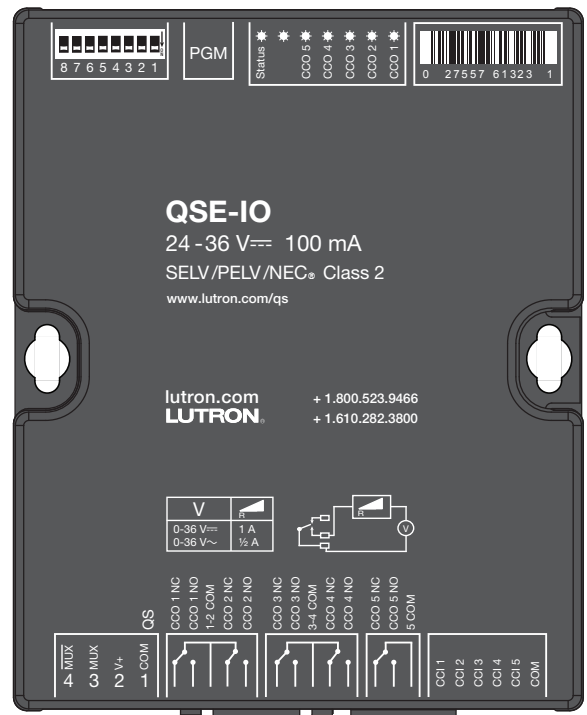# QSE-IO Control Interface

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:
Job Number:	

Specifications

Regulatory Approvals

- UL® Listed
- cUL® Listed
- CE compliant
- RoHS compliant

Power

- SELV / PELV / NEC® Class 2
- Operating voltage: 24–36 V⎓ 100 mA

QS Link Limits

- 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)

Job Name:	Model Numbers:
Job Number:	

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: 36 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	
0–36 V⎓	1.0 A	
0–36 V∼	0.5 A	
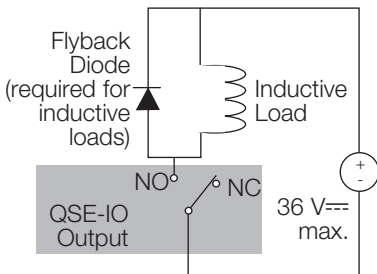
⚠ WARNING – Entrapment Hazard – To avoid the risk of entrapment, serious injury, or death, these controls must not be used to control equipment that is not visible from every control location or that could create hazardous situations if operated accidentally or through malfunction (for example, motorized gates, garage doors, industrial doors, microwave ovens, heating pads, fireplaces, space heaters, etc.). It is the installer's responsibility to ensure that these controls are connected only to suitable loads and equipment types and that such equipment is visible from every control location. Failure to do so could result in serious injury or death.

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Job Name:	Model Numbers:
Job Number:	

Dimensions

Dimensions are in inches (mm)

2.5 (63)

Mounting holes

Terminal blocks on this side

3.75 (95)

4.25 (108)

LEDs and addressing switches on this side

5.25 (134)

1.0 (27)

Mounting Hole Detail

0.1875 (5) dia.

0.3125 (9) dia.

0.1875 (5) dia.

0.25 (6)

