CONTROLLED POWER COMPANY

TROY, MICHIGAN

eLITE SERIES

MODEL ELN

OWNERS MANUAL

550W - 1500W

EMERGENCY LIGHTING INVERTER

UL924 LISTED

IMPORTANT - SAVE THESE INSTRUCTIONS - PLEASE READ THIS MANUAL
BEFORE USING EQUIPMENT

110150-Rev 34
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ABOUT THIS MANUAL

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INTRODUCTION

Controlled Power Company engineers and manufactures the industry's highest quality centralized emergency lighting inverters, capitalizing on 3 decades of expertise. We have an enviable reputation for quality, which is reflected in the design, workmanship, and performance of our products.

Features & Benefits

- Uninterrupted, regulated, continuous sinewave output for use with "normally on" lighting fixtures and exit lamps.
- Standby output for use with "normally off" emergency lighting fixtures.
- Programmable, timed "normally off" bus.
- Integral constant voltage transformer isolates and regulates output voltage.
- "Normally on" and "normally off" circuit breaker configurations:

  550 W: Input main circuit breaker (CB).
  Single main output CB standard.
  Optional 1 monitored CB or a total of 3 unmonitored CB's.

  1000 W and 1500 W: Input main CB.
  3 output CB's standard. Optional 3 monitored CB's or a total of 6 unmonitored CB's.

- Integral status and alarm panel.
- Remote communications via alarm signals or RS232.
- Integral 90 minute battery.
- Compatible with all lighting applications: HID, high-pressure sodium, fluorescent, incandescent, halogen, quartz, etc.
- System approved for 42k AIC rated source.
- Front-access design.
- Wall or floor-mounted options.
- NEMA 2 enclosure (standard).
- HVAC and NEMA 3R enclosure options for outdoor installations — consult factory.
- Remote status panel, and automatic phone dialer.
- Generator-compatible.
- Optional accelerated battery charger for full load runtimes > 90 minutes.

Safety

- UL 924 Auxiliary Lighting and Power Equipment.
- UL / cUL 1778
- NFPA 101, NFPA 111, NEC, and local codes.

Display Monitor & Diagnostics

Bright, 3-Digit LED Provides System Parameters:

- Input voltage
- Percent of battery capacity
- Output voltage
- Percent of battery charged
- Percent of load

LED Indicators Provide System Status:

- System ON (Green)
- LOW BATTERY Warning (Red)
- System ON BATTERY (Yellow)
- ALARM (Red)

Product Specifications

- Input Operating Voltage Range: +10%, – 40% typical, load-dependent, without battery usage
- Input Frequency: 60 Hz, ± 2.5%
- Output Sine Wave Voltage: Maximum 3% harmonic distortion, any single harmonic
- Power Factor: Self-correcting to >0.95
- Line Voltage Regulation: ± 3%
- Load Regulation: Typically better than ± 3%
- Isolation: Galvanic
- Standard Unit Operating Temperature: 0º C to +40º C
- Total System MTBF: 100,000 hours
- Common Mode Noise Rejection: 120 dB
- Transverse Mode Noise Rejection: 70 dB
- Efficiency 89% typical

Standards

- ANSI / IEEE C62.41 Category B3
- NFPA 101
- NFPA 111 Stored Electrical Energy Emergency and Standby Power Systems. Meets SEPSS / ECE / Level 1 and Level 2 criteria for types O, U, A, B, and 10; and Classes up to and including Class 1.5
- NFPA 70 National Electric Code
- FCC Article 15, J, Class A
- UL 924 Listed as "Emergency Lighting Equipment" with 90 minutes at full output kW rating. This 90 minute Emergency Lighting Inverter system meets NFPA 101 and 111 standards, and is NFPA compliant as "Life Safety Equipment in accordance with ANSI/NFPA 70 (NEC), Article 700.

RECEIVING, INSPECTING AND STORING THE UNIT

RECEIVING THE INVERTER INSPECTION, PLACEMENT, INSTALLATION, SETUP AND START-UP SHOULD BE PERFORMED BY QUALIFIED PERSONNEL ONLY

INSPECTION

Upon receipt of your lighting inverter, visually inspect the unit(s) for shipping damage. If shipping damage has occurred, the purchaser should promptly notify the carrier and file a claim with the carrier. The factory should be notified if the damages may impair the operation of the unit. Reference front cover or accompanying paper work for factory contact information.

Note: Open the front door of the enclosure(s) and inspect inside the unit for shipping damage.

IMPORTANT NOTICE

This shipment has been carefully inspected, checked and properly packaged at our company.

When it was delivered to the carrier it was in good condition and technically it became your property at that time. Thus, any damage, whether obvious or hidden, must be reported to the transportation company within FIVE days of receipt of the shipment at your premises to avoid forfeiting claims for damages.

FOR ALL SHIPMENTS DAMAGED IN TRANSIT

Leave the items, packing material and carton “AS IS”. Notify your carrier’s local office and ask for immediate inspection of the carton and contents.

After inspection has been made by the carrier, and you have received acknowledgement in writing as to the damage, notify our Customer Service Department to make any required repair arrangements.

It is your responsibility to follow the above instructions or the carrier will not honor any claims for damage. Also, if there are any shortages or questions regarding this shipment, please notify us within FIVE days.

Please note that we cannot be responsible for any service work or back-charges unless authorized by us in writing, before the work is performed.

STORAGE

WHILE IN STORAGE BATTERIES MUST BE CHARGED FOR 24 HOURS EVERY 6 MONTHS. WHILE IN STORAGE DISCONNECT THE BATTERY CONNECTOR FROM THE INVERTER.

If it is necessary to store the unit, be sure to place it in a clean dry area. **For extended storage, the batteries must be charged for 24 hours every 6 months. Failure to do so will result in weak or bad batteries which WILL NOT be covered under the warranty.** Charging is accomplished by installing the batteries, turning the unit on and allowing the lighting inverter to run. See *“Lighting Inverter Installation - Battery Installation and Wiring”* for details on installing batteries and the *“System Setup”* and *“Start-up Procedure”* for turning the lighting inverter on. **While storing, disconnect the battery connector from the inverter.** Make sure proper ventilation is available any time the lighting inverter is on.

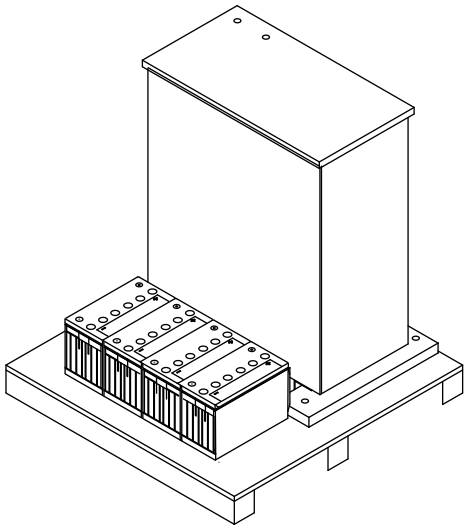
REMOVING THE INVERTER FROM THE SKID

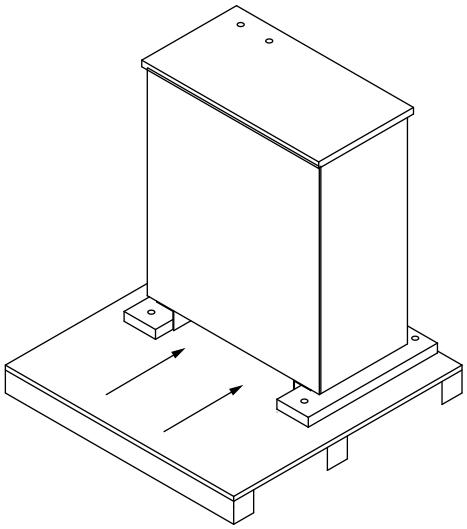
CAUTION
CABINETS AND BATTERIES ARE EXTREMELY HEAVY
USE PROPER EQUIPMENT WHEN REMOVING
THE CABINETS FROM THE SKID

TOOLS REQUIRED:
1/2” Socket, Forklift, dolly, utility knife

Batteries on same pallet as the lighting inverter

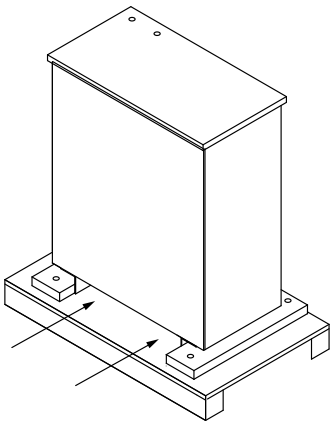
1. Using a utility knife, cut plastic wrapping and banding remove and discard.
2. Remove batteries from pallet with the use of a dolly or other lifting device be sure to place them in a safe location.
3. To remove the lighting inverter from the pallet, first remove the four 1/2” bolts that are securing the lighting inverter cabinet to the pallet.
4. Using a forklift, place the forks securely under the lighting inverter from the front or back side.
5. Carefully lift the lighting inverter from the skid.
6. Set the lighting inverter cabinet down until you are ready for installation.





Batteries on different pallet as the lighting inverter or batteries installed internally:

1. Using a utility knife, cut plastic wrapping.
2. To remove the lighting inverter from the pallet, first remove the four 1/2” bolts that are securing the lighting inverter cabinet to the pallet.
3. Using a forklift, place the forks securely under the lighting inverter from the front or back side.
4. Carefully lift the lighting inverter from the skid.
5. Set the lighting inverter cabinet down until you are ready for installation.




Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions.
Keep unauthorized personnel away from batteries.


******* CAUTION *******

A battery can present a risk of electrical shock and high short circuit current.
The following precautions should be observed when working on batteries:

1) Remove watches, rings, or other metal objects.
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.


******* CAUTION *******

USE CAUTION WHEN HANDLING OR SERVICING BATTERIES. BATTERY ACID CAN CAUSE BURNS TO SKIN AND EYES. IF ACID IS SPILLED ON SKIN OR IN THE EYES, FLUSH WITH FRESH WATER AND CONTACT A PHYSICIAN IMMEDIATELY.

BATTERIES ARE VERY HEAVY. USE CAUTION WHEN LIFTING AND MOVING THEM. INSTALLATION SHOULD ONLY BE PERFORMED BY AUTHORIZED PERSONNEL.

DIAGRAMS FOR WIRING BATTERIES ARE LOCATED ON THE BATTERY CABINET DOOR. BE SURE TO WIRE BATTERIES PROPERLY. IMPROPER WIRING CAN CAUSE DAMAGE TO THE BATTERIES. WIRING SHOULD ONLY BE PERFORMED BY AUTHORIZED PERSONNEL.


*******SHOCK HAZARD*******

DO NOT SHORT BATTERY TERMINALS

******* CAUTION *******

Do not dispose of battery or batteries in a fire. The battery may explode.

Only replace batteries with identical specification of original batteries supplied with the system.

- Follow all standard and local electrical codes. Be sure input power to UPS is properly grounded.
- Do not allow water or foreign objects to get inside UPS.
- Do not place objects or liquids on top of the UPS.
- Do not locate UPS near running water or where there is excessive humidity.


TOOLS REQUIRED AND INSTALLATION CHECKLIST

_____ Phillips Head Screw Driver, 3/16” Allen wrench (for input/output terminal blocks).

_____ For field wiring size, based on amperage and breaker sizes in table below. Units are rated for operation up to 40 deg. C. Amb. Refer only to the matrix below for the service panel AC breaker size. The unit comes standard with terminals for hard wire installation.

_____ Lighting Inverters require a ground wire. The grounded supply conductor (Neutral) wire should be the same size as the input feed wires. The ground wire should be installed in accordance to NEC code.The ground that feeds the Lighting Inverter should be of good integrity and dedicated to the Lighting Inverter. The run should be as short as possible. Conduit cannot be used for the grounding of the circuit.

_____ When wiring batteries be sure to use insulated tools for safety.

Reference: NEC ARTICLE 250

AC INPUT AND OUTPUT BREAKER, WIRING AND CURRENT MATRIX

Watts		550W			1000W			1500W		
Voltage	Input Breaker	Input Current	Output Current	BTU / Hr	Input Current	Output Current	BTU / Hr	Input Current	Output Current	BTU / Hr
120	*	6.3A	4.6A	304	11.9A	8.3A	573	14.9A	12.5A	752
277	15A	2.7A	2.0A	409	5.2A	3.6A	545	6.5A	5.4A	614
* 1500W units at 120V have an input breaker size of 20A. All other voltages and sizes are 15A.										

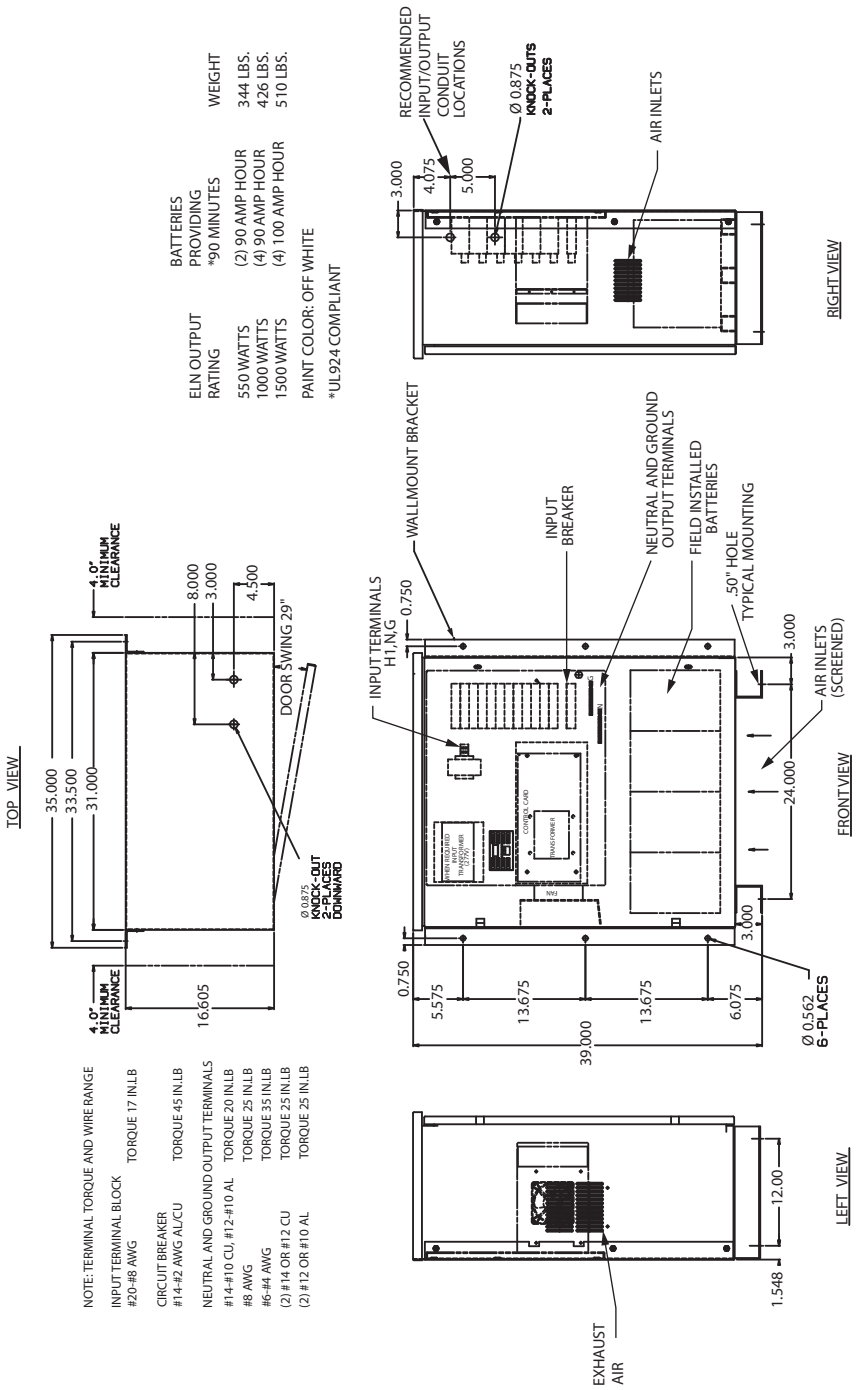
The ILS AC inverter systems must be located and installed conforming to CAN/CSA-C282-05 Emergency Electrical Power Supply for Buildings and CSA standard C22.1.

