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Notes and Warnings

Symbol Definitions

The following symbols are used throughout this manual:

-  This symbol is intended to alert the installer of shock hazards within the enclosure. Service should only be performed by qualified service personnel
-  This symbol is intended to alert the installer of important information intended to help the installer avoid personal injury or property damage

Warnings

-  Installation and service should be performed only by qualified service personnel and should conform to all local codes
-  To reduce the risk of electric shock or fire, do not expose this equipment to rain or moisture
-  This equipment shall be installed in a manner which prevents unintentional operation by employees, cleaning personnel, or others working in the premises, by falling objects, customers, building vibration, or similar causes
-  This equipment is not intended for use within the patient care areas of a Health Care Facility
-  Replace fuses only with the same type and rating as indicated in the specifications section of this manual.
-  To prevent impaired operation, ensure that all wiring is routed and secured to prevent accidental open or short circuit conditions
-  The system and any batteries (if used) should be tested at least once per year to ensure proper operation
-  Batteries (if used) should be maintained at an ambient temperature of between 32 and 120 degrees Fahrenheit (0-49 Celsius) or premature loss of battery power could occur

Regulatory Information

The equipment discussed within this manual has been tested to the following standards:

- CE (Europe & Worldwide)
- PSE (Japan)
- RCM/SAA (Australia & NZ)
- BIS (India)

FCC Information

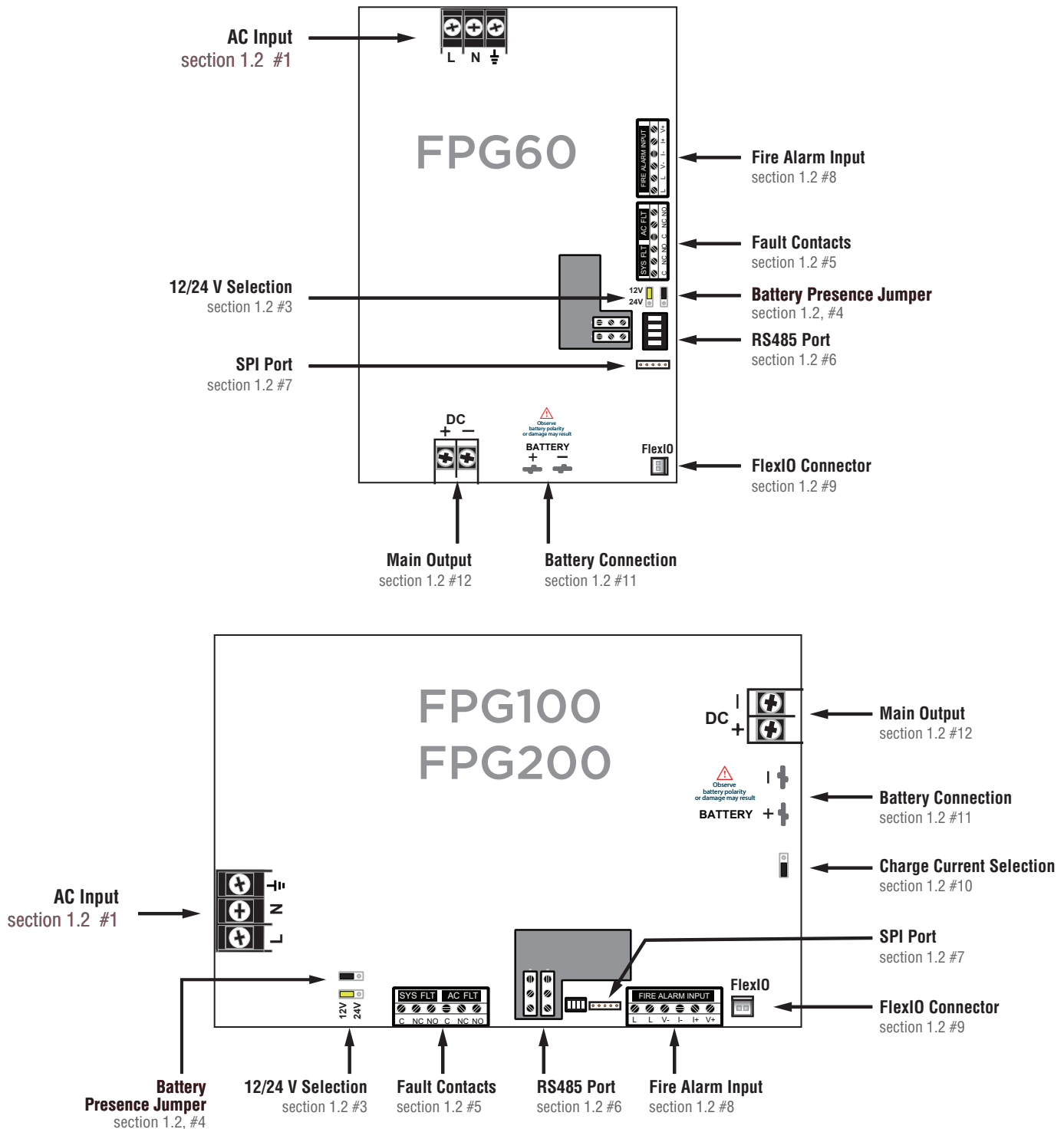
Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Conventions Used Within this Manual

