

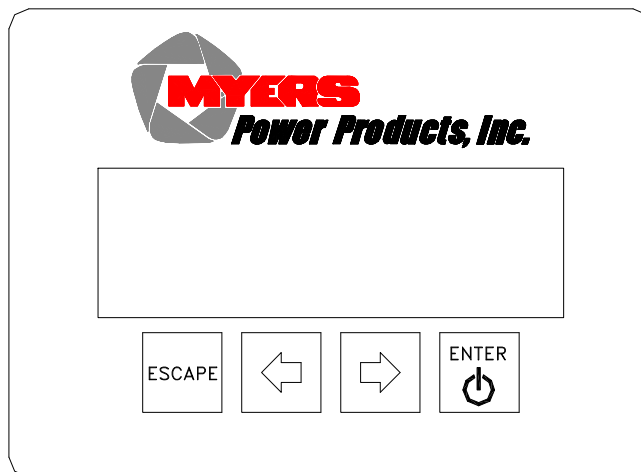


METERING/DISPLAY MANUAL

175W - 750W SINGLE PHASE

Series LV

EMERGENCY LIGHTING CENTRAL INVERTER



Myers Power Products, Inc.
44 South Commerce Way, Bethlehem, PA 18017
1-800-526-5088 • (610) 868-3500 • Fax: (610) 868-8686
Service: (610) 868-5400
www.myerspoverproducts.com

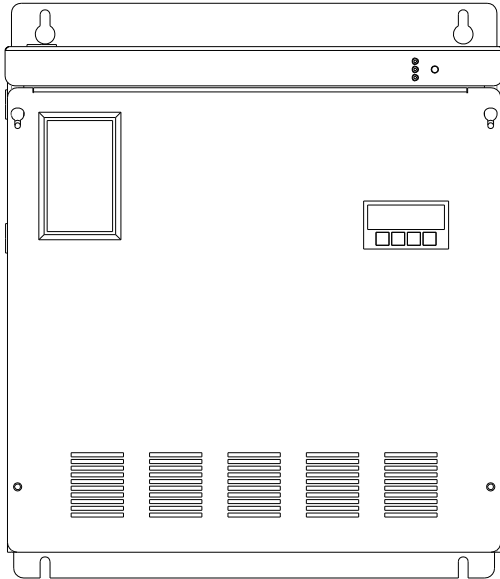
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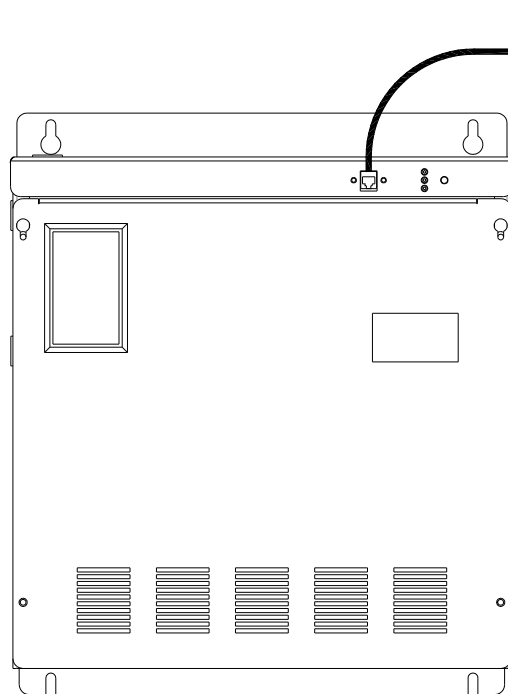
SECTION 1

