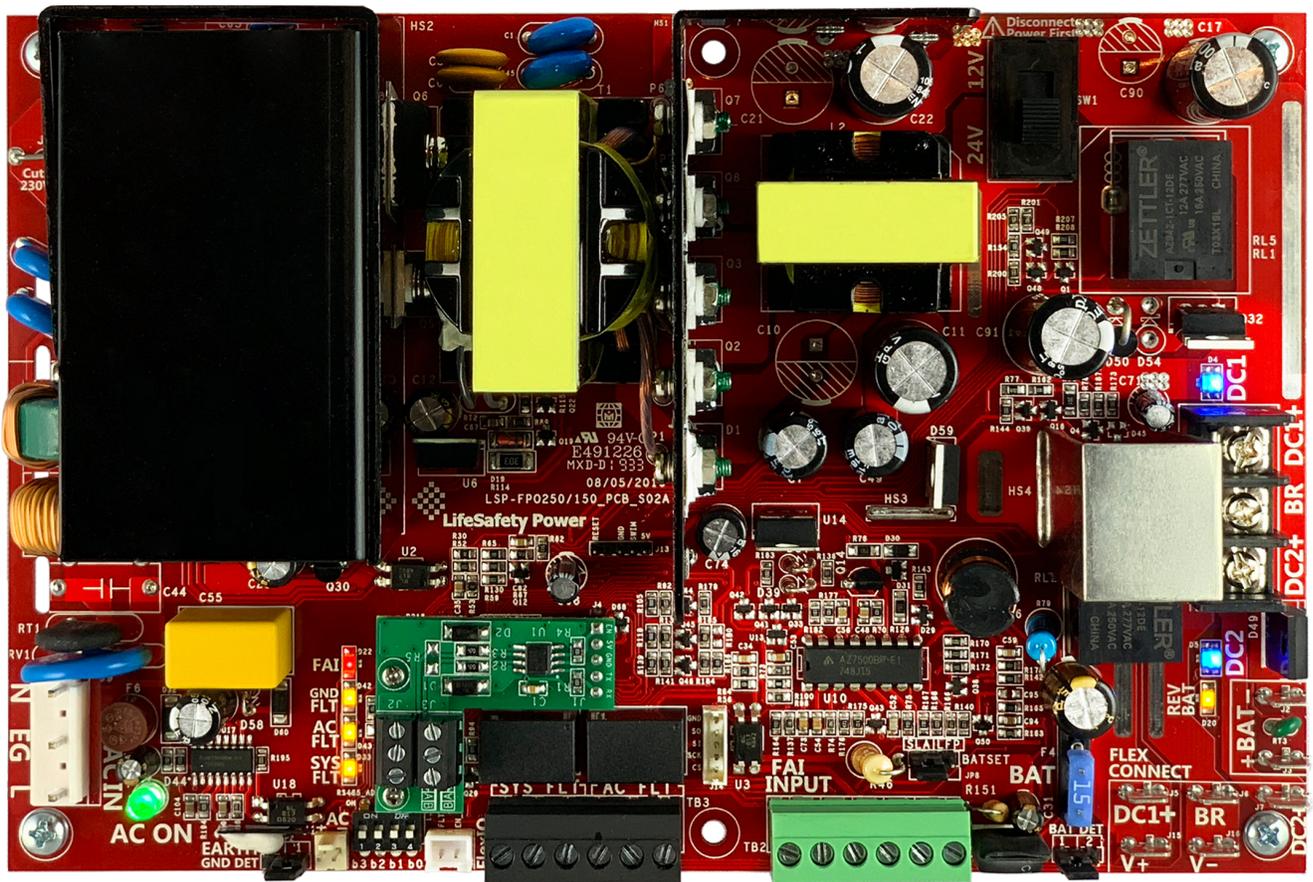


**OVERVIEW**

All of LifeSafety Power's power supplies come with an extremely flexible Fire Alarm Input (FAI) to provide control to selected outputs during a fire alarm or other condition. All of the applications presented reference an FACP for activation, however any device (REX, Keypad, pushbutton, etc.) may be used for activation.

