

Designers Lighting Forum

Adapting to the new requirements of UL
924 Emergency Lighting. Challenges
and New Opportunities

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Learning Objectives

At the end of this course, participants will be able to:

1. Understand what has changed with UL 924 Rules
2. What are the new rules and implications for current practices?
3. How to comply with the new rules in multiple wiring scenarios
4. Cost saving and other opportunities that are opened up by the new rules

UL 924 Updates. Changes, Implications, and Opportunities

It is a new day for emergency lighting requirements

What can't be done anymore

How it must be done

How to implement emergency lighting under the new rules

New cost saving opportunities

New sophisticated lighting opportunities made possible by the new rules

Emergency conditions could be detected by any of:

- Loss of Normal Power
- Emergency Power on (if not on by default)
- Interruption in Emergency Power

On Emergency condition, all emergency lights must be turned on to specified light levels (usually 100%)

All other control commands (sensors, switches, schedules) must be ignored

Must last for 90 minutes

The device providing the transfer switching must provide quarterly and annual test modes

Fixtures always on connected to emergency power

Emergency Circuit Shunt Relay

- Detects loss of emergency power or loss of normal power (some models)
- Bypasses dimming lines and sets lights on maximum

Battery Fixtures on an always powered emergency circuit

BCELTs -Circuit level transfer switch+shunt relay

- Wired to both normal and emergency power. Might detect either loss of normal or interruption in emergency power

UL 294 2022 Changed the way emergency lighting can be detected and implemented

- Loss of Normal Power **MUST** be used to detect the emergency condition
- The normal power detector can be different than the lighting control unit
- Testing mode is provided by the transfer switch (not relay function)
- New indicator light requirements for the transfer switch
- Duration of the emergency event is the duration of loss of normal power, or 90 minutes, whichever is less
- New flexibility in how the normal power signal and the controls communicate

Devices that only detect the presence or interruption of emergency power are no longer allowed

- No emergency circuit only transfer relays
- No battery backup fixtures that are wired to both normal and emergency power (normal only is ok)
- Battery and BCELTS have new indicator light requirements that must be visible in the controlled space (no panel mounted BCELTS without difficult wiring of indicator lights to the controlled rooms)

Wired:

- Run wire from a contact closure indicator on the transfer switch to any bypass relays.
 - Easy if the transfer switch and bypass relay are close together, not so easy if not

Wireless:

- UL 924 now explicitly allows wireless communications between normal power sensing devices and bypass relays. Multiple providers now offer wireless compliance with UL 924 using different approaches. Some use a dedicated normal power sensor, others have sensing built into individual normal power fixtures that signal the emergency fixtures (or loss of signal).
- Multiple providers now support UL 924 bypass relay functionality integrated into fixture or zone controllers. This eliminates the need for separate bypass relays.

