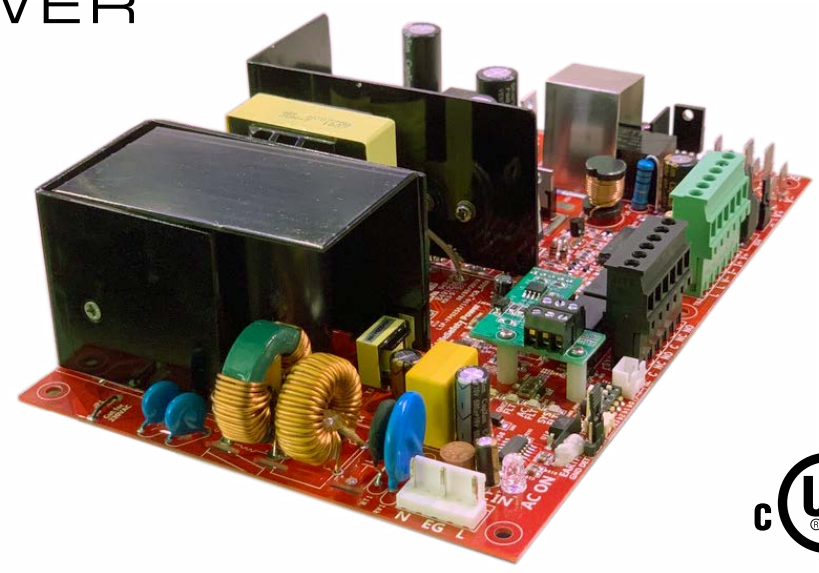
Power is knowledge.™

LifeSafety Power®

FlexPower Generation 2
DC Power System Installation Manual

FLEXPOWER®



c UL us

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P03-040 Rev A24

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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

All references to FPO, FPO75, FPO150, or FPO250 in this manual refer to the Generation 2 FPO family.

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

For UL294 compliance, the battery set must be sized to provide a minimum of 4 hours standby at full load

Non-ProWire enclosure models must not integrate the SY-CLOUDLINK-G2 if compliance with ULC-S319 or ULC 60839-11-1 is required

For Genetec ULC/EN 60839-11-1 grade 4 applications, the following conditions are applicable:

- UL 294/ULC 60839-11-1 Listed Genetec subassembly Model SY-CLOUDLINK G2 (aka SCL G2) may be employed (not Model SY-CLOUDLINK)
- The access control system units and monitoring console are not permitted to be employed in publicly shared networks
- Model [SY-]FPOxxx/yyy/zzz/H-qaaaaqaaaaeeee/V/WnC shall be installed within the controlled/protected area
- The Genetec Monitoring Console Software “Security Center” installed into ITE Listed equipment shall be used, along with Genetec's ULC/EN Security Center Configuration Guide (EN.702.039)
- The FPO250(G2)/FPO150(G2) is intended to employ SLA 40Ah backup battery and the PSU max output must be 9A @ 12VDC.
- The FPO75(G2) is intended to employ SLA secondary batteries rated 20 Ah and the PSU max output must be 4.5A @ 12VDC.

Regulatory Information

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

- UL294, UL2610
- ULC S318, ULC S319, ULC 60839-11-1
- CSA C22.2 #107.1, CSA C22.2 #205
- IEC 62368-1:2014, CE, UKCA, BIS IS13252(Part1):2010
- NOM 001:2018, RCM, SAA
- CSFM Approved, ROHS 3 Lead Free

The FPO75 when set for 230VAC applications complies with the additional standards below. Also, when FERRITE-BOXED is properly installed on an FPO150 or FPO250 in a 230VAC application, this equipment also complies with:

- CE
- EN55032:2015
- EN61000-3-2:2014, EN6100-3-3:2013
- EN55024:2010 +A1:2015

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.

