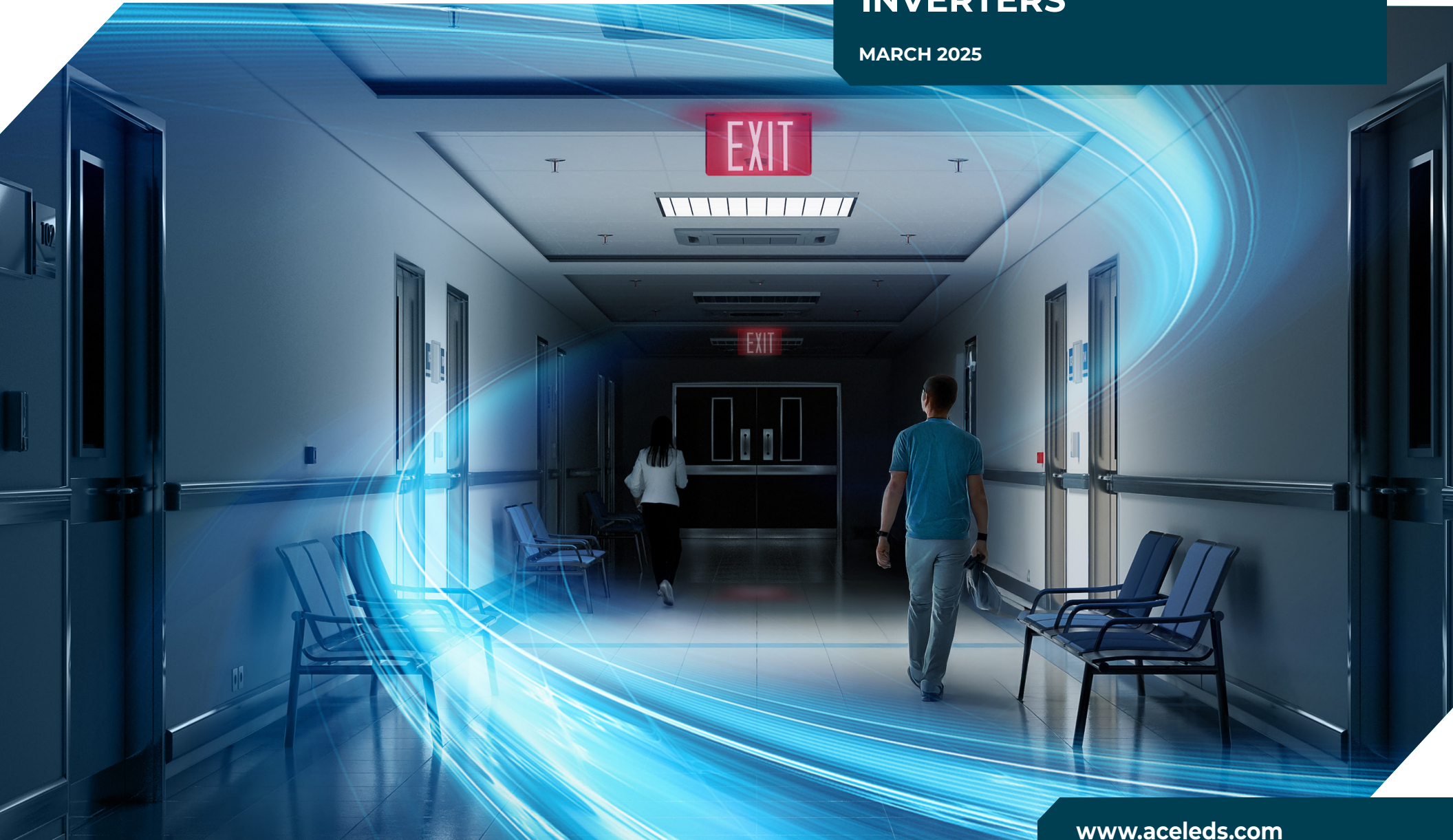


EXPLORING PURE SINE WAVE EMERGENCY LIGHTING INVERTERS

MARCH 2025

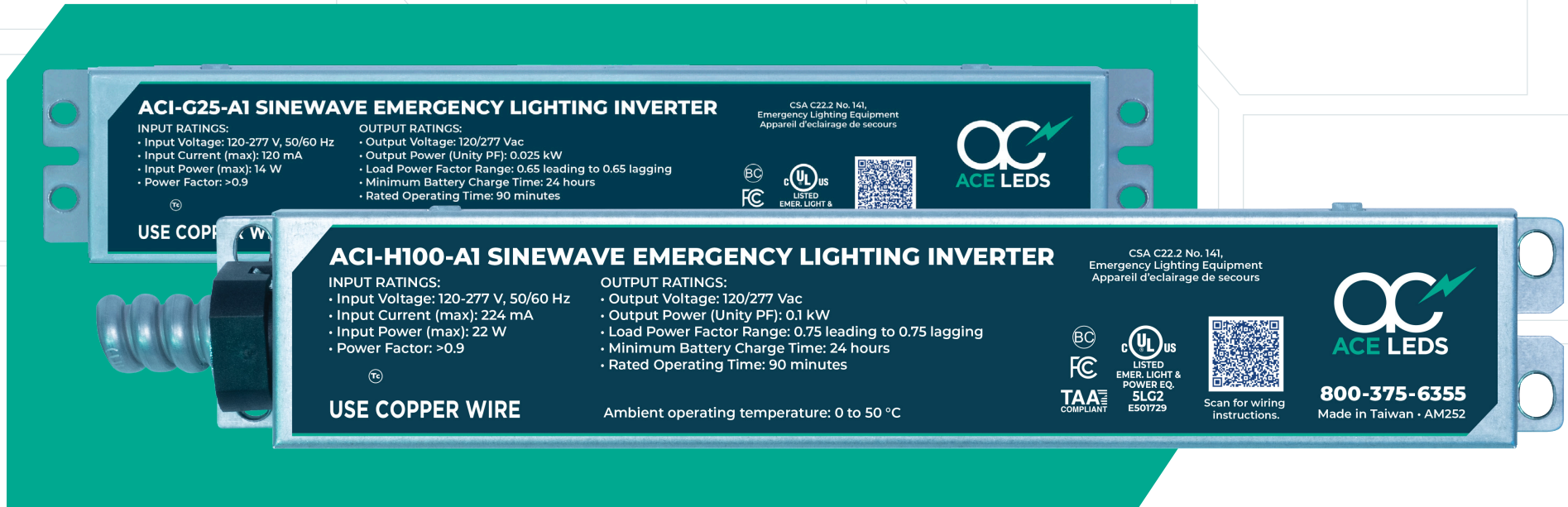




An **Emergency Lighting Inverter**

is an inverter specifically designed for the purposes of supplying AC power to Emergency Lighting equipment, such as luminaires, when the normal AC power fails.

WHAT IS an Emergency Lighting Inverter?



An inverter is a power converter, an electronic device that converts direct current (DC) to alternating current (AC). Therefore, by definition, an inverter has as its input a DC power source, such as a battery, and generates as its output an AC source of power. Inverters are used when

or where there is no access to the normal AC supply, such as in remote applications or as a backup power system when the normal AC supply fails. An **Emergency Lighting Inverter** is an inverter specifically designed for the purposes of supplying AC power to Emergency Lighting equipment,

such as luminaires, when the normal AC power fails. In the USA, single phase **Emergency Lighting Inverters** have as their input a battery and generate as their output a sinusoidal power source at 120 Vac (60 Hz) or 277 Vac (60 Hz).

HOW AND WHERE are Emergency Lighting Inverters used?



The pure sine wave output of ACE LEDs Emergency Lighting Inverters can operate a large variety of lighting fixture types, such as LED lighting fixtures, linear fluorescent, CFL, incandescent, integrated LED tubes (TLEDs), integrated LED fixtures and modules.

Emergency Lighting Inverters deliver power to its connected load when in emergency-mode, i.e., when the normal AC power fails. In this way, normal lighting luminaires used for normal lighting can also be utilized for emergency lighting. If a normal lighting luminaire normally operates from the normal AC power such as 120 or 277 Vac (60 Hz), then these same

lighting fixtures can also be operated by an **Emergency Lighting Inverter** when the normal AC power fails because the **Emergency Lighting Inverter** automatically replaces the normal AC power when the normal AC power fails. The pure sine wave output of ACE LEDs **Emergency Lighting Inverters** can operate a large variety of lighting fixture types, such as LED

lighting fixtures, linear fluorescent, CFL, incandescent, integrated LED tubes (TLEDs), integrated LED fixtures and modules. In addition, **Emergency Lighting Inverters** are ideal for industrial, recreational, office, retail, commercial, hospitality, schools, healthcare, etc.