#6 or #8 (M3 or M4) screw recommended
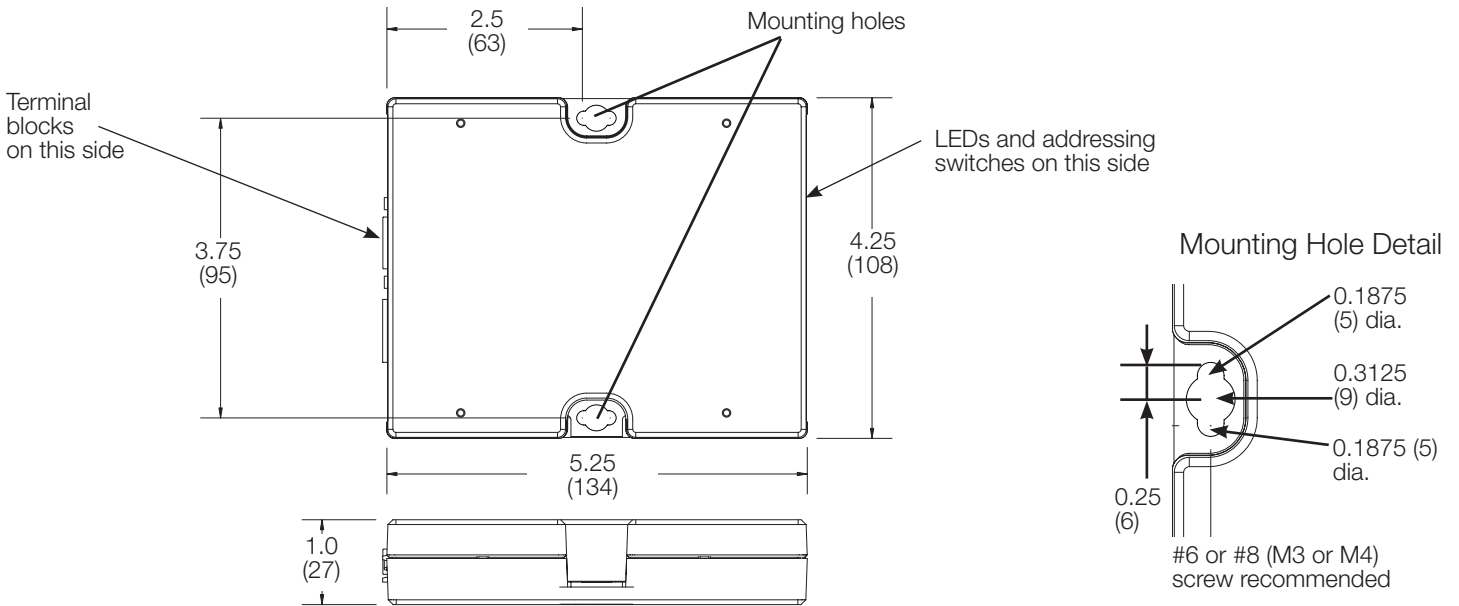
Mounting Options

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 mm^2) 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.
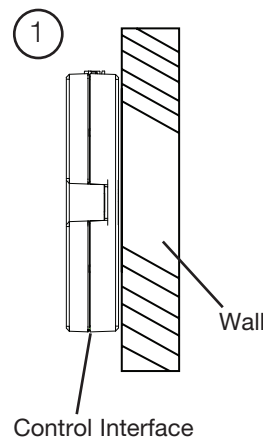
2 Rack Mounting

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

1

Wall

Control Interface

2

LUT-19AV-1U

3

LUT-5x10-ENC

Job Name:	Model Numbers:
Job Number:	

Terminal Locations

QS Data Link (to control units, processor, and wallstations)

1: Common
2: V+
3: MUX
4: MUX

Contact Closure Outputs

Contact Closure Inputs

CCO 1 NC
CCO 1 NO
1-2 COM
CCO 2 NC
CCO 2 NO
CCO 3 NC
CCO 3 NO
3-4 COM
CCO 4 NC
CCO 4 NO
CCO 5 NC
CCO 5 NO
5 COM
CCI 1
CCI 2
CCI 3
CCI 4
CCI 5
COM
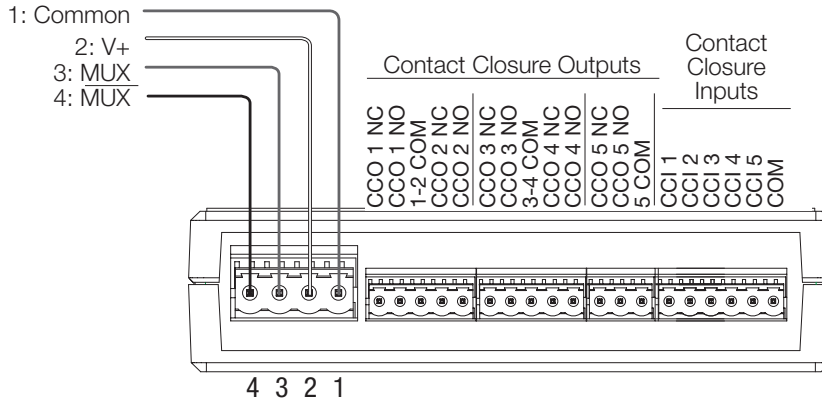
CCI and CCO terminals each hold one 28 to 16 AWG (0.08 to 1.5 mm²) wire

