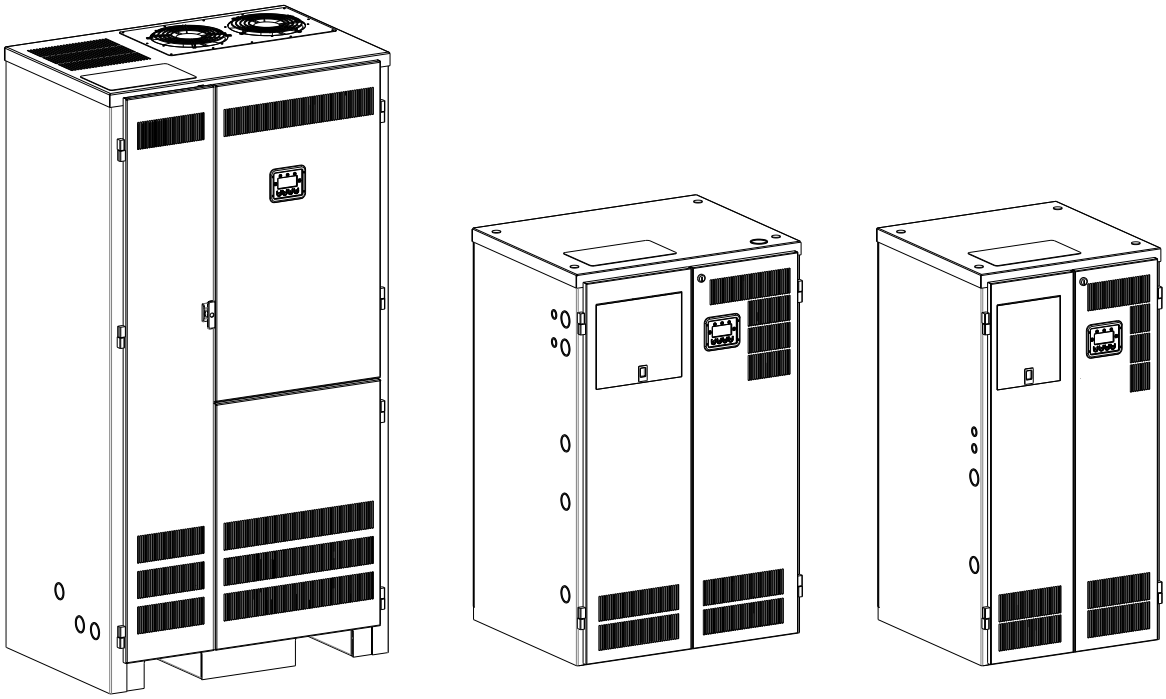
Illuminator™ System
Series Hypernova

3.2 kW – 80 kW

Users Manual



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

C A U T I O N

READ ENTIRE MANUAL AND REVIEW ALL DOCUMENTATION BEFORE ATTEMPTING SYSTEM INSTALLATION

FOR SERVICE OR INSTALLATION INFORMATION:
TELEPHONE: (610) 868-5400 (24 HR. HOTLINE)
FAX: (610) 954-8227

This unit contains LETHAL VOLTAGES. All repairs and service should be performed by AUTHORIZED SERVICE PERSONNEL ONLY! There are NO USER SERVICEABLE PARTS inside this unit.

IMPORTANT SAFEGUARDS

When using electrical equipment, you should always follow basic safety precautions, including the following:

1. **READ AND FOLLOW ALL SAFETY INSTRUCTIONS.**

2. **Do not install the system outdoors.**

3. **Do not install near gas or electric heaters or in other high-temperature locations.**

4. **Use caution when servicing batteries. Depending on battery type, batteries contain either acid or alkali and can cause burns to skin and eyes. If battery fluid is spilled on skin or in the eyes, flush with fresh water and contact a physician immediately.**

5. **Equipment should be mounted in locations where unauthorized personnel will not readily subject it to tampering.**

6. **The use of accessory equipment not recommended by Manufacturer may cause an unsafe condition and void the warranty.**

7. **Do not use this equipment for other than its intended use.**

8. **Qualified service personnel must perform all servicing of this equipment.**

SAVE THESE INSTRUCTIONS

The installation and use of this product must comply with all national, federal, state, municipal, or local codes that apply. If you need help, please call Service.

User’s Guide
An on-site permanent log of the inspection, testing, and maintenance of the emergency electrical power supply system shall be maintained in accordance with the Manufacturer's operating manual. The log shall include:

The date on which the inspection, testing, and maintenance exercise was carried out

The name of the person(s) who performed the inspection, testing, and maintenance.

A note of any unsatisfactory condition observed or discovered, and the steps taken to correct the condition

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CHAPTER 1

INTRODUCTION

Keep this manual and the System Installation Guide in the folder mounted inside the unit.