WHY USE Emergency Lighting Inverters

Emergency Lighting Inverters offer a more centralized remote solution as opposed to a decentralized solution such as luminaires equipped with a battery-powered Emergency LED Driver. As the number of emergency luminaires increases for a given facility, opportunities to reduce total costs

improve in favor of the Emergency Lighting Inverter solution. The obvious benefit of using Emergency Lighting Inverters is that multiple luminaires can be operated in emergency-mode with one Emergency Lighting Inverter, provided that the inverter has the appropriate power capabilities

and that the proper code-compliant emergency lighting control devices and luminaires are used. The high efficiency of LED luminaires has been a strong influencing factor in the trend towards using the remote Emergency Lighting Inverter solution.

CENTRALIZED		DECENTRALIZED	
Large inverters	Mini inverters	Micro inverters	Emergency LED Drivers
(Greater than 2 kW)	(100 W to 2 kW)	(100 Watts or less)	Typically, less than 35 Watts
Centralized system, remotely located, serving a large number of luminaires such as an entire zone, floor, or entire building.	Moderately centralized, remotely located, to operate multiple luminaires. Capable of operating large or small zones.	Remotely located to operate multiple low-power luminaires	Decentralized solution operates one luminaire. These are typically embedded inside the luminaire or mounted on the luminaire.

WHY USE an Emergency Lighting Inverter?

Emergency Lighting Inverters are the only possible solution available for completely integrated LED fixtures which are sealed and do not provide access to the LED Array. These fixtures include an embedded integrated LED driver inside the sealed fixture. Examples include Integrated LED Fixtures, Screw-in Bulbs and Recessed Fixtures, and type B TLEDs.



**Screw-in Bulbs and
Recessed Fixtures**

T LEDs



**High Bay
Integrated LED Fixture**

In addition, **Emergency Lighting Inverters** are the ideal solution when it is necessary to maintain the lighting aesthetics, such as with pendant mount or suspended luminaires.

UNDERSTANDING EMERGENCY LIGHTING

Inverters and Dimming Control

Emergency Lighting Inverters

enable the existing normal lighting fixtures to be utilized for emergency lighting. These normal lighting fixtures will typically have on/off and dimming functionality. NEC requires that both the on/off and dimming functionality be defeated or bypassed so that the

lighting fixtures are not left in the off state or in an unacceptable dimming level during emergency-mode operation. ACE LEDs **Emergency Lighting Inverters** automatically (a) bypass the on/off switch to keep the fixture on in emergency-mode, and (b) automatically override any

dimming controller, taking complete control of the dimming functionality of each fixture so that each fixture is placed into full illumination level or automatically dimmed to an appropriate illumination level when in emergency-mode.

ACE LEDS AUTOMATIC Dimming Technology & Benefits

ACE LEDS **Emergency Lighting Inverters** include Automatic Dimming technology which uses the 0-10 Vdc dimming control input of each fixture to control the dimming level of each fixture. ACE LEDS automatic dimming technology maintains the Inverter at its full rated output power; furthermore, it automatically shares the Inverter's power equally among each Luminaire in emergency-mode. The ACE LEDS Automatic Dimming technology automatically maximizes the full utilization of the Inverter. When normal power returns, the **Emergency Lighting Inverter** returns to normal-mode. The normal lighting functionality and the normal-mode dimming circuits are unaffected by the **Emergency Lighting Inverter** when in normal-mode.



ACI-H100-A1 Emergency Lighting Inverter

Safety and Regulatory Compliance:

- UL and cUL listed (UL924), USA and Canada, for both field and factory installation.
- cUL listed to CSA C22 No.141
- CEC Title 20 compliant: Certified in CA Title 20 Appliance Efficiency Database – Battery Charger
- EMI: Complies to FCC Part 15 class A

The smart controls and battery management system prevents the battery from being deep discharged during prolonged power outages.

