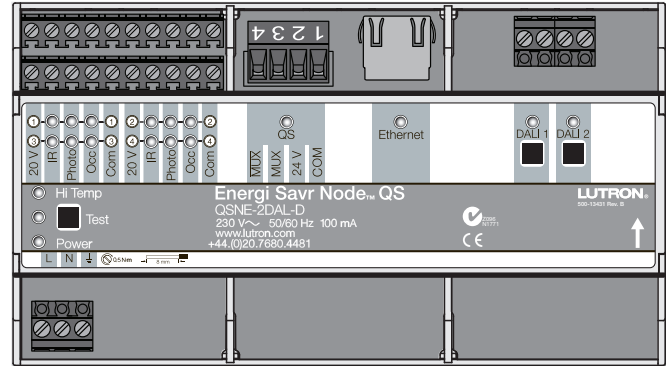


Energi Savr Node QS

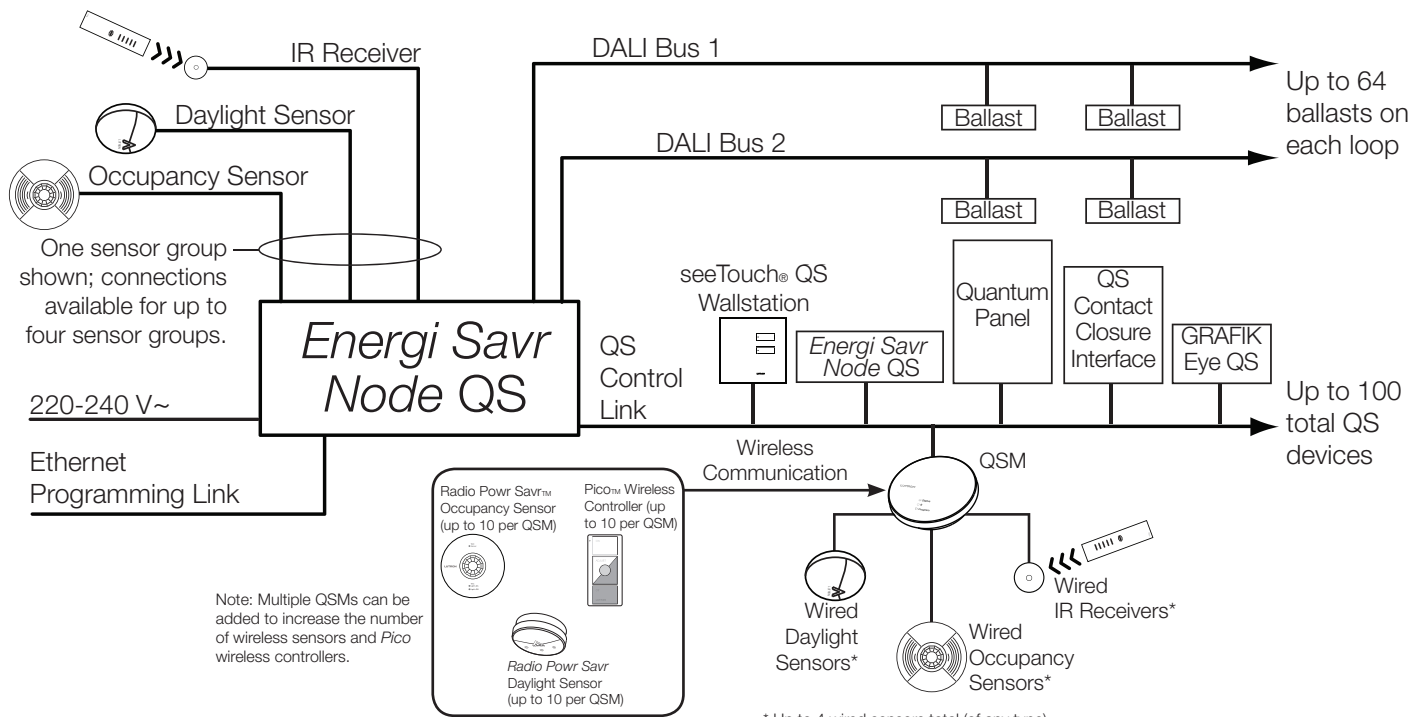
The *Energi Savr Node QS* unit is a DIN-rail mounted controller for DALI-compliant Digital Addressable loads. It provides DALI bus power and control for two independent DALI Buses with up to 64 ballasts each. The *Energi Savr Node QS* unit also provides direct connections and power for the following Lutron® devices:

- Occupancy sensors
- Daylight sensors
- IR receivers
- QS devices



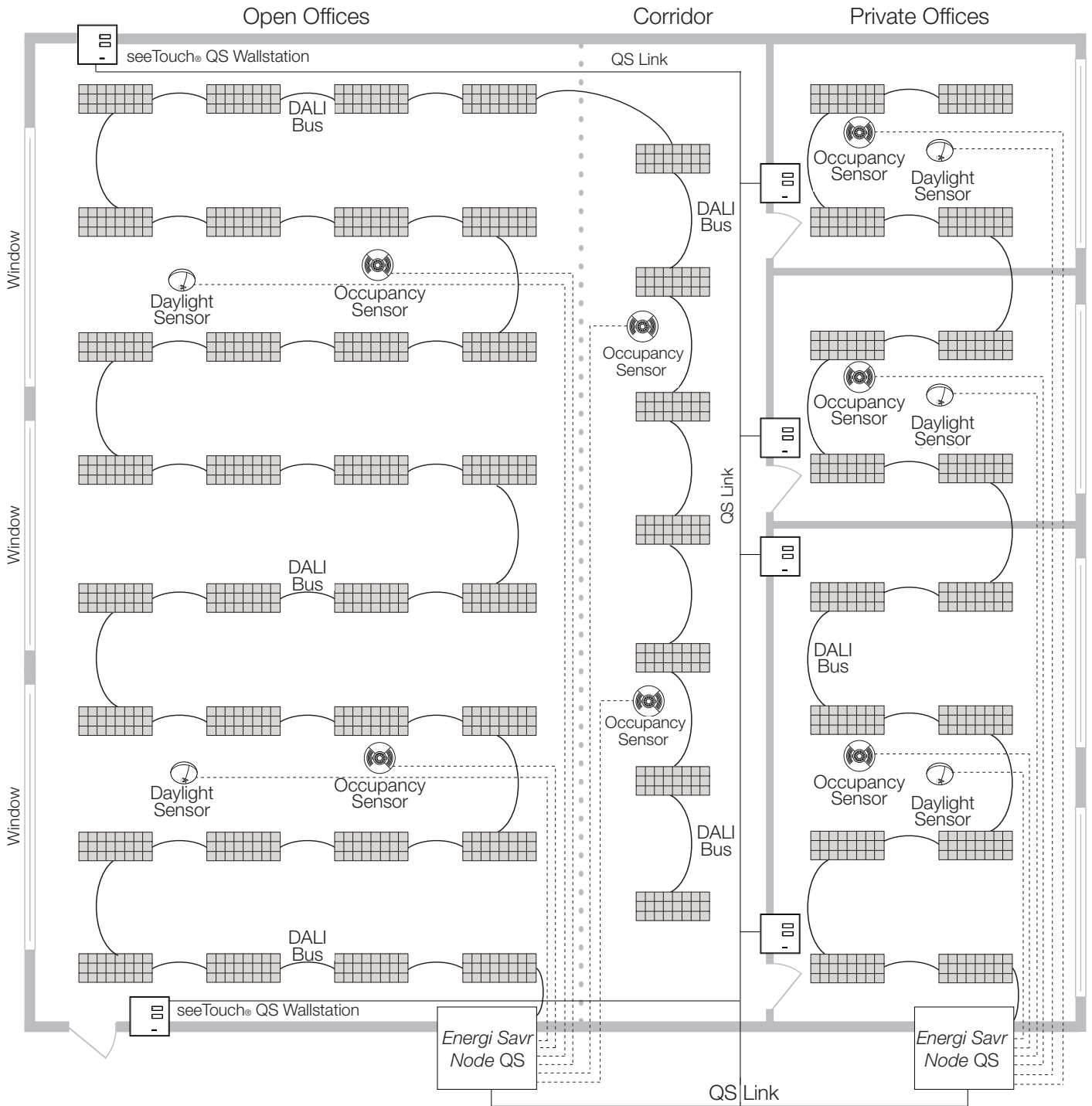
Features

- Provides power for either one or two buses of DALI compliant digital addressable loads (up to 250 mA per bus).
- Each DALI Bus can control a maximum of 16 zones.
- Power failure memory retains control unit programming in the event of a power loss.
- Default configuration requires no commissioning.
- Programming available via the *Energi Savr Node QS* hand-held device.
- Four occupancy sensor inputs for automated control of lights in areas.
- Four daylight sensor inputs automatically adjust light levels based on the amount of natural light entering through the windows.
- Four IR receiver inputs for personal control.
- Add more occupancy sensors, daylight sensors, or IR receivers by connecting QS Sensor Modules (QSMs).
- Includes QS control link for seamless integration of lights, motorized window treatments, control stations, and QS Sensor Modules.
- *Energi Savr Node QS* units and QS Sensor Modules can be used in a Quantum® system to control and manage light in an entire building.



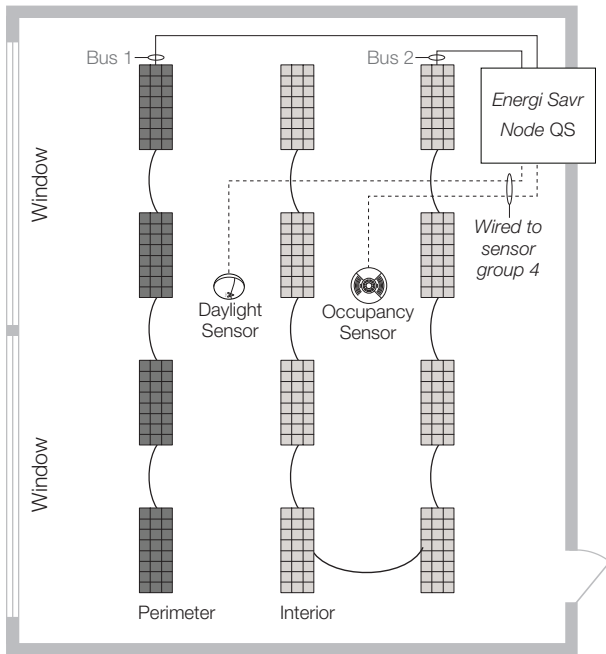
Job Name:	Model Numbers:
Job Number:	

Typical Application: Requires commissioning



Job Name:	Model Numbers:
Job Number:	

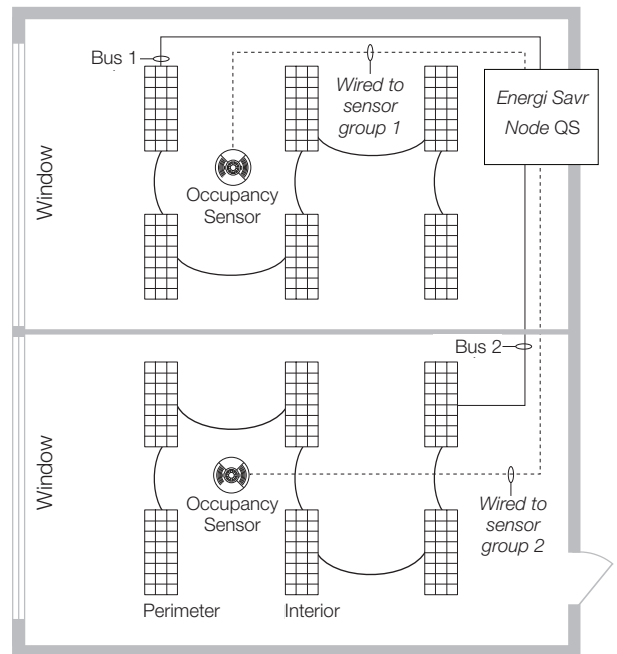
Simple Applications: Preconfigured modes require no commissioning



Preconfigured Mode 1

Perimeter Daylighting

* Four fixtures shown on Bus 1 and eight fixtures shown on Bus 2, however, up to 64 fixtures can be connected per bus.



Preconfigured Mode 2

Two Zones with Occupancy Sensors

* Six fixtures shown on each bus, however, up to 64 fixtures can be connected per bus.

Default Behavior for Sensor Connections

	Occupancy Sensor	Daylight Sensor
Connected to sensor group 1	Controls Bus 1 only	Controls Bus 1 only
Connected to sensor group 2	Controls Bus 2 only	Controls Bus 2 only
Connected to sensor group 3	Controls both Buses	Controls both Buses with equal daylight gain
Connected to sensor group 4	Controls both Buses	Controls both Buses with lower daylight gain on Loop 2

Troubleshooting and Maintenance Features

- Maintains redundant memory of ballast programming for ease of single or multiple ballast replacement.
- After installation, "TEST" button verifies DALI wiring on all fixtures
- Status LEDs verify connections to control stations and sensors.
- After installation, *Energi Savr Node QS* unit identifies ballast communication failures.