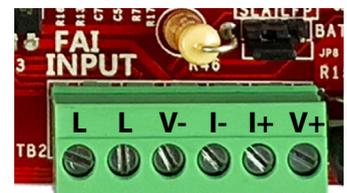
This application note gives in-depth information regarding the operation, wiring, and usage of the Fire Alarm Input.



**TERMINAL EXPLANATIONS**

The Fire Alarm Input on all LSP power supplies has six terminals.

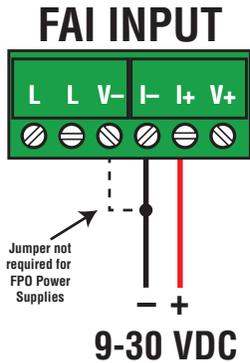
<b>I+ and I-</b>	These terminals are the input to the FAI circuitry of the Power Supply. They accept a voltage between 9 and 30VDC, only. On an FPO power supply, these terminals are also designed to allow activation by a polarity reversing source. A dry contact may be used to switch voltage to these terminals, but FAI will not activate by placing a dry contact across the I+ and I- terminals.
<b>V+ and V-</b>	These terminals are an auxiliary voltage output which can be used to activate the I+ and I- terminals through a dry contact.
<b>L and L</b>	These terminals are a normally closed dry contact input for enabling latching of FAI, as required in some regional codes. If your application does not require latching of the Fire Alarm Input, leave these terminals open.



**WIRING THE FIRE ALARM INPUT**

The Fire Alarm Input can accept virtually any type of activation method. The following covers the various wiring configurations based on the method used.

**Voltage Activation**

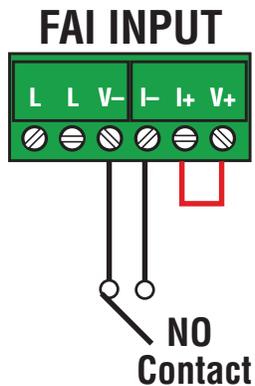


In this application, the FAI is activated whenever a voltage between 9 and 30VDC is applied in the proper polarity to the I+ and I- terminals. FPO power supplies also accept a polarity reversing input by leaving off the dashed jumper shown in the drawing. FPV and FPG power supplies require a jumper from V- to I- and do not operate on polarity reversal.

**Pros** Simple Wiring

**Cons** Wiring problems between the FACP and FAI input will not be known until FAI is activated

**Normally Open FACP Contact**



In this application, the positive side of the auxiliary voltage (V+) is tied directly to the I+ terminal. When the NO contact closes, the negative side of the auxiliary voltage is applied to the I- terminal, completing the circuit and activating FAI. If desired, the jumper and NO contact may be swapped to allow switching of the positive side of the FAI Input.

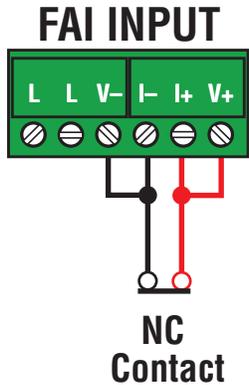
**Pros** Simple Wiring

Short on wiring from FACP will be shown by FAI activation

**Cons** Open circuit on wiring from FACP will not be known until FAI is activated

**WIRING THE FIRE ALARM INPUT - CONTINUED**

**Normally Closed FACP Contact**

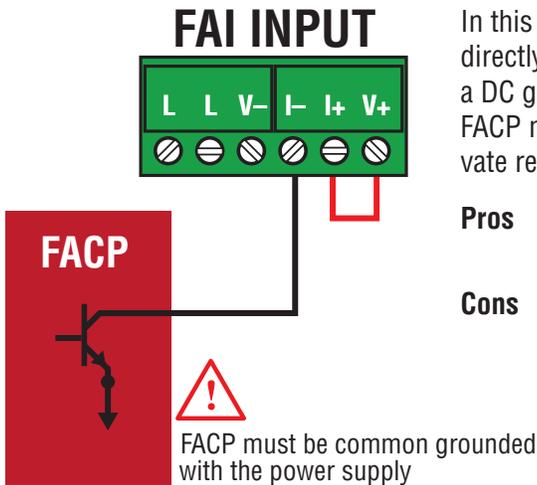


In this application, the auxiliary voltage (V+ and V-) is placed directly across the Input (I+ and I-) to hold the FAI activated. The NC contact from the FACP shunts this voltage out when the contact is closed. When the contact is opened, the auxiliary voltage activates FAI.