Positional information (e.g. top, bottom, up, down, left, right, etc.) is referenced with the board or enclosure in the orientation shown in the illustrations in this manual.

Quick Install - Section Finder

This section gives a quick visual guide of installation connections and settings for installers already familiar with the FlexPower Global line of power supplies. For full information, please read this entire manual before installing.

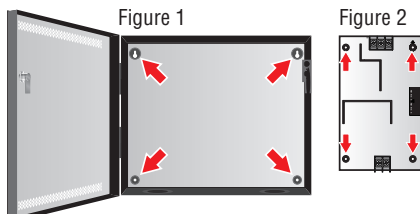




Section 1 – Installation and Operation

The following pages cover the installation, setup, and basic operation of the FPG series of power supplies.

1.1 Mounting



Mounting an Enclosure

Use the following procedure when mounting a wall-mount enclosure (figure 1).

1. (Optional) Remove the enclosure's cover.
2. Locate the top keyhole mounting holes in the back of the enclosure.
3. Mark and pre-drill the locations for the keyholes in the mounting surface.
4. Partially install two fasteners appropriate for the surface on which the enclosure is being installed. Leave the heads of the fasteners approximately 1/4" out from the surface. Minimum fastener size should be #10 or larger.
5. Hang the enclosure on the two fasteners and mark the locations of the remaining mounting holes.
6. Remove the enclosure and pre-drill the locations for the remaining mounting holes.
7. Re-hang the enclosure on the top mounting fasteners, start the remaining fasteners and tighten all fasteners.
8. Reinstall the enclosure's cover, if removed in step 1.

⚠ It is the installer's responsibility to determine the appropriate fastening system for use with the surface the enclosure is being mounted to.

Mounting an FPG PS Board to an Enclosure

Use the following procedure when mounting an FPG power supply to a LifeSafety Power enclosure (figure 2).

1. Locate the appropriate mounting holes in the enclosure and snap the four standoffs provided into the holes.
2. Align the board mounting holes (mounting hole locations are indicated in the drawing above) with the standoffs and snap the board onto the standoffs. Be sure the board is properly oriented before snapping the board onto the standoffs (Figure 3).
3. When two power supply boards are installed, the larger shall be located on top (figure 4).

Figure 3

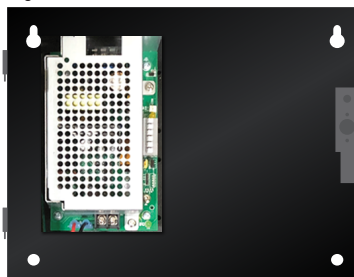


Figure 4

Mounting a Sub Assembly to an Enclosure

Third Party sub assemblies will be mounted in one of three methods based on the supplied mounting hardware (figure 5).

