

The Phoenix Lite series is a single-phase, standby, Solid-state inverter system utilizing DSP/PWM technology. The unit packs all the necessary options and is quickly and simply installed. The Phoenix Lite is designed to function in conjunction with the existing building electrical system to provide high-quality surge suppression, power conditioning, backup power protection and distribution for lighting loads and other critical loads.

Model: _____ Date: _____
 Accessories: _____ Job Name: _____
 _____ Type: _____

- Standard Power Level:** 525, 700, 875, 1050W
- Input Voltage:** 120, 208, 240, 277, 480VAC
- Input Voltage Range:** 10% to 15%
- Output Voltage:** 120, 277, 120/240 or 120/277VAC

- Output Voltage Regulation:** ±5% for all loads and battery discharge mode
- Output Frequency Range:** 60 Hz, ±1%
- Output Wave Form:** Sine-wave <5% @ 100% linear load
- Crest Factor:** 2.5 :1 typical
- Input Protection:** Input Main Circuit Breaker
- Output Protection:** Output Main Circuit Breaker
- Surge Protection:** The unit will protect itself and the load against surges defined in ANSI/IEEE C62.45 category A/B

- Battery:** Sealed maintenance-free (AGM) lead calcium
- Recharge Current:** Conforms to UL 924 standards
- External Battery:** Provision for hardware connection of external battery cabinets or DC source

- Efficiency:** ≥99% at 100% linear load
- Audible Noise:** <45dBA
- Operating Temperature:** 0° to 40°C (32° to 104°F)
- Storage Temperature:** -20° to 60°C (-4° to 140°F)
- Humidity:** 5 - 95%, Non-condensing
- Monitoring:** LED Displays Alarms and Diagnostics



ORDERING INFORMATION Example: PHXLTE-525-480-120-RP-90

Series	Power Rating	Input Voltage	Output Voltage	Options ¹	Run Time
PHXLTE	525 = 525W	120 = 120VAC	120 = 120VAC	Blank=None	90 = 90 Min (Std)
	700 = 700W	208 = 208VAC	277 = 277VAC	ECM120/#² = 120V Environmental Control Module / Qty	
	875 = 875W	240 = 240VAC	120/240 = 120/240VAC	ECM277/#² = 277V Environmental Control Module / Qty	
	1050 = 1050W	277 = 277VAC	120/277 = 120/277VAC	EW³ = Extended Warranty	
		480 = 480VAC	FCON = Form C Contacts		
			NOF/V/# = Normally OFF Output Circuit / Voltage / Qty		
			OCB/V/#/A = Output Circuit Breakers / Voltage / Qty / Amps		
			OST = Onsite Start-Up		
Notes			RP = Remote Indicator Panel		

¹ Some options may not be used together - Consult factory

² One ECM is used per switching device or circuit

³ Consult factory for warranty options

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About this Manual

Thank you for selecting this Emergency Lighting Inverter System (ELI). It provides you with perfect protection for connected loads and equipment. It includes important safety and instructions for operating the Emergency Lighting Inverter System. If you should have any problems with the Emergency Lighting Inverter System, please refer to this manual and/or call technical support.

To the best of our knowledge and at the time written, the information contained in this document is technically correct and the procedures accurate and adequate to operate this instrument in compliance with its original advertised specifications. While every precaution has been made to ensure accuracy and completeness in this manual, Barron assumes no responsibility and disclaims all liability for damages resulting from the use of this information or for any errors or omissions.

This instrument is designed to prevent accidental shock to the operator when properly used. However, no engineering design can render safe an instrument which is used carelessly. Therefore, this manual must be read carefully and completely before making any measurements. Failure to follow directions can result in a serious or fatal accident.

How to use this Manual

This manual is designed for ease of use, giving the user easy and quick reference to information. This manual uses notice icons to draw attention to the user important information regarding the safe operation and installation of the UPS. The notice icons used in this manual are explained below, and should be taken into account and adhered to whenever they appear in the text of this manual.

IMPORTANT SAFEGUARDS, READ AND FOLLOW ALL SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

SAFETY

Notes and Safety Information

Following safety precautions is important when operating or servicing electrical equipment. Always heed these precautions since they are essential to the safe operation and servicing of this product. This Manual contains warning symbols which alert the user to check for hazardous conditions. The symbols are used extensively throughout this manual and are defined below. To ensure the safety of operating performance of this electrical equipment, these instructions must be adhered to.



Electrical Hazard

WARNING: A Warning notice icon conveys information to protect the user and service personnel against hazardous conditions.



DANGER: A Danger notice icon conveys that there is a risk of electric shock, personal injury, or death to the user if instructions are not followed.



CAUTION: A Caution notice icon conveys to the user or service personnel information making them aware that there is a possibility of equipment damage.



NOTE: A Note notice icon indicates when the user should make a reference of information regarding the UPS operation, load status and display status. Such information is essential if Barron field service assistance and correspondence is required.

CAUTION!



ENSURE THAT NO FLUIDS OR OTHER FOREIGN OBJECTS CAN ENTER THE INVERTER SYSTEM.



NOTE!



READ THIS MANUAL IN ITS ENTIRETY BEFORE PERFORMING THE INSTALLATION, START-UP, OPERATION, OR MAINTENANCE OF THE UPS (Uninterruptible Power System) OR BATTERY SYSTEMS. FAILURE TO DO SO COULD RESULT IN ELECTROCUTION, FIRE, EXPLOSION, OR EQUIPMENT FAILURE.



WARNING!



Electrical Hazard

ONLY FACTORY TRAINED OR AUTHORIZED PERSONNEL SHOULD ATTEMPT TO INSTALL OR REPAIR THE UPS OR ITS BATTERY SYSTEM. IMPROPER INSTALLATION HAS PROVEN TO BE THE SINGLE MOST SIGNIFICANT CAUSE OF START-UP PROBLEMS. HIGH AC AND DC ELECTRICAL VOLTAGES ARE PRESENT THROUGHOUT THE UNIT(S) AND INCORRECT INSTALLATION OR



Electrical Hazard

SERVICING COULD RESULT IN ELECTROCUTION, FIRE, EXPLOSION, OR EQUIPMENT FAILURE.

CAUTION!



ALL POWER CONNECTIONS MUST BE COMPLETED BY A LICENSED ELECTRICIAN WHO IS EXPERIENCED IN WIRING THIS TYPE OF EQUIPMENT. WIRING MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE NATIONAL AND LOCAL ELECTRICAL CODES. IMPROPER WIRING MAY CAUSE DAMAGE TO THE EQUIPMENTS, INJURY OR DEATH OF PERSONNEL. VERIFY THAT ALL HIGH AND LOW VOLTAGE INPUT POWER CIRCUITS ARE DE-ENERGIZED AND LOCKED OUT BEFORE INSTALLING CABLES OR MAKING ANY ELECTRICAL CONNECTIONS.



NOTE!



THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY, AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THIS MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. IT HAS BEEN TESTED AND FOUND TO COMPLY WITHIN THE LIMITS FOR A COMPUTING DEVICE PURSUANT TO SUB PART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT.



DANGER!

LETHAL VOLTAGES EXIST WITHIN THE EQUIPMENT DURING OPERATION. EXTREME CAUTION IS REQUIRED WHEN PERFORMING MAINTENANCE. OBSERVE ALL WARNINGS AND CAUTIONS IN THIS MANUAL. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY OR DEATH. OBTAIN QUALIFIED SERVICE FOR THIS EQUIPMENT AS INSTRUCTED.



DANGER!