Job Name:	Model Numbers:
Job Number:	

Specifications

Energi Savr Node QS

Power

- 220-240 V \sim 50/60 Hz, max current draw 100 mA
- Lightning strike protection meets ANSI/IEEE standard 62.31-1980. Can withstand voltage surges of up to 6 000 V \sim and current surges of up to 3 000 A.
- DALI Bus Output: 18 V \equiv 250 mA maximum per bus.

Standards

- IEC 60669-2-1
- Lutron® Quality Systems registered to ISO 9001.2000

Environment

- Ambient Temperature Operating Range: 0 °C to 40 °C
- Relative humidity: less than 90% non-condensing
- For indoor use only

Terminals

- Mains wiring: 1,0 mm² to 4,0 mm² (18 AWG to 12 AWG)
- DALI Bus Wiring: 1,0 mm² to 4,0 mm² (18 AWG to 12 AWG)
- Sensor Wiring: 1,0 mm² to 2,5 mm² (18 AWG to 14 AWG)

Mounting

- Mounts to standard DIN rail
- Width = 9 modules (161,7 mm)

DALI Buses

- Up to 64 DALI compliant loads on each bus can be addressed and grouped into 16 zones
- *Energi Savr Node QS* unit supplies 250 mA to power each bus.
- DALI Bus wires are polarity insensitive and topology-free.

QS Link Limits

- The QS link can have up to 100 devices and 100 zones.
- Each *Energi Savr Node QS* unit counts as one device toward the 100 device limit.
- Each assigned zone counts toward the 100 zone limit.
- See Table 1 (page 6) for device details.

Occupancy Sensors Connected to the *Energi Savr Node QS* unit

- Use occupancy sensors to automatically turn the lights off in an area a fixed time after it becomes vacant.
- Use occupancy sensors to automatically turn the lights on in area when it becomes occupied and to automatically turn the lights off in an area a fixed time after it becomes vacant.
- Four occupancy sensors can connect directly to the *Energi Savr Node QS* unit.
- Each area's occupied level and unoccupied level can be programmed.
- Power Supply Outputs (4)
 - 20-24 V \equiv 50 mA maximum.
 - An auxiliary power supply must be used if the device requires more than 50 mA.
- Occupancy sensor must provide a dry contact closure or solid-state output.

Daylight Sensors Connected to the *Energi Savr Node QS* unit

- Lutron daylight sensors allow daylight harvesting with programmable gain settings in up to four gain groups per area.
- Four daylight sensors can connect directly to the *Energi Savr Node QS* unit.

Infrared Receivers Connected to the *Energi Savr Node QS* unit

- Use *Lutron* IR receivers for personal control of individual lighting zones.
- Four IR receivers can connect directly to the *Energi Savr Node QS* unit.

Job Name:	Model Numbers:
Job Number:	

Specifications (continued)

QSM (QS Sensor Module) - Integrating Wired and Wireless Sensors

- Use the QSM to integrate Radio Powr Savr™ Occupancy/Vacancy sensors, *Radio Powr Savr* Daylight sensors, and Pico™ Wireless Controllers to control zones on the *Energı Savr Node* QS unit.
- Assign up to 10 *Radio Powr Savr* Occupancy/Vacancy sensors per *Energı Savr Node* QS unit via QSM.
- Assign up to 10 *Radio Powr Savr* Daylight sensors per *Energı Savr Node* QS unit via QSM.
- Assign up to 10 *Pico* Wireless Controllers per *Energı Savr Node* QS unit via QSM.
- Add additional wired and wireless sensors by adding QS Sensor Modules to the QS link.
- Wire and power up to 4 wired sensors (of any type) total
 - Daylight sensors
 - Occupancy sensors
 - Infrared (IR) sensors
- The *Radio Powr Savr* sensors and *Pico* Wireless Controllers associated with the QSM should be mounted within 60 ft (18 m) line of sight, or 30 ft (9 m) through walls, of the QSM.
- Refer to QSM Specification Submittal for more information.

Accessory Controls

- seeTouch® QS wallstations can be configured to control *Energı Savr Node* QS unit zones.
- Select one of 16 scenes and off in *Energı Savr Node* QS unit areas.
- Control individual lighting zones in *Energı Savr Node* QS unit areas.
- Each *Energı Savr Node* QS unit can power up to three seeTouch QS controls.
- LED indicator displays the status of programmed lights.

Communication with GRAFIK Eye® QS

- *Energı Savr Node* QS unit zones respond to *GRAFIK Eye* QS scene buttons in areas associated with the *GRAFIK Eye* QS.
- *Energı Savr Node* QS unit zones respond to scene commands initiated by the *GRAFIK Eye* QS astronomic time clock in areas associated with the *GRAFIK Eye* QS.
- *Energı Savr Node* QS unit operates in afterhours mode in areas associated with a *GRAFIK Eye* QS that is in afterhours mode.

Communication with QSE-IO

- *Energı Savr Node* QS unit zones respond to scene commands initiated by the QSE-IO in scene selection mode or occupancy sensor mode.

Job Name: Job Number:	Model Numbers:
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QS System Limits

The table below lists the devices available on the QS link. See below for each device's count toward the link maximums for zones and devices.

A QS link can have up to 100 zones (outputs) and 100 devices. *Energı Savr Node* QS unit can supply 3 power draw units.