4 3 2 1

LED and DIP Switch Locations

Program Button

1 2 3 4 5 6 7

QSE-IO

DIP switches

LED 1: CCO 1
LED 2: CCO 2
LED 3: CCO 3
LED 4: CCO 4
LED 5: CCO 5
LED 6: Unused
LED 7: Status

Note: CCO LED is ON when CCO NO (normally open contact) is closed.
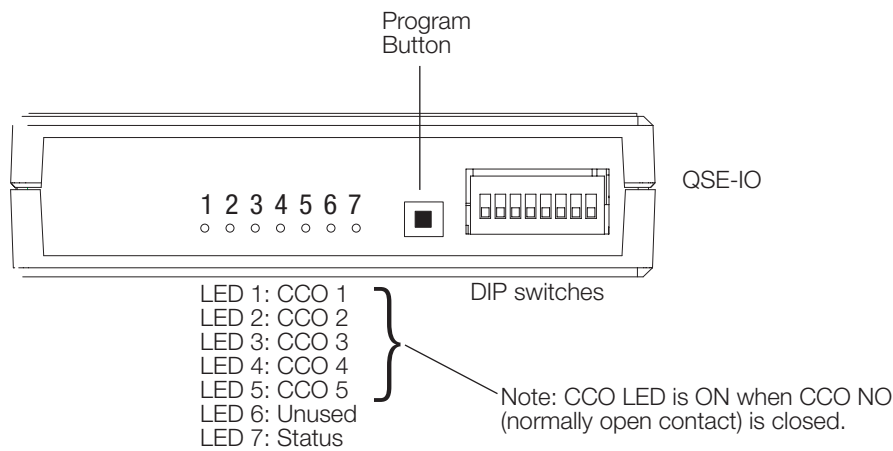
QS Link Wire Sizes (check compatibility in your area)

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)	

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Job Name:	Model Numbers:
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

Rear View of GRAFIK Eye QS Control Unit

Data Link:
4: $\overline{\text{MUX}}$
3: MUX
See QS Link Wire Sizes table previous page

QS Link

To additional wallstations / control interfaces

SELV / PELV / NEC Class 2 Power wiring:
2: V+
1: Common
See QS Link Wire Sizes table previous page
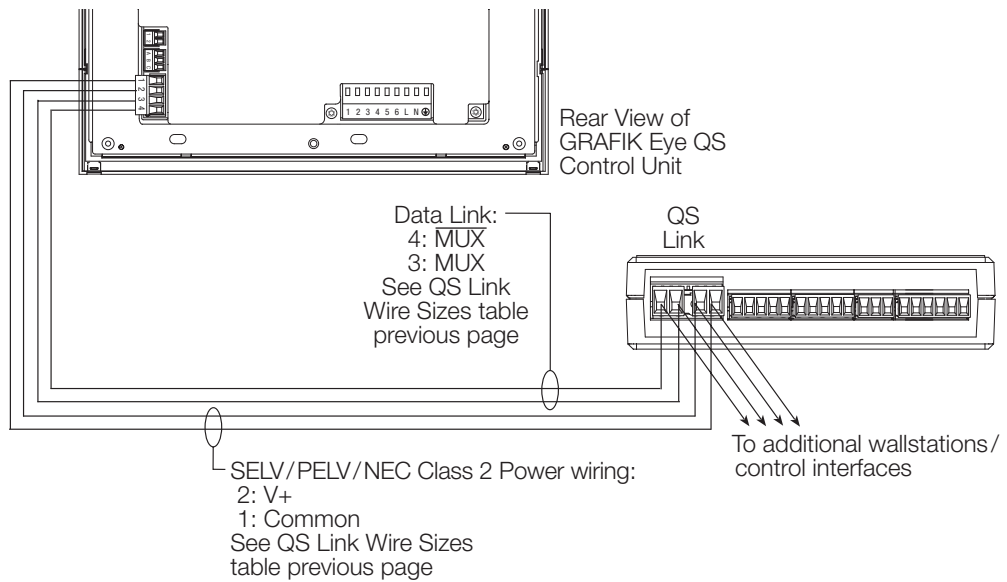
Powered by a QS Link Power Supply