MINIMUM CHARGE TIME FOR FULL BATTERY CAPACITY = 72 HOURS

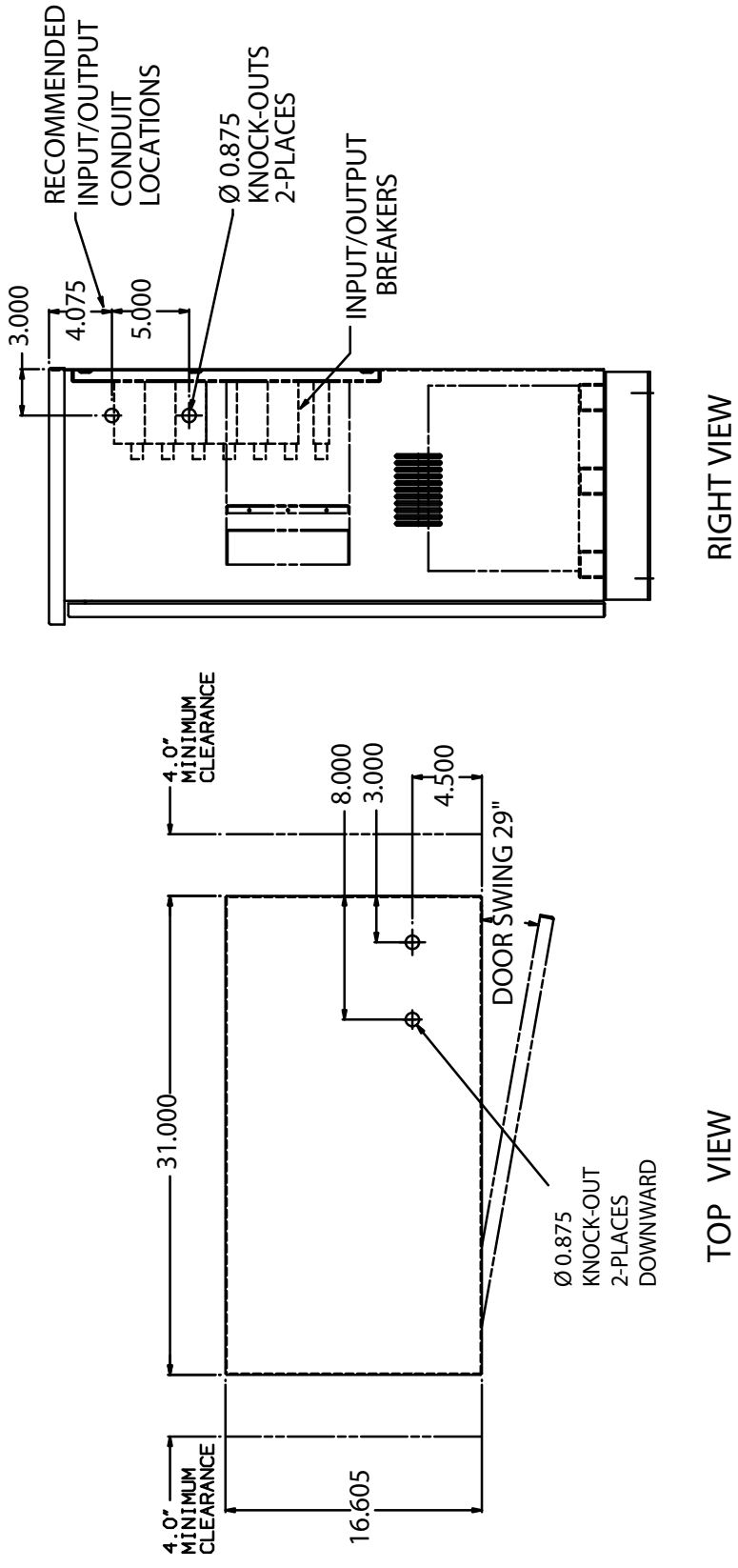
CABINET DIMENSIONS, ACCESSES AND CLEARANCES

LIGHTING INVERTER PLACEMENT AND MOUNTING

Refer to the drawing below for installation clearances and ventilation requirements. The lighting inverter should be placed in a dry, well ventilated or temperature controlled area with at least 4 inches of clearance on the sides. Allow at least 30 inches of clearance at the front of the unit for maintenance. Be sure not to block any fan or air inlet areas of the lighting inverter. Doing so will cause damage to the unit. The inverter can be mounted to a wall or floor with 1/2" bolts. See the *"Appendix A - Cabinet Outline"* or the illustration below.



CONDUIT ENTRY POINTS

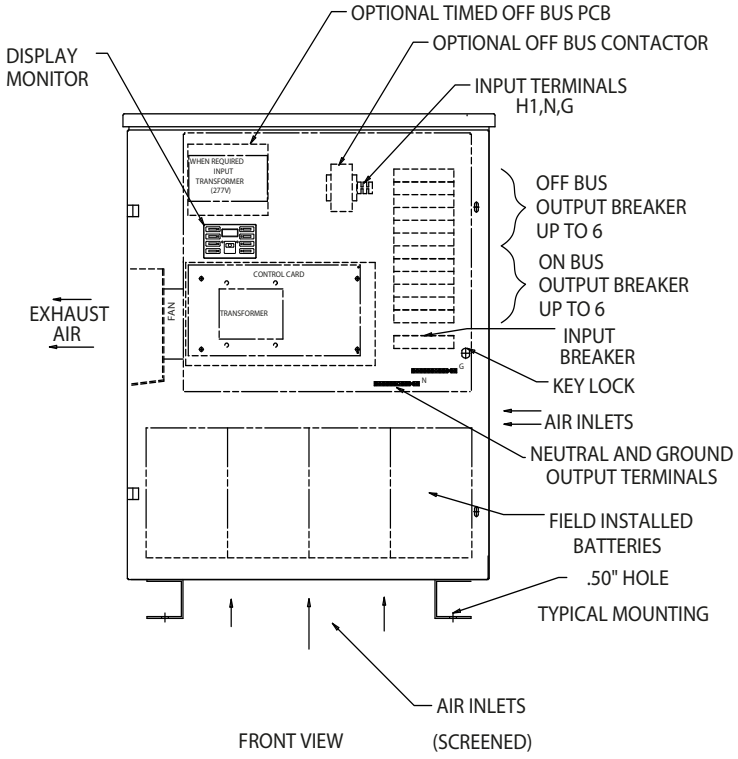


LIGHTING INVERTER WIRING WITH DISTRIBUTION

Input wiring is performed at the input terminal strip. Output wiring is performed at the load side of the circuit breakers. Distribution breakers come pre-wired from the factory. It is recommended that all wiring is performed according to NEC standards and local codes.

***** WARNING *****

CAUTION - RISK OF ELECTRICAL SHOCK.
THE LIGHTING INVERTER RECEIVES POWER FROM MORE THAN ONE SOURCE. BE SURE ALL UTILITY CIRCUIT BREAKERS ARE IN THE OFF POSITION AND THE BATTERY CONNECTOR IS UNPLUGGED BEFORE SERVICING.



NOTE: TERMINAL TORQUE AND WIRE RANGE

INPUT TERMINAL BLOCK
#20-#8 AWG TORQUE 17 IN.LB

CIRCUIT BREAKER
#14-#2 AWG AL/CU TORQUE 45 IN.LB

NEUTRAL AND GROUND OUTPUT TERMINALS
#14-#10 CU, #12-#10 AL TORQUE 20 IN.LB
#8 AWG TORQUE 25 IN.LB
#6-#4 AWG TORQUE 35 IN.LB
(2) #14 OR #12 CU TORQUE 25 IN.LB
(2) #12 OR #10 AL TORQUE 25 IN.LB

OUTPUT DISTRIBUTION

The ELN comes standard with (1) single pole breaker on the 550W unit and (3) single pole breakers on the 1kW - 1.5kW units for both normally off and normally on circuits.

ELN distribution has two options for the 550W units: (1) monitored single pole breaker or (3) standard single pole breakers.

On the 1kW - 1.5kW units there are two options: (6) single pole breakers or (3) monitored single pole breakers. Each of these options are available on normally on and normally off circuits.

BATTERY REQUIREMENTS

Batteries of a specific manufacturer and model are required to maintain the system's UL 924 listing. Use of batteries not recognized in the product's UL report will void its listing.

BATTERIES FOR ELN'S RATED FOR 90 MINUTES		
MANUFACTURER	**BATTERY MODEL NUMBER**	**FOR USE WITH MODELS RATED (QTY)**
Power Battery DEKA DEKA GNB	PRC/TC-1290 24HR3000 HR3000 S12V285/F	550W (2); 1.0kW (4)
Power Battery	PRC/TC-1265	1.0kW (4)
Power Battery DEKA DEKA Northstar	PRC/TC-12100 27HR3500 HR3500 NSB12-400	1.5kW (4)

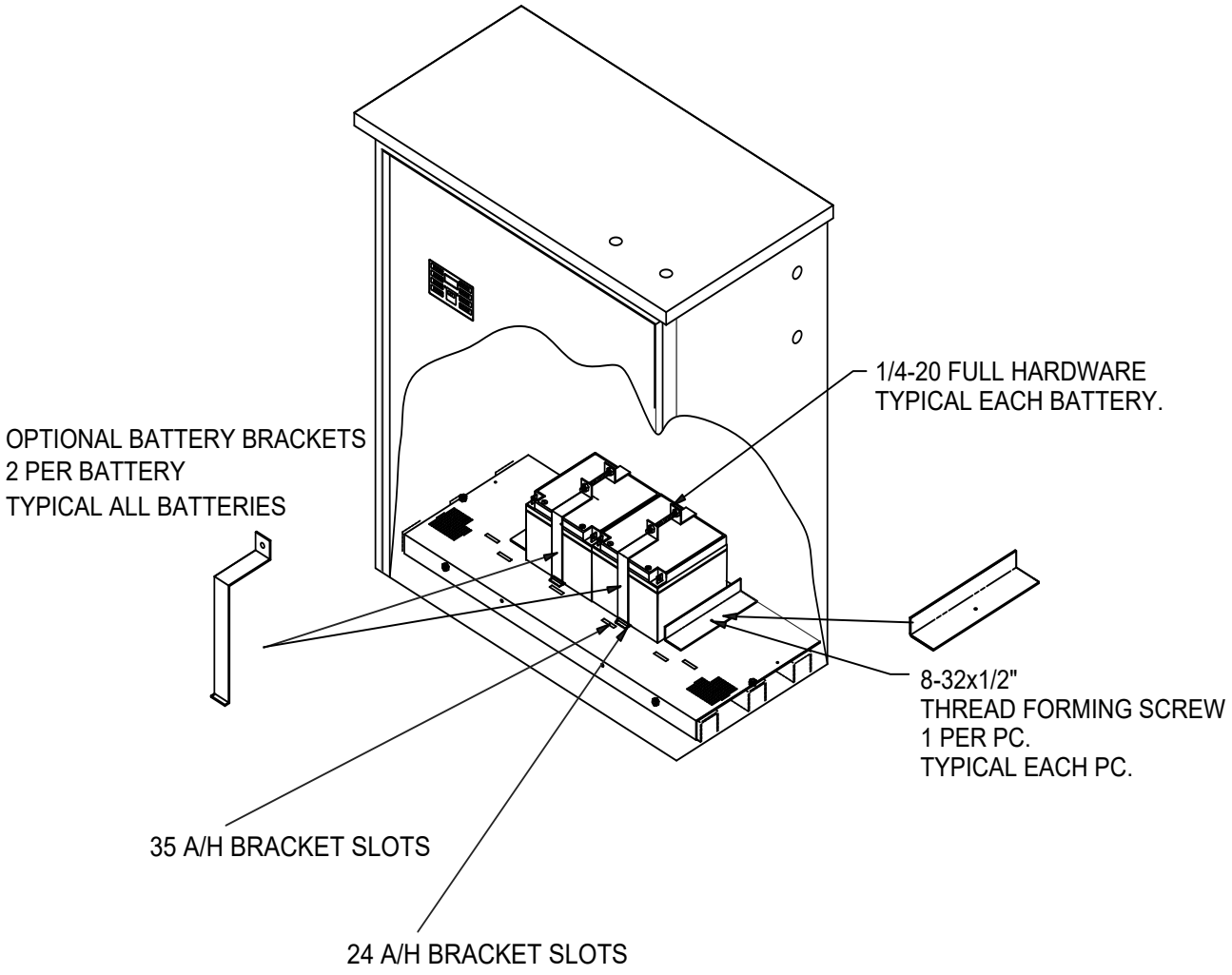
BATTERIES FOR ELN'S RATED FOR 30 MINUTES		
MANUFACTURER	**BATTERY MODEL NUMBER**	**FOR USE WITH MODELS RATED (QTY)**
Yuasa	NP-24-12B	550W (4)
DEKA	HR3500	1.0kW (2) , 1.5kW (2)

MINIMUM CHARGE TIME FOR FULL BATTERY CAPACITY = 72 HOURS

(2) 24A/H OR (2) 35 A/H BATTERY INSTALLATION

NOTE - NOT ALL BATTERY MANUFACTURERS WILL HAVE THE (+) AND (-) POST AS SHOWN BELOW. USE EXTREME CAUTION WHEN WIRING.

WARNING - DO NOT PLUG IN DC CONNECTOR UNTIL READY TO APPLY AC POWER.

