Emergency Lighting with a Vive System

Overview

Emergency lighting is an important aspect of designing a lighting system for commercial spaces. The system requirements are defined by several codes and standards. These requirements can be fulfilled by using a variety of equipment and methods.

The purpose of this application note is to provide an understanding of basic emergency system components, how those components work with Lutron products, and to show how to wire emergency load control devices to Vive system devices. It is not intended to provide a design guide for emergency systems. This guide focuses on installations in the United States. Consult local and national codes for emergency lighting requirements in other countries.
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Applications of Override and Lockout with a Vive System

In this section, the text and wiring diagrams explain how the Vive hub and various Vive load controllers work with override and lockout applications (such as emergency, fire alarm and security incident) using the Vive hub, the LUT-ELI and other third-party equipment. All information presented here is for reference only. Always check the appropriate codes and standards, the Authority Having Jurisdiction (AHJ), and the installation instructions for the requirements of all equipment included in the design of an emergency lighting system.

Applications for Vive Hub

The Vive hub (firmware version 1.13 or higher) can activate Override and Lockout with a contact closure integration from a Fire Alarm control panel or a LUT-ELI-3PH. This will send lights to defined levels and lock out controls in the case of a fire alarm, power loss, or security incident. The contact closure input 2 (CCI2) on the back of the hub must be set to normally closed when used for override and lockout.

Override and Lockout can also be activated through API integration or manually through the Vive app.

Common override and lockout scenarios involving the Vive hub are as follows:

- Emergency Lighting and Fire Alarm integration, single lighting response. In this application, the lights will override and lockout to the same levels with a loss of normal power or a fire alarm input. This can be achieved using a LUT-ELI-3PH connected to CCI2 on the Vive hub (see pages 8 and 9), or using LVS devices at each load controller.
- Emergency Lighting and Fire Alarm integration, separate lighting responses. In this application, the lights will override to full-on with loss of normal power using LVS Devices, and a programmable level during fire alarm operation (page 7).
- Emergency Lighting only. In this application, the lights will override and lockout to a programmable level with the Vive hub and LUT-ELI-3PH (see pages 8 and 9), or to full on using LVS devices at each load controller.
- Fire Alarm integration only. In this application, the lights will override and lockout to a programmable level with the Vive hub responding to a contact closure from a Fire Alarm Control Panel (see page 7).

Applications for Vive Emergency PowPak Devices

Emergency PowPak devices listed in this application note are intended for use in emergency power systems that provide a period of power interruption when transferring to the emergency power source (i.e. diesel generators). Power interruption during transfer time must be greater than a 250 ms for the Emergency PowPak devices to enter emergency mode. A list of these devices is provided below:

- Emergency PowPak 0–10 V Dimming Module (Model # RMJS-8T-DV-B-EM)
- Emergency PowPak Relay Module With Softswitch (Model # RMJS-16R-DV-B-EM)
- Emergency PowPak 0–10 V Fixture Control (Model # FCJS-010-EM)
- Emergency PowPak EcoSystem Fixture Control (Model # FCJS-ECO-EM)
- Emergency PowPak 347 V Dimming Module with 0–10 V Control (Model RMJS-5T-347-EM)

Emergency PowPak devices are NOT intended for use with the following types of emergency lighting systems:

- Fixtures containing integral inverters or battery backup drivers

Additional Notes

1. Fire alarm integration is only available with Emergency PowPak devices when used in conjunction with the:
   - Vive hub with or without a LUT-ELI-3PH
   - OR
   - Other emergency devices provided by LVS

2. A Vive hub should NEVER be used to commission a standalone Vive system. Emergency PowPak devices require communication from the hub to prevent permanent lockout (even after return to normal power operation) if a power loss were to occur.
Vive Emergency Lighting

Some Vive products can achieve emergency lighting requirements without using third-party devices (e.g., ALCRs, battery backup ballasts). When designing an emergency lighting system, it may not be necessary to force all lighting to 100%, which can help to reduce the load on a backup power source (e.g., a generator). The table below shows which Vive products have programmable emergency light levels and the methods for programming them. This programming is available only when not using third-party emergency devices, which typically force all connected lighting to 100%.

Vive Emergency Load Controllers

<table>
<thead>
<tr>
<th>Product</th>
<th>Model Number</th>
<th>Vive Hub</th>
<th>Emergency Light Level</th>
<th>How to Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vive Relay Emergency PowPak units</td>
<td>RMJS-16R-DV-B-EM</td>
<td>Without hub</td>
<td>ON</td>
<td>Not programmable</td>
</tr>
<tr>
<td>Vive Relay Emergency PowPak units</td>
<td>RMJS-16R-DV-B-EM</td>
<td>With hub</td>
<td>ON or OFF</td>
<td>Vive app or web page</td>
</tr>
<tr>
<td>Vive 0–10 V=== Emergency PowPak units</td>
<td>RMJS-8T-DV-B-EM</td>
<td>Without hub</td>
<td>100%</td>
<td>Not programmable</td>
</tr>
<tr>
<td>Vive 0–10 V=== Emergency PowPak units</td>
<td>FCJS-010-EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vive 0–10 V=== Emergency PowPak units</td>
<td>RMJS-ST-347-EM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vive Emergency EcoSystem PowPak units</td>
<td>FCJS-ECO-EM</td>
<td>Without hub</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Vive Emergency EcoSystem PowPak units</td>
<td>FCJS-ECO-EM</td>
<td>With hub</td>
<td>0–100%</td>
<td>Vive app or web page</td>
</tr>
<tr>
<td>Vive Phase Select PowPak</td>
<td>RMJS-PNE-DV-EM</td>
<td>Without hub</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Vive Phase Select PowPak</td>
<td>RMJS-PNE-DV-EM</td>
<td>With hub</td>
<td>0–100%</td>
<td>Vive app or web page</td>
</tr>
</tbody>
</table>

Vive Normal (non-emergency) Load Controllers

All other load controllers do not override to a configurable level and lockout upon loss of normal power. Equipment can be used to sense loss of normal power, such as the LUT-SHUNT and the LUT-ATS-D. This equipment would bypass the controls to send the load to 100% (not configurable). Since the controls would be powered down and bypassed, the emergency lighting level is not determined by the controls.
Fire Alarm Override & Emergency Lighting Controls

For the previously listed Vive Normal (non-emergency) Load Controllers, power can be turned on to full upon receipt of a contact closure signal from an external device, such as a Fire Alarm Control Panel (FACP). This is useful if an external event, such as the activation of a fire alarm, needs to turn the lights on to full, even if normal power is still present. The following table lists devices that provide compatible fire alarm contacts.

This solution will also ensure the lights turn on in the event that normal power is lost, whether a generator or Uninterruptable Power Supply (UPS) is used as the power source.

<table>
<thead>
<tr>
<th>Fire Alarm-Compatible Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Alarm tie-in included</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fire Alarm Contact Compatible LVS Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Alarm interface required</td>
</tr>
</tbody>
</table>

Dry Contacts

For fire alarm operation with Vive Normal (non-emergency) Load controllers, the above mentioned devices must be used in conjunction with normally closed OR normally open fire alarm contacts. The type of contact depends on the device per the recommendations in the table below. Dry contacts must be rated for 100 mA (24 V<sub>min</sub> or greater) and a 10 V<sub>min</sub> to 30 V<sub>min</sub> power supply (1 W or greater) must be present as well. A maximum of 20 devices can share one fire alarm dry contact. The 1 W minimum power supply must be provided for each device regardless of the quantities of dry contacts being shared. These fire alarm devices are polarity neutral for DC power supply inputs.

<table>
<thead>
<tr>
<th>Device</th>
<th>Dry Contact Type</th>
<th>Additional Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUT-ELI</td>
<td>Normally Open OR Normally Closed</td>
<td>HJS-0, HJS-1, or HJS-2 and Emergency PowPak units</td>
</tr>
</tbody>
</table>

LVS Devices

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LUT-ATS-D</td>
<td>Normally Closed (Closed= Normal Closed, Open= Fire Alarm Condition)</td>
<td>DC Power Supply and Dipswitch Positions 0,0,1,0</td>
</tr>
<tr>
<td>LUT-SHUNT, LUT-SHUNT-FM</td>
<td>Normally Closed (Closed= Normal Closed, Open= Fire Alarm Condition)</td>
<td>LVS TR-A-2 Device</td>
</tr>
</tbody>
</table>
Fire Alarm Integration using the Vive Hub

A Fire Alarm Control panel can integrate with the Vive hub through the contact closure input 2 on the back of the Vive hub. When the Fire Alarm Control Panel sets the CCI2 on the back of the Vive hub to OPEN, the Vive hub then sends all emergency Vive PowPak devices associated with that hub to defined levels and locks out controls. CCI2 on the Vive hub must be programmed as an emergency input, set to normally closed.

Wiring Schematic
Fire Alarm Integration using the Vive Hub (continued)

Regular Operation

Fire Alarm Activated
Emergency Lighting and Fire Alarm Integration using a Vive Hub

The Vive hub and PowPak units have been evaluated by UL for use in emergency lighting systems in accordance with UL 924 when paired with the LUT-ELI-3PH (UL file E234628).

