

Energi Savr Node 0-10 V $\overline{\text{V}}$ /Softswitch Power Module

The Energi Savr Node (ESN) family is a group of modular products for the control of lighting loads.

This document describes the following:

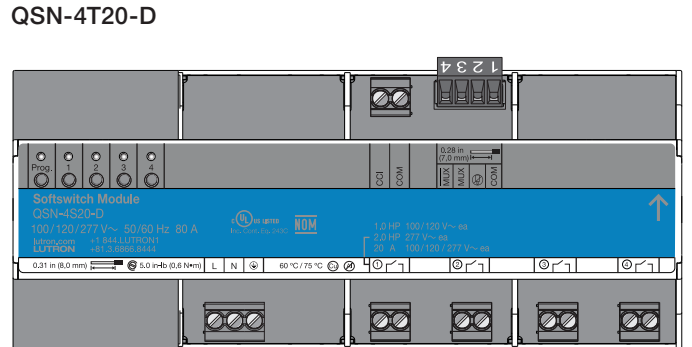
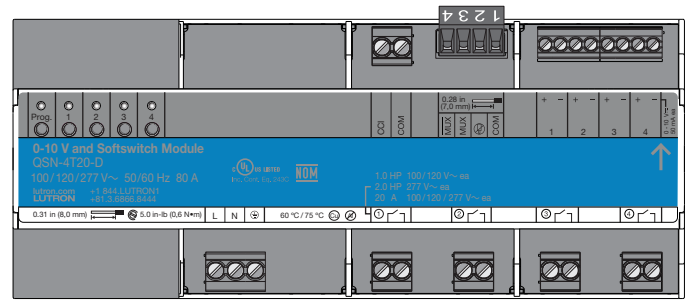
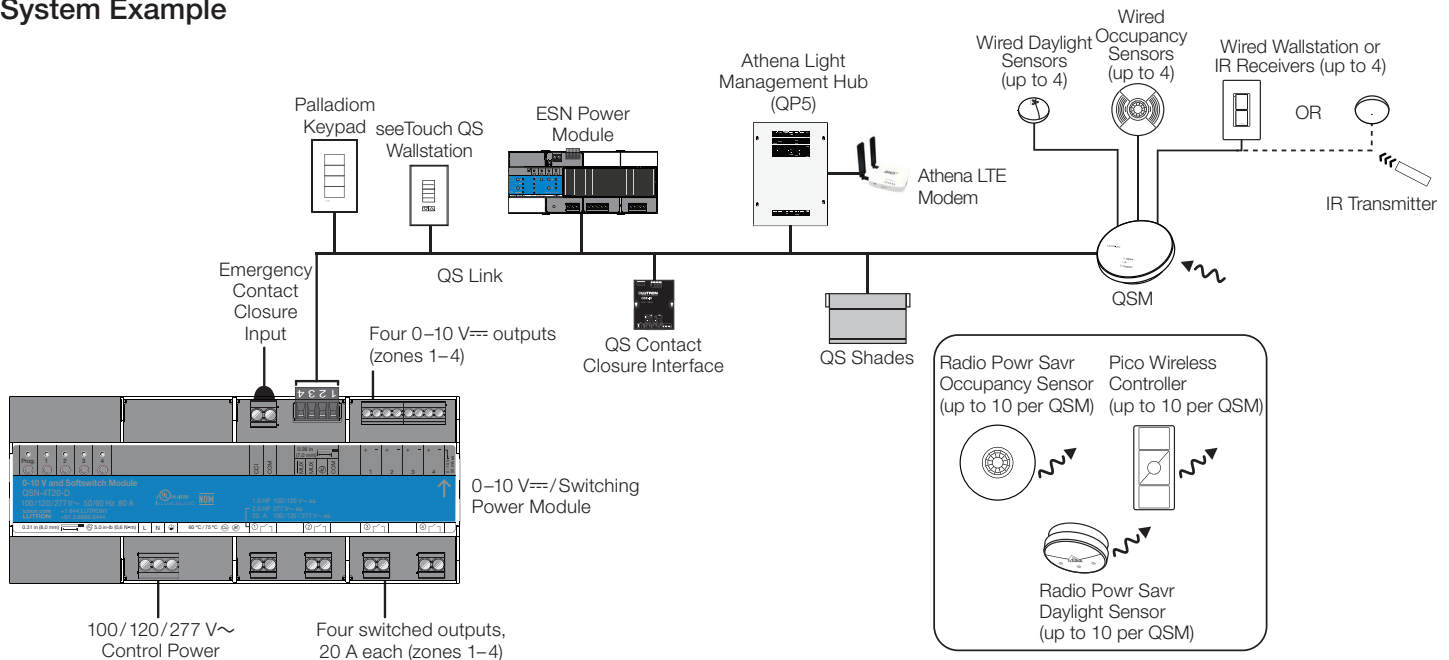
QSN-4T20-D: 4-zone ESN for 0-10 V $\overline{\text{V}}$ /Softswitch