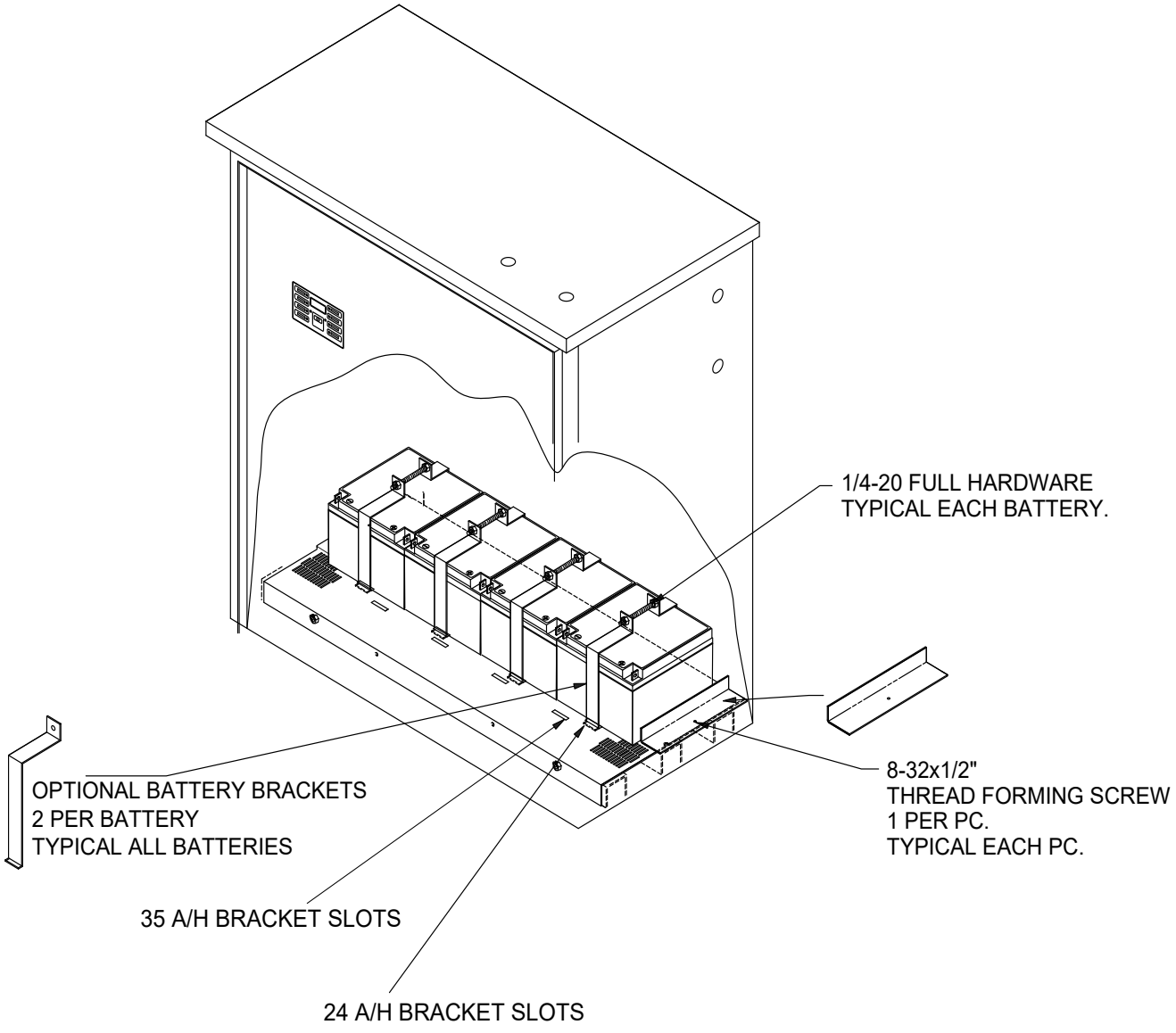


TOP BATTERY HOLD DOWN BRACKETS ARE OPTIONAL EQUIPMENT

(4) 24A/H OR (4) 35 A/H BATTERY INSTALLATION

NOTE - NOT ALL BATTERY MANUFACTURERS WILL HAVE THE (+) AND (-) POST AS SHOWN BELOW. USE EXTREME CAUTION WHEN WIRING.

WARNING - DO NOT PLUG IN DC CONNECTOR UNTIL READY TO APPLY AC POWER.

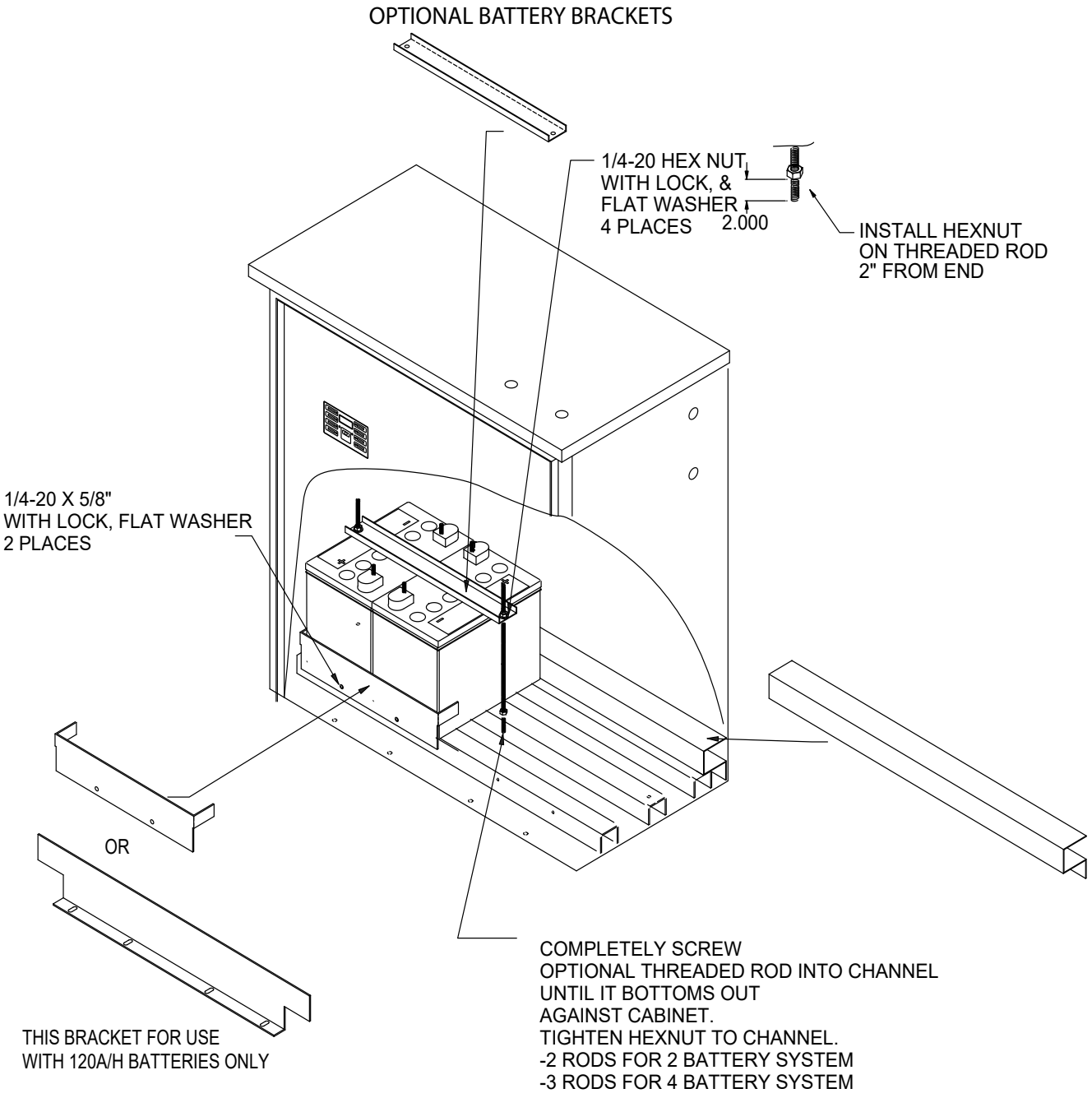


TOP BATTERY HOLD DOWN BRACKETS ARE OPTIONAL EQUIPMENT

(2) 65A/H, 90A/H, 100A/H OR 120A/H BATTERY INSTALLATION

NOTE - NOT ALL BATTERY MANUFACTURERS WILL HAVE THE (+) AND (-) POST AS SHOWN BELOW. USE EXTREME CAUTION WHEN WIRING.

WARNING - DO NOT PLUG IN DC CONNECTOR UNTIL READY TO APPLY AC POWER.



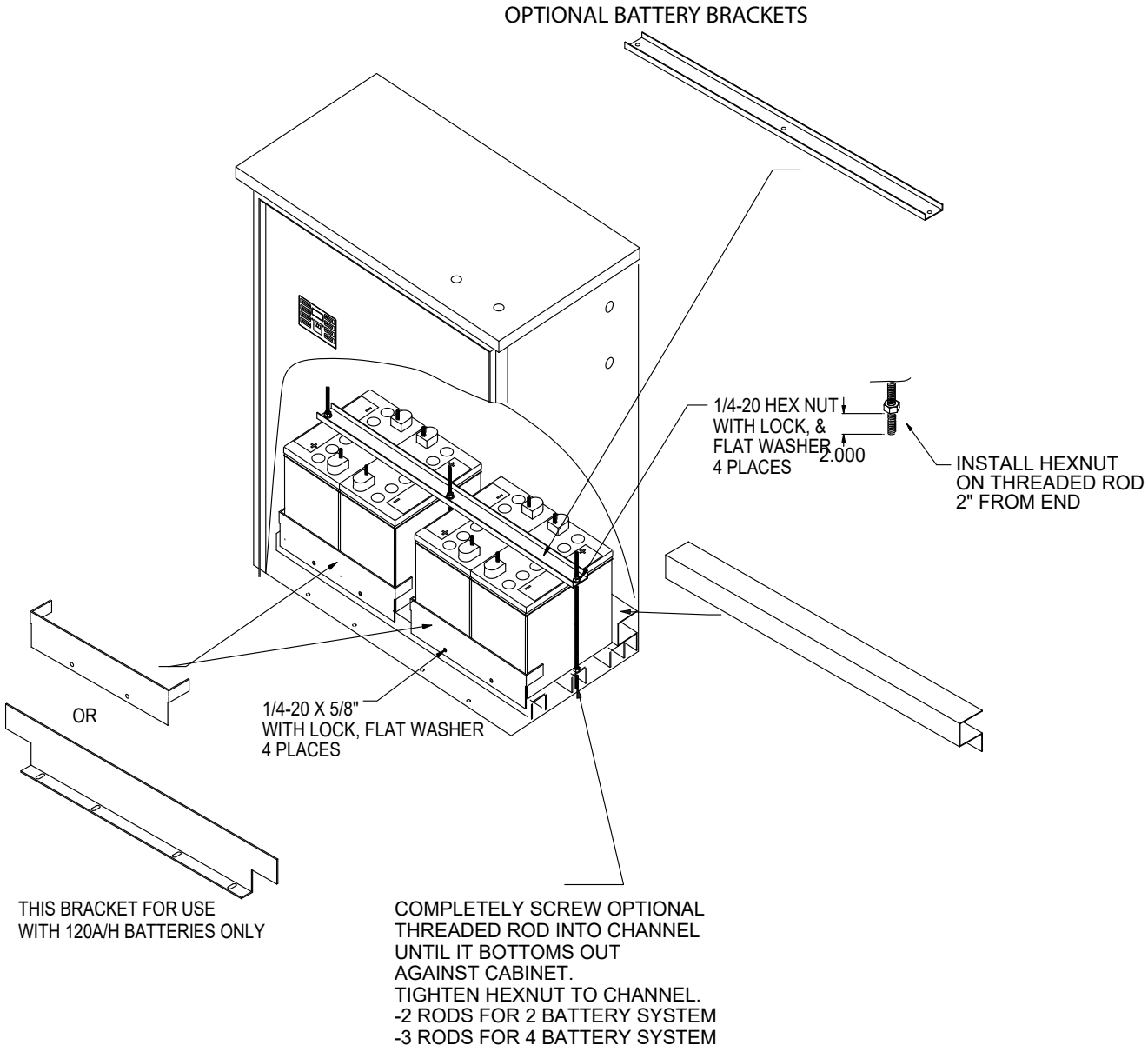
TOP BATTERY HOLD DOWN BRACKETS ARE OPTIONAL EQUIPMENT

BATTERY INSTALLATION CONTINUED

(4) 65A/H, 90A/H, 100A/H OR 120A/H BATTERY INSTALLATION

NOTE - NOT ALL BATTERY MANUFACTURERS WILL HAVE THE (+) AND (-) POST AS SHOWN BELOW. USE EXTREME CAUTION WHEN WIRING.

WARNING - DO NOT PLUG IN DC CONNECTOR UNTIL READY TO APPLY AC POWER.



TOP BATTERY HOLD DOWN BRACKETS ARE OPTIONAL EQUIPMENT

BATTERY INSTALLATION AND WIRING

REFER TO THE BATTERY WIRING DIAGRAM ON THE INNER DOOR OF THE INVERTER CABINET

BATTERY INSTALLATION

Batteries must be installed with the proper orientation. Note the orienation shown on the battery wiring diagrams attached to the inner door of the inverter. Battery hold down brackets are not standard equipment. If the battery bracket option was purchased, there will be a bracket installation diagram included with the brackets supplied. See ***"Installation and Safety Precautions"***.

BATTERY WIRING 550W - 1500KW

Batteries are wired as shown in the diagram on the inner door of the inverter. Included with the lighting inverter is a kit for the wiring. Follow the steps and the corresponding diagram on the inner door of the inverter, noting the different lengths and labels of wire.

1. Place batteries in the lower section of the lighting inverter cabinet as shown in the wiring diagram. Battery orientation is important. Install only as shown.
2. Locate the proper sections of wire that correspond to the wiring diagram.
3. Wire the batteries as shown, taking note of the polarity.
4. Once the batteries are wired, use a voltmeter to measure the positive and negative leads. The voltmeter should read between +24V and +27V. If it is different recheck the wiring and test again.If it is different then the diagram, recheck the wiring and test again.
5. **DO NOT PLUG IN DC CONNECTOR UNTIL READY TO APPLY AC POWER.** Insert the DC male connector into the DC female connector on the lighting inverter.

REFER TO THE BATTERY WIRING DIAGRAM ON THE INNER DOOR OF THE INVERTER CABINET

MINIMUM CHARGE TIME FOR FULL BATTERY CAPACITY = 72 HOURS

Batteries of a specific manufacturer and model are required to maintain the system's UL 924 listing. Use of batteries not recognized in the product's UL report will void its listing.

NOTE - NOT ALL BATTERY MANUFACTURERS WILL HAVE THE (+) AND (-) POST AS SHOWN BELOW. USE EXTREME CAUTION WHEN WIRING.

WARNING - DO NOT PLUG IN DC CONNECTOR UNTIL READY TO APPLY AC POWER.

START UP PROCEDURE

DO NOT ATTEMPT TO OPERATE THE UNIT UNTIL THE FOLLOWING STEPS HAVE BEEN COMPLETED

MINIMUM CHARGE TIME FOR FULL BATTERY CAPACITY = 72 HOURS

- Verify the input voltage matches the lighting inverter's input volts and the lighting inverter's output voltage matches your equipment's input voltage.
- Turn off all loads attached to the lighting inverter.
- Turn on the input service breaker.

  NOTE: Batteries require charging for 6 to 8 hours (sometimes longer). Backup time is reduced until batteries are fully charged.

- Turn on the source breaker feeding the lighting inverter followed by the lighting inverter's AC Input breaker. **Then turn the On/Off switch located inside the cabinet to the "on" position. (See *"Appendix A - Component Location Diagram"* for switch location].** There will be a few seconds delay as the unit comes on. The digital display and "System On" LED will illuminate. Scroll to the "Output Volts" function and make sure the output voltage is correct.
- Verify the output voltage on the lighting inverter matches the load requirement. Do not connect your equipment if output voltage is out of specification, contact factory.
- Simulate a power loss by turning off the AC INPUT BREAKER ONLY, located inside the lighting inverter.

  An "Audible Alarm" will sound and the following LED's will illuminate.

  - System On - System on Battery - Alarm

- While on inverter, verify that the output voltage of the lighting inverter matches the load requirement. Do not apply power to the load if output voltage is out of specification, contact factory.
- Turn on the AC Input breaker and the lighting inverter will return to utility power.
- With the lighting inverter running and System On LED illuminated, turn on the output circuit breakers and loads.
- Some loads create inrush currents and may cause the lighting inverter to display a temporary overload. This is normal and in no way damage the lighting inverter.
- If the overload (typically too many lighting loads are connected to the lighting inverter) persists and is in excess of 150% the lighting inverter will shut off within ten minutes. If the unit is overloaded, some of the lighting loads will have to be removed or the lighting inverter must be expanded.

Prior to turning on the power and starting the UPS, it is very important to check out the mode in which you intend to operate the system.

- All operating parameters are factory set to standard operating modes.
- Selector switch SW1 at the rear of the UPS allows you to change the mode of operation that best suits your specific needs.

SELECTOR SWITCH SW1 (DIP SWITCH SELECTING) - See *"Appendix A - Component Location Diagram"* for dip switch location.

Operating Mode

Position 1 - Slew Rate Normal (factory set to normal). **Do not change switch with UPS on**.

Position 2 - Slew Rate Fast - This selection is typically used when the UPS must follow a rapidly changing input frequency. I.E.....engine generators. Do not change switch with UPS on. **NOTE: Only one switch must be on at a time for Positions #1 and #2..**

Position 3 - Audible Alarm - (Off to silence audible alarm). This selection can be changed with the UPS on.