The LUT-ELI interfaces with the Vive hub through the contact closure input on the back of the Vive hub. When the LUT-ELI senses that any phase of normal power is lost, it sends a contact closure to the Vive hub. The Vive hub then sends all loads connected to the Vive hub to defined levels and locks out all controls. When using this application, remember these key points:

- The Vive hub must be powered by normal/emergency power.
- The input on the back of the Vive hub must be programmed as an emergency input.
- All Emergency Lighting load controllers must be fed by normal/emergency power.
- If EcoSystem devices are part of the emergency lighting, they must be powered by normal/emergency power.
- If using a power interface that controls emergency lighting, that interface must be powered by normal/emergency power.

Please refer to the LUT-ELI and Vive hub installation instructions for full wiring and programming instructions for this application.

Emergency and Fire Alarm Integration using the Vive Hub and LUT-ELI on a UPS

Fire Alarm response and Loss of normal power response will be the same.

Vive hub and Emergency PowPak modules are powered by normal and emergency power on a UPS.

In this application, the Vive hub and Emergency PowPak modules are powered by normal and emergency power. The LUT-ELI-3PH is powered by normal and emergency power, and senses normal power. During regular operation, the Automatic Transfer Switch is in the Normal position, allowing regular utility power to the Vive hub, Emergency PowPak modules and LUT-ELI-3PH.

During emergency operation, the Automatic Transfer Switch is in the Emergency position, allowing emergency backup power to power the device. As a result, the LUT-ELI-3PH senses the loss of normal power and will open the contact closure input (CCI2) on the Vive hub. The Vive hub will send the Emergency PowPak modules to their emergency lighting mode until the LUT-ELI-3PH senses normal power and re-makes the contact with CCI2 on the Vive hub. The Vive hub will then release the Emergency PowPak modules to their normal operation.

During Fire Alarm operation, normal power may still be present. The Fire Alarm Control Panel (FACP) will set a contact on the LUT-ELI-3PH which will cause the LUT-ELI-3PH to open the contact closure input (CCI2) on the Vive hub. The Vive hub will send the Emergency PowPak modules to their emergency lighting mode. When the FACP contact is cleared, the LUT-ELI-3PH will re-make the contact with CCI2 on the Vive hub. The Vive hub will then release the Emergency PowPak modules to their normal operation.
Emergency and Fire Alarm Integration using the Vive Hub and LUT-ELI on a UPS (continued)

Wiring Schematic

[Diagram showing the integration of regular utility power, emergency power, and normal/electric power, with connections to the normal circuit panel, power pack, and fire alarm control panel (FACP)].

- Regular Utility Power
- Emergency Power (UPS)
- Normal Power
- UL 1008 Transfer Switch
- Normal/Emergency Power
- Power Pack PP-DV
- All Emergency PowPak units
- Normal/Emergency Light Fixture
- Normal Light Fixture
- Optional Fire Alarm connection
- Fire Alarm Control Panel (FACP) Contact Closure Input
- Pins 1&7
- Pins 3&4 or 5&6
- Normally Open Pins 3&4
- Normally Closed Pins 5&6
- 1- or 3-phase Normal Power Sense
- Red wire
- LUT-ELI-3PH UL 924
- Emergency and Fire Alarm Integration using the Vive Hub and LUT-ELI on a UPS (continued)
Emergency and Fire Alarm Integration using the Vive Hub and LUT-ELI on a UPS (continued)

Regular Operation
Emergency and Fire Alarm Integration using the Vive Hub and LUT-ELI on a UPS (continued)

Fire Alarm Activated

Regular Utility Power

Emergency Power (UPS)

Normal Power

Emergency Power

UL 1008 Transfer Switch

Normal/Emergency Power

Normal Circuit Panel

Power Pack PP-DV

Pins 1&7

Red wires

Pins 3&4 or 5&6

Normally Open

Normally Closed

1- or 3-phase Normal Power Sense

Optional Fire Alarm connection

Fire Alarm Control Panel (FACP) Contact Closure Input

Normal Light Fixture

Fire Alarm Control Panel (FACP) Contact Closure Input

Normal Light Fixture

LUT-ELI-3PH UL 924

Normal Circuit Panel

Power Supply

24 Vm Common

CCI #2

Set to Normally Closed

Normal/Emergency Light Fixture

EM PowPak units at override level and locked out from controls

All Emergency PowPak units

Normal/Emergency Circuit Panel

Transfer Switch

Normal / Emergency Power

Normal Circuit Panel

Normal Power

Normal / Emergency Power

Emergency Power

Regular Utility Power

Fire Alarm Activated

Emergency and Fire Alarm Integration using the Vive Hub and LUT-ELI on a UPS (continued)
Emergency and Fire Alarm Integration using the Vive Hub and LUT-ELI on a UPS (continued)

Emergency Operation

Regular Utility Power

Emergency Power (UPS)

UL 1008 Transfer Switch

Normal Circuit Panel

Power Pack PP-DV

LUT-ELI-3PH UL 924

Normal/Emergency Circuit Panel

All Emergency PowPak units

24 Vm

Common

CCI #2
Set to Normally Closed

HJS-x

Normal Light Fixture

Fire Alarm Control Panel (FACP)
Contact Closure Input

Optional Fire Alarm connection

1- or 3-phase Normal Power Sense

Pins 3&4 or 5&6

Red Wire

Normally Open

Pins 3&4

Normally Closed

Pins 5&6

12 V

- 25 mA

IEC SELV / NEC®

Class 2
Emergency Lighting and Fire Alarm Integration using a Vive Hub and Emergency PowPak modules

Fire Alarm response and Loss of normal power response will be the same.

PowPak modules are powered by normal and emergency power on a Generator, Vive hub is powered by a UPS.

In this application, the Vive hub and Emergency PowPak modules are powered by normal and emergency power. The LUT-ELI-3PH is powered by normal and emergency power, and senses normal power. During regular operation, the Automatic Transfer Switch is in the Normal position, allowing regular utility power to the Vive hub, Emergency PowPak modules and LUT-ELI-3PH.

During emergency operation, the Automatic Transfer Switch is in the Emergency position, allowing emergency backup power to power the device. As a result, the LUT-ELI-3PH senses the loss of normal power and will open the contact closure input (CCI2) on the Vive hub. The Vive hub will send the Emergency PowPak modules to their emergency lighting mode until the LUT-ELI-3PH senses normal power and re-makes the contact with CCI2 on the Vive hub. The Vive hub will then release the Emergency PowPak modules to their normal operation.

During Fire Alarm operation, normal power may still be present. The Fire Alarm Control Panel (FACP) will set a contact on the LUT-ELI-3PH which will cause the LUT-ELI-3PH to open the contact closure input (CCI2) on the Vive hub. The Vive hub will send the Emergency PowPak modules to their emergency lighting mode. When the FACP contact is cleared, the LUT-ELI-3PH will re-make the contact with CCI2 on the Vive hub. The Vive hub will then release the Emergency PowPak modules to their normal operation.

Wiring Schematic
Emergency Lighting and Fire Alarm Integration using a Vive Hub and Emergency PowPak modules *(continued)*

Regular Operation

**Regular Utility Power**

**Emergency Power (UPS)**

**Normal Power**

**UL 1008 Transfer Switch**

**Normal Circuit Panel**

**Power Pack PP-DV**

**UPS by others**

**All Emergency PowPak units**

**Normal/Emergency Light Fixture**

**Fire Alarm Control Panel (FACP)**

**Contact Closure Input**

**Optional Fire Alarm connection**

**Fire Alarm Control Panel (FACP) Contact Closure Input**

**Normal Light Fixture**

**All Normal PowPak units**

**Normal/Emergency Circuit Panel**

**CCI #2 Set to Normally Closed**

**24 Vm**

**Common**
Emergency Lighting and Fire Alarm Integration using a Vive Hub and Emergency PowPak modules (continued)

Fire Alarm Activated
Emergency Lighting and Fire Alarm Integration using a Vive Hub and Emergency PowPak modules (continued)

Emergency Operation

- Regular Utility Power
- Emergency Power (UPS)

UL® 1008 Transfer Switch

Normal Power

Normal Circuit Panel

UL® 924

Pins 3&4 or 5&6

Red wires

Pins 3&4

Normally Closed

Pins 5&6

Normally Open

1- or 3-phase
Normal Power
 Sense

Optional Fire Alarm connection

Fire Alarm Control Panel (FACP)
Contact Closure Input

Normal Light Fixture

All Normal PowPak units

Emergency Power

Normal/Emergency Power

All Emergency PowPak units

UPS by others

Normal/Emergency Light Fixture

LUT-ELI-3PH

UL® R-1008

Transfer Switch

Normal / Emergency Power

24 Vm

Common

CCI #2
Set to Normally Closed

Regular Utility Power

Power Supply

Emergency Operation

Emergency Lighting and Fire Alarm Integration using a Vive Hub and Emergency PowPak modules (continued)
Emergency PowPak 0–10 V Dimming Module

Module is powered by normal and emergency power on a generator
In all applications, the Emergency PowPak 0–10 V Dimming Module is powered by normal and emergency power. During regular operation, the Automatic Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the Automatic Transfer Switch is in the Emergency position, allowing emergency backup power to power the device. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: RMJS-8T-DV-B-EM.

Note: When operating without a Vive hub, the Emergency PowPak 0–10 V Dimming Module senses a power cycle and enters emergency mode for 90 minutes.

