

Wiring Low-Voltage and Line-Voltage Using DIN Power Modules and Panels

This application note explains the wiring rules in the National Electric Code and Canadian Electric Code as they pertain to the connection of low-voltage Class 2 conductors and line-voltage conductors connected to DIN power modules installed in DIN power panels. This is intended to clarify the rules regarding low-voltage Class 2 and line-voltage conductors both occupying the same device box. Since local codes may vary, be sure to follow all local and the national codes.

DIN Power Module Connections Overview:

The following images show the different terminals and their location on each respective DIN Power Module. The terminals have been highlighted as follows to show the type of connection they are:



Low-Voltage (Class 2)



Line-Voltage



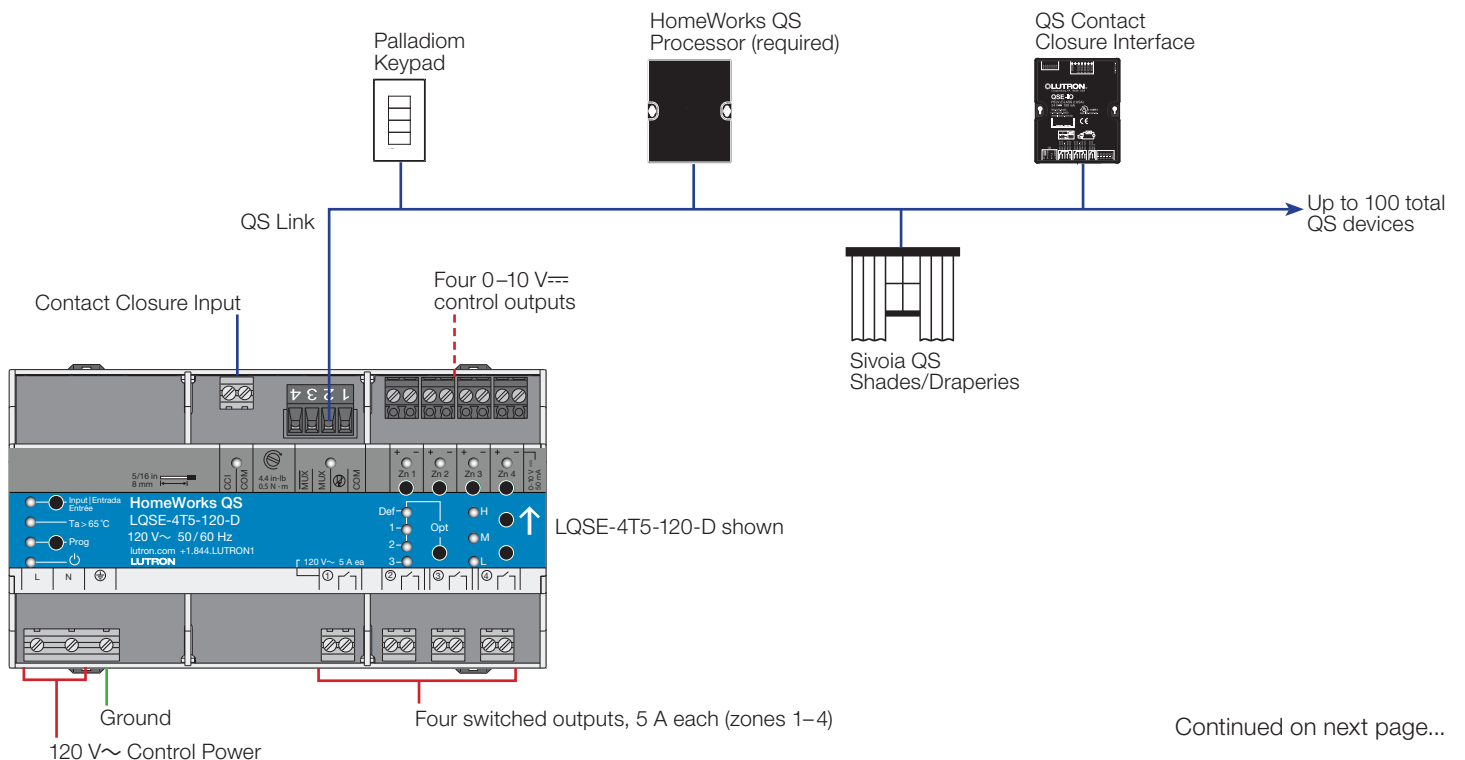
Line- or Low-Voltage
(dependent on devices
connected and wiring
practices used)