Position 4 - Manual or Automatic Restart - (Automatic Restart - following a power down caused by depleting the battery power, the UPS will automatically start upon restoration of utility power). This selection can be changed with the UPS on. Manual restart requires push button at front of unit to be reset. ON = Auto Restart, OFF = Manual Restart.

GENERATOR APPLICATIONS

If your UPS is going to operate with a generator system, the following changes will be needed.

1. Slew Rate Change – You will need to change selector switch SW1 on the back of the UPS from "normal" to "fast" slew rate.
2. System Set Point Changes – Change the system set points as noted below. Refer to the *"Communications"* section for instructions on how to change the set points.

System Set Points – Generator Applications Only

Description	Value entered w/ no al input voltage = 120V	Value entered w/ nominal input voltage = 208V	Value entered w/ nominal input voltage = 240V
High Line Switch Point	% = 115	% = 115	% = 115
Low Output Frequency Alarm Set Point	57	57	57
High Output Frequency Alarm Set Point	63	63	63
Low Line Sample Accumulation Set Point	Available (1-2) = 2	Available (1-2) = 2	Available (1-2) = 2
Frequency Accumulation Buffer	Available (2-9) = 9	Available (2-9) = 9	Available (2-9) = 9

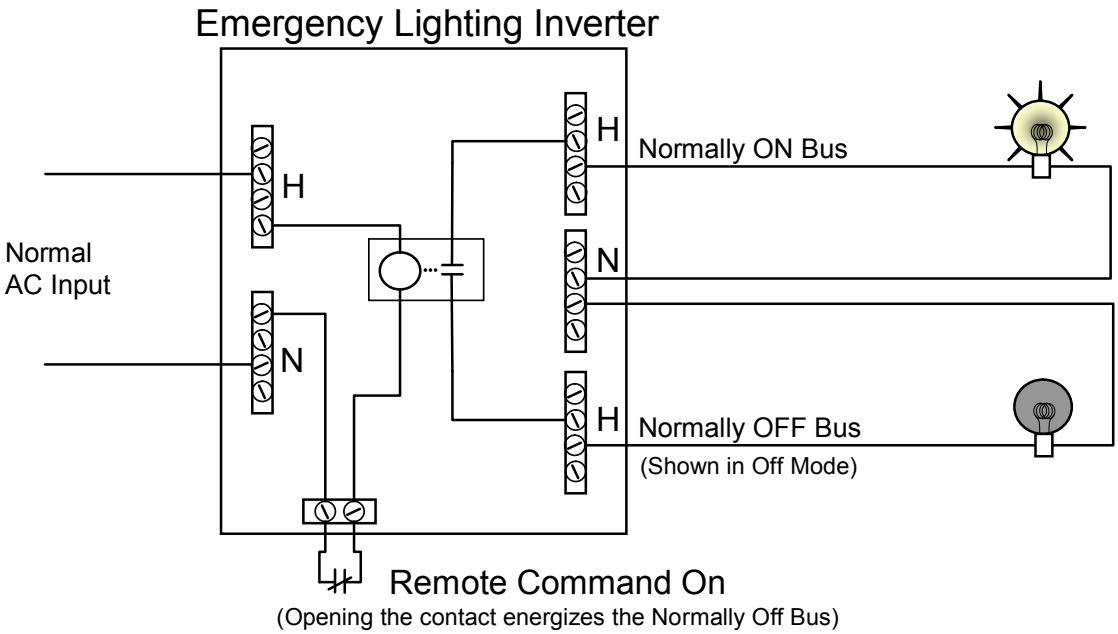
Note : All other parameters remain at Factory Preset Levels – refer to the *"Communications"* section for remaining parameters.

OPTIONAL OFF BUS

DESCRIPTION

In many emergency lighting applications, there are designated lights that remain off until a power outage occurs. Available on the eLITE and UltraLITE is a Normally Off Bus option. The Normally Off Bus incorporates an internal contactor located between the output of the inverter's "Normally On" uninterrupted output and the Normally Off emergency lighting. When power is lost, voltage is inadequate or a remote input "command on" signal is received, emergency power is applied to these lights, providing a safe means of egress. In certain applications, the voltage required to illuminate the emergency lighting is different than the utility voltage available at the lighting panel and at the input of the inverter. In this case, the inverter's isolation transformer is used to supply the normally off buss with the appropriate voltage. In addition, many inverter models provide more than one uninterrupted output voltage; for example 120V & 277V. This flexibility allows the inverter to supply Normally On and Normally Off emergency lighting fixtures with a different voltage if required. Example: Normally On emergency lighting may require 277V, while Normally Off emergency fixtures may require 120V. There is no need for external transformers.

The Normally Off bus is rated at 100% of full load capacity. The diagram below represents how the Normally Off Bus works:

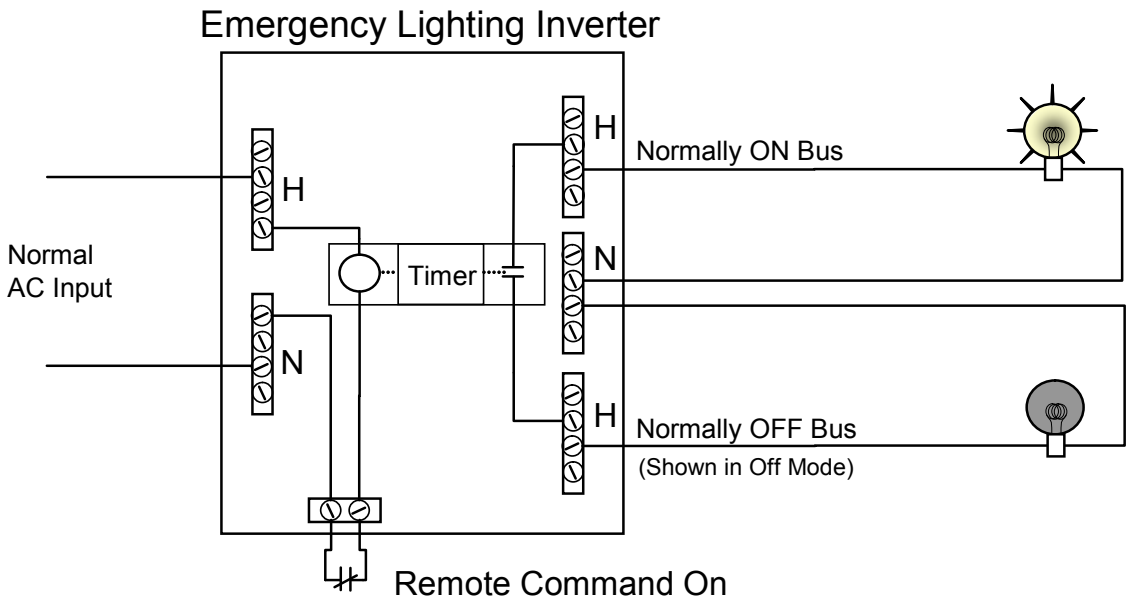


Under all conditions, uninterrupted power is being fed to the Normally On lighting. When utility power is present (as depicted above), the contactor between output of the inverter and the Normally Off lighting is open; thus the Normally Off lighting is not illuminated. When utility power is lost, the relay coil shown is de-energized which in turn energizes the contactor. Normally Off lighting will then illuminate. When utility power returns, the relay shown re-energizes, the contactor opens and the Normally Off lighting is turned off. No setup is required.

DESCRIPTION

In many lighting system applications, there are designated lights that remain off until a power outage occurs. Available on the eLITE Model ELN is a Timed Normally Off Bus option. This option incorporates a programmable timer which controls an internal contactor located between the output of the inverter's "Normally On" uninterrupted output and the Normally Off emergency lighting. When utility power is lost, voltage is inadequate or a remote input "command on" signal is received, emergency power is applied to these lights after a user configurable time period has expired. This is especially useful in applications where there may be only a short duration of power loss (a few seconds), in which it may not be desirable for the Normally Off lighting to illuminate. With an additional timer, a "delay return" or "timed off" feature is provided. In this case, the timer can be configured so that there is a delay in the shutoff of the emergency lighting when utility power is restored. This option is critical in applications where there is HID Sodium lighting used for normal lighting. Once utility power is restored to HID Sodium lighting, they required 10 or 15 minutes to reach full illumination. The Timed Normally Off bus compensates for that delay by keeping the Normally Off emergency lighting turned on until the HID lighting is fully illuminated. In certain applications, the voltage required to illuminate the emergency lighting is different than the utility voltage available at the lighting panel and at the input of the inverter. In this case, the inverter's isolation transformer is used to supply the normally off buss with the appropriate voltage. In addition, many inverter models provide more than one uninterrupted output voltage; for example 120V & 277V. This flexibility allows the inverter to supply Normally On and Normally Off emergency lighting fixtures with a different voltage if required. Example: Normally On emergency lighting may require 277V, while Normally Off emergency fixtures may require 120V. There is no need for external transformers.

The Normally Off bus is rated at 100% of full load capacity. The diagram below represents how the Normally Off Bus works:



Under all conditions, uninterrupted power is being fed to the Normally On lighting. When utility power is present (as depicted above), the contactor between output of the inverter and the Normally Off lighting is open; thus the Normally Off lighting is not illuminated. When utility power is lost, the timer senses it and in turn delays the energizing of the contactor. Once the contactor is energized, emergency power is applied to the Normally Off lighting. If an additional timer is implemented, when utility power returns, the timer senses it and delays the de-energizing of the contactor, according to the user programmed time period ("delay return" or "timed off" function). Once the contactor is de-energizes, the Normally Off lighting is turned off.

See *"Optional Timed Off Bus Setup"*

TIMED OFF BUS LOGIC AND CIRCUIT BOARD
SETTING UP THE DIP SWITCHES AND OFF BUS TIMING CIRCUITS

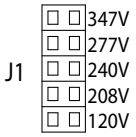
I/O FUNCTION AND CAPABILITIES

H1, H2(N):	FUSED 120-347VAC FROM INPUT OF UPS
L1, N:	FUSED 120VAC FROM OUPUT OF UPS
L1-2:	FUSED 120VAC OUTPUT TO RUN OUTBOARD CIRCUITRY
CONTACTOR L, N:	FUSED OUTPUT TO CONTACTOR(S) 120V-5A
GENERAL ALARM:	UNPROTECTED OUTPUT SIGNAL CONTACTS
REMOTE PANELS:	5V OUT TO N/O CONTACTS ON REMOTE POWER PANELS

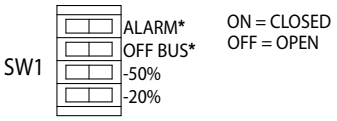
* **SW1 - Alarm and Off Bus Positions** - Disable position typically used when the inverter is having service or maintenance done. If you do not want the off bus lights or the alarm contacts to engage during this time, place these positions "off" while doing service. Be sure to place them back to the "on " position when service or maintenance is completed.

OPERATION OF CONTROLS
(SEE BOARD LAYOUT ON NEXT PAGE)

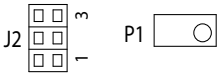
1 J1 VOLTAGE SELECT JUMPER: USED TO SELECT THE PROPER SCALING FOR THE INPUT LINE VOLTAGE PRESENT AT H1-H2.



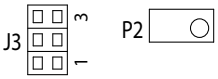
2. SW1: ENABLES AND DISABLES THE OFF BUSS AND GENERAL ALARM CONTACTS, AND ALSO CONTROLS WHEN THE OFF BUSS WILL ENGAGE (-20% OR -50% LINE VOLTAGE).



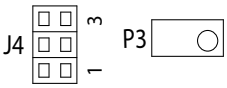
3. OFF BUSS ENGAGE DELAY: 1SEC-15MIN. DELAY IS DETERMINED BY J2 AND P1(0-100K POT)*.



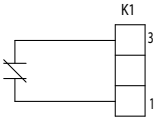
4. OFF BUSS DISENGAGE DELAY: 1SEC-15MIN. DELAY IS DETERMINED BY J3 AND P2(0-100K POT)*.



5. GENERAL ALARM DELAY: 1SEC-15MIN. DELAY IS DETERMINED BY J4 AND P3(0-100K POT)*.



6. REMOTE POWER PANEL INPUT: CONNECTED TO N/O CONTACTS. WHEN POWER IS PRESENT AT PANEL, CONTACT IS CLOSED. WHEN POWER IS LOST FROM ANY PANEL THE OFF BUSS WILL ENGAGE AFTER DELAY. JUMPER PINS 1 AND 3 IF NOT BEING USED.



SET SCREW CONNECTOR FOR CUSTOMER INTERFACE

*NOTE:

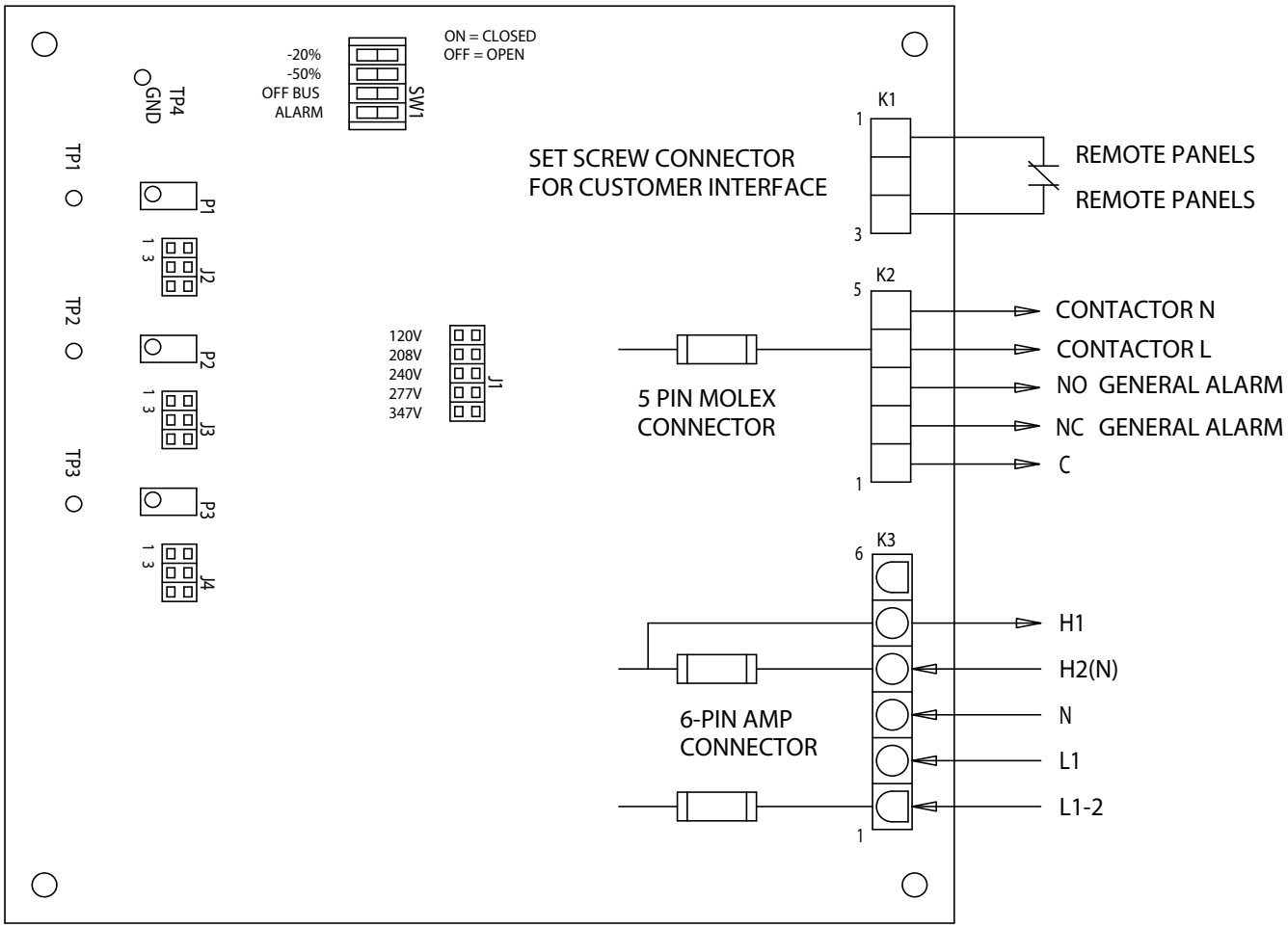
ALL TIME DELAY RANGES ARE DETERMINED BY ASSOCIATED JUMPER AND ADJUSTED WITHIN THAT RANGE BY ASSOCIATED POT.