IMPORTANT: This solution is not applicable for use with an Uninterruptable Power Supply (UPS) backup system. For solutions with an Uninterruptable Power Supply (UPS) backup system, please refer to page 7.

Wiring Schematic

* NOTE: Solution is not applicable for an Uninterruptable Power Supply (UPS) backup system. RMJS-8T-DV-B-EM must see a complete change-over of power from normal to emergency for the unit to go into emergency mode.

NOTE: Some applications (in the U.S.A.) require the PowPak module to be installed inside an additional junction box. For information about how to perform this installation see Application Note #423 (P/N 048423) at www.lutron.com Please consult all local and national electric codes for proper installation methods.
Emergency PowPak 0–10 V Dimming Module (continued)

Module is powered by normal and emergency power on a generator (continued)

Regular Operation

Emergency Operation
Emergency PowPak 0–10 V Dimming Module (continued)

Module is powered by normal and emergency power on a UPS

In all applications, the Emergency PowPak 0–10 V Dimming Module is powered by normal and emergency power. During regular operation, the UL 1008 Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the LUT-ATS-D senses the loss of normal power and creates a power interrupt to the Emergency PowPak. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: RMJS-8T-DV-B-EM.

Note: When operating without a Vive hub, the Emergency PowPak 0–10 V Dimming Module senses a power cycle and enters emergency mode for 90 minutes.

Wiring Schematic
Emergency PowPak 0–10 V Dimming Module (continued)

Module is powered by normal and emergency power on a UPS (continued)

Normal Operation
Emergency PowPak 0–10 V dimming Module (continued)

Module is powered by normal and emergency power on a UPS (continued)

Emergency Operation
PowPak 0–10 V Dimming Module

Module is powered by emergency power

In an application where a 0–10 V PowPak dimming module is powered by emergency power and controlling emergency loads, an ALCR with a normally open relay and a normally closed relay is used. During regular operation, the module controls the load directly. During emergency operation, the device senses normal power is lost and the normally closed relay closes while the normally open relay opens. Doing this provides power to the load and interrupts the 0–10 V signal which should cause the load to go to high-end if the ballast or driver complies with IEC 60929 Annex E. An example of this type of ALCR is the LUT-SHUNT-D from LVS Controls. This applies to: RMJS-8T-DV-B and RMJS-8TN-DV-B.

Wiring Schematic
PowPak 0–10 V Dimming Module (continued)

Module is powered by emergency power (continued)

Regular Operation

Emergency Operation
PowPak 0–10 V Dimming Module (continued)

Module is powered by emergency power (continued)

Fire Alarm Operation

Regular Utility Power

Emergency Power

Normal Power

Emergency Power

UL 1008 Transfer Switch

Normal/Emergency Power

Line/Hot

Red

White

Black

Emergency Circuit Panel

Normal Hot

Normal Neutral

Normal Voltage Sense

PowPak Dimming Module

Purple

Purple

Yellow

Blue

Black

White

(–)

(+)

Switched Line/Hot

Emergency Load

24 V Power Supply

LVS Controls LUT-SHUNT-D

Fire Alarm Control Panel (FACP)

Contact Closure Output

Closed: Fire Alarm Condition

Open: Normal Condition
**PowPak 0–10 V Dimming Module (continued)**

**Module is powered by normal power**

In an application where a 0–10 V PowPak dimming module is powered by normal power but controls an emergency load, an ALCR is used with a normally open relay and a normally closed relay that responds to a switched hot signal. During regular operation, the normally closed contact responds to the switched hot output of the module, while the normally open contact remains closed. During emergency operation, the device senses normal power is lost and the normally closed relay closes while the normally open relay opens. Doing this provides power to the load and interrupts the 0–10 V signal which should cause the load to go to high-end if the ballast or driver complies with IEC 60929 Annex E. An example of this type of ALCR is the LUT-ALCR-D from LVS Controls. This applies to: RMJS-8T-DV-B and RMJS-8TN-DV-B.

**Wiring Schematic**

[Diagram showing wiring connections for regular utility power, normal power, normal voltage sense, control state sense, normal hot, normal neutral, switched line/hot, and emergency power connections.]

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27 Customer Assistance — 1.844.LUTRON1
PowPak 0–10 V--- Dimming Module (continued)

Module is powered by normal power (continued)

Regular Operation

Emergency Operation
PowPak 0–10 V Dimming Module (continued)

Module is powered by normal power (continued)

Fire Alarm Operation

Regular Utility Power

Emergency Power

Normal Power

Normal Neutral

Normal Hot

Normal Voltage Sense

LVS Controls LUT-ALCR-D

Control State Sense

Black

Red

Purple

White

24 V Power Supply

Fire Alarm Control Panel (FACP) Contact Closure Output
Closed: Fire Alarm Condition
Open: Normal Condition

Emergency Power

UL® 1008 Transfer Switch

Normal/Emergency Power

Regular Utility Power

Normal Circuit Panel

Neutral

Switched Line/Hot (Blue)

Switched Line/Hot (Yellow)

(-)

(+)
Emergency PowPak Relay Module with Softswitch

Module is powered by normal and emergency power on a generator

In all applications, the Emergency PowPak Relay Module with Softswitch is powered by normal and emergency power. During regular operation, the Automatic Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the Automatic Transfer Switch is in the Emergency position, allowing emergency backup power to power the device. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: **RMJS-16R-DV-B-EM**.

**Note:** When operating without a Vive hub, the Emergency PowPak Relay Module with Softswitch senses a power cycle and enters emergency mode for 90 minutes.

**IMPORTANT:** This solution is not applicable for use with an Uninterruptable Power Supply (UPS) backup system. For solutions with an Uninterruptable Power Supply (UPS) backup system, please refer to page 15.

Wiring Schematic

*NOTE:* Solution is not applicable for an Uninterruptable Power Supply (UPS) backup system. **RMJS-16R-DV-B-EM** must see a complete change-over of power from normal to emergency for the unit to go into emergency mode.
Emergency PowPak Relay Module with Softswitch (continued)

Module is powered by normal and emergency power on a generator (continued)

Regular Operation

![Diagram of regular operation showing power flow from regular utility power to emergency power through PowPak units and automatic transfer switch.]

Emergency Operation

![Diagram of emergency operation showing power flow from emergency feed to normal load through PowPak units and automatic transfer switch.]

Neutral (N) Line / Hot (L)

120 / 277 V ~ Normal Feed
24 V ~ Common

Neutral (N)

To additional RMJS-16R-DV-B PowPak units

To additional RMJS-16R-DV-B-EM PowPak units

RMJS-16R-DV-B
Normal Load

RMJS-16R-DV-B
Normal Load

RMJS-16R-DV-B-EM
Normal / Emergency Load

RMJS-16R-DV-B-EM
Normal / Emergency Load

Junction Box

Switched Line / Hot

Switched Line / Hot

24 V ~

120 / 277 V ~

120 / 277 V ~ Generator / Emergency Feed

Neutral (N)

Automatic Transfer Switch

Neutral (N)
Emergency PowPak Relay Module with Softswitch (continued)

Module is powered by normal and emergency power on a UPS

In all applications, the Emergency PowPak Relay Module with Softswitch is powered by normal and emergency power. During regular operation, the UL 1008 Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the LUT-ATS-D senses the loss of normal power and creates a power interrupt to the Emergency PowPak. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: RMJS-8T-DV-B-EM.

Note: When operating without a Vive hub, the Emergency PowPak Relay Module with Softswitch senses a power cycle and enters emergency mode for 90 minutes.

Wiring Schematic

[Diagram of wiring schematic]
Emergency PowPak Relay Module with Softswitch (continued)

Module is powered by normal and emergency power on a UPS (continued)

Normal Operation

<table>
<thead>
<tr>
<th>Normal</th>
<th>Emergency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Power</td>
</tr>
<tr>
<td>Panel</td>
<td>Panel</td>
</tr>
<tr>
<td>RMJS-16R-DV-B</td>
<td>RMJS-16R-DV-B-EM</td>
</tr>
<tr>
<td>Neutral (N)</td>
<td>Neutral (N)</td>
</tr>
<tr>
<td>Line / Hot</td>
<td>Line / Hot</td>
</tr>
<tr>
<td>Normal Voltage Sense</td>
<td>Normal Voltage Sense</td>
</tr>
<tr>
<td>LUT-ATS-D</td>
<td>LUT-ATS-D</td>
</tr>
<tr>
<td>Normal / Emergency Load</td>
<td>Normal / Emergency Load</td>
</tr>
<tr>
<td>Normal / Emergency Load</td>
<td>Normal / Emergency Load</td>
</tr>
<tr>
<td>Switched Line / Hot</td>
<td>Switched Line / Hot</td>
</tr>
<tr>
<td>24 V</td>
<td>24 V</td>
</tr>
<tr>
<td>Hub</td>
<td>Hub</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Power Supply</td>
</tr>
</tbody>
</table>

DIP Switch Settings on LUT-ATS-D:

- ON
- OFF

To additional RMJS-16R-DV-B-EM PowPak units
Emergency PowPak Relay Module with Softswitch (continued)

Module is powered by normal and emergency power on a UPS (continued)