Note: FAI with a NC contact cannot be tested by removing the terminal strip, as this will remove the jumper wires from V+ and V- as well. To test, remove one wire going to the NC Contact.

- Pros** Open Circuit on wiring from FACP will be shown by FAI activation
- Cons** More complex initial wiring  
Short on wiring from FACP will not be known until FAI is activated

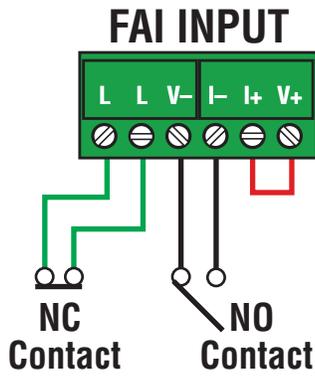
**Open Collector (Transistor) Activation**



In this application, the positive side of the auxiliary voltage (V+) is connected directly to the I+ terminal. When the transistor output activates, it provides a DC ground to the I- terminal, completing the circuit and activating FAI. The FACP must be common grounded with the power supply, or FAI will not activate reliably.

- Pros** Simple Wiring  
Short Circuit on wiring from FACP will be shown by FAI activation
- Cons** Open circuit on wiring from FACP will not be known until FAI is activated

**LATCHING THE FIRE ALARM INPUT**



The FAI input on the power supply provides two terminals which can be used to latch the FAI condition on until manually reset, even if the FACP is reset. Latching of the Fire Alarm Input is required in certain regional codes.

To enable latching of the Fire Alarm Input, a connection is placed between the two "L" terminals.

When the Fire Alarm Input is activated, it will stay activated (even if the input is removed from the FAI Input) until the connection between the "L" terminals is momentarily opened. The connection between the "L" terminals can be through a momentary NC pushbutton, keyswitch, keypad, or other NC dry contact.

Any of the methods shown in this application note may be used to activate the Fire Alarm Input when using the Latching feature.

**ACTIVATING MULTIPLE FAI INPUTS**

Many systems utilize multiple power supplies, but only have one FACP connection to use for FAI activation. If two power supplies are within the same enclosure, only one FAI Input needs to be activated - the second supply will be activated through the FlexIO connection.

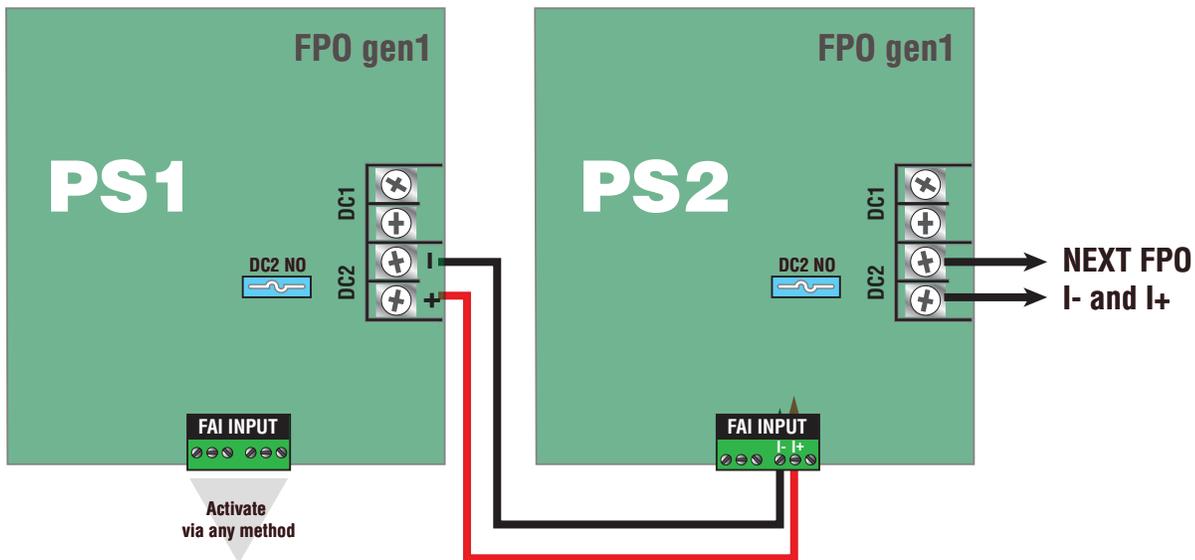
If the supplies are spread across multiple enclosures, any of several methods may be used for activation.

