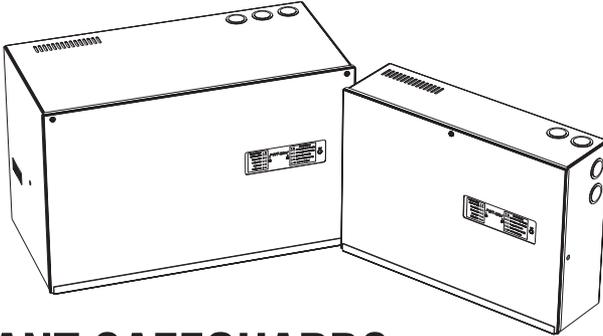




Installation / Operation Manual

Emergency Lighting Sine Wave Inverter System

for Si-125 and Si-250 Models Only



IMPORTANT SAFEGUARDS

When using electrical equipment, basic safety precautions should always be followed including the following:

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

- A. Do not use outdoors
- B. Do not mount near gas or electric heaters.
- C. Use caution when servicing batteries. Battery acid can cause burns to skin and eyes. If acid is spilled on skin or in eyes, flush acid with fresh water and contact a physician immediately.
- D. Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.
- E. The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
- F. Do not use this equipment for other than intended use.

This unit contains lethal voltages. There are no user serviceable parts inside. Only authorized service personnel are to be used for service.

SAVE THESE INSTRUCTIONS

The installation and use of this product must comply with all national, federal, state, municipal or local codes that apply. Please read this manual thoroughly before installing and operating the central inverter system. For assistance please call technical service at 1-800-967-5573 and speak to a technician during normal business hours (EST).

Table of Contents

1.0	Introduction
	1.1 Mechanical Design Features
	1.2 Electrical Design Features
2.0	Receiving and Storage
	2.1 Inspection
	2.2 Storage
3.0	Installation
	3.1 Location
	3.2 Operating Environment
	3.3 Ventilation
	3.4 Mounting Guidelines
	3.4.1 Clearance
	3.4.2 Wall Mounting Hole Locations
	3.4.3 Knockout Locations
4.0	AC Connections
	4.1 Removing the Front Cover
	4.2 Installing the Input Wires
	4.3 Installing the Output Wires
5.0	Battery and DC Connections
	5.1 Battery Inspection
	5.2 Battery Installation
	5.3 DC Voltage of System
6.0	Start up and Shut down procedures
7.0	Specifications
8.0	User Interface
	8.1 LED1 - Charging and Line Status
	8.2 LED2 - Inverter Operating and Battery Level Indication
	8.3 MINOR ALARMS
	8.4 MAJOR ALARMS
	8.5 Time Delay
9.0	System Operation
	9.1 Startup Mode
	9.2 Battery Charging Mode
	9.3 Switched Output
	9.4 Battery Power Mode
10.0	Warranty
	10.1 Technical Service and Support
	10.2 Return Material Authorization (RMA)
11.0	Maintenance and Service
	11.1 Battery Maintenance
	11.2 Battery Replacement

1.0 Introduction

The central inverter system integrates the latest inverter and microprocessor technology to produce a pure sine wave power output intended for use in emergency lighting. The unit is very efficient. It typically has a steady state loss of just 3 percent of full load while on-line which makes it ideal for energy saving and green initiatives. It is designed specifically for emergency lighting from the ground up and meets the needs of all lighting loads since it is a pure sine wave output. It was designed and developed by an Emergency Lighting Manufacturer. This product is a culmination of market requirements that require high efficiency, load compatibility, energy savings, low cost, and high quality. It produces a Pure Sine wave and this is the ONLY method of power that will ensure any lighting load will be powered safely, efficiently and effectively.

1.1 Mechanical Design Features

Batteries and electronics are contained in a single cabinet which makes installation very easy. Mounting can be achieved in three different methods and there are electrical knock outs available on all surfaces. Quick access to the interior of the cabinet for battery inspection and maintenance is accomplished by the removal of a single screw which holds the front cover. Single module containing all electronics can be easily removed for upgrade or replacement. This module concept makes maintenance and repair easier and more cost effective because specialized training and knowledge in central inverters is not required.

1.2 Electrical Design Features

Through the use of Pulse Width Modulation (PWM) and the latest MOSFET technology, the unit can produce a pure sine wave output which is compatible with all types of lighting loads (LED, fluorescent and incandescent luminaries). A high crest factor of 2.5 is extremely beneficial for high inrush loads and also ideal for bringing normally off lighting loads on from a cold start. The high crest factor also improves the dynamic response so mixing normally on and normally off loads together causes less performance loss than traditional inverters. Since the active modulation regulation scheme produces a very low THD waveform, the the unit can power up even the most demanding loads with power factor capabilities ranging from 0.5 leading to 0.5 lagging. There are three distinct outputs which are Normally On, Normally Off and the Switched Output. The Normally On output is always present under normal utility power or emergency power. The Normally Off output is only present under emergency power so it is a switched output when run under emergency power. The Switched Output is a user enabled output capable of switching emergency lighting loads on and off making energy savings and green initiatives easy to accomplish. The Switched Output is enabled by a standard command signal input of 120-277 VAC. Any output including Normally On, Normally off or the Switched Output is capable of producing full output power and has no de-rating which means that 100 percent of the units rating can be driven from any output. The Switched Output is also tied to the Time delay option for HID applications having normally off light sources. The batteries are charged by a temperature compensated charger integrated into a bi-directional converter. A three-rate charging scheme and bi-directional converter topology ensures maximum float life and minimal ripple current on the batteries.

2.0 Receiving and Storage

2.1 Inspection

The Central Inverter and batteries are shipped together. Upon arrival please inspect the contents to ensure that no shipping damage has occurred. This is especially important with the batteries - ensure that there are no cracks or leaks. If any damage has occurred notify the shipping carrier immediately and submit a damage claim.