TYPES OF METERING/DISPLAY PANELS

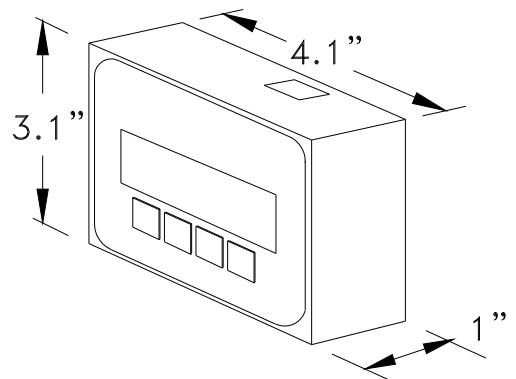
INTERNAL METER PANEL (UL 924 & NFPA 101)



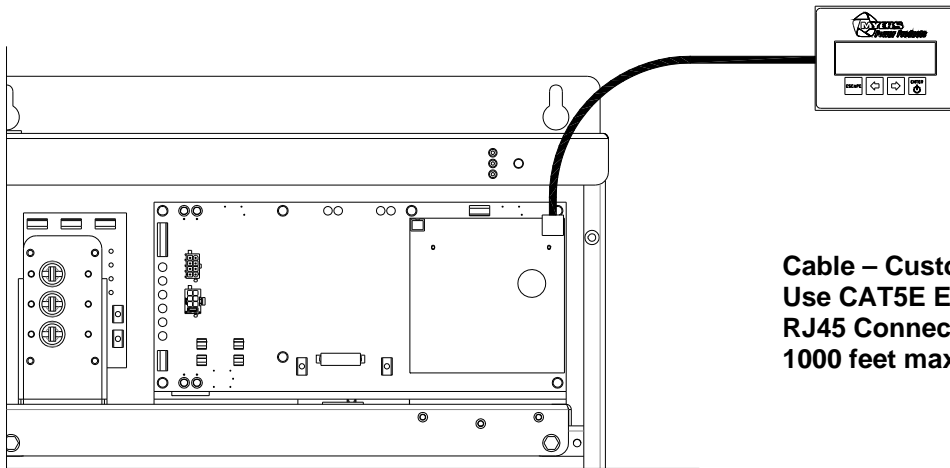
HANDHELD METER PANEL (UL 924 & NFPA 101)



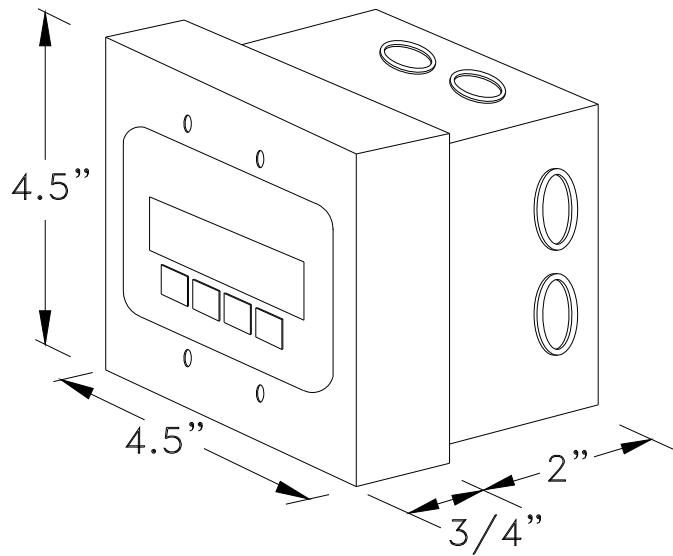
Cable – Factory supplied
CAT5E Ethernet Cable, 6 feet long



REMOTE METER PANEL (UL 924 & NFPA 101)



**Cable – Customer supplied
Use CAT5E Ethernet Cable,
RJ45 Connectors
1000 feet maximum**



SECTION 2

PANEL DISPLAY

The Panel Display assembly consists of a 4 x 20 OLED display and a 4-button keypad. The 4 buttons can navigate through all the menus by using the **left** and **right arrow** keys, the **ENTER** and the **ESCAPE**.

To turn on the display hold down the **ENTER** key for 2-3 seconds and release when the display becomes illuminated. After a period of 15 minutes with no key activity the display will enter a sleep mode and requires a re-initialization cycle as described previously.

