

# Energi Savr Node for 0–10 V $\overline{\sim}$

## Energi Savr Node with Softswitch

The Energi Savr Node (ESN) family is a group of modular products for the control of lighting, receptacles, and other loads. This document describes the following products:

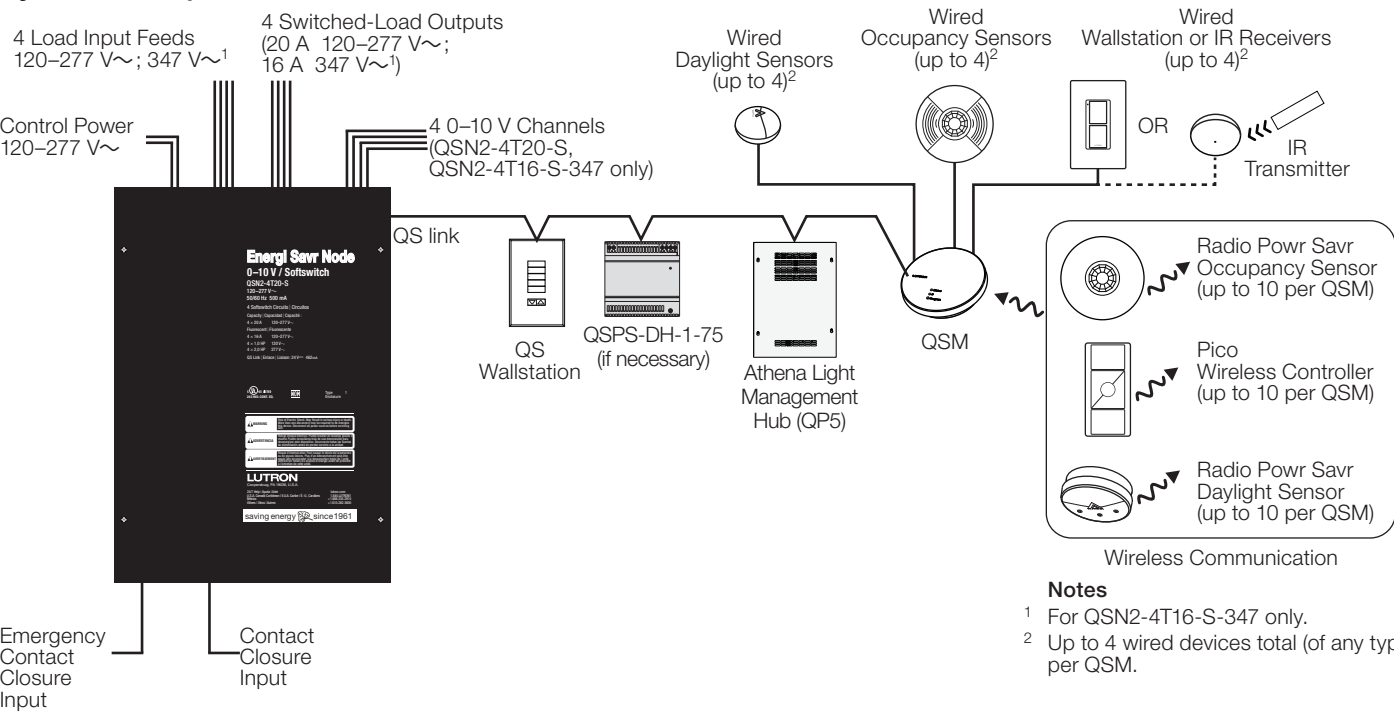
- QSN2-4T20-S, QSN2-4T16-S-347:** Energi Savr Node for 0–10 V $\overline{\sim}$ /Softswitch
- QSN2-4S20-S:** Energi Savr Node with Softswitch

### Features

- Rated to switch 20 A receptacles with any output.
- Includes QS control link for seamless integration of loads, control stations, and QS sensor modules.
- Patented Softswitch circuit eliminates arcing at mechanical contacts when loads are switched, prolonging relay life to an average of 1,000,000 cycles at 16 A.
- 0–10 V $\overline{\sim}$  fixtures used with this ESN must support switching power to turn on/off.
- Compatible with Lutron Athena system (software version 20.4 or higher\*).
- Compatible with Lutron Quantum system (software version 3.4.437 or higher\*).
- BAA-compliant model numbers available, refer to Lutron BAA product list at [www.lutron.com/baa](http://www.lutron.com/baa)

\* **Note:** Quantum or Athena systems lower than the listed version will require a billable upgrade to the latest version. Contact your local Lutron Representative for more information.

### System Example



- Notes**
- <sup>1</sup> For QSN2-4T16-S-347 only.
  - <sup>2</sup> Up to 4 wired devices total (of any type) per QSM.