BE CONSTANTLY AWARE THAT THE UPS SYSTEM CONTAINS HIGH DC AS WELL AS AC VOLTAGES. WITH INPUT POWER OFF AND THE BATTERY, DISCONNECTED, HIGH VOLTAGE AT THE FILTER CAPACITORS AND POWER CIRCUITS SHOULD DISCHARGE WITHIN 30 SECONDS. HOWEVER, POWER CIRCUIT FAILURES CAN OCCUR, SO YOU SHOULD ALWAYS ASSUME THAT HIGH VOLTAGE MIGHT STILL EXIST 30 SECONDS AFTER SHUTDOWN. VERIFY THAT POWER IS OFF USING AC AND DC VOLTMETERS BEFORE MAKING CONTACT.



DANGER!

SOME COMPONENTS WITHIN THE CABINETS ARE NOT CONNECTED TO CHASSIS GROUND. ANY CONTACT BETWEEN FLOATING CIRCUITS AND THE CHASSIS IS A LETHAL SHOCK HAZARD.



DANGER!

OBSERVE ALL BATTERY SAFETY PRECAUTIONS DURING SERVICE OF THE UPS OR BATTERIES. EVEN WITH THE BATTERY CIRCUIT BREAKER IN THE OFF POSITION, THE DANGER OF ELECTROCUTION MAY STILL BE PRESENT. THE BATTERY POWER TO THE UNIT MUST BE LOCKED AND TAGGED "OFF" BEFORE PERFORMING ANY SERVICE OR WORK ON THE UNIT. FAILURE TO FOLLOW THOSE INSTRUCTIONS AND THE INSTRUCTION LISTED ABOVE AND ELSEWHERE IN THIS MANUAL COULD RESULT IN AN EXPLOSION, FIRE, EQUIPMENT FAILURE, OR ELECTROCUTION.



CAUTION!

EXERCISE EXTREME CARE WHEN HANDLING UPS AND BATTERY CABINETS TO AVOID EQUIPMENT DAMAGE OR INJURY TO PERSONNEL. CABINETS WEIGH SEVERAL HUNDRED POUNDS.



CAUTION!

TEST LIFT AND BALANCE THE CABINETS BEFORE MOVING. MAINTAIN MINIMUM TILT FROM VERTICAL AT ALL TIMES. THE BOTTOM STRUCTURE WILL SUPPORT THE UNIT ONLY IF THE FORKLIFT FORKS ARE COMPLETELY UNDERNEATH THE UNIT.



CAUTION!

INTERNAL BATTERY STRAPPING MUST BE SECURED BY THE CUSTOMER PRIOR TO CONNECTING THE BATTERY CABINETS TO THE UPS UNIT. THIS UNIT CONTAINS NON-SPILLABLE BATTERIES. KEEP THE UNIT UPRIGHT. DO NOT STACK. DO NOT TILT. ALWAYS FOLLOW THE BATTERY MANUFACTURER'S SAFETY INFORMATION TO PREVENT AN ACCIDENT THAT COULD RESULT IN INJURY OR DEATH.



WARNING!

LEAD-ACID BATTERIES CONTAIN HAZARDOUS MATERIALS. BATTERIES MUST BE HANDLED, TRANSPORTED, AND RECYCLED OR DISCARDED IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. BECAUSE LEAD IS A TOXIC SUBSTANCE, LEAD-ACID BATTERIES SHOULD BE RECYCLED RATHER THAN DISCARDED.



Electrical Hazard

DO NOT DISPOSE OF BATTERIES IN A FIRE, THE BATTERIES MAY EXPLODE.

DO NOT OPEN OR MUTILATE THE BATTERIES. RELEASED ELECTROLYTE IS HARMFUL TO THE SKIN AND EYES AND MAY BE TOXIC.

A BATTERY CAN HAVE A HIGH SHORT CIRCUIT CURRENT AND PRESENT A RISK OF ELECTRICAL SHOCK. THE FOLLOWING PRECAUTIONS SHOULD BE OBSERVED WHEN WORKING ON BATTERIES:

1. REMOVE WATCHES, RINGS OR OTHER METAL OBJECTS.



Electrical Hazard

2. USE TOOLS WITH INSULATED HANDLES.
3. WEAR RUBBER GLOVES AND BOOTS.
4. DO NOT LAY TOOLS OR METAL PARTS ON TOP OF BATTERIES.
5. DISCONNECT CHARGING SOURCE PRIOR TO CONNECTING OR DISCONNECTING BATTERY TERMINALS.
6. DETERMINE IF BATTERY IS INADVERTENTLY GROUNDED. IF SO, REMOVE THE SOURCE OF THE GROUND. CONTACT WITH ANY PART OF A GROUNDED BATTERY CAN RESULT IN ELECTRICAL SHOCK. THE LIKELIHOOD OF SUCH SHOCK WILL BE REDUCED IF SUCH GROUNDS ARE REMOVED DURING INSTALLATION AND MAINTENANCE.
7. LEAD-ACID BATTERIES CAN PRESENT A RISK OF FIRE BECAUSE THEY GENERATE HYDROGEN GAS. THE FOLLOWING PROCEDURES SHOULD BE FOLLOWED:
 - ❖ DO NOT SMOKE WHEN NEAR BATTERIES.
 - ❖ DO NOT CAUSE FLAME OR SPARK IN BATTERY AREA.
8. DISCHARGE STATIC ELECTRICITY FROM YOUR BODY BEFORE TOUCHING BATTERIES BY FIRST TOUCHING A GROUNDED SURFACE.

CAUTION!



IN CASE OF FIRE INVOLVING ELECTRICAL EQUIPMENT. ONLY CARBON DIOXIDE FIRE EXTINGUISHERS, OR THOSE APPROVED FOR USE ON ELECTRICAL EQUIPMENT, SHOULD BE USED. USE OF WATER ON FIRES INVOLVING LIVE HIGH VOLTAGE ELECTRICAL CIRCUITS COULD PRESENT AN ELECTROCUTION HAZARD.



DANGER!



TO REDUCE THE RISK OF ELECTRICAL SHOCK; DISCONNECT THE EMERGENCY LIGHTING INVERTER SYSTEM FROM THE MAIN SUPPLY BEFORE INSTALLING AN INTERFACE SIGNAL CABLE. RECONNECT THE POWER ONLY AFTER SIGNALING INTERCONNECTIONS HAVE BEEN MADE.



DO NOT DISMANTLE THE EMERGENCY LIGHTING INVERTER SYSTEM.

1. INTRODUCTION

1.1. GENERAL

The principles of operation described herein are applicable to all models. The Phoenix Lite Emergency Lighting Inverters are manufactured to provide critical power for lighting during a power outage. The Phoenix Lite meets or exceeds the life safety codes of UL924 and UL1778. These codes were established to allow the emergency lighting inverters to provide critical power to the lighting circuits during a power failure. The emergency lighting inverter will then provide power for 90 minutes that will allow safe and orderly evacuation from the facility.

The product is an advanced Emergency Lighting Inverter System based on Intelligent Microprocessor Control. The Emergency Lighting Inverter System is an intelligent protector and provides pure, reliable AC power to the emergency loads – protecting them from utility power blackouts, swells, sags, surges and interference. All types of lamps are supported by our lighting inverter.

Under normal power conditions, this design enables the system to adjust and filter power fluctuations continuously and automatically. In the event of a power failure, it can immediately provide back-up power from the batteries without any interruption. When the utility power is connected or reconnected, the charger will automatically recharge the batteries.