This unit is a microprocessor controlled PWM (Pulse Width Modulated) pure sine wave based DC to AC power inverter utilizing IGBT technology. It integrates a fully automatic battery charger, a solid-state transfer system, control circuitry, self testing and recording digital meter display, and maintenance free sealed lead calcium type batteries. The system components are carefully matched to make the unit a completely self-contained, fully automatic standby power source for operation on all types of lighting loads. The batteries are sized and tested per UL-924 and Life Safety Code ANSI / NFPA 101, providing emergency power for a minimum of 90 minutes.

If the duration of a power failure is greater than the batteries storage capability, the inverter will automatically shut down when the battery voltage reaches 85% of the nominal DC voltage. This feature protects the battery from being permanently damaged from a deep discharge that could cause cell reversal. This battery protection feature is called "Low Voltage Disconnect" or L.V.D.

When the AC power is restored after a full discharge, the system will be ready for another power failure within 24hrs. If another power failure occurs before the 24-hour recharge time, the run time will be decreased.

The front panel display incorporates an OLED display, three LED status indicators and a 4-button keypad. All user interface functions are available from the front panel assembly.

Utilizing a small footprint, this unit is for use with any lighting load including LED, quartz, HID, incandescent, fluorescent and halogen.

HOW TO USE THIS MANUAL

This manual tells you how to start, operate, and communicate with your unit and lets you know how to get more information for special situations.
Please record your unit's model number, serial number, and part number below. You can find these numbers on the labels on the inside panel.

Model Number _____

Serial Number _____

Part Number _____

Service and Support

We are committed to outstanding customer service. A service technician is available **24** hours a day, **365** days a year. Service is also available **24** hours a day to give you access to technical notes and product information. You can also visit our web site.

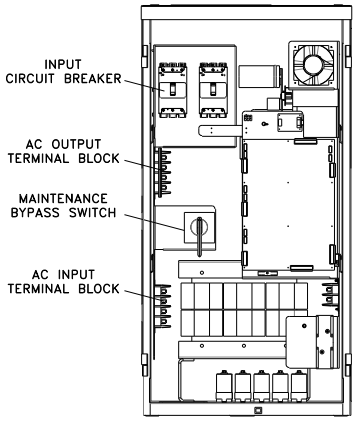
NOTE: Please have your unit's Serial and Model numbers available when you call; this number is located behind the right door.

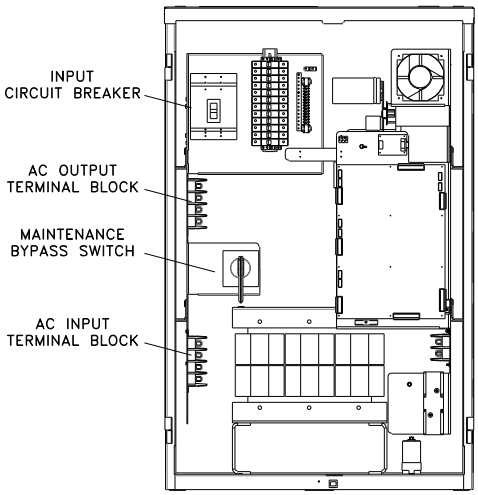
Contact SERVICE one of the following ways:

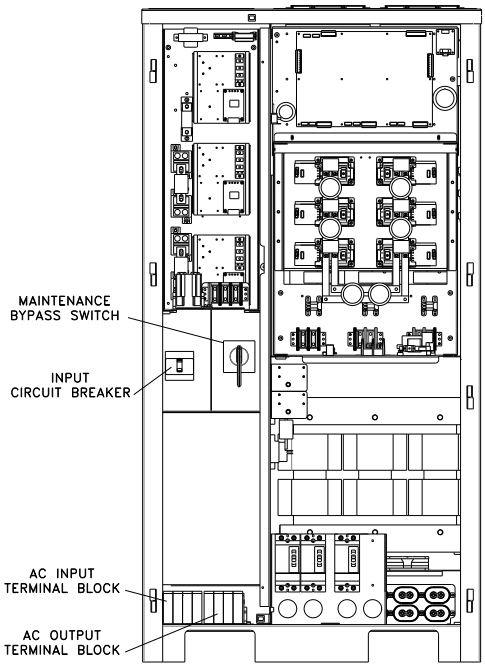
Service Number: 610-868-5400

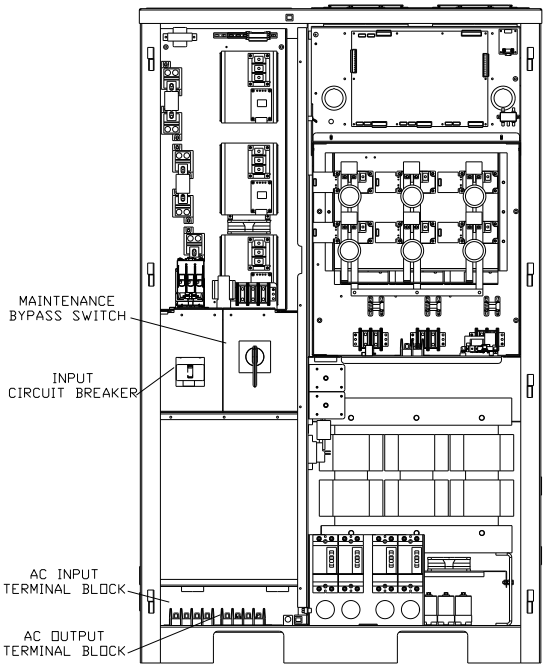
Service Fax: 610-954-8227

Website: **www.myerseps.com**









CHAPTER 2

ENVIRONMENT

Make sure the environment is a clean, cool, dry place with normal ventilation.