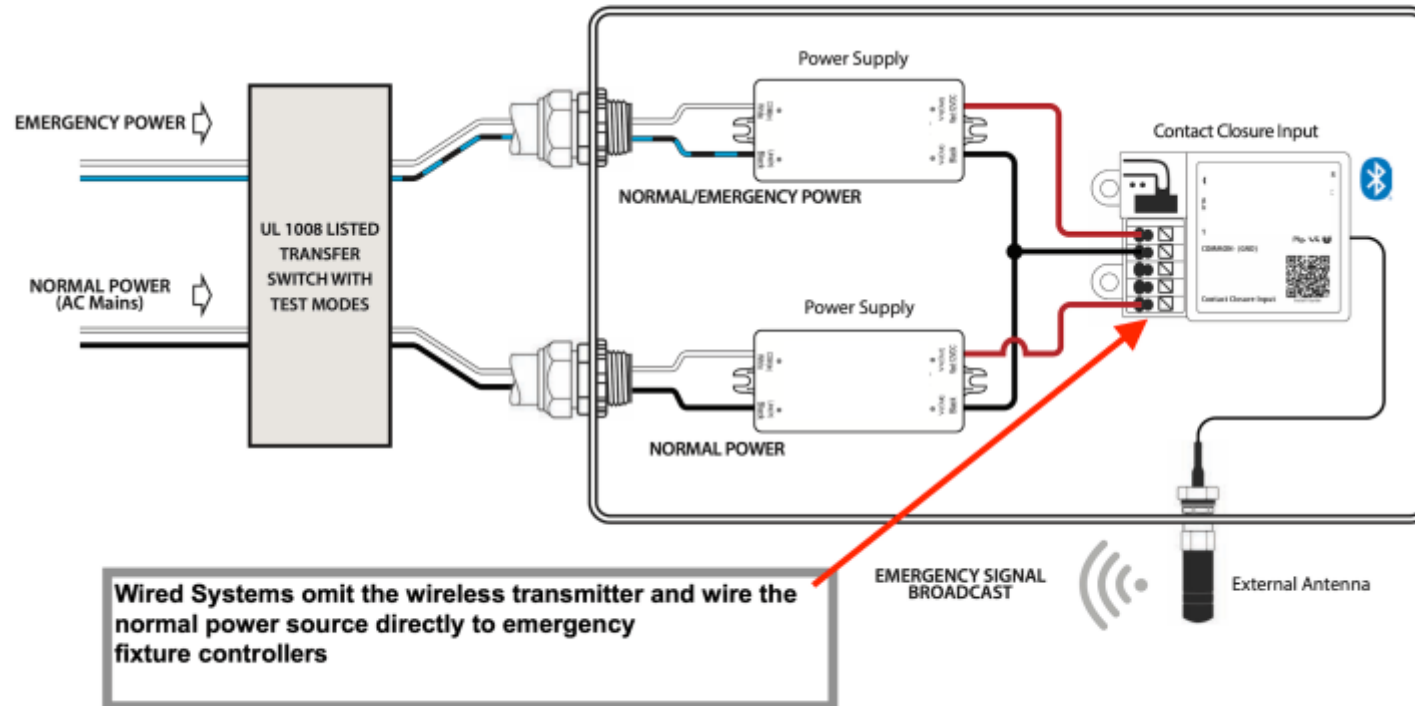
Integrated:

- BCELTS, battery emergency fixtures, and normal power sensing bypass relays have the normal power sensing built into the units already

Normal Power Sensor Wiring Diagram

EMERGENCY LIGHTING

Transfer Switch



Indicator and testing requirements are connected to the transfer switch (UL 1008) listing, not controls bypass relays (UL 924)

- Transfer switches must have monthly and annual test modes
- Bypass only devices do not need test modes

New indicator light requirements for BCELTS and Battery Fixtures. They must indicate normal power presence, emergency mode, and have a test mode. The lights must be visible in the space they are controlling.

- Indicator light requirements do not apply to bypass only devices

Open Warehouse/Manufacturing

- Battery fixtures are easy to install and require no special wiring. Must be powered from normal power to comply
- Wireless normal power beacon to fixture integrated UL 924 compliant fixture controllers

Large Office

- Battery fixtures. Must be powered from normal power to comply
- Wireless normal power beacon to fixture integrated UL 924 compliant controllers (fixture or zone)
- Wired transfer/bypass relay if there is dedicated emergency power and dimming wiring fully back to the transfer switch

Schools

- Battery fixtures. Must be powered from normal power to comply
- Wireless normal power beacon to fixture integrated UL 924 compliant controllers (fixture or zone)

Small Office

- Typically room level BCELTS are used if required by code. They already comply with the new rules if they meet the indicator light requirements

