Application Note

Using nLight Devices with Emergency Luminaires

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Introduction

This application note reviews the theory of operation and proper applications of nLight Wired and AIR (wireless) lighting control devices when used with various emergency lighting strategies. This note includes guidance regarding the use of UL 924-listed "ER" and "EM" options of nLight lighting control devices that provide energy saving operation (such as shutoff or dimming) during normal power conditions and automatic full-illumination override during typical loss of power scenarios. This note also discusses the use of standard nLight lighting control devices with separately listed (by others) UL 924-type devices, such as emergency battery drivers, generator transfer devices, emergency bypass relays, and AC micro-inverters.

Application Summary

Table 01 provides a summary of the recommended specification option for use with a given emergency lighting strategy. Each individual application is discussed in depth in the following sections.

Emergency Lighting Strategy	Recommended Control Device Operation
• Diesel generator emergency backup supply • Slow transfer inverter emergency backup supply • Fast Transfer (FT) inverter emergency backup supply • Uninterruptible Power System (UPS) emergency backup supply	**"EM" Option** • UL 924 Listed. • Detection of normal power is accomplished wirelessly via devices connected to normal power. Provides lighting control override while normal power sensing devices are offline. • Device automatically exits override state when normal power devices are once again powered.
• Diesel generator emergency backup supply • Slow transfer inverter emergency backup supply • Fast Transfer (FT) inverter emergency backup supply • Uninterruptible Power System (UPS) emergency backup supply	**"ER" Option** • The ER option is best used for nLight Wired applications and nLight AIR applications where a normal power sensing device is not available in groups that include emergency devices. • UL 924 Listed. • Line voltage devices utilize dedicated normal power sensing leads to initiate lighting control override during loss of normal power scenarios. • Line voltage devices require connections to both emergency and normal power circuits. • Low voltage fixture integrated devices utilize bus power sensing from fixtures with integrated control or external devices that are connected to normal power.
• Luminaire-integral Battery Pack (BP) and emergency driver • Luminaire-integral AC micro-inverter • Generator Transfer Device (GTD) • Emergency Bypass Relay (separate from integral control device)	**Standard Option** • Control device not specifically listed for emergency use. • Wired such that a separately listed emergency device provides emergency lighting power.

Table 01: Recommended Control Device Option for Emergency Lighting Strategy

UL 924 Standard Summary

The UL 924 standard applies to emergency lighting and power equipment for use in unclassified locations (meaning locations which are not specifically covered by other defined egress lighting requirements) and intended for connection to branch circuits of 600 volts or less. Such equipment is intended to automatically supply illumination, power, or both to critical areas and equipment in the event of failure of the normal supply. This is done in accordance with Article 700 or 701 of the National Electrical Code, NFPA 70; the Life Safety Code, NFPA 101; the Fire Code, NFPA 1; the International Building Code, IBC; and the International Fire Code, IFC.

Line Voltage "ER" Option - Normal Power Sensing Leads

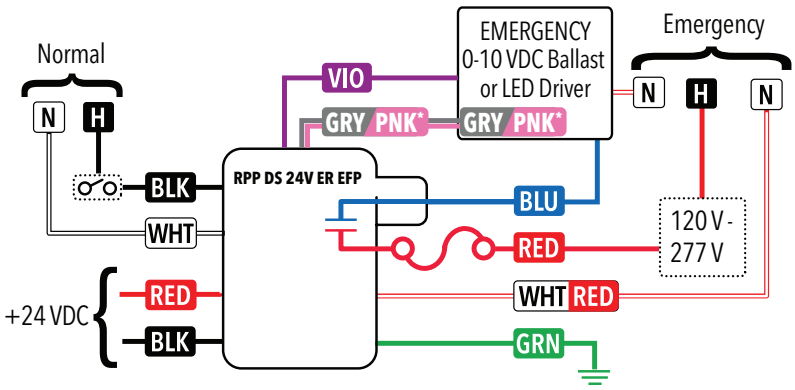
Line Voltage ER Intended Applications

The nLight line voltage "ER" models with normal power circuit sensing leads are intended to be powered by an emergency circuit and have an isolated AC power detection circuit that is intended to be connected to a normal power circuit. The ER model control device provides a flexible control solution for central emergency lighting power, suitable for traditional emergency power sources (diesel generator and slow transfer inverter backups) in addition to fast-transfer (FT) inverters or uninterruptible power systems (UPS).

Line Voltage ER Devices and Wiring

The following are the available UL 924 listed nLight models that use normal power circuit sensing leads for override of lighting control:

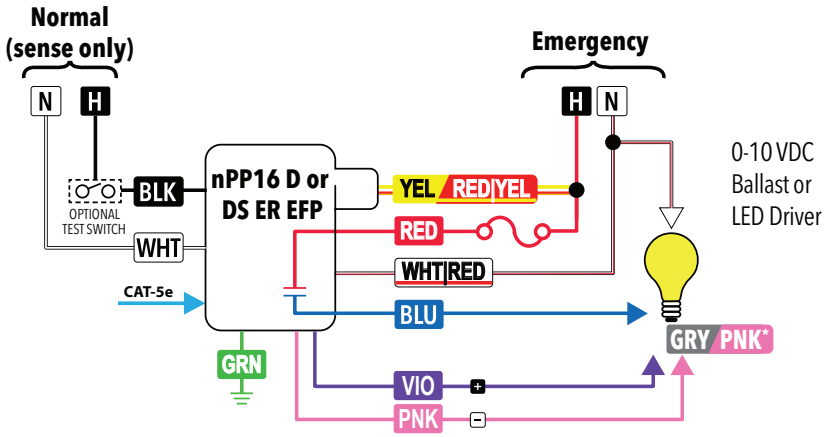
- **nPP16 (D/DS) ER EFP, nPS 80 EZ ER, rPP20 (D/DS) (24V) ER EFP (CP) (UVOLT) G2**
  Externally mounted control device, nipple mounted to luminaire or junction box. Nomenclature within parenthesis is optional.



Legend

RED – 120-277VAC Emergency Hot
WHT/RED – Emergency Neutral
BLK – Unswitched Normal Hot
WHT – Normal Neutral
BLU – Switched Output
VIO – 0-10V Dimming (+)
PNK – 0-10V Common (-)
GRN – Ground
– Normally Closed Test Switch (Optional, by others)

Figure 01 - Example Wiring Diagram: rPP20 DS 24V ER EFP G2



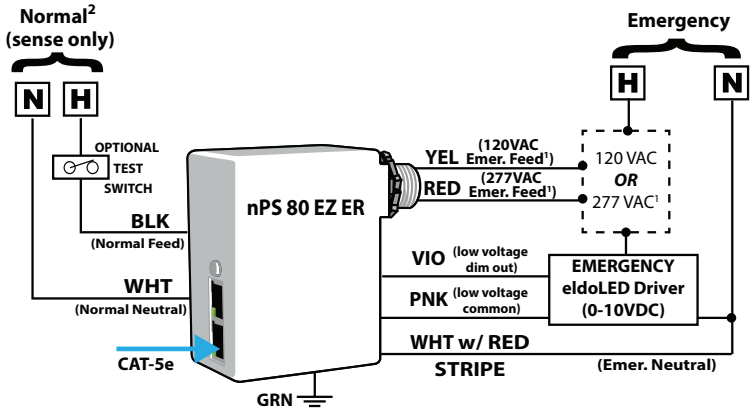
Legend

WHT|RED - Emer. Neutral
YEL - 120V Emer. Hot
RED|YEL - 277V Emer. Hot
RED - Emer. Hot (Switched In)
BLU - Emer. Load (Switched Out)
BLK - Norm. Hot
WHT - Norm. Neutral
VIO – 0-10V Dimming (+)
PNK – 0-10V Common (-)
GRN – Ground
– Normally Closed Test Switch (Optional, by others)

Figure 02 - Example Wiring Diagram: nPP16 D ER EFP

Line Voltage "ER" Option - Normal Power Sensing Leads - cont'd

Line Voltage ER Devices and Wiring - cont'd



Legend

WHT|RED - Emer. Neutral
YEL - 120V Emer. Hot
RED - 277V Emer. Hot
BLK - Norm. Hot
WHT - Norm. Neutral
VIO – 0-10V Dimming (+)
PNK – 0-10V Common (-)
GRN – Ground
– Normally Closed Test Switch (Optional, by others)

Figure 03 - Example Wiring Diagram: nPS 80 EZ ER

Line Voltage ER Testing

The line voltage ER devices may be tested by opening normal circuit breaker or through an optional test switch, provided by others. The test switch should be of type normally-closed with contacts and rated for line voltage. In the case of ER control devices, the test switch will only carry a small amount of current (less than 0.1A), as it is used only to interrupt AC line voltage to the ER control device's normal power circuit sensing leads.

A push button on the side of the control device can be used to test that the lighting load is properly connected and that controls will be overridden in the event that normal power is lost.

1. Press and release the button.
2. The relay will close, and the controlled load will go to full output for 4 seconds to simulate loss of normal power.
3. After 4 seconds, the device will return to its previous state.

Line Voltage ER Sequence of Operations

- Normal Condition:
  - AC line voltage is detected across normal hot and normal neutral (black and white wires).
  - Control device can dim and turn off the load as normal in response to automatic and manual control.
- Emergency Condition:
  - Whether due to failure of utility power or opening of normal hot circuit breaker, the ER control device detects loss of AC voltage on the normal power circuit sensing leads.
  - ER control device ignores all automatic and manual control commands and controls the driver or ballast to its fully turned light output. The relay is closed and the 0-10V dimming signal is set at the maximum trim level.
- Restoration of Normal Power:
  - ER control device resumes normally programmed manual and automatic control sequences when AC voltage is restored to the normal power circuit sensing leads.

Low Voltage "ER" Option - Fixture Embedded Devices with Bus Power Sensing

Low Voltage ER Intended Applications

The nLight Wired low voltage "ER" models in nLight enabled luminaires are intended to be used within luminaires powered by an emergency circuit. Additionally, they are intended to be connected via a CAT-5e cable to an nLight zone that has adequate bus power, and all the connected nLight devices generating bus power should be fed with normal power. The low voltage "ER" control device provides a flexible control solution for central emergency lighting power, suitable for traditional emergency power sources in addition to fast-transfer (FT) inverters or uninterruptible power systems (UPS).