Ground

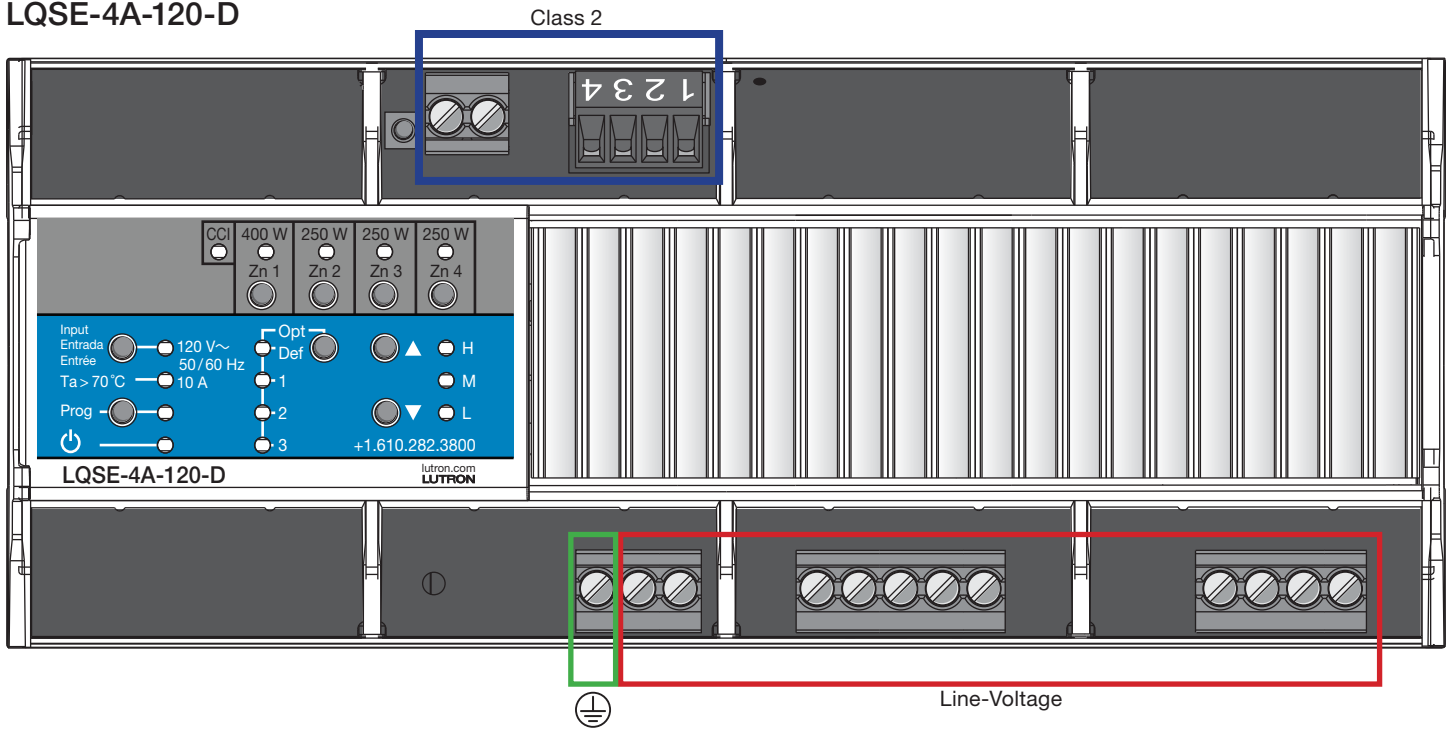
System Example

The following shows the wiring connection types in the context of a system diagram.