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## Specifications

### Regulatory Approvals

- cULus Listed
- NOM
- Lutron Quality Systems registered to ISO 9001:2015
- Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2017 300.22(C)(3)
- Meets the Canadian National Building Code plenum requirements for a concealed space used as a plenum within a floor or roof assembly
- For commercial use, FCC Part 15 Class A only

### Power

- Control Power: 120 – 277 V $\sim$  50/60 Hz
- Lightning strike protection meets ANSI/IEEE standard 62.41-1991. Can withstand voltage surges of up to 6000 V $\sim$  and current surges of up to 3000 A
- Current draw: 0.5 A max
- 10-year power failure memory: restores lighting to levels prior to power interruption
- Latching relays keep previously illuminated zones on when control power feed is lost

### Environment

- Ambient Temperature Operating Range: 32 °F to 104 °F (0 °C to 40 °C)
- Relative humidity: less than 90% non-condensing
- For indoor use only
- Thermal dissipation: 40 BTU/hr

### Terminal Wiring

- Control Power Wiring:  
14 AWG to 12 AWG (2.5 mm<sup>2</sup> to 4.0 mm<sup>2</sup>)  
7 in-lbs (0.8 N•m)
- Load Wiring:  
14 AWG to 12 AWG (2.5 mm<sup>2</sup> to 4.0 mm<sup>2</sup>)  
7 in-lbs (0.8 N•m)
- 0–10 V Wiring:  
20 AWG to 12 AWG (0.5 mm<sup>2</sup> to 4.0 mm<sup>2</sup>)  
5 in-lbs (0.6 N•m)
- Contact Closure Wiring:  
20 AWG to 12 AWG (0.5 mm<sup>2</sup> to 4.0 mm<sup>2</sup>)  
5 in-lbs (0.6 N•m)

- QS Link Wiring:  
5 in-lbs (0.6 N•m)

### Power (terminals 1 and 2):

22 AWG to 12 AWG (0.25 mm<sup>2</sup> to 2.5 mm<sup>2</sup>)  
(single wire, solid or stranded) **OR**  
22 AWG to 18 AWG (0.25 mm<sup>2</sup> to 1.0 mm<sup>2</sup>)  
(two wires, solid or stranded)

### Data (terminals 3 and 4):

1 pair, twisted and screened,  
22 AWG to 12 AWG (0.25 mm<sup>2</sup> to 2.5 mm<sup>2</sup>)  
(single wire, solid or stranded) **OR**  
22 AWG to 18 AWG (0.25 mm<sup>2</sup> to 1.0 mm<sup>2</sup>)  
(two wires, solid or stranded)

### Physical Design and Mounting

- NEMA Type 1, IP-20 protection
- Surface-mount

### Load Types (relay ratings)

- Rated to control 120–277 V $\sim$  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 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.

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## Specifications (continued)

### Load Types (relay ratings) (continued)

- **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).

Load Type	Relay Ratings	
	120–277 V $\sim$ QSN2-4S20-S QSN2-4T20-S QSN2-4T16-S-347	347 V $\sim$ QSN2-4T16-S-347
Tungsten	20 A	16 A
AC general use	20 A	16 A
Electric discharge lamp	16 A	16 A
LED drivers and fluorescent ballasts (NEMA 410)	16 A	16 A
Resistive	20 A	16 A
Inductive	20 A	16 A
Motor	1.0 HP 120 V $\sim$ 2.0 HP 277 V $\sim$	—

### Softswitch 120–277 V $\sim$ ; 347 V $\sim$

- For Softswitch relay ratings see the Relay Ratings chart under Load Types section.
- Relay is mechanically held.

### 0–10 V $\overline{\text{=}}$ Output Ratings (QSN2-4T20-S, QSN2-4T16-S-347)

- Each output sinks up to 50 mA maximum.
- Each output sinks current only (load device must provide 10 V $\overline{\text{=}}$  supply).
- Provides an IEC PELV/NEC® Class 2 isolated 0–10 V output signal that conforms to IEC 60929.
- 0–10 V $\overline{\text{=}}$  fixtures must support switching power to turn on/off. Use switched outputs to switch fixtures according to wiring diagrams shown on pages 9–11.
- Minimum voltage (Off, when relay is open) at the 0–10 V $\overline{\text{=}}$  terminals of the ESN unit is 1.0 V when 0–10 V $\overline{\text{=}}$  wires are loaded to 50 mA. Voltage at the fixture will vary; refer to “How far can I run a low voltage 0–10 V $\overline{\text{=}}$  circuit” of App Note #587 (P/N 048597) at [www.lutron.com](http://www.lutron.com) to determine required wire gauges, lengths, and compatibility.

### Contact Closure Input (CCI)

- Activate scenes using momentary or maintained closures from an external device such as a timeclock.
- The attached device must provide a dry-contact closure or solid-state output.
- Configurable for normally-open (NO) or normally-closed (NC) operation.
- Input is miswire-protected up to 36 V $\overline{\text{=}}$ .