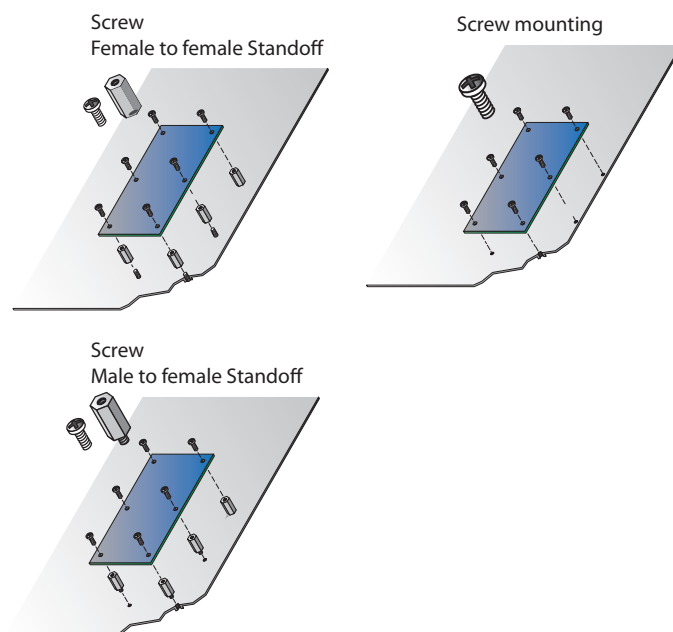
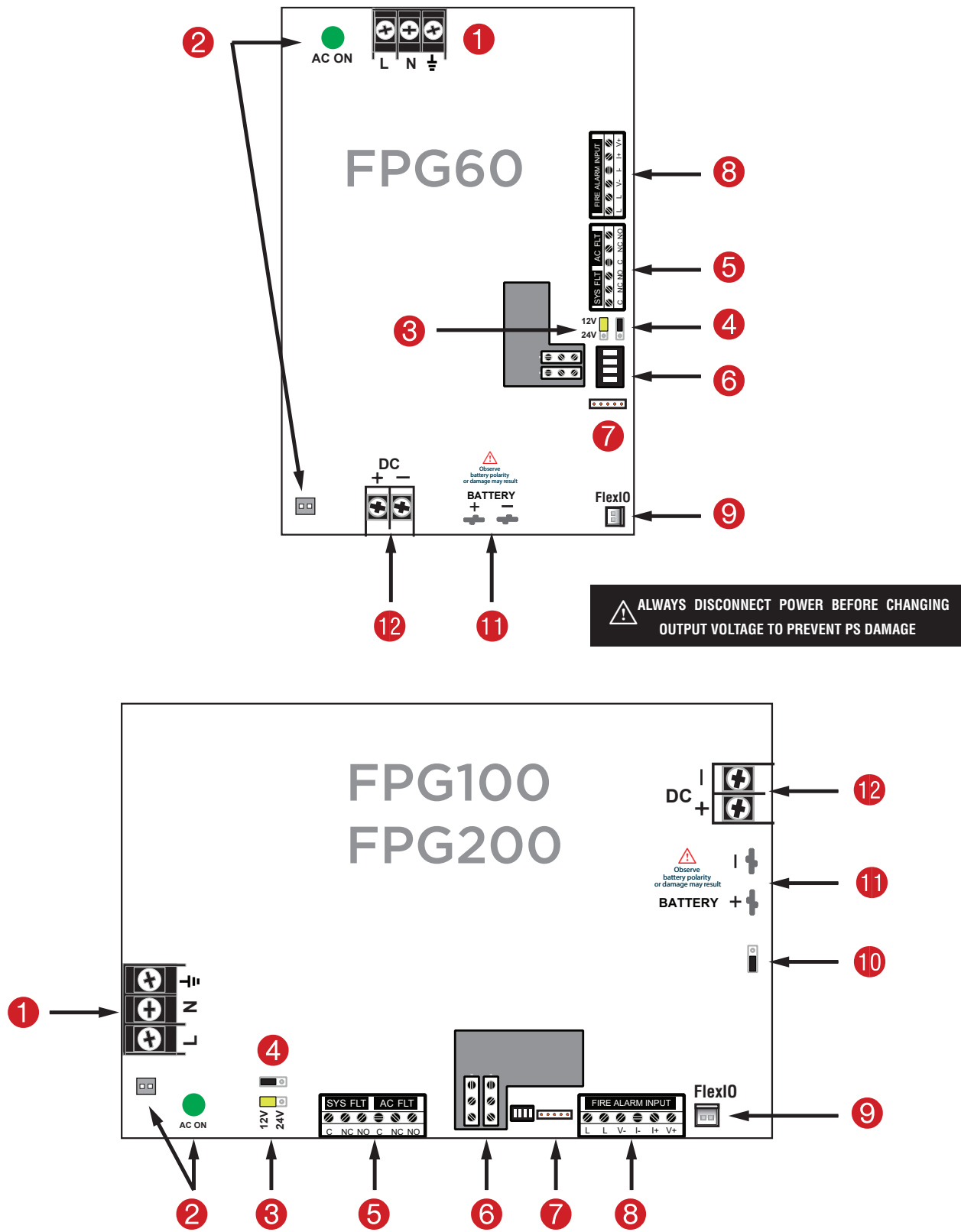


Figure 5

1.2 Power Supply Overview



⚠ FPG boards are supplied with a metal cover to shield the user from high voltage.