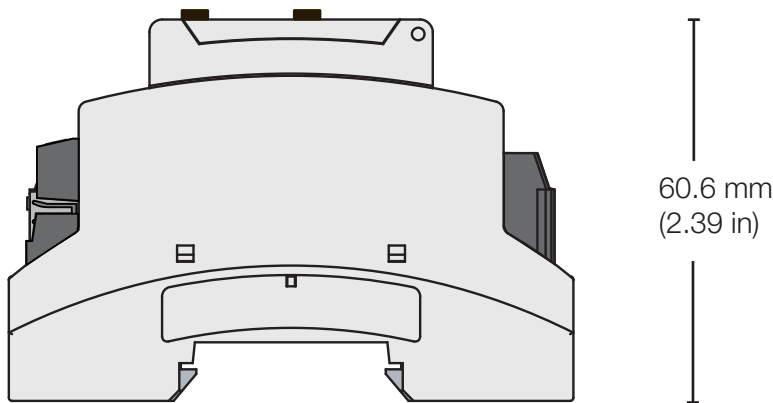
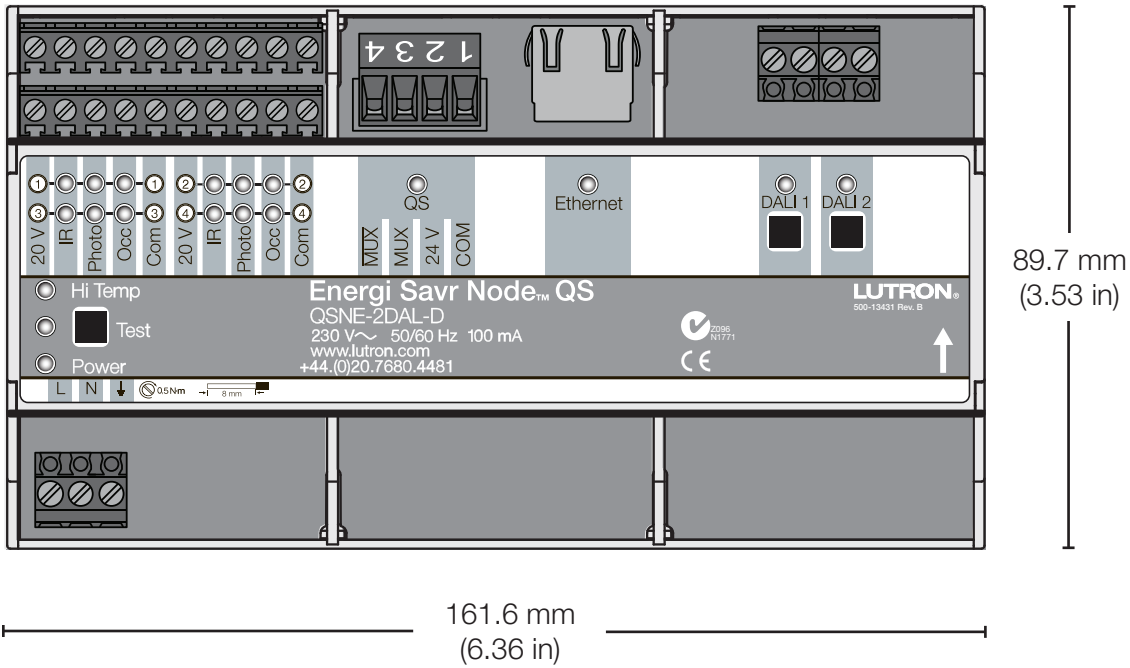
Table 1: QS System Limits

QS Device Description	Zone Count	Device Count	Power Draw Units (supplied)	Power Draw Units (consumed)
<i>Energı Savr Node</i> QS DALI QSNE-2DAL-D	up to 32	1	3	0
QS Sensor Module	0	1	0	3
Lutron® Occupancy Sensor (connected to QS Sensor Module)*	0	0	0	2
Lutron Daylight Sensor (connected to QS Sensor Module)*	0	0	0	0.5
Lutron Infrared (IR) Receiver (connected to QS Sensor Module)*	0	0	0	0.5
3-zone GRAFIK Eye® QS	3	1	3	0
4-zone GRAFIK Eye QS	4	1	3	0
6-zone GRAFIK Eye QS	6	1	3	0
6-zone GRAFIK Eye QS with DALI	6	1	3	0
8-zone GRAFIK Eye QS with DALI	6	1	3	0
16-zone GRAFIK Eye QS with DALI	6	1	3	0
seeTouch® QS	0	1	0	1
QS contact closure interface	up to 5	1	0	3
QS network interface for audio-visual integration	0	1	0	2
QS link power supply	0	0	8	0

***Note:** Power draw units are consumed by Occupancy Sensors, Daylight Sensors, and IR Receivers only if connected to the QS Sensor Module (QSM). Power draw calculations are not needed for wireless sensors or sensors connected directly to the *Energı Savr Node* QS units.

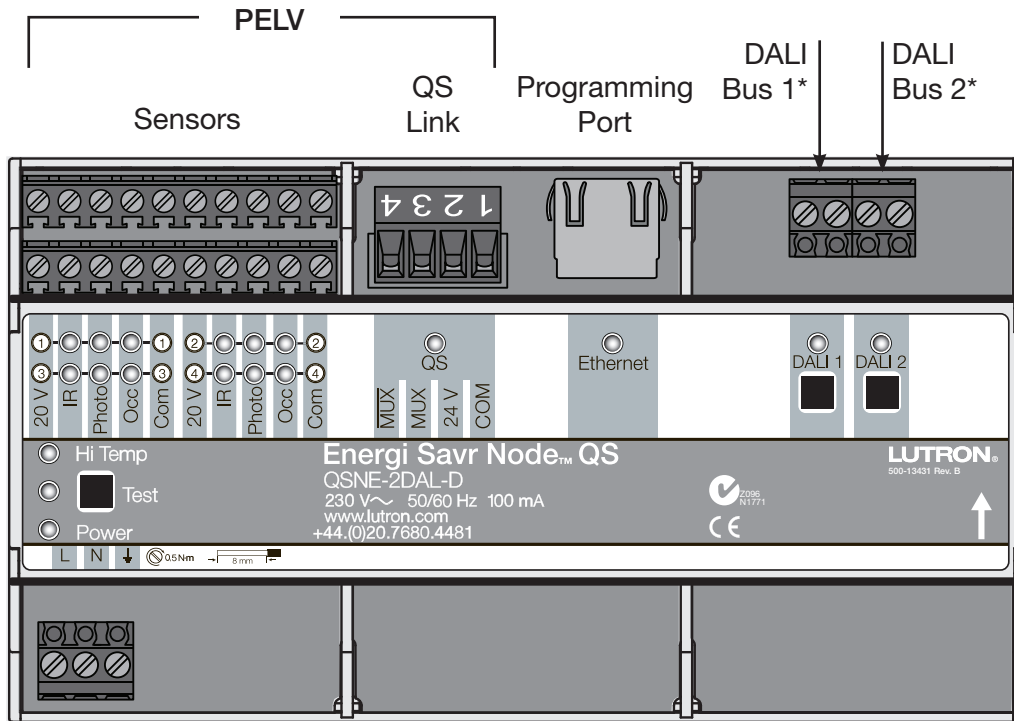
Job Name:	Model Numbers:
Job Number:	

Mechanical Dimensions



<p>Job Name:</p> <p>Job Number:</p>	<p>Model Numbers:</p>
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Overview of Wiring Terminals

