

## EcoSystem™ Bus Class 1 and Class 2 Listing

### Overview

EcoSystem digital fluorescent dimming ballasts are connected together by a 2-wire low voltage bus. The bus is designed for both Class 1 or Class 2 installations. This application note explains how the bus is installed in either type of configuration. Steps required by fixture manufacturers and electrical contractors to meet the National Electrical Code are detailed as well.

### Wiring Details: EcoSystem Bus wired Class 2

In the configuration diagrammed below the EcoSystem bus is wired Class 2.

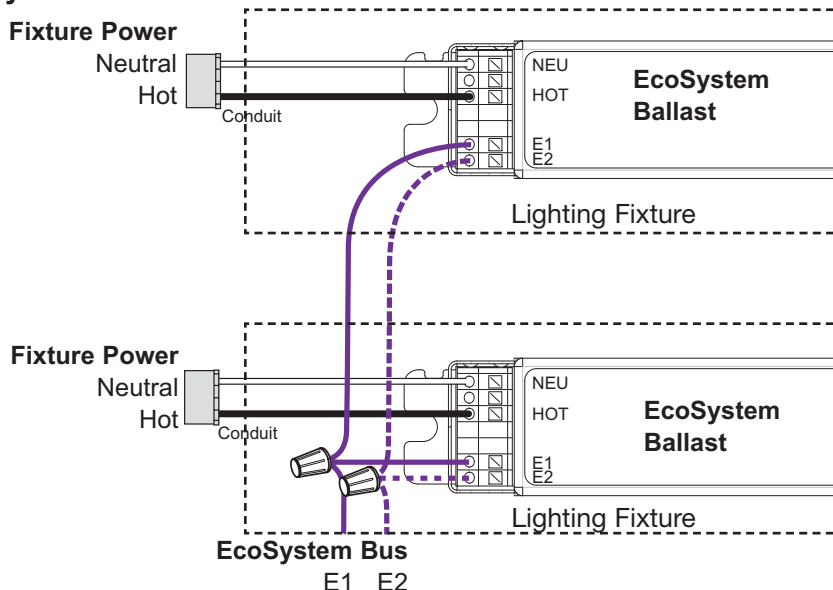
- For factory installed wiring, as per UL1598 section 6.17.1:

*Factory-installed power limited wiring and branch circuit wiring that come in random contact within the luminaire shall have insulation rated for the maximum voltage that exists in any of the circuits.*

As long as the properly rated insulation is used, no spacing or separation is required, regardless of the circuit conductor voltage.

- Class 2 wiring methods follow the NEC Requirement 725.54 (D) (references to Class 3 eliminated):  
*Class 2 circuit conductors in compartments enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, ... circuits where they are introduced solely to connect the equipment connected to Class 2 circuits, and where (1) or (2) applies:*
  - (1) *The electric light, power, Class 1, ... circuit conductors are routed to maintain a minimum of 6 mm (.25 in) separation from the conductors and cables of Class 2.*
  - (2) *The circuit conductors operate at 150 volts or less to ground and also comply with one of the following:*
    - a. *The Class 2 circuits are installed using Type CL3, CL3R, or CL3P or permitted substitute cables provided these Class 3 cable conductors extending beyond the jacket are separated by a minimum of 6 mm (.25 in) or by a nonconductive sleeve or nonconductive barrier from all other conductors.*
    - b. *The Class 2 circuit conductors are installed as a Class 1 circuit [see below]*
- EcoSystem Ballasts have a minimum of .25 in spacing between line voltage and EcoSystem Bus terminals (E1 and E2) for Class 2 installations. Terminals read "Class 2 Bus"

### EcoSystem Bus Wired Class 2



For more detail on Class 2 wiring and additional Class 2 wiring requirements see the National Electrical Code Article 725.

## Wiring Details: EcoSystem Bus wired Class 1

In the configuration diagrammed below, the EcoSystem bus is wired Class 1.

