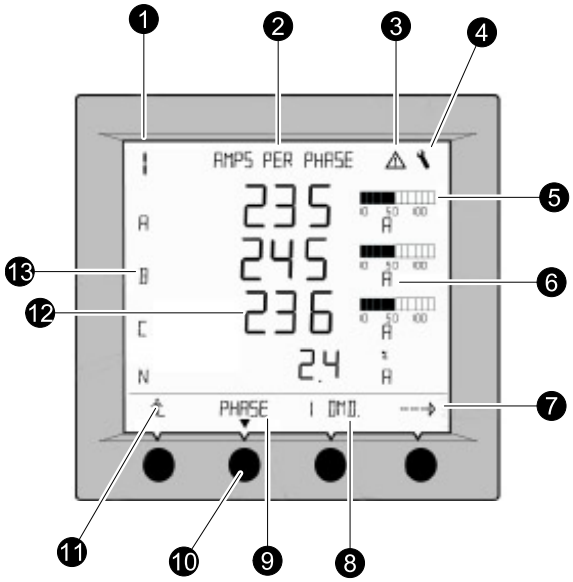


Note: For additional information, download the reference manual at powerlogic.com.

Button Operation

The buttons are used to select menu items, display more menu items in a menu list, and return to previous menus. A menu item appears over one of the four buttons. Pressing a button selects the menu item and displays the menu item's screen. When you have reached the highest menu level, a black triangle appears beneath the selected menu item. To return to the previous menu level, press button under item 11. To cycle through the menu items in a menu list press button under item 7.

Note: Each time you read "press" in this section, press and release the appropriate button beneath the screen menu item. For example, if you are asked to "Press PHASE", you would press the button below the display PHASE menu.



1	Type of Measurement	8	Menu item
2	Screen Title	9	Selected menu item (black triangle, highest menu level)
3	Alarm Indicator	10	Button
4	Maintenance Icon	11	Return to previous menu
5	Bar Chart (%)	12	Values
6	Units	13	Phase
7	Display more menu items		

PM800 Status Parameters

The following status and alarm parameters are available from the PM800 meter.

Real-time Readings
Current (per phase, residual, 3–Phase)
Voltage (L-L, L-N, 3–Phase)
Real Power (per phase, 3–Phase)
Reactive Power (per phase, 3–Phase)
Apparent Power (per phase, 3–Phase)
Power Factor (per phase, 3–Phase)
Frequency
THD (current and voltage)

Power Analysis
Displacement Power Factor (per phase, 3–Phase)
Fundamental Voltages (per phase)
Fundamental Currents (per phase)
Fundamental Real Power (per phase)
Fundamental Reactive Power (per phase)
Unbalance (current and voltage)
Phase Rotation
Harmonic Magnitudes
Sequence Components

Energy Readings
Accumulated Energy, Real
Accumulated Energy, Reactive
Accumulated Energy, Apparent
Bidirectional Readings
Reactive Energy by Quadrant
Incremental Energy
Conditional Energy

Demand Readings
Demand Current (per phase, 3–Phase avg.)
Average Power Factor (3–Phase total)
Demand Real Power (per phase present, peak)
Demand Apparent Power (per phase present, peak)
Coincident Readings
Predicted Power Demands

Alarm Points
Over Voltage
Under Voltage
Over Current
Over kVA
Phase Loss

PM800 Display Menu Structure

The menu trees below show the menu structure of the first three levels of the power meter. Selecting an item from one level takes you to the next levels menu items. The arrow icon (—>) is used to scroll through all menu items on a level.

Level 1	Level 2	Level 3
AMPS (I)	PHASE DMD UNBAL	
VOLTS (U-V)	V L-L V L-N	
PWR (PQS)	POWER PHASE DMD	
ENERG (E)	WH VAH VARH INC	
PF	TRUE DISPL	
HZ (F)		
THD	V L-L (U) V L-N (V) I	
MINMX	MINMX AMPS (I) VOLTS (U-V) UNBAL PWR (PQS) PF HZ (F) THD V THD I	
HARM	V L-L (U) V L-N (V) I	
ALARM	ACTIV HIST	
I/O	D OUT D IN	
TIMER		
CONTR		
MAINT	RESET	METER ENERG (E) DMD MINMX MODE TIMER
	SETUP	DATE TIME LANG COMMS (COM) METER ALARM I/O PASSW TIMER ADVAN
	DIAG	METER REG CLOCK