Storage Temperature

Store the batteries (in the system or battery cabinet) at -18 to 40°C (0 to 104°F). Batteries have a longer shelf life if they are stored below 25°C (77°F). Keep stored batteries fully charged. Recharge the batteries every 90–180 days. The system or battery cabinet without batteries may be stored at -20 to 70°C (-4 to 158°F).

Ventilation

The air around the unit must be clean, dust-free, and free of corrosive chemicals or other contaminants. Do not place the system or batteries in a sealed room or container.

Operating Temperature

System can operate from 20° to 30°C (68° to 86°F) and up to 95% relative humidity. The batteries' service life is longer if the operating temperature stays below 25°C (77°F).

Batteries

The temperature should be near 25°C (77°F) for optimum battery performance. Batteries are less efficient at temperatures below 18°C (65°F), and high temperatures reduce battery life. Typically, at about 35°C (95°F), battery life is half of what it would be at a normal temperature of 25°C (77°F). At about 45°C (113°F), battery life is one-fourth of normal.

Make sure that heaters, sunlight, air conditioners, or outside air vents are not directed toward the batteries. These conditions can make the temperature within battery strings vary, which can cause differences in the batteries' voltages. Eventually, these conditions affect battery performance.

If the batteries are not in the system, remember that the batteries should be installed as close as possible to the unit to reduce DC wiring costs and improve battery performance.

Do not allow tobacco smoking, sparks, or flames in the system location because hydrogen is concentrated under the vent cap of each cell of the battery. Hydrogen is highly explosive, and it is hard to detect because it is colorless, odorless, and lighter than air.

Every type of battery can produce hydrogen gas, even sealed maintenance-free batteries. The gas is vented through the vent caps and into the air, mainly when the unit is charging the batteries. The batteries produce the most hydrogen when maximum charging current is present when recharging batteries; the batteries produce minimal hydrogen gas during float charging. The amount of current that the charger supplies to the batteries (not the battery ampere-hour) determines how much hydrogen is produced.

High Altitude Operation

The maximum operating elevation is 3000m (10,000 ft) without derating. Required derating on output power is 4% per 300m (1000ft) above 3000m (10,000 ft).

CHAPTER3

STARTUP AND SHUTDOWN PROCEDURE

Refer to the Installation Manual to secure the unit and install AC and DC wiring.

STARTUP PROCEDURE

For the initial startup of the system, follow the instructions in the Startup and Warranty Validation Form. Failure to do so will void warranty.

CAUTION: HAZARDOUS VOLTAGES – ONLY QUALFIED SERVICE PERSONNEL SHOULD PERFORM PROCEDURE.

1. Verify that the installation switch located on the inverter chassis is in the (OFF) position and the main DC circuit breaker is (OFF). Verify that AC input breaker is (OFF). Install all battery cabinet fuses.

2. Press and hold the DC Pre-charge switch located on the inverter chassis for approximately thirty (30) seconds and then turn (ON) the main DC battery circuit breaker(s). If a large flash occurs or if the circuit breaker trips, the batteries are not connected properly. Call service immediately.

3. Energize the Mains AC input by turning (ON) the unit's input circuit breaker and/or the Distribution Panel breaker located upstream from the inverter.

4. Turn the installation switch to the (ON) position. The Front Panel display should now be illuminated and a slight hum should be heard from the inverter transformer. The unit is now charging and the output should be energized.

SHUTDOWN PROCEDURE

1. Interrupt the AC Mains to the machine by the Distribution Panel Breaker or the emergency lighting inverter's AC input circuit breaker. The Inverter should then start.

2. Turn the installation switch located on the inverter chassis to the (OFF) position. The inverter should stop.

3. Turn (OFF) DC battery circuit breaker(s) on the inverter chassis.
   NOTE: Each battery string will have a separate circuit breaker. Turn them all (OFF).

4. Remove battery string fuses in battery cabinet(s).

5. Depress and hold discharge switch for two minutes to discharge DC capacitors.

6. Using a DC Voltmeter measure the DC voltage across the DC capacitors to ensure the capacitors have been fully discharged.
   NOTE: If a reading of greater than 5 vdc is present repeat step 5.

CAUTION: HAZARDOUS VOLTAGES STILL EXIST AT THE BATTERY TERMINAL BLOCK AND WITHIN THE SYSTEM. AUTHORIZED SERVICE TECHNICIANS MUST DISCHARGE DC CAPACITORS AND TURN OFF UTILITY POWER BEFORE SERVICING EQUIPMENT.