When input power to the Phoenix Lite is lost during a power outage, the system will automatically draw power from its internal battery supply without any interruption. The critical load will receive only clean sine wave power. The internal VRLA (Valve Regulated Lead-Acid) maintenance-free batteries provide 90 minutes of backup power.

Upon restoration of input power, the Phoenix Lite automatically resumes normal operation, and immediately begins to recharge the batteries. The Phoenix Lite has an internal bypass circuit which maintains the power to the load in cases of internal UPS failure.

The Advanced Battery Management system in this unit uses a Digital Signal Processing/Pulse-Width Modulation (DSP/PWM) Smart Battery Monitoring System for managing the system batteries. The DSP/PWM Smart Battery Monitoring System is temperature compensated resulting in maintaining maximum runtime and battery life. The microprocessor controls recharge and the DSP/PWM offer overcharge protection.

The Phoenix Lite Online Emergency Lighting Inverter incorporates double-conversion technology that provides perfect protection specifically for Egress Lighting for facilities. It is designed to provide continuous and clean electrical power to a critical load. The load is powered by the inverter, which receives its power from the building source. In the event of an input power failure, the UPS will supply the power to the critical load for the specified battery time

The inverter uses of a double-conversion principle eliminates all sources of unwanted power disturbances. A rectifier converts the alternating current from the building source to Direct Current (DC). This DC charges the batteries and powers the inverter. With the basic DC voltage, the inverter generates a sinusoidal alternating current (AC) voltage, which continuously supplies the load. In times of power out- rages, the 90-minute backup time that come standard in our units keep the load energized. If the input power is not restored promptly, backup power from the UPS battery permits the orderly shutdown of equipment supported by the UPS. The UPS is simple to start up, operate and maintain.

The Phoenix Lite is an online PWM inverter available in multiple output rating. It is listed for compliance to UL1778, UL924 and CSA107.1 standards. The Phoenix Lite is available with a variety of input or output voltages and power configurations. This information is provided on the system Labels located on the inside door and the right side of the UPS. See chapter 2 for a complete listing of the Phoenix Lite specifications.

1.2 DEFINITIONS

1.2.1 UNINTERRUPTIBLE POWER SUPPLY SYSTEM (UPS)- All components within the UPS Module Cabinet and associated batteries, which function as a system to provide continuous AC power to a load.

This manual provides an overview of the Phoenix Lite components and their functions. The appearance and purpose of operator controls and indicators is described with procedures for installation, operation, start-up, and shutdown.

- 1.2.2. UPS MODULE CABINET** - The metal enclosure which contains the Rectifier/ Charger, Inverter, Static Transfer Switch, Internal Bypass line, operator controls, batteries (up to 30kVA models only) and internal control systems required to provide specified AC power to a load.
- 1.2.3. UPS MODULE** - The Rectifier/ Charger and Inverter assemblies which, under the direction of the internal control system and operator controls, provide specified AC power to a load.
- 1.2.4. RECTIFIER/ CHARGER** - The UPS components which contain the equipment and controls necessary to convert input AC power to regulated DC power required for battery charging and for supplying power to the Inverter.
- 1.2.5. INVERTER** - The UPS components which contain the equipment and controls necessary to convert DC power from the Rectifier/ Charger, or the battery, to AC power required by the critical load.
- 1.2.6. STATIC TRANSFER SWITCH** - The device that connects the critical load to the bypass line when the Inverter cannot supply continuous power.
- 1.2.7. BYPASS LINE** - The line, which conducts electricity directly from the input power source to the critical load during Maintenance or whenever the UPS is not completely operational.
- 1.2.8. AC INPUT POWER** - Is the power provided by the electrical utility company, or auxiliary generator, which is connected to the UPS for supplying the critical load and recharging the battery.
- 1.2.9. BATTERY** - The rechargeable battery strings that supply DC power to the inverter to maintain continuous AC power to the load during AC input power failure conditions.

1.3 THEORY OF OPERATION

1.3.1. Standby Mode

After power is applied, the system is placed in STANDBY mode and a self-check starts. During this period, the start subroutine checks for the input voltage and proper operation of the inverter and bypass SCR's. After the routine is completed and check confirmed OK, the system stays in bypass waiting for the utility to fail. When a power outage occurs, the load is transferred to the inverter.

1.3.2. Online Mode

The input contactor K1 receives a closing signal, connecting input power to the DC supply transformer. The DC rectifier supplies the battery charger, Control Board and the DC/AC inverter circuit. The battery charger is then activated allowing the batteries to be continuously charged. The on-line DC/AC inverter converts the DC voltage to a pulse-width-modulation (PWM) waveform. This waveform is filtered and reconstructed to a desired AC output and the load is transferred to the inverter.

1.3.3. Response to Input Power Failure for An Online System

When the input power fails, the charger is turned off and the battery bank becomes a DC supply source to the inverter circuit, maintaining an uninterrupted AC supply to the protected load. When the facility power returns, stabilizes and is in phase with the backup power, the system controller closes the input contactor and the system returns to the Online mode. If the battery voltage drops below 26% of its nominal

value and the facility power remains off, then the system will assume a FAILURE mode.

Response to Input Power Failure for A Standby System

When the input power fails, the charger is turned off and the battery bank is transferred, becomes a DC supply source used to drive the inverter circuit, maintaining an uninterrupted AC supply to the protected load. When the facility power returns, stabilizes and is in phase with the backup power, the system controller closes the input contactor and the system returns to the Standby mode. If the battery voltage drops below 26% of its nominal value and the facility power remains off, then the system will assume a FAILURE mode.

1.3.4. UPS Failure

The System controller will issue a FAILURE message if any of the following conditions happen:

- Internal failure
- System overheats
- Battery bank under voltage

During a FAILURE, the system stops its backup operation, inverter SCRs are switched OFF, and bypass SCRs are switched ON. A summary alarm signal is sent to the hardwired interface. The system remains in this mode until power is cycled or system has been repaired when needed.

1.3.5 UPS Problem

The System controller will issue a UPS PROBLEM message if any of the following conditions occur:

- Input power failure
- Output overload

During a PROBLEM mode, inverter IGBTs remain on and an alarm signal may be sent to the signal interface. The system will reset itself as soon as the problems disappears.

1.4. OUTPUT LOADS

The Phoenix Lite is designed to power any lighting system. There are, however, certain types of loads that exhibit an excessive inrush current when first turned on or at other times during operation.

The capacity of the Phoenix Lite may need to be greater than what would be estimated based on the system label requirements of loads previously discussed. Contact the factory directly if you have any questions about powering unusual loads from your unit

2. SPECIFICATIONS

The Phoenix Lite maintains efficient AC Emergency Power to operate all emergency lighting fixtures at “full-light” output providing superior dependability and security to commercial/industrial environments in a small footprint. The UPS System Label displays the rated kW as well as nominal voltages. There are System Labels located on the interior side of the UPS front door and the exterior side of the unit.

Phoenix Lite Series	Power Rating	UPS			Weight	British	Battery Type	Voltage (VAC)		Output	Safety
		Cabinet Dimensions			(Com-bined)	Thermal Unit		Input	Output	Protection	Approvals
(Consult Factory For others)	VA/W	W	H	D	(lbs.)	BTU's	Sealed, Maintenance Free (AGM) Lead Calcium	Input	Output	Input and Output Circuit Breakers standard	UL924 UL1778 NFPA 101 NFPA 70 NEC
	525	25"	22"	12"	157	17.8		Select	Select		
	700	25"	22"	12"	200	23.8		120,	120,		
	875	25"	22"	12"	200	29.8		208,	277,		
	1050	25"	22"	12"	207	35.7		240,	120/240		
							277,	Or	120/277		
							480				

2.1 POWER RATING

The Phoenix Lite unit comes in a power rating from 525 to 1050 VAW (Consult factory for other ratings.) They use the latest DSP/PWM technology to provide the most advanced performance and reliability features.