QSN-4S20-D: 4-zone ESN with Softswitch

Features

- 0-10 V $\overline{\text{V}}$ power module can be used in an Athena system.
- Includes QS link for seamless integration and control of lights.
- Auto sink and source capability for 0-10 V $\overline{\text{V}}$ outputs.
- Patented Softswitch circuit eliminates arcing at mechanical contacts when loads are switched, prolonging relay life to an average of 1,000,000 cycles at rated load.
- Buttons on the module provide override control.
- LEDs on the module provide diagnostic information.
- 0-10 V $\overline{\text{V}}$ power module can be used for 0-10 V $\overline{\text{V}}$ and switching applications only.
- Emergency contact closure input (CCI).
- Power failure memory automatically returns the outputs to the levels they were set to prior to a power outage.
- Switched outputs utilize latching relays to maintain relay state if control power is lost.
- Support for ANSI $\text{\textcircled{R}}$ C137.1 Standby (Electronic Off) Mode.
- Evaluated by UL $\text{\textcircled{R}}$ for use in emergency lighting systems in accordance with UL924 when paired with a LUT-ELI-3PH (UL $\text{\textcircled{R}}$ file E234628).

System Example



Job Name:	Model Numbers:
Job Number:	

Specifications

Power

- 100/120/277 V \sim 50/60 Hz
Standby power: 2 W max
- Lightning strike protection meets ANSI/IEEE standard 62.31-1980. Can withstand voltage surges of up to 6000 V \sim and current surges of up to 3000 A.

Regulatory Approvals

- Lutron Quality Systems registered to ISO 9001:2015
- cULus Listed
- NOM Certified
- ICES-5(B)/NMB-5(B)
- FCC Class B

Environment

- See **Mounting** on page 5 for thermal specifications.
- Room ambient temperature is between 32 °F and 104 °F (0 °C and 40 °C)
- Relative humidity: less than 90% non-condensing
- For indoor use only

Terminals (Torque, wire gauge & type ratings)

- Mains wiring: 5 in-lbs (0.6 N•m)
16 AWG to 10 AWG (1.5 mm² to 4.0 mm²)
(single wire, solid or stranded)
- Zone wiring: 5 in-lbs (0.6 N•m)
16 AWG to 10 AWG (1.5 mm² to 4.0 mm²)
(single wire, solid or stranded)
- Emergency CCI wiring: 5 in-lbs (0.6 N•m)
20 AWG to 10 AWG (0.5 mm² to 4.0 mm²)
(single wire, solid or stranded)
20 AWG to 16 AWG (0.5 mm² to 1.5 mm²)
(two wires, solid or stranded)
- 0-10 V \equiv wiring: 5 in-lbs (0.6 N•m)
20 AWG to 10 AWG (0.5 mm² to 4.0 mm²)
(single wire, solid or stranded)
- QS link: 5 in-lbs (0.6 N•m)

Power:

22 AWG to 12 AWG (0.25 mm² to 2.5 mm²)
(single wire, solid or stranded)
22 AWG to 18 AWG (0.25 mm² to 1.0 mm²)
(two wires, solid or stranded)

Data:

22 AWG to 12 AWG (0.25 mm² to 2.5 mm²)
(single wire, solid or stranded)
22 AWG to 18 AWG (0.25 mm² to 1.0 mm²)
(two wires, solid or stranded)

- See **Wiring: QS Link** section on page 10

Programming and Compatibility Requirements

- Setup and programming of the power module is done through the Athena programming software.

QS Link Limits

- Each module counts as one device toward the QS link device limit, and up to 4 switch legs toward the QS link switch leg limit.

<p>Job Name:</p> <p>Job Number:</p>	<p>Model Numbers:</p>
--	-----------------------

Specifications *(continued)*

Switched Output Ratings

- Rated to control 100/120/277 V_{AC} 20 A receptacles with any output.
- When using the Energi Savr Node to control receptacles, it may be used with, but is not limited to, the following:
 - Monitors
 - Fans
 - Humidifiers
 - Printers

Note: Refer to the load equipment manufacturer’s guidelines for acceptable switching methods.

- When using the Energi Savr Node to control receptacles, it may NOT be suitable for use with devices that require any of the following:
 - Shut-down process before power is interrupted, such as computers.
 - Cool-down process before power is interrupted, such as projectors.
 - Programming, such as clocks or DVRs.
 - Long warm-up cycle.
 - **Not for use** with loads that present a hazard if automatically energized (e.g., heaters).
- Any receptacles that are controlled by an automatic control device **must be marked** with “⏻ Controlled” located on the controlled receptacle outlet where visible after installation as stated in 2017 NEC® Article 406.3(E).

0-10 V_{DC} Output Ratings (QSN-4T20-D)

- 0-10 V_{DC} rated for 50 mA maximum output, source or sink per zone.
- Minimum control signal at the 0-10 V_{DC} terminals of the module is 0.3 V when 0-10 V wires are loaded to 50 mA supporting Standby Mode according to ANSI C137.1 ed 2019. Voltage at the fixture will vary; refer to App Note #587 (P/N 048587) on www.lutron.com “0-10 V Control Topology - How far can I run a low-voltage 0-10V circuit” to determine required wire gauges, lengths, and compatibility.