(1) twisted pair 22 AWG (0.5 mm²)

QS Link
1: Common
2: V+
3: $\overline{\text{MUX}}$
4: $\overline{\text{MUX}}$

QS Link

(1) 18 AWG (1.0 mm²) Common

To additional wallstations / control interfaces

Lutron Cable
See QS Link Wire Sizes table previous page

Rear View of GRAFIK Eye QS Control Unit

QS Power Supply

To power source
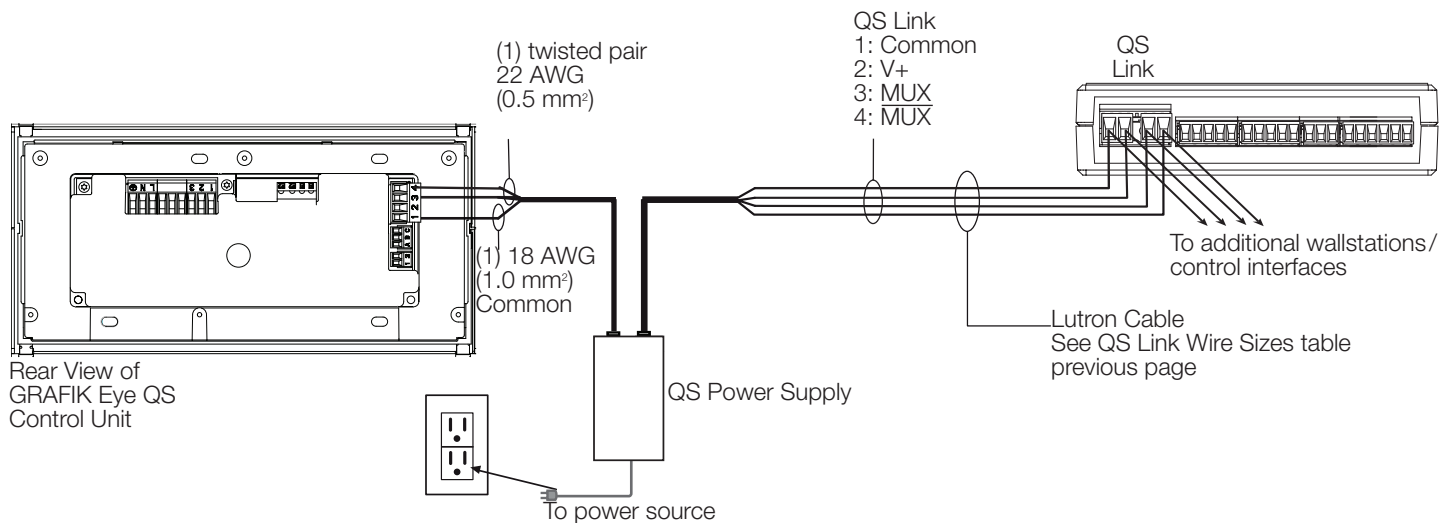
Job Name:	Model Numbers:
Job Number:	

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)