1.2 Power Supply Overview

1 AC Input Primary AC connection

FPG accepts a universal AC input voltage between 90-264 VAC at 50/60Hz.

2 AC ON – Green LED

This LED lights when AC voltage is present on the AC input. Missing or low AC is indicated by this LED extinguishing. Also available is an AC LED connector. This connector allows connection of an external AC ON indicator. Only a LifeSafety Power AC LED should be connected.

 Always confirm the absence of AC power with a meter before servicing to prevent electric shock.

3 Output Voltage Selection (FPG60 and FPG100 only)

This jumper selects the output voltage of the FPG60 or FPG100 power supply. Voltage settings are labeled on the PC board as follows:

- 12V 12VDC nominal out
- 24V 24VDC nominal out

 Remove power before changing output voltage or damage to the power supply could occur.

 The FPG200 has a fixed 24VDC output which cannot be changed.

4 Battery Presence Detection

The BAT DET jumper enables or disables Battery Presence (BP) fault detection as follows:

- Position 1 (jumper ON) Enable Battery Fault Detection
- Position 2 (jumper OFF) Disable Battery Fault Detection

 Enabled (Position 1) is the factory default position which will cause a fault to occur if a battery is not connected.

5 Fault Contacts (Sys Flt & AC Flt)

Fault output labeling is adjacent to the terminals and is shown in the unpowered (FAULT) condition. The yellow System fault LED is adjacent to the terminal strip. Fault conditions reported include:

AC FLT

- Low AC
- Missing AC
- Internal Fault

SYS FLT

- Missing Battery (If BAT DET jumper is ON)
- Battery voltage out of range
- DC output voltage out of range
- Ruptured battery fuse
- Accessory Board Fault
- Internal Fault

6 RS-485 Terminals and Address Switches (Optional)

This optional board provides the RS-485 terminals for connection to a NetLink NLC network board. The switches select the RS-485 address for the FPG when using the RS-485 connection and are used only when the optional RS-485 board is present. See section 1.6 for more information on the switches. See the NLC manual for connection information.

7 SPI Port for NetLink

This connector allows optional monitoring of the FPG power supply via the older NL4 or NLX NetLink network modules.

See the instructions for the NetLink module used for more information.

8 Fire Alarm Input (FAI)

These terminals accept the optional FAI / Access Control input for controlling any FAI capable accessory boards connected to the FPG power supply. The terminals are removable and are labeled on the PC board. These terminals accept AWG14 – AWG22 wire. The red FAI LED is adjacent to the terminal strip. See Section 1.3. Connections are as follows:

- **I+ & I– Terminals** These terminals are the input terminals for the FAI Input. The FAI input is activated when a voltage between 9 and 30 volts is applied across these terminals in the correct polarity. **See Section 1.3 - FAI Input Usage for more information.**
- **V+ & V– Terminals** These terminals are a low-current auxiliary voltage output and are typically used with a dry contact or open collector for activating the FAI Input's I+ and I– terminals.
- **L Terminals** Latch Reset contact input. If a latching FAI Input is desired, a normally closed contact is placed across these terminals. When the FAI Input is activated, it will latch in the activated state until this contact is momentarily opened. **If the latching feature is not desired, leave these terminals open.**

9 FlexIO Connector

This connector supplies the fault and FAI status between the FPG power supply and any accessory boards in the system. The appropriate cable is supplied with the accessory boards. For more information, see the instruction manual for any accessory boards used in the system.

10 Charge Current Selection (FPG100 and FPG200 only)

The charge current selection jumper selects between the low and high charge current levels.

- Position 1 - Low Charge Current
- Position 2 - High Charge

 This jumper is not present on an FPG60, as the charge rate is non-selectable

11 Battery Terminal Connection

For optional battery backup. Battery set voltage must match the DC output voltage setting. As default, the FPG is set for SLA battery type. When connected to a NetLink, the FPG may be programmed for LFP battery type. The FPG contains a built-in low battery cutoff to protect the battery set from deep discharge.

 Observe polarity or damage to the system will occur.

12 Main DC Power Supply Output

These terminals supply the output voltage of the FPG power supply. The DC LED will be illuminated with voltage present. The DC LED is dual color and will indicate the output voltage setting as follows:

- Green - 12VDC Output

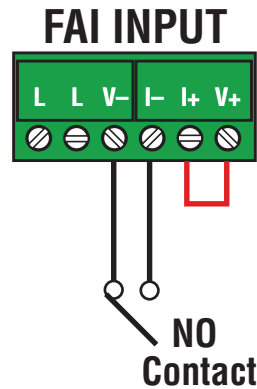
1.3 FAI Input Usage

This section provides more detailed information on the connection and usage of the FAI input.