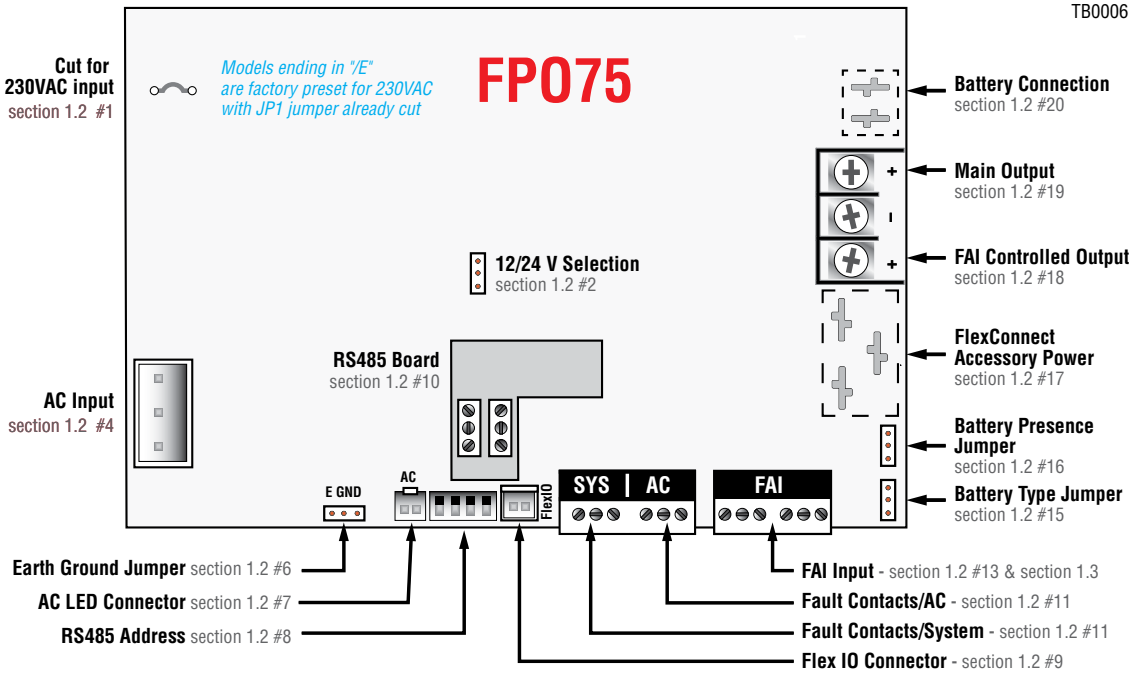
Power Supply Quick Start

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

QUICK INSTALL - SECTION FINDER

Scan QR Code for alternate FPO75 12/24V jumper location

TB0006



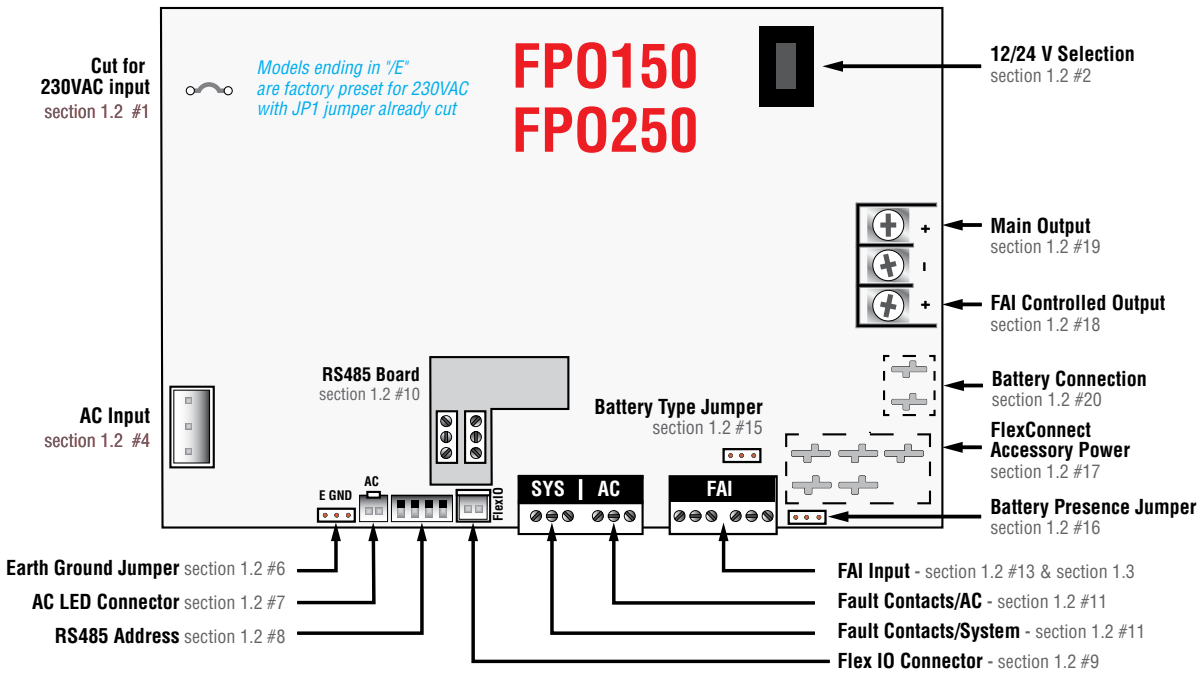


Figure 2

Section 1 – Installation and Operation

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

1.1 Mounting

Figure 1

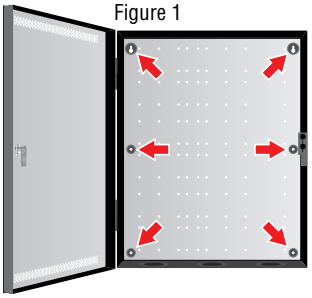


Figure 2

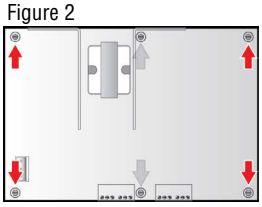


Figure 3



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 ¼" 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.