Continuous Feed UPS battery whole lighting emergency systems

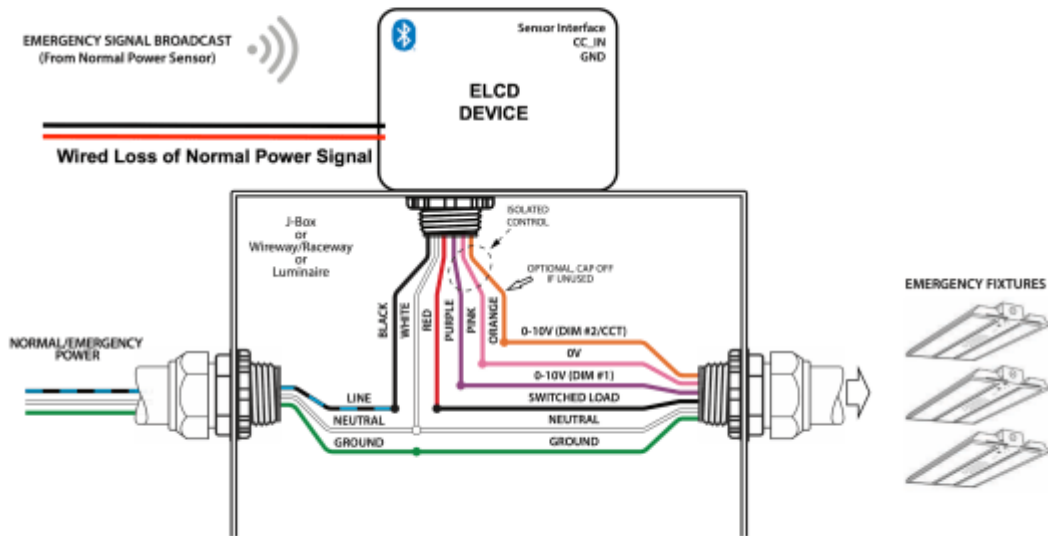
- Wireless normal power beacon to fixture integrated UL 924 compliant controllers (fixture or zone)

Common Wiring Applications

Class I

Emergency Zone Controller Wiring Diagram (Class 1)

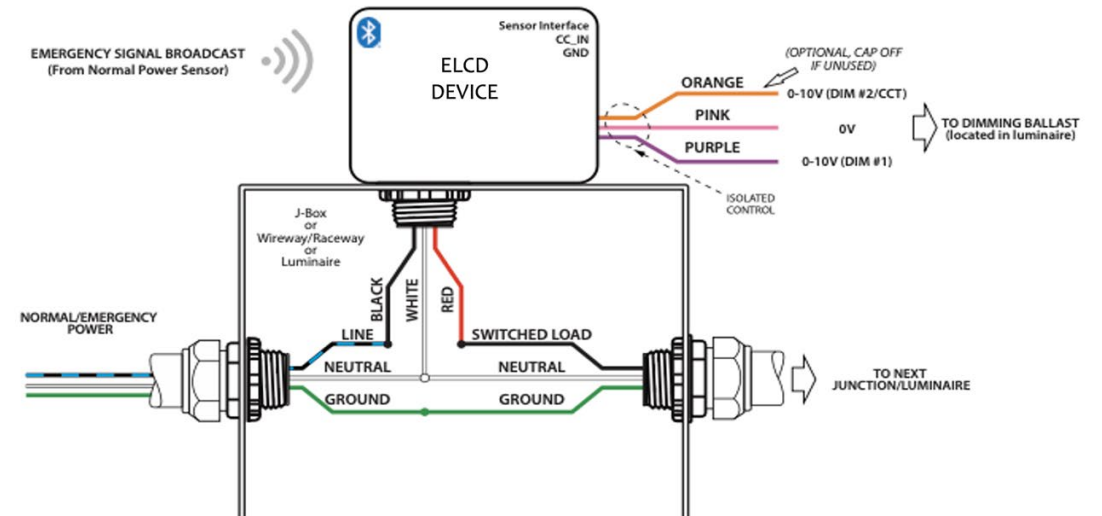
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Class II