Low Voltage ER Devices and Wiring

nLight Wired control devices are available in the following UL 924 listed models that use bus power sensing.

- **nIO EZ PH ER, nIO EZDCL ER**
  Fixture embedded low voltage control device.

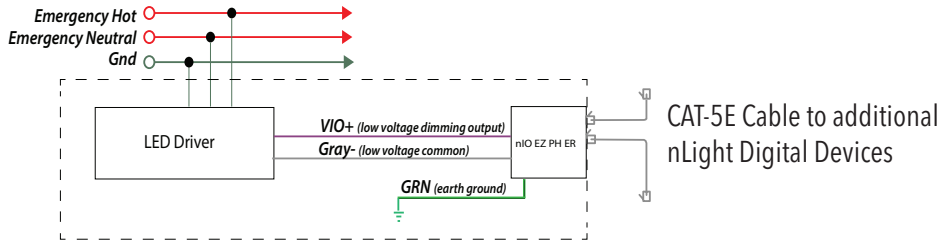


Figure 04 - Example Wiring Diagram: nIO EZ PH ER

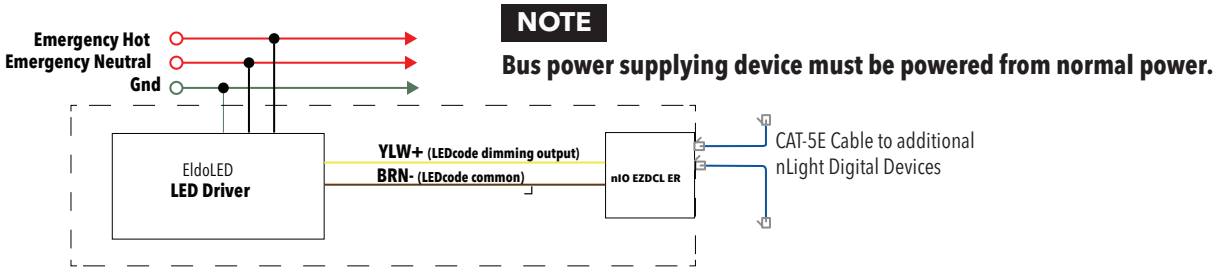


Figure 05 - Example Wiring Diagram: nIO EZDCL ER

The UL 924 nLight low voltage ER control devices are designed to drive the controlled luminaires to full light output if there is no bus power detected from the normally powered nLight devices. While in this mode, the nLight network is no longer powered and therefore the control device ignores manual dimming, automatic dimming, occupancy controls, and daylight controls.

Low Voltage ER Sequence of Operations

- Normal Condition:
  - Bus power is present from normally powered nLight devices in the space (e.g. nLight enabled fixtures, nLight bridges, power packs, bus power supplies, etc.).
  - Fixture embedded control device can dim and turn off the load as normal in response to automatic and manual control.
- Emergency Condition:
  - Whether due to failure of utility power or opening of normal hot circuit breaker, the nLight bus powering devices drop out and the low voltage ER control device detects this loss of bus power over the CAT-5e connection.
  - The low voltage ER control device ignores all automatic and manual control commands and controls the driver or ballast to its fully tuned light output in one of the following ways:
    - nIO EZ PH: Loss of bus power opens the 0-10V dimming signal, therefore releasing the fixture to full bright.
    - nIO EZDCL ER: Loss of bus power digitally drives the eldoLED drive to full bright based on maximum trim level (default 100%, user programmable).
- Restoration of Normal Power:
  - Low voltage ER control device resumes normally programmed manual and automatic control sequences when bus power is restored over the CAT-5e connection from the normal powered nLight devices.

