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UL Listed Retrofit Solution for Savant/LiteTouch™ Systems

1.0 Overview

This application note demonstrates a retrofit solution for centralized Savant/LiteTouch™ lighting systems involving a HomeWorks QS (HWQS) system. The aim is to provide a simple solution without the need for an infrastructure overhaul.
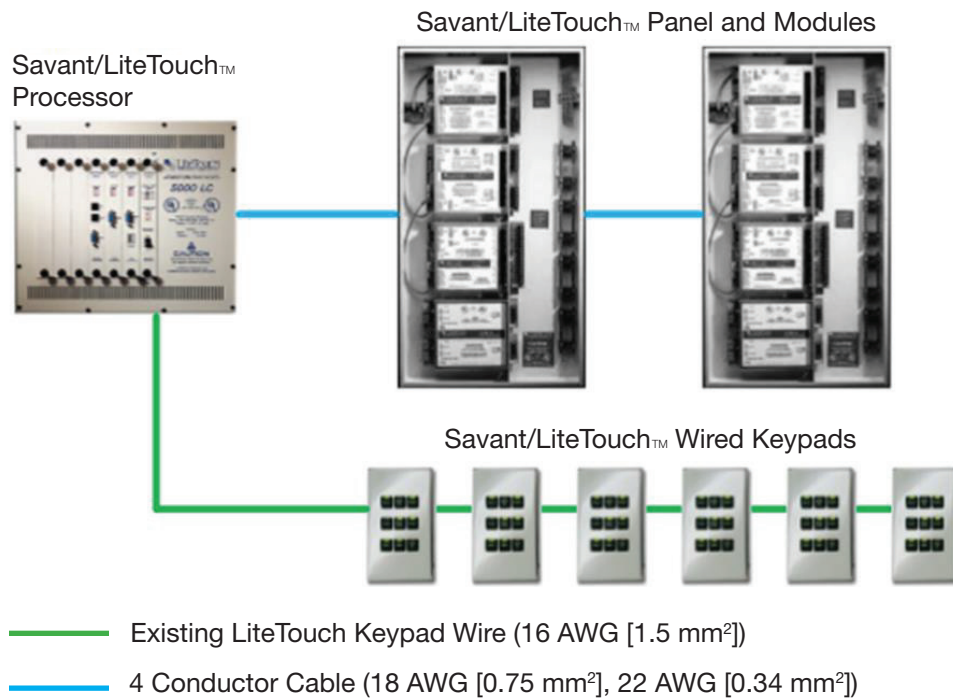
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Savant/LiteTouch™ Panel and Modules

Savant/LiteTouch™
Processor

Savant/LiteTouch™ Wired Keypads

——— Existing LiteTouch Keypad Wire (16 AWG [1.5 mm^2])

——— 4 Conductor Cable (18 AWG [0.75 mm^2], 22 AWG [0.34 mm^2])