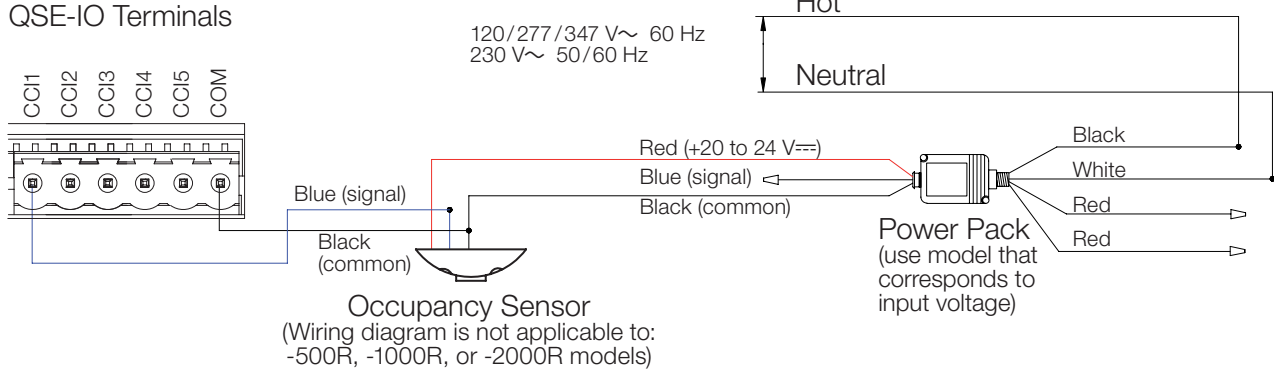## 1 Lutron Occupancy Sensor Wired to 1 QSE-IO Device Input

QSE-IO Terminals

120/277/347 V∼ 60 Hz
230 V∼ 50/60 Hz

Hot

Neutral

CCI1 CCI2 CCI3 CCI4 CCI5 COM

Red (+20 to 24 V===)
Blue (signal)
Black (common)

Black
White
Red
Red

Blue (signal)

Black
(common)

Occupancy Sensor
(Wiring diagram is not applicable to:
-500R, -1000R, or -2000R models)

Power Pack
(use model that
corresponds to
input voltage)

3 Lutron Occupancy Sensors Wired to 1 QSE-IO Device Input
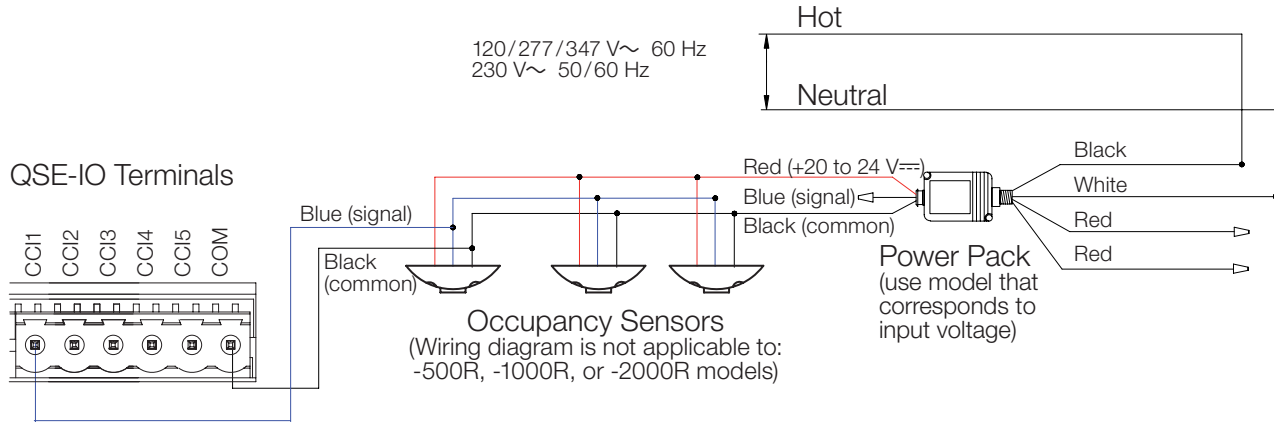
120/277/347 V∼ 60 Hz
230 V∼ 50/60 Hz

Hot

Neutral

QSE-IO Terminals

Red (+20 to 24 V===)
Blue (signal)
Black (common)