CAUTION: DO NOT LEAVE THE SYSTEM SHUTDOWN FOR A PROLONGED TIME. LEAD BASED BATTERIES WILL EXPERIENCE PERMANENT DAMAGE FROM LACK OF CHARGING.

MAINTENANCE BYPASS PROCEDURE

CAUTION:

HAZARDOUS VOLTAGES – ONLY QUALFIED SERVICE PERSONNEL SHOULD PERFORM PROCEDURE.

MAINTENANCE BYPASS SHOULD NOT BE PERFORMED WHEN SYSTEM IS IN BATTERY EMERGENCY MODE.

System Into Bypass Mode

1. Open left-hand door and locate Maintenance Bypass Switch.

   NOTE: Make sure the emergency lighting inverter is not running on battery by checking the front panel display and/or indicator LED's. See chapters 4 and 5 for description.

2. Turn the Maintenance Bypass Switch from normal mode **(UPS)** to bypass mode **(BYPASS)**.
3. Locate the Installation Switch and turn it to the **(OFF)** position.
4. Locate the AC Input Circuit Breaker (CB1) behind left-hand door and turn it **(OFF)**.
5. Turn (OFF) the Main DC Battery Circuit Breaker(s) in the lower right area inside the cabinet.
6. Remove all Battery String Fuses from all Battery Cabinets.

CAUTION:

HAZARDOUS VOLTAGES STILL EXIST AT THE BATTERY TERMINAL BLOCK AND WITHIN THE SYSTEM. AUTHORIZED SERVICE TECHNICIANS MUST DISCHARGE DC CAPACITORS BEFORE SERVICING EQUIPMENT.

WARNING:

DO NOT LEAVE THE SYSTEM SHUTDOWN FOR A PROLONGED LENGTH OF TIME. LEAD BASED BATTERIES WILL EXPERIENCE PERMANENT DAMAGE FROM LACK OF CHARGING.

System On Line From Bypass Mode

1. Verify that the installation switch located on the inverter chassis is in the (OFF) position and the main DC circuit breaker(s) are (OFF). Verify that AC input is (OFF). Install battery cabinet fuses.
2. Press and hold DC Pre-charge switch located on the inverter chassis for approximately 30 seconds. Then turn the DC Battery Circuit Breaker(s) to the (ON) position. If a large flash occurs or if the circuit breaker trips, the batteries are not connected properly. Call service immediately.
3. Turn the AC Input Circuit Breaker (CB1) to the **(ON)** position.
4. Turn (ON) the Installation Switch. The Front Panel Display will now be illuminated and a slight hum should be heard from the inverter transformer. The unit is now charging the batteries.

   NOTE: Make sure the emergency lighting inverter is not running on battery by checking the front meter panel indicator light (ON BATTERY) or front panel display.
5. Turn the Maintenance Bypass Switch from bypass mode **(BYPASS)** to normal mode **(UPS)**. The emergency equipment is now protected by the inverter system.

CHAPTER 4

OPERATION

The following is a description of the system status located on the front panel of the OLED Display. These statuses will automatically scroll on the display, along with time and date information, while the emergency lighting inverter is powered.

AC Present

When the AC Mains is present, the words “AC PRESENT” will illuminate. If a power failure was long in duration, or the AC mains was disconnected by some other means (Circuit breaker open) the “AC PRESENT” would not be illuminated. When the control circuit senses that the line has dropped below an acceptable level (Black Out, Brown Out, or Transient), the inverter will energize for at least one minute. So, if the power failure was a momentary glitch, the “AC PRESENT” would be illuminated but the inverter would be running.

System Ready

When the system has adequate battery voltage to transfer, the words “SYSTEM READY” will illuminate, and the Left LED will be illuminated green. This feature prevents damage from multiple deep discharges of the battery.

Battery Charging

When the AC Mains is connected to the line and the battery is charging under normal conditions, the words “BATTERY CHARGING” will illuminate.

On Battery Power

When the inverter is producing output power (battery bank is being discharged), the words “ON BATTERY” will be illuminated. If the inverter is running on battery power, but there are no active alarms, the Middle LED will be illuminated amber.

Alarms/Faults

This is a summary alarm/fault indication. When there is an active alarm/fault condition, the word “ALARM” will illuminate, and the Right LED will be illuminated red. To view which fault is present, use the keypad and OLED display feature.

The front panel display will provide the user with a variety of information. It has a full compliment of Meter functions, Control functions and Program functions.

CHAPTER 5

FRONT PANEL DISPLAY

The Front Panel Display assembly consists of an 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.