### Emergency Contact Closure Input

- By default, contact closure input from Lutron Emergency Lighting Interface (LUT-ELI-3PH), security, or fire alarm systems turns all zones on to full output when emergency state is detected.
- Emergency contact closure input is normally closed (NC). The ESN unit is shipped with a jumper pre-installed.
- Response of each zone is configurable.
- Attached devices, by default, will go to maximum output and ignore control inputs.
- No operations will be allowed until emergency signal is cleared.
- The attached device must provide a dry-contact closure or solid-state output.
- Input is miswire-protected up to 36 V $\overline{\text{=}}$ .
- Emergency CCI cannot control other ESN units.
- See Application Note #106 “Emergency Lighting” (P/N 048106) at [www.lutron.com](http://www.lutron.com) for more details.

### QS Link Limits

- Each ESN unit can provide up to 14 Power Draw Units (PDUs) for other QS devices. Refer to the QS Link Power Draw Unit specification submittal (Lutron P/N 369405) for more information concerning PDUs.
- Each ESN unit counts as 1 device towards the QS device limit.
- Each ESN unit counts as 4 zones towards the zone limit.

### Programming and Compatibility Requirements

- Setup and programming of the ESN unit is done through the Athena/Quantum programming software.

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## Specifications (continued)

### Out of Box Functionality

This section describes the default functionality when the unit is first installed.

#### Emergency Contact Closure Input (CCI)

- **Normal mode:** The unit 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 unit 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.

#### Contact Closure Input (CCI)

- Momentary closure from a normally-open (NO) dry-contact closure device will result in all zones being turned off.

### Normal Mode Operation

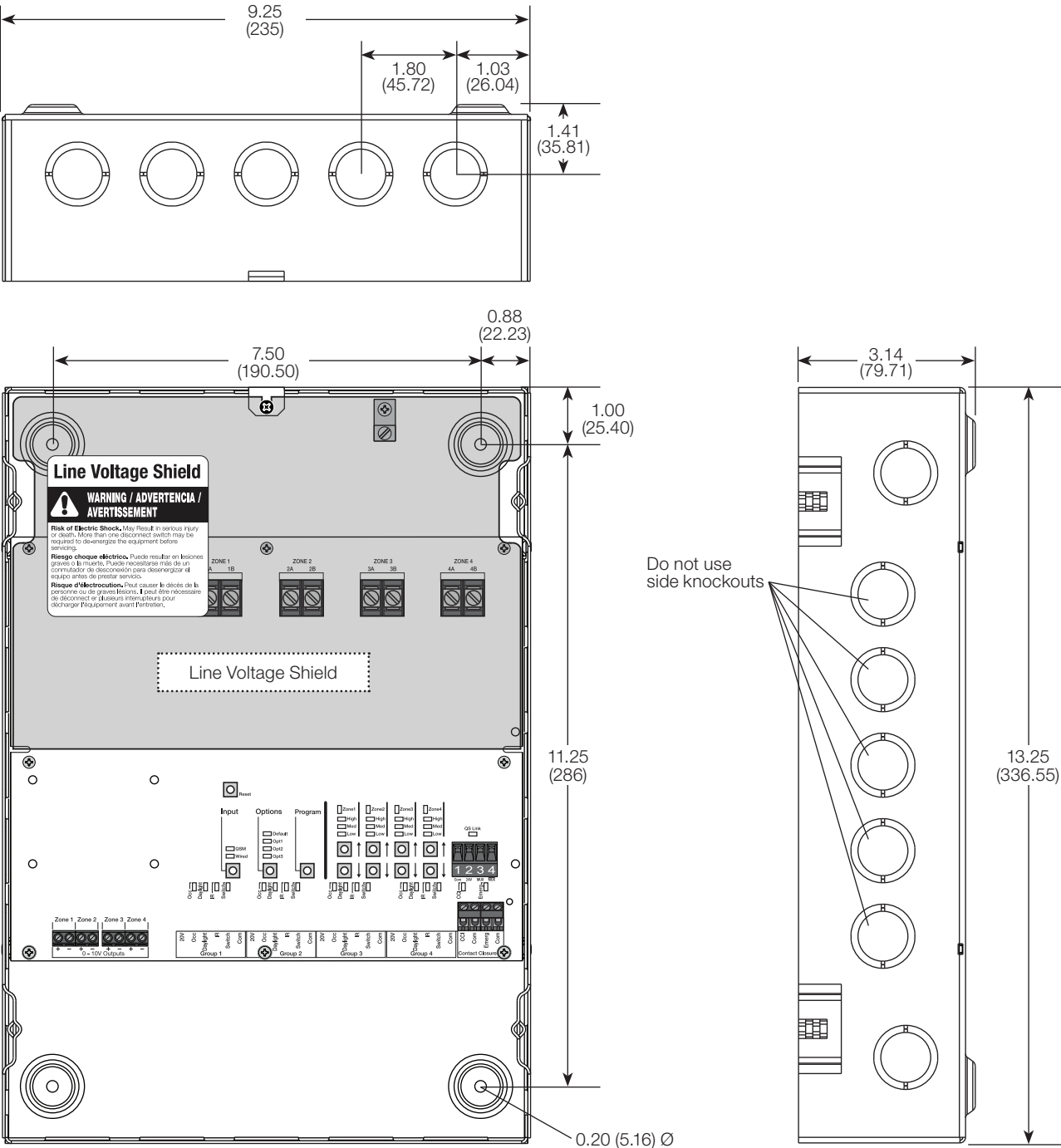
- In normal operation, the following buttons allow the user to access certain basic functions:
  - Raise
    - 0-10 V/Softswitch: Raises zone light level in 1% increments from 0-100%.
    - Softswitch: Turns selected zone on.
  - Lower
    - 0-10 V/Softswitch: Decreases zone light level in 1% decrements from 100-0%.
    - Softswitch: Turns selected zone off.