2.2. INPUT

120, 208, 240, 277 or 480VAC input 60Hz

2.3. OUTPUT

120, 277, 120/240 or 120/277 VAC True “on-line” design is ≥92% efficient at 100% linear load

2.4. BATTERIES

2.4.1. Sealed, maintenance-free, lead calcium (AGM) batteries

2.4.2. 10-Year prorated warranty

2.4.3. DSP/PWM Smart Battery Monitoring System is **TEMPERATURE COMPENSATED** maintaining maximum runtime and battery life

2.4.4. Microprocessor controlled recharge and DSP/PWM overcharge protection standard

2.5. LAMPS AND LOADS

2.5.1. Emergency power provides **FULL LIGHT OUTPUT** from all lamps and fixtures for the entire runtime

2.5.2. Operates fluorescent, compact fluorescent, incandescent, quartz, H.I.D., LED and other lamp types

2.5.3. Standard or electronic ballasts, dimming devices or panels, sensors and most control equipment

2.5.4. Standard or LED Exits and other safety equipment

2.6. CODES

2.6.1. Meet UL 924, UL 1778, NFPA 101, NFPA 70, NEC and OSHA standards

2.6.2. Cities of Los Angeles, Chicago, New York approved

2.6.3. Complies with the Buy American Act

2.7. PROTECTION

2.7.1. Provides overload, surge and undercurrent protection using DSP/PWM technology to protect system performance and reliability

2.7.2. Surge protection against load surges as defined in ANSI/IEEE C62.45 category A and B

2.8. DIAGNOSTICS AND MAINTENANCE

- 2.8.1. DSP/PWM technology provides complete self diagnostic capabilities and LED Monitoring
- 2.8.2. Informative advanced Display and Alarms keep you in control of your emergency lighting environment 24/7
- 2.8.3. Automatically performs periodic self-tests ensuring a safely lighted environment *prior* to an emergency. The power supplies are able to do a 5-minute battery run the first of every month except for New Year's Day when the test is for 90 minutes. The testing can be enabled by going to the Auto-run screen and selecting Yes or No with the Menu Forward or Menu Reverse button. When the battery test happens, the rectifier is turned off, and the batteries will sustain the load on the output. If the voltage dips too low the test is terminated prematurely, and an entry is recorded in the alarm log accordingly. Two minutes into the battery run test the voltage, power date, and time are logged in the battery log. This is a feature that is standard in our power supplies.
- 2.8.4. Single point of testing instead of multiple testing points with battery packs
- 2.8.5. Water Dots are placed on every shelf and door panel to indicate if moisture is present or has got inside the unit. The Dots are originally white in color but will turn red when water is absorbed.

2.9. CABINET

- 2.9.1. Modular design enables flexible installation
- 2.9.2. Forced air cooling for maximum reliability
- 2.9.3. All systems are self contained and require external battery cabinet (s)

2.10. INSTALLATION

- 2.10.1. Modular design and small footprint allow easy installation in electrical closet or other convenient locations
- 2.10.2. Phone assisted factory start-up standard for all systems
- 2.10.3. Extended warranty available

2.11. SPECIAL APPLICATIONS

- 2.11.1. ECM - Environmental Circuit Module allows fixtures and lamps on the emergency circuit (s) to be operated by normal switching and/or dimming devices in NON-emergency conditions
- 2.11.2. Dimming Panel Interface allows use with emergency lights controlled by common dimmer panel

2.12. WARRANTY

- 2.12.1. One-Year full warranty on system electronics
- 2.12.2. Battery warranty 1-year with 9-years pro-rated
- 2.12.3. System 1-year on-site warranty labor with DSPM phone assisted start-up
- 2.12.4. Five-Year powertrain warranty
- 2.12.5. Maintenance contracts available

3. FIELD REPLACEABLE UNITS (FRUS)

Each FRUS comes with detail instructions of how the part should be performed. At the ends of most wires/cables are labels that indicates their locations. When ordering replacement parts from the factory, supply the information from the System Label (refer to Technical Assistance section in this manual). Include the model number, serial number, input/output voltages, and power rating when ordering parts. Replacement parts must be replaced by qualified factory trained service personnel only.

Circuit boards and IGBTs contain ESDS (Electro-Static Discharge Susceptible) components. Handle and package ESDS devices in accordance with JEDEC standard JESD625-A. Use a grounded ESD wrist strap when handling the devices and circuit boards. Always package components and circuit boards in static-dissipative plastic bags or the static-dissipative material that the FRUS came in before transporting (Even if a device has failed). Failure to do so could result in further damage, complicating repair and failure analysis.



3.1. MOTHER/MAIN BOARDS

The Mother/Main Boards are located on the three middle shelves and mounted with 10 screws. Verify that all connectors are matches with their designations and pins #1, 2, etc (**Note:** all plugs and connections are not used!) Unplug jumper on daughter board and all connectors from on Mother Board. Install the new board. Reconnect all plugs and connections returning them to their original orientations.

3.2. All Other Parts

Verify that the cables are marked before disconnecting. Replace the defective part with the new part. Reconnect wiring the same way as it was disconnected.

4. TRANSPORTATION, INSPECTION, AND INSTALLATION

4.1. HOW TO TRANSPORT THE SYSTEM

Note: *Do not transport in a horizontal position. Cabinets should be maintained upright within +/- 15° of the vertical during handling.*

4.2. INSPECTION

- 4.2.1. If there was any damage during transportation; **Do Not turn on the unit.** Immediately notify the shipping agent/transportation carrier and Barron.



The packaging is recyclable; keep it for reuse or please disposed of it.



- 4.2.2. Using care to avoid puncturing the shipping material with any sharp objects, which would damage the contents, open the shipping material by carefully removing any banding and shipping material from the sides, ends and top.
- 4.2.3. Remove the packing and vapor barrier and inspect the equipment for any obvious shipping damage. It is recommended that the units not be loosened from the shipping pallet until after all handling by forklift or pallet jack is completed.
- 4.2.4. Immediately file a claim with the shipping agency if any damage, as a result of shipping, is observed.
- 4.2.5. Follow these steps to inspect all surfaces for abrasions and dents:
- 4.2.5.1. Open the front door of the cabinet.
 - 4.2.5.2. Verify that all the transformers, inductors, electrical, and electronic devices are firmly mounted.
 - 4.2.5.3. Verify that the transformer coils and terminal lugs are free of contact with any grounded metal surface and that the transformer terminal wires are securely connected.
 - 4.2.5.4. Verify that the internal Wiring is not damaged.
 - 4.2.5.5. Verify that all wires to and from the output filter assembly, input filter assembly, inverter assembly, and bypass switch are securely connected.
 - 4.2.5.6. Verify that the circuit breakers are firmly seated and that the wires are securely connected.
 - 4.2.5.7. Inspect all batteries for damage (cracks, leaks, loose connections, etc.,)
 - 4.2.5.8. Reinstall all panels, covers and close all doors.

4.3 LOCATION AND PLACEMENT

- 4.3.1. Before starting, check the load tolerance of the floor and verify that the floor will be able to support the UPS at its final destination and the route to get it there. After verifying the weights verify that when the unit is placed in its final position that the minimum clearances required have been met. Install the Emergency Lighting Inverter System in a protected area with adequate airflow and free from excessive dust. Do not operate the Emergency Lighting Inverter System where the temperature and humidity are out of the specified limits. Water Dots are placed on every shelf and door panel to indicate if moisture is present or has got inside the unit. The Dots are originally white in color but will turn red when water is absorbed.