WARNING - Do not use system with a damaged battery as this may cause an unsafe condition.

2.2 Storage

Storage before the installation is critical for the battery life expectancy and warranty. Store the system indoors in a clean, dry and cool location. Storage at higher temperatures will result in accelerated rates of self-discharge and possible deterioration of battery performance and life.

WARNING - The maximum storage time from shipment to initial charge is 6 months for batteries stored at ambient temperatures no warmer than 77 °F (25 °C). For storage temperatures greater than 77 °F (25 °C) the batteries must be recharged one (1) month sooner for every 5 °F (3 °C) increase above 77 °F (25 °C).

Storage Temperature	Storage Time
32 °F (0 °C) to 50 °F (10 °C)	9 Months
51 °F (11 °C) to 77 °F (25 °C)	6 Months
78 °F (25 °C) to 92 °F (33 °C)	3 Months

Storage at high temperatures will result in accelerated rates of self-discharge and possible deterioration of battery performance and life. Storage times exceeding the above may result in plate sulfation, which may adversely affect electrical performance and expected life.

Failure to install and charge the batteries as noted VOIDS the battery's warranty.

DANGER - A battery can present a risk of electrical shock and high short circuit current. Valve-regulated lead-acid (VRLA) batteries contain an explosive mixture of hydrogen gas. Do not smoke, cause a flame or spark in the immediate area of the batteries, this includes static electricity from the body. Use proper lifting means when moving batteries and wear all appropriate safety clothing and equipment.

3.0 Installation

3.1 Location

NEC article 700 EMERGENCY CIRCUITS should be referenced for proper installation of a central inverter system. Article 700 dictates that unit must be mounted in a permanent location. Choose a cool dry place with normal ventilation and one which will allow easy access for testing and maintenance. Avoid a location which could allow vandalism and tampering with. Avoid areas that would prohibit visual contact with the heads up LED status displays.

3.2 Operating Environment

Choose a location that is controlled between 20 and 30 degrees C. for optimum battery life and performance. The unit is UL listed between 20 °C to 30 °C (68 °F to 86 °F) because of battery discharge performance results. Do not install in a wet or damp location. Do not install in environments that will expose the unit to excessive temperatures like boiler rooms as this will significantly depreciate battery life. Heat is the determining factor of battery life. Every means should be made to keep the batteries in an environment that keeps the batteries around 25 degrees C for rated battery life.

3.3 Ventilation

Choose a mounting location that is clean and dust free. Do not install in areas where there is particulate from heavy industrial machinery, corrosive chemicals or welding or plasma cutting environments etc.

3.4 Mounting Guidelines

3.4.1 Clearance

The unit is convection cooled and air ventilation is through the sides and up the top. Leave at least 4 inches of clearance on the sides and top for proper air circulation. **WARNING** - Never leave objects lying on the top of the unit which would prevent proper air flow. This blocking of air circulation may result in an over-temperature fault during Battery Charging or Battery Power mode depending upon ambient conditions.

3.4.2 Wall Mounting Hole Location

Mounting holes are provided for Wall Mount purposes. The location of these holes are at the back side of the cabinet and will accommodate ¼” mounting hardware. Four holes are provided and all 4 should be used when wall mounting.

3.4.3 Knockout Locations

Electrical Knock Outs are provided on three surfaces of the cabinet. Ensure all metal conduit is secured and tightened creating a good connection to earth ground. Use an Ohm-Meter to check that continuity between conduit and protective earth ground has been established. At NO time is drilling allowed into the cabinet! Drilling causes metal filings to be deposited on surfaces and could land on the Printed Circuit Boards and cause short circuits.

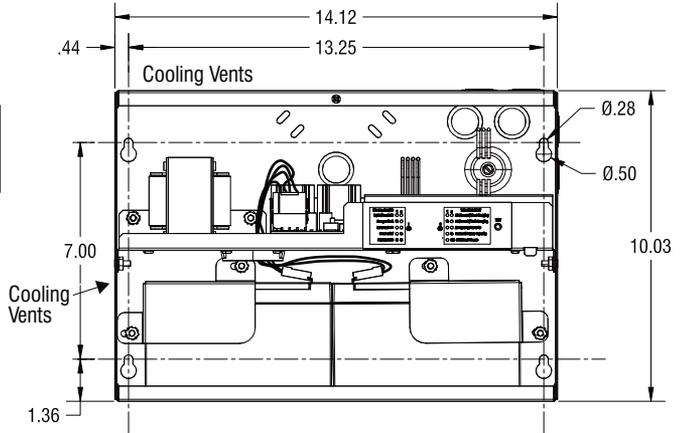
WARNING - Drilling into cabinet may void warranty if metal filings causes unit failure.

Wall Mounting Hole Locations

125 Watt Model

weight: 32 lbs.