The default menu will scroll between the Identification/Date-Time screen, the Status Screen, and the Meter screens. 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 desire function. To exit, press the **ESCAPE** key until the desired level has been reached. (See figure 5.1

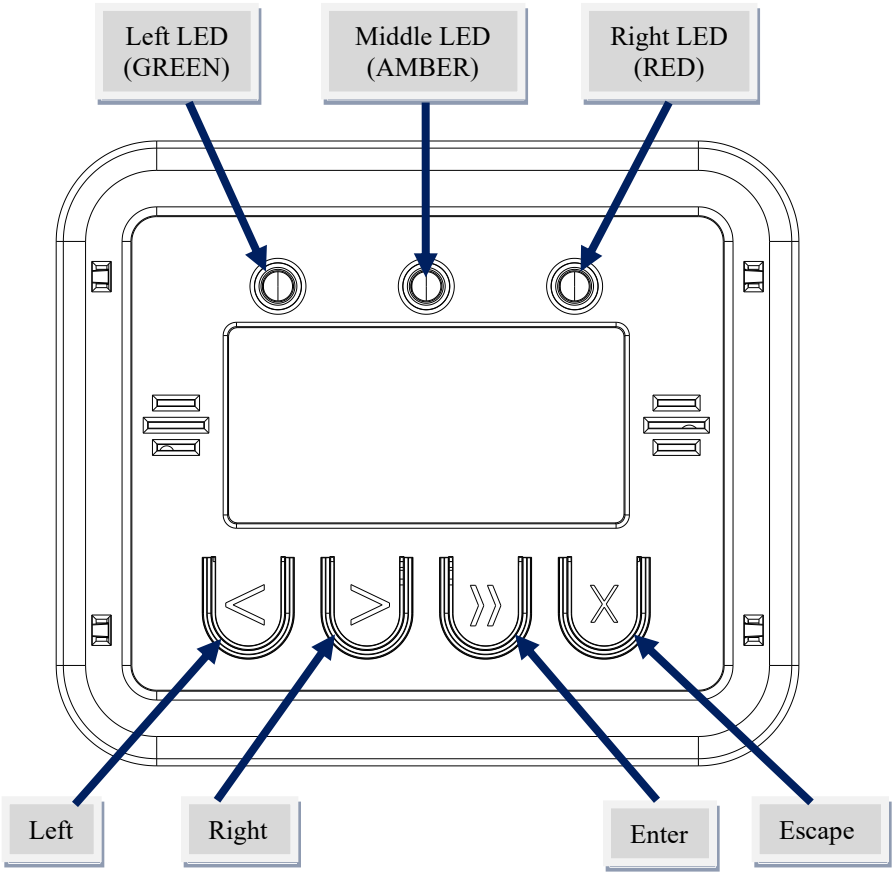


Figure 5.1 Front Panel Display

LED Function

The inverter Front Panel Display (FPD) features three LEDs: A green LED (on the left), an amber LED (in the middle), and a red LED (on the right). One LED (and only one LED) will always be on. The following table describes the meaning behind each of the LEDs:

Table 5.1 Keypad Functions

LED Color (position)	Meaning
GREEN (left)	There are no alarms, and the inverter is running the load on utility power.
AMBER (middle)	There are no alarms, but the inverter is running the load on battery power.
RED (right)	There are one or more active alarms asserted. Refer to 'Alarms' screen (below) for more information.

Control Panel Keypads

Table 5.2 Keypad Functions

Key Name	Description
LEFT (<)	This key functions as Left scroll key.
RIGHT (>)	This key functions as Right scroll key.
ENTER (»)	Pressing this key will view menus.
ESCAPE (x)	Pressing this key will exit out of menus and return to the Identification/Date-Time screen.

Meter

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

Table 5.3 Meter Functions

Function	Description
Input Voltage	Measures the AC Input Voltage to the Inverter for each phase.
Output Voltage	Measures the AC Output Voltage from the Inverter for each phase.
Output Current	Measures the AC Output Current from the Inverter for each phase.
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 Voltage	Measures DC Battery Voltage.
Output Power	Indicates the AC Wattage of the Inverter output total and for each phase.
Battery Power	Indicates the total DC Watts (Battery Power) the Inverter is processing.
Ambient Temperature	Measures the internal ambient temperature inside the system.
Operating Days	Indicates the total days the system has been on-line.
Inverter Runtime	Indicates the total minutes the system has run on inverter.

System Status

To get to the System Status from the default screen, press the **ENTER** key, scroll to the SYSTEM STATUS heading using the left or the right arrow key, then press the **ENTER** key again. If there are more than 3 statuses present, use left or the right arrow key to scroll through all.

Indicates the Status of the machine – AC Present, Battery Charging, System Ready, On Battery Power, and any Alarms/Faults present.

System Setup

To get to System Setup from the default screen, press the **ENTER** key, scroll to the SYSTEM SETUP menu using the left or the right arrow key, then press the **ENTER** key again. Use left or the right arrow key to view the System Setup functions.

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

Set 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.

Config Buzzer
For audible buzzer the parameter is Enabled/Disabled. Use the left or right arrow key to change the setting and the **ENTER** key to save. WARNING: disabling the buzzer will disable audible notification when the inverter transfers to battery power or when there is an inverter alarm or fault. The default buzzer setting is enabled; once the system is shut down, the default setting is reactivated upon restart.