2.1.2 HomeWorks QS Retrofit Solution
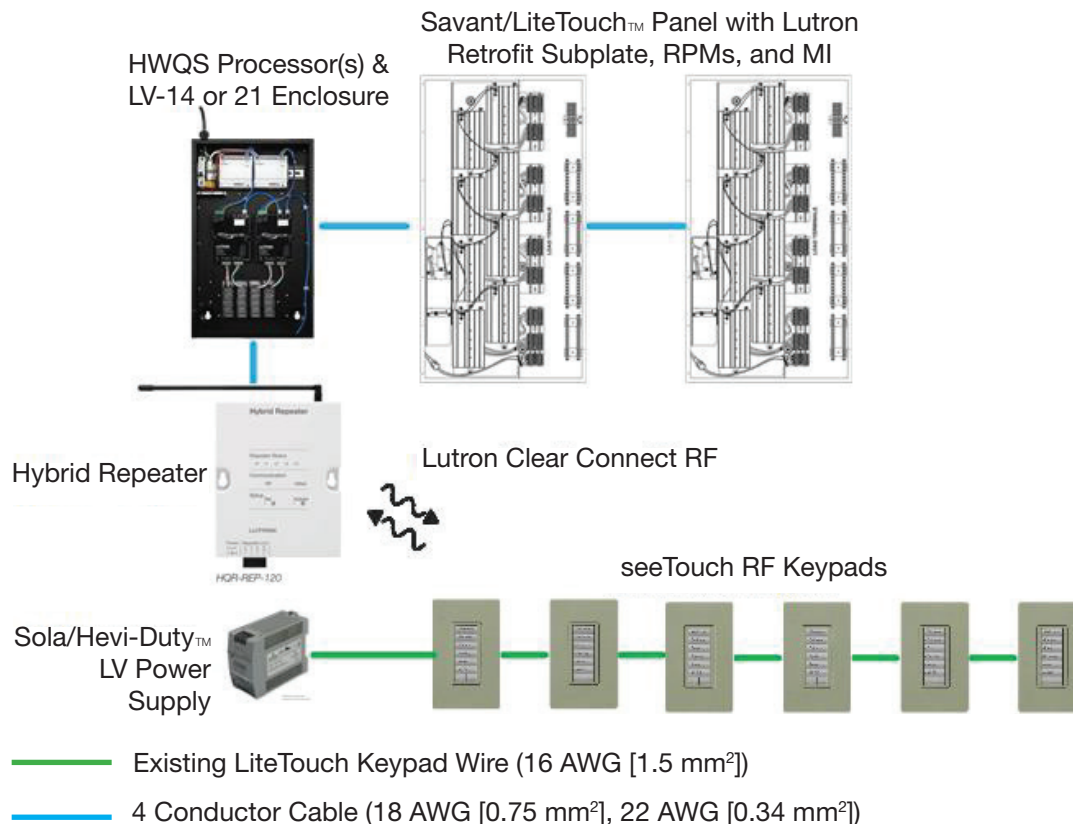
Savant/LiteTouch™ Panel with Lutron
Retrofit Subplate, RPMs, and MI

HWQS Processor(s) &
LV-14 or 21 Enclosure

Hybrid Repeater

Lutron Clear Connect RF

HQR-REP-120

seeTouch RF Keypads

Sola/Hevi-Duty™
LV Power
Supply

——— Existing LiteTouch Keypad Wire (16 AWG [1.5 mm^2])

——— 4 Conductor Cable (18 AWG [0.75 mm^2], 22 AWG [0.34 mm^2])

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2.0 Centralized Lighting Panel Retrofit (continued)