Load Type	Relay Ratings
	100/120/277 V _{AC}
Tungsten	20 A
AC general use	20 A
Electric discharge lamp	16 A
LED drivers and fluorescent ballasts (NEMA 410)	16 A
Resistive	20 A
Inductive	20 A
Motor	1.0 HP 100/120 V _{AC} 2.0 HP 277 V _{AC}

- Switched outputs utilize mechanically held latching relays to maintain relay state if control power is lost.
- For applications requiring control of multiple feed circuits, use the PHPM-SW-DV-WH interface.
- Control of 208 V_{AC} is possible by following App Note #102 (P/N 048068) at www.lutron.com

Job Name:	Model Numbers:
Job Number:	

Out of Box Functionality

Normal Mode Operation

- Control buttons on the module can be used to control the module, with or without system connection, to:
 - Turn loads on and off
 - Dim loads up and down for zones with 0-10 V loads (QSN-4T20-D only)

Emergency Contact Closure Input (CCI)

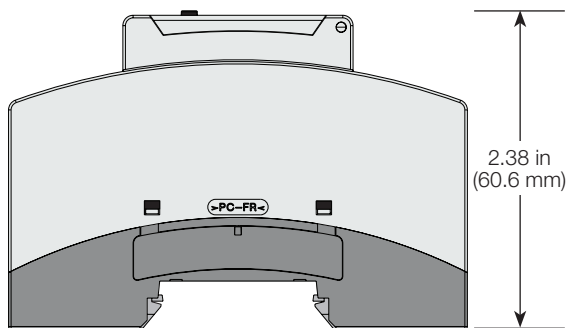
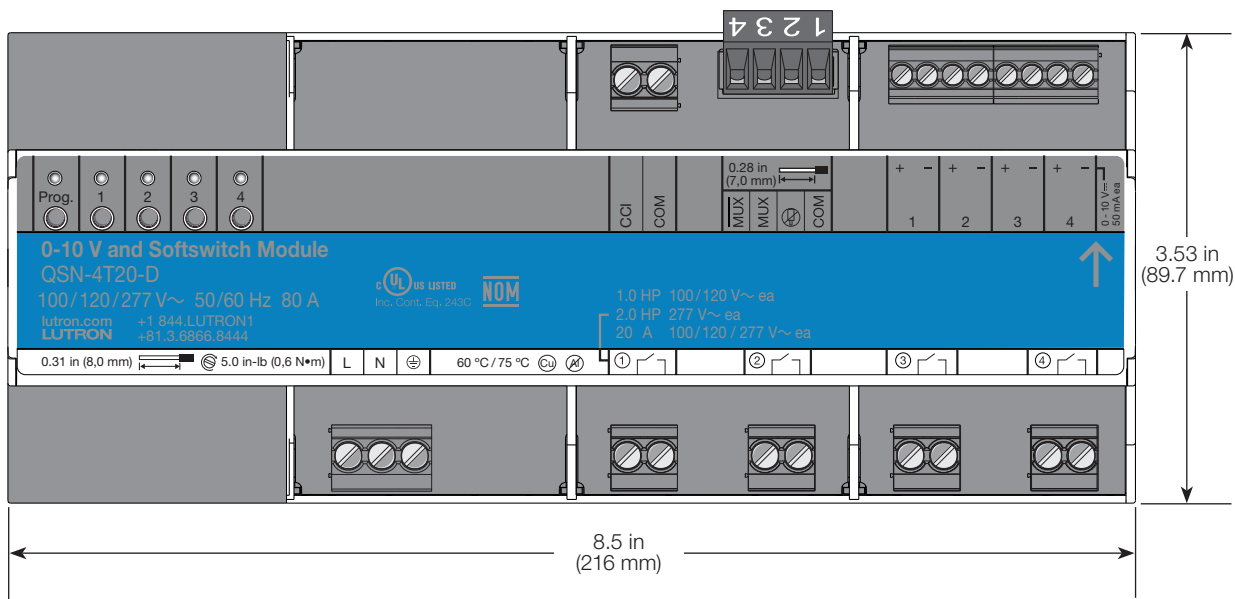
- Normal mode: The module can dim loads as normal and respond to button presses, occupancy sensors, daylight sensors, timeclock events and preset scene calls.
- Emergency mode: When the Emergency CCI is open, the module will override the light output to its emergency level and enter lockout mode. It will not respond to any button presses, occupancy sensors, daylight sensors, timeclock events, or preset scene calls.
- Return from Emergency mode to Normal mode: Once the Emergency CCI is closed or jumpered, the zones will return to the previous light level and it will again respond to button presses, occupancy sensors, daylight sensors, timeclock events, and preset scene calls.