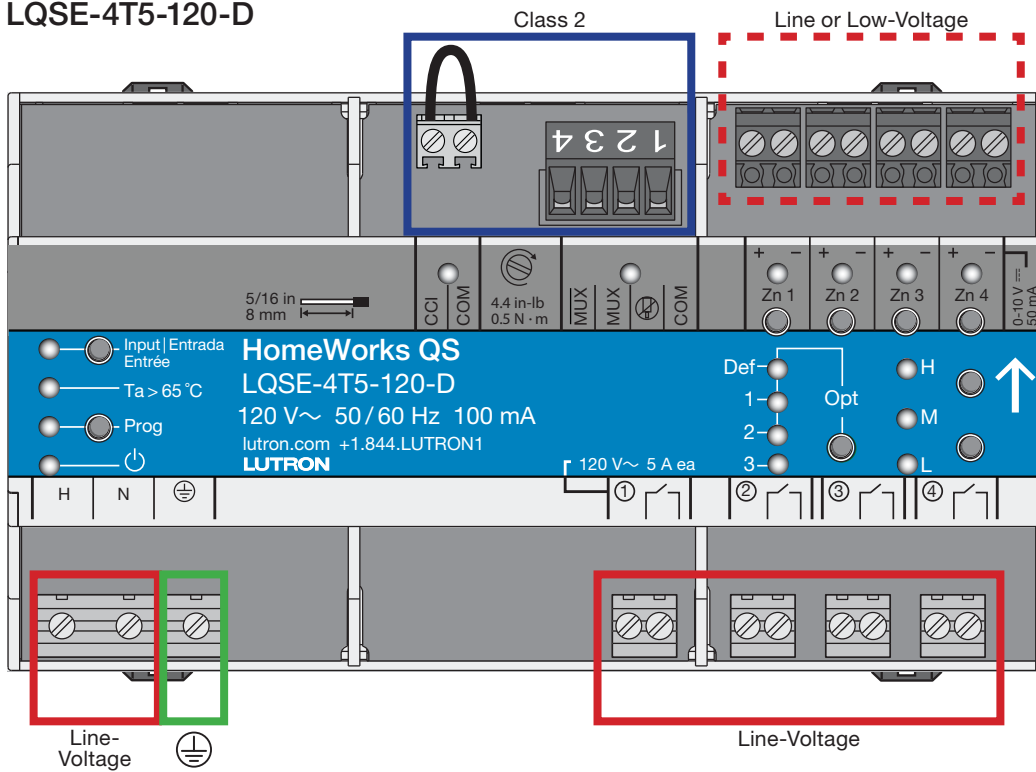


DIN Power Module Connections Overview (continued)