**Using DC2 - FPO Gen1 green power supplies only (Gen2 PCB's are red)**

This method allows the FAI input on the first power supply to be activated normally from the FACP. The DC2 output on this FPO power supply is then used to activate the next FPO power supply's FAI Input as a voltage input. Set the FPO power supply's DC2 Fuse to "DC2 NO" so the DC2 output powers up on a fire alarm condition.

**Pros** Simple Wiring

**Cons** Will not work with FPO Generation 2 (Red PC Board)  
 Cannot be used if the FPO power supply's DC2 output is being used in the "DC2 NC" setting  
 If any FPO in the chain fails, FAI will not activate on any FPO after the failed supply  
 Opens or shorts in the wiring between FPO power supplies would not be known until FAI is activated



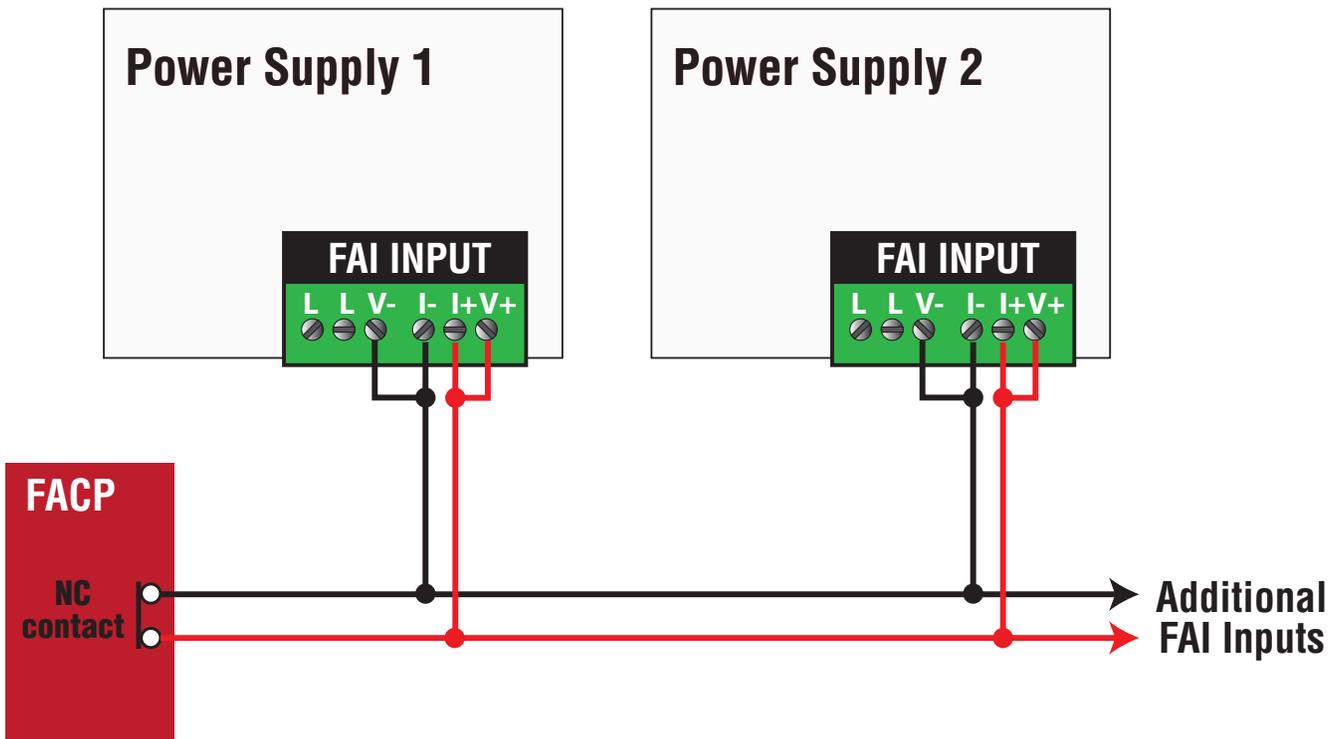
**ACTIVATING MULTIPLE FAI INPUTS - CONTINUED**

**Paralleling FAI Inputs (NC contact activation only)**

When using a NC contact from the FACP, the FAI inputs of multiple power supplies may simply be paralleled as shown in the diagram.