Activation with a Normally Open Relay Contact

FAI Activates when the NO contact CLOSSES.

FAI Deactivates when the NO contact OPENS.

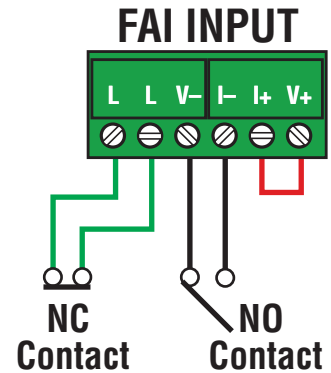


Latching the FAI Input

Latching of the FAI Input is achieved by placing a NC contact across the two 'L' terminals. The FAI may be activated by any of the methods listed. FAI Deactivates when the input is deactivated AND the NC Latching contact is momentarily OPENED.

Example – NO Contact activation with latching.

FAI Activates when the NO contact CLOSSES. FAI Deactivates when the NO contact OPENS AND the NC contact momentarily OPENS.

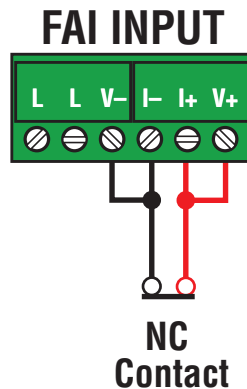


Activation with a Normally Closed Relay Contact

FAI Activates when the NC contact OPENS.

FAI Deactivates when the NC contact CLOSSES.

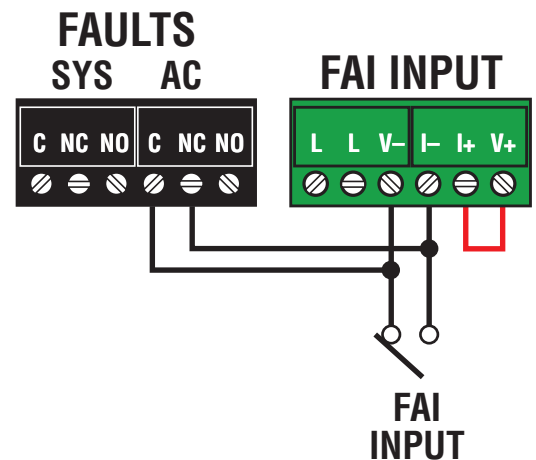
Note: FAI with a NC contact cannot be tested by removing the terminal strip, as this will remove the jumper wires from V+ and V- as well. To test, remove one wire going to the NC Contact.



FAI Activation with a Normally Open Relay Contact and FPV AC Fault Lock Override

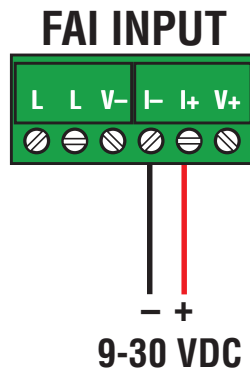
FAI Activates either, when the Fire Alarm NO contact CLOSSES, **or** when the AC Fault NC contact CLOSSES.

FAI Deactivates either, when the Fire Alarm NO contact OPENS, **or** when the FPV AC Fault NC contact OPENS.