Black
White
Red
Red

CCI1 CCI2 CCI3 CCI4 CCI5 COM

Blue (signal)

Black
(common)

Occupancy Sensors
(Wiring diagram is not applicable to:
-500R, -1000R, or -2000R models)

Power Pack
(use model that
corresponds to
input voltage)

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:
Job Number:	

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)

Hot
Neutral
120/277/347 V∼ 60 Hz
230 V∼ 50/60 Hz

Red (+20 to 24 V⎓)
Blue (signal)
Black (common)
Power Pack*

Black
White
Red
Red

Occupancy Sensors
(Wiring diagram is not applicable
to: -500R, -1000R, or -2000R models)

QSE-IO Terminals

CCI1 CCI2 CCI3 CCI4 CCI5 COM

Occupancy Sensors
(Wiring diagram is not applicable to:
-500R, -1000R, or -2000R models)

*(use power pack model that corresponds to input voltage)

Occupancy Sensors
(Wiring diagram is not applicable to:
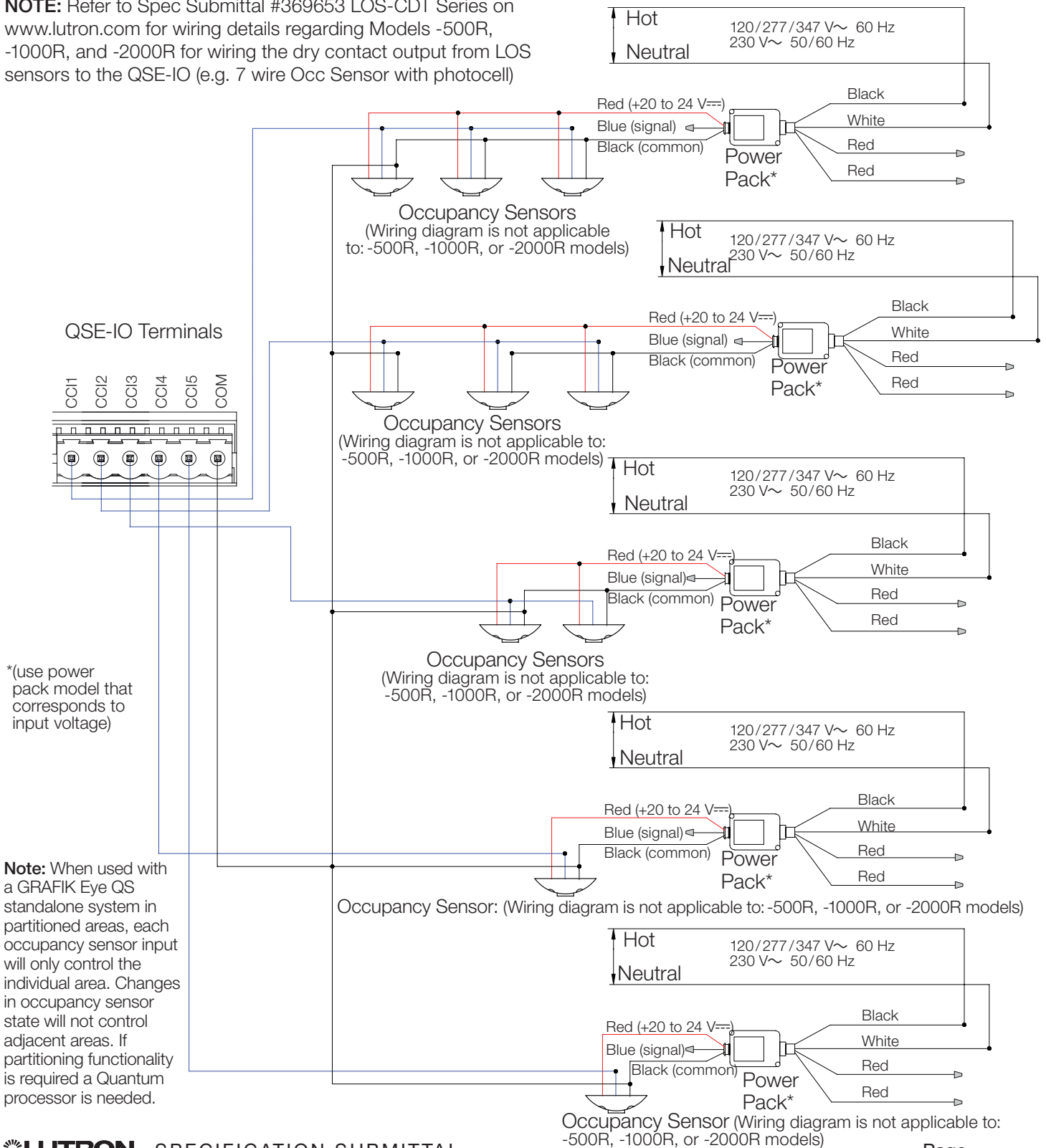-500R, -1000R, or -2000R models)