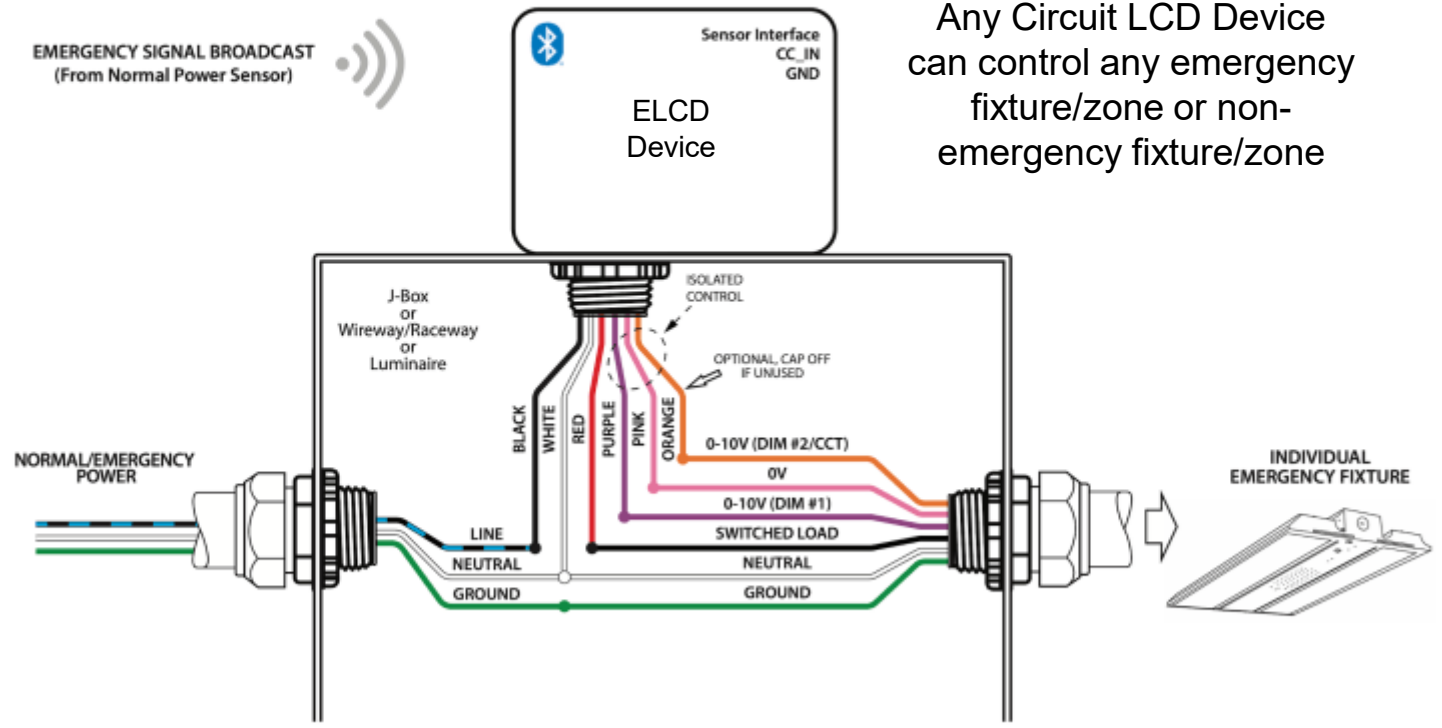
Emergency Zone Controller Wiring Diagram (Class 2)

Any XFAC Can Control An Emergency Fixture/Zone Or Non-Emergency Fixture/Zone



Emergency Control Wiring Diagram (Individual Fixture)