**Note:** On 0-10 V/Softswitch only — For any zone, simultaneously pressing and holding the Raise and Lower buttons will toggle the zone between high-end and low-end.

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Mechanical Dimensions

All dimensions shown as in (mm)



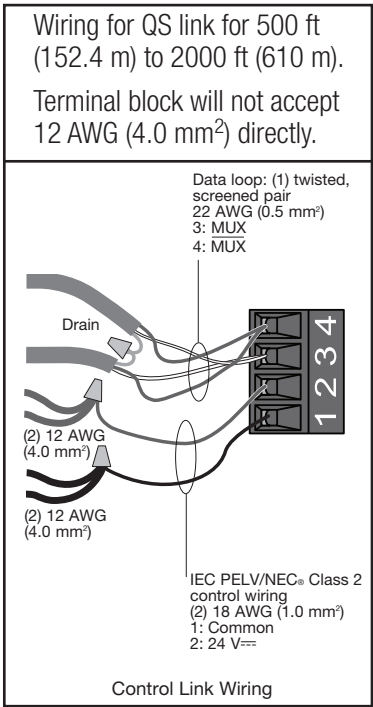
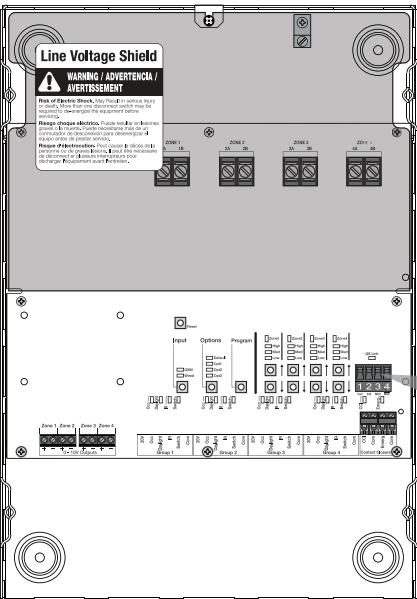
Wiring: QS Link

- QS link communication uses IEC PELV/NEC® Class 2 wiring. Follow all local and national electrical codes when installing IEC PELV/NEC® Class 2 wiring with line voltage wiring.
- The total distance of the QS link wiring must not exceed 2000 ft (610 m).

QS Link Wiring Distance	Wire Gauge	Available from Lutron in one cable:
Less than 500 ft (152.4 m)	Power (terminals 1 and 2): 1 pair 18 AWG (1.0 mm <sup>2</sup> )	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4): 1 pair 22 AWG (0.5 mm <sup>2</sup> ), twisted and screened*	
500 ft (152.4 m) to 2000 ft (610 m)	Power (terminals 1 and 2): 1 pair 12 AWG (4.0 mm <sup>2</sup> )	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4): 1 pair 22 AWG (0.5 mm <sup>2</sup> ), twisted and screened*	