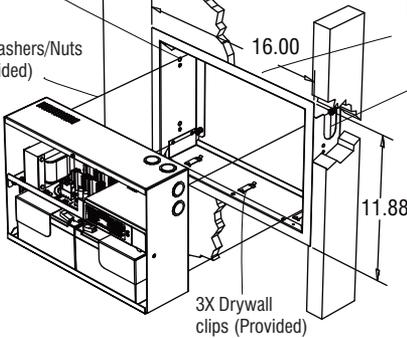
**125W AND 250W MODELS
MUST BE MOUNTED IN A
DRY LOCATION ONLY**



125 Watt Model Optional Recessing Kit

Recessing Pan is fastened to wall (hardware to be provided by others)

4X Washers/Nuts (Provided)

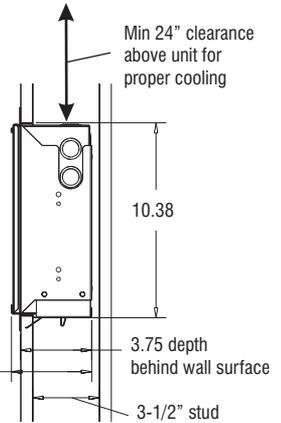


Rough-in 14-3/8" x 10-3/8"

Side conduit access

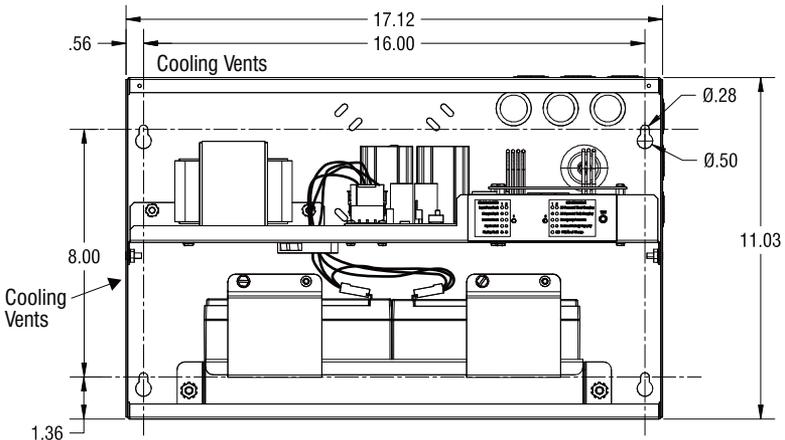
THERE MUST BE NO INSULATION CONTACT WHEN FULLY INSTALLED

4.21 total depth



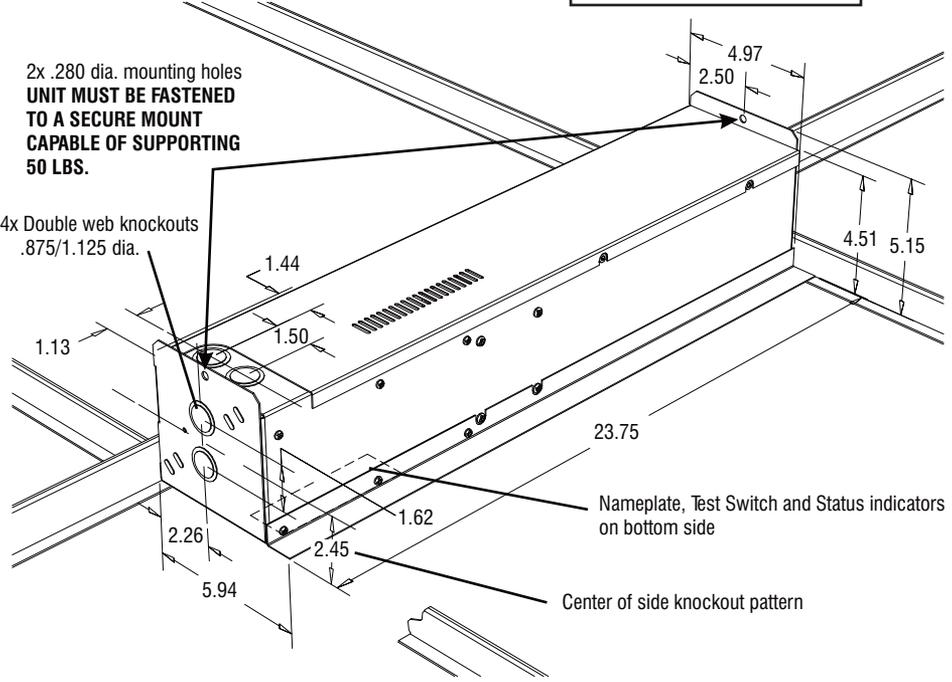
250 Watt Model

weight: 63 lbs.



Knockout Locations and Mounting Dimensions 125 Watt Troffer

**ABOVE CEILING ACCESS
IS REQUIRED**



4.0 AC Connections

WARNING - Only qualified personnel that are familiar with AC and DC installation techniques and codes (such as an electrician) should perform the Installation.

WARNING - This unit contains lethal AC Voltages. Because of these hazards of high voltage electrocution, always shut down all sources of power before you install, maintain, or service the unit.

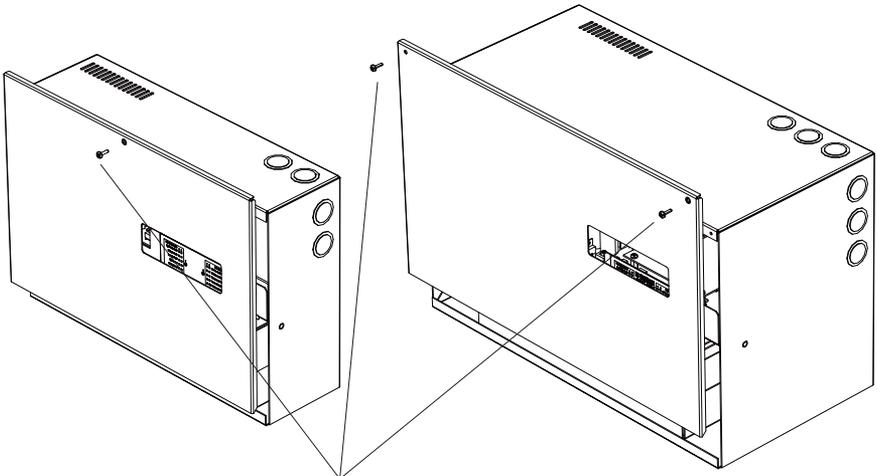
WARNING - Remove all rings, watches, and other jewelry before doing any electrical service or installation work. Always wear protective clothing and appropriate personal protective equipment (PPE) that is suitable such as eye protection when working near batteries.