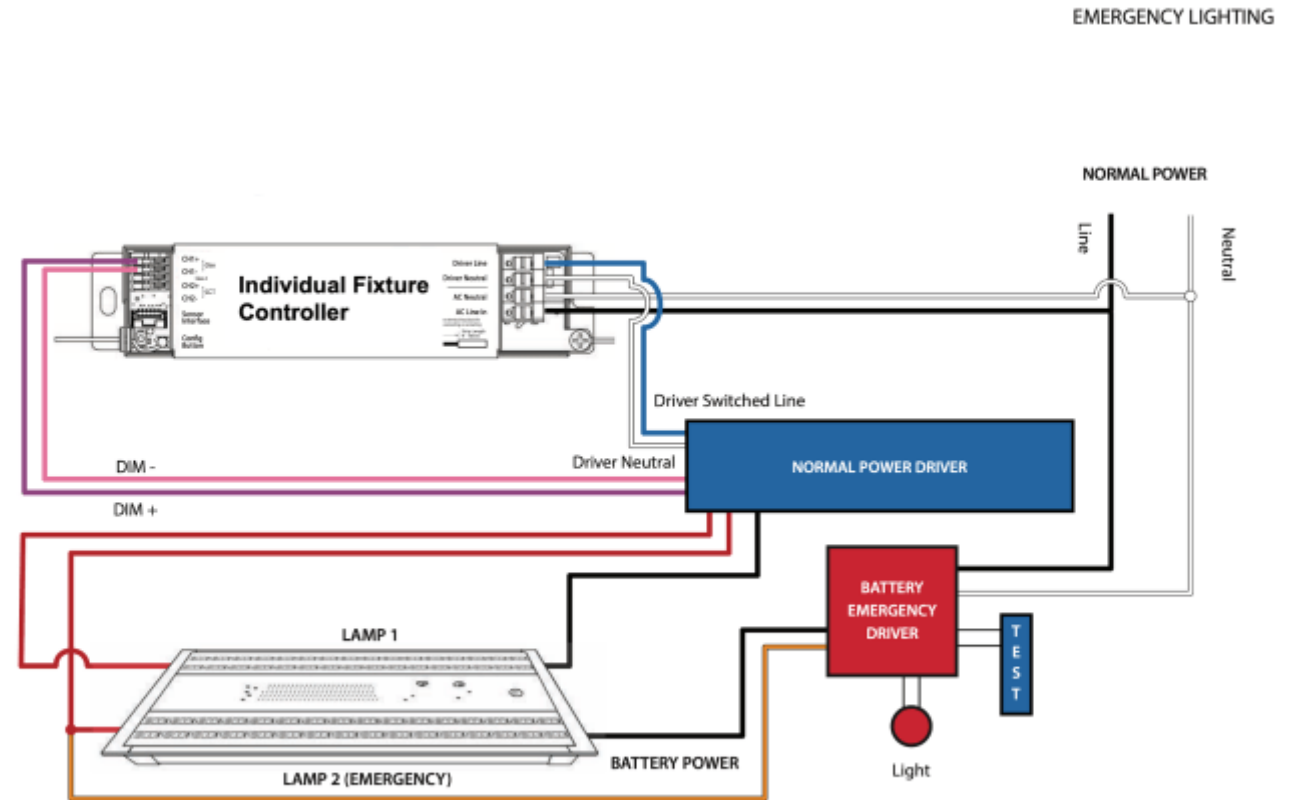
EMERGENCY LIGHTING



Any Circuit LCD Device
can control any emergency
fixture/zone or non-
emergency fixture/zone

Make sure:

- ELCD controller is powered from normal power
- Dimming lines are connected to normal power driver