2.2 Savant/LiteTouch™ Module Cross Reference Table

Savant/LiteTouch™ Model #	Description	HWQS Part Number	HWQS Part QTY Req'd
LMC-FAN120 (08-2118-01)	4-Output Fan Control Module	HW-RPM-4FSQ-120	1
LMD-4120 (08-2134-01)	Quad II Dimmer Module	HW-RPM-4U-120	2
LMD-8120 (08-2108-01)	8 Channel Dimmer Module	HW-RPM-4U-120	2
LMD-AP8120	Adaptive Phase 8 Channel Dimmer	HW-RPM-4J-120	2
LMD-IN120 (08-2140-01)	Inverse Phase Dimmer Module	HW-RPM-4J-120	2
LMD-ELV120 (08-2150-01)	Electronic Dimmer Module	HW-RPM-4U-120 and GRX-TVM2's	up to 2 4U and 3 TVM2
LMR-8120 (08-2210-01)	High Power Relay Module	HW-RPM-4R	2
LMI-MAI2 (08-2290-01 DUAL 003)	Maintained Input Module (16 inputs)	QSE-CI-WCI or QSE-IO	up to 2 WCI or 4 QSE-IO
LMI-MOM2 (08-2290-02 DUAL 002)	Momentary Input Module (16 inputs)	QSE-CI-WCI or QSE-IO	up to 2 WCI or 4 QSE-IO
LMI-REL2 (08-2235-01 DUAL 001)	Low Voltage Relay Module (16 outputs)	QSE-IO	up to 4 QSE-IO
08-2208-01	8 Channel Relay Module	HW-RPM-4R	2
08-2200-01	6 Channel Relay Module	HW-RPM-4R	up to 2 4R
08-2100-01	6 Channel Dimmer Module	HW-RPM-4U-120	up to 2 4U
LMD-20A120 (08-2125-01)	Dual 20 A Dimmer Module	HW-RPM-4U-120	2
08-2400-01	Analog Output Module	LMJ-5T-DV-B	up to 8
08-8400-00 & 08-8400-01	6 Load Switching Module	HW-RPM-4R	2
08-8402-00 & 08-8402-01	6 Load Module, Ports 1 & 2 = Standard Dimming Ports 3 – 6 = Switching	HW-RPM-4U-120 HW-RPM-4R	1 of each RPM model
08-8404-00 & 08-8404-01	6 Load Module, Ports 1 – 4 = Standard Dimming Ports 5 – 6 = Switching	HW-RPM-4U-120 HW-RPM-4R	1 of each RPM model
08-8412-00 & 08-8412-01	6 Load Module, Ports 1 – 2 = Memory Dimming Ports 3 – 6 = Switching	HW-RPM-4U-120 HW-RPM-4R	1 of each RPM model
08-8414-00 & 08-8414-01	6 Load Module, Ports 1 – 4 = Memory Dimming Ports 5 – 6 = Switching	HW-RPM-4U-120 HW-RPM-4R	1 of each RPM model
08-8420-00	4 Load Module Ports 1 – 4 = 20 amp each, Switching	HW-RPM-4R	1

2.0 Centralized Lighting Panel Retrofit (continued)

2.2 Savant/LiteTouch™ Module Cross Reference Table (continued)

Please note the following:

- When TVMs are required, they have to mounted in a HWI-PNL-8; it may be possible to use LMJ-5T-DV-B modules instead as there will typically be an RF link for the replacement of the LiteTouch™ keypads

- The suggested HWQS part quantity shows options for full utilization of the corresponding Savant/LiteTouch™ module outputs. Actual required quantities will vary depending upon the actual input or output count being used.

- The table on the prevous page demonstrates drop-in replacements that fit the existing application. If the lighting is also upgraded, there may be cases where the 4J module would be required instead of the 4U. Verify the load type being controlled and choose the appropriate module. For LED dimming, verify performance using the LED Product Selection Tool at www.lutron.com/ledtool.

2.0 Centralized Lighting Panel Retrofit (continued)

2.3 Savant/LiteTouch™ Dimming and Switching Controls with Surface Mounted Savant/LiteTouch™ Panels

When retrofitting Savant/LiteTouch™ systems with panels that are surface-mounted it is recommended to replace the panel with a HomeWorks QS feed-through panel. Using a HomeWorks QS feed-through panel ensures that all standard HomeWorks QS remote power modules can be utilized and without the need for de-rating from their normal load capacity.