4.1 Removing the front Cover

All the connections for the AC input and output are located on the top right side of the units' enclosure. To access the wiring area, remove the screw which secure the units cover. After the screw is removed, simply lift the cover up and away from enclosure.

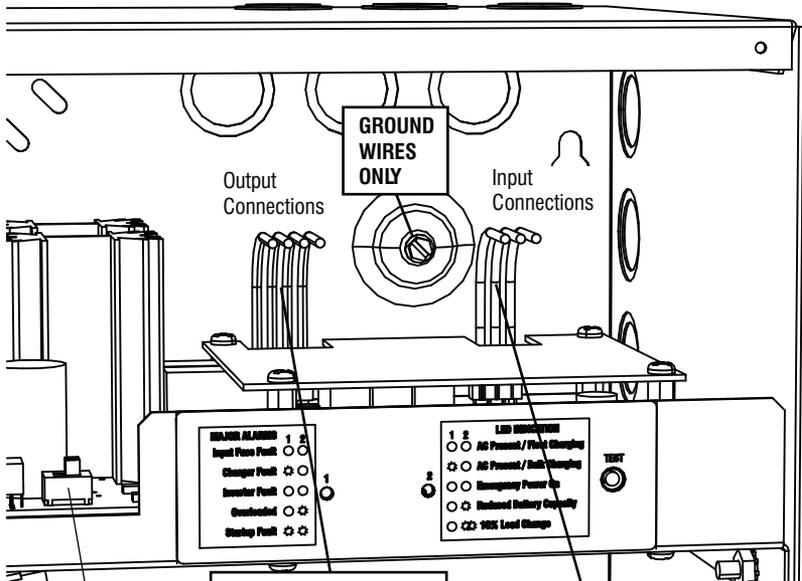
Front Panel Removal and AC Connections

125 & 250 Watt Front Panel Removal



Remove screws and lift cover off

125 & 250 Watt AC connections



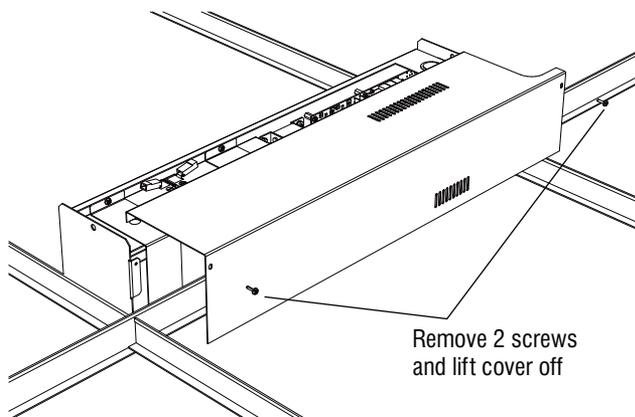
Installation

Switch

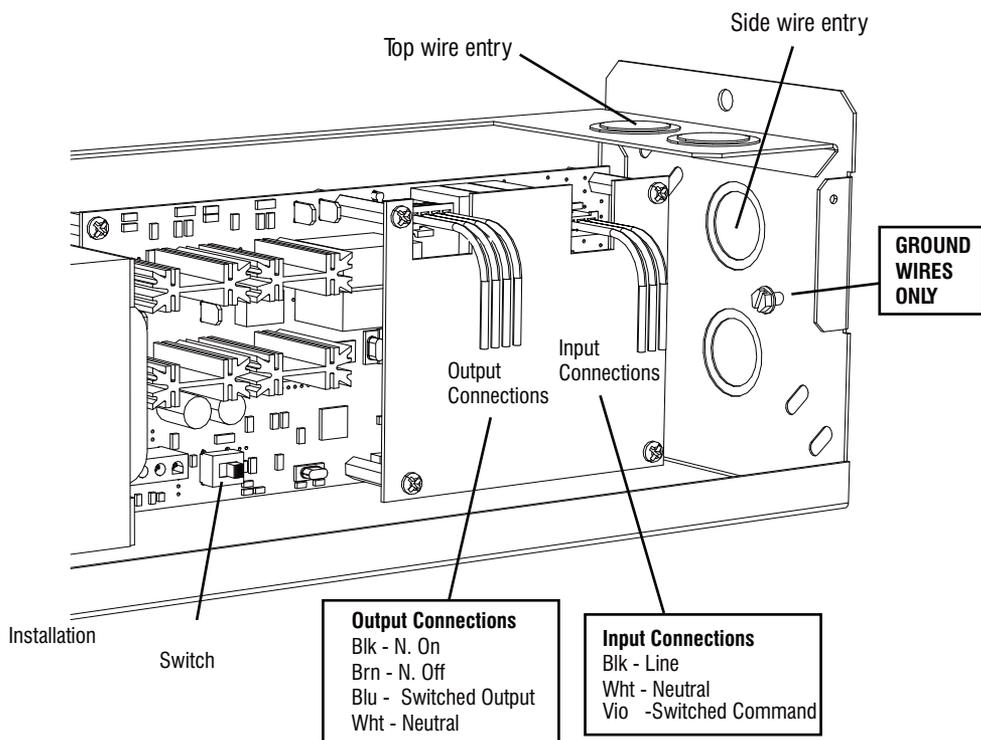
Output Connections
 Blk - N. On
 Brn - N. Off
 Blu - Switched Output
 Wht - Neutral

Input Connections
 Blk - Line
 Wht - Neutral
 Vio - Switched Command

125 Watt Troffer Cover Removal



125 Watt Troffer AC Connections



4.2 Installing the Input Wires

Once the front Cover is removed,

1. Ensure that the incoming AC voltage to the unit is the same voltage rating as the unit.
2. Ensure that the feed breaker from the panel has at least the same rating as the unit.

