Specification Submittal Quick Links

Front End

QS-A-CMP-DBO-0

Desktop (Not Provided by Lutron)

QS-A-CMP-SBO-0

Standard server for Quantum/Vive (Not Provided by Lutron)

QS-EO

Shared Ethernet Network (Not Provided by Lutron)

Processor Panels

QP3-1PL-100-240

Lighting Management Hub with One Quantum Processor

Licenses

QSW-BAC-PP-A

Q-Admin BACnet Software License

QSW-MC-PS-A

Quantum Mobile Control and Programming Software License (iPad Not Provided by…

QSW-QVS-L

Quantum Lights software license allows for control, monitoring and programming of lig…

QSW-RPT-PP-A

Quantum Reporting software license

LUTRON
7200 Suter Road
Coopersburg, PA 18036, USA
+1.610.282.3800 | Fax: +1.610.282.1146

Project Name: Hotel Hartness | **Location:** Greenville, South Carolina

Quotation Number: | **Created by:** Mitch Lee | **Document Revision:**

Specification Submittal Quick Links

Panels

CCP-1X2L1T-1204ML-20-CGP472

Standard CCP Panel (60" H, 16" W, 4" D): 120V, 20A, 3-phase, 4-wire with 1-link circ…

CCP-2L7A-1204ML-20-CGP914

Standard CCP Panel (60" H, 16" W, 4" D): 120V, 20A, 3-phase, 4-wire with 1-link circ…

CCP-2X5A3T-120FT-CGP645

Standard CCP Panel (60" H, 16" W, 4" D): 120V, feed-through with 1-link circuit select…

CCP-4X1A5T-1204ML-20-CGP472

Standard CCP Panel (60" H, 16" W, 4" D): 120V, 20A, 3-phase, 4-wire with 1-link circ…

Panels

CCP-5A-1204ML-20-CGP914

Standard CCP Panel (60" H, 16" W, 4" D): 120V, 20A, 3-phase, 4-wire with 1-link circ…

CCP-5X10T-1204ML-20-CGP472

Standard CCP Panel (60" H, 16" W, 4" D): 120V, 20A, 3-phase, 4-wire with 1-link circ…

CCP-5X9T-1204ML-20-CGP472

Standard CCP Panel (60" H, 16" W, 4" D): 120V, 20A, 3-phase, 4-wire with 1-link circ…

CCP-6A-120FT-CGP645

Standard CCP Panel (60" H, 16" W, 4" D): 120V, feed-through with 1-link circuit select…

ESN Panels

QSN-2ECO-S

EcoSystem Energi Savr Node with 2 EcoSystem Digital Link

QSN-4S20-S

Energi Savr Node Softswitch

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Specification Submittal Quick Links

QSMs

QSM2-4W-C

QS Sensor Module wired and wireless inputs

Controls

IPAD

Link not available

Custom Device

MS-Z101-V-WH

120- 277 V, 8 A Maestro 0-10 V Dimmer with XCT, PIR vacancy sensor, neutral wire re…

QSGRJ-16E-WH

GRAFIK Eye QS Wireless 16 zone with EcoSystem

QSGRJ-6E-WH

GRAFIK Eye QS Wireless 6 zone with EcoSystem

Controls

QSGRJ-8E-WH

GRAFIK Eye QS Wireless 8 zone with EcoSystem

QSWS2-5BRLI-WH

seeTouch QS Insert 5 Button with Raise/Lower

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Specification Submittal Quick Links

Sensors

GRX-IRPS-WH

GRAFIK Eye Ceiling Mount Partition Sensors (Infrared Transmitter/Receiver Pair)

LOS-CDT-2000R-WH

Ceiling Mount Dual Technology Self Adaptive Occupancy Sensor 2000 sq.ft. with additio…

Interfaces

GRX-TVI

GRX-TVI Control Interface (Phase Control to 0-10 V)

LUT-ELI-3PH

Emergency Lighting Interface

LUT-LBX-WH

A simulated load to the dimmer to meet the minimum load requirements

PHPM-PA-120-WH

Phase Adaptive Power Module (120 V)

Interfaces

QSE-CI-NWK-E

QS Ethernet & RS232 Control Interface

QSE-IO

QS Contact Closure Input/Output Control Interface

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Specification Submittal Quick Links

Power Supplies

GRX-12VDC

12 V DC Plug-in Class 2 Transformer

QSPS-DH-1-75

DIN Rail Power Supply can supply up to 75 PDUs on a QS link.

QSPS-J-1-35V

J-Box Power Supply can support one shade or supply up to 8 PDU's on a QS Link.

Accessories

CW-1-WH

Link not available

Claro Wallplate

CW-2-WH

Link not available

Claro Wallplate-2 Gang

LTR-F15-TR-WH

New Architectural 15 A duplex receptacle

Warranty and Services

LSC-OS-PST-QTM

Lutron will provide a pre-wiring inspection, an on-site technician during startup, and a visit…

LSC-PREWIRE

Link not available

Pre-wire Visit – An onsite visit with the Electrical Contractor to discuss logistical c…

LSC-AF-VISIT

Onsite Scene and Level Tuning – A visit to make lighting adjustments per the direction…

LSC-B2

Commercial Systems 2-Year Limited Warranty – A 2-year warranty providing 100% replace…

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Specification Submittal Quick Links

Warranty and Services

 LSC-BALLASTCOUNT Link not available Approximate number of digital ballasts/drivers controlled by the system.	

Q-Manager Desktop PC by Others

The Q-Manager desktop PC by others is a dedicated desktop PC used to run the Quantum light management software. Optionally, it can be used as a client PC to run the Quantum Vue application.

Quantum Vue allows the operator to control the Quantum system, monitor system status, and run system reports.

During system start-up, the Lutron field engineer will install the Q-Manager software on the desktop. The customer's IT department staff must be available on-site to assist with this process.

The desktop is dedicated for Lutron Quantum software only.

Enterprise Vue is only compatible with Server Hardware/OS. For more information see the Enterprise Vue Spec Submittal (P/N 3691076) at www.lutron.com

Minimum Hardware Configuration Required

- Processor: Intel Core® i7 (4 cores, 8 threads 2.5 GHz) or AMD® equivalent
- 16 GB RAM
- 500 GB SSD
- Screen with minimum 1280 x 1024 resolution
- 100 MB Ethernet network interface for communication to Quantum processors or the Quantum server (if used as a client PC)

Software Required

- Microsoft® Internet Information Services (IIS) 7 or later (for Quantum Vue)
- Microsoft® Internet Explorer® 9 or later
- Microsoft® .NET Framework 3.5
- Microsoft® .NET Framework 4.5 (Quantum 3.0 and 3.1)
- Microsoft® .NET Framework 4.6.1 (Quantum 3.2 and newer)

For more information on system and network configurations see the Lutron IT Implementation Guide: (P/N 040423) at www.lutron.com

Microsoft® SQL & OS Required for Each Quantum Version

Quantum Version	Microsoft® SQL Version	Microsoft® OS Version
1.5 - 1.9	SQL 2005 Express (default) SQL 2005 Full (requires custom installation)	Windows® XP Pro (32-bit)
2.0 - 2.7	SQL 2005 Express (default) SQL 2005 Full (requires custom installation)	Windows® XP Pro (32-bit) Windows® 7 Professional (32 or 64-bit)
3.0	SQL 2012 Express (default) SQL 2012 Full (requires custom installation)	Windows® 7 Professional (64-bit) Windows® 8 Professional (64-bit) Windows® 8.1 Professional (64-bit)
3.1 - 3.2	SQL 2012 Express (default) SQL 2012 Full (requires custom installation)	Windows® 7 Professional (64-bit) Windows® 8 Professional (64-bit) Windows® 8.1 Professional (64-bit) Windows® 10 Professional (64-bit) Windows® 10 Enterprise (64-bit)
3.4	SQL 2017 Express (default) SQL 2017 Full (requires custom installation)	Windows® 8 Professional (64-bit) Windows® 8.1 Professional (64-bit) Windows® 10 Professional (64-bit) Windows® 10 Enterprise (64-bit)

Job Name:	Model Numbers:	
Hotel Hartness	QS-A-CMP-DBO-0	
Job Number:		

Considerations for Customer-Supplied Computers

- Lutron Field Service will install the purchased Lutron software on one computer only, at the time of commissioning. Customer must have available:
  - The working computer that meets the minimum Lutron specification
  - The original Windows® installation disks
  - All driver disks for the customer-supplied computer
  - Administrative rights for the customer-supplied computer
  - An IT representative
- Computers that meet the minimum specification but cannot be configured by Field Service (maximum on-site configuration time is limited to 4 hours) will require a connection to the Internet for remote access from a Lutron services company representative (additional charges may apply)
- If remote access is not available, the computer must be shipped (using an insured shipment) by the customer, at the owner's risk and expense, to Lutron for Lutron software installation. The computer must be shipped with the correct operating system disk and all driver disks. A 4 week lead-time will apply to any computers shipped to Lutron. To cover the Lutron troubleshooting, an additional 4 hour service charge will apply. Computers supplied by the customer are not covered by a Lutron warranty
- Once configured by Lutron, the computer must be used for Lutron lighting control only and cannot be used for other applications
- Lutron reserves the right to ask the customer to reformat the customer's computer and reload the operating system to rectify any installation issues
- Any Lutron software upgrades can only be loaded on computers that have been unaltered after the initial Lutron configuration. Otherwise, additional charges will apply
- When the Quantum software suite is hosted on a desktop PC, the software is designed to be used locally on the PC. Remote connection to the PC from another PC or tablet is not supported
- When the Quantum software suite is hosted on a computer running a server-grade operating system, a laptop, desktop PC or tablet can connect to the server using a web browser. In these cases, Lutron recommends following the guidelines in QS-A-CMP-SBO-0 for machines that will function as servers

Software Updates/Patches

- Note that Lutron will not be responsible for maintenance, security and software patching of the machine.
- Lutron recommends that the machine is installed and maintained as part of the customer's IT infrastructure and involve the customer's IT department in the patching, security and maintenance of the machine.

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Q-Manager Standard Server by Others

The Q-Manager standard server is a dedicated server for a Quantum system or Vive system with Vive Vue. It is used to collect and record data from the Quantum or Vive systems.

During system start-up, the Lutron field engineer will install the software on the server. The customer's IT department staff must be available on-site to assist with this process.

The server is dedicated for Enterprise Vue, Vive Vue, and Quantum software only.

Software Required

- Microsoft® Internet Information Services (IIS) 7 or later (for Quantum Vue, Vive Vue, and Enterprise Vue)
- Google Chrome™ version 49 or later
- Microsoft® .NET Framework 3.5
- Microsoft® .NET Framework 4.5 (Quantum 3.0 and 3.1, Vive Vue 1.7 and newer)
- Microsoft® .NET Framework 4.6.1 (Quantum 3.2 and newer)

For more information on required system and network configurations, see the Lutron IT Implementation Guides: (P/Ns 040423 and 040437) at www.lutron.com

Auto Restart Recommended

- Server should be configured to automatically restart when power is lost so it does not remain off when power is restored.
- Data recording is not active while the server is powered off.

Minimum Hardware Configuration Required[1]

- Processor: Intel® Xeon® (4 cores, 8 threads 2.5 GHz) or AMD® equivalent
- 16 GB RAM
- 500 GB SSD
- Screen with minimum 1280 x 1024 resolution
- 100 MB Ethernet network interface which will be used for communication to Quantum processors or Vive wireless hubs
- Enterprise Vue software limits per server (optional feature)
  - – Quantum 3.4 or greater
  - – Vive Vue 1.7 or greater
  - – Total of up to 10 Quantum/Vive systems (max of 1 Vive Vue instance per server)
  - – Max 100 connected Quantum processors or Vive hubs
  - – 25 Limelight systems

  For more information see the Enterprise Vue Spec Submittal (P/N 3691076) at www.lutron.com

Microsoft® SQL & OS Required for Each Quantum Version

Software Version	Microsoft® SQL Version	Microsoft® OS Version[1]
Quantum 1.5 - 1.9	SQL 2005 Express (default) SQL 2005 Full (requires custom installation)	Windows® 2003 Server (32-bit)
Quantum 2.0 - 2.7	SQL 2005 Express (default) SQL 2005 Full (requires custom installation)	Windows® 2003 Server (32-bit) Windows® 2008 R2 Server (64-bit)
Quantum 3.0 - 3.1	SQL 2012 Express (default) SQL 2012 Full (requires custom installation)	Windows® 2008 R2 Server (64-bit) Windows® 2012 R1 Server (64-bit) Windows® 2012 R2 Server (64-bit)
Quantum 3.2	SQL 2012 Express (default) SQL 2012 Full (requires custom installation)	Windows® 2008 R2 Server (64-bit) Windows® 2012 R2 Server (64-bit) Windows® 2016 Server (64-bit)
Quantum 3.4	SQL 2017 Express (default) SQL 2017 Full (requires custom installation)	Windows® 2012 R2 Server (64-bit) Windows® 2016 Server (64-bit) Windows® 2019 Server (64-bit)

Microsoft® SQL & OS Required for Each Vive Vue Version

Software Version	Microsoft® SQL Version	Microsoft® OS Version
Vive Vue 1.7 and newer	SQL 2012 Express (default) SQL 2012 Full (requires custom installation)	Windows® 2016 R1 Server (64-bit) Windows® 2016 R2 Server (64-bit)

Microsoft® SQL & OS Required for Each Enterprise Vue Version

Software Version	Microsoft® SQL Version	Microsoft® OS Version
Enterprise Vue 1.0	SQL 2017 Express (default) SQL 2017 Full (requires custom installation)	Windows® 2016 R1 Server (64-bit) Windows® 2016 R2 Server (64-bit)

[1] All Server editions are standard.

Job Name:	Model Numbers:	
Hotel Hartness	QS-A-CMP-SBO-0	
Job Number:		

Considerations for Customer-Supplied Computers

- Lutron Field Service will install the purchased Lutron software on one computer only, at the time of commissioning. Customer must have available:
  - The working computer that meets the minimum Lutron specification
  - The original Windows® installation disks
  - All driver disks for the customer-supplied computer
  - Administrative rights for the customer-supplied computer
  - An IT representative
- Computers that meet the minimum specification but cannot be configured by Field Service (maximum on-site configuration time is limited to 4 hours) will require a connection to the Internet for remote access from a Lutron services company representative (additional charges may apply).
- If remote access is not available, the computer must be shipped (using an insured shipment) by the customer, at the owner's risk and expense, to Lutron for Lutron software installation and from Lutron to the job site. The computer must be shipped with the correct operating system disk and all driver disks. A 4 week lead-time will apply to any computers shipped to Lutron. To cover the Lutron troubleshooting, an additional 4 hour service charge will apply. Computers supplied by the customer are not covered by a Lutron warranty.
- Once configured by Lutron, the computer must be used for Lutron lighting control only and cannot be used for other applications. No applications other than the Lutron software may be installed on the computer.
- Lutron reserves the right to ask the customer to reformat the customer's computer and reload the operating system to rectify any installation issues.
- Any Lutron software upgrades can only be loaded on computers that have been unaltered after the initial Lutron configuration. Otherwise, additional charges will apply.

Software Updates/Patches

- Note that Lutron will not be responsible for maintenance, security and software patching of the machine.
- Lutron recommends that the machine is installed and maintained as part of the customer's IT infrastructure and involve the customer's IT department in the patching, security and maintenance of the machine.

Job Name:	Model Numbers:	
Hotel Hartness	QS-A-CMP-SBO-0	
Job Number:		

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Quantum® and Quantum Vue™ Ethernet Network Configuration

Installation Overview

The network architecture that forms the Local Area Network (LAN) for the Quantum® processor and server communications of the Quantum® lighting control system through the Quantum Vue™ browser can be adapted to an existing institutional network infrastructure. While this can be of substantial savings in time and material when adapted to an institution's network infrastructure, the responsibility, setup, and authority for that network falls directly under that institution's IT administration.

When using an institution's network infrastructure, the Quantum® LAN must have unrestricted communication within that institution's IT parameters. This document lists the IT requirements for the Quantum® LAN and needs to be given to the institution's IT administration far in advance of system installation.

Timeliness of a project where a Quantum® system is residing on the institution's network is dependent on that institution's IT planning and cooperation. The earlier the institution IT administration is brought into the project, the easier and more efficient the installation will be.

Ethernet Overview

The Quantum® light management system requires an IEEE 802.3 Ethernet link to enable communications between Quantum® processors as well as between Quantum® processors and the Quantum® server. When this Ethernet link is supplied by a customer's IT department, it must be designed and configured to meet the institution's IT requirements and the Quantum® LAN requirements.

System Overview

Each facility will have its own characteristics. This document outlines the guidelines and requirements for the infrastructure to support the Lutron® Quantum® system.

The Quantum® Ethernet communications link follows the IEEE 802.3 Ethernet standard using a minimum cabling of Category 5 (CAT5) at the Quantum® processor, and IEEE 802.3 Ethernet standard cabling between Quantum® processors and the Quantum® server. This copper or fiber wiring must follow the standard IEEE 802.3 Ethernet wiring rules for distance and separation.

- CAT5 maximum distance requirement: 328 ft (100 m)
  - If a cable run of longer than 328 ft (100 m) is required, a switch or repeater will need to be used to extend the length.
- There should not be more than 6 "hops" from the processor to the server.
  - A "hop" is defined as the Ethernet link passing through a device such as a router or switch. Keep in mind that there is a "hop" from the Quantum® processor to the first Ethernet switch.

It is possible to use an existing Ethernet infrastructure installed in the building as the Quantum® processor communications link. When this is done, the customer, network installer, and network administrator must be aware of the Quantum® system requirements.

The Quantum® system uses UDP multicast between Quantum® processors. The customer-provided network must be configured to allow multicast traffic between the Quantum® processors on the network.

Job Name:	Model Numbers:	
Hotel Hartness	QS-EO	
Job Number:		

Quantum® and Quantum Vue™ Ethernet Network Configuration

System Start-Up

When the network is supplied by others, the network must be operational before the Lutron® field service engineer arrives on site for system start-up. The system start-up cannot be completed without reliable connectivity between the Quantum® processors and the Quantum® server.

The customer may be required to schedule an additional field service visit at an additional charge if start-up cannot be completed. This may occur if the network is not installed or if any networking equipment required to ensure connectivity between Quantum® components is not operational and properly configured.

Site and Network Access

Lutron® field service engineers and supporting personnel must have access to network equipment required to ensure communication between Lutron® components on the network.

If access to network equipment and/or use of network analysis tools is not permitted, the customer must ensure that qualified network support personnel are on site and available to support the Lutron® field service engineer during the commissioning process. Lack of support may require scheduling additional field service visits at an additional charge.

Network Documentation

The network configuration settings of the Lutron® equipment connected to the network; such as, IP addresses, subnet masks, and gateway addresses, must be supplied to Lutron prior to the Lutron® field service engineer's arrival on site to commission the system.

Network Support Disclaimer

When the network is supplied by the customer's IT department, Lutron cannot be held responsible for Quantum® system downtime that results from network downtime.

The network that is used to communicate between Lutron® Quantum® equipment is utilized as a control and a data network. Control networks require more predictable and consistent response times. Increased traffic from corporate intranet data can greatly affect these response times.

Network reliability impacts the collection of data from the Quantum® system. This data is used to generate reports and to assess the system health. Network reliability also impacts control functions.

Lutron recommends that the customer employ qualified network support personnel that will maintain the reliability and health of the network post-occupancy.

Network Equipment Requirements

All network equipment ports connected to the Lutron® Quantum® processor are configured to 10/100 MB/sec data speeds.

Network communications between the Quantum® processor and the Lutron® server must not rely on wireless technology. A wired IEEE 802.3 Ethernet network is required for the Quantum® system to function. Quantum Vue™ browser-based user interface can be used with wireless technology, IEEE 802.11 in communications to the Quantum® server.

Physical and administrative access to network equipment should be limited to authorized personnel only.

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Quantum® and Quantum Vue™ Ethernet Network Configuration

Network Port Configuration

All network equipment that is required to enable connectivity between Lutron® equipment must have the following ports open.

For communication between processors:

- UDP Port Range 2055 thru 2184
  - Used for Lutron® subsystem processor communication (required)

For communication between processors and server:

- UDP Port Range 2055 thru 2184 or TCP Port 51023 (an option for Quantum Vue™ only)

For communication between processors and other equipment:

- UDP Port 2647
  - Used for Lutron® Processor Configuration and detection software (only required while performing initial commissioning/maintenance)
- UDP Port 47808 (BAC0)
  - Used for BACnet IP communication from a third-party Building Management System (only required if the Quantum® system is integrating with a BMS through BACnet)
- TCP Port 5327
  - Used for Q Control+ App communication (only required if using the Quantum® Control+ App for the *iPad* and not connecting app to server)

For communication from admin client to the server (only required of admin client is in a separate PC)

- TCP Port 8888
  - Used for the Quantum® Runtime Service (required)
- TCP Port 9999
  - Used for the Quantum® Reporting Service (required)
- TCP Port 4444
  - Used for the Lutron® Service Manager (required)
- TCP Port Range 49152 thru 65535
  - Ephemeral ports used for communication between server and client
- TCP Port 1433 and UDP Port 1434
  - Used for Microsoft® SQL Database Connection (required)

For communication from browser hosting Quantum Vue™ to the server:

- TCP Port 80 or 443

For communication from Q Control + IPAD app to the server:

- TCP Port 5327
  - Used for Q Control+ App communication (only required if using the Q Control+ App for the *iPad*)

All network equipment required to enable connectivity to the Lutron® system must have all ports and protocols mentioned enabled/opened by default after a power-up to prevent system downtime after a power-cycle.

Job Name:	Model Numbers:	
Hotel Hartness	QS-EO	
Job Number:		

Quantum® and Quantum Vue™ Ethernet Network Configuration

IP Multicast Configuration

Lutron® uses IP any-source multicast for system communication between Quantum® processors.

Each sub-system of the Quantum® system must have its own unique multicast address. These multicast addresses are assigned to Lutron® for use with the Quantum® system only. Multicast addresses must be determined and configured prior to the Lutron® field service engineer's arrival on site to commission the system. Class D addresses may be assigned by end user or will be supplied by default by field service engineer

IGMP (Internet Group Management Protocol)

In order to properly route multicast traffic between Layer 2 and Layer 3 devices, "IGMP snooping" needs to be enabled on all switches in both directions from the Quantum® server to the Quantum® processor and from the Quantum® processor to the Quantum® server.

The Quantum® system multicast supports the IGMP standard Versions 1, 2, and 3.

PIM (Protocol Independent Multicast)

If routing multicast traffic between Layer 3 devices over a LAN or WAN, Protocol Independent Multicast will need to be enabled to properly route the multicast traffic. Both sparse mode and dense mode are supported.

Quantum® Processor Configuration Software

During system commissioning the multicast address of 224.0.37.42 must be configured. This multicast address will be used by the Quantum® processor Configuration Software to set up Lutron® processors in the system. All Lutron® devices will respond to the multicast address of 224.0.37.42, and Lutron® processors will join the multicast group 224.0.37.42 using IGMP.

Note: The multicast address of 224.0.37.42 is only used during the initial startup and commissioning of the system. It is also used for diagnostics if a Lutron® field service engineer is on site. It is not a constant requirement to have this multicast address active.

Quantum® and Quantum Vue™ Ethernet Network Configuration

Quantum® Server and Windows® SQL Server® Requirements

The Quantum® server hosts a Quantum® specific instance of Microsoft® SQL Server®. The Quantum® instance of Microsoft® SQL Server® has two functions; historical data collection for reporting and acts as the host for server/client software. The Quantum® instance of the Microsoft® SQL Server® does not affect the normal functionality of the Quantum® lighting system. If communications to the Quantum® processors from the server were suspended, the lighting system and its components would function as normal. However, any historical energy data and management software access would be lost during the downtime.

Refer to the Q-Manager™ Specification Submittals, Lutron® P/N 369593 and 369589 at www.lutron.com for a description of Quantum® server-approved Windows operating systems and compatible Microsoft® SQL Server versions. Quantum® system can use an end-user supplied version of Microsoft® SQL server full edition.

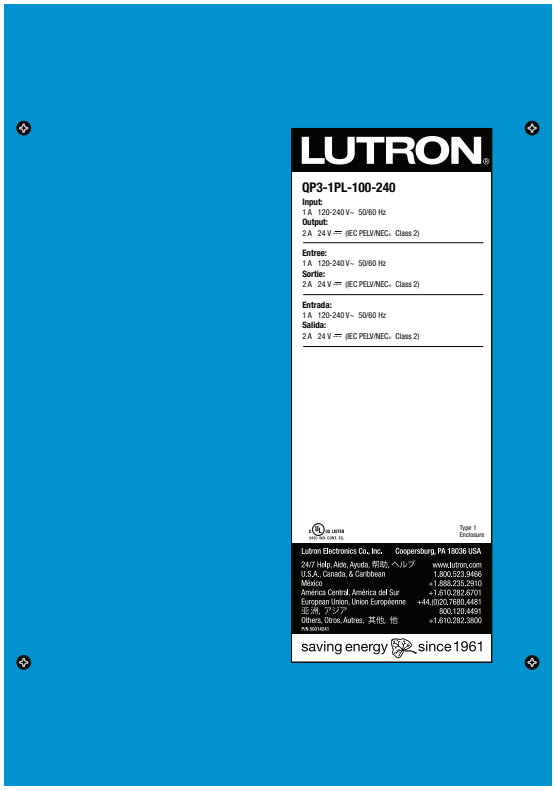
Configurable Processors Perimeters

- Static IPv4 Address (Default - 192.168.X.X)
- Subnet Mask (Default - 255.255.255.0)
- Gateway (Default - 0.0.0.0)
- Mulicast Address (Default - 239.X.X.X)
- BACnet port (Default - 47808)

Job Name:	Model Numbers:		
Hotel Hartness	QS-EO		
Job Number:			

Quantum Light Management Hub (QP3) for Quantum Select

The Quantum Light Management Hub (QP3) connects Lutron QS devices, Lutron power panels and DMX-512 devices to your Quantum lighting control system.



Features

- Designed to control, manage, and monitor Lutron Energi Savr Node units, Lutron power panels, GRAFIK Eye QS units, Sivoia QS shade/drapery systems and DMX-512 devices.
- The small size of 9.25 in x 3.16 in x 13.25 in (235 mm x 80.3 mm x 337 mm) allows almost any space to be enhanced with Quantum light management.
- Supports both astronomic and time-of-day events to automatically control the lights and shades/draperies in the system.
- Simple reconfiguration of a space without rewiring.
- Individually control, monitor, and adjust any light or shade/drapery in a space.
- Can be connected to other Quantum Light Management Hubs.
- Enables a Quantum system to cost-effectively scale from a single floor, to multiple floors, to whole building and to whole campus.

Panel Capabilities

- Each Quantum Light Management Hub (QP3) has 2 links that can be individually configured to communicate with:
  - Lutron power panels
  - Lutron QS devices
  - DMX-512 devices for lighting zones (use QSE-CI-DMX for DMX integration zones)

Allowed combinations of links a single processor:

	DMX-In	DMX-Out	QS	Panel	DBI
DMX-In			✓		✓
DMX-Out			✓		✓
QS	✓	✓	✓	✓	✓
Panel			✓	✓	✓
DBI	✓	✓	✓	✓	

Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Specifications

Regulatory Approvals

- UL®
- cUL®
- CE
- NOM dictum per NOM-019
- Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2014 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

Power

- Input voltage: 120–240 V~ 1 A
  normal/emergency feed*
  50/60 Hz
- Output: Processor: 24 V⎓ 2 A

Physical Design

- Enclosure: L: 9.25 in (235 mm)
  W: 3.16 in (80.3 mm)
  H: 13.25 in (337 mm)
- Weight: 11 lb (4.9 kg)
- NEMA Type 1, IP-20 protection

Performance

- ± 6 kV surge protection (ANSI/IEEE C62.41-1991)

Mounting

- Surface-mount only

Environment

- For indoor use only
- 32 ºF to 104 ºF (0 ºC to 40 ºC)
- Relative humidity less than 90% non-condensing

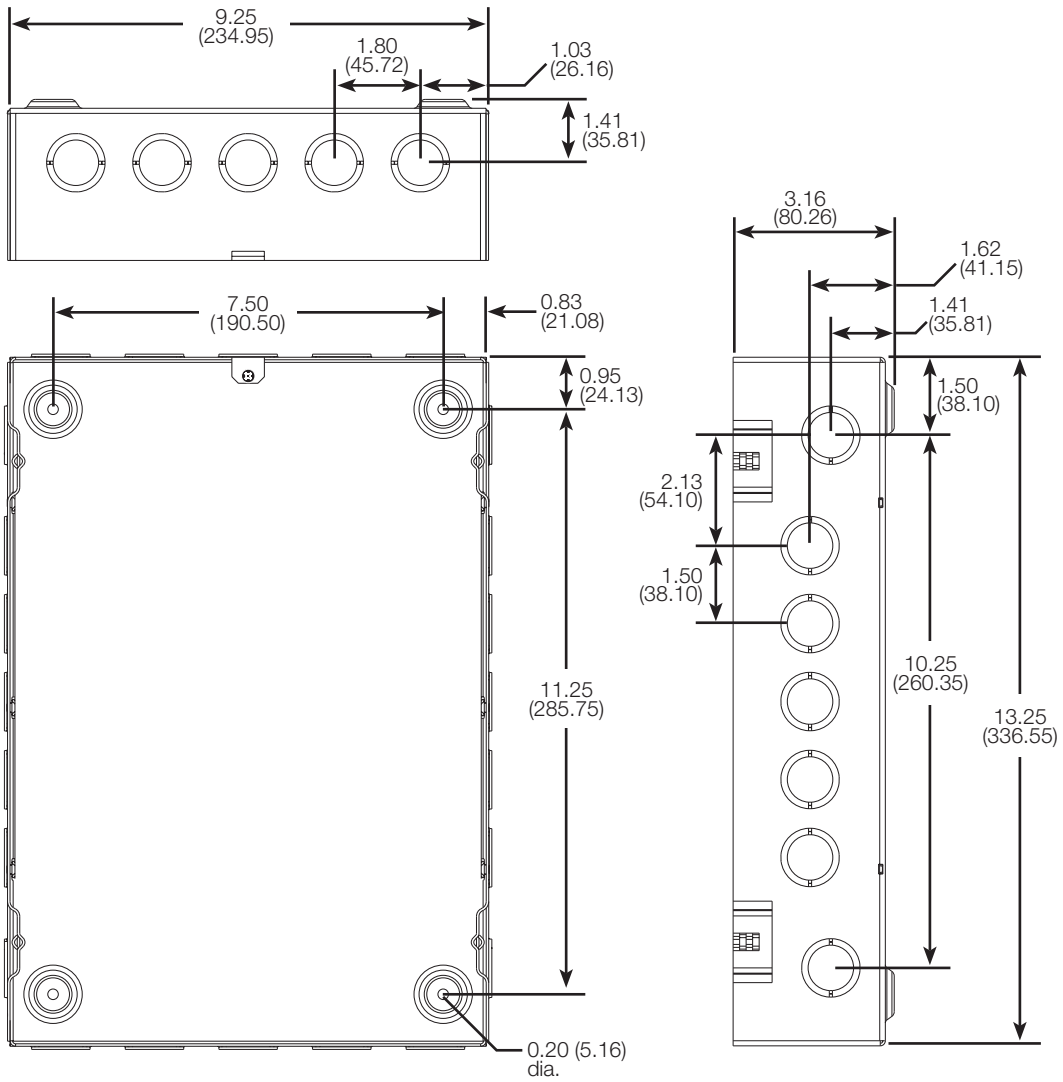
Available Models

- QP3-1PL-100-240

* Emergency feed is recommended so that the system status can be monitored during an emergency event. If this is not required, normal power can be used.

Dimensions

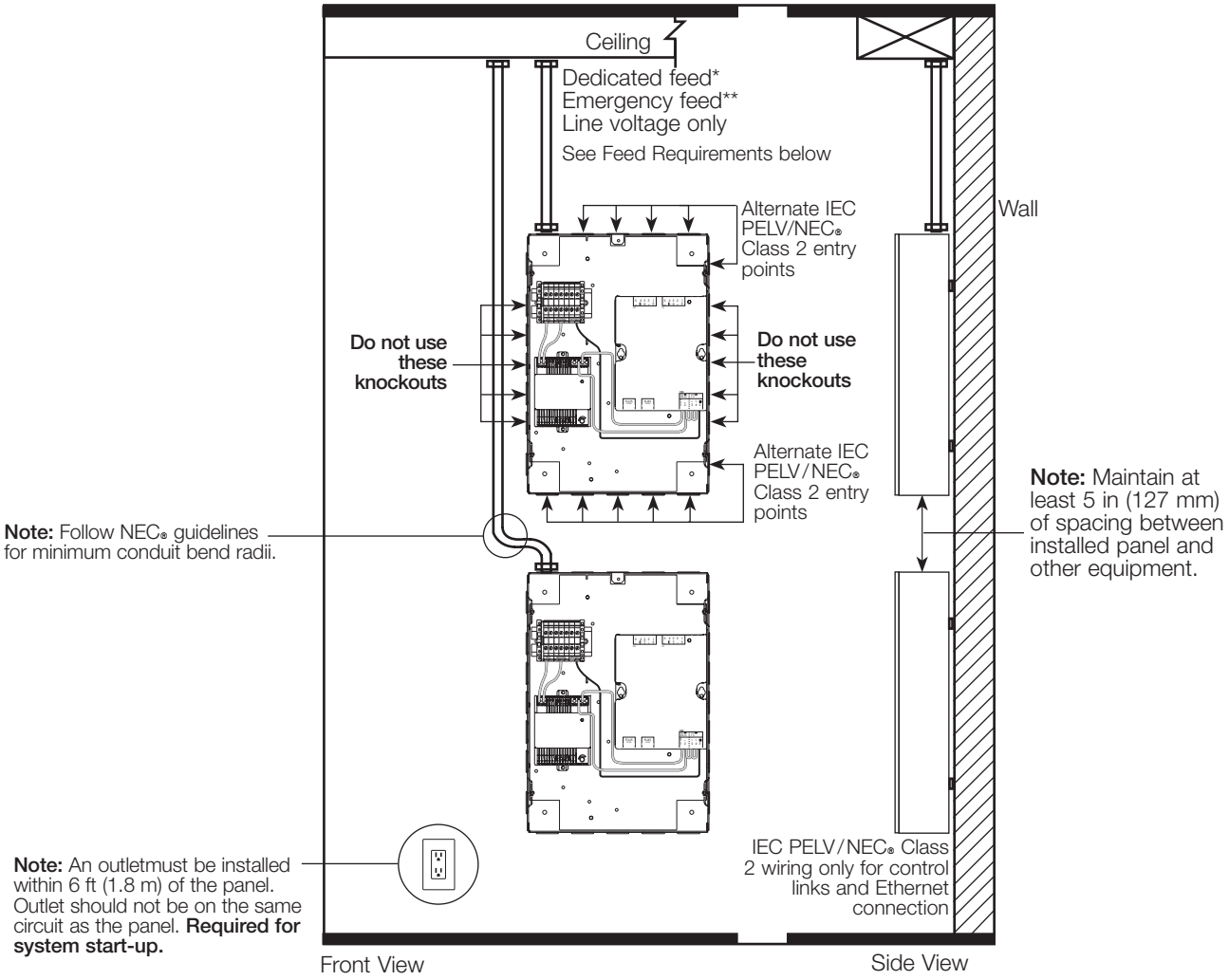
Shown as in (mm)



Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Mounting and Conduit Entry

- Surface mount indoors.
- Panel generates heat, maximum 255 BTUs/h. Mount only where temperature will be 32 ℉ to 104 ℉ (0 ℃ to 40 ℃).
- Water damages equipment. Mount in a location where the panel and processors will not get wet.
- Mount in an accessible and serviceable location.
- An outlet must be installed within 6 ft (1.8 m) of the panel for servicing. Outlet should not be on the same circuit as the panel.
- A Light Management Hub (QP3) may be mounted above, below, or beside another Light Management Hub (QP3). Maintain at least 5 in (127 mm) of spacing between installed panel and other equipment, and follow NEC® guidelines for minimum conduit bend radii.



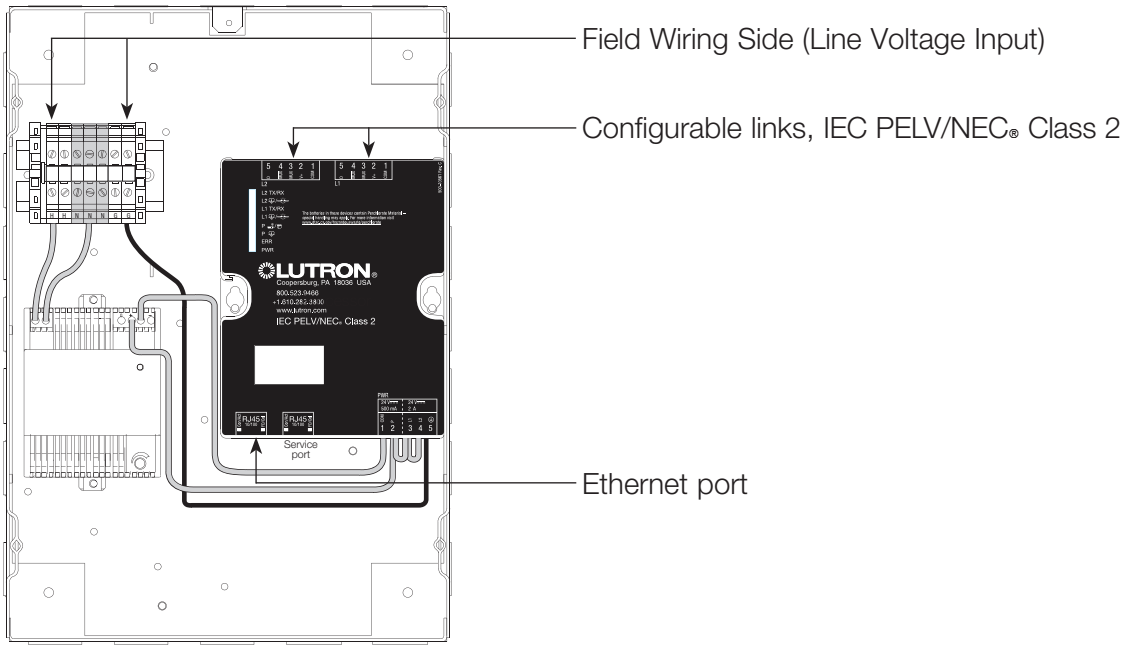
Feed Requirements

* Lutron recommends using a dedicated circuit for lighting control devices.

** Emergency feed is recommended so that the system status can be monitored during an emergency event. If this is not required, normal power can be used.

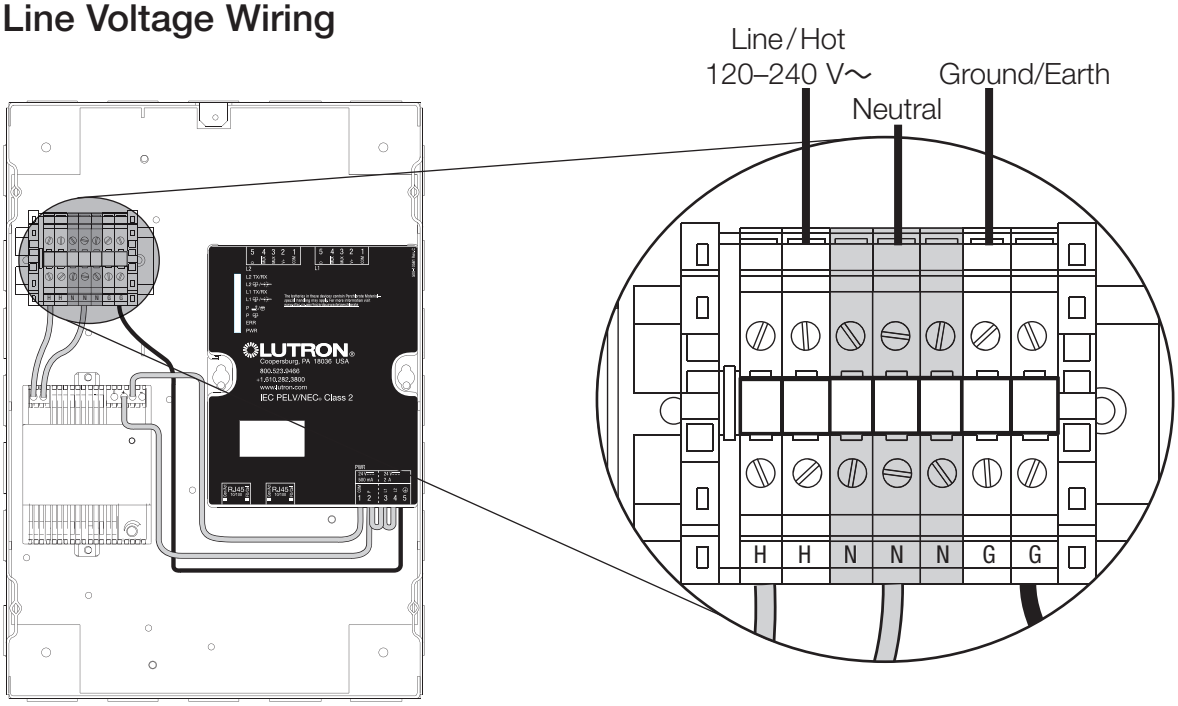
Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Panel Overview



Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Line Voltage Wiring

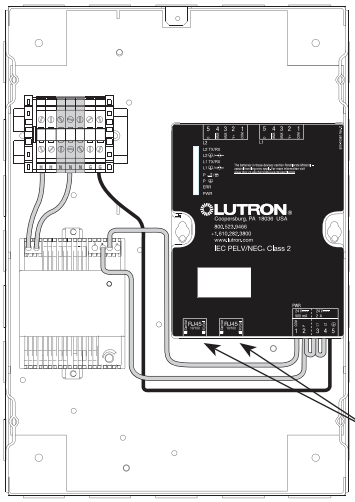


Notes

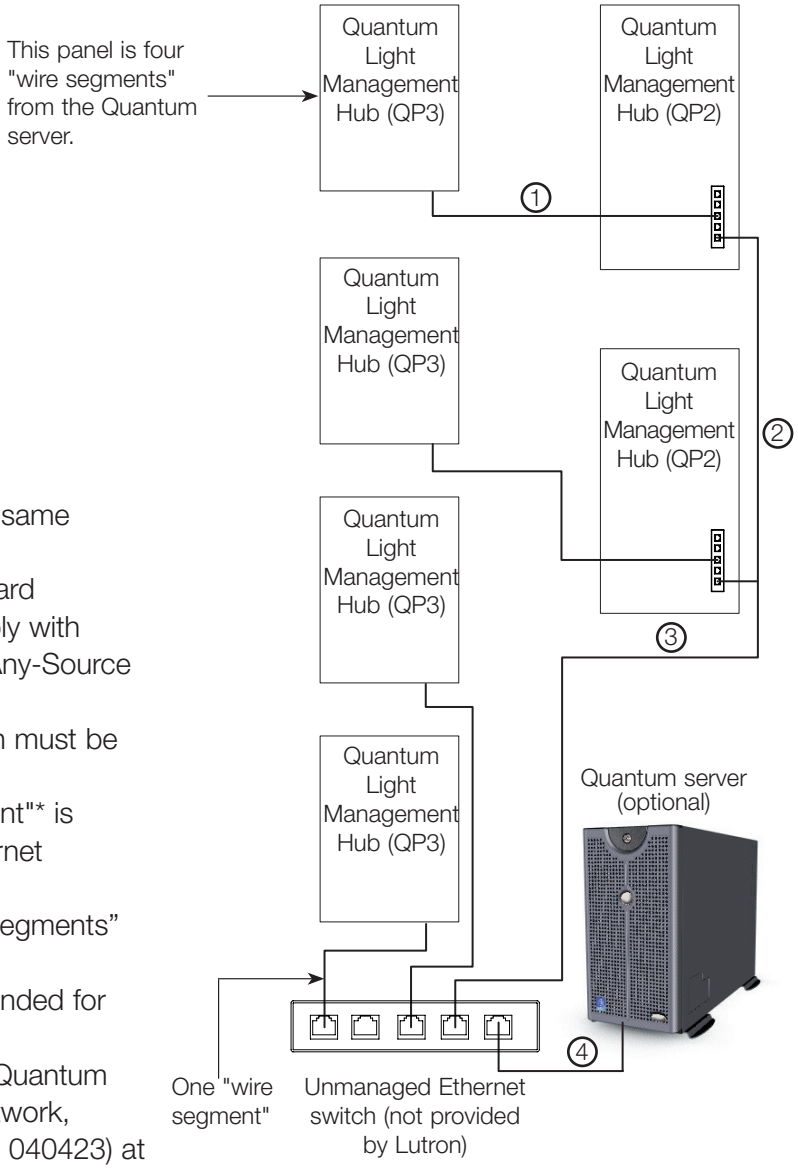
- Line voltage must enter panel from top left of enclosure
- Run wiring so line (mains) Class 1 voltage is separate from IEC PELV/NEC® Class 2 wiring

Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Quantum Inter-Processor Link Wiring



Example of Inter-Processor Wiring: Riser Diagram



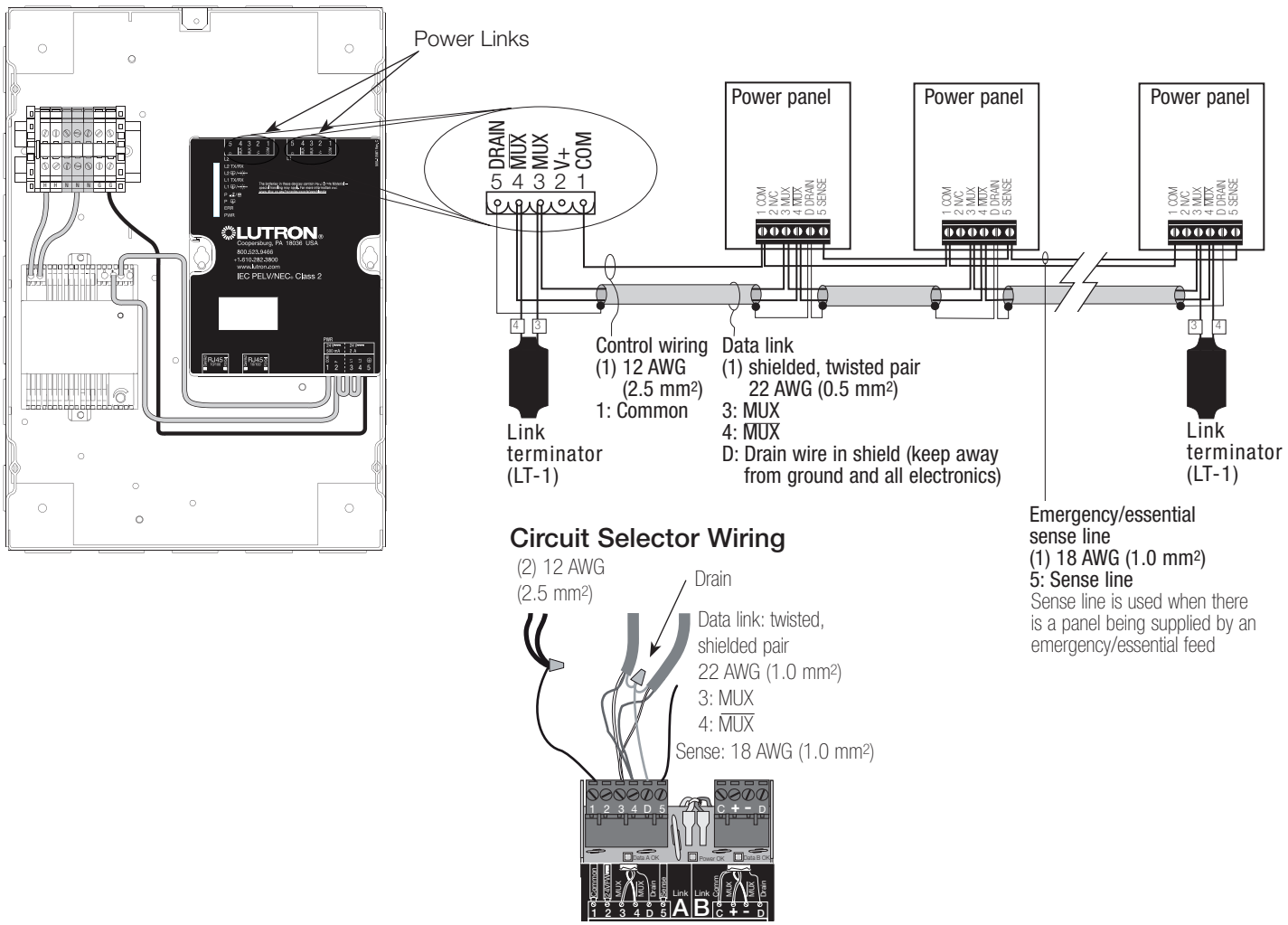
Notes

- The inter-processor wiring is considered IEC PELV/NEC® Class 2; do not run in the same conduit as line (mains) voltage wiring.
- Interprocess communication uses a standard Ethernet connection. All wiring must comply with IEEE 802.3 standards and must support Any-Source Multicast communication.
- Processors cannot be daisy chained. Each must be connected to an Ethernet switch.
- Wiring distance for any single "wire segment"* is 330 ft (100 m) max; use unmanaged Ethernet switches for longer distances.
- Processors cannot be more than 6 “wire segments” from the server.
- A dedicated network or VLAN is recommended for the lighting control system.
- For more information about connecting a Quantum system to a corporate or building wide network, please refer to the Quantum IT Guide (P/N 040423) at www.lutron.com/ITGuide

* A wire segment is a length of cable connecting two devices communicating over Ethernet.

Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Configurable Link Wiring: Power Panel Link

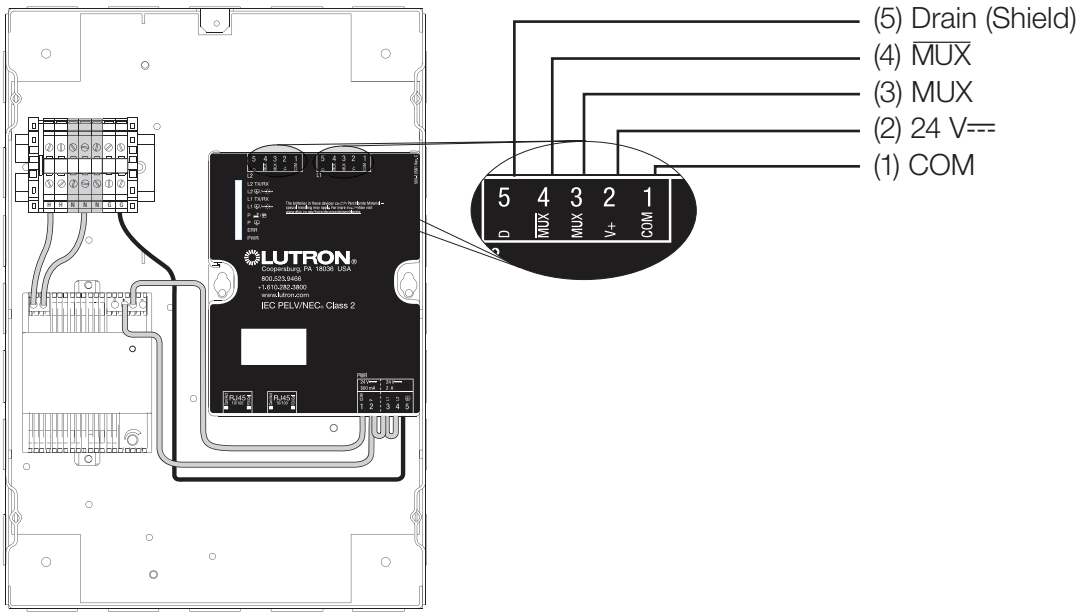


Notes

- Power panel link must be daisy-chained (no T-taps).
- Maximum of 32 circuit selectors per link or 512 switch legs (controllable outputs) per link.
- It is not necessary to have the Quantum panel at the end of the link (it may be in the middle).
- The sense wire (terminal 5) is used whenever there is a panel being supplied by an emergency/essential feed; see power panel instructions for details.
- Each low-voltage IEC PELV/NEC® Class 2 terminal can accept only two 18 AWG (1.0 mm²) wires or one 12 AWG to 22 AWG (2.5 mm² to 0.5 mm²) wire. Connect as shown using appropriate wire connectors.
- Total length of control link may be no more than 2000 ft (600 m). Lutron model: MX-RPTR can be used to extend the link beyond 2000 ft (610 m). Contact Lutron for more information.
- GRX-CBL-46L wiring cable is available from Lutron and contains two 12 AWG (2.5 mm²) conductors for control power, one twisted, shielded pair of 22 AWG (0.5 mm²) for data link, and one 18 AWG (1.0 mm²) conductor for emergency (essential) sense line.

Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Configurable Link Wiring: QS Link



QS Link Wiring:

- 22 AWG to 12 AWG (0.5 mm² to 4.0 mm²)

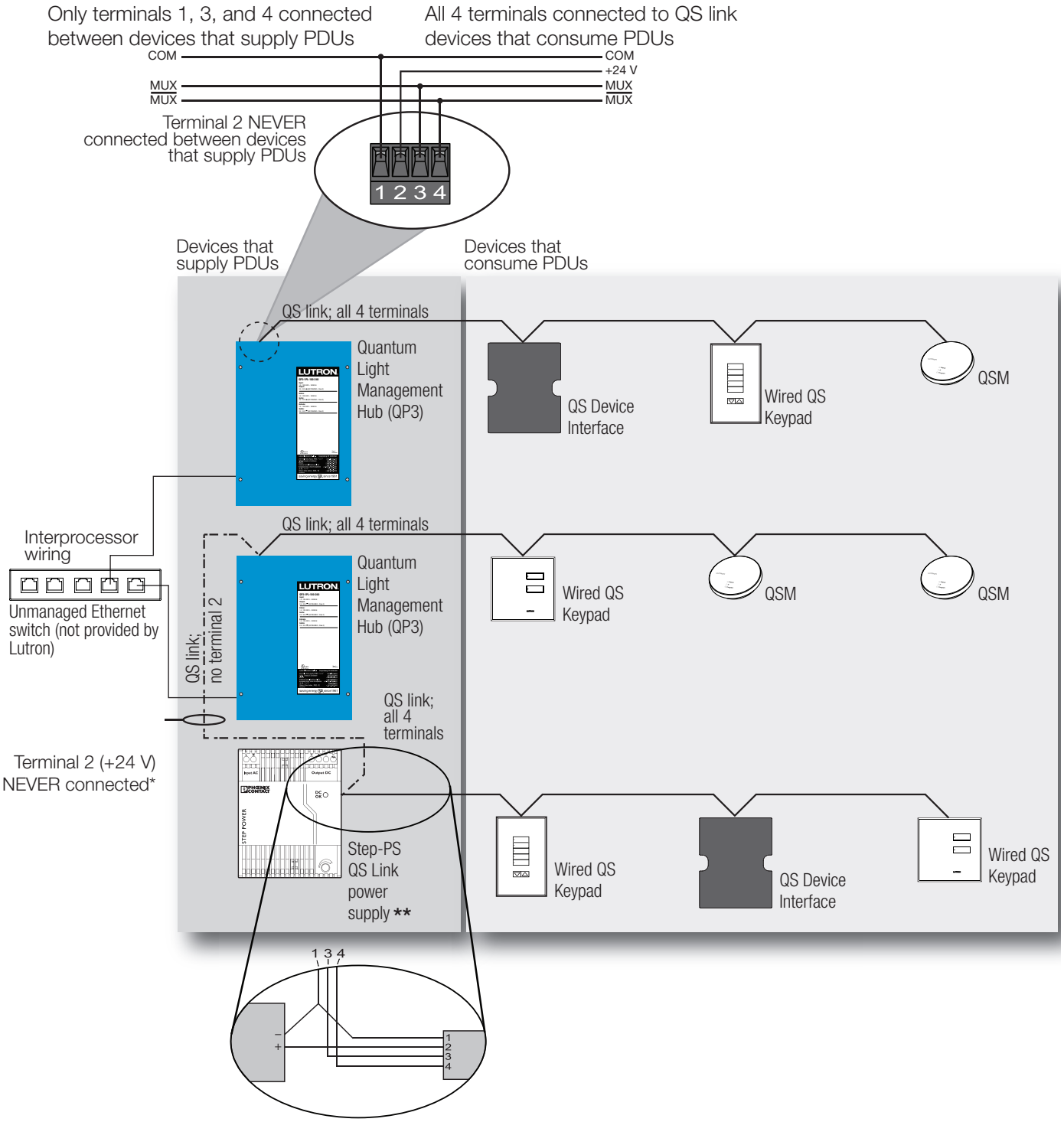
Availble Power Draw Units (PDUs) per link	Maximum Link Length	Wire Gauge	Available from Lutron in one cable
33	500 ft (152.4 m)	Power (terminals 1 and 2) 1 pair 18 AWG (1.0 mm²) Data (terminals 3 and 4) 1 pair 22 AWG (0.5 mm²) twisted and shielded	GRX-CBL-346S GRX-PCBL-346S
33	2000 ft (609.6 m)	Power (terminals 1 and 2) 1 pair 12 AWG (4.0 mm²) Data (terminals 3 and 4) 1 pair 22 AWG (0.5 mm²) twisted and shielded	GRX-CBL-46L GRX-PCBL-46L

Notes

- System communication uses IEC PELV/NEC® Class 2 low-voltage wiring.
- Follow all local and national electrical codes when installing IEC PELV/NEC® Class 2 wiring with line voltage/mains wiring.
- Each terminal accepts two 22 AWG – 18 AWG (0,5 mm² – 1.0 mm²) wires or one 22 AWG –12 AWG (0.5 mm² – 4.0 mm²) wire.
- Make all connections inside the control unit's wallbox.
- A Quantum QS link can have up to 512 switch legs (controllable outputs) and 99 Lutron QS devices. Refer to the QS Link Power Draw Units Specification Submittal (Lutron P/N 369405) at www.lutron.com and the table above for information concerning Power Draw Units (PDUs).
- QS link wiring can be T-tapped or daisy-chained.

Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Configurable Link Wiring: QS Link



QS Link Wiring Rules

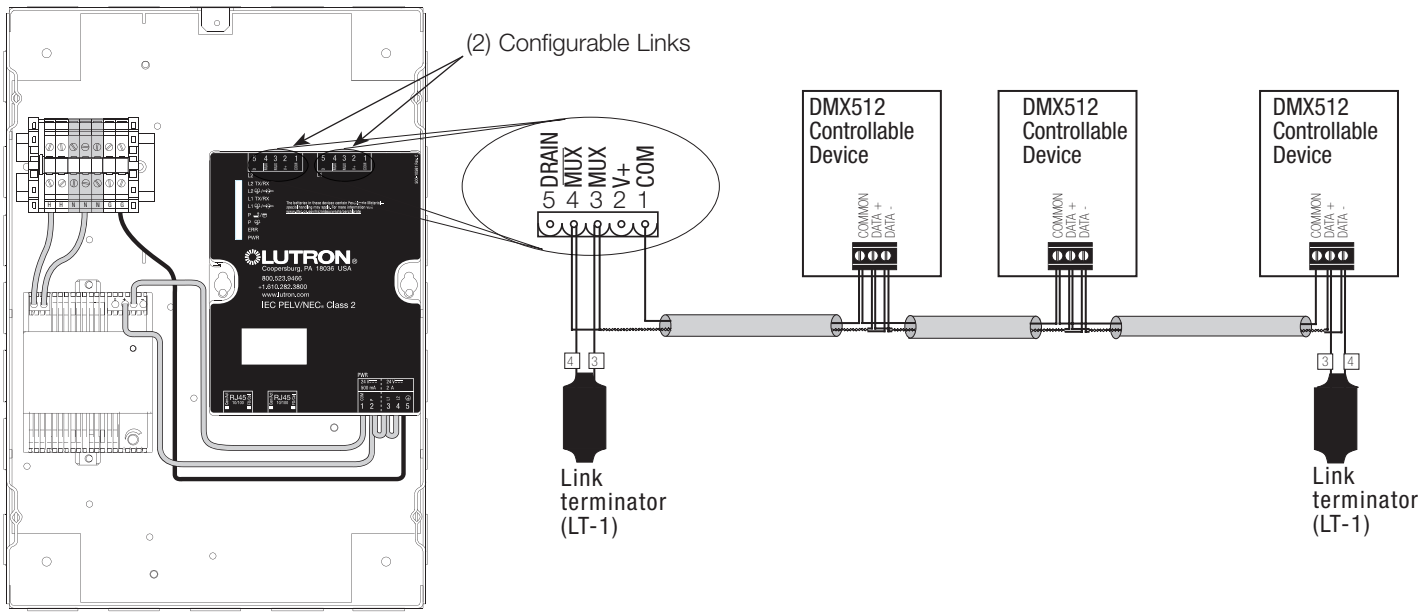
* Terminal 2 (+24 V) should NEVER be connected between devices that supply PDUs.

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

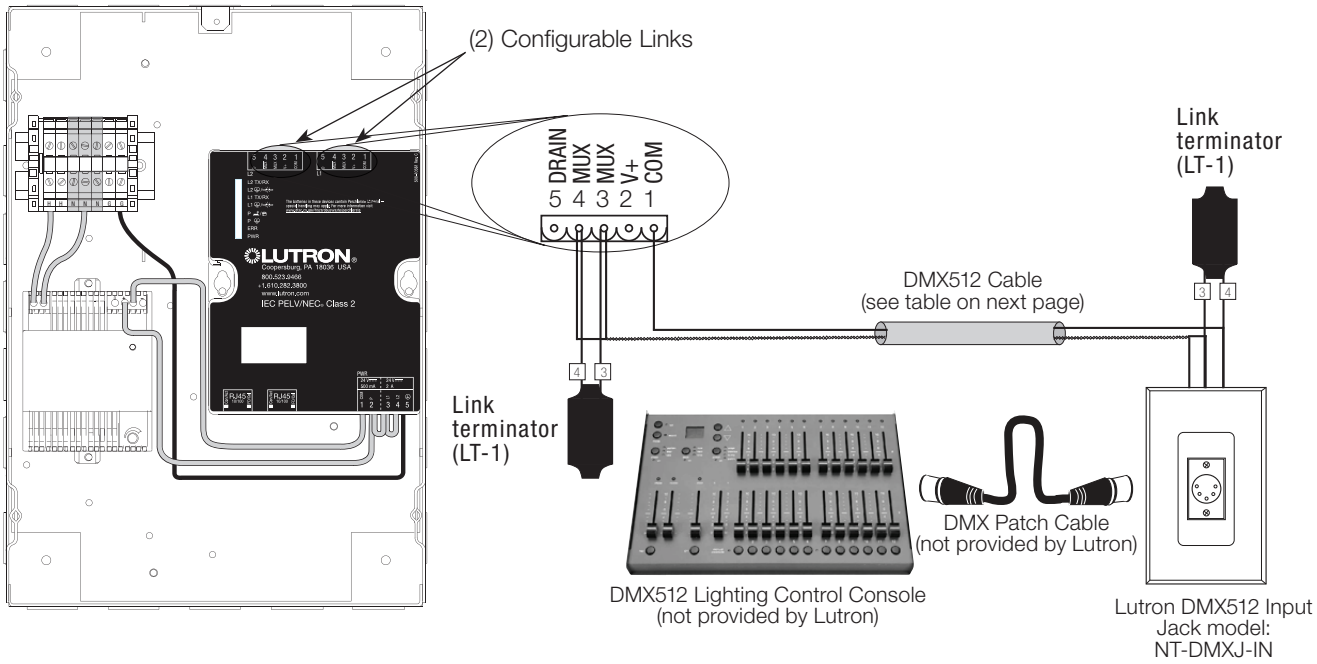
Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Configurable Link Wiring: DMX512

DMX512 Output Wiring Example



DMX512 Input Wiring Example



Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

Configurable Link Wiring: DMX512 (continued)

DMX Cable Wiring Table

This table shows examples of some Manufacturers of DMX512 cable and how they should be terminated.

DMX512 Cable Type	Wire	From Circuit Selector	To DMX512 Jack
Belden 9729/89729	(2) drain/shield	C	C (1) (white/black)
	black	+	– (2) (red)
	white	–	+ (3) (yellow)
	black	No Connect	– (4) (blue)
	red	No Connect	+ (5) (black)
Duraflex 22/4WS or Lutron GRX-CBL-DMX-250/500	(2) drain/shield	C	C (1) (white/black)
	white	+	– (2) (red)
	black	–	+ (3) (yellow)
	green	No Connect	– (4) (blue)
	red	No Connect	+ (5) (black)

Notes

- Installation and all devices must comply with the ANSI E1.11-2008, USITT DMX512-A standard.
- Below are a few Important points from the standard:
  - All DMX512 devices in a DMX512 universe must be wired in a daisy-chain configuration.
  - Total length of the link wiring for one DMX512 universe must not exceed 1300 ft (400 m). DMX repeaters or splitters can be used to extend the link. All repeaters must comply with the standard. The repeater manufacturer's guidelines must be followed.
  - All cable used must comply with the standard. Lutron models GRX-CBL-DMX-250 and GRX-CLB-DMX-500 comply with the standard and are recommended.
  - DMX512 link terminators must be installed at both ends of the DMX512 link. Lutron model LT-1A link terminators are included with the panel and are recommended. Note that some DMX512 devices have built-in link terminators.
  - A maximum of (31) DMX512 devices can be directly connected to the DMX512 controller. If (32) or more devices are required, DMX512 repeaters or splitters must be used. A repeater or splitter is needed so that no more than (32) devices are directly connected on the same wire segment. Note that link terminators are required at the beginning and end of every wire segment.
- The Quantum processor can be programmed to either control DMX512 devices (DMX512 output) or to receive DMX512 signals from a DMX512 controller (DMX512 input) such as a theatrical stage board.
- All wiring must be low-voltage IEC PELV/NEC® Class 2 wiring. Each terminals of the Lutron processor can accept only stranded wire, and either (1 or 2) 22–18 AWG (0.5 mm^2 – 1.0 mm^2) conductors or (1) 16–12 AWG (1.5 mm^2 – 2.5 mm^2).
- The Quantum processor can be at the end or in the middle of the DMX512 link. The link terminators must always be installed at the ends of the link.
- Only one link of the processor can be configured as a DMX512 link. The other link of the processor must be configured as a QS link.
- DMX512 devices must be addressed prior to commissioning of the system. A schedule of the DMX devices and their addresses must be supplied to the Lutron project manager prior to commissioning. Lutron is not responsible for the addressing of the DMX512 devices.
- Refer to the Lutron DMX512 Application Note #592 (P/N 048592) at www.lutron.com for information on the different DMX512 applications that Lutron can provide.

Job Name:	Model Numbers:	
Hotel Hartness	QP3-1PL-100-240	
Job Number:		

BACnet® Software License for Quantum®

Description

This license for BACnet software enables a third-party building management system to control, monitor, and manage lights and shades in the Quantum® system. This license can also be used to share information between the Quantum® system and other control systems such as area occupancy, power usage, lighting state, etc. This license must be activated by a Lutron Field Service Engineer. One license is required for each processor. BACnet IP is embedded in the Quantum® processors. There are two types of BACnet devices in a Quantum® system: Subsystem Devices and Area Devices. The Subsystem Devices are Main BACnet Devices; typically one main device per floor of the building. The Area Devices are Virtual BACnet Devices of the Subsystem Device. Each area in the system will be represented by one Virtual BACnet Device. It is possible to have multiple Subsytem Devices in a project.

Visit http://www.lutron.com/Products/WholeBuildingSystems/Quantum/Pages/Overview.aspx for BACnet Protocol Implementation Conformance Statements (PICS) for the Main Subsystem Devices and the Virtual Area Devices. These documents detail all BACnet objects available in each version of the Quantum® software.

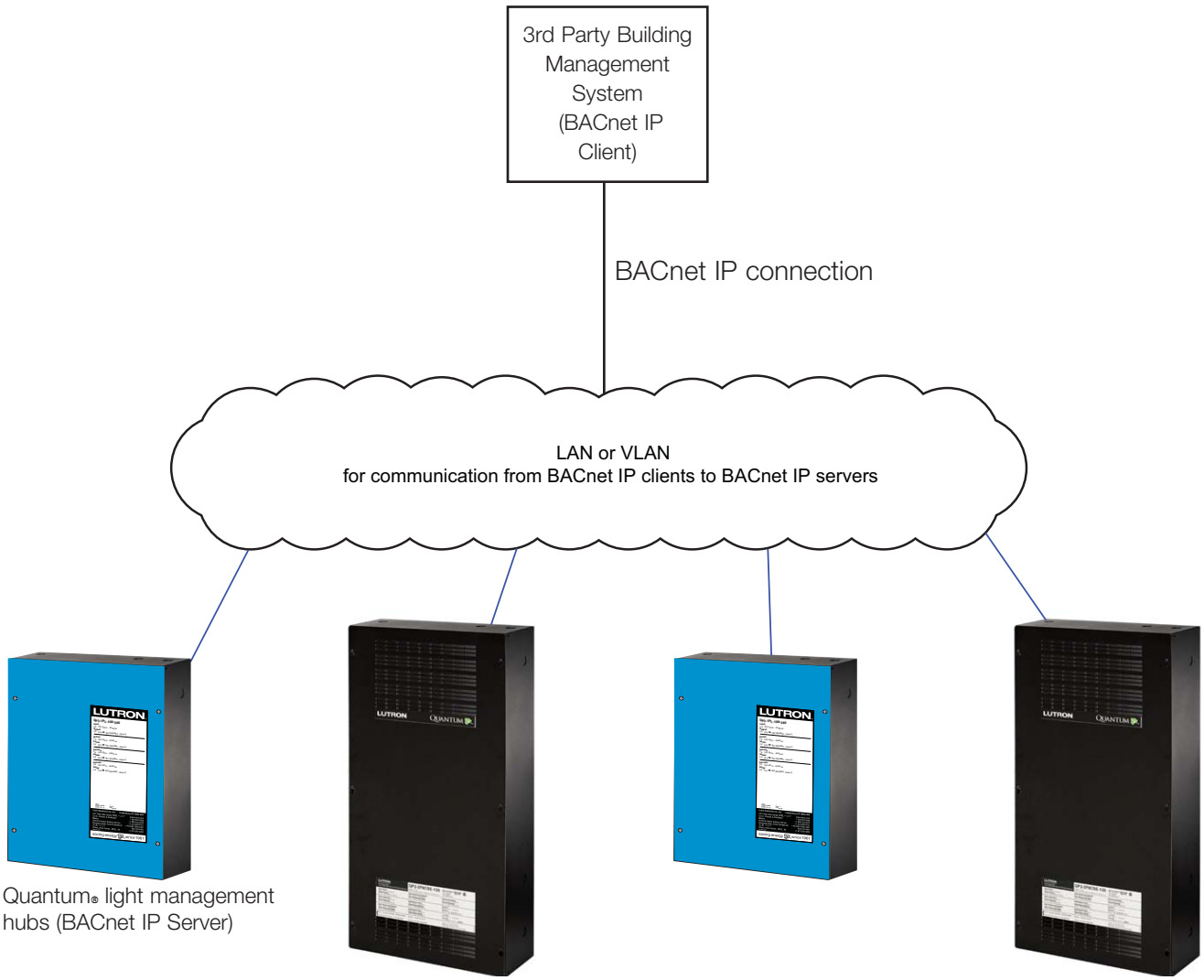
Requirements

- Quantum® light management system

Licenses Required

- Model number: QSW-BAC-PP-A
  - One BACnet software license required for each Quantum® processor in the system.
- Optional Model number: QSW-L-PP-A
  - One Q-Admin™ lighting license required for each Quantum® processor in the system if the system is controlling lighting.
- Optional Model number: QSW-S-PP-A
  - One Q-Admin™ window treatment license required for each Quantum® processor in the system if the system is controlling window treatments.
- Optional Model number: QSW-RPT-PP-A
  - One Q-Reporting™ license required for each Quantum® processor in the system if power data via BACnet is required.

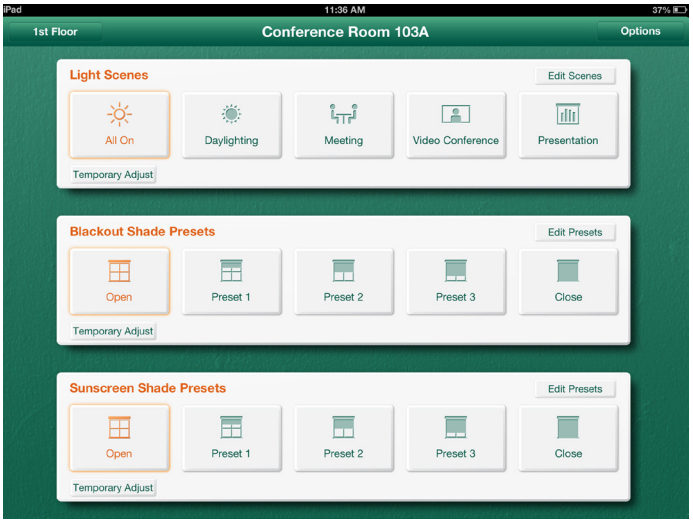
System Network Diagram



Job Name:	Model Numbers:	
Hotel Hartness	QSW-BAC-PP-A	
Job Number:		

Quantum Mobile Control and Programming Software License

This software license allows mobile control and programming of a Quantum system via an *Apple iPad*[1] which communicates to the system on a local area network (LAN) or corporate intranet.



Quantum Mobile Control and Programming Software License (QSW-MC-PS-A)

Features

- Control and monitor[2]:
  - Area lighting scenes and zones
  - Lutron Sivoia QS shades
  - White tuning with Lutron T-Series zones
- Edit[2]:
  - Adjust area scene lighting levels
  - Adjust area scene fade and delay times
  - Adjust shade preset levels
  - Make zones unaffected in scenes
  - Copy and paste area scenes
- Area access control provided to restrict access to specific areas per user
- The ability to limit access to the edit function
- Identify zones by flashing
- Historical logging of who made changes. Report can be viewed in Quantum Vue[3] in Quantum systems that have a server
- App can be used with a server connected through Q-Gateway, or without a server connected directly to the processor
- Languages supported: English, Spanish, French, German and Simplified Chinese
- Quantum Mobile Control and Programming Software can be used wirelessly (using *iPad* app or Windows® app) or with a wired Ethernet connection[4] (only available when using the Windows® app)

Software Compatibility Chart

Quantum Version	Apple App Version	Server to Device	Processor to Device[6]
2.6	1.0/2.2/2.3/2.5	✓	X
2.7	2.2/2.3/2.5	✓	✓
3.0	2.3/2.5	✓	✓
3.1	2.3/2.5	✓	✓
3.2	2.3/2.5	✓	✓
3.4	2.5	✓[5]	✓

1 iPad not included.

2 For GRAFIK Eye QS applications, reconfiguration of scenes is done from the GRAFIK Eye QS main unit (the Quantum Mobile Control and Programming software is not used to reconfigure these devices). This App cannot control CCO Integration zones and DMX 3-channel lighting zones.

3 Q-Admin is used to view the report in the Quantum versions prior to 3.2.

4 Device must be equipped with a wired ethernet connection.

5 When multiple instances of Quantum as installed on the same server, Q-Control+ will work with the first server, only.

6 Direct connection to the processor is not supported on jobs with multiple Quantum subsystems.

Job Name:	Model Numbers:	
Hotel Hartness	QSW-MC-PS-A	
Job Number:		

Administration

- Administrators can manage user accounts from the App
  - Create and configure usernames and passcodes
  - Configure area access rights
  - Configure edit privilege
- Administrators can set up new connections to the system and configure access rights
- Secure access to lighting system through Lutron® Q-Control+ App provided by network security (provided by others), creation of administrator user account(s)/passcode(s), and through the security PIN of the device
- App connectivity requires Quantum Mobile Control and Programming software license

Requirements for Server to device Connection

- *iPad* mobile digital device
  - Lutron Q-Control+ App version 1.0 or greater
  - iOS version 8.x or greater
  - Lutron tested models: *iPad* Air 2, and *iPad* mini
  - Quantum version 2.6 or later
  - *Apple* ID required to download the Lutron Q-Control+ App from the *App Store* (if using *iPad*)
- Quantum server (can be physical or virtual)
- 1 license required per device per Quantum system
- The maximum number of concurrent devices used on a Quantum Server: 20

Requirements for Quantum Processor to device Connection

- Lutron Q-Control+ App version 2.0 or greater
- Quantum software suite version 2.7 or later
- 1 license required per device per Quantum system
- The maximum number of concurrent devices used on a Quantum Processor: 2
- Only one sub-system can be controlled when connected directly to a processor. Multiple sub-systems need a server connection to be controlled from the same application

Networking Requirements

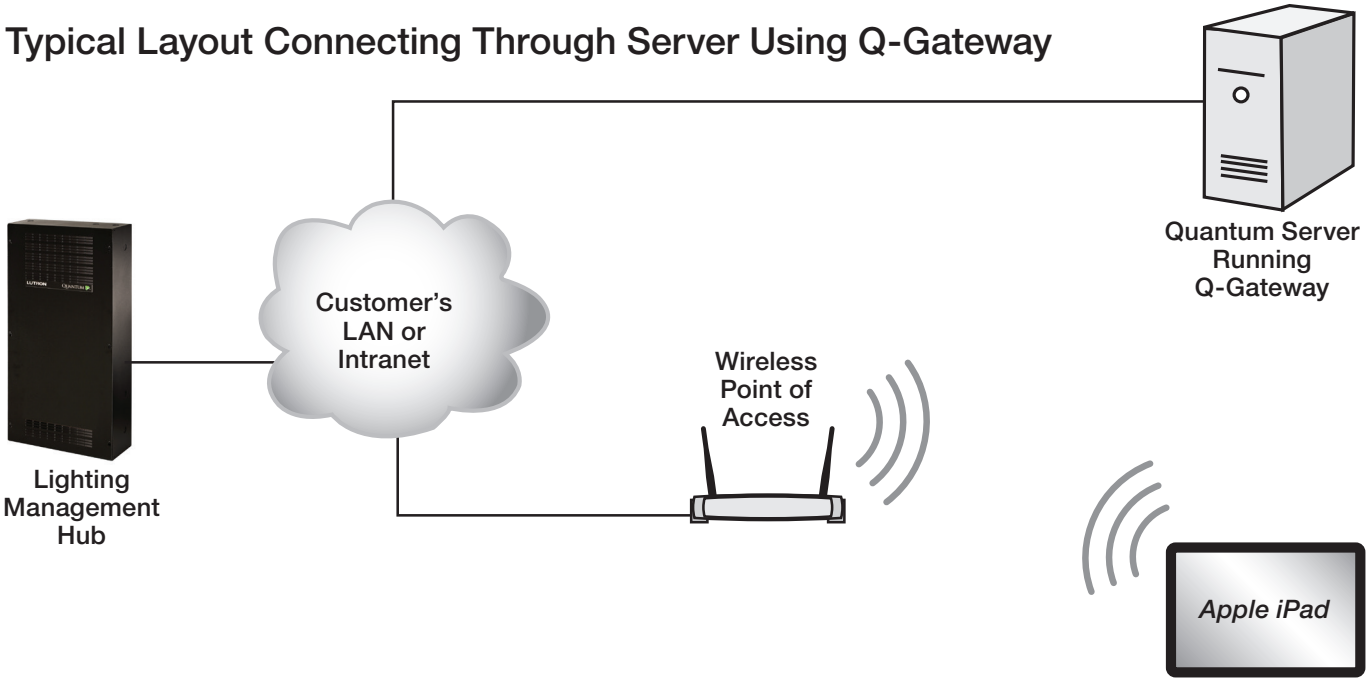
- Network access point(s) and connectivity with Quantum server to be provided by the customer
- Network components to be set up and configured by the customer's IT department
- This App will function only on a local network or company intranet; it is not intended for use via the Internet
- The following TCP ports need to be opened between the mobile device and the server: 5443, 5327
- Server requires a static IP address when connecting via the server
- A gateway address is required for Quantum Processor to mobile device connections where the connection to the mobile device is on a different Ethernet network than the Quantum Processor
- From Quantum 3.4 onwards, multiple instances of Quantum can be installed on the same Windows Server. Q-Control+ will work with the first instance. To configure it to work with other instances, either install each instance on a separate server or contact Lutron remote services to modify the Quantum server settings

Lutron Recommendations

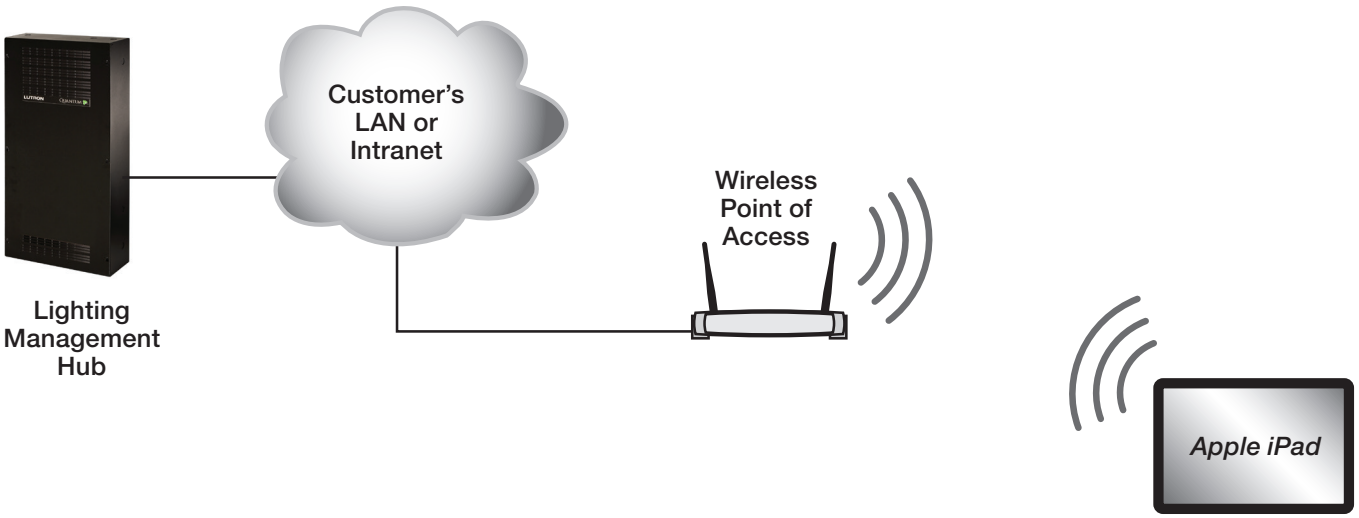
- Prior to using the Quantum Mobile Control and Programming Software, your network should be configured and in use
- Mounting an *iPad* on a wall for use with the Q-Control+ app is not recommended
- LSC-INT-VISIT: A Lutron Service Representative will attend a meeting to discuss building network requirements at the location determined by a facility representative. This visit should take place prior to start-up
- LSC-AF-VISIT: A Lutron Service Representative will attend an aim-and-focus visit to make lighting adjustments at the direction of a lighting designer

Job Name:	Model Numbers:	
Hotel Hartness	QSW-MC-PS-A	
Job Number:		

Typical Layout Connecting Through Server Using Q-Gateway



Typical Layout Connecting Through the Quantum Processor

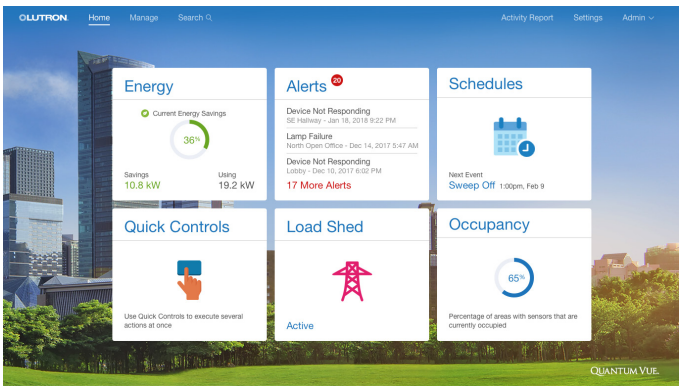


Job Name:	Model Numbers:	
Hotel Hartness	QSW-MC-PS-A	
Job Number:		

System Overview

The Quantum Total Light Management Suite is a facility management solution that creates a flexible, productive, and energy-efficient environment for a room, floor, building, or campus. The system brings switching, dimming, motorized window shades, digital ballasts, digital LED drivers, and smart sensors together under one software umbrella. Quantum is ideal for new construction or retrofit applications and can easily scale from a single room to an entire campus.

Quantum Vue User Interface



Quantum License Model Numbers

These licenses and the features and capabilities discussed in this specification submittal pertain to Quantum System Version 3.0 and above.

- A Quantum license must be purchased for each Quantum processor in the system.
- Quantum licenses do not include start-up labor costs.
- Available licenses:

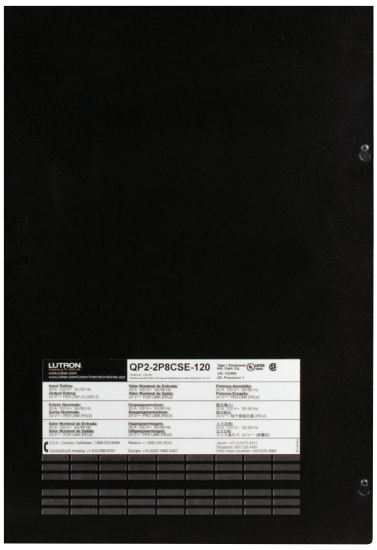
QSW-QVS-L: Lighting Control Only
QSW-QVS-S: Shade Control Only
QSW-QVS-LS: Lighting and Shade Control

Compatible Lighting Hubs

The processors are mounted inside the lighting hubs. The processor licenses are compatible with the following Quantum lighting hubs (to view online, click on the individual model numbers below):

- **QP2-xPxCSE-120**
- **QP2-xPxCSE-240**
- **QP2-xP0CSE-230**
- **QP3-1PL-100-240**

Quantum Lighting Hubs



Job Name:	Model Numbers:	
Hotel Hartness	QSW-QVS-L	
Job Number:		

Features

Navigation

- Navigate through buildings, floors, and areas using customized graphical floor plans

User Access

- Username and password required for user access
- Supports multiple user accounts with configurable permission levels per user
- Supports up to 20 concurrent users and up to 10,000 user accounts

System Adjustments

- Group areas together by type and make changes (such as high-end tuning) to all areas in a group at one time[1]
- Create quick controls to allow for simple activation of common lighting/shading preset settings[1]

Lighting Control[2]

- Monitor current status of areas, scenes, and zones
- Activate lighting scenes
- Adjust lighting zone levels
- Modify lighting zone levels in area scenes[3]
- Rename areas, scenes, and zones
- Adjust daylight harvesting functionality
- Tune and trim both high-end and low-end[1] output of lights
- Configure and enable load shedding to respond to demand response events[1]
- Control individual fixtures on the graphical floorplan[4]
- Control both the intensity and color of tunable white fixtures[5]

Shade Control[6]

- Monitor current status of shade groups and motors
- Activate shade presets
- Adjust shade motor levels
- Modify shade motor levels in shade group presets
- Rename shade groups and presets
- Adjust Hyperion solar adaptive shade functionality
- Remotely adjust shade open/close limits[1]

Occupancy

- View the real-time occupancy status of areas that contain occupancy sensors
- Modify area occupancy functionality
- Record/analyze occupancy sensor data and view trends using space utilization reports[7]

Scheduling

- Create and edit scheduled events
- Events can be scheduled to occur at fixed times or relative to sunrise/sunset and can be programmed to occur once or to be reoccurring

Energy Management[8]

- View energy and power usage graphs by system, floor, or area

Reports

- System activity
- Diagnostic
- Energy savings by strategy[8]
- Energy and power usage[8]

Alerts

- Locate system alerts on the graphical floor plan
- Manage lamp, ballast, and driver failures of digitally controlled fixtures
- Manage communication failures to digital devices in the system
- Receive low-disk space alerts and manage reporting service outages[1]
- Configure which alerts are generated as well as the frequency/timing of alert messages[1]

1 Available only with Quantum System Version 3.1 and above.
2 Quantum Vue cannot control non-lighting zones or DMX 3-channel lighting zones.
3 For areas controlled by a GRAFIK Eye QS system, scene changes can be made only by using the GRAFIK Eye QS device; Quantum Vue cannot modify scenes in areas controlled by a GRAFIK Eye QS system.
4 Requires the Fixtures on the Floorplan software license (model number QSW-RPT-FOFP). For more information, see www.lutron.com/TechnicalDocumentLibrary/Fixtures_on_the_Floorplan_3691022.pdf
5 Available with Quantum system version 3.3 or later. Requires fixtures with built-in CCT control. For more details, see www.lutron.com/en-US/Education-Training/Pages/LCE/ColorTuning.aspx
6 For Lutron QS Wired Roller Shades only.
7 Requires the Space Utilization software license (model number QSW-RPT-SU) and the Quantum Reporting software license (model number QSW-RPT-PP-A).
8 Energy features in Quantum Vue require Quantum reporting software licenses per processor (model number QSW-RPT-PP-A).

Job Name:	Model Numbers:	
Hotel Hartness	QSW-QVS-L	
Job Number:		

System Requirements

- The Quantum System Software Suite version 3.0 or later is required for Quantum Vue.
- Access to the Quantum Vue software from multiple devices (e.g., laptops, desktops, tablets) on the network requires a Windows® physical or virtual server called the Q-Manager. See the following specifications for Q-Manager server requirements (to view online, click on the individual model numbers below):
  - **QS-A-CMP-S-0**: Lutron provided standard server
  - **QS-A-CMP-R-0**: Lutron provided high reliability server
  - **QS-A-CMP-SBO-0**: Customer provided server
  - **QS-A-CMP-VSBO-0**: Customer provided virtual server
- A Windows® physical or virtual server-based Q-Manager is recommended for all Quantum systems to maximize all of the features of the system. Alternatively, the Q-Manager can be a laptop or desktop with the specified limitations. If using a laptop or desktop PC instead of a Windows® server to run the Quantum System Software Suite, certain features will not be available:
  - Quantum Vue will not be available unless the PC is connected to the system, powered, and logged in.
  - Historical System Activity Information will not be stored over time when the PC is not powered and connected to the system.
  - Power and Energy Data will not be stored over time so power and energy reports may not be accurate.
  - Alerts cannot be automatically emailed without a server.

  See the following specifications for Q-Manager laptop and desktop requirements (to view online, click on the individual model numbers below):
  - **QS-A-CMP-D-0**: Lutron provided desktop
  - **QS-A-CMP-L-0**: Lutron provided laptop
  - **QS-A-CMP-DBO-0**: Customer provided desktop
  - **QS-A-CMP-LBO-0**: Customer provided laptop
- A Q-Manager Windows® computer running the Quantum System Software Suite must be able to communicate with the Quantum processors over an Ethernet network. See the following specifications for network requirements (to view online, click on the individual model numbers below):
  - **QS-EO**: Indicates that the Quantum processors and server system will be interconnected using the building network
  - **QS-LO**: Indicates that the Quantum processors and server system will be interconnected using an isolated network dedicated to the Quantum system
- See the Quantum IT Implementation guide for all Quantum computer and networking requirements and best practices at www.lutron.com/ITGuide

Optional Features

- Additional software licenses are required to enable specific Quantum features (to view online, click on the individual model numbers below):
  - **QSW-RPT-PP-A**: Quantum reporting licenses enable the processors in the Quantum system to store historical information on the Q-Manager server so that the information can be displayed in Quantum Vue. The information stored includes power, energy, runtime hours, system activity, and alerts
  - **QSW-RPT-FOFP**: The Fixtures on the Floorplan software license enables individual Lutron addressable fixture/switchleg control using fixture icons within the Quantum Vue software
  - **QSW-RPT-SU**: The Space Utilization license enables Quantum Vue to record/analyze occupancy sensor data and report on occupancy trends within the system[1]
  - **QSW-BAC-PP-A**: Quantum BACnet licenses enable the processors in the Quantum system to integrate with building management systems using BACnet IP
  - **QSW-MC-PS-A**: Q-Control+ is a software user license that allows the user to control, monitor, and tweak the scene levels of lights and shades in the Quantum system using an *iPad* app over the building network. Q-Control+ is only available when a single instance of Quantum is installed on a server. If more than one instance is installed on a server, Q-Control+ will work with the first instance only
  - **QSW-DEM-PP-A**: DALI® Emergency is a software license that enables the processors of a Quantum system to monitor, manage, and schedule DALI® emergency device testing for compatible DALI® emergency devices connected to Energi Savr Node modules in the Quantum system
  - **ENTERPRISE-VUE**: Allows multiple Quantum systems to be accessed through a single Quantum Vue web page.
  - **QSW-API**: Enables integration to a Quantum system using a RESTful Web Service.
- The Q-Manager does not require a connection to the Internet in order to use Quantum Vue.
- To more quickly respond to service requests, Lutron highly recommends configuring remote access to the Q-Manager. This will allow a Lutron service engineer to readily access the system. Contact your Lutron service team for more information on how to configure remote access.
- All system programming such as timeclocks, keypad button presses, occupancy sensor control, daylight sensor control, and integration will function without a Quantum Server or PC connected to the system. Quantum Vue and Q-Reporting will not function without a Quantum Server or PC connected to the system.

[1] Requires a server.

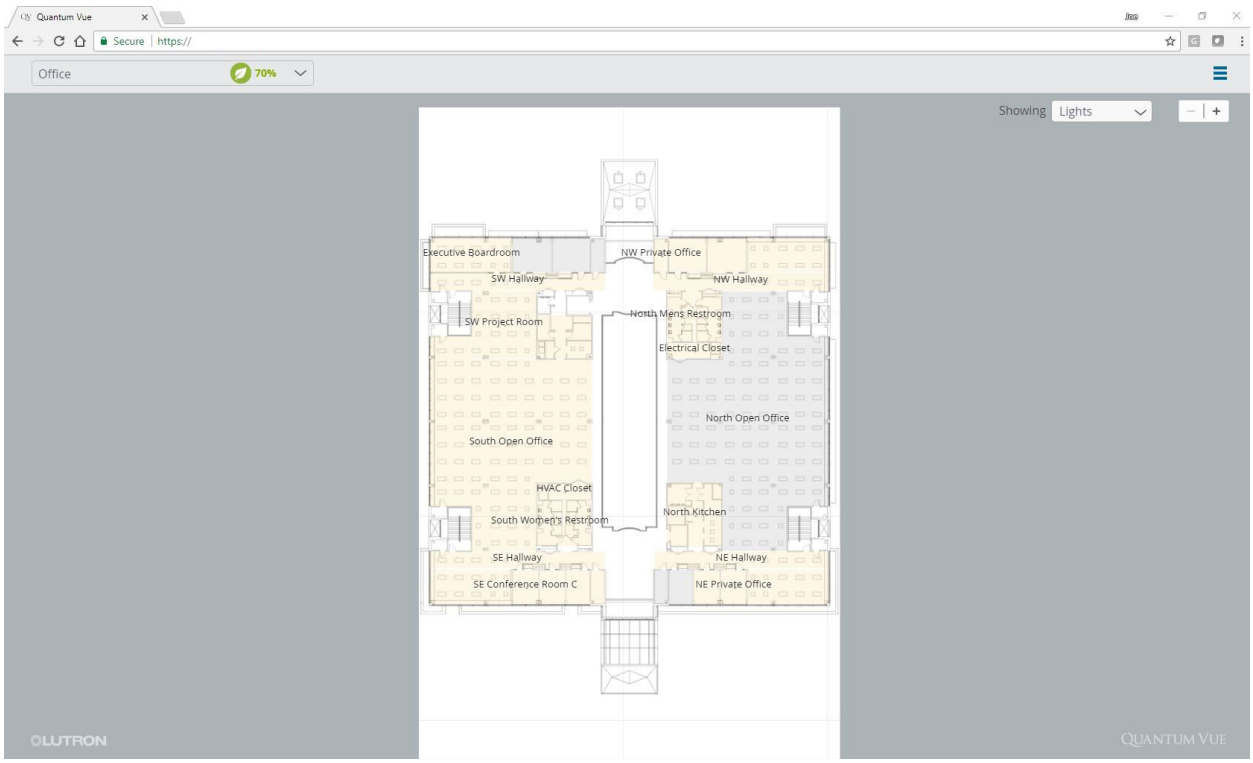
Additional System Components

- Q-Design is a Windows® application that is part of the Quantum System Software Suite. The application is used by the Lutron service team for startup and to make major hardware additions and reconfigurations to a Quantum system. This application runs locally on the Quantum server.

Floor Plan Requirements

- Lutron requires one electronic drawing per floor of the system (provided by the customer) 8 weeks prior to software installation to create the Quantum Vue navigation images. Drawings are required to be in a CAD format such as .dxf or .dwg. Adobe .pdf files are acceptable but may require additional time to remove unnecessary information. If additional time is required, additional fees may be incurred. **The quality of the images in the Quantum Vue software is dependant on the quality of the images Lutron receives. FF&E (Fixtures, Floorplans and Equipment) style drawings are recommended as they are generally cleaner and will deliver a more aesthetically pleasing result.** If the drawings are provided after the deadline, additional fees will apply for the additional services needed to add the drawings into the system at a later time. An example of a Quantum Vue navigation image using the background layout is shown in Figure 1 (on the following page).
- Lutron may configure the navigation images using the perimeter layout (see Figure 2 on the following page) if requested or if the background images provided contain too much information or have poor resolution.
- Lutron will provide a default layout for each floor of the system if drawings are not made available. An example of a default layout is shown in Figure 3 (on the following page).
- Lutron recommends providing one drawing per floor. Drawings sets provided that have multiple drawings per floor, will not be combined unless requested. Additional fees and time will be required to combine drawings. CAD files (.dxf or .dwg files) are required to combine drawings.
- Lutron requires contact information of an authorized owner representative to make decisions regarding the design and functionality of the images shown in the Quantum Vue software. This contact may be used to answer questions regarding the software appearance.
- Customizations or modifications to the layout or appearance of the floorplan are subject to approval by Lutron. Additional fees and time will apply.