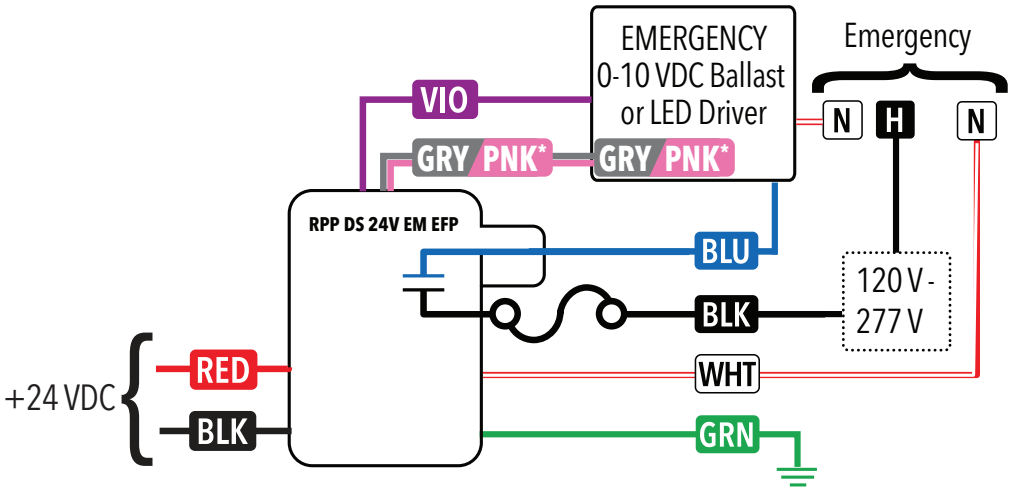
EM Intended Applications

nLight AIR devices with an EM option assess the presence of normal power via wireless broadcasts. Broadcasts are received from normal powered devices that have been paired to an Emergency Behavior Zone via CL**AIR**ITY+ and selected as normal power sensing (NPS) devices. Association with up to three NPS devices can be made for any given Emergency Behavior Zone. This wirelessly imitates the functionality of the ER solution, which requires a wired connection to normal power, but allows EM devices to track up to three separate phases of power simultaneously. As a result, the EM option can be used in applications that an ER solution are would otherwise be used. Because the EM solution is wireless, it can be applied more easily to high bay applications and applications where running wire would be difficult (such as parking garages and stairwells).

Line Voltage EM Control Devices

The following line voltage EM models include a relay and optional dimming so that the lights may be completely turned off during normal power conditions.

- **rSDGR EM G2**
  Luminaire mounted wireless control device, integrated to an outdoor luminaire.
- **rSBOR EM G2**
  Externally mounted wireless control device and sensor, attached to luminaire or junction box.
- **rLSXR EM G2**
  Externally mounted wireless control device and sensor, attached to luminaire or junction box.
- **rPP20 EM G2**
  Externally mounted wireless control device, attached to luminaire or junction box.



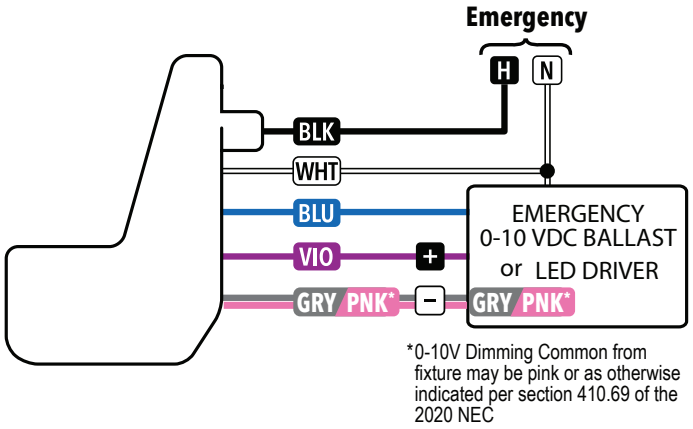
Legend

BLK - 120-277, 347VAC** Emergency Hot
WHT – Emergency Neutral
BLU – Switched Output
VIO – 0-10V Dim (+)
PNK* – 0-10V Com (-)
RED (Terminal) - +24VDC
BLK (Terminal) - DC Com
GRN – Ground

*0-10V Dimming Common from luminaire may be pink or as otherwise indicated per section 410.69 of the 2020 NEC

**347 only supported by UVOLT option.

Figure 06 - Example EM Wiring Diagram: rPP20 DS 24V EM G2



*0-10V Dimming Common from fixture may be pink or as otherwise indicated per section 410.69 of the 2020 NEC

Legend

BLK - 120/277 Input Emergency Hot
WHT – Emergency Neutral
BLU – Switched Line Voltage Output to Luminaire
VIO – Low Voltage Dim Output (0-10 VDC)
PNK – 0Low Voltage Common

Figure 07 - Example EM Wiring Diagram: rSBOR EM G2

Low Voltage EM Control Devices

The following low voltage EM models provide UL 924 compliance when included in a luminaire finished assembly. EM devices must have version 3.4 or later firmware. Devices with version 2 firmware (e.g., 2.14.161) cannot be updated to version 3 or later firmware (e.g., 3.4.1). Version 3 firmware is only available on G2 hardware manufactured in May of 2021 or later.

- **rES7 EM G2**
  Fixture embedded control device, occupancy sensor, and daylight sensor.
- **rIO EM G2**
  Fixture embedded control device.
- **rMSOD EM G2**
  Fixture embedded IP66 rated control device, occupancy sensor, and daylight sensor.
- **rSBG EM G2**
  Fixture embedded IP66 rated control device, occupancy sensor, and daylight sensor.

NOTE

Where LEDcode speaking EM devices are included in a luminaire finished assembly, eldoLED drivers require LEDcode firmware V2.1 or newer to support the "emergency power interruption detection" feature.

Normal Power Sensing (NPS) Control Devices

NPS control devices provide normal power sensing broadcasts to EM devices in the same group, allowing EM devices to know when normal power is available.

- NPS devices must have version 3.4 or later firmware. Devices with version 2 firmware (e.g., 2.14.161) cannot be updated to version 3 or later firmware (e.g., 3.4.1). Version 3 firmware is only available on G2 hardware manufactured in May of 2021 or later.
- NPS is not available for devices that include an emergency option. E.g., an rPP20 D ER EFP G2 could not be used as an NPS device. Whereas an rPP20 D EFP G2 could serve as an NPS device.
- Only available in the following device types: rPP20, rLSXR, rSBOR, rSDGR, rIO EZDL, rIO ZTS, rES7 LEDcode, rES7 ZTS, rMSOD LEDcode, rMSOD ZTS, rSBG LEDcode, rSBG ZTS.
- Each nLight ECLYPSE can support up to 50 NPS devices.