LQSE-4A-120-D



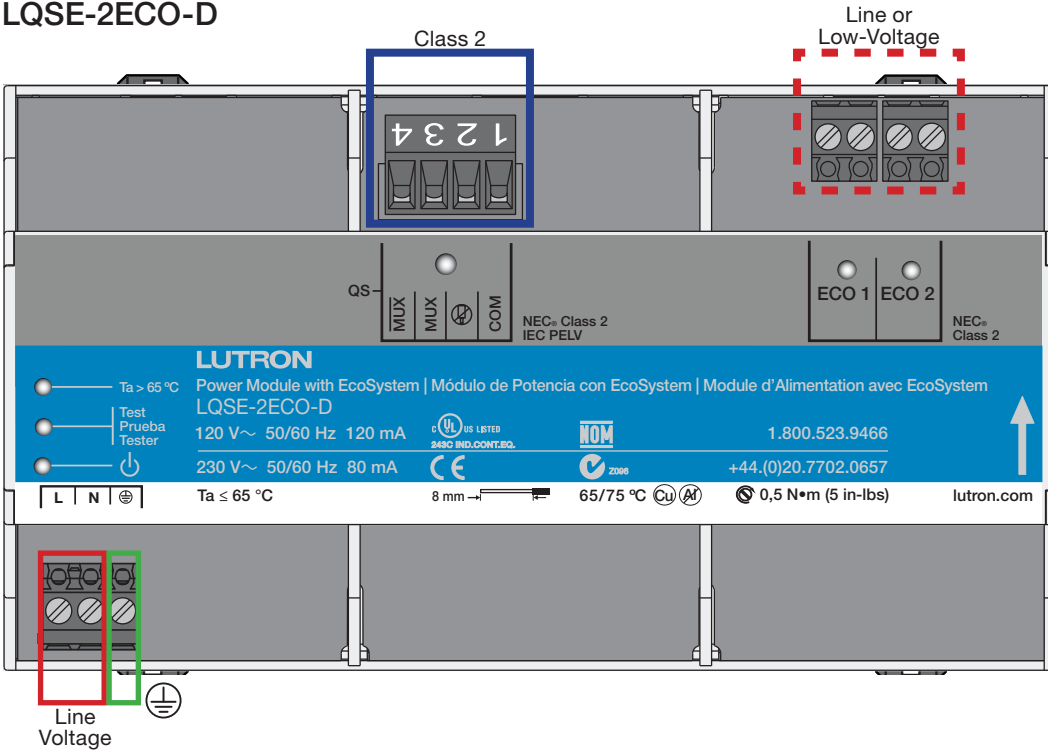
LQSE-4T5-120-D



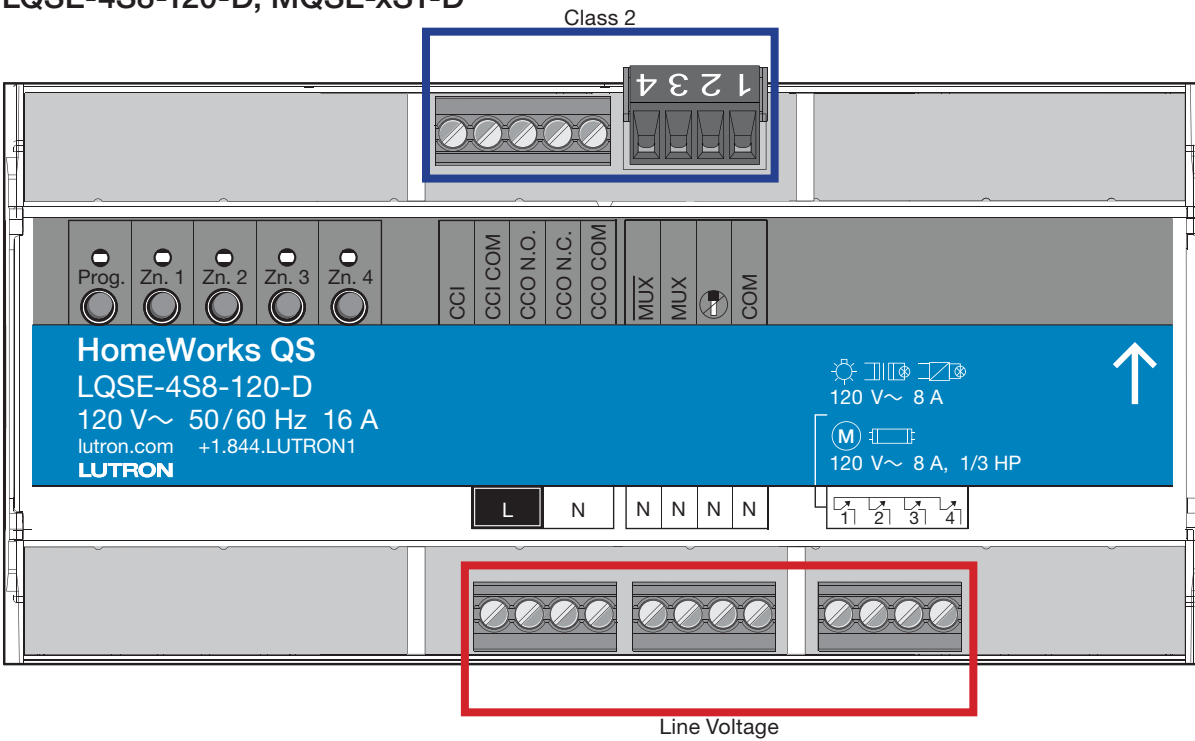
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DIN Power Module Connections Overview (continued)