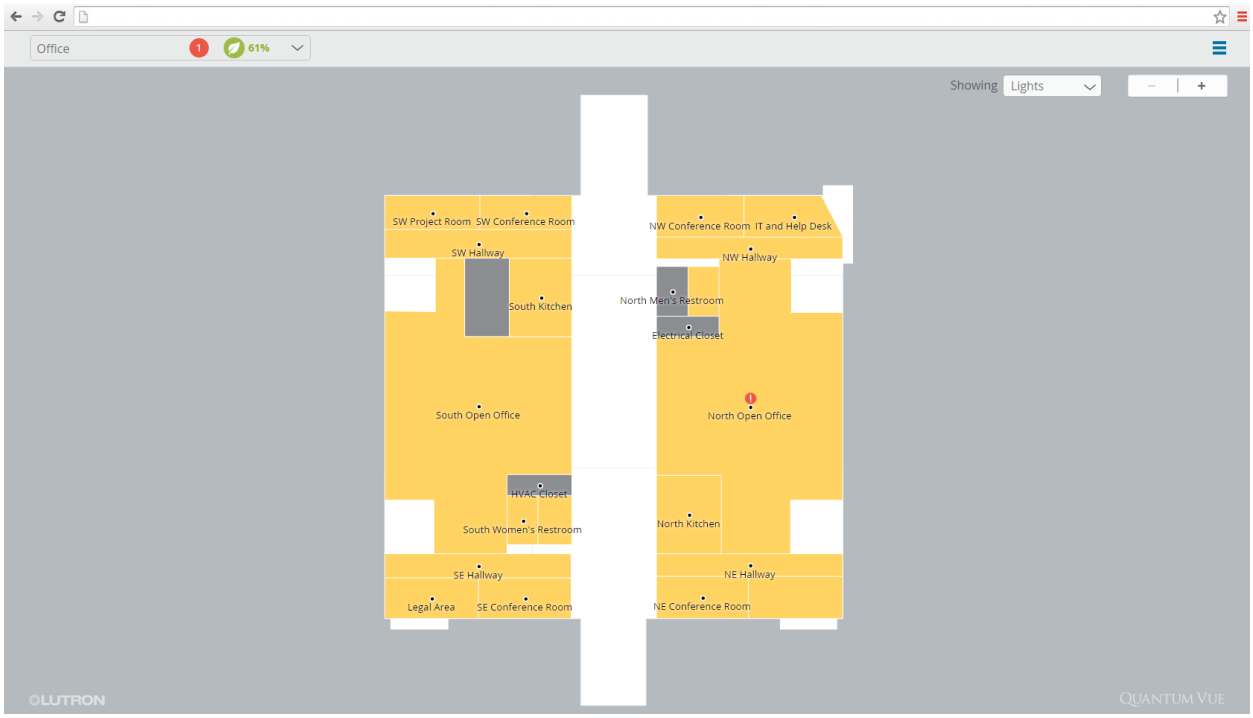
Figure 1 - Quantum Vue Background Layout



This is an example of a Quantum Vue floor plan that was created using customer supplied FF&E (Fixtures, Furniture and Equipment) drawings in a CAD format (such as .dwg or .dxf).

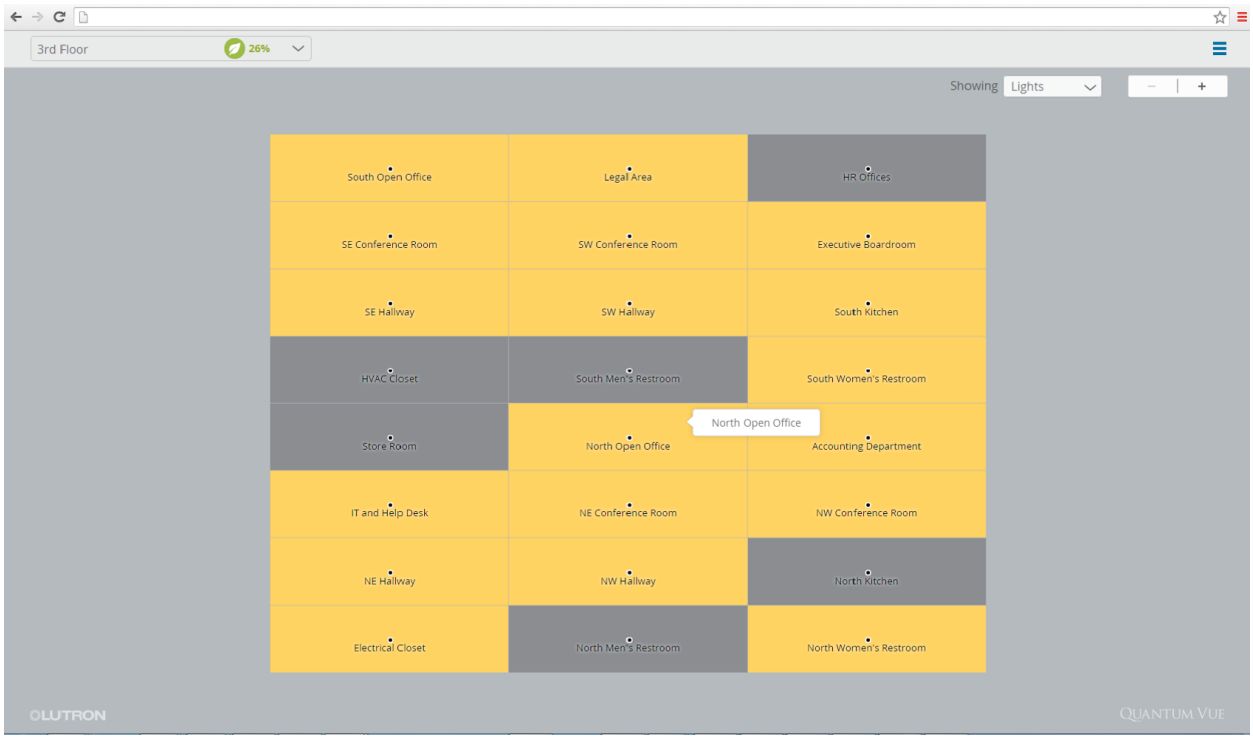
Job Name:	Model Numbers:	
Hotel Hartness	QSW-QVS-L	
Job Number:		

Figure 2 - Quantum Vue Perimeter Layout



This is an example of a Quantum Vue floor plan that was created using customer supplied as-built drawings in an uneditable format (such as .pdf). The drawings contained information that cluttered the drawing and made it less intuitive so an outline of the image was used.

Figure 3 - Quantum Vue Default Layout



This is an example of a Quantum Vue floor plan that was created with no customer supplied drawings. Since no drawings were available, the software generated a default grid containing one square for each area.

Quantum Reporting Software

The reporting software license adds the following features to your Quantum system.

- Logging of calculated energy usage for lighting loads
- Custom reporting on energy usage from the Quantum Vue software
- Ability to configure and activate load shed/demand response from the Quantum Vue software
- Tracking of light fixture hours of operation
- System activity reports

Lighting Power and Energy Usage Reports

- Energy reports allow the user to gather historical information about the buildings energy and power usage.
- Energy reports show a comparison of cumulative energy used over a period of time for one or more areas in the system.
- Power reports show power usage trends over a period of time for one or more areas in the system.

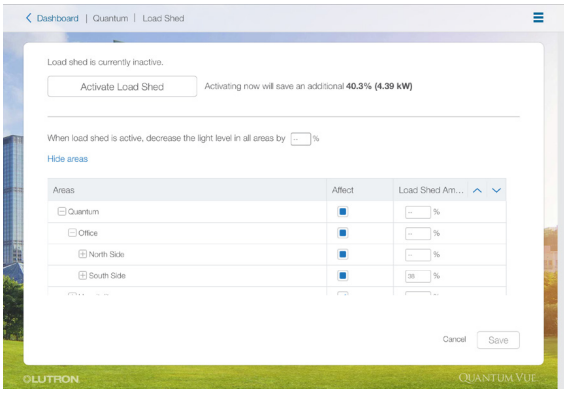
Lamp Maintenance Reports

- Creates a list of all failed fluorescent lamps that are connected to EcoSystem or DALI ballasts.

System Activity Reports

- Creates a detailed report of all events that have occurred in the system.
- Available information: Occupant Activity; Time Clock Activity; Building Manager Activity; Status Activity; Device Failure Activity; Lamp Failure Activity; Sensor Activity; Ballast Replacement/Auto Replacement Activity; System Errors; BACnet® Activity

Load Shed/Demand Response



- Participate in load shed/demand response programs offered by the local utility
- Apply a load shed reduction to selected areas (configurable per area), thereby reducing the building's lighting power usage

Requirements

- Quantum light management system
- Lutron Q-Manager server (can be supplied by Lutron or by customer)

Licenses Required

- Model number: QSW-RPT-PP-A
  - One Q-Reporting license required for each Quantum processor in the system.
- Model number: QSW-QVS-L
  - One Quantum Vue - Lights software license required for each Quantum processor in the system.
- Optional model number: QSW-BAC-PP-A
  - One BACnet® software license required for each Quantum processor in the system if power data via BACnet® is required.

Job Name:	Model Numbers:	
Hotel Hartness	QSW-RPT-PP-A	
Job Number:		

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CCP Custom Combination Panels: 120 V~

Custom Combination Panels are pre-assembled and tested power panels that are configurable to control multiple load types. They are ideal for projects with many small loads.

Features

- Panels are pre-wired and tested prior to shipping.
- Feed-through panels and panels with breakers are available.
- Supports various load types using remote power modules (RPMs):
  - Dimming Module: Works directly with incandescent, forward-phase electronic low-voltage (ELV), magnetic low-voltage (MLV), Lutron® 2-wire LED drivers, switched lighting loads, switched LED drivers, switched fluorescent ballasts and compatible forward-phase dimmable LEDs.
  - Adaptive Module: Works directly with incandescent, ELV (forward- and reverse-phase), MLV, Lutron® 2-wire LED drivers and compatible forward- and reverse-phase dimmable LEDs.
  - XP Switching Module: Works with many switchable load types including, but not limited to, resistive, inductive, motor loads, switched LED drivers and fluorescent ballasts. Also rated to control 20 A general purpose receptacles at 120 V~.
  - Motor Module: Works with 3-wire 120 V~ motors.
  - Fan Speed Module: Works with ceiling fans at 120 V~.
  - 0-10 V⎓ Dimming Module: (12 modules, 24 dimming legs total per panel, max). Works with 0–10 V⎓ dimming ballasts and drivers. Works in conjunction with a dimming module or an XP switching module. Also capable of outputting DALI® intensity broadcast to control DALI® drivers and ballasts.
- Panels are rated for 120 V~ input power.
- Bypass jumpers included for load mis-wire protection.
- Front cover provided to maximize thermal performance without needing a fan.
- 1–9 modules (Dimming, Adaptive, XP, Motor, Fan) for 4–36 controllable outputs.
- Panels have a circuit selector that allows panels to be compatible with:
  - GRAFIK Eye® 4000 series control units and operate on the same link as GP and XP panels.
  - Quantum® systems.
  - DMX512 dimming systems via the 2LINK™ option.
  - LUT-ELI-3PH for emergency applications requiring a listed device to comply with UL924 or CSA C22.2 No. 141-02.
- Each panel provides power and dimming for 4–36 controllable outputs.

Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

Panel Specifications

Regulatory Approvals

- UL® Listed (Reference: UL File E42071).
- CSA Certified.
- Seismic certified panels can be provided upon request. Contact Lutron for details.
- Other certificates may apply.

Power

- Input power: 120 V~. All voltages 50/60 Hz, phase-to-neutral
- Branch circuit breakers (AIC ratings):
  – 120 V~ 10,000 A
- Lightning strike protection: Meets ANSI/IEEE standard 62.41-1980. Can withstand voltage surges of up to 6000 V~ and current surges of up to 3000 A.
- 10-year power failure memory: Automatically restores lighting to scene selected prior to power interruption.

Short-Circuit Current Ratings (other ratings available)

Panel Size	Voltage	Standard SCCR Rating
All other sizes	120 V~	25,000 A
24 in enclosure with breakers	120 V~	10,000 A

Wiring

- Internal: Prewired by Lutron.
- System communications: IEC PELV/NEC® Class 2 wiring connects dimming panels to other components.
- Line voltage: Feed and load wiring only. No other wiring or assembly required.

Setup

Circuit selector digitally assigns controllable outputs to zones and sources. Permits reassignment of zones and sources without rewiring.

Physical Design

- Enclosure: NEMA-Type 1, IP-20 protection; 16 U.S. gauge steel. Indoor use only.
- Maximum Weight:
  – Small panel (24 in) = 27 lbs (12 kg)
  – Standard panel (59 in) = 80 lbs (36 kg)
- Seismic Certification Limits: SDS = 2.5 g, z/h = 1.0, IP = 1.5. Panels containing fan or motor modules are limited to SDS = 1.5 g. Contact Lutron for details.

Mounting

- Surface mount or recess mount between 16 in (40 cm) studs.
- Allow clearance around panel for ventilation.

Line Voltage (Mains) Connections

- Use copper wire only, supply conductors 60 °C to 75 °C (140 °F to 167 °F).
- Feed-through panels
  – DIN rail-mounted terminal blocks provided for line-voltage (mains) power to RPMs and to circuit selector power supply.
  – DIN rail-mounted terminal blocks provided for load wiring.
- Breaker panels
  – Main breaker or main lug provided for line-voltage (mains) power. Power is distributed to branch circuit breakers, modules, and control gear via internal wiring installed by Lutron.
  – DIN rail-mounted terminal blocks provided for load wiring.

Wire Sizing

- Refer to wiring page for wire sizes.
- Main breakers vary in size depending on modules in the panel. Consult with Lutron for wire sizes accommodated.
- Main lugs vary in size depending on modules in the panel. Consult with Lutron for wire sizes that can be accommodated.

Environment

32–104 °F (0–40 °C). Relative humidity less than 90%, non-condensing.

* For more information on load ratings, please refer to Application Note #201 at www.lutron.com/TechnicalDocumentLibrary/048-201.pdf

** Not all LED and CFL loads available today are dimmable. Visit www.lutron.com/LEDtool for a list of loads that have been tested by Luton to be compatible with this product.

Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

Module Specifications

Sources/Load Types

Operate these sources with a smooth, continuous Square Law dimming curve or in a full-conduction, non-dim state:

Dimming Modules

- 80 BTUs/hour maximum per module.
- RTISS™ filter circuit technology compensates for incoming line voltage variations: No visible flicker with +/– 10% change in RMS voltage/cycle and +/–2% Hz change in frequency/second.
- Rated to handle a fully loaded electrical circuit (16 A max). 4 outputs per module. Maximum of 16 A on an output.
- Can operate HID sources in a full conduction, non-dim state.
- When controlling Lutron 2-wire drivers, refer to driver spec sheet for permitted driver quantities.
- If mixing Lutron 2-wire drivers and other loads on the same module, treat each driver as a 50 W load.

Adaptive Dimming Modules

- 115 BTUs/hour maximum per module.
- RTISS-TE™ filter circuit technology compensates for incoming line voltage variations: No visible flicker with +/– 10% change in RMS voltage/cycle and +/–2% Hz change in frequency/second.
- Rated to handle a fully loaded electrical circuit (16 A max). 4 outputs per module. Maximum of 10 A on an output.
- When programmed to “auto” mode, the unit starts in reverse-phase and if an incompatible load is detected, it will convert to forward-phase.
- When controlling Lutron 2-wire drivers, refer to driver spec sheet for permitted driver quantities.
- If mixing Lutron 2-wire drivers and other loads on the same module, treat each driver as a 50 W load.

0-10 V Dimming Modules (TVM)

- Two 0–10 V⎓ circuits per module.
- Sink or source 50 mA per output (~25 ballasts/drivers; maximum 750 mA total per twenty-four outputs).
- 5 BTUs/hour maximum per module.
- DIN rail mounted.
- Able to control:
  - 0–10 V⎓, IEC® Standard 60929
  - 10–0 V⎓
  - PWM (Pulse Width Modulation), IEC® Standard 60929
  - DALI® (Broadcast only), IEC® Standard 62386
- Must be used in conjection with a dimming module or XP switching module.

XP Switching Modules*

- Able to control 20 A receptacles.
- Switch legs rated at 20 A.
- Four switch legs per module.
- Patented Softswitch® circuit eliminates arcing at mechanical contacts when loads are switched, which prolongs relay life to 1,000,000 cycles at 16 A.
- 10 BTUs/hour per module.
- For additional information, see Lutron® XP Specification Submittal (P/N 369345e).

Load

- When controlling receptacles, the XP Switching Module may be used with, but is not limited to, the following:
  - Motors
  - Fans
  - Humidifiers
  - Printers

  Note: Refer to the manufacturer’s guidelines for acceptable switching methods.
- When controlling receptacles, the XP Switching Module may NOT be suitable for use with devices that require any of the following:
  - Shut-down process before power is interrupted (e.g., computers)
  - Cool-down process before power is interrupted (e.g., projectors)
  - Programming (e.g., clocks, DVRs)
  - Long warm-up cycle
- The XP Switching Module is 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 “⏻” located on the controlled receptacle outlet where visible after installation as stated in 2014 NEC® Article 406.3(E).

Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

Module Specifications (continued)

Motor Modules*

- For 20 A branch circuit, 1/4 HP per circuit. 5 A maximum per circuit for motor loads, 3 A maximum per circuit for tungsten loads.
- Each module controls four 3-wire 120 V~ motors for applications such as shades, draperies, and hurricane shutters.
- Individual control outputs use two mechanically interlocked relays for directional control that prevents simultaneous operation of both outputs. Air gap provided when all four circuits are off.

Fan Speed Modules

- Each of the four outputs of the fan module controls a single ceiling fan.
- There are five available speeds: off, low, medium, medium-high, and high.
- Each output is rated to control a single ceiling fan load up to 2 A at 120 V~.

Module Specifications (continued)

	Adaptive Module LP-RPM-4A-120	Dimming Module LP-RPM-4U-120	Motor Module LP-RPM-4M-120	Fan Speed Module LP-RPM-4FSQ-120	Switching Module XP2-SM-4S	0-10 V⎓ Dimming Module + Dimming Module GRX-TVM2 + LP-RPM-4U-120	0-10 V⎓ Dimming Module + Switching Module GRX-TVM2 + XP2-SM-4S
Ratings							
Input Voltage	120 V~	120 V~	120 V~	120 V~	120 V~	120 V~	120 V~
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Maximum load per module	16 A	16 A	16 A	8 A	80 A	16 A	64 A
Maximum load per output	10 A	16 A	5 A	2 A	20 A	16 A	16 A
Number of outputs	4	4	4	4	4	4	4
Minimum load	10 W	25 W	-	0.25 W	-	25 W	-
Technology							
Forward-phase dimming	✓	✓					
Reverse-phase dimming	✓						
Phase adaptive	✓						
Phase selective	✓						
RTISS®	✓	✓					
RTISS TE®	✓						
Softswitch®					✓		✓
Mechanically interlocked switching relays			✓				
Switched capacitor quiet control circuitry				✓			
Load Types							
Dimmable phase control LED (forward compatible dimming phase)	✓	✓					
Dimmable phase control LED (reverse-phase)	✓						
ELV (forward-phase)	✓	✓					
ELV (reverse-phase)	✓						
MLV	✓	✓			✓		
Incandescent	✓	✓			✓		
Lutron® 2-wire LED drivers	✓	✓					
Lutron® Tu-wire® fluorescent ballasts	✓	✓					
Switched LED driver		✓			✓		
Switched fluorescent ballasts		✓			✓		
Switched general purpose receptacle					✓		
0-10 V⎓ LED driver						✓	✓
0-10 V⎓ fluorescent ballast						✓	✓
Other non-dim lighting loads		✓			✓		
Motor loads					✓		
Neon/cold-cathode	✓	✓			✓		
AC shade/projection screen motors			✓				
Ceiling paddle fan				✓	✓		

Module Specifications (continued)

Load Interfaces	**Adaptive Module** LP-RPM-4A-120	**Dimming Module** LP-RPM-4U-120	**Motor Module** LP-RPM-4M-120	**Fan Speed Module** LP-RPM-4FSQ-120	**Switching Module** XP2-SM-4S	**0-10 V⎓ Dimming Module +** GRX-TVM2 + LP-RPM-4U-120	**0-10 V⎓ Dimming Module + Switching Module** GRX-TVM2 + XP2-SM-4S
PHPM-PA	✓	✓					
PHPM-3F	✓	✓					
PHPM-SW-DV	✓	✓			✓		
PHPM-WBX	✓	✓					
GRX-TVI	✓	✓					
BCI-0-10						✓	✓

How to Build a Model Number

C C P – _X_L_A_M_F_T – 1 2 0 4 M L – 2 0 – C G P _ _ _

- Prefix
- Quantity and Type of Modules
- Voltage
- Feed Type
- Branch Circuit Breaker Rating
- Custom Panel Suffix

Prefix

- **CCP**: Custom Combination Panel

Quantity and Type of Modules

_X _L _A _M _F _T

List modules in the order shown above. Insert the quantity before each module code. Omit codes for modules not used in panel. See Note at right for limits on numbers of modules per panel.

X = Four-Circuit Switching Module (XP2-SM-4)

L = Four-Circuit Dimming Module (LP-RPM-4U-120)

A = Four-Circuit Adaptive Dimming Module (LP-RPM-4A-120)

M = Four-Circuit Motor Module (LP-RPM-4M-120)

F = Four-Circuit Quiet Fan Speed (LP-RPM-4FSQ-120)

T = 0-10 V⎓ Control (GRX-TVM2)

Note: if any of the available module types is not desired, do not include it in the model number.

Example: if two XP switching modules, three dimming modules, and one motor module are desired, the correct model number would begin CCP–2X3L1M…, *not* CCP–2X3L0A1M…

Voltage

- **120**: 120 V~

Feed Type

- **FT:** Feed-through
- **2M*:** 1 phase 2 wire feed in a mini panel.
- **3M*:** 1 phase 3 wire feed (split phase) in a mini panel.
- **4M*:** 3 phase 4 wire feed in a mini panel.
- **2ML:** Main lug for a 1 phase 2 wire feed.
- **3ML:** Main lug for a 1 phase 3 wire feed (split phase).
- **4ML:** Main lug for a 3 phase 4 wire feed.

Branch Circuit Breaker Rating

- **20**: 20 A branch circuit breakers
- **15**: 15 A branch circuit breakers
- Omit for feed-through

Custom Panel Suffix

- CGP number indicates specific characteristics of the customized panel. All CCP panels will have a corresponding CGP number.

NOTE:

Module quantities are limited as follows:

Standard-Size Branch Circuit Breaker panels

Max. # in panel: 9
Max. # with TVM modules: 8
Max. # with XP modules: 7
Max. # with XP and TVM modules: 5

Standard-Size Feed-Through panels

Max. # in panel: 9
Max. # with TVM modules: 8

Mini-Size Branch Circuit Breaker panels

(no XP modules):
Max. # in panel: 3

Mini-Size Feed-Through panels

Max. # in panel (with dimming modules and no TVMs): 3

Max. # in panel (with dimming modules and TVMs): 2
Max. # in panel (all switching modules): 4

Input Ratings

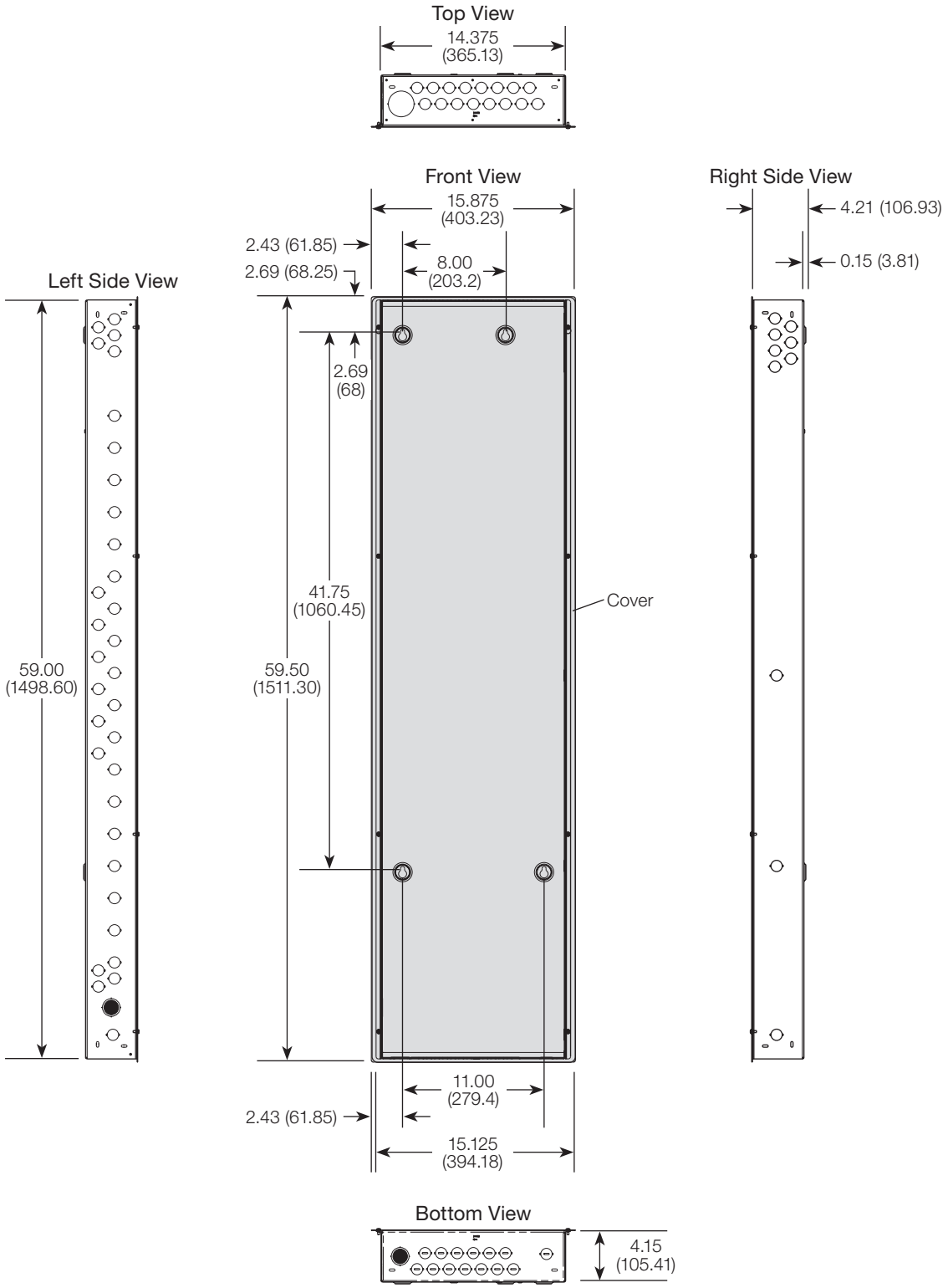
120 V~
120/240 V~
120/208 V~

* Branch circut breakers serve as a main input device. Incoming feeds lands directly to these branch circut breakers.

Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

Standard Size Panel Dimensions

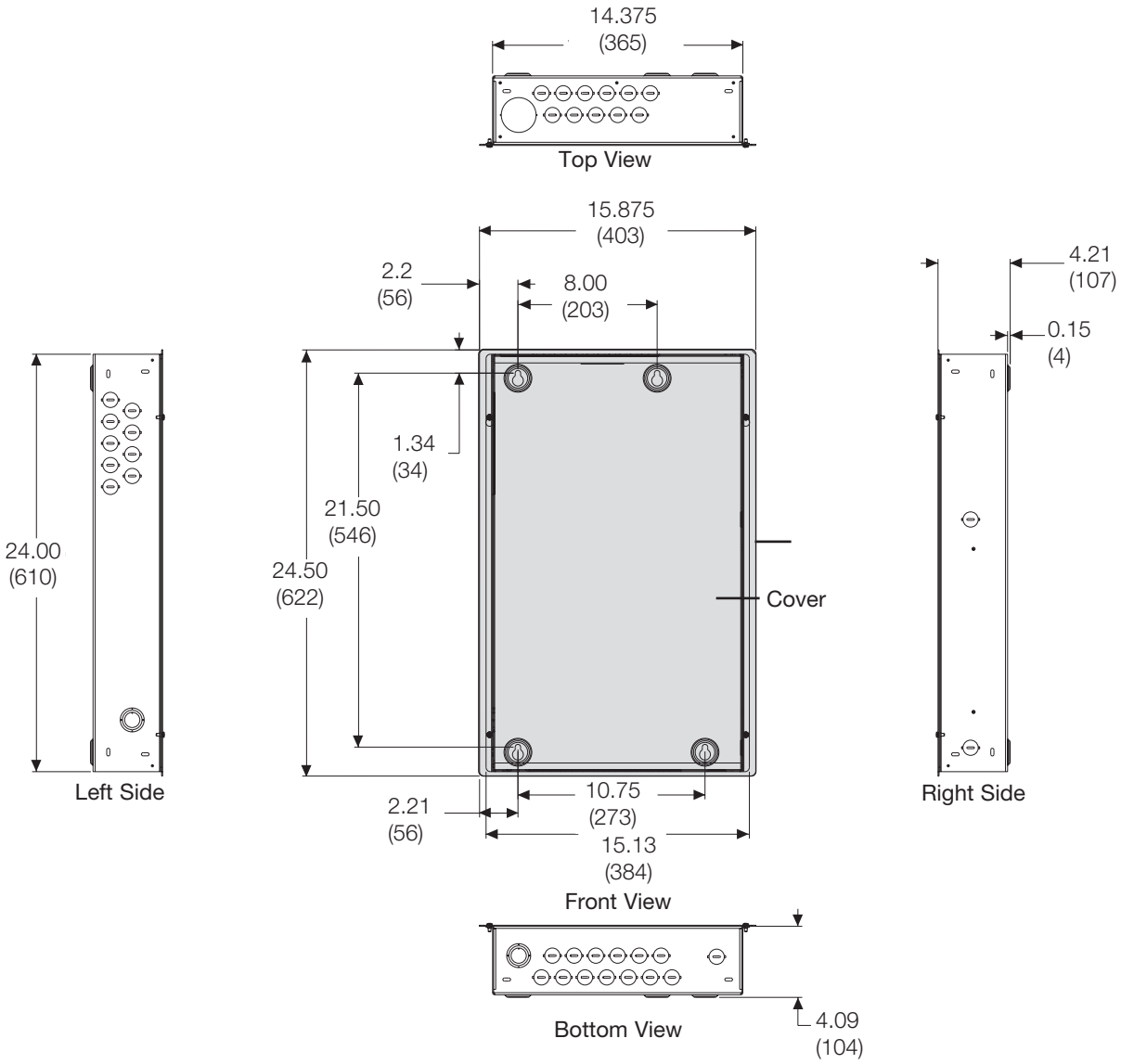
All dimensions shown as: in (mm)



Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

Mini Panel Dimensions

Dimensions shown as: in (mm).



Mounting

Standard-size CCP Dimming Panels

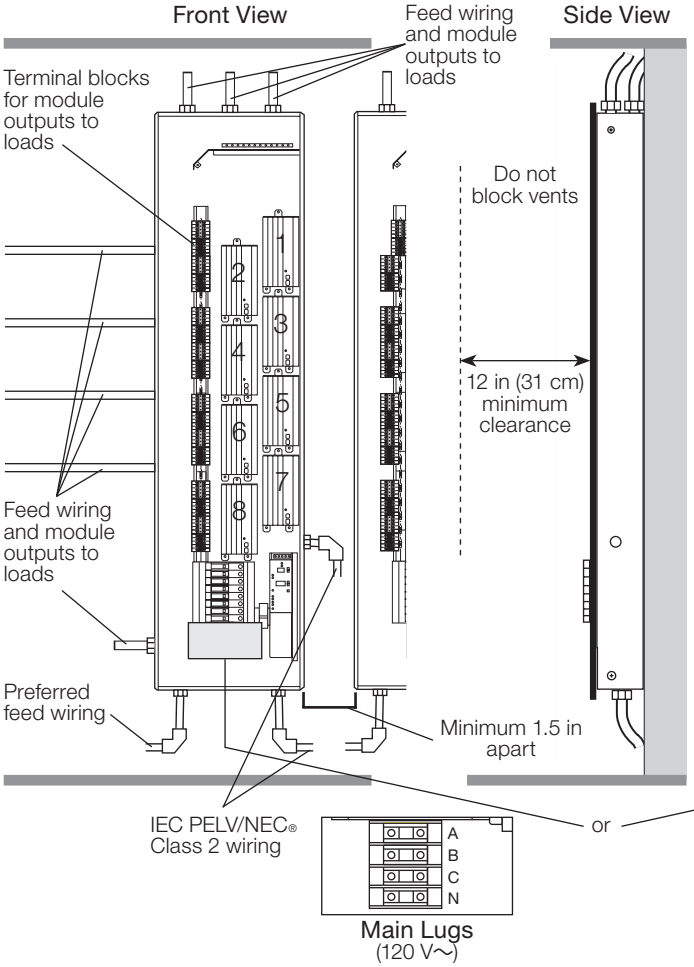
- Surface- or recess-mount indoors.
- Consult Dimensions page for dimensions and conduit knockout locations.
- Panel generates heat. Mount only where ambient temperature is 32–104 °F (0–40 °C).
- This equipment is air-cooled. Do not block vents or warranty will be void.
- Reinforce wall structure for weight and local codes.
- Mount panels where audible noise is acceptable. (Panels hum slightly and internal relays click.)
- Mount panels so line (mains) voltage wiring is at least 6 ft (1.8 m) from sound or electronic equipment and wiring.
- Mount panel within 7° of true vertical.

Number of Modules	Maximum Heat* (BTUs [Kcal]/Hr)
1	125 (31.5)
2	240 (60.5)
3	355 (89.5)
4	470 (118.5)
5	585 (147.5)
6	700 (176.5)
7	815 (205.5)
8	930 (234.5)
9	1045 (263.5)

* Maximum heat is calculated using a panel with Adaptive Modules and maximum loading. Heat will vary based on module configuration and loading.

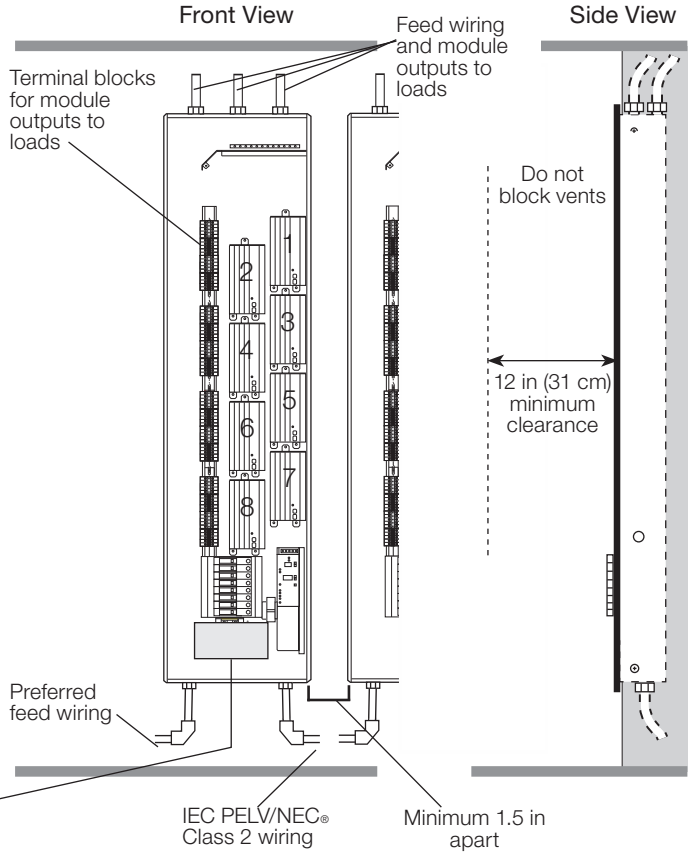
Surface Mounting

- Surface mounting keyholes accept 1/4 in (6 mm) mounting bolts. This size is recommended.
- If mounting panels next to each other, leave 1.5 in (38 mm) clearance on each side of the panels for front covers to be attached to the enclosure.



Recess Mounting

- Mount panel flush to 1/8 in (3 mm) below finished wall surface.
- If mounting panels next to each other, leave 1.5 in (38 mm) clearance on each side of the panels for front covers to be attached to the enclosure.



Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

Mounting

Mini Sized CCP Panels

- Surface- or recess-mount indoors.
- Consult Dimensions page for dimensions and conduit knockout locations.
- Panel generates heat. Mount only where ambient temperature is 32–104 °F (0–40 °C).
- This equipment is air-cooled. Do not block vents or warranty will be void.
- Mount Panels where audible noise is acceptable. (Panels hum slightly and internal relays click.)
- Mount Panels so line (mains) voltage wiring is at least 6 ft (1.8 m) from sound or electronic equipment and wiring.
- Mount Panel within 7° of true vertical.

Surface Mounting

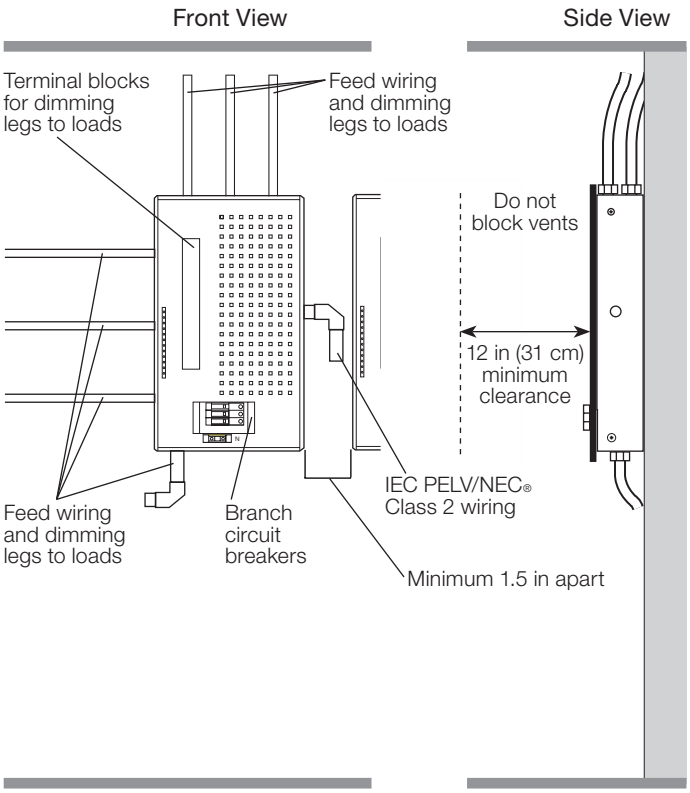
- Surface mounting keyholes accept 1/4 in (6 mm) mounting bolts. This size is recommended.
- If mounting panels next to each other, leave 1.5 in (38 mm) clearance on each side of the panels for front covers to be attached to the enclosure.

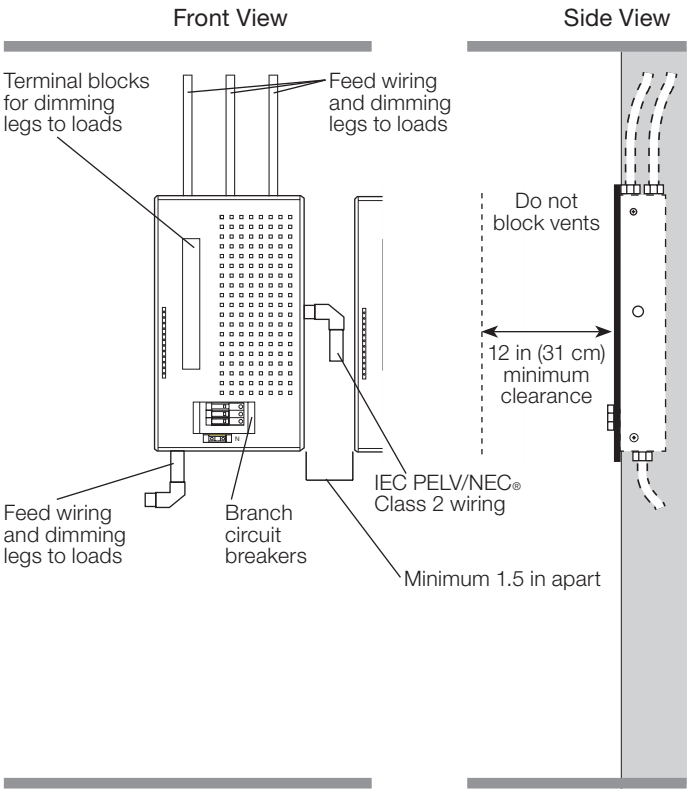
Number of Modules	Maximum Heat* (BTUs [Kcal]/Hr)
1	125 (31.5)
2	240 (60.5)
3	355 (89.5)

* Maximum heat is calculated using a panel with Adaptive Modules and maximum loading. Heat will vary based on module configuration and loading.

Recess Mounting

- Mount to wall stud by screwing through slots in corners of panel.
- Mount panel between flush and 1/8 in (3 mm) below finished wall surface.
- If mounting panels next to each other, leave 1.5 in (38 mm) clearance on each side of the panels for front covers to be attached to the enclosure.





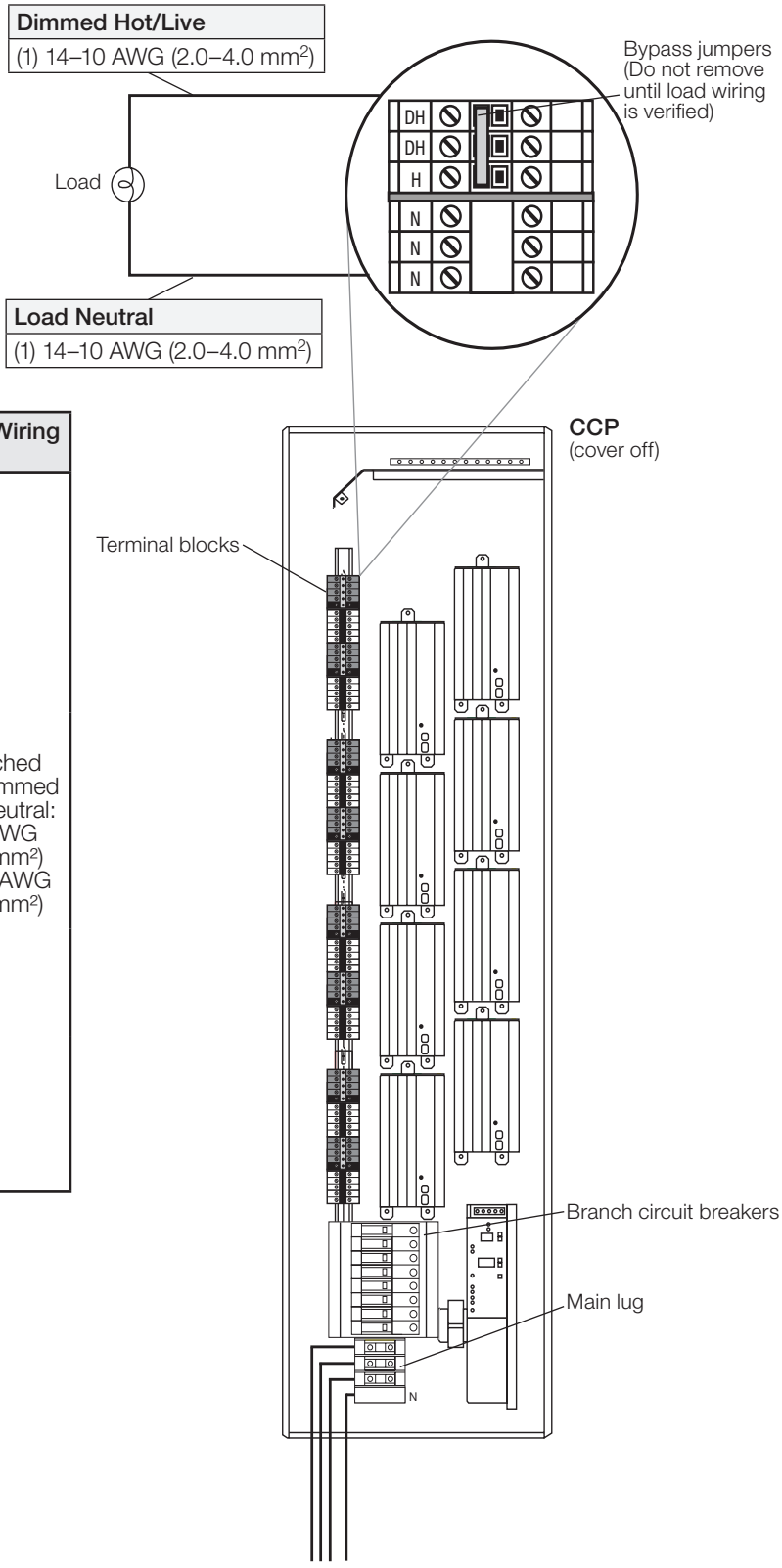
Wiring

Wire the CCP similarly to a lighting distribution panel:

- Run feed and load wiring; no other wiring or assembly is required.
- Run separate neutrals for each module (no common neutrals across phases).

The CCP can provide temporary lighting:

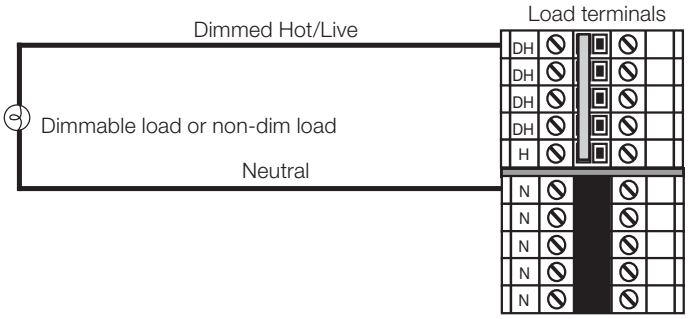
- Wire all loads.
- Do not remove the bypass jumpers that protect the dimming modules.
- Use branch circuit breakers to switch lights on and off.



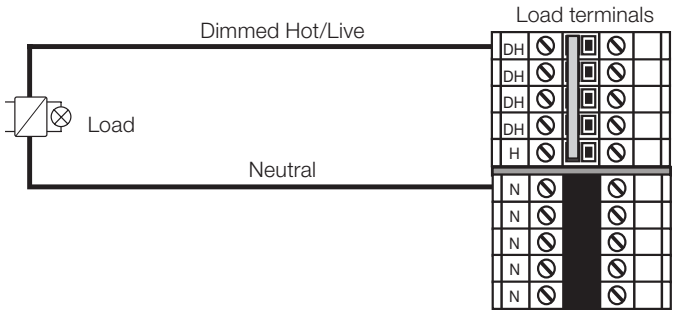
Panel Type	Feed Wiring	Feed Type	Max Input	Load Wiring
24 in or 59 in Feed Through	Hot/Neutral: 14 AWG (2.0 mm²) to 10 AWG (6.0 mm²)	1P2W	20 A	Switched Hot/Dimmed Hot/Neutral: 14 AWG (2.0 mm²) to 10 AWG (6.0 mm²)
24 in with breakers (1 module, no XP)	Hot: 14 AWG (2.0 mm²) to 8 AWG (10 mm²) Neutral: 14 AWG (2.0 mm²) to 2/0 (67 mm²)	1P2W	20 A	
24 in with breakers (2 modules, no XP)		1P2W, 1P3W	40 A	
24 in with breakers (3 modules, no XP)		1P2W, 1P3W 3P4W	40 A 20 A	
59 in with breakers (no XP)	Hot/Neutral: 14 AWG (2.0 mm²) to 2/0 (67 mm²)	1P2W, 1P3W, 3P4W	175 A (CU wire), 135 A (AL wire)	
59 in with breakers (3P4W, with XP)	Hot/Neutral: 4 AWG (25 mm²) to 250 kcmil (mcm) (120 mm²)	1P3W, 3P4W	200 A	

Typical Load Wiring

LP Dimming Module

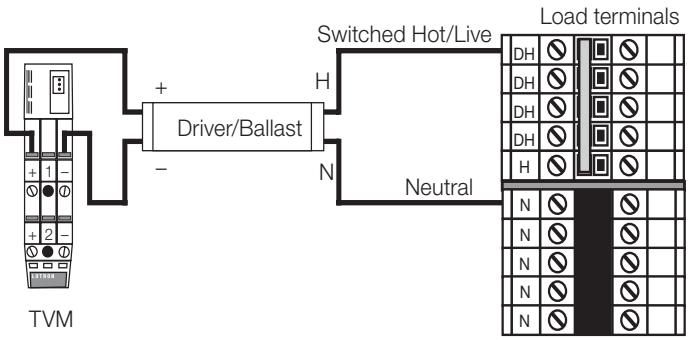


Adaptive Dimming Module

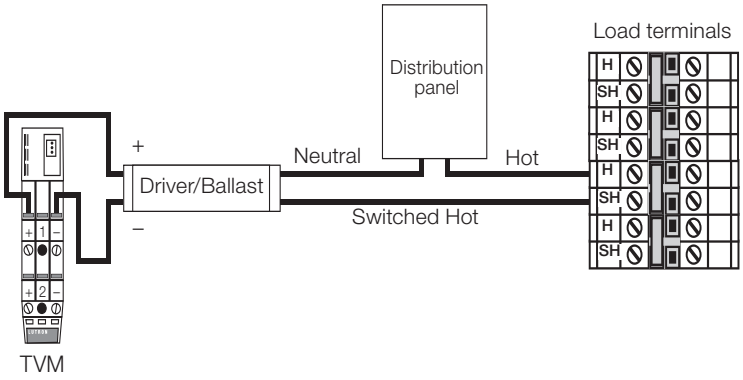


0-10 V Dimming Module + Dimming Module

- For 0–10 V, PWM, and DALI® (Intensity broadcast only) loads.
- Each TVM controls 2 consecutive dimming legs of lighting which are the first dimming legs in the panel.
- Maximum low-voltage ballast control current: 50 mA per zone, 750 mA per panel.

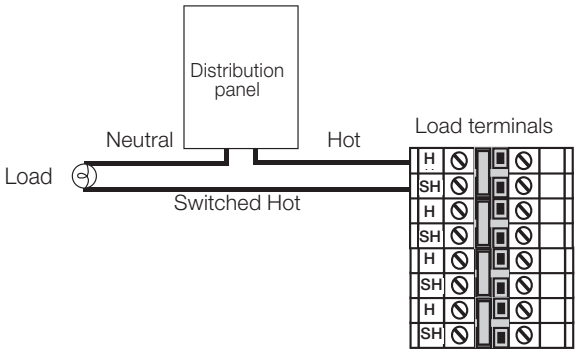


0-10 V Dimming Module + XP Switching Module



XP Switching Module*

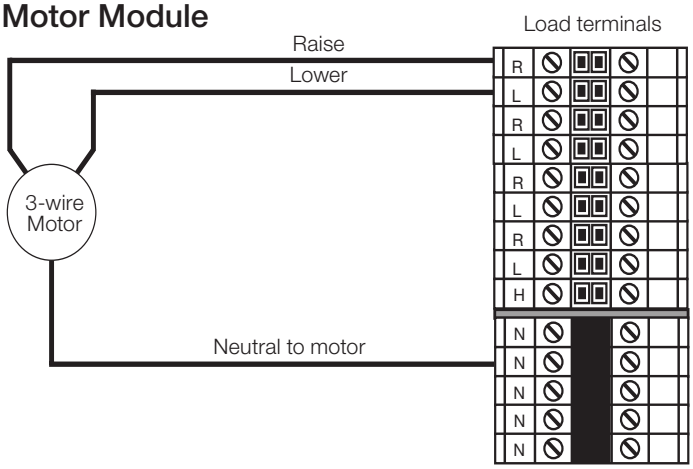
* To avoid the risk of entrapment, serious injury, or death, these controls must not be used to control equipment which is not visible from every control location or which could create hazardous situations such as entrapment if operated accidentally. Examples of such equipment which must not be operated 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:	
Hotel Hartness	CCP	
Job Number:		

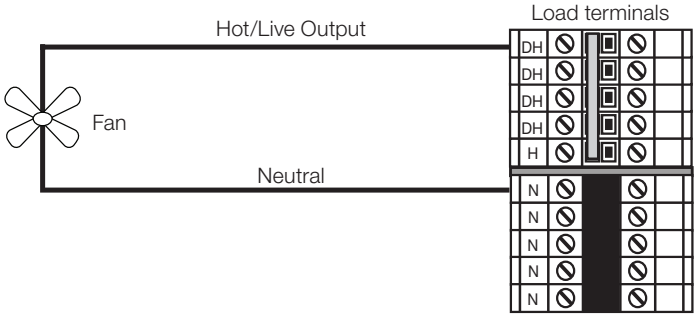
Typical Load Wiring

Motor Module



Fan Module

- For ceiling fan control.
- Each fan module output controls a single ceiling fan.



Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

Low-Voltage IEC PELV/NEC® Class 2 Wiring (All Models)

- System communications use low-voltage IEC PELV/NEC® Class 2 wiring.
- Wiring must be daisy-chained.
- Wiring must run separately from line (mains) voltage.

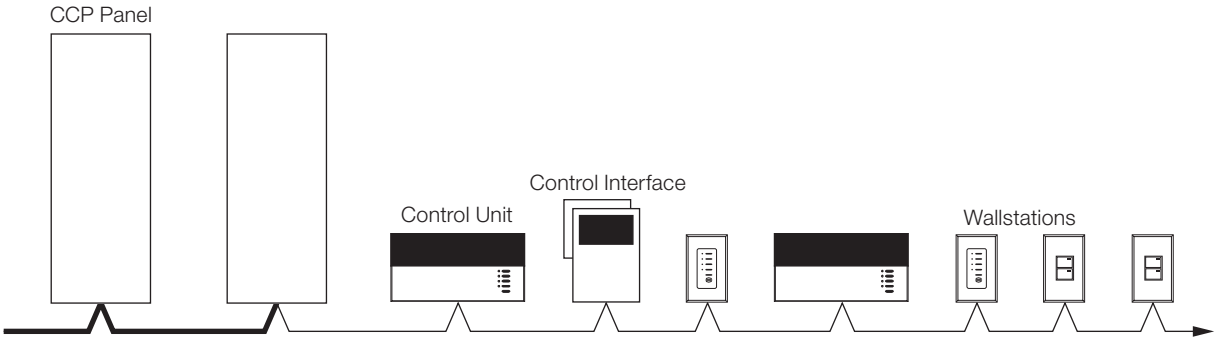
GRAFIK Eye® 4000 System

IEC PELV/NEC® Class 2 wiring link requires:

- Two 12 AWG (2.5 mm^2) conductors for control power.
- One twisted, shielded pair of 18 AWG (1.0 mm^2) for data link.
- One 18 AWG (1.0 mm^2) conductor for emergency (essential) sense line, from panel to panel.

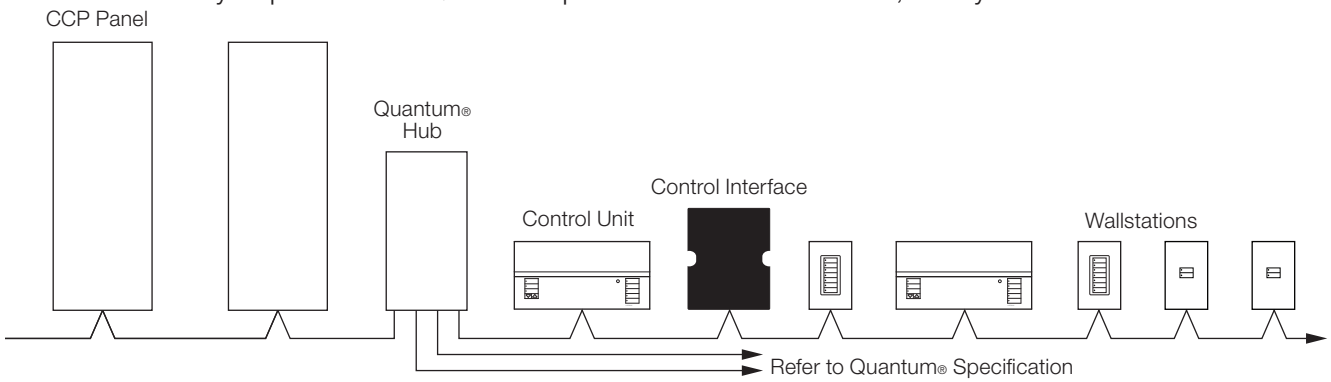
Total length of control link may be no more than 2000 ft (610 m).

Approved low-voltage cable is available from Lutron[1], Belden, and Liberty. These are approved with 22 AWG (0.625 mm^2) data link wires.



Quantum® System

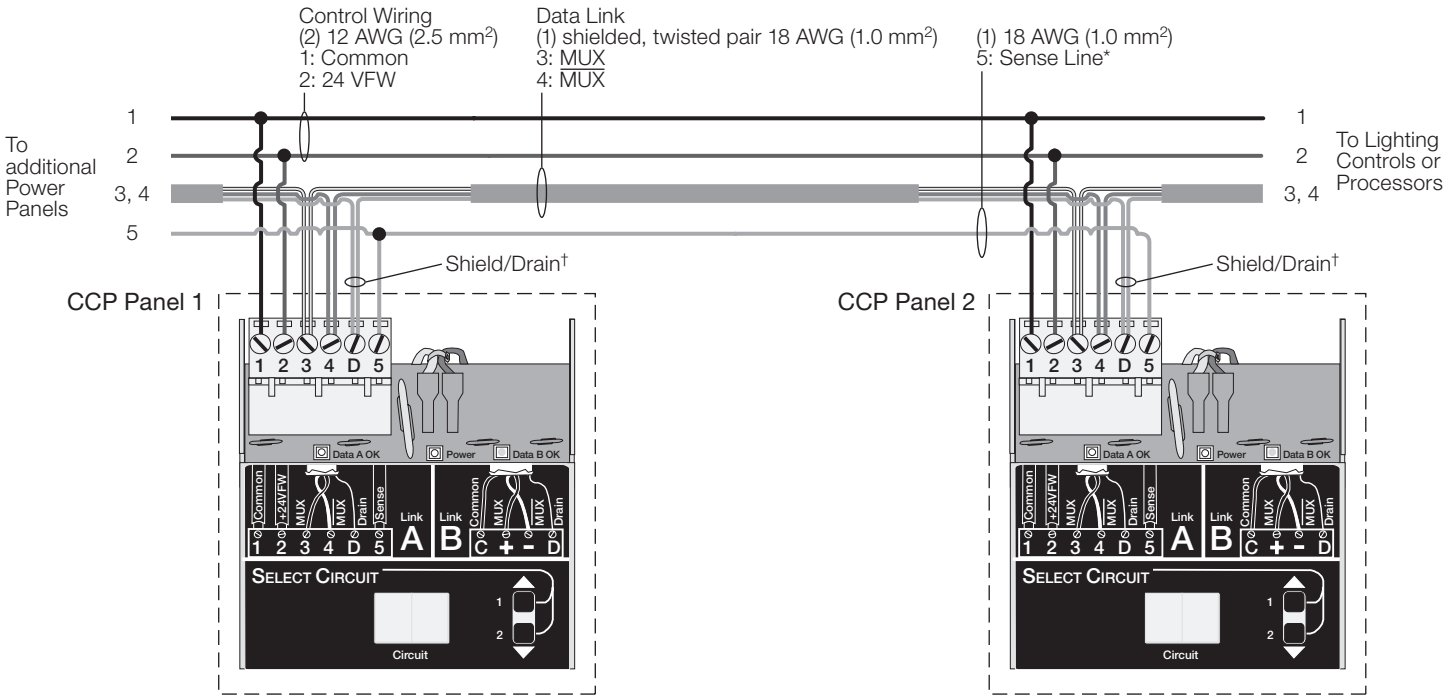
- IEC PELV/NEC® Class 2 wiring link requires:
  - Two 12 AWG (2.5 mm^2) conductors for control power.
  - One twisted, shielded pair of 22 AWG (0.5 mm^2) for data link.
  - One 18 AWG (1.0 mm^2) conductor for emergency (essential) sense line, from panel to panel.
- Total length of control link may be no more than 2000 ft (610 m).
- If MUX-RPTR interface[2] and GRX-CBL-46L cable[1] is used, length may be up to 4000 ft (1219 m).
- Maximum of 32 circuit selectors per link or 512 switch legs (controllable outputs) per link.
- It is not necessary to position the Quantum® panel at the end of the link; it may be in the middle.



[1] GRX-CBL-46L IEC PELV/NEC® Class 2 wiring cable is available from Lutron and contains:
Two 12 AWG (2.5 mm^2) conductors for control power.
One twisted, shielded pair of 22 AWG (0.625 mm^2) for data link.
One 18 AWG (1.0 mm^2) conductor for emergency (essential) sense line.

Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

IEC PELV/NEC® Class 2 Panel-to-Panel Wiring (All Models)

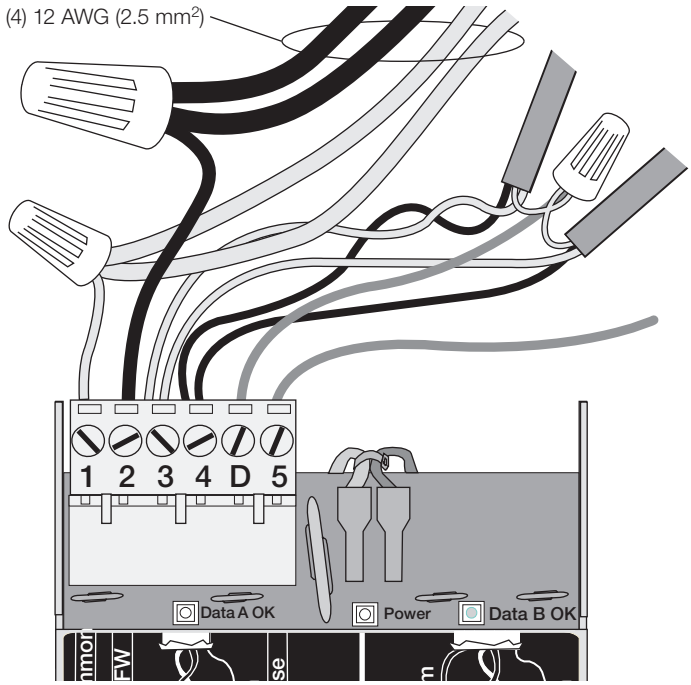


* Emergency power: The additional 18 AWG (1.0 mm²) wire is a "sense" line from terminal 5 of another panel. This sense line allows an emergency (essential) lighting panel to "sense" when normal (non-essential) power is lost. If more than one emergency lighting panel needs to sense from a specific normal panel, a dedicated wire between each pair of normal (non-essential) and emergency (essential) panels may be required.

† Shield/Drain: Connect shielding as shown. Do not connect to ground (earth) or circuit board of circuit selector. Connect the bare drain wires and cut off the outside shield.

IEC PELV/NEC® Class 2 Terminal Connections

Each Low-Voltage IEC PELV/NEC® Class 2 terminal can accept only two 18 AWG (1.0 mm²) wires. Two 12 AWG (2.5 mm²) conductors won't fit. Connect as shown, using appropriate wire connectors.

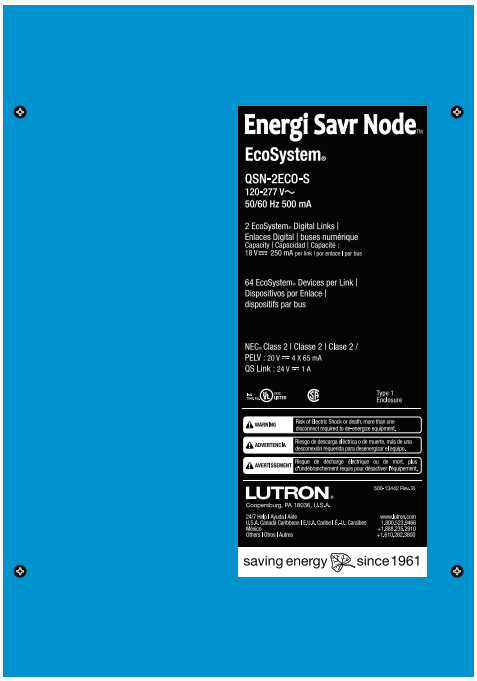


Job Name:	Model Numbers:	
Hotel Hartness	CCP	
Job Number:		

Energi Savr Node with EcoSystem

The Energi Savr Node family is a group of intelligent, modular products for the control of lighting loads. This document describes the Energi Savr Node unit with EcoSystem, which can control all EcoSystem compatible products including EcoSystem ballasts and modules and Hi-lume EcoSystem LED drivers.

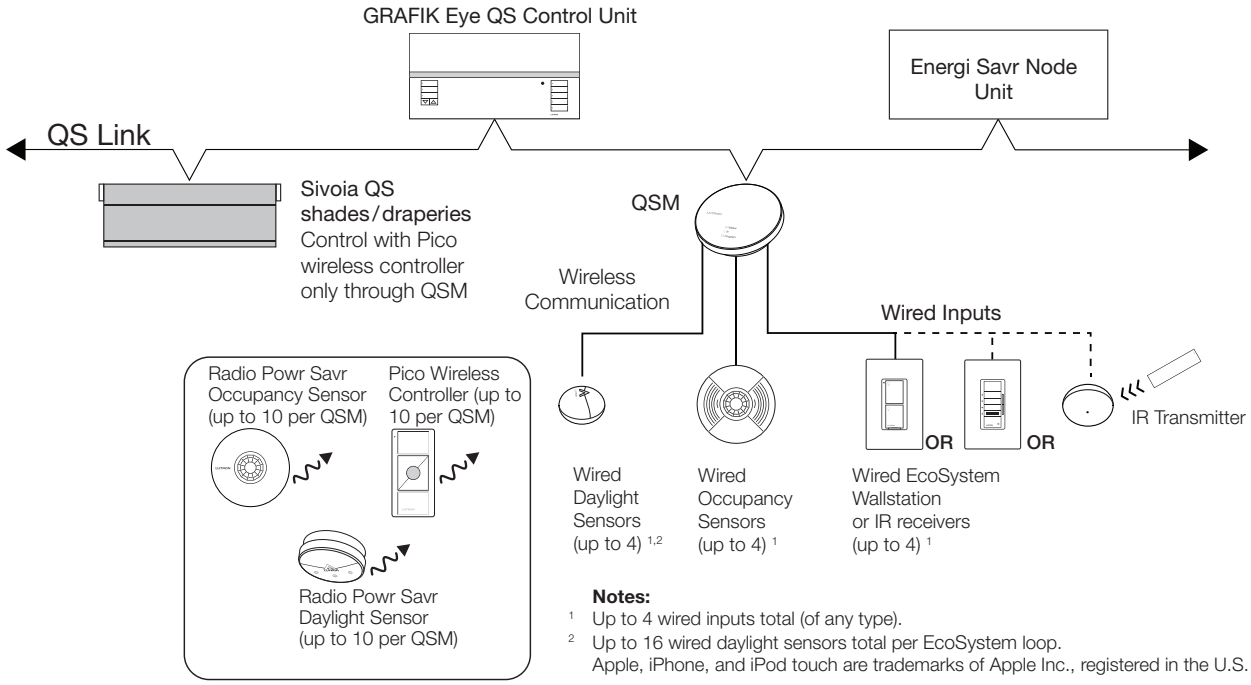
- Energi Savr Node unit with EcoSystem with 1 EcoSystem Digital Loop (QSN-1ECO-S).
- Energi Savr Node unit with EcoSystem with 2 EcoSystem Digital Loops (QSN-2ECO-S).



Features

- Powers up to 2 EcoSystem Digital Loops (QSN-2ECO-S).
- Easy system programming with an intuitive application for *Apple iPhone* or *iPod touch* mobile digital devices (required for non-Quantum systems).
- Four occupancy sensor inputs for automated control of lights.
- 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.
- Includes QS control link for seamless integration of lights, control stations, and QS sensor modules.
- Expand the number of sensors and controls using the QS Sensor Module (QSM) or sensors connections on EcoSystem ballasts and modules.
- Connect directly to other Energi Savr Node units, GRAFIK Eye QS units, or Quantum systems to expand functionality and control.
- BAA-compliant model numbers available. Add a “U” prefix to the model number.

System Example



Notes:

1 Up to 4 wired inputs total (of any type).

2 Up to 16 wired daylight sensors total per EcoSystem loop.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

Specifications

Energi Savr Node with EcoSystem

Regulatory Approvals

- UL® Listed
- CSA
- NOM Certified
- Lutron Quality Systems registered to ISO 9001.2008
- Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2014 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, Class A only

Power

- Control Power: 120-277 V~ 50/60 Hz
- Lightning strike protection meets ANSI/IEEE standard 62.31-1980. Can withstand voltage surges of up to 6000 V~ and current surges of up to 3000 A
- Current draw: 0.5 A
- 10-year power failure memory: restores lighting to levels prior to power interruption

Environment

- Ambient Temperature Operating Range: 32 ºF to 104 ºF (0 ºC to 40 ºC)
- Relative humidity: less than 90% non-condensing.
- For indoor use only

Terminals

- Control Power wiring: 14 AWG to 12 AWG (2.5 mm^2 to 4.0 mm^2)
- EcoSystem Digital Loop Wiring: 18 AWG to 12 AWG (1.0 mm^2 to 4.0 mm^2)
- Input Group Wiring: 22 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)
- QS Loop Wiring: 22 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)

Physical Design

- NEMA Type 1, IP-20 protection.

Mounting

- Surface-mount

Programming Requirements

- An *Apple iPod touch* or *iPhone* mobile digital device with the Energi Savr app is required for programming Energi Savr Node with EcoSystem systems
- The Energi Savr app is available from the *Apple App Store* online store
- The Energi Savr app cannot be used to program the Energi Savr Node with EcoSystem units when installed as part of a Quantum system
- The *Apple iPod touch* or *iPhone* communicates with the Energi Savr Node unit via a WiFi router (not included)
- See “Wiring: System Programming Connection” section for further information

Input Default Associations

- Energi Savr Node with EcoSystem units are pre-programmed from the factory to respond to inputs wired directly to the Energi Savr Node with EcoSystem unit
- Programmable CCI activates a scene using a normally open momentary closure by default

Specifications *(continued)*

EcoSystem

- Control up to 64 EcoSystem compatible devices (ballast, modules, or LED drivers) per EcoSystem Digital Loop (up to 128 devices per Energi Savr Node with EcoSystem unit):
  – EcoSystem ballasts and modules
  – Hi-lume EcoSystem LED drivers
- Digitally define areas and zones.
- Configure wired or wireless sensors and controls to control devices on multiple EcoSystem Digital Loops and/or multiple Energi Savr Node units.
- Automatic replacement of a single failed ballast, module, or driver.
- Simple method of replacing multiple failed ballasts, modules, or drivers.
- EcoSystem Digital Loop can be wired as Class 1 or IEC PELV/NEC® Class 2 for maximum wiring flexibility.

Occupancy Sensors

- Use Lutron LOS series of wired occupancy sensors in occupancy mode to control one or more areas.
- Use Lutron occupancy sensors in vacancy mode to automatically turn the lights off in an area after it becomes vacant.
- Use Lutron occupancy sensors to automatically turn the lights on in area when it becomes occupied and to automatically turn the lights off in an area after it becomes vacant.
- Each of the four occupancy inputs can power one Lutron occupancy sensor.
- Each area's occupied light level and unoccupied light level can be programmed independently.
- Up to four additional Lutron Wired Occupancy Sensors or ten additional Radio Powr Savr Occupancy/Vacancy Sensors can be assigned per QS Sensor Module (QSM) on the QS link.

seeTouch QS Controls

- seeTouch QS wallstations can be configured as a zone toggle or scene wallstation.
- In zone toggle mode, zone buttons are able to turn one or more zones on and off.
- In scene mode, buttons are able to recall scenes in one or more areas.
- All buttons on a wallstation will be in the same mode - zone toggle or scene.
- LED indicator displays zone or scene status.
- A single button can control lights or shades/draperies, but not both.

IR Wallstation or Receiver Input

- Four inputs for IR receivers or wallstations for control of lighting zones can be connected directly to the Energi Savr Node with EcoSystem unit.
- Use Lutron CC-4BRL-WH wallstations to control one or more zones.
- Use Lutron EC-IR-WH or EC-DIR-WH ceiling mount sensors to control one or more zones.
- Up to four additional wired wallstations or IR receivers can be assigned per QSM on the QS link

Daylight Sensors

- Lutron daylight sensors allow daylight harvesting with programmable effect on light output.
- Four daylight sensors can be connected directly to the Energi Savr Node with EcoSystem unit.
- Use Lutron EC-DIR-WH sensors to control one or more daylight rows.
- Alternatively, up to four additional Lutron Wired Daylight Sensors or ten additional Radio Powr Savr Daylight Sensors can be assigned per QSM on the QS link.
- Control 4 daylight rows per area with a maximum of 2 daylight sensors per area.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

Specifications *(continued)*

Contact Closure Input (CCI)

- Activate scenes using momentary or maintained closures from an external device like a timeclock.
- Start or stop Afterhours mode using a maintained closure.
- Enable or disable Load Shed mode to save energy during peak demand periods using a maintained closure.
- 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⎓.

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 Energi Savr Node unit with EcoSystem 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 normally-closed (NC) dry contact closure or solid-state output.
- Input is miswire-protected up to 36 V⎓.
- Emergency CCI cannot control other Energi Savr Node units.
- See Application Note #140, “EcoSystem Ballasts and Emergency Wiring” at www.lutron.com for more details.

Functionality with GRAFIK Eye QS

- Energi Savr Node with EcoSystem areas follow GRAFIK Eye QS unit scene activations when associated with the GRAFIK Eye QS unit.
- Energi Savr Node with EcoSystem areas respond to commands initiated by the GRAFIK Eye QS unit astronomic time clock when associated with the GRAFIK Eye QS unit.
- Energi Savr Node with EcoSystem areas operate in Afterhours mode when associated with a GRAFIK Eye QS unit that is in Afterhours mode.
- Zones on Energi Savr Node units cannot be associated with zone controls on GRAFIK Eye QS units.

Functionality with QSE-IO

- Energi Savr Node unit with EcoSystem responds to scene commands initiated by the QSE-IO, if the QSE-IO DIP switches have been set to either Scene Selection mode, Zone Toggle mode, Partition mode, or Occupancy Sensor mode.

Functionality with QSE-CI-NWK-E

- Integrate the Energi Savr Node unit with EcoSystem with touchscreens, PCs, A/V systems, or other digital systems and devices.
- Recall scenes and set/adjust zone levels.

Specifications *(continued)*

QS Sensor Module (QSM)

- Use the QSM to integrate Radio Powr Savr Occupancy/Vacancy sensors, Radio Powr Savr Daylight sensors, and Pico Wireless Controllers with an Energi Savr Node unit with EcoSystem.
- Associate up to 99 QSMs per Energi Savr Node unit with EcoSystem.
- Assign up to 10 Radio Powr Savr Occupancy sensors per QSM.
- Assign up to 10 Radio Powr Savr Daylight sensors per QSM.
- Assign up to 10 Pico Wireless Controllers per QSM.
- Connect up to 100 wired or wireless sensors of each type per QS link.
- Wire and power up to 4 wired sensors per QSM:
  – Daylight sensors
  – Occupancy sensors
  – Infrared (IR) receivers or wallstations
- 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.

EcoSystem Digital Loop Limits

- Up to 64 EcoSystem compatible fluorescent ballasts and/or LED drivers per EcoSystem digital loop.
- Sensor and control communication limits:
  – 16 daylight sensors
  – 64 occupancy sensors
  – 64 infrared (IR) receivers or wallstations
  A sensor or control counts as a device on the EcoSystem digital loop if it is wired to an EcoSystem ballast on the same loop, or is programmed to communicate with a fluorescent ballast or LED driver on the EcoSystem digital loop.
- EcoSystem compatible fluorescent ballasts and LED drivers on the EcoSystem digital loop do not count as QS devices.

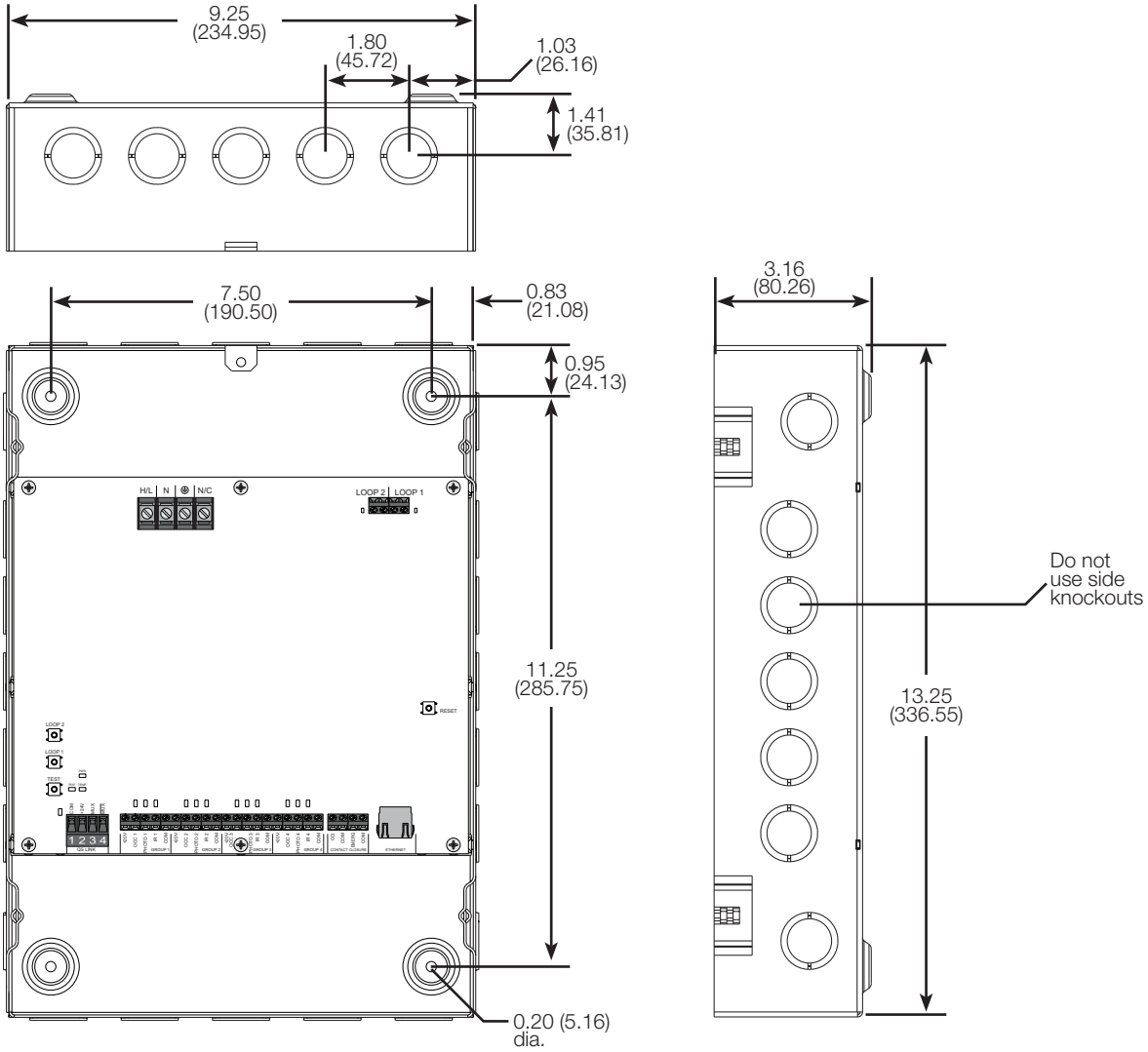
QS Link Limits

- Each Energi Savr Node unit with EcoSystem can provide up to 30 Power Draw Units for other QS devices. Refer to the QS Link Power Draw Units specification submittal (Lutron P/N 369405) for more information concerning Power Draw Units.
- The QS Link can have up to 100 devices and 100 zones.
- Each Energi Savr Node unit with EcoSystem counts as 1 device towards the 100 device limit.
- Each Energi Savr Node unit with EcoSystem can count as 1 to 100 zones towards the 100 zone limit, depending on the number of zones created (up to 512 zones in a Quantum system).
- A maximum of 8 EcoSystem digital loops may be connected to the QS link. Energi Savr Node unit with EcoSystem counts as up to 64 or up to 128 ballasts.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

Mechanical Dimensions

All dimensions shown as in (mm)



Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

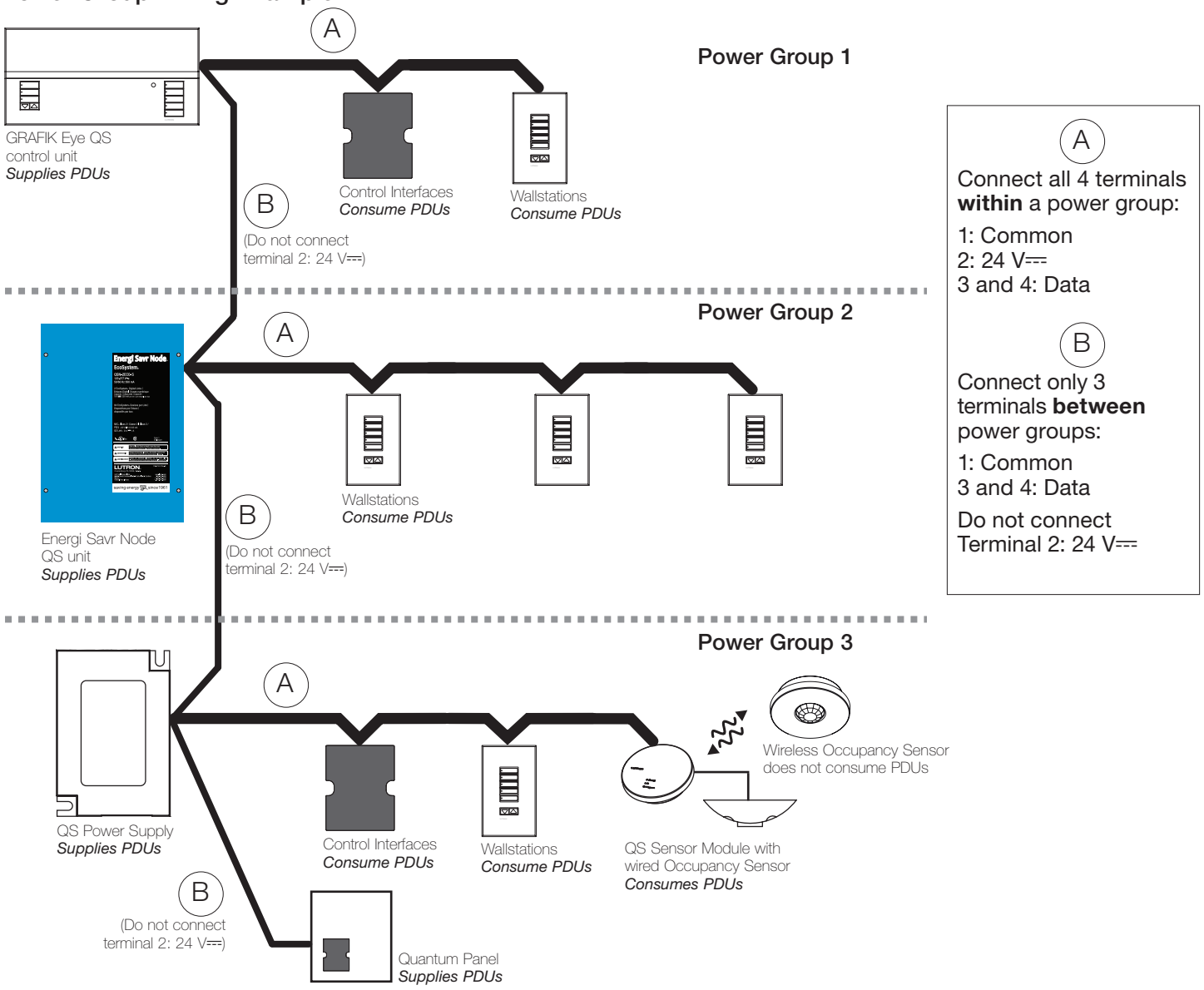
Power Draw Units (PDUs) on the QS Link

On the QS link, there are devices that supply power and devices that consume power. Each device has a specific number of PDUs it either supplies or consumes.

A Power Group consists of one device that supplies power and one or more devices that consume power; each Power Group may have only one power-supplying device. Refer to the QS Link Power Draw Units specification submittal (Lutron P/N 369405) for more information concerning PDU's.

Within Power Groups on the QS link, connect all 4 terminals (1, 2, 3, and 4), shown by the letter A in the diagram. Between devices on the QS link that supply power, connect only terminals 1, 3, and 4 (NOT terminal 2), shown by the letter B on the diagram. Wiring can be T-tapped or daisy-chained.

Power Group Wiring Example



Note: Each QS link has a limit of 100 total devices; device count can vary depending on your system and your connected devices.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

Wiring: QS Link

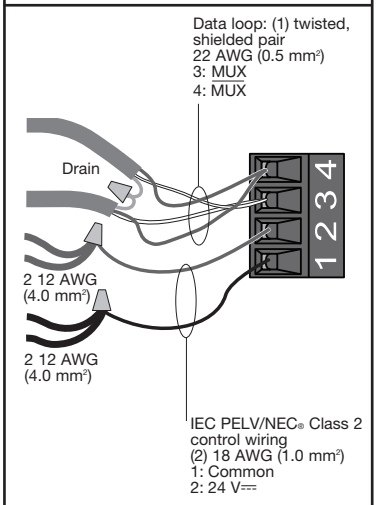
- QS link communication uses IEC PELV/NEC® Class 2 wiring. Follow all local and national electrical codes when installing IEC PELV/NEC® Class 2 wiring with line voltage wiring.
- The total distance of the QS link wiring must not exceed 2000 ft (610 m).

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 mm²)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4): 1 pair 22 AWG (0.5 mm²), twisted and shielded*	
500 ft (152.4 m) to 2000 ft (610 m)	*Power (terminals 1 and 2):* 1 pair 12 AWG (4.0 mm²)	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4): 1 pair 22 AWG (0.5 mm²), twisted and shielded*	

* Alternate Data-only cable: Use approved data loop cable (22 AWG [0.5 mm²] twisted/shielded) from Belden, model #9461.

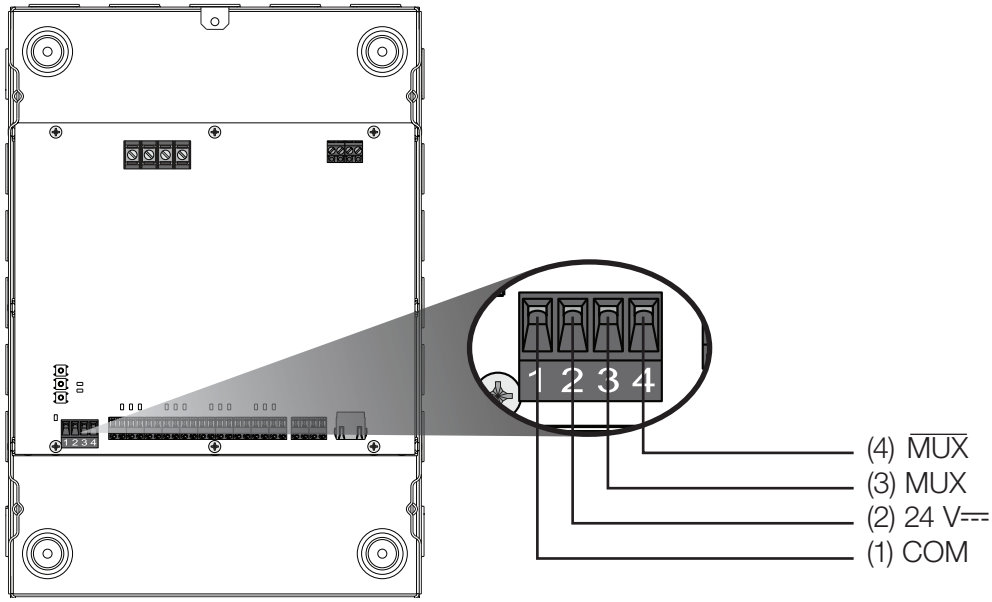
Wiring for QS link for 500 ft (152.4 m) to 2000 ft (610 m).

Terminal block will not accept 12 AWG (4.0 mm²) directly.



Control Link Wiring

Energi Savr Node unit with EcoSystem

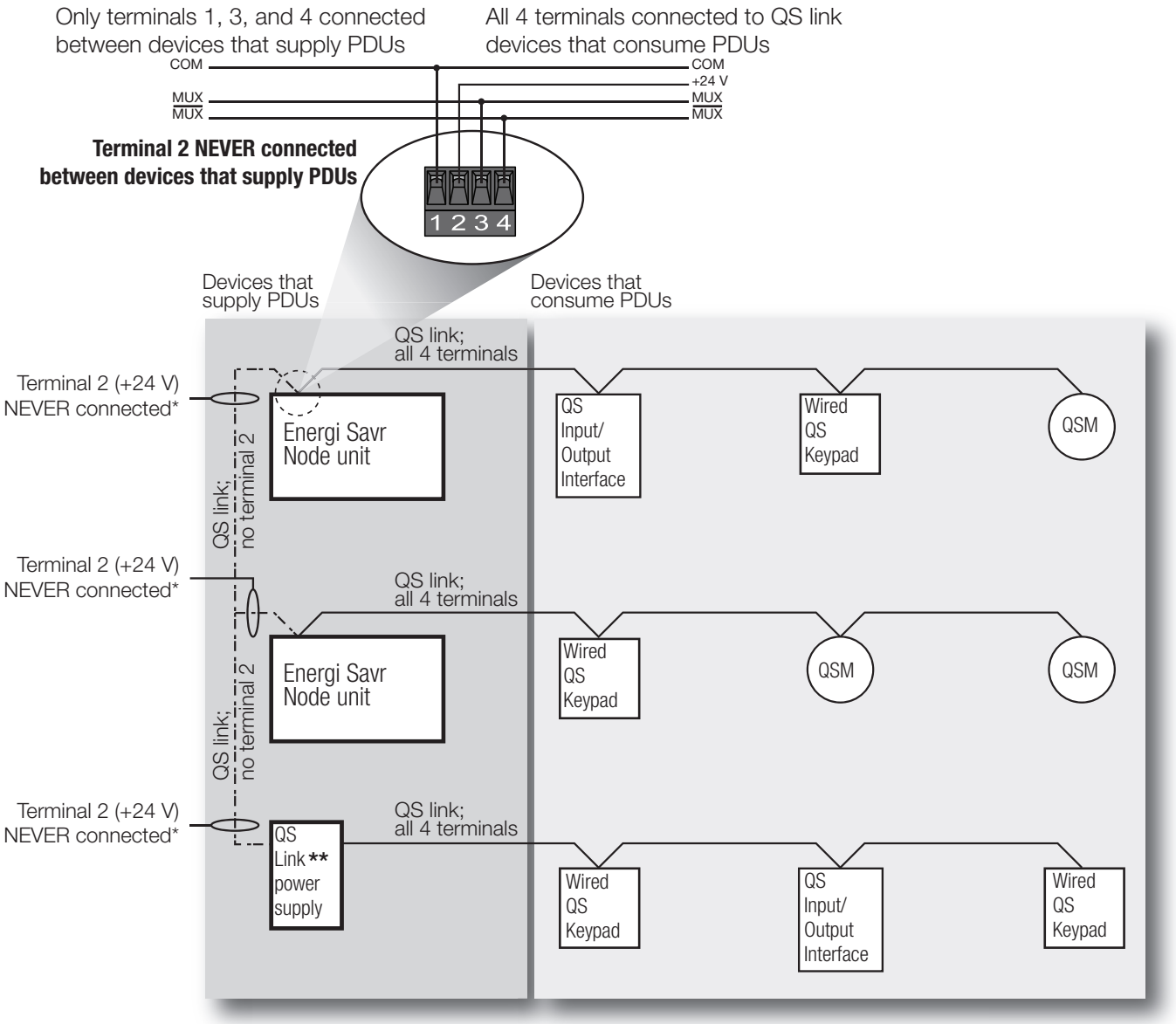


QS Link Wiring:

- 22 AWG to 12 AWG (0.5 mm² to 4.0 mm²)

Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

Wiring: QS Link *(continued)*

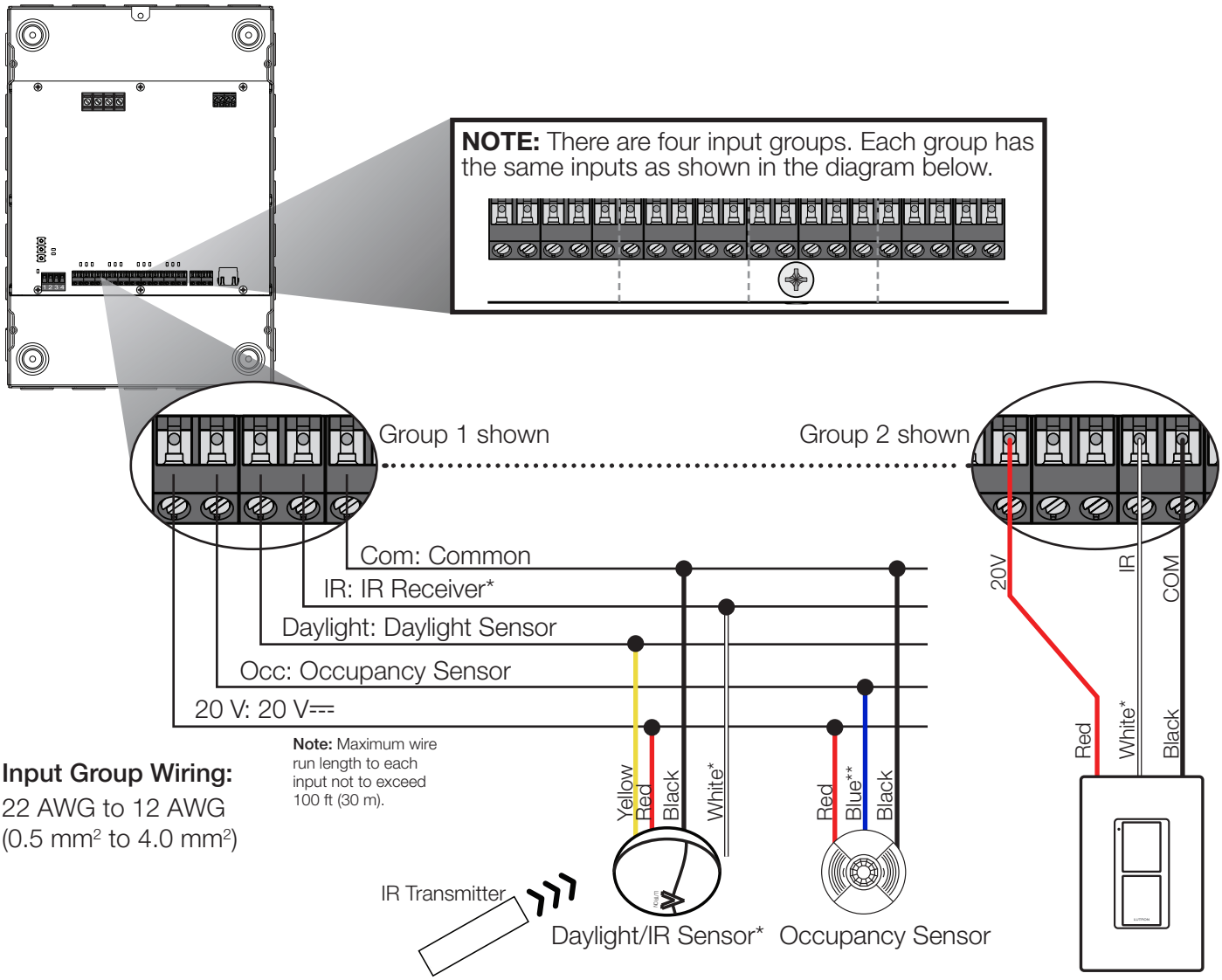


QS Link Wiring Rules

* 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.

Wiring: IEC PELV / NEC® Class 2 Inputs



Input Group Wiring:

- 22 AWG to 12 AWG (0.5 mm² to 4.0 mm²)

* **Note:** Only one IR device may be connected per input. If the IR signal from a daylight sensor is connected, a wall control may not be connected to the same input, and vice-versa.

** Connect the gray wire on -R model occupancy sensors.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

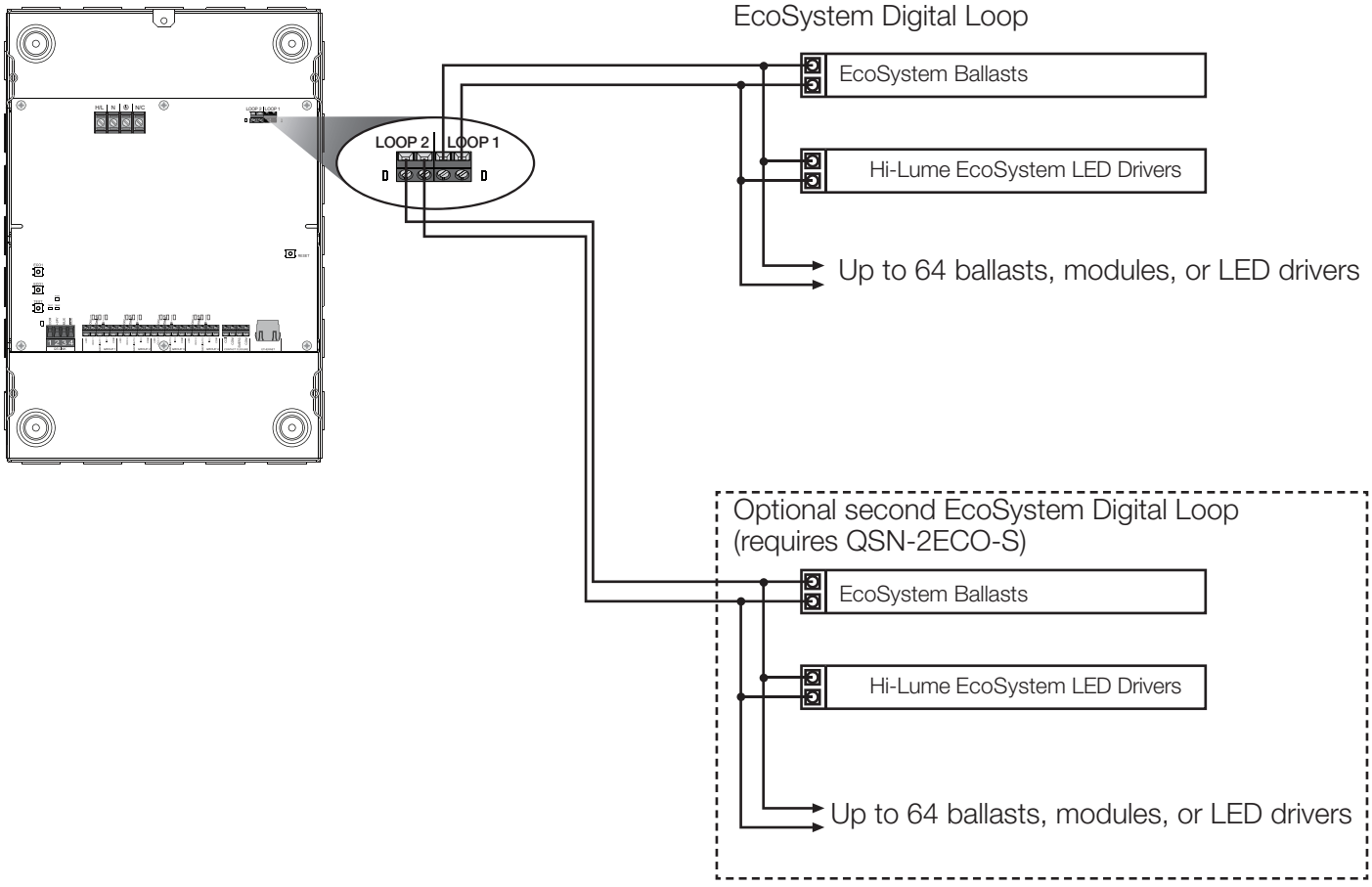
Wiring Diagram: EcoSystem Digital Loop

Wiring Notes

- Can be wired as Class 1 or IEC PELV/NEC® Class 2 (see App Note #142, "EcoSystem Bus Class 1 and IEC PELV/NEC® Class 2 Listing" at www.lutron.com for more details).
- Polarity free.
- Topology free.
- EcoSystem Digital Loops are not electrically isolated from each other. A miswire or short on one EcoSystem Digital Loop will affect both loops.