Config Setpoints
Available configurable setpoint values are Battey Voltage, Ambient Temperature, Input Voltage, Max Runtime, Load Reduction, and Max Current. 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.

Battery Voltage – Battery bank Low and Near Low values in Volts DC.

Table 5.4 Near Low Battery Fault Chart

DC Voltage	Near Low Battery
144VDC	130VDC
180VDC	162VDC
240VDC	216VDC

Ambient Temperature – Internal high temperature setpoint in Degrees Centigrade.

Input Voltage – Utility Low and High value setpoints in Volts AC.

Max Runtime – Elapsed time the inverter may run in emergency mode, setpoint in minutes.

Load Reduction – This will automatically generate an alarm when the system output current is 10 percent higher or lower than the setpoint number, set in Amps AC.

Max Current – This will automatically generate an alarm when the system output current is higher than the setpoint number, set in Amps AC. Depending on the duration and severity of the overcurrent event, the inverter may shut down to protect the electronics.

Log View

To get to the 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. Use the left or right arrow key to view the type of log desired, and the press the **ENTER** key for more information. Available logs are Alarm, Event, and Test.

The Alarm Log creates a new log every time an alarm becomes active. The number of alarms that can be captured in the Alarm Log is 75. The format is first in is first out so; alarm number one is the most recent alarm. Each Alarm Log entry indicates the Log Number, Alarm type, Date, and Time of the alarm.

The Event Log captures data and creates a new log every time there is a transfer from utility power to battery power. The number of events that can be captured in the Event Log is 75. The format is first in is first out so; event number one is the most recent event. Each Event Log entry indicates the Log Number, Event type, Date, and Time of the event on Page 1. Press the ENTER key again to view Page 2, with Output Voltage logged for each phase. Press the ENTER key again to view Page 3, with Output Current logged for each phase. Press the ENTER key again to view Page 4, with Ambient Temperature and Event Duration.

The Test Log captures data and creates a new log every time an automatic monthly or yearly test occurs. The number of tests that can be captured in the Test Log is 75. The format is first in is first out so; test number one is the most recent test. Each Test Log entry indicates the Log Number, Monthly or Yearly test type, Date, and Time of the test on Page 1. Press the ENTER key again to view Page 2, with Output Voltage logged for each phase. Press the ENTER key again to view Page 3, with Output Current logged for each phase. Press the ENTER key again to view Page 4, with Ambient Temperature and Test Duration.

Maintenance

To get to the Maintenance menu from the default screen, press the **ENTER** key, scroll to the MAINTENANCE menu using the left or right arrow key, then press the **ENTER** key again. The display will prompt for a password.
****** The password is left arrow, right arrow, left arrow, and right arrow. ******

Once the password is entered, use the left or right arrow key to view the specific Maintenance setting desired, and the press the ENTER key for more information. The user has access to change the following settings: Self Test, Monthly Test, Yearly Test, Factory Setup, and Clear Logs.

Self Test
This will manually perform a 1-minute self test, causing the inverter to run on battery power.

Monthly Test
The parameters are Day, and Time in Hour and Minute. The 24-hour standard is used so 2:00 PM would be 14 hours.
To change any of the auto monthly test parameters, use the left or right arrow key depending on if you want to increase or decrease. Once the parameter is correct, press the **ENTER** key and the next parameter can be changed.

Yearly Test
The parameters are Month, Day, and Time in Hour and Minute. The 24-hour standard is used so 2:00 PM would be 14 hours.
To change any of the auto yearly test parameters, use the left or right arrow key depending on if you want to increase or decrease. Once the parameter is correct, press the **ENTER** key and the next parameter can be changed.

Factory Setup
An additional password is required to access the Factory Setup functions, and only the factory is authorized to have this password.

Clear Logs
This permanently clears all previous Alarm, Event, and Test Log records.

Unit Info

To get to Unit Info from the default screen, press the **ENTER** key, scroll to the UNIT INFO heading using the left or right arrow key, then press the **ENTER** key again.

Indicates Current Software Revision Level of the front panel display.

Alarms/Faults

To get to Alarms/Faults from the default screen, press the **ENTER** key, scroll to the ALARMS/FAULTS heading using the left or right arrow key, then press the **ENTER** key again.

The alarm/fault menu displays all active alarms and faults. If there are none active, the display screen will indicate no alarms or faults.

Keypad Setup Mode

The Front Panel features a Setup Mode where you can do the following:

- See the firmware version of the Front Panel Display.
- Disable or Re-enable the buzzer on the Front Panel display. WARNING: disabling the buzzer will disable audible notification when the inverter transfers to battery or when there is an inverter alarm.
- Disable or Re-enable the “soft button guides”, which are symbols that hover over the buttons (on the bottom of the display screen, next to their respective buttons) when the buttons are touched, to guide the User on which button is which. The button guides are very helpful when the Lighting Inverter is in a dark room where the symbols engraved on the buttons are difficult to see but may be disabled if the Lighting Inverter is always in a bright room and hiding the button guides from the screen is aesthetically preferred.
- Soft reset the Front Panel display, as a troubleshooting step in case of a software issue.