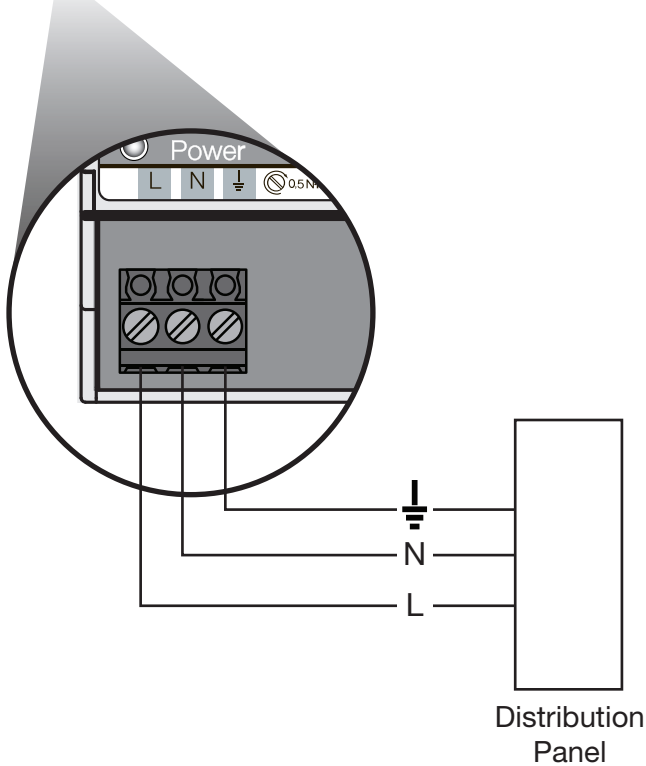
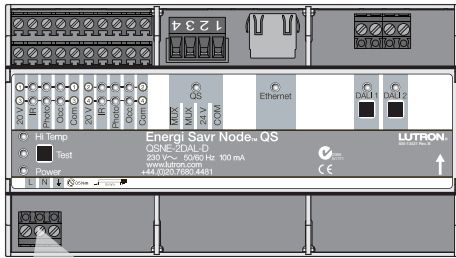


Mains
Wiring

* Wire DALI according to local codes.

Job Name:	Model Numbers:
Job Number:	

Wiring: Line Voltage



Wiring from Distribution to Bus Supply

- Turn off breaker at distribution panel.
- Run line, neutral, and ground wires from a 220-240 V~ 50/60 Hz feed to the *Energi Savr Node QS* unit.

Emergency Lighting Applications

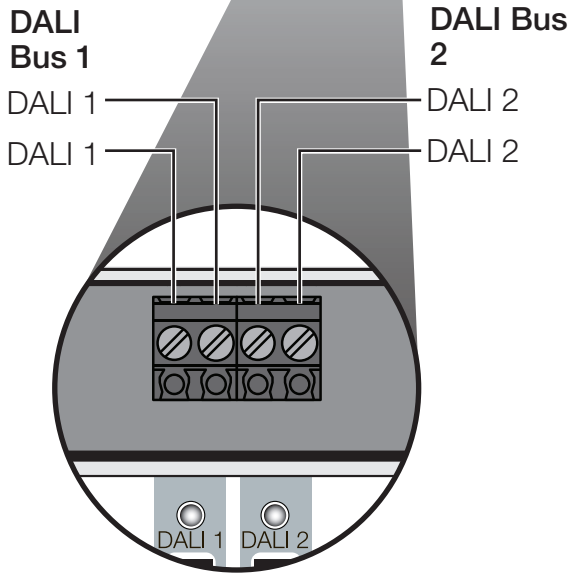
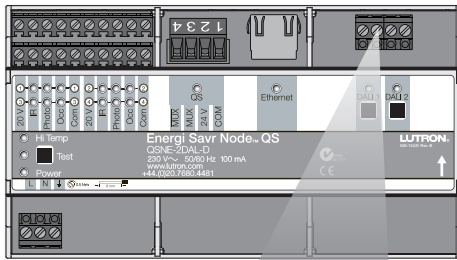
- Use normal (non-essential) power only.
- When normal power drops out, the *Energi Savr Node QS* unit will not power the DALI Buses. When this occurs, ballasts powered from emergency feeds go to their emergency mode, full light output by default.

Mains Wiring and Low Voltage Separation

- The *Energi Savr Node QS* unit is designed to separate mains wiring from PELV circuits.
- Follow appropriate local and national codes to avoid violating required separation guidelines.

Job Name:	Model Numbers:
Job Number:	

Wiring: DALI Bus



The *Energi Savr Node QS* unit will supply power to an independent DALI Bus, which supports a maximum of 64 ballasts.

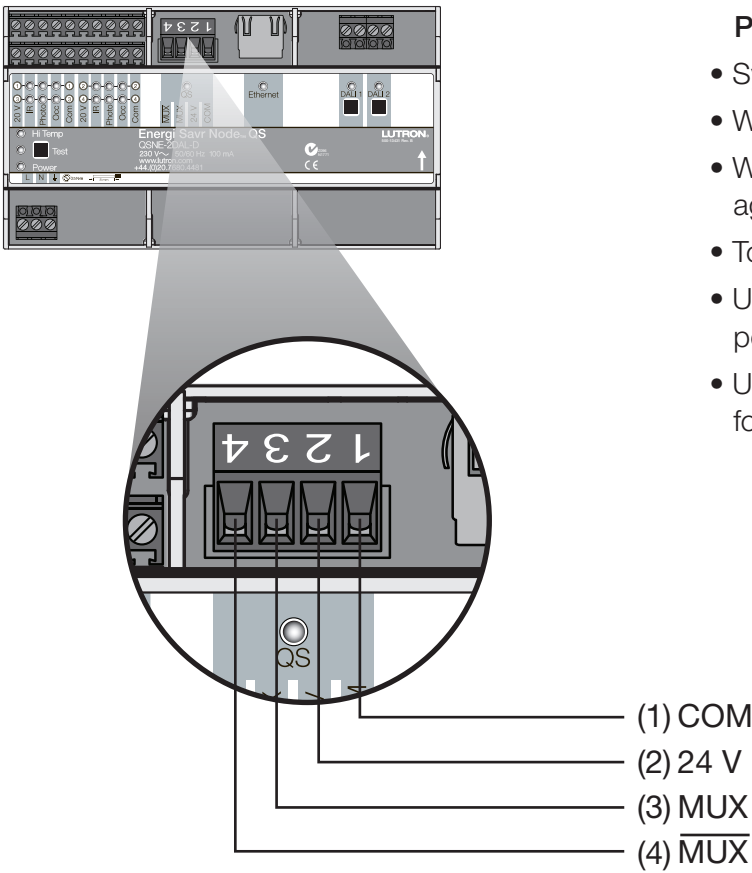
DALI Wiring

- DALI wiring is not SELV.
- DALI wiring is treated as mains voltage, and thus may be run within the same sheathing.
- Ensure that there is no greater than a 2 V drop between the *Energi Savr Node QS* unit and the end of the DALI Bus.
- Consult all national and local electrical codes for separation requirements.