Emergency Operation

![Diagram of Emergency PowPak Relay Module with Softswitch]

- Regular Utility Power
- Emergency Power (UPS)
- DIP Switch Settings on LUT-ATS-D
- UL+ 1008 Transfer Switch
- LVS Controls LUT/ATS-D
- Normal/Voltage Sense
- Normal Circuit Panel
- Neutral (N)
- Line/Hot (L)
- 120/277 V~ Normal Feed
- 24 V~ Normal Feed
- Power Supply
- Common
- Hub
- To additional RMJS-16R-DV-B-EM PowPak units
- Neutral (N)
- Switched Line/Hot
- Normal/Emergency Load

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Application Note #628

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PowPak Relay Module With Softswitch

Module is powered by emergency power

In an application where a PowPak relay module has power during an emergency, an ALCR with a normally closed relay (simple shunt relay) is used. During regular operation, normal power is present and the contact in the shunt relay is open, which allows the module to function. When normal power is lost, the contact in the shunt relay closes and bypasses the local control by providing power to the load. An example of an ALCR with a normally closed relay is LUT-SHUNT from LVS Controls. This shunt relay can be used with switching PowPak modules, which include:

- RMJS-16R-DV-B
- RMJS-5R-DV-B
- RMJS-16RCCO1DV-B
- RMJS-5RCCO1-DV-B
- RMJS-20R-DV-B
- RMJS-20RCCO1DV-B

Wiring Schematic

[Diagram showing wiring connections for regular utility power, normal power, emergency power, and emergency load connections.]
PowPak Relay Module With Softswitch (continued)

Module is powered by emergency power (continued)

Regular Operation

Emergency Operation
PowPak Relay Module With Softswitch (continued)

Module is powered by emergency power (continued)

Fire Alarm Operation

[Diagram showing the connection between the power sources and the emergency load, with labels for Regular Utility Power, Normal Power, Emergency Power, Normal Neutral, Normal Hot, Switched Line/Hot, Normal Voltage Sense, and Fire Alarm Control Panel (FACP) Contact Closure Output.]

Closed: Normal Condition
Open: Fire Alarm Condition

LVS Controls TR-A-2

LVS Controls LUT-SHUNT

120 V~ 240/277 V~

Emergency Load
PowPak Relay Module With Softswitch (continued)

Module is powered by normal power

In an application where a PowPak relay module does not have power during an emergency, but is controlling emergency loads during regular operation, an ALCR with a normally closed relay that responds to the switched hot output of the module is used. During regular operation, normal power is present and the relay in the ALCR will respond to switched hot output of the module. When normal power is lost, the contact in the ALCR will close and provide power to the emergency load. An example of an ALCR like this is LUT-ALCR from LVS controls. This relay can be used with switching PowPak modules, which include:

- RMJS-16R-DV-B
- RMJS-5R-DV-B
- RMJS-16RCCO1DV-B
- RMJS-5RCCO1-DV-B
- RMJS-20R-DV-B
- RMJS-20RCCO1DV-B

Wiring Schematic
PowPak Relay Module With Softswitch (continued)

Module is powered by normal power (continued)

Regular Operation

Emergency Operation
PowPak Relay Module With Softswitch (continued)

Module is powered by normal power (continued)

Fire Alarm Operation

Regular Utility Power

Emergency Power

UL® 1008 Transfer Switch

Emergency Circuit Panel

Normal Load

Emergency Load

Normal Voltage Sense

Control State Sense

24 Volt Power Supply

LVS Controls LUT-ALCR

Fire Alarm Control Panel (FACP)
Contact Closure Output
Closed: Fire Alarm Condition
Open: Normal Condition

PowPak Relay Module

Normal Load

Switched Line/Hot

Neutral

Line/Hot (Blue)

2 Blue/White

Switched Line/Hot (Yellow)

Fire Alarm Operation

Red

Black

White

Black

Red

White

40
Emergency PowPak 0–10 V== Fixture Control

Fixture Control is powered by normal and emergency power on a generator

In all applications, the Emergency PowPak 0–10 V== Fixture Control is powered by normal and emergency power. During regular operation, the Automatic Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the Automatic Transfer Switch is in the Emergency position, allowing emergency backup power to power the device. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: FCJS-010-EM.

Note: When operating without a Vive hub, the Emergency PowPak 0–10 V== Fixture Control senses a power cycle and enters emergency mode for 90 minutes.

IMPORTANT: This solution is not applicable for use with an Uninterruptable Power Supply (UPS) backup system. For solutions with an Uninterruptable Power Supply (UPS) backup system, please refer to page 23.

Wiring Schematic

*NOTE: Solution is not applicable for an Uninterruptable Power Supply (UPS) backup system. FCJS-010-EM must see a complete change-over of power from normal to emergency for the unit to go into emergency mode.*
Emergency PowPak 0–10 VFixture Control (continued)

Fixture Control is powered by normal and emergency power on a generator (continued)

Regular Operation

Emergency Operation
Emergency PowPak 0–10 V== Fixture Control (continued)

Fixture Control is powered by normal and emergency power on a UPS

In all applications, the Emergency PowPak Fixture Control is powered by normal and emergency power. During regular operation, the UL® 1008 Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the LUT-ATS-D senses the loss of normal power and creates a power interrupt to the Emergency PowPak. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: FCJS-010-EM.

Note: When operating without a Vive hub, the Emergency PowPak Fixture Control senses a power cycle and enters emergency mode for 90 minutes.

Wiring Schematic
Emergency PowPak 0–10 VFixture Control (continued)

Fixture Control is powered by normal and emergency power on a UPS (continued)

Normal Operation

[Diagram showing the connection and power flow of the Emergency PowPak system, including the LVS Controls LUT-ATS-D and the FCJS-010-EM PowPak units.]
Emergency PowPak 0–10 V= Fixture Control (continued)

Fixture Control is powered by normal and emergency power on a UPS (continued)

Emergency Operation
PowPak 0–10 V Fixture Control

Fixture Control is powered by emergency power

In an application where a PowPak Fixture Control is powered by emergency power and is controlling an emergency load, an ALCR is used with a normally open relay and a normally closed relay. During regular operation, the Fixture Control controls the loads directly. During emergency operation, the ALCR senses normal power is lost and the normally closed relay closes while the normally open relay opens. Doing this provides power to the load and interrupts the 0–10 V signal which should cause the load to go to high-end if the ballast or driver complies with IEC 60929 Annex E. An example of this type of ALCR is LUT-SHUNT-D from LVS Controls. This applies to: FCJS-010.

Wiring Schematic
PowPak 0–10 V--- Fixture Control (continued)

Fixture Control is powered by emergency power (continued)

Regular Operation

Emergency Operation
PowPak 0–10 V Fixture Control (continued)

Fixture Control is powered by emergency power (continued)

Fire Alarm Operation
Emergency PowPak EcoSystem Fixture Control

Fixture Control is powered by normal and emergency power on a generator

In all applications, the Emergency PowPak is powered by normal and emergency power. During regular operation, the Automatic Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the Automatic Transfer Switch is in the Emergency position, allowing emergency backup power to power the device. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: FCJS-ECO-EM.

**Note:** When operating without a Vive hub, the Emergency PowPak senses a power cycle and enters emergency mode for 90 minutes.

**IMPORTANT:** This solution is not applicable for use with an Uninterruptable Power Supply (UPS) backup system. For solutions with an Uninterruptable Power Supply (UPS) backup system, please refer to page 30.

Wiring Schematic
Emergency PowPak EcoSystem Fixture Control (continued)

Fixture Control is powered by normal and emergency power on a generator (continued)

Regular Operation

Emergency Operation

Neutral (N)
Emergency PowPak EcoSystem Fixture Control (continued)

Fixture Control is powered by normal and emergency power on a UPS

In all applications, the Emergency PowPak EcoSystem Fixture Control is powered by normal and emergency power. During regular operation, the UL 1008 Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the LUT-ATS-D senses the loss of normal power and creates a power interrupt to the Emergency PowPak. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: FCJS-ECO-EM.

Note: When operating without a Vive hub, the Emergency PowPak EcoSystem Fixture Control senses a power cycle and enters emergency mode for 90 minutes.

Wiring Schematic

[Diagram showing the wiring schematic for the Emergency PowPak EcoSystem Fixture Control]
Emergency PowPak EcoSystem Fixture Control (continued)

Fixture Control is powered by normal and emergency power on a UPS (continued)

Normal Operation

DIP Switch Settings on LUT-ATS-D

Neutral (N)
Emergency PowPak EcoSystem Fixture Control (continued)

 Fixture Control is powered by normal and emergency power on a UPS (continued)

Emergency Operation

![Diagram of PowPak EcoSystem Fixture Control](image-url)
PowPak EcoSystem Fixture Control

Fixture Control is powered by emergency power

In an application where a PowPak Fixture Control is powered by emergency power and is controlling an emergency load, an ALCR is used with a normally open relay and a normally closed relay. During regular operation, the PowPak Fixture Control controls the loads directly. During emergency operation, the ALCR senses normal power is lost and the normally closed relay closes while the normally open relay opens. Doing this provides power to the load and interrupts the EcoSystem signal which causes the load to go to high-end. An example of this type of ALCR is LUT-SHUNT-D from LVS Controls. This applies to: FCJS-ECO and RMJS-ECO32-SZ.