Setup Mode is entered (and also exited) by holding down the RIGHT (>) and ENTER (») keys together for 3 seconds at any time.

When in Setup Mode, navigate as follows:

- Use the LEFT (<) and RIGHT (>) keys to toggle the currently selected setting.
- Use the ENTER (») and ESCAPE (x) keys to navigate back and forth between setting.

CHAPTER 6

SPECIFICATIONS

Illuminator Series Hypernova

General Specifications

Input	Voltage	120/208 or 277/480 Vac 3-phase 4-wire +10% -15%.
	Input Frequency	60Hz, +/- 3%, 50Hz Available upon request
	Synchronizing Slew Rate	1Hz per second nominal
	Protection	Input Circuit Breaker
	Voltage Harmonic Distortion	< 10% (For Resistive Load)
	Power Factor	.5 lag/lead
Output	Voltage	120/208 or 277/480 Vac 3-phase 4-wire.
	Static Voltage	Load current change +/-4%, battery discharge +/-4%
	Dynamic Voltage	+/- 3% for +/-25% load step change, +/-6% for a 50% load step change
	Harmonic Distortion	< 3% THD for linear load
	Output Frequency	60Hz +/- .05Hz during emergency mode
	Load Power Factor	.5 lag to .5 lead
	Inverter Overload	115% continuous rating; 150% for 2.5 seconds; 250% for 3 line cycles
	Protection	Output Circuit Breaker
Battery	Type	Valve-regulated sealed lead-calcium. Contact factory for additional battery types.
	Charger	Microcontroller two stage charger (recharge - 24HR)
	Protection	Automatic low-battery disconnect; automatic restart upon utility return.
	Disconnect	Fuse / Circuit Breaker
Environmental	Altitude	< 3000m (10,000 feet) above sea level without derating
	Operating Temperature	Inverter: 0°C to 40°C (32°F to 104°F) Battery: 20°C to 30°C (68°F to 86°F)
	Storage Temperature	-20 to 70 degrees Celsius (electronics only)
	Relative Humidity	< 95% (non-condensing)
General	Design	Stand-By UPS, PWM inverter type utilizing IGBT technology with 2mS transfer time.
	Generator Input	Compatible with generators (10x unit size or larger)
	Control Panel	Microcontroller OLED Display with keypad controls & functions
		3 LED indicators & alarm with status indicator
	Metering	Input & Output Voltage, Battery Voltage, Battery & Output Current, Output VA, Temperature, Inverter Wattage
	Alarms	High/Low Battery Charger Fault, Near Low Battery, Low Battery, Load Reduction Fault, Output Overload High/Low AC Input Volts, High Ambient Temperature, Inverter Fault, Output Fault, Optional Circuit Breaker Trip
	Communications	RS-232 port (DB9)
	Manual Maintenance Bypass	Standard internal
	Alarm Contacts	Optional Summary Form "C" Contacts
	Warranty	1 year standard warranty includes all parts, labor, & travel expenses within 48 contiguous states. Up to 10 years prorated warranty on batteries. Extended warranties, preventative maintenance and customized service plans are available.
	Factory Start-up	Purchase factory start-up & receive 1 additional year of warranty.
	5 Year Service Plan	Purchase 5 year service plan & receive free factory start-up.
Physical	Cabinet	Freestanding NEMA Type 1
	Cooling	Forced Air, during emergency mode.
	Cable Entry	Top or Side
	Access	Front

CHAPTER 7

MAINTENANCE AND SERVICE

The Self-testing feature of the inverter ensures that the system is tested at least once per month for 5 minutes and once per year for 90 minutes. If there are any problems with the self-tests, the fault log shall indicate which faults occurred. Please see the fault descriptions and troubleshooting guide.

A few simple maintenance operations performed periodically will help ensure many years of trouble-free operation. Battery terminals should be checked for tightness and corrosion. If severe corrosion is evident, maintenance is required to correct this situation.

Since the unit depends on unrestricted airflow for cooling of power handling components, it is important to keep the air vents free of any obstruction. If the environment tends to be extremely dusty, occasionally blow away any accumulation of dust on components. Please follow the shutdown procedure before cleaning.

CAUTION: Follow the shutdown procedure (See Chapter 3) before cleaning. An authorized technician only should perform Service!

Table 7.1 Preventive Maintenance Schedule

SERVICE TO PERFORM:	PERFORM SERVICE EVERY:		
	3 MONTHS	6 MONTHS	12 MONTHS
1. TEST UNIT:	X		
NOTE: Perform manual test only when critical load is connected but not required.			
----- Output voltage should be present.			
----- Confirm operations of front panel indicators.			
2. **INSPECT BATTERIES:**		X	
----- All connections are tight.			
----- Connections have no corrosion. (Clean if necessary).			
CLEAN UNIT: NOTE: Unit must be shut down during this service.			X
----- Inspect air vents and clean if necessary.			
----- Clean excessive dust from inside cabinet(s).			
----- Clean excessive dust from fan(s).			