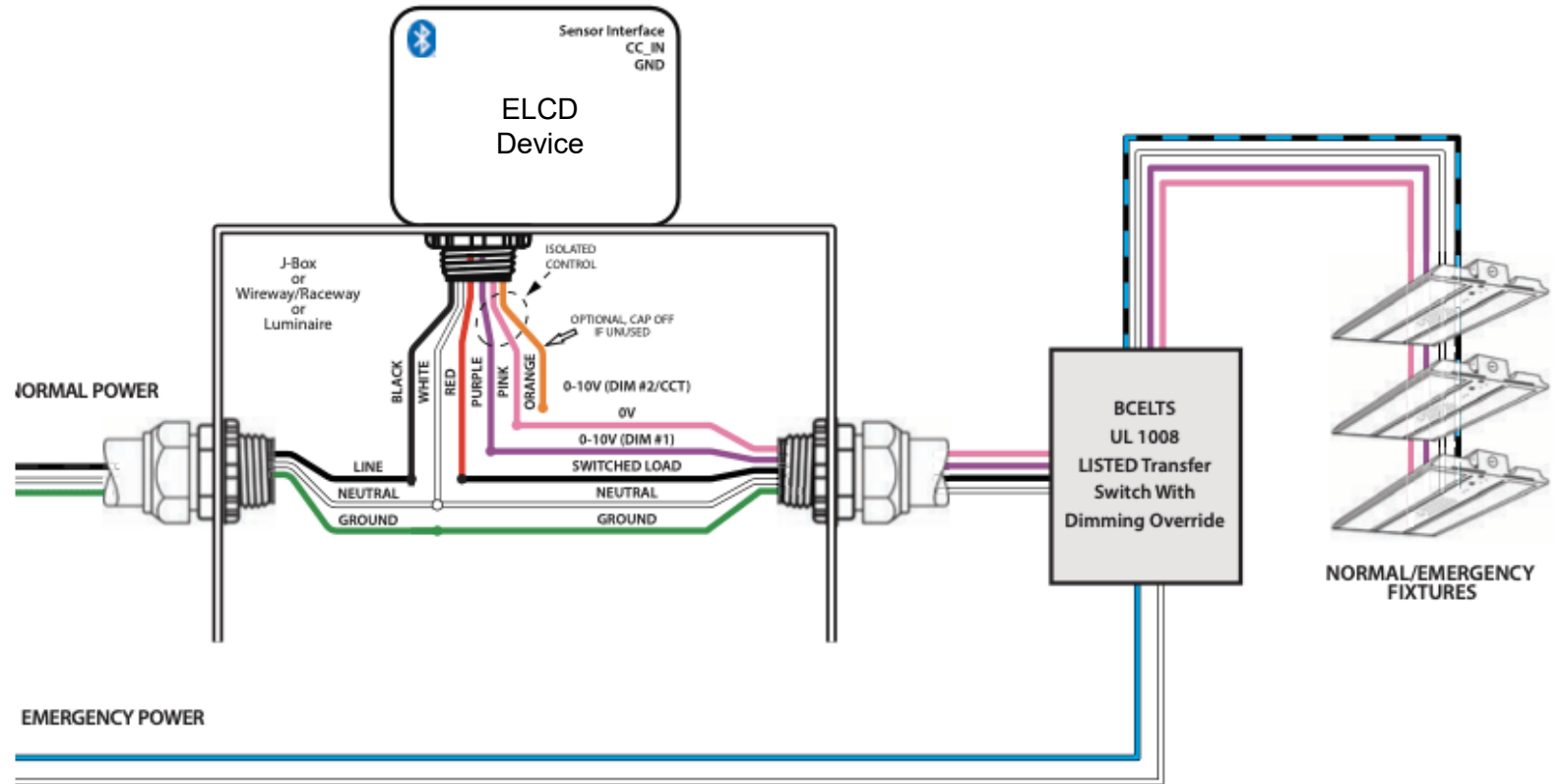


Make sure:

- ELCD is powered from normal power
- Dimming and fixture power lines are connected to BCELTS **-UPSTREAM**

Zone Controller Wiring Diagram

Branch Circuit Emergency Lighting Transfer Switch (BCELTS)



No Transfer Relays Required!! (\$150-\$250 PER ROOM)

Wiring between normal power detectors and emergency fixtures is no longer required with wireless 924 approved systems

No rewiring in retrofit applications with existing emergency only wiring to comply with new codes

Group functions of lights in rooms independent of the emergency wiring layout

Dimming available to all lights at no extra cost without running new wire

Energy savings: No need to leave emergency lights on at 100% 24/7

The new requirements are difficult for full building lights UPS battery systems

- Getting the signal from the central UPS to emergency circuits is difficult and expensive