When there are no alarms, the default menu will scroll between the Identification/Date-Time screen and the metered values. To view the other menu options from the default screen, press the **ENTER** key, and then press the **left** or the **right arrow** key to go to the desired menu.

The Menu's available are Meter, System Status, System Setup, Log View, Maintenance, Unit Info, and Alarms/Faults.

Once the desired menu has been reached, press the **ENTER** key to gain access to this menu. Once into the menu, use the **left** or **right arrow** key to scroll to different functions within the menu. Press the **ENTER** key again to gain access to the desired function. To exit, press the **ESCAPE** key until the desired level has been reached. (See figure 2.1)

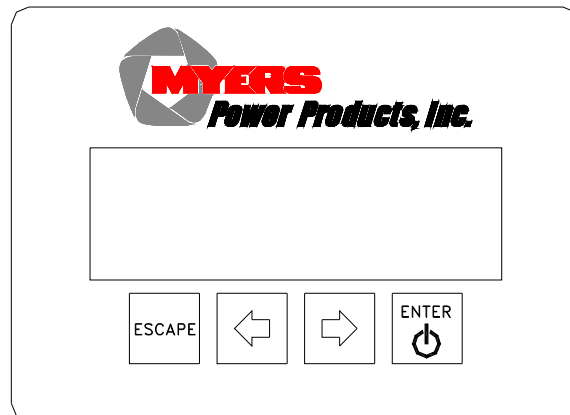


Figure 2.1 Panel Display

Control Panel Keypads

Table 2.1 Keypad Functions

Key Name	Description
Enter	Pressing this key will drop one tier deeper into the menu structure.
Escape	Pressing this key will retract one tier less in the menu structure.
[◀]	This key functions as Left scroll key moving horizontally across one tier.
[▶]	This key functions as Right scroll key moving horizontally across one tier.

*Continuing to depress escape will retract the display and eventually reach the default screen.

Meter Functions

To get to the meter functions from the default screen, press the **ENTER** key, then press the **ENTER** key again. Use **left** or the **right arrow** key to view the meter function desired.

Table 2.2 Meter Functions

Function	Description
Input voltage	Measures the RMS AC Input Voltage to the Inverter.
Input Current	Measures the RMS AC Input Current to the Inverter.
Input Frequency	Measures the AC Input Frequency to the Inverter.
Output Voltage	Measures the RMS AC Output Voltage from the Inverter.
Output Current	Measures the RMS AC Output Current from the Inverter. If there are Normally Off loads connected, it will read the sum of Normally On and Normally Off outputs.
Output Power (VA)	Measures the Output Power (VA) from the Inverter.
Battery Voltage	Measures the DC Battery Voltage.
Battery Current	Measures the DC Battery Current. When in charge mode, the current will be positive. When in Inverter mode, the current will be negative.
Battery Temperature	Measures temperature at the battery.
Battery Power	Measures the Battery Power (Watts) to the Inverter.
Internal Ambient Temperature	Measures the ambient temperature inside the system.
Heatsink Temperature	Measures the temperature at the heatsink.
UPS Events	Indicates the total Events the system has on the inverter.
UPS Time	Indicates the total minutes the system has run on inverter.
System Days	Indicates the total days the system has been on-line.

System Status

The system status will indicate the operating mode of the system. The table listed below describes the modes of operation the system will display.

Table 2.3 System Status Modes

Function	Description
On Utility	Indicates the utility is present and in tolerance but not charging.
Charging Bulk	The batteries are being charged but the float or absorption voltage has not been reached.
Charging Absorption	The batteries are being charged at the absorption voltage but the charging current is not below 1A.
Charging Float	The battery charger is float charging the battery.
Manual Test	Indicated when the self test push button is depressed or the self test is activated from the menu.
Monthly Test	A monthly test is in progress.
Yearly Test	A yearly test is in progress.
On Battery	The unit is on battery due to an out of tolerance condition. Does not indicate for test modes.
Load Reduction Calibration	Indicated when a load reduction calibration is activated.
Standby	Indicated if the utility is present but not in tolerance. The error can be voltage, frequency, or phase.
Normally Off Active	Indicated if the normally of timer relay is activated after the system returns from inverter.
Shutdown	Indicated if the battery voltage reaches LVD (1.75v/cell) and the system is waiting for the disconnect timer to time out.