Note: (IEC)

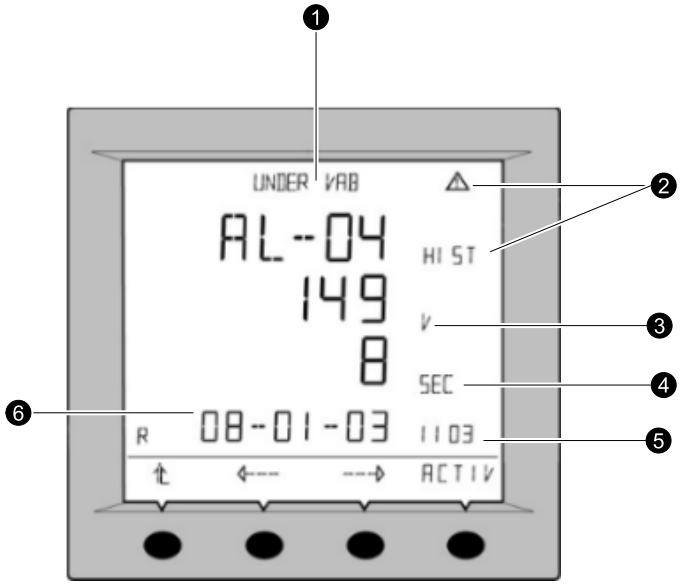
PM800 Alarm History Screen

The PM800 meter is set in the factory to detect five alarm conditions, including over or under voltage, over current, phase loss conditions, and over kVA. It also maintains a counter for each alarm to keep track of the total number of occurrences. Alarms have a factory setting of one second detection rate. See below figure for example of an under voltage alarm, where this is the fourth alarm in the alarm history log.

The power meter stores alarm log data in nonvolatile memory. The size of the alarm log is fixed at 100 records. For a complete list of the available alarm configurations see ***"PM800 Available Alarms by Alarm Number"***.

When one or more alarm conditions occur, the alarm icon (see callout no. 2 below) appears in the upper-right corner of the PM800 meter display, indicating that an alarm is active. If multiple alarms with different priorities are active at the same time, the display shows the alarm message for the last alarm that occurred.

The APC factory default alarm settings have a low priority level. If a low priority alarm occurs, the alarm icon blinks only while the alarm is active. Once the alarm becomes inactive, the alarm icon disappears from the display.



1	Screen Title	4	Duration
2	Alarm icon and # *	5	Time
3	Value	6	Date
* A sequential number in the alarm log (active or history)			

Note: Pressing any button will stop the alarm icon from blinking.

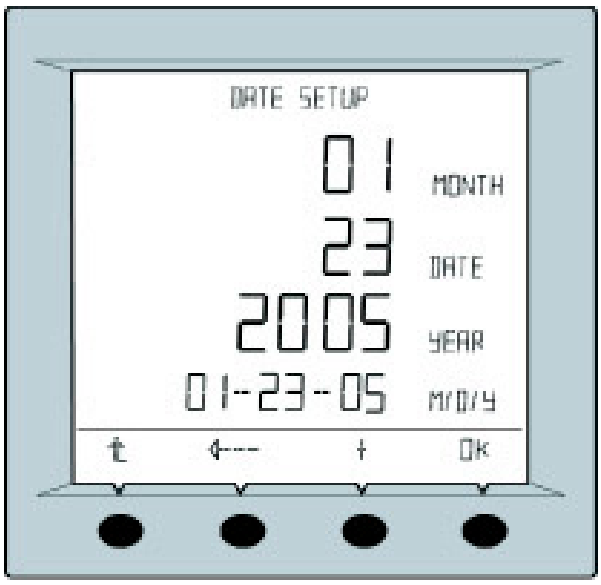
PM800 Setup The Power Meter

To begin power meter setup, do the following:

1. Scroll through the Level 1 menu list until you see MAINT.
2. Press “MAINT”.
3. Press “SETUP”.
4. Enter your password. (NOTE: the default password is 0000)
5. To save the changes, press ↑ until the “SAVE CHANGES?” prompt appears, then press “YES”.