2.3.1 Designing the Lutron Feed-Through Panel in the HWQS Programming Software

To begin adding the feed-through panel first go to **Design > Equipment** in the HWQS programming software.
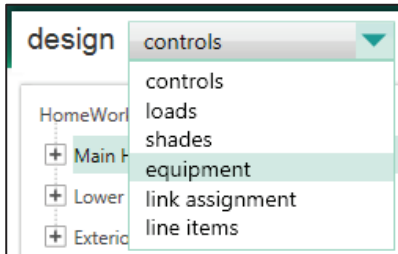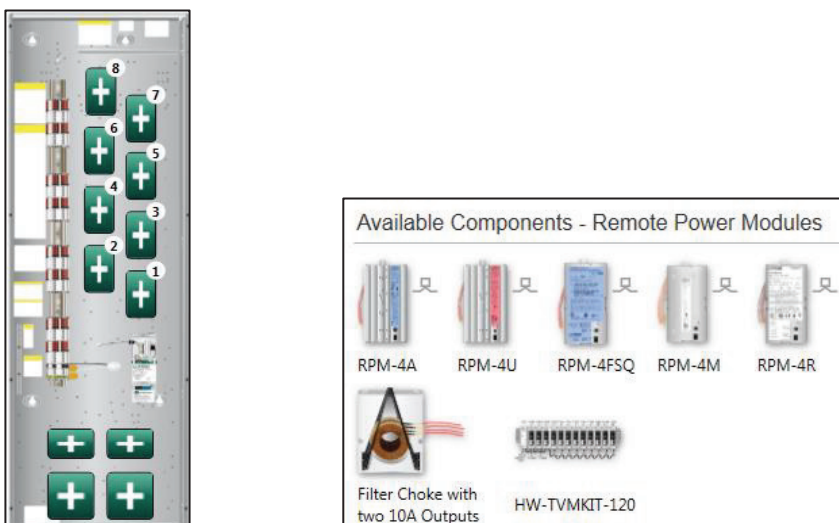

Proceed to the area of the Area Tree where the Savant/LiteTouch™ panel is being replaced. Once the area has been clicked and selected, add an PNL-8 panel to the space.

The PNL-8 has the ability to house up to two processors or QS interfaces as well as wired landing boards and 24 V⎓ DIN rail power supplies in addition to a module interface (MI) and up to 8 remote power modules (RPMs).

It is important that the module addressed as 1 is designed into the database at position 1 of the PNL-8 placeholder and so on. The numbering of the module in the software is a direct correlation to the physical address set on each module using the hexadecimal rotary switch.

Available Components - Remote Power Modules

RPM-4A   RPM-4U   RPM-4FSQ   RPM-4M   RPM-4R

Filter Choke with two 10A Outputs   HW-TVMKIT-120
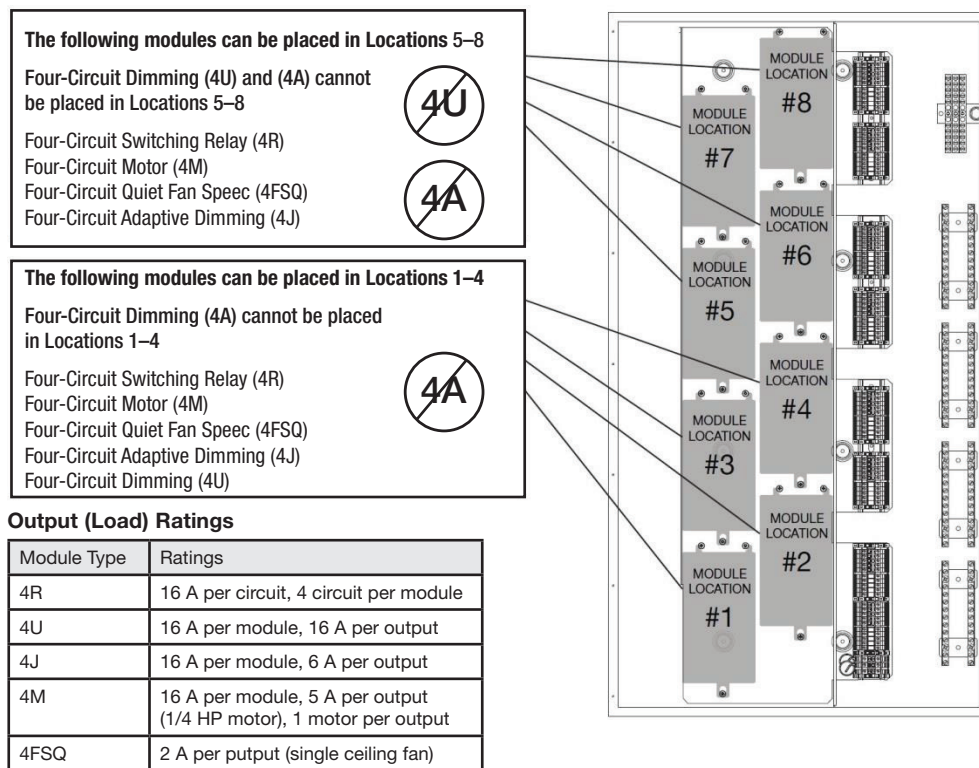
2.0 Centralized Lighting Panel Retrofit (continued)