Once Feed Voltage and Breaker size is correct, connect the Utilities Feed Line voltage to the Input Wires Line and Neutral leads. Ensure that the connections are tight by giving the wires a good pull and ensure that the wires nuts are secured.

NOTE - AC Input and AC output wires must be run in separate conduit or raceways per NEC ARTICLE 700. Please ensure all codes and standards are observed.

NOTE - This unit requires that the Neutral and Ground potential does not exceed 5 VAC for proper function. Anything above 5 VAC typically indicates that there may be a grounding issue or inadequate conductor size or continuity. This should be looked at immediately as it could cause a safety concern.

NOTE - Neutral and ground should never be tied together anywhere in the unit. Always keep Neutral and Ground wires separate and ensure no shorts occur.

NOTE - Neutral connections are a - Pass Through - which means Input and Output Neutrals are directly connected.

NOTE - Never mix Neutrals on the building wiring (Non-Emergency) with the Emergency wiring. Dedicated wiring is required by NEC code ARTICLE 700.4.4

4.3 Installing the Output Wires

Connect the load wires to the output leads labeled N. On, N. Off or Switched Outputs. Ensure that the connections are tight by giving the wires a good pull and ensure that the wires nuts are secure.

5.0 Battery and DC Connections

WARNING - Only qualified personnel that are familiar with AC and DC installation techniques and codes (such as an electrician) should perform the Installation.

WARNING - Remove all rings, watches, and other jewelry before doing any electrical service or installation work. Always wear protective clothing and appropriate personal protective equipment (PPE) that is suitable such as eye protection when working near batteries.

WARNING - Batteries contain tremendous energy and can explode if short circuited. Precautions should be taken to eliminate possible short circuits. Do not install batteries until unit is completely mounted and secured in a permanent location with all conduit and AC wiring connected.

5.1 Battery Inspection

Inspect the batteries for any physical damage such as cracks or any other sign of leaking electrolyte. Batteries contain Sulfuric Acid which is highly corrosive. A leak from a battery will cause an unsafe condition.

5.2 Battery Installation

Batteries come pre-installed and pre-terminated to the main DC Battery Connector. When all AC connections are made, simply plug the connector into the mating plug on the unit's printed circuit board.

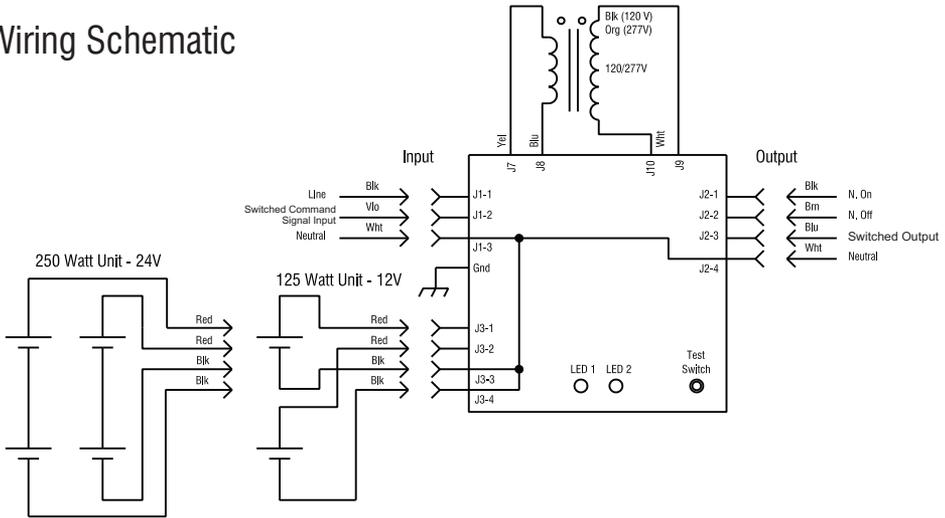
NOTE - The top cover should already be removed from installing the AC Input and Output wiring. Please refer to section 4.1 for Top Cover Removal.

5.3 DC Voltage of System

The systems DC battery voltage for the Si-125 Sine Wave is 12 VDC and the Si-250 is 24VDC nominal. This voltage is produced by connecting batteries (each 12 VDC) in parallel for 125W model or a series parallel connection for the 250W model. All required cables are provided by the manufacturer and come pre-installed on the batteries, and the batteries connect to a wiring harness in a fail-safe manner to accomplish the system buss requirements.

NOTE - Battery potential does not have galvanic isolation from AC potential. Battery Negative is tied to Neutral.

Wiring Schematic



6.0 Start up and shut down procedures

Start-Up

After the AC input and output wires are connected and the battery connector is properly installed, the unit is ready to be started up. Ensure that the incoming AC voltage is reaching the unit by turning on all feed circuit breakers. Once AC input is verified, simply turn on the systems on/off switch located on the printed circuit boards front left area. Place the switch position to the right for the system to turn on. The unit will go through a series of relay clicks to verify proper connections and then go into the charge mode. The unit is now on-line and ready.

Verify that all load connections are operating within the specifications of the unit by measuring AC currents on both the line and load and measure all neutral currents to ensure line and neutral currents are the same. Press the Test button on the front panel to verify that the Normally Off and Switched Output loads are all operational and again measure currents. If alarms occur during start-up, see section 8.3 for possible explanations. Also see section 9.1 for Start-Up Mode explanations.

Shut-Down

To shut the system completely down simply place the system on/off switch to the off position. If the unit is Shut-Down for a long duration please see Battery Storage Section 2.2 to ensure that the batteries are not damaged from the effects of self-discharge and high ambient temperatures.