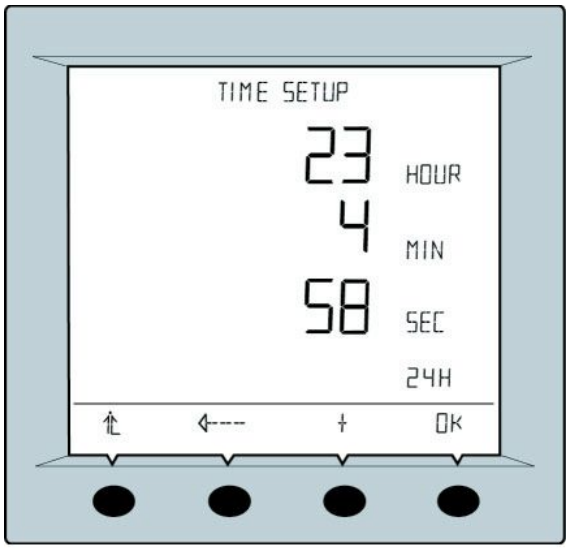
PM800 Setup The Date

1. Press → until DATE is visible.
2. Press “DATE”.
3. Enter the MONTH number.
4. Press “OK”.
5. Enter the DATE number.
6. Press “OK”.
7. Enter the YEAR number.
8. Press “OK”.
9. Select how the date is displayed: M/D/Y, D/M/Y, or Y/M/D.
10. Press ↑ to return to the SETUP screen.



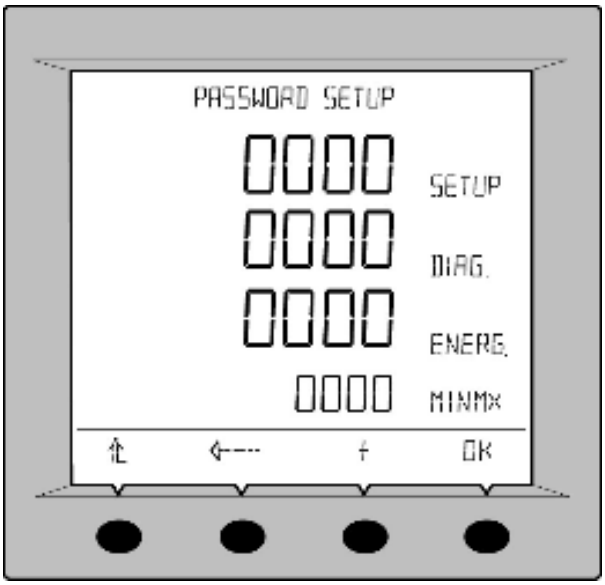
PM800 Setup the Time

1. Press → until SETUP is visible.
2. Press “TIME”.
3. Enter the HOUR.
4. Press “OK”.
5. Enter the MIN (minutes).
6. Press “OK”.
7. Enter the SEC (seconds).
8. Press “OK”.
9. Select how the time is displayed: 24H or AM/PM.
10. Press ↑ to return to the SETUP screen.



PM800 Set the Password

1. Press → until PASSW (password) is visible.
2. Press “PASSW”.
3. Enter the SETUP password.
4. Press “OK”.
5. Enter the DIAG (diagnostics) password.
6. Press “OK”.
7. Enter the ENERG (energy reset) password.
8. Press “OK”.
9. Enter the MINMX (minimum/maximum reset) password.
10. Press “OK”.
11. Press ↑ to return to the SETUP screen.

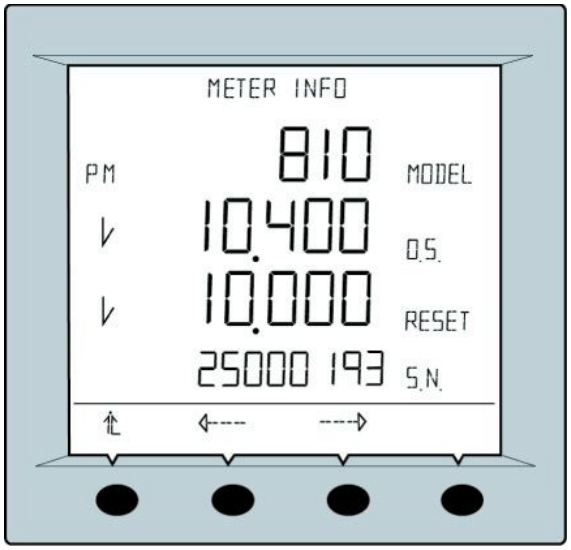


To recover a lost password, contact PowerLogic Technical Support. Go to www.powerlogic.com. Technical Support will require the meter’s serial number.