2.4 Savant/LiteTouch™ Dimming and Switching Controls with Recess Mounted Savant/LiteTouch™ Panels

Retrofitting the existing Savant/LiteTouch™ centralized lighting control equipment to HWQS remote power modules (RPMs) requires the utilization of either the field assembled subplate option, model number **HWR-PNLS-8S-120FT-CGP2730** or the Lutron factory assembled subplate option, model number **HWR-_R_U_J_M_F-120FT-CGP2745**. Installation guides can be found at www.lutron.com, offering a complete overview on the installation of the subplate, installation of the RPMs (field assembled only) and module interface (MI), and the wiring. The installation guide for the factory assembled subplate contains a model number builder (model number varies depending on quantity and model of RPM modules used).

- Each Subplate has the ability to mount up to eight RPMs
- Module interface (MI) mounts next to the subplate (sold separately)
- HWQS Processors cannot be mounted on the subplate assembly and will thus require another panel for mounting (LV14, LV21, or PNL-8 with power kit)

2.4.1 Designing the Lutron Feed-Through Panel in the HWQS Programming Software

The Savant/LiteTouch™ panel combined with the subplate will have different dimensions and clearances than a PNL-8, for example, and some of the RPMs are subject to derated maximum load capacities as a result. Below is a table depicting the maximum load of each RPM when utilizing the subplate and Savant/LiteTouch™ panel as well as module numbering and placement considerations.

The following modules can be placed in Locations 5–8

Four-Circuit Dimming (4U) and (4A) cannot be placed in Locations 5–8

Four-Circuit Switching Relay (4R)
Four-Circuit Motor (4M)
Four-Circuit Quiet Fan Speec (4FSQ)
Four-Circuit Adaptive Dimming (4J)

The following modules can be placed in Locations 1–4

Four-Circuit Dimming (4A) cannot be placed in Locations 1–4

Four-Circuit Switching Relay (4R)
Four-Circuit Motor (4M)
Four-Circuit Quiet Fan Speec (4FSQ)
Four-Circuit Adaptive Dimming (4J)
Four-Circuit Dimming (4U)

Output (Load) Ratings

Module Type	Ratings
4R	16 A per circuit, 4 circuit per module
4U	16 A per module, 16 A per output
4J	16 A per module, 6 A per output
4M	16 A per module, 5 A per output (1/4 HP motor), 1 motor per output
4FSQ	2 A per putput (single ceiling fan)

NOTE: The 4A module is not recommended for use in the subplate solution. The 4J module replaces the 4A module in this application.

Be sure to consider the above maximum load capacities when designing your load schedule in the HWQS programming software. The 4U maximum output ratings are different than the typical ratings when enclosed within a Lutron PNL-5 or PNL-8 panel. As the subplate and Savant/LiteTouch™ assembly are not modeled in the programming software, maximum capacities will assume the typical maximum load. Subsequently, as a result of typical maximum load assumption, the software may not identify the necessity for interfaces such as a Power Booster (PHPM-PA) in some applications.