**Pros** Open Circuits on the FAI wiring will be shown by FAI activation  
Failure of any one power supply will not affect the other power supplies in the chain

**Cons** Short on wiring from FACP will not be known until FAI is activated



**ACTIVATING MULTIPLE FAI INPUTS - CONTINUED**

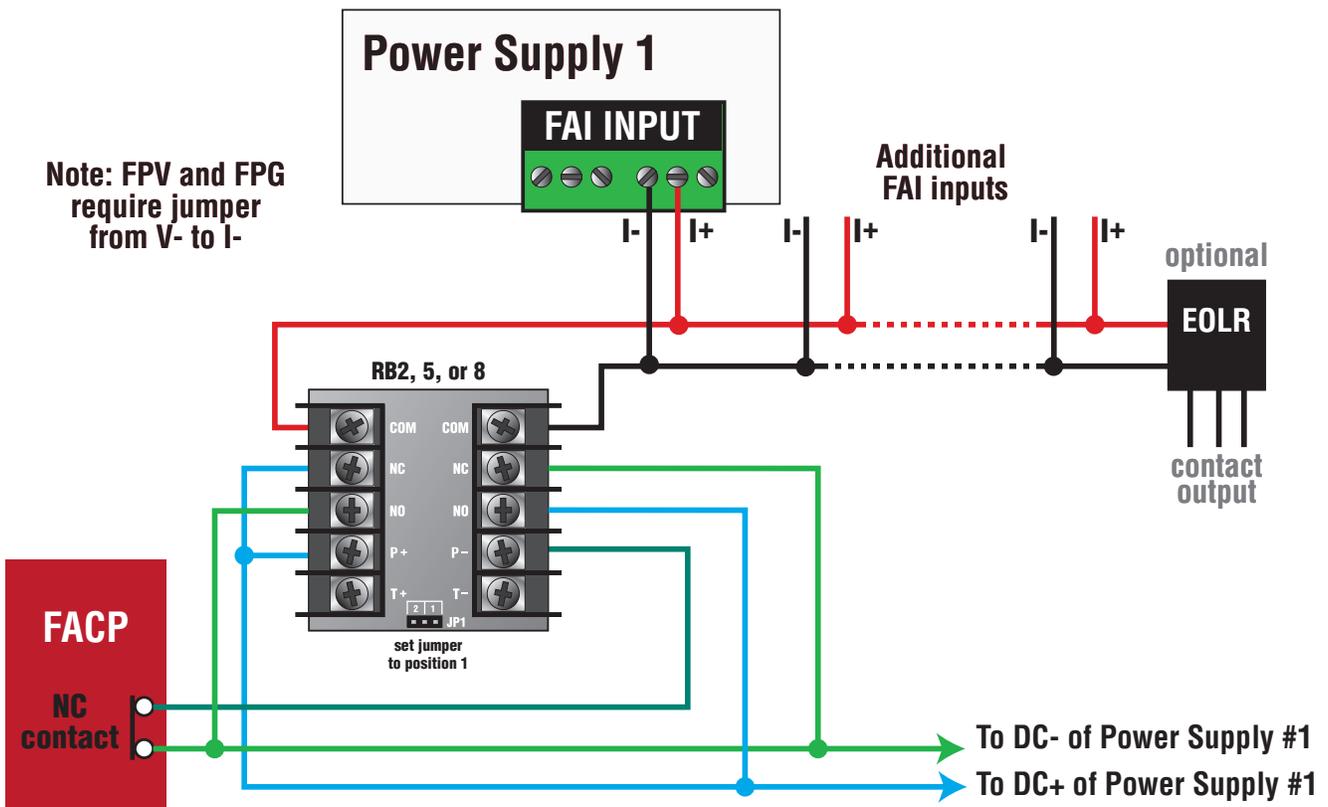
**Using an Auxiliary Relay**

By using an auxiliary relay, multiple supplies may be activated while optionally allowing for supervision of the FAI wiring using a standard polarity-sensitive EOL Relay. The Auxiliary relay is in the powered-on state normally, so any fault in the wiring between the FACP and the relay will be shown by activation of FAI.