Wiring Schematic
PowPak EcoSystem Fixture Control (continued)

Fixture Control is powered by emergency power (continued)

Regular Operation

Regular Utility Power

![Diagram showing regular utility power flow]

Emergency Operation

Regular Utility Power

![Diagram showing emergency operation flow]
PowPak EcoSystem Fixture Control *(continued)*

Fixture Control is powered by emergency power *(continued)*

Fire Alarm Operation
Vive 347 V~ Dimming Module with 0–10 V\textsuperscript{⇌} Control

Module is powered by normal/emergency power on a generator

In all applications, the Emergency Vive 347 V~ Dimming Module with 0–10 V\textsuperscript{⇌} Control is powered by normal/emergency power. During regular operation, the Automatic Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the Automatic Transfer Switch is in the Emergency position, allowing emergency backup power to power the device. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized.

This applies to: RMJS-5T-347-EM.

Note: When operating without a Vive hub, the Emergency Vive 347 V~ Dimming Module with 0–10 V\textsuperscript{⇌} Control senses a power cycle and enters emergency mode for 120 minutes.

IMPORTANT: This solution is not applicable for use with an Uninterruptable Power Supply (UPS) backup system. For solutions with an Uninterruptable Power Supply (UPS) backup system, please refer to page 7.

Wiring Schematic

* NOTE: Solution is not applicable for an Uninterruptable Power Supply (UPS) backup system. RMJS-5T-347-EM must see a complete change-over of power from normal to emergency for the unit to go into emergency mode.
Vive 347 V~ Dimming Module with 0 -10 V Control (continued)

Module is powered by normal/emergency power on a generator (continued)

Regular Operation

Regular Utility Power

Emergency Power

Not Provided by Lutron

To additional RMJS-ST-347-EM units

To additional RMJS-ST-347 units
Vive 347 V~ Dimming Module with 0–10 V™ Control (continued)

Module is powered by normal/emergency power on a generator (continued)

Emergency Operation
Vive 347 V~ Dimming Module with 0–10 V—Control

Module is powered by emergency power

In an application where a dimming module with 0–10 V—control is powered by emergency power and controlling emergency loads, an ALCR with a normally open relay and a normally closed relay is used. During regular operation, the module controls the load directly. During emergency operation, the device senses normal power is lost and the normally closed relay closes while the normally open relay opens. Doing this provides power to the load and interrupts the 0–10 V—signal which should cause the load to go to high-end if the ballast or driver complies with IEC 60929 Annex E. An example of this type of ALCR is the LUT-ALCR-D-HV-347 from LVS Controls. This applies to: RMJS-5T-347.

Wiring Schematic

* This wire/terminal may be gray on older products or in retrofit applications.
Vive 347 V~ Dimming Module with 0 –10 V-- Control (continued)

Module is powered by emergency power (continued)

Regular Operation

Emergency Operation

* This wire/terminal may be gray on older products or in retrofit applications.
Vive 347 V~ Dimming Module with 0–10 V--- Control (continued)

Module is powered by emergency power (continued)

Fire Alarm Operation

Regular Utility Power

Emergency Power

* This wire/terminal may be gray on older products or in retrofit applications.
Vive 347 V～ Dimming Module with 0–10 V～ Control (continued)

Module is powered by normal power

In an application where a Vive 347 V～ Dimming Module with 0–10 V～ Control is powered by normal power but controls an emergency load, an ALCR is used with a normally open relay and a normally closed relay that responds to a switched hot signal. During regular operation, the normally closed contact responds to the switched hot output of the module, while the normally open contact remains closed. During emergency operation, the device senses normal power is lost and the normally closed relay closes while the normally open relay opens. Doing this provides power to the load and interrupts the 0–10 V～ signal which should cause the load to go to high-end if the ballast or driver complies with IEC 60929 Annex E. An example of this type of ALCR is the LUT-ALCR-D-HV-347 from LVS Controls. This applies to: RMJS-5T-347.

Wiring Schematic
Vive 347 V~ Dimming Module with 0 -10 V Control (continued)

Module is powered by normal power (continued)

Regular Operation

Emergency Operation
Vive 347 V~ Dimming Module with 0-10 V Control (continued)

Module is powered by normal power (continued)

Fire Alarm Operation

Regular Utility Power

Emergency Power

Fire Alarm Control Panel (FACP)
Contact Closure Output
Closed: Fire Alarm Condition
Open: Normal Condition

UL Transfer Switch
Normal Circuit Panel
Fire Alarm Load
Normal Load

24 V Power Supply
LVS Controls
LUT-ALCR-D-HV-347

Normal Power
Emergency Power

Line/Hot (Blue)
Blue
Yellow
White
Purple

Red
Orange
White
Purple

Black
Normal Feed
Normal Neutral
Red
Purple (+)
Pink (-)
Normal Power
Vive Phase Select PowPak Module

Module is powered by normal/emergency power on a generator

In all applications, the Emergency Vive Phase Select PowPak module is powered by normal/emergency power. During regular operation, the Automatic Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the Automatic Transfer Switch is in the Emergency position, allowing emergency backup power to power the device. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized.

This applies to: **RMJS-PNE-DV-EM**.

**Note:** When operating without a Vive hub, the Emergency Vive Phase Select PowPak module senses a power cycle and enters emergency mode for 90 minutes.

**IMPORTANT:** This solution is not applicable for use with an Uninterruptable Power Supply (UPS) backup system. For solutions with an Uninterruptable Power Supply (UPS) backup system, please refer to page 69.

**Wiring Schematic**

```
Regular Utility Power

120/277 V~ Normal Feed
Neutral (N)

Junction Box

Dimmed Line / Hot
Neutral (N)

RMJS-PNE-DV
Normal Load

120/277 V~ Generator / Emergency Feed
Neutral (N)

Automatic Transfer Switch

120/277 V~ Emergency Feed
Neutral (N)

Junction Box

Dimmed Line / Hot
Neutral (N)

RMJS-PNE-DV-EM
Normal / Emergency Load

To additional RMJS-PNE-DV units

To additional RMJS-PNE-DV-EM units
```

* **NOTE:** Solution is not applicable for an Uninterruptable Power Supply (UPS) backup system. RMJS-PNE-DV-EM must see a complete change-over of power from normal to emergency for the unit to go into emergency mode.
Vive Phase Select PowPak Module (continued)

Module is powered by normal/emergency power on a generator (continued)

Regular Operation

Regular Utility Power

*NOTE: Solution is not applicable for an Uninterruptable Power Supply (UPS) backup system. RMJS-PNE-DV-EM must see a complete change-over of power from normal to emergency for the unit to go into emergency mode.
Vive Phase Select PowPak Module (continued)

Module is powered by normal/emergency power on a generator (continued)

Emergency Wiring

*NOTE: Solution is not applicable for an Uninterruptable Power Supply (UPS) backup system. RMJS-PNE-DV-EM must see a complete change-over of power from normal to emergency for the unit to go into emergency mode.
Emergency Vive Phase Select PowPak

Module is powered by normal and emergency power on a UPS

In all applications, the Emergency Vive Phase Select PowPak module is powered by normal and emergency power. During regular operation, the UL® 1008 Transfer Switch is in the Normal position, allowing regular utility power to power the device. During emergency operation, the LUT-ATS-D senses the loss of normal power and creates a power interrupt to the Emergency PowPak. As a result, the device senses the power cycle and can no longer communicate with the Vive hub, thus entering emergency lighting mode until the Vive hub is re-energized. This applies to: RMJS-PNE-DV-EM.

Note: When operating without a Vive hub, the Emergency PowPak module senses a power cycle and enters emergency mode for 90 minutes.

Wiring Schematic
Emergency Vive Phase Select PowPak *(continued)*

Module is powered by normal and emergency power on a UPS *(continued)*

Regular Operation

![Diagram of Emergency Vive Phase Select PowPak](attachment:image.png)
Emergency Vive Phase Select PowPak (continued)

Module is powered by normal and emergency power on a UPS (continued)

Emergency Operation

![Diagram of emergency operation](image-url)
Vive Phase Select PowPak Modules

PowPak module is powered by emergency power

In an application where a PowPak module has power during an emergency, an Automatic Transfer Switch (ATS) is used. During regular operation, normal power is present and the power is routed by the transfer switch to the PowPak, which allows the PowPak module to function. During regular operation, the PowPak module controls the load directly. During emergency operation, the ATS senses when normal power is lost and transfers from the PowPak module to emergency power, sending the load to high-end. This device is commonly called a load-side transfer switch. An example of a device like this is the LUT-ATS-D from LVS Controls. Simple shunt relays (LUT-SHUNT-D) are not recommended for use with reverse-phase or phase-selectable dimmers. This applies to: RMJS-PNE-DV.