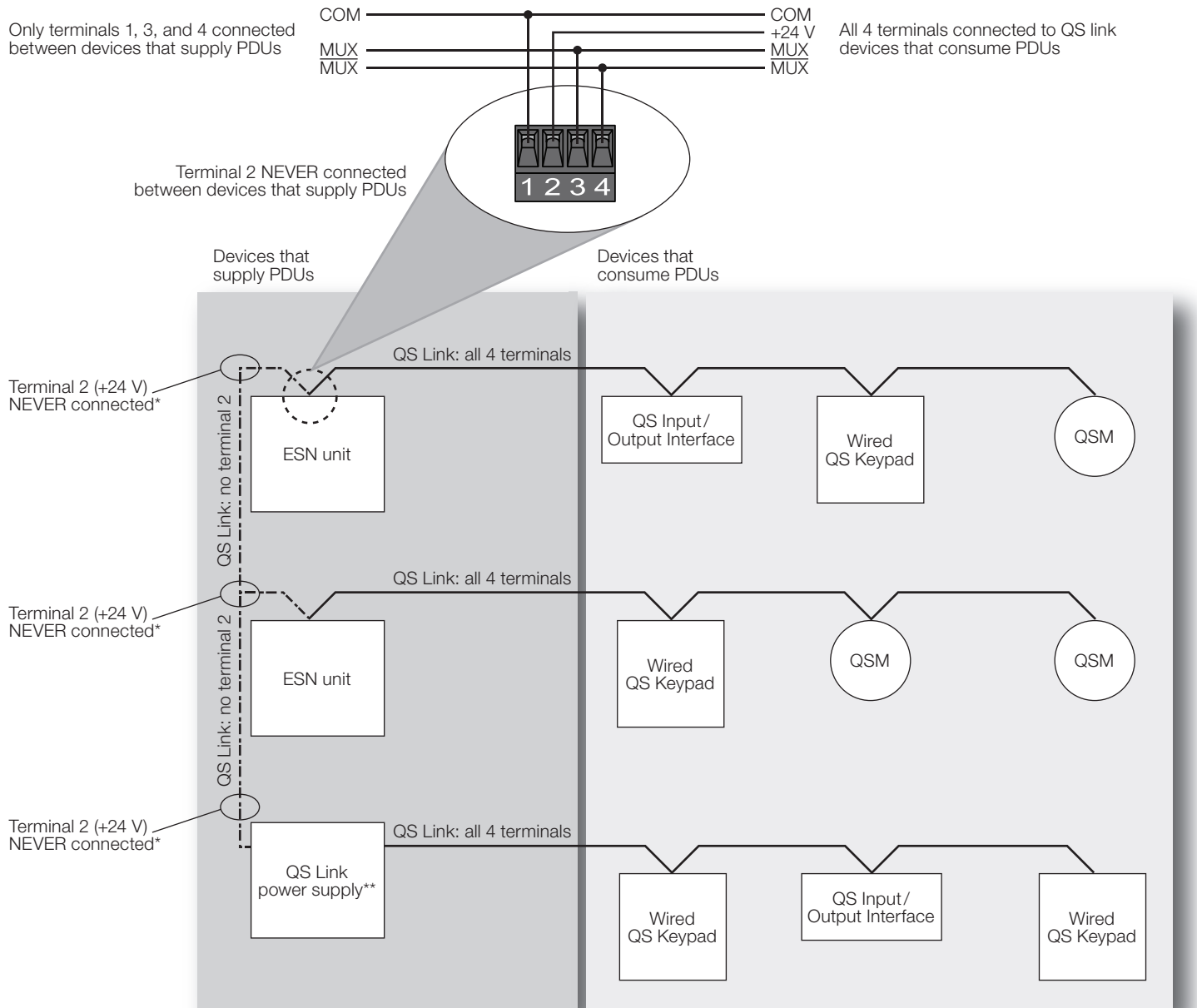
\* Alternate data-only cable: Use approved data loop cable (22 AWG [0.5 mm<sup>2</sup>] twisted/screened) from Belden, model #9461.

Energi Savr Node unit



- (4) MUX
- (3) MUX
- (2) 24 V<sup>—</sup>
- (1) COM

## Wiring: QS Link (continued)



### QS Link Wiring Rules

\* Terminal 2 (+24 V) should NEVER be connected between devices that supply PDUs.

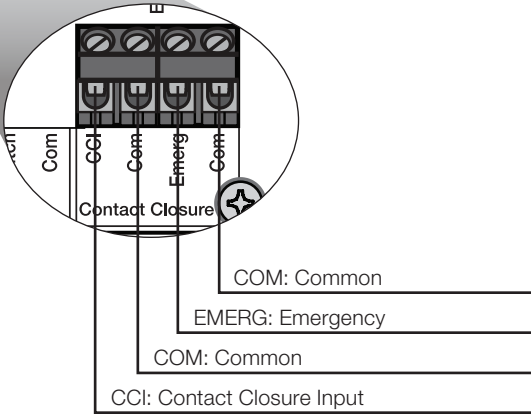
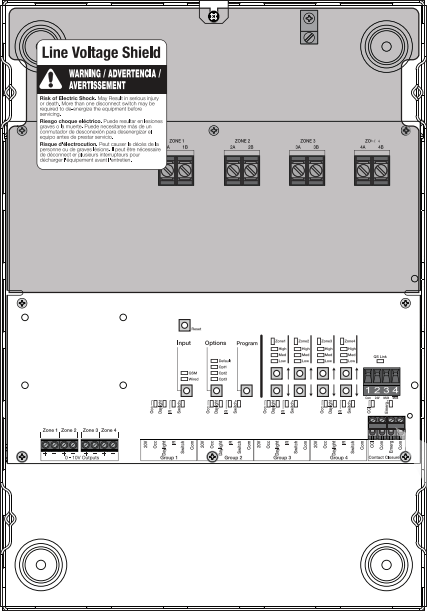
\*\* For QS Link power supply wiring connection details, refer to the installation instructions for the specific power supply model being used.