2.0 Centralized Lighting Panel Retrofit (continued)

2.4 Savant/LiteTouch™ Dimming and Switching Controls with Recess Mounted Savant/ LiteTouch™ Panels (continued)

2.4.2 Designing for the Subplate in the HWQS Programming Software

To begin adding the placeholder for the subplate assembly and panel link product first go to **Design > Equipment** in the HWQS programming software.
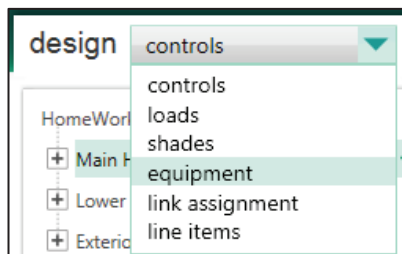
Proceed to the area of the Area Tree where the Savant/LiteTouch™ Panel with Subplate will reside. Once the area has been clicked and selected, add an PNL-8 panel to the space.

The RPM layout of the PNL-8 is different than that of the subplate. The PNL-8 also has the ability to house up to two processors or QS interfaces as well as wired landing boards and 24 V⎓ DIN rail power supplies. The subplate can only house an MI and up to 8 RPMs (no processors, power supplies, TVM2 modules, lamp de-buzzing coils, or interfaces).

Module position may vary as a result of variables such as the available load wire length within the panel. It is typically recommended to start in the lower portion of the panel with module 1 and build upwards from there, similar to the addressing commonly used with a PNL-8 panel, for example.

2.0 Centralized Lighting Panel Retrofit (continued)

## 2.4 Savant/LiteTouch™ Dimming and Switching Controls with Recess Mounted Savant/ LiteTouch™ Panels (continued)

2.4.2 Designing for the Subplate in the HWQS Programming Software (continued)

It is important that the module addressed as 1 is designed into the database at position 1 of the PNL-8 placeholder and so on. The numbering of the module in the software is a direct correlation to the physical address set on each module using the hexadecimal rotary switch.

PNL-8 Layout   Subplate Layout
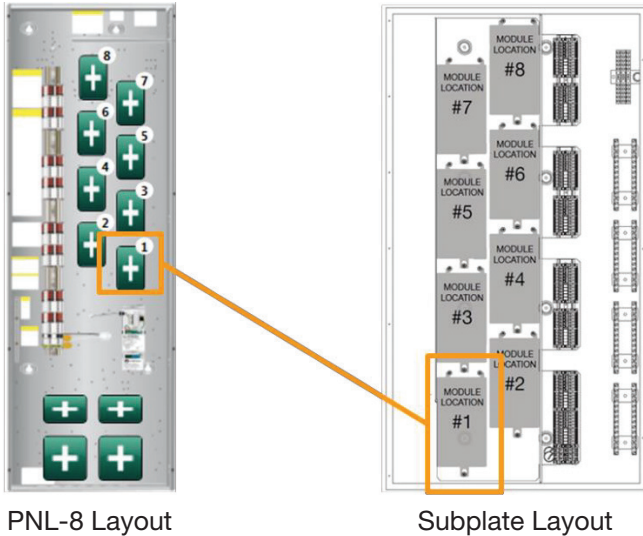
When using an HW-RPM-4J-120 module, place a 4A module into the software to represent the 4J module.