EM Testing

The EM devices may be tested by opening the normal circuit breaker feeding normal luminaires in the space. CL**AIR**ITY+ may also be used to test the devices in the space using the Run Simulation button after an Emergency Device zone has been set up.

EM Sequence of Operations

- Normal Condition:
  - Devices that are connected to normal power and have been selected as NPS devices provide NPS broadcasts.
  - Control device can dim and turn off the load as normal in response to automatic and manual control.
- Emergency Condition:
  - Whether due to failure of utility power or opening of normal hot circuit breaker, the NPS devices lose power and no longer send NPS broadcasts.
  - Backup power source activates; transfer switch moves the emergency circuit powering the EM control device onto the backup source, and the EM control device regains power.
  - The EM control device initializes at full output because, upon boot up, it does not have record of a normal power sense (NPS) broadcast having been received.
  - EM control device ignores all automatic and manual commands and controls the driver or ballast to its full output. For line voltage devices, the relay is closed and 0-10V dimming is set at the maximum trim level. For low voltage devices, the driver is controlled to the maximum trim level.
  - For devices that did not lose power, EM control devices will go to full output after not receiving an NPS broadcast from one or more associated NPS devices for 8 seconds.
- Restoration of Normal Power:
  - Utility power recovers or a circuitbreaker powering NPS devices is closed.
  - NPS devices receive normal power and send a broadcast identifying that normal power is present within 250ms of completing their boot up.
  - Once EM devices receive an NPS broadcast from all associated NPS devices, they will exit emergency operation and can once again be controlled.

Emergency Driver with Standard nLight Line Voltage Control Devices

Example nLight Device Families: nPP16, rPP20, rSBOR, rLSXR, rSDGR

Emergency Driver Intended Applications

This application typically involves the following characteristics:

- The luminaire is fed by a normal power circuit unswitched hot line feed.
- When normal power fails, a battery-powered emergency driver is intended to supply DC power directly to the light engine.

Emergency Driver Wiring Instructions

Wiring instructions for this use case will vary with the specific model of emergency driver, but the following are general guidelines for how an emergency driver is typically connected. The installation instructions and wiring diagram supplied with the specific emergency driver being used should be followed.

- Control device's line voltage input wire should be connected in parallel with emergency driver or battery unswitched hot input wire.
- Control device's switched relay output should be connected to line voltage input of standard AC LED driver(s) only.
- Control device's 0-10V dimming wires should be connected to 0-10V input of all LED drivers.

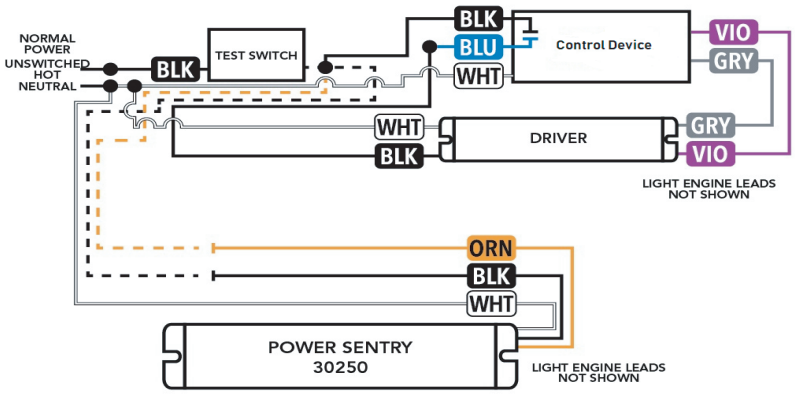


Figure 08 - Example Wiring Diagram - Power Sentry PS30250 battery powered emergency driver with nLight control device

NOTE

Wiring shown is for example only and should be confirmed with respective control device's wiring details.

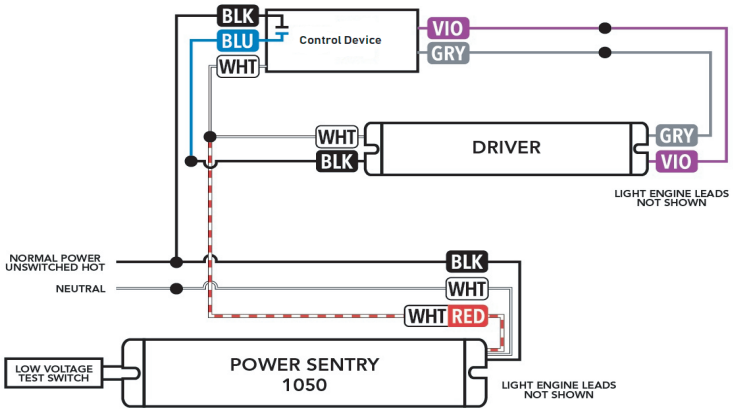


Figure 09 - Example Wiring Diagram - Power Sentry PS1050 battery powered emergency driver with nLight control device

NOTE

Wiring shown is for example only and should be confirmed with respective control device's wiring details.

Emergency Driver with Standard nLight Line Voltage Control Device - cont'd

Testing Note

Follow the emergency driver manufacturer's instructions for installation and wiring of test switches. Some emergency drivers use low voltage test switches and others use line voltage test switches.