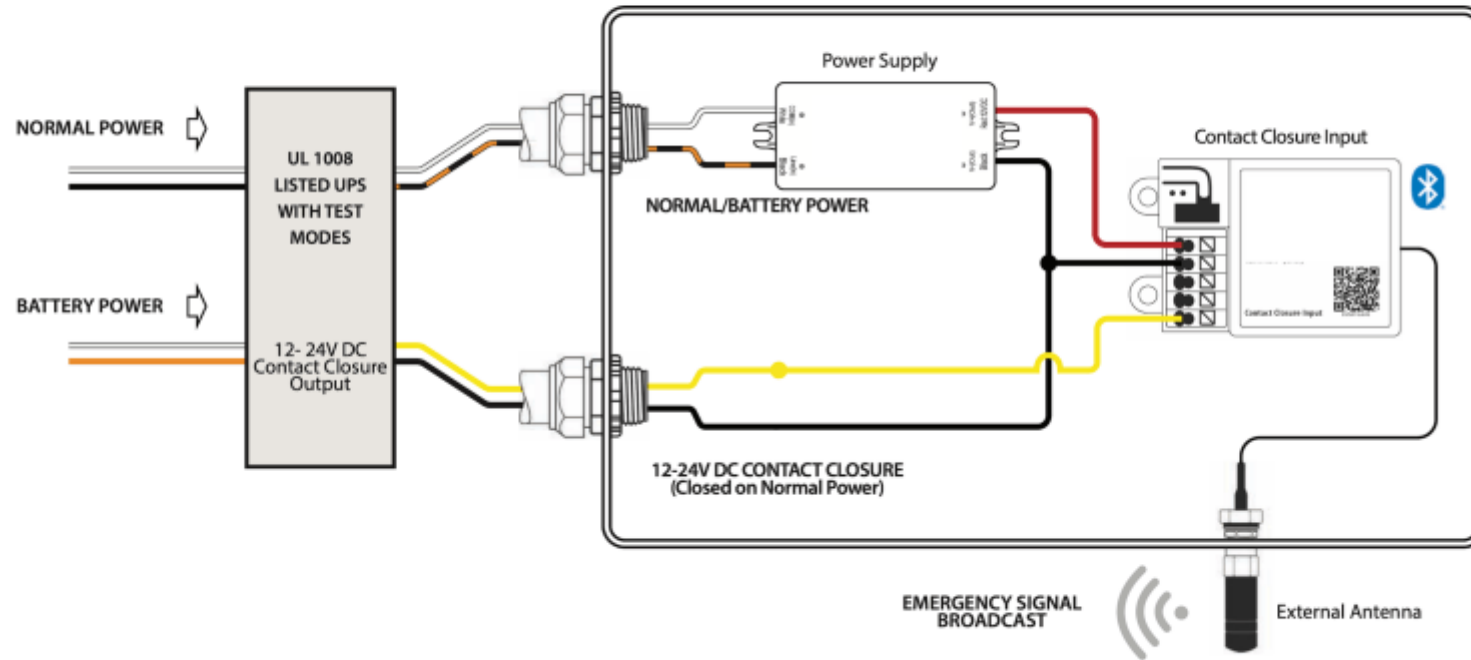
Wireless solutions make it easy

- Simply connect the Normal Power Beacon to a contact output of the UPS and configure as normal, with the signal wirelessly going to UL 924 listed fixture or zone controllers

Normal Power Sensor Wiring Diagram

Uninterruptible Power Supply (UPS)

EMERGENCY LIGHTING



Optimize the sizing of battery systems (big \$ savings)

- Set light dimming levels to code levels in emergency conditions
- Turn non-emergency lights to reduced levels/off
- Reduce battery pack sizing accordingly to hit 90 minute levels. Up to 85% reduction in battery sizing

Re-think emergency mode as not just a “controls bypass”

- *Imagine the mode you want all lights to be in during emergency conditions. Implement it at virtually no additional controls cost and up to 85% reduction in battery pack sizing.*

- Emergency Lighting must now use normal power detection. Emergency power detection only methods are no longer allowed
- It is now possible to use wireless communications between normal power sensors and emergency bypass devices. This simplifies and reduces cost of deployment
- Manufacturers are now offering fixture and zone controllers that have integrated UL 924 listings, eliminating the need for separate bypass relays
- Existing BCELTS and battery fixtures work without change as long as they meet the indicator light and test button requirements and are connected to normal power circuits
- Cool new ways to optimize UPS whole building battery systems

This concludes The American Institute of Architects Continuing
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