LQSE-2ECO-D



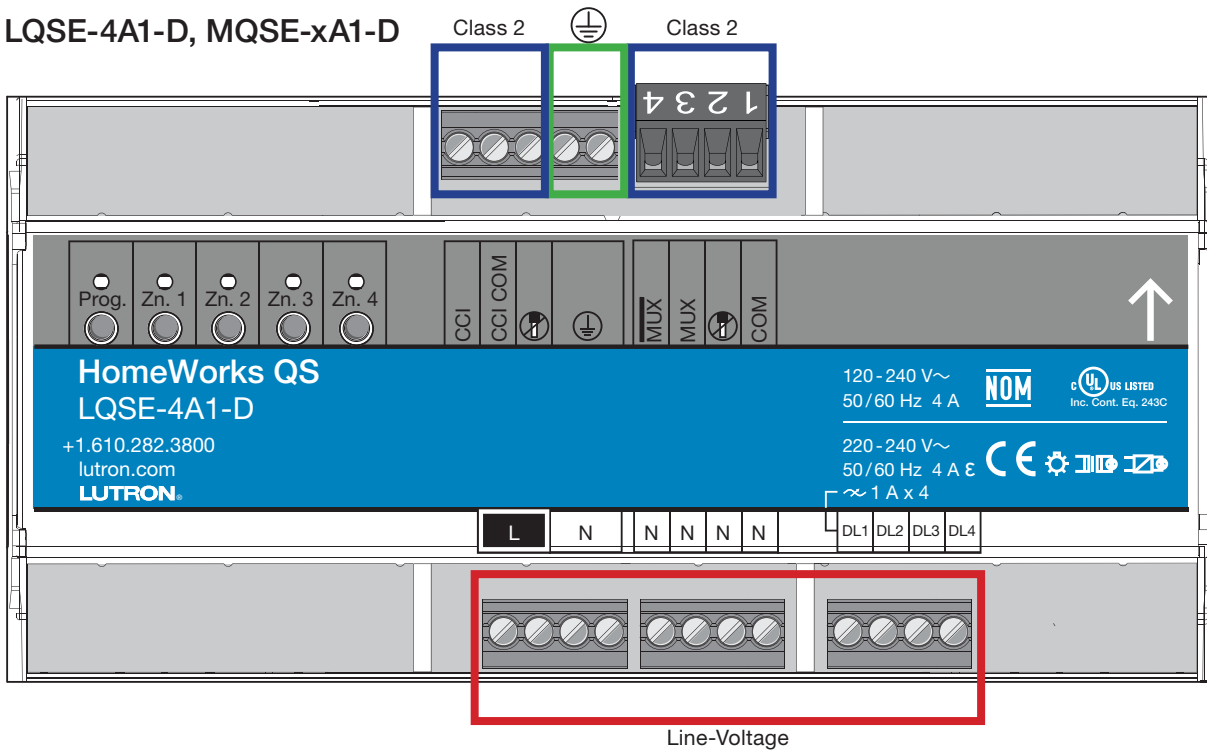
LQSE-4S8-120-D, MQSE-xS1-D



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DIN Power Module Connections Overview (continued)