PM800 Power Meter Diagnostics

To view the power meter’s model, firmware version, serial number, do the following:

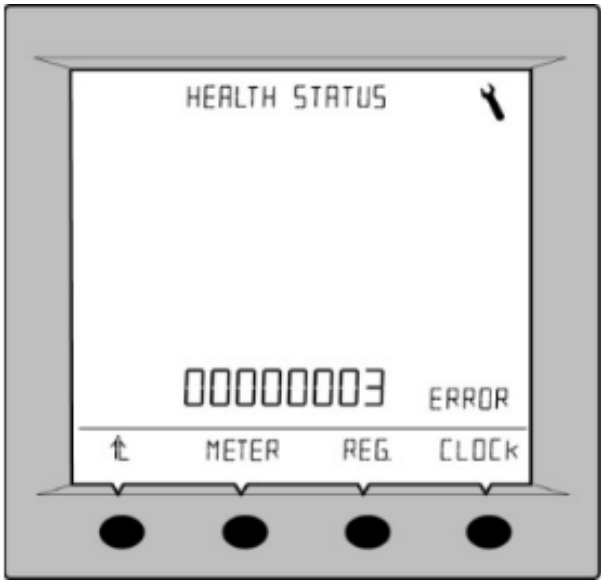
1. Press “MAINT”.
2. The health status is displayed on the screen.
3. Press “DIAG”.
4. Press “METER” (meter info).
5. View the meter information (shown here).
6. Press ← to view more meter information.
7. Press ↑ to return to the DIAG screen.



PM800 Check Health Status

To view error codes, do the following:

1. Press “MAINT” (maintenance).
2. Press “DIAG”.
3. The health status is displayed on the screen.
4. Press ↑ to return to the MAINT screen.



The wrench icon and the health status code displays when a health problem is detected. Error codes appear as shown above. For example, code 3 is to set up the Date/Time. For other codes, contact PowerLogic Technical Support. Go to www.powerlogic.com.

Min/Max Values for Real-time Readings

When certain one-second real-time readings reach their highest or lowest value, the PM800 saves the values in its nonvolatile memory. These values are called the minimum and maximum (min/max) values.

The PM800 stores the min/max values for the current month and previous month. After the end of each month, the meter moves the current month’s min/max values into the previous month’s register space and resets the current month’s min/max values.

The real-time readings evaluated are:

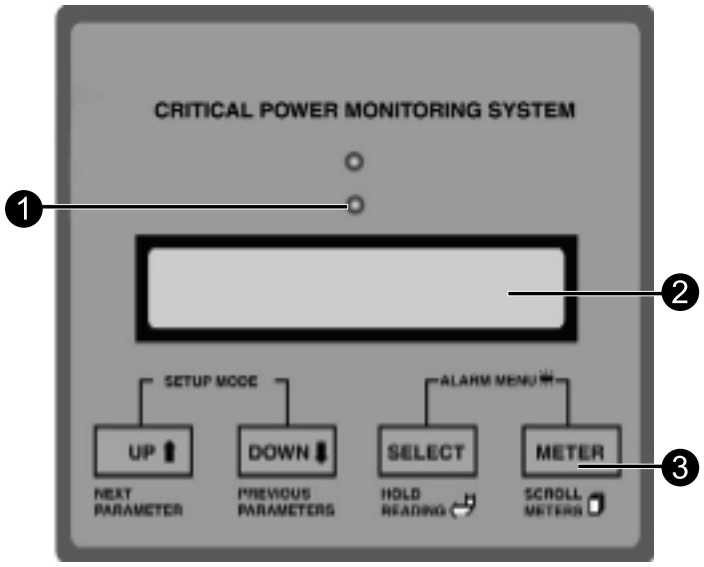
- Min/Max Voltage L-L
- Min/Max Voltage L-N
- Min/Max Current
- Min/Max Voltage L-L, Unbalance
- Min/Max Voltage L-N, Unbalance
- Min/Max Total True Power Factor
- Min/Max Total Displacement Power Factor
- Min/Max Real Power Total
- Min/Max Reactive Power Total
- Min/Max Apparent Power Total
- Min/Max THD/THD Voltage L-L
- Min/Max THD/THD Voltage L-N
- Min/Max THD/THD Current
- Min/Max Frequency

Multi Circuit Monitor and Network Display

The Multi Circuit Monitor (MCM) consists of two parts – The Multi-Circuit Meter and Network Display. The Multi-Circuit meter monitors all of the standard measurements and this data is presented on the Network Display. The MCM is equipped with serial RS232/RS485 and is designed to accommodate optional features such as Input Monitoring, Panelboard Main Circuit Breaker Monitoring, and Branch Current Monitoring.