NOTE: When using the 4A module as the model for the 4J in the programming software, the load calculations will assume the 10 A zone rating maximum of the 4A module, not the 6 A rating of the 4J module. Make sure that no zone of a 4J module exceeds 6 A.
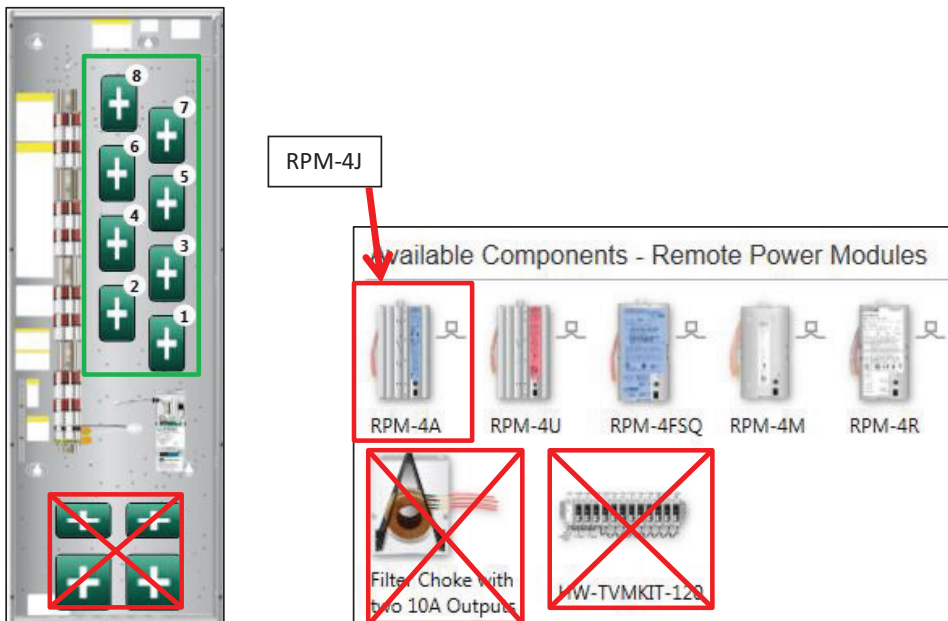
3.0 Savant/LiteTouch™ Wired Keypads

Savant/LiteTouch™ recommends 16 AWG (1.5 mm²) four conductor cable for their wired keypad communication wiring. There is no shielding within the cable and the communication wires are not twisted or shielded. HomeWorks QS wired keypads require 4 conductor wire: one pair 22 AWG (0.34 mm²) twisted/shielded for communication and a pair of 18 AWG (0.75 mm²) (or 12 AWG [2.5 mm²] for longer wire runs) for 24 V⎓ power and common.

As a result, the existing infrastructure is not recommended for the installation of HomeWorks QS wired keypads. One of two solutions is recommended:

1. Run new wire to allow for the installation of HWQS wired keypads

    or

2. Install HWQS RF seeTouch keypads and power using a low-voltage power supply (see Section 3.1)

3.1 Using an Auxiliary Power Supply to Power HomeWorks QS RF Keypads

The recommended auxiliary power supply for this application is the Sola/Hevi-Duty SDP 1-48-100T power supply. This power supply will output a low voltage DC output that is able to power wall-mounted RF seeTouch HWQS keypads. The amount of RF seeTouch keypads that can be powered from a single supply will vary depending on wire length and the cross-sectional area of the wire being used.

3.1.1 Wiring Diagram
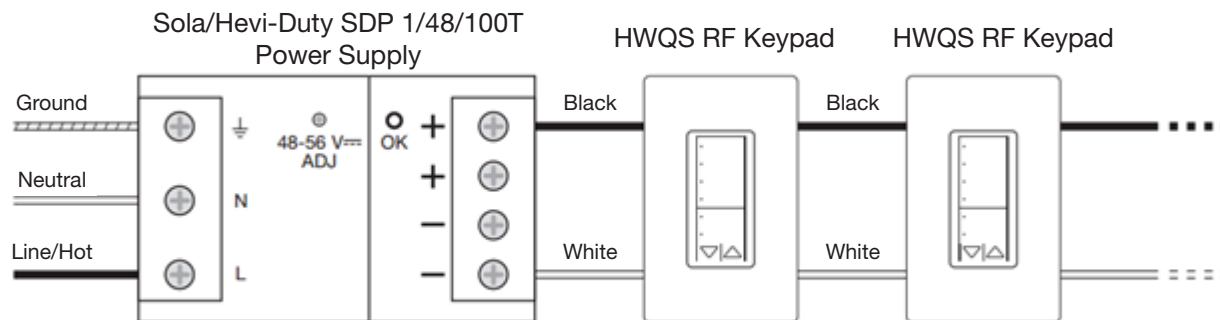
Note: GRAFIK T Hybrid Keypads are not supported in this application.