**Pros** FAI Wiring Supervised if EOLR is used

**Cons** Complex wiring

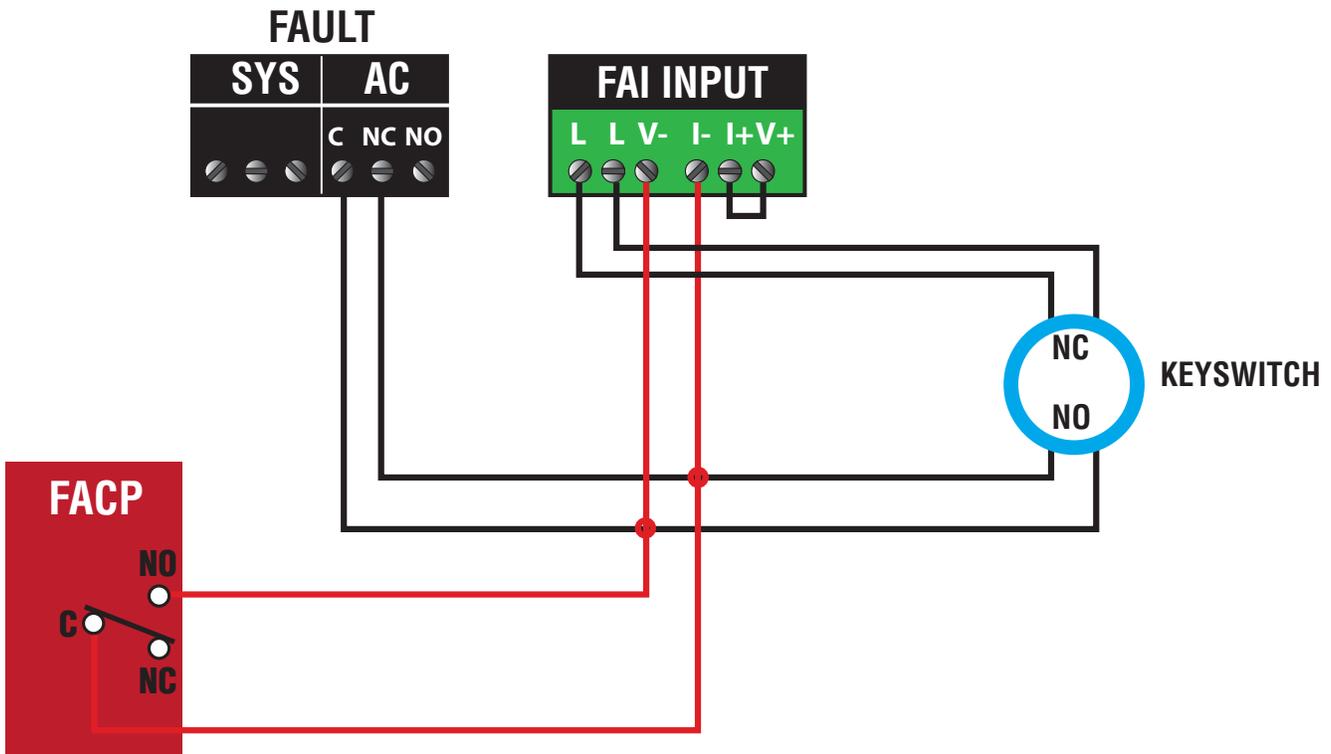
Complete Failure of FPO1 would prevent FAI from operating on all supplies



**CANADIAN APPLICATIONS**

**Using a keyswitch reset**

Certain regions require the doors to unlock on a fire alarm condition, a loss of AC, or activation of a manual momentary keyswitch. The doors must remain unlocked until a keyswitch is reset. This application shows how to accomplish this using the FAI input of the FPO power supply. The keyswitch for this application can either be a single keyswitch with isolated momentary NO and NC contacts, or a two separate momentary keyswitches



**Note:** If the FACP contact is NC only, the NC contact must be used to activate an auxiliary relay. The relay's contact then can be used as the NO FACP relay in this diagram