System Setup

The system setup tier allows the user to set parameters and customize settings that can indicate out of tolerance conditions. To get to the System Setup menu from the default screen, press the **ENTER** key, scroll to the System Setup menu using the **left** or **right arrow** key, then press the **ENTER** key again.

Date

The parameters are Month, Day, and Year.

To change any of the parameters, use the **left** or **right arrow** key depending if you want to increase or decrease. Once the parameter is correct, press the **ENTER** key and the next parameter can be changed.

Time

The parameters are Hour and Minute. The 24-hour standard is used so 2:00 PM would be 14 hours. Use the **left** or **right arrow** key to change the parameters and the **ENTER** key to scroll between parameters.

Set points

This tier contains settings that the user can use to activate the summary alarm creating a warning condition. The setting will not have a direct effect on the operation of the UPS. Set points include Battery Low & High, Battery Temp Low & High, Ambient Temp Low & High, Input Voltage Low & High, Output Voltage Low & High, and On Inverter Timer. Use the left or right arrow key to turn on or off this alarm. When the alarm is turned on, a number will appear. To change the number,

Press the **ENTER** key and then use the **left** or **right arrow** key. Once the desired number is reached, press the **ENTER** key and this will return to the top-level menu.

Table 2.4 Summary Alarm Codes

Type	User Settings
Input Frequency Low	Enabled / Disabled
Input Frequency High	Enabled / Disabled
Input Voltage Low	Enabled / Disabled
Input Voltage High	Enabled / Disabled
Battery Voltage Low	Enabled / Disabled
Battery Voltage High	Enabled / Disabled
Battery Temperature Low	Enabled / Disabled
Battery Temperature High	Enabled / Disabled
Ambient Temperature Low	Enabled / Disabled
Ambient Temperature High	Enabled / Disabled
On Inverter Time	Enabled / Disabled
Charger Fault	None User / Fixed Setting
Failed Monthly Test	None User / Fixed Setting
Failed Yearly Test	None User / Fixed Setting
Load Reduction Fault	None User / Fixed Setting
Overload Fault	None User / Fixed Setting
Output Voltage Low	None User / Fixed Setting
Output Voltage High	None User / Fixed Setting
Input Fuse Failed	None User / Fixed Setting
Heatsink Over Temperature	None User / Fixed Setting
Battery Low Voltage Disconnect	None User / Fixed Setting

Normally Off Timer

The normally off timer will hold on the normally off relay, providing power to the normally off load until the specified time has elapsed.

Log View

Test Log

To get to the Test log menu from the default screen, press the **ENTER** key, scroll to the Log View menu using the **left** or **right arrow** key, then press the **ENTER** key again, scroll to the Test Log menu and press the **ENTER** key again. Use the **left** or **right arrow** key to view the test desired, and then press the **ENTER** key for more information.

The Test log indicates the Date, Time and Duration of the test. It also indicates if it was a monthly or yearly test, and it records the output voltage, the output current, the ambient temperature, and if there were any alarm conditions.

The numbers of tests that can be captured in the test log are 25. The format is first in is first out so; test number one is the most recent test.

Alarm/Fault Log

To get to the Event log menu from the default screen, press the **ENTER** key, scroll to the Event log menu using the **left** or **right arrow** key, then press the **ENTER** key again. Use the **left** or **right arrow** key to view the event desired, and then press the **ENTER** key for more information.

The Alarm/Fault log will store three critical parameters relative to the alarm that occurred. In some instances a description is used to describe what occurred. The Event log captures data every time there is a transfer from utility power to battery power. The numbers of alarms/faults that can be captured in the log are 75. The format is first in is first out so; event number one is the most recent event.