SMD63M Network Display

The SMD63M Network Display provides local indication of all power system parameters of a Power Management Module. To report critical alarm data the SMD63M is equipped with one relay output, and local alarm annunciation. All system variables and alarms can be passed to the network operations center by means of a Modbus RTU protocol.



1	**Tri Color LED**	
	Green	Normal Operation — no network devices are in warning or alarm mode.
	Yellow	One or more network devices are in warning mode.
	Red	One or more network devices are in alarm mode.
2	**LCD Display**	
3	**Control Buttons**	
	[UP] [DOWN]	Scroll up or to next parameters.
	[UP] & [DOWN] (simultaneously)	Enter monitor setup mode.
	[SELECT]	Holds display to prevent automatic scrolling.
	[METER]	Proceed to the next metering function.

Serial Communications	The Display provides ModBus RTU communications via standard RS232 and RS485 ports, allowing the transfer of data and alarm points. Up to 30 displays can be addressed on the same ModBus network. The RS232 and RS485 ports are located on the back of the Display. For details on accessing the serial port refer to the SMD63M Network Display Manual. Go to www.powerlogic.com.
Dry Contact Communications	The Display for the MCM is equipped with one relay output, (activated upon any alarm condition) located behind the display board. Refer to the SMD63M Network Display Manual for connection details. Go to www.powerlogic.com.
Display	All metered values of the Remote PMM are presented on the front of the LCD. The SMD63M network display meter will also display all branch circuit currents when the optional Branch Current Monitor (BCM) is installed. A detailed explanation of display operation can be found in the SMD63M Network Display Manual. Go to www.powerlogic.com.

Multi Circuit Meter Status Parameters

The following status and alarm parameters are available from the MCM meter.

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

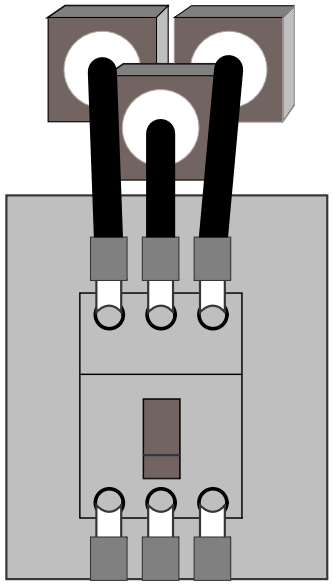
Alarm Points (also available via serial output)	
Over Voltage	Phase Loss A
Under Voltage	Phase Loss B
Over Current	Phase Loss C
Over kVA	

Input Monitoring Option

The Remote PMM can be ordered with the MCM present to monitor the power on the input side of the unit. Refer to the MCM8364 manual for operating and monitoring details. Go to www.powerlogic.com.

Panelboard Main Circuit Breaker Option

The optional MCM breaker monitoring displays the current only of the Panelboard Main Circuit Breaker(s). In the event that the current approaches the trip rating (factory set current limit @ 80% of the CBs of 225A rating of the breaker), the monitor will alarm via the LED on the Network Display. Panelboard Main Circuit Breaker Monitoring can warn the user when too much current is being drawn, helping to avoid overloading the circuits and causing accidental tripping.