Wire Gauge	Maximum EcoSystem Digital Loop Wire Length
12 AWG (4.0 mm^2)	2200 ft (671 m)
14 AWG (2.5 mm^2)	1400 ft (427 m)
16 AWG (1.5 mm^2)	900 ft (275 m)
18 AWG (1.0 mm^2)	570 ft (175 m)

Energi Savr Node unit with EcoSystem

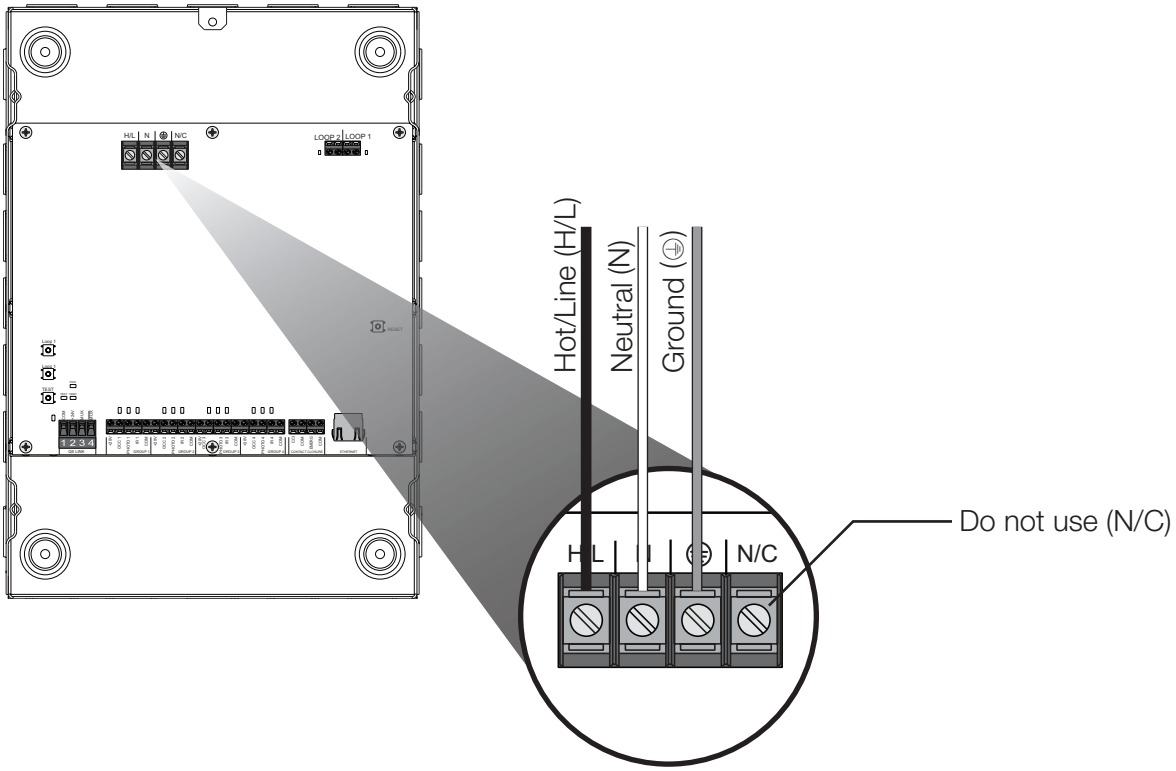


Wiring: Control Power

Wiring Notes

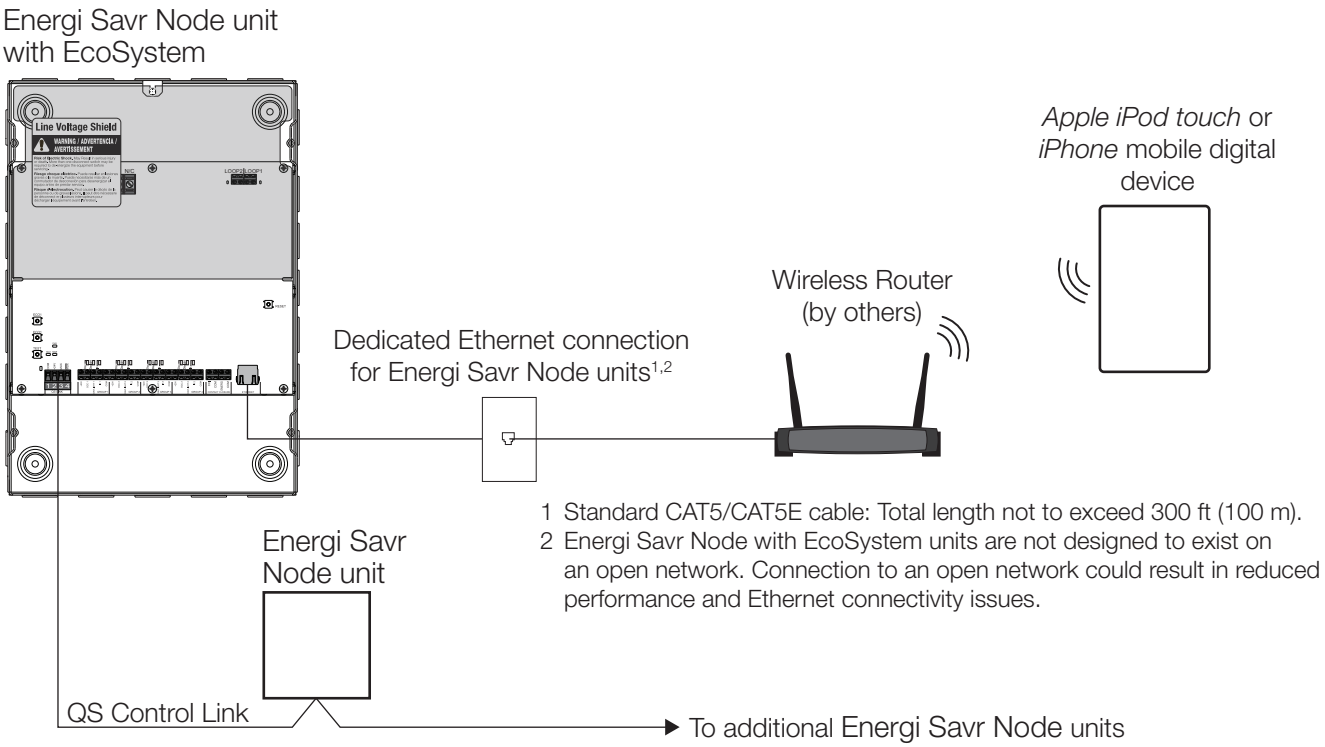
- Control Power wiring should be from a normal, non-emergency feed for proper operation of the Energi Savr Node unit with EcoSystem.
- Power terminals accept (1) or (2) 14 AWG to 12 AWG (2.5 mm^2 to 4.0 mm^2) solid or stranded wire.

Energi Savr Node unit with EcoSystem



Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

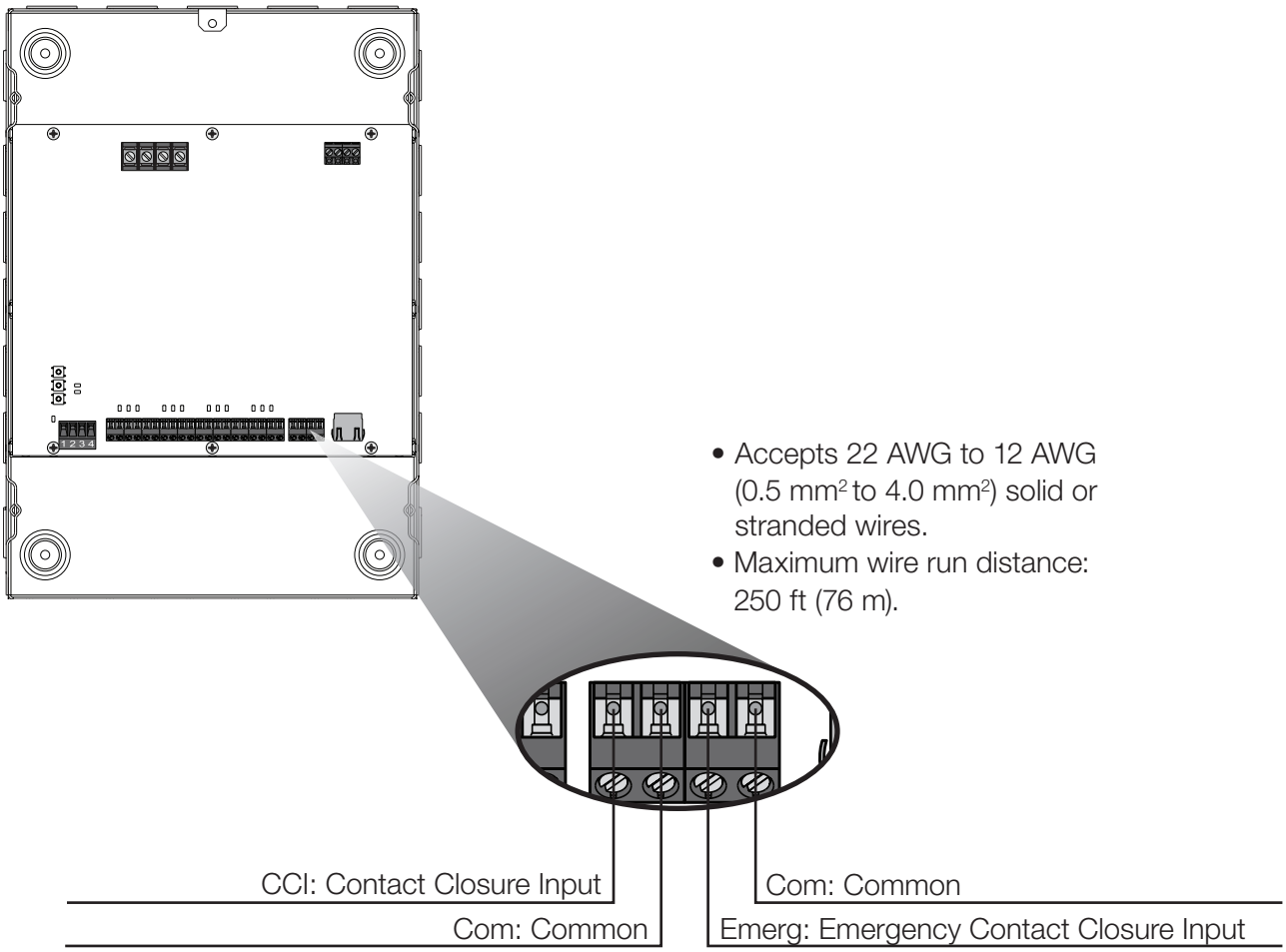
Wiring: System Programming Connection



- Wireless router only required for programming with an *Apple iPod touch* or *iPhone*.
- Wireless router may be removed for normal operation.
- Lutron recommends that an Energi Savr Node unit with EcoSystem be wired to an Ethernet jack in the space for ease of access and proximity to power for the wireless router.
- Works with any standard wireless router that supports multicast packets.
- *Apple iPod touch* or *iPhone* can program other Energi Savr Node units connected to an Energi Savr Node unit with EcoSystem via the QS Link (except when part of a Quantum system).
- Energi Savr app is required (except when part of a Quantum system) to program Energi Savr Node units with EcoSystem and is available from the *Apple AppStore* online marketplace.

Wiring: Contact Closure Inputs

Energi Savr Node unit with EcoSystem



Emergency CCI

- The attached device must provide a closed dry contact closure or solid-state output.
- Input is miswire-protected up to 36 V⎓.
- The Energi Savr Node with EcoSystem unit is shipped with a jumper pre-installed in the Emergency Contact Closure Input.
- Emergency mode is activated by opening the Emergency Contact Closure. Pre-installed jumper must be removed to utilize this function.
- See Application Note #140, “EcoSystem Ballasts and Emergency Wiring” at www.lutron.com for more details.

Programmable CCI

- The attached device must provide a dry contact closure or solid-state output.
- Input is miswire-protected up to 36 V⎓.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-2ECO-S	
Job Number:		

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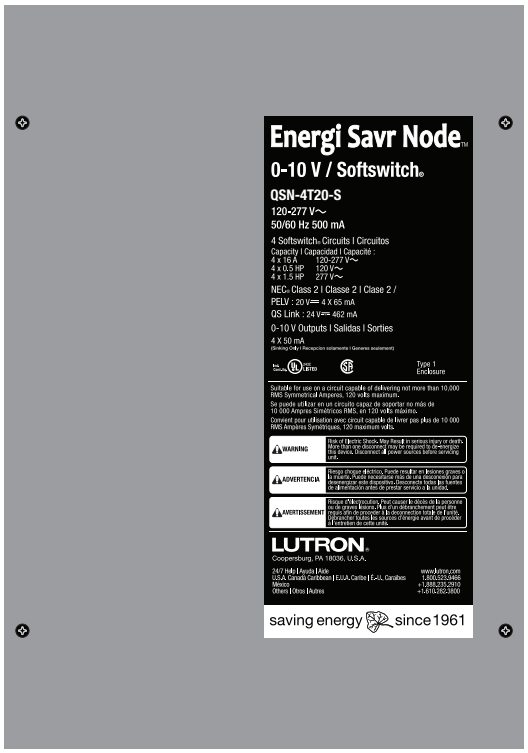
Energi Savr Node for 0–10 V⎓
Energi Savr Node with Softswitch

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:

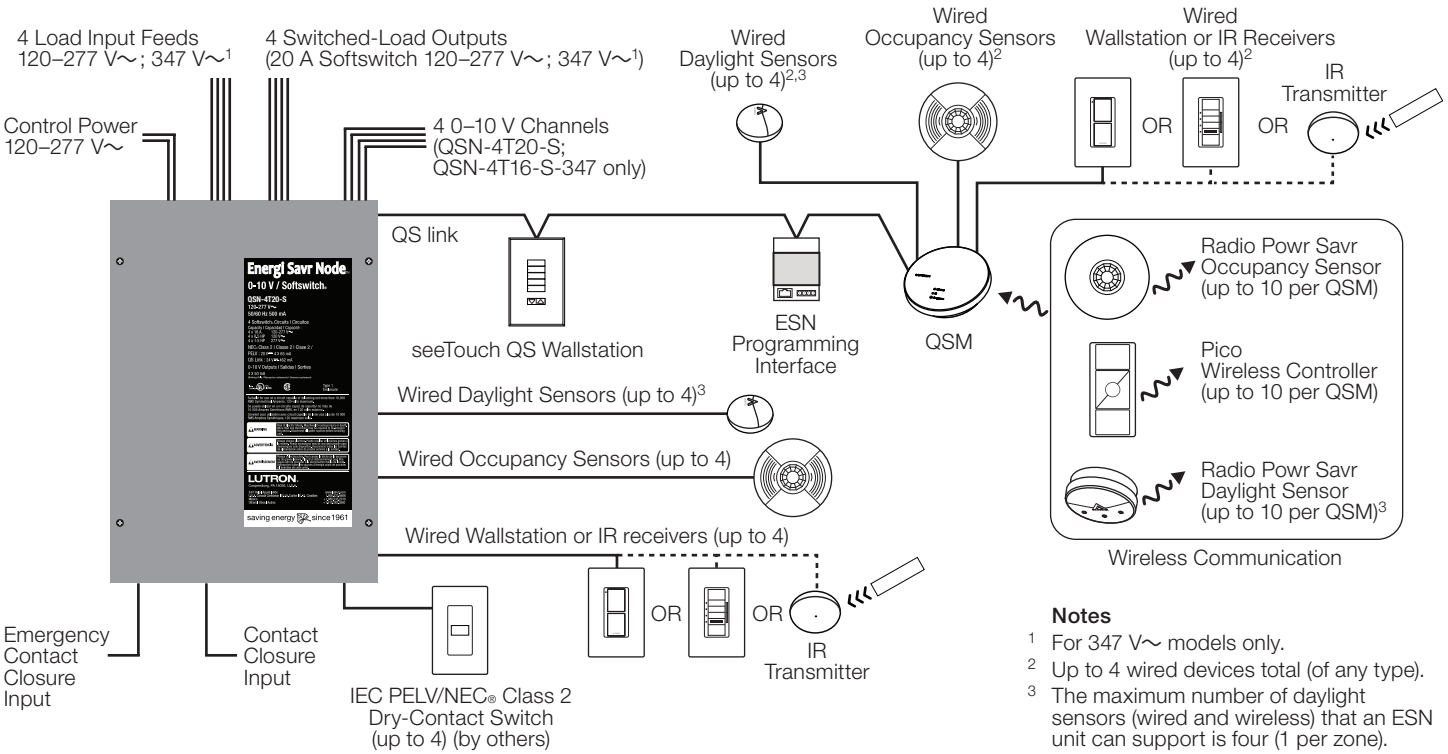
- Energi Savr Node for 0–10 V⎓ (models QSN-4T20-S, QSN-4T16-S-347)
- Energi Savr Node with Softswitch (models QSN-4S20-S, QSN-4S16-S-347)



Features

- Rated to switch 20 A receptacles with any output.
- Default configuration requires no commissioning.
- Program using integral interface on the ESN unit.
- Four occupancy sensor inputs for automated control of loads in 4 zones.
- 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.
- Four inputs for IEC PELV/NEC® Class 2 dry-contact switches.
- 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.
- Contact Lutron for compatibility with a Quantum system.

System Example



Notes

1 For 347 V~ models only.
2 Up to 4 wired devices total (of any type).
3 The maximum number of daylight sensors (wired and wireless) that an ESN unit can support is four (1 per zone).

Job Name:	Model Numbers:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

Specifications

Regulatory Approvals

- UL® Listed
- CSA
- NOM
- Lutron Quality Systems registered to ISO 9001:2015
- Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2014 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, Class A only

Power

- Control Power: 120 V~; 220–240 V~; 277 V~ 50/60 Hz
- Lightning strike protection meets ANSI/IEEE standard 62.41-1991. Can withstand voltage surges of up to 6000 V~ 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^2 to 4.0 mm^2)
- Load Wiring: 14 AWG to 12 AWG (2.5 mm^2 to 4.0 mm^2)
- 0–10 V Wiring: 20 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)
- Input Group Wiring: 20 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2); maximum wire run length to each input not to exceed 150 ft (46 m)
- QS Link Wiring: 22 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)
- Contact Closure Wiring: 20 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)

Physical Design and Mounting

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

Load Types (relay ratings)

- Rated to control 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.

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 "⏻" located on the controlled receptacle outlet where visible after installation as stated in 2014 NEC® Article 406.3(E).

Load Type	Relay Ratings	
	120–277 V∼ QSN-4S20-S QSN-4T20-S	**347 V∼** QSN-4S16-S-347 QSN-4T16-S-347
Tungsten	20 A	16 A
AC General Use	20 A	16 A
Electric Discharge Lamp	16 A	16 A
Electric Ballast (NEMA 410)	16 A	16 A
Resistive	20 A	16 A
Inductive	20 A	16 A
Motor	1.0 HP 120 V∼ 2.0 HP 277 V∼	—

Input Default Associations

	Inputs/Outputs	Zone 1	Zone 2	Zone 3	Zone 4
Group 1	Occ	X			
	Daylight	X			
	IR	X			
	Switch	X			
Group 2	Occ		X		
	Daylight		X		
	IR		X		
	Switch		X		
Group 3	Occ			X	
	Daylight			X	
	IR			X	
	Switch			X	
Group 4	Occ				X
	Daylight				X
	IR				X
	Switch				X
	CCI	X	X	X	X
	Emergency CCI	X	X	X	X

Softswitch 120–277 V∼

- Softswitch relay is rated for 20 A continuous use per channel.
- Relay is mechanically held.

0–10 V⎓ Output Ratings (QSN-4T20-S)

- Each output sinks up to 50 mA maximum.
- Each output sinks current only (load device must provide 10 V⎓ supply).
- Provides an IEC PELV/NEC® Class 2 isolated 0–10 V output signal that conforms to IEC 60929.

Occupancy Sensors

- Up to 16 occupancy sensors can be programmed to the Energi Savr Node device.
- Manual Programming: up to 4 occupancy sensors wired directly to the Energi Savr Node device, up to 4 occupancy sensors wired to a QS Sensor Module (QSM), and up to 10 wireless occupancy sensors through the same QSM; the total programmed to the Energi Savr Node device cannot exceed 16.
- HHD (*iPod/iPhone*) Programming: up to 16 occupancy sensors from any source (wired directly to the Energi Savr Node device, wired to any other Energi Savr Node device, or wired/wireless from any QSM on the QS link); the total programmed to the Energi Savr Node device cannot exceed 16.
- Use Lutron occupancy sensors to control one or more zones.
- Lutron occupancy sensors can be programmed to automatically turn on the lights and receptacles in an area when it becomes occupied and turn off the lights and receptacles in an area after it becomes vacant.
- For spaces that require vacancy mode operation for lights, a single occupancy sensor can control a zone of lights in vacancy mode and control a zone of receptacles in occupancy mode.

Specifications (continued)

Occupancy Sensors *(continued)*

- Each of the four occupancy inputs can power one Lutron occupant sensor.
- Each area's occupied scene and unoccupied scene can be programmed independently.
- Occupancy sensor must provide a dry-contact closure or solid-state output.
- Additional occupancy sensors can be used with the Energi Savr Node device. Refer to the "Programming Options and Features" table for system rules.

seeTouch QS Controls

- seeTouch QS wallstations can be configured to control ESN unit scenes or zones.
- In zone toggle mode, zone buttons can be assigned to one or more zones on any ESN unit connected to the QS Link.
- In scene mode, wallstations can be assigned to one or more ESN units connected to the QS Link.
- LED indicator displays zone or scene status.

Table 1: seeTouch QS Wallstation Configurations

	# Buttons				
Wallstation Function	1	2	3	5	7
Zone Toggle	✓	✓	✓	✓	✓
Scene	1, Off (toggle)	1, Off	1, 2, Off	1–4, Off	N/A

IR Wallstation or Receiver Input

- Four inputs for IR receivers or wallstations for control of lighting zones can be connected directly to the ESN unit
- Use Lutron Pico wired control or CC-4BRL-WH wallstation to control one or more zones.
- Up to four additional wired wallstations or IR receivers can be assigned when associated with a QSM.
- Associate additional QSMs and sensors/controls with ESN unit when programming with an *Apple iPod touch* or *iPhone*. Refer to "Programming Options" section for details.

Daylight Sensors

- Lutron daylight sensors allow daylight harvesting with programmable effect on light output.
- Four daylight sensors can be connected directly to the ESN unit.
- Use Lutron EC-DIR-WH sensors to control one or more zones.
- Alternatively, up to 4 sensors (Lutron wired daylight sensors or Radio Powr Savr daylight sensors) can be assigned when associated with a QSM.
- The maximum number of Lutron daylight sensors (wired or wireless), either wired directly to the unit or indirectly (associated with a QSM) cannot exceed 4.
- Associate additional QSMs and sensors/controls with ESN unit when programming with an *Apple iPod touch* or *iPhone*. Refer to "Programming Options" section for details.

Contact Closure Input (CCI)

- Activate scenes using momentary or maintained closures from an external device such as a timeclock.
- Start or stop Afterhours Mode using a maintained closure.
- 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⎓.

Specifications (continued)

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⎓.
- Emergency CCI cannot control other ESN units.

Functionality with GRAFIK Eye QS

- ESN unit follows GRAFIK Eye QS scene activations when associated with the GRAFIK Eye QS.
- ESN unit responds to commands initiated by the GRAFIK Eye QS astronomic time clock when associated with the GRAFIK Eye QS.
- ESN unit operates in afterhours mode when associated with a GRAFIK Eye QS that is in afterhours mode.

Functionality with QSE-IO

- ESN unit responds to scene commands initiated by the QSE-IO if the QSE-IO DIP switches have been set to either scene selection mode, zone toggle mode, partition mode, or occupancy sensor mode.

Functionality with QSE-CI-NWK-E

- Integrate ESN unit with touchscreens, PCs, A/V systems, or other digital systems and devices.
- Recall scenes and set/adjust zone levels.

IEC PELV/NEC® Class 2 Dry-Contact Switches

- Four inputs for IEC PELV/NEC® Class 2 dry-contact switches can be assigned to turn on and off one or more zones.
- Configure for momentary or maintained operation.

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.
- The QS Link can have up to 100 devices and 100 zones.
- Each ESN unit counts as 1 device towards the 100 device limit.
- Each ESN unit counts as 4 zones towards the 100 zone limit.

QSM (QS Sensor Module)

- Use the QSM to integrate Radio Powr Savr occupancy sensors, Radio Powr Savr daylight sensors, and Pico wireless controllers to control zones on the ESN unit.
- Associate 1 QSM per ESN unit with manual programming.
- Associate multiple QSMs per ESN unit with *Apple iPod touch* or *iPhone* programming (requires QSE-CI-AP-D and Wi-Fi router). See “Programming Options” for details.
- Assign up to 10 Radio Powr Savr occupancy sensors per ESN unit via QSM.
- Assign up to 4 Radio Powr Savr daylight sensors per ESN unit via QSM.
- Assign up to 10 Pico wireless controllers per ESN unit via QSM.
- The 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.
- Wire and power up to 4 wired sensors per QSM
  - Daylight Sensors
  - Occupancy Sensors
  - Infrared (IR) Receivers or Wallstations
- Refer to QSM Specification Submittal for more information.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

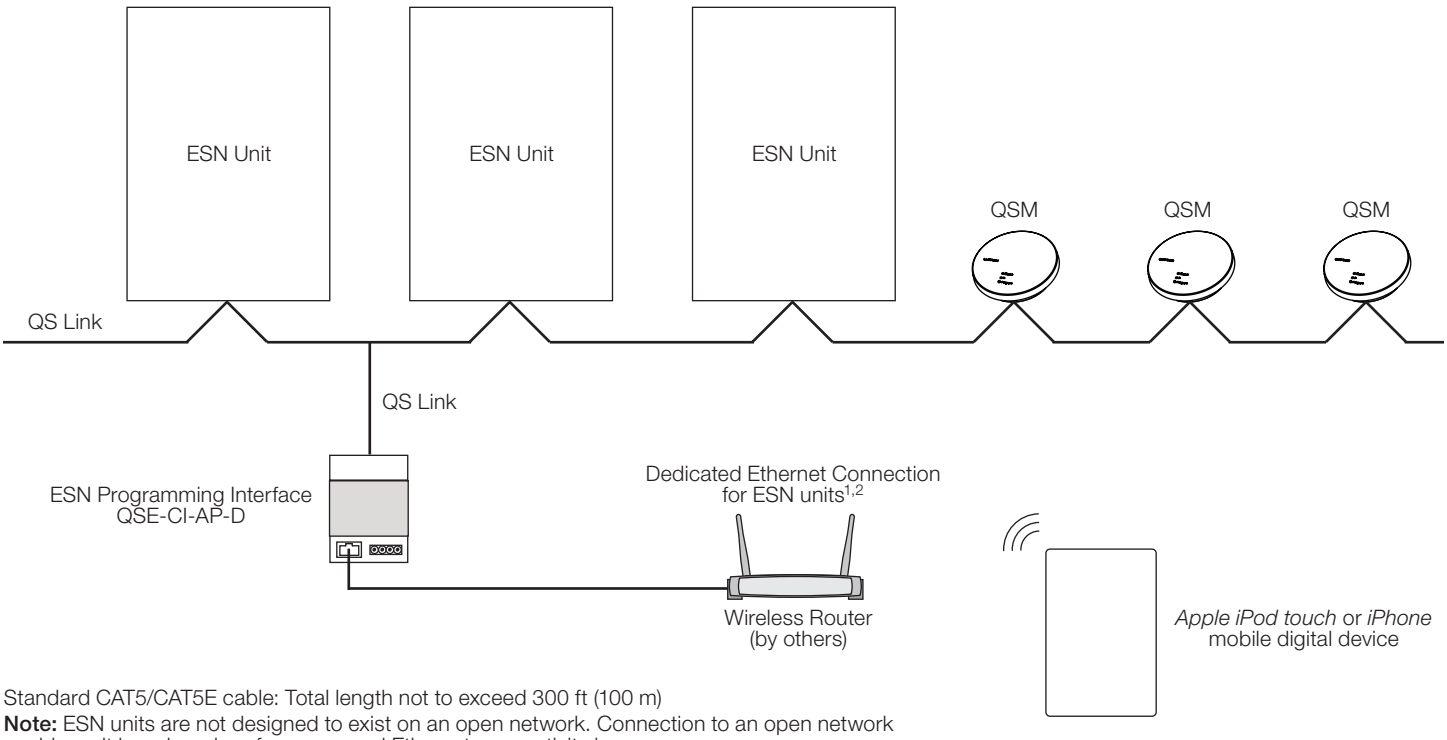
Programming Options

Manual Programming

- Use buttons on the front of the ESN unit.
- Use manual programming in installations with only one ESN unit and with one QSM or fewer on the QS link.

HHD Programming

- Requires ESN Programming Interface (QSE-CI-AP-D).
- Requires *Apple iPod touch* or *iPhone* mobile digital device.
- Use the intuitive programming application for the *Apple iPod touch* or *iPhone* to program systems with multiple ESN units and QSMs on the QS link.
- Wireless router required for programming with an *Apple iPod touch* or *iPhone* only.
- Wireless router may be removed for normal operation.
- Ethernet connection may be made via an ESN Programming Interface (QSE-CI-AP-D) or an ESN QS unit with integral Ethernet jack.
- Lutron recommends that an ESN Programming Interface (or ESN QS unit with Ethernet jack) be wired to an Ethernet jack in the space for ease of access and proximity to power for the wireless router.
- Works with any standard wireless router that supports multicast packets.
- *Apple iPod touch* or *iPhone* can program all ESN QS units connected to an ESN Programming Interface via the QS Link (except when part of a Quantum system).
- ESN app is required and is available from the *Apple App Store* online marketplace.



1 Standard CAT5/CAT5E cable: Total length not to exceed 300 ft (100 m)

2 **Note:** ESN units are not designed to exist on an open network. Connection to an open network could result in reduced performance and Ethernet connectivity issues.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

Programming Options and Features

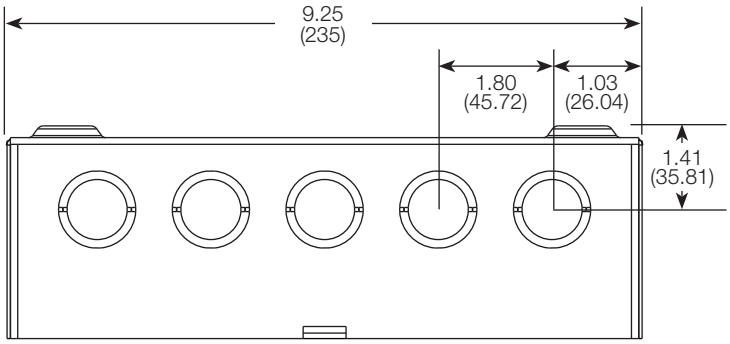
	Manual Programming	HHD Programming • Requires ESN Programming Interface QSE-CI-AP-D • Requires *Apple iPod touch* or *iPhone* mobile digital device
ESN units connected to 1 QS Link	Not more than 1	Multiple (100 QS devices and 100 zone limits apply)
QSMs connected to 1 QS link	Not more than 1	Multiple (100 QS devices limit applies)
Wired Occupancy Sensors		
System Limits	• 4 connected directly to ESN unit; • Up to 4 wired to QSM	• Maximum of 16 occupancy sensors per ESN • Up to 100 total occupancy sensors per QS link (wired and wireless)
Can be assigned to…	Any zone(s) on the ESN unit	Zones on ESN unit or share to other ESN units on same QS link
Occupancy Dependency Supported	No	Yes
Wireless Occupancy Sensors		
System Limits	Associate 10 occupancy sensors to QSM to control zones on the ESN unit	• Maximum of 16 occupancy sensors per ESN • Up to 100 total occupancy sensors per QS link (wired and wireless)
Can be assigned to…	Any zone(s) on the ESN unit	Zones on ESN unit or share to other ESN units on same QS link
Occupancy Dependency Supported	No	Yes
Wired Daylight Sensors		
System Limits	Maximum of 1 daylight sensor per zone connected directly to the ESN unit or to the QSM	• Maximum of 2 daylight sensors per zone; • Up to 100 total daylight sensors per QS link (wired and wireless)
Can be assigned to…	Any zone(s) on the ESN unit	Zones on ESN unit or share to other ESN units on same QS link
Disable daylighting in Scenes	No	Yes
Wireless Daylight Sensors		
System Limits	• Maximum of 1 daylight sensor per zone; • Associate wireless daylight sensors to the QSM	• Maximum of 2 daylight sensors per zone; • Associate up to 10 wireless daylight sensors per QSM; • Up to 100 total daylight sensors per QS link (wired and wireless)
Can be assigned to…	Any zone(s) on the ESN unit	Zones on ESN unit or share to other ESN units on same QS link
Disable daylighting in Scenes	No	Yes
Pico Wireless Controllers		
System Limits	Associate 10 Pico wireless controllers to QSM to control zones on the ESN unit	Up to 100 total controls per QS link (wired wallstations, Pico wireless controllers, IR receivers)
Can be assigned to…	Any zone on the local ESN unit	Zones on ESN unit or share to other ESN units on same QS link
IR Receivers and Wallstations		
System Limits	• 4 connect directly to the ESN unit; • Up to 4 wired to the QSM	Up to 100 total controls per QS link (wired wallstations, Pico wireless controllers, IR receivers)
Can be assigned to…	Any zone on the local ESN unit	Zones on ESN unit or share to other ESN units on same QS link

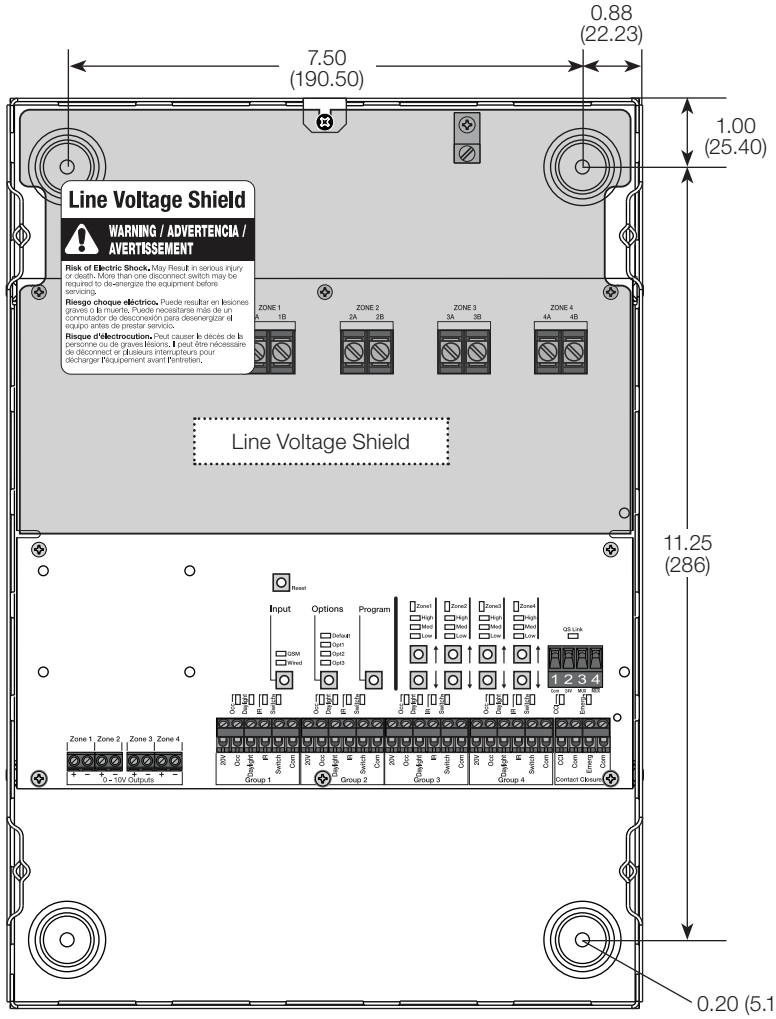
Programming Options and Features (continued)

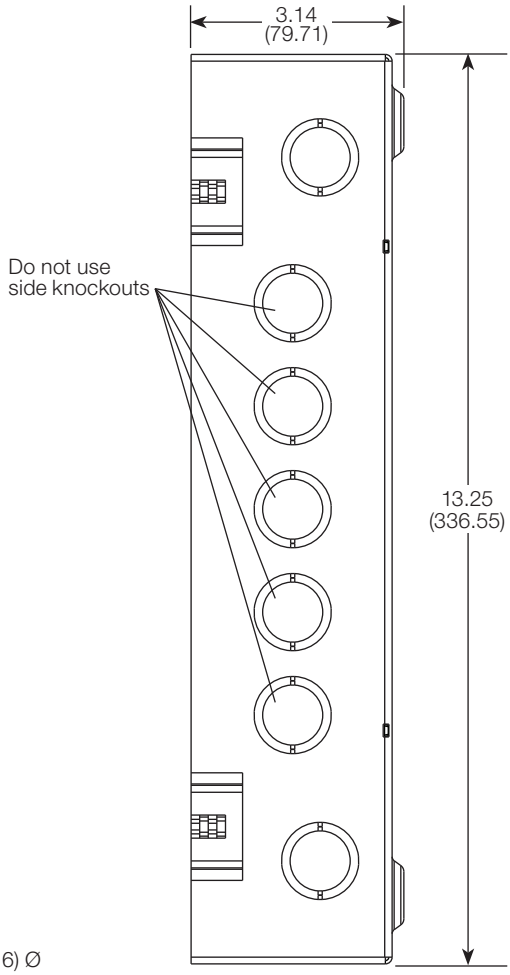
	Manual Programming	HHD Programming • Requires ESN Programming Interface QSE-CI-AP-D • Requires *Apple iPod touch* or *iPhone* mobile digital device
NEC® Dry-Contact Switches Inputs		
Can be assigned to…	Any zone(s) on the connected ESN	Any zone(s) on the connected ESN
Contact Closure Input		
Can be assigned to…	Any zone(s) on the ESN unit	Any or all local ESN unit zones
Functions	• Sweep to off • Enable/disable afterhours • Turn on to preset and turn off	• Sweep to off • Enable/disable afterhours • Turn on to preset and turn off • Load shed
Afterhours Configuration	• Afterhours timeout: 15 minutes • Blink-warn timeout: 5 minutes	Afterhours timeout and blink-warn timeouts are configurable
Emergency Contact Closure Input		
Can be assigned to…	Any zone(s) on the ESN unit	Any or all local ESN zones
Emergency Light level	Configurable	Configurable
seeTouch QS wallstations		
Scene Keypads assigned to…	Any zone(s) on the ESN unit	Any zone(s) on one or more ESN units on the QS link
Scene + Off Keypads assigned to…	Any zone(s) on the ESN unit	Any zone(s) on one or more ESN units on the QS link
Zone toggle keypad buttons assigned to…	Any zone(s) on the ESN unit	Any zone(s) on on or more ESN units on the link
Change Keypad to Scene or Zone	Yes	Yes
Changing keypads to shade, panic, fine tune	No	Yes
Zone Configuration Parameters		
Load type	0–10, 10–0, or switched	0–10, 10–0, or switched
High-end trim	Adjustable	Adjustable
Low-end trim	Adjustable	Adjustable
Absolute minimum level	Adjustable	Adjustable
Scenes		
Available scenes	Scenes 1–16 + Off	Scenes 1–16 + Off
GRAFIK Eye QS	Share scenes, timeclock events, afterhours events, or remote zone mapping to ESN units on QS Link	Share scenes, timeclock events, afterhours events, or remote zone mapping to ESN units on QS Link
QSE-IO	Scene, zone toggle, occupancy	Scene, zone toggle, occupancy
QSE-CI-NWK-E	Yes	Yes

Mechanical Dimensions

All dimensions shown as in (mm)

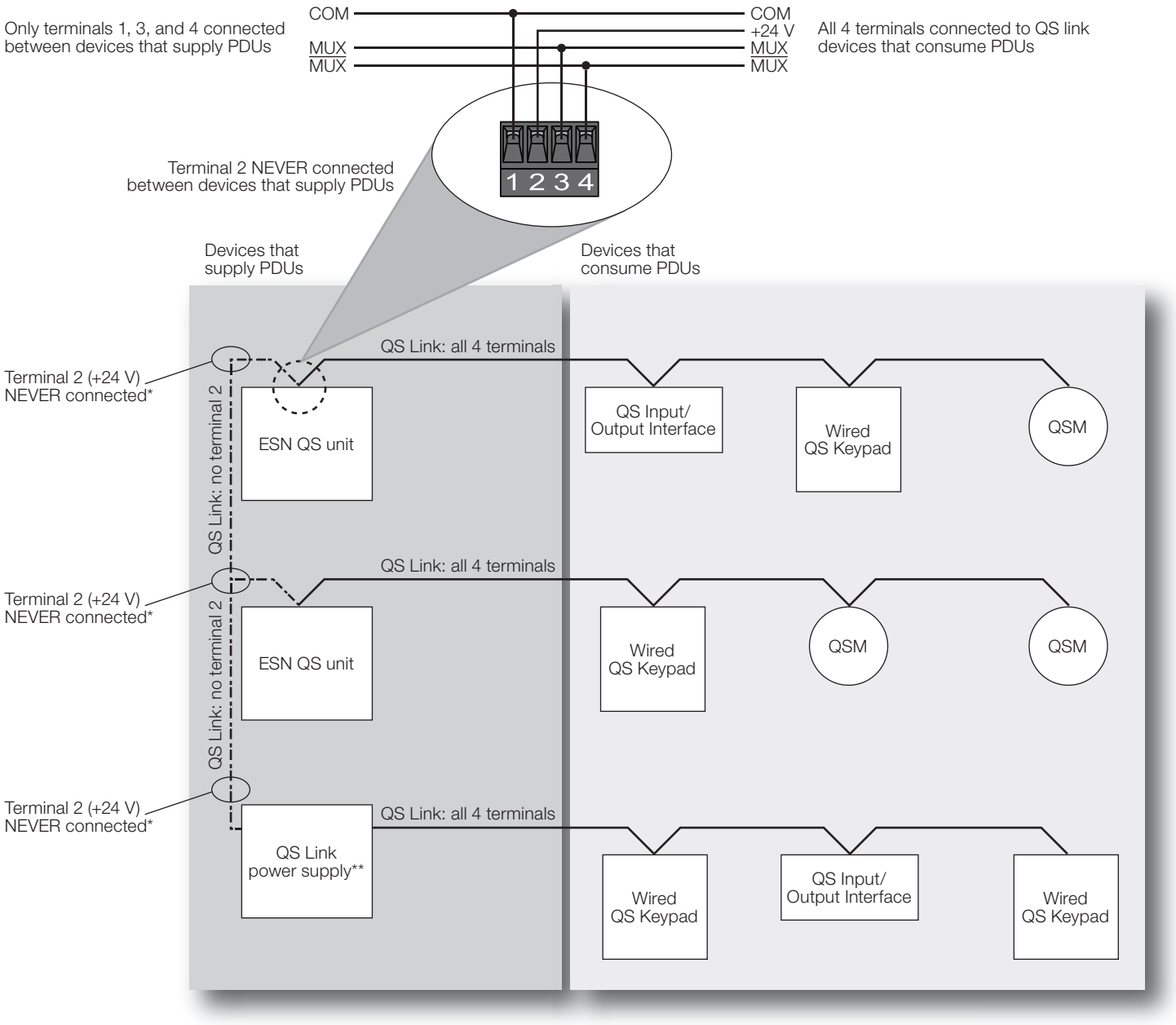






Job Name:	Model Numbers:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

Wiring: QS Link



QS Link Wiring Rules

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

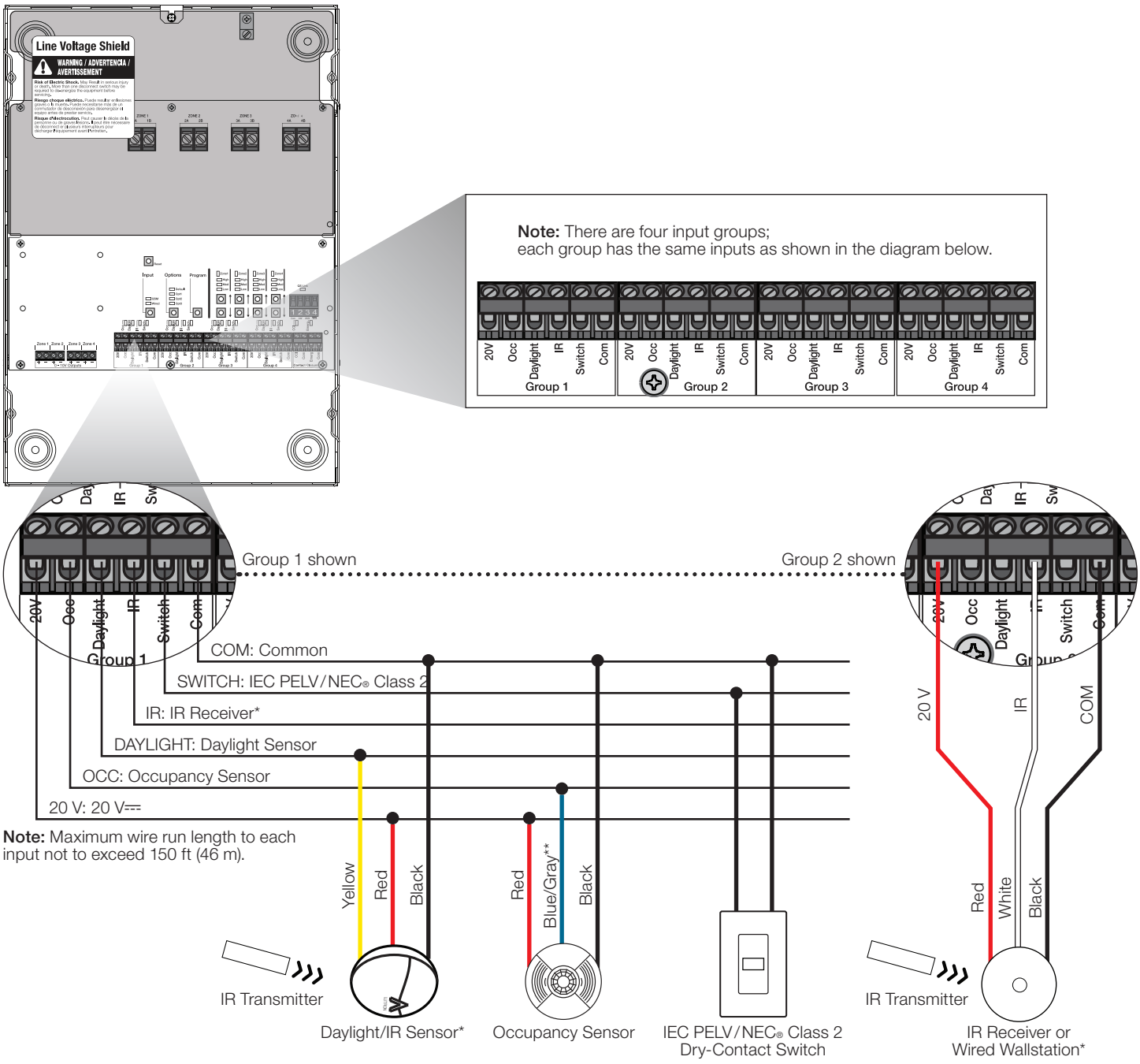
** For QS Link power supply wiring connection details, refer to the installation instructions for the specific power supply model being used.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

Wiring: IEC PELV/NEC® Class 2 Inputs

Input Group Wiring

- 20 to 12 AWG (0.5 to 4.0 mm²)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.5 N•m)



* **Note:** Only one IR device may be connected per input. If the IR signal from a daylight sensor is connected, a wall control may not be connected to the same input, and vice-versa.

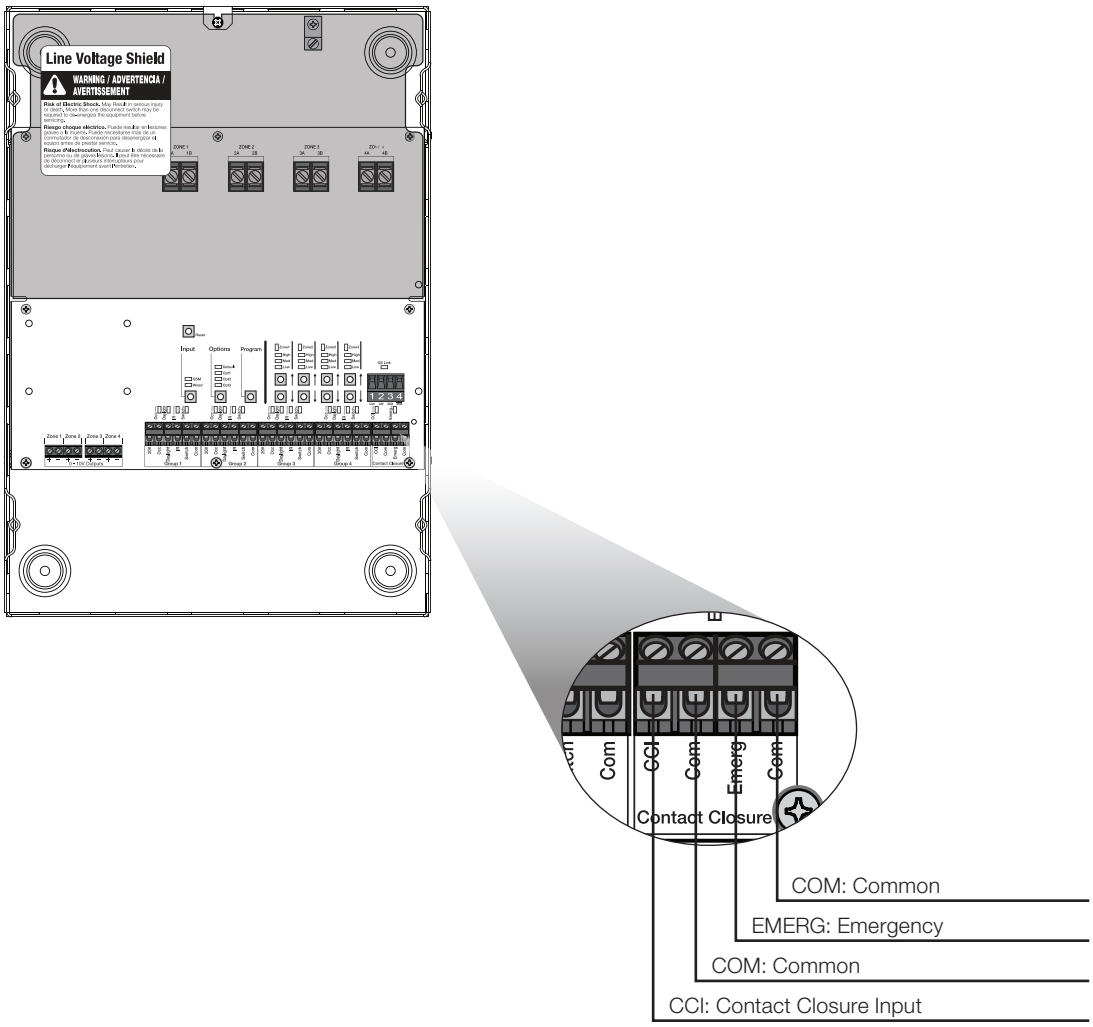
** Connect the gray wire on -R model occupancy sensors.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

Wiring: Contact Closure Inputs (CCI and Emerg)

Contact Closure Wiring

- 20 to 12 AWG (0.5 to 4.0 mm^2)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.5 N•m)



Job Name:	Model Numbers:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

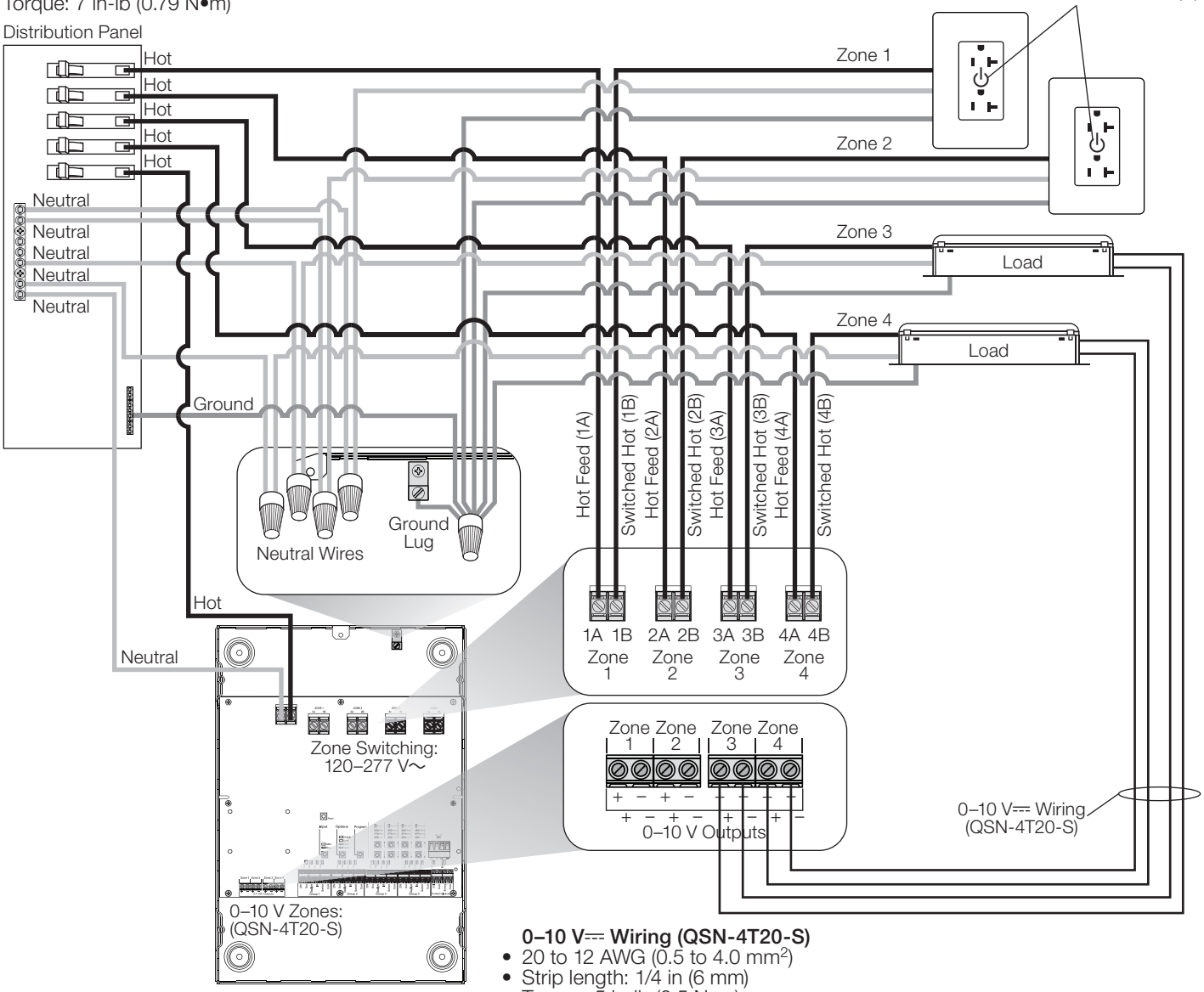
Wiring: 4 Circuits, Multiple Feeds

Load Wiring

- Two (2) 14 to 12 AWG (2.5 to 4.0 mm²)
- Strip length: 3/8 in (8.5 mm)
- Torque: 7 in-lb (0.79 N•m)

Attention Installer

Any receptacles that are controlled by an automatic control device must be marked with "⏻" located on the controlled receptacle outlet where visible after installation as stated in 2014 NEC® Article 406.3(E).



0–10 V⎓ Wiring (QSN-4T20-S)

- 20 to 12 AWG (0.5 to 4.0 mm²)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.5 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.

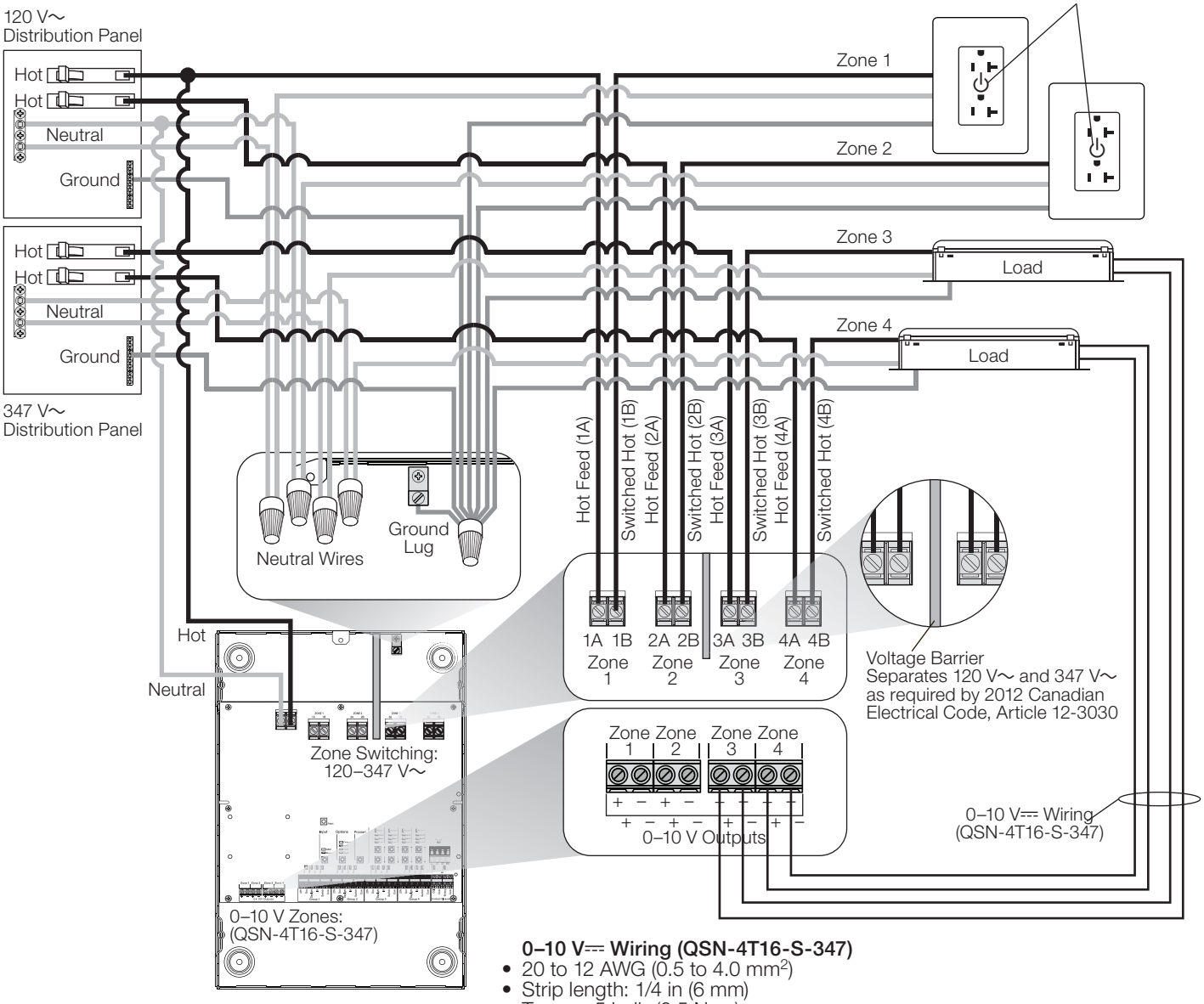
WARNING. Entrapment/Fire Hazard. To avoid the risk of entrapment, serious injury, or death, these controls must not be used to control equipment which is not visible from every control location or which could create hazardous situations such as entrapment if operated accidentally. Examples of such equipment 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:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

Wiring: 4 Circuits, Multiple Feeds, 120 V~ Receptacles and 347 V~ Lighting

Load Wiring
- Two (2) 14 to 12 AWG (2.5 to 4.0 mm²)
- Strip length: 3/8 in (8.5 mm)
- Torque: 7 in-lb (0.79 N•m)

Attention Installer
Any receptacles that are controlled by an automatic control device must be marked with "⏻" located on the controlled receptacle outlet where visible after installation as stated in 2014 NEC® Article 406.3(E).



0–10 V⎓ Wiring (QSN-4T16-S-347)
- 20 to 12 AWG (0.5 to 4.0 mm²)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.5 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.

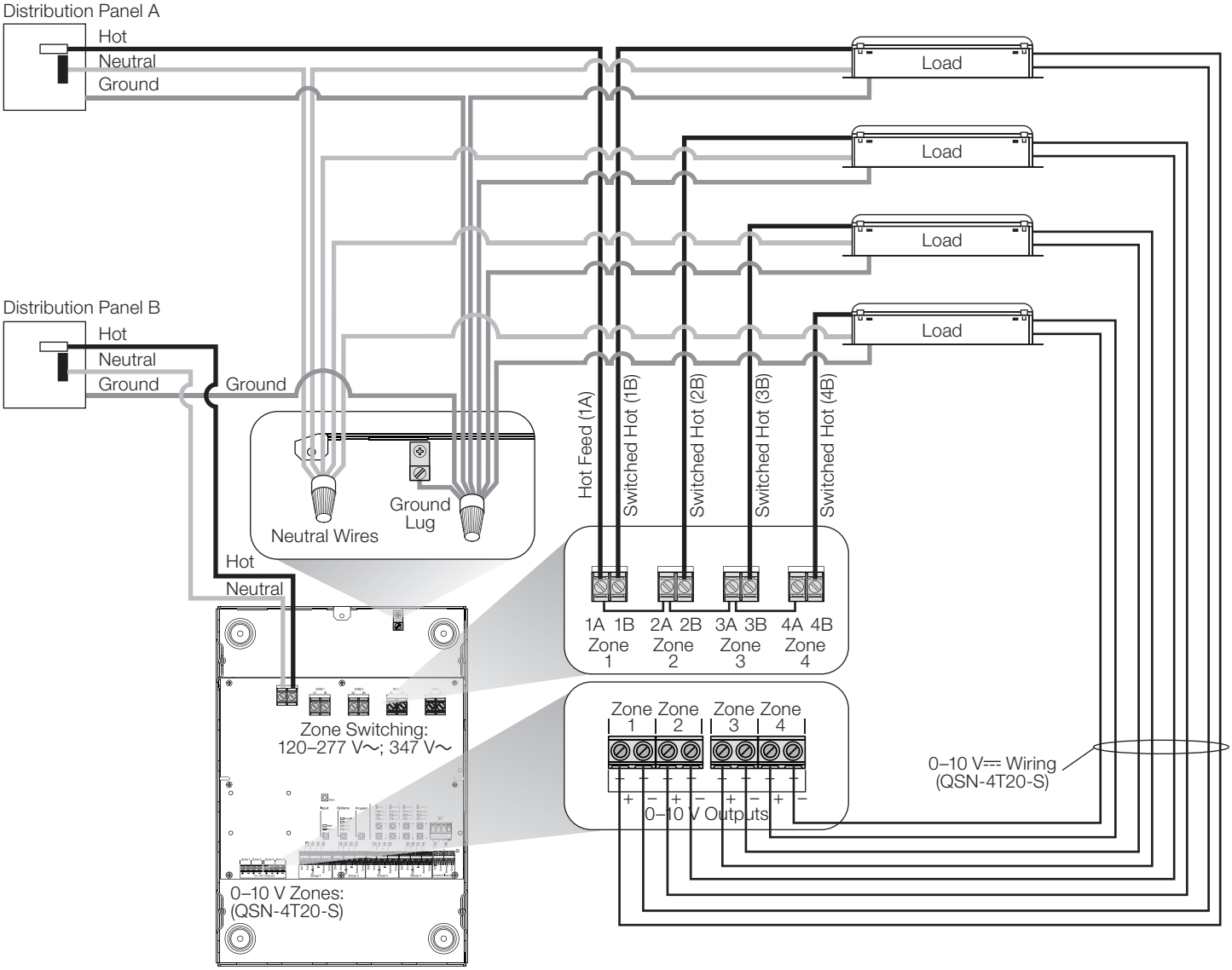
WARNING. Entrapment/Fire Hazard. To avoid the risk of entrapment, serious injury, or death, these controls must not be used to control equipment which is not visible from every control location or which could create hazardous situations such as entrapment if operated accidentally. Examples of such equipment 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:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

Wiring: 4 Circuits, Single Feed

Load Wiring

- Two (2) 14 to 12 AWG (2.5 to 4.0 mm²)
- Strip length: 3/8 in (8.5 mm)
- Torque: 7 in-lb (0.79 N•m)



0–10 V⎓ Wiring (QSN-4T20-S)

- 20 to 12 AWG (0.5 to 4.0 mm²)
- Strip length: 1/4 in (6 mm)
- Torque: 5 in-lb (0.5 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.

Job Name:	Model Numbers:	
Hotel Hartness	QSN-4S20-S	
Job Number:		

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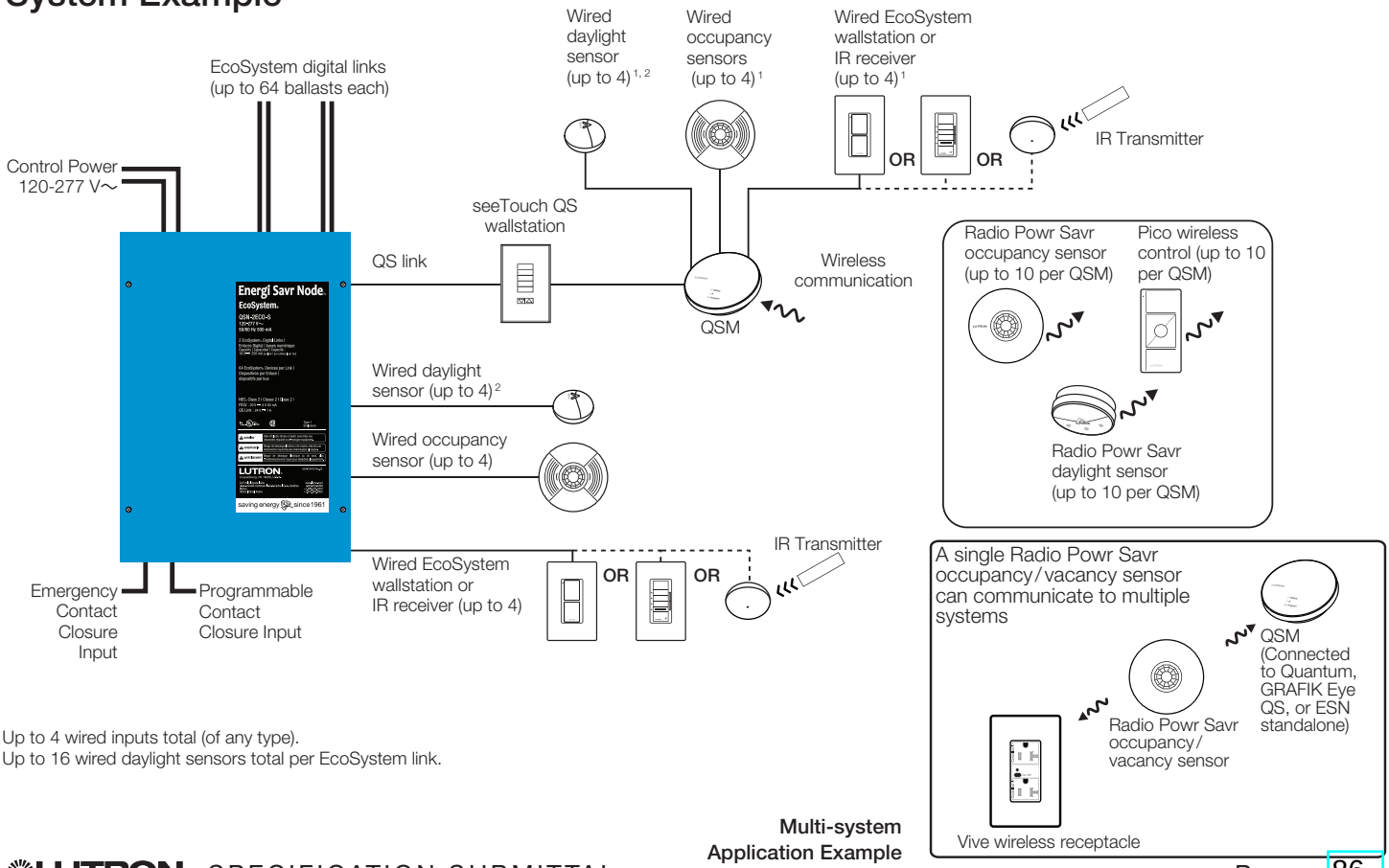
QS Sensor Module

The QS Sensor Module (QSM) is a ceiling-mounted device that integrates Lutron wireless and wired sensors and controls through the QS communication link to Energi Savr Node (ESN) units, GRAFIK Eye QS control units, Quantum systems, myRoom control modules, and Sivoia QS shades/draperies.

Features

- Uses Clear Connect RF technology for communication with Radio Powr Savr sensors and Pico wireless controls.
- QSM connects to four Lutron wired sensors or controls—sensors, EcoSystem infrared (IR) receivers, or EcoSystem wallstations. Does not apply to wireless only models.
- Powered by the QS link—no line voltage connections are required.
- Contact Lutron for compatibility details with the Quantum system.
- Compatible with the entire ESN product family:
  - — Allows Lutron wired sensors, EcoSystem wallstations, EcoSystem IR receivers, Pico wireless controls, and Radio Powr Savr sensors to control ESN units.
- Compatible with myRoom power modules.
  - — Allows Lutron wired and wireless occupancy/vacancy sensors to control power modules.
  - — Allows Pico wireless controls to control power modules.
- Compatible with GRAFIK Eye QS control units.
  - — GRAFIK Eye QS control unit models starting with QSGR.
  - — Allows Lutron wired or Radio Powr Savr wireless sensors linked to a QSM to control the GRAFIK Eye QS control unit.
  - — Contact Lutron for compatibility with Pico wireless controls, EcoSystem wallstations, and EcoSystem infrared (IR) receivers.
- Compatible with Sivoia QS shades/draperies.
  - — Allows Pico wireless controls to control Sivoia QS shades/draperies (QSM models with wireless inputs only).

System Example

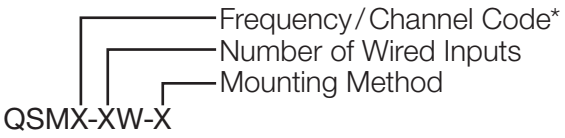


[1] Up to 4 wired inputs total (of any type).
[2] Up to 16 wired daylight sensors total per EcoSystem link.

Multi-system Application Example

Job Name:	Model Numbers:	
Hotel Hartness	QSM2-4W-C	
Job Number:		

Models



Frequency/Channel Code*
2—431.5 - 436.6 MHz U.S.A., Canada, and Mexico
3—868.1 - 869.8 MHz European Union and United Arab Emirates
4—868.1 - 868.5 MHz Singapore and China
5—865.5 - 866.5 MHz India
7—433.0 - 434.7 MHz Hong Kong
X—No RF

*Contact Lutron for frequency/channel code compatibility with your particular geographic region if it is not indicated above.

Number of Wired Inputs
4—4
X—None

Mounting Method
C—Ceiling Mount
J—Junction Box Ceiling Mount

Availability/Compatibility

Refer to the chart below to determine QSM model availability and compatibility with different sensor models.

	Radio Powr Savr Sensors		
QSM Models	Occupancy/Vacancy***	Daylight**	Pico Wireless Controls
QSM2-4W-C, QSM2-XW-C, QSM2-4W-J, QSM2-XW-J	LRF2-OCRB-P, LRF2-OHLB-P, LRF2-OKLB-P, LRF2-OWLB-P, LRF2-VHLB-P, LRF2-VKLB-P, LRF2-VWLB-P, LRF2-OCR2B-WH, LRF2-VCR2B-WH	LRF2-DCRB	MRF2-3BRL, MRF2-3B, MRF2-2BRL, MRF2-2B, QSR4P-3R, PJ-2B-Gxx-xxx, PJ-2BRL-Gxx-xxx, PJ-3B-Gxx-xxx, PJ-3BRL-Gx-xxx, PJ2-2B-Gxx-xxx, PJ2-2BRL-Gxx-xxx, PJ2-3B-Gxx-xxx, PJ2-3BRL-Gx-xxx, PJ2-4B-Gxx-xxxx
QSM3-4W-C, QSM3-XW-C	LRF3-OCRB-P	LRF3-DCRB	QSRKP-2, QSRKP-2R, QSRKP-3R
QSM4-4W-C, QSM4-XW-C	LRF4-OCRB-P	LRF4-DCRB	QSRMP-2, QSRMP-2R, QSRMP-3R
QSM5-XW-C	LRF5-OCRB-P	LRF5-DCRB	QSRNP-2, QSRNP-2R, QSRNP-3, QSRNP-3R
QSM7-4W-C, QSM7-XW-C	LRF7-OCR2B-P	LRF7-DCRB	QSRQP-2, QSRQP-2R, QSRQP-3, QSRQP-3R
QSMX-4W-C	N/A	N/A	N/A

** Daylight sensors cannot be used as part of myRoom solutions.
***Low light occupancy mode is incompatible with QSM models.

Job Name:	Model Numbers:	
Hotel Hartness	QSM2-4W-C	
Job Number:		

Specifications

QS Sensor Module (QSM)

Power

- 24–36 V⎓
- Maximum current draw:
  - 400 mA (models with wired input)
  - 100 mA (models without wired input)
- Power Draw Units (PDU): Refer to the QS Link Power Draw Units specification submittal (P/N 369405) for information concerning PDUs on the QS link. Use only Lutron approved power sources.
- 10-year power failure memory: restores settings and programming after power interruption.

Regulatory

- Lutron quality systems registered to ISO 9001.
- RoHS compliant
- Wireless receiver (Rx) device. Product has no wireless transmit functionality.

QSM2 –

- cUL US Listed (U.S.A. and Canada)
- FCC Compliant. Complies with the limits for a Class B digital device, persuant to Part 15 of the FCC Rules (U.S.A.).
- IC Certified. (Canada)
- SCT Certified (Mexico)

QSM3 –

- CE Marked (European Union)

QSM5 –

- WPC Type Approved (India)

QSM7 –

- FCC Compliant. Complies with the limits for a Class B digital device, persuant to Part 15 of the FCC Rules (U.S.A.).

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.

Terminals

- Input wiring: 22 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)
- QS link wiring: 22 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)

Mounting

- QSM units should be mounted in the middle of non-metal ceiling tile or drywall, visible from inside the space.
- Installation near metal other than a junction box may reduce RF range.

Wireless Communication (models with wireless inputs only)

- RF Range: 60 ft (18 m) line of sight or 30 ft (9 m) through typical construction materials.
- To ensure optimal wireless range, install the QSM in the ceiling in a visible position from inside the space.
- Radio Powr Savr occupancy/vacancy sensor (up to 10)
- Radio Powr Savr daylight sensor (up to 10)
- Pico wireless control (up to 10)

Wired Inputs

- There are 4 universal wired inputs. Each input can accept one of the following:
  - EcoSystem wallstation (CC- series)
  - Occupancy sensor (LOS- series)
  - Daylight sensor (EC-DIR- series)
  - EcoSystem IR receiver (EC-IR or EC-DIR- series)
  - Wired Pico control (PX- series)
- Use of both the infrared receiver and daylight sensor on the EC-DIR- series sensors is considered two wired inputs on a QSM
- Maximum wiring distance = 150 ft (46 m)
- Only wired (LOS- series) and wireless occupancy/vacancy sensors may be used in myRoom; no Ecosystem wallstations, daylight sensors, Ecosystem IR receivers or wired Pico controls

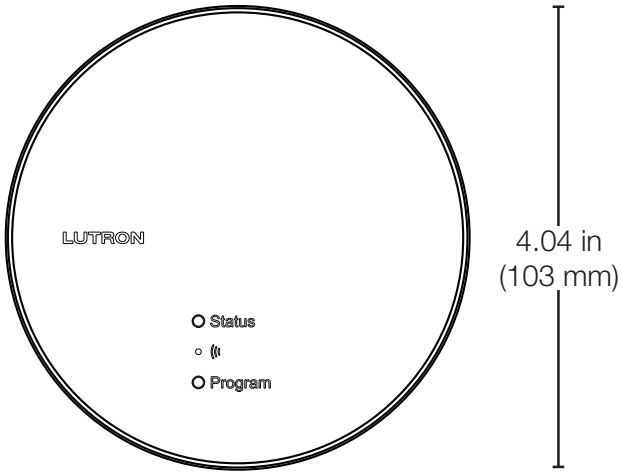
QS Link Limits

- The QS link can have up to 100 devices.
- Each QSM counts as 1 device towards the 100 device limit.
- Each QSM draws 3 Power Draw Units (PDUs) on the QS link.
- Wired sensors add to the PDU draw of a QSM. Refer to the QS Link Power Draw Units specification submittal (P/N 369405) for information concerning PDUs.
- QS link maximum wire run length is 2000 ft (610 m).
- See the commercial system rules spec (P/N 369821) for system specific limitations.

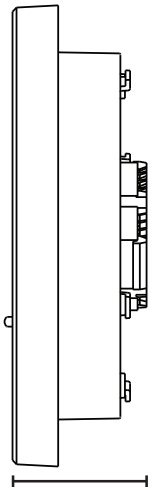
Job Name:	Model Numbers:	
Hotel Hartness	QSM2-4W-C	
Job Number:		

Mechanical Dimensions (All Models)

Front View

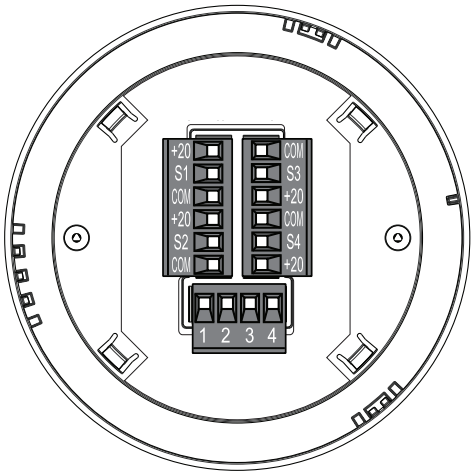


Side View

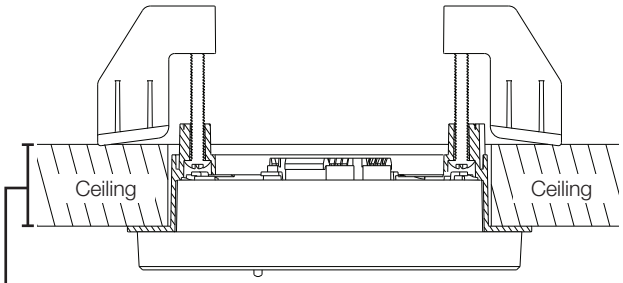


Back View

(QSM2-4W-C shown)

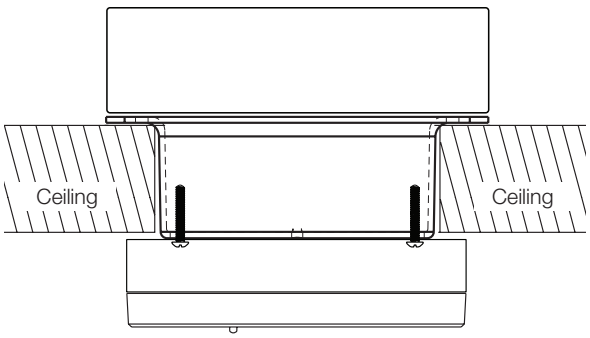


Mounted (-C Models)

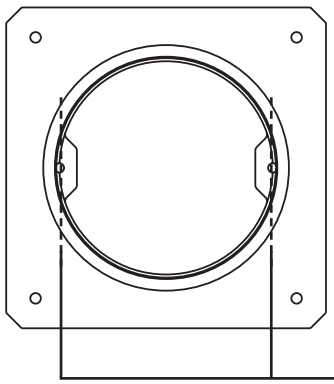


Ceiling thickness range for -C models
Minimum 0.30 in (8 mm)
to
Maximum 1.20 in (30 mm)

Mounted (-J Models)



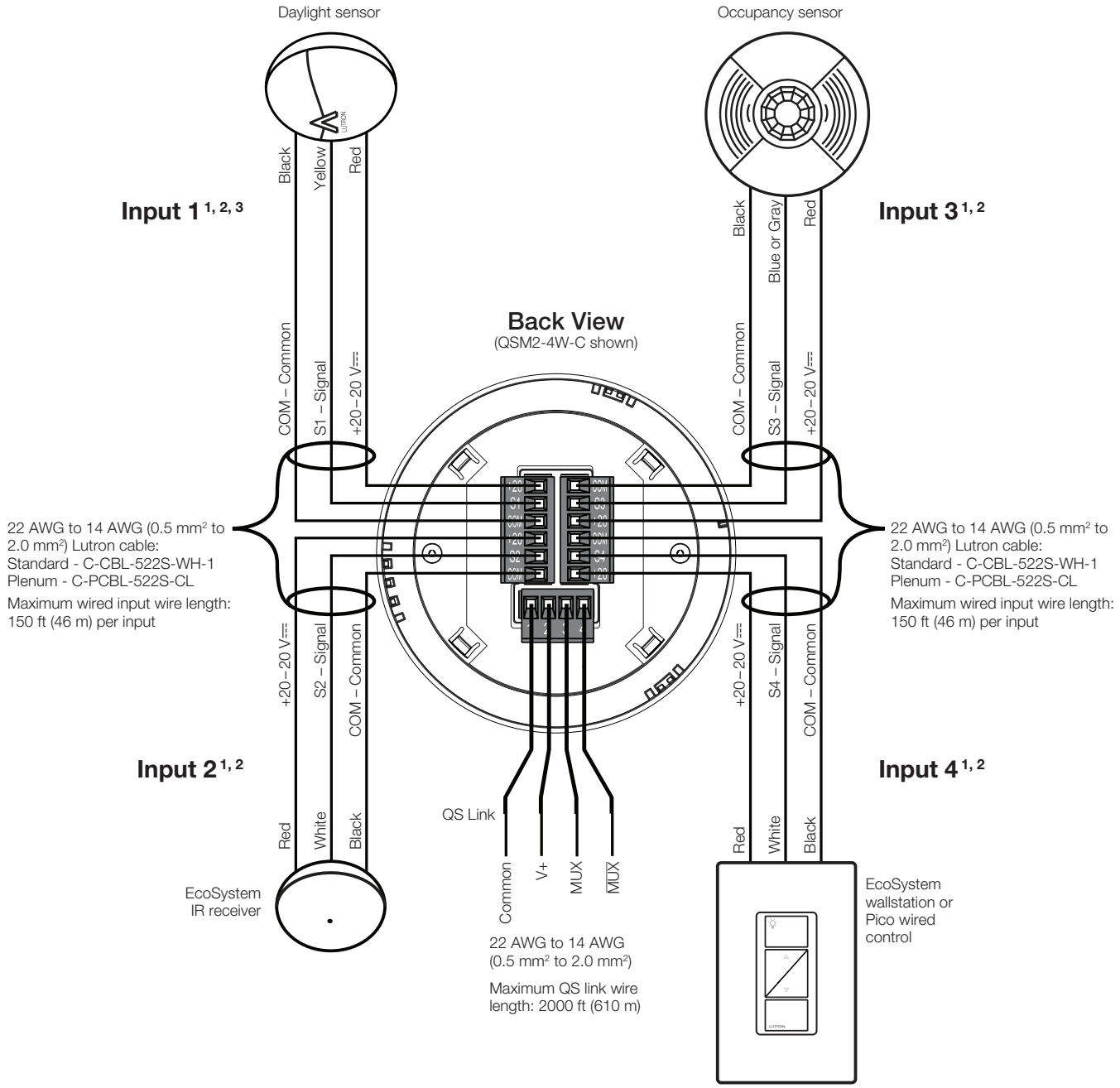
Use appropriate mud ring for ceiling tile thickness. Do not allow the tile to carry the weight of the junction box.



Use mud ring with hole spacing shown below. Mud ring not included with any QSM models.

Job Name:	Model Numbers:	
Hotel Hartness	QSM2-4W-C	
Job Number:		

Wiring: QS Link and Wired Inputs[1]

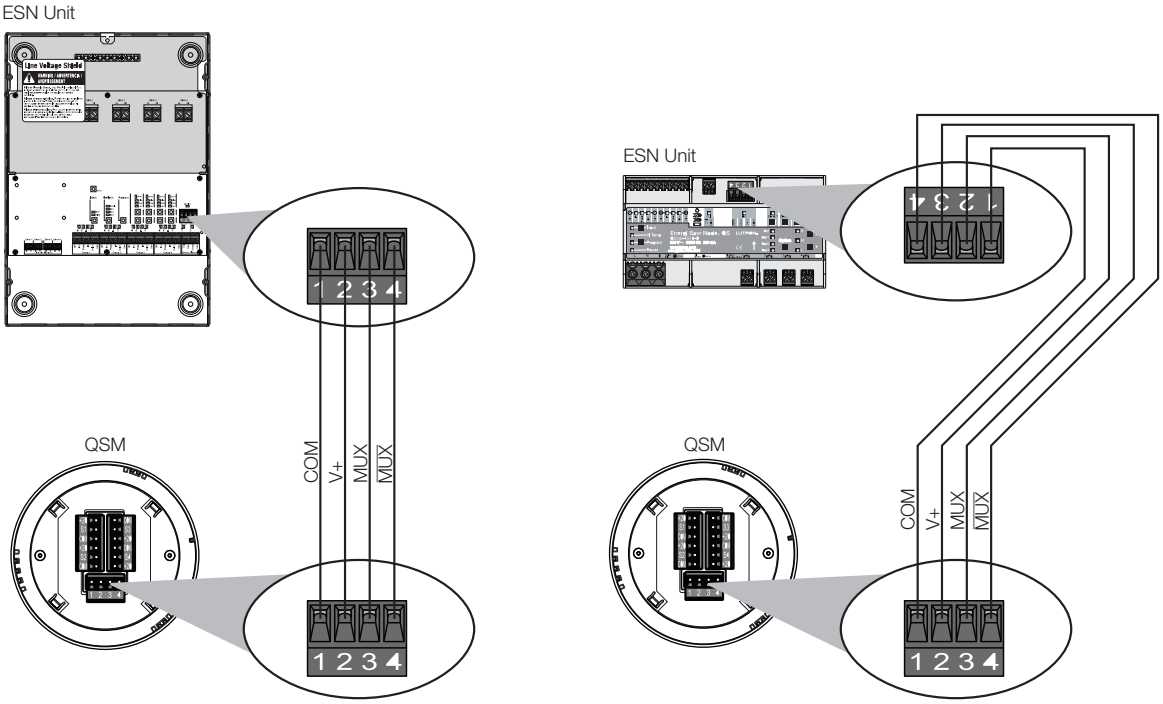


[1] Only on QSM models with wired inputs.
[2] For reference only. Each input is universal and can accept any of the inputs shown above.
[3] Only daylight sensor signal connected to QSM shown above. Use of IR signal counts as an additional input on the QSM.

Job Name:	Model Numbers:	
Hotel Hartness	QSM2-4W-C	
Job Number:		

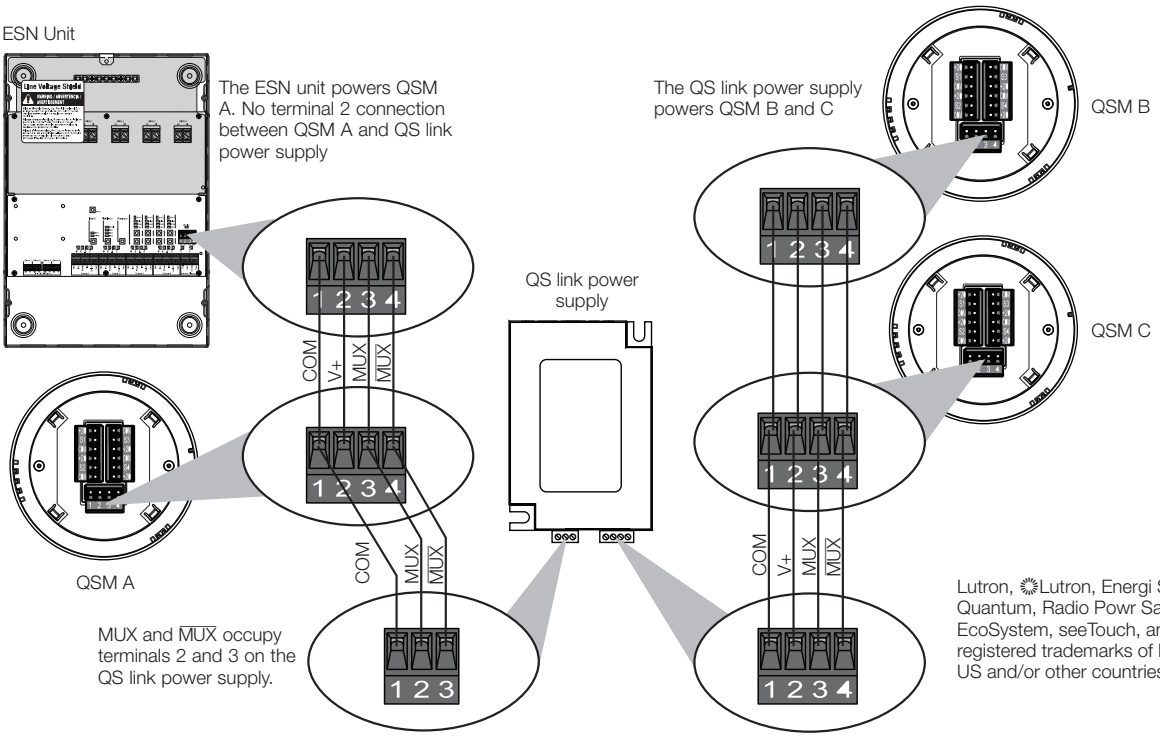
Wiring: Device Power

Single QSM Powered by an ESN Unit



Multiple QSMs Powered by an ESN Unit and a QS Link Power Supply

A QS link power supply may be necessary if PDUs required by QSMs exceed available PDUs from the device supplying power.



Job Name:	Model Numbers:	
Hotel Hartness	QSM2-4W-C	
Job Number:		

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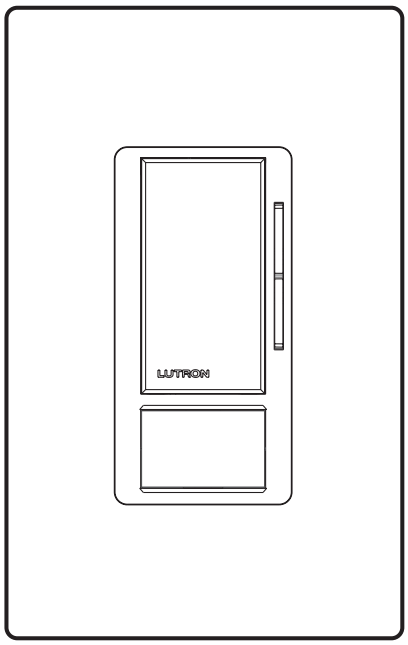
Maestro 0–10 V Dimmer Sensor

Lutron Maestro 0–10 V Dimmer Sensors are lighting controls with passive infrared sensors that automatically control the lights in an area. These sensors detect heat from occupants moving within an area to determine when the space is occupied. The Maestro 0–10 V Dimmer Sensor combines a Maestro 0–10 V Dimmer with an Occupancy or Vacancy Sensor.



Features

- Controls 0–10 V⎓ electronic fluorescent ballasts or LED driver load types*
- Passive infrared motion detection with exclusive Lutron XCT Technology for fine motion detection
- 180° sensor field-of-view
- Up to 30 ft × 30 ft (9 m × 9 m) [900 ft^2 (81 m^2)] major motion coverage and 20 ft × 20 ft (6 m × 6 m) [400 ft^2 (36 m^2)] minor motion coverage
- Occupancy version can be set to auto-on/auto-off or manual-on/auto-off
- Vacancy version available to meet CA Title 24 requirements
- Adjustable timeout (1, 5, 15, or 30 minutes)
- Adjustable settings for auto-on light level (occupied level): 100%, 50%, last light level, or locked preset light level
- Adjustable sensitivity level: High, Med, Low, Min
- Off warning fades lights to off over a period of 10 seconds
- Advanced Maestro dimmer features available (locked preset, fade-to-on, and fade-to-off, etc.)
- Adaptive switching algorithm for extended relay life
- Smart ambient light detection (ALD)
- All models have single pole and 3-way capability
- Works with a single standard mechanical 3-way switch or up to 9 companion switches (MA-AS or MSC-AS)*
- High-end trim and low-end trim to adjust maximum and minimum light levels
- Selectable dimming curve—linear or square law
- Miswire and incompatible load alert

* When using with standard mechanical 3-way switch, some rewiring is required. Not compatible with MA-R.

Models Available

Model Number	Description	Sensor Operation	Maximum Capacity
MS-Z101-XX[1, 2]	Occupancy/vacancy Single-pole/multi-location	Auto-on/auto-off or manual-on/auto-off	8 A electronic fluorescent ballasts or LED driver[3]
MS-Z101-V-XX[1]	Vacancy Single-pole/ multi-location	Manual-on/auto-off ONLY	8 A electronic fluorescent ballasts or LED driver[3]

1 XX in model number represents color/finish code.
2 For a bulk pack of 6 pieces, order MS-Z101-WH-6. Available in WH only.
3 Works with all ballasts and drivers that provide a current source compliant to IEC 60629 Annex E.2.

Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

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Specifications

Regulatory Approvals

- UL Listed to U.S. and Canadian safety requirements
- Title 20/24 certified lighting control device
  – Complies with Title 20 and Title 24 Section 110.9

Power

- Operating voltage: 120–277 V~ 50/60 Hz

Loads

- 8 A 0–10 V⎓ electronic fluorescent ballasts or LED drivers
- Works with all ballasts and drivers that provide a current source compliant to IEC 60629 Annex E.2, and whose inrush current does not exceed NEMA410 standards for electronic ballast/driver loads of 8 A steady state current.
- 50 mA max sink current
- Controls up to 25 ballasts or drivers (IEC 60929 Annex E.2 requires the ballast/driver to limit the current draw to 2.0 mA maximum)

Environment

- Ambient operating temperature:
  32 °F to 104 °F (0 °C to 40 °C), 0%–90% humidity, non-condensing; indoor use only

Warranty

- 5 Year Limited Warranty
  For additional Warranty information, please visit: www.lutron.com/TechnicalDocumentLibrary/Sensor_Warranty.pdf

Key Design Features

Dimmer

- On a single-tap, lights fade ON or OFF
- On a double-tap, lights go to full ON
- Light levels can be fine-tuned by pressing and holding the dimming rocker until the desired light level is reached
- High-end trim (adjust maximum light level that can be achieved, for energy savings)
- Low-end trim (adjust minimum light level that can be dimmed down, to prevent flickering lights)

Additional Information on Sensors

- For single-circuit PIR Maestro occupancy sensor switch models, refer to Lutron P/N 369666
- For Maestro occupancy sensor C•L dimmer models, refer to Lutron P/N 369748
- For dual-circuit PIR Maestro occupancy sensor switch, refer to Lutron P/N 369758
- For dual technology occupancy sensor switch models, refer to Lutron P/N 369773
- For more information, please see www.lutron.com/occvacsensors
- Lutron Customer Assistance: 1.844.LUTRON1

Select Design Feature Details

- Selectable dimming curve—linear or square law. Drivers exist with linear response and some exist with square law response. By providing a selectable dimming curve from the 0–10 V Dimmer Sensor, the user is able to choose his/her preferred response for optimized dimming performance.
- Miswire and incompatible load alert. The user will receive a visual alert when the product's 0–10 V⎓ control wires are incorrectly connected or an incompatible load is detected. In these conditions, the product will still function as a switch. Refer to Application Note 048536 for more details.
- Fade-to-On and Fade-to-Off.

Load Type and Capacity

Control	Vacancy Only	0–10 V⎓ Current[1,2]	Voltage/Load Type/Maximum Load (Anywhere in gang)[3]	Minimum Load	3-Way with Mechanical Switch	Multi-Location with Accessory Switch
MS-Z101-	—	50 mA max sink	120–277 V~ Electronic fluorescent ballast or LED drivers, 8 A	0 A	✓	✓
MS-Z101-V	✓	50mA max sink	120 V~ Fan 4.4 A (1/6 HP)[4]	0 A	✓	✓

1 The 0–10 V⎓ control wires are not to exceed 250 ft (76.2 m) in length, and must have a size of no less than 20 AWG (0.75 mm^2).

2 The 0–10 V⎓ wires must be installed as Class One per NEC® or local jurisdiction.

3 Dimmer Sensor load type: Designed for use with permanently installed electronic fluorescent ballast or LED driver lighting loads. Do not install dimmers to control receptacles or motor-operated appliances.

4 When controlling light and fan loads simultaneously on a single circuit, maximum load capacity per circuit is 4.4 A at 120 V~.

Notes:

- Ground or neutral is required for product to function.
- Connect green-sleeved wire to ground only in retrofit and replacement applications. When neutral connection is available, remove green sleeve and connect to neutral. If neither is present, consult a licensed electrician.
- When power is applied, the Dimmer Sensor can be manually turned on or off after the first 10 seconds and will automatically control the load after 2 minutes.
- Works with all ballasts and drivers that provide a current source compliant to IEC 60929 Annex E.2.

Custom Settings (default settings shown in **bold**)

: Timeout

- 30 min
- **15 min**
- 5 min
- 1 min

Mode: Sensor Modes

Lights automatically turn off in all sensor modes

- **Occ: Occupancy mode (No ALD)**
- Lrn: Occupancy with learning ALD mode
- Fixd: Occupancy with fixed ALD mode
- Vac: Vacancy mode (No ALD)

PIR: Passive Infrared Sensitivity

- **Hi**
- Med
- Low
- Min

Additional Settings

Fixed ALD Light Level

- Hi
- Med
- **Low***
- Min

* *Low* is the default setting for any sensor that is set by the user to "Occupancy with fixed ALD mode"

Manual Off-While-Occupied

- **Enabled**
- Disabled

Walk-Thru Mode

- Enabled
- **Disabled**

Occupied Level

A programmable setting that determines the light level the Dimmer Sensor will turn on to, once occupancy has been detected

- **100%**
- 50%
- Preset Level
  - When the Occupied Level is set to *Preset Level*, the Dimmer Sensor will automatically and manually turn on to the selected Preset Level.

Fade On Rate

- 15 sec
- 5 sec
- **2.5 sec**
- 0.75 sec

Fade Off Rate

- 15 sec
- 5 sec
- **2.5 sec**
- 0.75 sec

Preset Level**

- Locked (High range)
- Locked (Med range)
- Locked (Low range)
- Locked (Min range)
- **Unlocked**
  - When the Preset Level is set to a *locked* level, the Dimmer Sensor will turn ON to the predetermined "locked" level with a single tap of the Tap button.
  - When the Preset Level is set to *unlocked*, a single tap of the Tap button will turn the Dimmer Sensor ON to the light level to which it was adjusted the last time the light was on.

