



## Using Mini-Inverter Systems for Outdoor Egress Applications



Outdoor emergency lighting is often an overlooked aspect of a facility's emergency egress plan. The **Life Safety Code** calls for considerations to be made for building occupants once they have exited a building. NFPA 101: Life Safety Code, Section 7.9.1.2 specifies that exit discharge include "*designated stairs, ramps, aisles, walkways, and escalators leading to a public way.*"

However, not all outdoor paths of egress are the same. Several factors - distance to the public way and the types of outdoor fixtures used, for example - can impact the selection process for the appropriate emergency lighting solution. IIS Mini Inverter Systems are an ideal way of meeting Life Safety Code requirements for outdoor paths of egress because they address many of the challenges inherent with outdoor paths of egress, such as fixture variety, distances, and temperature conditions.

### 1 Outdoor Fixture Types

Outdoor paths of egress can consist of a variety of lighting types: wallpacks to illuminate landings, bollards along pathways, steplights, sconces and handrail lighting along ramps and stairs, and IP-rated enclosed and gasketed strip fixtures within a parking structure, just to name a few. Depending on the size and specifications of the fixture, integral battery pack options may be limited. Also, a variety of fixtures along the outdoor path of egress may likely dictate a unique battery pack design *for each fixture type* and will require installation at the factory.



#### Load Compatibility with IIS Mini-Inverter Systems

IOTA mini-inverter systems power an entire circuit with emergency AC power, rather than just a single fixture. This delivers the benefit of operating multiple fixtures of varying lamp technologies and sizes without concerns about fixture compatibility.

Additionally, the IIS mini-inverter will operate the designated outdoor fixtures at full light output whereas typical emergency driver solutions usually illuminate the fixture at less-than-full output. In outdoor areas susceptible to additional hazards such as ice, debris, or uneven surfaces, maximum illumination is always ideal.



### 2 Distance Factors



The outdoor area to be illuminated may be extensive. The longer the required path of egress, the more emergency lighting is needed. Also, facilities will most likely have more than one exit discharge point. Should each fixture be required to provide adequate foot-candles along these multiple paths, integral battery solutions may not be the most practical or cost-effective option. Mini inverters positioned near the discharge exit also allows for electrical connection and monitoring of a dedicated exterior lighting branch circuit, if one exists, to trigger emergency operation and maintain compliance to the NEC.

#### Remote Mounting Mini-Inverters

Because inverters deliver line voltage to the circuit, they can operate greater loads at significant distances. Depending on the rating of the inverter, system voltage, and wire gauge, an inverter can operate loads up to a distance of 3000+ feet.

**Table 1A** [see Page 2] provides a useful reference to find the available inverter wattages for different distance requirements.

**TABLE 1A: IIS Mini-Inverter Remote Mounting Distances** Distances shown allow for a 3% voltage drop.

	Watts	120V			277V*
		14 gauge	12 gauge	10 gauge	14 gauge
<b>IIS 125</b>	<b>50W</b>	1600 ft	2468 ft	4084 ft	8623 ft
	<b>100W</b>	809 ft	1249 ft	2066 ft	4311 ft
	<b>125W</b>	646 ft	997 ft	1649 ft	3445 ft
<b>IIS 375</b>	<b>150W</b>	537 ft	829 ft	1372 ft	2874 ft
	<b>200W</b>	404 ft	624 ft	1033 ft	2155 ft
	<b>250W</b>	323 ft	493 ft	827 ft	1722 ft
	<b>300W</b>	268 ft	414 ft	686 ft	1437 ft
	<b>350W</b>	230 ft	356 ft	589 ft	1230 ft
	<b>375W</b>	214 ft	331 ft	548 ft	1146 ft
<b>IIS 550</b>	<b>550W</b>	146 ft	226 ft	374 ft	779 ft

\*Incandescent lamps are not generally operated above 140 volts except by special permission by the authority having jurisdiction.

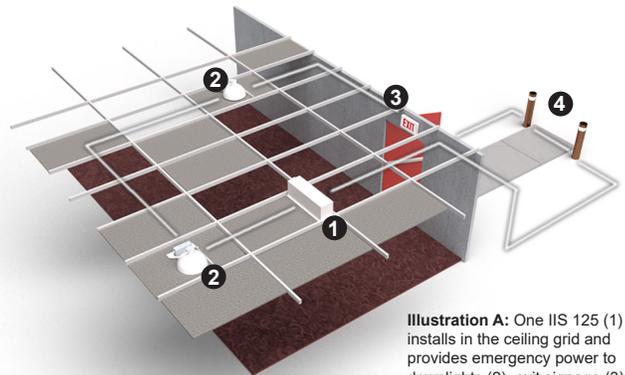
### 3 Thermal Considerations

Outdoor fixtures are specially-designed to withstand extreme weather and temperature conditions. The sealed, ingress-protected nature of these designs can cause significant temperature conditions within the fixture. An integral emergency battery with a thermal blanket design for cold-weather applications may perform well in cooler climates but may not be well-suited for outdoor fixtures where ambient temperatures are consistently higher. As a general rule, **the life span of battery equipment is cut in half for every 10°C above normal ambient temperature.** In a sealed fixture with little or no ventilation, any integral battery solution is subject to these detrimental conditions that result in a shorter life span.

#### Inverters in Controlled Climates

Because inverters can operate the outdoor fixtures remotely, they can be installed within the facility where the inverter's battery supply is not subject to the negative impacts of outdoor temperature conditions. Emergency lighting is provided to the building's exterior during hours of darkness without the emergency supply being unnecessarily exposed to extreme temperatures during non-use daylight periods.

Depending on the inverter's rated output and the emergency lighting requirements of the facility -- both indoor and outdoor -- a single inverter solution can be sufficient to provide a 'one-size-fits-all' emergency supply for the facility's egress needs. **Illustration A** provides an example where one inverter is used to operate multiple fixtures within a zone of a building, while also providing emergency power to an exit sign or outdoor remote lamp head or bollard along the discharge point.



**Illustration A:** One IIS 125 (1) installs in the ceiling grid and provides emergency power to downlights (2), exit signage (3) and exterior bollards (4).

### Summary

IIS Mini-Inverters offer a convenient and practical single-source emergency lighting solution for outdoor egress requirements, while avoiding the complications of fixture compatibility, distances, and detrimental effects of outdoor conditions.

For additional information on IIS Series models, product features and benefits, and application details, contact IOTA at **1-800-866-462** or visit **www.iotaengineering.com**.