Wire Gauge	Maximum DALI-compliant Bus Wire Length
4,0 mm ² (12 AWG)	671 m (2 200 ft)
2,5 mm ² (14 AWG)	427 m (1 400 ft)
1,5 mm ² (16 AWG)	275 m (900 ft)
1,0 mm ² (18 AWG)	175 m (570 ft)

Job Name:	Model Numbers:
Job Number:	

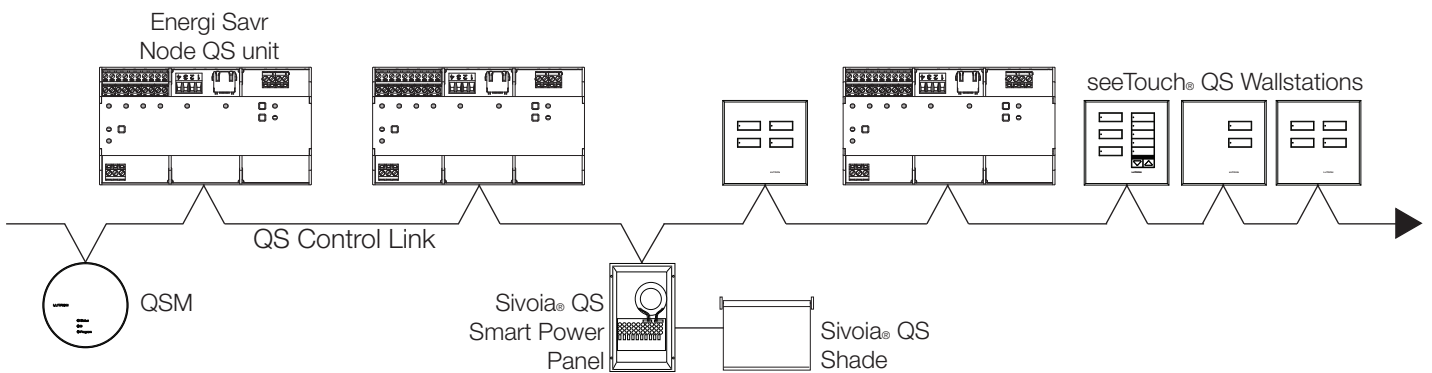
Wiring: QS Control Link



PELV QS System Low-Voltage Wiring

- System communicates using low-voltage wiring.
- Wiring may be daisy chained or t-tapped.
- Wiring must be run separate from line/mains voltage.
- Total length of control link must not exceed 600 m.
- Use two 1,0 mm² (18 AWG) conductors for control power (24 V, COM).
- Use one, twisted-shielded pair of 1,0 mm² (18 AWG) for data link (MUX, MUX).

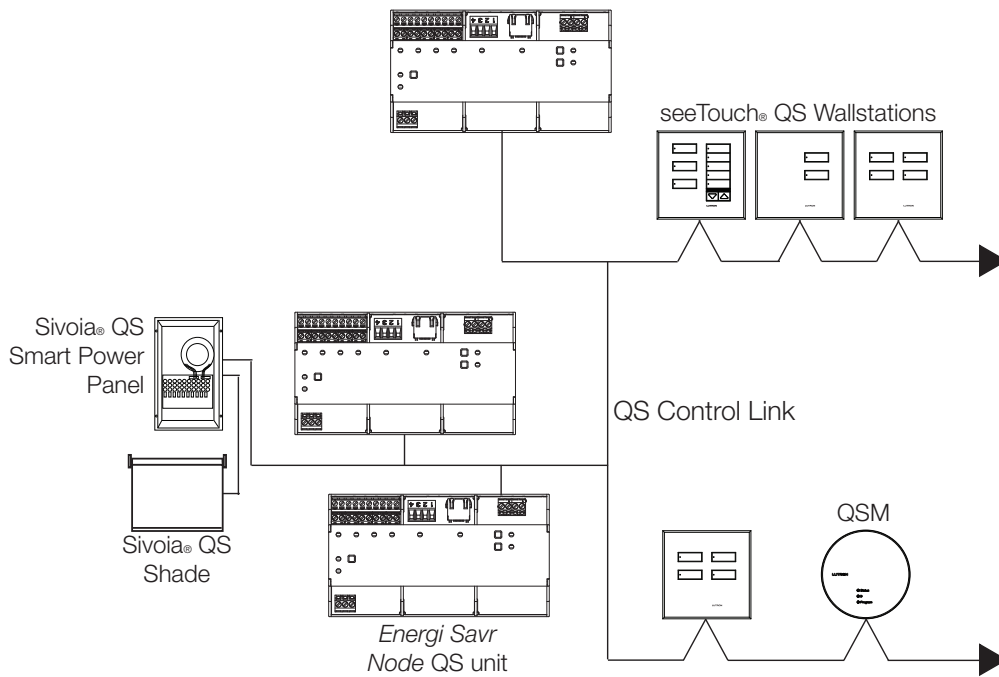
Daisy-Chain Wiring Example



Job Name:	Model Numbers:
Job Number:	

Wiring: QS Control Link (continued)