Low-End Trim**

- High range
- Med range
- Low range
- Min range

High-End Trim**

- High range
- Med range
- Low range
- Min range

** Setting is fully variable within each range.

Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

Custom Settings: Details (default settings shown in **bold**)

Ambient Light Detection (ALD) mode

Lights turn on only when natural light in the room is below the set threshold.

- Enabled
  - Learning: The ambient light threshold adjusts to the user's preference via manual interaction with the Dimmer Sensor.
  - Fixed: Choose a fixed ALD light level from 4 pre-set options: High, Medium, Low, Minimum.
- **Disabled**

Manual Off-While-Occupied Options

- **Enabled**
  - When the Dimmer Sensor is manually turned off, the sensor switch will not turn the lights back on automatically while the room is occupied.
  - Once the room is vacated, the Auto-On feature returns to normal operation after the timeout period has expired.
  - This may be the preference in conference rooms or classrooms while viewing presentations. This feature requires motions to keep the lights off.
- Disabled
  - When the Dimmer Sensor is manually turned off, the Auto-On feature will return to normal operation after 25 seconds.
  - This may be the preference in a restroom if the user always wants the lights to turn on upon entering and the lights to turn off when the room is vacant.

Walk-Thru Mode

- Enabled*
  - If motion is not detected within 3 minutes after initial occupancy, the lights will turn off after 3 minutes, instead of the current timeout.
  - This setting may be the preference in commercial applications where personnel may briefly trigger sensors during non-working hours.
- **Disabled**
  - When motion is detected, the lights will ALWAYS remain on for the entire timeout duration regardless of the duration of occupancy detection.

* 1 minute timeout would be overridden if walk-thru mode is also *Enabled*

Fade-On Rate

The time required for the lights to reach the preset light level when the tap button is pressed.

Fade-Off Rate

The time required for the lights to turn off (from the ON state) when the tap button is pressed.

Low-End Trim

Lowest achievable light level to which the Dimmer Sensor can be adjusted.

High-End trim

Highest achievable light level to which the Dimmer Sensor can be adjusted.

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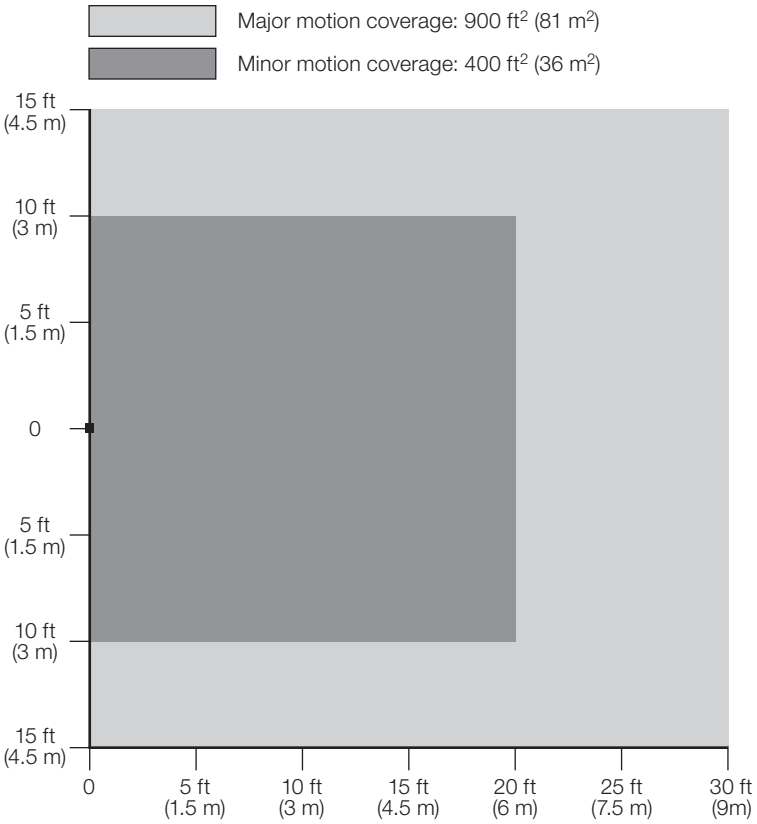
Maestro 0–10 V Dimmer Sensor Placement and Operation

- The ability of the Dimmer Sensor to detect motion requires line-of-sight of room occupants. The Dimmer Sensor must have an unobstructed view of the room.
- Hot objects and moving air currents can affect the performance of the Dimmer Sensor. For best performance, the Dimmer Sensor should be mounted at least 4 ft (1.2 m) away from HVAC vents and light bulbs.
- The performance of the Dimmer Sensor depends on a temperature differential between the ambient room temperature and that of room occupants. Warmer rooms may reduce the ability of the Dimmer Sensor to detect occupants.

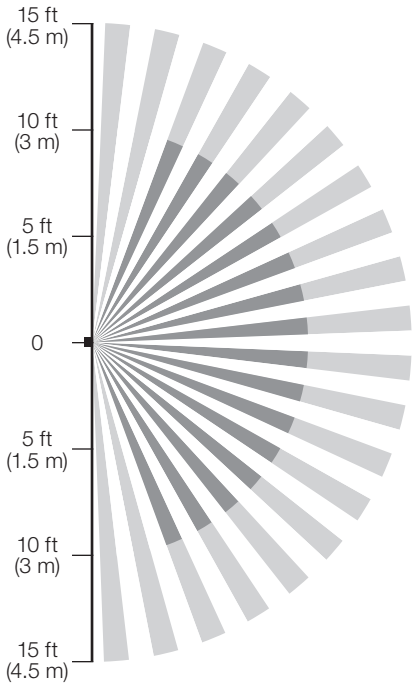
NEMA WD7 Test Grid Coverage

(High Sensitivity Setting)



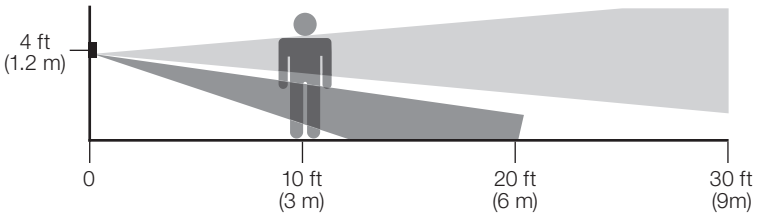
Horizontal Beam Diagram

(For Reference Only)



Vertical Beam Diagram

(For Reference Only)



Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

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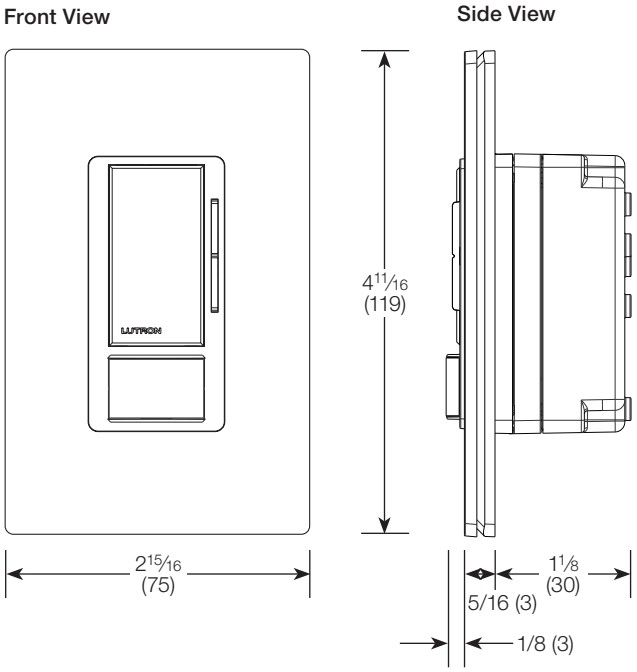
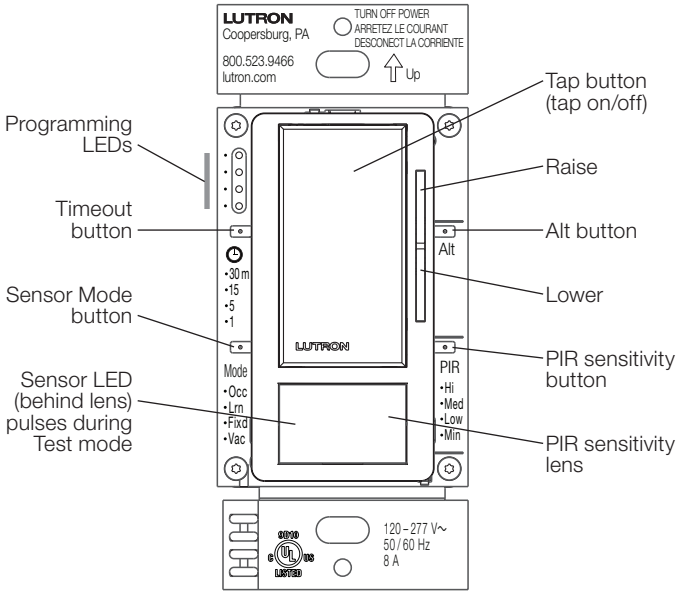
Dimensions

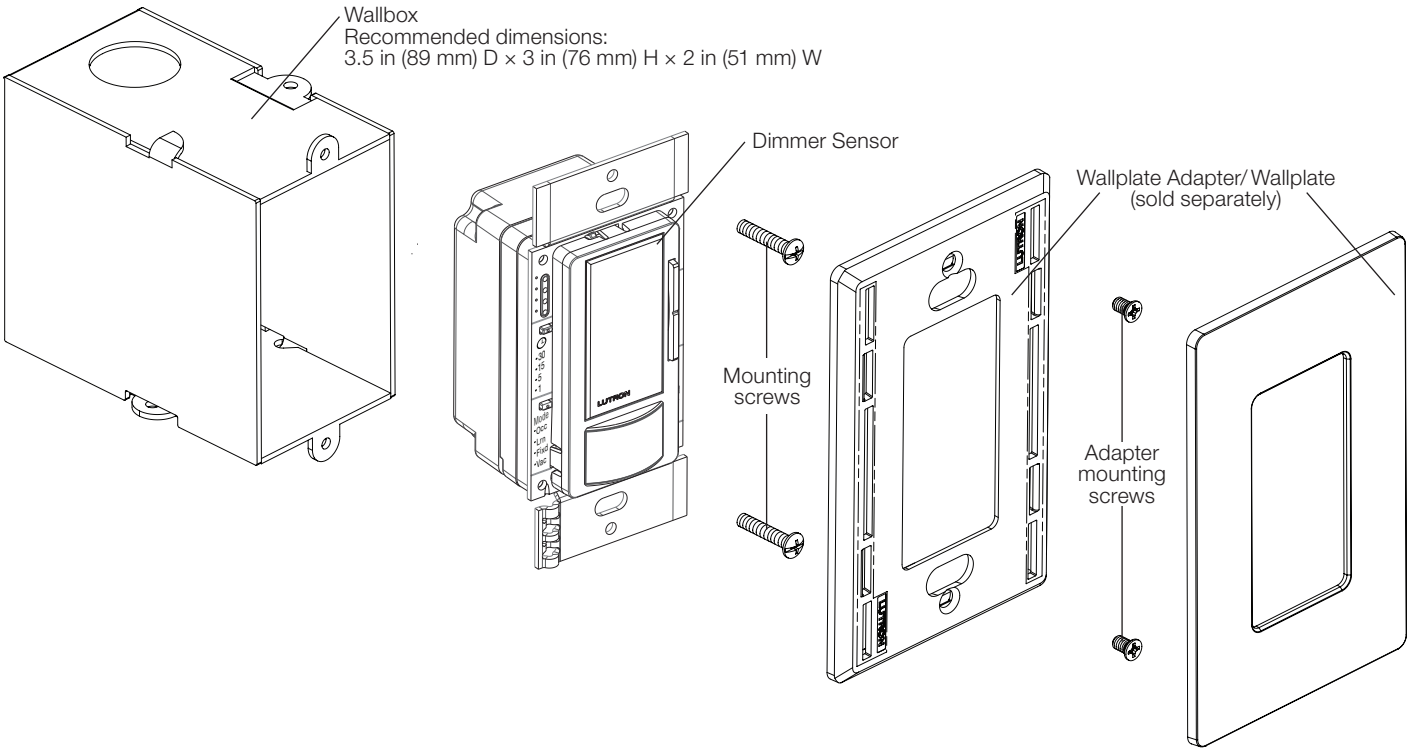
Measurements shown as: in (mm)



Operation



Mounting



Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

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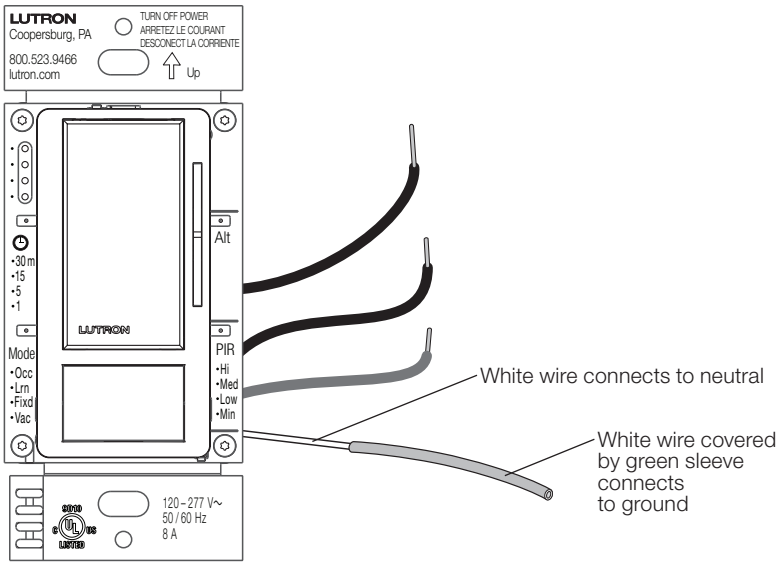
Wiring Installations with the Maestro 0–10 V Dimmer Sensor

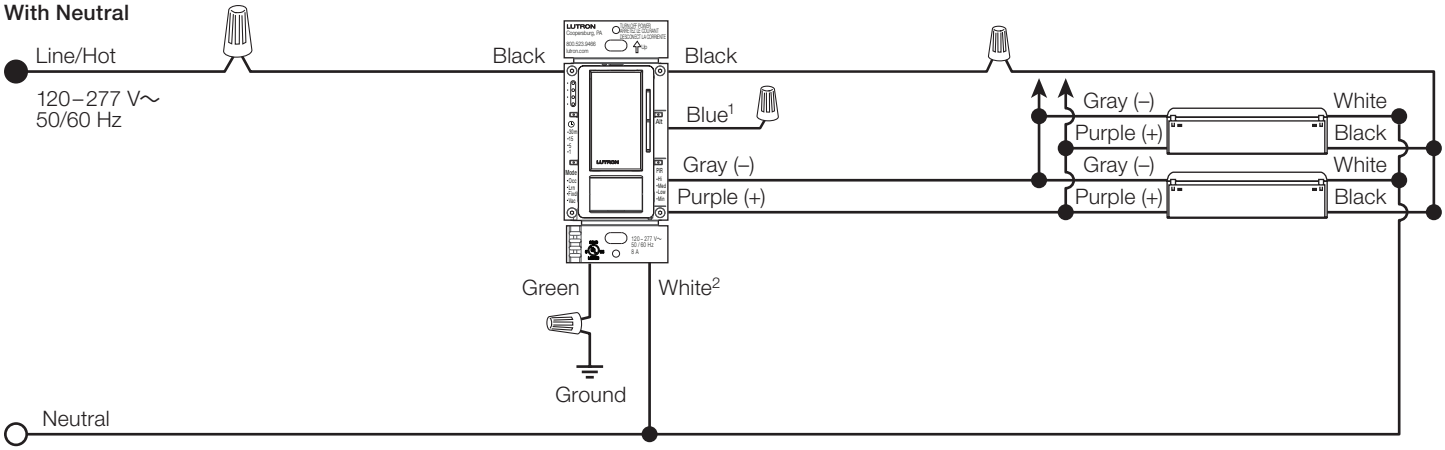
In order to function, the 0–10 V Dimmer Sensor must have the green-sleeved wire connected to ground, or the white wire connected to neutral.

Before installing wallplate, program all desired settings.

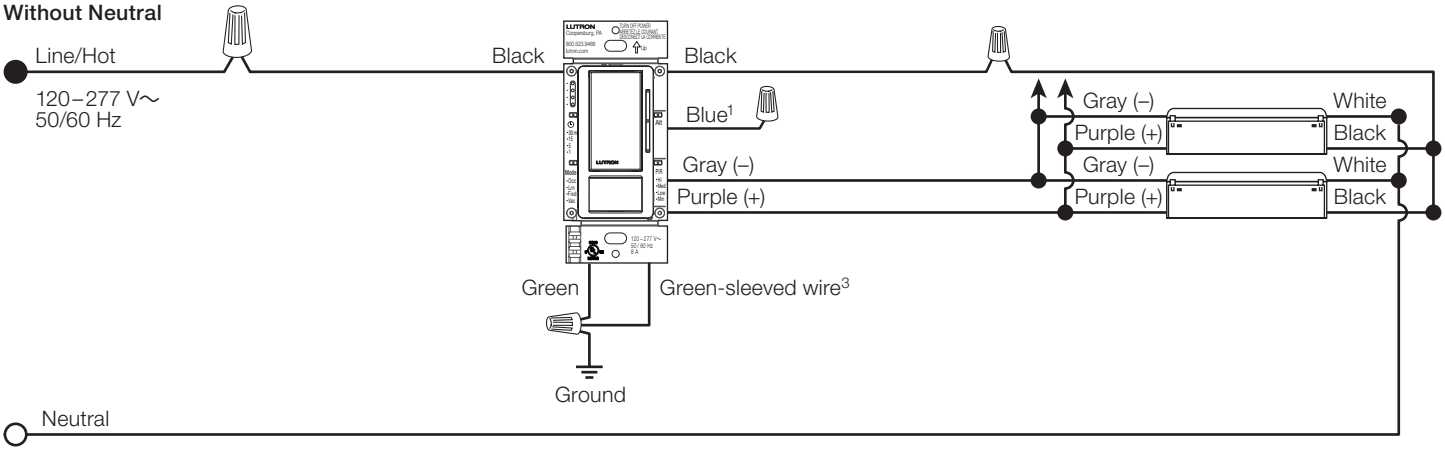


Wiring: Single-Pole Installation

With Neutral



Without Neutral



1 When using controls in single location installations, cap the blue wire. Do not connect the blue wire to any other wiring or to ground.
2 When neutral is present in wallbox, remove green sleeve from the white wire and connect the white wire to neutral.
3 If no neutral is present, connect green-sleeved wire to ground.

Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

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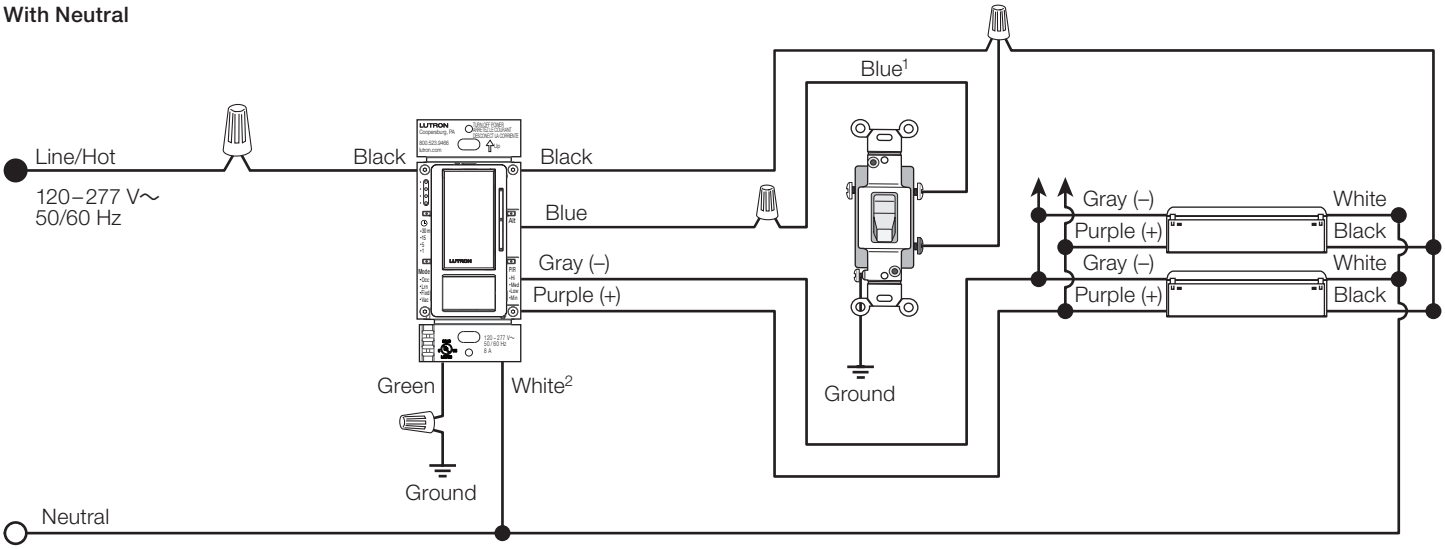
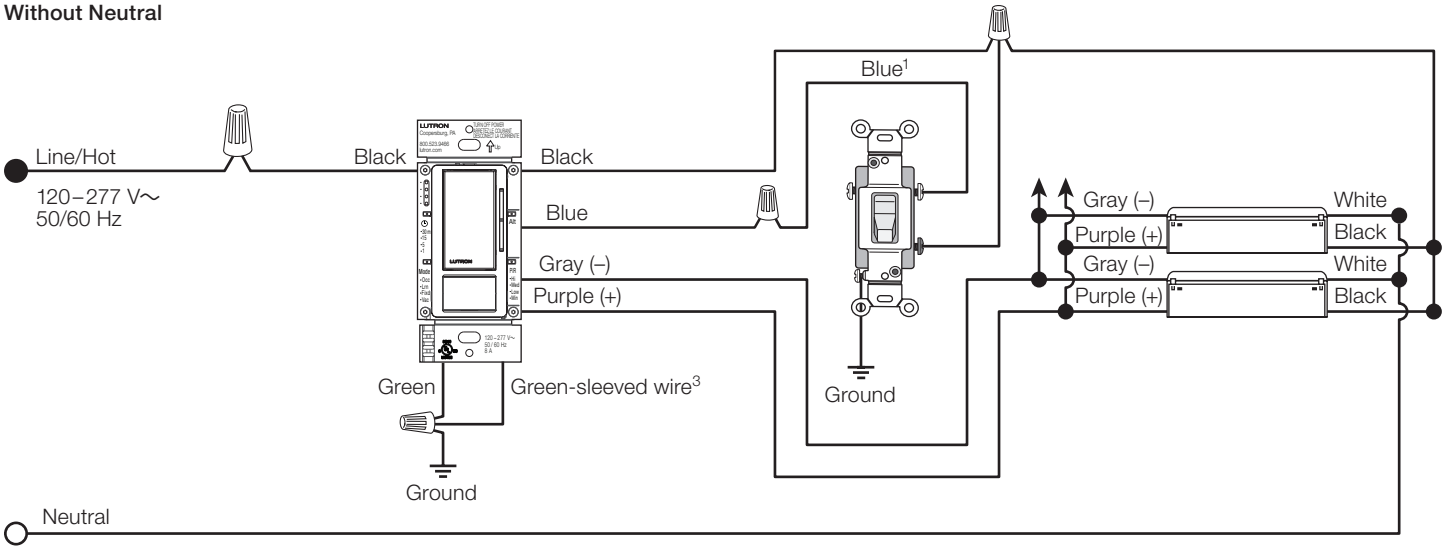
Wiring: 3-Way Installation* with Standard Mechanical Switch**

With Neutral



Without Neutral



* One Dimmer Sensor can be installed in any location.

** **Important:** Some rewiring of 3-way mechanical switch is required. See page 10 for instructions.

1 The length of the Blue wire (3-way wire) must not exceed 150 ft (45.72 m).

2 When neutral is present in wallbox, remove green sleeve from the white wire and connect the white wire to neutral.

3 If no neutral is present, connect green-sleeved wire to ground.

Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

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3-Way Retrofit Installation

For retrofit 3-way installations, the mechanical switch needs to be rewired as shown in the diagram below after wiring the Dimmer Sensor. Otherwise, the 3-way installation will not work as expected. Single-pole mechanical switches may also be used in a 3-way installation with MS-Z101 and MS-Z101-V models.

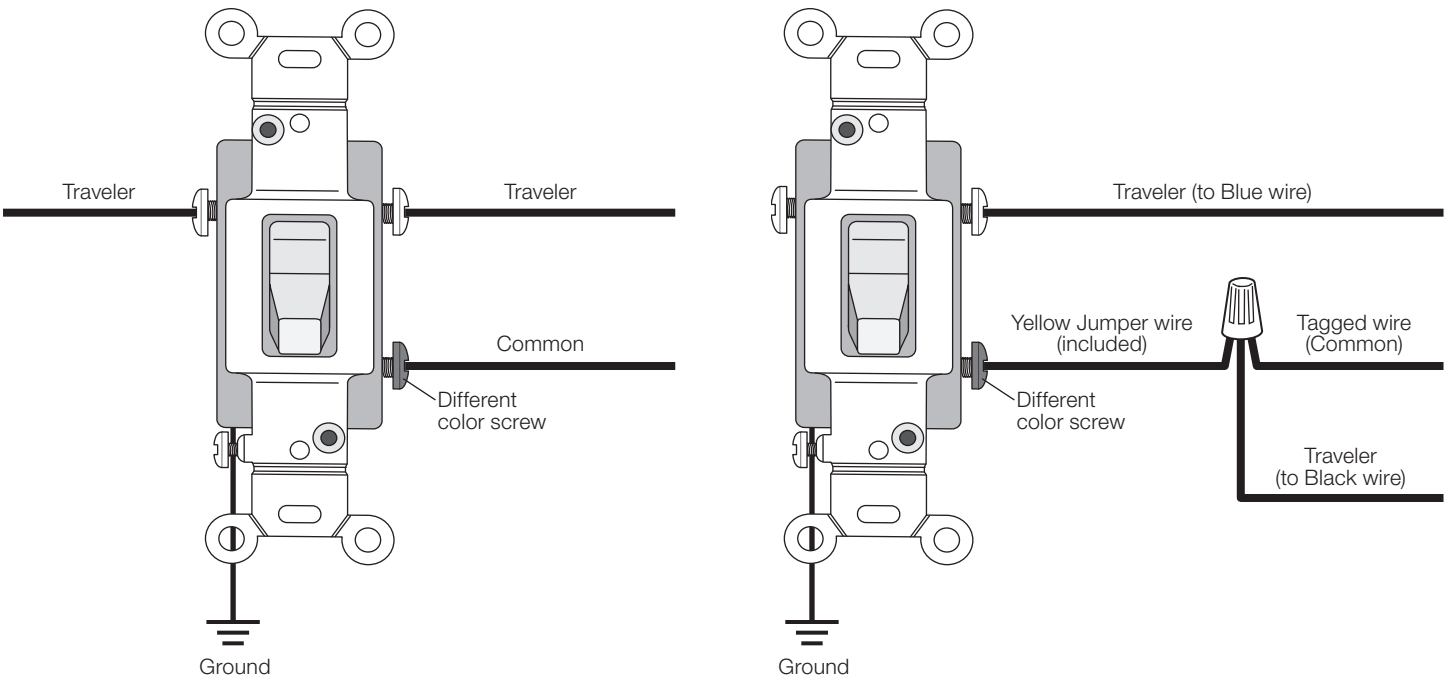
1. Connect Ground: Ensure that the bare copper or green ground wire from the wallbox is connected to the green ground screw of the mechanical switch.
2. Tag circuit Common: Your 3-way mechanical switch should have three screw terminals, two of the same color, and one of a different color. Tag the wire that is connected to the screw terminal of a different color.
3. Identify the wire that matches the color of the wire you connected to the blue wire of the Maestro Dimmer Sensor. Connect this wire to one of the two terminals of the same color.
4. Combine the tagged wire, the remaining wire, and the yellow jumper wire (included) using a wire connector. Connect the other end of jumper wire to the different color screw.

Note: If the 0–10 V Dimmer Sensor is first installed with a traditional 3-way mechanical switch and the mechanical switch is later replaced with a Maestro Accessory Switch, the 0–10 V Dimmer Sensor will need to be returned to factory default settings in order to function correctly.

Traditional 3-Way Mechanical Switch Wiring

Rewired to →

3-Way Mechanical Switch Wiring with Dimmer Sensor



Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

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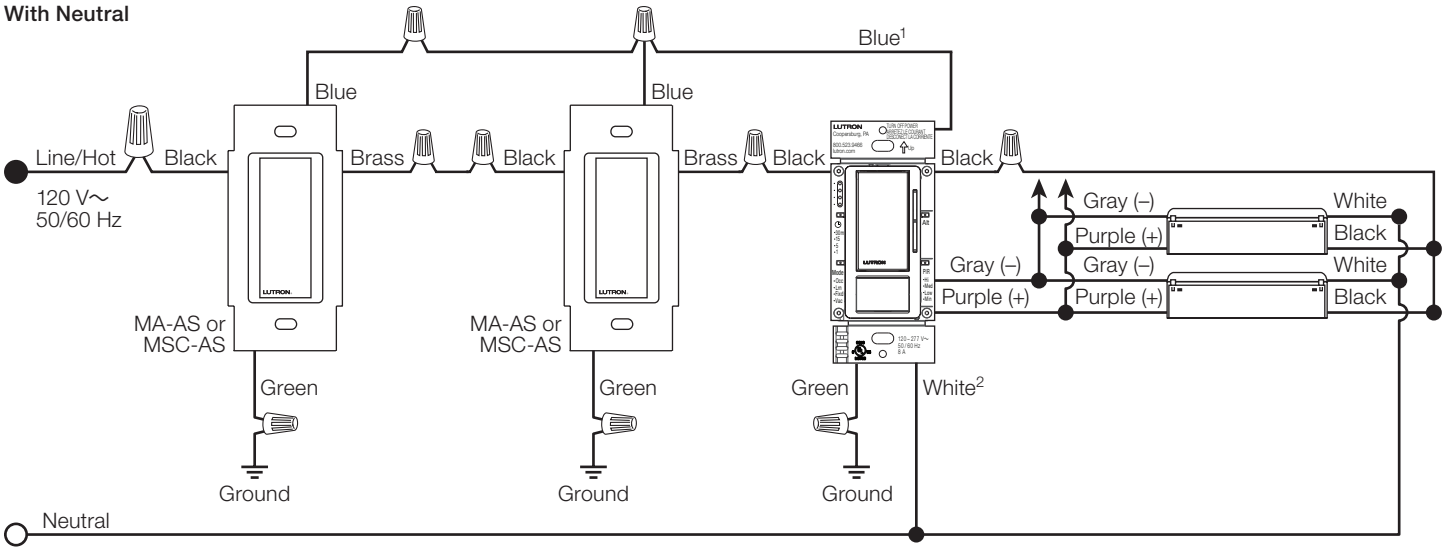
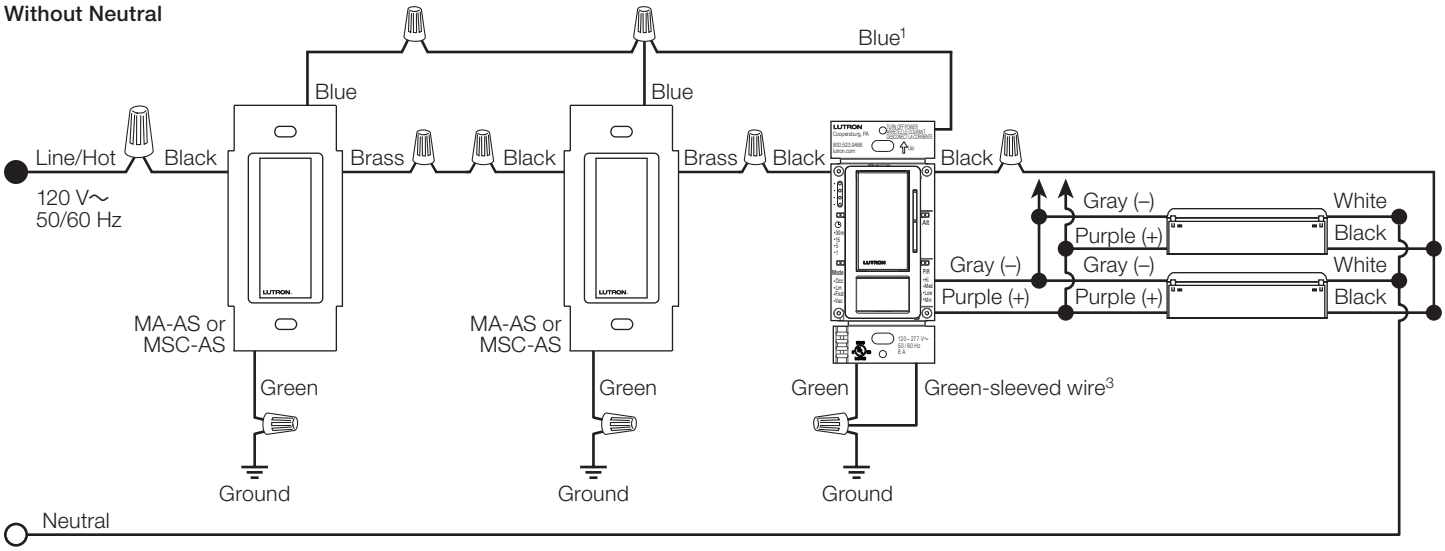
Wiring: 120 V~ Multi-Location Installation* with Maestro Accessory Switches

Note: If the 0–10 V Dimmer Sensor is first installed with a traditional 3-way mechanical switch and the mechanical switch is later replaced with a Maestro Accessory Switch, the 0–10 V Dimmer Sensor will need to be returned to factory default settings in order to function correctly.

With Neutral



Without Neutral



* One Dimmer Sensor can be installed in any location.

1 The length of the Blue wire (3-way wire) must not exceed 150 ft (45.72 m).

2 When neutral is present in wallbox, remove green sleeve from the white wire and connect the white wire to neutral.

3 If no neutral is present, connect green-sleeved wire to ground.

Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

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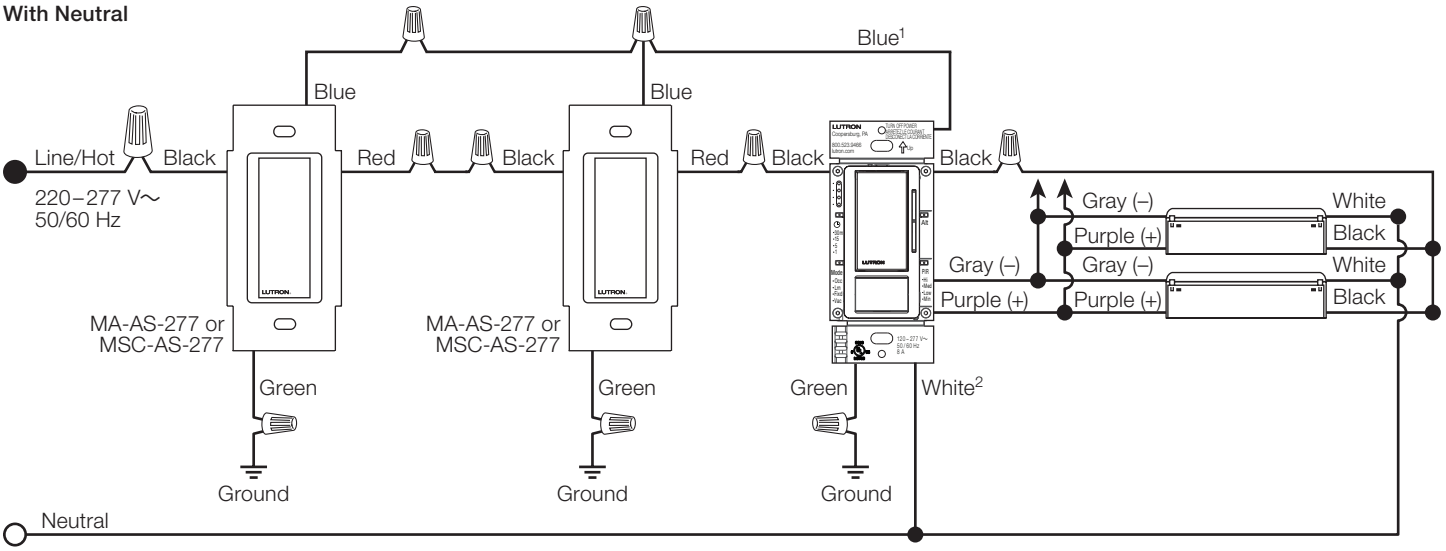
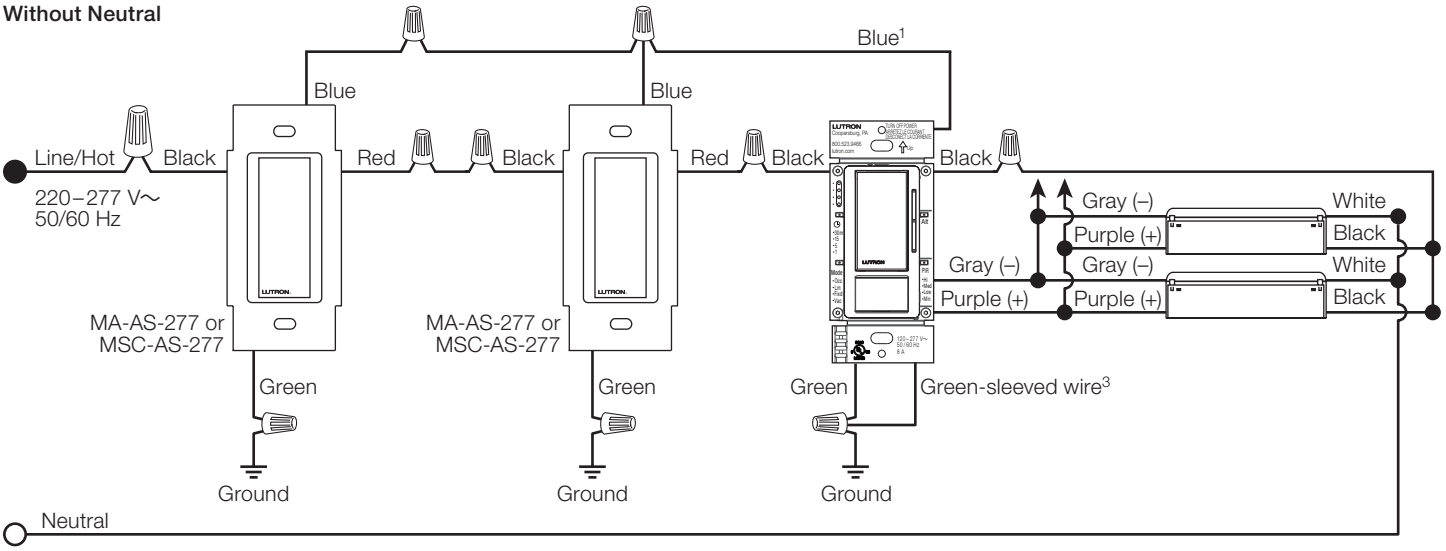
Wiring: 220–277 V~ Multi-Location Installation with Maestro Accessory Switches

Note: If the 0–10 V Dimmer Sensor is first installed with a traditional 3-way mechanical switch and the mechanical switch is later replaced with a Maestro Accessory Switch, the 0–10 V Dimmer Sensor will need to be returned to factory default settings in order to function correctly.

With Neutral



Without Neutral



* One Dimmer Sensor can be installed in any location.

1 The length of the Blue wire (3-way wire) must not exceed 150 ft (45.72 m).

2 When neutral is present in wallbox, remove green sleeve from the white wire and connect the white wire to neutral.

3 If no neutral is present, connect green-sleeved wire to ground.

Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

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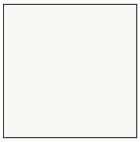
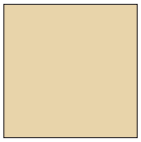
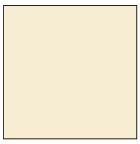
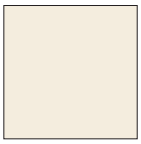
Colors and Finishes

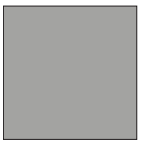
Gloss Finishes


White
WH


Ivory
IV


Almond
AL

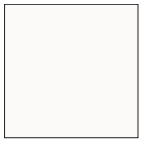

Light Almond
LA


Gray
GR

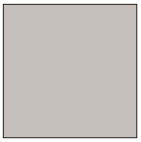

Brown
BR

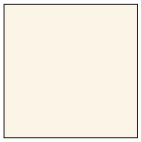

Black
BL

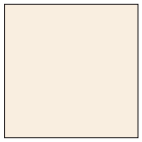
Satin Finishes

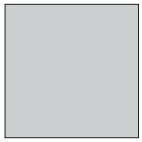

Snow
SW


Midnight
MN


Taupe
TP


Biscuit
BI


Eggshell
ES

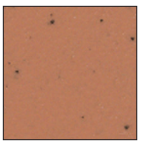

Palladium
PD


Hot
HT


Merlot
MR


Plum
PL

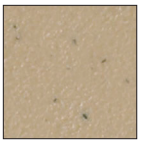

Sienna SI

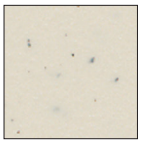

Terracotta
TC

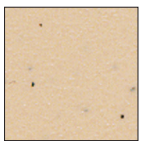

Bluestone
BG

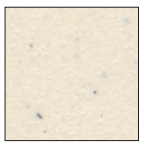

Greenbriar
GB


Goldstone
GS


Mocha Stone
MS


Stone
ST


Desert Stone
DS


Limestone
LS

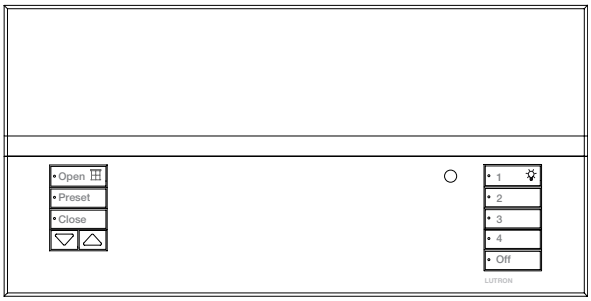
- Due to printing limitations, colors and finishes shown cannot be guaranteed to perfectly match actual product colors.
- Color chip keychains are available for more precise color matching:
  - Gloss Finishes: DG-CK-1
  - Satin Finishes: SC-CK-1

For the latest color offerings please see our website:
http://www.lutron.com/satincolors

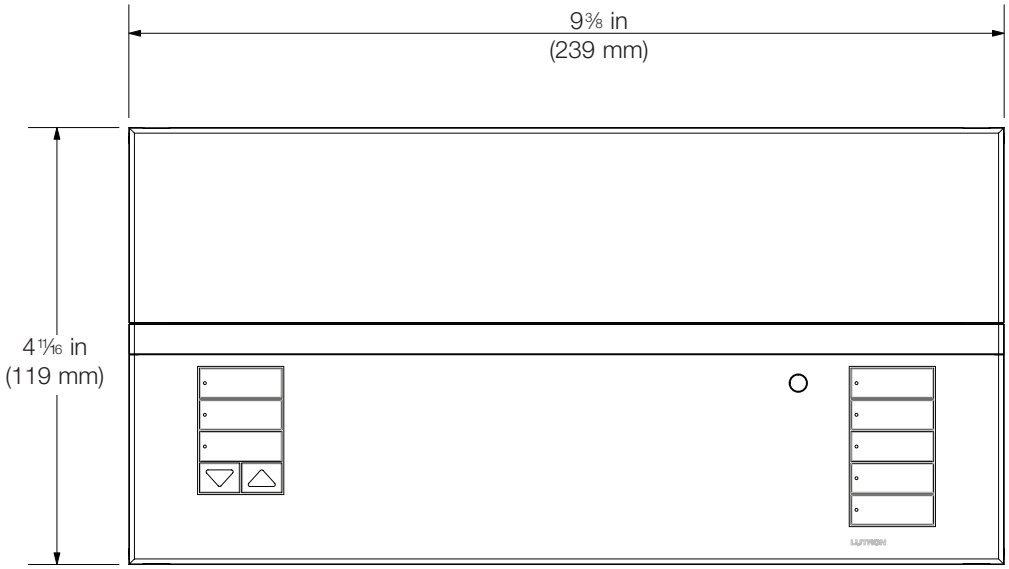
Job Name:	Model Numbers:	
Hotel Hartness	MS-Z101-V	
Job Number:		

GRAFIK Eye QS Wireless Control Unit with EcoSystem

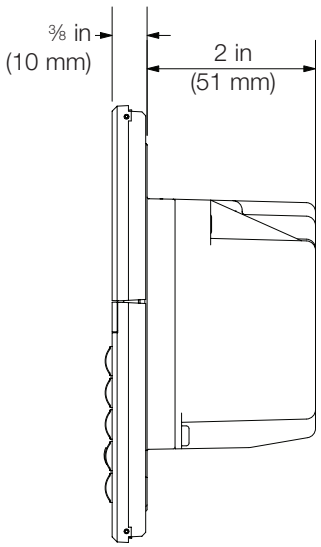
GRAFIK Eye QS Wireless with EcoSystem is the premier energy-saving lighting and shade control. The GRAFIK Eye QS control unit features an astronomic timeclock and intuitive lighting presets, which are seamlessly integrated with EcoSystem LED drivers and Lutron's QS components and systems. Now with wireless technology and an integral EcoSystem bus supply, you can choose to use the phase control outputs to control screw in LED bulbs, or use EcoSystem to control LED drivers and shades without interfaces. You can also integrate with a variety of Lutron wireless products and systems, including Radio Powr Savr occupancy, vacancy, and daylight sensors, Sivoia QS wireless shades, Pico wireless controls, and other GRAFIK Eye QS wireless control units. Additionally, the GRAFIK Eye QS wireless control unit is compatible with all Lutron wired QS products and systems, including Quantum.



Mechanical Dimensions



Front View



Side View

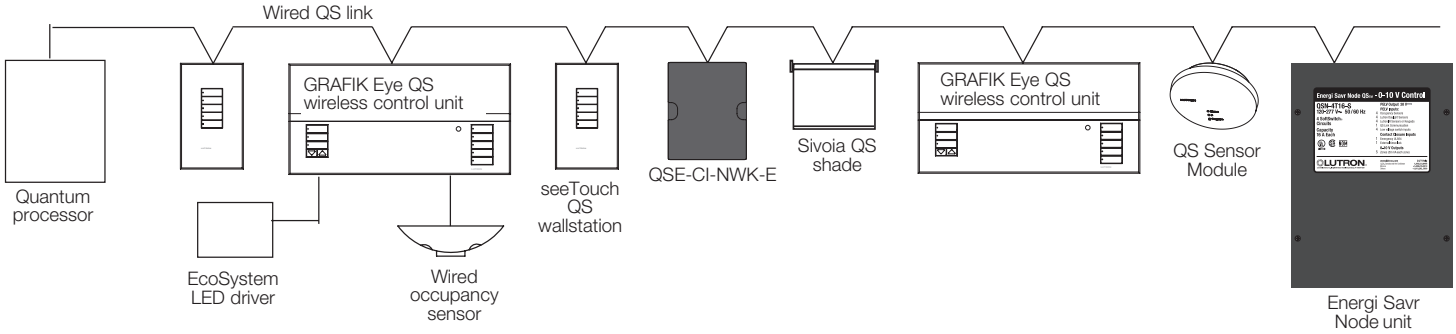
Fits into a 4-gang U.S. backbox, 3½ in (90.4 mm) deep (Lutron P/N 245254) or 3 in (76.2 mm) deep (Lutron P/N 241400)

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

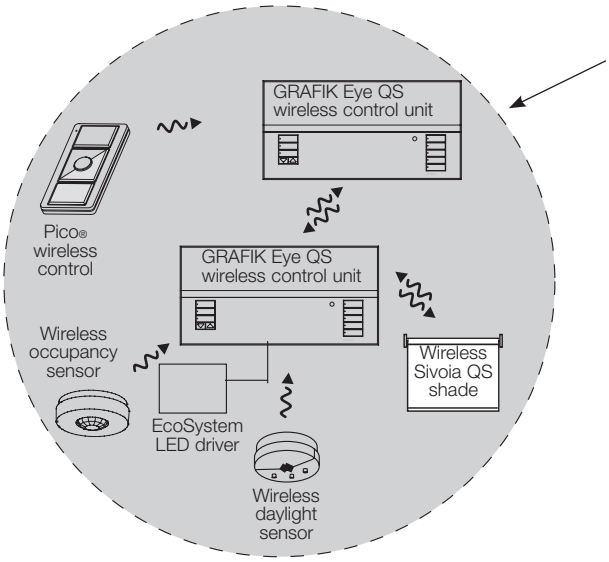
System Topologies

The GRAFIK Eye QS Wireless control unit with EcoSystem can be specified in three different system topologies. Examples of each are shown below.

Example of Wired System

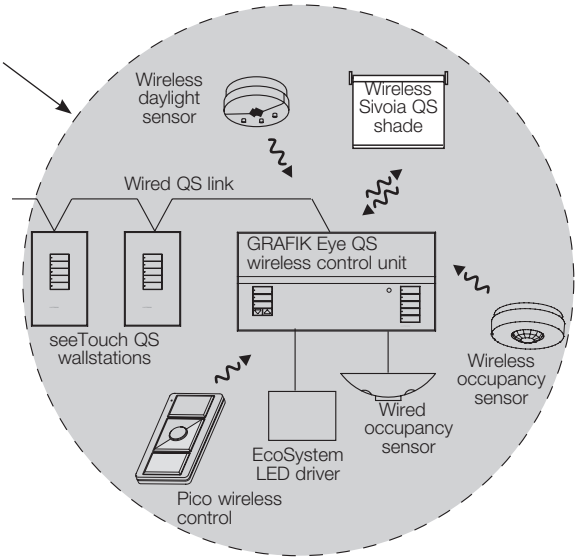


Example of GRAFIK Eye-centric Wireless System



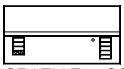
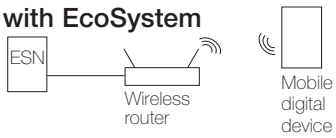
30 ft (10 m) wireless range; 60 ft (20 m) in open air

Example of Mixed GRAFIK Eye-centric Wired/Wireless System



Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

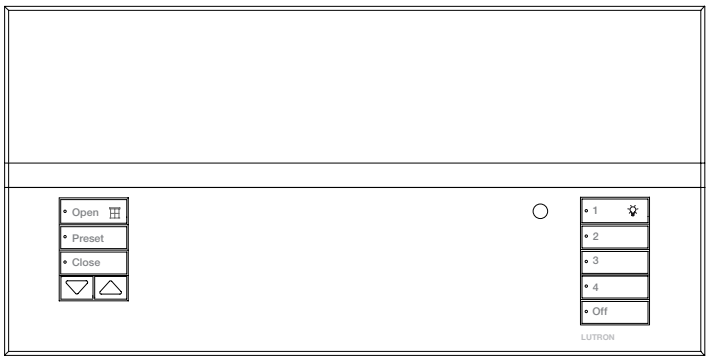
Application Suggestions and Differences between GRAFIK Eye QS with EcoSystem Control Unit and Energi Savr Node with EcoSystem Unit

	GRAFIK Eye QS with EcoSystem  GRAFIK Eye QS with EcoSystem control unit	Energi Savr Node (ESN) with EcoSystem 
Suggested/Recommended Applications	**Single rooms, partitioned spaces, e.g., conference room, classroom, ballroom, lobby**	**Open spaces, multiple enclosed rooms, e.g., open office, window offices**
Programming Method	Info Screen on the QS control unit	Via Energi Savr Node App
Integral Timeclock	Yes	Yes (using a QS Timeclock or contact closure interface)
Compatible with seeTouch QS Keypads	Yes	Yes
Compatible with EcoSystem Wall Controls	No	Yes
Compatible with EcoSystem IR Sensors	No	Yes
Includes dry contact closure for integration to BMS or Security Systems	Yes	Yes
Input Voltage	120–127 or 220-240 V~ 50/60 Hz	120/240/277 V~ 50/60 Hz
Number of EcoSystem Busses	1	1 or 2
Number of Zones	6, 8, or 16	Programmable (maximum 100)
Number of Line-Voltage Outputs	3 (Zones 1-3 only)	--
Compatible with other QS Devices	Yes	Yes

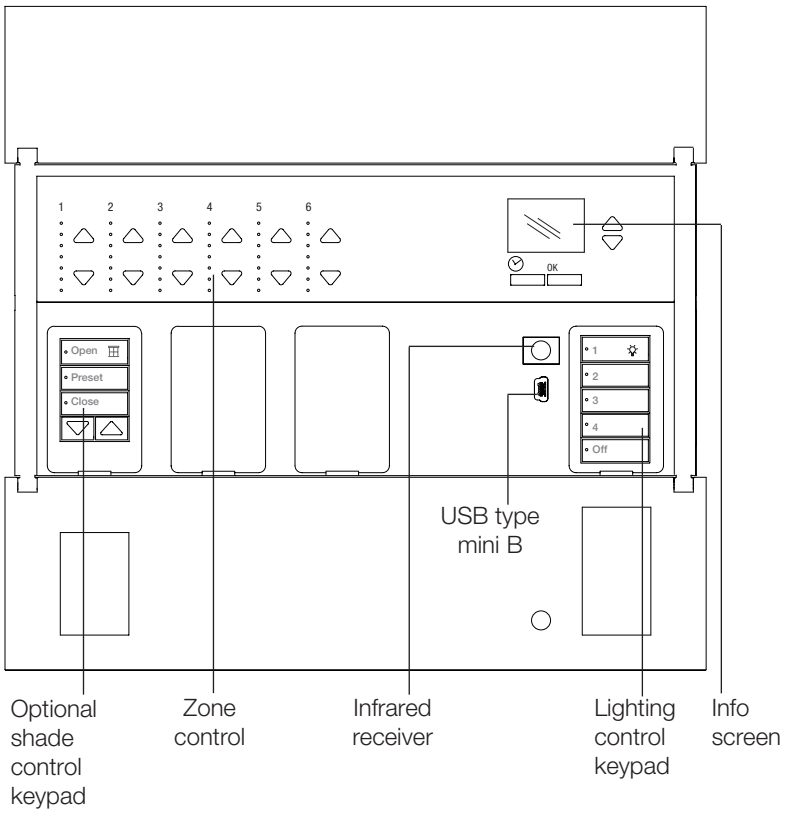
Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Features

- Lutron's proprietary Clear Connect RF technology. Operates in the 434 MHz band.
- Pushbutton recall of four preset lighting scenes, plus Off.
- Sixteen (16) total available scenes, plus Off scene.
- Zones 1, 2, and 3 can control many light source types directly or through power modules.
- Optional integrated shade control buttons, which can also be added to the unit after installation.
- Master override buttons to raise and lower all lights.
- Allows setup of lighting scenes and shade presets using buttons on the control unit.
- Built-in infrared (IR) receiver.
- External IR connection.
- Built-in astronomic timeclock.
- Info screen shows zone light level percentage, energy savings, zone labeling, programming, and EcoSystem setup.
- Lockout option prevents accidental changes.
- Occupancy sensor input and 24 V⎓ power for one occupancy sensor.
- QS communication link for seamless integration of lights, motorized window treatments, occupancy sensors, wallstations, and integration interfaces.
- Compatible with all Lutron QS system components.
- Wireless communication for seamless integration with a variety of Lutron wireless products and systems, including Radio Powr Savr occupancy, vacancy, and daylight sensors, Sivoia QS wireless shades, Pico wireless controls, and other GRAFIK Eye QS Wireless control units.
- Control up to 6, 8, or 16 EcoSystem zones from internal bus supply.
- Zones 1, 2, and 3 are integral line voltage dimming zones and can be optionally programmed as EcoSystem zones.
- Up to 64 EcoSystem or Hi-lume LED drivers can be addressed and grouped to zones.
- Integral EcoSystem setup and programming through the info screen.
- Backlit buttons with engraving make unit easy to locate and operate.
- Available in a variety of colors and finishes.



Note: General Engraving (-EGN) shown.



Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Specifications

Input Power

- 120–127 V~ 50/60 Hz
- 220–240 V~ 50/60 Hz

Listings (120–127 V~)

- UL® Listed
- CSA
- NOM
- CEC (Title 24)
- FCC Part 15 Class B
- IC RSS-210
- SCT

Environment

- 32 to 104 °F (0 to 40 °C)
- Relative humidity less than 90% non-condensing

Lighting Sources/Load Types

All Zones

- Hi-lume and 5-series LED drivers directly wired to integral EcoSystem digital link
- Before system is addressed, Zone 4 will transmit broadcast commands to all EcoSystem loads wired to the GRAFIK Eye QS.
- Zones on Energi Savr Node products wired to the same QS link
  – Zones on Energi Savr Node with Softswitch
  – Zones on Energi Savr Node for 0-10 V
  – Zones on Energi Savr Node with EcoSystem
  Please refer to “Remote Zone Mapping” for important information.
- DMX channel(s) through DMX output interface (QSE-CI-DMX). Please refer to “Accessory Controls: DMX Output Interface”

Zones 1, 2, and 3 can also control the following lighting sources with a smooth, continuous square law dimming curve or on a full conduction non-dim basis:

- Dimmable LED Bulbs (for a complete list of approved dimmable LEDs please call 1.800.523.9466 or visit www.lutron.com/dimcflled)
- Cree LR4/6, 120 V~ fixtures (for loading capacities, please refer to the LED report card located at www.lutron.com/LEDtool)
- Incandescent
- Halogen
- Magnetic low-voltage transformer
- Lutron Tu-Wire electronic fluorescent dimming ballast
- Lutron Hi-lume 2-wire LTE LED driver
- Advance Mark 10® electronic dimming ballast
- Neon and cold cathode
- Non-dim (incandescent, magnetic low-voltage, Tu-Wire, or neon/cold cathode)
  Please refer to “Capacities” for more information.

Zones 1, 2, and 3 can also control the following lighting sources with a smooth, continuous square law dimming curve or on a full conduction non-dim basis through separate Lutron power modules:

- Electronic low-voltage transformers (use ELV or Phase-Adaptive power module)
- Lutron 3-wire controlled electronic fluorescent dimming ballasts (use fluorescent 3-wire power module)
- Lutron 3-wire controlled LED drivers (use flourescent 3-wire power module)
- Non-dim (use switching module)
- 0–10 V (use TVI)

Note: A zone may be programmed to control only one load type at a time.

Key Design Features

- RF meets FCC Part 15 Class B.
- Lightning strike protection meets ANSI/IEEE standard 62.41-1980. Can withstand voltage surges of up to 6000 V~ and current surges of up to 3000 A.
- Tested to withstand 16 kV electrostatic discharge without damage or memory loss.
- RTISS Equipped: Compensates in real time for incoming line voltage variations (no visible flicker with +/-2% change in RMS voltage per cycle, and +/-2% Hz change in frequency per second).
- Power failure memory retains programming and light level settings for up to 10 years in the event of a power loss.
- The GRAFIK Eye QS control unit supplies 3 Power Draw Units (PDUs) on the QS link.
  For complete information, see the **Power Draw Units on the QS Link** Spec (369405) on www.lutron.com
- Faceplate is hinged at the top and bottom, and stays open at 180° for ease of access.
- Direct control of 120 V~ and 277 V~ EcoSystem, Hi-lume 3D, and Hi-lume LED ballasts (no interface required).

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Specifications *(continued)*

Scene and Shade Buttons

- Large, rounded buttons are easy to use.
- Backlit buttons with optional engraving make it easy to find and to operate the control unit in low light conditions (backlight can be disabled).
- Optional button engraving is angled up to the eye for easy reading.
- Predefined label stickers are included for field labeling.
- 4 preset lighting scenes, plus Off, are accessible from the front of the control unit.
- 12 additional scenes are stored in the control unit and are accessible from the integral timeclock, seeTouch QS wallstations, and QS interfaces.
- Light levels fade smoothly between scenes. Fade time can be set differently for each scene: 0 to 59 seconds, or 1 to 60 minutes. Maximum fade time from Scene Off is 3 seconds.

Shade Control

- The GRAFIK Eye QS control unit can include up to 3 shade button columns. Each column has backlit open, preset, close, and raise/lower buttons.
- Each shade button column can be programmed to operate one shade or a group of shades. (Shades may be assigned to more than one shade button column).
- Faceplates are available with 1, 2 and 3 shade button columns.

Wireless shade limitations:

- Access to the Sivoia QS Wireless electronic drive unit (EDU) is required to associate shades with the GRAFIK Eye QS control unit and set their raise/lower limits. Exception: Sivoia QS Wireless cellular shades allow limit setting from the GRAFIK Eye QS wireless control unit.
- Wired and wireless shades may not be programmed into the same shade button column; however, both may be used on the same GRAFIK Eye QS control unit.
- Scene commands that affect wireless shades across multiple shade button columns will have a 1-second delay from column to column. This does not occur in RadioRA 2 systems.

Zone Control

- Each zone has a dedicated raise and lower button to adjust the zone.
- Each zone has a dedicated 7 LED bar graph for level status. Percentage of light level and energy saved is displayed on the info screen.
- All zone information has blue backlit LEDs. Backlight turns off when idle for 30 seconds.
- High-end and low-end trim settings are adjustable per zone (high end from 99 to 55%; low end from 45 to 1%). Note: Trim for remote zones must be adjusted locally on the Energi Savr Node unit.
- Each zone is programmable to only one load type at a time.

Info Screen

- OLED (organic LED) screen is viewable from all angles.
- Screen turns off when idle for 30 seconds.
- Programmable zone labels.
- Programmable scene labels.
- Status of real-time zone percentage and energy savings.
- Programmable timeclock schedules.
- Programmable shade labels.
- Selectable display languages:
  - English - Spanish - French
  - Italian - German - Portuguese

Astronomic Timeclock

- Integral to all units.
- 7 daily schedules available.
- One available holiday schedule is programmable by date up to one year in advance.
- 25 events per day maximum.
- Timeclock events are programmable to control scenes that affect any Energi Savr Node unit connected on the QS link without changing the local scene on the GRAFIK Eye QS control unit.
- Astronomic times are programmable by integral city database or by entering latitude and longitude. Sunrise/Sunset times automatically adjust throughout the year based on location.
- Automatically adjusts for Daylight Saving Time (DST); DST is programmable.
- Local timeclock events can activate any of the following features:
  - Scenes 1 to 16 and Off
  - Any available shade presets
  - Start and End afterhours mode
  - Enable and Disable daylighting for all zones/groups
  - Enable and Disable occupancy for occupancy/vacancy sensors
  - Enable and Disable occupied events for all occupancy sensors

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Specifications *(continued)*

System Communications and Capacities

- Low-voltage type IEC PELV/NEC® Class 2 wiring connects control units, wallstations, motorized shades, and control interfaces.
- A QS system can have up to 100 devices and 100 zones.
- A QS system can have up to 30 wireless devices.
- Class 1/Class 2 wiring connects ballast to control unit.

Infrared

- Infrared (IR) receiver allows infrared transmitters to select 8 scenes, raise/lower lighting zones, or raise/lower shades.
- Transmitter buttons imitate buttons on faceplate.
- 50 ft (15 m) line of sight range.
- Terminal block infrared input for connection to a wired IR input from third-party equipment.
- IR can be disabled via programming.
- Works with Lutron GRX-IT and GRX-8IT infrared remote controls.

Accessory Controls: seeTouch QS Wallstations (QSWS2)

- Wired seeTouch QS keypads provide the following features:
  - Access to one or more of the 16 scenes on the GRAFIK Eye QS Wireless control unit
  - Zone toggle, partitioning, sequencing, fine tune, panic mode, and timeclock enable/disable
  - Contact closure inputs
  - Various other functions that are available on specific wallstation configurations. Refer to the seeTouch specification submittal.

Wireless RF Compatibility

- Lutron's proprietary Clear Connect RF Technology
- Operates in the 434 MHz band
- Compatible with other Lutron wireless products/systems, such as:
  - Pico wireless control (P/N PJ-)
  - Radio Powr Savr occupancy/vacancy/daylight sensors (P/N LRF2-)
  - Sivoia QS wireless products
  - Other GRAFIK Eye QS wireless control units (P/N QSGRJ-)

Accessory Controls: Pico Wireless Control (PJ models)

- The Pico wireless control is battery powered. It can control GRAFIK Eye QS wireless control units within a 30 ft (10 m) range (60 ft/20 m in open air). It provides the following features:
  - Control of one or more zones on the GRAFIK Eye QS Wireless control unit: turns zone(s) on or off, raises/lowers zone(s), allows programmable light levels for each button, and goes to user-programmable preset level
  - Control of one or more scenes on the GRAFIK Eye QS Wireless control unit: the Pico wireless control can access any three sequential scenes (1 through 16), or any two sequential scenes and Off; and can raise and lower lighting levels.

  Note: "Unaffected" is not a valid level for Pico zone programming.

Accessory Controls: QS Sensor Module (QSM2)

- The QS Sensor Module provides a means to link wired or wireless occupancy sensors or daylight sensors, Pico controls, and wired infrared sensors to a GRAFIK Eye QS control unit via the wired QS link.
  - Occupancy sensors wired (or wirelessly linked) to a QS Sensor Module can be used by one or more GRAFIK Eye QS control units on the wired link.
  - Daylight sensors wired (or wirelessly linked) to a QS Sensor Module can be used by one or more GRAFIK Eye QS control units on the wired link.
  - Pico wireless controls can control either one or more zones or scenes on the GRAFIK Eye QS control unit.
  - Pico wired controls can be used, when connected to a QS Sensor Module, to control one or more zones or scenes on the GRAFIK Eye QS control unit.
  - Infrared sensors can control either one or more zones or scenes on the GRAFIK Eye QS control unit. Functionality varies; refer to the documentation for the QS Sensor Module for details.

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Specifications *(continued)*

Accessory Controls: Contact Closure Input/Output Interface (QSE-IO)

- Recalls preset light levels for the following set of scenes on the GRAFIK Eye QS control unit:
  Scenes 1-4 and Off Scenes 9-12 and Off
  Scenes 5-8 and Off Scenes 13-16 and Off
- Sequence scenes 5-16, Enable/Disable Zone Lockout, Enable/Disable Scene Lockout, Enable/Disable Panic Mode, Enable/Disable Timeclock.
- Occupancy Sensors. An individual input counts as 1 occupancy sensor for the GRAFIK Eye QS control unit. Each input can be assigned to either Scene Control or Zone Control (please refer to the Occupancy Sensor(s) section of this guide).
- Zone Toggle. Allows an input to toggle one or more zones between programmable preset level(s) and off.
- Shade Output mode. A Shade Column on the GRAFIK Eye QS control unit can be linked to control outputs 1-3 and/or outputs 4-5 on the QSE-IO.

Accessory Controls: DMX Output Interface (QSE-CI-DMX)

- Any zone on the GRAFIK Eye QS control unit can be mapped to any single DMX512 Channel.
- Any zone on the GRAFIK Eye QS control unit can be simultaneously mapped to any three DMX512 channels (providing RGB/CMY control).
- DMX loads cannot be used with daylighting.

Accessory Controls: Ethernet and RS232 Interface (QSE-CI-NWK-E)

- Allows for monitoring and control of the outputs and local scenes of the GRAFIK Eye QS control unit.

Accessory Controls: QS Keyswitch Wallstations (QSWS2-KS)

- Recalls preset light levels for any two scenes including Off
- Allows fine-tuning (raise/lower level) of a zone or group of zones
- Starts/Stops scene sequencing (Scenes 1-4 or Scenes 5-16)
- Enables/Disables Timeclock
- Enables/Disables occupancy sensors
- Enables/Disabled daylight sensors
- Allows toggle of Zone(s) to a preset level and off
- Enables/Disables panic mode
- Starts/Stops afterhours mode

EcoSystem Ballasts and Devices

- Supports all Hi-lume and 5-Series LED drivers (maximum 64 per GRAFIK Eye control unit)
- Supports all EcoSystem ballasts (maximum of 64 ballasts per GRAFIK Eye control unit)
- Supports occupancy and daylight sensors wired to a ballast
- Does NOT support IR sensors (or IR keypads) wired to the ballast

Other Accessory Controls and Devices

- Energi Savr Node QS (ESN). Refer to the Specification Submittal for complete details.

Occupancy Sensor(s)

- The GRAFIK Eye QS control unit works with occupancy sensors through either:
  - Scene Control: Up to 16 sensors activate user-selected occupancy and vacancy scenes.*
  - Zone Control: Up to 4 sensors per zone activate user-selected occupancy and vacancy zone levels.
- Occupancy sensors may include:
  - Contact closure sensors wired to CCI input on back of GRAFIK Eye QS control unit
  - Wireless Radio Powr Savr occupancy or vacancy sensors (model numbers starting with LRF2)
  - Wired sensors connected to EcoSystem ballasts or interfaces
  - Wired or wireless sensors connected to a QS Sensor Module (QSM)
- If any sensor in a group detects occupancy, then the GRAFIK Eye QS control unit will go to the designated occupancy scene or zone level.
- If all sensors in a group detect vacancy, then the GRAFIK Eye QS control unit will go to the designated vacancy scene or zone level.
- Low battery: the Diagnostics screen will display a low battery symbol when applicable.
- If the GRAFIK Eye QS control unit does not receive a signal from an occupancy sensor on the link (usually due to a dead battery), the lights associated with that sensor will go to the occupied level.

* Applicable only to units that ship with firmware version 9.002 and higher. Previous versions support up to 4 sensors.

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Specifications *(continued)*

Daylight Sensor(s)

- The GRAFIK Eye QS control unit with EcoSystem works with compatible daylight sensors to adjust electric light levels based on measured daylight levels. Sensors can be configured to control either GRAFIK Eye QS zones or groups of EcoSystem loads independent of zoning.
- Daylight sensors may include:
  - Wireless Radio Powr Savr (model numbers starting with LRF2)
  - Wired sensors connected to EcoSystem ballasts or interfaces
  - Wired or wireless sensors connected to a QS sensor module (QSM)
- In Zone Mode, a daylight sensor can control one or more GRAFIK Eye QS zones. Each zone can be calibrated to target light levels.
  - A zone can be controlled by no more than one daylight sensor
- In Group Mode, a daylight sensor can control one or more EcoSystem loads, regardless of how they are zoned on the GRAFIK Eye QS control unit.
  - A group can be controlled by a single daylight sensor
  - Each group can be calibrated to independent target light levels
  - Up to 16 groups are available
- Daylight control can be enabled or disabled on a scene-by-scene basis
  - By default, daylight control is enabled in all scenes

Note: Daylight control through the GRAFIK Eye QS control unit only affects select lighting loads. Shade groups cannot be controlled by daylight sensors. Daylighting does not affect DMX or RGB/CMY DMX loads. Daylighting of Remote Zones linked to Energi Savr Node zones must be configured at the Energi Savr Node unit or through the Energi Savr Node app for *iPod*.

Contact Closure Input (CCI) with Power Supply Output

- Each GRAFIK Eye QS control unit has one contact closure input (Terminal A).
  - The attached device must provide a dry contact closure or solid-state output.
  - Input is miswire-protected up to 36 V⎓.
- The contact closure is capable of accepting the following types of inputs:
  - Maintained (default): The GRAFIK Eye QS control unit will act on both a contact closure and a contact open/release event.
  - Momentary: The GRAFIK Eye QS control unit will act on only contact closure events.
- Each GRAFIK Eye QS control unit can supply 50 mA maximum at 24 V⎓.
  - Useful for powering occupancy sensors.
  - An auxiliary power supply must be used if the device requires more than 50 mA.
- The CCI is capable of operating in the following modes
  - Occupancy: If an occupancy sensor is wired directly to the GRAFIK Eye QS control unit.
  - Emergency: This setting allows the GRAFIK Eye QS control unit to work with a LUT-ELI. When an emergency situation is detected, all lights will go to full on, and no operations will be allowed until the emergency signal is cleared.
  - Afterhours: Allows the CCI to start and end the afterhours mode.
  - Timeclock: Allows the CCI to enable and disable the timeclock.
  - Scene Lockout: Prevents the user from making any changes to the control unit. The current scene will stay on until the CCI enables normal operation.
  - Save Never: Prevents any changes from being saved while the CCI is being used.
  - Disable CCI: The CCI will have no effect on the system and will not appear on the list of available sensors.

Security Lockout Password

- A 4-digit password (using characters A to Z and 0 to 9) can be enabled/disabled to lock out access to the Programming Menu.
- By default there is no password enabled on the GRAFIK Eye QS control unit.
- If the 4-digit password is forgotten, contact Lutron Customer Assistance to regain access.

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Specifications *(continued)*

Remote Zone Mapping

- Map a GRAFIK Eye QS zone directly to an Energi Savr Node output so that programmed scenes in the GRAFIK Eye QS control unit will directly control the output levels of the Energi Savr Node.
- Adjust high-end and low-end trim for remote zones through the Energi Savr Node or Energi Savr app software.
- Change load types of remote zones through the Energi Savr Node or Energi Savr app software.
- Configure daylighting for remote zones through the Energi Savr Node or Energi Savr app software.
- Required:
  - GRAFIK Eye QS control unit with firmware version 7.000 or higher
  - Energi Savr Node unit with firmware version 6.000 or higher
  - Energi Savr app version 6.0.0 or higher (required only if the Energi Savr Node unit has been configured using the app)

Partitioning

- When partition is open, creating one large space, automatically combines lighting preset functions for multiple GRAFIK Eye QS control units.
- When partition is closed, creating two or more smaller spaces, lighting preset functions become independent.
- Requires one QSWS2-2B wallstation, a GRX-IRPS infrared transmitter/receiver pair, and a GRX-12VDC power supply for operation.
- If occupancy sensors are required in a partitioned space, note that each room's occupancy sensor(s) will operate independent of the partition status.

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Capacities

	220 - 240 V~ 50/60 Hz	120 - 127 V~ 50/60 Hz
Unit Capacity (watts)	3000	2000
MLV	3000 VA/2400 W	2000 VA/1600 W
Zone Capacity (watts)	40 – 1200	25 – 800
MLV	40 – 1200 VA/40 – 960 W	25 – 800 VA/25 – 600 W

Load Type Notes (Zones 1, 2 and 3)

- All electronic low-voltage (ELV) lighting used with an interface must be rated for reverse phase control dimming. Before installing an ELV light source, verify with the manufacturer that their transformer can be dimmed. When dimming, an ELV interface (such as the PHPM-PA-DV-WH) must be used with the control unit.
- Not all zones must be connected; however, connected zones must have a minimum load as specified above.
- Maximum total lighting load for a magnetic low-voltage (MLV) varies by input voltage:
  – 120 - 127 V~: 800 VA/600 W
  – 220 - 240 V~: 1200 VA/960 W
- Maximum total lighting load for Lutron Tu-Wire and Advance Mark 10® electronic dimming ballasts (120 to 127 V~ only) must not exceed 6 A per zone or 16 A per unit.
- No zone may be loaded with more than the capacity specified above. For higher wattage applications, or for 277 V~ applications, use Lutron power module PHPM-PA, PHPM-WBX, PHPM-PA-DV, PHPM-SW, or PHPM-WBX-DV.
- For controlling low-wattage loads (CFL, LED) in a non-dim application, contact Lutron Technical Support for the appropriate solution.

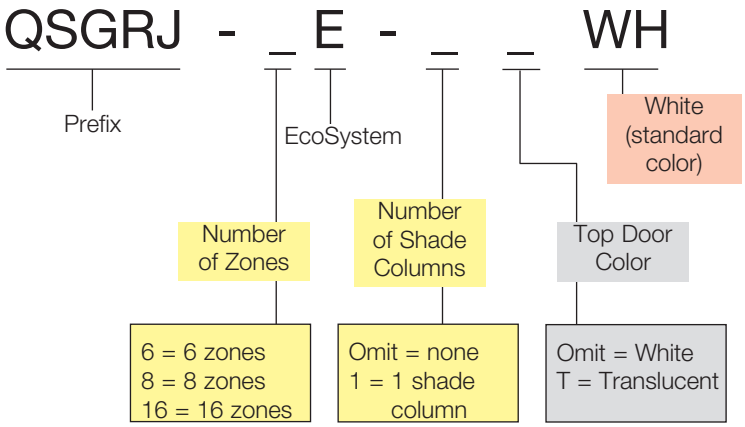
System Limits

- The QS wired communication link is limited to 100 devices or 100 zones.

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

GRAFIK Eye QS Wireless with EcoSystem
Standard Model Numbers

See following pages for Ordering Standard and Custom (Non-Standard) Model Numbers
See Standard Color Combinations page for faceplate, stripe, and button colors



Example:
QSGRJ-6E-1TWH
6-zone standard white unit with 1 shade column and translucent top door.

Unit will ship unengraved with engraving certificate that customer can redeem at no charge.

Available Standard Model Numbers

6 Zones	8 Zones	16 Zones
QSGRJ-6E-WH	QSGRJ-8E-WH	QSGRJ-16E-WH
QSGRJ-6E-TWH	QSGRJ-8E-TWH	QSGRJ-16E-TWH
QSGRJ-6E-1WH	QSGRJ-8E-1WH	QSGRJ-16E-1WH
QSGRJ-6E-1TWH	QSGRJ-8E-1TWH	QSGRJ-16E-1TWH

Important Note:

For any standard and non-standard engraved units, you must order **BOTH** a base unit and a Faceplate Kit.
Please see the Standard/Custom Engraved Ordering Information on the following pages.

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

GRAFIK Eye QS Wireless with EcoSystem *(continued)*

Standard Color Options and Model Numbers

You must order a Base Unit and a Faceplate Kit

See Standard Color Combinations page for faceplate, stripe, and button colors

Base Unit

QSGRJ - _ E

- QSGRJ: Prefix
- _: Number of Zones
  - 6 = 6 zones
  - 8 = 8 zones
  - 16 = 16 zones
- E: EcoSystem

Example:

QSGRJ-6E
6-zone base unit
and
QSGFP-2IV-EGN
Ivory faceplate kit with two shade columns and general engraving

Standard Engraved Faceplate Kit
(includes coordinating stripe and buttons)

QSGFP - _ WH -

- QSGFP: Faceplate Prefix
- _: Number of Shade Columns
  - Omit = none
  - 1 = 1 column
  - 2 = 2 columns
  - 3 = 3 columns
- WH: Top Door Color
  - Omit = same as unit
  - T = Translucent
- _: Keypad Engraving Code

Keypad Engraving Codes

-G = Generic
-S = Shades
-H = Hotel Room
-A = Auditorium
-L = Lobby
-R = Restaurant
-M = Meeting Room
-B = Ballroom
-Z = Zone Toggle

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

GRAFIK Eye QS Wireless with EcoSystem *(continued)*

Standard Engraved Faceplate Kit (WH only) *(continued)*

Generic (-G)

1
2
3
4
Off

Meeting Room (-M)

All On
Meeting
A/V
Cleaning
All Off

Shades (-S)

Open
Preset 1
Preset 2
Preset 3
Close

Ballroom (-B)

All On
Event 1
Event 2
Event 3
All Off

Hotel Room (-H)

High
Medium
Low
Nightlight
Off

Zone Toggle (-Z)

Zone 1
Zone 2
Zone 3
Zone 4
Zone 5

Auditorium (-A)

All On
Present
Lecture
Exam
All Off

Lobby (-L)

All On
Morning
Afternoon
Evening
All Off

Restaurant (-R)

All On
Breakfast
Lunch
Dinner
All Off

* Standard engraving text does not automatically assign or re-assign system programming to the QS keypad buttons. Project-specific customer input and programming by a Lutron service team member is still required to achieve a desired sequence of operation/system functionality per control.

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

GRAFIK Eye QS Wireless with EcoSystem *(continued)*

Custom Color Options and Model Numbers

You must order a Base Unit and a Faceplate Kit

See Standard Color Combinations page for faceplate, stripe, and button colors

Custom (non-standard) Faceplate Kit

(includes coordinating stripe and buttons)

QSGFP - - -

- Faceplate Prefix
- Number of Shade Columns: Omit = none; 1 = 1 column; 2 = 2 columns; 3 = 3 columns
- Top Door Color: Omit = same as unit; T = Translucent
- Color/Finish
- Keypad Engraving Code

Faceplate Custom Color/Finish Codes

Architectural Matte Finishes

Standard (ship in 48 hours)	
White	WH
Ivory	IV
Beige	BE
Gray	GR
Brown	BR
Black	BL
Almond	AL
Light Almond	LA

Architectural Metal Finishes

Bright Brass	BB
Bright Chrome	BC
Bright Nickel	BN
Satin Brass	SB
Satin Chrome	SC
Satin Nickel	SN
Antique Brass	QB
Antique Bronze	QZ

Anodized Aluminum Finishes

Clear	CLA
Black	BLA
Brass	BRA

Satin Color Matte Finishes

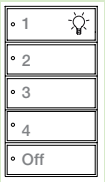
Snow	SW
Midnight	MN
Taupe	TP
Biscuit	BI
Eggshell	ES
Palladium	PD
Hot	HT
Merlot	MR
Plum	PL
Sienna	SI
Terracotta	TC
Bluestone	BG
Greenbriar	GB
Goldstone	GS
Mocha Stone	MS
Stone	ST
Desert Stone	DS
Limestone	LS

For the latest color offerings please see our website:
http://www.lutron.com/satincolors

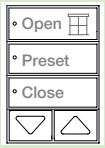
Keypad Engraving Codes

Omit = Unengraved
Ships with engraving certificate that customer can redeem at no charge

EGN = General Engraving



Lighting keypad



Shade column

NST = Non-Standard Text Engraving
Please visit the GRAFIK Eye QS website at **www.lutron.com/grafikeyeqs** for custom engraving forms. Submit completed form with order, and unit will ship engraved as specified by customer.

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

GRAFIK Eye QS Wireless with EcoSystem *(continued)*

Custom Options and Model Numbers *(continued)*

See previous pages for Standard and Other Custom Model Numbers
See Standard Color Combinations page for faceplate, stripe, and button colors

Custom Button Kit

QSGB - 5B - WH -

- QSGB: Custom Button Kit Prefix
- 5B: Button Configuration
- WH: Button Color/Finish
- Keypad Engraving Code

3BRL = 3-button with raise/lower (shade column)
5B = 5-button (lighting keypad)

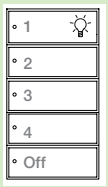
Button Kit Custom Color/Finish Codes

Architectural Matte Finishes		Satin Color Matte Finishes	
White	WH	Snow	SW
Ivory	IV	Biscuit	BI
Beige	BE	Eggshell	ES
Gray	GR	Taupe	TP
Brown	BR		
Black	BL		
Almond	AL		
Light Almond	LA		

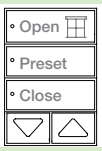
Keypad Engraving Codes

Omit = Unengraved
Ships with engraving certificate that customer can redeem at no charge

EGN = General Engraving



Lighting keypad



Shade column

NST = Non-Standard Text Engraving
Please visit the GRAFIK Eye QS website at **www.lutron.com/grafikeyeqs** for custom engraving forms. Submit completed form with order, and unit will ship engraved as specified by customer.

Custom Stripe Kit

QSGS - WH

- QSGS: Stripe Kit Prefix
- WH: Stripe Color/Finish

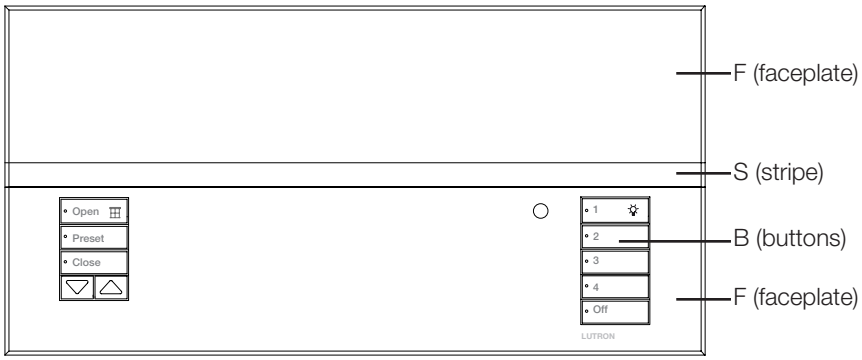
Stripe Custom Color/Finish Codes
Same as Faceplate colors on previous page

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

GRAFIK Eye QS Wireless with EcoSystem *(continued)*

Standard Color Combinations

See previous pages for Standard and Custom Model Numbers



Faceplate is comprised of a top and bottom. The bottom will always be the color indicated under "faceplate." The top may be the same color or translucent. Use the chart for faceplates that have the same color top and bottom. If a translucent lid is chosen, the stripe will automatically be the same color as the bottom lid.

Example:
If you order QSGRJ-6E-1WH, your GRAFIK Eye QS with 6 lighting zones and 1 shade column will come with a white faceplate (both top and bottom), gray stripe, and white buttons.

Suffix	Faceplate (F)	Stripe (S)	Button (B)
Architectural Matte			
WH	White	Gray	White
IV	Ivory	Beige	Ivory
BE	Beige	Ivory	Beige
GR	Gray	Black	Gray
BR	Brown	Black	Brown
BL	Black	Gray	Black
AL	Almond	Light Almond	Almond
LA	Light Almond	Almond	Light Almond
Architectural Metal			
BB	Bright Brass	Black	Black
BC	Bright Chrome	Black	Black
BN	Bright Nickel	Black	Black
SB	Satin Brass	Black	Black
SC	Satin Chrome	Black	Black
SN	Satin Nickel	Black	Black
QB	Antique Brass	Black	Black
QZ	Antique Bronze	Black	Black
Anodized			
CLA	Clear	Black	Black
BLA	Black	Black	Black
BRA	Brass	Black	Black

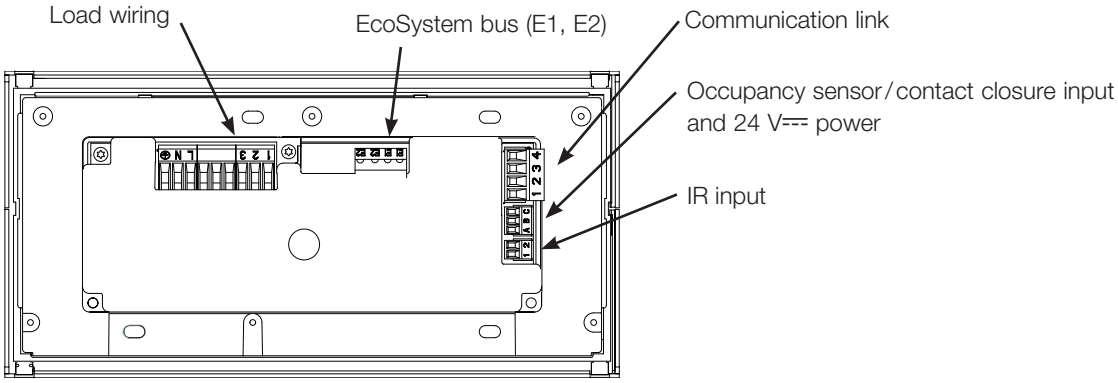
Suffix	Faceplate (F)	Stripe (S)	Button (B)
Satin Matte			
SW	Snow	Gray	Snow
MN	Midnight	Gray	Black
TP	Taupe	Gray	Taupe
BI	Biscuit	Eggshell	Biscuit
ES	Eggshell	Beige	Eggshell
PD	Palladium	Gray	Gray
HT	Hot	Taupe	Taupe
MR	Merlot	Taupe	Taupe
PL	Plum	Taupe	Taupe
SI	Sienna	Brown	Brown
TC	Terracotta	Taupe	Taupe
BG	Bluestone	Gray	Gray
GB	Greenbriar	Gray	Gray
GS	Goldstone	Ivory	Ivory
MS	Mocha Stone	Taupe	Taupe
ST	Stone	Gray	Gray
DS	Desert Stone	Taupe	Taupe
LS	Limestone	Gray	Gray

For the latest color offerings please see our website:
http://www.lutron.com/satincolors

Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Overview

Terminations



Wire Gauge	Maximum EcoSystem Bus Length
12 AWG (4.0 mm²)	2200 ft (671 m)
14 AWG (2.5 mm²)	1400 ft (427 m)
16 AWG (1.5 mm²)	900 ft (275 m)
18 AWG (1.0 mm²)	570 ft (175 m)

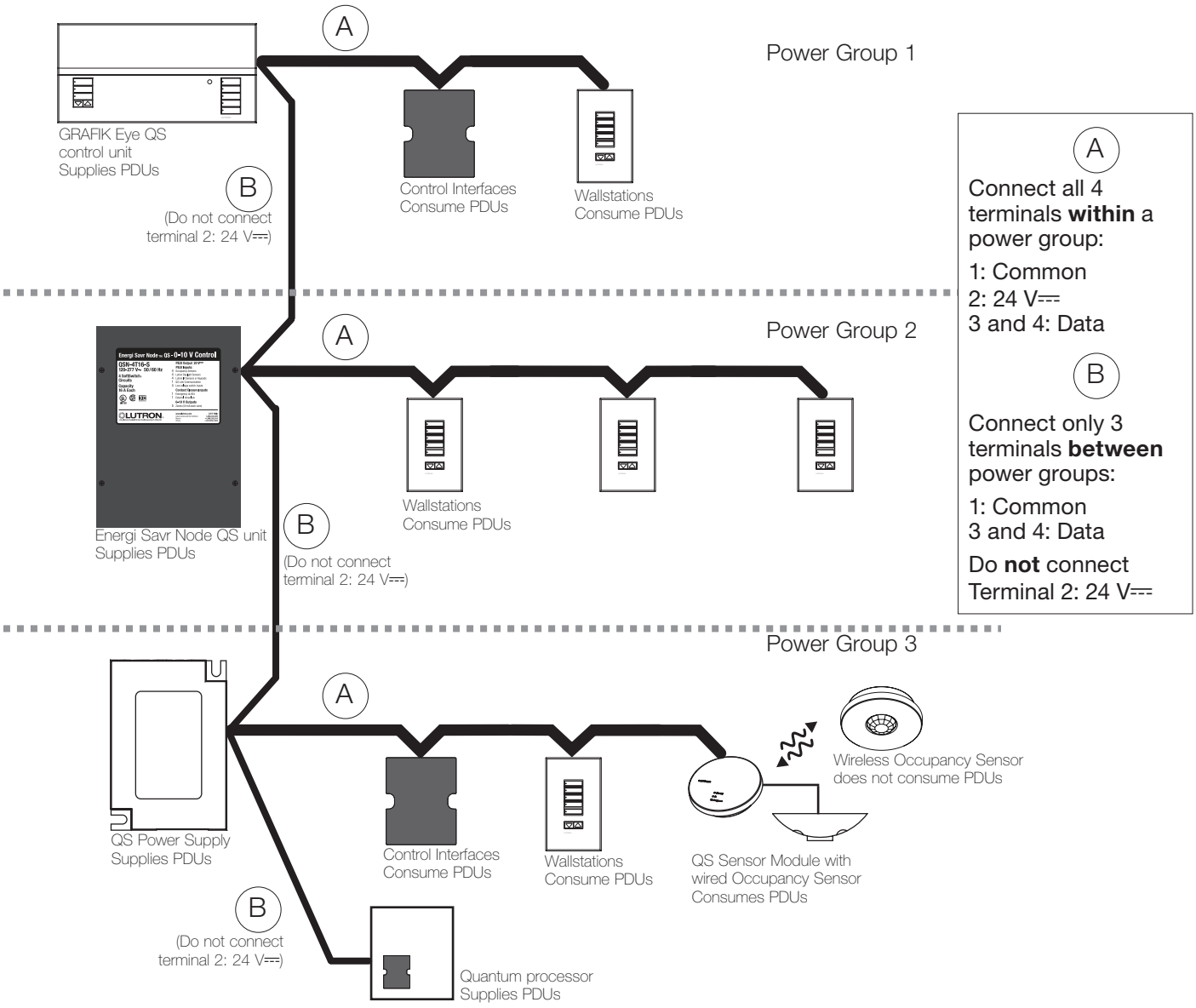
Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Power Group Wiring Example

On the QS link, there are devices that supply power and devices that consume power. Each device has a specific number of Power Draw Units (PDUs) it either supplies or consumes. A Power Group consists of one device that supplies power and one or more devices that consume power; each Power Group may have only one power-supplying device. Refer to the **Power Draw Units on the QS Link** Spec (369405) on www.lutron.com for more information concerning PDUs.

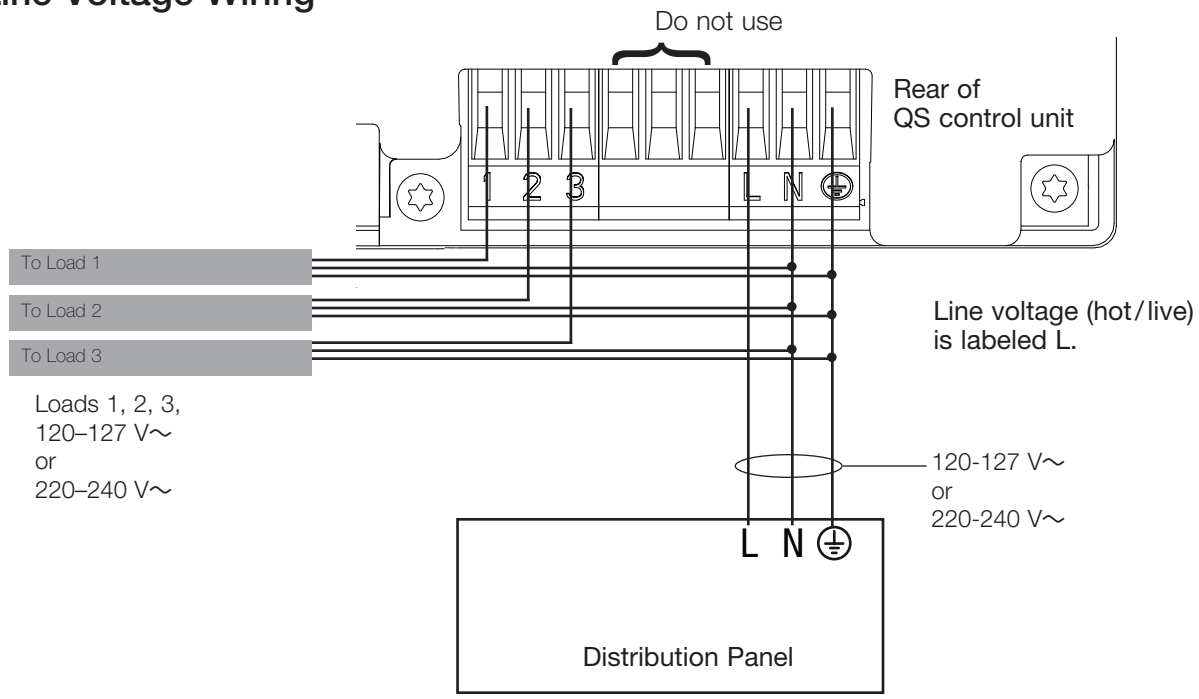
Within Power Groups on the QS link, connect all 4 terminals (1, 2, 3, and 4), shown by the letter A in the diagram. Between devices on the QS link that supply power, connect only terminals 1, 3, and 4 (NOT terminal 2), shown by the letter B on the diagram.

Wiring can be T-tapped or daisy-chained.



Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Line Voltage Wiring

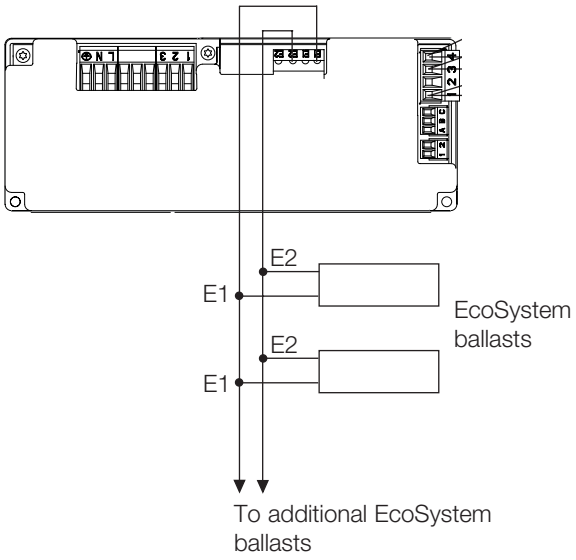


- Pull power wiring from distribution panel and to light fixtures.
- Each line voltage terminal can accept one 12 AWG (4.0 mm^2) wire.
- Consult Lutron for non-dim relay wiring and/or load side emergency transfer wiring.

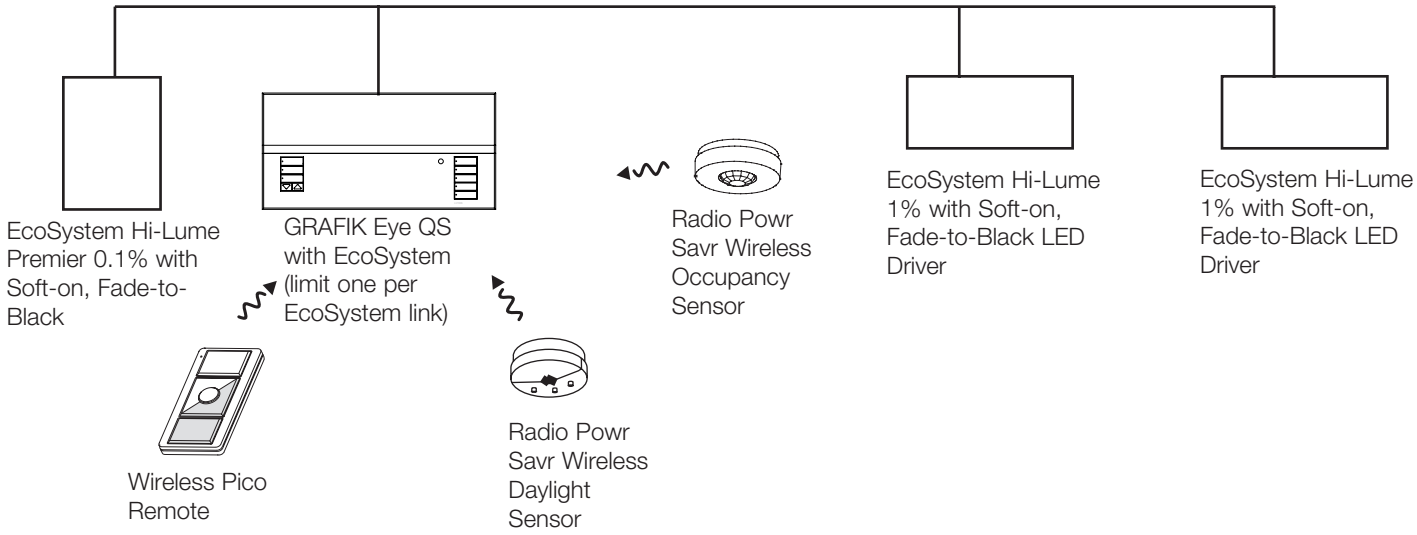
Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

EcoSystem Bus Wiring

EcoSystem Bus Link Terminal Detail



EcoSystem Bus Wiring Example



Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

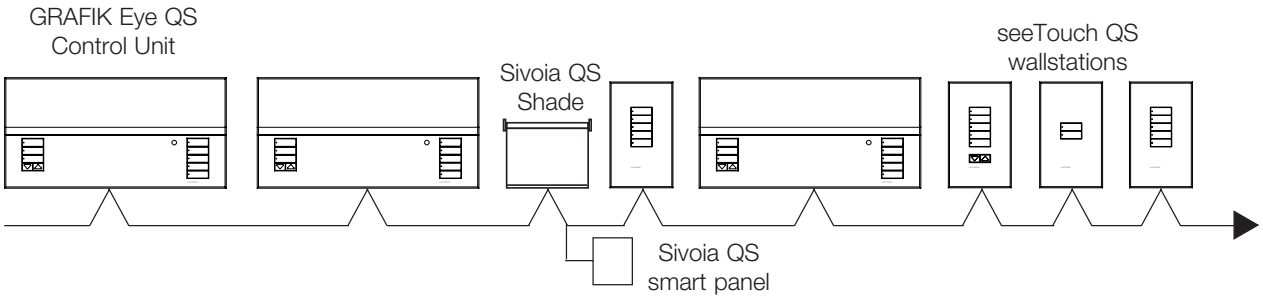
IEC PELV/NEC® Class 2 QS System Wiring

- Wiring can be daisy-chained or T-tapped.
- Wiring must be run separately from line/mains voltage.
- Total length of control link must not exceed 2000 ft (610 m).