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# Wiring: Contact Closure Inputs (CCI and Emerg)

## Contact Closure Wiring

- Single-wire 20 to 12 AWG (0.5 to 4.0 mm<sup>2</sup>)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.6 N•m)



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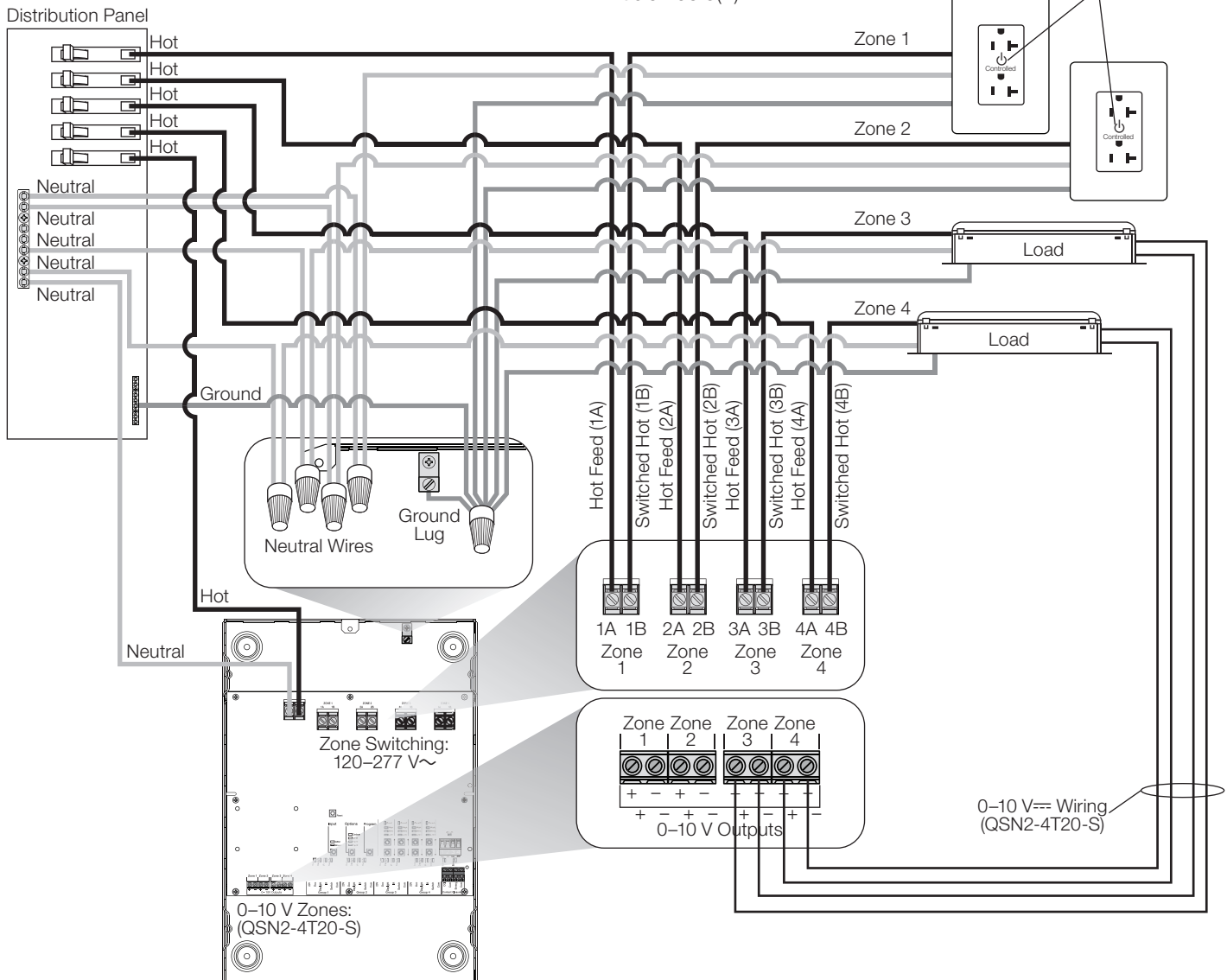
## Wiring: 4 Circuits, Multiple Feeds

### Load Wiring

- Two (2) 14 to 12 AWG (2.5 to 4.0 mm<sup>2</sup>)
- Strip length: 3/8 in (8.5 mm)
- Torque: 7 in-lb (0.8 N•m)

### Attention Installer

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 $\equiv$ Wiring (QSN2-4T20-S)

- 20 to 12 AWG (0.5 to 4.0 mm<sup>2</sup>)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.6 N•m)
- 0-10 V $\equiv$  control wires for zones 1-4 can be installed using NEC® Class 1 or Class 2 wiring methods.
- 0-10 V zones 1-4 are not isolated from each other.
- Negative (-) terminals are not internally connected to each other; both positive (+) and negative (-) connections must be made.

- Follow all national and local codes for separation requirements.
- If any pair of 0-10 V $\equiv$  control wires are installed using NEC® Class 1 wiring methods, then these wires must be physically separated from all other Class 2 wiring in the Energi Savr Node in accordance with NEC® guidance on separation of Class 1 and 2 wires.
- If one pair of 0-10 V $\equiv$  control wires are wired using NEC® Class 1 wiring methods, then all pairs of 0-10 V $\equiv$  control wires must be installed using NEC® Class 1 wiring methods.