LQSE-4A1-D, MQSE-xA1-D



Electrical Code Details

NFPA 70 – National Electric Code 2017

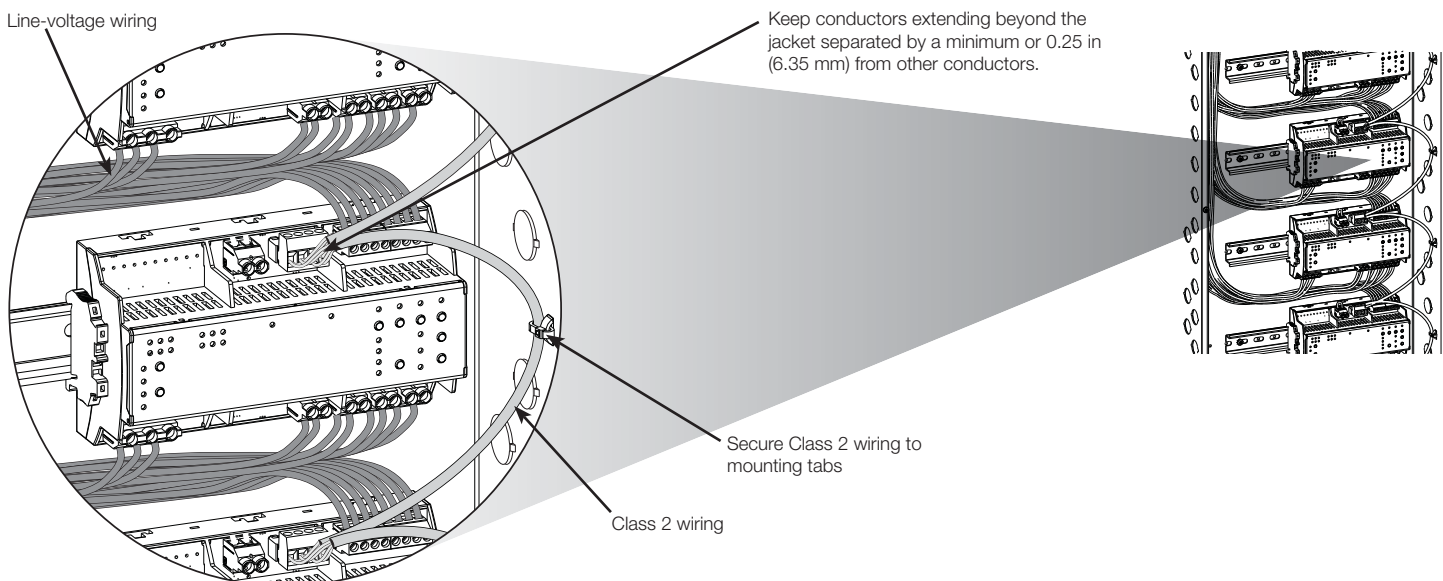
The following are the Class 2 wiring methods per NEC® requirement 725.136 (D) (references to Class 3 eliminated):

- 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, non-power-limited fire alarm, and medium-power, network-powered broadband communications circuits where they are introduced solely to connect equipment connected to Class 2 circuits, and where **1** or **2** below applies:
 1. The electric light, power, Class 1, non-power-limited fire alarm, and medium-power, network-powered broadband communications circuit conductors are routed to maintain a minimum of 0.25 in (6 mm) separation from the conductors and cables of Class 2 circuits
 2. The circuit conductors operate at 150 V~ or less to ground and also comply with one of the following:
 - a. The Class 2 circuits are installed using Type CL3, CL3R, CL3P or permitted substitute cables, provided these Class 3 cable conductors extending beyond the jacket are separated by a minimum of 0.25 in (6 mm) 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 in accordance with 725.41