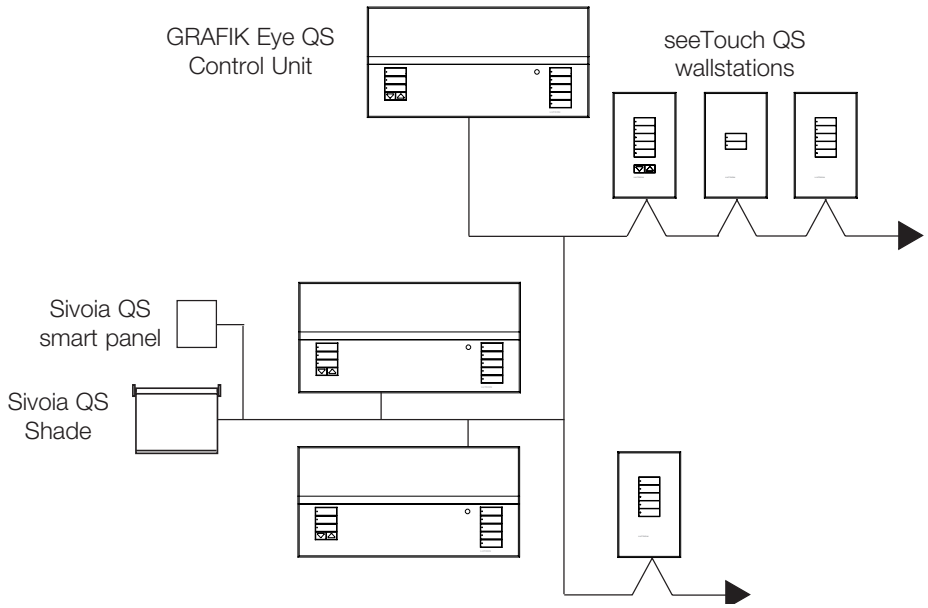
Wire Sizes (check compatibility in your area)

QS Link Wiring Length	Wire Gauge	Lutron Cable Part Number
Less than 500 ft (153 m)	Power (terminals 1 and 2) 1 pair 18 AWG (1.0 mm^2)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm^2)	
500 to 2000 ft (153 to 610 m)	Power (terminals 1 and 2) 1 pair 12 AWG (4.0 mm^2)	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm^2)	

Daisy-Chain Wiring Example

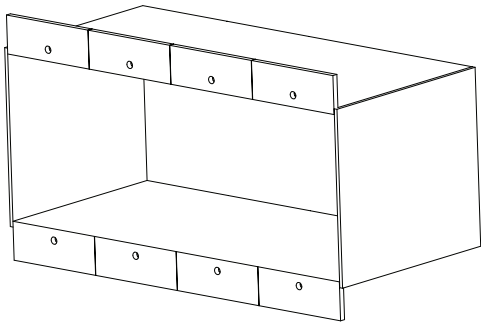


T-Tap Wiring Example

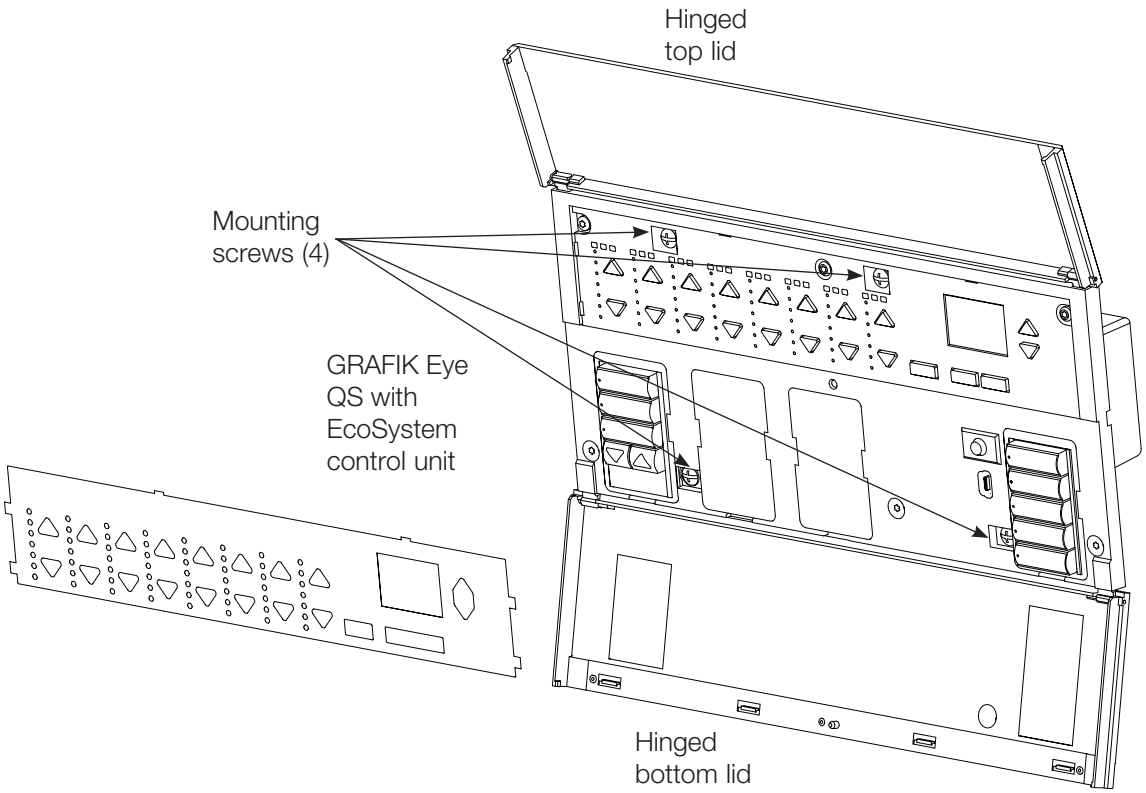


Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Mounting



Fits into a 4-gang
U.S. backbox,
3½ in (90.4 mm) deep
(Lutron P/N 245-254)
or
3 in (76.2 mm) deep
(Lutron P/N 241-400)



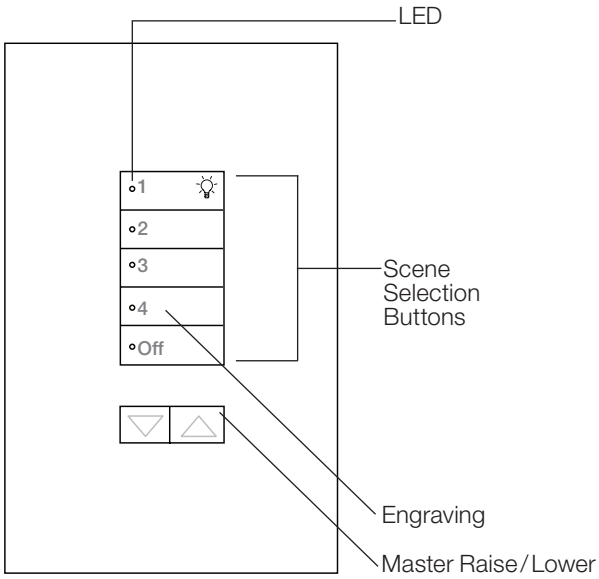
Job Name:	Model Numbers:	
Hotel Hartness	QSGRJ-16E	QSGRJ-8E
Job Number:	QSGRJ-6E	

Color and Engraving Codes (continued)

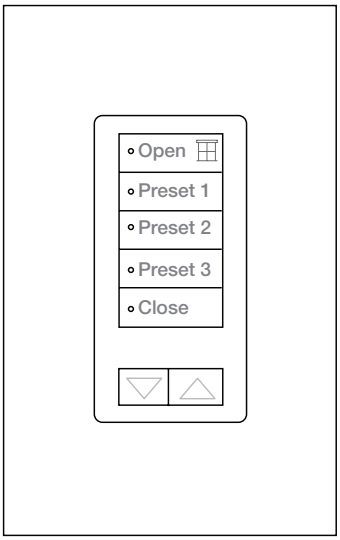
QSWS2-5BRLN-___-___
QSWS2-5BRLI-___-___
5-Button Wallstation with Raise/Lower

Description

- Often used to select and adjust scenes.
- Receives up to two contact closure inputs through a connector on the back of the wallstation.
- Large, rounded buttons are easy to use.
- Backlit buttons with optional engraving make it easy to find and operate the wallstation in low-light conditions.
- Optional button engraving is angled up to the eye for easy reading.
- Master Raise/Lower brightens or dims all lighting or raises/lowers all assigned shades in the last selected scene or toggled group.
- The LEDs next to each button are used during programming and provide feedback when the buttons are pressed.
- Shade control features (E01 engraving):
  – Can control Sivoia QS Window Treatments.
  – Pressing the Open (or Close) button once will cause the window treatments to move to their fully open (or closed) position. Tap any button (regardless of function) to stop a shade that is in motion.
  – Three (3) programmable preset buttons.



QSWS2-5BRLN-WH-EGN
(Non-insert version)



QSWS2-5BRLI-WH-E01
(Insert version)

Specifications

Power Input (Control Link Terminal 2)
SELV/PELV/NEC® Class 2. Operating voltage: 24–36 V⎓ 30 mA

Key Design Features
- Field-changeable button and faceplate assemblies allow easy customization.
- Meets IEC 801-2. Tested to withstand 15 kV electrostatic discharge without damage or memory loss.
- Faceplate snaps on with no visible means of attachment.
- Available as an “insert” style control for multiganging.
- Can be ganged to share a common faceplate with Nova T☆ and Vareo dimmers. To order new wallplates for multi-ganging, specify “R3” openings in a Nova T☆ multi-gang FB (fins broken) Series model number.
- Use Faceplate Replacement Kits to change color, button configuration, or engraving, or to convert between non-insert and insert configurations.

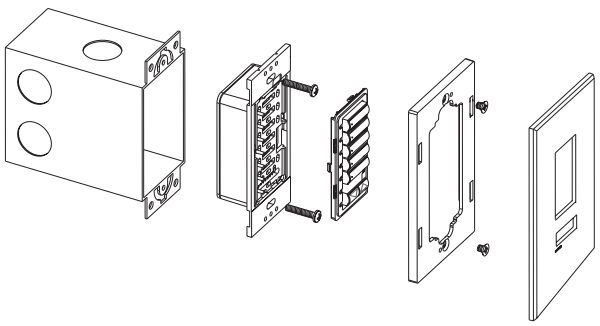
System Communications and Capacity
- SELV/PELV/NEC® Class 2 wiring connects wallstations to other devices on the QS Link.
- A QS system can have up to 100 devices and 100 zones; seeTouch QS wallstations each count as 1 device and 0 zones on the QS Link.
- A seeTouch QS wallstation consumes 1 power draw unit (PDU) on the QS link. For complete information, see **Power Draw Units on the QS Link** (P/N 369405) at www.lutron.com

Terminals
Accept up to two 18 AWG (1.0 mm²).

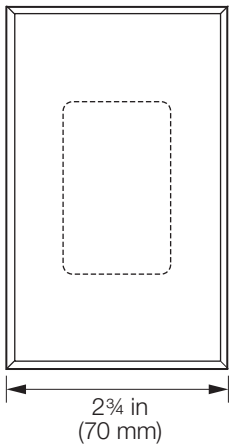
Environment
32 °F to 104 °F (0 °C to 40 °C). Relative humidity less than 90% non-condensing.

Compatibility
seeTouch QS keypads are compatible with GRAFIK Eye QS, Sivoia QS, Energi Savr Node, and Quantum systems.

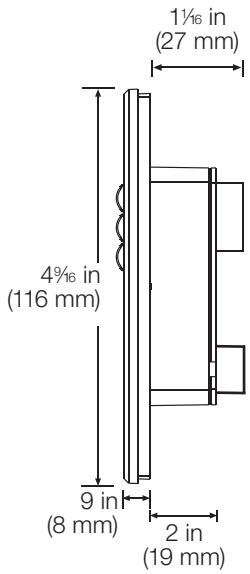
Mounting
Typical backbox dimensions:
3.75 in (95 mm) high,
2.1875 in (55 mm) wide,
2.75 in (70 mm) deep.



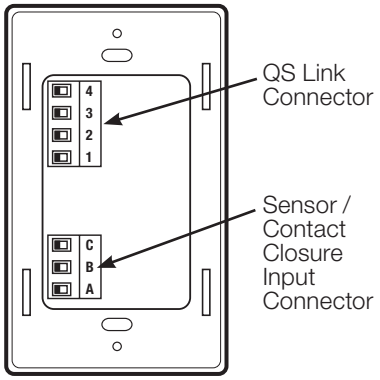
Dimensions
Front View



Side View



Back View

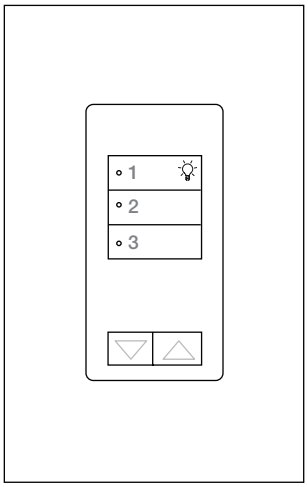


Job Name:	Model Numbers:	
Hotel Hartness	QSWS2-5BRLI	
Job Number:		

Available Control Types

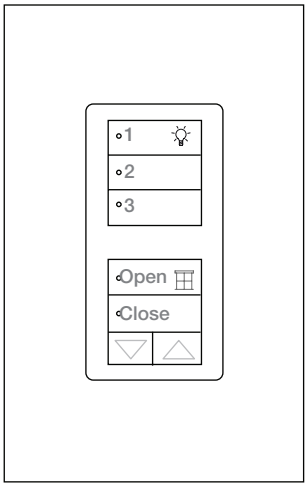
seeTouch wallstations are available in three types:

Lights Only



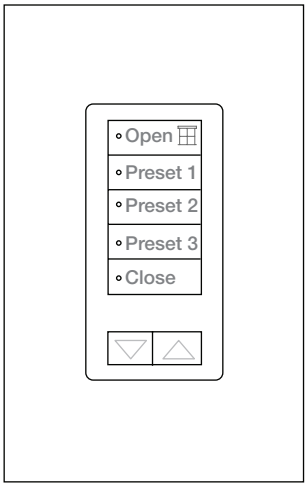
QSWS2-3BRLI-WH-EGN
(Insert version)

Lights and Shades



QSWS2-1RLDI-WH-EGN
(Insert version)

Shades Only



QSWS2-5BRLI-WH-E01
(Insert version)

Lights Only

- Controls only lights.
- Has a programmable column type (choose from the list on the following pages).
- Engraving options: General (EGN) and Non-Standard (NST).

Lights and Shades

- Top column controls only lights and has a programmable column type (choose from the list on the following pages).
- Bottom column controls only shades and has a programmable column type (choose from the list on the following pages).
- Engraving options: General (EGN) and Non-Standard (NST).

Shades Only

- Controls only shades.
- Models with preset buttons have programmable preset levels.
- Engraving options: Standard (E01), Secondary (E02), and Non-Standard (NST).

Available Column Types

Scene (with Off)

- Controls pre-programmed scenes on one or more scene controllers (such as a GRAFIK Eye QS, or an area on an Energy Savr Node).
- Buttons within a column control the same scene controller(s) (different buttons within a column cannot control different scene controllers).
- The scene recalled by the first button in a column is programmable, subsequent buttons recall the next numerical scene, and the last button always recalls Scene Off.
- A 1-button scene wallstation will always toggle between the assigned scene and Scene Off.

Scene (without OFF)

- Identical function to scene with Off, except the last button in a column recalls the next consecutive scene, not Scene Off.

Zone Toggle

- Buttons toggle a zone or group of zones between programmable preset values and Off (where all zones are Off).
- Each zone can be programmed to a different value.
- Each button can be individually programmed to a different zone or group of zones.

Partition

- Allows the user to assign individual buttons of a column to different scene controllers (areas).
- One button press (button LED lights) indicates an open partition within the space so that devices programmed to that button talk to each other in both directions.
- A second button press (button LED goes off) indicates a closed partition within the space so that devices programmed to that button function independently.

2B Partition (2-button wallstation only)

- Identical function to partition, except that there are two buttons.
- A top button press indicates an open partition; a bottom button press indicates a closed partition.

2B Fine Tune (2-button wallstation only)

- Buttons function as raise and lower buttons for assigned zones.
- A button tap will raise/lower the level of assigned zones by 1 percent.
- Pressing and holding the buttons smoothly raises to high end or smoothly lowers to low end.

2B Sequence (2-button wallstation only)

- All assigned scene controllers continuously cycle through either Scenes 1-4 or Scenes 5-16 using the programmed fade times for each scene.
- Useful for spaces that desire dynamic lighting, such as decorative lighting or displays in retail stores.

(continued on next page)

Available Column Types (continued)

2B Panic (2-button wallstation only)
- Button press causes all assigned scene controllers go to Scene 16.
- Temporarily disables all button presses and ignores scene or zone level changes.

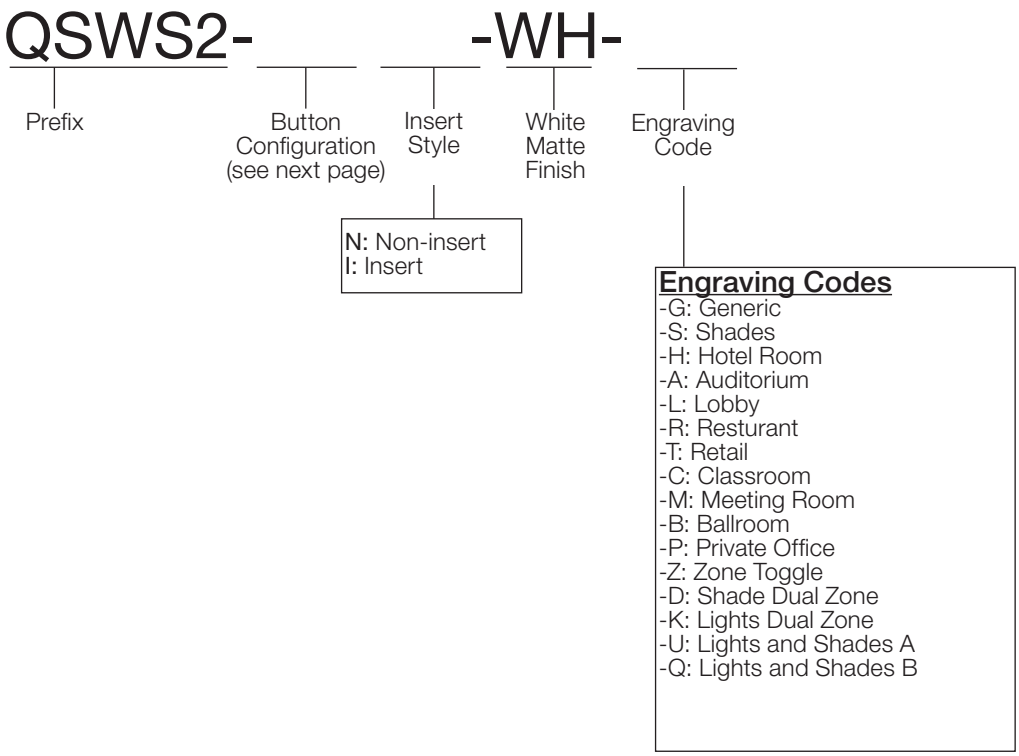
2B Timeclock (2-button wallstation only)
- Allows the user to enable or disable the timeclock on a GRAFIK Eye QS.
- A top button press enables the timeclock; a bottom button press disables the timeclock.

Shade
- Wallstation must have more than 1 button.
- Raise/Lower buttons are recommended for programming.
- The top button becomes the Open button; the bottom button becomes the Close button for associated Lutron Sivoia QS shades or third-party AC shades.
- For keypads with more than two buttons, the middle buttons are programmable preset buttons.

Shade Group
- Available only on a multi-column keypad where another column is a shade column.
- Allows the shade column to operate as multiple independent keypads (one per group).
- The shade group column selects which independent keypad is currently active (indicated by the group button whose LED is lit).

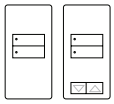
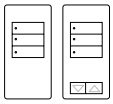
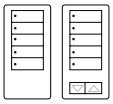
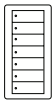
Note: Column types can be changed using the GRAFIK Eye QS programming menu (e.g., control programmed as lights only can be changed to shades only).

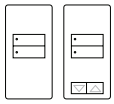
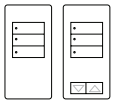
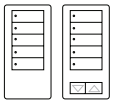
How to Build a Standard seeTouch QS Model Number



Job Name:	Model Numbers:	
Hotel Hartness	QSWS2-5BRLI	
Job Number:		

Standard seeTouch QS Wallstation Button Functions Summary* (WH Only)

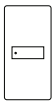
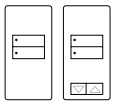
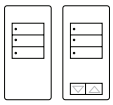
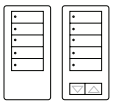
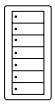
Button Configurations			
			
2B	3B	5B	7B
Generic			
On Off	1 2 Off	1 2 3 4 Off	1 2 3 4 5 6 Off
Shades			
Open Close	Open Preset 1 Close	Open Preset 1 Preset 2 Preset 3 Close	Open Preset 1 Preset 2 Preset 3 Preset 4 Preset 5 Close
Hotel Room			
DND MUR	High Low Off	High Medium Low Nightlight Off	Welcome Foyer Living Bed Bath Bedside Off
Auditorium			
All On All Off	All On Present All Off	All On Present Lecture Exam All Off	All On Present Lecture Exam Perform Cleaning All Off

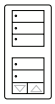
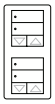
Button Configurations			
			
2B	3B	5B	7B
Lobby			
All On All Off	All On Event All Off	All On Morning Afternoon Evening All Off	All On Morning Afternoon Evening After Hours Event All Off
Restaurant			
All On All Off	All On After Hours All Off	All On Breakfast Lunch Dinner All Off	All On Breakfast Lunch Dinner After Hours Cleaning All Off
Retail			
All On All Off	All On After Hours All Off	All On Morning Afternoon Evening All Off	All On Morning Afternoon Evening After Hours Cleaning All Off
Classroom			
All On All Off	All On Present All Off	All On Present Lecture Exam All Off	All On Present Lecture Exam Movie Cleaning All Off

* Standard engraving text does not automatically assign or re-assign system programming to the QS keypad buttons. Project-specific customer input and programming by a Lutron service team member is still required to achieve a desired sequence of operation/system functionality per control.

Job Name:	Model Numbers:	
Hotel Hartness	QSWS2-5BRLI	
Job Number:		

Standard seeTouch QS Wallstation Button Functions Summary (WH only) (continued)

Button Configurations				
				
1B	2B	3B	5B	7B
Meeting Room				
N/A	All On All Off	All On Meeting All Off	All On Meeting A/V Cleaning All Off	All On Meeting A/V Pendant Perimeter Event All Off
Ballroom				
N/A	All On All Off	All On Event 1 All Off	All On Event 1 Event 2 Event 3 All Off	All On Event 1 Event 2 Event 3 Event 4 Event 5 All Off
Private Office				
N/A	All On All Off	On Dim Off	On Dim Zone 1 Zone 2 Off	N/A
Zone Toggle				
On/Off	Zone 1 Zone 2	Zone 1 Zone 2 Zone 3	Zone 1 Zone 2 Zone 3 Zone 4 Zone 5	Zone 1 Zone 2 Zone 3 Zone 4 Zone 5 Zone 6 Zone 7

Button Configurations		
		
1RLD	2RLD	3BD
Shades – Dual Zone		
N/A	Open Close Open Close	N/A
Lights and Shades A		
On Preset Off Open Close	On Off Open Close	On Preset Off Open Preset Close
Lights Dual Zone		
N/A	On Off On Off	On Preset Off On Preset Off
Lights and Shades B		
N/A	N/A	On Preset Off Open Stop Close

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How to Build a Custom seeTouch QS Model Number

QSWS2- ___ - ___ - ___

- Prefix: QSWS2-
- Button Configuration (see next page): ___
- Insert Style: ___
  - N: Non-insert
  - I: Insert
- Color/Finish: ___
- Engraving Code: ___

Color/Finish Codes

Architectural Matte Finishes

White	WH
Ivory	IV
Beige	BE
Gray	GR
Brown	BR
Black	BL
Almond	AL
Light Almond	LA
Taupe	TP

Architectural Metal Finishes

With black plastic buttons (standard).

Bright Brass	BB
Bright Chrome	BC
Bright Nickel	BN
Satin Brass	SB
Satin Chrome	SC
Satin Nickel	SN
Antique Brass	QB
Antique Bronze	QZ

Anodized Aluminum Finishes

With black plastic buttons (standard).

Clear	CLA
Black	BLA
Brass	BRA

Satin Colors Matte Finishes

Available with Insert (I) style controls only.

Snow	SW
Midnight	MN
Taupe	TP
Biscuit	BI
Eggshell	ES
Palladium	PD*
Hot	HT*
Merlot	MR*
Plum	PL*
Sienna	SI*
Terracotta	TC*
Bluestone	BG*
Green briar	GB*
Goldstone	QS*
Mocha stone	MS*
Stone	ST*
Desert Stone	DS*
Limestone	LS*

*__Note:__ Some Satin Colors units ship with different color buttons. For more information, please visit the seeTouch website at **www.lutron.com/seetouch**

*For the latest color offerings please see our website: http://www.lutron.com/satincolors

If no color is specified, wallstations will ship with white (WH) finish.

Engraving Codes

Omit: Unengraved

EGN: General Engraving
For “Lights only” and “Lights and Shades” controls

E01: Standard Engraving
For “Shades only” controls

E02: Secondary engraving for “Shades only” controls

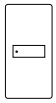
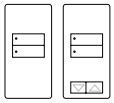
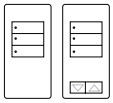
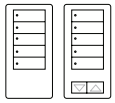
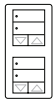
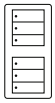
NST: Non-Standard Text Engraving
Please visit the GRAFIK Eye QS website at **www.lutron.com/grafikeyeqs** for custom engraving forms

Engraving Notes

- The engraving option (model number and suffix) is related to the control type, as shown above in the "How to Build a Standard seeTouch QS Model Number" section.
- Four engraving options are available:
  1. EGN: General engraving for ‘Lights Only’ and ‘Lights and Shades’ controls
  2. E01: Standard engraving for ‘Shades Only’ controls and ‘Lights and Shades’ for model QSWE-10BRLI-WH-E01 only
  3. E02: Secondary engraving for ‘Shades Only’ controls
  4. NST: Non-standard engraving for ‘Lights Only’, ‘Lights and Shades’, or ‘Shades Only’ controls
- If no engraving is specified, wallstations will ship with an engraving certificate, with EGN being its default engraving type.

Job Name:	Model Numbers:	
Hotel Hartness	QSWS2-5BRLI	
Job Number:		

Custom seeTouch QS Wallstation Button Functions Summary

Button Configuration							
							
1B	2B	3B	5B	7B	1RLD	2RLD	3BD
EGN (General Engraving) Functionality							
Scene 1	Scene 1 Off	Scene 1 Scene 2 Scene 3	Scene 1 Scene 2 Scene 3 Scene 4 Off	Scene 1 Scene 2 Scene 3 Scene 4 Scene 5 Scene 6 Scene 7	Scene 1 Scene 2 Scene 3 Open Close	Scene 1 Off Open Close	Scene 1 Scene 2 Scene 3 Open Preset Close
E01 (Standard Engraving) Functionality							
N/A	Open Close	Open Preset Close	Open Preset 1 Preset 2 Preset 3 Close	N/A	Group 1 Group 2 Group 3 Open Close	Open Close Open Close	Open Preset Close Open Preset Close
E02 (Secondary/Shades Only Engraving) Functionality							
N/A	N/A	N/A	N/A	N/A	Blackout Sheer Both Open Close	N/A	N/A

Legend:

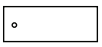
Light Control

Shade Control

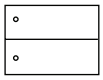
Job Name:	Model Numbers:	
Hotel Hartness	QSWS2-5BRLI	
Job Number:		

How to Build a seeTouch QS Model Number

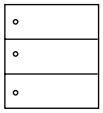
Button Configurations



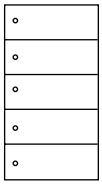
1B
1-button



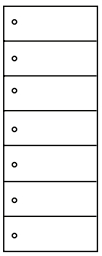
2B
2-button



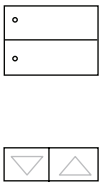
3B
3-button



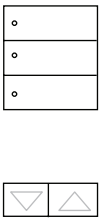
5B
5-button



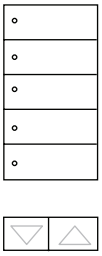
7B
7-button



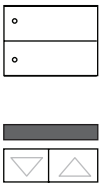
2BRL
2-button with
raise/lower



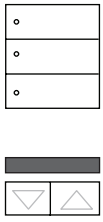
3BRL
3-button with
raise/lower



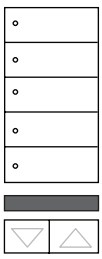
5BRL
5-button with
raise/lower



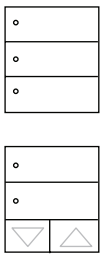
2BRLIR
2-button with IR
receiver and
raise/lower



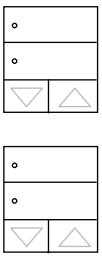
3BRLIR
3-button with IR
receiver and
raise/lower



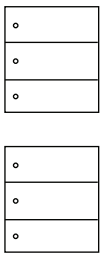
5BRLIR
5-button with IR
receiver and
raise/lower



1RLD
Dual with 3-button
and 2-button with
raise/lower



2RLD
Dual 2-button with
raise/lower



3BD
Dual 3-button

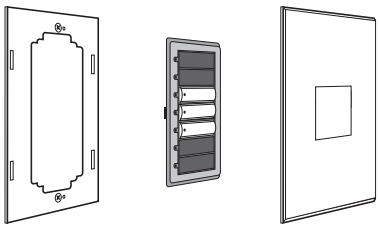
Job Name:	Model Numbers:	
Hotel Hartness	QSWS2-5BRLI	
Job Number:		

Faceplate Information

Faceplate Replacement Kits

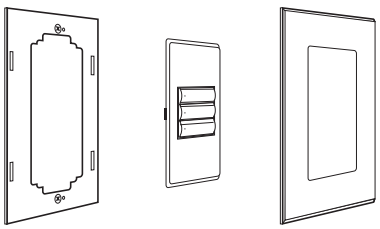
Use faceplate replacement kits to change: colors, button configuration, engraving, between insert and non-insert versions. Each kit includes an adapter, button assembly, and wallplate

Non-Insert Kit



Non-insert style controls: Faceplate complements a specified button kit. When the faceplate is removed or replaced, the buttons are removed and replaced along with it.

Insert Kit



Insert style controls: Faceplate is a decorator style with a universal size opening that fits all button kits. This style allows for easy replacements of button kits without changing the faceplate.

Model Numbers for Kits

Non-Insert	Insert
QSWS2R-1BN	QSWS2R-1BI
QSWS2R-2BN	QSWS2R-2BI
QSWS2R-3BN	QSWS2R-3BI
QSWS2R-5BN	QSWS2R-5BI
QSWS2R-7BN	QSWS2R-7BI
QSWS2R-2BRLN	QSWS2R-2BRLI
QSWS2R-3BRLN	QSWS2R-3BRLI
QSWS2R-5BRLN	QSWS2R-5BRLI
QSWS2R-1RLDN	QSWS2R-1RLDI
QSWS2R-2RLDN	QSWS2R-2RLDI
QSWS2R-3BDN	QSWS2R-3BDI
QSWS2R-2BRLIRN	QSWS2R-2BRLIRI
QSWS2R-3BRLIRN	QSWS2R-3BRLIRI
QSWS2R-5BRLIRN	QSWS2R-5BRLIRI

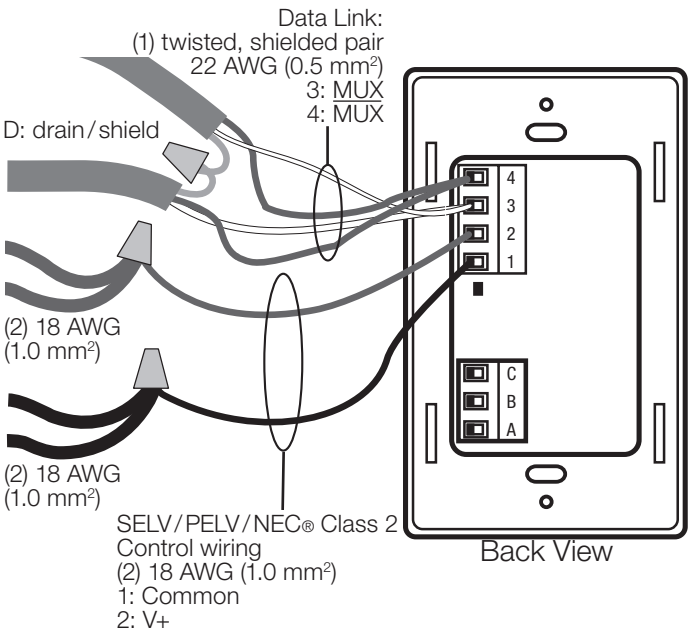
Wallstation Installation

QS Link Wiring

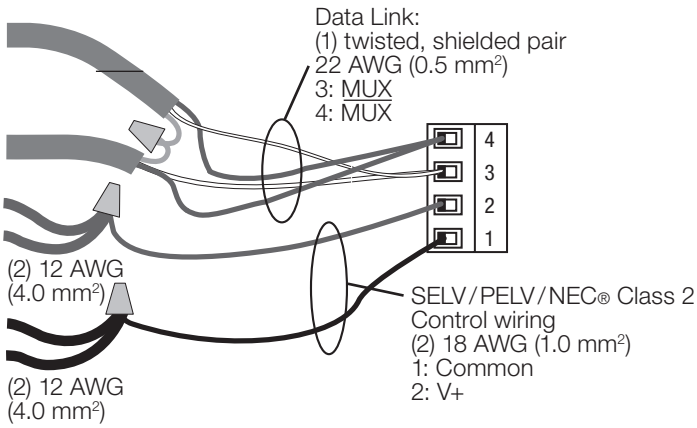
- Use SELV/PELV/NEC® Class 2 wiring to connect wallstations to the QS Link.
- Connect two 22 AWG (0.5 mm²) shielded, twisted pair wires to terminals 3 and 4 of the wallstation's control link connector. Shielding (drain) of the twisted pair wires must be connected together as shown, but do not connect the shielding to earth/ground or the wallstation and do not allow it to contact the grounded wallbox.
- Connect the appropriate size wires to terminals 1 and 2 for power, according to your link length (see table below).
- Connect drain/shield as shown. Do not connect to ground (earth) or wallstation. Connect the bare drain wires and cut off the outside shield.

Note: Use appropriate wire connecting devices as specified by local codes.

Link Wiring (<500 ft/153 m)



Link Wiring (500 ft/153 m to 2000 ft/610 m)



QS Link Wire Sizes (check compatibility in your area)

QS Link Wiring Length	Wire Gauge	Lutron Cable Part Number
Less than 500 ft (153 m)	Power (terminals 1 and 2) 1 pair 18 AWG (1.0 mm²)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm²)	
500ft to 2000 ft (153 m to 610 m)	Power (terminals 1 and 2) 1 pair 12 AWG (4.0 mm²)	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm²)	

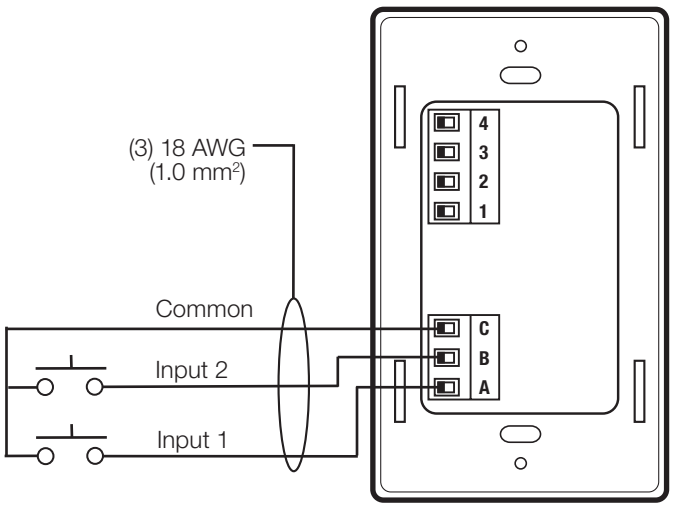
Contact Closure Inputs

Specifications

- Inputs must be dry contact closure, solid-state, open collector, or active-low (NPN)/active-high (PNP) output.
  - Open collector NPN or active-low on-state voltage must be less than 2 V⎓ and sink 3.0 mA
  - Open collector PNP or active-high on-state voltage must be greater than 12 V⎓ and source 3.0 mA
- Wallstation is miswire protected up to 36 V⎓.
- Outputs must stay in the closed or open states for at least 40 msec in order to be recognized by the wallstation.

Contact Closure Input Wiring

- Use low-voltage SELV/PELV/NEC® Class 2 wiring to connect the contact closure inputs to the wallstation.



Back View

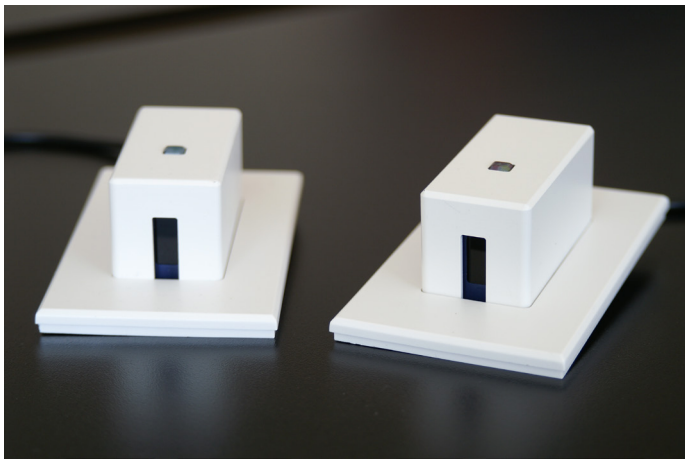
Job Name:	Model Numbers:	
Hotel Hartness	QSWS2-5BRLI	
Job Number:		

369302d 1 02.25.19

GRX-IRPS-WH Partition Sensor

Description

The GRX-IRPS Partition Sensor uses an infrared transmitter/receiver pair to detect partition movement and, in conjunction with other Lutron products, coordinates lighting preset functions in areas such as partitioned meeting rooms or ballrooms. The GRX-IRPS may be used with GRAFIK Eye 3000 or 4000 systems, GRAFIK Eye QS, Energi Savr Node, or Quantum systems.



Features

- Automatically combines lighting preset functions when partition is open creating one large space.
- Lighting preset functions become independent as partition is closed creating several smaller spaces.
- For operation with GRAFIK Eye 3000/4000 system, the GRX-IRPS requires an interface (GRX-IO) and a power supply (GRX-12VDC or PP-DV).
- For operation with GRAFIK Eye QS,or Energi Savr Node systems, the GRX-IRPS requires an interface (QSE-IO) and a power supply (GRX-12VDC or PP-DV).
- For operation with Quantum, the GRX-IRPS requires either an interface (QSE-IO) or wallstation with contact closure input (QSWS2-, QSWA-, or similar) and a power supply (GRX-12VDC or PP-DV).

Job Name:	Model Numbers:	
Hotel Hartness	GRX-IRPS	
Job Number:		

Specifications

Power

- Operating voltage: Low-voltage PELV (Class 2: USA) 12–24 V⎓, 135 mA.
  - Lutron recommends using a GRX-12VDC plug-in power supply or a PP-DV power supply (both ordered separately).
    - One GRX-12VDC can supply power to eleven sensor transmitter/receiver pairs.
    - One PP-DV can supply power to one sensor transmitter/receiver pair.
- Transmitter and receiver have reverse polarity and short-circuit protection.

Sensor Status Indicator

- Receiver and transmitter includes an LED indicator that assists in sensor alignment during installation and provides sensor operating status.
  - Transmitter LED will be green when properly powered and transmitting
  - Receiver LED will be orange when receiving beam and not illuminate when blocked.

System Capacity

- Each GRX-IO or QSE-IO Interface (prefix QSWS2-, QSWA-, or similar; ordered separately) can accommodate up to five GRX-IRPS partition sensors for five different moveable walls.
- Each seeTouch wallstation (ordered separately) can accommodate one GRX-IRPS partition sensors for one moveable wall.
- Contact Closure Output from GRX-IRPS is configurable to Normally Open or Normally Closed from receiver unit.

Connection

- Wire leads provided.

Finish

- White painted plastic.

Environment

- 32 °F–104 °F (0 °C–40 °C). Relative humidity less than 90% non condensing.

Mounting

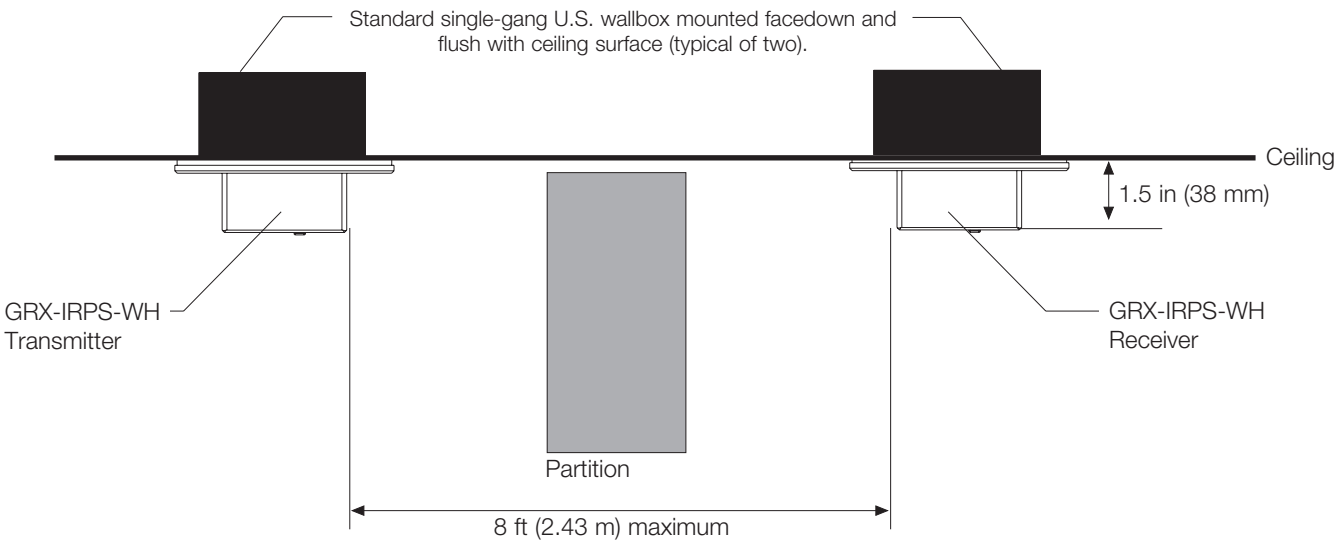
- Surface mount indoors only.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-IRPS	
Job Number:		

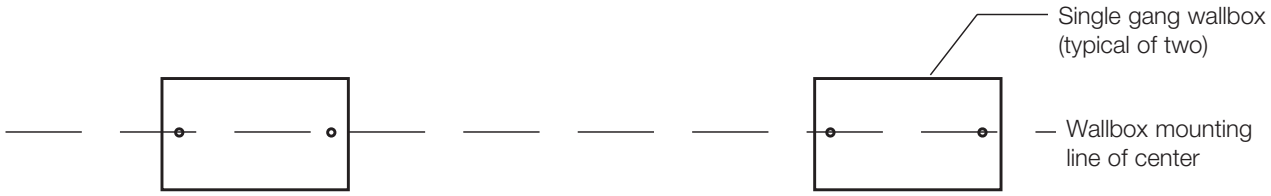
Dimensions and Mounting

- Receiver and transmitter surface mount in 1-gang U.S. wallboxes 3.5 in (89 mm) deep, mounted facedown from the ceiling. Indoor use only.
- The sensors must be mounted in a position where the partition separates the transmitter and receiver when the partition is closed.
- Transmitter and receiver may be located no more than 8 ft (2.43 m) apart.
- Adjustable mounting brackets allow easy alignment during installation.
- Wires feed through the back of the transmitter/receiver.

Side View



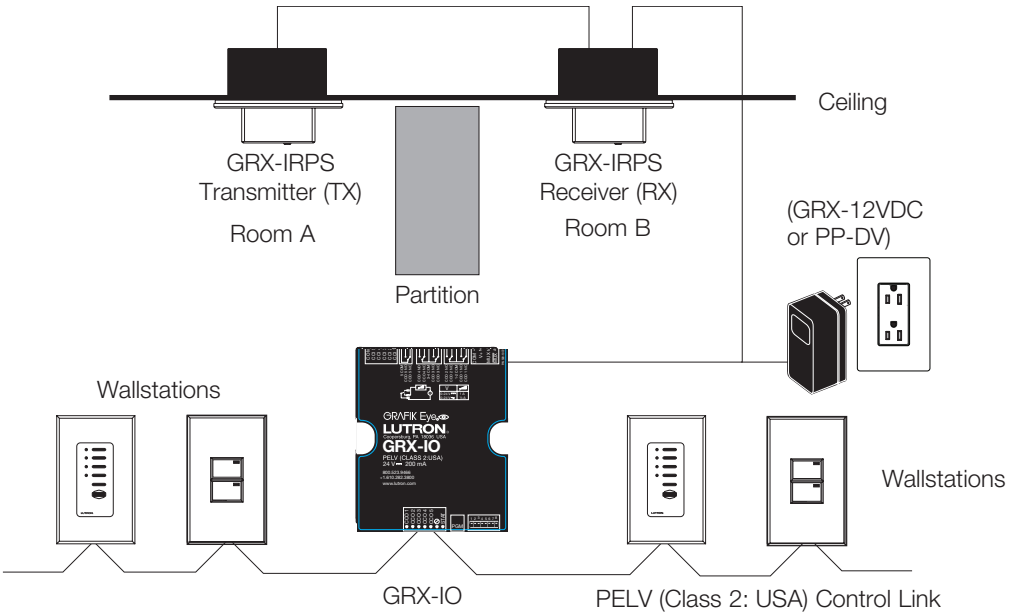
Top View



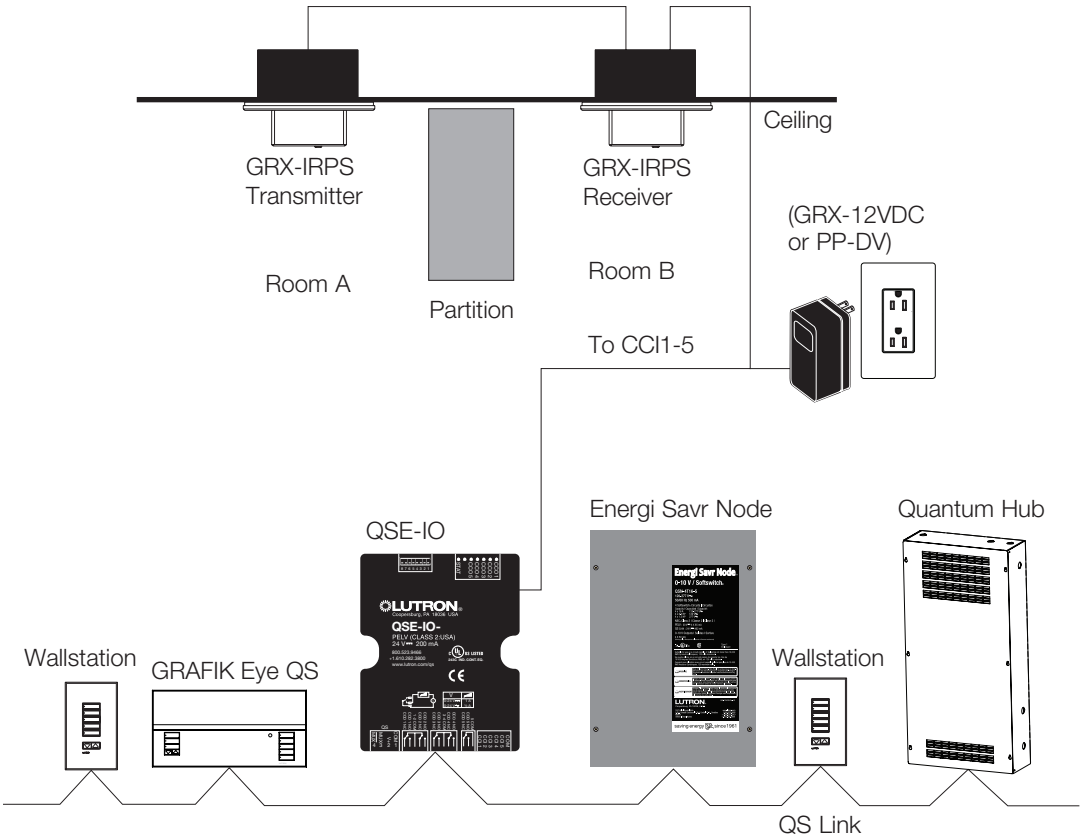
Job Name:	Model Numbers:	
Hotel Hartness	GRX-IRPS	
Job Number:		

System Diagrams

GRAFIK Eye 3000 and 4000 Systems



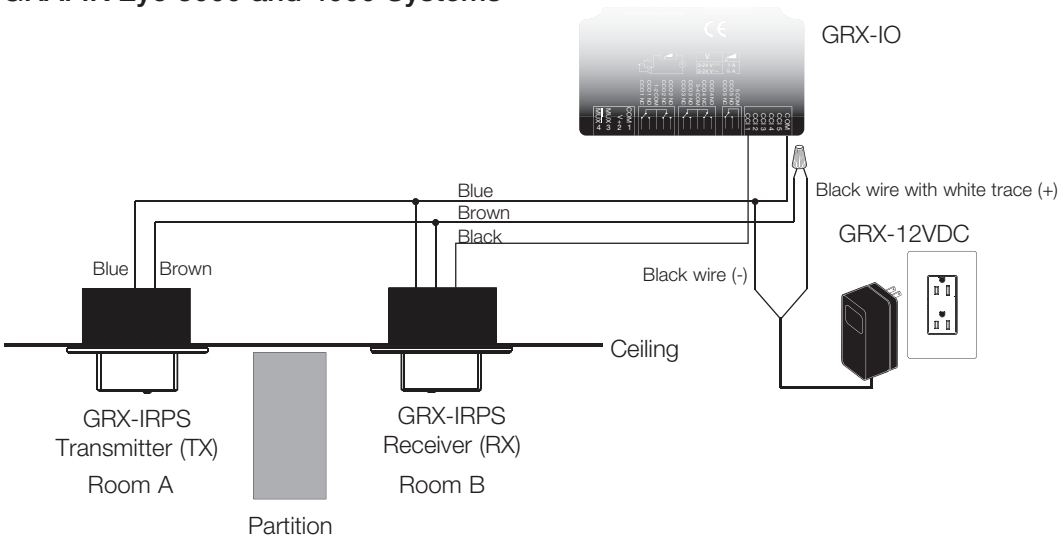
GRAFIK Eye QS System, Energi Savr Node System, Quantum System



Job Name:	Model Numbers:	
Hotel Hartness	GRX-IRPS	
Job Number:		

Wiring Diagrams

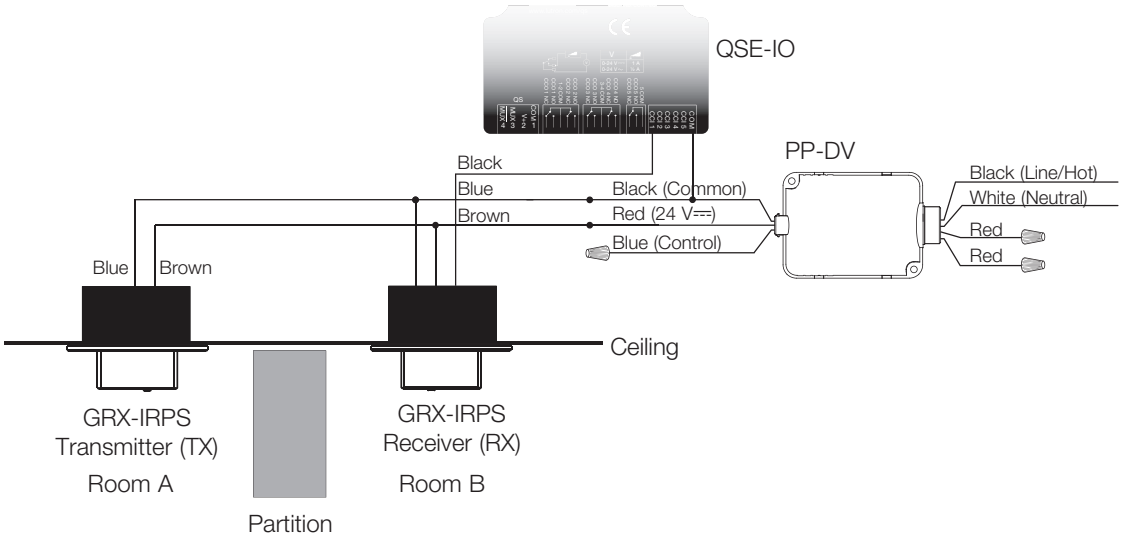
GRAFIK Eye 3000 and 4000 Systems



Note: Diagram represents a single partition. A GRX-IO will accomodate up to five GRX-IRPS partition sensors (five partitions). A single GRX-12VDC will power up to eleven GRX-IRPS partition sensors.

Note: The GRX-IO is programmed for partition mode. Set input closures for maintained inputs (refer to the GRX-IO installation instructions).

GRAFIK Eye QS System, Energi Savr Node System, Quantum System



Note: Diagram represents a single partition. A QSE-IO will accomodate up to five GRX-IRPS partition sensors (five partitions). A single PP-DV will power one GRX-IRPS partition sensor.

Note: The QSE-IO is programmed for partition mode. Set input closures for maintained inputs (refer to the QSE-IO installation instructions).

Job Name:	Model Numbers:	
Hotel Hartness	GRX-IRPS	
Job Number:		

Dual Technology Ceiling Mount Sensor

The LOS-CDT Series dual technology ceiling-mount sensors can integrate into Lutron® systems or function as stand-alone controls using a Lutron® power pack. The technology eliminates manual sensitivity and timer adjustments during installation and over the life of the product.

Features

- Intelligent, continually adapting sensor
- Ultrasonic (US) combined with Passive Infrared (PIR) sensing provide high sensitivity, high noise immunity, and excellent false tripping immunity
- Suited for complex environments that are difficult to control with single-technology sensors
- Snap-locks to ceiling-mounted cover plate
- Non-Volatile Memory: settings saved in protected memory are not lost during power outages
- 500 ft² to 2000 ft² (46 m² to 186 m²) coverage when mounted on an 8 ft to 12 ft (2.4 m to 3.7 m) ceiling
- Affords choice of turning lights off or dimming to a preset level in the unoccupied state when integrated with a Lutron® system.

Models Available

Model	Color	Coverage	Field of View
LOS-CDT-500-WH	White	500 ft² (46 m²)	180°
LOS-CDT-500R-WH	White	500 ft² (46 m²)	180°
LOS-CDT-1000-WH	White	1000 ft² (93 m²)	180°
LOS-CDT-1000R-WH	White	1000 ft² (93 m²)	180°
LOS-CDT-2000-WH	White	2000 ft² (186 m²)	360°
LOS-CDT-2000R-WH	White	2000 ft² (186 m²)	360°

Self-Adaptive Feature

The LOS-CDT Series sensors combine both Ultrasonic (US) motion detection for maximum sensitivity and Passive Infrared (PIR) motion detection for false triggering immunity. The self-adapting internal microprocessor analyzes the composite sum of both signals to eliminate time-consuming adjustments and callbacks found in non-intelligent sensors.

Job Name:	Model Numbers:	
Hotel Hartness	LOS-CDT	
Job Number:		

Specifications

Regulatory Approvals

- UL® and cUL® listed

Power

- Operating voltage: 20 – 24 V⎓, IEC PELV/NEC® Class 2
- Operating current: 33 mA nominal
- Control output: 20 – 24 V⎓ active high logic control signal with short-circuit protection, open collector when unoccupied

Environment

- Temperature: 32 °F to 104 °F (0 °C to 40 °C)
- Relative humidity: less than 95%, non-condensing
- For indoor use only

Timer Adjustment

- Automatic mode: Continually adapting sensor automatically adjusts settings to the space
- Manual mode: 8 to 30 minutes
- Test mode: 8 seconds

LED Lamp

- Red: infrared motion detected
- Green: ultrasonic motion detected

Housing

- Rugged, high-impact, injection-molded plastic
- Color-coded leads 6 in (15 cm)

Adaptive Functions

- Installation: 60 minutes
- Learning: 4 weeks for response to error conditions, air current adaptation, and timer optimization
- Post-learning occupancy periods
  - —24 hour circadian occupancy periods learned
  - —Weekly occupancy periods learned
- Adjustments in post-learning period
  - —Generally occupied periods (threshold = high-sensitivity mode)
  - —Generally unoccupied periods (threshold = miser mode)

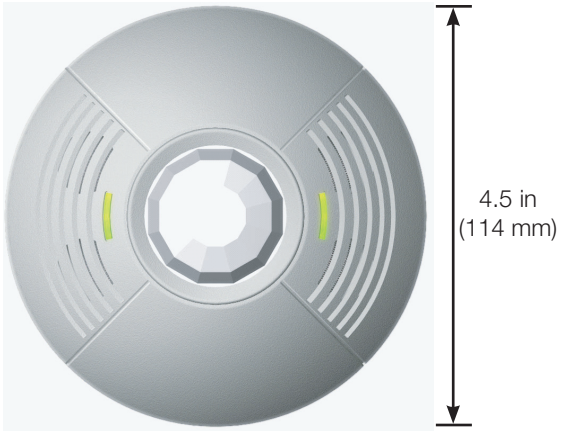
Contact Rating (R Models only)

- SPDT 500 mA rated at 24 V⎓ isolated relay

Photo Cell (R Models only)

- Prevents light from turning on when there is sufficient natural light
- Sensitivity: 0 lx to 1000 lx adjustable

Dimensions



Front View

Side View

Job Name:	Model Numbers:	
Hotel Hartness	LOS-CDT	
Job Number:		

Wiring: System Control

Power packs may be required when interfaced to Lutron® lighting control systems. If more than 1 occupancy sensor is connected to the same input, a power pack is required. A maximum of 3 occupancy sensors can be connected to the same input. If more than 3 sensors are required per input, use one of the following models: LOS-CDT-500R-WH, LOS-CDT-1000R-WH, or LOS-CDT-2000R-WH.

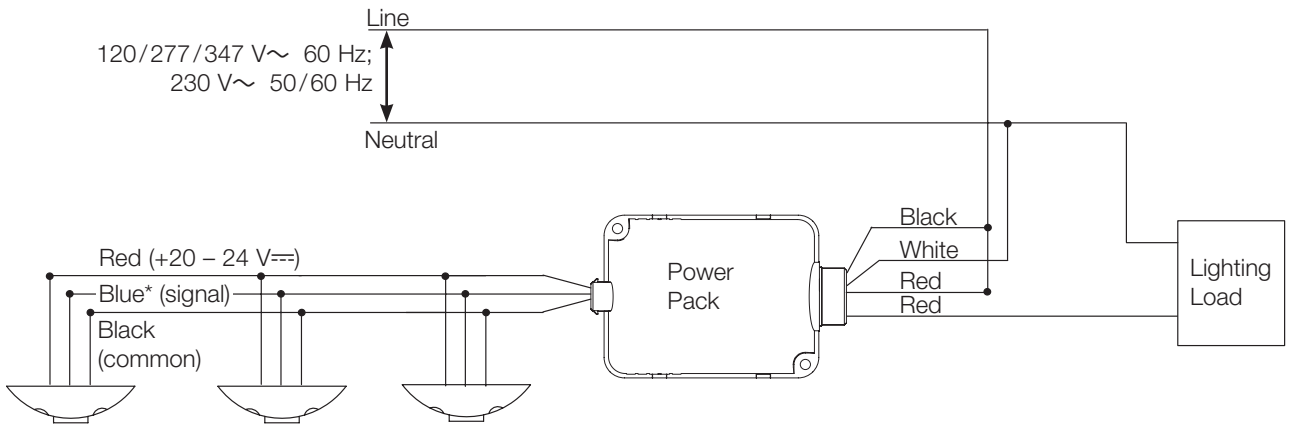
Power Supply Options

Lutron® Lighting Control System	Power Pack Required?
Digital microWATT™	No
EcoSystem®	No
Energi Savr Node™	No*
GRAFIK 5000™/6000®/7000™	No, when used with seeTouch® wallstations with occupancy sensor connections.
GRAFIK Eye® 3000/4000	Yes
GRAFIK Eye® QS	No*
HomeWorks®	Yes
HomeWorks® QS	No*
LCP128™	No, when used with seeTouch® wallstations with occupancy sensor connections.
microWATT®	No
Quantum®	No*
RadioRA®	Yes
RadioRA® 2	Yes
Softswitch128®	No, when used with seeTouch® wallstations with occupancy sensor connections.

* Some system components do not supply external power for occupancy sensors. Refer to individual product specifications for more information.

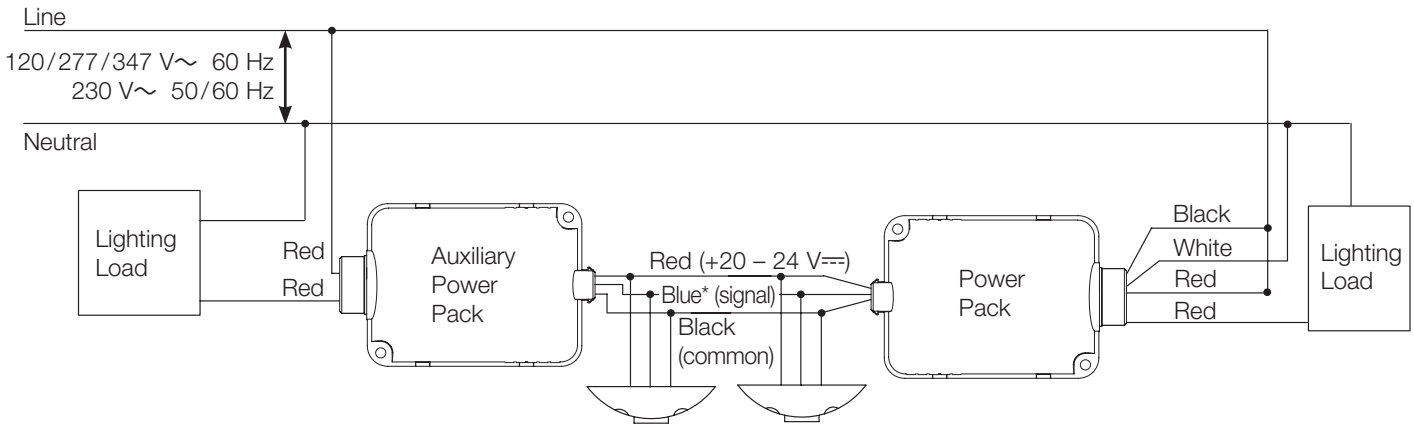
Wiring: Stand-Alone Control

1 to 3 Sensors with Power Pack



NOTE: Maximum 3 occupancy sensors.

Switching Multiple Loads with Auxiliary Power Packs



NOTE: Maximum of 3 devices total (occupancy sensors and auxiliary power packs) can be connected to a power pack.

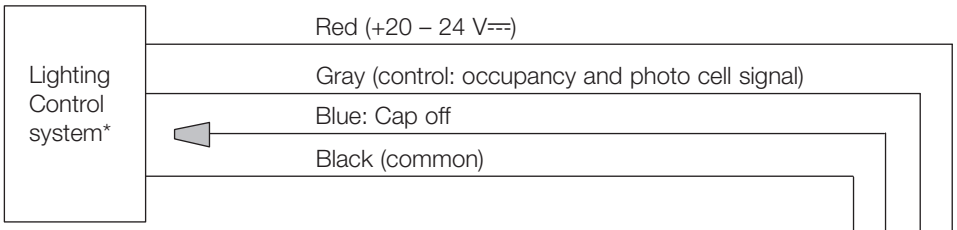
*Use gray wire for LOS-CDT-500R-WH, LOS-CDT-1000R-WH, and LOS-CDT-2000R-WH.

Job Name:	Model Numbers:	
Hotel Hartness	LOS-CDT	
Job Number:		

Wiring

Relay Model Option

LOS-CDT-500R-WH, LOS-CDT-1000R-WH, and LOS-CDT-2000R-WH only

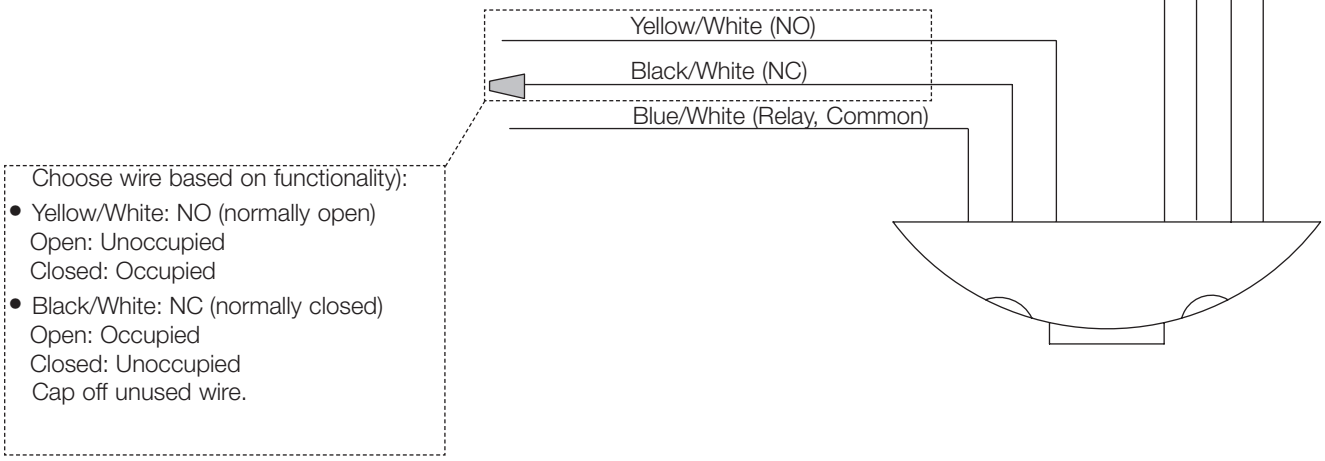


Gray wire logic with photo cell active:

Room First Occupied	
Light level	Lights
Below set value	Turn on
Above set value	Remain off

During Occupancy	
Light level	Lights
Falls below set value	Turn on
Moves above set value	Remain on

*May require power pack



Installation

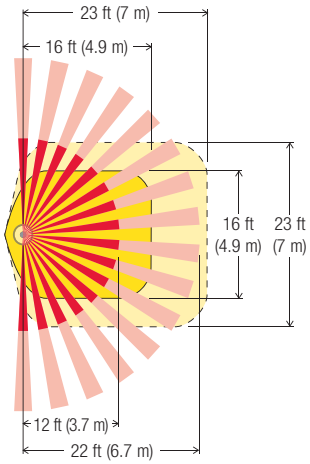
Sensor Setup

- Sensor setup is available as a service by Lutron. For more information see the **Sensor Layout and Tuning** service document (Lutron® P/N 3601235).

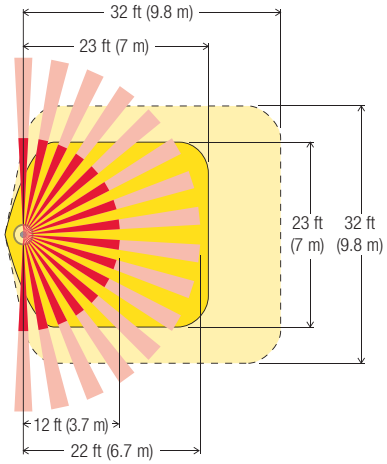
Sensor Placement

- Mount the sensor so the grilles face the open portion of the room and are not facing a nearby wall, window, or other obstructing object.
- Do not place sensor within 6 ft (1.8 m) of air vents, air handlers, windows, fans, etc., as this may cause false triggering.
- If installing a 180° occupancy sensor (500 and 1000 models), place the sensor on the same wall as the doorway so that traffic in a hallway will not affect the sensor; otherwise, place in center of room.
- Closely follow the diagrams shown concerning major and minor motion coverage. The sensor can detect major motion (e.g. person taking a half-step) at a greater distance than it can detect minor motion (e.g. writing at a desk or reading a book).
- Decrease total coverage area by 15% for “soft” rooms (e.g. heavy draperies or thick carpeting).

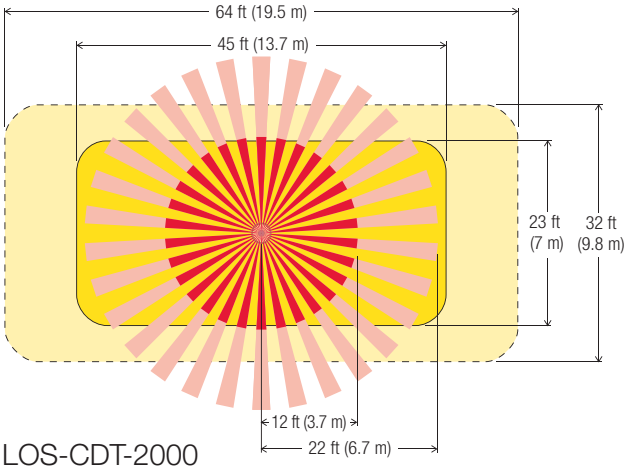
Range Diagrams



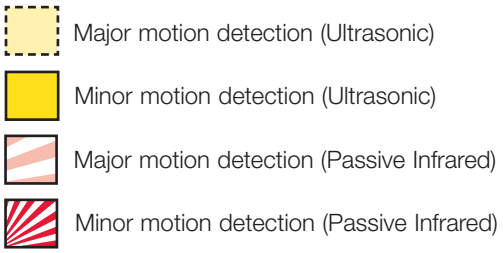
LOS-CDT-500



LOS-CDT-1000



LOS-CDT-2000

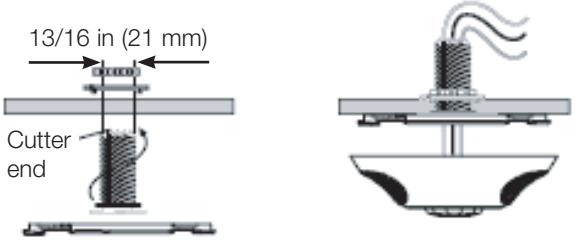


Job Name:	Model Numbers:	
Hotel Hartness	LOS-CDT	
Job Number:		

Mounting

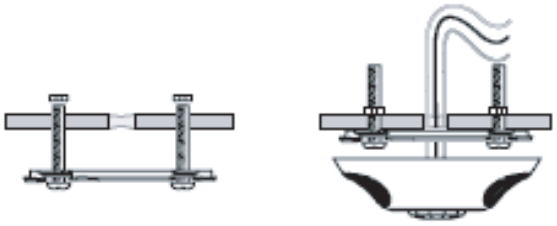
Normal Mounting

Twist and lock threaded mounting post onto cover plate. Drill through ceiling tile with assembly, using cutter end of the threaded mounting post. Secure with washer and nut.

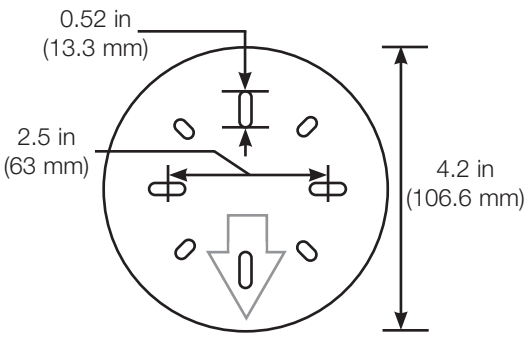


Mounting to Non-Standard Ceiling or Fixture

Mount twist-lock cover plate using mounting screws, nuts, and washers (included). Drill/punch wire routing hole through ceiling tile at center of cover plate.



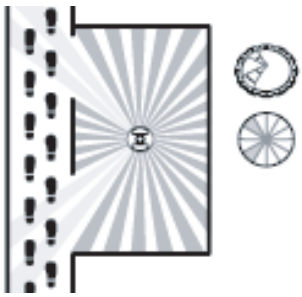
Mounting Plate Dimensions



Wire Lengths

Number of Sensors	1	2	3	1	2	1
Number of Auxiliary Power Packs	0	0	0	1	1	2
22 AWG	750 ft	375 ft	250 ft	375 ft	250 ft	250 ft
0.5 mm^2	365 m	180 m	120 m	90 m	120 m	120 m
20 AWG	1200 ft	600 ft	400 ft	600 ft	400 ft	400 ft
0.75 mm^2	730 m	365 m	240 m	365 m	240 m	365 m
18 AWG	2400 ft	1200 ft	800 ft	1200 ft	800 ft	800 ft

Using the Infrared Mask



Center Ceiling Mount
(Mask blocks sensor seeing out doorway into hall)

Corner Ceiling Mount
(No mask needed)

Typical Mask Patterns

Conference Room Mask

180° Mask

Full Mask

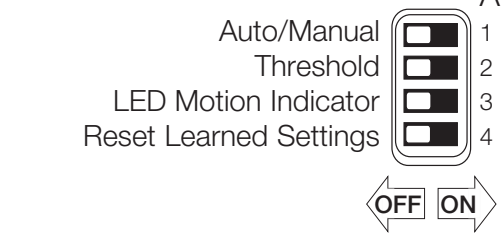
Rectangular Areas

Over the Door

Specific Areas You Wish to Mask

Sensor Adjustments

Override Settings



A	Off (Default)	On
1 Auto/Manual	Automatic (Normal)	Manual on/off (Override)
2 Threshold	Auto Threshold Adjustment	High Sensitivity (Low turn-on threshold)
3 LED Motion Indicator	Lights indicate motion	Disable LED Indicator
4 Reset Learned Settings	Retain Settings (Normal)	Erase all learned settings; Restart Learning (Toggle On)

B	Off (Default)	On
1 Strong Airflow Compensation	Disable Compensation (Normal)	Enable Compensation
2 Over Doorway Installation	No (Normal)	Yes (Use increased turn-on threshold)
3 Timer Adjust	Adjust Timer Automatically	Use Manual Setting (No adjustment)
4 Auto Sensitivity	Adjust Sensitivity Automatically	Adjust Sensitivity Manually

Timer Test Mode

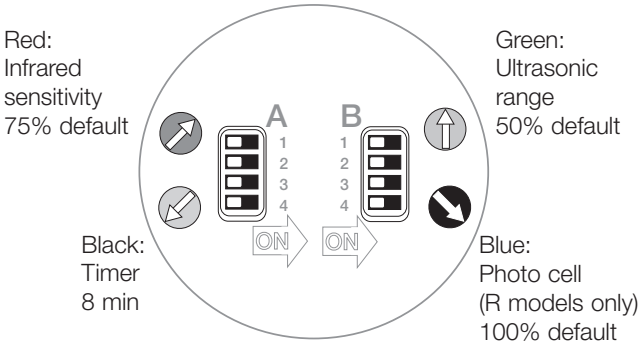
1. Remove the retainer cover.
2. Rotate the black timer adjustment knob to about midway (12 o'clock).
3. Return setting to minimum setting (full CCW).

Factory Settings | 12 o'clock | Full CCW

NOTE: The timer will remain in the 8 second test mode for 1 hour, then automatically reset to 8 minutes.

4. To manually take the timer out of the 8 second test mode, turn the timer adjustment approximately 1/16 in (1.5 mm) clockwise to make the setting slightly above minimum (just above the 8 minute setting).

Factory Settings



Continued on next page...

Sensor Adjustments *(continued)*

Adjusting the "Lights Not On" Level

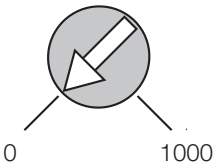
LOS-CDT-500R-WH, LOS-CDT-1000R-WH, and LOS-CDT-2000R-WH only

1. Place timer in Test Mode (see page 8).
2. Set photo cell to maximum. Turn the blue knob full clockwise (lights on no matter how bright the natural light is), then about 30° counterclockwise.
3. Check for Lights-Out. Move from underneath the sensor, and remain still until the lights turn off. Move around normally to turn the light on.
4. Adjust to desired level. If lights remain off, adjust the blue knob another 30° counterclockwise and repeat step 3 until the lights turn on.

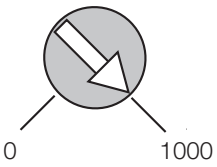
NOTE: Set blue knob to 100% to disable photo cell functionality and leave secondary dry contact closure output functionality intact.

Control Settings (Blue Knob)

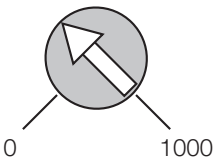
LOS-CDT-500R-WH, LOS-CDT-1000R-WH, and LOS-CDT-2000R-WH only



Minimum (low):
Lights will never come on, even though room is occupied.



Maximum (high):
Photo cell has no effect on operation (factory setting).



Normal:
200 lx to 600 lx is normal range.

369247e 1 07.07.16

GRX-TVI Ten Volt Interface

Features

- 100-277 V~ forward, reverse, and center phase control input capability
- Provides 0—10 V⎓ control and switching capabilities to switch and dim current sourcing fluorescent ballasts and LED drivers.
- Switches and dims current sourcing 0—10 V⎓ electronic dimming ballasts/drivers powered by 100—277 V~. Switches up to 16 A of electronic capacitive ballasts/drivers.
- Switches motors up to 1/2 HP @ 100-120 V~, 1 ½ HP @ 200—277 V~ and 5 A @ 230 V~ CE.
- Up to five Ten Volt Interfaces may be connected to one Control Unit zone. This allows one zone to control up to five 16 A circuits of Electronic Dimming Ballasts/Drivers or five motors (This is not true for C5-BMJ-16A).
- Provides 100—277 V~ power to loads.
- Requires 100—277 V~ power for internal operations.

Note: 277 V~ operation on the control terminal was a design feature added September 2013. To check whether your TVI has this feature, please ensure the front label of the TVI shows the acceptable voltage range as 100—277 V~ for the **control input**. Prior revisions of the unit had (2) L2/H2 terminals (one for 120 V~ and one for 240 V~). The current design of the unit accepts a universal voltage (100—277 V~), so either of these terminals can be used for the control feed. They are internally tied together.

Compatible Controls

Family	Product	Wiring Diagram
Residential Systems	HW-RPM-4U	I, J
	HW-RPM-4A	I, J
	HWI-WPM-6D (Wallbox Power Module)	A, B
	HxD-6ND	C, D
	HWV-FDB-8A	E, F
	Rx-6ND*	C, D
	RRD-10ND*	C, D
	GRX-IA	A, B
	RRD-6NA*	C, D
	HQRD-6NA*	C, D
	HWD-5NE*	C, D
Commercial Systems	LP-RPM-4U	I, J
	LP-RPM-4A	I, J
	GRAFIK Eye® Control Unit 3000 Series or QSG	A, B
	GP Panels	K, L
	C5-BMJ-16A**	M, N

All models in this column are set to fluorescent load type except those model numbers followed by a *.

Family	Product	Wiring Diagram
Wallbox Fluorescent 3-wire Dimmers	AYF-103P	E, F
	DVF-103P	E, F
	DVSCF-103P	E, F
	LXF-103PL	E, F
	MAF-6AM**	G, H
	MRF2-F6AN-DV	G, H
	MSCF-6AM**	G, H
	NF-10	E, F
	NF-103P	E, F
	NTF-10	E, F
	NTF-103P	E, F
	SF-10P	E, F
	SF-103P	E, F
	VF-10	E, F
	VTF-6AM	G, H
	MRF2-6ELV-120*	C, D

* The low end trim should be set at 28% and the high end trim at 81% manually to have the output signal set to fluorescent load type.

** These specific controls result in the GRX-TVI not conforming to the IEC929 standard for 0—10 V⎓ output since they cannot reach the 1 V⎓ minimum.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Specifications

Regulatory Approvals

- cUL® Listed in US and Canada
- CE
- NOM (Mexico)
- Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2014 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

Power

- Control circuit: 100—277 V~
- Output/Load circuit: 100—277 V~
- Control and Load circuits are independent of each other and can have unique phases
- Works with all ballasts and drivers that provide a current source that is compliant to IEC 60629 Annex E.2, and whose inrush current does not exceed NEMA410 standards for electronic ballast/driver

0-10 V⎓ Dimming Control

- Output rating: 10 µA—300 mA. Sinks current only (ballast/driver must source/provide 10 V⎓ supply). <1 V⎓ minimum, >10 V⎓ maximum

Zone Capacity

- Up to five Ten Volt Interfaces per Control Unit zone. (This is not true for C5-BMJ-16A)

Key Design Features

- Complies with UL508 Standard
- Provides a Class 2 isolated 0—10 V⎓ output signal that conforms to EN60929 and IEC929
- Accepts a forward, reverse and center phase control signal (100—277 V~ 50/60 Hz)

Terminals

- Each terminal accepts up to two 12 AWG (2.5 mm^2) conductors

Physical Design

- Wall-mounted. Indoor use only. Type 1 enclosure.
- Weight: 4.25 lbs (2 kg)

Environment

- Temperature: 32 °F to 104 °F (0 °C to 40 °C)
- 0 to 90% humidity, non-condensing

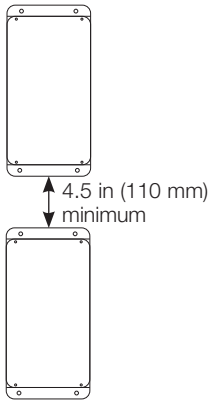
Switching Load Types and Capacities

Source/Load Type	100—277 V~*	230 V~ (CE)
Fluorescent • Electronic Capacitive Non-Dim	16 A	10 A
• Other manufacturers' 0—10 V⎓ ballasts/drivers	16 A	10 A
LED	16 A	10 A
Incandescent	16 A	10 A
Low-voltage	16 A	10 A
Metal Halide	16 A	10 A
Neon/Cold Cathode	16 A	10 A
Motor	1/2 HP @ 100—120 V~ 1½ HP @ 200—277 V~	5 A @ 230 V~ CE

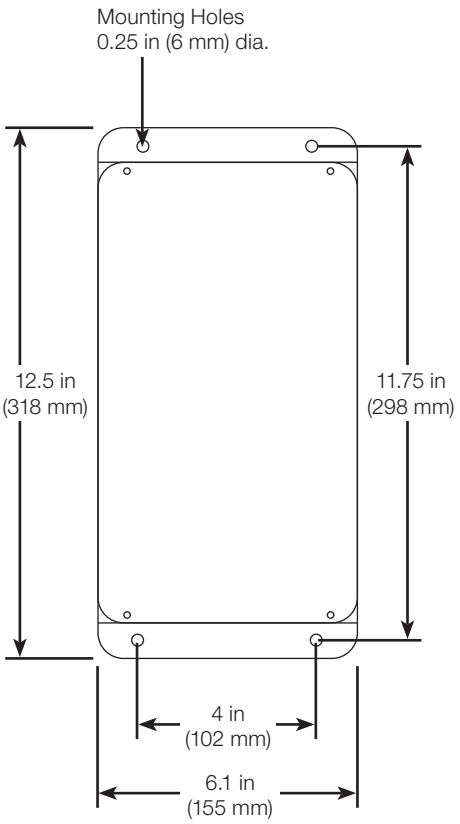
* Not if product requires CE certification

Dimensions and Mounting

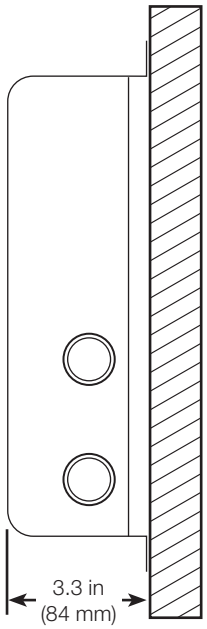
- Mount only where ambient temperature is 32 °F to 104 °F (0 °C to 40 °C)
- Allow 4.5 in (114 mm) between Interfaces when mounting several in a vertical layout
- Mount so that line (mains) voltage wiring is at least 6 ft (1.8 m) from sound or electronic equipment and associated wiring
- Mount within 7° of true vertical



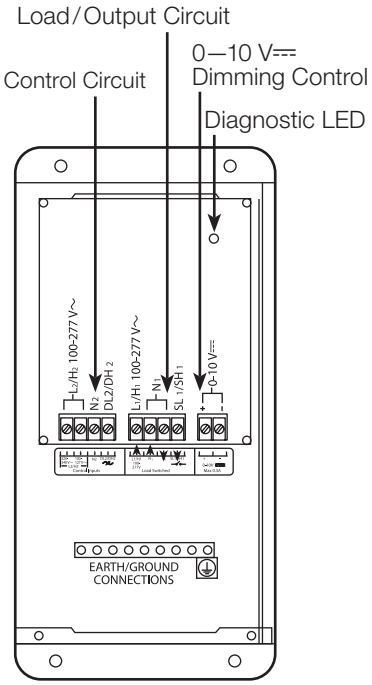
Front View
(cover closed)



Side View



Front View
(cover open)

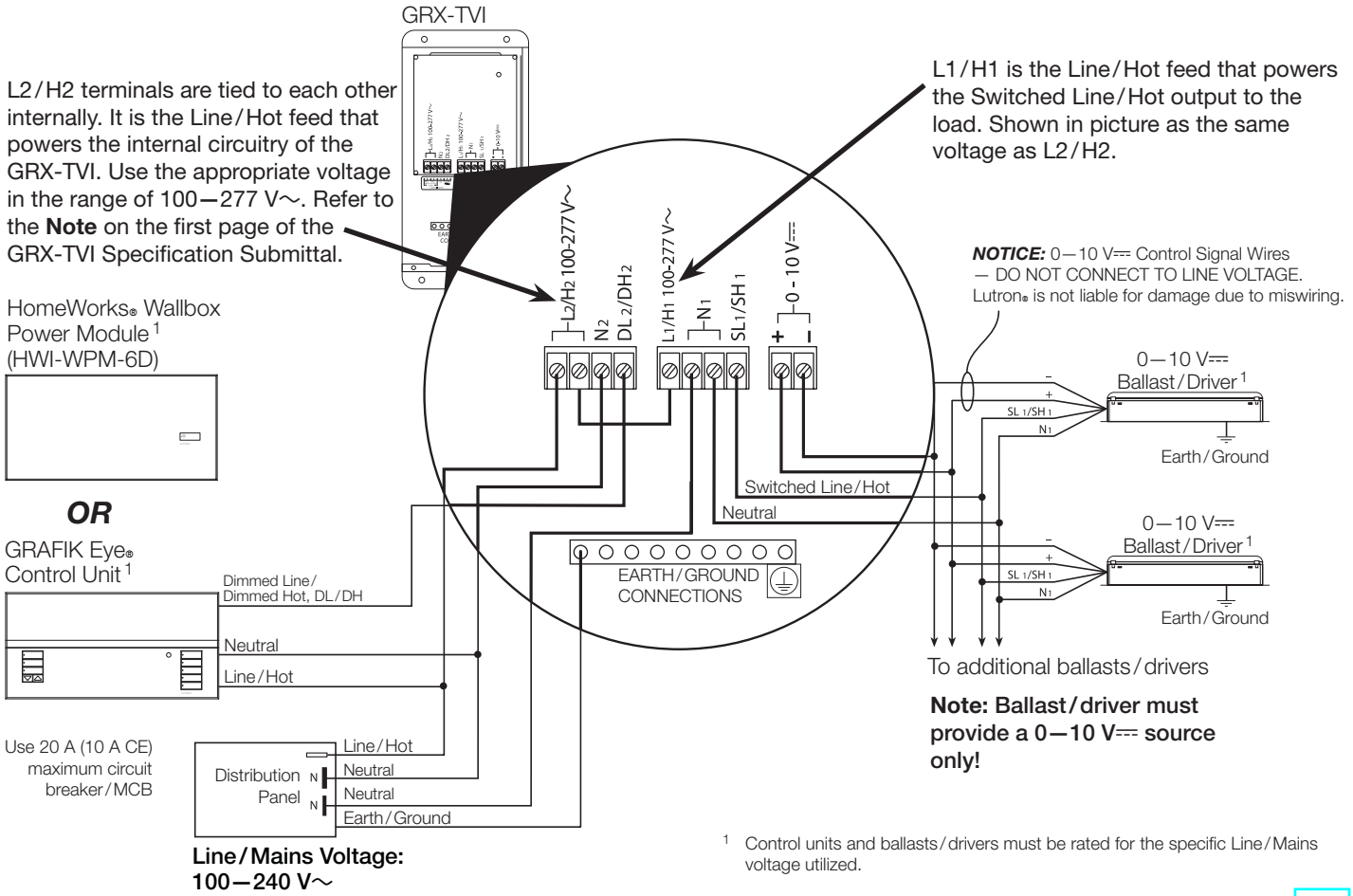


Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams

- Each terminal can accept up to two 12 AWG (2.5 mm^2) conductors.
- L1/H1 is the Line/Hot feed to power the load.
- L2/H2 (on the control circuit terminals) supplies operating power for the Ten Volt Interface.
- Wiring Diagrams A, C, E, G, I, and M show a GRX-TVI wired from one distribution panel. If the power requirement of the complete system is less than an MCB/circuit breaker rating and L1/H1 and L2/H2 are both coming from the same phase, one feed can be jumpered inside the enclosure (as shown).
- Wiring Diagrams B, D, F, H, J, L, and N show a GRX-TVI wired from two separate distribution panels that may be different phases or voltages.
- Wiring Diagram O shows a GRX-TVI wired from one distribution panel with 2 separate feeds.
- Make sure L2/H2 and DL2/DH2 (Dimmed Line/Dimmed Hot) are fed from the same breaker that powers the control unit.
- Run separate neutrals for load circuit and control circuit- no common neutrals.
- NEC® Class 2/IEC PELV, 0—10 V⎓ wiring from a ballast/driver to the GRX-TVI must be separated from the power wiring. Enter the Class 2/PELV wires through the knockout adjacent to the 0—10 V⎓ terminal blocks. The barrier ensures separation and is flexible to allow access to the terminals. The barrier must be in place when installation is complete.

Wiring Diagram A: HomeWorks® Wallbox Power Module/GRAFIK Eye® Control Unit — 1 Distribution Panel/1 Feed

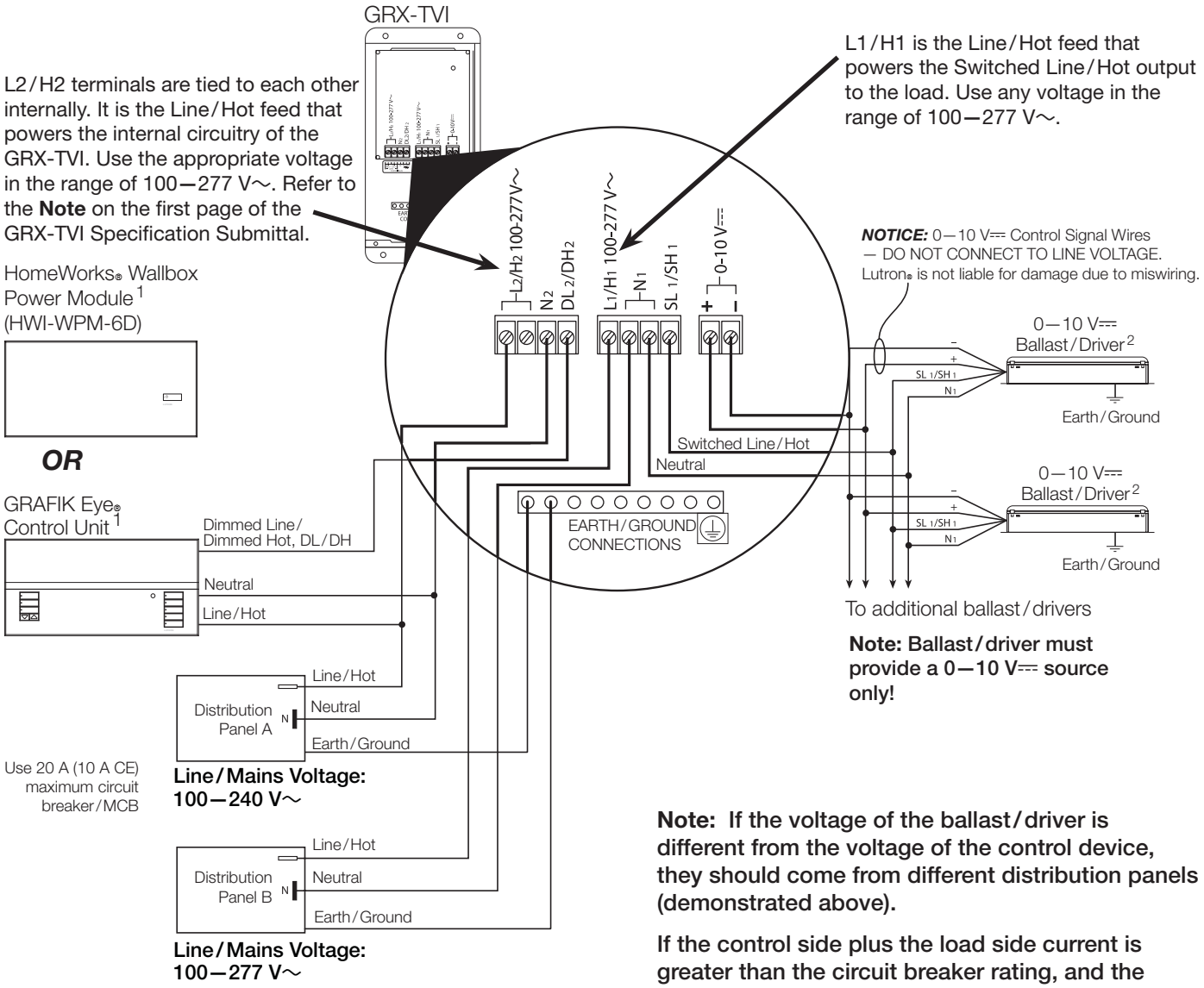


1 Control units and ballasts/drivers must be rated for the specific Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram B: HomeWorks® Wallbox Power Module/GRAFIK Eye® Control Unit — 2 Distribution Panels/2 Feeds



Note: If the voltage of the ballast/driver is different from the voltage of the control device, they should come from different distribution panels (demonstrated above).

If the control side plus the load side current is greater than the circuit breaker rating, and the voltages of load and control are the same level, follow Diagram O.

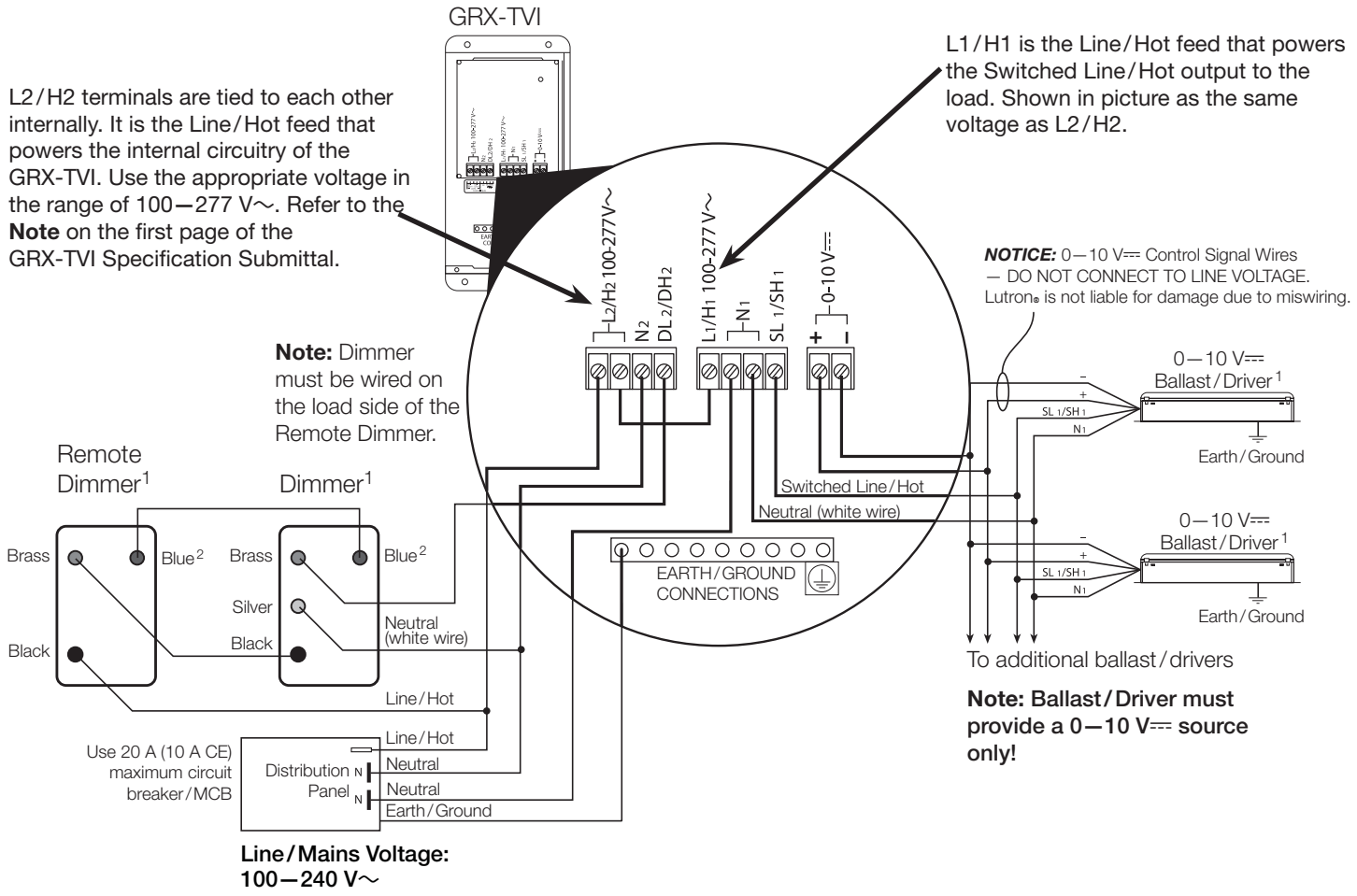
[1] Control units must be rated for the Distribution Panel A Line/Mains voltage utilized.