CLOCKWISE=INCREASE TIME,
COUNTER CLOCKWISE=DECREASE TIME.

FOR 1-9 SEC, PLACE JUMPER IN POSITION 3
FOR 10-90 SEC PLACE JUMPER IN POSITION 2
FOR 100-900 SEC PLACE JUMPER IN POSITION 1

TIMED OFF BUS CONTROL BOARD LAYOUT

OFF BUSS ON DELAY FACTORY PRESET AT 0 SECONDS
OFF BUSS RETURN DELAY FACTORY PRESET AT 15 MINUTES



*NOTE:

ALL TIME DELAY RANGES ARE DETERMINED
BY ASSOCIATED JUMPER AND ADJUSTED WITHIN
THAT RANGE BY ASSOCIATED POT.

CLOCKWISE=INCREASE TIME,
COUNTER CLOCKWISE=DECREASE TIME.

FOR 1-9 SEC, PLACE JUMPER IN POSITION 3
FOR 10-90 SEC PLACE JUMPER IN POSITION 2
FOR 100-900 SEC PLACE JUMPER IN POSITION 1

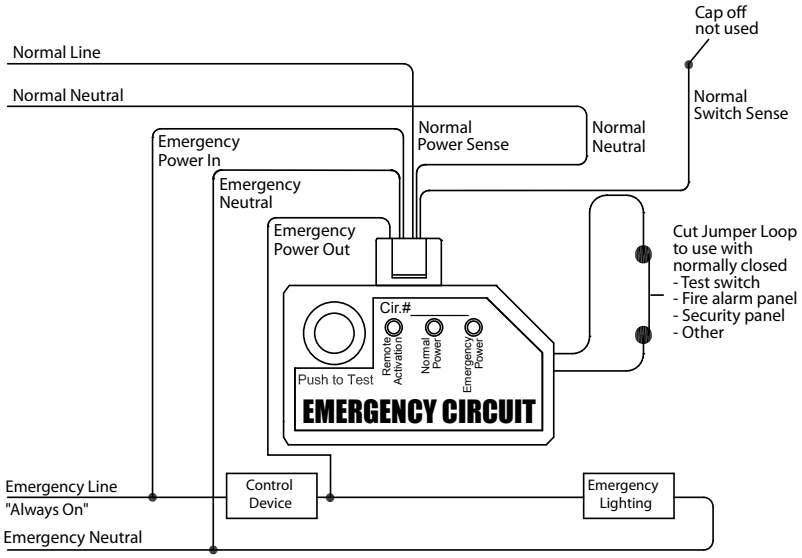
Specifications
Voltages 277VAC 50/60Hz
Max Load Requirements
LED Lighting.....18A @277VAC
Ballast..... 20A @277VAC
Incandescent.....10A @120VAC

ZONESAVER-2, "LOCAL CONTROL OVERRIDE" INSTALLATION

CONTROL DEVICE OVERRIDE

The ZoneSaver-2 emergency lighting control unit is a UL 924 listed load control relay wired to shunt around a local control device (e.g. dimmer control, wall switch, occupancy sensor) powered from the inverter's normally on output, in order to provide emergency power to designated emergency lights upon the failure or loss of commercial AC power.

The ZoneSaver-2 is a single circuit, single pole 120 VAC or 277 VAC, control unit that allows independent control of lighting fixtures during normal power conditions. However in the event of a power failure, or if remotely activated by a signal from a fire alarm panel, security panel, or test switch, the ZoneSaver-2 will automatically override the local control of selected fixtures and ensure their full illumination for safe egress.



When utility voltage is available at the Normal Power Sense input, the "Normal Power" light is illuminated indicating a normal condition. Local control is allowed. Note that when emergency power is available at the Emergency Power input, the "Emergency Power" light is illuminated.

When utility voltage is lost, the normal power light turns off. The control device is then bypassed, and emergency power is diverted to the selected emergency fixtures. Once power returns to the Normal Power Sense input, the local control device is inserted back into the circuit and the ZoneSaver-2 indicates a normal operating condition.

The "Remote Activation" light is illuminated under a normal condition, and turns off when the ZoneSaver-2 is activated by a signal from a fire alarm panel, a security panel, or the emergency power supply when performing an automatic "periodic" system test per NFPA 101. When activated, the local control device is then bypassed, and emergency power is diverted to the selected emergency fixtures. An integral push-to-test button is also provided to manually test the emergency circuits per NFPA 101.

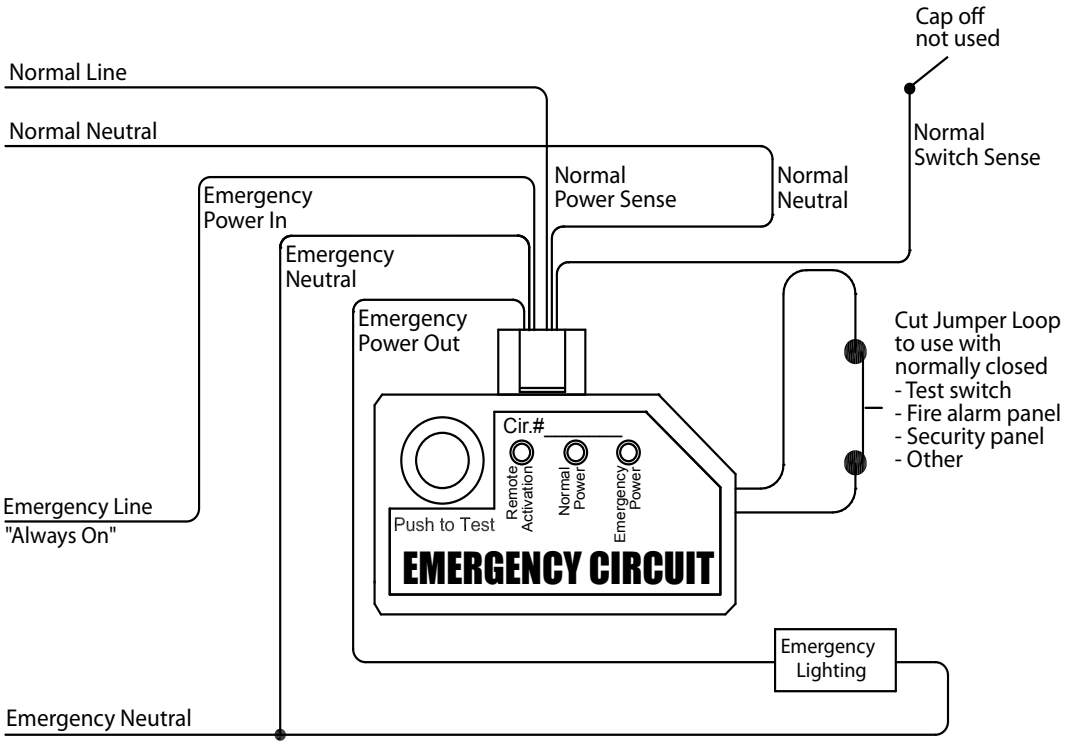
Refer to the manual that accompanied this device for function, use and installation instructions.

ZONESAVER-2, “ZONE SENSING” INSTALLATION

ZONE SENSING AND CONTROL OF NORMALLY OFF EMERGENCY LIGHTING

The ZoneSaver-2 emergency lighting control unit is a UL 924 listed load control relay, wired for zone sensing and independent control of normally off (standby) emergency lighting fixtures. The ZoneSaver-2 senses the voltage at an individual zone lighting panel. When a loss of normal power is detected, emergency power is made available to illuminate emergency fixtures within that specific zone.

The ZoneSaver-2 is a single circuit, single pole 120 VAC or 277 VAC, control unit that energizes normally off emergency lighting fixtures if a loss of power is detected at the normal lighting panel in that zone, or if remotely activated by a signal from a fire alarm panel, security panel, or test switch.



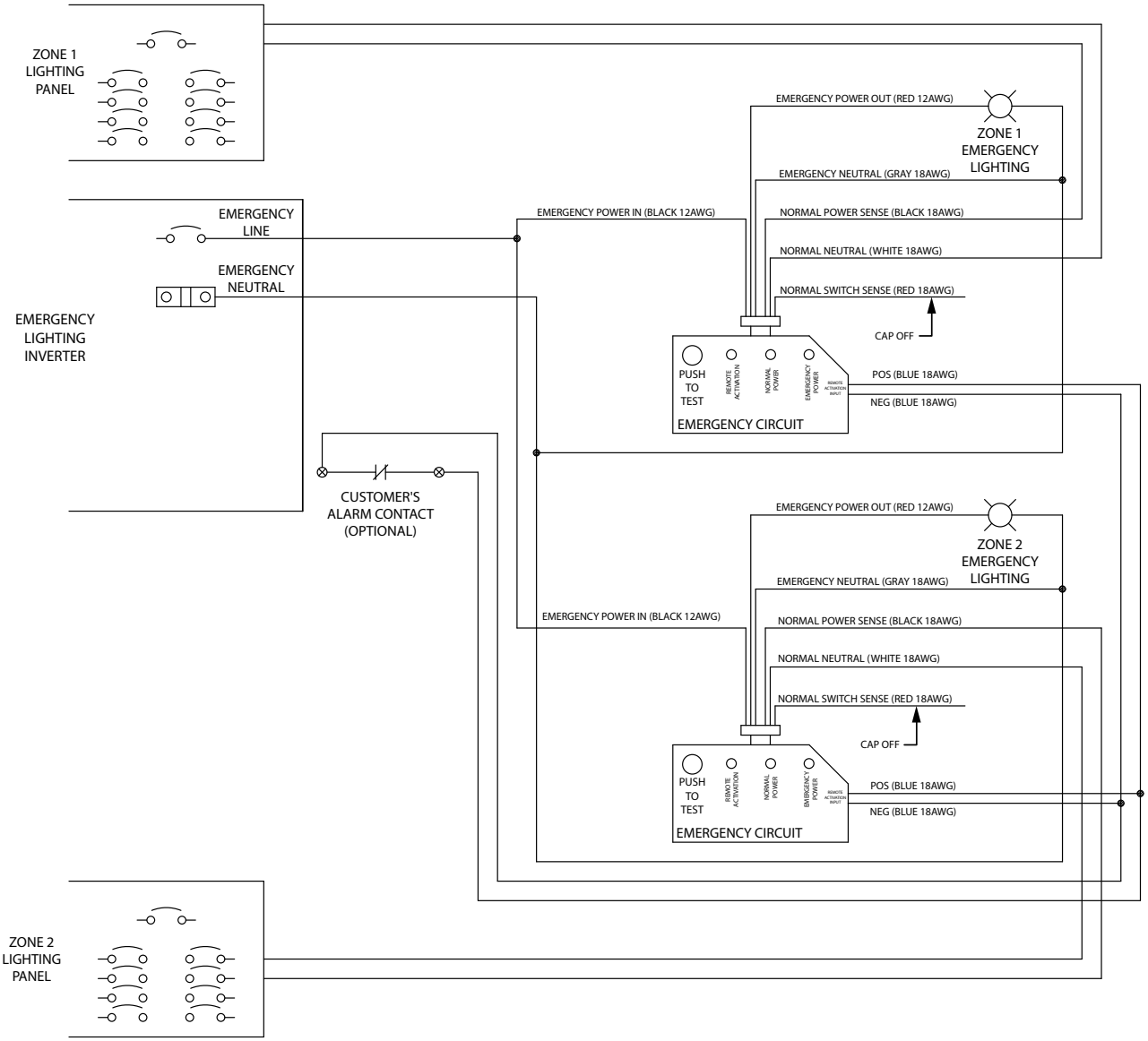
When utility voltage is available at the Normal Power Sense input, the “Normal Power” light is illuminated indicating a normal condition, and the normally off (standby) emergency lights remain off. Note that when emergency power is available at the Emergency Power input, the “Emergency Power” light is illuminated.

When utility voltage is lost, the normal power light turns off and the normally off (standby) emergency lights are energized. Once power returns to the Normal Power Sense input, the emergency lights are shut off and the ZoneSaver-2 indicates a normal operating condition.

The “Remote Activation” light is illuminated under a normal condition, and turns off when the ZoneSaver-2 is activated by a signal from a fire alarm panel, a security panel, or the emergency power supply when performing an automatic “periodic” system test per NFPA 101. When activated, emergency power energizes the normally off (standby) emergency lights. An integral push-to-test button is also provided to manually test the emergency circuits per NFPA 101.

Refer to the manual that accompanied this device for function, use and installation instructions.

MULTIPLE ZONESAVER-2 UNITS CONNECTED TO ONE EMERGENCY LIGHTING INVERTER - WIRING DIAGRAM



NOTES:

1. UP TO 5 ZONESAVER - 2 REMOTE ACTIVATION INPUTS MAYBE BE WIRED IN PARALLEL TO THE SAME ALARM CONTACT(S). MAXIMUM WIRE RUN 500' WITH #18 AWG.

2. ONLY ONE SET OF WIRES CAN BE LANDED ON THE EMERGENCY LIGHTING INVERTER'S, J1 (DB25) PORT UPS ON BATTERY PIN 1. NOTE: CUSTOMER SUPPLIED SLAVE RELAYS REQUIRED - SEE "COMMUNICATIONS DESCRIPTION".

Refer to the manual that accompanied this device for function, use and installation instructions.

OPTIONAL REMOTE ANNUNCIATOR INSTALLATION

Please read this entire instruction set before installing!
Turn off all power before installing or servicing!

REMOTE ANNUNCIATOR

Controlled Power Company's Remote Annunciator is capable of displaying status conditions of an Emergency Lighting Inverter and alarming under critical conditions. The following installation instructions include operation, wiring, and mounting your Remote Annunciator.

OPERATION

During normal operation of the Inverter, the Remote Annunciator will illuminate the green Inverter On LED. During an alarm condition (unit over temperature, utility fail, etc.) the red General Alarm LED will illuminate along with other applicable LED's indicating the nature of the alarm and the audible alarm will sound. The On Bypass LED is inactive for ELN Systems. The audible alarm can be silenced by pressing the Alarm Silence button on the front of the unit. If another alarm condition occurs (i.e. low battery), the alarm will resound. The audible alarm can be altogether defeated by changing jumper J1 on the circuit board. See the back side of the Remote Annunciator for J1 jumper setting.