WARNING: Condensation of water may occur if the system is unpacked in a very low temperature environment. In this case it is necessary to wait until the system is fully dry inside before proceeding with the connection of any power; otherwise an electrical shock hazards might exist. Installation and wiring must be performed in accordance with the local electrical code and under the guidance or instructions of professional personnel.



Note: Per code requirements, leave 3" on each side of the cabinet (including the back) and 3-foot clearance in front (Refer to Figure 1).



Storage of the system should be in a cool and dry area with the unit being upright and covered. The warranty can be affected if the unit is stored for more than 3 months without charging the batteries.

Operating Temperature: 0° to 40°C (32° to 104°F); **Storage Temperature:** -20° to 60°C (-4° to 140°F)

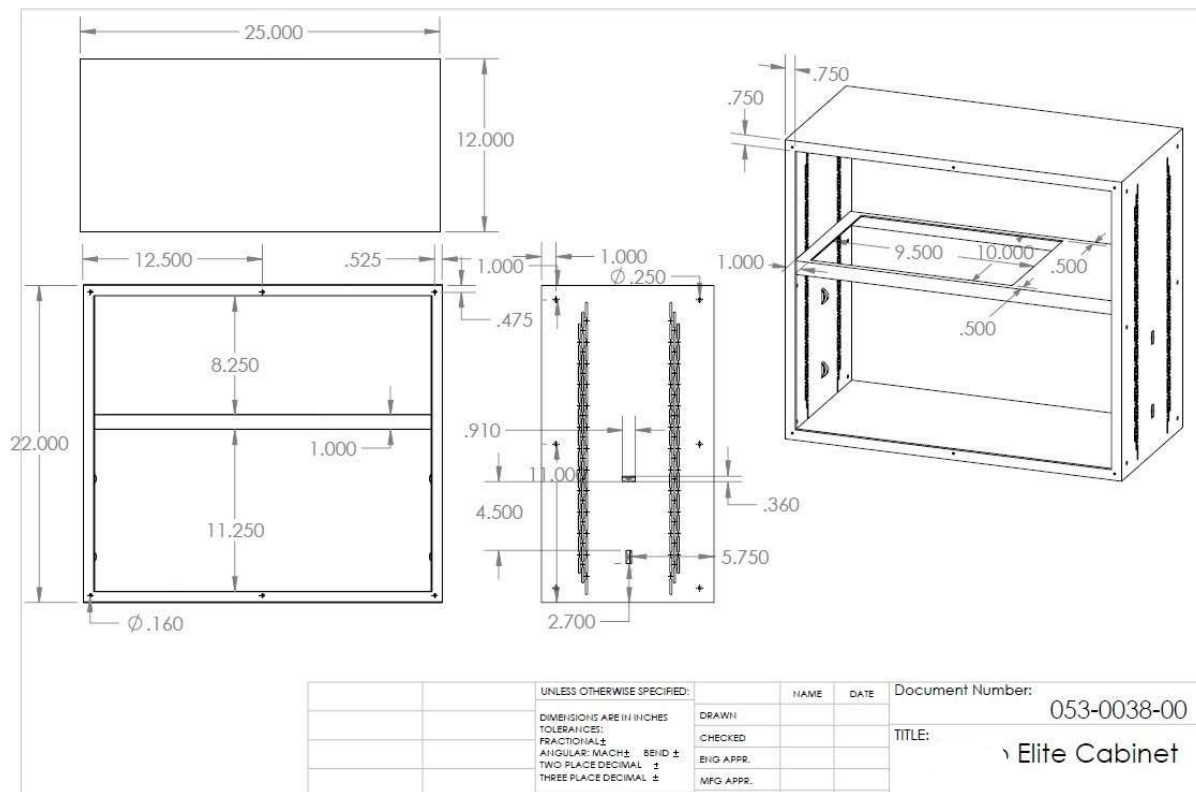


Figure 1

5. DESCRIPTION

5.1. DESCRIPTION OF UPS CABINET

5.1.A. SYSTEM COMPONENT LAYOUT

Figure 6 is the layouts that will help you find the parts and components in your Emergency Lighting Inverter. **Maintenance should only be performed by factory-trained or qualified personnel.** Do not attempt to service. If you need technical assistance, please contact Barron.



Electrical Hazard

LETHAL VOLTAGES EXIST WITHIN THE CABINET, EVEN WHEN THE UNIT IS DEENERGIZED. ONLY QUALIFIED SERVICE PERSONNEL WITH ADEQUATE TRAINING MUST SERVICE THIS EQUIPMENT.



Electrical Hazard

5.2. DESCRIPTION OF AC INPUT AND AC OUTPUT TERMINALS BLOCKS

The AC Input, AC Output Terminals Blocks are provided for the connection of incoming power and the connection of the load (equipment) intended to be powered by the UPS. Refer to Figure 6—Component layout for these connections and their locations in the UPS Cabinet.

5.3 MANUAL BYPASS SWITCH DESCRIPTION (NOT APPLICABLE IN A PHOENIX LITE)

In most units, this switch is located on the inside of the left door of the system (see Figure 6—System Component Layout for exact location). The bypass switch is used in case of a failure of the lighting inverter. If the lighting inverter fails, place the bypass switch in the “MAN” position. In this position the inverter section is bypassed allowing the load to be powered by the utility until the inverter can be repaired. In case of system failure, contact factory for service. The manual Bypass Switch is used to bypass the electronic inverter when the system has failed. The manual Bypass Switch should never be operated when the UPS is supporting the load. The rotation of this switch will turn off the inverter. The Load will be fed from the utility until the switch is back into place the UPS position, and the inverter is returned to operation.



Electrical Hazard

LETHAL VOLTAGES EXIST WITHIN THE CABINET, EVEN WHEN THE UNIT IS ON BYPASS. ONLY QUALIFIED SERVICE PERSONNEL WITH ADEQUATE TRAINING MUST SERVICE THIS EQUIPMENT.



Electrical Hazard

“WHEN PASSING THROUGH ENCLOSURE WALL, CORDS AND INSULATED CONDUCTORS, EITHER SINGLE OR BUNCHED, OR CABLED, SHALL BE EFFECTIVELY PROTECTED BY SUITABLE BUSHINGS OR WELL-ROUNDED SURFACES AGAINST WHICH THE CORDS OR CONDUCTORS MAY BEAR.”



“WHEN INSTALLING SIGNAL INPUT/OUTPUT WIRING, ROUTE IT THROUGH A SEPARATE OPENING, AND AWAY FROM AC INPUT AND OUTPUT WIRING.”



“A DISCONNECTING MEANS SHALL BE PROVIDED FOR THE OUTPUT, AC POWER CIRCUIT DURING INSTALLATION.”

“RESTRAIN ALL BATTERIES, SUCH THAT BATTERY CONTACTS AND WIRE TERMINATIONS DO NOT TOUCH THE ENCLOSURE WALLS.”

5.4. INPUT AND OUTPUT POWER REQUIREMENTS/CONNECTIONS

After unpacking and inspecting the Inverter System for shipping damage and reporting any such damage to the carrier, it is vital that the input power be connected correctly at the required voltages. It is highly recommended that a qualified electrician make all input and output power connections. It is vital that a true ground be brought into the unit, not a neutral. The ground conductor should be the same size as the two input/primary voltage phase conductors. The input power connections to the UPS come from building supplied services.