<p>Job Name:</p> <p>Job Number:</p>	<p>Model Numbers:</p>
--	-----------------------

Mounting

- Module is 12 DIN wide, 8.5 in (215.9 mm).
- Mount in a Lutron DIN panel (see Lutron specification submittal 3691183 at www.lutron.com).
- Mount module in orientation shown.
- Mount to DIN rail by pressing module onto the rail with the clips locked. To remove from rail, unlock clips using a screwdriver.
- Mount the module where audible noise is acceptable (internal relays click).
- Mount in an accessible and serviceable location.
- Module generates heat, maximum 4 BTUs/hr.
- Mount module such that all the conditions below are met:
 - Ambient temperature operating range (inside mounting panel): 32 °F to 104 °F (0 °C to 40 °C)
 - Calibration point maximum: 149 °F (65 °C)
 - See Lutron Application Note 048466 at www.lutron.com

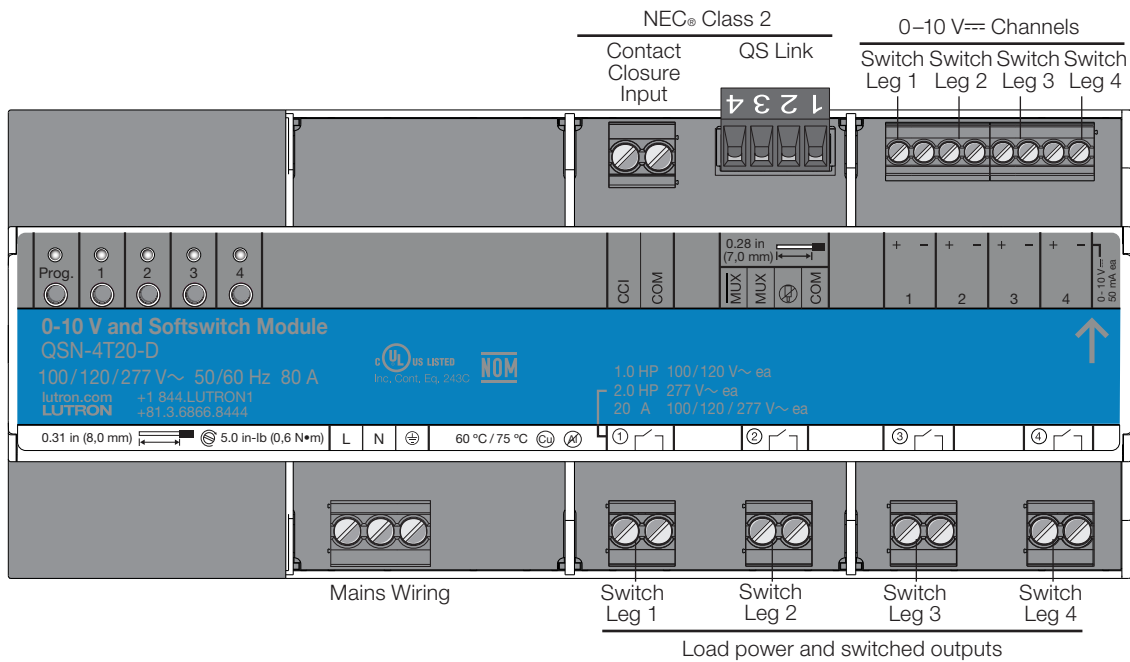
Mechanical Dimensions



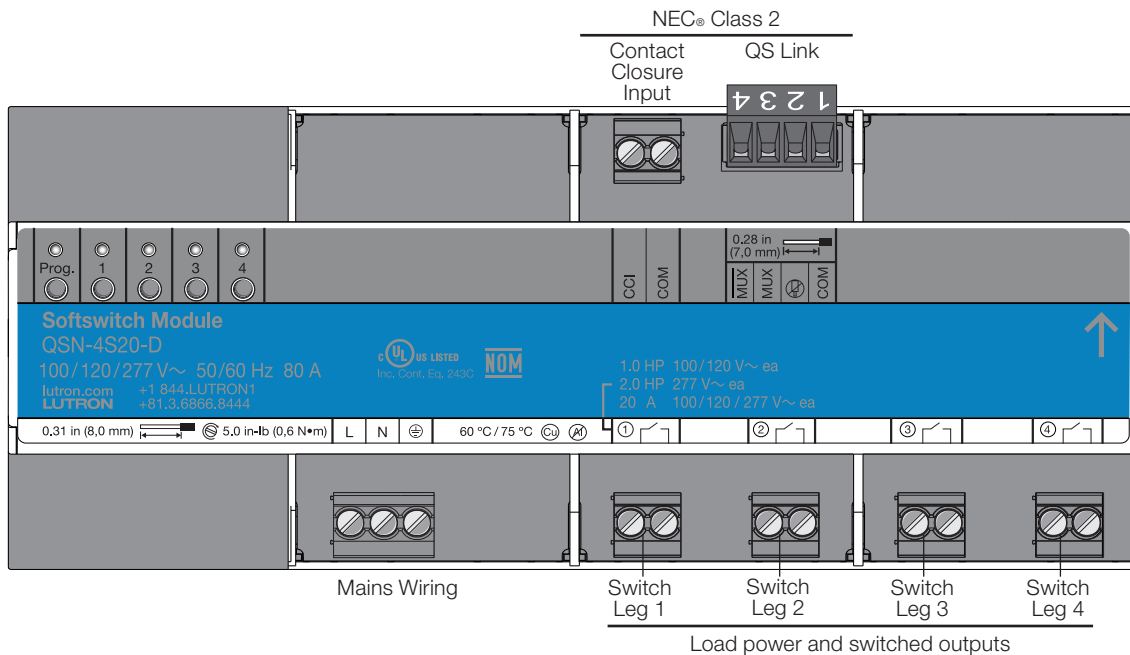
<p>Job Name:</p> <p>Job Number:</p>	<p>Model Numbers:</p>
--	-----------------------