Figure 1: Remote Annunciator

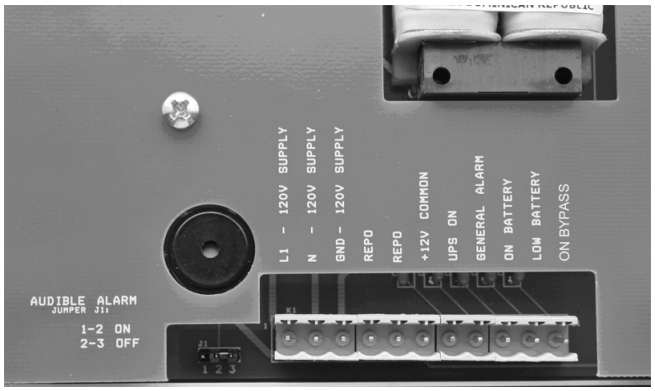


Figure 2: Rear of Remote Annunciator showing J1 and terminal header

WIRING

The wiring of the Remote Annunciator consists of two feeds. One being the communication cable supplied with the unit, and the other is 120Vac 50/60Hz from the output of the Inverter it is monitoring. The power supply can be taken directly from an output breaker on the unit, a receptacle or panel that is fed by the Inverter or a nearby emergency lighting circuit fed by the Inverter. From the Inverter, run the communication cable to the location of the Remote Annunciator. The cable may be run through conduit, walls or cable tray/raceway, but care must be taken not to pinch, cut or kink the cable. After the cable is run, trim excess cable or coil in a safe location. Both feeds, after entering the box, must be wired to the supplied connector as shown in Fig 3. Use standard 1/2" box connector clamps to anchor the wire to the box (not supplied).

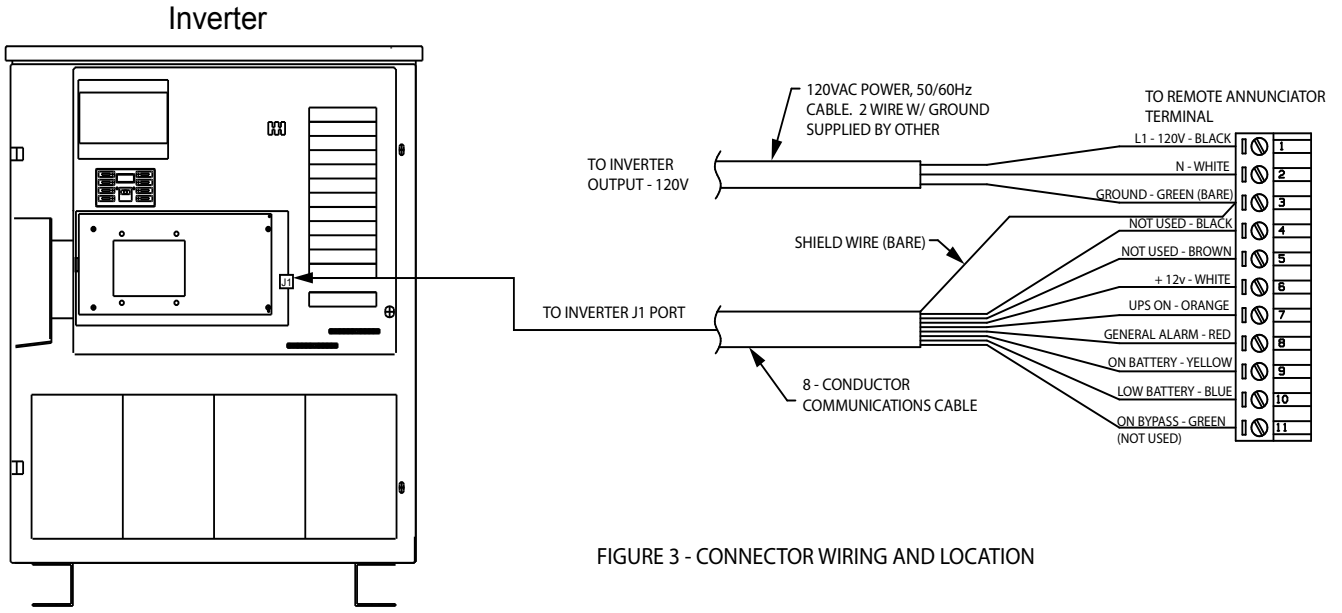


FIGURE 3 - CONNECTOR WIRING AND LOCATION

NOTES:

1. All wires to connector must be stranded, maximum 12 AWG.
2. If using solid conductor for AC power, splice in length (minimum 4”) of stranded wire to connector.
3. Strip outer sheathing and foil back minimum 2”.
4. Strip all wires 0.25”.
5. 120V supply must come from UPS/Inverter output. Power must be present in event of utility failure.
6. Connector on other end of communication cable to be factory wired.

After all cable routing and connector wiring is complete, plug Remote Annunciator connector into the terminal header.

MOUNTING

The Remote Annunciator is designed to be wall mounted with wiring inputs through the rear or top/bottom (using conduit). Flipping out the side doors, remove the four screws fastening the cover to the box. The cover is attached to the box with two plastic retaining straps. Using the four holes in the back of the box and proper anchors (not supplied), mount the unit to drywall, masonry, paneling or any other type of wall. Holes are provided for rear cable entry. If top or bottom entry is desired, holes must be drilled in recommended location for (maximum 1/2”) conduit (Fig. 4).

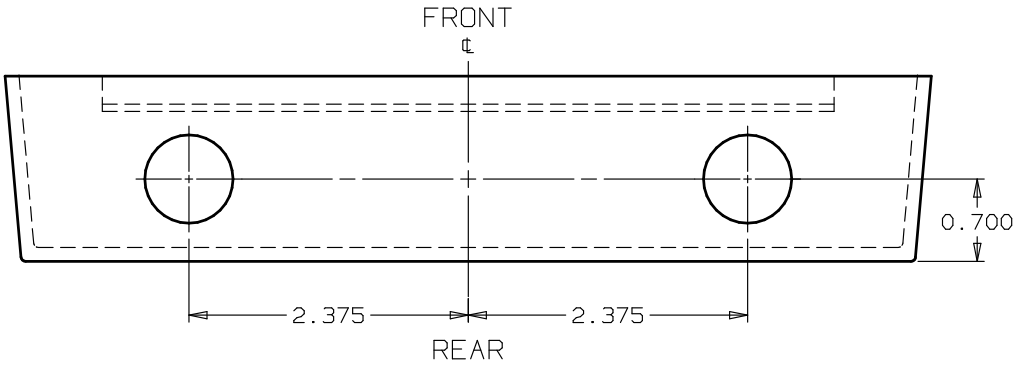
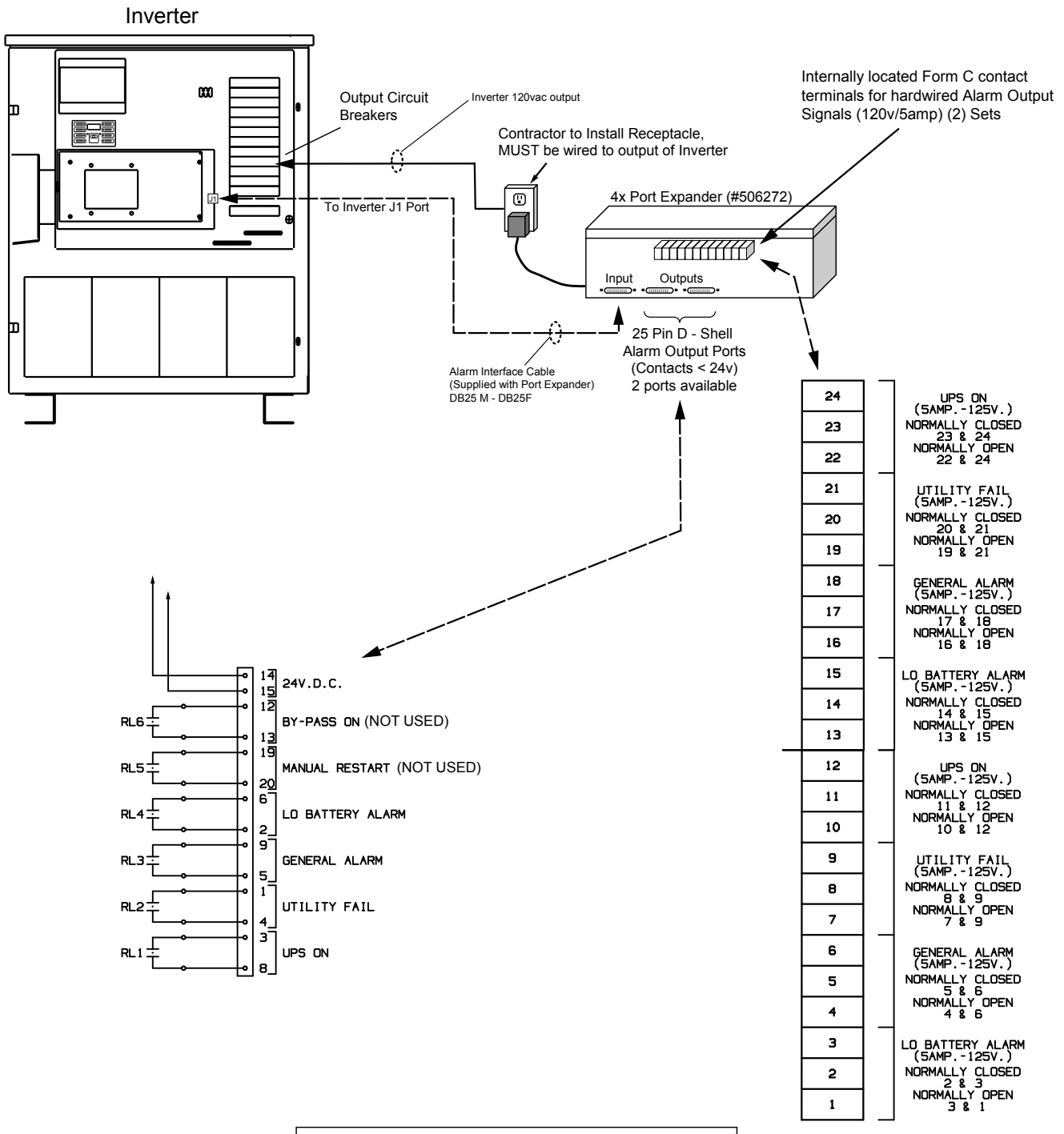


Figure 4: Drilling locations for top/bottom conduit entrance.

Inverter Alarm Option
Port Expander (4x) Modified for Hardwire Alarm Interface
Typical Layout



Notes:
Port Expander to be placed on top of Inverter.
Refer to Schematic for Alarm Assignment and Contact Pinout

NETMINDER REMOTE COMMUNICATIONS

The NetMinder CS141 series of adapters integrate a Controlled Power UPS or lighting inverter into an Ethernet TCP/IP, MODBUS TCP, or MODBUS RS485 network with a specific IP address. The NetMinder CS141 adapters provide remote monitoring of UPS / Inverter status, alarm conditions and electrical measurements via a web browser, without the need for any external software. Remote notification of alarms and status are available via SNMP, e-mail, and network broadcast messaging. The CS141 series of adapters also perform an unattended graceful shutdown of critical servers when used in conjunction with the NetMinder RCCMD client. When used in a lighting inverter application, the NetMinder CS141B will report inverter battery test pass/fail results (not available for the ELN) for NFPA life safety system requirements. The NetMinder CS141L advanced version provides a temperature and humidity sensing interface. NOTE the CS121 has been discontinued and replaced by the CS141. The CS121 is still supported.

BACnet Communications

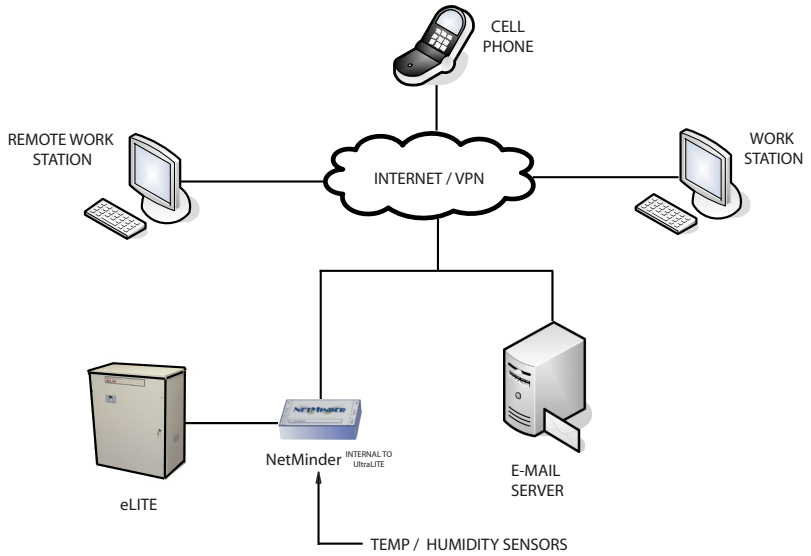
The NetMinder CS141 series of adapters are now able to communicate over a BACnet/IP or MS/TP network with the addition of customized hardware provided by Controlled Power Company. All objects including: parameters, alarms, status, and test results can be monitored and stored by building management systems, improving connectivity and simplifying maintenance.

The NetMinder CS141 series of adapters are available in three different versions:

NetMinder CS141B – Basic Ethernet / SNMP / TCP/IP / MODBUS TCP communications used in UPS and lighting inverter applications. The CS141B also provides battery test pass/fail reporting (not available for the ELN) via TCP/IP, e-mail and MODBUS TCP for lighting inverters to satisfy NFPA requirements for life safety.

NetMinder CS141L – Advanced version, includes all functionality of the basic version, plus the addition of temperature and humidity sensing capability, and 4 auxiliary contact closure inputs.

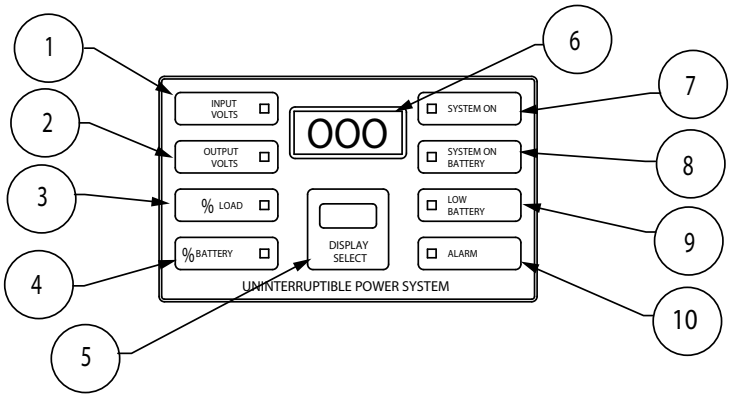
NetMinder CS141L-485 – Adds MODBUS 485 communications to the advanced version of the NetMinder CS141L. However, temperature and humidity sensing are not available in this version.



See the accompanying communications manual for setup instructions.

See *"Communications Description"* for port locations.

LIGHTING INVERTER DISPLAY OPERATION
(Front Of Lighting Inverter, Door Closed)



DISPLAY PANEL

1. Input Volts - LED ON indicates unit is monitoring the input voltage via the digital display. This function is activated by pushing the display select button.

2. Output Volts - LED ON indicates unit is monitoring the output voltage via the digital display. This function is activated by pushing the display select button.

3. Percent Load - LED ON indicates unit is monitoring the output load capacity relative to maximum watts via the digital display. This function is activated by pushing the display select button.

4. Percent Battery - LED ON indicates unit is monitoring the percentage of battery charge via the digital display. When operating on battery power the digital display monitors percentage of battery time remaining.

5. Display Select - This push button selects 1 of 4 monitor functions mentioned above and displays the results on the digital display.

6. Digital Display - Three digit display monitoring the four previous functions. This display monitors one function at a time and is selected by the “Display Select” push button.

7. System On - LED ON indicates the on/off switch is on and AC power is available at the input. LED will remain on when unit is on battery power.

8. System On Battery - LED ON indicates the UPS is on battery power accompanied by an audible alarm. The UPS may switch to battery power even when it appears there are no power outages. The reason is that the UPS detects input sags and surges and does not necessarily require a total power loss to switch to battery power. The UPS will remain on battery power for a few seconds after normal AC power is restored.

9. Low Battery - LED ON indicates batteries are low and a total UPS shutdown is imminent unless AC power returns. This alarm set point is user selectable via the communications port (Refer to *“Communications”*) to turn on at a predetermined percentage of battery time remaining. Percentage is selectable from 10% to 90% of battery remaining. Standard selection is 40%.