- Class 1 wiring methods follow the NEC Requirement 725.26
  - Class 1 circuits shall be permitted to be installed with other circuits as specified in 725.26 (A) and (B)*
  - (A) Class 1 circuits shall be permitted to occupy the same cable, cable tray, enclosure, or raceway without regard to whether the individual circuits are alternating or direct current, provided all conductors are insulated for the maximum voltage of any conductors in the cable, cable tray, enclosure or raceway.*
  - (B) Class 1 circuits shall be permitted to be installed with power supply conductors as specified:*
    - (1) Class 1 and power supply circuits shall be permitted to occupy the same cable, enclosure, or raceway only when functionally associated.*
- Since the EcoSystem bus is designed for the more stringent requirements of a Class 2 installation, EcoSystem bus devices can be installed in a Class 1 manner when Class 2 markings are eliminated. The NEC allows the reclassification of Class 2 circuits provided:
  - 725.52 Exception No. 2: Class 2 and circuits shall be permitted to be reclassified and installed as Class 1 circuits if the Class 2 markings ... are eliminated and the entire circuit is installed using the wiring methods and materials in accordance with Part II, Class 1 circuits.*

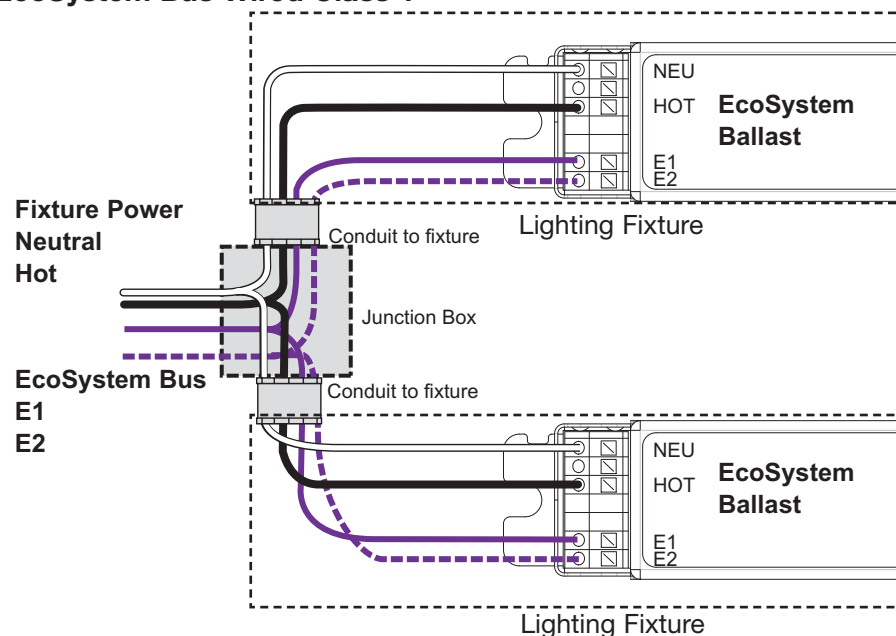
For more detail on Class 2 wiring and additional Class 2 wiring requirements see the National Electrical Code Article 725.

- The EcoSystem bus is labeled "Class 2" rather than "Class 1 or Class 2" because the ballast is a sink of power, not a source. According to UL 935 SB12.3:

*When the ballast is the sink of a Class 2 limited power circuit, the circuit shall be identified as such with the words "Class 2 Circuit" to indicate that the ballast is intended for connection to a Class 2 circuit and that the controlling circuit is not affected by the presence of the ballast.*

Since the ballast is not a source for this link, it is prohibited from being marked as "Class 1 or Class 2" even though it is allowed to be wired as Class 1 or Class 2.

### EcoSystem Bus Wired Class 1



## Other Notes

Summary: EcoSystem components and bus wiring is designated by UL listing to be used in Class 2 installations per NEC 725.54 if conductors are over 150V, must have more than .25" or type CL3, CL3R, CL3P per 725.54 or the EcoSystem bus can be wired Class 1 per NEC 725.26 and 725.52.

- Code quotation, guidance, and wiring guides above are listed for reference only. Always follow local and national wiring requirements.
- NEC 2002 was used as a reference in this Application Note. More recent releases of the National Electrical Code should always be consulted.
- The National Electrical Code (NEC) is a registered trademark of the National Fire Protection Association, Quincy, MA.

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