Wiring Schematic
Regular Operation

Regular Utility Power

Vive Phase Select PowPak Modules (continued)

PowPak module is powered by emergency power (continued)
Vive Phase Select PowPak Modules (continued)

PowPak module is powered by emergency power (continued)

Emergency Operation

Regular Utility Power

Emergency Power

Normal Power

Emergency Power

UL® 1008 Transfer Switch

Normal/Emergency Power

Normal/Emergency Circuit Panel

Neutral

Hot

Dimmed Hot

RMJS-PNE-DV

Normal / Emergency phase dim driver

Normal / Emergency Circuit Panel

Normal Neutral

Normal Hot

Normal Voltage Sense

LUT-ATS-D

Normal Power

Regular Utility Power

Normal Power

Normal Voltage Sense

(continued)

PowPak module is powered by emergency power (continued)
Vive Phase Select PowPak Modules (continued)

PowPak module is powered by emergency power (continued)

Regular Operation

Regular Utility Power

Emergency Power

Normal Power

Emergency Power

UL® 1008
Transfer Switch

Normal / Emergency Circuit Panel

Normal Power

Neutral

Hot

Dimmed Hot

RMJS-PNE-DV

Normal / Circuit Panel

Normal Hot

Normal Neutral

Normal Voltage Sense

24 Vdc Power Supply

Fire Alarm Control Panel (FACP)

Contact Closure Output
Closed: Normal Condition
Open: Fire Alarm Condition

LUT-ATS-D

Normal / Emergency phase dim driver
Vive Phase Selective PowPak Modules

**PowPak module is powered by normal power**

In an application where a dimmer is powered by normal power and is controlling an emergency load, an Automatic Transfer Switch (ATS) with multiple normally open and multiple normally closed relays are used. During regular operation, the PowPak module controls the load directly. During emergency operation, the ATS senses when normal power is lost and transfers from the PowPak module to emergency power, sending the load to high-end. This device is commonly called a load-side transfer switch. An example of a device like this LUT-ATS-D from LVS Controls.

This applies to: RMJ S-PNE-DV.

**Wiring Schematic**

![Wiring Schematic Diagram]
Vive Phase Selective PowPak Modules (continued)

PowPak module is powered by normal power (continued)

Regular Operation
Vive Phase Selective PowPak Modules (continued)

PowPak module is powered by normal power (continued)

Emergency Operation

[Diagram of emergency power system with labeled components]
Vive Phase Selective PowPak Modules (continued)

PowPak module is powered by normal power (continued)

Fire Alarm Operation

Regular Utility Power

Emergency Power

Normal Power

Emergency Power

UL 1008 Transfer Switch

Normal / Emergency Power

LVS Controls LUT-ATS-D

Normal Voltage Sense

24 Vdc Power Supply

Emergency Load

Normal Load

Normal Hot

Normal Neutral

Load (Line/Hot)

Load (Neutral)

Fire Alarm Control Panel (FACP)
Contact Closure Output
Closed: Normal Condition
Open: Fire Alarm Condition
Maestro Wireless Dimmers Not Requiring a Neutral Connection

Dimmer is powered by emergency power

In an application where a dimmer has power during an emergency, an ALCR with a normally closed relay (simple shunt relay) is used. During regular operation, normal power is present and the contact in the shunt relay is open, which allows the dimmer to function. When normal power is lost, the contact in the shunt relay closes and bypasses the dimmer by providing power to the load. Simple shunt relays are not recommended for use with reverse phase dimmers. An example of an ALCR with a normally closed relay is the LUT-SHUNT from LVS Controls. This applies to: MRF2S-6CL.

Wiring Schematic
Maestro Wireless Dimmers Not Requiring a Neutral Connection *(continued)*

Dimmer is powered by emergency power *(continued)*

Regular Operation

![Diagram showing regular operation of Maestro Wireless Dimmer with emergency power]
Maestro Wireless Dimmers Not Requiring a Neutral Connection *(continued)*

Dimmer is powered by emergency power *(continued)*

Fire Alarm Operation
Maestro Wireless Dimmers Not Requiring a Neutral Connection (continued)

Dimmer is powered by normal power

In an application where a dimmer is powered by normal power and is controlling an emergency load, an Automatic Transfer Switch (ATS) with multiple normally open and multiple normally closed relays are used. During regular operation, the dimmer controls the load directly. During emergency operation, the ATS senses when normal power is lost and transfers from the dimmer to emergency power, sending the load to high-end. The device is commonly called a load-side transfer switch. An example of an ATS like this is LUT-ATS-D from LVS Controls. This applies to: MRF2S-6CL.

Wiring Schematic

Regular Utility Power

Emergency Power

Normal Power

Normal Voltage Sense

UL® 1008 Transfer Switch

LVS Controls LUT-ATS-D

Normal / Emergency Circuit Panel

Normal / Emergency Power

Load (Line / Hot)

Load (Neutral)

Normal Load

Dimmed Line / Hot

Maestro Wireless Dimmer
Maestro Wireless Dimmers Not Requiring a Neutral Connection (continued)

Dimmer is powered by normal power (continued)

Regular Operation

Emergency Operation
Maestro Wireless Dimmers Not Requiring a Neutral Connection (continued)

Dimmer is powered by normal power (continued)

Fire Alarm Operation
Maestro Wireless Dimmers Requiring a Neutral Connection

Dimmer is powered by emergency power

In an application where a dimmer has power during an emergency, an ALCR with a normally closed relay (simple shunt relay) is used. During regular operation, normal power is present and the contact in the shunt relay is open, which allows the dimmer to function. When normal power is lost, the contact in the shunt relay closes and bypasses the dimmer by providing power to the load. Simple shunt relays are not recommended for use with reverse phase dimmers. An example of an ALCR with a normally closed relay is the LUT-SHUNT from LVS Controls. This applies to: MRF2S-6ND.

Wiring Schematic

Regular Utility Power

Emergency Power

UL® 1008 Transfer Switch

Normal/Emergency Power

Normal Power

Emergency Power

Regular Utility Power

Normal Circuit Panel

Normal Hot

Normal Neutral

Normal Voltage Sense

LVS Controls LUT-SHUNT

Maestro Wireless Dimmer

MRF2S-6ND

Switched Line/Hot

Blue

Yellow

Black

White

Brass Terminal

Black Terminal

Dimmed Hot

Emergency Load

Line/Hot

Neutral

Switched Line/Hot
Maestro Wireless Dimmers Requiring a Neutral Connection (continued)

Dimmer is powered by emergency power (continued)

Regular Operation

Emergency Operation
Maestro Wireless Dimmers Requiring a Neutral Connection (continued)

Dimmer is powered by emergency power (continued)

Fire Alarm Operation
Maestro Wireless Dimmers Not Requiring a Neutral Connection *(continued)*

**Dimmer is powered by normal power**

In an application where a dimmer is powered by normal power and is controlling an emergency load, an Automatic Transfer Switch (ATS) with multiple normally open and multiple normally closed relays are used. During regular operation, the dimmer controls the load directly. During emergency operation, the ATS senses when normal power is lost and transfers from the dimmer to emergency power, sending the load to high-end. The device is commonly called a load-side transfer switch. An example of an ATS like this is LUT-ATS-D from LVS Controls. This applies to: MRF2S-6ND.

![Wiring Schematic](image-url)
Maestro Wireless Dimmers Not Requiring a Neutral Connection (continued)

Dimmer is powered by normal power (continued)

Regular Operation

Emergency Operation
Maestro Wireless Dimmers Not Requiring a Neutral Connection (continued)

Dimmer is powered by normal power (continued)

Fire Alarm Operation
Maestro Wireless Dimmers Requiring a Neutral Connection

**Dimmer is powered by normal power**

In an application where a reverse-phase dimmer is powered by normal power and is controlling an emergency load, an Automatic Transfer Switch (ATS) with multiple normally open and multiple normally closed relays are used. During regular operation, the dimmer controls the load directly. During emergency operation, the ATS senses when normal power is lost and transfers from the dimmer to emergency power, sending the load to high-end. This device is commonly called a load-side transfer switch. An example of a device like this LUT-ATS-D from LVS Controls. This applies to: MRF2S-6ELV120.

**Wiring Schematic**

Regular Utility Power

![Regular Utility Power diagram](image)

Normal Power

Emergency Power

Emergency Power

![Emergency Power diagram](image)

Utility Power

UL® 1008 Transfer Switch

Normal/Emergency Circuit Panel

Normal/Emergency Power

LVS Controls LUT-ATS-D

Normal Voltage Sense

Load (Line/Hot)

Load (Neutral)

Normal Load

Dimmed Line/Hot

Brass Terminal

Black Terminal

Normal Neutral

Silver Terminal

Maestro Wireless Dimmer

Normal Hot

Normal Circuit Panel

Regular Utility Power

 ![Regular Utility Power diagram](image)

Normal Power

Normal Power

![Regular Circuit Panel diagram](image)
Maestro Wireless Dimmers Requiring a Neutral Connection (continued)

Dimmer is powered by normal power (continued)

Regular Operation

Regular Utility Power

Emergency Power

Emergency Operation

Regular Utility Power

Emergency Power

Regular Utility Power

Emergency Power
Maestro Wireless Dimmers Requiring a Neutral Connection *(continued)*

Dimmer is powered by normal power *(continued)*

Fire Alarm Operation

![Diagram of Maestro Wireless Dimmers Requiring a Neutral Connection](image-url)
Maestro Wireless Switches Requiring a Neutral Connection

Switch is powered by emergency power

In an application where a switch has power during an emergency, an ALCR with a normally closed relay (simple shunt relay) is used. During regular operation, normal power is present and the contact in the shunt relay is open, which allows the switch to function. When normal power is lost, the contact in the shunt relay closes and bypasses the switch by providing power to the load. An example of an ALCR with a normally closed relay is the LUT-SHUNT from LVS Controls. This shunt relay can be used with Maestro Wireless switches, which include:

- MRF2S-6ANS
- MRF2S-8ANS120

Wiring Schematic
Maestro Wireless Switches Requiring a Neutral Connection (continued)

Switch is powered by emergency power (continued)

Regular Operation

Emergency Operation
Maestro Wireless Dimmers Requiring a Neutral Connection (continued)

Switch is powered by emergency power (continued)

Fire Alarm Operation
Maestro Wireless Switches Requiring a Neutral Connection (continued)

Switch is powered by normal power

In an application where a switch does not have power during an emergency, but is controlling emergency loads during regular operation, an ALCR with a normally closed relay that responds to the switched hot output of the switch is used. During regular operation, normal power is present and the relay in the ALCR will respond to switched hot output of the switch. When normal power is lost, the contact in the ALCR will close and provide power to the emergency load. An example of an ALCR like this is LUT-ALCR from LVS controls. This relay can be used with Maestro Wireless switches, which include:

- MRF2S-6ANS
- MRF2S-8ANS120

Wiring Schematic

Regular Utility Power

[Diagram showing wiring connections between regular utility power, normal circuit panel, and emergency panel, including terminals for blue, white, black, silver, and brass connections.]