Overview of Wiring Terminals

QSN-4T20-D



QSN-4S20-D



Job Name:	Model Numbers:
Job Number:	

Mains Voltage Wiring

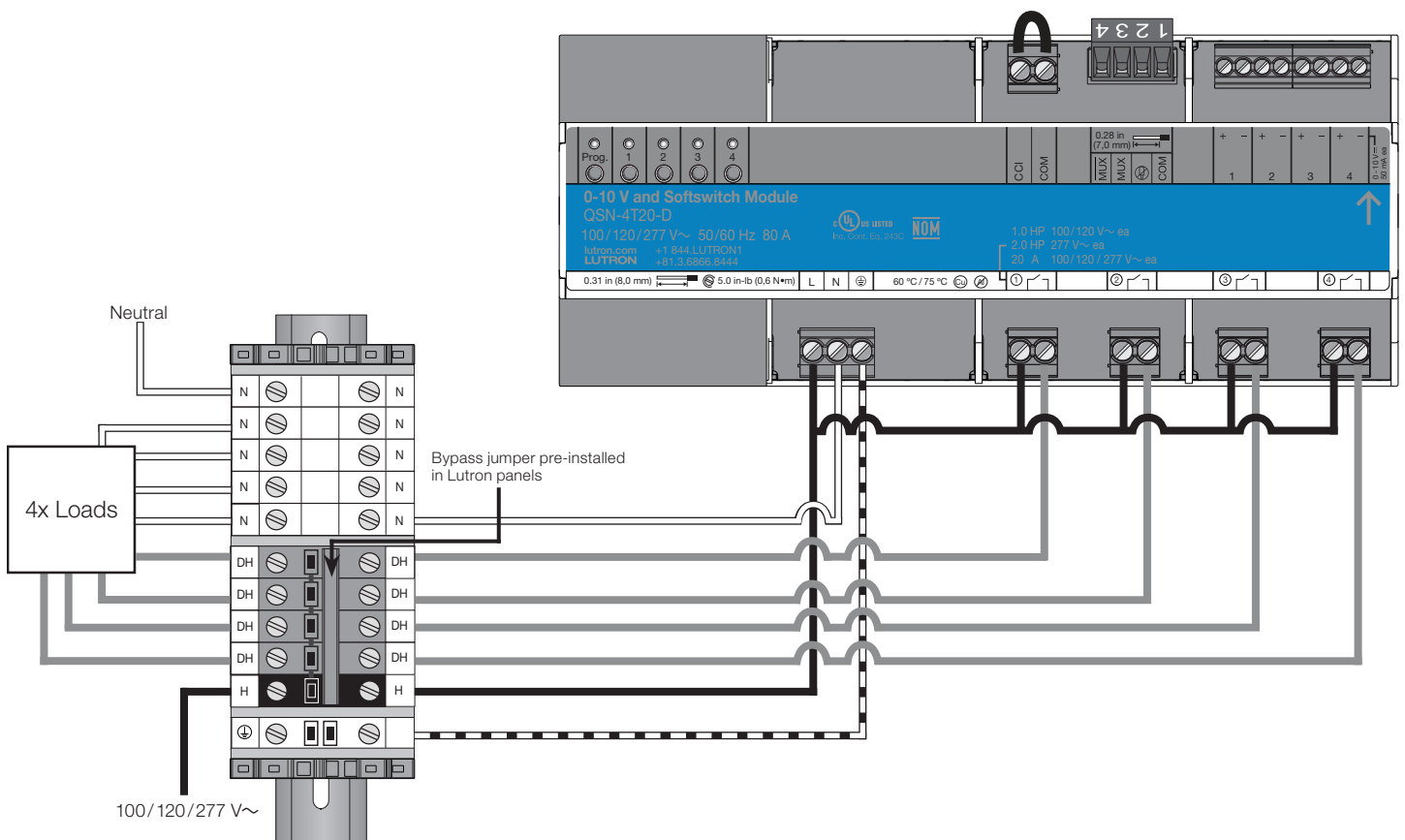
Wiring from Distribution Panel to Energi Savr Node

- Turn off all circuit breakers or isolators feeding the module at the distribution panel.
- Run line/hot, neutral, and earth (\perp) wires from a 100/120/277 V \sim 50/60 Hz feed to the module.
- Follow appropriate local and national codes.
- Optional pre-stripped wiring harness sold separately, Lutron P/N PDW-T-DV-MF for multi-feed applications or PDW-T-DV for single-feed applications.
- For multi-feed installation, terminal block kit PDT-T-DV-MF is required.