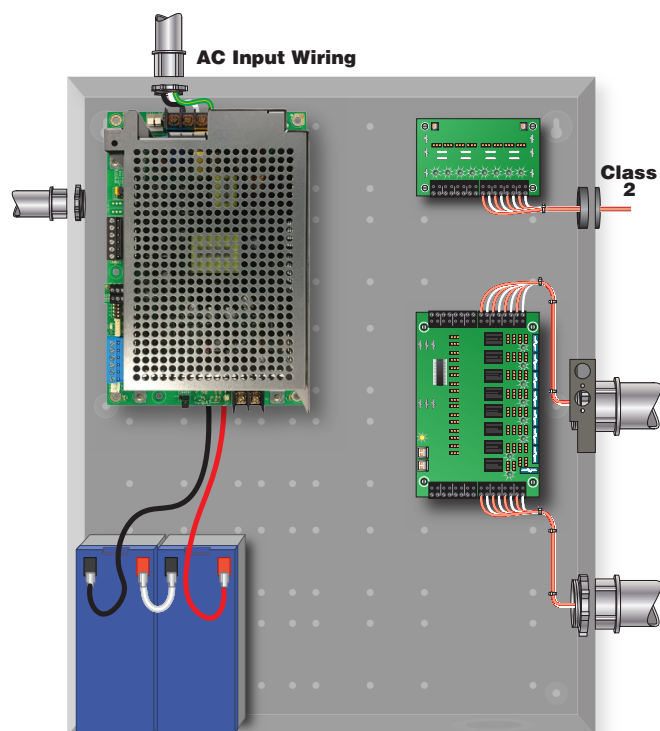
Activation with a Voltage Input

FAI Activates when voltage is APPLIED in the correct polarity. FAI Deactivates when voltage is REMOVED or the polarity of the voltage is REVERSED. Polarity shown in the ACTIVATED state.





1.4 Typical Installation & Wire Routing



The drawing above shows a typical installation. Actual configuration and wire routing will vary based on the components installed in your system. The following guidelines should be followed for installation:

- Class 2 Power limited wiring must be separated from non-power limited wiring by a minimum of 1/4 inch and must use separate knockouts.
 - The installation and all wiring methods shall be in accordance with ANSI/NFPA70 and all local codes.
 - The installation and all wiring methods shall be in accordance with ANSI/NFPA70 and all local codes.
 - Any wiring passing through knockouts in the bottom or top surfaces of the enclosure must be enclosed in rigid or flexible metal conduit.
- For **Canadian Installations** - For permanently connected equipment, a readily accessible disconnect device shall be incorporated external to the equipment. Output circuits not connected to removable terminal strips shall also utilize a readily accessible disconnect device.

1.5 Power-Up and Basic System Verification Checklist

1. Ensure proper configuration of all jumpers and switches.
2. Apply AC power to the FPG power supply.
3. Ensure the “AC ON” and “DC” LEDs are lit.
4. Verify DC output voltage with a meter.
 - a. If set for the 12V nominal setting, the voltage should be approximately 12.5VDC
 - b. If set for the 24V nominal setting, the voltage should be approximately 25.0VDC
5. Connect battery, if required for the installation.
6. Verify that the yellow fault LED is not lit on the FPG power supply.
7. If the battery presence jumper is enabled, remove one lead from the battery – verify that the yellow “Fault” LED lights. Reconnect the battery and the “Fault” LED should extinguish.
8. When a standby battery set is used, remove AC power from the FPG power supply. Verify that the “DC” LED remains lit and that the “AC” LED extinguishes. Reconnect AC power and verify that the “AC” LED illuminates.



Section 2 – Troubleshooting and Maintenance

2.1 Troubleshooting Table

Symptom	Possible Problem	Information / Possible Solution
Fault LED lit and SYS FLT relay indicating a trouble condition	Battery Disconnected	- Verify that the battery is connected to the FPG. Check all crimp connections on the battery leads - Verify that the battery set being used is charged and in good condition - If no battery will be used in the installation, move the BAT DET jumper to position 2
	Low Battery Voltage	Battery discharged or damaged– Allow the battery to charge or replace the battery
	High Battery Voltage	- Incorrect battery set– Ensure the battery set is configured properly for the output voltage setting - Problem with battery charging circuit– Contact LifeSafety Power
	High or Low Output Voltage	Measure the output voltage at the DC terminals. The voltage should be 12.50V for the 12V setting or 25.00V for the 24V setting ($\pm 10\%$). Contact LifeSafety Power if the voltage is outside of this range
	Battery Overcurrent	Remove the battery and check the battery fuse. Verify the polarity of the battery and the integrity of the output wiring and powered devices before reconnecting.
	Internal Problem	Contact Lifesafety Power
AC LED Extinguished and AC FLT relay indicating a trouble condition	Primary AC Voltage Low or Missing	Verify that the AC input voltage is between 90 and 264VAC with a meter. The green AC ON LED indicates the presence of a valid AC voltage on the input.
	Internal problem	Contact LifeSafety Power
No DC Output DC LED Extinguished	Power Supply Shut Down	- Verify DC output voltage, AC power, and backup battery voltage (if used) - Check output load integrity and current draw - Contact LifeSafety Power
Missing Battery Not Detected	Improper setting of BAT DETECT Jumper	The BAT DETECT jumper must be ON to detect a missing battery

2.2 Maintenance Instructions

The following are the maintenance instructions for the FPG Series power supply system

- Disconnect AC power prior to servicing
- Verify that there are no fault conditions displayed on any of the yellow fault LEDs as indicated in this instruction manual
- Verify the integrity of all fuses and replace as necessary using the fuse ratings supplied in the Specifications section of this manual
- The battery set (if used) should be checked and replaced if found to be defective or if more than 4 years old (or as required by local code)
- Verify that all output voltages are within range as specified in the Specifications section of this document