Emergency Power

[Diagram showing wiring connections between emergency power, normal circuit panel, and emergency panel, including terminals for blue, white, black, silver, and brass connections.]

Regular Utility Power

[Diagram showing wiring connections between regular utility power, normal circuit panel, and emergency panel, including terminals for blue, white, black, silver, and brass connections.]

Emergency Load

[Diagram showing wiring connections between emergency load, normal circuit panel, and emergency panel, including terminals for blue, white, black, silver, and brass connections.]

Normal Voltage Sense

Control State Sense

Switched Line/Hot (Yellow)

Switched Line/Hot
Maestro Wireless Switches Requiring a Neutral Connection (continued)

Switch is powered by normal power (continued)

Regular Operation

Regular Utility Power

Emergency Power

Emergency Power

Regular Utility Power

Normal Circuit Panel

Normal / Emergency Power

Emergency Circuit Panel

Switched Line / Hot

Blue / White

Normal Circuit Panel

Normal Hot

Normal Neutral

Black Terminal

White Terminal

Silver Terminal

Brass Terminal

Maestro Wireless Switch

LVS Controls LUT-ALCR

Normal Load

Regular Utility Power

Emergency Power

Emergency Power

Regular Utility Power

Normal Circuit Panel

Normal / Emergency Power

Emergency Circuit Panel

Switched Line / Hot

Blue / White

Normal Circuit Panel

Normal Hot

Neutral

Black Terminal

White Terminal

Silver Terminal

Brass Terminal

Maestro Wireless Switch

LVS Controls LUT-ALCR

Normal Load

Responds to switched output of control
Maestro Wireless Switches Requiring a Neutral Connection (continued)

Switch is powered by normal power (continued)

Fire Alarm Operation
Maestro Wireless Switches Not Requiring a Neutral Connection

Switch is powered by emergency power

In an application where a switch has power during an emergency, an ALCR with a normally closed relay (simple shunt relay) is used. During regular operation, normal power is present and the contact in the shunt relay is open, which allows the switch to function. When normal power is lost, the contact in the shunt relay closes and bypasses the switch by providing power to the load. An example of an ALCR with a normally closed relay is LUT-SHUNT from LVS Controls. This applies to: MRF2S-8S-DV

Wiring Schematic

![Wiring Schematic Diagram]
Maestro Wireless Switches Not Requiring a Neutral Connection (continued)

Switch is powered by emergency power (continued)

Regular Operation

Emergency Operation
Maestro Wireless Switches Nots Requiring a Neutral Connection (continued)

Switch is powered by emergency power (continued)

Fire Alarm Operation

![Diagram of fire alarm control panel and fire alarm operation]

- Regular Utility Power
- Emergency Power
- Normal Power
- Normal Neutral
- Normal Hot
- Normal Voltage Sense
- Switched Line/Hot
- UL® LISTED EMERGENCY LIGHTING EQUIPMENT
- Emergency Circuit Panel
- Emergency Load
- Fire Alarm Control Panel (FACP)
- Contact Closure Output
- Closed: Normal Condition
- Open: Fire Alarm Condition
- LVS Controls TR-A-2
- LVS Controls LUT-SHUNT
- Black Terminal
- Brass Terminal
- Blue
- Yellow
- Red
- White
- Normal Neutral
- Normal Hot
- Normal Voltage Sense
- Switched Line/Hot
- Emergency Power
- Normal Power
- UL® Transfer Switch
- 1008
Maestro Wireless Switches Not Requiring a Neutral Connection (continued)

Switch is powered by normal power

In an application where a switch does not have power during an emergency, but is controlling emergency loads during regular operation, an ALCR with a normally closed relay that responds to the switched hot output of the switch is used. During regular operation, normal power is present and the relay in the ALCR will respond to switched hot output of the switch. When normal power is lost, the contact in the ALCR will close and provide power to the emergency load. An example of an ALCR like this is LUT-ALCR from LVS controls. These apply to: MRF2S-8S-DV
Maestro Wireless Switches Not Requiring a Neutral Connection (continued)

Switch is powered by normal power (continued)

Regular Operation

Emergency Operation

LUTRON
Maestro Wireless Switches Not Requiring a Neutral Connection *(continued)*

Switch is powered by normal power *(continued)*

Fire Alarm Operation
Vive Integral Fixture Control with an EcoSystem Driver

Powered by normal/emergency power and controlling an emergency load

In the application where the Vive Integral Fixture Control is being used, an ALCR is used with a normally open relay. During regular operation the normally open relay is closed allowing the Vive Integral Fixture Control to control the load. During emergency operation, the normally open relay opens, breaking the communication to the load, resulting in the load going to high-end. An example of an ALCR like this is LUT-SHUNT-FM from Lutron. This applies to DFCSJ-OEM-OCC/RF with DFC-OEM-DBI.

Note: LUT-SHUNT-FM is intended to be installed at the factory of an OEM fixture manufacturer and not for field installation.

Wiring Schematic
Regular Operation

Vive Integral Fixture Control with an EcoSystem Driver (continued)

Powered by normal/emergency power and controlling an emergency load (continued)

Regular Utility Power

Normal Power

Emergency Power

Normal Power

Normal Hot

Normal Neutral

DFC-OEM-DBI

DFCSJ-OEM-OCC/RF

LUT-SHUNT-FM

Blue 3

Brown 2

Black 1

White 2

Yellow 5

Emergency Power

Normal Power

Normally open relay closes when normal power is present

Normal Power

Normal Hot

Normal Neutral

Normal Voltage Sense

Normal Operation

Regular Utility Power

DFC-OEM-DBI

DFCSJ-OEM-OCC/RF

LUT-SHUNT-FM

Blue 3

Brown 2

Black 1

White 2

Yellow 5

Emergency Power

Normal Power

Normally open relay closes when normal power is present

Normal Power

Normal Hot

Normal Neutral

Normal Voltage Sense
Vive Integral Fixture Control with an EcoSystem Driver (continued)

Powered by normal/emergency power and controlling an emergency load (continued)

Emergency Operation

The EcoSystem driver goes to programmed Emergency light level (100% by default).
Vive Integral Fixture Control with an EcoSystem Driver (continued)

 Powered by normal/emergency power and controlling an emergency load (continued)

Fire Alarm Operation

Regular Utility Power

Normal Power

Emergency Power

DFC-OEM-DBI

Normal/Emergency Hot

Normal/Emergency Neutral

DFCSJ-OEM-OCC/RF

LUT-SHUNT-FM

Normally open relay closes when normal power is present

LVS Controls TR-A-2

Fire Alarm Control Panel (FACP)
Contact Closure Output
Closed: Normal Condition
Open: Fire Alarm Condition

Normal Voltage Sense

Normal Hot

Normal Neutral

LUTRON

www.lutron.com/support
Vive Integral Fixture Control and Driver with Self-Powered DALI Link

Powered by normal/emergency power and controlling an emergency load

In the application where the Vive Integral Fixture Control is being used, an ALCR is used with a normally closed relay. During regular operation the normally closed relay is held open allowing the Vive Integral Fixture Control to control the load. During emergency operation, the normally closed relay closes and shorts the SR+/DEXAL+ and SR-/DEXAL- terminals, resulting in the load going to high-end. An example of an ALCR like this is LUT-SHUNT-FM from Lutron. This applies to DFCSJ-OEM-OCC/RF.

Note: LUT-SHUNT-FM is intended to be installed at the factory of an OEM fixture manufacturer and not for field installation.