"X" Indicates when to perform service. Lines below the "X" are for the date of service.

TROUBLE SHOOTING CHART

THE NUMBER IN THE CHART INDICATES ORDER IN WHICH PROBLEMS SHOULD BE CHECKED / SYMPTOMS / PROBLEMS	Inverter will not run during a power failure	System draws excessive AC input current	System noisy, excessive transformer hum during normal run conditions	AC output voltage low during a utility power failure	System overheats, smells, smokes, etc.	System noisy, transformer hum during a power failure	Inverter jitters or staggers during a power failure	System blows battery fuse (& fuses in battery cabinet if applicable)	Charger not charging properly, batteries low or dead	Charger stays in HI charge	Batteries require continuous addition of water to keep proper level (optional w/ wet cells)	Battery acid leaking in cabinet or around tops of batteries	Battery voltage does not read properly after Installation of fresh cells	Battery Voltage low or non existent
Installation switch on inverter in off position	1													
Shorted IGBT module(s)	3			3	3		1	3						
No AC input voltage									2					
Defective inverter	4			2	2	1	3	5						
Output volt-ampere rating of unit being exceeded	6	1		1	1	2	2	6						
Ambient temperature too high, vents blocked											3	1		
Shorted load		2		4		3								
Reverse battery diodes shorted								2						
Open battery fuse (& fuses in battery cabinet if applicable)	2													1
Battery polarity wrong								1						
Defective charger	11		1		4				6	1	1	2	4	2
Battery capacity low	7												3	3
Low water in battery (optional w/ wet cells)	10								3					4
Wrong amount of battery cells in series	9		2		6			4	4	2	2	4	1	5
Batteries dead, low or defective	8								5	3	4	3	2	
Transfer module and/or control circuit malfunction	5													
Transformer not connected for proper voltage		3	3		5				1					

RETURN MATERIAL AUTHORIZATION (RMA) POLICY

No return material is accepted without written "Return Material Authorization"(RMA). An RMA number is obtainable by contacting the Field Service Department.

Every effort will be made to correct problems over the phone before an RMA is granted or a service trip made. Cooperation will save both time and expense for customer and manufacturer.

If it is deemed necessary to return material, the RMA number must appear on shipping labels, packing slips, and bills of lading.

OUT OF WARRANTY REPAIR CHARGES AND LABOR

Contact Field service for current parts and labor rates. A minimum rate will be assessed. The manufacturer will not proceed with repairs of an out of warranty unit until authorization in the form of a purchase order is received from the customer. The unit for repair must be returned prepaid with an RMA number on the carton. For travel to the job site, a quote "Not to Exceed" estimate will be given. A purchase order to cover that amount is required before a trip to the job site is made.

LIMITED WARRANTY

The parts and on-site labor for the electronics portion of this equipment are warranted against defects in workmanship and material for a period of one year from time of shipment, but in no case will this warranty be valid if installation of equipment is not accomplished within 180 days from date of shipment. Batteries cannot be disconnected from the unit for long periods (180 days) or they will not be able to charge, creating malfunction of both batteries and/or electronics and thereby voiding the warranty. Systems ordered with "Heavy Lead" batteries over 25 Ah have a one-year unconditional battery warranty with an additional prorated warranty contingent upon timely return of warranty registration card and the terms called out in the particular battery warranty sheet. See individual battery warranty policy.

The warranty does not cover damage caused by abuse, improper environmental conditions, shipping damage, improper electronics and/or battery installation, unauthorized modifications, service by unauthorized personnel, transportation of damaged equipment, or acts of war. Damage due to lack of maintenance (where applicable) or damage resulting from installation in areas with other than normal temperatures are not covered. See the battery warranty policy for details, as adverse environmental conditions reduce battery life and void the warranty. Replacement of fuses, pilot lamps, and/or contractor labor is not included in warranty. Damage do to acts of nature, such as, but not limited to, lightning, flooding, explosions, and earthquakes, are not covered.

The warranty is limited to the repair and/or replacement of parts and/or units that upon examination at our factory and/or job site are determined to be defective and in our judgment are subject to repair or replacement.
All such repair shall be manufacturer's exclusive remedy. All such units are identified by a date code, part number and serial number.

TO THE EXTENT ALLOWED BY LAW, MANUFACTURER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, AND LEED WARRANTIES OR MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTY OF MERCHANT ABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY. TO THE EXTENT ALLOWED BY LAW, THE MANUFACTURER SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, INJURIES TO PROPERTY, LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT.

Special on-site extended warranties are also available upon request. The warranty period may be adjusted because of special circumstances, but only by arrangement with the manufacturer at the time of purchase.

All in or out of warranty repaired material or replacement units/parts carry a 90-day new part guarantee. Return of your original repaired component or unit is not guaranteed.

This limited warranty is for the 48 contiguous states.

For international warranty information, call the Field Service Department. See telephone number in front of manual. The standard warranty can be extended and renewed for a nominal fee. Please contact the factory for pricing information.