Automatic Dimming:

The **ACI-H100-A1** features an automatic dimming control (0-10 Vdc) circuit that greatly expands the utilization of this Emergency Lighting Inverter. When the inverter's 0-10 Vdc dimming circuit is connected to the 0-10 Vdc dimmable LED driver, and the inverter is in emergency-mode, the inverter's 0-10 Vdc dimming circuit controls the dimmable LED driver's power level so that the total load on the inverter does not exceed 100 Watts. This feature allows the **ACI-H100-A1** to be connected to a single fixture or multiple parallel connected fixtures where the total power in normal-mode could exceed 100 Watts. For example, with the **ACI-H100-A1** connected to multiple parallel connected fixtures, each 50 Watt fixtures, then in emergency-mode, the **ACI-H100-A1** will automatically adjust the 0-10 Vdc dimming voltage level of each fixture so that the total load on the inverter does not exceed 100 Watts. In this way, each of the connected fixtures will be operated at 16.6 Watts in emergency-mode. Note that, in normal-mode operation, the normal lighting functionality and the normal-mode dimming circuits are unaffected by the **ACI-H100-A1** and operate as normal.

Specifications:

Emergency lighting shall be provided by using the **ACI-H100-A1 emergency lighting inverter**. The **ACI-H100-A1** shall contain a lithium iron phosphate battery.

Features, Benefits, and Applications:

ACE LEDS automatic dimming technology maintains the Inverter at its full rated output power; furthermore, it automatically shares the Inverter's power equally among each Luminaire in emergency-mode.

- Maintains output voltage regardless of load.
- Includes input over voltage surge protection.
- Improves reliability.
- Reduces installation time and complexity.
- Pure sine wave output waveform provides improved compatibility with sensitive electronic loads.
- Provides optimum compatibility across all lighting technologies including high crest factor loads.
- High load inrush current (I²t) capability.
- High start-up power delivery capability. Provides robust and smooth start-up for the most demanding luminaire loads.
- Wide load power factor range.
- Includes a miniature illuminated test switch status indicator.
- Suitable for indoor and damp locations.

OTHER FEATURES AND BENEFITS of ACE ACI Inverters



- **Small size:** The small size of ACE LEDS Emergency Lighting Inverters make them among the industry's most versatile for mounting. The "H" series inverters are suitable for plenum space mounting in close proximity to the luminaire or for remote mounting up to 300 ft. distance. Further distances are

possible with larger gage wire. The small size "G" series micro inverters are designed to be mounted inside a luminaire. ACE LEDS Emergency Lighting Inverters are UL and cUL listed (UL924), USA and Canada, for both field and factory installation.

- **Automatically selects the appropriate output voltage:** The inverter automatically selects the appropriate output voltage (120 or 277 Vac).
- **Pure Sine Wave output waveform:** Provides improved reliability of connected loads, reduces heat, improves efficiency, and provides optimum compatibility across all lighting load types.
- **Capable of sourcing high crest factor loads:** Some lighting loads require a demanding high current crest factor (peak-to-RMS ratio), and ACE ACI Inverters deliver.
- **High load inrush current (I2t) capability:** Some LED loads have high inrush current (I2t) and the ACE ACI Inverters deliver.
- **High start-up power delivery capability:** Provides robust and smooth start-up for the most demanding luminaire loads.

- **Wide load power factor range:**
Most lighting loads are not purely “resistive,” therefore they exhibit a less than unity power factor. This is demanding on the Inverter. ACE ACI Inverters are capable of supplying power efficiently to a wide range of loads that have poor power factor.

- **Versatile output wiring configuration options:** The inverter can be configured for a Normally On configuration, or a Normally Off (Emergency only) configuration, or a Switched configuration.
- **Compatible with LED, Fluorescent, & Incandescent lighting loads**

- **Suitable for high temperature environments:** ACE Inverters are suitable for indoor and damp locations, as well as high temperature environments. The primary benefit of this high temperature environment capability is versatile mounting, such as plenum space mounting in close proximity to the luminaire or for remote mounting up to 300 ft.





At ACE LEDS, we are committed to delivering value-engineered solutions that enhance safety, reliability, and performance in the emergency lighting industry.

Our **Emergency Lighting Inverters** are designed with cutting-edge technology to ensure seamless power transition during AC power failures, providing emergency illumination for various lighting applications. By integrating automatic dimming, high efficiency, and versatile mounting options, we maximize power utilization and operational effectiveness while maintaining lighting aesthetics.

ACE LEDS is dedicated to **innovation and continuous improvement, offering solutions that are reliable, cost-effective, and adaptable to a wide range of environments and lighting systems.**

Visit aceleds.com to learn more about our latest innovations

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or your local WPG Americans Sales representative at inquiry@wpgamericas.com or 888-WPG8881