T-Tap Wiring Example

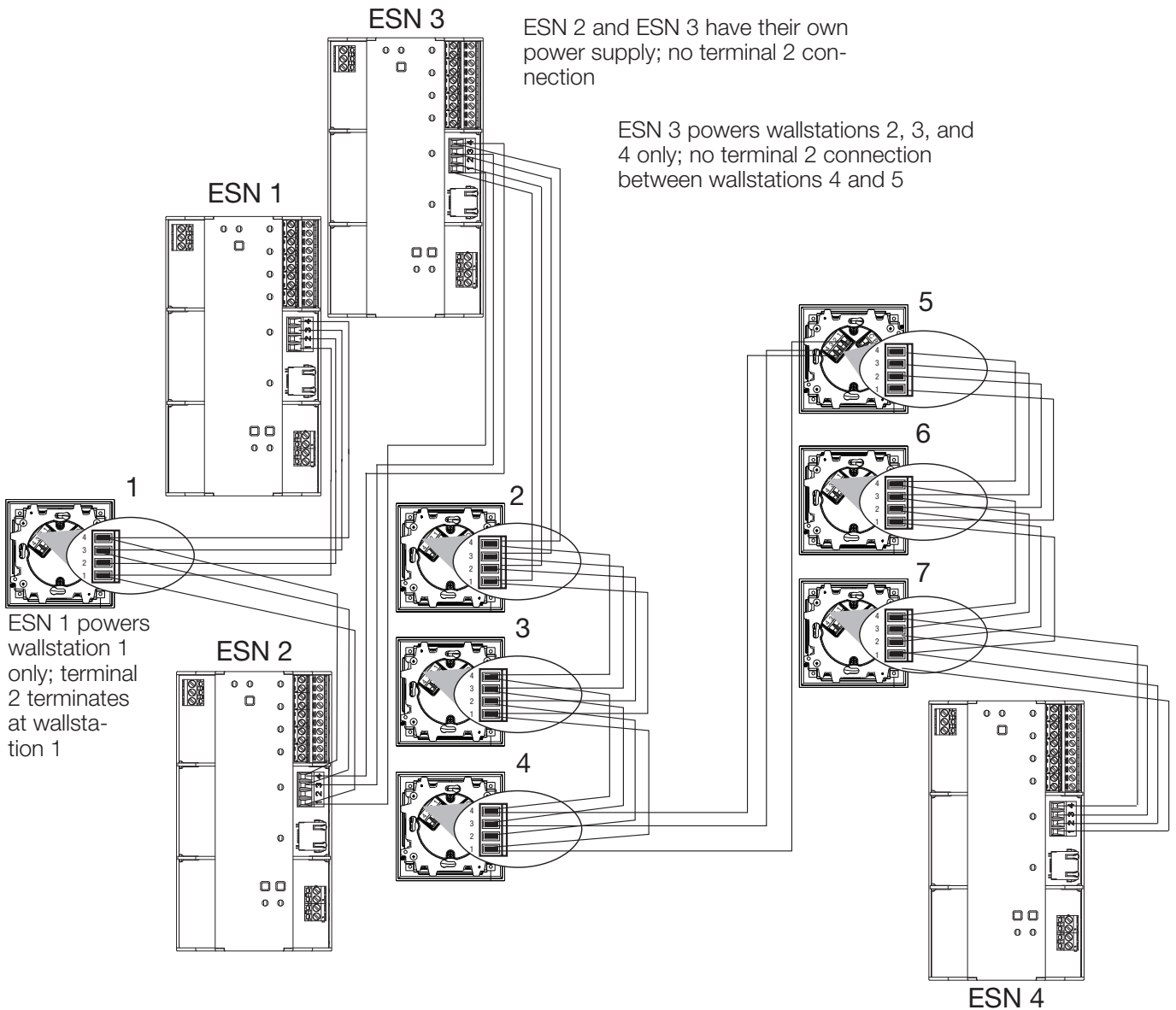


Job Name:	Model Numbers:
Job Number:	

Wiring: QS Control Link (continued)

Low-Voltage Wiring Example

ESN = *Energi Savr Node* QS unit



- Connect the terminal 1, 3, and 4 connections to all control interfaces.
- Each control unit has its own power supply. Terminate the terminal 2 connection (24 V power) so that each control unit supplies power to a maximum of three wallstations. Do not connect terminal 2 between an *Energi Savr Node* QS unit and any other *Energi Savr Node* QS unit and/or another power supply.
- Each wallstation should receive power from only one unit.

ESN 4 powers wallstations 5, 6, and 7 only; no terminal 2 connection between wallstations 4 and 5

Job Name:	Model Numbers:
Job Number:	

Wiring: Class 2 Sensors

Electrical Contractors and Engineers

- All sensor wiring is PELV. Follow all applicable national and local codes for proper circuit separation and protection.
- Class 2 sensor terminals accept 1.0 - 2.5 mm² (18 - 14 AWG) solid conductors.
- Mains voltage and PELV wiring must be kept separate.

Wiring Instructions:

- Turn off breaker at distribution panel.

Daylight Sensor:

- Connect the four conductors to the four terminals as shown.
- Terminals:
 - Red = 20 V
 - Black = Common
 - White = IR
 - Yellow = Daylight
- Daylight Sensor must be placed within 30 m of the *Energi Savr Node QS* unit.

NOTES:

- One daylight sensor can be wired to each sensor group.
- Consult the daylight sensor specification sheet to properly locate the sensor.
- Do not place the sensor above pendants, fixtures, directly below lighting fixtures, or within skylight wells.

Occupancy Sensor:

- Connect three conductors to three terminals as shown.
- One occupancy sensor can be wired to each sensor group.

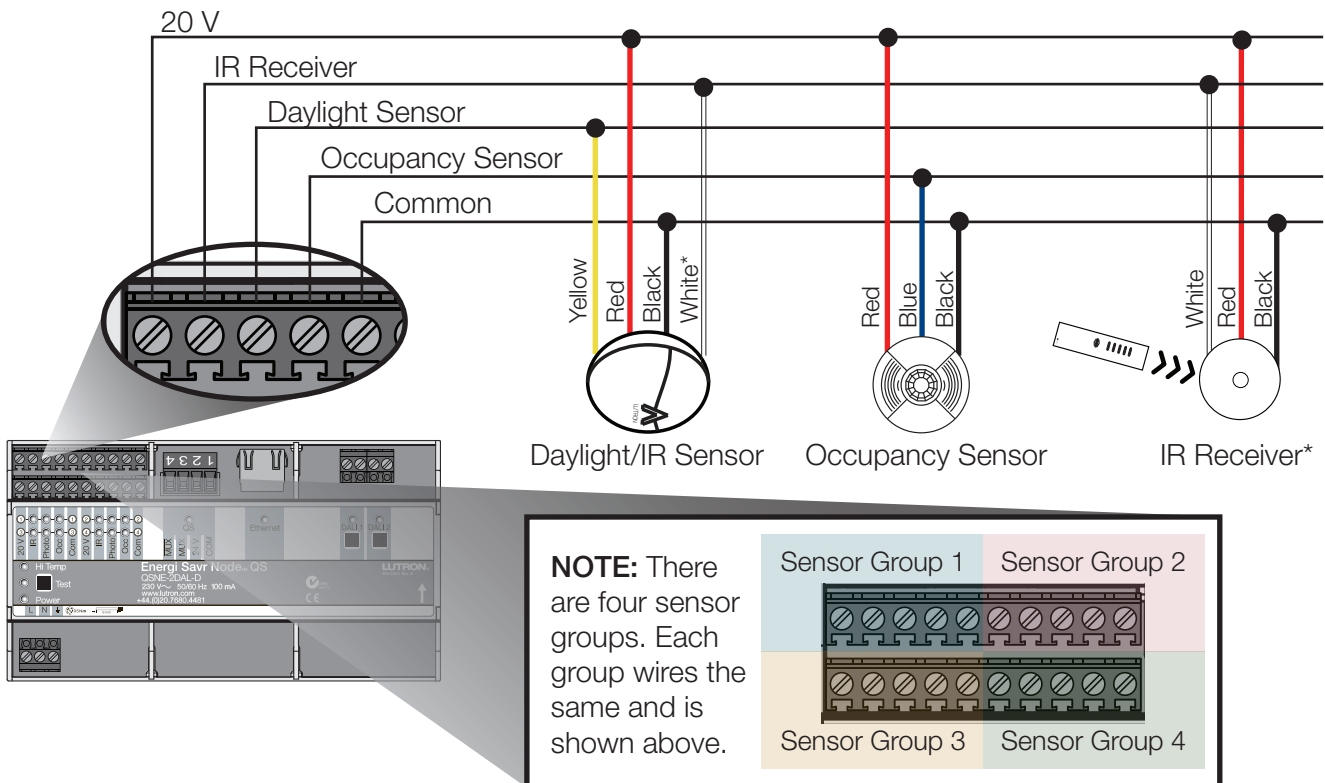
IR Receiver:

- Connect the three conductors to the three terminals as shown.
- Receiver must be placed within 30 m of the *Energi Savr Node QS* unit.