3.0 Savant/LiteTouch™ Wired Keypads (continued)

3.1 Using an Auxiliary Power Supply to Power HomeWorks QS RF Keypads (continued)

3.1.2 Maximum Number of Keypads per Supply

The maximum number of RF HWQS seeTouch keypads that can be powered from a single supply varies based upon wire run length and the wire gauge.

Wire Gage AWG (mm²)	Wire Run Length ft (m)	Maximum number of Lutron Clear Connect RF Keypads
12 to 18 (2.5 to 0.75)	0 to 900 (0 to 274)	20
20 (0.50)	0 to 600 (0 to 183)	20
20 (0.50)	601 to 900 (183 to 274)	16
22 (0.34)	0 to 300 (0 to 91)	20
22 (0.34)	301 to 600 (92 to 183)	15
22 (0.34)	601 to 900 (183 to 274)	10
24 (0.25)	0 to 300 (0 to 91)	19
24 (0.25)	301 to 600 (92 to 183)	9
24 (0.25)	601 to 900 (183 to 274)	6

3.1.3 Installation

The steps for installing this solution are as follows:

1. Remove the fuse or lock the breaker in the OFF position.
2. Install the SDP 1-48-100T power supply in accordance with the manufacturer's instructions.
3. Wire the black wires of the RF seeTouch keypad(s) to the "+" terminal of the SDP 1-48-100T power supply.
4. Wire the white wires of the RF seeTouch keypad(s) to the "-" terminal of the SDP 1-48-100T power supply.
5. Turn on the breaker to the SDP 1-48-100T power supply.
6. Ensure that the "OK" LED is lit on the SDP 1-48-100T power supply.
7. On the SDP 1-48-100T power supply, turn the 48-56 V ADJ screw clockwise to the maximum output voltage.
8. Verify that all attached keypads are powered.

4.0 Warranty

Lutron's standard warranty policy for HomeWorks QS products is applicable only when following the exact installation recommendations. Failure to do so will result in a void in warranty coverage. Lutron's warranty is valid only when installing the entire Lutron system as recommended, including the use of RPM-4J modules in place of RPM-4A modules. Replacement of all existing Savant/LiteTouch™ power modules AND keypads are required for warranty coverage.

5.0 Appendix – Importance of Product Standards and UL Listing

The National Electric Code® (NEC), or NFPA® 70, is a regionally adopted standard which aims for safe installation and wiring of electrical equipment. Underwriters Laboratories (UL) is an independent global standards company focused on safety science. Compliance with both of these standards ensures safe installation of electrical and electronic equipment within residential spaces.

A listing with UL is important because it indicates to the installer and consumer that UL has received samples of the product and conducted testing, proving that the product meets UL's requirements.

As is the case with all electrical products, it is important to meet the regionally accepted NEC which will direct the installer to follow the manufacturer's instructions for the listed product being installed, thus directing the installer to install products and solutions which have been listed via a standards agency such as UL. It is important to follow the guidelines detailed in this application note and the instruction sheet for the subplate solution to ensure compliance to the UL Listing and subsequently the locally adopted code, ensuring a safe, high quality, and high performance solution.

2014 NEC Article 110.3(B) reads: "Listed or Labeled equipment shall be installed and used in accordance with any instructions included in the Listing or Labeling."

Looking back over 20 years, 1993 NEC Article 110.3(B) is essentially the same: "Installation and Use. Listed or labeled equipment shall be used or installed in accordance with any instructions included in the listing or labeling."

Lutron's LiteTouch Retrofit solution allows the installer to maintain compliance with UL and NEC with a simple solution that can be implemented into any LiteTouch Installation regardless of whether the existing LiteTouch enclosures are newer (with pop-rivet fixed barriers) or older (with welded fixed barriers) and utilizing the existing infrastructure.

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