[2] Ballasts/drivers must be rated for the Distribution Panel B Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram C: HomeWorks® Maestro®/RadioRA®/RadioRA® 2 Dimmers — 1 Distribution Panel/1 Feed



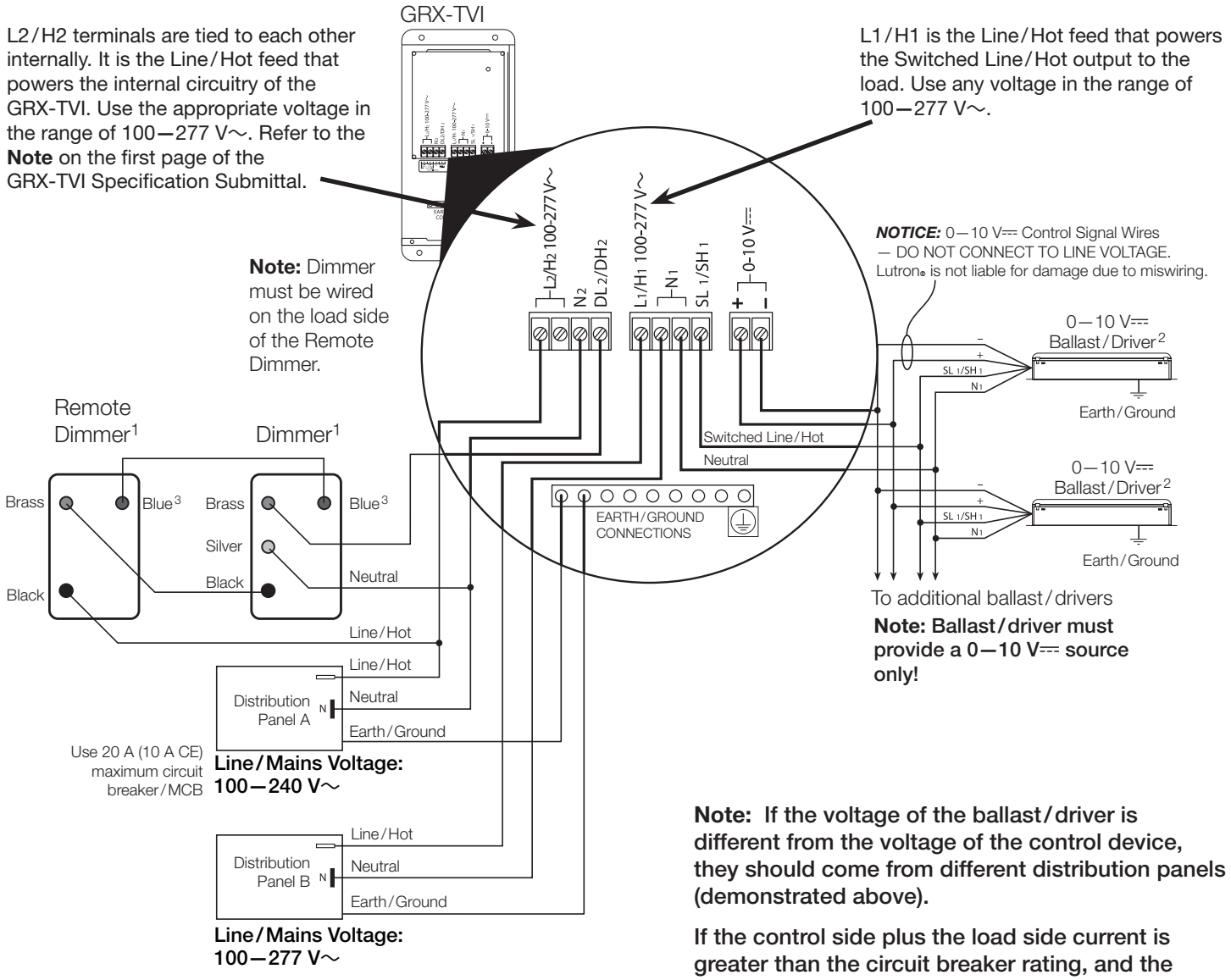
[1] Dimmers and ballasts/drivers must be rated for the specific Line/Mains voltage utilized.

[2] When used as a single-pole dimmer, the blue screw terminal is not used. Tighten the blue screw terminal—do not connect the blue screw terminal to ground or to any other wiring.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram D: HomeWorks® Maestro®/RadioRA®/RadioRA® 2 Dimmers — 2 Distribution Panels/2 Feeds



Note: If the voltage of the ballast/driver is different from the voltage of the control device, they should come from different distribution panels (demonstrated above).

If the control side plus the load side current is greater than the circuit breaker rating, and the voltages of load and control are the same level, follow Diagram O.

1 Dimmers must be rated for the Distribution Panel A Line/Mains voltage utilized.

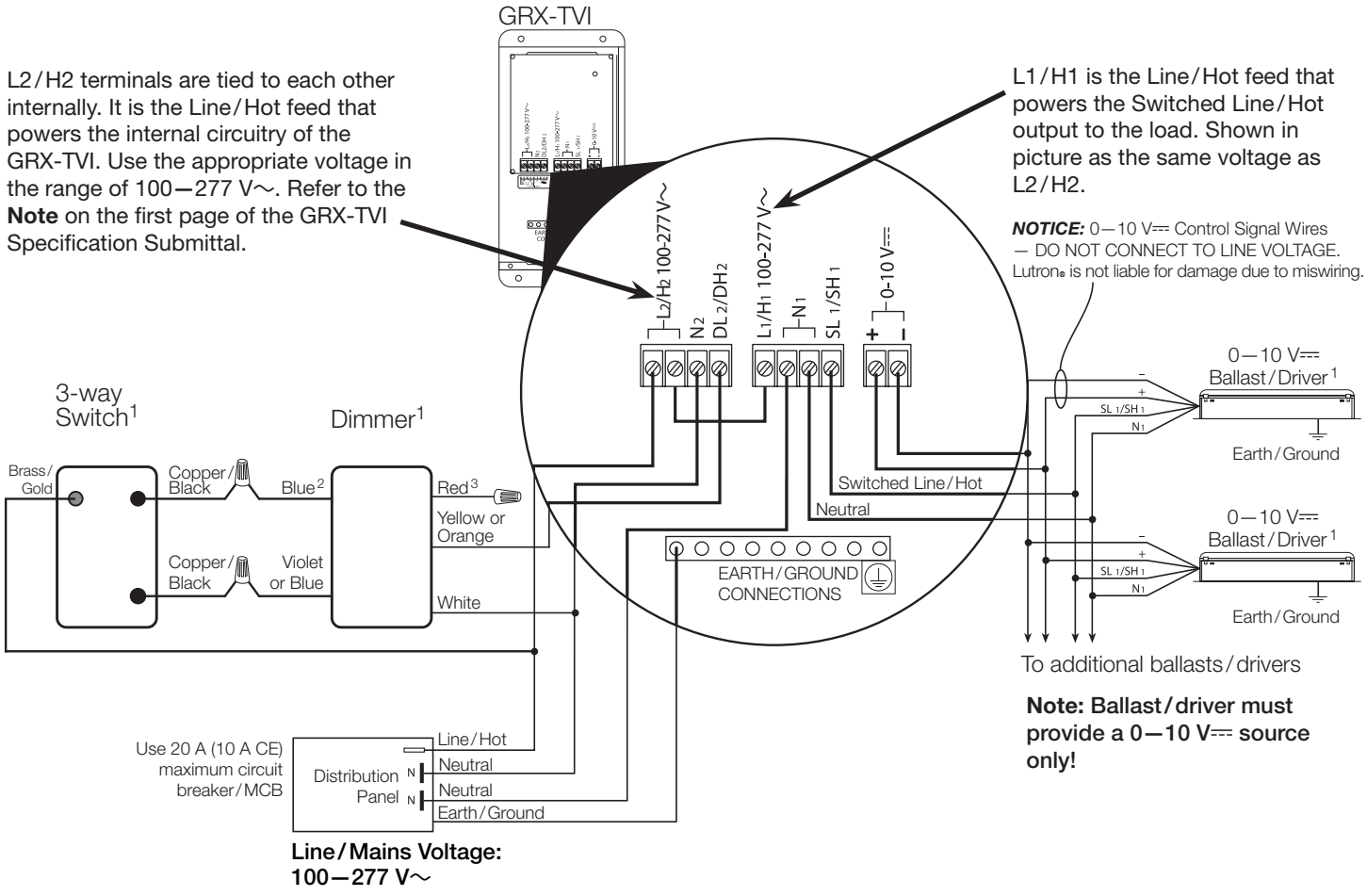
2 Ballasts/drivers must be rated for the Distribution Panel B Line/Mains voltage utilized.

3 When used as a single-pole dimmer, the blue screw terminal is not used. Tighten the blue screw terminal—do not connect the blue screw terminal to ground or to any other wiring.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram E: Ariadni® / Diva® / Lyneo® / Skylark® / Nova® / Nova T☆® / Vareo® 3-wire Fluorescent Dimmers — 1 Distribution Panel / 1 Feed

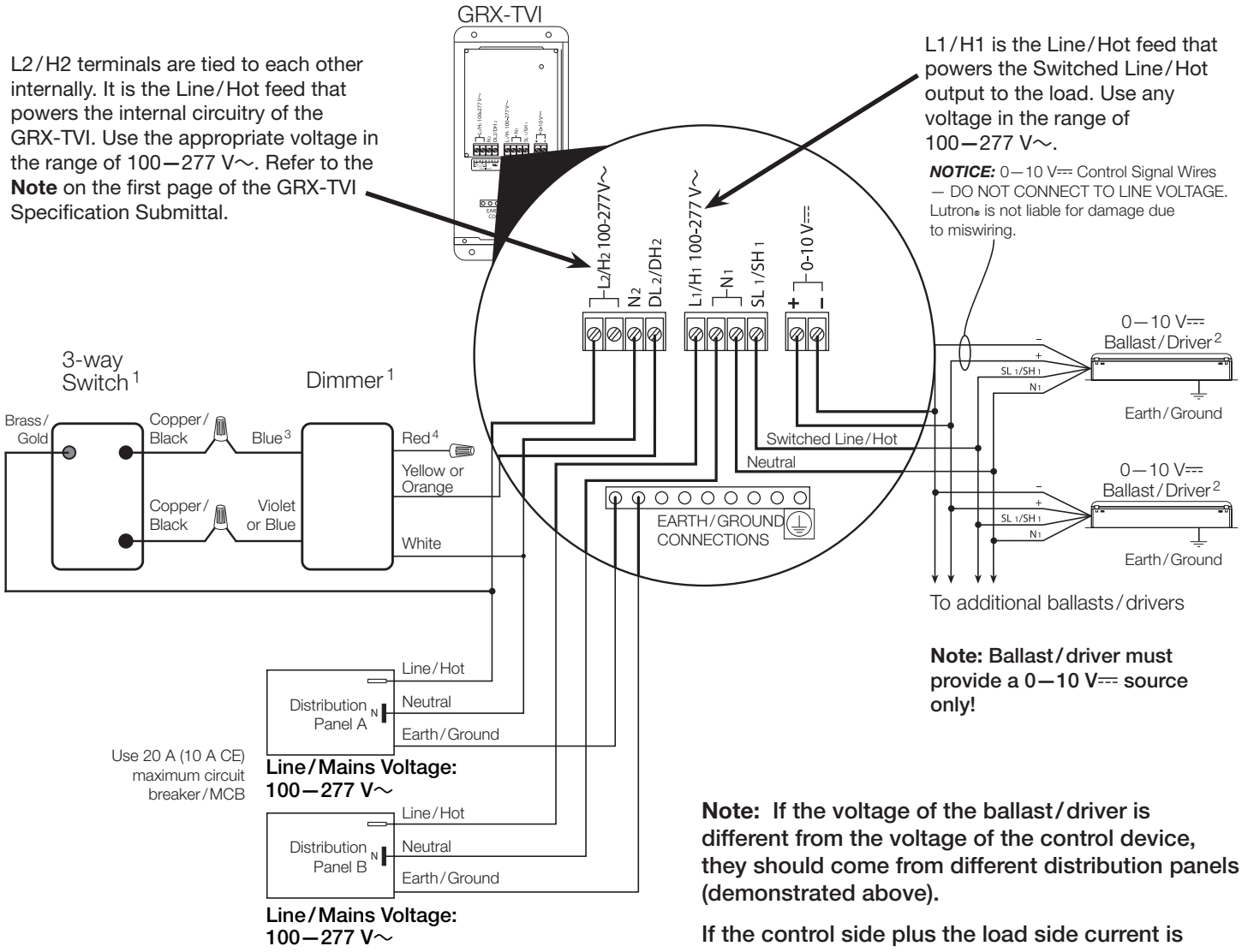


1 Switches, dimmers, and ballasts/drivers must be rated for the specific Line/Mains voltage utilized.
2 Single pole dimmers use black for the line/hot wire. Refer to the single-pole dimmer's installation instructions to identify the line/hot wire for that product.
3 The red wire is not used. Cap off the red wire using a wire connector. Do not wire the red wire to ground or to any other wiring.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram F: Ariadni®/Diva®/Lyneo®/Skylark®/Nova®/Nova T☆®/Vareo® 3-wire Fluorescent Dimmers — 2 Distribution Panels/2 Feeds



Note: If the voltage of the ballast/driver is different from the voltage of the control device, they should come from different distribution panels (demonstrated above).

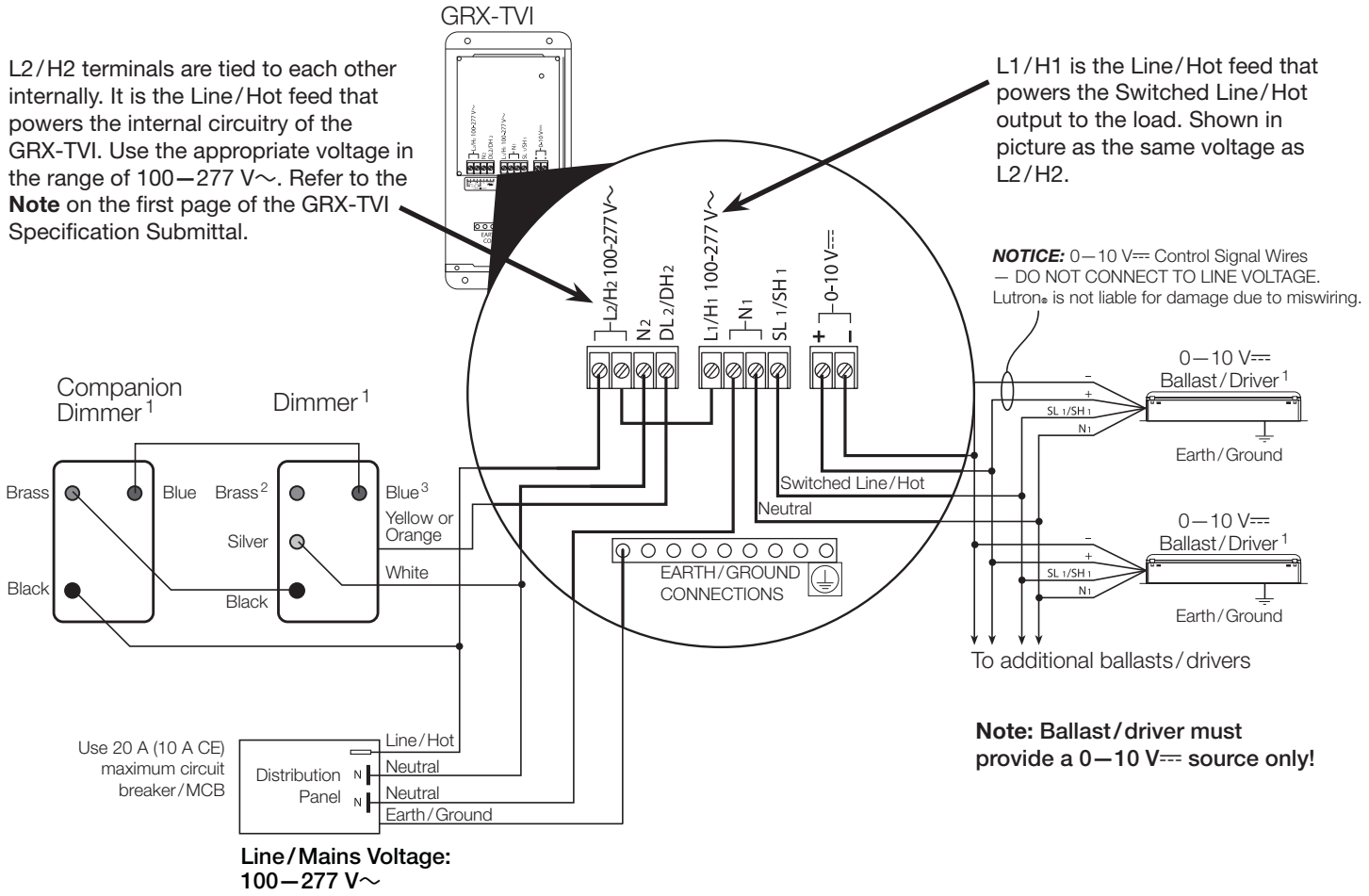
If the control side plus the load side current is greater than the circuit breaker rating, and the voltages of load and control are the same level, follow Diagram O.

1 Switches and dimmers must be rated for the Distribution Panel A Line/Mains voltage utilized.
2 Ballasts/drivers must be rated for the Distribution Panel B Line/Mains voltage utilized.
3 Single pole dimmers use black for the line/hot wire. Refer to the single-pole dimmer's installation instructions to identify the line/hot wire for that product.
4 The red wire is not used. Cap off the red wire using a wire connector. Do not wire the red wire to ground or to any other wiring.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram G: Maestro®/Vierti® 3-wire Fluorescent Dimmers — 1 Distribution Panel/1 Feed



1 Dimmers, companion dimmers, and ballasts/drivers must be rated for the specific Line/Mains voltage utilized.

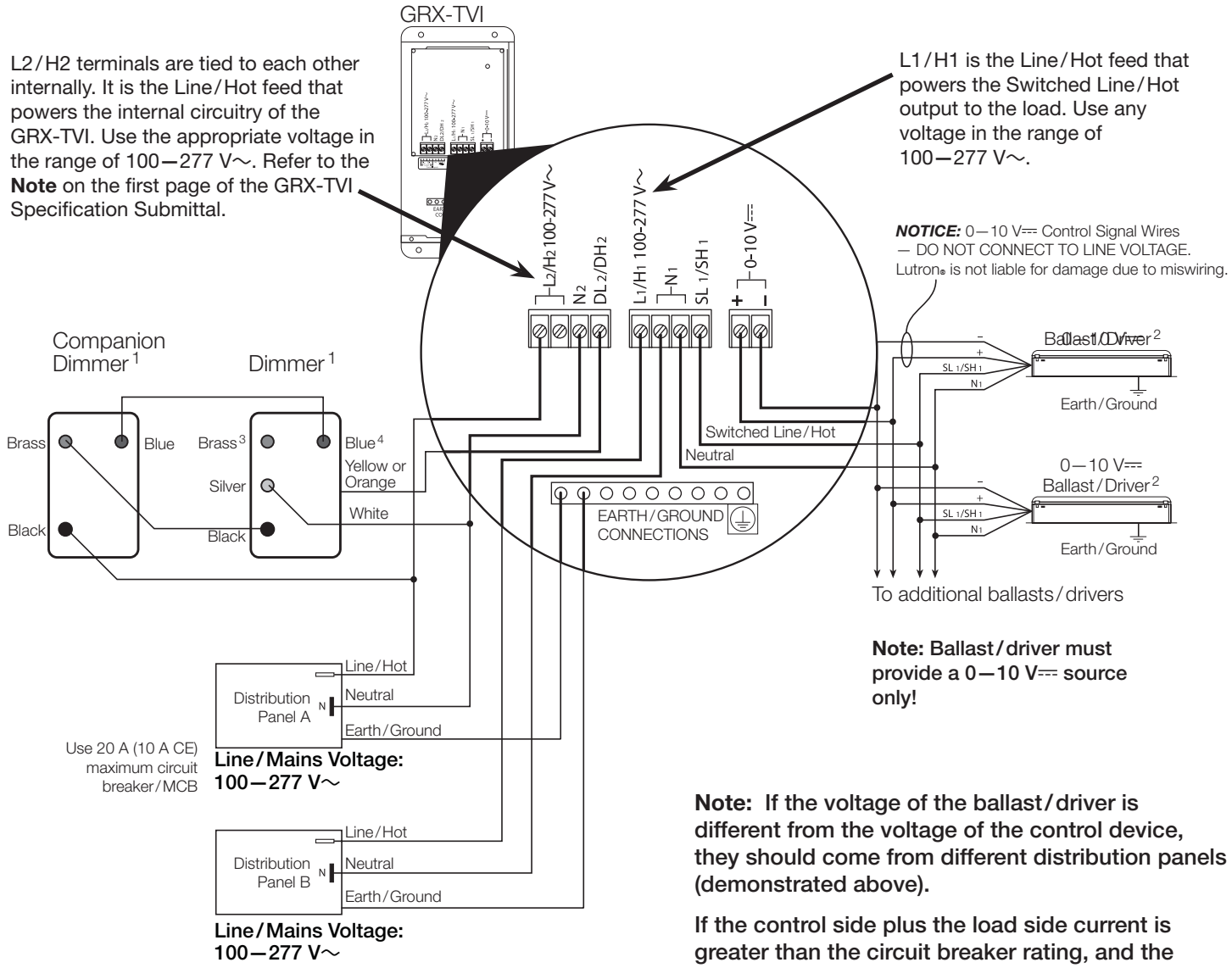
2 The brass screw terminal is not used. Tighten the brass screw terminal. Do not connect the brass screw terminal to ground or to any other wiring.

3 When used as a single-pole dimmer, the blue screw terminal is not used. Tighten the blue screw terminal—do not connect the blue screw terminal to ground or to any other wiring.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram H: Maestro®/Vierti® 3-wire Fluorescent Dimmers — 2 Distribution Panels/2 Feeds



Note: If the voltage of the ballast/driver is different from the voltage of the control device, they should come from different distribution panels (demonstrated above).

If the control side plus the load side current is greater than the circuit breaker rating, and the voltages of load and control are the same level, follow Diagram O.

1 Dimmers and companion dimmers must be rated for the Distribution Panel A Line/Mains voltage utilized.

2 Ballasts/drivers must be rated for the Distribution Panel B Line/Mains voltage utilized.

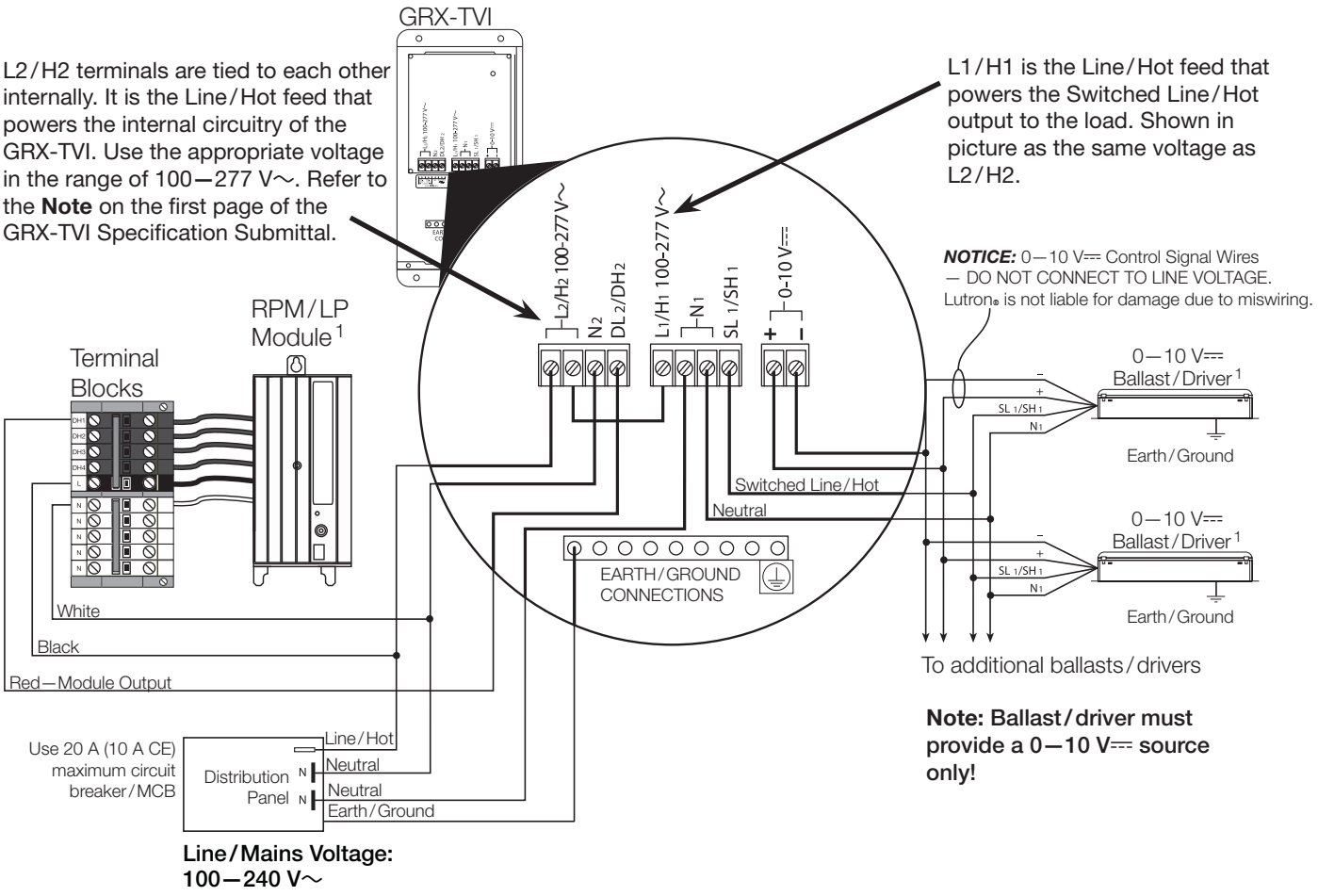
3 The brass screw terminal is not used. Tighten the brass screw terminal. Do not connect the brass screw terminal to ground or to any other wiring.

4 When used as a single-pole dimmer, the blue screw terminal is not used. Tighten the blue screw terminal—do not connect the blue screw terminal to ground or to any other wiring.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram I: HomeWorks® Remote Power Module/LP Module — 1 Distribution Panel/1 Feed

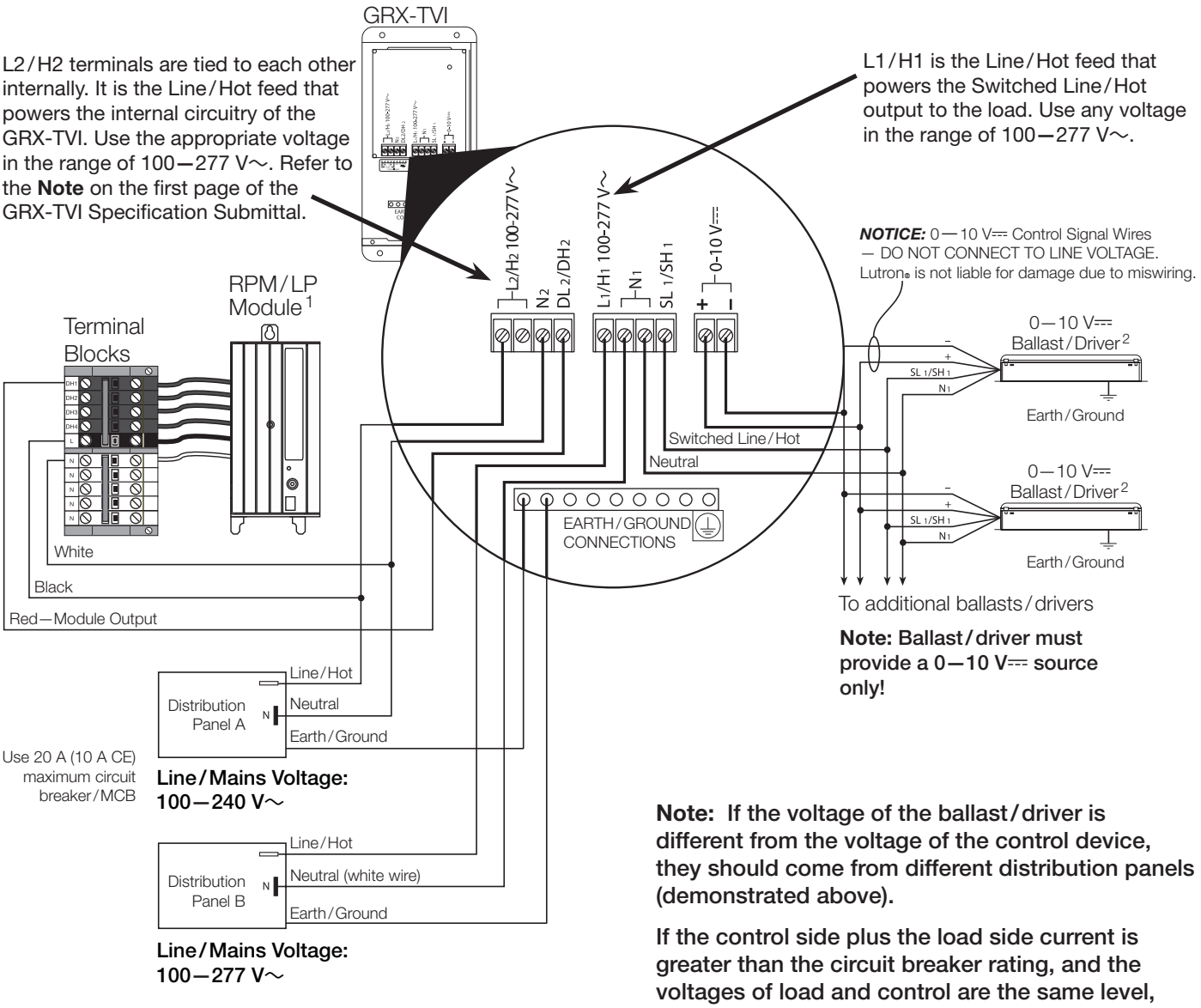


1 Remote Power Modules and ballasts/drivers must be rated for the specific Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

Wiring Diagram J: HomeWorks® Remote Power Module/LP Module — 2 Distribution Panels/2 Feeds



Note: If the voltage of the ballast/driver is different from the voltage of the control device, they should come from different distribution panels (demonstrated above).

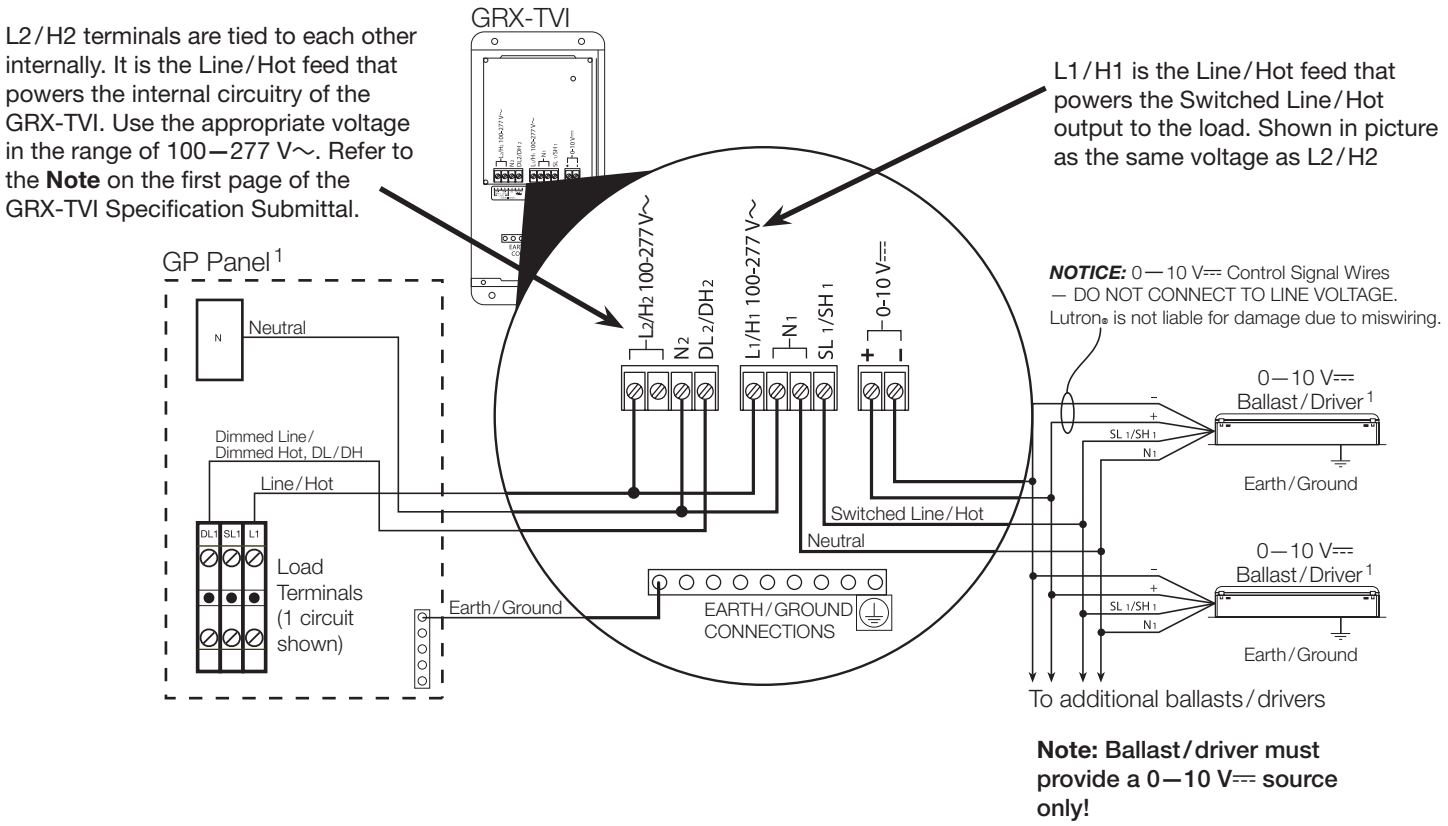
If the control side plus the load side current is greater than the circuit breaker rating, and the voltages of load and control are the same level, follow Diagram O.

1 Remote Power Module must be rated for the Distribution Panel A Line/Mains voltage utilized.
2 Ballasts/drivers must be rated for the Distribution Panel B Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagrams *(continued)*

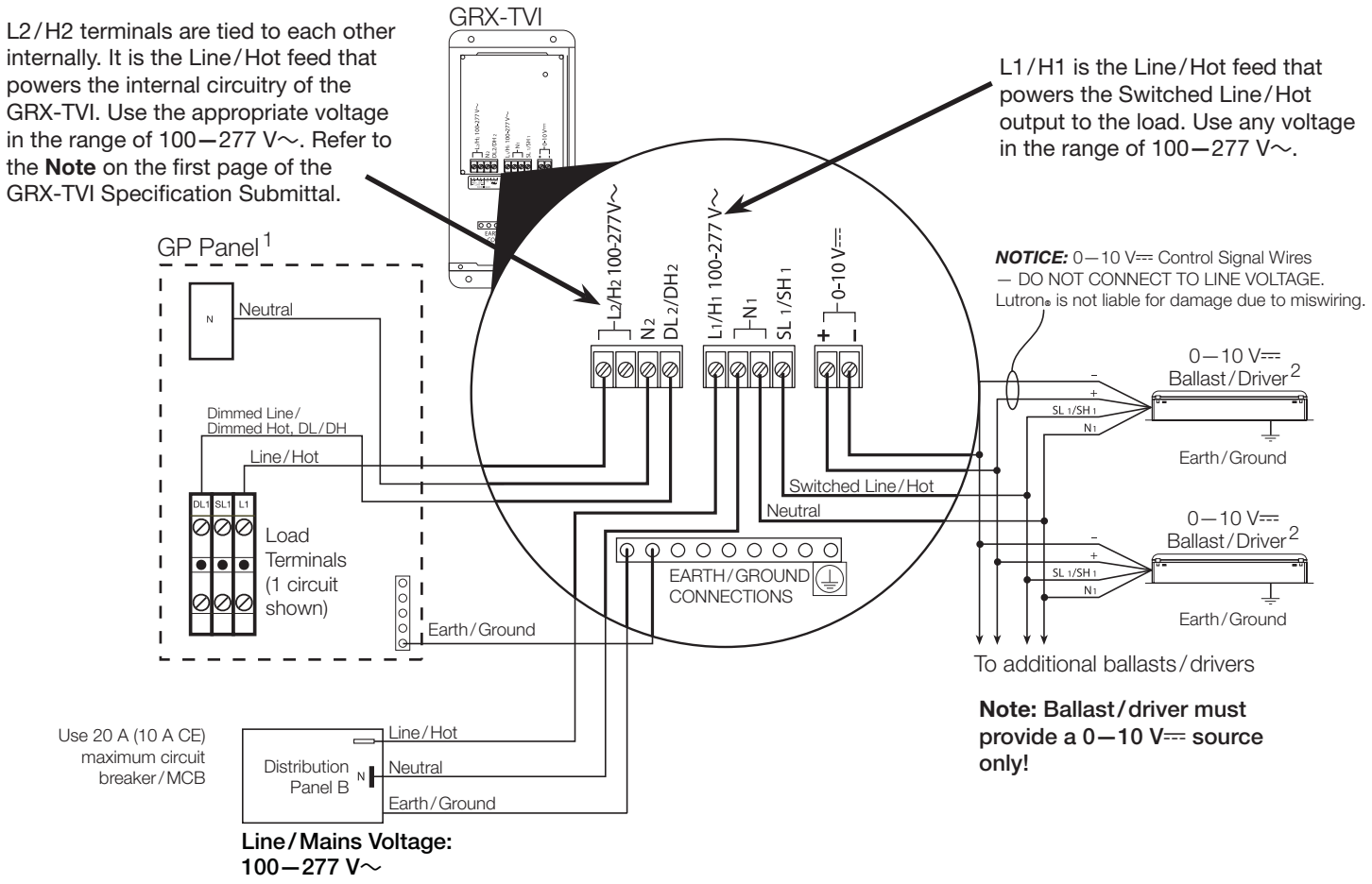
Wiring Diagram K: GP Panel — 1 Distribution Panel/1 Feed



[1] GP Panel and ballasts/drivers must be rated for the specific Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagram L: GP Panel — 2 Distribution Panels/2 Feeds



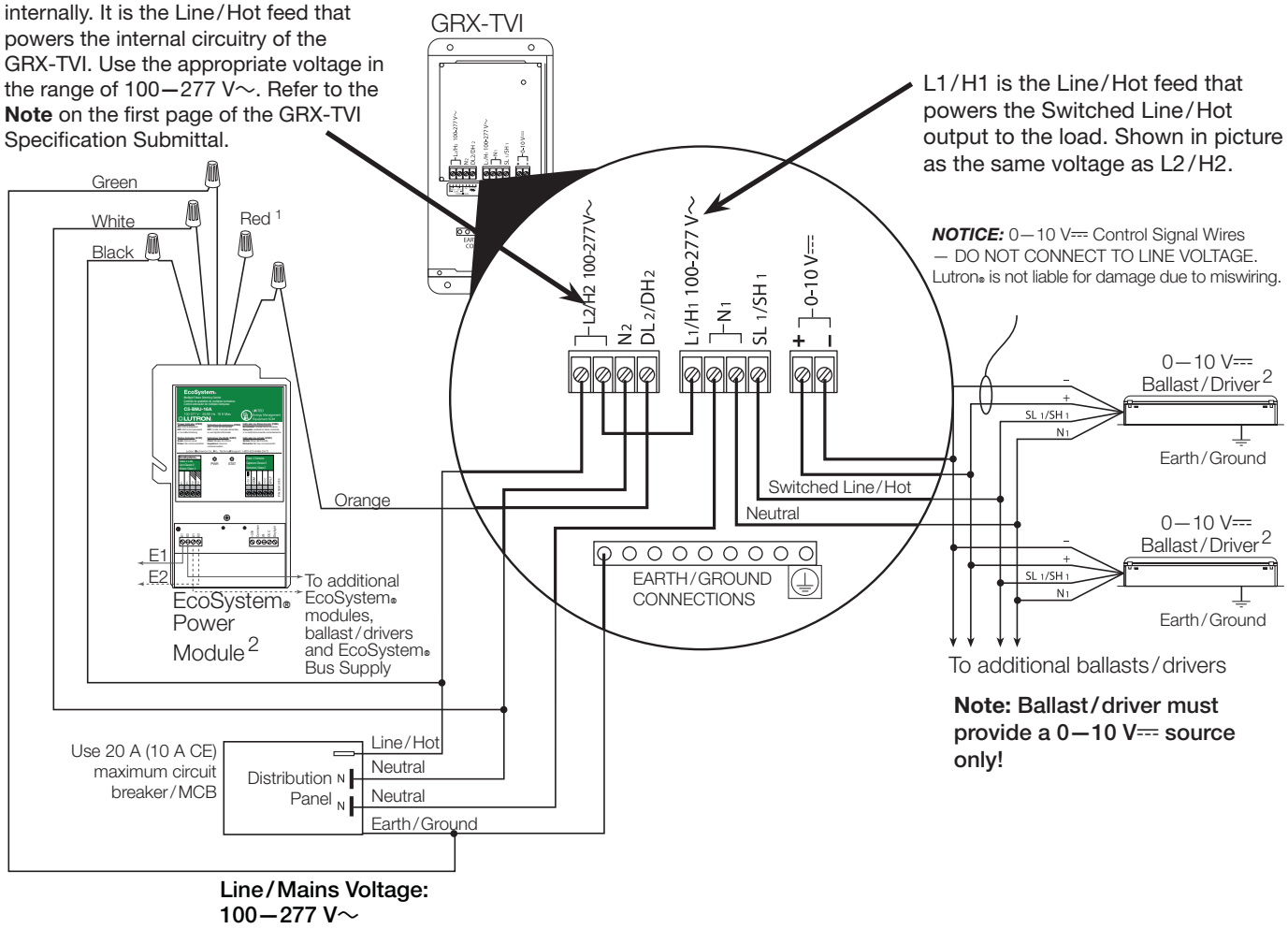
1 GP Panel must be rated for the for the specific Line/Mains voltage utilized.

2 Ballasts/drivers must be rated for the Distribution Panel B Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagram M: EcoSystem® Dimming Power Module for 3-wire Lutron® Dimming Ballast/drivers — 1 Distribution Panel/1 Feed

L2/H2 terminals are tied to each other internally. It is the Line/Hot feed that powers the internal circuitry of the GRX-TVI. Use the appropriate voltage in the range of 100—277 V~. Refer to the **Note** on the first page of the GRX-TVI Specification Submittal.



Line/Mains Voltage: 100—277 V~

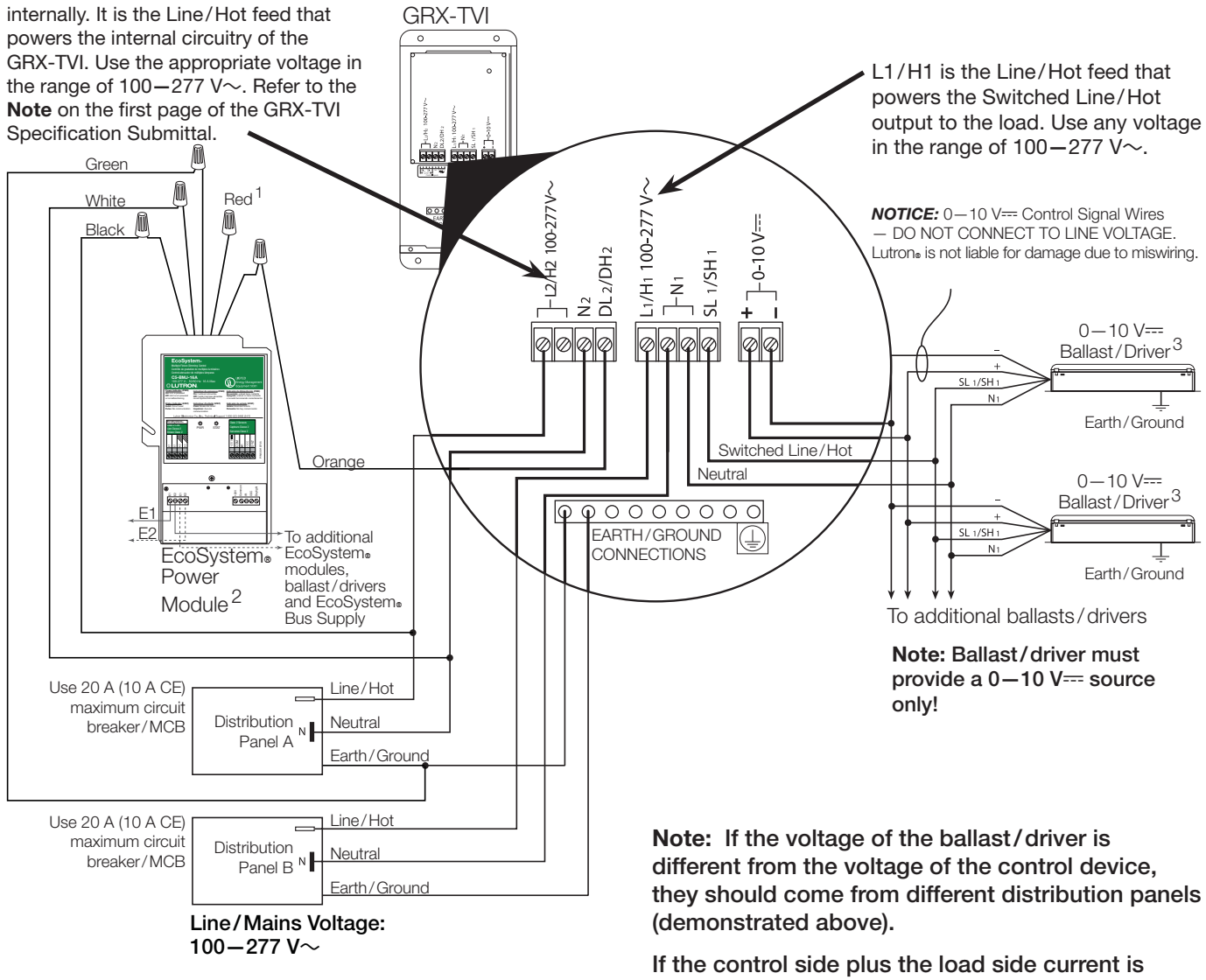
1 The red wire is not used. Cap off the red wire using a wire connector. Do not wire the red wire to ground or to any other wiring.

2 The EcoSytem® Power Module and ballasts/drivers must be rated for the specific Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagram N: EcoSystem® Dimming Power Module for 3-wire Lutron® Dimming Ballast/drivers — 2 Distribution Panels/2 Feeds

L2/H2 terminals are tied to each other internally. It is the Line/Hot feed that powers the internal circuitry of the GRX-TVI. Use the appropriate voltage in the range of 100—277 V~. Refer to the **Note** on the first page of the GRX-TVI Specification Submittal.



Line/Mains Voltage: 100—277 V~

Note: If the voltage of the ballast/driver is different from the voltage of the control device, they should come from different distribution panels (demonstrated above).

If the control side plus the load side current is greater than the circuit breaker rating, and the voltages of load and control are the same level, follow Diagram O.

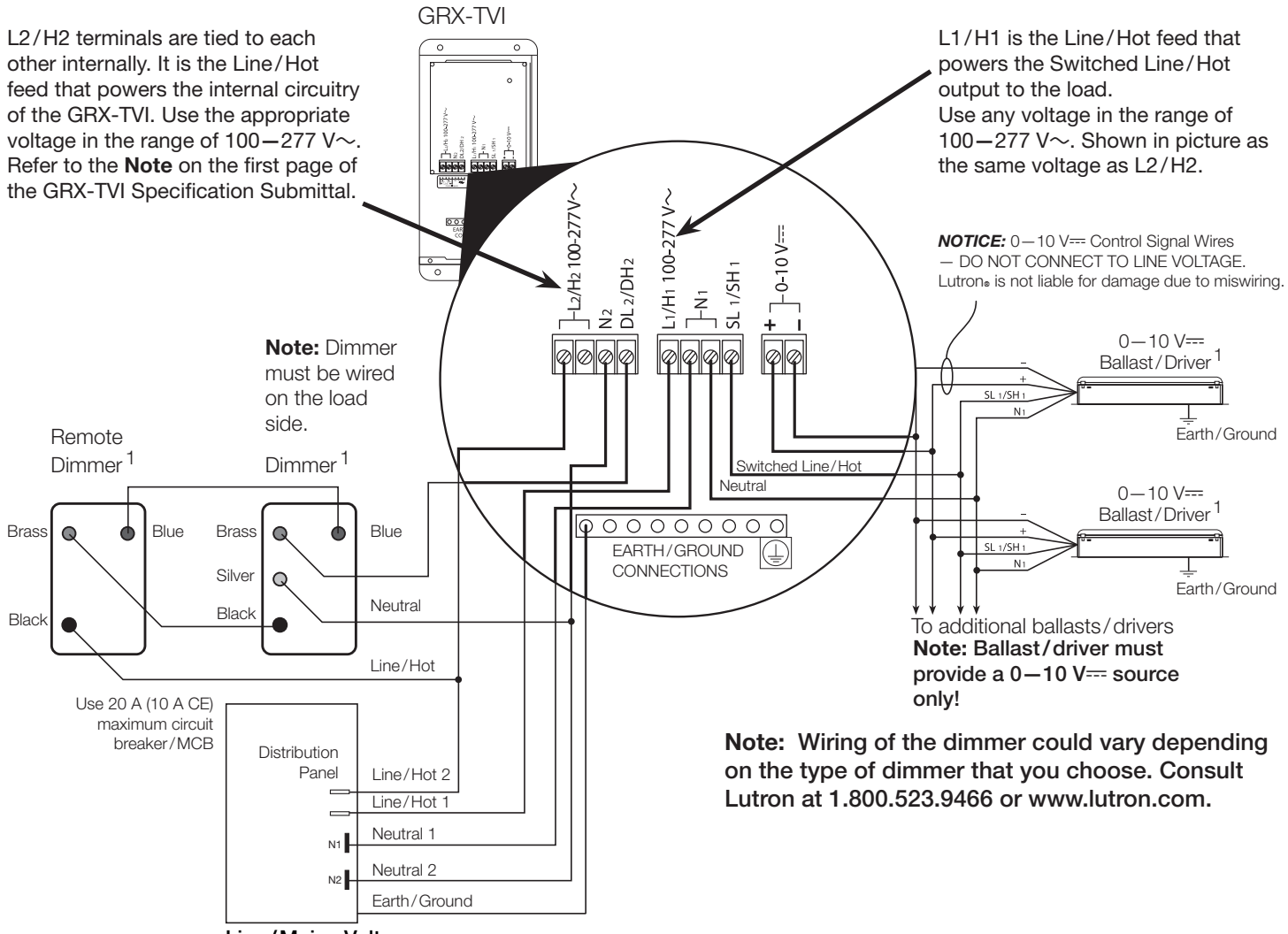
1 The red wire is not used. Cap off the red wire using a wire connector. Do not wire the red wire to ground or to any other wiring.

2 The EcoSystem Power Module must be rated for the for the Distribution Panel A Line/Mains voltage utilized.

3 Ballasts/drivers must be rated for the Distribution Panel B Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

Wiring Diagram O: 1 Distribution Panel with 2 Separate Feeds



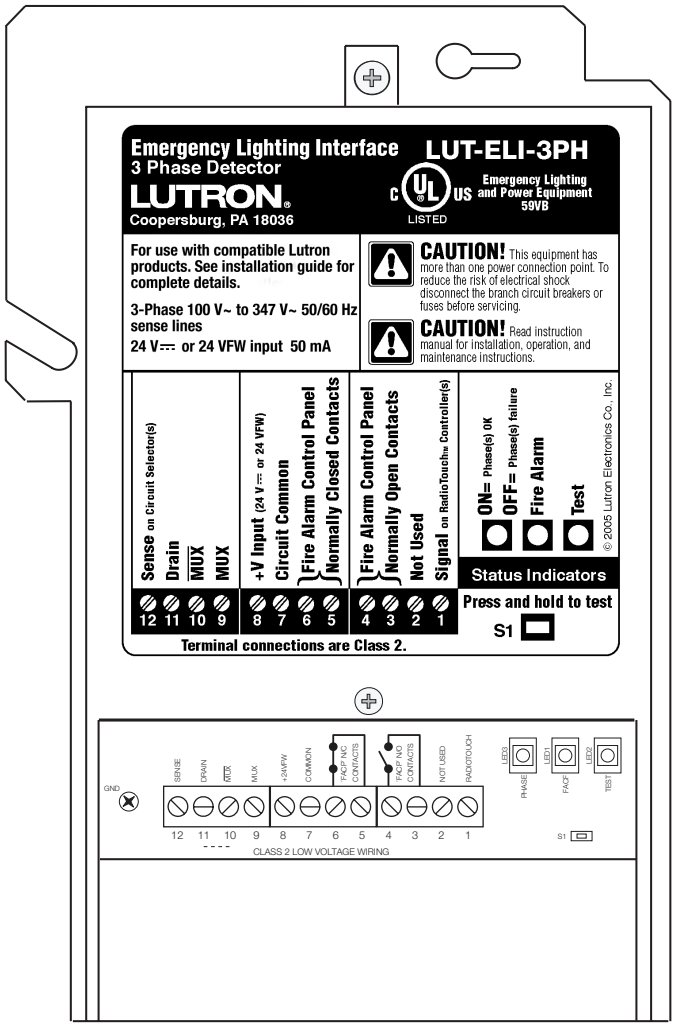
Note: Wiring of the dimmer could vary depending on the type of dimmer that you choose. Consult Lutron at 1.800.523.9466 or www.lutron.com.

[1] Dimmers and ballasts/drivers must be rated for the specific Line/Mains voltage utilized.

Job Name:	Model Numbers:	
Hotel Hartness	GRX-TVI	
Job Number:		

LUT-ELI-3PH Emergency Lighting Interface

The LUT-ELI-3PH is a device that works with Lutron lighting controls to provide an emergency lighting solution. The device is capable of sensing normal (non-essential) line voltage power and accepting an output from a fire alarm control panel (FACP). Upon loss of normal power or receiving a signal from the FACP, the LUT-ELI-3PH will send a signal to the compatible Lutron control(s) to which it is connected. This signal will cause the controls to enter the emergency lighting mode and any lights controlled will go to the emergency light level setting.



Features

- Compatible Lutron controls
  - GP, LP, LCP, XP, XPS, CCP, CXP, and HS
  - Energi Savr Node units
  - GRAFIK Eye QS units
  - Quantum lighting management hubs with EcoSystem bus supplies
- UL® 924 & CSA C22.2 No. 141-02 listed as “Emergency Lighting and Power Equipment”
- Requires a 24 V⎓ power feed from a source on normal/emergency (essential) power for unit to operate.
- Status light indicates the phase status. Status light “ON” is normal mode, “OFF” is emergency mode.
- A test button is provided to perform a functional test of the system by simulating an emergency situation.
- Accepts a maintained dry contact closure from an FACP to actuate the emergency mode.
- Senses line voltage from 100–347 V~.

Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

Specifications

Regulatory Approvals

- Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2014 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
- cULus Listed - USA & Canada
- NOM Certified (LUT-ELI-3PH-S only) - Mexico
- Lutron Quality Systems registered to ISO 9001.2000

Power

- Sense voltage input to the LUT-ELI-3PH unit must be from the Normal (Non-Essential) power source.
- Sense voltage range: 100–347 V~ 50/60 Hz 30 mA, 1-Phase, 3-Phase, or split phase.
- Proper short-circuit and over-current protection must be provided at the distribution panel. A 20 A maximum circuit breaker may be used for the installation.

Environment

- Ambient Temperature Operating Range: 32 °F–104 °F (0 °C–40 °C).
- Relative humidity: less than 90% non-condensing.
- For indoor use only.

Inputs

- 2 inputs for an FACP. A normally open or normally closed dry contact input on the FACP inputs will activate the emergency mode.

Status Light

- Status light indicates the phase status. Status light “ON” is normal mode, “OFF” is emergency mode.

Test Button

- A test button is provided to perform a functional test of the system by simulating an emergency situation.

System Communications and Capacity

- May be added to an existing Lutron system.
- One LUT-ELI-3PH unit may be used with up to 32 circuit selectors, specification-grade panel interfaces (SPI) or LCD controllers, Energi Savr Node units, GRAFIK Eye QS units, or Quantum bus supplies mixed in any combination.
- There can be up to 4 Quantum bus supplies in a Quantum hub. Only 1 Quantum bus supply per hub needs to be connected per LUT-ELI-3PH unit. There can be up to 32 Quantum bus supplies connected to one LUT-ELI-3PH unit.

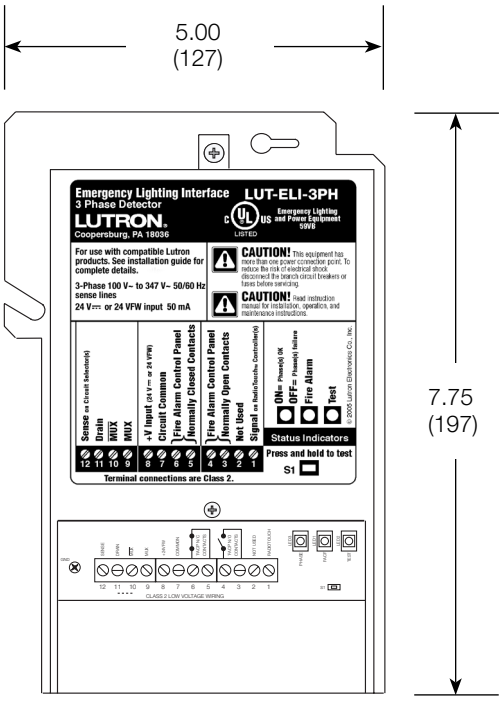
Mounting

- The interface mounts to a standard 4 x 4 in (102 x 102 mm) junction box.

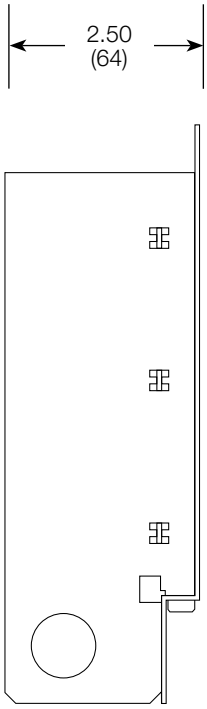
Dimensions and Mounting

All dimensions shown as in (mm)

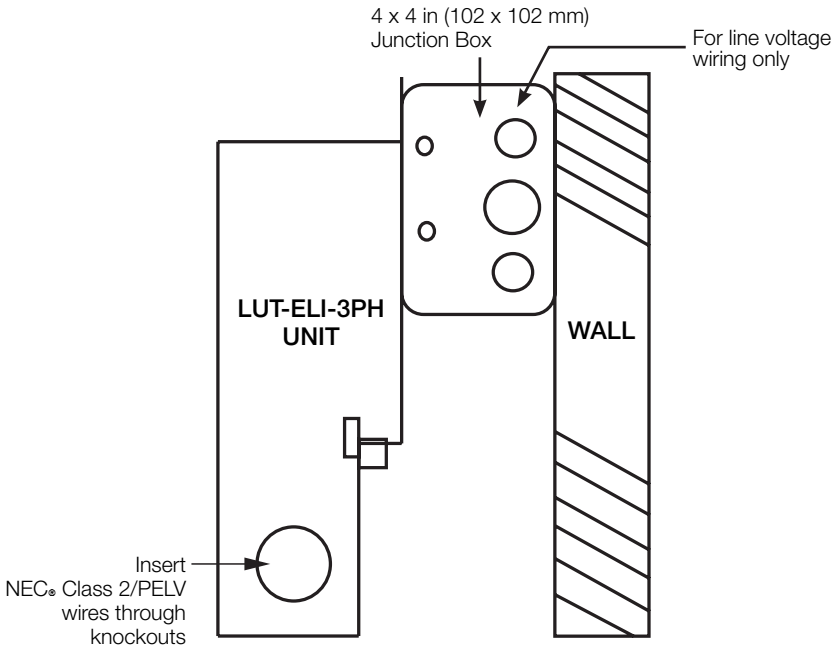
Front View



Side View



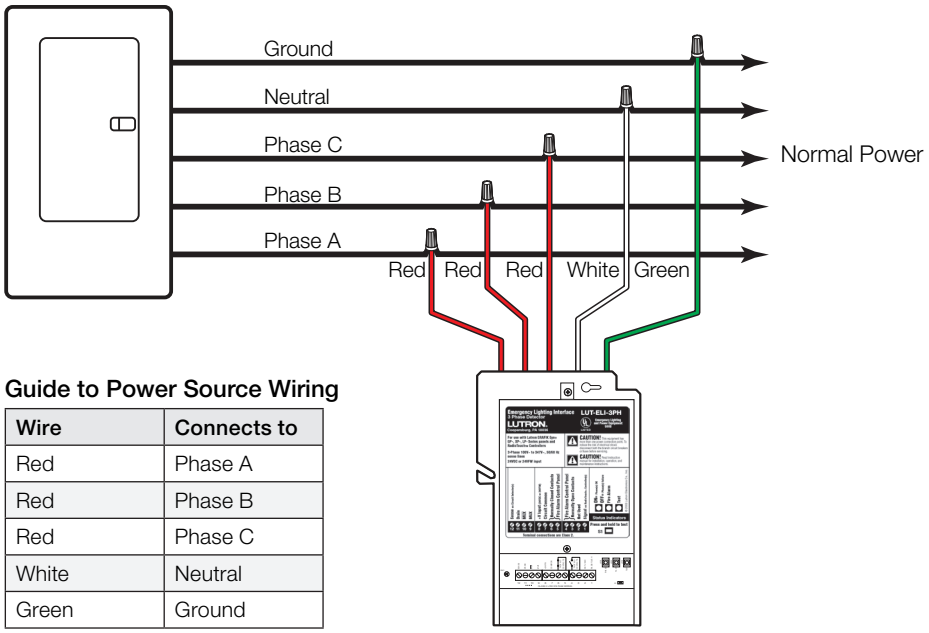
Mounting Example Side View (Cross-Section)



Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

Line Voltage Wiring Examples:

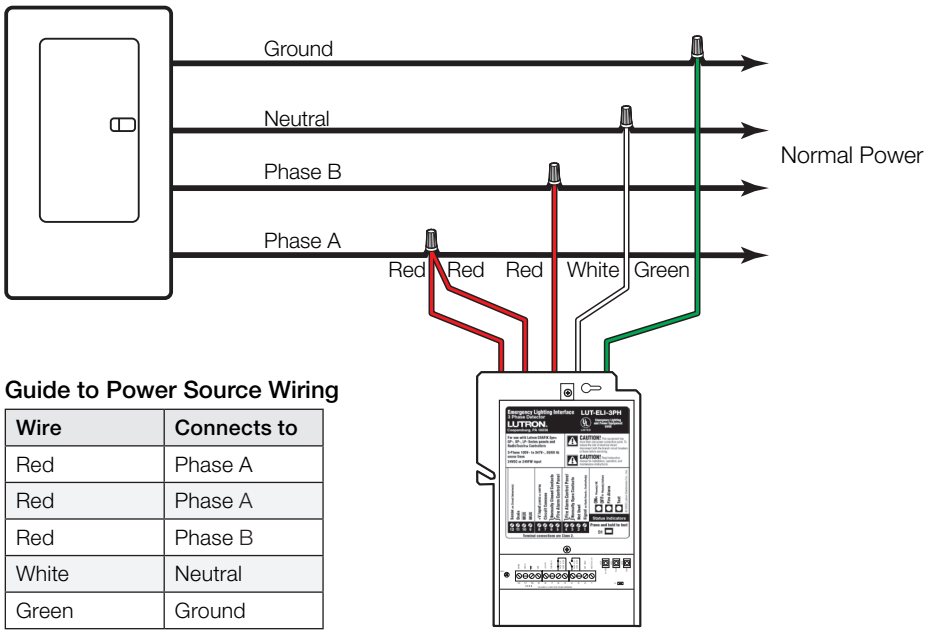
3-Phase Diagram



Guide to Power Source Wiring

Wire	Connects to
Red	Phase A
Red	Phase B
Red	Phase C
White	Neutral
Green	Ground

Split Phase Diagram



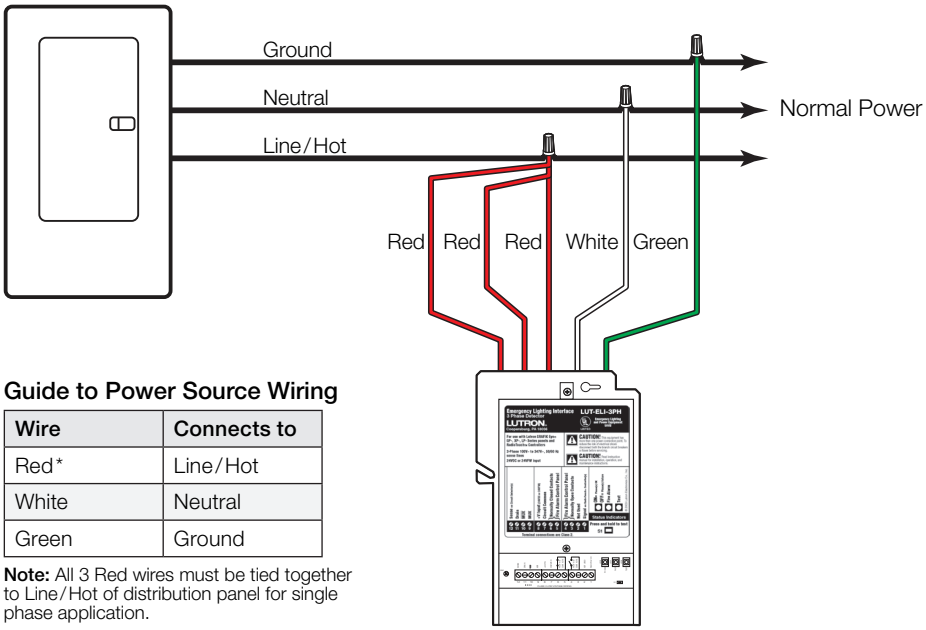
Guide to Power Source Wiring

Wire	Connects to
Red	Phase A
Red	Phase A
Red	Phase B
White	Neutral
Green	Ground

Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

Line Voltage Wiring Examples: *(continued)*

Single Phase Diagram



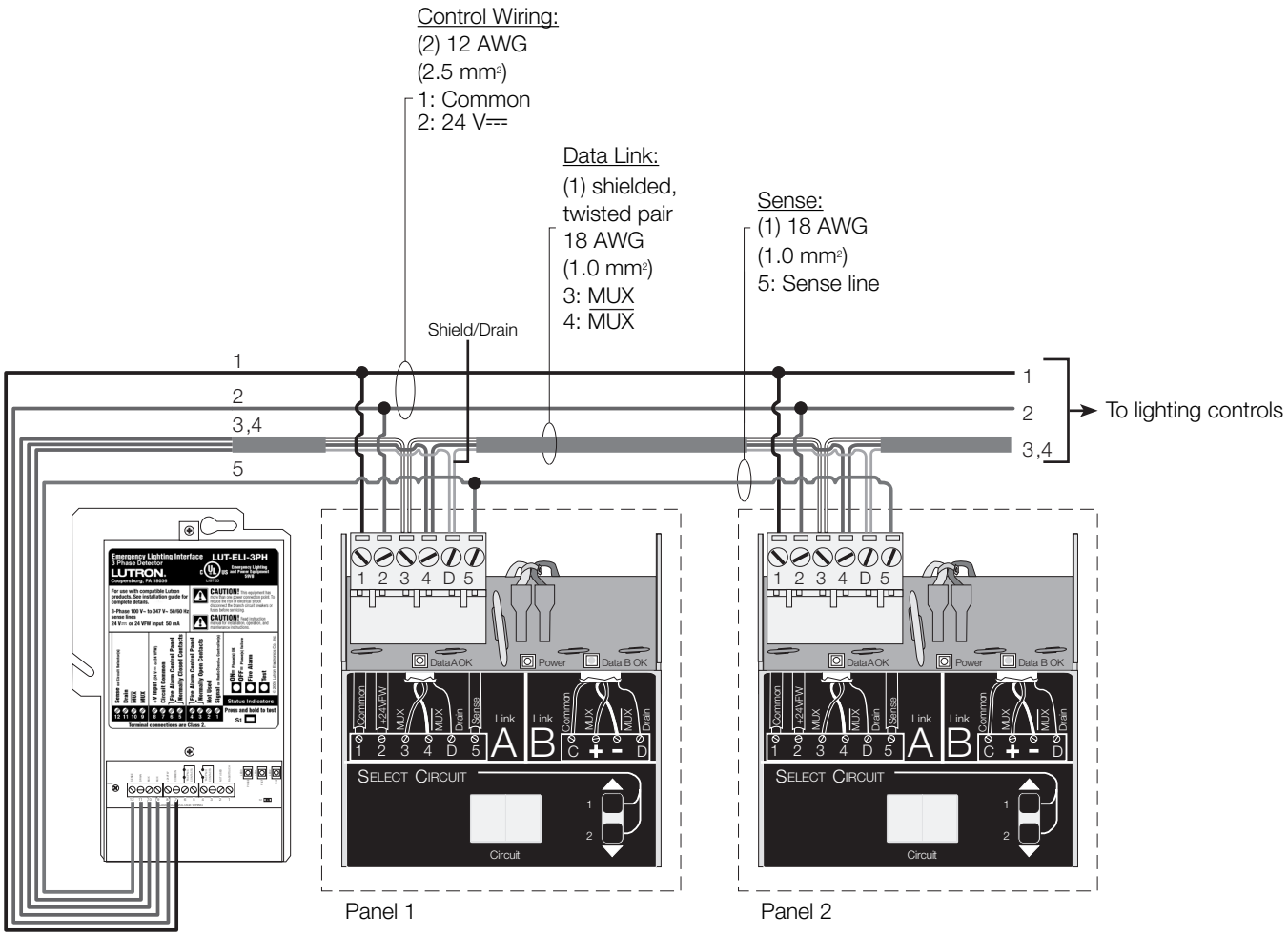
Guide to Power Source Wiring

Wire	Connects to
Red*	Line/Hot
White	Neutral
Green	Ground

* **Note:** All 3 Red wires must be tied together to Line/Hot of distribution panel for single phase application.

Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

IEC PELV/NEC® Class 2 Wiring Example: GP, XP, LP, CCP, and CXP Panels



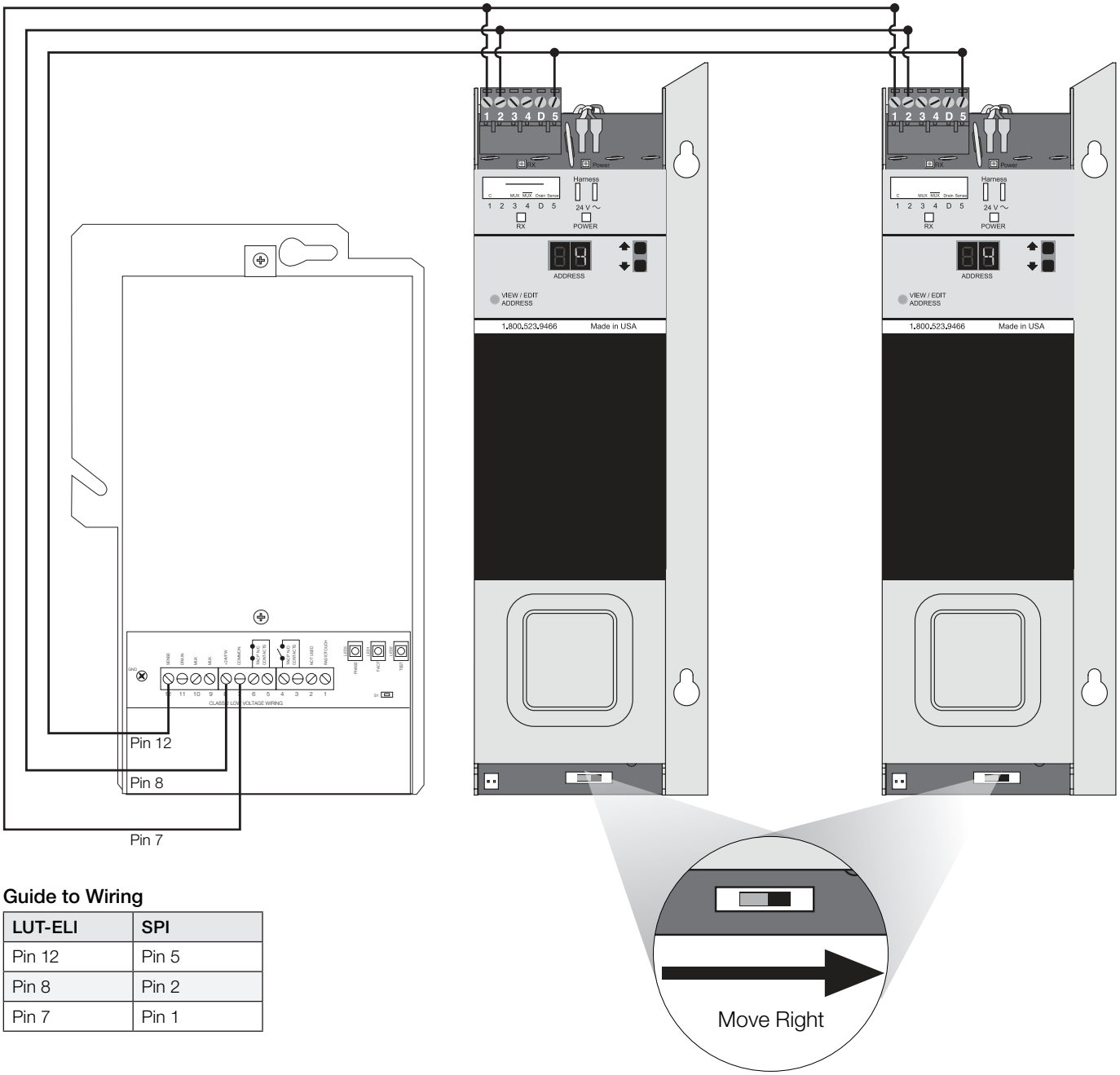
Guide to Wiring

LUT-ELI	Circuit Selector
Pin 12	Pin 5
Pin 11	Pin D
Pin 10	Pin 4
Pin 9	Pin 3
Pin 8	Pin 2
Pin 7	Pin 1

- One LUT-ELI-3PH unit may be connected in parallel with up to 32 circuit selectors.
- A LUT-ELI-3PH unit may be placed anywhere on the power panel link.
- The switch position SW6 on the circuit selector/controller must be in the right-most position, “Essential” on all Emergency Panels.
- The LUT-ELI-3PH unit 24 V⎓ input must always be connected to at least one of the Emergency Panels.

Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

IEC PELV/NEC® Class 2 Wiring Example: HomeWorks QS Panels with a Specification Grade Interface (SPI)



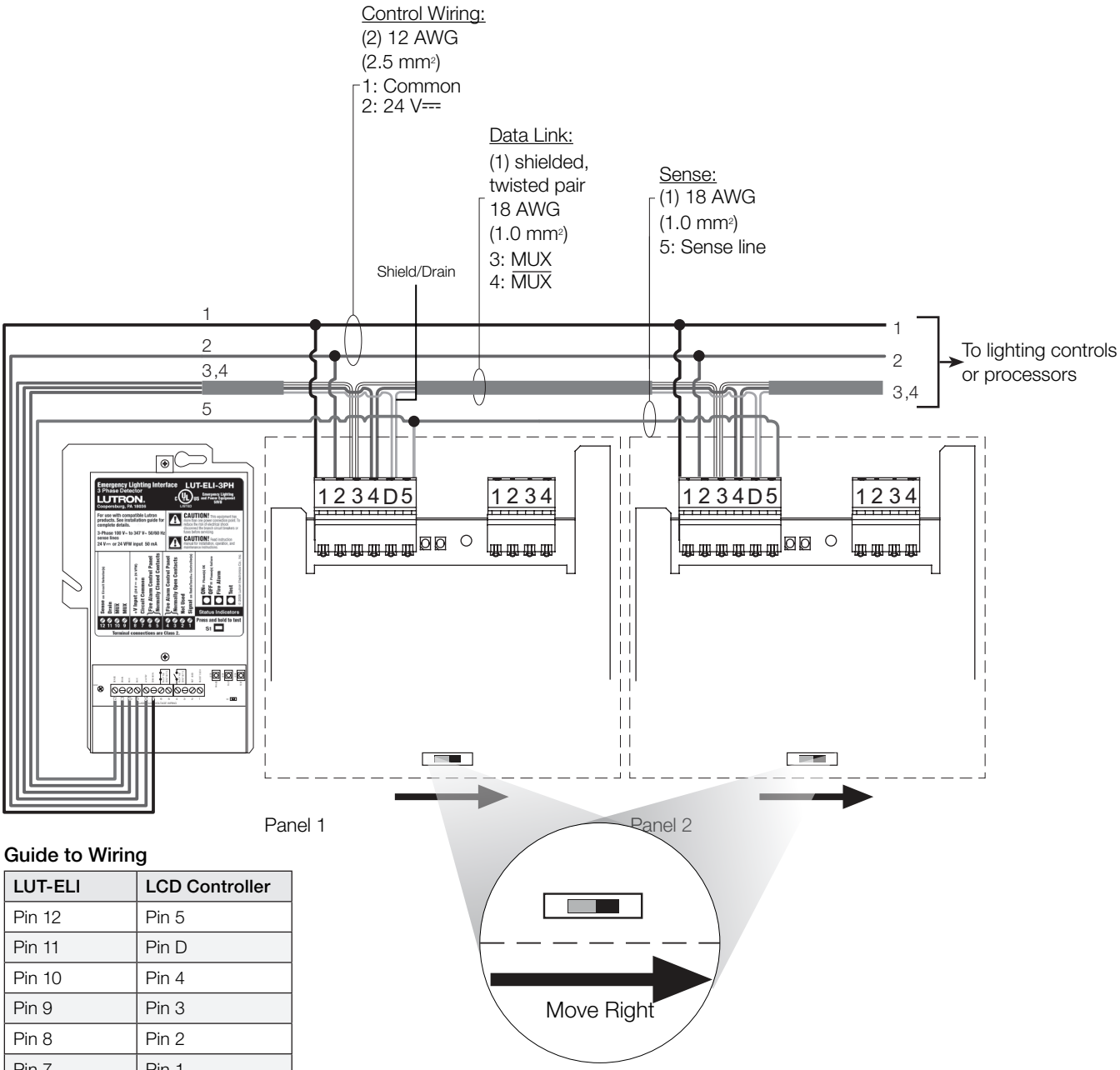
Guide to Wiring

LUT-ELI	SPI
Pin 12	Pin 5
Pin 8	Pin 2
Pin 7	Pin 1

- One LUT-ELI-3PH unit may be connected in parallel with up to 32 SPIs across two panel links.
- A LUT-ELI-3PH unit may be placed anywhere on the power panel link.
- The switch position SW6 on the SPI must be in the right-most position, “Essential” on all Emergency Panels.
- The LUT-ELI-3PH unit 24 V⎓ input must always be connected to at least one of the Emergency Panels.

Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

IEC PELV/NEC® Class 2 Wiring Example: LCP128 and Softswitch128 (XPS) Panels



Guide to Wiring

LUT-ELI	LCD Controller
Pin 12	Pin 5
Pin 11	Pin D
Pin 10	Pin 4
Pin 9	Pin 3
Pin 8	Pin 2
Pin 7	Pin 1

- One LUT-ELI-3PH unit may be connected in parallel with up to 32 LCP/XPS controllers.
- A LUT-ELI-3PH unit may be placed anywhere on the power panel link.
- The switch position SW6 on the controller must be in the right-most position, '"Essential" on all Emergency Panels.
- The LUT-ELI-3PH unit 24 V⎓ input must always be connected to at least one of the Emergency Panels.

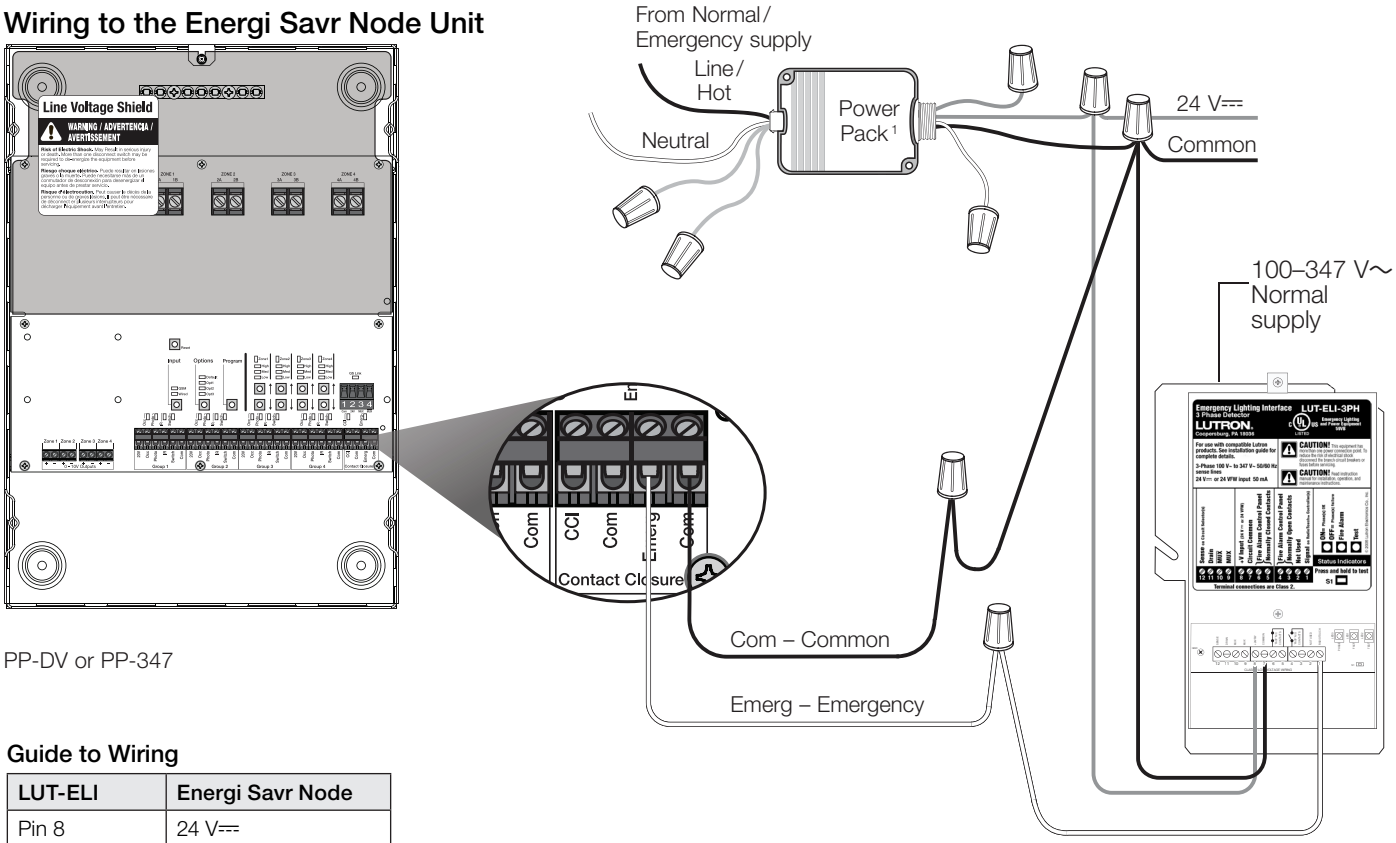
Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

Energi Savr Node Units

Using a LUT-ELI-3PH unit with an Energi Savr Node unit ensures that the system is compliant with UL® 924. Follow the wiring diagram in the LUT-ELI-3PH for mains wiring. Use the diagram below to complete the installation. There can be up to 32 Energi Savr Node units connected to one LUT-ELI-3PH unit.

Model QSN-4T16-S is shown below. Check the documentation of your particular model for proper terminal connections.

Wiring to the Energi Savr Node Unit



[1] PP-DV or PP-347

Guide to Wiring

LUT-ELI	Energi Savr Node
Pin 8	24 V⎓
Pin 7	Com
Pin 1	Emerg

Wiring Summary:

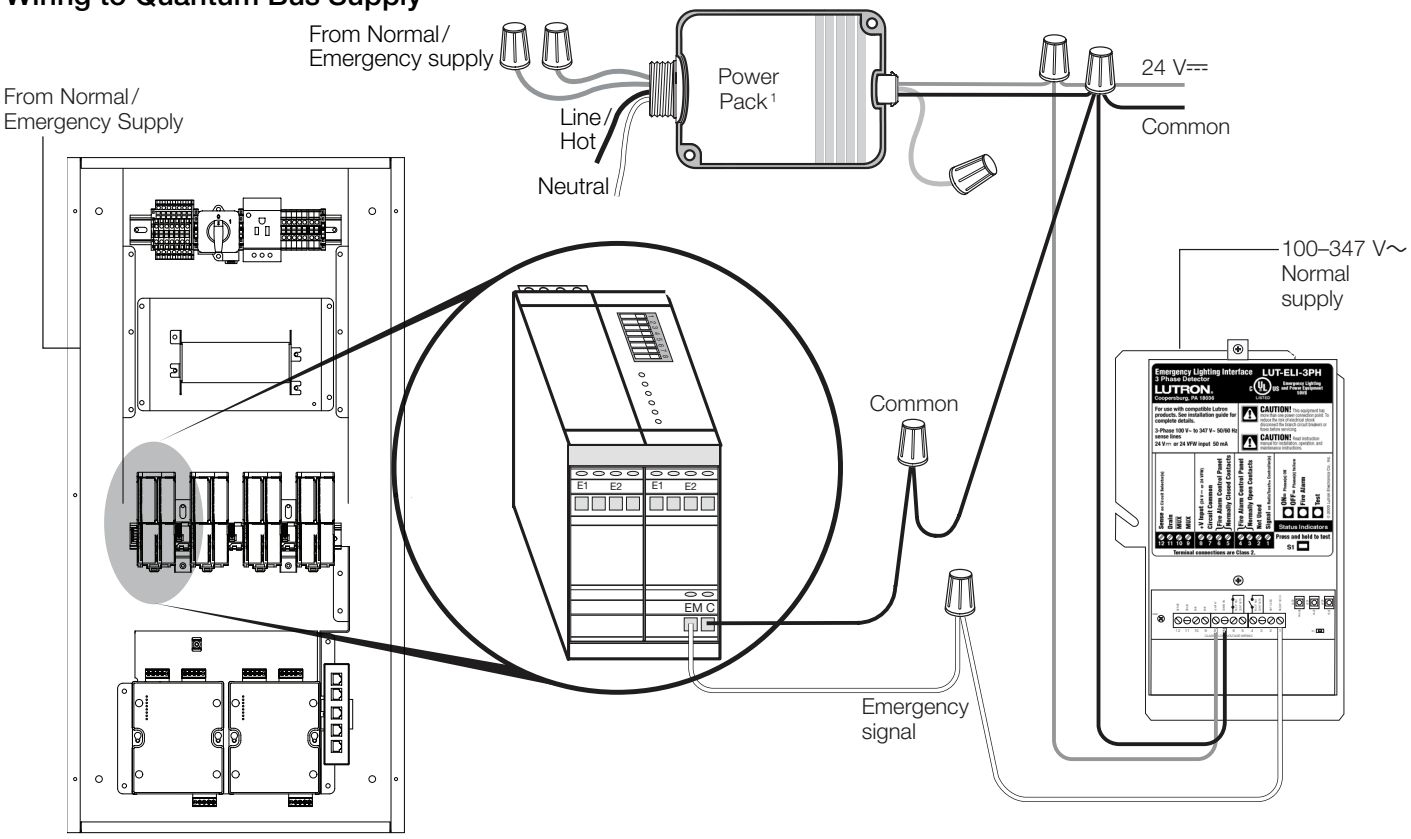
- Wire the power pack red wire (+24 V) to the LUT-ELI-3PH unit terminal 8 (V+).
- Wire the power pack black wire (Common) to the LUT-ELI-3PH unit terminal 7 (Circuit Common) and to Energi Savr Node “Com” terminal of the Emergency Contact Closure Input.
- Wire the signal wire from the LUT-ELI-3PH unit (terminal 1) to the Energi Savr Node “Emerg” terminal of the Emergency Contact Closure Input.
- When normal power loss is detected, the LUT-ELI-3PH unit sends all programmed zones to emergency light levels (Default is typically 100%).
- When normal power loss is restored, the LUT-ELI-3PH unit causes all programmed zones to return to previous light levels.

Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

Quantum Systems

Using a LUT-ELI-3PH unit with a Quantum bus supply ensures that the system is compliant with UL® 924. Follow the wiring diagram in the LUT-ELI-3PH unit for mains wiring. Use the diagram below to complete the installation. Only 1 bus supply per hub needs to be connected per LUT-ELI-3PH unit. There can be up to 32 Quantum bus supplies connected to one LUT-ELI-3PH unit.

Wiring to Quantum Bus Supply



[1] PP-DV or PP-347

Guide to Wiring

LUT-ELI	Bus Supply
Pin 8	24 V⎓
Pin 7	Com
Pin 1	Emerg

Wiring Summary:

- Wire the power pack red wire (+24 V) to the LUT-ELI-3PH unit terminal 8 (+VFW).
- Wire the power pack black wire (Common) to the LUT-ELI-3PH unit terminal 7 (Common) and to the Quantum bus supply terminal 5 (Common).
- Wire the signal wire from the LUT-ELI-3PH unit (terminal 1) to the Quantum bus supply terminal 6 (CCI-Emergency).

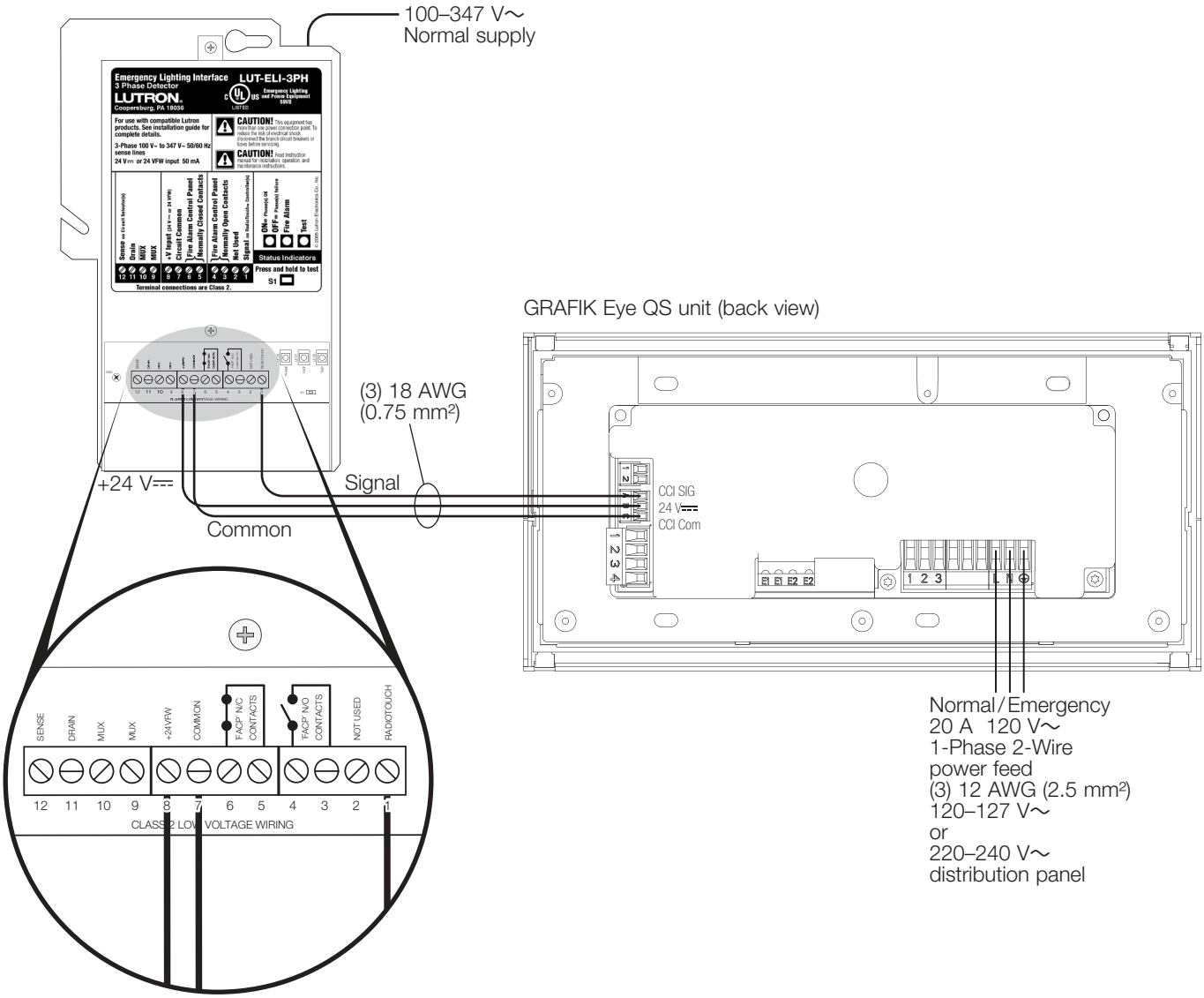
Note: When normal power loss is detected, the LUT-ELI-3PH unit sends a signal to the bus supplies which send the programmed lights to emergency light levels.

Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

Installing a LUT-ELI-3PH Unit with a GRAFIK Eye QS Unit

Wiring to a GRAFIK Eye QS Control Unit

Note: For a 1-phase 2-wire application, connect phase A, B, and C wires on LUT-ELI-3PH together for phase sensing.

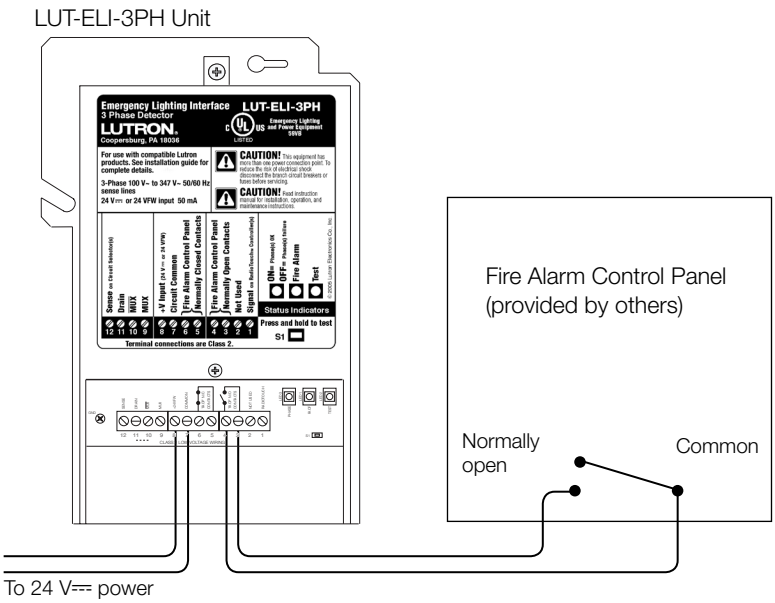


- Provide proper short-circuit and overcurrent protection at the distribution panel. Maximum circuit breaker installation of 20 A.
- When normal power loss is detected at the LUT-ELI-3PH unit, all zones in the GRAFIK Eye QS units will go to their emergency states.
- The GRAFIK Eye QS unit MUST be powered from a normal/emergency power feed.

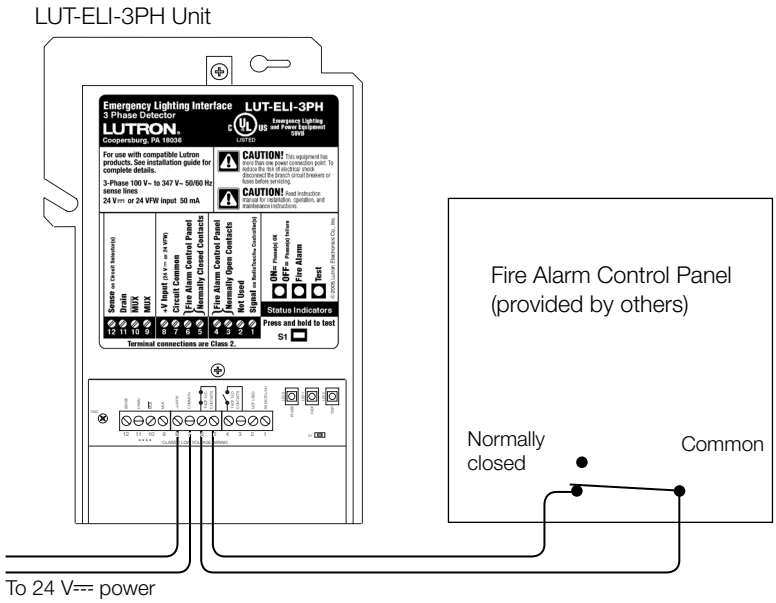
Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

IEC PELV/NEC® Class 2 Wiring Example: Fire Alarm Control Panel (FACP)

Normally Open FACP Input



Supervisory Circuit (Normally Closed FACP Input)



Important

Use only with normally open (terminals 3 and 4) or normally closed (terminals 5 and 6) dry contact closure. When the proper contact state is triggered, it must be maintained for the LUT-ELI-3PH unit to go into Emergency Mode. Once the contact is released, the LUT-ELI-3PH unit will return the GRAFIK Systems GP, LP, XP panel(s), XPS, LCP, RadioTouch controller, EcoSystem Bus Supply, GRAFIK Eye QS unit, or Quantum Bus Supply back to normal operation mode.

The LUT-ELI-3PH unit will have a factory installed jumper to provide the normally closed input signal for the supervisory circuit when a normally closed FACP input is not provided.

Consult your Fire Alarm Control Panel's instruction manual before connecting to the LUT-ELI-3PH unit.