7.0 Specifications

Input

Voltage	120 or 277 VAC model dependent
Current	2.7A (120V), 1.2A (277V) for 250 Watt Model 1.4A (120V), 0.6A (277V) for 125 Watt Model
Frequency	60Hz +/- 2 Hz
Protection	PCB mounted fast acting 5x20 mm fuse .
Power Factor	0.5 lead to 0.5 lag

Output

Voltage	120 or 277 VAC model dependent
Current	2.08A (120V), 0.9A (277V) for 250 Watt Model 1.04A (120V), 0.45A (277V) for 125 Watt Model
Frequency	60Hz +/- 0.02 Hz crystal controlled during emergency mode
Overload	110 percent will generate overload fault
Transfer Time	50mS
Output Distortion	Less than 3% THD
Crest Factor	2.5 for 125 and 250W model
Load Power Factor	0.5 lead to 0.5 lag
Output Types	Normally On, Normally Off and Switched Output

Battery

Type	Valve-Regulated sealed lead-calcium.
Charger	3 rate with Temperature Compensation
Recharge Time	24 Hour recharge standard.
Protection	Automatic Low Voltage Disconnect (LVD) set at 1.67 VPC Automatic restart upon utility return
Runtime	90 Minutes at 25 deg. C
DC Voltage	12/24 VDC Nominal, 2.27 VPC float, temperature compensated
DC Current	12 ADC Nominal for 125/250 Watt model respectively

Environmental

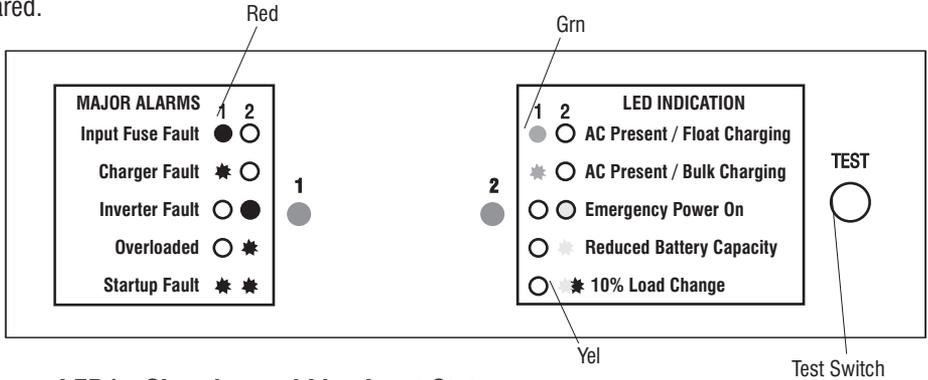
Operating Temp	20 to 30 degrees Centigrade
Storage Temp	-20 to 70 degrees Centigrade (Electronics) 0 to 40 degrees Centigrade (Batteries)
Relative Humidity	<95 % (non-condensing)

Physical

Cabinet	NEMA Type 1 enclosure, 18 AWG powder painted CRS
Cooling	Natural Convection - No fans

8.0 User Interface

There are two heads-up LEDs to indicate system status and a recessed test button to initiate the inverter to run on battery power. Both LED1 and LED2 are bi-color LEDs and will illuminate either solid, blinking, or changing between colors for different modes of operation or faults. There are two distinct fault levels - Minor and Major. A Minor alarm will not cause the system to suspend output and will operate although the fault exists. A Major alarm will cause the system to cease all outputs and will need to be reset. If a Major alarm exists, it must be identified and fixed before the system can be operated. To reset the Major Alarm, simply press the System Test button and the system will start its self-testing diagnostics to verify the fault has been cleared.



8.1 LED1- Charging and Line Input Status

When the LED1 is illuminated green, the system is charging the batteries and the AC is present. If LED1 is solid green, the batteries are fully charged or near fully charged. If the LED1 is blinking green, the batteries are being charged at a high capacity and they are not at the float voltage level yet.

8.2 LED2 - Inverter Operating and Battery Level Indication

When the LED2 is illuminated yellow, the system is running on battery power. If the LED2 is solid Yellow, the voltage of the battery is above 11.4 and 22.8 for 12 and 24 VDC systems respectively. If the LED2 is blinking Yellow, the battery voltage is getting low and has less than 30 minutes of run time left.

8.3 MINOR ALARMS

The systems minor alarm occurs on battery power if a load change has been detected. The system will automatically store the operating output current when it transfers to battery power after five seconds. It will then actively compare the stored value against the current value. If the current value of the load current deviates by more than 10 percent high or low, it will generate a load change alarm - which is a Minor Alarm. If this alarm is present, the LED2 will blink between a Yellow and Red color.

8.4 MAJOR ALARMS

The system Major alarm can occur on three distinct modes - System Start-Up Diagnostics, Charge Mode and Battery Power Mode. During the System Start Up Diagnostics, there are several items that are being verified. LED1 and LED2 will be illuminated for Start Up faults. The blinking rate varies with each fault type detected for diagnostic purposes.

Start Up Faults (LED1 and LED2 illuminated RED):

LOW BATTERY	One Blink - If the battery voltage drops below 9VDC, the charger will not be applied.
ROTATION	Two Blinks - This indicates that there is a wiring fault on the transformer.
OVER LOAD	Three Blinks - This indicates there is an overload on the output.
NO VOLTAGE	Four Blinks - This indicates a missing wire from the transformer or a possible faulty inverter.
BACKFEED	Five Blinks - Indicates another AC power source is connected to the output.