5.5. SYSTEM CURRENT RATINGS

All circuit breakers provided by the end user that are connected to the inputs and outputs, need to be of the “High Inrush” type. This is to prevent the breakers from tripping during the startup of the unit and its load. Barron uses only the “High Inrush” type of breaker in its units. Refer to Figure 3 when determining the size of your input and output breakers.

5.6. GROUNDING

The Ground Terminals centralize the system grounds for routing back to the building service entry panel and the output load. The equipment grounding electrode terminals are all tied to a single point within the cabinet along with all grounds from within the UPS cabinet. This single point functions as a true, single-point ground. The output neutral point, equipment ground, transformer core, cabinet and system ground are all tied together at one point.



DO NOT CONNECT THE UPS GROUND WIRE TO ANY FORM OF AN ISOLATED GROUND SYSTEM. SUCH A CONNECTION WOULD RESULT IN A SAFETY HAZARD, AND UNDER GROUND FAULT CONDITIONS OR LIGHTNING STRIKES, MAY CAUSE SEVERE SYSTEM DAMAGE.



6. INSTALLATION

6.1. INSTALLING BATTERIES

Please refer to the following when installing and maintaining batteries:

- 6.1.1.** Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries. When installing or replacing batteries, install or replace with the same number and type.
- 6.1.2.** Do not dispose of battery or batteries in a fire. The battery may explode.
- 6.1.3.** Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes and may be toxic.
- 6.1.4.** A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:
 - 6.1.4.1.** Remove watches, rings, or other metal objects.
 - 6.1.4.2.** Use tools with insulated handles.
 - 6.1.4.3.** Wear rubber gloves and boots.

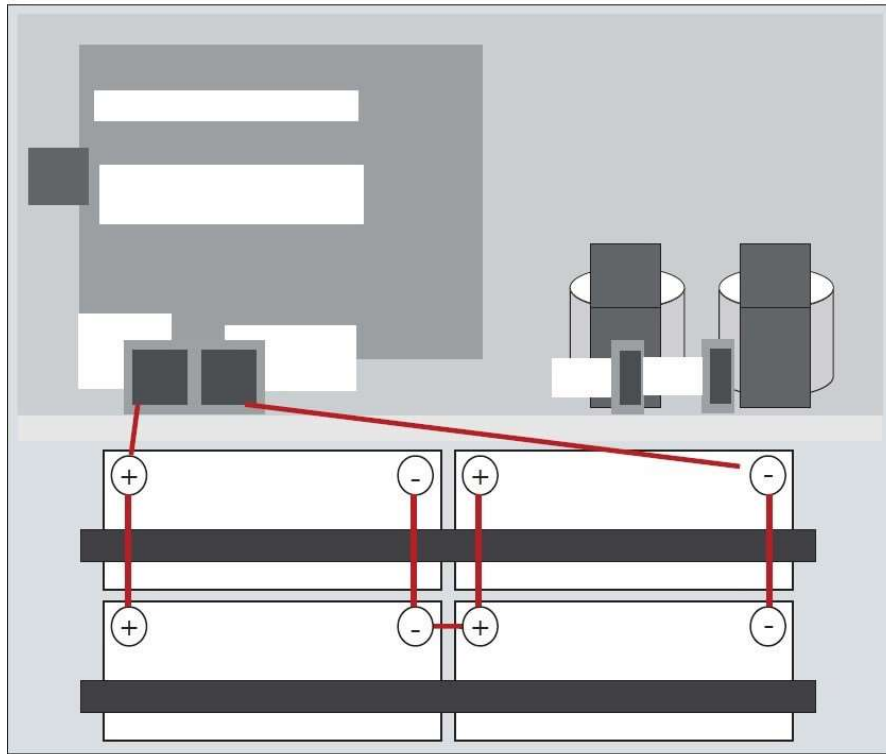


Figure 2

6.1.4.4. Do not lay tools or metal parts on top of batteries.

6.1.5. Make sure the proper polarity is observed. DC bus should be between 23.1 and 27.6 Vdc as tested at the Battery Bus Terminals (Refer to Figure 2 and 6—System Component Layout).

6.1.6. All battery are housed in the UPS unit. Internal Battery Pack's jumpers are provided by the factory. When connecting batteries, you must connect the individual batteries into string (s). Please see battery layout on the inside of your inverter unit. Note: Layout illustrate the number of batteries in a string, number of batteries per shelf, and their jumpers' placements.

After creating each string of batteries, ensure that each string consist of the number of batteries indicated by the battery layout and the measured voltage across the string is within tolerance.

If you have any further questions about battery connections please contact Barron Service Department at 1(877)377-6769.

6.1.7. Securing the batteries. Each Unit will come with a couple banding poly plastic strips (See figure 2), along with a couple metal buckle to tighten the batteries to the cabinet. The cabinet was designed with four battery strap holders. These are located on each side of the cabinet (See figure 1). The bottom two (vertical opening - left and right) are to secure the battery to the back wall when strapped. The two on top (horizontal opening - left and right) are to secure the battery to the bottom of the cabinet.

****WARNING**** When using the buckle to tighten the strap down, place the buckle away from any terminal post on the batteries.

6.1.8. CHARGING OF THE BATTERIES: The Emergency Lighting Inverter System charges its battery whenever it is connected to utility power and the input utility is turned on. Disconnect charging source prior to connecting or disconnecting battery terminals. For the best results, charge the battery for 24 hours after they are hooked up and the ELI is brought on line.

6.2. INPUT POWER CONNECTIONS

It is highly recommended that a qualified electrician make all input power connections. The input power should be connected correctly at the required voltages and the ground cable should be of the same gauge as the input power cables. Ensure that the utility power to be connected is rated as on the system label. Make sure the hot, neutral and ground are correctly identified and wired to the input terminal block as designated.

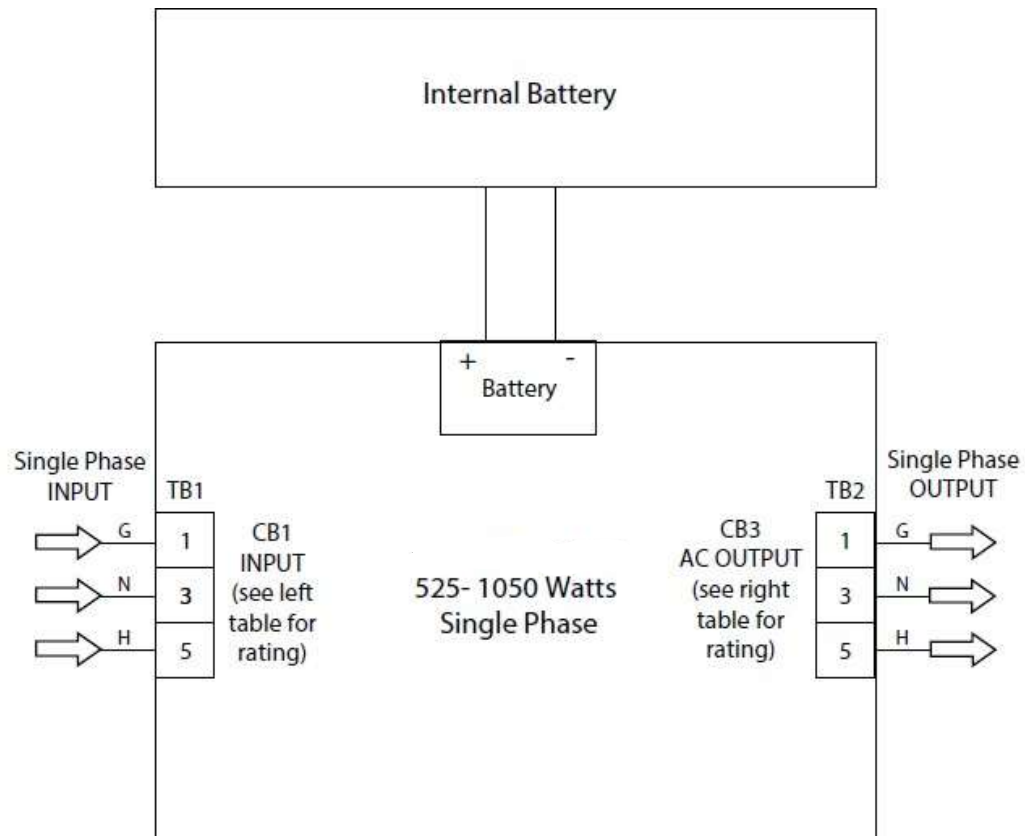
The input power connections to the UPS come from the building supplied services. These connections are made inside the UPS cabinet (refer to Figure 6, System Component Layout). The input cables are connected to a three (3) pole terminal block(TB1) which is comprised of one (1) input power, neutral, and ground connections.