Behavior During Power Failure

- Relays do not change state when power is lost to the H/N/ \perp terminals. Follow local and national codes for emergency lighting requirements.
- After a power failure, the 0-10 V \equiv outputs return to their previous setting.

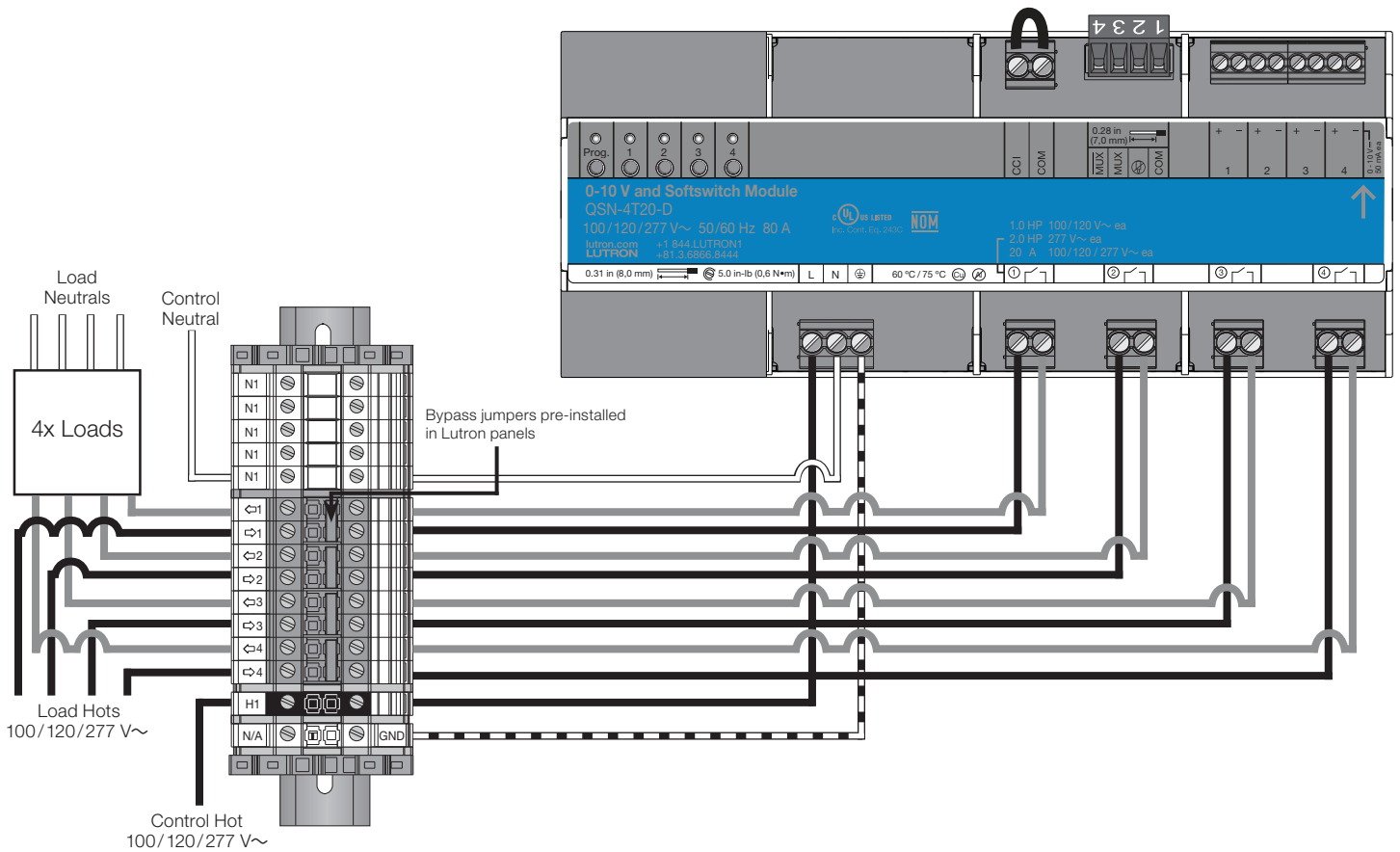
Wiring: 4 Circuits, Single-Feed



WARNING: Entrapment/Fire Hazard. To avoid the risk of entrapment, serious injury, or death, these controls must not be used to control equipment which is not visible from every control location or which could create hazardous situations such as entrapment if operated accidentally. Examples of such equipment which must not be operated by these controls include (but are not limited to) motorized gates, industrial doors, space heaters, etc. It is the installer's responsibility to ensure that the equipment being controlled is visible from every control location and that only suitable equipment is connected to these controls. Failure to do so could result in serious injury or death.