10. Alarm - LED ON is accompanied by an audible alarm for a number of alarm functions (Refer to *“Communications”*). Alarm will clear automatically once the alarm condition is resolved.

NOT SHOWN - Optional Circuit Breaker Tripped Indicator - Will illuminate when an output circuit breaker has opened. See *“Appendix A - Component Location Diagram”* for location.

COMMUNICATIONS DESCRIPTION

Three methods can be used to communicate with the UPS:

- Direct connect to a terminal.
- Direct connect to a PC that is operating as a terminal emulator or a communication software that will emulate a terminal.
- Modem operation.

Once the communication link is established, system set points, system parameters, system status and memory modification is attainable.

Any system status change will automatically cause the UPS to send an alert warning signal. The signal sent is "?". User software can be written to identify this signal and initiate automatic unattended action.

J1 PORT - DB25 PIN FUNCTION

Pin #	Name	Description
1	UPS On (Battery Operation)	Closes on battery operation
2	Receive Data	RS/232
3	Transmit Data	RS/232
6	(+) 10 VDC Supply	Limited to 1 mA
7	Signal Ground	Communication signal ground
8	UPS On (Ready)	Closes when UPS is ready
11	Low Battery Alarm (Shutdown Pending)	Closes when low battery
14	General Alarm	Closes on alarm condition
20	(+) 10 VDC Supply	RS/232
21	(-) 10 VDC Supply	Limited to 1 mA
23	Remote Emergency Power Off	Positive DC input w / reference to ground shuts unit off
25	Signal Ground	Communication signal ground

Pins 8, 1, 11 and 14 are open collector transistor, 40V Max. requiring a pull up resistor, 300mA Max. The contacts are referenced to pins 7 or 25 which is chassis ground.

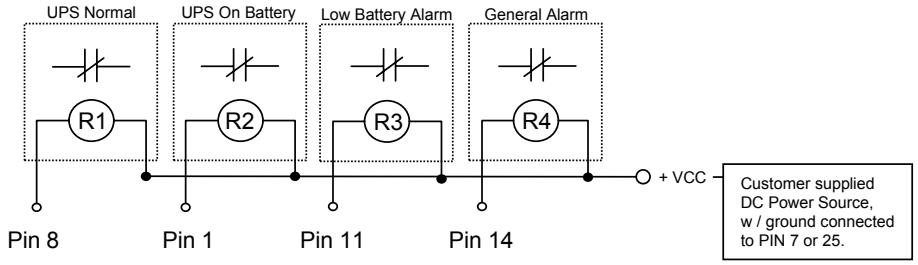
Pin 23 requires a high input limited to 20 VDC with reference to pin 7 and 25 (ground) or the +10 VDC signal at pin 6 may be utilized with an external contact.

RS232 TECHNICAL SPECIFICATION SUMMARY

Connector	25 Pin, Type D, Female
Format	ASCII 8 bit, One Start Bit, One Stop Bit
Parity	None
Duplex	Full
Delimiters	Carriage Return per Block

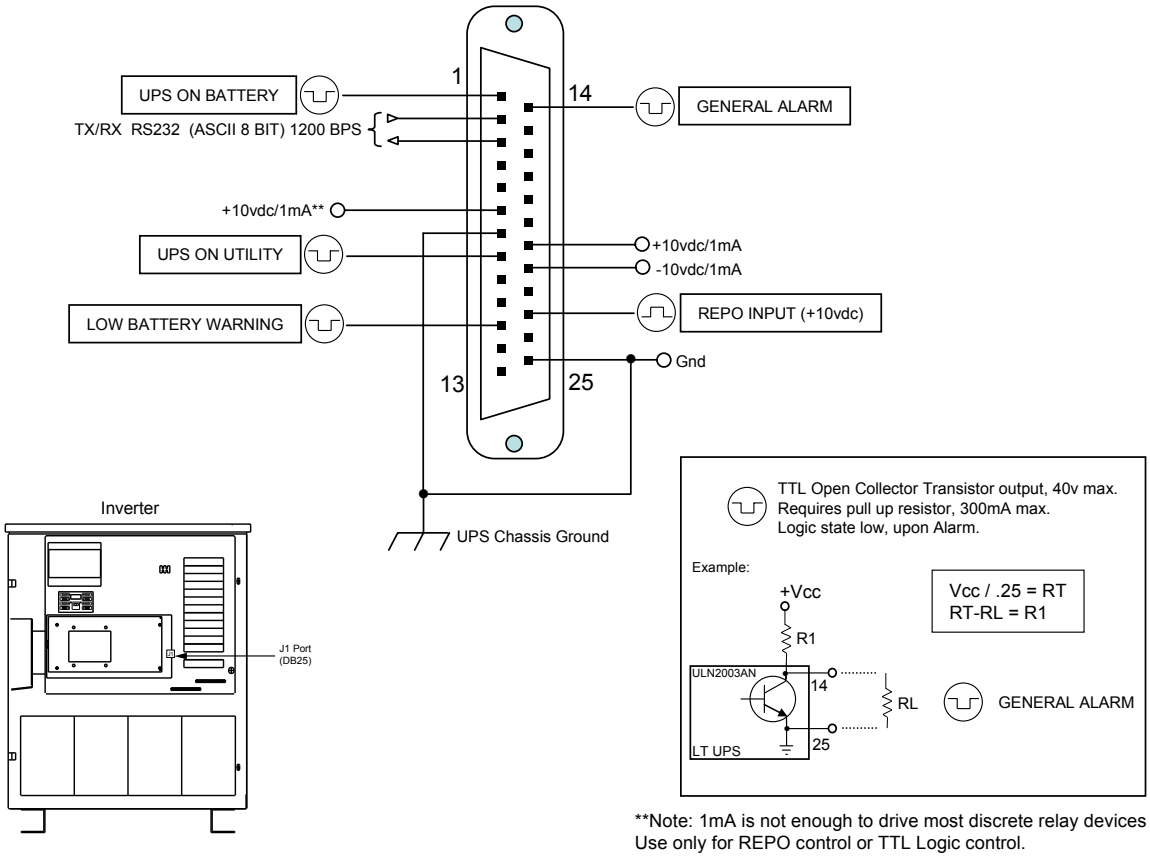
Baud Rate – 1200 BPS. Standard SNMP operation is 9600 BPS. Default is 1200 BPS.

Customer Supplied Slave Relays for alternate voltage/current and isolation requirements
(Recommended to insure proper interface without operational interference)



R1-R4 contact and coil specifications to match customer alarm interface and DC Power Source requirements.

J1 Port / DB25



**Note: 1mA is not enough to drive most discrete relay devices
Use only for REPO control or TTL Logic control.

COMMUNICATIONS

There are alarm and operational set points that will alter the behavior of the UPS. It is not recommended that these be modified without a complete understanding of the function. Consult Customer Support at 1-800-521-4792 prior to modifying set points.

MINIMUM SYSTEM REQUIREMENTS:

1. Computer/Laptop with Windows 3.1 or later.
2. "Hyperterminal" (Windows 3.1, Windows XP) or "PuTTY" for Windows Vista and Windows 7 or later. (download at http://www.putty.org/).
3. USB Port and a DB25 to USB Null Modem Conversion Cable - for use with all Windows operating systems and "Hyperterminal" or "PuTTY" emulation programs.

PROCEDURE

1. Connect the DB25 to USB Null Modem Conversion cable from J1 (DB25) on the Inverter to the USB port on a computer. See *"Communications Description"* for location.

2. Make sure the UPS in ON and running.

3. Start Windows on the computer, access "All Programs" then "Accessories" then "Communications" then "Hyper Terminal" for Windows 3.1 or Windows XP. Or launch "PuTTY" for Windows Vista and Windows 7 or later.

4. In the Hyperterminal "Connection Description" window, enter any name then choose any icon - Click OK. For "PuTTY" users, Connection type = Serial, Serial Line = Com Port of computer being used, Speed = 1200. "PuTTY" users can name and save the session for later use. "PuTTY" users skip to step 7.

5. In the Hyperterminal "Connect To" window, choose "Connect Using" and select the comport you are using, Click OK.

6. In the Hyperterminal "COM Port Settings" window, set the following parameters: 1200 Baud, 8 data bits, 0 parity, 1 stop bit, flow control = xon/xoff, then click OK.

7. To enter into the "Memory Modification Group" type a lower case "m" and hit "ENTER".

8. The response will be: PASSWORD=

9. Enter a lower case "sps-92". then hit "ENTER"

10. Upon entering the correct password, one line item will be displayed at a time, i.e.,

    Min AC Start = 204

    Min AC Start = If the value is to remain unchanged press ENTER and the next parameter will appear or else type the new value. After entering the new value press "ENTER" to scroll to the next parameter. To end the process type a lower case "e".

11. After making the desired changes, send a lower case "p" and the System Parameters will appear on the screen. Verify the changes that you have made. If further changes are required, go back to step 7.

12. At this point you are already out of the "Memory Modification Group" (after entering the lower case "e" in step 10).

13. Disconnect the communications cable.

SYSTEM PARAMETERS

The following lists parameters the UPS monitors and also system status of the UPS while operating.

To access System Parameters and Status send the lower case “s” to the UPS from the terminal.

You must hit the “s” key each time to update system status.

Description	Sample Display	Description
AC Volts In	Input Line Voltage = 240	The voltage the UPS is receiving
AC Volts Out	Output Voltage = 240	The voltage the UPS is delivering to the load
Battery Volts	Batter Voltage % = 98	Percentage of full charge of the battery
AC Amps Out	Output Current = 2.4	Amperage the load draws from the UPS
% of Full Load	Load % = 90	The percentage of total capacity that the load is using
Watts Out	KW = .54	The total real power the UPS is delivering to the load
Volt Amps Out	KVA = .77	The total apparent power the UPS is delivering to the load
Power Factor	Power Factor = 0.70	The power factor of the load (KW/KVA)
Incoming Line Frequency	Frequency = 60.0	Displays the input frequency when on line, output frequency when on inverter
Crest Factor	Crest Factor	Peak Current / RMS Current
Outages	Outage	The number of outages recorded from the last clear function
Overloads	Overload	The number of overloads from the last clear function

SYSTEM STATUS

Description	Sample Display	Description
Synchronization	Synchronization	When the UPS is in sync with the line frequency
UPS On	UPS On	When the UPS is producing an output voltage
Low Battery Warning	Low Battery Warning	When the battery level reaches the preset value of alarm condition
On Battery	On Inverter	When the UPS is supplying output power from the batteries
Overload Alarm	Overload Alarm	When the UPS is supplying more power than its rated capacity
Low Output	Low Output	When the output voltage goes lower than the preset alarm condition
High Output	High Output	When the output voltage exceeds the preset alarm condition
Check Battery	Check Battery	When the battery discharge is greater then normal
Frequency Fault	Frequency Fault	When the fault exceeds the preset range of alarm conditions
Overtemp Warning	Overtemp Warning	When the UPS temperature reaches a critical level. Immediate shut-down.
Shorted SCR Shutdown	Shorted SCR Shutdown	When the power electronic switch is shorted
Low Battery Shutdown	Low Battery Shutdown	When the batteries are depleted the UPS shuts off
Output Shutdown	Output Shutdown	If selected, the UPS will shutdown when the output exceeds set points
Output Warning	Output Warning	If selected, UPS will alarm when output exceeds set points

SYSTEM SET POINTS

To access System Set Points send the lower case “p” to the UPS from the terminal. Note: This allows monitoring of system set points only.

Description	Sample Display	Password	Explanation
Minimum AC Start Voltage	204	Required	Minimum AC voltage required before the UPS will start.
Maximum AC Start Voltage	Max AC Start = 264(+15% Max)	Required	If the input voltage exceeds this value, the UPS will not start
Low Output Alarm Set points	Low Output = 210	Required	Alarm or shutdown if the output voltage dips to this set value.
High Output Alarm Set points	High Output = 264	Required	Alarm or shutdown if the output voltage reaches this set value.
Low Battery Warning Set Point	Low Battery (%) - Min = 010 Max = 070	No Access	Percent of battery capacity alarm set value.
High Battery Warning Set Point	High Battery (%) = 105	No Access	Manufacturer set point for diagnostics and charger control.
Low Frequency Alarm Set Point	Low Frequency = 059 Max = 057	Required	Alarm or shutdown if the output frequency dips to this set value.
High Frequency Alarm Set Point	High Frequency = 061 Max = 063	Required	Alarm or shutdown if the output frequency reaches this set value.
Over Temperature Set Point	Over Temperature = 160	No Access	Manufacturer set point.
Nominal Input Voltage	Input Nominal = 240	Required	Nominal input voltage. Switch set points are calculated from this value.
Nominal Output Voltage	Output Nominal = 240	Required	Nominal output voltage. Value from which other calculations are derived.
Maximum KVA Rating	Output VA = 850	Required	Maximum KVA rating of the UPS.
Low Line Switch Point. NOTE: Fuzzy Logic is entered as shown	Sag Switch Point (%) = 065 Fuzzy Logic = 000 Fuzzy Plus = 001	Required	Percent below nominal AC input when the UPS will switch to battery operation.
High Line Switch Point	Surge Switch Point (%) = 110 (%) = 115 Max	Required	Percent above nominal AC input when the UPS will switch to battery operation.
Low Line Sample Accumulation Buffer	Sensitivity (1-2) = 1	Required	Averaging factor for low line voltage. 1 = least averaging (greater sensitivity).
Frequency Accumulation Buffer	Frequency Delay (2-9) = 8	Required	Number of AC cycles required to be out of set frequency range prior to switching to inverter mode.
Power Grid Stability Check	Transfer Delay (Sec) = 20	No Access	Amount of time in seconds the UPS will wait before accepting the AC input
System ID Number	System ID = Units 8 Digit Serial #	Required	System identification serial number.
System Shutdown Enable	Output Shutdown Enable (1/0) = 0	Required	If enable set = 1, the UPS will shut-down when alarm set points are exceeded. 0 = audible alarm only.
Hot Start or AC Start	Hot Start = 1 AC Start = 0	Required	Hot Start - Unit turns on with no AC input power. AC Start - AC power required for unit to turn on.

SYSTEM SET POINTS - FACTORY PRESET LEVELS

Description	Value entered w/ nominal input voltage = 120V	Value entered w/ nominal input voltage = 208V	Value entered w/ nominal input voltage = 240V
Minimum AC Start Voltage	102	177	204
Maximum AC Start Voltage	132	229	264
Nominal Input Voltage	120	208	240
Nominal Output Voltage	Refer to unit Spec tag	Refer to unit Spec tag	Refer to unit Spec tag
Low Output Alarm Set points	105	182	210
High Output Alarm Set points	132	229	264
Low Line Switch Point. NOTE: Fuzzy Logic is entered as shown	Fuzzy Logic = 00.	Fuzzy Logic = 00.	Fuzzy Logic = 00.
High Line Switch Point	% = 110	% = 110	% = 110
Low Output Frequency Alarm Set Point	59	59	59
High Output Frequency Alarm Set Point	61	61	61
Low Line Sample Accumulation Set Point	Available (1-2) = 1	Available (1-2) = 1	Available (1-2) = 1
Frequency Accumulation Buffer	Available (2-9) = 8	Available (2-9) = 8	Available (2-9) = 8
System Shutdown Enable	Audible Only = 0	Audible Only = 0	Audible Only = 0
Maximum KVA Rating	Enter actual KVA Rating - See units spec tag	Enter actual KVA Rating - See units spec tag	Enter actual KVA Rating - See units spec tag
Hot Start or AC Start	AC Start = 0	AC Start = 0	AC Start = 0

***** WARNING *****

CAUTION - RISK OF ELECTRICAL SHOCK.
THE LIGHTING INVERTER RECEIVES POWER FROM MORE THAN ONE SOURCE. BE SURE ALL UTILITY CIRCUIT BREAKERS ARE IN THE OFF POSITION AND THE BATTERY CONNECTOR IS UNPLUGGED BEFORE SERVICING.