Section 3 – Specifications

3.1 Electrical Specifications

FPG60, FPG100, & FPG200 Power Supplies

Specifications		FPG60	FPG100	FPG200
AC Input	Voltage	90VAC to 264VAC @ 50-60Hz	90VAC to 264VAC @ 50-60Hz	90VAC to 264VAC @ 50-60Hz
	Current	1.50A Max	1.8A Max	3.1A Max
	Power Factor	> 0.9	> 0.9	> 0.9
Standby	Current	100mA	100mA	100mA
DC Output at 12V Setting	Voltage	12.5V $\pm$ 5%	12.5V $\pm$ 5%	N/A
	Max Current	5A	8A	N/A
	Ripple	120mV	120mV	N/A
	Regulation	$\pm$ 2%	$\pm$ 2%	N/A
	Efficiency	85%	84% Typical	N/A
DC Output at 24V Setting	Voltage	25V $\pm$ 5%	25V $\pm$ 5%	25V $\pm$ 5%
	Max Current	2.5A	4A	8A
	Ripple	120mV	120mV	120mV
	Regulation	$\pm$ 2%	$\pm$ 2%	$\pm$ 2%
	Efficiency	85%	82% Typical	90% Typical
Battery	Size & Type	4-20AH Programmable for SLA or LFP	4-40AH Programmable for SLA or LFP	4-40AH Programmable for SLA or LFP
	Charge Current	0.5A ($\pm$ 10%) Maximum	1.1A ($\pm$ 10%) Maximum	1.6A ($\pm$ 10%) Maximum
Low Battery Disconnect	Cutoff	at 70% of Battery Voltage 8.4V DC for 12V battery 16.8V DC for 24V battery	at 70% of Battery Voltage 8.4V DC for 12V battery 16.8V DC for 24V battery	at 70% of Battery Voltage 16.8V DC for 24V battery
BTU Dissipation	BTU/Hr	66	70	76
Fault Setpoints	Output Voltage	$\pm$ 10% of nominal	$\pm$ 10% of nominal	$\pm$ 10% of nominal
	Batt Voltage	$\pm$ 10% of nominal	$\pm$ 10% of nominal	$\pm$ 10% of nominal
	Batt Presence	6–15V (12V Setting), 11–29V (24V Setting)	6–15V (12V Setting), 11–29V (24V Setting)	11–29V
Fault Relay Contacts	AC FLT	1A at 24VDC	1A at 24VDC	1A at 24VDC
	SYS FLT	1A at 24VDC	1A at 24VDC	1A at 24VDC



Section 3 – Specifications

3.2 Temperature Specifications

Models

Ambient Temperature	0°C to 49°C (32°F to 120°F)
Ambient Humidity	93% at 32°C (90°F) maximum
Storage Temperature	–30°C to 70°C (–22°F to 158°F)

3.3 Mechanical Specifications

Visit www.lifesafetypower.com for AutoCAD files.

Power Supply Board - FPG60

Size	6.00" L x 4.00" W x 2.00" H (152mm L x 102mm W x 51mm H) (With Cover)
Approximate Weight	1.38 lbs. (0.340 kg)

Power Supply Board - FPG100 & FPG200

Size	8.25" L x 5.50" W x 2.5" H (210mm L x 140mm W x 64mm H) (With Cover)
Approximate Weight	0.95 lbs. (0.430 kg)

Enclosure E5

Size	8.63" H x 11" W x 3" D (286mm H x 219mm W x 76mm D)
Approximate Weight (base cabinet)	4 lbs. (2 kg) empty

Enclosure E2; A, B, C, D, F, G, BL, H, I, G, K, L, M, N, P, R, S, SO, T, V, W, X, 1, 2, 3

Size	20" H x 16" W x 4.5" D (508mm H x 406mm W x 114mm D)
Approximate Weight (base cabinet)	18 lbs. (8.0 kg) empty

Enclosure E1; A, B, C, D, F, G, BL, H, I, G, K, L, M, N, P, R, S, SO, T, V, W, X, 1, 2, 3

Size	14" H x 12" W x 4.5" D (356mm H x 305mm W x 114mm D)
Approximate Weight (base cabinet)	8 lbs. (3.5 kg) empty

Enclosure E4; A, B, C, D, F, G, BL, H, I, G, K, L, M, N, P, R, S, SO, T, V, W, X, 1, 2, 3