Job Name:	Model Numbers:
Job Number:	

Wiring: 4 Circuits, Multiple Feeds

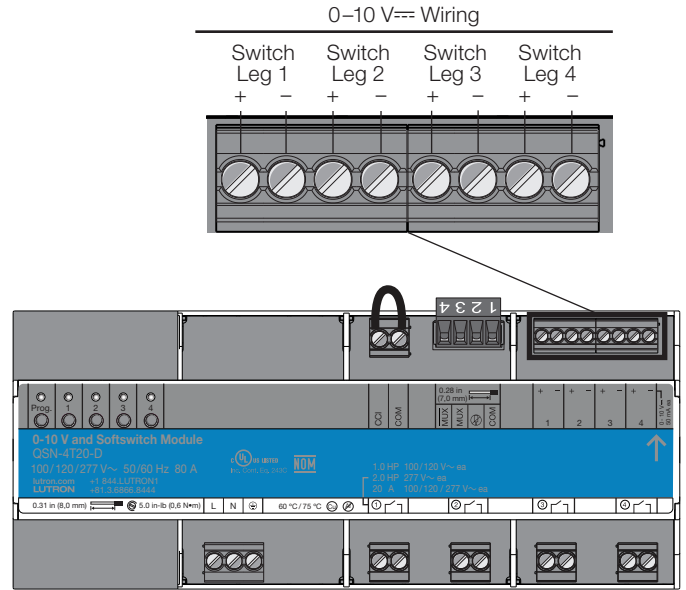


WARNING: Entrapment/Fire Hazard. To avoid the risk of entrapment, serious injury, or death, these controls must not be used to control equipment which is not visible from every control location or which could create hazardous situations such as entrapment if operated accidentally. Examples of such equipment which must not be operated by these controls include (but are not limited to) motorized gates, industrial doors, space heaters, etc. It is the installer's responsibility to ensure that the equipment being controlled is visible from every control location and that only suitable equipment is connected to these controls. Failure to do so could result in serious injury or death.

Job Name:	Model Numbers:
Job Number:	

Wiring: 0-10 V_{DC}

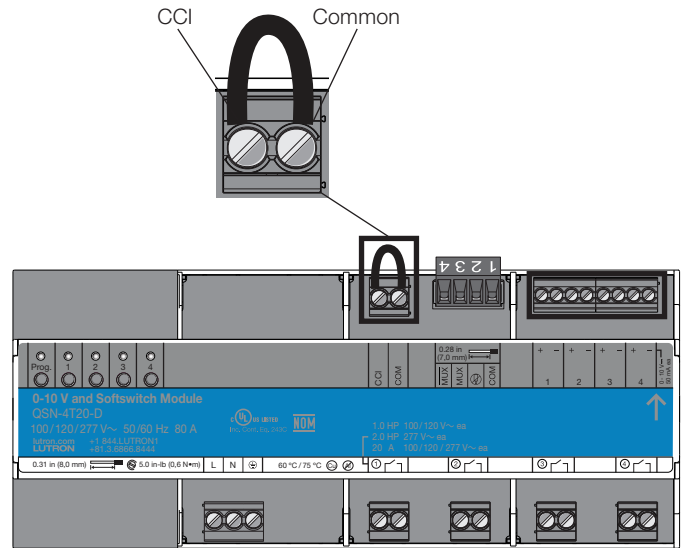
- 0-10 V_{DC} zones 1-4 are double insulated from line voltage and the QS link but are not insulated from each other.
- They share the same common terminal (negative “-” terminal)
- Do not mix NEC® Class 2 circuits and non-NEC® Class 2 circuits for 0-10 V_{DC} zone 1-4.
- Follow all national and local electrical codes for separation requirements.



Wiring: Emergency Contact Closure Input

- Contact closure input (CCI) wiring is NEC® Class 2. Follow all applicable national and local codes for proper circuit separation and protection.
- When in emergency mode, all drivers and zone outputs will be at their programmed emergency light level (default is 100%). All other controls are locked out.
- The CCI is a local control only and cannot control other modules over the QS link. A maximum of 32 modules may be connected in parallel to a CCO device (LUT-ELI-3PH) if the event is intended to affect multiple devices. Refer to Lutron’s Emergency Lighting Application Note #106 (P/N 048106) on www.lutron.com for details.
- Emergency contact closure input is normally closed (N.C.). The module is shipped with a jumper wire pre-installed.

Note: The module will default to emergency mode if the CCI is left open. If no emergency contact input is required, leave the wire jumper in the CCI terminals.