Faults While Si-Series is on Battery Charging (LED1 illuminated RED):

OVERTEMP	One Blink - Indicates an over temperature condition has occurred.
AC FUSE	Two Blinks - Indicates the AC fuse has opened and needs to be replaced.
CHARGER	Three Blinks - Indicates possible faulty charger.

Faults While Si-Series is on Battery Power (LED2 illuminated RED):

OVERTEMP	One Blink - Indicates an over-temperature condition has occurred.
LOW VOUT	Two Blinks - Indicates that the inverter could not produce enough AC voltage to support the load.
HIGH VOUT	Three Blinks - Indicates that a back surge has occurred.
OVERLOAD	Four Blinks - Indicates there is too much load connected to the output.
BACKFEED	Five Blinks - Indicates another AC power source is connected to the output.

8.5 Time Delay

The optional Time Delay feature has a fixed time of 15 minutes during which the Switched Output will remain on after the unit operates on battery power either from a power outage or a self-test. This function is useful if there is High Pressure Sodium, Metal Halide, or Mercury Vapor High Intensity Discharge Lamps used for illumination. If these types of HID lights are used, the variable time delay will keep the Switched Output lights energized for 15 minutes to allow time for the lamps to re-strike and come up to full illumination.

9.0 System Operation

9.1 Start-Up Mode

When the unit is first turned on, it goes through a sequence of self-tests to ensure proper connections and it checks for faults that may be present. This is the System Start Up mode and it must qualify several things before advancing to go into the Battery Charging mode. There will be two distinct clicks of relays as it goes through the self-check sequence. These relay clicks are the unit turning on the output relays to check if any voltages are present and then tickling the output with a small voltage to see if short circuits or overloads are present. The faults that are checked for during start-up mode are:

BACKFEED - This is when AC voltages are present at any of the outputs. If there are AC voltages present at any of the outputs, it means that there is a mis-wire and the utility AC power is being back-fed into the inverter.

ROTATION - This fault would occur if the module was replaced and re-connected improperly. The Phase Rotation diagnostic energizes the inverter and looks for output voltages out of regulation.

OVERLOAD - This fault would occur if the connected load exceeds that of the rating of the unit. This check is performed by tickling the output to a low voltage for one cycle and looking for overcurrent faults. This diagnostic features connects all the outputs such as the normally off and the maintained output.

MISWIRE - This fault would occur if the AC input voltage is not within specification. For example if the unit is a 277V model and only 120V was connected, a MISWIRE fault would occur. Conversely if a 120V model had 277 VAC connected, a MISWIRE fault would occur. Also if no AC voltage was applied to the input, a MISWIRE would occur. After all the Start-Up diagnostics are performed, the PW-Series is OK to proceed to the Battery Charging mode.

9.2 Battery Charging Mode

The Battery Charging mode is where the system will remain for 99.9+ percent of its life. In this mode, AC power is being passed through to the units output and subsequently its loads and the batteries are keeping a float charge. The charger is floating at 2.27 Volts per Cell (VPC) and is temperature compensated to 4mV per deg. C (per cell), centered at 25 degrees C. For higher temperatures, the float voltage would go down and for lower temperatures, the float voltage would go up. The nominal DC battery voltage is 12 VDC for the 125W models and 24 VDC for the 250W model. The float voltage is 2.27 VPC or 13.62 VDC for the 125W model and 27.24 VDC for the 250W model. LVD voltage is 1.67 VPC or 10.05 VDC for the 125W and 20.1 VDC for the 250W. Float voltage varies with temperature, LVD voltage is fixed.

The typical voltages that the charger would float the batteries are:

10 Deg. C 13.8/27.60 VDC	15 Deg. C 13.74/27.48 VDC
20 Deg. C 13.68/27.36 VDC	25 Deg. C 13.62/27.24 VDC
30 Deg. C 13.56/27.12 VDC	35 Deg. C 13.5/27.00 VDC
40 Deg. C 13.44/26.88 VDC	

Above 40 deg. Centigrade no additional compensation is performed.

9.3 Switched Output

The Switched Output is an output that can be switched on and off and is controlled by an external voltage applied to the Switched Command Signal Input. The designed function is to act as an interface to energy saving controls such as time clocks, daylight harvesting, photo-sensors or any building occupation sensing. It is also tied in to the Time Delay Option function so if the Time Delay Option is desired for normally off loads, connect these loads to the Switched Output. The Switched Output can be energized while in the Battery Charging mode of operation by applying 120 or 277 VAC to the Switched Command Signal Input. When the unit changes mode of operation to the Battery Power mode, the Switched Output will automatically energize.

9.4 Battery Power Mode

Battery Power Mode can have several other names such as Emergency Power and Inverter Mode. This terminology may be used throughout this document. During Battery Power mode, the inverter is producing a pure sine wave for the output loads and the batteries are being discharged. The output current is limited by an active pulse by pulse current limit technique and limits the inverter from failure. The current limit is set to the crest factor value or 2.5 times the average output current. In the event of an overload there are several ways that the inverter will protect itself. First is the pulse by pulse limit and second is by average sensing. The pulse by pulse is a transient protection and occurs in the micro-second time scale, the average sensing looks at a heavily filtered signal and occurs in the seconds time scale. Since the crest factor is high on the unit, loads that have high inrush currents are quickly up and running. This is very beneficial with normally off loads which seem to be more prevalent with modern lighting and green building design techniques. The Normally On, Normally Off and Switched Outputs are all producing voltage during Battery Power mode.

10.0 Warranty

There are two separate warranty periods for the Central Inverter System. The Electronics/Cabinet warranty period is for 2 years from the date of shipment. It is warranted against defects in workmanship and materials under normal and proper use. The batteries are covered under a separate warranty and these durations may change dependent on battery type.