Size	24" H x 20" W x 6.5" D (508mm H x 508mm W x 165mm D)
Approximate Weight (base cabinet)	21 lbs. (9.5 kg) empty

Enclosure E6; A, B, C, D, F, G, BL, H, I, G, K, L, M, N, P, R, S, SO, T, V, W, X, 1, 2, 3

Size	30" H x 23" W x 6.5" D (762mm H x 584mm W x 165mm D)
Approximate Weight (base cabinet)	45 lbs. (21.0 kg) empty

Enclosure E8; A, B, C, D, F, G, BL, H, I, G, K, L, M, N, P, R, S, SO, T, V, W, X, 1, 2, 3

Size	36" H x 30" W x 6.5" D (910mm H x 760mm W x 165mm D)
Approximate Weight (base cabinet)	55 lbs. (25.0 kg) empty

Section 3 – Specifications

3.4 Replacement Parts

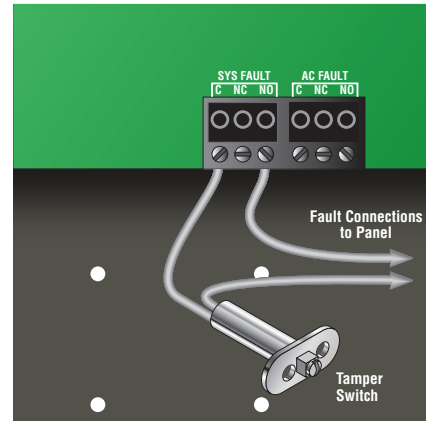
Board Kits	Description
FPG60-Boxed	FPG60 replacement board
FPG100-Boxed	FPG100 replacement board
FPG200-Boxed	FPG200 replacement board
B100-Boxed	DC-DC Converter 4A (12VDC or adjustable 5 to 18VDC) replacement board
B150-Boxed	DC-DC Converter 6A (12VDC or adjustable 3 to 18VDC) replacement board
D8-Boxed	Simple distribution replacement board
D8P-Boxed	Simple distribution (Class 2) replacement board
F8-Boxed	FAI controlled distribution replacement board
F8P-Boxed	FAI controlled distribution (Class 2) replacement board
C4-Boxed	Four zone power control replacement board
C4P-Boxed	Four zone power control (Class 2) replacement board
C8-Boxed	Eight zone power control replacement board
C8P-Boxed	Eight zone power control (Class 2) replacement board
M8-Boxed	Eight zone managed power control replacement board
M8P-Boxed	Eight zone managed power control (Class 2) replacement board
SD4	Four zone managed auxiliary output replacement board
SD4P	Four zone managed auxiliary output (Class 2) replacement board
SD16	Sixteen zone managed auxiliary output (Class 2) replacement board
NLC-Boxed	NetLink Connect network communication board with RS-485
NXB-Boxed	NetLink Connect expansion board

Hardware	Description
Tamper Switch	Tamper Switch for LSP "E" enclosure
Battery Cable	Battery Harness – 24"
Module Cable - 12"	Accessory board cable set – 12"
Module Cable - 18"	Accessory board cable set – 18"
Fuse - 3A	ATM-3A Fuse – Bag of 25
Fuse - 5A	ATM-5A Fuse – Bag of 25
Fuse - 7.5A	ATM-7.5A Fuse – Bag of 25
Fuse - 10A	ATM-10A Fuse – Bag of 25
Fuse - 15A	ATM-15A Fuse – Bag of 25
Fuse - 30A	ATM-30A Fuse – Bag of 25
Standoffs	Nylon Standoffs – Bag of 25
Camlock Set	Key and Lock fits LSP "E" enclosure



Appendix 1 – Tamper Switch Wiring

All FlexPower DC systems with an enclosure include a normally closed tamper switch for monitoring by the host panel. The tamper switch can either be brought into a dedicated input in the panel (see the panel's instructions), to the Event 1 input of a NetLink Network Module (See the NetLink's Instruction Manual), or the tamper switch may be series connected into the System Fault relay in the FPG supply as shown in the illustration.



IMPORTANT

All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their particular application. LifeSafety Power makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. LifeSafety Power's only obligations are those in the LifeSafety Power Standard Terms and Conditions of Sale for this product, and in no case will LifeSafety Power or its distributors be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of the product. Specifications are subject to change without notice. In addition, LifeSafety Power reserves the right to make changes—without notification to Buyer—to processing or materials that do not affect compliance with any applicable specification.