**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:

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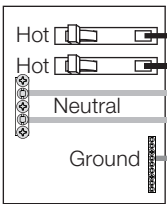
Wiring: 4 Circuits, Multiple Feeds, 120 V $\sim$  Receptacles and 347 V $\sim$  Lighting

Load Wiring

- Two (2) 14 to 12 AWG (2.5 to 4.0 mm<sup>2</sup>)
- Strip length: 3/8 in (8.5 mm)
- Torque: 7 in-lb (0.8 N•m)

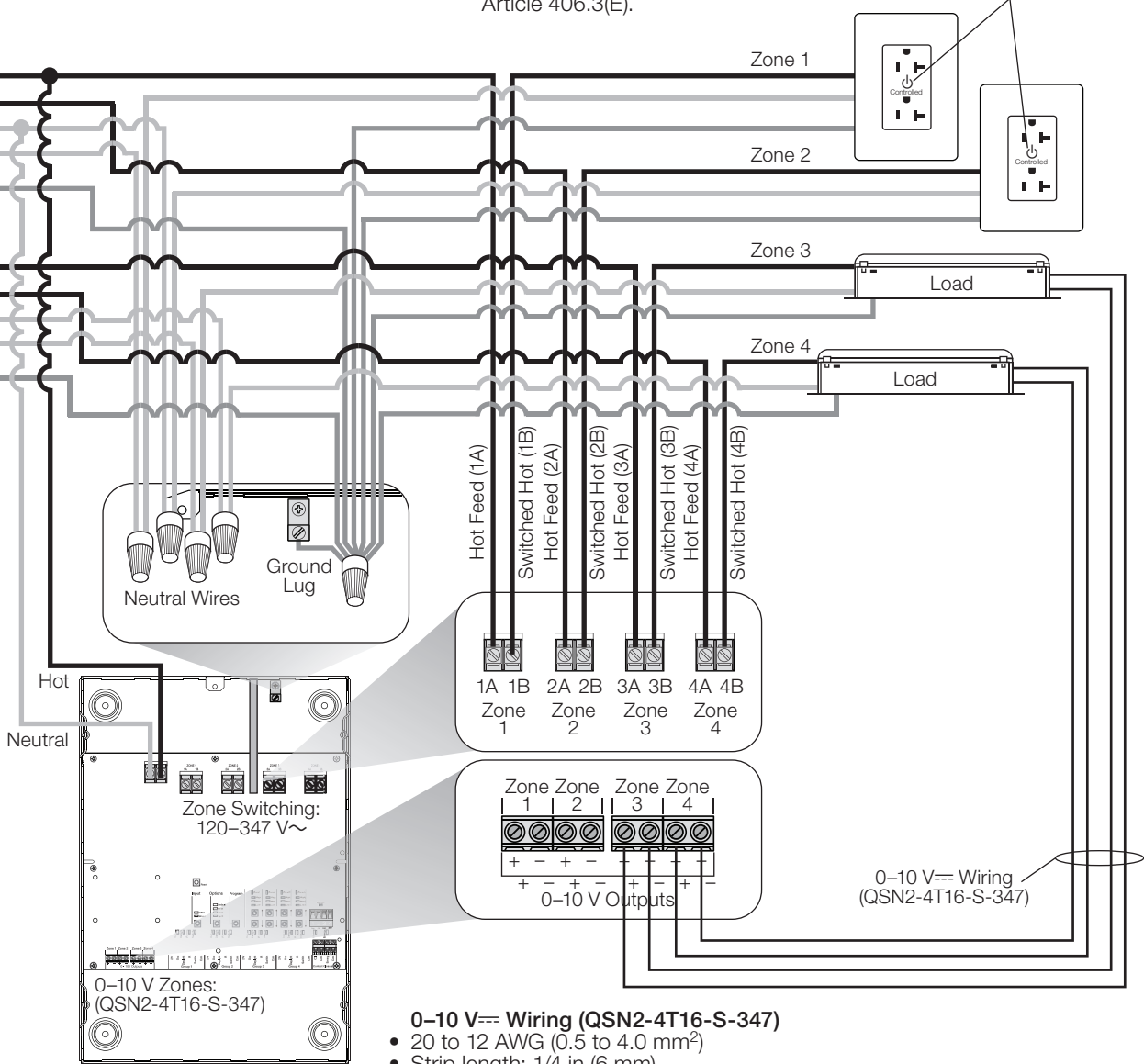
120 V $\sim$

Distribution Panel



347 V $\sim$

Distribution Panel



Attention Installer

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 $\equiv$  Wiring (QSN2-4T16-S-347)

- 20 to 12 AWG (0.5 to 4.0 mm<sup>2</sup>)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.6 N•m)
- Connect only IEC PELV/NEC® Class 2 circuits or connect only non-IEC PELV/NEC® Class 2 circuits to 0-10 V zones 1-4.
- 0-10 V zones 1-4 are not isolated from each other.
- Negative (-) terminals are not internally connected to each other; both positive (+) and negative (-) connections must be made.
- Follow all national and local codes for separation requirements.