Where a line voltage normally closed test switch is supplied that is also intended (and rated) to carry the full load of the AC drivers in the luminaire, it is recommended to wire the unswitched hot connections of both control device and battery pack on the output side of this type of test switch. That use of the switch has the following simultaneous effects: control device along with normal AC drivers are disabled, battery driver is enabled.

Sequence of Operations

- Normal Condition:
  - Control device operates the standard AC LED driver(s) under normal power conditions and otherwise does not interfere with the unswitched hot connection to the emergency driver.
- Emergency Condition:
  - Control device and standard AC LED drivers are de-energized by loss of normal power.
  - Emergency driver detects the loss of normal power on the unswitched hot input, and provides power to the connected light engines to provide illumination.
- Restoration of Normal Power:
  - Emergency driver detects the presence of line voltage on the normal power unswitched hot input, disables power to the connected light engines, and resumes charging.
  - nLight control device becomes re-energized and follows its normal default power-on sequence: relay is closed to switch on the AC driver(s) and dimming output is at maximum trim voltage until further instructions are received by automatic or manual control measures.

Generator Transfer Device (GTD) with Standard nLight Control Device

GTD Intended Applications

This application typically involves the following characteristics:

- The GTD is fed by both a normal power circuit and by an emergency power circuit.
  - Confirm that the GTD being evaluated/installed is approved for use as a transfer device (and not a bypass device) featuring normal power switched hot & neutral inputs that are fully isolated from emergency power unswitched hot & neutral inputs.
  - The normal power and emergency power circuits have both been sized to carry the load of this luminaire.

NOTE

If the normal power circuit has not been sized for this lighting load and is only intended to be used as a normal power unswitched hot sensing line, then a bypass relay should be used; see "Emergency Bypass Relay" section lower down for more details.

  - GTD provides AC output power for emergency luminaire(s) or emergency driver(s).
  - When normal power fails, the GTD transfers the emergency lighting load from the normal circuit (typically a controlled/switched hot and neutral pair) to the emergency circuit (unswitched hot and neutral pair).

Generator Transfer Device (GTD) with Standard nLight Control Device - cont'd

GTD Wiring Instructions

Wiring instructions for this use case will vary with the specific model of GTD but the following general guidelines for wiring a standard control device can be followed:

- Control device's line voltage input wire should be connected in parallel with GTD's normal power unswitched hot input wire.
  - Do not connect standard model control device to emergency power unswitched hot when used with a transfer device. This is important to ensure that emergency AC drivers are not dimmed by the control device during loss of normal power.
- Control device's switched relay output (blue) should be connected to switched hot line voltage input of GTD.
- Emergency AC driver(s) – to be powered during emergency power conditions – line voltage & neutral inputs should only be connected to line voltage & neutral driver output of GTD: there should be no direct line voltage connections between the nLight control device and the emergency AC driver(s).
- Control device's 0-10V output (violet):
  - If GTD does not provide 0-10V interrupt, control device's 0-10V output should be connected to 0-10V input of all LED drivers.
  - If the GTD unit offers a 0-10V interrupting capability, then control device's 0-10V output may be wired to GTD.

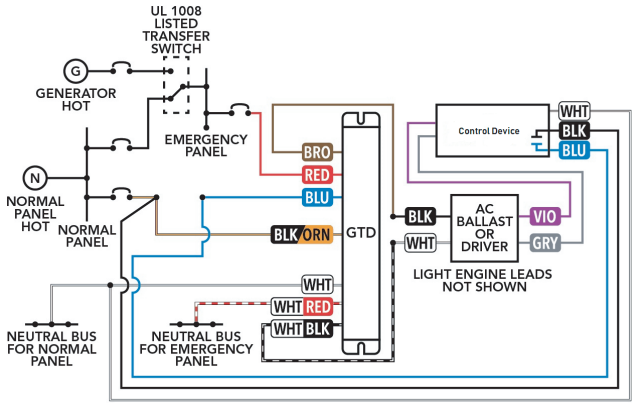


Figure 10 - Example Wiring Diagram - GTD with nLight Control Device

NOTE

Wiring shown is for example only and should be confirmed with respective GTD and control device wiring details.

GTD Testing Note

Follow the emergency driver manufacturer's instructions for installation and wiring of test switches. Some emergency drivers use low voltage test switches and others use line voltage test switches.

Where a line voltage normally closed test switch is supplied that is also intended (and rated) to carry the full load of the AC drivers in the luminaire, it is recommended to wire the unswitched hot connections of both control device and battery pack on the output side of this type of test switch. That use of the switch has the following simultaneous effects: control device along with normal AC drivers are disabled, battery driver is enabled.

GTD Sequence of Operations

- Normal Condition:
  - Control device operates the standard AC LED driver(s) under normal power conditions, and control device switched output does not impact the status of the GTD.
- Emergency Condition:
  - GTD detects loss of normal power unswitched hot and transfers emergency power unswitched hot and neutral directly to emergency AC drivers.
  - Loss of normal power results in nLight control device's dimming output opening (becoming uncontrolled).
  - Emergency AC drivers operate at full, uncontrolled output.
- Restoration of Normal Power:
  - GTD detects presence of line voltage on normal power unswitched hot and transfers normal power switched hot and neutral to emergency AC drivers.
  - nLight control device becomes re-energized and follows its normal default power-on sequence: relay is closed to switch on the AC driver(s) and dimming output is at maximum trim voltage until further instructions are received by automatic or manual control measures.