6.3. OUTPUT POWER CONNECTIONS

It is highly recommended that a qualified electrician make all input power connections. The output power should be connected correctly at the required voltages and the ground cable should be of the same gauge as the output power cables. Ensure that the loads to be connected are as listed on the system label, and the hot, neutral and ground are correctly identified and are wired to the output terminal block as designated. Loads not powered by the system cannot use the neutral of the Emergency Lighting Inverter System.

DO NOT BOND THE OUTPUT NEUTRAL TO CHASSIS GROUND! THE SYSTEM HAS BEEN BONDED AS REQUIRED BY THE MANUFACTURER AND NATIONAL ELECTRICAL CODE.

Watts	Input Voltage	Utility Feed Amps
525	120	6.56
	208	3.79
	240	3.28
	277	2.84
700	480	1.64
	120	8.75
	208	5.05
	240	4.38
875	277	3.79
	480	2.19
	120	10.93
	208	6.31
1050	240	5.47
	277	4.74
	480	2.73
	120	13.13
1050	208	7.57
	240	6.56
	277	5.67
	480	3.28



Watts	Output Voltage	Max Output Amps
525	120	4.4
	277	1.9
	120/240	2.2
	120/277	4.4/1.9
700	120	5.83
	277	2.92
	120/240	2.91
	120/277	5.83/2.91
875	120	7.3
	277	3.15
	120/240	3.64
	120/277	7.3/3.15
1050	120	8.8
	277	3.8
	120/240	4.4
	120/277	8.8/3.8

7. DISPLAYS

7.1. DISPLAY PANEL DESCRIPTION

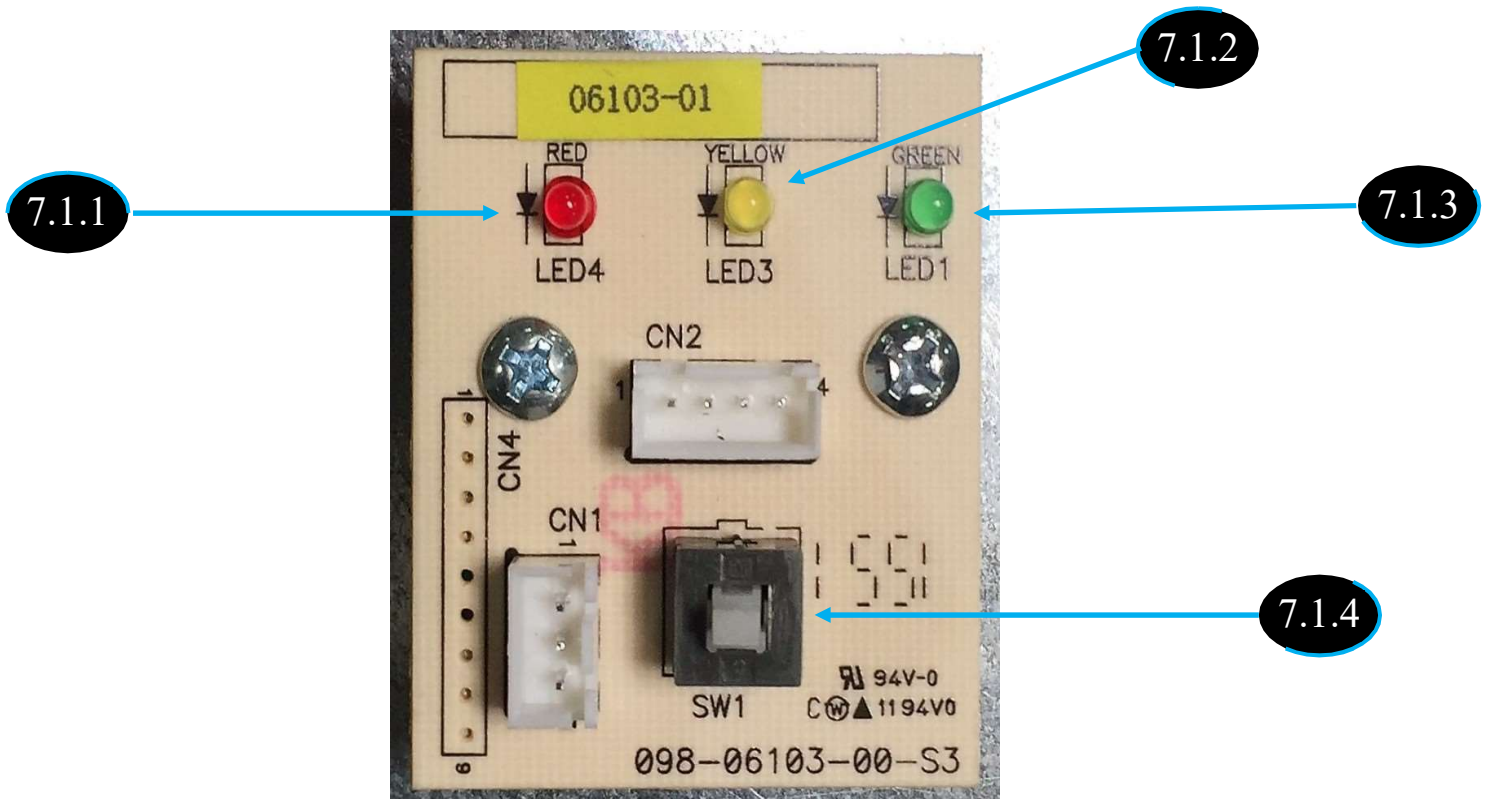


Figure 4

Displays

Refer to Figure 4 for descriptions of the Display Panel's button and indicators.

- 7.1.1. – Fault LED (RED):** Used as a Warning LED, this indicator is lit whenever the UPS faults. Red flashing every 0.5 seconds indicates that the UPS is in Overload.
- 7.1.2. – Inverter Mode (Yellow):** The Yellow LED will light when AC input power is abnormal. This indicator is present when the UPS is in the Battery Backup mode.
- 7.1.3. – Main Mode LED (Green):** The green LED will blink or light steadily when power mains is normal. (Note: The green LED blinks every 2 seconds to indicate that battery capacity is not full enough and battery is being charged by high rate.)