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.

Occupancy Sensor: (Wiring diagram is not applicable to: -500R, -1000R, or -2000R models)

Occupancy Sensor (Wiring diagram is not applicable to: -500R, -1000R, or -2000R models)

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Job Name:	Model Numbers:
Job Number:	

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:
Job Number:	

QSE-IO Operating Modes and DIP Switch Settings Overview (continued)

Mode Configuration	3	4	5	6	7	8	Input 1	Input 2	Input 3	Input 4	Input 5	Inputs	Outputs
Partitioning (momentary)	Down	Down	Up	Up	Down	Up	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Momentary	Maintained
Partitioning (maintained)	Down	Down	Up	Up	Down	Down	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Maintained	Maintained
Occupancy sensor (auto on/off)	Up	Down	Down	Up	Up	Up	Generates events on occupancy and vacancy					Maintained	Maintained
Occupancy sensor (manual on/auto off)	Up	Down	Down	Up	Up	Up	Generates events on vacancy only					Maintained	Maintained
Zone toggle (maintained)	Up	Down	Up	Up	Down	Down	Toggle 1	Toggle 2	Toggle 3	Toggle 4	Toggle 5	Maintained	Maintained
Zone toggle (momentary)	Up	Down	Up	Up	Down	Up	Toggle 1	Toggle 2	Toggle 3	Toggle 4	Toggle 5	Momentary	
Zone toggle with raise/lower (maintained)	Down	Up	Up	Up	Up	Down	Toggle 1	Toggle 2	Toggle 3	Raise	Lower	Maintained	
Zone toggle with raise/lower (momentary)	Down	Up	Up	Up	Down	Down	Toggle 1	Toggle 2	Toggle 3	Raise	Lower	Momentary	
Zone control (maintained output)	Down	Up	Up	Up	Up	Down	Toggle 1	Toggle 2	Toggle 3	Toggle 4	Toggle 5	Maintained	Maintained
Zone control (maintained output)	Up	Up	Down	Up	Down	Up	Toggle 1	Toggle 2	Toggle 3	Toggle 4	Toggle 5	Momentary	
Zone control (momentary output)	Down	Up	Down	Up	Down	Down	Pulse 1	Pulse 2	Pulse 3	Pulse 4	Pulse 5	Maintained	Momentary
Zone control (momentary output)	Down	Up	Up	Up	Up	Up	Pulse 1	Pulse 2	Pulse 3	Pulse 4	Pulse 5	Momentary	
Zone control (pulsed output)	Up	Up	Up	Down	Up	Up	Pulse 1	Pulse 2	Pulse 3	Pulse 4	Pulse 5	Maintained	Pulsed
Zone control (pulsed output)	Down	Up	Down	Up	Up	Down	Pulse 1	Pulse 2	Pulse 3	Pulse 4	Pulse 5	Momentary	
Hotel configuration 1	Up	Down	Up	Down	Down	Down	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	Up	Down	Down	Down	Up	Down	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	Up	Down	Down	Down	Up	Up	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

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Job Name:	Model Numbers:
Job Number:	