Wiring Schematic
Vive Integral Fixture Control and Driver with Self-Powered DALI Link (continued)

Powered by normal/emergency power and controlling an emergency load (continued)

Regular Operation

![Diagram of regular operation with labels for normal power and emergency power connections]

Emergency Operation

![Diagram of emergency operation with labels for normal power and emergency power connections]

When SR+/DEXAL+ and SR-/DEXAL- are shorted together (ALCR relay closed), the driver defaults to high-end. Normally closed relay opens when normal power is present.
Vive Integral Fixture Control and Driver with Self-Powered DALI Link (continued)

Powered by normal/emergency power and controlling an emergency load (continued)

Fire Alarm Operation

[Diagram of Vive Integral Fixture Control and Driver with Self-Powered DALI Link]

- **Regular Utility Power**
  - Normal Power
  - Emergency Power

- **UL 1008 Transfer Switch**
  - Normal Power
  - Normal/Emergency Power

- **Normal/Emergency Circuit Panel**
  - Normal Power
  - Normal/Emergency Power

- **Driver with self-powered DALI link**
  - Normally closed relay opens when normal power is present

- **DFCSJ-OEM-OCC/RF**
  - When SR+/DEXAL+ and SR-/DEXAL- are shorted together (ALCR relay closed), the driver defaults to high-end

- **LUT-SHUNT-FM**
  - Normal Hot
  - Normal Neutral

- **Fire Alarm Control Panel (FACP)**
  - Contact Closure Output
    - Closed: Normal Condition
    - Open: Fire Alarm Condition

- **Normal Voltage Sense**
  - Normal Power
  - Normal Neutral
  - Normal Hot
Vive Integral Fixture Control with EcoSystem Driver and Battery Backup

Powered by normal power and controlling an emergency load

Using a battery backup

In the application where the Vive Integral Fixture Control is being used with a battery backup is desired, no ALCR is used. When normal power is lost, the battery will provide power to the LED to provide light to the space. For additional information, please see Application Note #106; page 13 at www.lutron.com.

Wiring Schematic
Vive Integral Fixture Control with EcoSystem Driver and Battery Backup (continued)

Powered by normal power and controlling an emergency load (continued)

Using a battery backup (continued)

Regular Operation

![Regular Operation Diagram]

Emergency Operation

![Emergency Operation Diagram]
Vive Integral Fixture Control and Driver with Self-Powered DALI Link and Battery Backup

Powered by normal power and controlling an emergency load

Using a battery backup

In the application where the Vive Integral Fixture Control is being used with a battery backup, no ALCR is used. When normal power is lost, the battery will provide power to the LED to provide light to the space. For additional information, please see Application Note #106; page 13 at www.lutron.com.

Wiring Schematic
Vive Integral Fixture Control and Driver with Self-Powered DALI Link and Battery Backup (continued)

Powered by normal power and controlling an emergency load (continued)
Using a battery backup (continued)

Regular Operation

Emergency Operation
Frequently Asked Questions (FAQs)

FAQ 1: How many LUT-ELI devices will I need?

The LUT-ELI is used to sense the presence of normal power and signal connected Lutron equipment when normal power has been lost. The number of LUT-ELI devices required depends on the number of different sources of power or distribution panels that need to be monitored. For example, a 120/277 V~ load controls on the same floor may have one distribution panel for power panel loads and a separate panel for EcoSystem loads, both of which need to be individually monitored. One LUT-ELI per monitored source is recommended.

Another consideration is the sequence of operations for emergency lighting. In a multi-story or multi-tenant building, it may be desirable to monitor normal power floor-by-floor or area-by-area instead of monitoring the entire building as a single area. A common application for this scenario is to install one LUT-ELI per floor. Although this will require more LUT-ELIs, it will ensure a more focused power sensing approach.

FAQ 2: Can I share the LUT-ELI with multiple devices? How many?

The LUT-ELI signal can be shared with any combination of up to four Vive hubs. When sharing the LUT-ELI signal, keep these points in mind:

It is recommended that one LUT-ELI be used for every source of power or distribution panel that needs to be monitored. If the LUT-ELI is shared among multiple devices being fed from different power sources, then proper emergency lighting requirements may not be satisfied. For example, an area that contains both 120 V~ and 277 V~ emergency lighting should use two LUT-ELIs, one to monitor each source. Sharing one LUT-ELI between the 120 V~ and 277 V~ devices may not satisfy emergency lighting requirements.

FAQ 3: I’m sharing a LUT-ELI with multiple devices. How does this wire together?

![Diagram of LUT-ELI installation with Vive hub connections](image-url)
Frequently Asked Questions (FAQs) (continued)

FAQ 4: I want only certain load controllers to go to into emergency override and lockout, while still being able to control other load controllers. How do I achieve this?

Emergency PowPak units can be command to override and lockout from the hub, and their override levels are programmable. If normal power is not lost, the non-Emergency load controllers will not be locked out from control.

Emergency PowPak units:
- RMJS-8T-DV-B-EM
- FCJS-010-EM
- RMJS-5T-347-EM
- RMJS-16R-DV-B-EM
- FCJS-ECO-EM

FAQ 5: Since Emergency PowPak units automatically go to full on when normal power is lost without using a LUT-ELI, what is the benefit of using a LUT-ELI for these devices?

Even though Emergency PowPak units do have this functionality, there are several benefits to using a LUT-ELI with those products:

- When a LUT-ELI is used, the lighting control system becomes listed under UL 924. This listing cannot be achieved without using the LUT-ELI.
- The LUT-ELI can sense all three phases of power and then signal a Lutron device when any phase has been lost. When a LUT-ELI is not used with Emergency PowPak units, only one phase of power can be monitored.

FAQ 6: I have a Lutron device that is powered by one voltage source, but it needs to control emergency fixtures on a different source. How do I use the LUT-ELI in this situation?

It is not uncommon for buildings to have multiple power sources, including 120, 277, and 347 V~. In this situation, Lutron recommends using two LUT-ELI devices – one to monitor each source – to guarantee that if either source is lost, the system will go into emergency mode. Note that this setup requires that both the controller and the loads be supplied with normal/emergency power. When this is difficult to accommodate, an ALCR may be a more workable solution because it requires only one normal/emergency feed.
Frequently Asked Questions (FAQs) (continued)

FAQ 7: I have a Lutron device that is powered by one voltage source, but it needs to control emergency fixtures on a different source. How do I use the LUT-ELI in this situation?

It is not uncommon for buildings to have multiple power sources, including 120, 277, and 347 V~. In this situation, Lutron recommends using two LUT-ELI devices – one to monitor each source – to guarantee that if either source is lost, the system will go into emergency mode. Note that this setup requires that both the controller and the loads be supplied with normal/emergency power. When this is difficult to accommodate, an ALCR may be a more workable solution because it requires only one normal/emergency feed.

Notes

1. As many as 16 LUT-ELI units may be wired in series; continue to wire the signal and common in one continuous loop if more LUT-ELI units are required. The LUT-ELI signal can then be shared with up to 32 devices as illustrated in FAQ 3.
2. The LUT-ELI cannot be shared with power panels in this application.
3. A separate power pack must be used for each LUT-ELI in all series wiring applications.
Frequently Asked Questions (FAQs) (continued)

FAQ 8: I have multiple areas which are fed from different sources of power. I have a separate LUT-ELI for each source, but I want all of my devices controlling emergency loads in each area to go into emergency mode when any source of power is lost. How do I use the LUT-ELI?

Refer to FAQ 7 for series wiring with multiple LUT-ELIs.

FAQ 9: How far can I run the LUT-ELI signal or sense wire?

When the LUT-ELI is used with a Vive hub, the signal line can be run up to 2000 ft (600 m) with 18 AWG (1.0 mm²) wire.

FAQ 10: Do I need to use the LUT-ELI if I want to interface with a fire alarm system?

If your project has a Vive hub, only one input can be connected to CCI2. Using the LUT-ELI-3PH to provide a system that meets UL924 will also accept a contact closure from the fire alarm control panel as well as monitor normal power. If emergency lighting is not handled through the Vive hub, the fire alarm control panel can connect to CCI2 on the Vive hub directly.

If your system does not have a Vive hub, the LVS devices must be used to interface with a fire alarm system.

FAQ 11: How many LUT-ELI can be wired in parallel on one fire alarm input and how far can I run the fire input wire?

When using either the normally open or normally closed contact closure input on the LUT-ELI with a fire alarm output, the number of LUT-ELI and distance may vary based on the installation. The contact closure capability of the fire alarm needs to be considered. The LUT-ELI provides a maximum current of 20 mA that needs to be carried by the contacts. Therefore, a contact rated for 100 mA can only be used with a maximum of 5 LUT-ELI. The following table gives the wiring limitations of multiple LUT-ELI connected to a single fire alarm input. If the application exceeds 10 devices, please contact Lutron for more information.

<table>
<thead>
<tr>
<th>Wire Size Limitations</th>
<th>Number of LUT-ELI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>16 AWG (1.5 mm²)</td>
<td>4000 ft (1220 m)</td>
</tr>
<tr>
<td>18 AWG (1.0 mm²)</td>
<td>4000 ft (1220 m)</td>
</tr>
<tr>
<td>20 AWG (0.75 mm²)</td>
<td>4000 ft (1220 m)</td>
</tr>
<tr>
<td>22 AWG (0.50 mm²)</td>
<td>4000 ft (1220 m)</td>
</tr>
<tr>
<td>24 AWG (0.25 mm²)</td>
<td>4000 ft (1220 m)</td>
</tr>
<tr>
<td>26 AWG (0.20 mm²)</td>
<td>4000 ft (1220 m)</td>
</tr>
</tbody>
</table>