Panelboard Main Circuit Breaker

Branch Current Monitoring

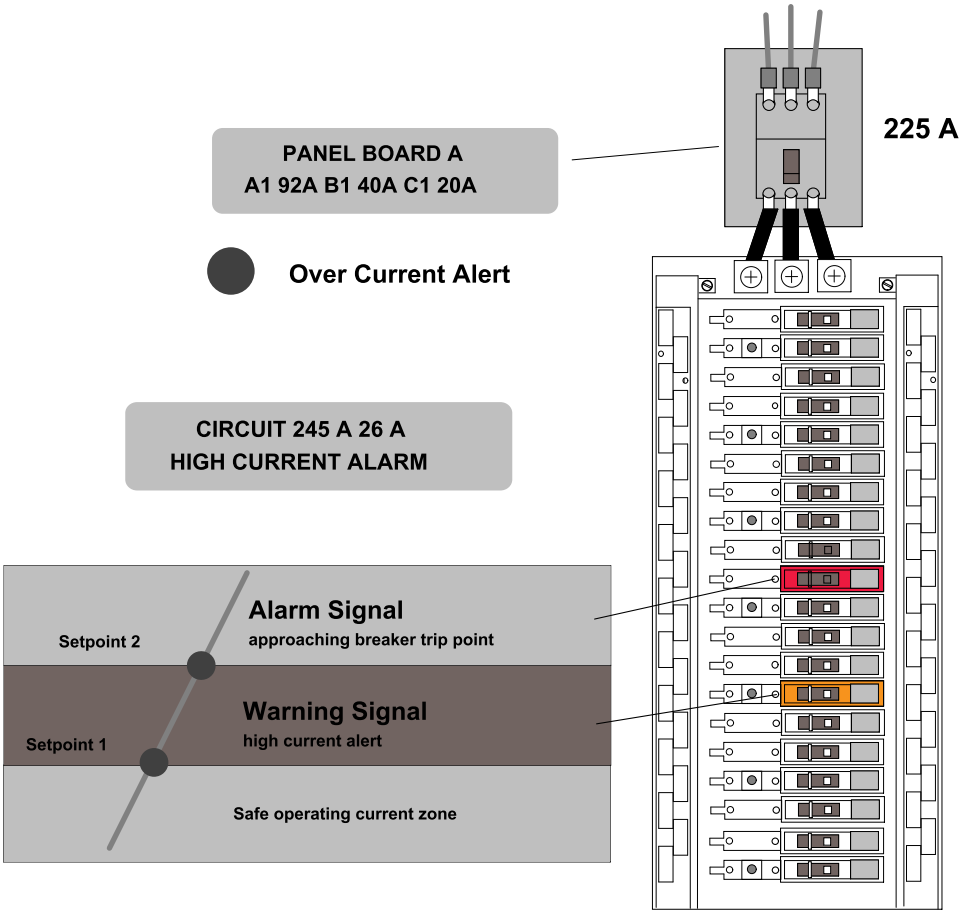
The MGE Branch Current Monitoring System monitors individual currents for each of the 42 branch circuits on the standard SQ-D panelboard. Each current sensor can monitor conductors carrying up to a maximum of 50 amperes. The maximum wire size capacity is #6 THHN, 0,35” diameter. In the event that current on any branch circuit exceeds a threshold, an alarm will be activated.

There are two thresholds which are factory set.

- The first threshold is a warning alarm that will activate a yellow LED on the Network Display to indicate current is approaching high levels; this is factory set at 75% of 20A.
- The second threshold is factory set at 80% of 20A and will activate a red LED on the Network Display.

For changes to the default settings, this can be accomplished by three methods. First, use the System Management Software (SMS) provided by SquareD. Second, use the P-node software available through the Customer Support Center. Third, contact your certified APC service partner for site assistance.

Individual branch circuit currents are displayed on the LCD of the Network Display. Current data can also be pulled via the serial port of the Branch Current Monitor.. For PDA software contact the Customer Support Center.



Note: Go to ww.powerlogic.com for details on the operation of the monitoring system in the following manuals:

- SMD63M Network Display with MCM8364 Multi-Circuit Meter
- Branch Current Monitor (BCM42) (For Branch Current Monitor option only)

For the SMS go to www.powerlogic.com.

Startup Procedures

These procedures are to be used for initial startup of the Remote PMM, and the sequence to be followed any time that the system is restarted after having been shut completely down with no power applied to the system.

Checks Before Startup

Before starting the Remote PMM, read this Remote PMM Manual thoroughly. Be certain that you fully understand the operation of the indicators, controls, and operational sequences. Before starting the Remote PMM, verify the following:

1. Upstream power circuit breaker is open.
2. Power cables have been properly connected to the input circuit breaker, or the Junction Box, if installed.
3. Voltage connected to the Remote PMM matches the Remote PMM nameplate and model number.
4. Equipment has been properly grounded.
5. All power and control connections are properly made and are tight.