Maintenance

To get to the Maintenance menu from the default screen, press the **ENTER** key, scroll to the Event log menu using the **left** or **right arrow** key, then press the **ENTER** key again. **The maintenance menu is password protected.**

****** The password is left arrow, right arrow, left arrow, and right arrow. ******

The following functions can be performed from the maintenance menu:

Self Test

Initiates a manual test and transfers the inverter to battery power. The time is programmable prior to execution of the test.

Monthly Test

Programs the Date, Time (Hours and Minutes), and duration to execute the monthly test. The monthly test will not be executed the month that the yearly test is executed. Use the **left** or **right arrow** key to change the parameters and the **ENTER** key to scroll between parameters.

Yearly Test

Programs the Date, Time (Hours and Minutes), and duration to execute the yearly test. Use the **left** or **right arrow** key to change the parameters and the **ENTER** key to scroll between parameters.

Load Reduction

If enabled an alarm will be generated if the output load on battery is less than 90% of the calibrated value. A calibration can also be performed from this menu. A calibration will auto measure the load and store the value as a 90% reference load number.

Soft Reset

Resets the unit to clear the alarms and faults in the system.

Event/Timer Clear

Clear the event and timer values.

Alarm Log Clear

Clears the alarms log.

Test Log Clear

Clears the test log.

Factory Defaults

Reverts the unit setting back to the original factory parameters.

Change Password

Allows the user to change the password to a different four button sequence.

Unit Info

The unit info includes information about the system including Part Number, Serial Number, and Firmware revisions for the control and display programmed parts.

Alarms/Faults

To get to the Alarm menu from the default screen, press the **ENTER** key, scroll the Alarm menu using the **left** or **right arrow** key, then press the **ENTER** key again.

The alarm menu displays all present alarms. If there are no alarms, the display screen will indicate no alarms.

Table 2.5 Alarms

Function	Description
Year Test Failed	If a year test is executed and does not complete successfully.
Month Test Failed	If a month test is executed and does not complete successfully.
Summary Contact	If any of the fixed alarms or user set alarms are active (see section on summary alarm for details).
Load Reduction	If load reduction is active and the load is reduced below 90%.
Battery Charger	If the charger is not operating properly.
Output Voltage Low	If the output voltage is below -15% of nominal or the user setting if active.
Output Voltage High	If the output voltage is above +15% of nominal or the user setting if active.
Input Voltage Low	If the input voltage is below -15% of nominal or the user setting if active.
Input Voltage High	If the input voltage is above +15% of nominal or the user setting if active.
Input Frequency Low	If the input voltage is below 55 Hz or the user setting if active.
Input Frequency High	If the input voltage is above 65 Hz or the user setting is active.
PLL Error	If the unit cannot phase lock to the utility input.
Battery Probe not connected	The temperature probe is not connected or out of tolerance.
Overload	Timed overload function that activates if the unit is above 1.10% nominal load on inverter and the timer has expired.
Low Battery Temperature	If enabled and the battery temperature is below the user set point.
High Battery Temperature	If the battery temperature is above 50 degrees C
Low Ambient Temperature	If enabled and the ambient temperature is below the user set point.
High Ambient Temperature	If enabled and the ambient temperature is above the user set point.
RTC Error	If the Real Time Clock is not operating properly.
Battery Low	If enabled and the battery voltage is below the user set point.
Battery High	If enabled and the battery voltage is above the user set point.
Input not present	If the utility is below 60vac.
Input Fuse failed	If the input fuse is failed.
Heatsink Over Temperature	If the heatsink temperature is above 90 degrees C.
Battery Low Voltage Disconnect	If the battery voltage reaches 1.75V/cell.
Over Current	Timed over current function that activates if the unit is above 1.25% nominal load on utility and the timer has expired.
Short Circuit	If the current required from the unit is too high.

NOTES: