

# Midsized Inverter Series

## STANDARD



## OPTIONAL



## DESCRIPTION

- Midsized-electrical inverter systems for powering 375 up to 600 watts of incandescent, fluorescent, induction or LED lighting loads. Pulse width modulated (PWM) output design provides clean, 60 Hz. sinusoidal emergency power to loads.
- All models are designed for fast, easy wall mounting.

## ELECTRICAL SPECIFICATIONS

### Input

- Input Voltages: Universal 120 or 277VAC, 60Hz (User selectable with (2) wire jumpers provided)
- Input Frequencies: 60Hz  $\pm$ 2%
- Input Surge Protection: Meets UL924
- Input Protection: Provided by Service Panel rated at 20 amps maximum

### Output

- Output Voltages: (60Hz) 120 or 277VAC
- Efficiency Rating: 98% at full rated load (line)
- Waveform: Sinusoidal (digitally controlled)
- Static Voltage:  $\pm$ 5% during battery discharge. 0-100% linear load.
- Output Frequencies: 60Hz.  $\pm$ 0.3Hz during emergency cycle
- Output Distortion: Less than 3% THD (linear load)
- Transfer Time: Less than 1.0 second
- Load Power Factor Range: 0.44 Lead to 0.44 Lag
- Minimum Loading: 0% of rated system capacity
- Output Protection: Circuit breaker

## HOUSING

- Heavy duty steel cabinet is finished in white baked-on powder paint providing scratch and corrosion resistance.

## MOUNTING

- Surface Mount: Surface mount models are designed for mounting to walls by means of keyhole slots provided in the back of the unit housing.

True  
Sinusoidal  
Output Power

EMPS375 Model



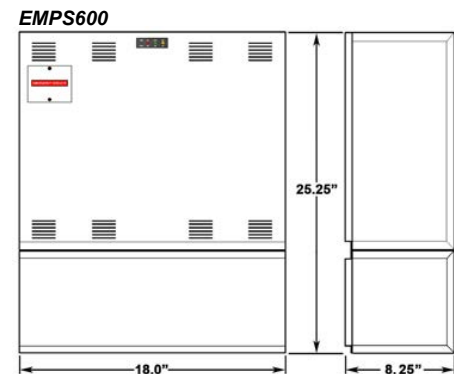
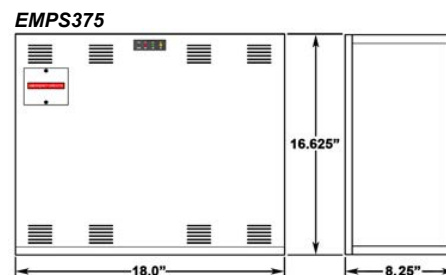
EMPS600 Model



## WARRANTY / LISTING

- Unit: (excluding lamps) Full coverage against defects in materials and workmanship for 3 years from date of shipment.
- Battery: 3 years full warranty plus an additional 7 years of pro-rata coverage.
- All models are UL924 Listed and meet NFPA 101 Life Safety Code, NEC, OSHA, Local and State Codes.
- UL Listed for damp locations (20° - 30°C).
- Certified to CEC under Title 20 Regulations.

## DIMENSIONS



## Midsize Inverter Series



The Midsize Inverter Series is designed to provide 375 to 600 watts of emergency power to incandescent, fluorescent, induction and/or LED fixtures. The Midsize Inverter unit provides clean, sinusoidal AC output power allowing it to be remotely mounted up to 1,000 feet away from the controlled fixture(s).

Unlike a ballast fluorescent emergency pack, the Midsize provides power to the input side of the fixture, (including the ballast) eliminating and chance of incompatibility. The Midsize Inverter Series is designed for surface mounting. All Midsize Inverter Series systems will provide emergency power output for a minimum of 90-minutes

### FEATURES

- For powering incandescent, fluorescent, induction and LED fixtures \*
- Sinusoidal output eliminates compatibility problems
- Universal 120/277VAC, 60Hz. input/output
- Unit capacities up to 600 watts
- “Soft Start” design reduces fixture inrush current
- Unit may be installed up to 1,000 feet from controlled fixture(s)
- Lumen output from fixture is 100% of nominal
- Unique design eliminates compatibility problems with LED drivers as well as fluorescent and induction ballasts
- Compatible with dimming ballasts
- Normally-ON and/or Normally-OFF load output
- Provisions for local switching capability - Always on during emergency conditions regardless of local switch position
- Emergency fixtures can be ON, OFF or SWITCHED
- Solid-state, line latched low voltage disconnect provides protection against battery deep discharge
- Long life, maintenance-free lead-calcium battery
- Momentary test switch
- AC-ON, Charge-ON and Inverter-ON LED indicators

\* Consult factory for compatibility for other lamp types

### WIRING

Connection to an unswitched AC circuit is required by the NEC. Wiring access is provided for by conduit knockouts in the unit housing.

### LOAD COMPATIBILITY

The Midsize Inverter model's clean, sinusoidal AC output will operate incandescent lamps as well as all common fluorescent, induction and LED lamp types. Consult factory for compatibility with all other lamp types

Lighting loads are driven at 100% output for the entire emergency power cycle. This outstanding feature translates into greater occupant egress vision and safety.

### SYSTEM OPTIONS <sup>(1)(2)</sup>

| ADD SUFFIX | DESCRIPTION                                    |
|------------|--|
| OCB1       | One Output Breaker                             |
| OCB2       | Two Output Breakers                            |
| ICB        | Input Breaker                                  |
| 4AO        | Adjustable Output/Dimmer Bypass <sup>(3)</sup> |
| 4C         | Four Output Circuit Switching <sup>(3)</sup>   |
| SDT        | Self-Testing / Self-Diagnostics <sup>(3)</sup> |

(1) Other options available. Consult factory.

(2) Some options may impact product UL listing. Consult factory.

(3) For more information, separate specification sheets are available on the 4AO, 4C and SDT options. Consult factory.

### GENERAL SPECIFICATIONS

| MODEL NUMBER | INPUT/OUTPUT VOLTAGE | CAPACITY For 1 1/2 Hrs. (Watts/VA) | SYSTEM WEIGHT |      | SYSTEM EFFICIENCY (Full Load) | NUMBER OF BATTERIES | BATTERY VOLTAGE (VDC) | BATTERY CURRENT (Amps) | AC INPUT CURRENT (MAX) |        | THERMAL OUTPUT (BTUs) |           |
|--------------|----------------------|------------------------------------|---------------|------|-------------------------------|---------------------|-----------------------|------------------------|------------------------|--------|-----------------------|-----------|
|              |                      |                                    | Lbs.          | Kg.  |                               |                     |                       |                        | 120VAC                 | 277VAC | On-Line               | Emergency |
| EMPS375      | 120/277VAC           | 375/375                            | 113           | 51.3 | 98%                           | 5                   | 60                    | 7.3                    | 3.43                   | 1.49   | 11                    | 205       |
| EMPS600      | 120/277VAC           | 600/600                            | 172           | 78.1 | 98%                           | 8                   | 96                    | 7.1                    | 5.50                   | 2.38   | 15                    | 275       |

## Midsize Inverter Series

### BATTERIES AND CHARGER

#### Battery

**Battery:** Sealed Lead Calcium (10 year life)

**Battery Voltage:** 60VDC for EMPS375 model and 96VDC for EMPS600 model

**Runtime:** 90 minutes standard - based on battery performance at 77°F (25°C).

Other runtimes available, consult factory.

**Battery Protection:** Low Voltage Battery Disconnect protects the battery from being severely damaged by deep discharge during prolonged power failures.

Reverse Polarity, DC Overload and Short Circuit Protection provided by a DC input breaker and fuse.

#### Charger

**Charger Type:** Fully automatic, temperature compensated, dual-mode charger

**Power Consumption (Charger Only):**

37W maximum (2.5W in standby) for EMPS375 model

56W maximum (5W in standby) for EMPS600 model

**Recharge Duty Cycle:** Meets UL924 requirements

**Battery Circuit Breaker:** Also used as battery isolator

**Controls:** Momentary test switch, AC-On, Charge-On and Inverter-On LED indicator lights

**Safety Circuitry:** AC Lockout prevents battery discharge prior to initial unit power-up.

Brownout Protection automatically switches the unit to emergency mode when utility voltage is significantly reduced.

#### Environmental

**High Altitude Operation:** Maximum operating temperature drops 1 degree C per 300 meters (2 degrees F per 1000 feet) above sea level.

**Operating Temperature Range:** 68°F to 86°F (20°C to 30°C)

**NOTE:** Optimum system performance between 20°C (68°F) and 30°C (86°F); temperatures outside of this range will affect battery performance and life.

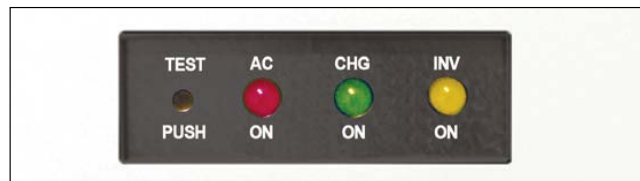
**Relative Humidity:** 95% non-condensing

### OPERATION

Upon failure of the normal utility power the Midsize Inverter unit is automatically turned on by a solid state switching circuit and provides a minimum of 90 minutes of emergency power to the connected load. Lumen output will be maintained at 100% of the lamp's rating throughout the entire duration.

A solid state low voltage disconnect circuit is used to protect the battery from being severely damaged by a deep discharge. When normal utility power is restored, the unit switches the load back to normal utility operation and the fully automatic, temperature compensated, dual mode charger begins to restore the battery; bringing it to full charge within UL 924 specified parameters. A brownout sensing circuit insures proper operation during "low line" conditions.

### SYSTEM STATUS MONITORING PANEL



All Midsize Inverter systems provide a monitoring panel on the front of the unit to show operating status at all times. The Panel provides a test switch for user initiated system tests and a 3-LED array that provides an intuitive visual indication of unit readiness.

### IMPROVED AESTHETICS

The Midsize Inverter system's sinusoidal AC output design eliminates voltage drop and proximity concerns. This allows added flexibility in installation location as Midsize Inverter units can be installed hundred of feet from the units they power. This means Midsize Inverter units can be located conveniently out of sight in closets or utility rooms without interrupting architectural aesthetics.

In lighting applications, no special or addition emergency fixtures are necessary. Simply designate and connect existing lighting fixtures, either interior or exterior, to the Midsize Inverter unit for emergency operation eliminating the need for exposed, stand-alone emergency luminaries

### MIDSIZE INVERTER SYSTEM ADVANTAGES

Compared to traditional discrete emergency lighting units the Midsize Inverter Series provides emergency illumination from a single power source resulting in lower maintenance overhead routine testing expenses. Midsize Inverter units lower installation costs by powering existing lighting fixtures during emergencies. And because connected fixtures are driven at full brilliancy, they provide far superior egree lighting and deliver improved occupant safety.

# Midsize Inverter Series

## SUGGESTED SPECIFICATIONS

An inverter system with sinusoidal output shall be supplied capable of powering any combination of lighting fixtures, including incandescent, fluorescent, induction and/or LED light sources without compatibility problems.

The system shall transfer in less than 1.0 second to reliably back up lighting fixtures without loss of illumination and operate any and all connected lighting fixtures at full lumen output during the complete 90-minute discharge cycle.

The input voltage shall be the same as the output voltage and shall be single phase 120/277 volts, 60 Hz. Output capacity will be (375W/375VA) (600W/600VA) for a minimum duration of 90-minutes.

The design shall be a standby, off-line inverter with on-line efficiency of 98%; on-line double conversion UPS systems shall not to be considered acceptable alternatives. Midsize Inverter system output shall be a PWM generated sine wave with less than 3% total harmonic distortion with "Soft Start" design reducing fixture inrush current. The system shall also provide short circuit and overload protection as standard.

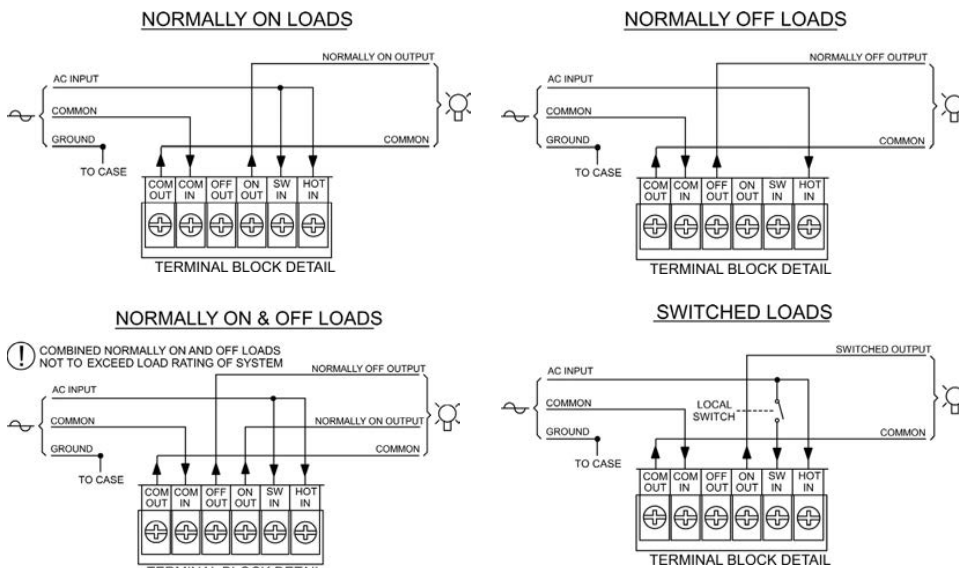
An intuitive three LED display shall provide system operational information at a glance and alert user to any malfunction in system performance. Authorized maintenance personnel shall have access to the system's controls while being protected from any live exposed connections.

Productive devices shall include AC Line fuses, DC input breaker and a DC input fuse. The entire Midsize Inverter system, including, batteries, shall be incorporated into compact cabinetry which shall have provisions for surface mounting.

System shall be capable of providing up to 4 switch bypass circuits, adjustable output or 2.5 to 10 volt dimmer bypass and self-test/self-diagnostics, were necessary

System shall utilize a sealed lead calcium battery with a 10 year design life. The charger shall be temperature compensated, dual mode type, and recharge the batteries as per UL924 guidelines. Entire system shall be tested, approved, and labeled to UL924 Emergency Lighting and Power Systems standards.

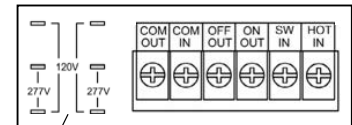
## WIRING DIAGRAMS



### NOTES:

-  INPUT SUPPLY FROM UNSWITCHED UTILITY RATED 20 AMPS MAXIMUM.
-  OUTPUT(S) TO LIGHTING LOADS

## VOLTAGE SELECTION DETAIL



### NOTE:

Factory terminated jumper wires are provided with Midsize Inverter making user selected input/output voltage connections.



# Micro, Mini, and Midsize Inverter Series

STANDARD



## DESCRIPTION

RIB® Lighting Controls offers the self-testing and self-diagnostic (SDT) options in their Micro, Mini, and Midsize series of inverters. This feature is becoming increasingly more important to architects, engineers and building owners as they become more aware of its tremendous value-added functions and safety-assuring technology. UL Listed to meet NFPA 101 for self-testing and self-diagnostic requirements.

## SELF-DIAGNOSTIC FUNCTIONS

The self-diagnostic function is factory preset and performs the following:

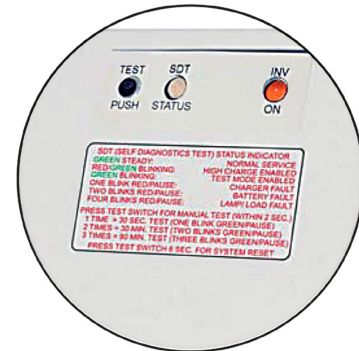
- Monitoring of battery, battery charger and connected loads.
- Self-testing and a 30-second battery discharge once every 30 days after normal utility power has been supplied for a minimum of 48 hours.
- Self-testing and a 30-minute battery discharge once every 180 days after normal utility power has been supplied for a minimum of 48 hours.
- Self-testing and a 90-minute battery discharge once every 365 days after normal utility power has been supplied for a minimum of 48 hours.

## SERVICE INDICATION

| LED INDICATOR           | STATUS                |
|-------------------------|-----------------------|
| GREEN Steady            | Normal Service        |
| RED/GREEN Blinking      | High Charge Enabled   |
| GREEN Blinking          | Test mode Enabled     |
| One Blink RED / Pause   | Battery Charger Fault |
| Two Blinks RED / Pause  | Battery Fault         |
| Four Blinks RED / Pause | Lamp / Load Fault     |

## MANUAL TESTING

| ACTION                                     | REACTION & LED INDICATION                  |
|--|--|
| Push test switch once (within 2 seconds)   | 30 Second test: One blink GREEN / Pause    |
| Push test switch twice (within 2 seconds)  | 30 Minute test: Two blinks GREEN / Pause   |
| Push test switch thrice (within 2 seconds) | 90 Minute test: Three blinks GREEN / Pause |
| Push test switch and hold for 3 seconds    | Cancels test                               |
| Push test switch and hold for 6 seconds    | System reset                               |



Improved Self-Diagnostic Feature

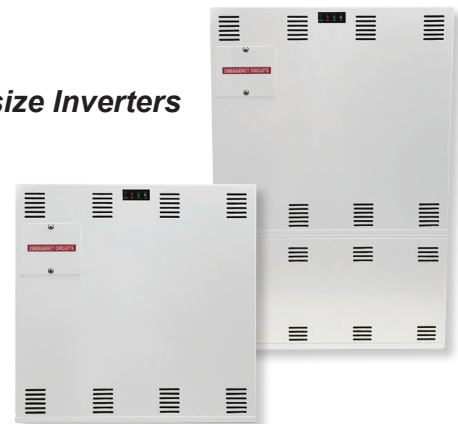
### Mini Inverters



### Micro Inverters



### Midsize Inverters



# Mini and Midsize Inverter Emergency Power Systems

## 4C Option

Provides adjusted power output to connected LED loads during emergency mode operation regardless of local control switch position or operating status

### Features

- Provides capacity for four override control circuits
- Provides full power emergency output to connected loads regardless of local control switch position or operating status
- Works with most standard local control devices including wall switches, dimmers, timers, occupancy sensors and ambient light sensors.
- Ideal for use with incandescent, fluorescent or LED lighting fixtures
- Eliminates the need for bypass devices or separate inverters for each switched load providing cost efficiency
- All wiring is done within the Mini and Midsize Inverter housing, no need for additional j-boxes
- Allows normally-on, normally-off, combination and switched wiring of connected loads
- System may be remotely mounted up to 1,000 feet
- Models available from 55 to 600 watt capacity

### 4C Option Operation

The inverter power system's 4C option allows lighting fixtures or other load types on circuits controlled by local switching devices to be easily connected to and powered by the Mini and Midsize Inverter system during utility power outages. The 4C option provides four local switching device override circuits which, under emergency mode operating conditions, automatically disconnect the load side of the local control device(s) and connect the selected loads to the inverter output assuring normal operation of connected loads regardless of local control device switch position operating status.

### 4C Option Connectivity

Any or all of the 4C option override circuits may be used to power lighting fixtures or other loads, up to the maximum output capacity of the system. The outstanding features of the Mini and Midsize Inverter systems provide additional connectivity and flexibility features to the 4C option. The system's universal output allows for the powering of 120VAC and/or 277VAC loads and because the system's output is a clean, sinusoidal waveform, load compatibility issues are never a problem. Additionally, provisions are provided so that emergency loads can be configured for normally-on, normally-off, combination along with switched operation.

### Mini Inverters



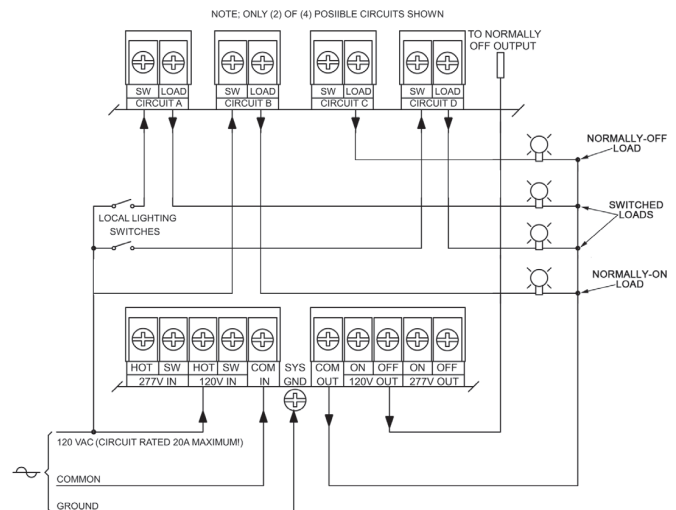
### Midsize Inverters



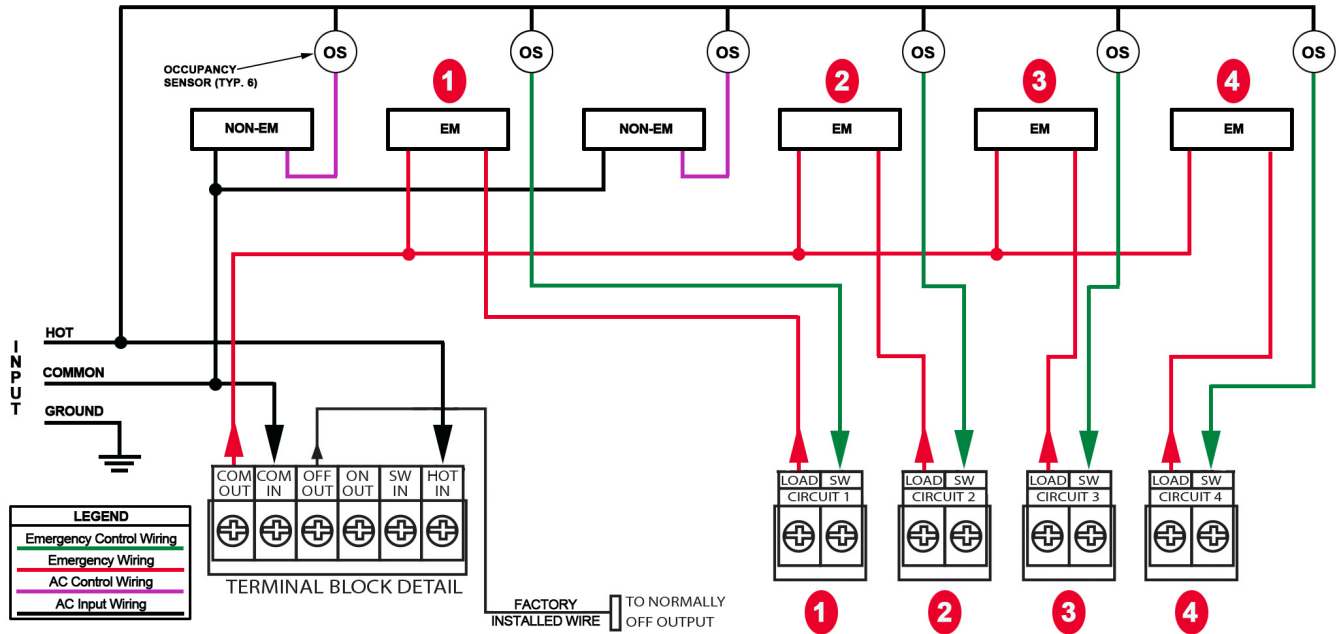
### All Mini and Midsize Series inverters offer:

- Universal 120/277VAC sinusoidal output
- 90 minute operation
- UL Listing

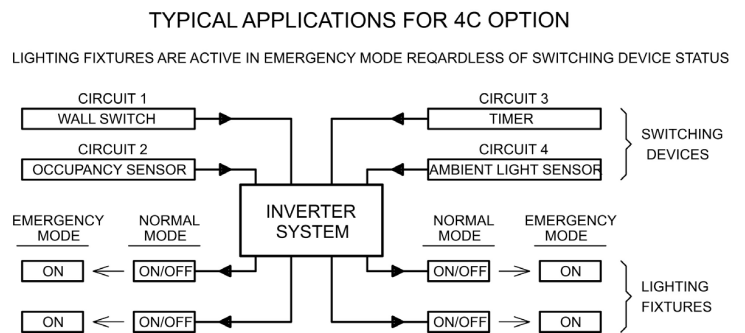
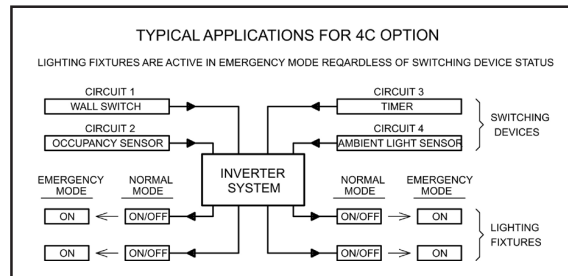
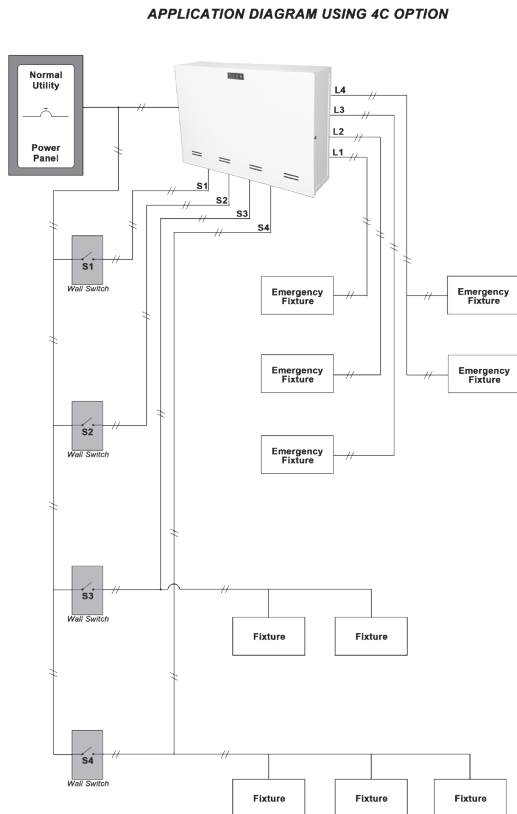
### 4C Option Wiring Diagram



## 4C Option Line Voltage Switching



## 4C Option Schematic



# Mini and Midsize Inverter Emergency Power Systems

## AO and 4AO Option

Provides adjusted power output to dimmable LED Lighting loads during emergency mode operation independent of dimmer control switch position

### Features

- For use with 0 to 10 volt dimmable LED lighting fixtures
- AO Option for use with Mini model inverters provides two user-adjustable emergency output circuits
- 4AO Option for use with Midsize model inverters provides four user-adjustable emergency output circuits
- Delivers 25%, 50%, 75% or 100% of full illumination levels to selected LED fixtures during emergency mode operation regardless of local dimmer control switch position
- Works with all standard 0 to 10 volt dimmer controls
- Reduced emergency illumination levels means fewer total emergency inverter units required on jobs
- The AO Option for Mini Series inverters eliminates the need for bypass devices on 0 to 10 volt dimmer controlled fixtures
- The 4AO Option for Midsize Series inverters eliminates the need for up to four bypass devices on 0 to 10 volt dimmer controlled fixtures
- All wiring is done within the Mini or Midsize inverter housing, no need for additional j-boxes
- Allows normally-on, normally-off, combination and switched wiring of connected loads
- System may be remotely mounted up to 1,000 feet
- The AO Option is available on Mini inverter models with 55 to 220 watt capacity ratings
- The 4AO Option is available on Midsize inverter models with 375 to 600 watt capacity ratings

### AO Option Operation

The AO Option is designed for use with the Mini Series of inverter power systems. The option will bypass one 0 to 10 volt local dimmer switch as well as allow user-programmable setting of emergency output lighting levels. Two load terminals as well as two dip-switch sets for independent output settings are provided to allow 25%, 50%, 75% or 100% of nominal illumination output during power outages. This outstanding level of control allows for fewer Mini Inverter power systems to be required in typical applications.

### 4AO Option Operation

The 4AO Option is designed for use with the Midsize Series of inverter power systems. The option can bypass up to four 0 to 10 volt local dimmer switches as well as allow user-programmable setting of emergency output lighting levels. Four load terminals as well as four dip-switch sets for independent output settings are provided to allow 25%, 50%, 75% or 100% of nominal illumination output during power outages. This outstanding level of control allows for fewer Mini Inverter power systems to be required in typical applications.

### Mini Inverters



### Midsize Inverters



### All Mini and Midsize Series inverters offer:

- Universal 120/277VAC sinusoidal output
- 90 minute operation
- UL Listing

### AO/4AO Option Connectivity

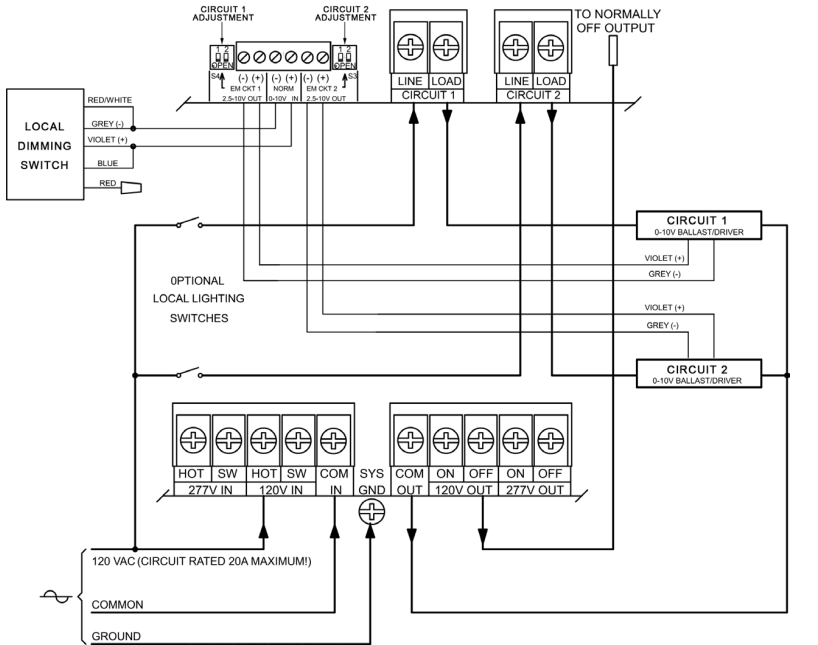
The AO and 4AO option's emergency output circuits may be used to power dimmable LED lighting loads up to the maximum output capacity of the Mini and Midsize Inverter system. Additionally, the override circuits allow the user to select the power level the connected load will be operated at in emergency mode. Each override circuit is controlled by DIP switches which determine the emergency output power level. Emergency output can be set for 25%, 50%, 75% or 100% of maximum fixture illumination, independent of the local dimmer switch position. This level of flexibility provides a highly efficient use of the system output.

The outstanding features of the Mini and Midsize Inverter Series systems provide additional connectivity and flexibility features to the AO and 4AO options. The system's universal output allows for the power-ing of 120VAC and/or 277VAC loads and because the system's output is a clean, sinusoidal waveform, load compatibility issues are never a problem. Additionally, provisions are provided so that emergency loads can be configured for normally-on, normally-off, combination or switched operation.



## AO Option Wiring

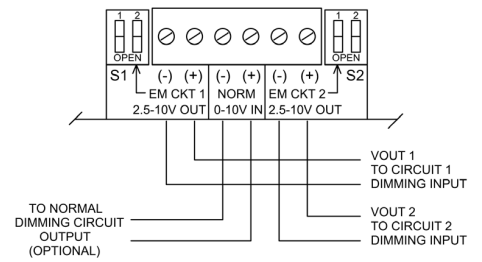
### DIMMING OPTION, 120V OPERATION



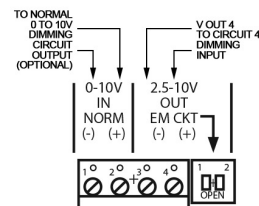
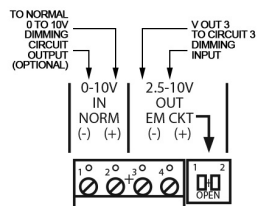
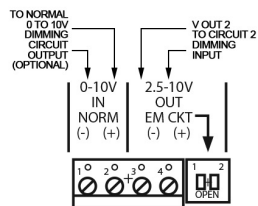
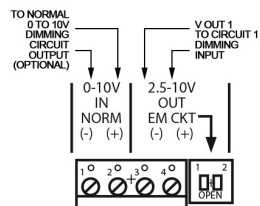
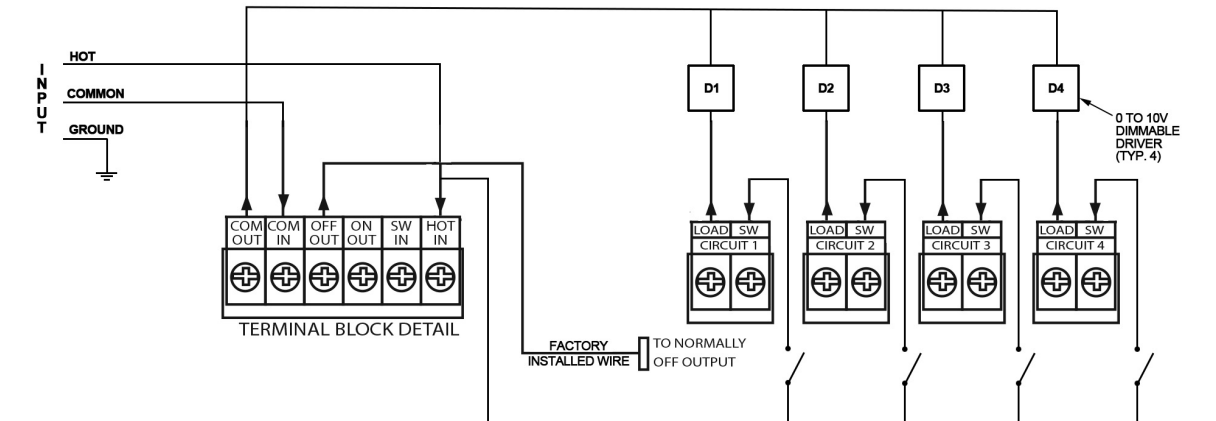
### DIMMING OPTION PROGRAMMING TABLE

| S1,2-1      | S1,2-2      | VOUT 1, VOUT 2 |
|-------------|-------------|----------------|
| OPEN (OFF)  | OPEN (OFF)  | 10.0V          |
| OPEN (OFF)  | CLOSED (ON) | 7.50V          |
| CLOSED (ON) | OPEN (OFF)  | 5.00V          |
| CLOSED (ON) | CLOSED (ON) | 2.50V          |

### DIMMING OPTION CONTROL WIRING



## 4AO Option Wiring



### DIMMING OPTION PROGRAMMING TABLE

| S1,2-1      | S1,2-2      | VOUT 1, VOUT 2 |
|-------------|-------------|----------------|
| OPEN (OFF)  | OPEN (OFF)  | 10.0V          |
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| CLOSED (ON) | CLOSED (ON) | 2.50V          |

### DIMMING OPTION CONTROL WIRING