7.1.4 –Audible Alarm

- 7.1.4.1 Low Battery at Battery Mode:** Sounding every 2 seconds.
- 7.1.4.2 Overload:** Sounding every 0.5 seconds.
- 7.1.4.3 Fault:** Continuously sounding.

7.1.5. – Power On/Off Switch: Once the Inverter has been properly installed and the batteries are connected, the pressing of this button alone with the closing of the Main Input Breaker, automatically turns the emergency lighting inverter on and it works in Main mode or Inverter mode according to the input AC source status. When this button is pressed again, the Inverter will turn off automatically. (Note: The Main Output terminal block will not have any power on it, if the Main Output Breaker is not in the ON position.)

Audible Fault Indicator: An alarm buzzer beeps continuously when an Overload is detected. Verify that the load matches the capability specified in the Unit System Label.

8. OPERATION AND PROCEDURE

The initial startup must be done in conjunction with Barron or by a factory authorized technician.

PLEASE CALL FOR STARTUP BEFORE APPLYING POWER TO THE UPS!



8.1. START-UP PROCEDURE

8.1.1. After making all power and grounding connections to the Emergency Lighting Inverter System; verify that the system is OFF (None of the LEDs are lit).



Note: The Red LED indicates an alarm, a Yellow LED indicates inverter is running on batteries power, and a solid Green LED indicates inverter is running on utility power.



8.1.2. Energize the building feeder circuit for the input power for the UPS.

8.1.3. Verify the output voltage is correct BEFORE POWERING the inverter.

8.1.4. Power up all electrical equipment connected to the UPS, as specified by the equipment manufacturers.

8.1.5. Press and hold the Off/On push button until you hear a beep and release the button. Verify that each of the following items takes place:

8.1.5.1. The fan come on.

8.1.5.2. The Processor perform a series of checks (These checks will be indicated by a delay in the red LED extinguishing and the green LED illuminating (see Figure 4).

8.1.6. The unit is on the inverter.



Note: With the Batteries properly connected about 20 Second after unit is up and running, the batteries will automatically be placed online to the UPS.



8.2. SHUT-DOWN PROCEDURE

8.2.1. Power down all electrical equipment connected to the UPS.

8.2.2. Press and hold the "OFF/ON switch" until the inverter beeps.

8.2.3. Set all breakers to the OFF position

8.2.4. De-energize the input feeder breaker.

10. APPENDIX

10.1. FIGURES AND TABLES

Troubleshooting		
Problem	Possible Reasons	Solutions
No LEDs lit on Display panel.	Battery/ies voltage too low.	Charge battery/ies up to 8-hours.
	Battery/ies defect	Replace with the same type of battery.
	Power switch is not engaged/ pressed	Press the power switch again.
Alarm buzzer beeps continuously when AC supply is normal.	Overload of the UPS.	Turn off Emergency Lighting Inverter System, take off all load to make sure there are no problems on it or any internal short circuits. Verify that the load matches the UPS capability specified in the specs. Contact Barron for service or help.
When power failure, backup time is short.	Overload of the UPS.	Remove some noncritical load.
	Battery voltage is too low.	Charge battery 8 hours or more.
	Battery defect.	Replace with the same type of battery.
Communication lost between UPS and computer.	Software is not installed well.	Check the setting of the software.
	Cable is not properly connected	Check the USB cable is firmly connected to the computer and confirm the setting again.
Mains normal but red and green LEDs are flashing	Breaker is trip.	Reset the breaker.
	Input power connections are loose.	Secure Utility Feed wires to the input terminal block
Available time of batteries is too short.	Batteries haven't been charged.	Check out batteries part of the Emergency Lighting Inverter System, make sure they are well connected. Keep Emergency Lighting Inverter System "ON" for over 20 hours to recharge the batteries. If they will not charge or there is any damage to batteries, contact Barron immediately.
	Emergency Lighting Inverter System is overloaded.	
	Batteries are aged and need to be replaced.	
	The charger is out of order.	
If any abnormal situations occur that are not listed above, please call for service immediately.		

Table 3

When insulated grip tools are not available, a method for insulating grips on tools that we use at Barron using Plasti Dip by Performix is illustrated in Figures 5a-f. The illustration is only an example of how to insulate your tools, i.e. you may want to insulate the open end of the wrench. The product gives the user a lot of flexibility when it comes to how many coats to apply (as many as you want). Applying multiple coats by following the instructions on the can should insulate sufficiently.



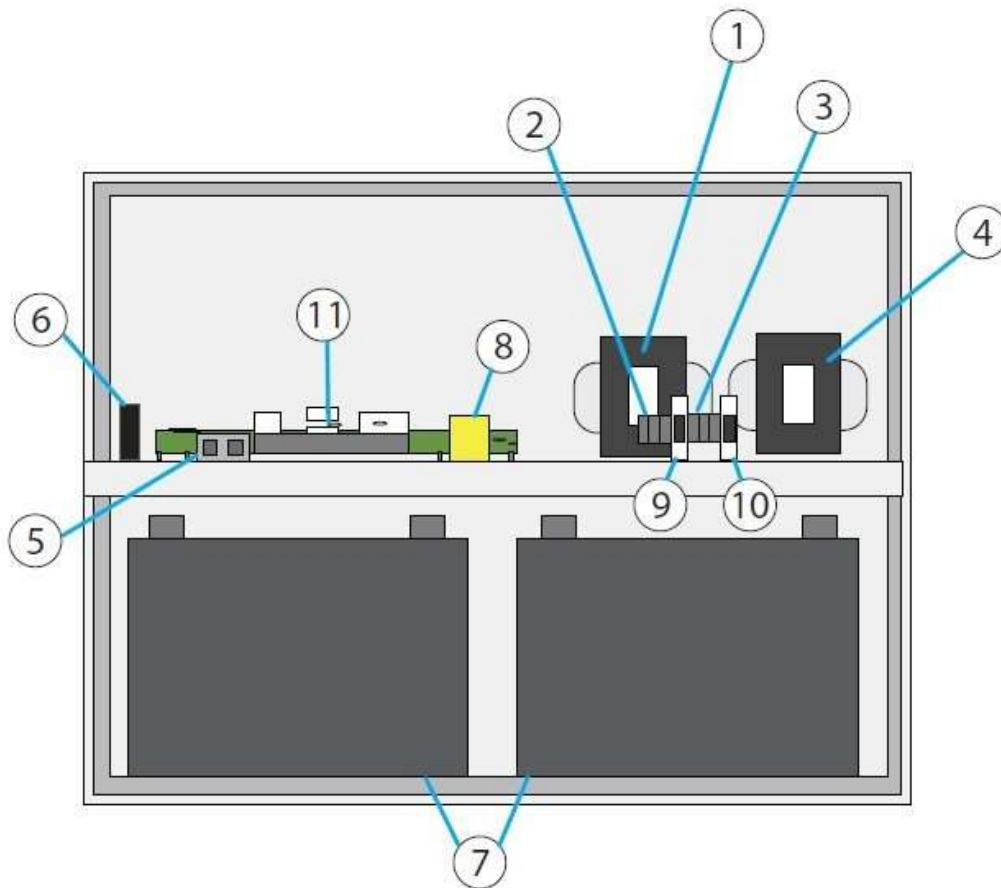
Figures 5a-f



Barron cannot control use of this product and will not accept liability.



System Component Layout



1. Input Trasnformer
2. Input Terminal Blocks
3. Output Terminal Blocks
4. Ouput Terminal Block
5. Battery Terminal Block
6. Fan
7. Batteries
8. Power On/Off Display
9. Main Input Breaker (CB1)
10. Main Output Breaker (CB3)
11. Main Power Board

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Figure 6