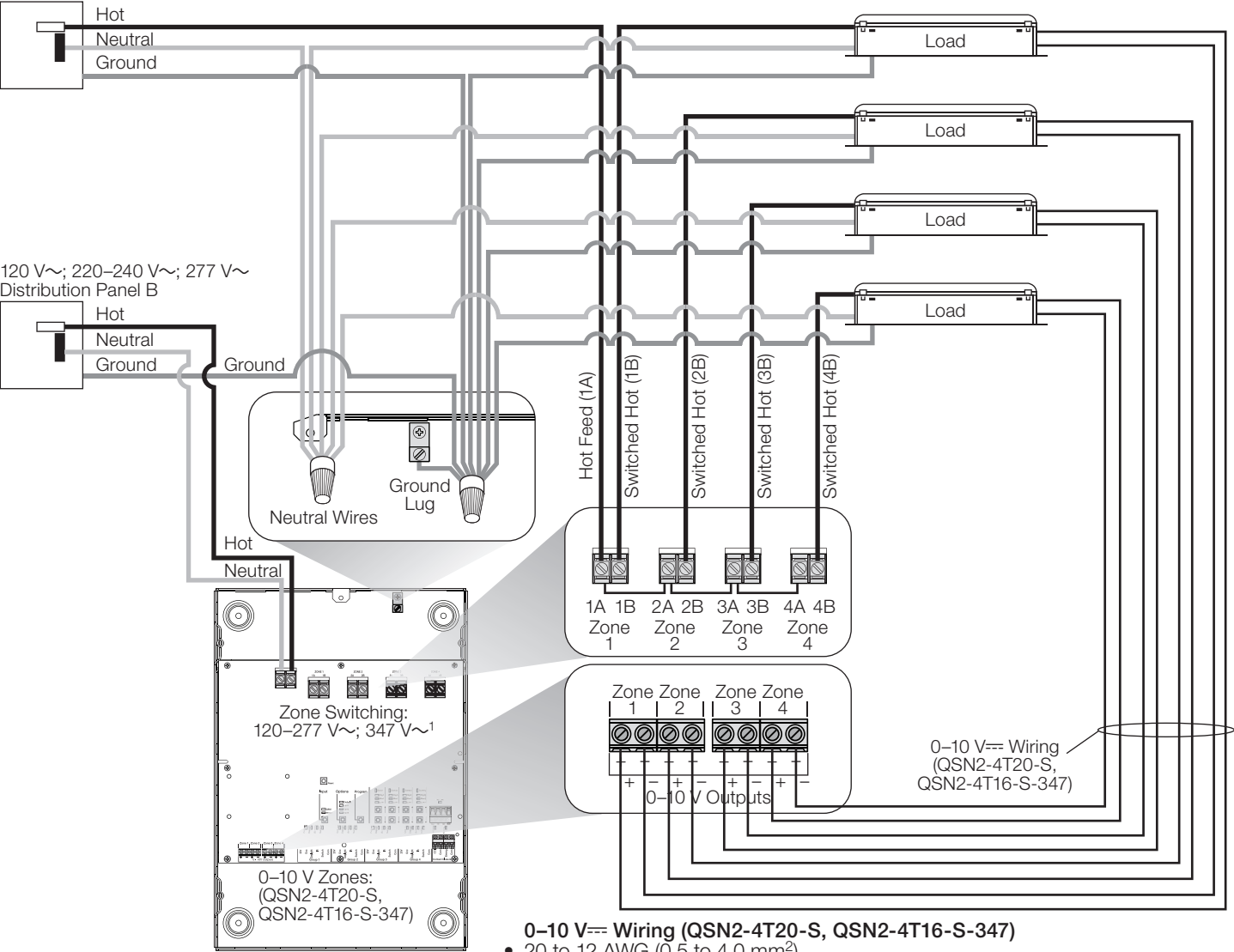
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Wiring: 4 Circuits, Single Feed

Load Wiring

- Two (2) 14 to 12 AWG (2.5 to 4.0 mm<sup>2</sup>)
  - Strip length: 3/8 in (8.5 mm)
  - Torque: 7 in-lb (0.8 N•m)
- 120 V $\sim$ ; 220–240 V $\sim$ ; 277 V $\sim$ ; 347 V $\sim$ <sup>1</sup> Distribution Panel A



0–10 V $\equiv$  Wiring (QSN2-4T20-S, QSN2-4T16-S-347)

- 20 to 12 AWG (0.5 to 4.0 mm<sup>2</sup>)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.6 N•m)
- Connect only IEC PELV/NEC<sup>®</sup> Class 2 circuits or connect only non-IEC PELV/NEC<sup>®</sup> Class 2 circuits to 0–10 V $\equiv$  zones 1–4.
- 0–10 V $\equiv$  zones 1–4 are not isolated from each other.
- Negative (–) terminals are not internally connected to each other; both positive (+) and negative (–) connections must be made.
- Follow all national and local codes for separation requirements.

**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.