Notice: Do not connect any voltage source to the FACP inputs on the LUT-ELI-3PH unit. If voltage is provided by the FACP and connected to the LUT-ELI-3PH unit, it can damage the LUT-ELI-3PH unit.

Job Name:	Model Numbers:	
Hotel Hartness	LUT-ELI-3PH	
Job Number:		

LUT-LBX Synthetic Minimum Load

Description

- Provides capability for certain Lutron dimmers to control low-wattage loads from 0 watts up to the dimmer's minimum rating
- Presents a simulated load to the dimmer to meet the minimum load requirements even when the actual load is smaller.
- Works with forward phase or leading edge dimmers and reverse phase or trailing edge dimmers.
- Models available for 120 V~ and 220-240 V~ input power.
- This "load-side" equipment installs on the zone wiring in parallel with the lighting load.
- Dissapates a maximum of 10 watts when the controlling dimmer is near high-end.

Works with:

- GRAFIK Eye® 3000 Series control units
- LP RPM Dimmimg Modules
- HomeWorks® RPM Dimming Modules
- HomeWorks® WPM Dimming Modules
- Neutral-referenced Lutron dimmers
- Two-wire Lutron dimmers

Available Models

Input Power	Model Number
120 V~	LUT-LBX-WH
220 - 240 V~	LUT-LBX-CE-WH

Job Name:	Model Numbers:	
Hotel Hartness	LUT-LBX	
Job Number:		

Specifications

Input

- 120 V~ 100 mA 50/60 Hz (LUT-LBX)
- 220-240 V~ 65 mA 50/60 Hz (LUT-LBX-CE)
- Power dissipation less than 10 watts

Sources/Load Types*

Operates these sources when wired in parallel with the load:

- Incandescent (Tungsten)
- Halogen
- Magnetic Low-Voltage Transformer
- Electronic Low-Voltage Transformer
- Lutron Tu-Wire® Electronic Fluorescent Dimming Ballast
- Neon/Cold Cathode
- LED lighting (refer to Application Note #138 for further details)

Terminals

Accepts up to two 12 AWG (2.5 mm^2) wires.

Environment

32 - 104 °F (0 - 40 °C). Relative humidity less than 90% non-condensing.

Mounting

Surface or recess mount indoors only.

EMC Immunity

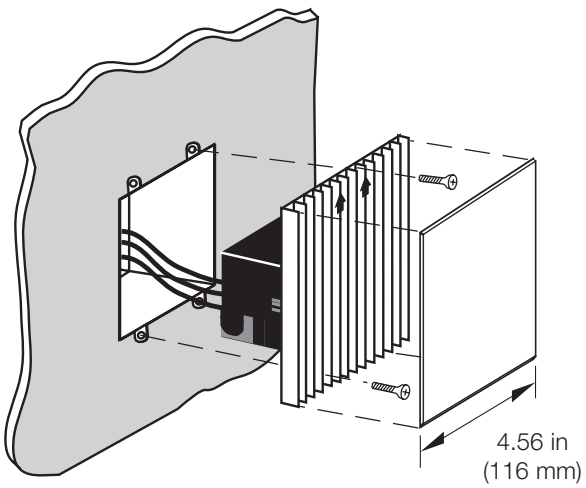
- Surge protection up to 6 kV, 3000 A, IEEE std. C62.41
- ESD protection up to 16 kV

* The dimmer must be rated for the load type being used. The LUT-LBX does not change the approved load types of the dimmer, just the minimum load requirement. For example, MLV loads must still be used with MLV dimmers.

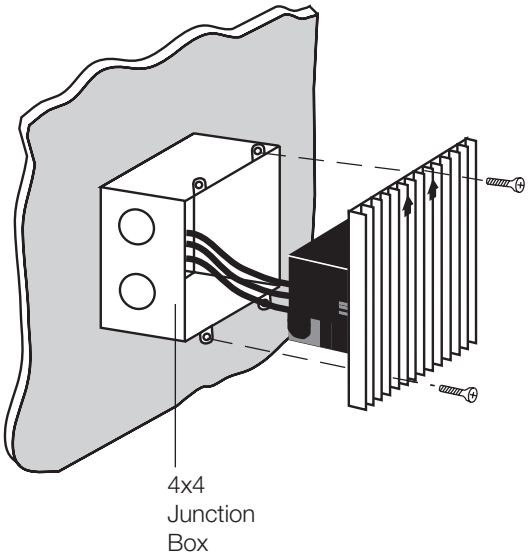
Dimensions and Mounting

- Recess or surface mount in provided 4x4 junction box (Lutron P/N 241-496) 3.5 in (89 mm) deep. Indoors only.
- LUT-LBX generates heat; mount only where ambient temperature is 32 - 104 °F (0 - 40 °C).
- Mount with arrows on yoke facing up to ensure adequate cooling.
- Allow 4.5 in (114 mm) above and below unit and between faceplates when mounting several in a vertical layout.
- For better heat dissipation, surface mount without faceplate.
- Mount so line (mains) voltage wiring is at least 6 ft (1.8 m) from sound or electronic equipment and wiring.
- Mount Interface within 7° of true vertical.

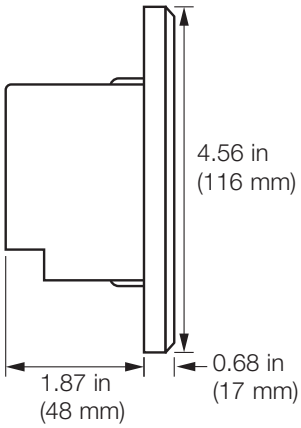
Recess Mount with Faceplate



Surface Mount without Faceplate



Side View

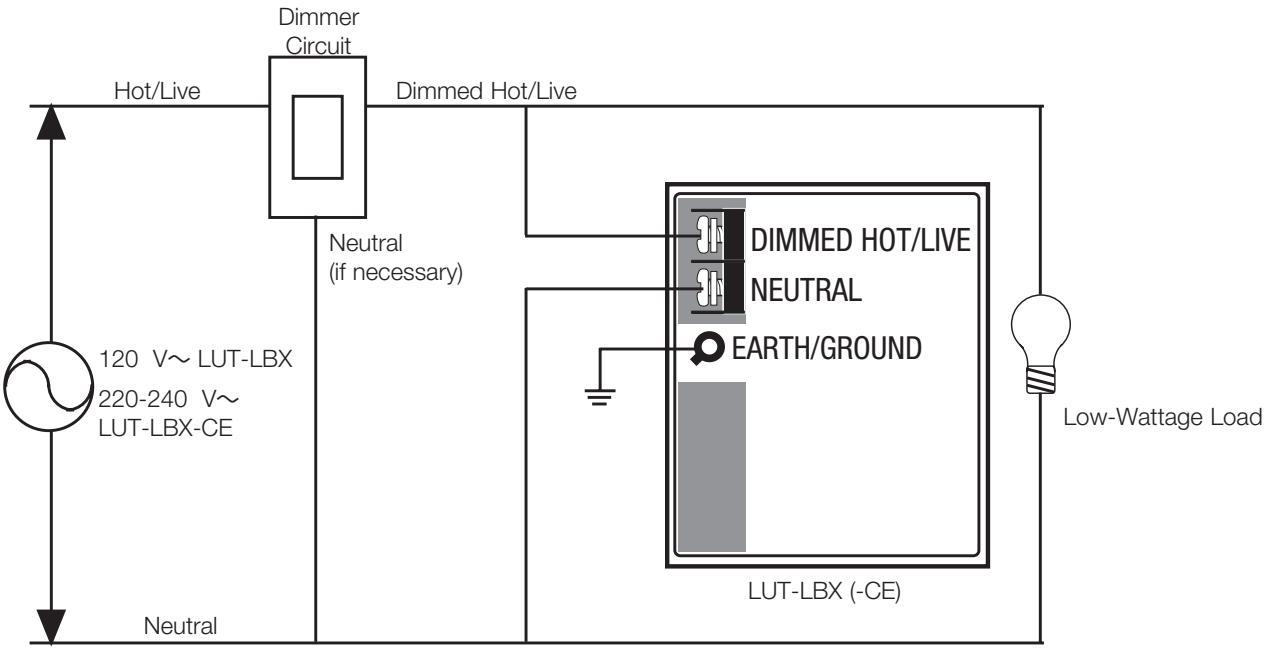


Job Name:	Model Numbers:	
Hotel Hartness	LUT-LBX	
Job Number:		

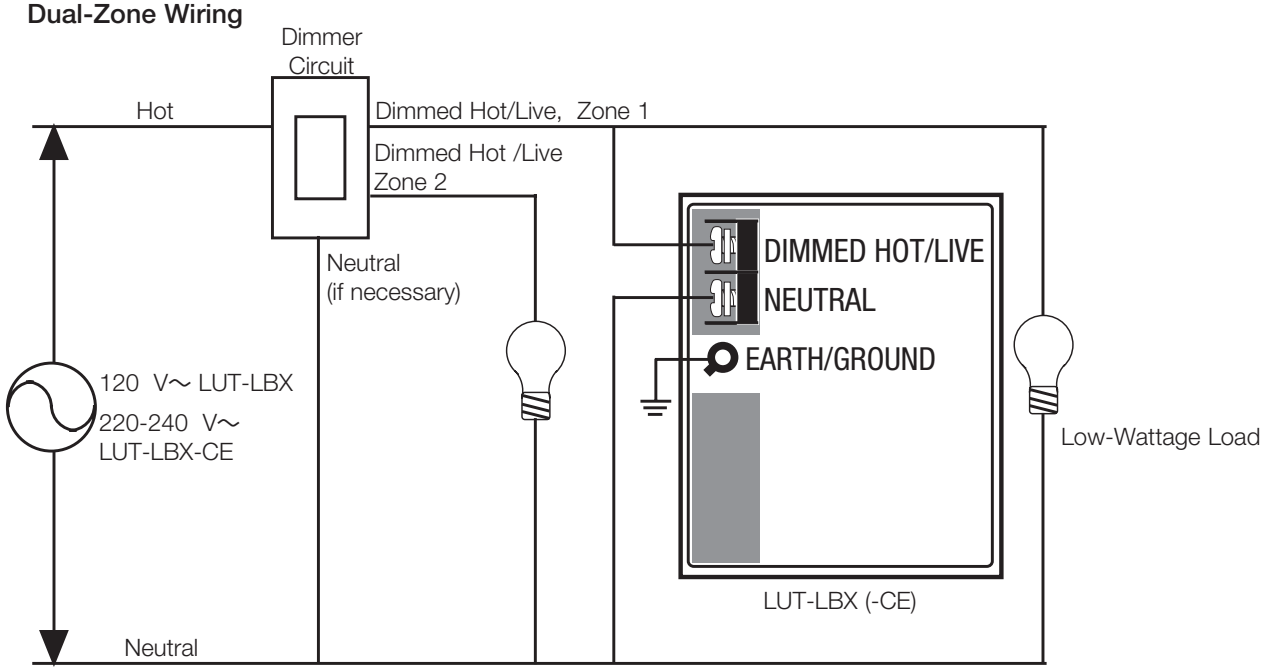
Wiring

- Pull 12 to 16 AWG (2.5 - 1.0 mm²) Copper (Cu) wires (75 °C minimum) for input power and load circuit.
- Strip 0.5 in (12 mm) insulation from wires before connecting.

Single-Zone Wiring



Dual-Zone Wiring



Job Name:	Model Numbers:	
Hotel Hartness	LUT-LBX	
Job Number:		

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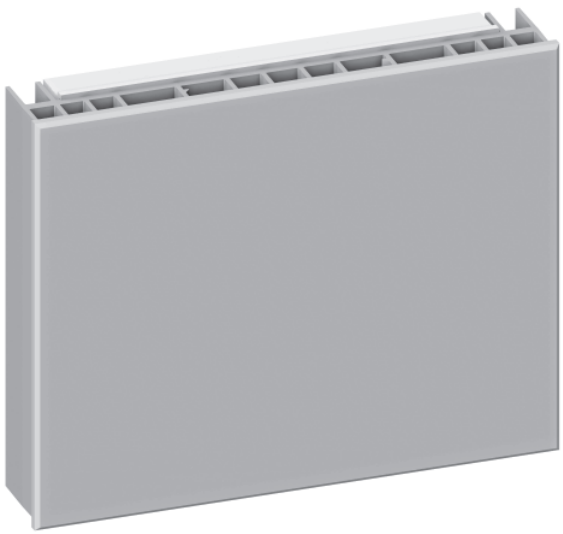
Phase-Adaptive Power Module

- Provides dimming control for 1 zone of a full 16 A lighting load.
- May be used to dim incandescent, halogen, electronic low-voltage, magnetic low-voltage, neon/cold cathode.
- Phase-adaptive technology automatically selects leading-edge or trailing-edge dimming for low-voltage transformers.
- Up to 3 power modules may be controlled by a single dimmer (C5-BMJ- will control only 1 module).
- Use PHPM-WBX- models for 3-wire fluorescent dimmer input and PHPM-PA- models for 2-wire input.
- PHPM-WBX- models can be used in conjunction with BCI-0-10 for 0–10 V dimming applications. For more information, see Application Note #516 (Lutron P/N 048516) at www.lutron.com
- Models available for control voltage of 120 V~ only or 220–277 V~.
- Models available for load voltage of 120 V~ only or 120–277 V~.
- Compatible with 220/240 V~, non-CE systems. Contact Lutron for specific system applications.
- Not for use with non-dim loads.

Works with 120 V~ or 220–277 V~ versions of:

- Lutron in-wall neutral wire dimmers; see approved list in the Dimmers and Switches Specification Guide (Lutron P/N 3671746) at www.lutron.com (see Lighting Load Interfaces section)
- GRAFIK Eye QS control units*
- GRAFIK Eye 3000 Series control units**
- LP, LCP, and GP dimming panels**
- HomeWorks QS remote power panels**
- HomeWorks QS in-line dimmer
- HomeWorks QS DIN-rail power modules
- EcoSystem interface C5-BMJ-XXX†
- Energi Savr Node phase adaptive
- RadioRA 2 neutral wire dimmers; see approved list in the specification submittal (Lutron P/N 369225) at www.lutron.com
- HomeWorks QS neutral wire dimmers; see approved list in the specification submittal (Lutron P/N 369305) at www.lutron.com
- Caséta Wireless neutral wire dimmers; see approved list in the specification submittal (Lutron P/N 369987) at www.lutron.com

*For PHPM-PA- models, set load type to “power module”.
**For PHPM-PA- models, set load type to “incandescent”.
†Use only PHPM-WBX models with this product; using PHPM-PA- models is not recommended



Models and Capacities

Control Voltage[1, 2]	Load Voltage[1, 2]	Load Capacity	Model Number[3, 4]
120 V~	120 V~	16 A	PHPM-PA-120-WH
120 V~	120–277 V~	16 A	PHPM-PA-DV-WH
220–277 V~	120–277 V~	16 A	PHPM-PA-277/DV
120 V~	120 V~	16 A	PHPM-WBX-120-WH
120 V~	120–277 V~	16 A	PHPM-WBX-DV-WH
220–277 V~	120–277 V~	16 A	PHPM-WBX-277/DV

[1] All voltages are phase-to-neutral.
[2] For explanation of “control voltage” and “load voltage”, see page 5.
[3] Use PHPM-PA- models for incandescent/halogen dimmers and set the controller load type to “power module” or “incandescent”.
[4] Use PHPM-WBX- models for 3-wire fluorescent dimmers and set the controller load type to “fluorescent”.

Job Name:	Model Numbers:	
Hotel Hartness	PHPM-PA-120	
Job Number:		

Specifications

Power

Control voltage	120 V~ only	PHPM-PA-120-WH
		PHPM-PA-DV-WH
		PHPM-WBX-120-WH
		PHPM-WBX-DV-WH
	220–277 V~	PHPM-PA-277/DV
		PHPM-WBX-277/DV
Load voltage	120 V~ only	PHPM-PA-120-WH
		PHPM-WBX-120-WH
	120–277 V~	PHPM-PA-DV-WH
		PHPM-PA-277/DV
		PHPM-WBX-DV-WH
		PHPM-WBX-277/DV

- Capacity: Full 16 A
  120 V~: 1920 W
  120–277 V~: 1920–4432 W
  220–240 V~: 3520–3840 W
- Frequency: 50/60 Hz
- Load (output) power: Phase independent of control device/control voltage

Sources/Load Types

- Operates these sources with a smooth, continuous, Square Law dimming curve:
  - Incandescent (tungsten)
  - Halogen
  - Magnetic low-voltage transformer (iron core)
  - Electronic (solid-state) low-voltage transformer (must be manufacturer-approved for reverse-phase control dimming)
  - Neon/Cold cathode
- Incandescent and electronic low-voltage sources may be controlled on the same circuit/control zone. Up to 30% of the capacity of the unit can be used for incandescent lighting.
- Incandescent and magnetic low-voltage sources may be controlled on the same circuit/control zone. Up to 30% of the capacity of the unit can be used for incandescent lighting.
- Electronic low-voltage and magnetic low-voltage sources may NOT be controlled on the same circuit/control zone.
- PHPM-PA- and PHPM-WBX- models are not for use with non-dim loads. Use switching power module (PHPM-SW-DV-WH) for non-dim loads.
- Minimum load on power module is 10 W.
- Output must be directly connected to the load. Load side switching is not recommended.

Key Design Features

- Automatically selects between forward-phase/leading edge (e.g., magnetic low-voltage) and reverse-phase/trailing edge (e.g., electronic low-voltage) dimming/output based on connected load.
- Patented RTISS Equipped circuitry compensates in real time for incoming line voltage variations: Compensates for +/–2% change in RMS voltage/cycle and +/–2% Hz change in frequency/second.
- Provides air-gap off.
- Module protects itself during most temporary over-current and over-voltage conditions.
- Two LEDs on front of unit provide diagnostic information (visible when faceplate is removed).

Terminals

- Each terminal accepts up to two 12 AWG (2.5 mm^2) wires.

Environment

- 32 to 104 °F (0 to 40 °C). Relative humidity less than 90% non-condensing.
- Indoor use only.
- Maximum heat output of module: 135 BTU/hour.

Mounting

- Surface or recess mount.
- Power module is UL tested and approved for use in spaces designed for environmental air handling.

Regulatory Approvals

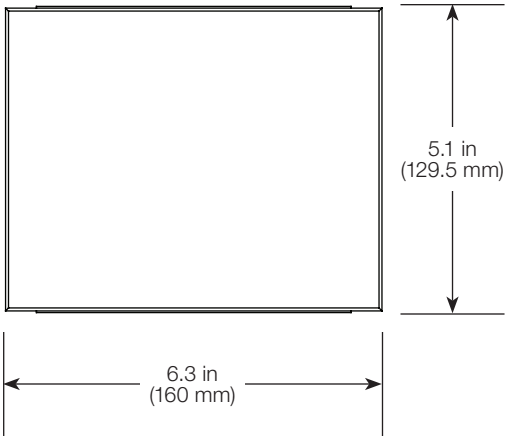
- Models: PHPM-PA-120-WH, PHPM-PA-DV-WH, PHPM-WBX-120-WH, PHPM-WBX-DV-WH
  - UL
  - RoHS Compliant
  - CSA
  - NOM
  - CIDET
  - Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2014 300.22(C)(3).
- Models: PHPM-PA-277/DV, PHPM-WBX-277/DV
  - UL
  - RoHS Compliant
  - Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2014 300.22(C)(3).

Job Name:	Model Numbers:	
Hotel Hartness	PHPM-PA-120	
Job Number:		

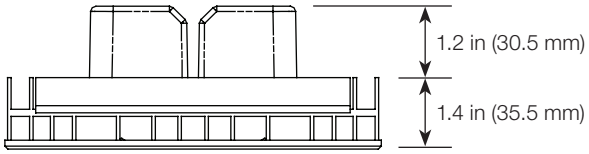
Dimensions and Mounting

- Mount in 2-gang U.S. wallbox, 3.5 in (89 mm) deep or 4 × 4 in (102 × 102 mm) junction box, 2.1 in (53 mm) deep.
- For indoor use only.
- This device generates heat; mount only where ambient temperature is 32 to 104 °F (0 to 40 °C).
- Mount with arrows facing up to ensure adequate cooling.
- Allow 4.5 in (114 mm) above and below faceplates when mounting several modules in a vertical layout.
- Units may butt together when mounted in a horizontal layout.
- Mount so line (mains) voltage wiring is at least 6 ft (1.8 m) from sound or electronic equipment and wiring.
- Mount within 7° of true vertical.

Front View

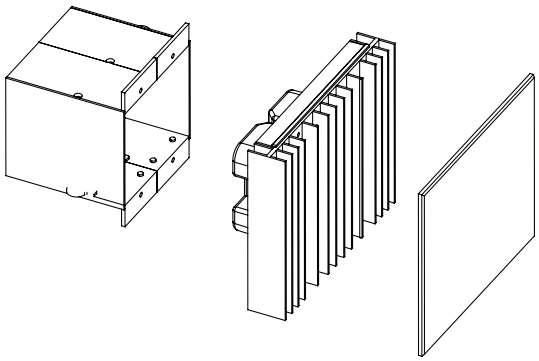


Side View

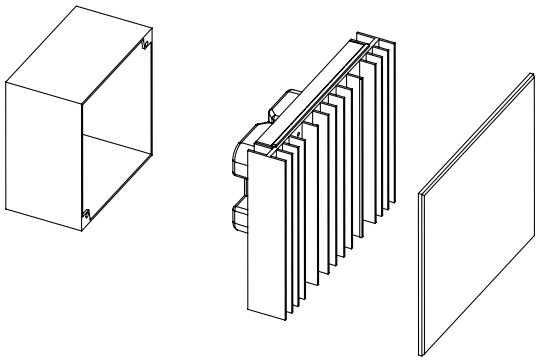


Mounting Methods

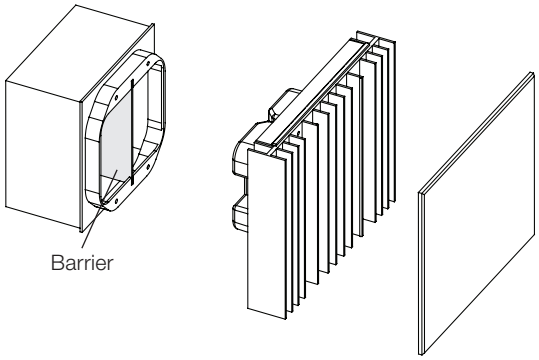
Mount to 2-gang U.S. wallbox



Mount to 4 × 4 in (102 × 102 mm), 2.1 in (53 mm) deep U.S. junction box



Mount to 4 × 4 in (102 × 102 mm), 2.1 in (53 mm) deep U.S. junction box with barrier
(for 277 V~ loads if required by local electrical code)



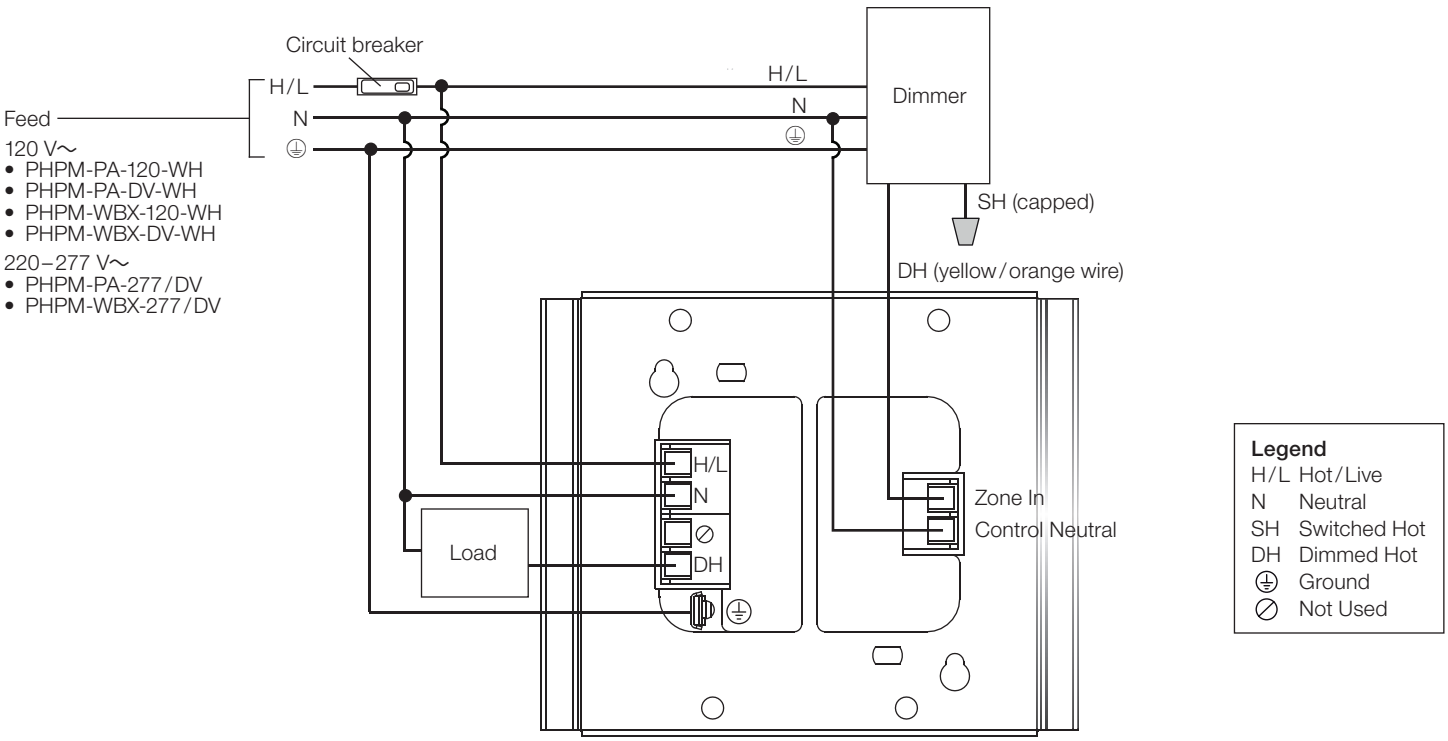
Wiring

- 12 AWG (2.5 mm^2) copper (Cu) wires (75 °C/167 °F minimum) for input power and load circuit.
- Strip 1/2 in (12 mm) insulation from wires before connecting.
- Run separate neutral for load circuit; no common neutrals.
- May be used with GFI breaker protected loads. Load circuit wiring (from GFI breaker to power module to load) must be run in its own non-metallic conduit, or nuisance tripping may occur. Maximum 100 ft (30.5 m) between power module and load.
- May be used with AFI breaker protected loads. Maximum load on AFI circuit is 1000 W. Exceeding 1000 W may cause nuisance tripping of AFI breaker.

Wiring to a Dimmer

Single Power Module to Single Control Device: Combined Power Feed for Control and Load Sides

- The power module may be on the same circuit/control zone as the control unit only if the total load does not exceed the rating of the breaker.
- Use PHPM-WBX- models for 3-wire fluorescent dimmers and PHPM-PA- models for other dimmer types.
- PHPM-PA-DV-WH and PHPM-WBX-DV-WH are included as 120 V~ only because of limits on zone-in voltages.
- For specific wire colors, see the wallbox lighting controls catalog (Lutron P/N 3691746) at www.lutron.com/wallbox



(continued on next page…)

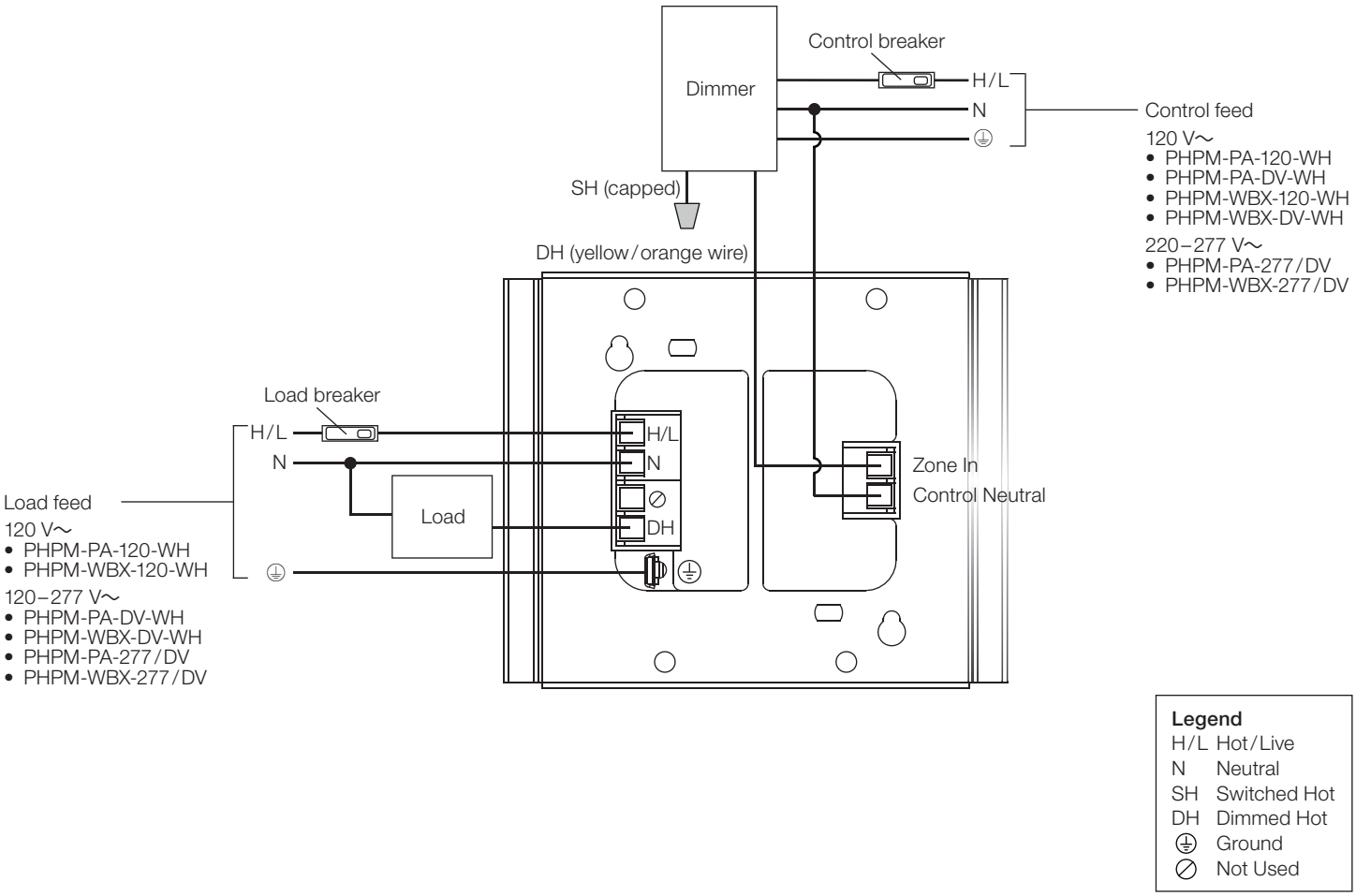
Job Name:	Model Numbers:	
Hotel Hartness	PHPM-PA-120	
Job Number:		

Wiring to a Dimmer (continued)

Single Power Module to Single Control Device: Separate Power Feeds for Control and Load Sides

- The load breaker may be on a different phase from the control breaker.
- Use PHPM-WBX- models for 3-wire fluorescent dimmers and PHPM-PA- models for other dimmer types.
- Load feed must not exceed voltage rating of the load[1]; control feed must not exceed voltage rating of the dimmer[2].
- For specific wire colors, see the wallbox lighting controls catalog (Lutron P/N 3691746) at www.lutron.com/wallbox

1 "Load feed" and "load voltage" refer to the circuit powering the load dimmed by the power module.
2 "Control feed" and "control voltage" refer to the circuit powering the dimmer that controls the power module.



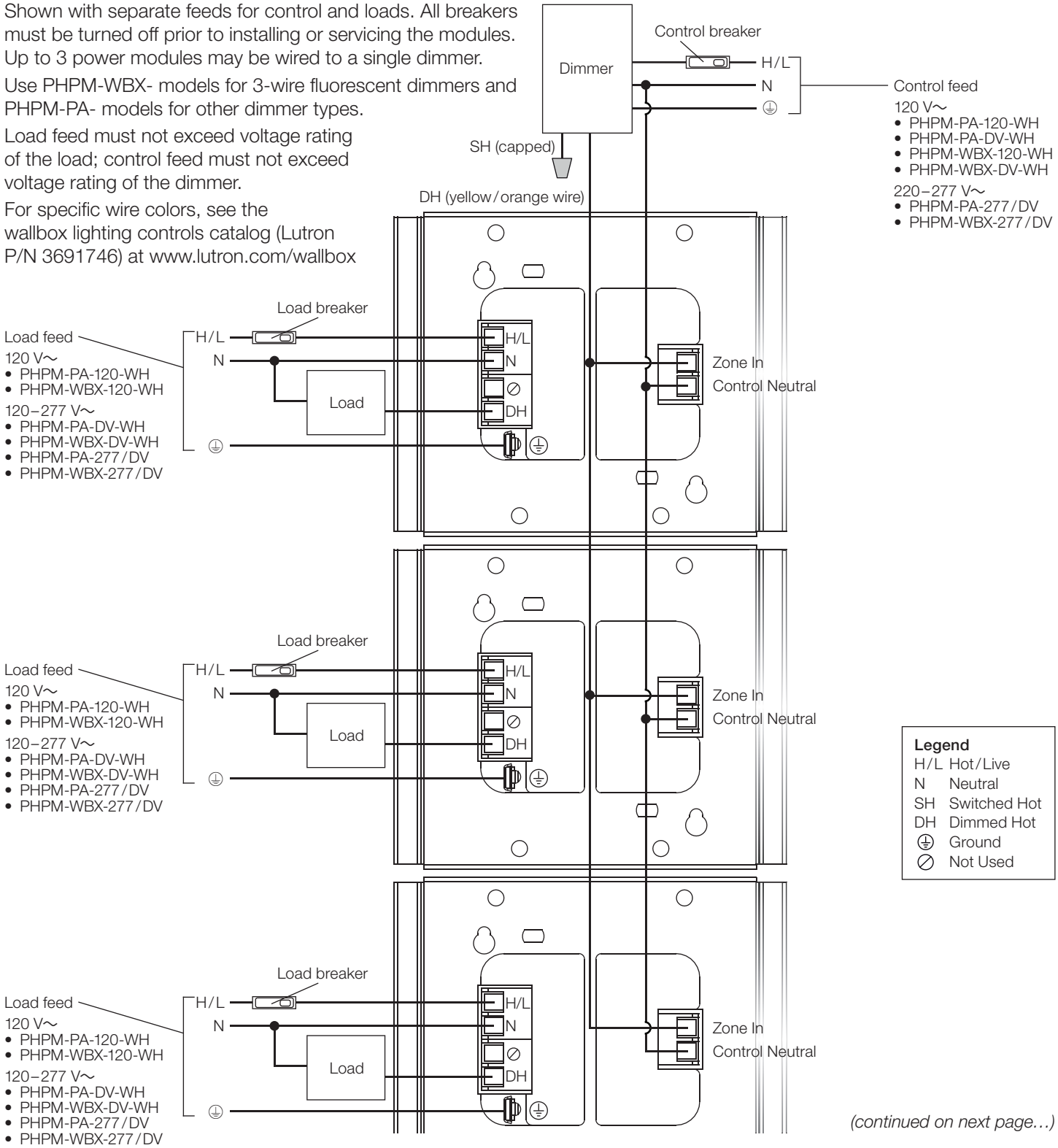
(continued on next page…)

Job Name:	Model Numbers:	
Hotel Hartness	PHPM-PA-120	
Job Number:		

Wiring to a Dimmer (continued)

Multiple Power Modules to Single Control Device

- Shown with separate feeds for control and loads. All breakers must be turned off prior to installing or servicing the modules. Up to 3 power modules may be wired to a single dimmer.
- Use PHPM-WBX- models for 3-wire fluorescent dimmers and PHPM-PA- models for other dimmer types.
- Load feed must not exceed voltage rating of the load; control feed must not exceed voltage rating of the dimmer.
- For specific wire colors, see the wallbox lighting controls catalog (Lutron P/N 3691746) at www.lutron.com/wallbox



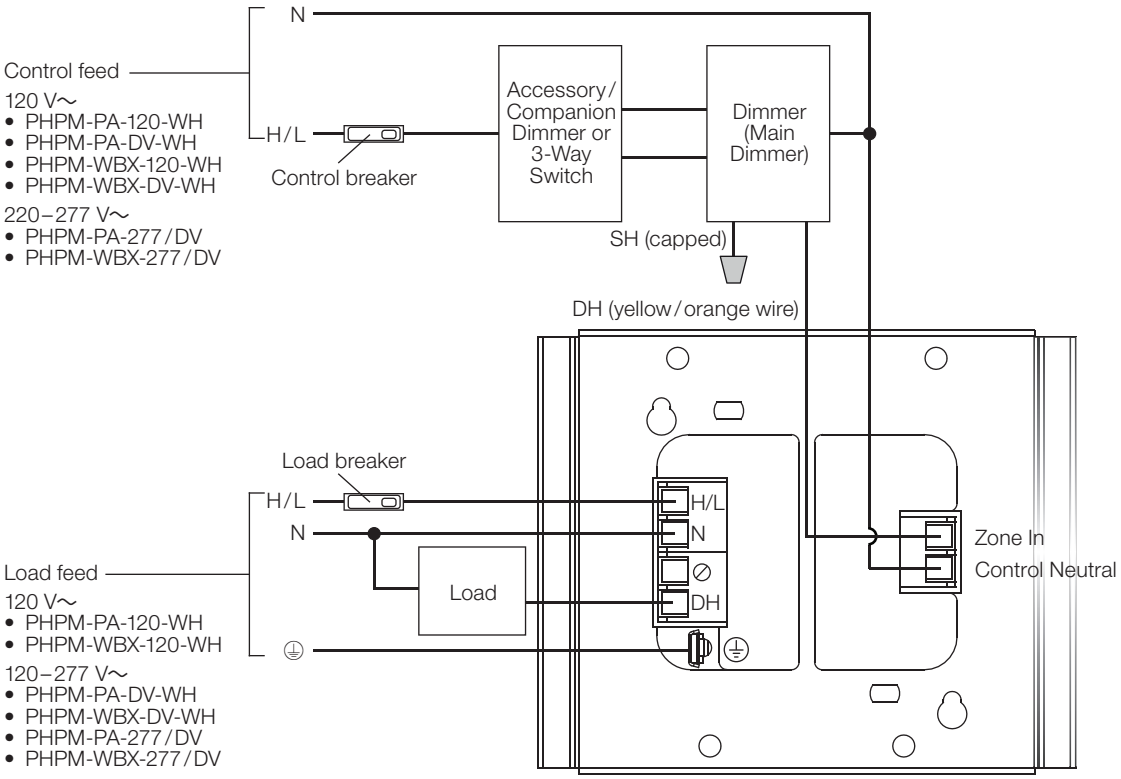
(continued on next page…)

Job Name:	Model Numbers:	
Hotel Hartness	PHPM-PA-120	
Job Number:		

Wiring to a Dimmer (continued)

Single Power Module to Multiple Control Devices

- The power module may be on the same circuit/control zone as the control unit only if the total load does not exceed the rating of the breaker.
- Use PHPM-WBX- models for 3-wire fluorescent dimmers and PHPM-PA- models for other dimmer types.
- Load feed must not exceed voltage rating of the load; control feed must not exceed voltage rating of the dimmer.
- For specific wire colors, see the wallbox lighting controls catalog (Lutron P/N 3691746) at www.lutron.com/wallbox



Legend

H/L	Hot/Live
N	Neutral
SH	Switched Hot
DH	Dimmed Hot
⏚	Ground
⊘	Not Used

Job Name:	Model Numbers:	
Hotel Hartness	PHPM-PA-120	
Job Number:		

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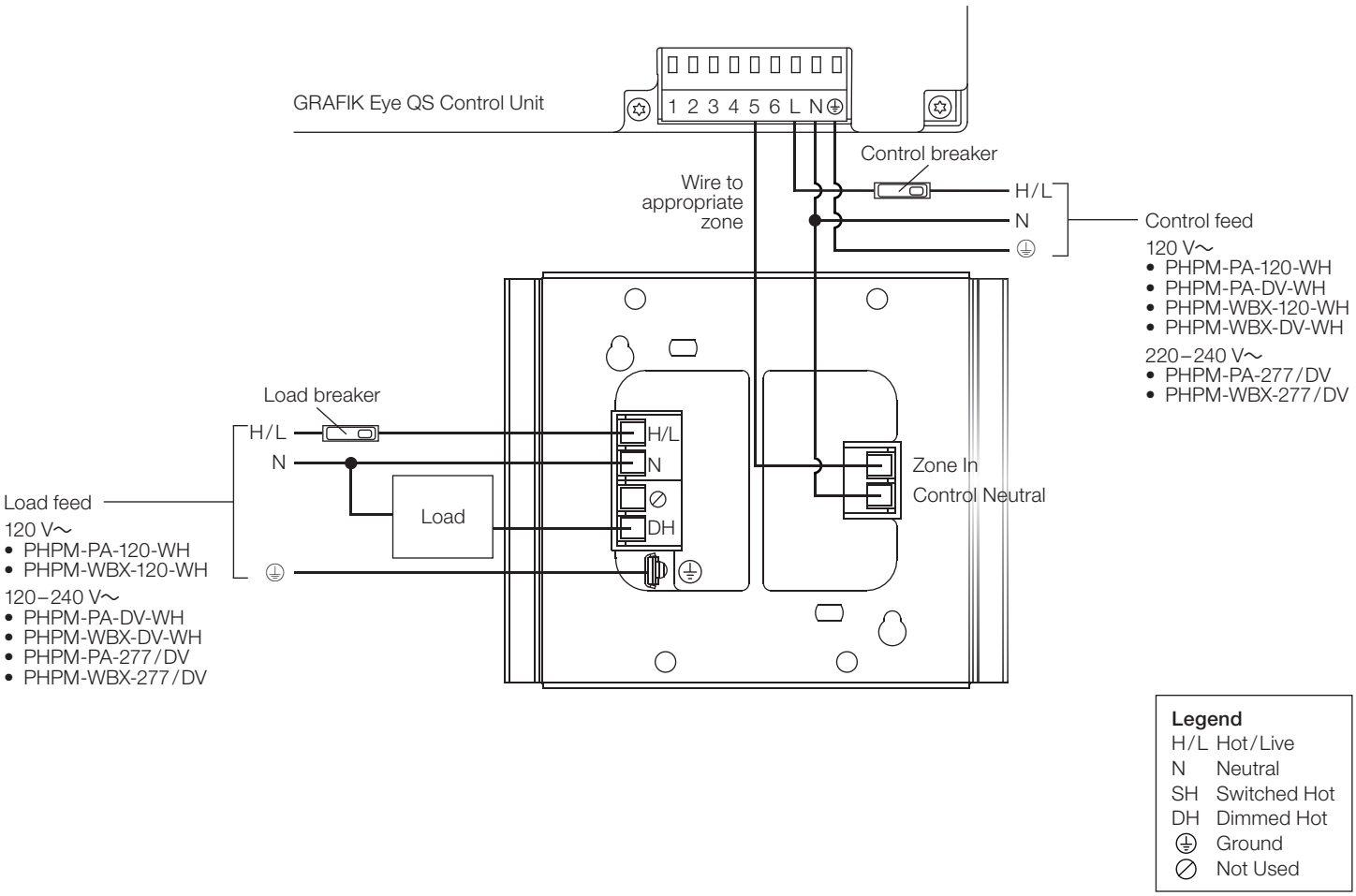
Wiring to a GRAFIK Eye QS

Single Power Module to Single Control Device: Separate Power Feeds for Control and Load Sides

- The load type for the output must be set appropriately on the panel's circuit selector (for an LP or GP panel), on the controller (for an LCP panel), or in the HomeWorks software (for a HomeWorks panel).
  - For PHPM-PA- models, set load type to "incandescent".
  - For PHPM-WBX- models, set load type to "fluorescent".
- Load feed must not exceed voltage rating of the load; control feed must not exceed voltage rating of the dimmer.
- For specific wire colors, see the wallbox lighting controls catalog (Lutron P/N 3691746) at www.lutron.com/wallbox



Job Name:	Model Numbers:	
Hotel Hartness	PHPM-PA-120	
Job Number:		

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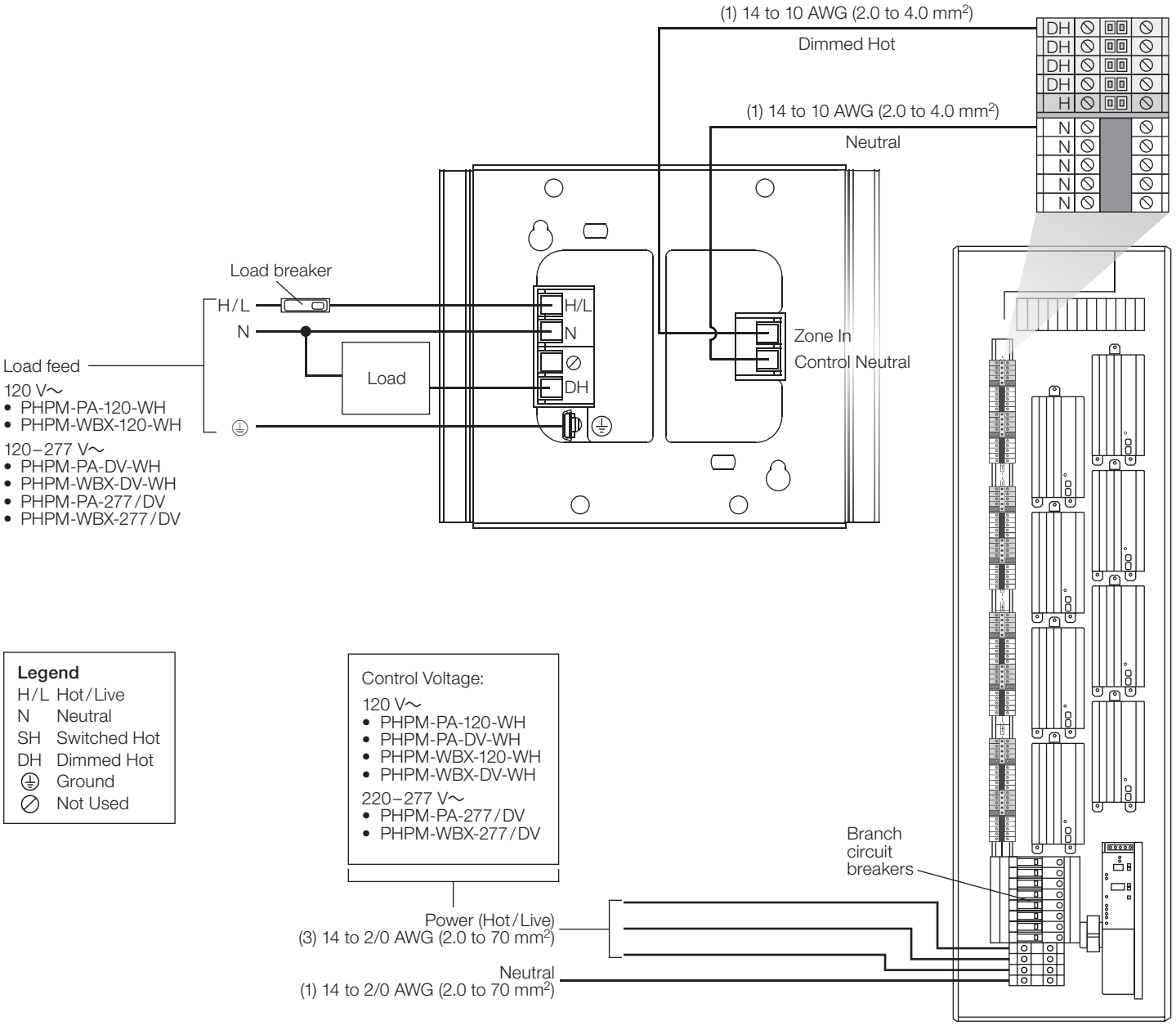
Wiring to an LP, GP, LCP, or HomeWorks Panel

Single or Multiple Power Modules to Single Power Panel

- The load type for the output must be set appropriately on the panel's circuit selector (for an LP or GP panel), on the controller (for an LCP panel), or in the HomeWorks software (for a HomeWorks panel).
  - For PHPM-PA- models, set load type to "incandescent".
  - For PHPM-WBX- models, set load type to "fluorescent".
- Load feed must not exceed voltage rating of the load.
- For specific wire colors, see the wallbox lighting controls catalog (Lutron P/N 3691746) at www.lutron.com/wallbox



Job Name:	Model Numbers:	
Hotel Hartness	PHPM-PA-120	
Job Number:		

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QSE-CI-NWK-E Control Interface

The QSE-CI-NWK-E is a versatile integration access point for Lutron® QS-based systems. Through either RS232 or TCP/IP over Ethernet, third-party devices can control and/or monitor a QS system.

Features

- Easily integrate with touchscreens, PCs, A/V systems, or other digital systems and devices.
- Control and monitor GRAFIK Eye® QS, Sivoia® QS, Energi Savr Node™, and other products on the wired QS link.
- Monitor lighting scenes, levels, shade positions and more. For a full list of commands see Integration Protocol document (P/N 040249) at www.lutron.com
- Up to 10 QSE-CI-NWK-E control interfaces are allowed per QS link.
- The QSE-CI-NWK-E is Quantum® compatible. Refer to the Quantum® System Specification Sheet (P/N 369634) at www.lutron.com for compatibility details.

Job Name:	Model Numbers:	
Hotel Hartness	QSE-CI-NWK-E	
Job Number:		

Specifications

Power

- SELV/PELV/NEC® Class 2
- Operating voltage: 24–36 V⎓ 65 mA

QS Link Limits

- The QS wired communications link is limited to 100 devices and 100 zones. Each QSE-CI-NWK-E control interface counts as 1 device and 0 zones.
- Each QSE-CI-NWK-E control interface consumes 2 Power Draw Units (PDU) on the QS link. Refer to the QS Link Power Draw Units Specification Submittal (P/N 369405) at www.lutron.com for more information.
- The maximum wiring length for the QS link is 2000 ft (610 m).

Environment

- 32 °F to 104 °F (0 °C to 40 °C).
- Relative humidity less than 90% non-condensing.
- Indoor use only.
- Unit generates heat, maximum 8 BTU/hr.

Integration Features

- Monitoring: Current scene, zone level, button presses, shade group levels.
- Control: Scene selection, scene lockout, zone lockout, sequencing, zone raise/lower, master raise/lower, set shade group level, simulate button press/release.

  For the full list of features and commands, please refer to the Integration Protocol document (P/N 040249) on the accompanying CD or at www.lutron.com

Compatible Components

- Compatible with most QS devices. For a complete list of compatible components see Integration Protocol document (P/N 040249) at www.lutron.com

Requirements

- QS Link Power Supply, such as a:
  – GRAFIK Eye® QS.
  – QS Link power supply, such as the QSPS-P1-1-50 .
  – Energi Savr Node™ QS.
- QS Communication Link - SELV/PELV/NEC® Class 2 (see QS Link Wire Sizes table).

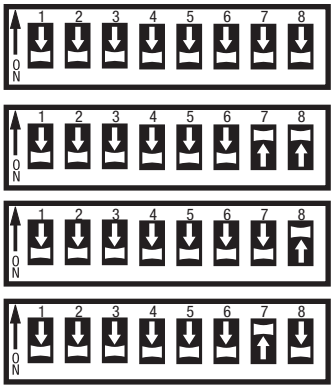
Protocol

- Integration Protocol document (P/N 040249) included on a CD accompanying the packaged QSE-CI-NWK-E.
- Also available for download, see Integration Protocol document (P/N 040249) at www.lutron.com

RS232 Connection

- Standard 9-pin female serial connector on interface.
- 50 ft (15 m) maximum serial cable length.
- Dip switches are set at factory, all Off.
- Dip switches are used to set RS232 baud rate:

DIP Switch Settings for RS232 Baud Rate



Ethernet Connection

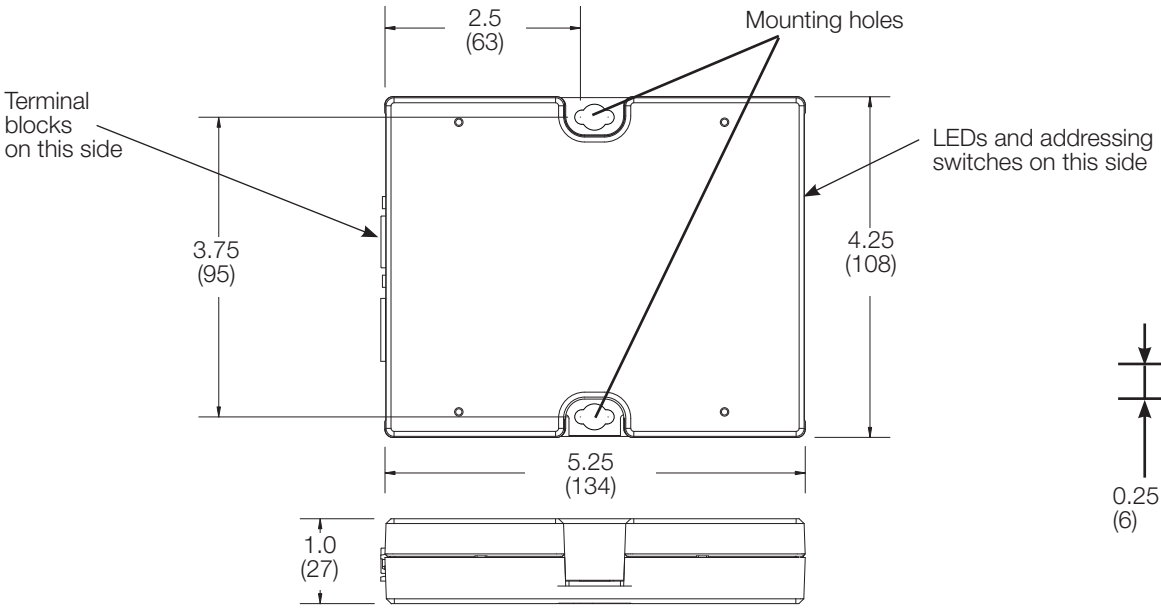
- Standard CAT5 (or better) cable, 328 ft (100 m) maximum, connects the QSE-CI-NWK-E interface to a PC or other Ethernet source.
- Supports MDI/MDIX auto-crossover (no crossover cable needed).
- Auto-negotiation of 10 or 100 Mbps speed and full- or half-duplex operation.
- Default IP address is 192.168.250.1. Can be changed using the Lutron® DeviceIP tool located on the accompanying CD.

Note: Either the RS232 or the Ethernet can be used, but not both.

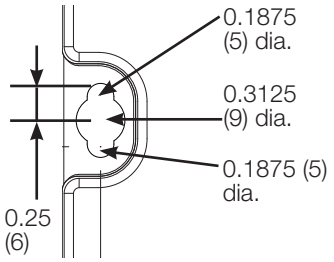
Job Name:	Model Numbers:	
Hotel Hartness	QSE-CI-NWK-E	
Job Number:		

Dimensions

Dimensions are in inches (mm)



Mounting Hole Detail



#6 or #8 (M3 or M4)
screw recommended

Mounting Options

Mount where terminal blocks, switches, and LEDs are accessible. Strip 3/8 in (10 mm) of insulation from wires. Each data link terminal will accept up to two 18 AWG (1.0 mm²) wires. Connect wiring as shown on the Wiring page. LED 1 lights continuously (Power) and LED 7 blinks rapidly (Data Link RX) when the SELV/PELV/NEC® Class 2 Data Link is installed correctly. Choose from the following mounting methods:

1 Direct Wall Mounting

Mount the control interface directly on a wall, as shown in Mounting Methods at right, using screws (not included). When mounting, provide sufficient space for connecting cables.

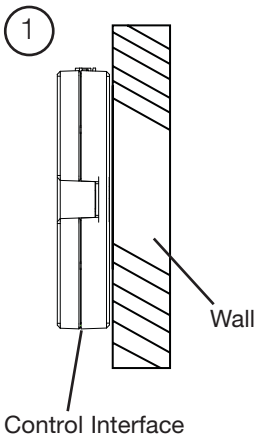
2 Rack Mounting

Place the unit in the LUT-19AV-1U AV rack using screws provided with the unit. The LUT-19AV-1U will hold up to four units.

3 Enclosed Wall Mounting

If conduit is desired for wiring, use the LUT-5x10-ENC to mount one unit.

Mounting Methods

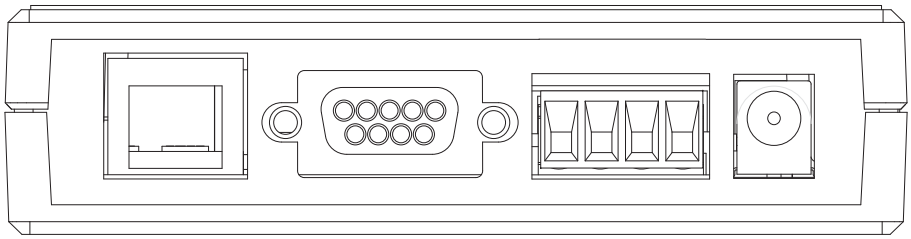


LUT-19AV-1U

LUT-5x10-ENC

Job Name:	Model Numbers:	
Hotel Hartness	QSE-CI-NWK-E	
Job Number:		

Terminal Locations

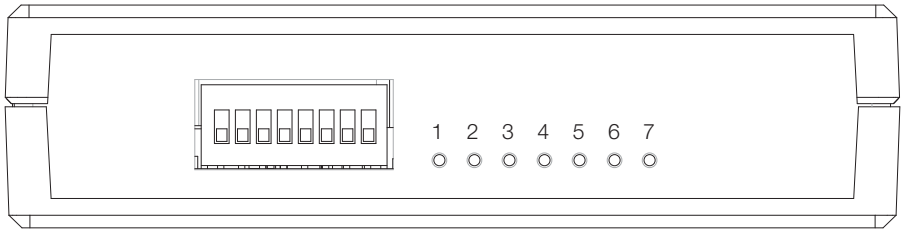


Ethernet Link (to PC or AV Equipment

Female 9-pin RS232 Link (to PC or AV Equipment)

QS Link to other wired QS system Devices

LED and DIP Switch Locations



DIP Switches

LED 1: Power
LED 2: Ethernet Activity
LED 3: Unused
LED 4: RS232 Link Tx
LED 5: RS232 Link Rx
LED 6: QS Link Tx
LED 7: QS Link Rx

Wiring

RS232 Link

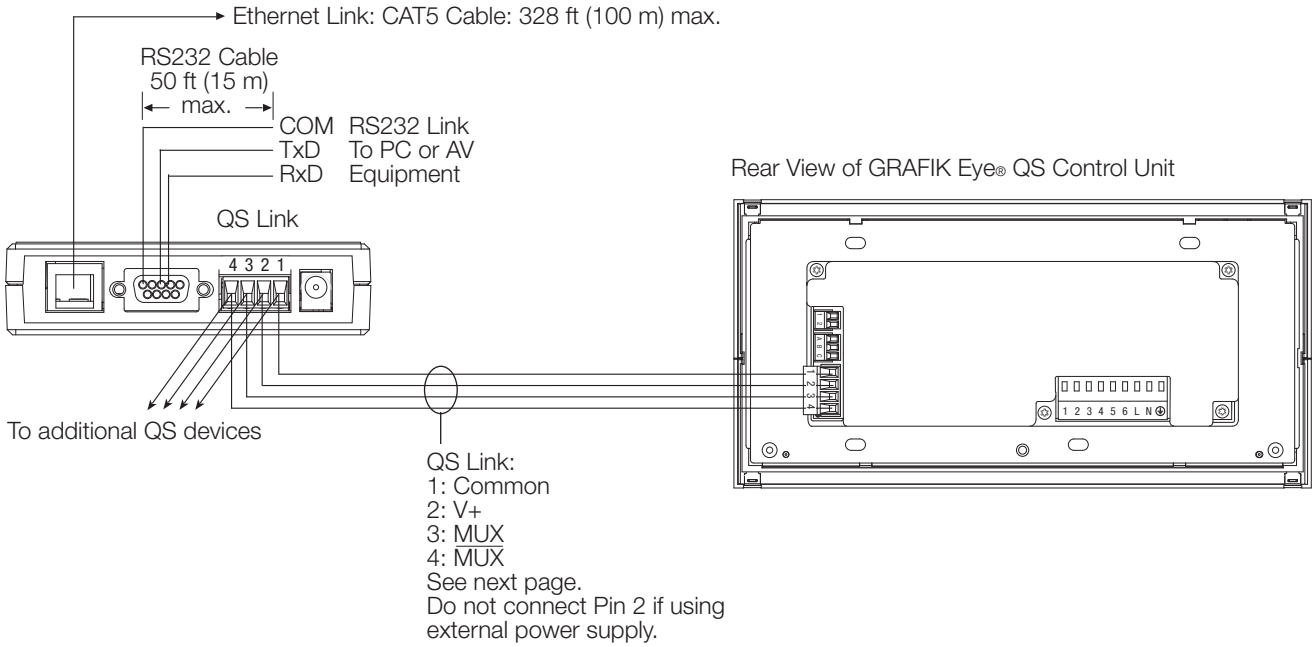
- Standard 9-pin serial connector plugs into RS232 equipment, and to QSE-CI-NWK-E.
- Must be 50 ft (15 m) or less.

RS232 Signals

Signals	Pin on 9-Pin Cable
Com	5
TxD	3
RxD	2

Ethernet Link Wiring

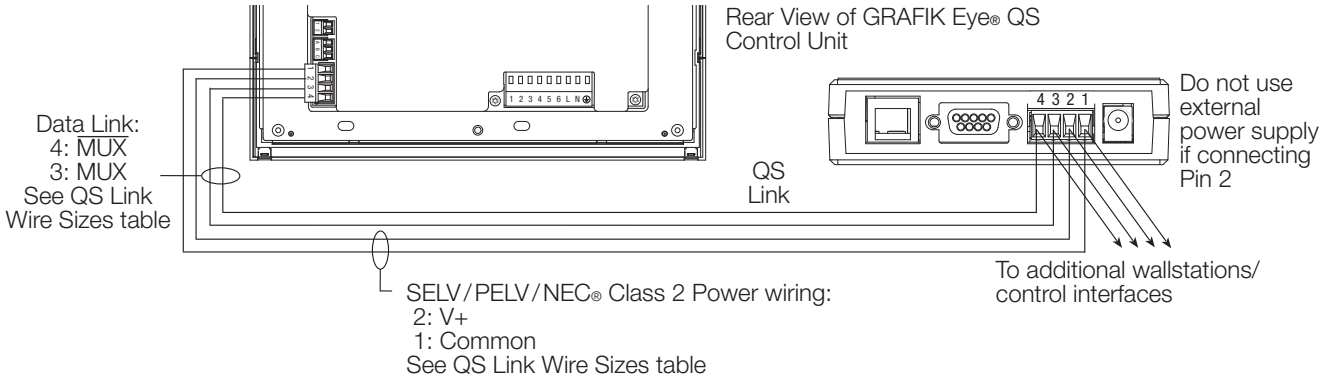
- Standard CAT5 cable connects QSE-CI-NWK-E Interface to PC, router, or other Ethernet source.
- No crossover cable needed.
- Must be 328 ft (100 m) or less.
- Ethernet network and cable provided by others.



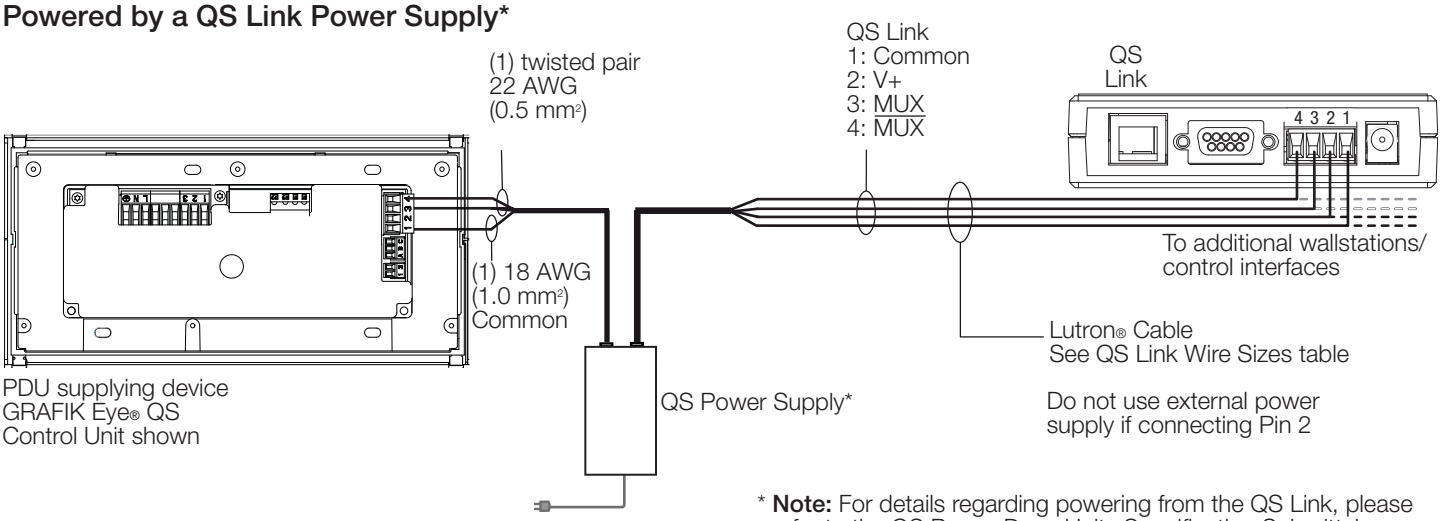
Wiring (continued): QS Link Wiring Methods (choose one)

- System communication uses SELV/PELV/NEC® Class 2 wiring. Follow all local and national electrical codes for installation.
- Each terminal accepts up to two 18 AWG (1.0 mm²) wires or one 12 AWG (4.0 mm²) wire.
- Total length of control link must not exceed 2000 ft (610 m).
- Do not allow SELV/PELV/NEC® Class 2 wires to contact live/mains wire.
- Typical Wire Sizes: See QS Link Wire Sizes table.
- Connect the terminal 1, 3, and 4 connections to all control units, wallstations, and control interfaces in the QS system. For terminal 2 connectivity, see below.

Powered by GRAFIK Eye® QS Control Unit



Powered by a QS Link Power Supply*



* **Note:** For details regarding powering from the QS Link, please refer to the QS Power Draw Units Specification Submittal (P/N 369405) at www.Lutron.com

QS Link Wire Sizes (check compatibility in your area)

QS Link Wiring Length	Wire Gauge	Lutron Cable Part Number
< 500 ft (153 m)	Power (terminals 1 and 2) 1 pair 18 AWG (1.0 mm²)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm²)	
500 ft–2000 ft (153 m–610 m)	Power (terminals 1 and 2) 1 pair 12 AWG (4.0 mm²)	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm²)	

Job Name:	Model Numbers:	
Hotel Hartness	QSE-CI-NWK-E	
Job Number:		

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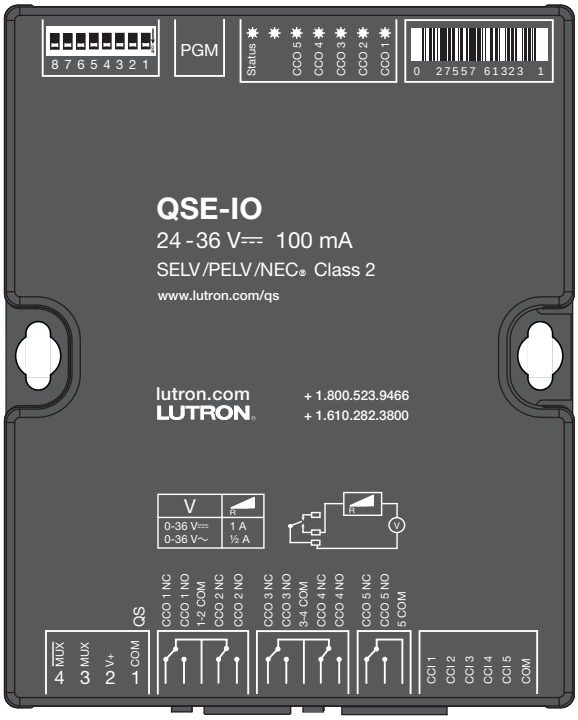
QSE-IO Control Interface

The QSE-IO contact closure interface provides integration with third-party equipment requiring contact closure input/output, including occupancy and vacancy sensors; motorized projection screens, skylights, and window shades; AV equipment; security systems; movable partition walls; and timeclocks. One QSE-IO interface provides five (5) dry contact closure outputs and five (5) inputs.

For complete functionality, programming instructions, and detailed DIP switch settings, see the QSE-IO Programming Guide, www.lutron.com/TechnicalDocumentLibrary/040391.pdf

Features

- Integrates a QS control system with equipment that has contact-closure inputs and outputs.
- Provides five inputs and five dry contact closure outputs.
- Provides both normally open (NO) and normally closed (NC) contacts.
- May be programmed to control or be controlled on a QS system.



QSE-IO Contact Closure Interface

Job Name:	Model Numbers:	
Hotel Hartness	QSE-IO	
Job Number:		

Specifications

Regulatory Approvals

- UL® Listed
- cUL® Listed
- CE compliant

Power

- SELV/PELV/NEC® Class 2
- Operating voltage: 24–36 V⎓ 100 mA

QS Link Limits

- The QS wired communications link is limited to 100 devices and 100 zones. Each QSE-IO control interface counts as 1 device and 5 zones.
- Each QSE-IO control interface consumes 3 Power Draw Units (PDU) on the QS link. Refer to the QS Link Power Draw Units Specification Submittal (P/N 369405) at www.lutron.com for more information.
- The maximum wiring length for the QS link is 2000 ft (610 m).

Environment

- 32 °F to 104 °F (0 °C to 40 °C).
- Relative humidity less than 90% non-condensing.
- Indoor use only.
- Unit generates heat, maximum 8 BTU/hr.

Functionality and Operating Modes

- Using the inputs, contact closures in other equipment can operate control units to:
  – Select scenes
  – Adjust scenes to reflect status of movable walls
  – Toggle any combination of zones in the system between Off and a configurable preset value
  – Turn lights on or off and/or move shades based on room occupancy
  – Perform special functions such as sequencing, panic, control lockout, or timeclock disable
- Using the outputs, scene and/or zone changes in control units can:
  – Trigger outputs to control other equipment
  – Provide status feedback to other equipment

Functionality and Operating Modes (continued)

- Using the inputs, contact closures in other equipment can operate Sivoia® QS window treatments to:
  – Open or close.
  – Raise, lower, or stop.
  – Select one of three adjustable presets.
- Using the outputs, key presses on QS window treatment keypads or GRAFIK Eye® QS window treatment buttons can:
  – Trigger outputs to other motorized window treatment equipment
- Scene selection
- Occupancy sensor
- Zone toggle
- Shade input
- Special functions
- Shade output
- Partitioning
- For a full list of functionality and operating modes, please see the Operating Modes and Dipswitch Settings table on Pages 8 and 9

Requirements

- QS Link Power Supply, such as a:
  - GRAFIK Eye® QS
  - QS Link power supply, such as the QSPS-P1-1-50
  - Energi Savr Node™ QS
  - Quantum® light management hub
- QS Communication Link (SELV/PELV/NEC® Class 2) (see QS Link Wire Sizes table)

Specifications *(continued)*

Five Input Terminals

- Accept maintained inputs and momentary inputs with
  40 msec minimum pulse times
- Off-state leakage current must be less than 100 µA
- Open circuit voltage: 24 V⎓ maximum
- Inputs must be dry contact closure, solid state, open collector, or active-low (NPN) / active high (PNP) output
  – Open collector NPN or active-low on-state voltage must be less than 2 V⎓ and sink 3.0 mA
  – Open collector PNP or active-high on-state voltage must be greater than 12 V⎓ and source 3.0 mA

Five Output Terminals

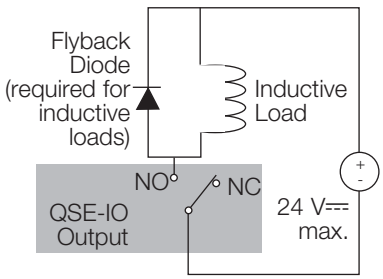
- Provide selectable maintained or momentary (1/4 second) outputs (SELV / PELV / NEC® Class 2 rated only)
- The QSE-IO is not rated to control unclamped, inductive loads. Inductive loads include, but are not limited to, relays, solenoids, and motors. To control these types of equipment, a flyback diode must be used (DC voltages only). See "Terminal Locations"
- Output relays are non-latching (if relays are closed and power is lost, relays will open)

Status LEDs

- Five Status LEDs light when associated output is active (on)

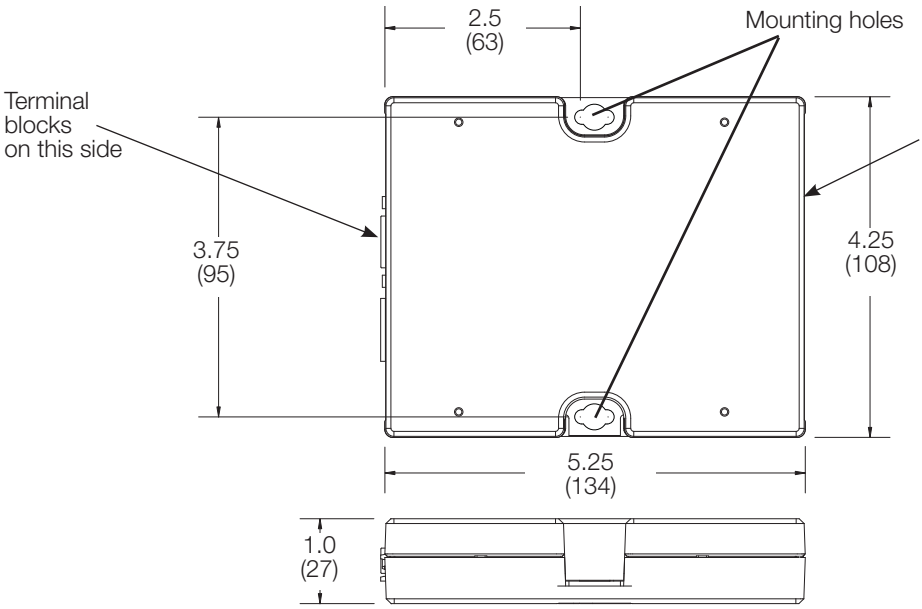
Output Ratings

Supply Voltage	Resistive Load
0–24 V⎓	1.0 A
0–24 V∼	0.5 A

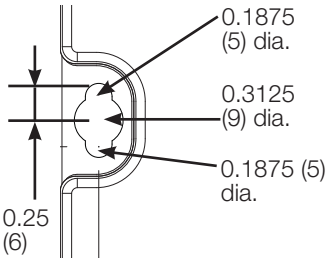


Dimensions

Dimensions are in inches (mm)



Mounting Hole Detail



#6 or #8 (M3 or M4)
screw recommended

Mounting Options

Mount where terminal blocks, switches, and LEDs are accessible. Strip 3/8 in (10 mm) of insulation from wires. Each data link terminal will accept up to two 18 AWG (1.0 mm²) wires. Connect wiring as shown on the Wiring page. LED 1 lights continuously (Power) and LED 7 blinks rapidly (Data Link RX) when the SELV/PELV/NEC® Class 2 Data Link is installed correctly. Choose from the following mounting methods:

1 Direct Wall Mounting

Mount the control interface directly on a wall, as shown in Mounting Methods at right, using screws (not included). When mounting, provide sufficient space for connecting cables.

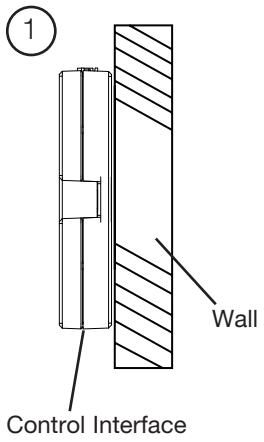
2 Rack Mounting

Place the unit in the LUT-19AV-1U AV rack using screws provided with the unit. The LUT-19AV-1U will hold up to four units.

3 Enclosed Wall Mounting

If conduit is desired for wiring, use the LUT-5x10-ENC to mount one unit.

Mounting Methods

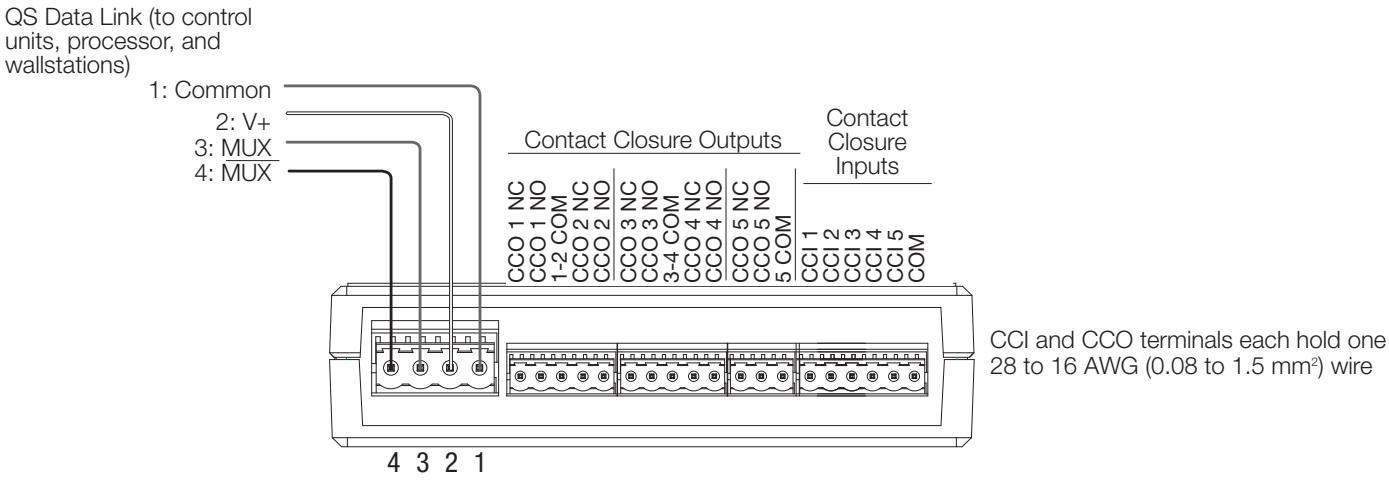


LUT-19AV-1U

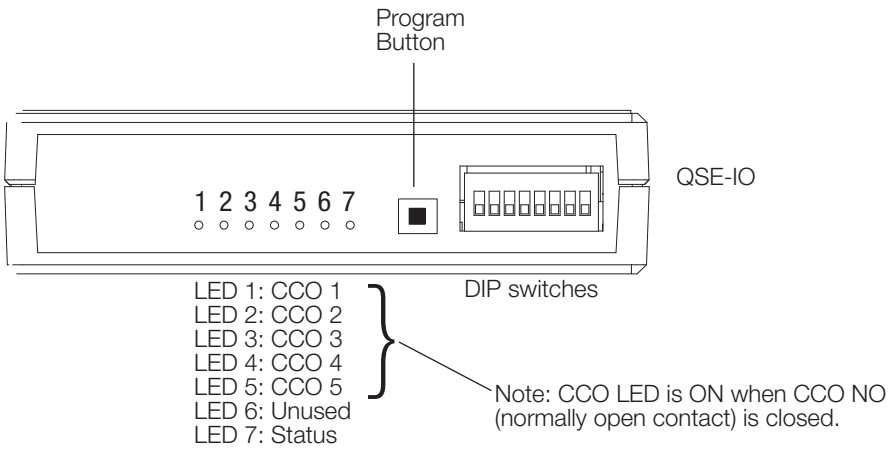
LUT-5x10-ENC

Job Name:	Model Numbers:	
Hotel Hartness	QSE-IO	
Job Number:		

Terminal Locations



LED and DIP Switch Locations



QS Link Wire Sizes (check compatibility in your area)

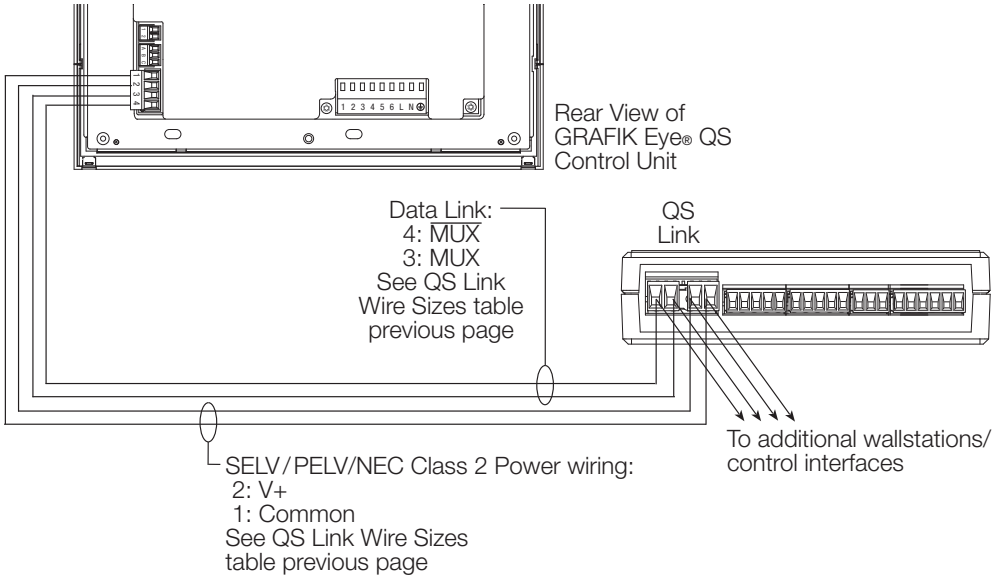
QS Link Wiring Length	Wire Gauge	Lutron® Cable Part Number
< 500 ft (153 m)	Power (terminals 1 and 2) 1 pair 18 AWG (1.0 mm²)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm²)	
500 to 2000 ft (153 to 610 m)	Power (terminals 1 and 2) 1 pair 12 AWG (4.0 mm²)	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm²)	

Job Name:	Model Numbers:	
Hotel Hartness	QSE-IO	
Job Number:		

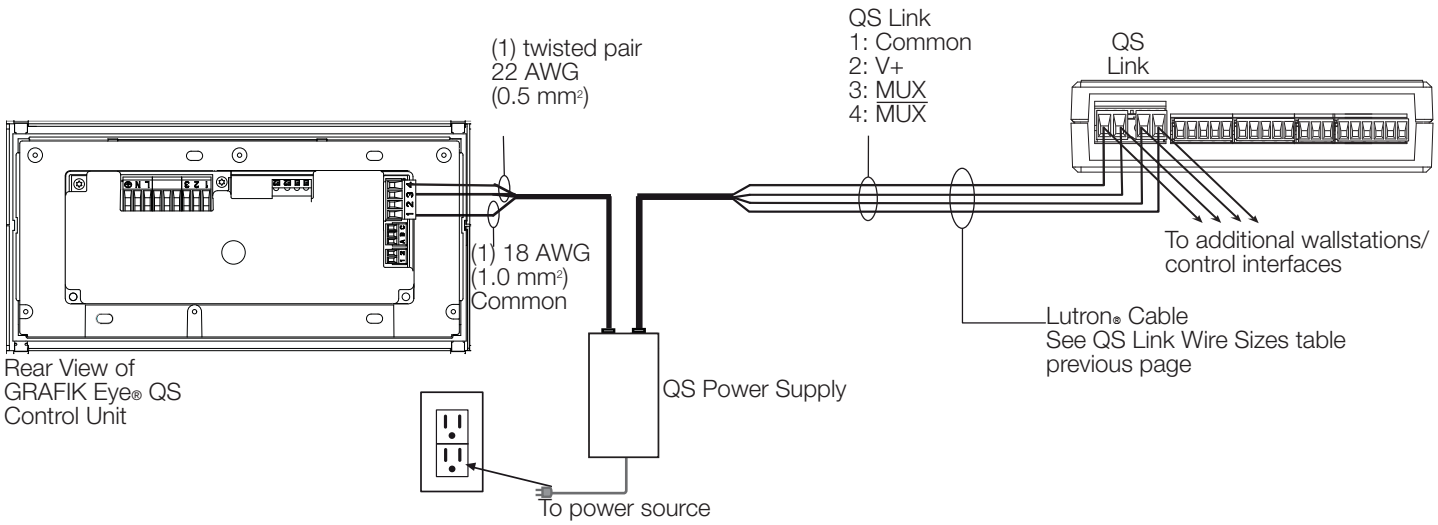
QS Link Wiring Methods (choose one)

- System communication uses SELV/PELV/NEC® Class 2 wiring.
- Follow all local and national electrical codes when installing SELV/PELV/NEC® Class 2 wiring with line voltage/mains wiring.
- Each terminal accepts up to two 18 AWG (1.0 mm²) wires.
- Total length of control link must not exceed 2000 ft (610 m).
- Typical Wire Sizes: See QS Link Wire Sizes table, previous page.
- Connect the terminal 1, 3, and 4 connections to all control units, wallstations, and control interfaces in the QS system. For terminal 2 connectivity, please refer to the wiring diagrams below.

Powered by GRAFIK Eye® QS Control Unit



Powered by a QS Link Power Supply

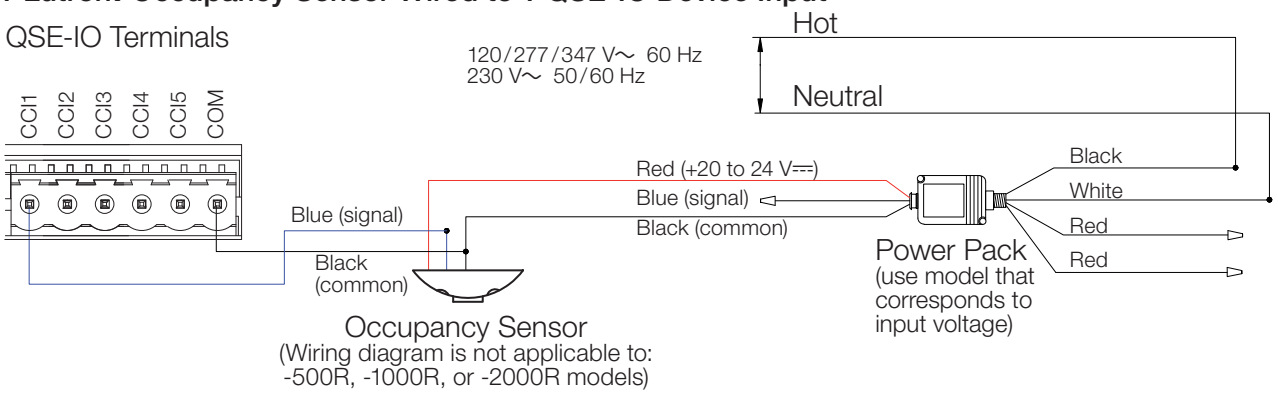


Job Name:	Model Numbers:	
Hotel Hartness	QSE-IO	
Job Number:		

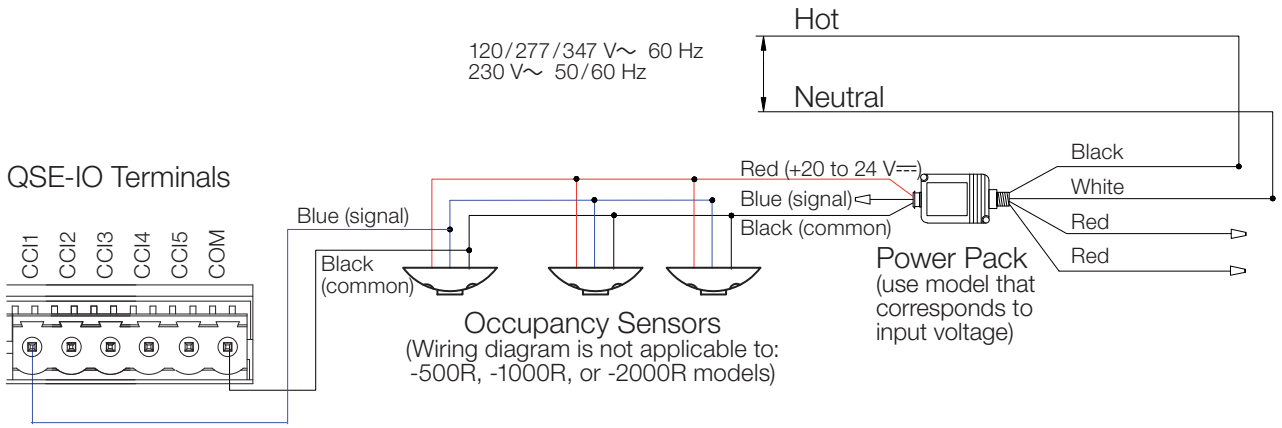
Wiring Application Examples

NOTE: Refer to Spec Submittal #369653 LOS-CDT Series on www.lutron.com for wiring details regarding Models -500R, -1000R, and -2000R for wiring the dry contact output from LOS sensors to the QSE-IO (e.g. 7 wire Occ Sensor with photocell)

1 Lutron® Occupancy Sensor Wired to 1 QSE-IO Device Input



3 Lutron® Occupancy Sensors Wired to 1 QSE-IO Device Input

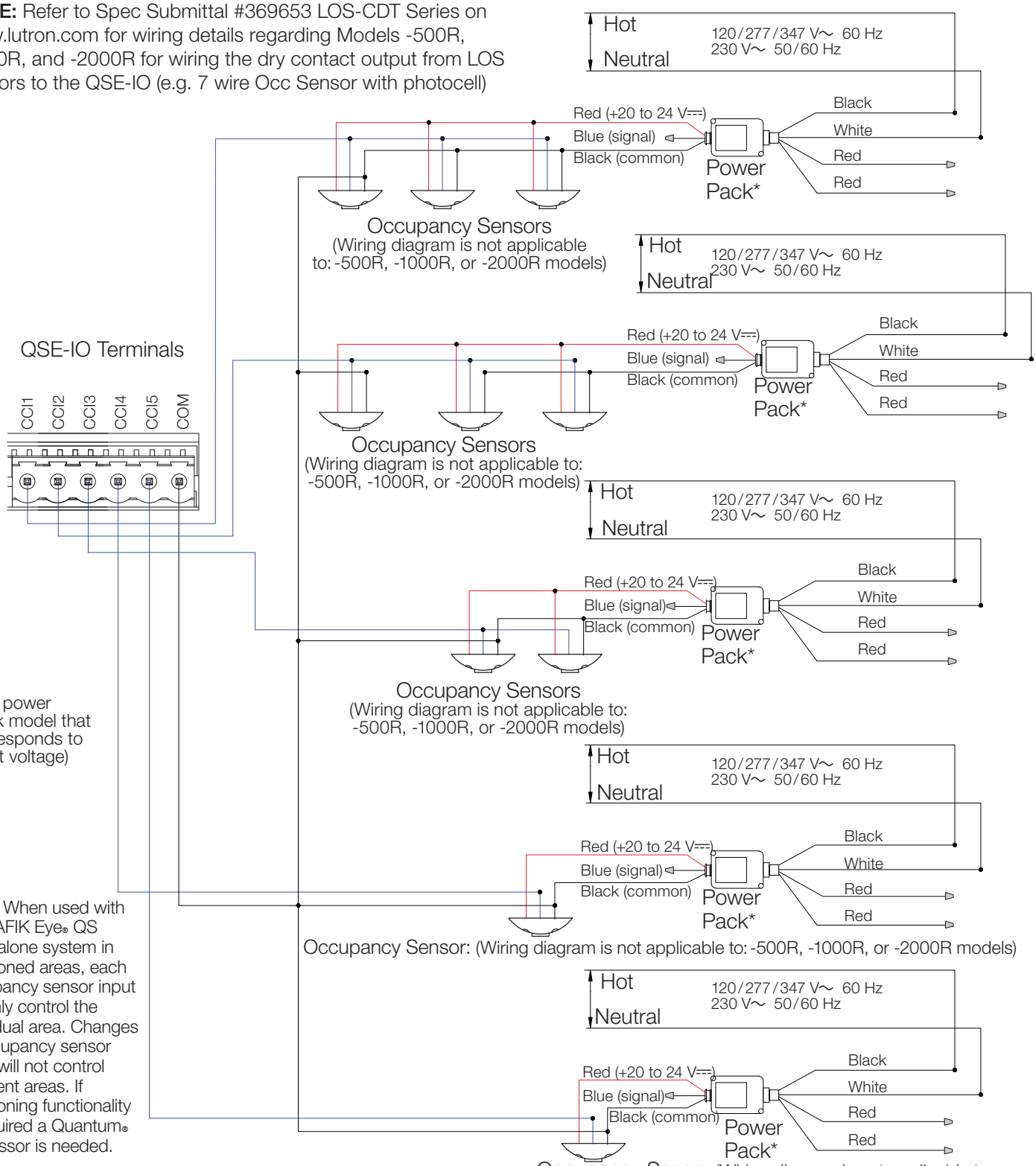


Note: When used with a GRAFIK Eye® QS standalone system in partitioned areas, each occupancy sensor input will only control the individual area. Changes in occupancy sensor state will not control adjacent areas. If partitioning functionality is required a Quantum® processor is needed.

Wiring Application Examples

Multiple Lutron® Occupancy Sensors Wired to Multiple QSE-IO Device Inputs

NOTE: Refer to Spec Submittal #369653 LOS-CDT Series on www.lutron.com for wiring details regarding Models -500R, -1000R, and -2000R for wiring the dry contact output from LOS sensors to the QSE-IO (e.g. 7 wire Occ Sensor with photocell)



Note: When used with a GRAFIK Eye® QS standalone system in partitioned areas, each occupancy sensor input will only control the individual area. Changes in occupancy sensor state will not control adjacent areas. If partitioning functionality is required a Quantum® processor is needed.

Job Name:	Model Numbers:	
Hotel Hartness	QSE-IO	
Job Number:		

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QSE-IO Operating Modes and DIP Switch Settings Overview

Mode	Dip Switch						Contact Closures Invoke:						
Configuration	3	4	5	6	7	8	Input 1	Input 2	Input 3	Input 4	Input 5	Inputs	Outputs
Scene selection							Scene 1	Scene 2	Scene 3	Scene 4	Scene Off	Maintained or Momentary	Maintained
							Scene 5	Scene 6	Scene 7	Scene 8	Scene Off		
							Scene 9	Scene 10	Scene 11	Scene 12	Scene Off		
							Scene 13	Scene 14	Scene 15	Scene 16	Scene Off		
							Scene 1	Scene 2	Scene 3	Scene 4	Scene Off	Maintained or Momentary	Momentary
							Scene 5	Scene 6	Scene 7	Scene 8	Scene Off		
							Scene 9	Scene 10	Scene 11	Scene 12	Scene Off		
							Scene 13	Scene 14	Scene 15	Scene 16	Scene Off		
Special (maintained)							Sequence 5–16	Zone lockout	Scene lockout	Panic mode	Timeclock	Maintained	Maintained
Special (momentary)							Sequence 5–16	Zone lockout	Scene lockout	Panic mode	Timeclock	Momentary	
Special 2 (maintained)							Sequence 1–4	Zone lockout	Scene lockout	Panic mode	Afterhours mode	Maintained	Maintained
Special 2 (momentary)							Sequence 1–4	Zone lockout	Scene lockout	Panic mode	Afterhours mode	Momentary	
Shade input preset (“stop if moving”)							Shade open	Shade preset 1	Shade preset 2	Shade preset 3	Shade close	Maintained or Momentary	Maintained
Shade input preset (no “stop if moving”)													
Shade input (raise, lower, stop)							Shade open	Shade raise	Shade lower	Shade stop	Shade close	Momentary or Maintained	Maintained
Shade input dual group (“stop if moving”)							Open Group 1	Close Group 1	Open Group 2	Close Group 2	—	Maintained or Momentary	Maintained
Shade input dual group (no “stop if moving”)													
Shade input dual group (raise/lower)							Raise/Stop Group 1	Lower/Stop Group 1	Raise/Stop Group 2	Lower/Stop Group 2	—	Momentary	Momentary
Shade input toggle (“stop if moving”: open/stop/close/stop)							Toggle Group 1	Toggle Group 2	Toggle Group 3	Toggle Group 4	Toggle Group 5	Momentary	Momentary
Shade input toggle (no “stop if moving”: open/close)							Toggle Group 1	Toggle Group 2	Toggle Group 3	Toggle Group 4	Toggle Group 5	Maintained	Momentary
AC Shade output (maintained outputs)							Open Group 1	Stop Group 1	Close Group 1	Open Group 2	Close Group 2	Maintained or Momentary	Maintained
AC Shade output (momentary stop)							Open Group 1	Stop Group 1 if moving	Close Group 1	Open Group 2	Close Group 2	Maintained or Momentary	Maintained (except 2, which is Momentary)
AC Shade output (momentary outputs)							Open Group 1	Stop Group 1 if moving	Close Group 1	Open Group 2	Close Group 2	Maintained or Momentary	Momentary

Notes

- For AC shades with only 2 inputs (open/close), set DIP switch 1 to the up/on position to enable the feature that mimics “stop” (asserts both “open” and “close” CCOs together when a “stop” command is received).
- The QSE-IO provides no power, only a control signal, to AC shades. Refer to the instructions that came with your shades for more information.