NOTES:

- One IR Receiver can be wired to each sensor group.

* If a daylight sensor and IR receiver are connected, do not connect the daylight sensor's IR output (white wire).



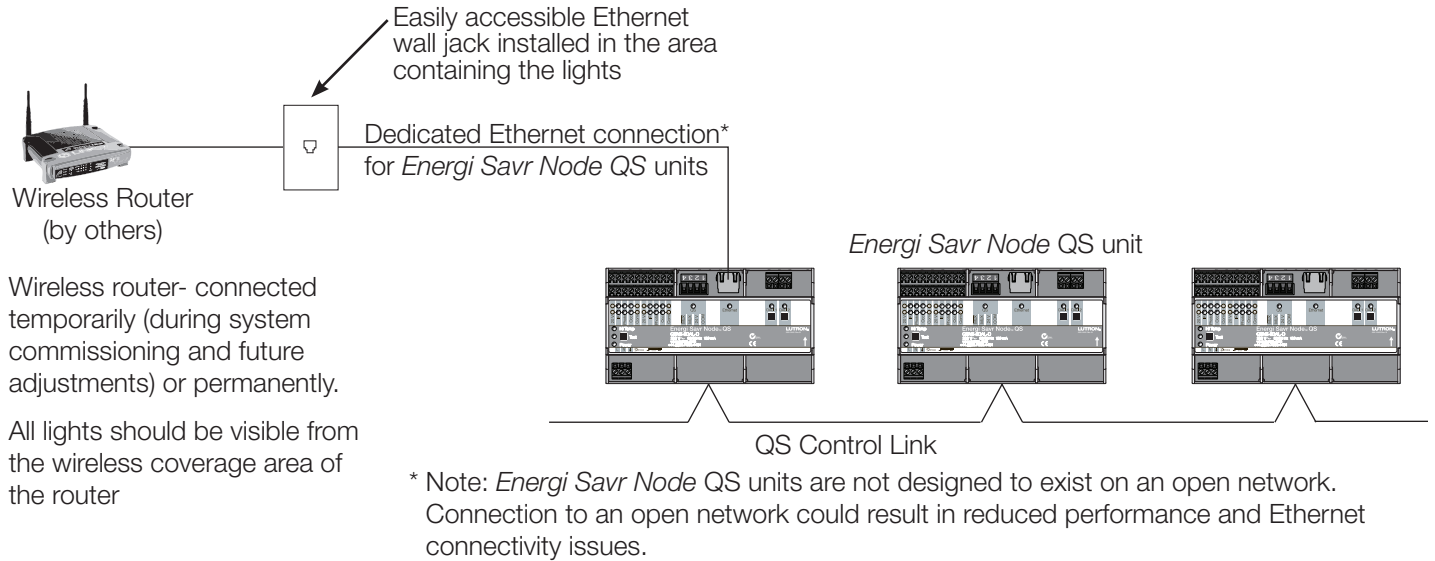
Job Name:	Model Numbers:
Job Number:	

Installation of Programming Connection

- The *Energi Savr Node QS* Hand-Held Device is used to program *Energi Savr Node QS* units in installations requiring commissioning.
- Connection to the system is made via Wi-Fi through a wireless router as shown below.
- It is recommended that the person programming the system is able to see all of the lights during the programming process.

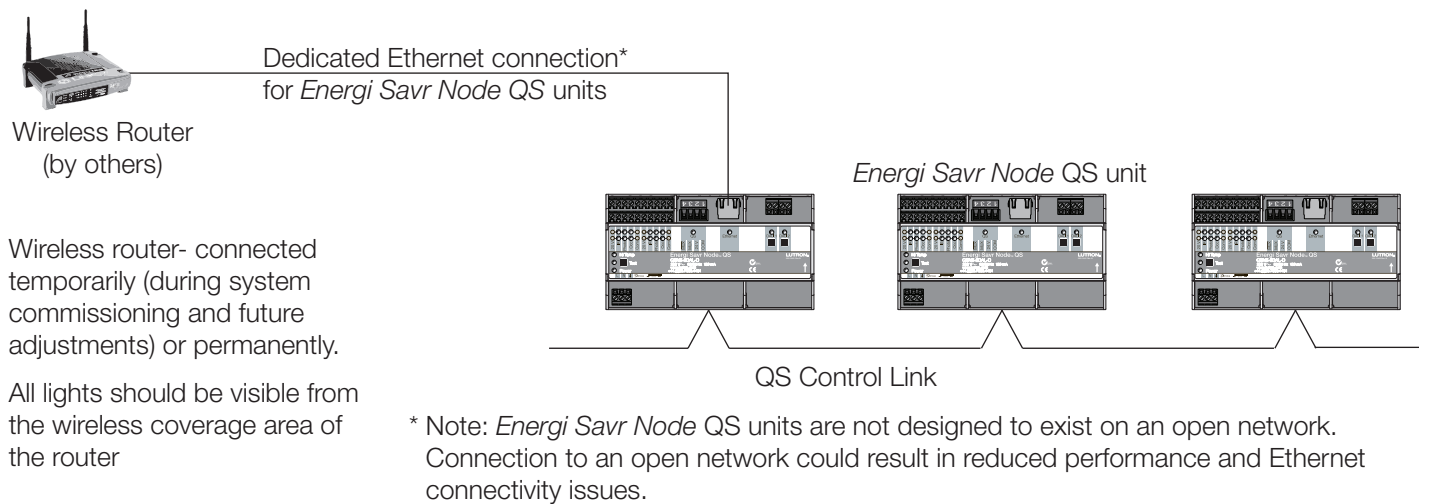
NOTE: Ethernet programming connection not used when the *Energi Savr Node QS* unit is part of a Quantum® system.

Recommended: Install Wall Jack for Commissioning



Alternate Approach: Router connected directly to the *Energi Savr Node QS* unit

- If *Energi Savr Node QS* unit is accessible and located such that lights are visible from the Wi-Fi coverage area, then the wireless router can be connected directly to *Energi Savr Node QS* unit as shown below.



Job Name:	Model Numbers:
Job Number:	