Battery Type	Warranty Duration
Standard VRLA	4 years pro-rata

10.1 Technical Service and Support

Our technical support staff is available before, during, and after the units installation for help on any detail of this product. Should you need help, please contact our service center at:

Service Center 1-800-967-5573

They are available during normal business hours Eastern Standard Time Zone.

10.2 Return Material Authorization (RMA)

At no time will material be accepted as returned goods without a RMA number issued from the factory. If parts are deemed defective by our Technical Service group and are troubleshot at the site to be defective they can be exchanged at no cost during the warranty period with an RMA. When returning defective parts back to the factory, the RMA number must be written on the packaging, bill of lading, or shipping labels so it can be properly identified. Technical Service will make every effort to troubleshoot the problem over the phone before an RMA will be issued. Phone troubleshooting may save both the customer and manufacturer added time and thus expense. Cooperation is greatly appreciated.

11.0 Maintenance and Service

CAUTION - Whenever maintenance and service is to be performed, it may be desirable to shut unit down. Please refer to Start up and Shut Down procedures for details.

CAUTION - Always assume AC and DC Voltages are present at the terminals because the inverter is capable of providing output voltage from the batteries when there is no AC input. The unit can pass through AC voltages from input to output with no batteries connected if the installation switch is on.

Routine Maintenance

Routine Maintenance should be considered any maintenance that does not require removing the Inverter's front cover panel. This maintenance includes periodic cleaning of dust from the cover and cabinet base to ensure proper convection air flow. Since no fans are required on this system, air flow moves by convection. Convection air circulation is from bottom to top as heat naturally rises. Keep all foreign objects off the top and away from the sides of the unit as these may impede convection air flow.

The unit automatically performs monthly tests (every 28 days), and has a self-clearing 28 day counter which resets any time the unit transferred to battery power. If on day 14 the unit had a brief power outage, the counter gets reset and 28 days later (pending no other transfers) a monthly test would be performed.

A quick test by manually pressing the test button will transfer the system to Battery Power and will turn on all the connected loads such as the Normally Off and the Switched Output load. Ensure there are no faults present. If there are faults, please refer to the User Interface section for a complete detail of what this fault may indicate.

Test

By pressing the TEST button on the front panel, the unit will transfer to Battery Power. This test will run for at least 15 seconds and will exit back to Battery Charging upon synchronizing to utility power.

Yearly Test

The NFPA code requires that a yearly test of 90 minutes be performed and the system must be able to run the full 90 minutes without going into a LVD fault. A yearly test of 90 minutes can be initiated by holding in the TEST button for 5 seconds. An alternate method of performing the 90 minute yearly test would be to turn off the input feed breaker for the 90 minutes and then re-apply when the 90 minute duration is complete.

11.1 Battery Maintenance

The batteries used in this unit are sealed lead calcium and are termed “Maintenance Free”. This term may be misleading because ALL batteries require periodic maintenance even if it only consists of a visual inspection. We recommend the following maintenance plan:

Once every 6 months the batteries should be visually inspected for cracks, leaks, bulging or deformities and corrosion buildup on terminals.

11.2 Battery Replacement

The unit is a UL approved and listed component with exact battery requirements. Failure to replace the batteries with the exact same type will VOID the UL approval. For battery replacement, please call the service number listed in the warranty section so that the unit performs as it was intended.

WARNING - Only qualified personnel that is familiar with AC and DC installation techniques and codes (such as an electrician) should perform the removal and replacement.

WARNING- Remove all rings, watches, and other jewelry before doing any electrical service or installation work. Always wear protective clothing and appropriate personal protective equipment (PPE) that is suitable such as eye protection, etc. when working with batteries.

WARNING - Batteries contain tremendous energy and can explode if short circuited.

Precautions should be taken to eliminate possible short circuits.

WARNING - Batteries contain lead. Follow all local and state requirements for battery disposal. Please dispose of properly by recycling.

TIP - If the batteries are to be replaced, discharging the batteries by letting the unit run on Battery Power can be beneficial for several reasons. First, it verifies that the batteries need replacing if it does not make 90 minutes of discharge time. Second, it depletes the battery which reduces the fault current available at the batteries terminals. A completely discharged battery that ran to LVD still has fault current available - just not nearly as much. By running the battery to LVD, the available fault current would be substantially less and safer if an inadvertent short circuit were to happen during the removal or transportation process to the recycling facility.

To remove the batteries, shut the unit completely down by turning off the System On/Off switch and remove AC power Feed source by turning off the input circuit breaker.

Disconnect the Battery Connector from the PCB before removing the inverter assembly.

Remove the Inverter Assembly by removing the 4 nuts that attach it to the cabinet.

Pull the faston connectors from the batteries and now the inverter assembly is free for removal. Remove the battery brackets with a nut driver or socket extension and then lift the batteries out of the cabinet.

DANGER - The worst thing that can happen when removing or installing batteries is an inadvertent short circuit. All means must be taken to ensure that all lugs are secure and insulated after removal from the batteries post. Batteries contain tremendous short circuit energy and are on the magnitude of thousands of amps. When a short circuit occurs, it first creates a very loud shock wave similar to a shotgun blast. If the short circuit creates a welded lug so that the short circuit remains conducting current, the battery may explode.

Extreme danger and bodily injury can be caused by primary and secondary effects of the short circuit. Primary effects would be burns, vision or hearing loss. Secondary effects could be falling off a ladder or sustaining injuries not created by the battery itself.

***DANGER* - DO NOT TOUCH BATTERIES UNLESS TRAINED OR KNOWLEDGEABLE AND KNOW THE HAZARDS!**

WARNING - Always use the correct tools with insulated handles and wear the appropriate personal protective equipment (PPE) required for battery work.

To install new batteries, see Section 5.0 Battery and DC Connections.