GENERAL MAINTENANCE

The best preventive maintenance is to operate the lighting inverter in a clean environment with proper ventilation and no restrictions on air intakes and cooling fan outputs.

Battery connections should be tightened annually by qualified electrical personnel. Batteries should be replaced as indicated by battery testing.

The lighting inverter should be checked monthly on battery operation. Take precautions to have the lighting load in a mode that could tolerate a shut down. See *"Lighting Inverter Maintenance Procedures - Battery Test"*.

COMPLETE MAINTENANCE CHECK

PREPARATION - A shutdown period must be scheduled to perform maintenance. The lighting loads should be available to test the lighting inverter with a loss of power simulation.

EQUIPMENT - Wire brush or other cleaning device (for battery connections), insulated tools (for battery connections) and safety glasses.

SYSTEM OPERATION

1. With power on, check display functions of unit for proper operation.
2. Turn Input Source and Input AC breaker off.

VISUAL INSPECTION

1. Open Door.
2. Remove any load from unit's output.
3. Check for burnt, frayed, broken or loose connections. Look closely in the following areas: Input, output connections ,circuit breakers and battery terminals.
4. Correct any loose connections, replace any physically burned or broken components. Use extreme care when replacing components to assure correct installation.

GENERATOR TEST

1. If generator is backing the lighting inverter, check to be sure the lighting inverter operates properly with the generator.

   A. Check generator operation with no load. Unit should switch to inverter when generator turns on. After a minute or so the lighting inverter should switch back to normal mode and run off the generator.

   B. Check generator with customers loads.

BATTERY MAINTENANCE

Batteries of a specific manufacturer and model are required to maintain the system's UL 924 listing. Use of batteries not recognized in the product's UL report will void its listing.

Accidental shorts will cause severe arching, burning or battery explosion - wear eye protection and use insulated tools when servicing batteries. Remove all jewelry.

NOTE: Never mix batteries with a different brand or size. Never mix old and new batteries. Dispose of batteries properly. Do not open, mutilate or dispose in a fire.

1. Visually inspect all battery connections,. If there is any sign of corrosion - disconnect that battery and clean with wire brush. Tighten all other battery connections. Make sure batteries are not swollen or cracked. If they are, contact factory.

2. If batteries must be replaced, contact factory or see *"Lighting Inverter Installation - Battery Installation"*.

BATTERY TESTING

Battery testing should be performed monthly to ensure efficient operation.

PREPARATION

Proper precautions must be taken when performing battery testing. The lighting load(s) should be available to test on inverter, in a loss of power simulation. Be sure also to take precautions to have the lighting load in a mode that could tolerate a shut down. If the battery test fails the system may shutdown and all of the lighting loads connected to it will lose power.

It is recommended that batteries are inspected for corroded and loose connections before performing the battery test. Battery connections should be tightened annually by qualified electrical personnel. Batteries should be replaced as indicated by monthly battery testing.

Annual Battery Test - 90 Minute (or full load run time)

1. On the front display select battery percentage, be sure that it is 100%. If it is not 100%, allow batteries to charge until it reads 100%.

2. Open front door and turn the AC input breaker off only, unit should run on inverter. Allow batteries to discharge for 90 minutes. If the batteries do not complete the 90 minute discharge time, they may need to be replaced. Contact factory for service.

Monthly or Quarterly Battery Test (90 minute models) - 5 Minute

1. On the front display select battery percentage, be sure that it is 100%. If it is not 100%, allow batteries to charge until it reads 100%.

2. Set a timer for 5 minutes

3. Turn off AC input breaker and start timer

4. After the 5 minutes has elapsed record battery percentage. If the battery percentage is 85% or less then there may be a defective battery in the system. Contact factory for service. If the percentage is greater than 85 percent, this would indicate that the batteries are operating properly.

This Warranty applies only to the original purchaser who must properly register the product within thirty (30) days of receipt.

https://controlledpwr.com/customer-support/warranty-registration/

Controlled Power Company warrants that our products and their components will remain free from defects in material and workmanship for the duration of the respective warranty period* from the date of shipment and agrees to replace, F. O. B. its factory, any parts which fault through defect in material or workmanship during such period. Non payment for the product to either the reseller, rep, distributor or the factory direct will result in revocation of warranty, technical support and service contracts. **Warranty begins from date of shipment unless a factory start-up is purchased, then the warranty begins from date of Start Up or 90 days from ship date; whichever comes first.**

If a Start-Up is purchased with the unit(s) or within 30 days from original ship date, the 1st year warranty is upgraded to include onsite labor and expenses during normal business hours (Monday - Friday, 8AM - 4PM). Start up includes all travel and living expenses. Start up description: Testing all emergency circuitry - Calibration - Inspection - Exercising all circuit breakers - Cooling fan check - Input and output parameter check - Air intake / exhaust check - Re-torque all high current terminals - Input/Output verification - Written report. User training to be done at time of start up (no return visits). Product installation is required to be complete before start up can be scheduled.

Products:

- Emergency Lighting Inverters (ELC, ELU, ELN, ELE) / 2 Years parts only*, Batteries 1 Year full, 14 year pro-rated.

* From original shipment date / Excludes on site labor and expenses unless otherwise noted.

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1. This Warranty shall be effective only if and so long as the system is installed and operated in the manner specified in the manual which accompanied the product, and is operated within the ratings on the nameplate of the system.

2. This Warranty shall be effective provided the purchaser pays the cost of transporting the faulty component(s) to and from Controlled Power Company's factory at the purchaser's own expense, unless the item covered under service contract with Controlled Power Company. There is no cost for installation of the replacement component(s) when done at the factory. Otherwise installation of the replacement component(s) are the responsibility of the purchaser, unless the item is covered under service contract with Controlled Power Company. If after inspection the faulty component has been caused by misuse or abnormal conditions in the judgment of Controlled Power Company, the purchaser will be charged for repairs based on parts and labor required. This Warranty does not cover fuses, light bulbs, and other normally expendable items. Controlled Power Company service personnel are not included in this warranty unless covered by a Controlled Power Company service contract.

3. This Warranty shall be void if any alteration is made to the system, or any of its components are altered by anyone other than an authorized Controlled Power Company service person, without the written permission of Controlled Power Company.

4. This Warranty is in lieu of all other warranties, expressed or implied. Controlled Power Company neither assumes, nor authorizes any person to assume for it, any liability other than that specifically set forth in this Warranty. Except for its obligations, Controlled Power Company assumes no liability or responsibility for personal injury, loss of life, consequential or other damages resulting from defects in, or failure of, the system or any of its components.

https://controlledpwr.com/customer-support/warranty-registration/

Contact Controlled Power Company.

CONTROLLED POWER COMPANY NATIONWIDE CUSTOMER SUPPORT

Controlled Power Company offers total customer support that assures your critical equipment is maintained properly for trouble free operation.

WHAT A CUSTOMER SUPPORT PLAN OFFERS:

HOTLINE: 24 hour toll free 1-800-521-4792.

REMEDIAL MAINTENANCE : Covers all on-site repairs, parts, freight, labor and travel expenses.

RESPONSE: Immediate 24 hour phone support. If problem is not solved Controlled Power will make every effort to have your system running within 48 hours.

BATTERIES: Batteries are covered under a 15 year pro-rate schedule, beginning from the shipment date. The battery pro-rate does not cover labor, freight, battery disposal, travel or living expenses.

PREVENTIVE MAINTENANCE: Optional preventive maintenance includes the following:

Annual battery run down certification for 90 minutes per NFPA 101 Life Safety Code, Section 5- 9.3 and NFPA 70 (N.E.C. 70) National Electric Code.

- Testing all emergency circuitry
- Inspection
- Exercising all circuit breakers
- Input and output parameter check
- Complete battery inspection and testing
- Re-torque all high current terminals
- Calibration
- Clean internal and external
- Cooling fan check
- Air intake / exhaust check
- Written report
- **Battery certification report**

START UP: Includes installation inspection (wired properly, location, environment), Unit inspection (internal and external), Unit power up, Operation verification including options. One visit, includes all travel expenses.

PLAN	ON SITE COVERAGE	PARTS COVERED	FIELD REPAIR LABOR COVERED	FACTORY REPAIR LABOR COVERED	FREIGHT COVERED	TRAVEL EXPENSES COVERED
SILVER	NONE	YES	NO	YES	NO	NO
GOLD	M-F 8AM-4PM	YES	YES	YES	YES	YES
PLATINUM	24-7	YES	YES	YES	YES	YES

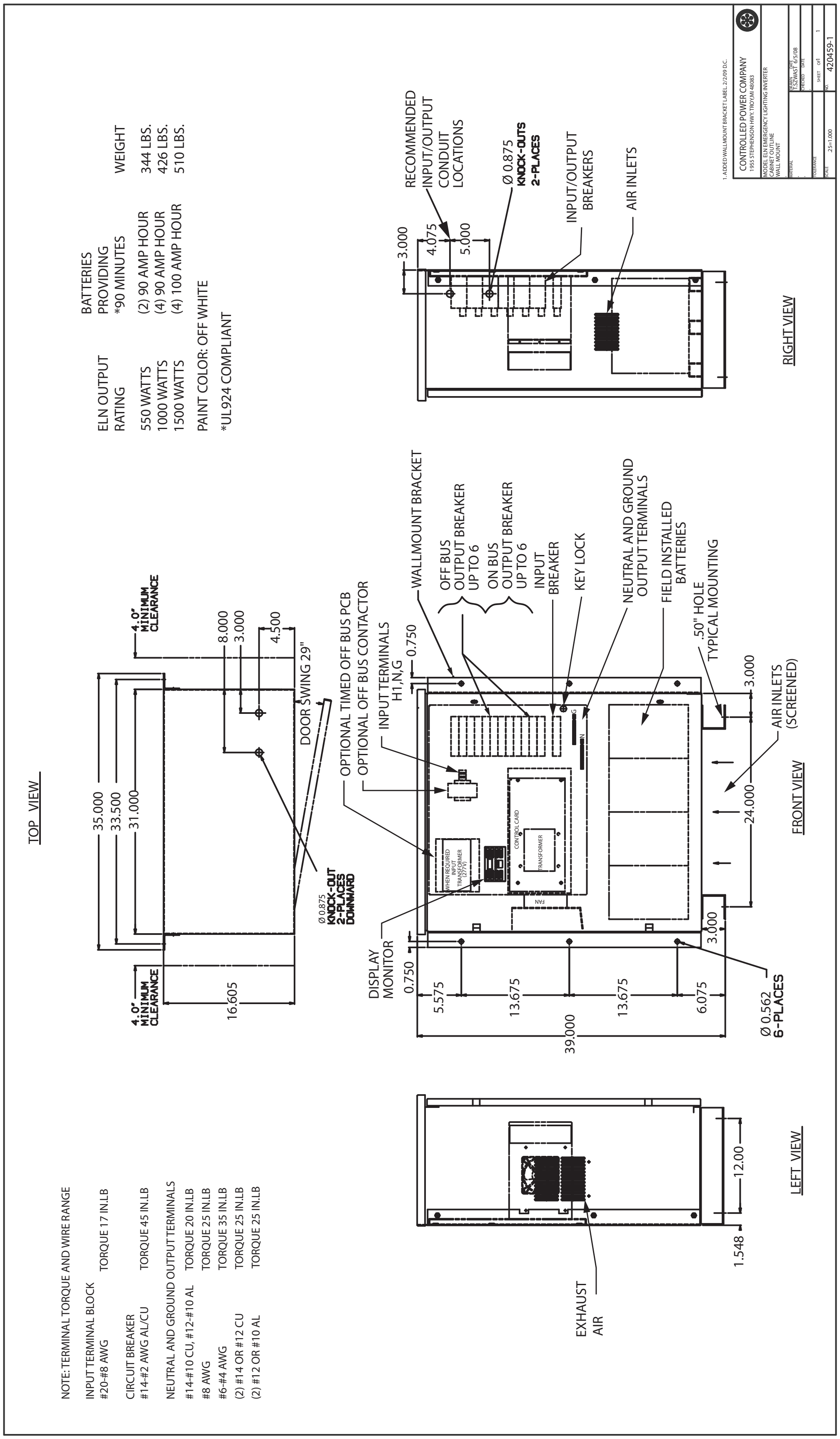
TRAINING AND PARTS

For Customers who maintain their own equipment, Controlled Power offers hands on training at our training facility and part kits. For more information, contact Controlled Power Customer Support Department at 1-800-521-4792.

Individual components are available upon request, please contact the factory for specific part numbers and prices. See "*Appendix A - Component Location Diagrams*" for component location and description. When contacting the Parts Department, please have the unit's full model number and serial or system number. Call 1-800-521-4792.

APPENDIX A

RELATIVE DRAWINGS


TOP VIEW
35.000
33.500
31.000
16.605
4.0" MINIMUM CLEARANCE
4.0" MINIMUM CLEARANCE
8.000
3.000
4.500
DOOR SWING 29"
Ø 0.875 KNOCK-OUT 2-PLACES DOWNWARD
ELN OUTPUT RATING
BATTERIES PROVIDING *90 MINUTES
WEIGHT
550 WATTS
(2) 90 AMP HOUR
344 LBS.
1000 WATTS
(4) 90 AMP HOUR
426 LBS.
1500 WATTS
(4) 100 AMP HOUR
510 LBS.
PAINT COLOR: OFF WHITE
*UL924 COMPLIANT
NOTE: TERMINAL TORQUE AND WIRE RANGE
INPUT TERMINAL BLOCK
#20-#8 AWG TORQUE 17 IN.LB
CIRCUIT BREAKER
#14-#2 AWG AL/CU TORQUE 45 IN.LB
NEUTRAL AND GROUND OUTPUT TERMINALS
#14-#10 CU, #12-#10 AL TORQUE 20 IN.LB
#8 AWG TORQUE 25 IN.LB
#6-#4 AWG TORQUE 35 IN.LB
(2) #14 OR #12 CU TORQUE 25 IN.LB
(2) #12 OR #10 AL TORQUE 25 IN.LB
OPTIONAL TIMED OFF BUS PCB
OPTIONAL OFF BUS CONTACTOR
INPUT TERMINALS H1,N,G
0.750
WALLMOUNT BRACKET
OFF BUS OUTPUT BREAKER UP TO 6
ON BUS OUTPUT BREAKER UP TO 6
INPUT BREAKER
KEY LOCK
NEUTRAL AND GROUND OUTPUT TERMINALS
FIELD INSTALLED BATTERIES
.50" HOLE TYPICAL MOUNTING
3.000
AIR INLETS (SCREENED)
24.000
FRONT VIEW
3.000
DISPLAY MONITOR
0.750
5.575
13.675
13.675
6.075
39.000
Ø 0.562 6-PLACES
CONTROL CARD
TRANSFORMER
FAN
WHEN REQUIRED INPUT TRANSFORMER (277V)
EXHAUST AIR
1.548
12.00
LEFT VIEW
RECOMMENDED INPUT/OUTPUT CONDUIT LOCATIONS
3.000
4.075
5.000
Ø 0.875 KNOCK-OUTS 2-PLACES
INPUT/OUTPUT BREAKERS
AIR INLETS
RIGHT VIEW
1. ADDED WALLMOUNT BRACKET LABEL 2/2/09 D.C.
CONTROLLED POWER COMPANY
1955 STEPHENSON HWY, TROY, MI 48083
MODEL ELN EMERGENCY LIGHTING INVERTER
CABINET OUTLINE
WALL MOUNT
420459-1

Caution

The following symbol indicates that caution should be taken when performing the process required in this manual. Damage to the unit or personal harm could happen if proper precautions are not taken.

Shock Hazard

The following symbol indicates that there is a risk of electrical shock if proper precautions are not followed. Only qualified personnel should perform the actions required in this manual.