Job Name:	Model Numbers:
Job Number:	

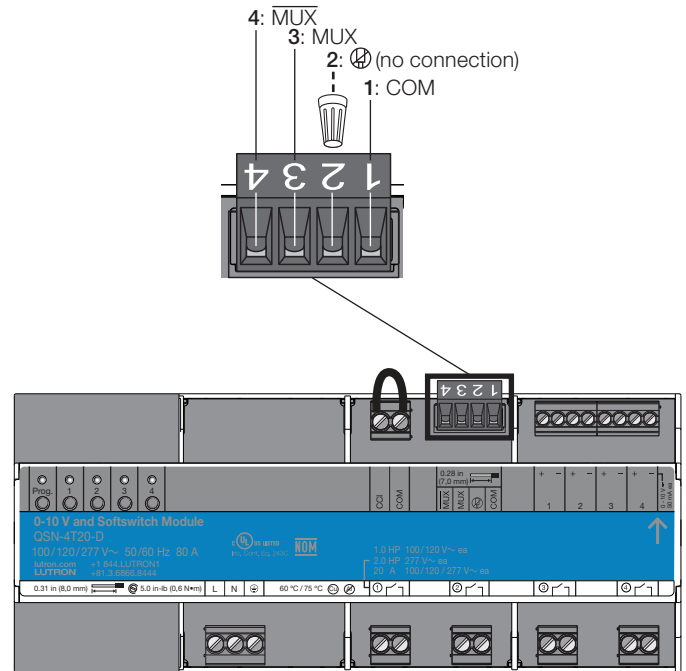
Wiring: QS Link

QS Link NEC® Class 2 Wiring

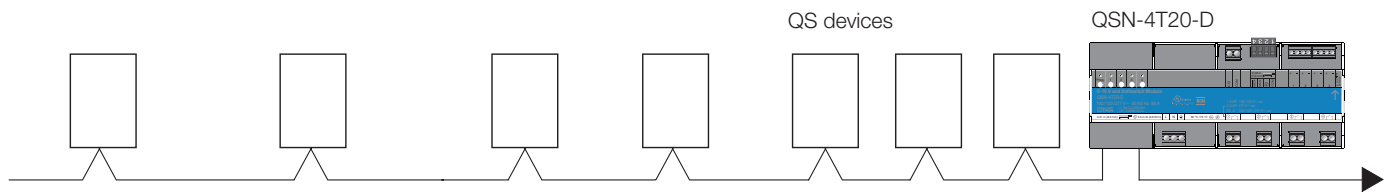
- Follow all applicable national and local codes for proper circuit separation and protection.
- Link communicates using NEC® Class 2 wiring.
- Device does not supply or consume PDUs.
- Wiring may be daisy-chained or T-tapped.
- Do NOT connect terminal 2.
- Optional QS link wiring harnesses sold separately, refer to Lutron specification submittal 3691183 on www.lutron.com for part numbers.

QS Link Wiring Options

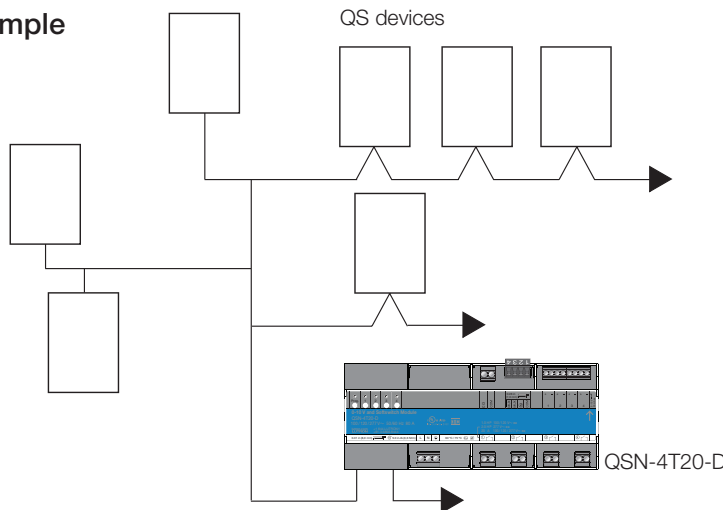
Control Link Length	Wire Gauge (for terminals)	Available from Lutron in one cable:
Less than 500 ft (153 m)	Power (terminals 1 and 2); 1 pair 18 AWG (0.75 mm ²)	GRX-CBL-346S (non-plenum)
	Data (terminals 3 and 4); 1 pair 22 AWG (0.25 mm ²), twisted and screened	GRX-PCBL346S (plenum)
500 ft (153 m) to 2000 ft (610 m)	Power (terminals 1 and 2); 1 pair 12 AWG (4.0 mm ²)	GRX-CBL-46L (non-plenum)
	Data (terminals 3 and 4); 1 pair 22 AWG (0.25 mm ²), twisted and screened	GRX-PCBL-46L (plenum)



Daisy-Chain Wiring Example



T-Tap Wiring Example



The Lutron logo, Lutron, Athena, Energi Savr Node, Palladiom, Pico, Radio Powr Savr, Softswitch, and seeTouch are trademarks or registered trademarks of Lutron Electronics Co., Inc. in the US and/or other countries.

All other product names, logos, and brands are property of their respective owners.

Job Name:	Model Numbers:
Job Number:	