Legend:
Up/On
Down/Off

Job Name:	Model Numbers:	
Hotel Hartness	QSE-IO	
Job Number:		

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QSE-IO Operating Modes and DIP Switch Settings Overview (continued)

Mode	Dip Switch						Contact Closures Invoke:						
Configuration	3	4	5	6	7	8	Input 1	Input 2	Input 3	Input 4	Input 5	Inputs	Outputs
Partitioning (momentary)	↓	↓	↑	↑	↓	↓	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Momentary	Maintained
Partitioning (maintained)	↓	↓	↓	↑	↓	↓	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Maintained	Maintained
Occupancy sensor (auto on/off)	↓	↓	↑	↓	↓	↓	Generates events on occupancy and vacancy					Maintained	Maintained
Occupancy sensor (manual on/auto off)	↓	↓	↓	↓	↓	↓	Generates events on vacancy only					Maintained	Maintained
Zone toggle (maintained)	↓	↑	↓	↓	↓	↑	Toggle 1	Toggle 2	Toggle 3	Toggle 4	Toggle 5	Maintained	Maintained
Zone toggle (momentary)	↓	↑	↓	↓	↓	↓	Toggle 1	Toggle 2	Toggle 3	Toggle 4	Toggle 5	Momentary	
Zone toggle with raise/lower (maintained)	↓	↑	↓	↓	↓	↑	Toggle 1	Toggle 2	Toggle 3	Raise	Lower	Maintained	
Zone toggle with raise/lower (momentary)	↓	↑	↓	↓	↓	↓	Toggle 1	Toggle 2	Toggle 3	Raise	Lower	Momentary	
Zone control (maintained output)	↓	↑	↓	↓	↓	↑	Toggle 1	Toggle 2	Toggle 3	Toggle 4	Toggle 5	Maintained	Maintained
	↑	↑	↓	↓	↓	↑	Toggle 1	Toggle 2	Toggle 3	Toggle 4	Toggle 5	Momentary	
Zone control (momentary output)	↓	↑	↓	↓	↓	↓	Pulse 1	Pulse 2	Pulse 3	Pulse 4	Pulse 5	Maintained	Momentary
	↑	↑	↓	↓	↓	↓	Pulse 1	Pulse 2	Pulse 3	Pulse 4	Pulse 5	Momentary	
Zone control (pulsed output)	↓	↑	↓	↓	↓	↑	Pulse 1	Pulse 2	Pulse 3	Pulse 4	Pulse 5	Maintained	Pulsed
	↑	↑	↓	↓	↓	↑	Pulse 1	Pulse 2	Pulse 3	Pulse 4	Pulse 5	Momentary	
Hotel configuration 1	↓	↑	↓	↓	↓	↓	Service (make up room)	Privacy (do not disturb)	Doorbell	Start/end afterhours mode	Toggle Scene 1/ Off	1-3: Maintained or Momentary 4-5: Maintained	Maintained (except 3)
Hotel configuration 2	↓	↑	↓	↓	↓	↓	Service (make up room)	Privacy (do not disturb)	Doorbell	Start/end afterhours mode	Enable/ disable Scene lockout	1-3: Maintained or Momentary 4-5: Maintained	Maintained (except 3)
Integration configuration	↓	↑	↓	↓	↑	↑	Control output 1	Control output 2	Control output 3	Control output 4	Control output 5	Maintained or Momentary	Maintained or Momentary

Notes

- Occupancy sensor: Each input represents 1 sensor/group of sensors. Response to sensor event is programmable at the assigned lighting control.
- "Momentary" output pulse is of fixed duration (250 ms default).
  "Pulsed" output duration corresponds to activating button being held/released.
- Hotel: "Service" and "Privacy" are mutually exclusive; "Doorbell" is locked out when "Privacy" is active.
- DIP switch 1 must be up/on to activate the "Start/End Afterhours" feature on CCI4.
- DIP switch 2 must be up/on to activate the "Toggle Scene" or "Scene Blackout" feature on CCI 5.
- Occupancy sensors will not participate in partitioning logic.

Legend:
↑ Up/On
↓ Down/Off

Job Name:	Model Numbers:	
Hotel Hartness	QSE-IO	
Job Number:		

GRX-12VDC Plug-In Class 2 Transformer

Description

Use this external 12VDC power supply whenever more than three Wallstations or Control Interfaces must be powered from a single Control Unit.

- Must be Class 2/PELV rated.
- Must be rated for at least 50mA per Wallstation on the link.
- Must be a regulated supply.

Specifications

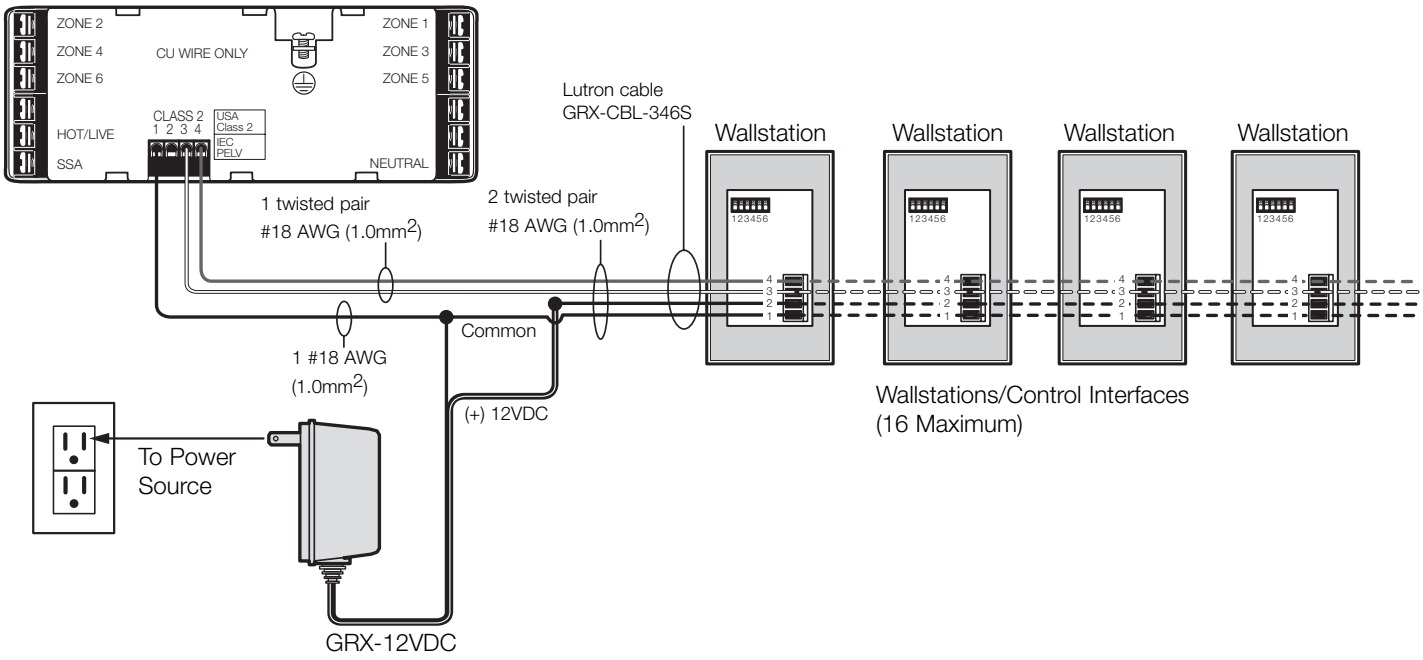
Input Power:
120V, 60 Hz.

Output Power:
Regulated 12VDC. Rated for 800mA, 9.5W. Provides power for up to 16 Wallstations.

Wiring

- Connect the +12VDC wire from the power supply to terminal 2 on all Wallstations and Control Interfaces. Do not connect this wire to any Control Units.
- Connect the COMMON wire to terminal 1 on all Wallstations, Control Interfaces, and Control Units.
- Keep the distance from the external power supply and the sixteenth Wallstation less than 300 feet (90m). With fewer Wallstations, the allowable maximum distance may be greater - consult Lutron.

Rear View of GRAFIK Eye Control Unit
(GRX-3106 shown)



Job Name:	Model Numbers:	
Hotel Hartness	GRX-12VDC	
Job Number:		

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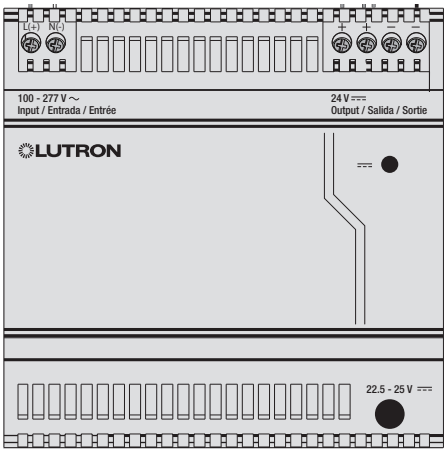
QS Link Power Supply

The QSPS-DH-1-75 QS link power supply provides up to 75 Power Draw Units (PDUs) on a QS link. The QSPS-DH-1-75 powers additional compatible accessories and devices, allowing them to be added to a QS system.



QSPS-DH-1-75

Specifications

Model Number

- QSPS-DH-1-75

Input Power

- Nominal input voltage: 100–277 V~
- Frequency: 50/60 Hz
- Current consumption, fully loaded (typical):
  0.5 A (277 V~)
  0.7 A (230 V~)
  1.0 A (120 V~)
  1.3 A (100 V~)

Power Supply Output

- Nominal output voltage and tolerance:
  24 V⎓ / ±1%, 75 Power Draw Units (PDUs)*
- 2.5 A SELV / PELV / NEC® Class 2
- Power Draw Units (PDUs): Supplies 75 PDUs maximum*

  Note: This power supply is NOT rated for use with motorized shades/window treatments.

Environment

- Ambient operating temperature : 32 °F to 131 °F (0 °C to 55 °C).
- Ambient operating humidity: 0% to 90% humidity, non-condensing. Indoor use only.
- Unit generates heat, maximum 28 BTU / hr
- 60 °C maximum calibration point temperature. For more information, see www.lutron.com/TechnicalDocumentLibrary/048466.pdf

Mounting

- Mount using 1.38 in (35 mm) DIN rail in accordance with EN 60715

Dimensions

- 3.54 in (90 mm) × 3.54 in (90 mm) × 2.40 in (61 mm)

Regulatory Approvals

- UL
- cUL
- CE compliant
- NOM compliant

Efficiency

- Meets the U.S. Department of Energy level VI efficiency standard

Warranty

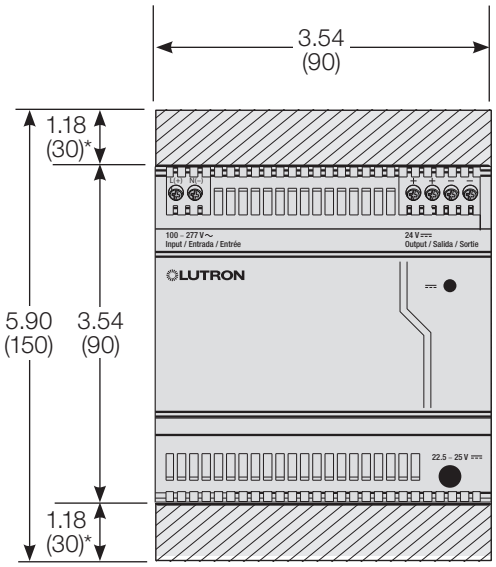
- www.lutron.com/TechnicalDocumentLibrary/3601201A_Commercial_Limited_Warranty.pdf

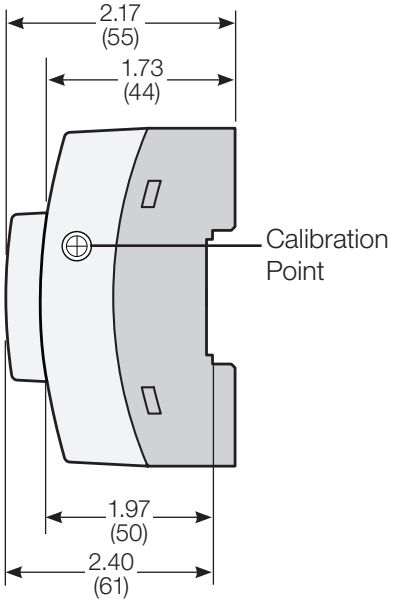
* Use above this maximum will reduce the lifetime of the supply and void all Lutron warranties. For more information about Power Draw Units (PDUs), please refer to www.lutron.com/TechnicalDocumentLibrary/369405%20pdu%20spec%20submittal.pdf

Job Name:	Model Numbers:	
Hotel Hartness	QSPS-DH-1-75	
Job Number:		

Dimensions

Dimensions shown as: in (mm)

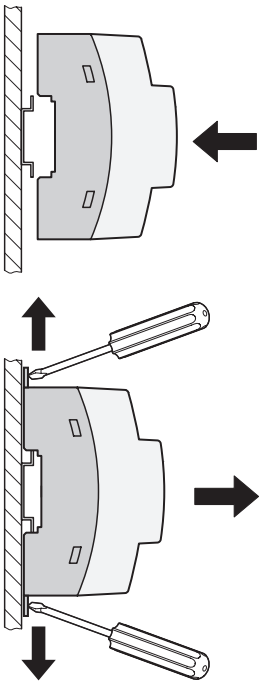




* Required clearance above and below the power supply.

Mounting

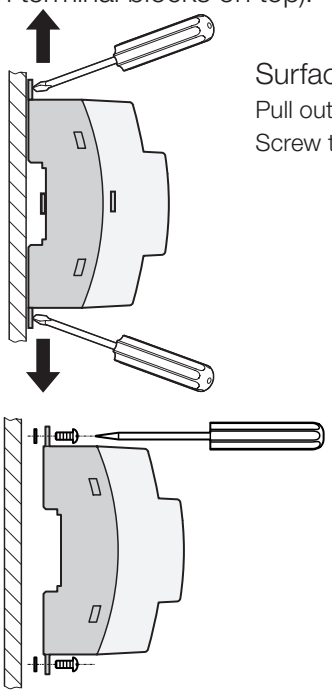
- Surface mount using screws, or mount on DIN rail
- Use an IP20 (minimum) rated consumer panel or breaker panel with integrated DIN
- The device must be mounted horizontally (connection terminal blocks on top).



DIN Rail Mounting:

Snap onto DIN rail.

To remove, pull out tabs with screwdriver and lift off.



Surface Mounting:

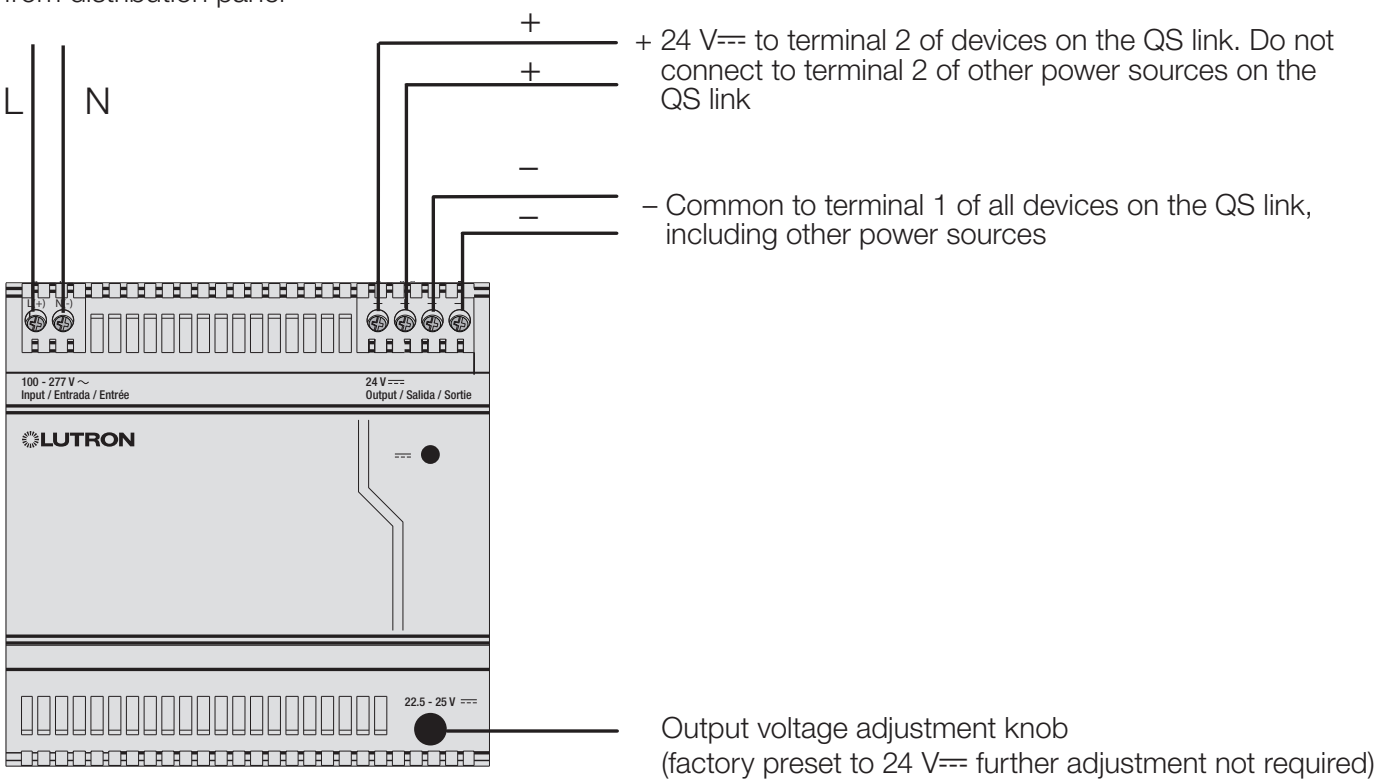
Pull out tabs with screwdriver.

Screw through tabs to secure.

Job Name:	Model Numbers:	
Hotel Hartness	QSPS-DH-1-75	
Job Number:		

Wiring

- Wire in accordance with national and local electrical codes
- Each terminal accepts one 24 AWG to 12 AWG (0.2 mm^2 to 2.5 mm^2) wire, with 1/4 in (6.5 mm) stripped bare
- Maximum torque: 5.0 in-lb to 7.0 in-lb (0.6 N•m to 0.8 N•m)



QS Link Wiring Length	Wire Gauge	Lutron Cable Part Number
Less than 500 ft (153 m)	Power (terminals 1 and 2) 1 pair 18 AWG (1.0 mm^2)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm^2)	
Up to 2000 ft (610 m)	Power (terminals 1 and 2) 1 pair 12 AWG (4.0 mm^2)	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4) 1 twisted, shielded pair 22 AWG (0.5 mm^2)	

Job Name:	Model Numbers:	
Hotel Hartness	QSPS-DH-1-75	
Job Number:		

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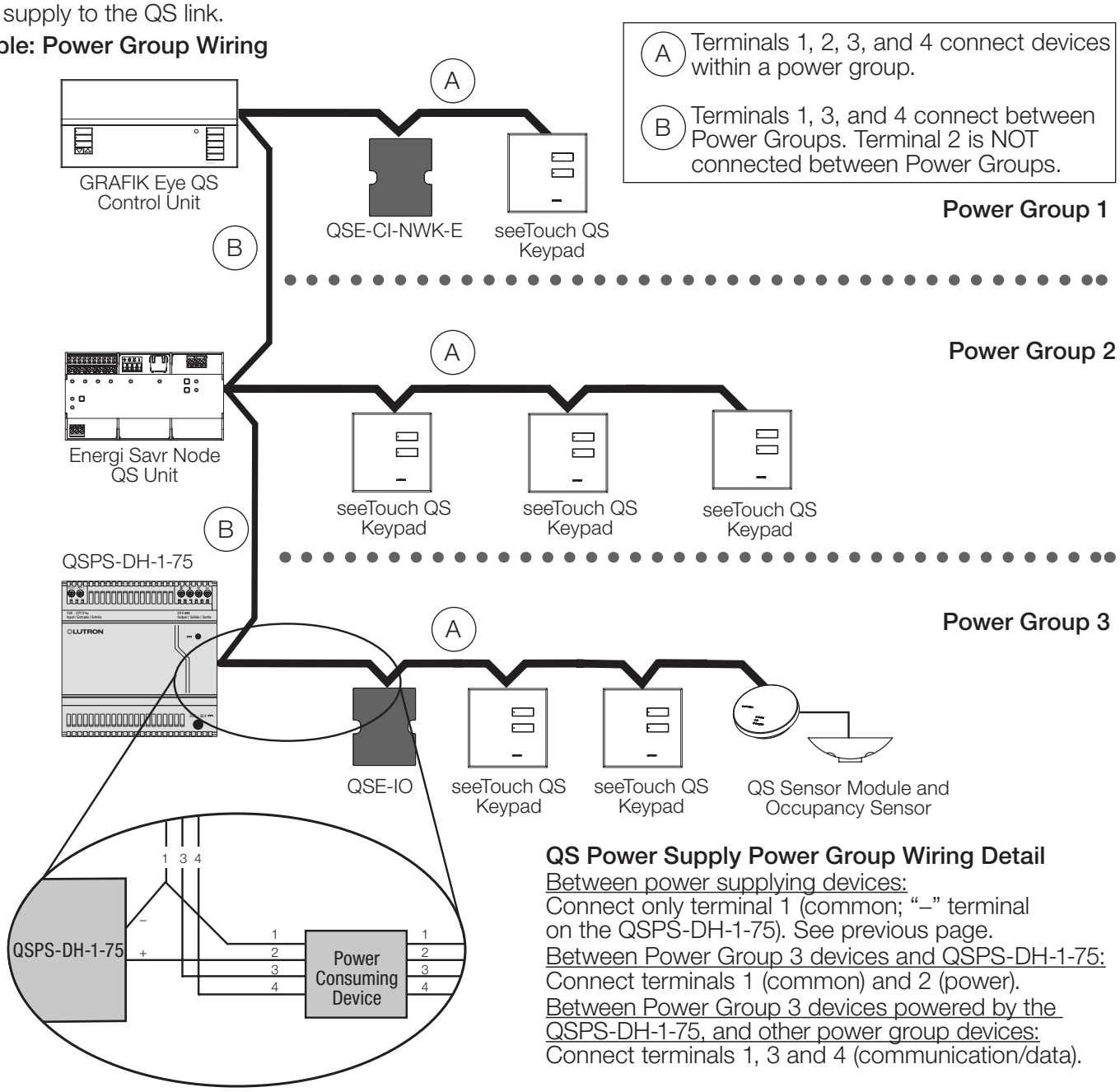
QS Link Power Distribution

On the QS link, there are devices that supply power and devices that consume power. Each device has a specific number of Power Draw Units (PDUs) it either supplies or consumes. A Power Group consists of one device that supplies power and one or more devices that consume power; each Power Group may have only one power-supplying device. Refer to the Power Draw Units (PDUs) on the QS Link Specification Submittal (Lutron P/N 369405) at www.lutron.com for more information regarding PDUs.

Within Power Groups on the QS link, connect all 4 terminals (1, 2, 3, and 4), shown by the letter A in the diagram. Between devices on the QS link that supply power, connect only terminals 1, 3, and 4 (NOT terminal 2), shown by the letter B on the diagram. See **Wiring** section on the previous page for details on wiring the QSPS-DH-1-75 power supply to the QS link.

Example: Power Group Wiring



QS Power Supply Power Group Wiring Detail

Between power supplying devices:
Connect only terminal 1 (common; "–" terminal on the QSPS-DH-1-75). See previous page.

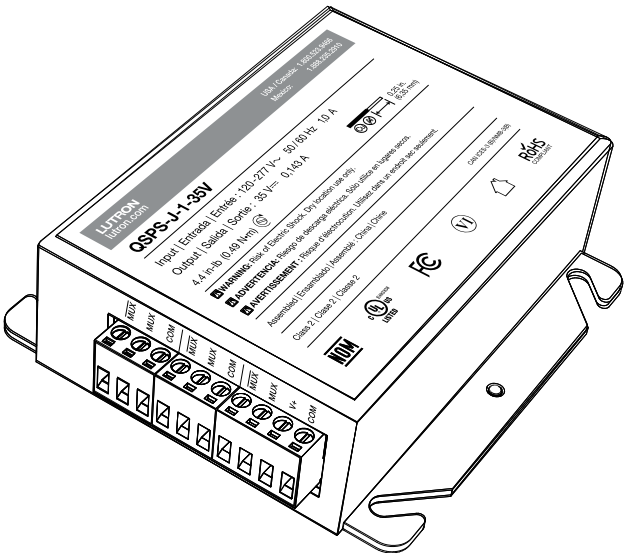
Between Power Group 3 devices and QSPS-DH-1-75:
Connect terminals 1 (common) and 2 (power).

Between Power Group 3 devices powered by the QSPS-DH-1-75, and other power group devices:
Connect terminals 1, 3 and 4 (communication/data).

Job Name:	Model Numbers:	
Hotel Hartness	QSPS-DH-1-75	
Job Number:		

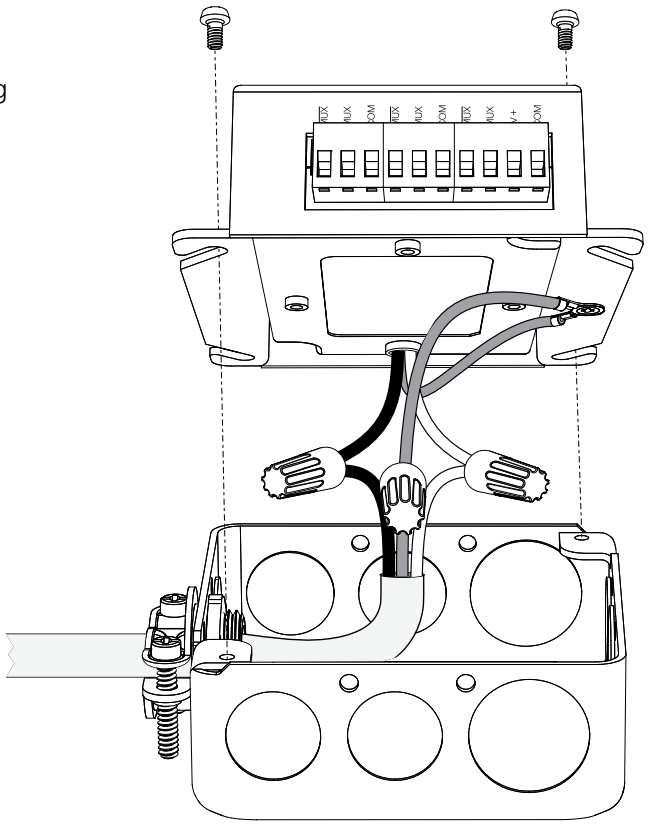
QS Junction Box Power Supply

The QS Junction Box power supply (QSPS-J-1-35V) is a 35 V⎓ power supply that is used with Lutron QS lighting and shading devices. It is designed to be hard-wired into a standard 120 - 277 V~ circuit, and mount on a 4 in x 4 in junction box, in place of the junction box cover as shown.



Features

- NEC® Class 2 / PELV power supply capable of powering Lutron Sivoia, Stanza, and Contract shades, drapery drives, keypads & accessories
- Compliant with U.S. Department of Energy Efficiency Level VI regulations for External Power Supplies
- Simple wiring scheme uses 4-conductor, low voltage link to provide power and communication pass-through for both QS electronic drive units (EDUs) and QS keypads
- Flexible wiring topology for easy installation and integration
- Removable terminal blocks for easy access to low voltage wiring
- Form factor allows the power supply to be installed discretely in utility spaces



Job Name:	Model Numbers:	
Hotel Hartness	QSPS-J-1-35V	
Job Number:		

Specifications

Power

- Input: 120 - 277 V~ 50/60 Hz 1.0 A
- Output: 35 V⎓ 0.143 A
- Capable of powering any one Lutron QS window treatment drive OR up to 8 QS PDU's (see QS Link Wiring Rules)

Input Wiring

- Three (3) 8 in, 18 AWG flying leads
- Up to 20 power supplies may be wired into a standard 20 A circuit
- No replaceable fuses
- Must be installed by a qualified electrician

Output Terminal Wiring

- 22 AWG – 12 AWG (0,5 mm^2 – 4,0 mm^2) single wire, solid or stranded
- Torque: 4.4 in-lbs (0,5 N•m)
- Strip length: 0.25 in (6 mm)
- 4-position terminal block accepts 4-conductor shade power/communication cable
- 3-position terminal block accepts 3-conductor inbound communication link
- 3-position terminal block accepts 3-conductor outbound communication link

Regulatory Approvals

- U.S. Department of Energy Level VI Compliant
- NRCan Compliant
- cULus Listed
- FCC Compliant
- NOM Certified
- RoHS Compliant

Environment

- Ambient temperature operating range: 32 °F to 104 °F (0 °C to 40 °C)
- Relative humidity: 0% to 90% non-condensing
- For indoor use only; not approved for plenum installation
- Thermal dissipation: 4.5 BTU/hr

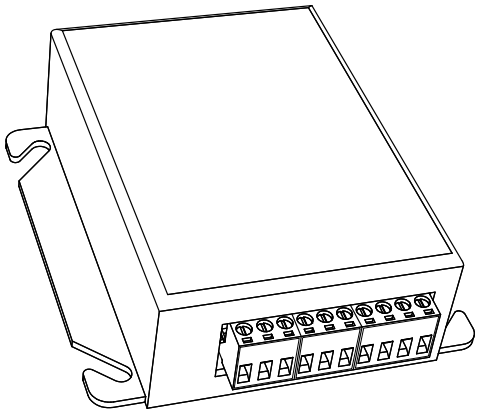
Performance

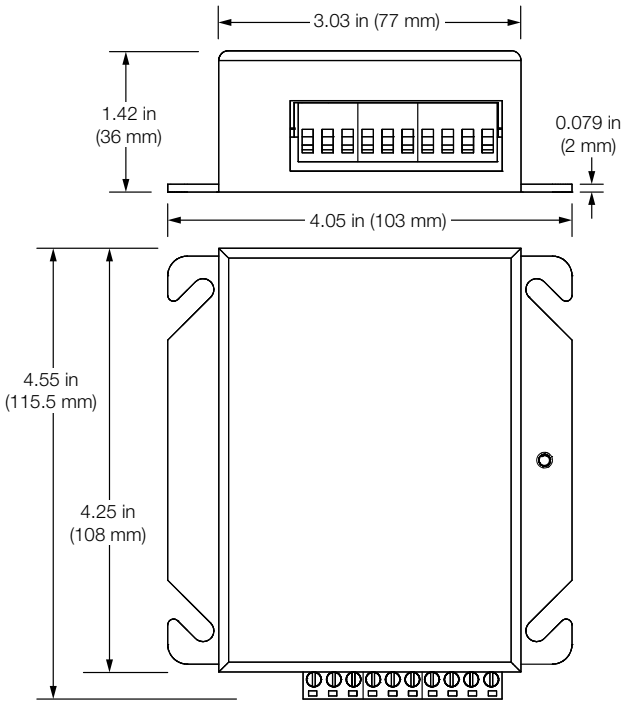
- +/- 6 kV surge protection (ANSI/IEEE C62.41 - 1991)
- +/- 16 kV ESD protection (IEC 61000 - 4 - 2 AIR DISCHARGE)
- Self-recoverable short circuit/miswire protection on power output terminals
- Self-recoverable overload/over temperature protection

Warranty

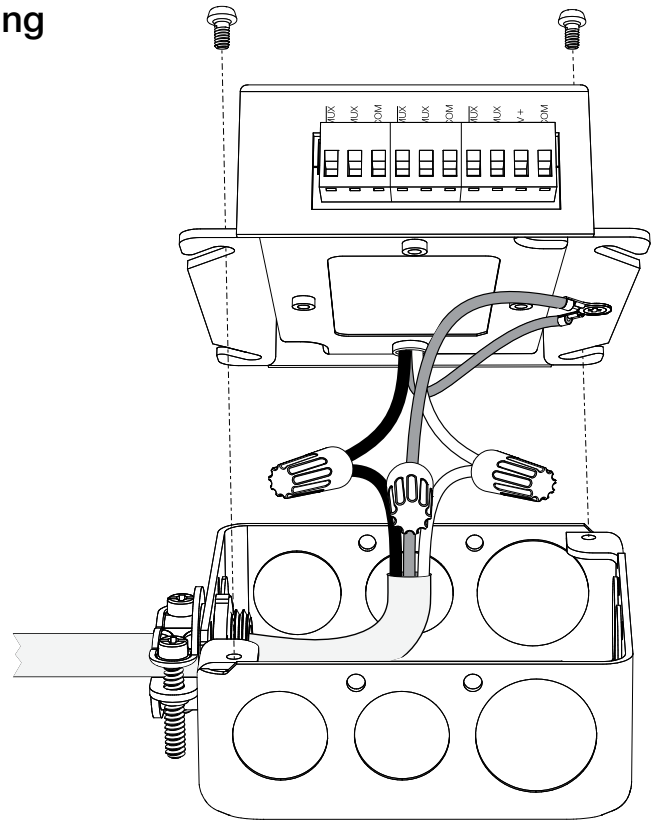
- Covered by Lutron Shading Solutions standard warranty; see: lutron.com/TechnicalDocumentLibrary/Window Systems Warranty.pdf

Dimensions





Input Wiring



Black Wire:	HOT/LIVE
White Wire:	NEUTRAL
Green Wire:	GROUND

Job Name:	Model Numbers:	
Hotel Hartness	QSPS-J-1-35V	
Job Number:		

Output Wiring Overview:

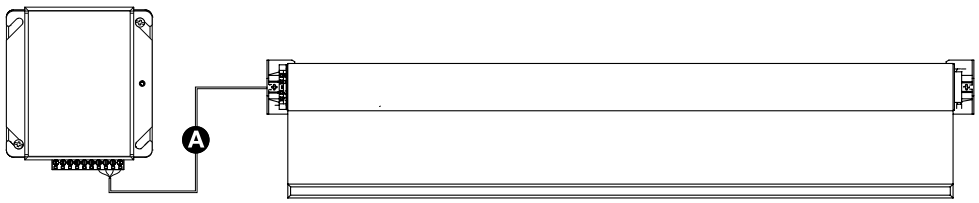
Ⓐ Power and communication link (4 conductor)

Provides power and communication to QS shades and/or keypads

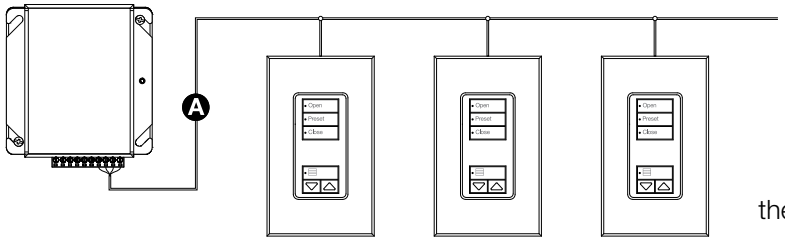
Ⓑ Communication link (3 conductor)

Used as a communications pass-through connection for QS Link devices

Example: Powering one window treatment drive unit
(maximum 1 window treatment drive unit per power supply)

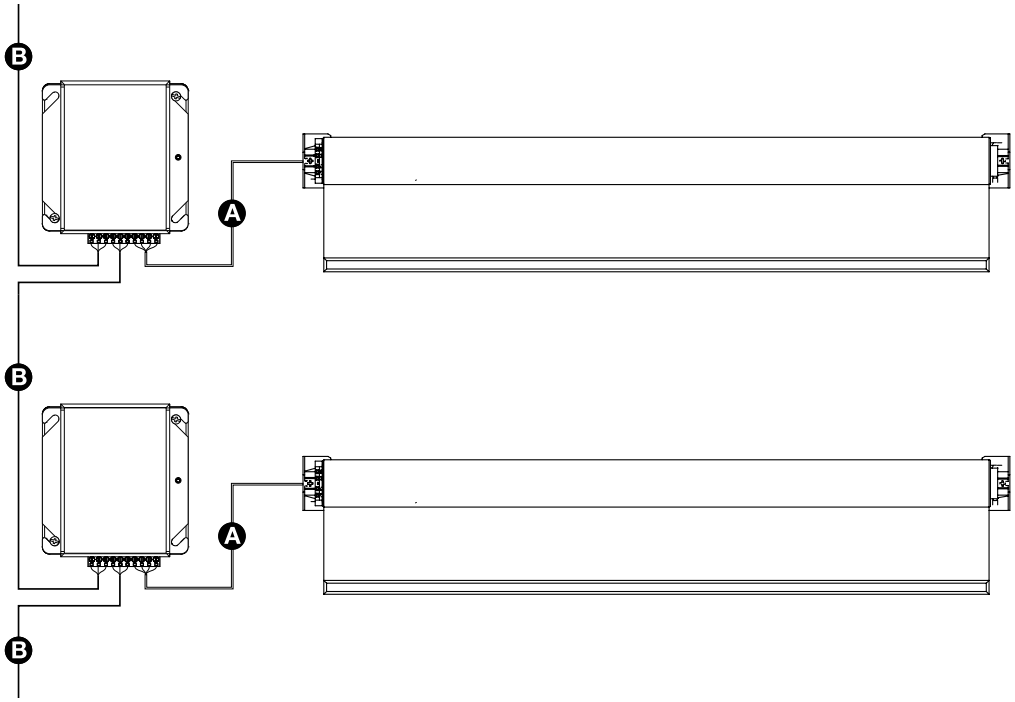


Example: Powering keypads



...up to 8 PDU's total on link Ⓐ (refer to QS Link Wiring Rules on the following page)

Example: 2 power supplies / 2 window treatment drive units, with communication link



Job Name:	Model Numbers:	
Hotel Hartness	QSPS-J-1-35V	
Job Number:		

QS Wiring Rules

The following rules must be observed for proper operation.

- QS wiring is NEC® Class 2/PELV. Follow all applicable local and national codes for proper circuit separation and protection.
- Power (V+ and COM): 12 - 18 AWG (4,0-1,0 mm²)
- Communication (MUX and $\overline{\text{MUX}}$): 22 AWG (0,5 mm²) twisted/shielded pair
- V+ must NEVER be connected between power supplies
- Total length of QS link wiring must not exceed 2000 ft (610 m)

Maximum devices powered from one QSPS-J-1-35V			Maximum total length of wiring between power supply and device(s) based on wire gauge		
Shades	+	Controls	12 AWG (4,0 mm²)	16 AWG (1,5 mm²)	18 AWG (1,0 mm²)
1 Sivoia QS shade/drapery drive unit	+	Up to 1 Power Draw Unit*	250 ft (75 m)	100 ft (30 m)	50 ft (15 m)
None	+	Up to 8 Power Draw Units*	2000 ft (610 m)	2000 ft (610 m)	1500 ft (450 m)

*For more information, refer to the QS Link Power Draw Unit Specification Submittal (P/N 369405)

Options available from Lutron with power and communication conductors in one cable:

Gauge	Lutron Model Number
12 AWG (4,0 mm²)	QSH-CBL-L-500
16 AWG (1,5 mm²)	QSH-CBL-M-500
18 AWG (1.0 mm²)	GRX-CBL-346S-500

It is the responsibility of the installer to ensure plenum installations are compliant with all applicable local and national codes.

Job Name:	Model Numbers:	
Hotel Hartness	QSPS-J-1-35V	
Job Number:		

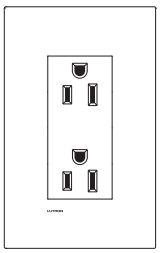
New Architectural Accessories

New Architectural accessories provide a clean, consistent aesthetic by allowing accessories to be added to the Palladiom and GRAFIK T product lines.

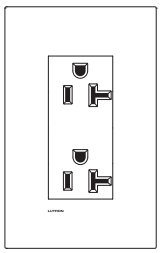
Features

- Able to be ganged with Palladiom keypads and GRAFIK T controls.
- Faceplates available in a variety of colors and finishes.
- Plastic receptacles used with all colors and finishes.
- Tamper resistant.
- Side or back wire installation capable.
- 125 V~ only (U.S. style wallbox).
- Compatible with Lutron New Architectural faceplates only.

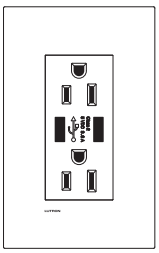
Note: For applications requiring GFCI receptacles with Palladiom and GRAFIK T devices, refer to the **Using Ground Fault Circuit Interrupters with New Architectural Controls and Accessories** Application Note #681 (048681) at www.lutron.com



15 A Duplex Receptacle



20 A Duplex Receptacle



15 A USB Receptacle

Colors and Finishes

Architectural Matte Finishes

- Almond AL
- Beige BE
- Black BL
- Brown BR
- Gray GR
- Light Almond LA
- Ivory IV
- Sienna SI
- Taupe TP
- White WH

Architectural Metal Finishes (faceplate only)[1]

- Bright Nickel BN[2]
- Polished Graphite PG[2,5]
- Satin Chrome SC[2]
- Antique Brass QB[6]
- Satin Nickel SN[2]
- Bright Brass BB[2]
- Bright Chrome BC[2]
- Satin Brass SB[2]

Architectural Glass Finish (faceplate only)

- Clear White Glass CWH[3]
- Clear Black Glass CBL[4]

- Due to printing limitations, colors and finishes shown cannot be guaranteed to perfectly match actual product colors.
- Color chip keychains are available for more precise color matching:
  - Architectural Matte Finishes: AM-CK-1
  - Architectural Metal Finishes: AMTL-CK-1
- For antique finishes please contact your local Lutron Customer Service representative.

[1] Architectural Metal finishes are not available for GRAFIK T RF C•L Hybrid Keypads.
[2] Receptacle will be matte black when purchased with metal faceplate.
[3] Receptacle will be gloss white when purchased with white glass faceplate.
[4] Receptacle will be gloss black when purchased with black glass faceplate.
[5] Polished Graphite finishes are not available for GRAFIK T products.
[6] Antique Brass is a handcrafted finish that is created using a manual relief process. This artisanal process can result in variations in luster, hue and appearance.

Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

Specifications

Regulatory Approvals

- Lutron Quality Systems registered to ISO 9001:2015.
- cULus listed devices
- NOM Certified
- All receptacles comply with UL498
- USB receptacle complies with UL1310

Ratings

- Duplex receptacle
  - 15 A 125 V~ 60 Hz
  - 20 A 125 V~ 60 Hz
  - Capable of being wired in a split feed installation
  - Fork terminal capable
- USB receptacle
  - 15 A 125 V~ 60 Hz
  - Can be wired to a 20 A, 125 V circuit
  - USB 3.8 A* 5 V⎓ dual output Type A 2.0 (3.8 A is the combined output of both ports)
  - Dielectric withstand: 1500 V~ for 1 minute
  - Off state power consumption: 0.1 W
  - USB ports: Rated for minimum 10,000 insertions and removals
  - Complies with battery charging specification BC1.2
  - Compatible with USB 1.1/2.0/3.0 devices

Terminals

- Each terminal accepts up to two 14 AWG to 10 AWG (1.5 mm^2 to 6.0 mm^2) wires.
- Side or back wire installation capable.
- Solid or stranded wires.
- Copper wires only.

Environment

- Ambient operating temperature: 32 ℉ to 104 ℉ (0 ℃ to 40 ℃)
- Maximum 90% non-condensing relative humidity
- Indoor use only

Mounting

- Typical U.S. style wallbox dimensions: 3.0 in (76 mm) H x 2.0 in (51 mm) W x 2.5 in (64 mm) D
- See **Mounting Diagrams** on page 11 for more details.
- When ganging receptacles with low-voltage keypads, the installation should be in accordance with all local and national codes. Separation from low-voltage wiring must be maintained.

* Charging certain combinations of devices from the USB ports, may result in currents greater than the 3.8 A product rating.

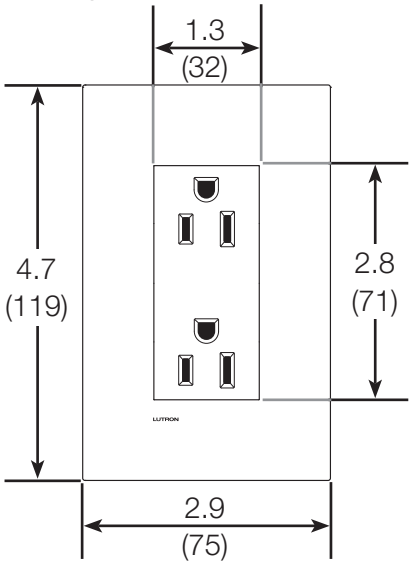
Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

Dimensions

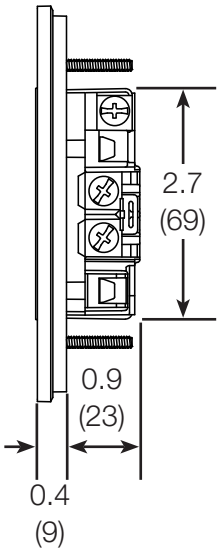
U.S. Style

Measurements shown as: in (mm)

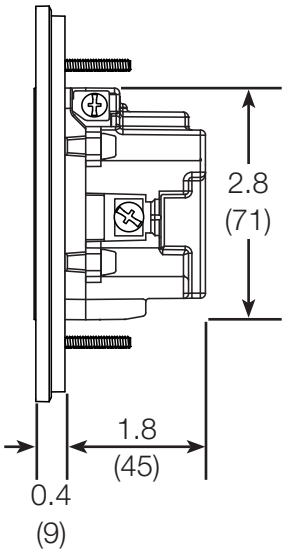
1-Gang



Duplex

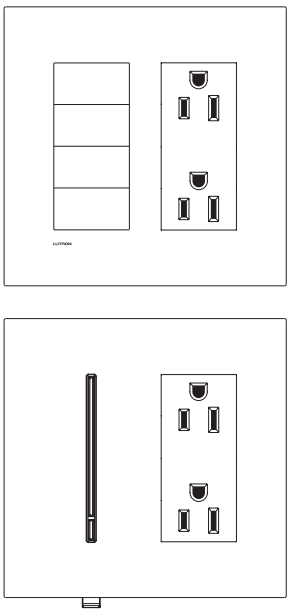


USB

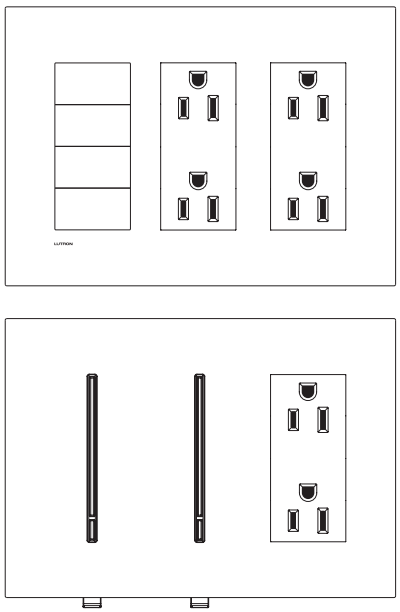


Multi-Gang

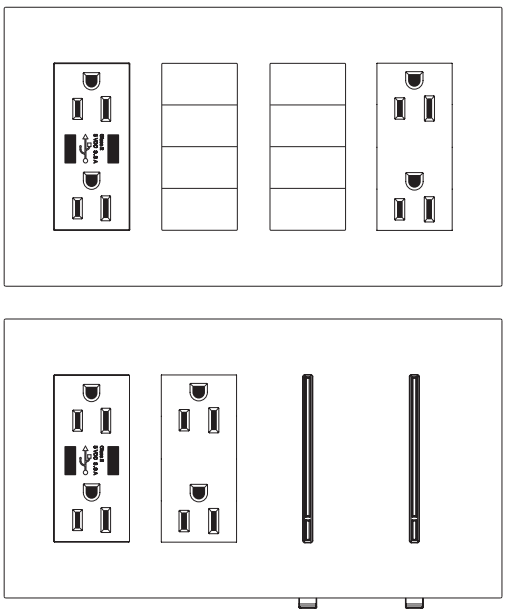
2-Gang
4.8 (122) W x 4.7 (119) H



3-Gang
6.6 (167) W x 4.7 (119) H

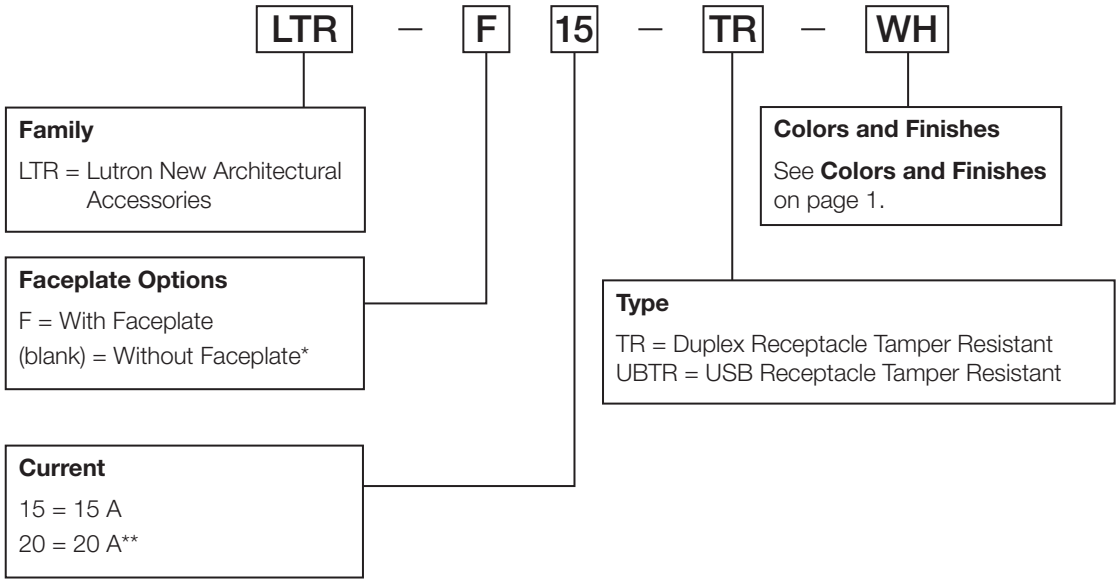


4-Gang
8.4 (213) W x 4.7 (119) H



Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

How to Build an Accessory Model Number



Notes:

- Matte finishes are available with or without a faceplate. Receptacle and faceplate will be the same color/finish.
- Glass finishes are available with or without a faceplate. When glass finish is ordered, the receptacle will be gloss and coordinate with the faceplate color.
- Metal finishes are only available with a faceplate. When metal finish is ordered, the receptacle will be matte black.

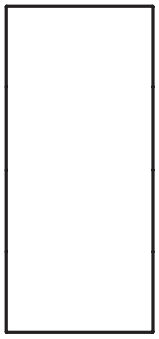
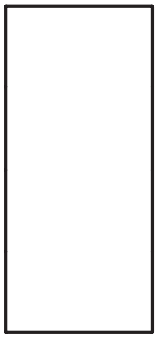
Faceplate Finish	Faceplate Availability	Receptacle Color/Finish
Matte	With or without	Same as faceplate
Glass	With or without	Coordinate with faceplate. Gloss.†
Metal	With	Matte black

*For use in multi-gang installations. For multi-gang metal applications, receptacles must be ordered without a faceplate and in one of the architectural matte finishes (see **Colors and Finishes** on page 1). Receptacles are compatible with Lutron New Architectural faceplates only.
**Only available for duplex receptacles. Not available for USB receptacles.
†Only gloss receptacles can be used with glass faceplates. Other receptacle colors will not fit into glass faceplates.

Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

How to Build a Multi-Gang Faceplate Kit Model Number

Step 1: Identify the components in the application and which faceplate openings are needed

Accessories (“P” or “T” opening)	Palladiom keypads (“P” opening only)	GRAFIK T controls (“G” opening only)
		

Step 2: Determine which faceplate kit is best for the application

a. When ganging with Palladiom keypads or receptacle-only applications (see page 6 for more details)

LWT – U – PP – WH

b. When ganging with GRAFIK T controls (see page 7 for more details)

LWT – GT – WH

Note: Palladiom keypads and GRAFIK T controls cannot be ganged together.

Continued on next page...

Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

How to Build a Multi-Gang Faceplate Kit Model Number *(Continued)*

Step 3: Build appropriate faceplate model number

a. When ganging with Palladiom keypads or receptacle-only applications

LWT – **U** – **PPP** – **WH**

Family

LWT = New Architectural Faceplate Kit

Faceplate Options

U = U.S. style

Colors and Finishes

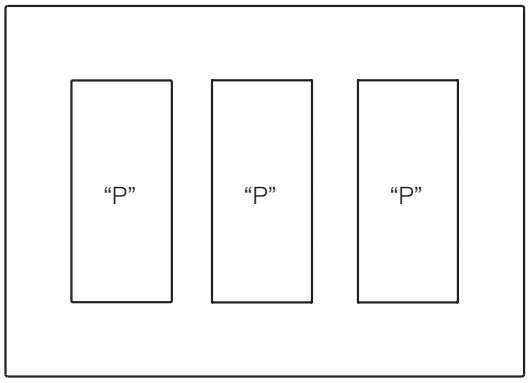
See **Colors and Finishes** on page 1.

Gangs and Openings*

P = Palladiom opening**†

Available Models

1-Gang	2-Gang	3-Gang	4-Gang
P	PP	PPP	PPPP



*Repeat letter designation for each number of openings (4 maximum).
**New Architectural accessories will fit into "P" openings when ganging with Palladiom keypads.
†Palladiom keypads will only fit into "P" openings.

Continued on next page...

Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

How to Build a Multi-Gang Faceplate Kit Model Number *(Continued)*

Step 3: Build appropriate faceplate model number *(Continued)*

b. When ganging with GRAFIK T controls

LWT – **GT** – **WH**

Family

LWT = New Architectural Faceplate Kit

Colors and Finishes

See **Colors and Finishes** on page 1.

Gangs and Openings

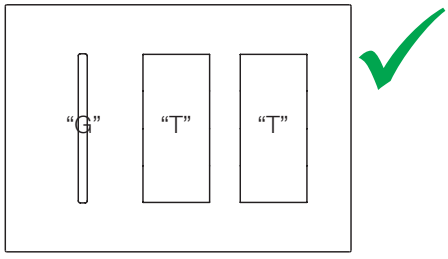
G = GRAFIK T opening*

T = New Architectural opening**

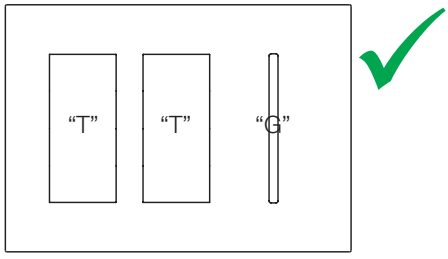
Available Combinations

2-Gang	3-Gang	4-Gang
GT	GGT	GGGT
TG	GTT	GGTT
	TGG	GTTT
	TTG	TGGG
		TTGG
		TTTG

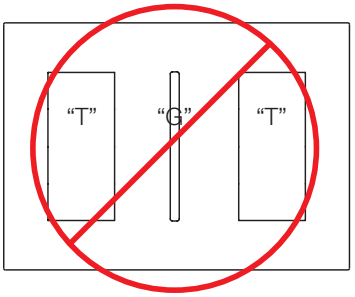
Correct (LWT-GTT-XXX†)



Correct (LWT-TTG-XXX†)



Incorrect



Step 4: See *Colors and Finishes* on page 1 to determine the desired color code

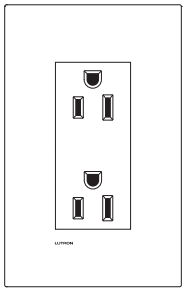
*GRAFIK T controls will only fit into "G" openings.
**New Architectural accessories will fit into "T" openings when ganging with GRAFIK T controls.
†"XXX" in the model number represents color/finish code. See **Colors and Finishes** on page 1.

Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

Examples of How to Select a New Architectural Accessory

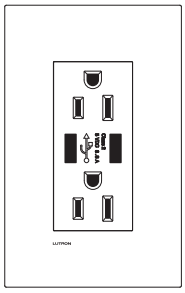
Example 1:

15 A Duplex Receptacle with Faceplate in Matte White			
Order: Model Number	Quantity	Description	Mount
LTR-F15-TR-WH	1	15 A Duplex Receptacle with Faceplate in Matte White	Wallbox



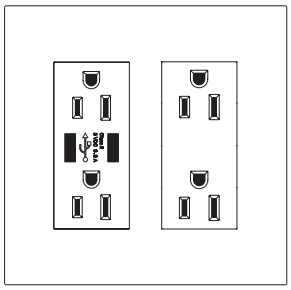
Example 2:

15 A USB Receptacle in Matte Black with Satin Nickel Faceplate			
Order: Model Number	Quantity	Description	Mount
LTR-F15-UBTR-SN	1	15 A USB Receptacle in Matte Black with Satin Nickel Faceplate	Wallbox



Example 3:

15 A USB Receptacle and 15 A Duplex Receptacle with Satin Nickel Faceplate			
Order: Model Number	Quantity	Description	Mount
LTR-15-UBTR-BL*	1	15 A USB Receptacle in Matte Black	Wallbox
LTR-15-TR-BL*	1	15 A Duplex Receptacle in Matte Black	
LWT-U-PP-SN	1	2-Gang Faceplate in Satin Nickel	

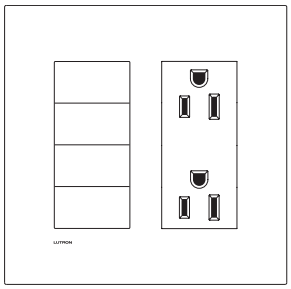


*Accessories are ordered in Black (BL) when used with metal faceplates.

Continued on next page...

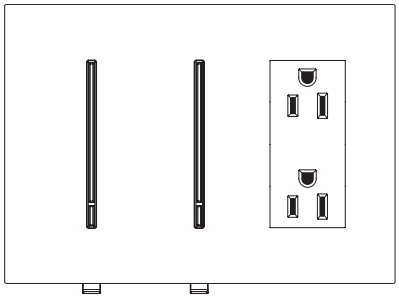
Examples of How to Select a New Architectural Accessory *(Continued)*

Example 4:



4-Button Quantum Palladiom Keypad and 15 A Duplex Receptacle in Satin Nickel Faceplate			
Order:			
Model Number	Quantity	Description	Mount
QWP-B-4W-SN	1	4-Button Quantum Palladiom Keypad in Satin Nickel	Wallbox
LTR-15-TR-BL*	1	15 A Duplex Receptacle in Matte Black	
LWT-U-PP-SN	1	2-Gang Faceplate in Satin Nickel	

Example 5:



Two GRAFIK T dimmers and 15 A Duplex Receptacle in White Glass Faceplate			
Order:			
Model Number	Quantity	Description	Mount
GT-250M-WH	2	GRAFIK T Dimmer in White	Wallbox
LTR-15-TR-CWH**	1	15 A Duplex Receptacle in Gloss White	
LWT-GGT-CWH	1	3-Gang Faceplate in Clear White Glass	

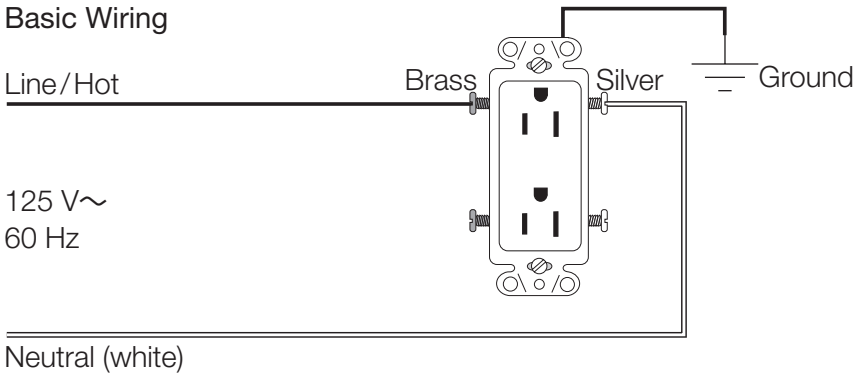
*Accessories are ordered in Black (BL) when used with metal faceplates.
**Accessories are ordered in Gloss White (CWH) when used with glass faceplates.

Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

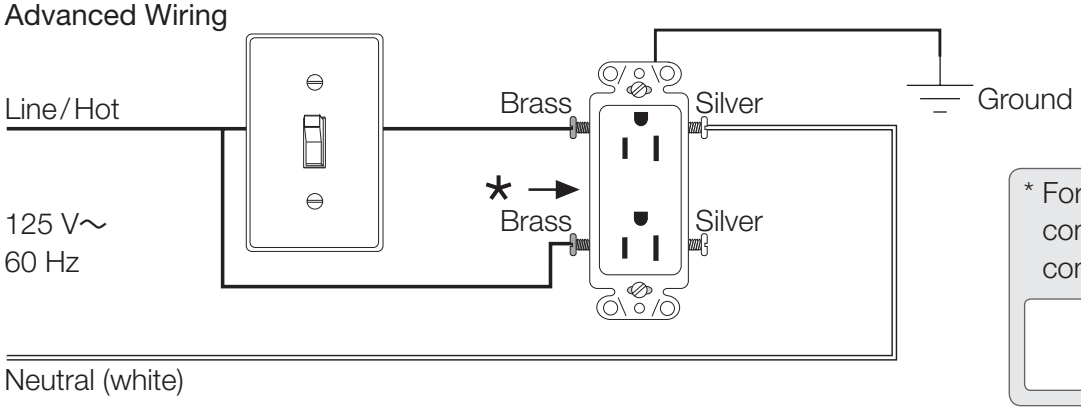
Wiring Diagrams

Duplex Receptacles (15 A shown)

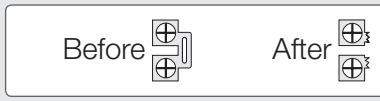
Basic Wiring



Advanced Wiring

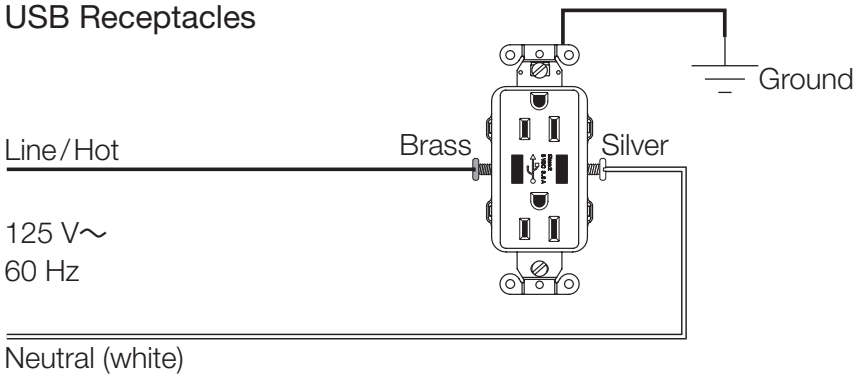


* For independent Line/Hot connections, remove connecting link.



Note: Switch controls upper receptacle.

USB Receptacles

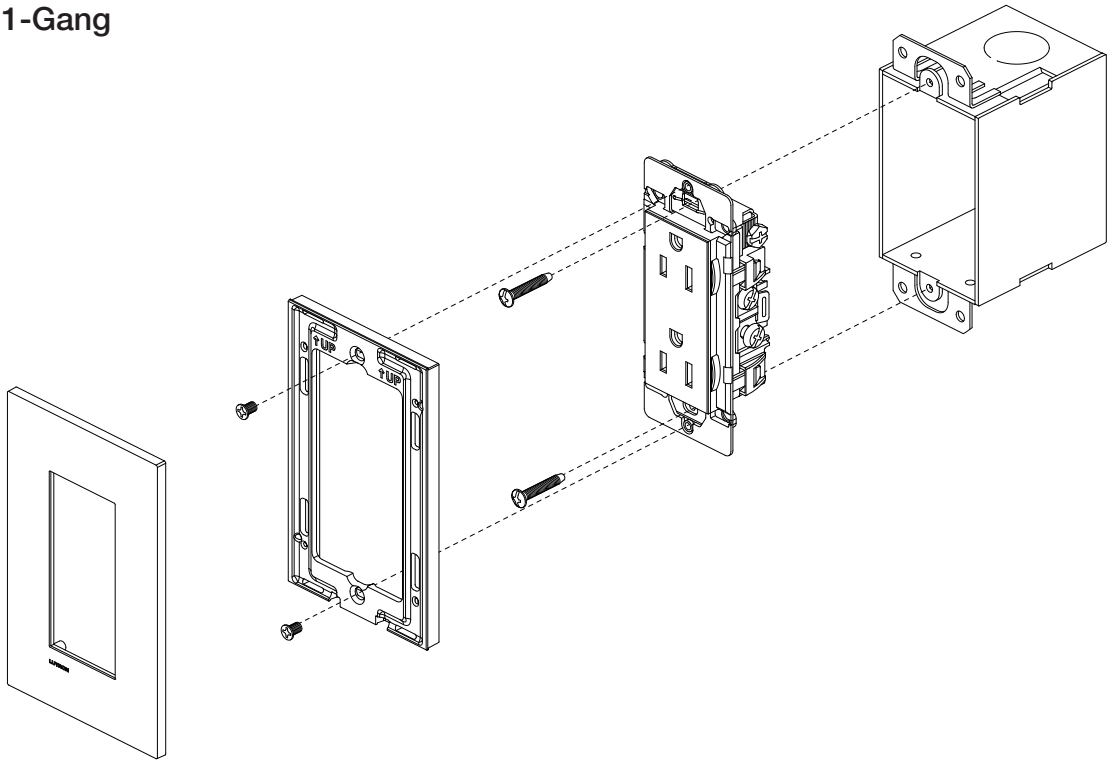


Note: Top and bottom receptacles cannot be split apart into independent Line/Hot and Switched Hot connections.

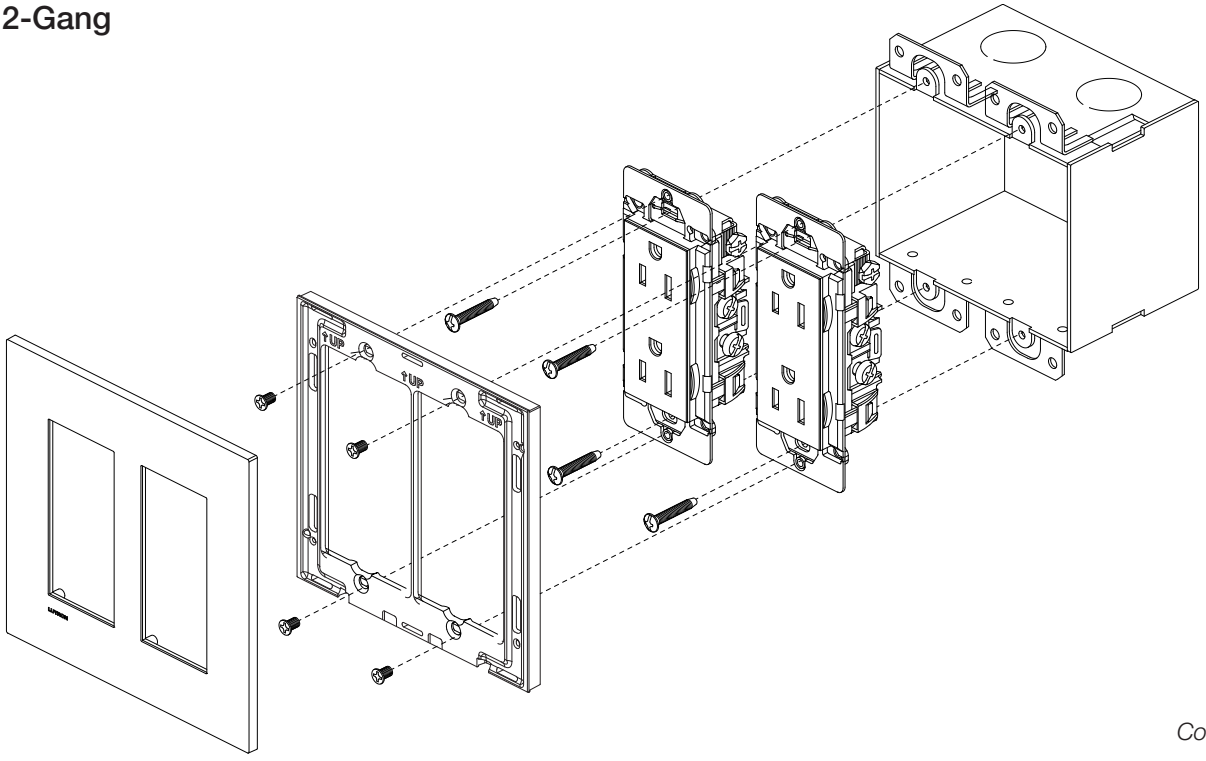
Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

Mounting Diagrams

1-Gang



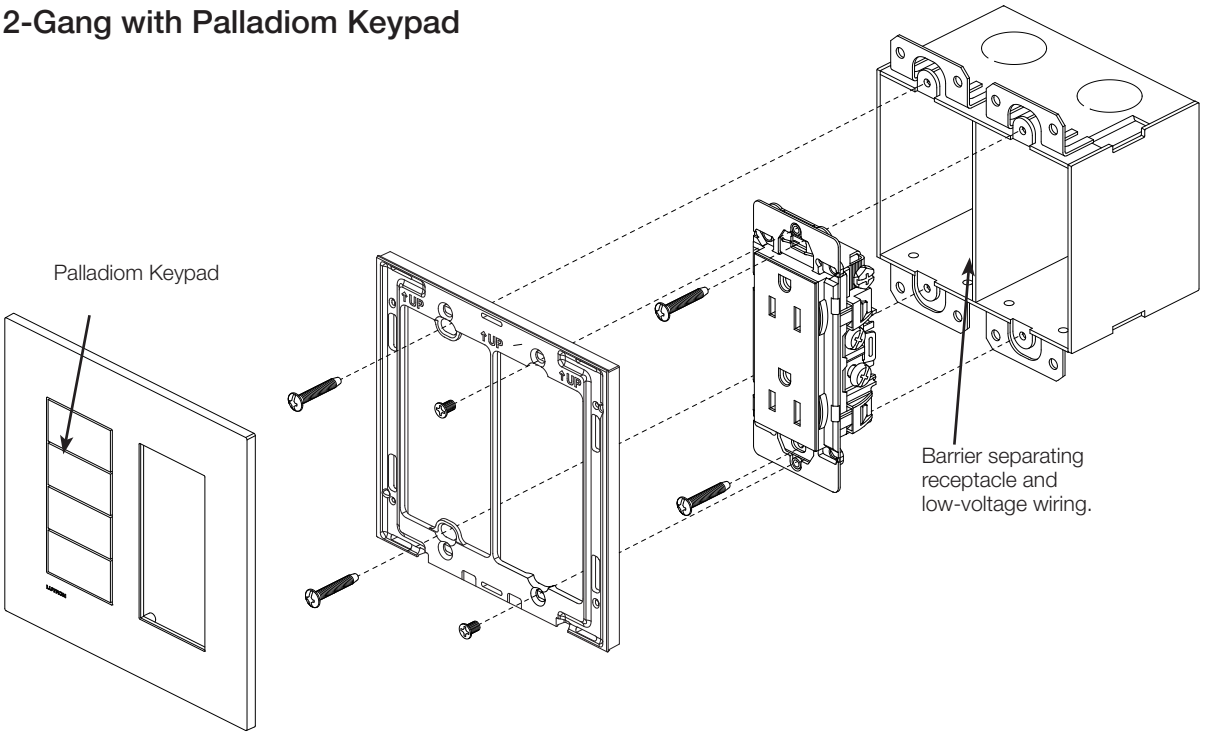
2-Gang



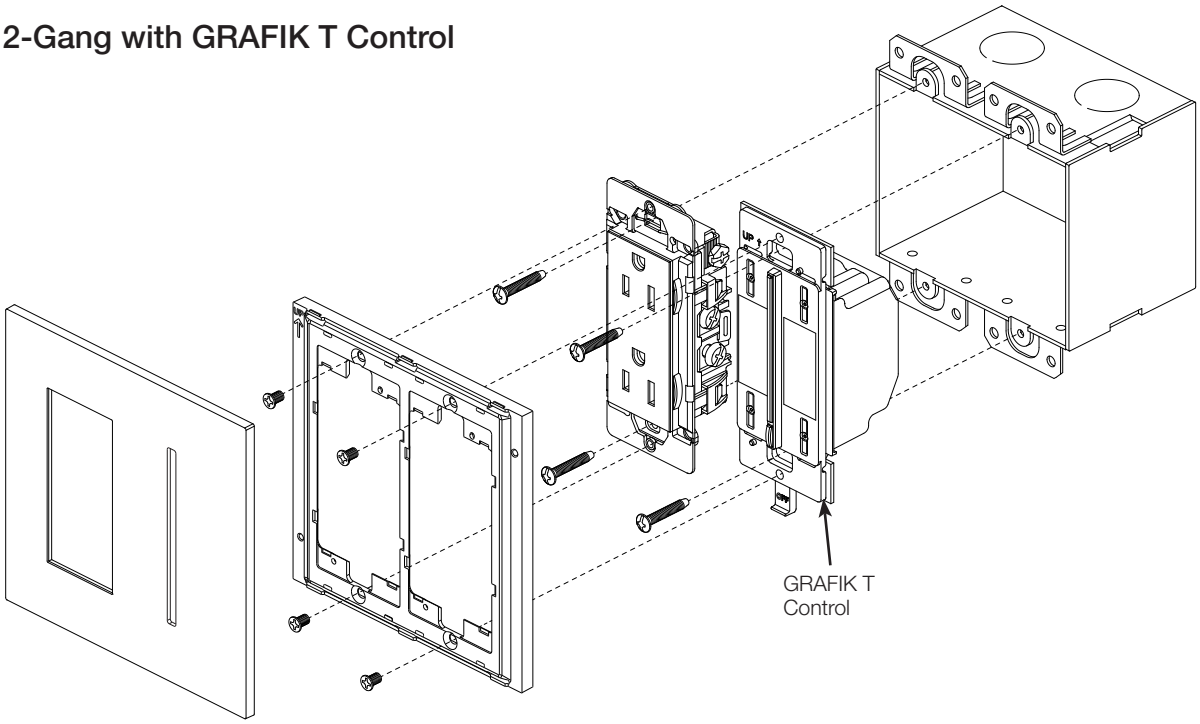
Continued on next page...

Mounting Diagrams *(Continued)*

2-Gang with Palladiom Keypad



2-Gang with GRAFIK T Control



Job Name:	Model Numbers:	
Hotel Hartness	LTR-F15-TR	
Job Number:		

Quantum® System Onsite Startup

Model numbers LSC-OS-S-QTM, LSC-OS-PS-QTM, LSC-OS-ST-QTM, and LSC-OS-PST-QTM

Overview

The Quantum® total light management system optimizes the use of light to improve comfort and productivity, simplify operations, and save energy. Quantum® systems can dim or switch all electric lighting and control daylight using automated shades/draperies.

Please refer to the Lutron® Bill of Material to determine which startup service was purchased.

- LSC-OS-PST-QTM: Includes a pre-wire, startup, and training visit.
- LSC-OS-PS-QTM: Includes a pre-wire and startup visit with training overview.
- LSC-OS-S-QTM: Includes only a startup visit with training overview.
- LSC-OS-ST-QTM: Includes a startup and training visit.

Quantum® service notes:

- Any site visits included in the service will occur between the hours of 7 A.M. and 5 P.M. on a Monday through Friday that is not a Lutron® Holiday.
- Visits can be made outside these hours for an additional charge.
- Visits may require multiple days depending on the size of the system.
- Lutron requires fifteen (15) business days' notice to schedule a startup visit. Additional charges may apply for expediting service within fifteen (15) business days.
- Lutron offers a portfolio of elective services that support the startup process; these services are offered a-la-carte and are not included as part of the typical scope of startup. If they are required, verify that they were included with the system purchase.

A Lutron® service representative performs all system startup items.

All terminations will be done by the installing agency. A representative from the installing agency must be present for the pre-wire and startup visits and must be familiar with the installation of the system.

Items not included in standard Quantum® Startup:

- Lutron® service representatives will not perform work on non-Lutron® equipment. If System and Network Integration Consultation visits (LSC-INT-VISIT) were purchased, Lutron will work with other manufacturers on integration with equipment by others.
- Programming or any other changes that are requested to be performed counter to the approved submittal sequence of operations must be approved via the proper channels and may result in additional charges.
- Field wiring changes or corrections that delay the startup process such that additional time is required for Lutron to complete the startup will result in additional charges.
- Replacement of controls damaged due to miswires, incorrect installation, or any other related issue not covered under the Lutron® warranty is the responsibility of the installer.
- Reprogramming of any functions after initial programming and sign-off may result in additional charges.
- Construction phasing, which may require multiple visits, is not included in a standard Quantum® startup. If this is required, please contact your Lutron® representative.

Logistics

- To schedule an onsite service, please submit a “Schedule a Visit” form at www.lutron.com/scheduling or call: 1.800.523.9466.
- Please contact Lutron at least 3 weeks prior to the requested visit date.

Job Name: Hotel Hartness Job Number:	**Toll Free 24/7 Tech Support Line 1.800.523.9466** **Field Service Scheduling 1.800.523.9466, follow the prompts for "field service," then "scheduling onsite visit" or www.lutron.com/scheduling**

Visit 1: System pre-wire inspection.

- Familiarize the electrical contractor, project manager, and/or owner's representative with wiring and mounting of system devices.
- Understand the overall project schedule.
- Review preliminary mounting locations and wiring practices for PC/Server, QS devices or shades, dimming/switching panels, local wall controls, ceiling mount controls/sensors, interface devices, ballasts, and Quantum® hub(s).
- Review preliminary wiring plans of devices wired to ballasts (i.e., occupancy sensor xx is wired to fixture number xx). Ensure infrared (IR) sensors are wired to ballasts on the same loop.
- Review preliminary drawings for proper hub to EcoSystem® loop wiring.
- Provide training to the appropriate parties in dipswitch overrides.
- Review preliminary Lutron® network topology (i.e., CAT5 hub interconnections and/or Lutron® PC/server).

Visit 2: System startup.

- Audit the system to ensure the Quantum® system is installed according to Lutron® specifications.
- Verify/setup system PC/Server (if applicable).
- Verify proper wiring and operation of EcoSystem® loops.
- Verify Quantum® hubs and transfer system database.
- Check loads for shorts and overloads and remove bypass jumpers.
  - Dimming/switching panels should be energized in bypass, fully lamped and tested prior to our arrival.
- Verify proper wiring and operation of the Quantum® controls.
- Programming the dimming/switching panels includes:
  - Panel addressing.
  - Verify proper wiring and operation of control link.
  - Proper load types assigned as installed or as per approved submittal drawings. As installed conditions take precedence. This may be a modular system and if load types differ from the original design additional equipment may be required.
  - Circuit to button assignments as per approved submittal sequence of operations. If no button information exists prior to startup, programming will be done according to written instructions from the end user or the end users' representative, contractor, or will be based upon the Lutron® provided sequence of operations, in that order of priority.
  - When applicable, program emergency function per the installation guide for the system.
- Programming the wall controls/interfaces includes:
  - Control addressing.
  - Verify proper wiring and operation of the control link.
  - Setup controls to function as per the approved submittal sequence of operations. If no control functionality is included, controls will be programmed according to written instructions from the end user or end users' representative, contractor, or will be based upon the following rules:
    - o Occupancy/Vacancy sensors:
      - In spaces with a wall control, occupancy/vacancy sensors will be set up as a vacancy sensor (only automatically turning off the lights) with 15-minute, plus/minus 1-minute, time-out.
      - In spaces without a wall control, occupancy/vacancy sensors will be set up as occupancy sensors (automatically turning the lights on and off) with a 15-minute, plus/minus 1-minute, time-out.

o Daylight sensors:
- Calibrated in such a manner to provide 40 fc, plus/minus 5 fc, 3 ft (91 cm) off the floor at a specific point in the room, typically the center of a desk or directly under a fixture. Note the consistency of light distribution throughout the space is highly dependent upon fixture design and placement.

o Wall controls:
- One button: Toggle lights on and off.
- Two button: Top button will turn lights on; bottom button will turn lights off.
- More than two buttons, for Dimmed zones: Top buttons will set the lights to different levels; bottom button will turn the lights off.

o Timeclock settings:
- Lights on the Lutron® system on the building's exterior will turn on at sunset and turn off at sunrise.

– Test all buttons to ensure proper operation
– Set light levels and fade times on controls as per approved submittal drawings. If no information is provided, test scenes will be set to 100%, 75%, 50%, and 25%, and default fade times will be set to 3 seconds.

o **Occupancy/Vacancy sensor:**
- Verification of proper installation and operation. If a sensor is not installed in accordance with Lutron® procedures, Lutron will cease startup activities on that sensor until the installation issues are corrected.
- Unless a Sensor Layout and Tuning Service has been purchased or otherwise noted, a rough calibration will be performed at system startup. Final calibration is the responsibility of the end user since it is very dependent on furniture placement, HVAC operation, and space usage. Lutron will neither fine-tune occupancy sensors to detect minor movements in the space nor to detect motion that contributes to false-trips.

o **Daylight sensor:**
- Verification of proper installation and operation. If a sensor is not installed in accordance with Lutron® procedures, Lutron will not continue startup activities on that sensor until the installation issues are corrected.
- Calibration will be performed at system startup. Final adjustment is the responsibility of the end user since it is very dependent on furniture placement, window treatments, outside weather conditions, and space usage. End user will be trained on making final adjustments. Lutron will not fine-tune daylight sensors to achieve specified foot-candle readings.

o **Timeclock setup:**
- Lutron will set up the system location, daylight savings, and time of day preparation for event programming.
- Lutron will set up timeclock events as per the approved submittal drawings or written instructions from the end user or the end user's representative or contractor, in that order of priority.
- In the absence of instructions, the timeclock will not be programmed. The end user will be trained on how to set up and adjust timeclocks.

• **End user training visit on overall system operation:**
– It is the responsibility of the person scheduling the startup to ensure the appropriate end users are present for training. Lutron typically does not have these contacts.
– Additional charges will apply if additional visits are required for training the end user.
– Lutron does not provide video media for training sessions. The training may be recorded by others to be provided to the end-user.
– System demonstration and sign-off by the end user.
– Typical training agenda is attached.

Additional items that are not included with standard startup, but may be purchased—check your quote to verify that an item has been included in your quote. Additional details of each item are available from your Lutron® representative.

- LSC-AF-VISIT: Onsite Scene and Level Tuning visit with the design team or the end user.
- LSC-SYSOPT: System Optimization visit with end user.
- LSC-WALK: Startup agent or design team System Performance-Verification Walkthrough.
- LSC-E8S: This is the 8-year, Pro-rated Enhanced Warranty that was included with the purchase of the system startup. Details are supplied within the submittal documentation.
- LSC-E8G and LSC-E8P: These are upgraded Enhanced Warranties which include expedited response time and a scheduled Preventive Maintenance visit.
- LSC-TRAINING: Customer-Site Solution Training visit for additional time on the job for training the end user.
- LSC-AH-SU: After-Hours Startup.
- LSC-INT-VISIT: System and Network Integration Consultation. Typically conducted prior to startup, meeting is intended to meet with other equipment manufacturers, system integrators, and/or IT managers to discuss integration with Lutron® equipment.
- LSC-LEED-DOC: Solution Performance-Verification Documentation that describes the pre-functional tests, functional tests, and test results.
- LSC-SMA: Software Maintenance Agreement. Annual subscription for Quantum® customers that ensures Microsoft Product Patches (Internet Explorer, Operating Systems, SQL Server) and application compatibility.
- LSC-SENS-LT: Sensor Layout and Tuning. Ensures that the Lutron® sensors are properly positioned and programmed.

Additional items listed below may be charged for job sites.

- LSC-NS-TRAVEL: Non-standard travel arrangements.
- LSC-RETURN: Job site contact schedules startup but job is not ready when field service engineer arrives, requiring a return visit.
- LSC-CHANGE-ORDER: For onsite or remote service time required to implement changes that fall outside of the scope of work for services quoted and ordered set forth in this document.

Quantum® Training Visit: Typical Agenda

- System Overview
  – Controls
  – Components
  – Functionality Walk-through
- System Software
  – Navigation
  – System Features
  – Report Generation
  – Administration
- Preventive Maintenance
- Warranty Information
- Additional Lutron® Service & Support
  Dial 800.523.9466 and follow the prompts for field service, then scheduling.
  – Lutron® Services Catalog
  – Technical Support
  – Remote Services
  – Onsite Services
  – Additional Training Opportunities
- Questions/Discussion

NOTE: All topics may not be relevant to every system. The topics listed above represent a standard Lutron® training agenda.

Onsite Scene and Level Tuning (LSC-AF-VISIT)

Onsite Scene and Level Tuning visit to make lighting adjustments per the direction of a lighting designer.

Visit Summary

- Lighting designer will dictate what, if any, changes will be made.
- These adjustments may include light level, fade time, and delay in lighting scenes.
- Facility representative and/or lighting designer will sign off on all work at the completion of the visit.

Additional Information

- Lutron requires 10 business days notice to schedule an onsite visit.
- Coordination of required visit attendees, including lighting designer, is the responsibility of the facility representative.
- Quantity dictates the number of days purchased.
- Facility representative should secure access to the required areas prior to the visit date.
- This visit may occur after hours.
- Should be performed after building is in operation.

Contact Information

Toll-free 24/7 Technical Support Line: 1.800.523.9466

To schedule a visit, contact Lutron Scheduling Representatives:

Phone: 1.800.523.9466, ext. 4439

Email: LSCscheduling@lutron.com

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Lutron Electronics Co., Inc. Commercial Systems Limited Warranty

Effective: October 1, 2011

SCOPE

This limited warranty ("Warranty") covers Lutron Electronics Co., Inc. ("Lutron"):

(a) commercial lighting control system panels, controls, processor panels, wall box products, and sensors (collectively, "Hardware"),
(b) Lutron ballasts and LED drivers ("Ballasts/Drivers"),
(c) provided computer hardware ("Supplied Computer"), and
(d) Lutron's commercial systems software ("Lutron Software").

The Lutron Software with the Hardware, Ballasts/Drivers and Supplied Computer, comprises the "System".

Use of the System, or any part thereof, constitutes acceptance of (i) all terms and conditions of this Warranty and (ii) the terms and conditions of the applicable Lutron Software license.

LIMITED WARRANTY

Warranty coverage begins on the date of System start-up, or the date of shipment for components not purchased with start-up.

Hardware, Ballasts/Drivers, and Supplied Computer

Subject to the exclusions and restrictions and for the periods of time described in this warranty, Lutron warrants that the Hardware, Ballasts/Drivers, and Supplied Computer will be free from defects.

If any defect exists during the period of time identified below, Lutron will, at its option, either repair or replace the defective part(s) or issue a credit against the purchase price of comparable replacement part(s) purchased from Lutron. Replacement parts may be new, used, repaired, and/or reconditioned.

Hardware: 2 Years, 100% parts coverage for Hardware purchased with on-site start-up. 1 year, 100% parts coverage for Hardware not purchased with start-up.

Ballasts/Drivers: 5 Years, 100% parts coverage for Ballasts/Drivers purchased with on-site start-up. 3 Years, 100% parts coverage for Ballasts/Drivers not purchased with start-up.

Supplied Computer: 1 year, 100% parts coverage. The warranty for non-Lutron Software (such as operating system software included with the Supplied Computer) is provided by the respective software provider; Lutron makes no warranty with respect to non-Lutron software.

Lutron Software: Subject to the exclusions and restrictions, for a period of 1 year, Lutron warrants the Lutron Software will substantially conform to Lutron's published specifications and documentation. Lutron does not warrant that the Lutron Software will operate in combination with any other software. Lutron does not warrant that the Lutron Software operation will be uninterrupted or error-free (see applicable Lutron Software license for additional terms and conditions).

NOTE: Systems purchased with start-up include 2 years of diagnostic labor. Diagnostic labor is provided by Lutron Services Co., Inc. (See below for Terms and Conditions of Lutron Services Co., Inc. Technology Support Plan for details.)

EXCLUSIONS AND RESTRICTIONS

This Warranty does not cover:

1. Damage, malfunction or inoperability diagnosed by Lutron as caused by normal wear and tear, abuse, misuse, incorrect installation, neglect, accident, interference or environmental factors, such as, but not limited to, (a) use of incorrect line voltage, fuses, or circuit breakers; excessive line noise in the power supply; (b) failure to install, maintain and operate the System pursuant to the operating instructions provided by Lutron and the applicable provisions of the National Electrical Code and of the Safety Standards of Underwriters Laboratories; (c) use of incompatible devices or accessories; (d) improper or insufficient ventilation; (e) unauthorized repairs or adjustments; (f) vandalism; (g) water damage, (h) an act of god, such as fire, lightning, flooding, tornado,

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Job Number:		

earthquake, hurricane or other problems beyond Lutron's control; (i) a virus or computer hacker; or (j) failure to maintain equipment in specified temperature range.

2. Except as otherwise provided herein, on-site labor costs to diagnose issues with, and to remove, repair, replace, adjust, reinstall and/or reprogram the System or any of its components.
3. Components and equipment external to the System, such as, lamps, non-Lutron ballasts/drivers, sockets, and fixtures; fixture wiring between ballasts and lamps; building wiring between the lighting control system panels and lamps and between the controls and the lighting control system panels; audio-visual equipment; and non-Lutron hardware to include time clocks, motion detectors, and sensors.
4. The cost of repairing or replacing other property that is damaged when the System does not work properly, even if the damage was caused by the System.
5. Modifications or upgrades to the Lutron Software necessitated by the upgrade or modification of the operating system software on the Supplied Computer, or any other computer, being utilized to operate the Lutron Software
6. Repairs required due to malfunctions caused by non-Lutron Software.
7. Any loss of software, including the Lutron Software, or data. Customer has sole responsibility to properly back up all data on the Supplied Computer and on any other storage device in the System.
8. Damage, malfunction or inoperability to the Supplied Computer diagnosed by Lutron as caused by a)any item included in 1, above, b)failure to provide a reliable power supply (including generator or battery back-up), c)improper shut down caused by power loss, or d) installation of any unauthorized software.
9. Window shade systems, including components and fabric.

WARRANTY LIMITATIONS

EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY, THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF ANY TYPE, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. LUTRON DOES NOT WARRANT THAT THE SYSTEM WILL OPERATE WITHOUT INTERRUPTION OR BE ERROR FREE.

NO LUTRON AGENT, EMPLOYEE OR REPRESENTATIVE HAS ANY AUTHORITY TO BIND LUTRON TO ANY AFFIRMATION, REPRESENTATION OR WARRANTY CONCERNING THE SYSTEM. UNLESS AN AFFIRMATION, REPRESENTATION OR WARRANTY MADE BY AN AGENT, EMPLOYEE OR REPRESENTATIVE IS SPECIFICALLY INCLUDED HEREIN, OR IN STANDARD PRINTED MATERIALS PROVIDED BY LUTRON, IT DOES NOT FORM A PART OF THE BASIS OF ANY BARGAIN BETWEEN LUTRON AND CUSTOMER AND WILL NOT IN ANY WAY BE ENFORCEABLE BY CUSTOMER.

IN NO EVENT WILL LUTRON OR ANY OTHER PARTY BE LIABLE FOR EXEMPLARY, CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFITS, CONFIDENTIAL OR OTHER INFORMATION, OR PRIVACY; BUSINESS INTERRUPTION; PERSONAL INJURY; FAILURE TO MEET ANY DUTY, INCLUDING OF GOOD FAITH OR OF REASONABLE CARE; NEGLIGENCE, OR ANY OTHER PECUNIARY OR OTHER LOSS WHATSOEVER), NOR FOR ANY REPAIR WORK UNDERTAKEN WITHOUT LUTRON'S WRITTEN CONSENT ARISING OUT OF OR IN ANY WAY RELATED TO THE INSTALLATION, DEINSTALLATION, USE OF OR INABILITY TO USE THE SYSTEM OR OTHER¬WISE UNDER OR IN CONNECTION WITH ANY PROVISION OF THIS WARRANTY, OR ANY AGREEMENT INCORPORATING THIS WARRANTY, EVEN IN THE EVENT OF THE FAULT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, BREACH OF CONTRACT OR BREACH OF WARRANTY OF LUTRON OR ANY SUPPLIER, AND EVEN IF

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LUTRON OR ANY OTHER PARTY WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

NOTWITHSTANDING ANY DAMAGES THAT CUSTOMER MIGHT INCUR FOR ANY REASON WHATSOEVER (INCLUDING, WITHOUT LIMITATION, ALL DIRECT DAMAGES AND ALL DAMAGES LISTED ABOVE), THE ENTIRE LIABILITY OF LUTRON AND OF ALL OTHER PARTIES UNDER THIS WARRANTY ON ANY CLAIM FOR DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE MANUFACTURE, SALE, INSTALLATION, DELIVERY, USE, REPAIR, OR REPLACEMENT OF THE SYSTEM, OR ANY AGREEMENT INCORPORATING THIS WARRANTY, AND CUSTOMER'S SOLE REMEDY FOR THE FOREGOING, WILL BE LIMITED TO THE AMOUNT RECEIVED BY LUTRON FOR THE SYSTEM. THE FOREGOING LIMITATIONS, EXCLUSIONS AND DISCLAIMERS WILL APPLY TO THE MAXIMUM EXTENT ALLOWED BY APPLICABLE LAW, EVEN IF ANY REMEDY FAILS ITS ESSENTIAL PURPOSE.

TO MAKE A WARRANTY CLAIM

To make a warranty claim, promptly notify Lutron within the warranty periods described above by calling the Lutron Technical Support Center at 800-523-9466. Lutron, in its sole discretion, will determine what action, if any, is required under this warranty. Most System problems can be corrected over the phone through close cooperation between customer and a technician. To better enable Lutron to address a warranty claim, have the System's serial and model numbers, its current operating system version, and the brand names and models of any peripheral devices used with the System available when making the call.

If Lutron, in its sole discretion, determines that an on-site visit or other remedial action is necessary, Lutron may send a Lutron Services Co. representative or coordinate the dispatch of a representative from a Lutron approved vendor, to the site of the System and/or coordinate a warranty service call between customer and a Lutron approved vendor. All on-site labor costs incurred to diagnose any problems with the System and to repair, replace or adjust (at Lutron's option) the System to restore it to normal operation will be paid by customer at the then current service price unless covered by this Warranty.

REMOTE ACCESS

An appropriate communications link to the computer must be installed to allow Lutron to remotely administer, troubleshoot, and support the System. Contact Lutron for supported communication link protocols (example: Ethernet). Lutron expressly disclaims all liability due to local area network (LAN) and wide area network (WAN) problems, firewalls, or other security features which prevent Lutron's ability to remotely access the System. Lutron disclaims all responsibility for ensuring the security of the Supplied Computer and communication link from unauthorized access.

EXTENDED LIMITED WARRANTY OPTIONS

The following extended warranties may be purchased (see Lutron project specific bill of materials for applicable coverage).

NOTE: On-Site diagnostic labor and maintenance visit provided by Lutron Services Co., Inc., see Terms and Conditions of Technology Support Plan for details.

Lutron p/n: **LSC-E8S**

- On-Site or remote diagnostic labor (years 1 and 2 only) response time: **AS AVAILABLE**
- Hardware warranty: Years 3 through 5 = 50% parts only coverage; years 6 through 8 = 25% parts only coverage.

Lutron p/n: **LSC-E8G**

- On-Site or remote diagnostic labor (years 1 and 2 only) response time: **72-hour**
- Preventive Maintenance Visit: Years 1 and 2 only; 1-day annual scheduled maintenance visit
- Hardware warranty: Years 3 through 5 = 50% parts only coverage; years 6 through 8 = 25% parts only coverage.

Lutron p/n: **LSC-E8P**

- On-Site or remote diagnostic labor (years 1 and 2 only) response time: **24-hour**
- Preventive Maintenance Visit: Years 1 and 2 only; 1-day annual scheduled maintenance visit
- Hardware warranty: Years 3 through 5; 50% parts only coverage, years 6 through 8, 25% parts only coverage.

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TERMS AND CONDITIONS OF LUTRON SERVICES CO., INC. TECHNOLOGY SUPPORT PLAN

Included Services

- Services are provided by Lutron Services Co., Inc. ("LSC").
- On-site or remote service to troubleshoot and diagnose the Lighting Control System ("LCS") manufactured by Lutron Electronics Co., Inc. ("Lutron")
- Coverage hours are 8:00am-5:00pm Monday through Friday excluding LSC holidays. Travel costs incurred by LSC are included. Support requested outside normal business hours, will be billable at LSC's then-current rates and minimum charges for overtime hours. Response time: LSC services scheduled on an as available basis.
- Preventive Maintenance Visit (optional—see project Bill of Materials for Lutron p/n and applicability) annual scheduled preventive maintenance site visit which can include on-site LCS customer training, minor LCS reprogramming, and LCS system optimization.

Service Procedures

- To schedule a visit, call 800-523-9466 and follow prompts to be connected to LSC Field Service Scheduling.
- LSC representatives will perform service in compliance with security and safety instructions provided by customer. LSC will provide a certificate of insurance upon request of customer.
- Customer agrees that all LSC service must be done in compliance with LSC's safety procedures, which may include temporarily disabling or de-energizing the LCS and other equipment connected to the LCS.
- LSC will respect the customer's confidentiality and will utilize job-specific information only as needed to complete the service visit.

This Technology Support Plan DOES NOT COVER:

- **Labor costs to remove and reinstall components, fixtures, window shades, ballasts/LED drivers, and/or line voltage electrical equipment.**
- **Services requiring a licensed electrician or electrical contractor.**
- Non-Lutron components and equipment to include: lamps, non-Lutron ballasts/LED drivers, sockets, fixtures, fixture wiring between ballasts and lamps, building wiring between LCS elements, audio-visual equipment, non-Lutron timeclocks and sensors, and local area networks.
- Computers, associated equipment, and software; backup of the customer's LCS database.
- Customer activities related to providing a virtual private network or secured internet connection for remote access in support of remote programming and diagnosis by LSC; absence of such remote access prohibits remote access and related LSC support.
- Window Shade systems, including components and fabric.
- Repairs or adjustments to Lutron LCS required as a result of (i) malfunctions caused by non-Lutron supplied equipment, (ii) non-Lutron software that is connected to or used with the LCS, or (iii) programming changes made by anyone other than LSC or approved LSC authorized agent.

Warranties

- LSC makes no warranty, either express or implied, including, but not limited to, any implied warranties of merchantability and fitness for a particular purpose.

Indemnification/Hold Harmless/Limitation of Liability

- LSC agrees to indemnify, defend, and hold harmless customer from and against any liability or loss (including reasonable attorneys' fees and other costs of defense) resulting from judgments or claims for a) personal injury, including death, and/or b) damage/destruction of tangible property arising out of or incident to this Agreement (a) and b) collectively "Losses"), but only to the extent that such Losses are proximately caused by the negligence or willful misconduct of LSC.
- This indemnification obligation of LSC shall be construed so as to extend to all reasonable legal, defense and investigation costs provided customer promptly notifies LSC (Attn: General Counsel) that a claim or demand is being made. LSC will have the exclusive rights to defend, control, settle and compromise any claim, provided however, that LSC will consult with customer regarding any settlement or compromise that includes substantive

Job Name:	Model Numbers:	
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terms beyond a monetary settlement. Further, if LSC assumes the defense of a claim and customer desires to retain its own counsel with respect to such claim, customer may do so provided such counsel is retained at customer's sole cost and expense.

- **IN NO EVENT SHALL LSC BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS), SPECIAL, PUNITIVE OR EXEMPLARY DAMAGES IN CONNECTION WITH THE SERVICES RENDERED HERETO EVEN IF NOTICE WAS GIVEN OF THE POSSIBILITY OF SUCH DAMAGES AND EVEN IF SUCH DAMAGES WERE REASONABLY FORESEEABLE.**
- **EXCEPT AS OTHERWISE PROVIDED HEREIN, CUSTOMER'S EXCLUSIVE REMEDY AND LSC'S ENTIRE, COLLECTIVE LIABILITY IN CONTRACT, TORT OR OTHERWISE, UNDER THE AGREEMENT BETWEEN THE PARTIES WILL BE THE PAYMENT OF ACTUAL DAMAGES NOT TO EXCEED $1000.**
- These Terms and Conditions of Lutron Services Co., Inc. Technology Support Plan are the complete agreement between customer and LSC regarding the services provided hereunder, and replaces any prior oral or written communications between Customer and LSC regarding such services. None of LSC's employees or agents may orally vary the terms and conditions of this Agreement. LSC's failure to exercise, delay in exercising, or single or partial exercise of any right, power, or privilege under this Agreement shall not operate to waive or preclude LSC's right to exercise such rights, power, or privileges. If any part of this Agreement is held to be invalid or unenforceable, it will not affect the validity or enforceability of the rest of the Agreement. Without further action of the parties, that part will be reformed to the minimum extent necessary to make it valid and enforceable. Any modification of this Agreement must be signed in writing by authorized representatives of Customer and LSC.