Complying with NFPA 70

The following describes how Lutron DIN power modules and panels meet the requirements outlined in **2** and **2a** above:

- Circuit conductors operate at 150 V~ or less, as mentioned in **2** above, is applicable since these modules and panels are rated for 120 V~ operation.
- If using Lutron Cable GRX-CBL-346S-500, it is CL3 rated as called out in **2a** above. If using Lutron wiring harness PDW-QS-x (where x = 4, 5, 8 or 9), these are CM type cables which are considered a permitted substitute, mentioned in **2a** above, per Table 725.154.
- A minimum of 0.25 in (6 mm) of separation between conductors, mentioned in **2a** above, can be maintained due to the spacing and positioning of the terminals where Class 2 and line-voltage connects to the DIN power modules. Be mindful of wire strip lengths and wire routing to make sure the proper spacing is maintained between conductors on a single unit or other units in the panel. See picture below:



Note: Maintain a minimum separation between Class 2 conductors (beyond the jacket) and other conductors.

DIN Power Module Connections Details *(continued)*

CSA 22.1 – Canadian Electric Code 2015

Section 16-212 – Section 4 indicates that sub-rule 3 shall not apply to the separation of Class 2 circuit conductors from other circuits, where the conductors of a power circuit are in the raceway, compartment, outlet box, junction box, or similar fitting for the sole purpose of supplying power to the Class 2 circuits. All conductors must also be insulated for the maximum voltage of any conductor in the enclosure, cable, or raceway. No Class 2 conductor installed in a raceway, compartment, outlet box, junction box, or similar fitting with such conductors of a power circuit shall show a green-coloured insulation, unless such Class 2 conductor is completely contained within a sheathed or jacketed cable assembly throughout the length that is present in such a raceway or enclosure.

Complying with CSA 22.1

The following describes how Lutron DIN power modules/panels meet the requirements as specified by Section 16-212.

- The maximum voltage rating for the modules and panels is 120 V~. When using Lutron Cable GRX-CBL-346S-500 or PDW-QS-x (where x = 4, 5, 8 or 9) the cable insulation rating is 300 V~ which is greater than the maximum voltage of any conductor.

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Lutron Contact Numbers

WORLD HEADQUARTERS

USA
Lutron Electronics Co., Inc.
7200 Suter Road
Coopersburg, PA 18036-1299
 TEL: +1.610.282.3800
 FAX: +1.610.282.1243
 Customer Assistance:
 1.844.LUTRON1
 intsales@lutron.com
 support@lutron.com

North & South America

Customer Assistance
USA, Canada, Caribbean:
 1.844.LUTRON1 (1.844.588.7661)
Mexico:
 +1.888.235.2910
Central/South America:
 +1.610.282.6701

EUROPEAN HEADQUARTERS

United Kingdom
Lutron EA Ltd.
125 Finsbury Pavement, 4th Floor
London, EC2A 1NQ, United Kingdom
 TEL: +44.(0)20.7702.0657
 FAX: +44.(0)20.7480.6899
 FREEPHONE (UK): 0800.282.107
 Technical Support: +44.(0)20.7680.4481
 lutronlondon@lutron.com

ASIAN HEADQUARTERS

Singapore
Lutron GL Ltd.
390 Havelock Road
#07-04 King's Centre
Singapore 169662
 TEL: +65.6220.4666
 FAX: +65.6220.4333
 Technical Support: 800.120.4491
 lutronsea@lutron.com

Asia Technical Hotlines

Northern China: 10.800.712.1536
 Southern China: 10.800.120.1536
 Hong Kong: 800.901.849
 Indonesia: 001.803.011.3994
 Japan: +81.3.5575.8411
 Macau: 0800.401
 Taiwan: 00.801.137.737
 Thailand: 001.800.120.665853
 Other Countries: +65.6220.4666