AC Micro-Inverter with Standard nLight Line Voltage Control Device

Intended Applications

This application typically involves the following characteristics:

- The AC Inverter is fed by a normal power circuit unswitched hot line feed.
- When normal power fails, a battery and inverter are intended to supply unswitched AC power to the emergency AC drivers.

Wiring Instructions

Wiring instructions for this use case will vary with the specific model of AC inverter but the following general guidelines for wiring a standard control device can be followed:

- Control device's line voltage input wire should be connected in parallel with AC inverter's unswitched hot input wire.
- Control device's switched relay output should be connected to switched hot line voltage input of AC inverter.
- Emergency AC driver(s) – to be powered during emergency power conditions – line voltage & neutral inputs should only be connected to line voltage & neutral driver output of AC inverter. There should be no direct line voltage connections between the nLight control device and the emergency AC driver(s).
- Control device's 0-10V dimming wires:
    - If AC inverter does not provide 0-10V interrupt, control device's 0-10V output should be connected to 0-10V input of all LED drivers.
    - o If the AC inverter offers a 0-10V interrupting capability, then control device's 0-10V output may be wired to AC inverter.

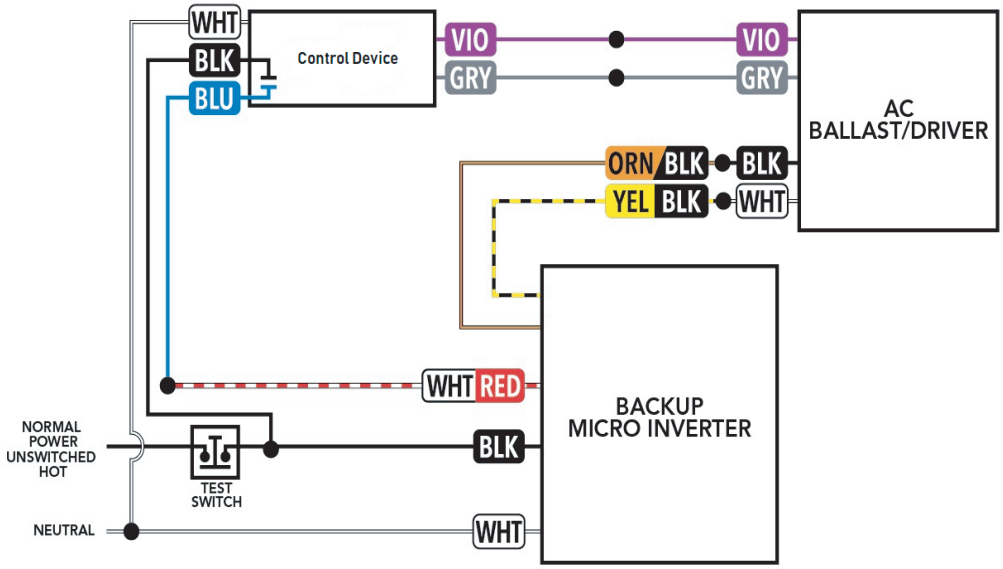


Figure 11 - Example Wiring Diagram - Backup Micro Inverter with nLight Control Device

NOTE

Wiring shown is for example only and should be confirmed with respective control device wiring details.

Testing Note

Follow the AC inverter manufacturer's instructions for installation and wiring of test switches. Some inverters use low voltage test switches and others use line voltage test switches.

Where a line voltage normally closed test switch is supplied, confirm whether the switch is rated to carry the full load of the AC drivers in the luminaire. If so, then it is recommended to wire the unswitched hot connections of both control device and battery pack on the output side of this type of test switch, so that use of the switch has the following simultaneous effects: control device along with normal AC drivers are disabled, battery driver is enabled.

Note that if the AC inverter's test switch mechanism does not de-power the nLight control device or interrupt the control device's 0-10V output, it may be possible for the control device to maintain dimming control of the LED driver during a test. If this is the case, then opening of normal circuit breaker is the recommended testing procedure.

AC Micro-Inverter with Standard nLight Line Voltage Control Device - cont'd

Sequence of Operations

- Normal Condition:
  - Control device operates emergency AC LED driver(s) under normal power conditions and otherwise does not interfere with unswitched hot connection to AC inverter.
- Emergency Condition:
  - AC inverter detects loss of normal power unswitched hot and provides unswitched AC power to emergency AC drivers.
  - Loss of normal power results in nLight control device's dimming output opening (becoming uncontrolled).
  - Emergency AC drivers operate at full uncontrolled output.
- Restoration of Normal Power:
  - AC inverter detects presence of line voltage on normal power unswitched hot and provides normal power switched hot and neutral to emergency AC drivers.
  - nLight control device becomes re-energized and follows its normal default power-on sequence: relay is closed to switch on the AC driver(s) and dimming output is at maximum trim voltage until further instructions are received by automatic or manual control measures.