Initial Startup

After verifying the information in ***"Checks Before Startup"***, proceed as follows:

1. Close the upstream circuit breaker.
2. Close the main panelboard circuit breaker(s).
3. Close individual output circuit breaker(s) as required.

Checks After Startup

Normal operation of the Remote PMM should be verified immediately after the initial startup has been performed.

At the minimum, use the monitor, if installed, to verify proper readings from all circuits.

Preventive Maintenance

The following preventive maintenance routines should be considered the minimum requirements; your installation and site may require additional preventive maintenance to assure optimal performance from the Remote PMM and associated equipment. These routines should be performed twice a year.

The technician or electrician performing preventive maintenance on the Remote PMM must read this manual thoroughly and be familiar with the indicators, controls, and operation of the equipment.

Caution: Isolate and de-energize the equipment for all maintenance operations.

Caution: Operation of the upstream circuit breaker(s) will cause power to be removed if it is present and will cause power to be applied if it is not. Make sure that all loads are prepared to have power removed (all critical circuits have been shut down), or circuits are safe for power application (no maintenance procedures are being conducted and downstream circuit breaker(s) are open and tagged) before upstream operation of the circuit breaker(s).

A. Ensure that the equipment is clean and free of loose dust, dirt, and debris. The exterior of the enclosures can be cleaned with a mild solution of soap and water, lightly applied with a lint-free cloth.

B. Inspect the air intake and exhaust plates and clean as required. Verify that air flows freely through the equipment. Clean the air intake and exhaust plates, and the enclosure interior, with a vacuum cleaner.

C. Operate all circuit breaker(s) to verify that circuit breaker(s) function properly.

D. Verify that all system monitoring functions operate properly.

PM800 Available Alarms by Alarm Number

Alarm No.	Alarm Description	Abbreviated Display Name	Units
01	Over Current Phase A	Over Ia	Amperes
02	Over Current Phase B	Over Ib	Amperes
03	Over Current Phase C	Over Ic	Amperes
04	Over Current Neutral	Over In	Amperes
05	Current Unbalance, Max	I Unbal Max	Tenths %
06	Current Loss	Current Loss	Amperes
07	Over Voltage Phase A-N	Over Van	Volts
08	Over Voltage Phase B-N	Over Vbn	Volts
09	Over Voltage Phase C-N	Over Vcn	Volts
10	Over Voltage Phase A-B	Over Vab	Volts
11	Over Voltage Phase B-C	Over Vbc	Volts
12	Over Voltage Phase C-A	Over Vca	Volts
13	Under Voltage Phase A	Under Van	Volts
14	Under Voltage Phase B	Under Vbn	Volts
15	Under Voltage Phase C	Under Vcn	Volts
16	Under Voltage Phase A-B	Under Vab	Volts
17	Under Voltage Phase B-C	Under Vbc	Volts
18	Under Voltage Phase C-A	Under Vca	Volts
19	Voltage Unbalance L-N, Max	V Unbal L-N Max	Tenths %
20	Voltage Unbalance L-L, Max	V Unbal L-L Max	Tenths %
21	Voltage Loss (loss of A,B,C, but not all)	Voltage Loss	Volts
22	Phase Reversal	Phase Rev	-
23	Over kW Demand	Over kW Dmd	kW
24	Lagging true power factor	Lag True PF	Thousandths
25	Over THD VAN	Over THD VAN	%
26	Over THD VBN	Over THD VBN	%
27	Over THD VCN	Over THD VCN	%
28	Over THD VAB	Over THD VAB	%
29	Over THD VBC	Over THD VBC	%
30	Over THD VCA	Over THD VCA	%
31	Over KVA Demand	Over KVA DMD	KVA
32	Over KW Total	Over KW Total	KW
33	Over KVA Total	Over KVA Total	KVA
53	End Incremental Energy Interval	END INC ENR INT	-
54	End Demand Interval	END DMD INT	-
55	Power up/Reset	PWR UP/RESET	-
56	Digital Input Signal	DIGITAL IN SI	-

Worldwide Customer Support

Customer support for this or any other product is available at no charge:

- Contact the Customer Support Center by telephone or e-mail. For local, country-specific centers: go to www.apc.com/support/contact for contact information.

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