Emergency Bypass Relay with Standard nLight Control Device

Intended Applications

This application typically involves the following characteristics:

- The emergency bypass relay is fed by both a normal power circuit and by an emergency power circuit.
  - The emergency power circuit is intended to carry the load of this luminaire.
  - The normal power circuit is only intended to be used as a normal power unswitched hot sensing line.
- When normal power fails, the emergency bypass relay provides a path for AC voltage to reach the emergency AC drivers, regardless of whether the control device's relay is open or closed.
- Because nLight control devices are typically used with 0-10V dimming, it is important to select an emergency bypass relay that can perform at least one of the following functions that will result in disabling/opening of the dimming control:
  - **Normally open dry contact intended for use as 0-10V interrupt –** This will break the positive leg of the 0-10V control signal (violet).
  - **Double-throw Form C contact (combination NO and NC line voltage bypass relay) –** This will simultaneously open unswitched emergency hot power input to control device while closing the emergency hot bypass to the lighting load, thereby disabling 0-10V dimming output.

Wiring Instructions

Wiring instructions for this use case will vary with the specific model of emergency bypass but the following general guidelines for wiring a standard control device can be followed:

- Control device line voltage input wire should be connected as follows:
  - Double-throw Form C contact available: connect control device's line voltage input to emergency bypass relay Normally Open contact.
  - Single-throw Normally Closed contact: connect control device's line voltage input to emergency power circuit unswitched hot (note that 0-10V interrupt must be used).
- Control device's switched relay output should be connected in parallel to emergency bypass relay Normally Closed bypass relay contact and emergency AC drivers line voltage input wires.
- Control device's 0-10V output:
  - If emergency bypass relay provides 0-10V interrupting capability, control device's 0-10V output should be connected to normally open dry contact.
  - If emergency bypass relay does not provide 0-10V interrupting capability, then control device's 0-10V output may be wired directly to LED drivers (note that double-throw form C contact must be used).

Emergency Bypass Relay with Standard nLight Control Device - cont'd

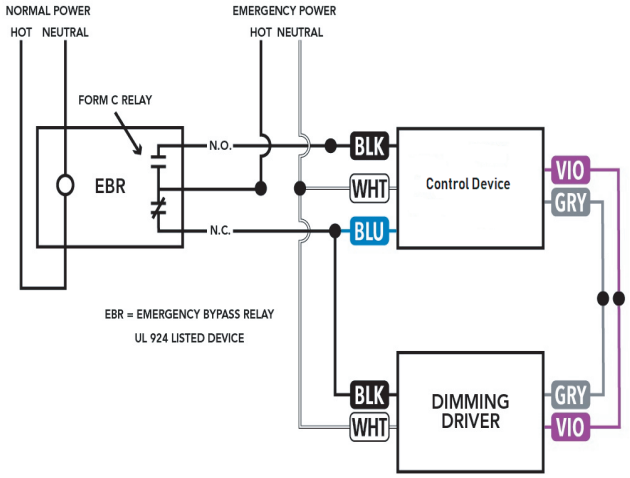


Figure 12 - Example Wiring Diagram - Emergency Bypass Relay (Form C) with nLight Control Device

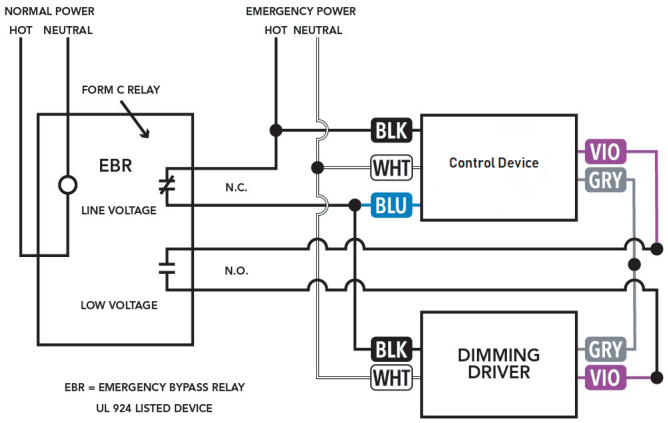


Figure 13 - Example Wiring Diagram - Emergency Bypass Relay (0-10V Interrupt) with nLight Control Device

NOTE

Wiring shown is for example only and should be confirmed with respective emergency bypass relay and control device wiring details.

Testing Note

Follow the emergency bypass relay manufacturer's instructions for installation and wiring of test switches. Some emergency bypass relays use low voltage test switches and others use line voltage test switches. A typical line voltage test switch would consist of a normally-closed switch wired in series with the normal power unswitched hot connection to the bypass relay; opening the test switch would trigger the bypass relay to momentarily override the nLight control device.

Sequence of Operations

- Normal Condition:
  - Control device operates all standard and emergency AC LED driver(s) together under normal power conditions and control device's switched output does not impact on the status of the Emergency Bypass Relay.
- Emergency Condition:
  - Loss of power, or use of test switch, completely disables both the control device and standard AC drivers.
  - Emergency Bypass Relay detects loss of normal power unswitched hot, or use of test switch, and provides emergency AC power to emergency AC drivers.
  - Emergency AC drivers are at full uncontrolled output because control device's dimming wires are open (either due to de-powering of nLight by Form C contact, or due to interruption of dimming wire by N.O. relay).