⚠ For UL2610 applications, after installation is complete, the installer must install the two supplied 1" long screws to the edge of the enclosure's cover for additional security.

Mounting an FPO PS Board to an Enclosure

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

1. Locate the appropriate mounting holes in the enclosure and snap the four or six 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).

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).

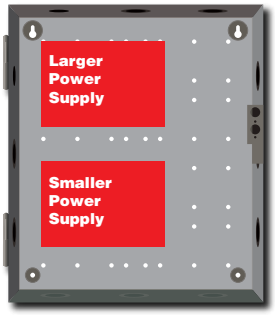


Figure 4

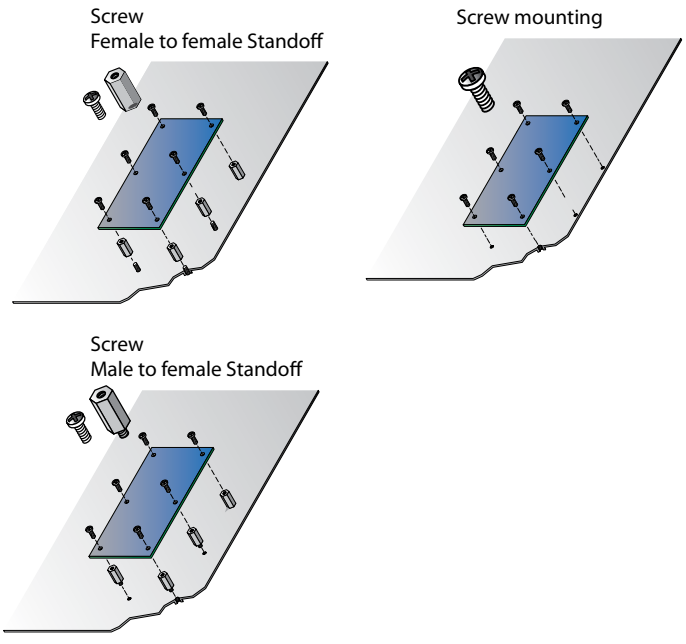
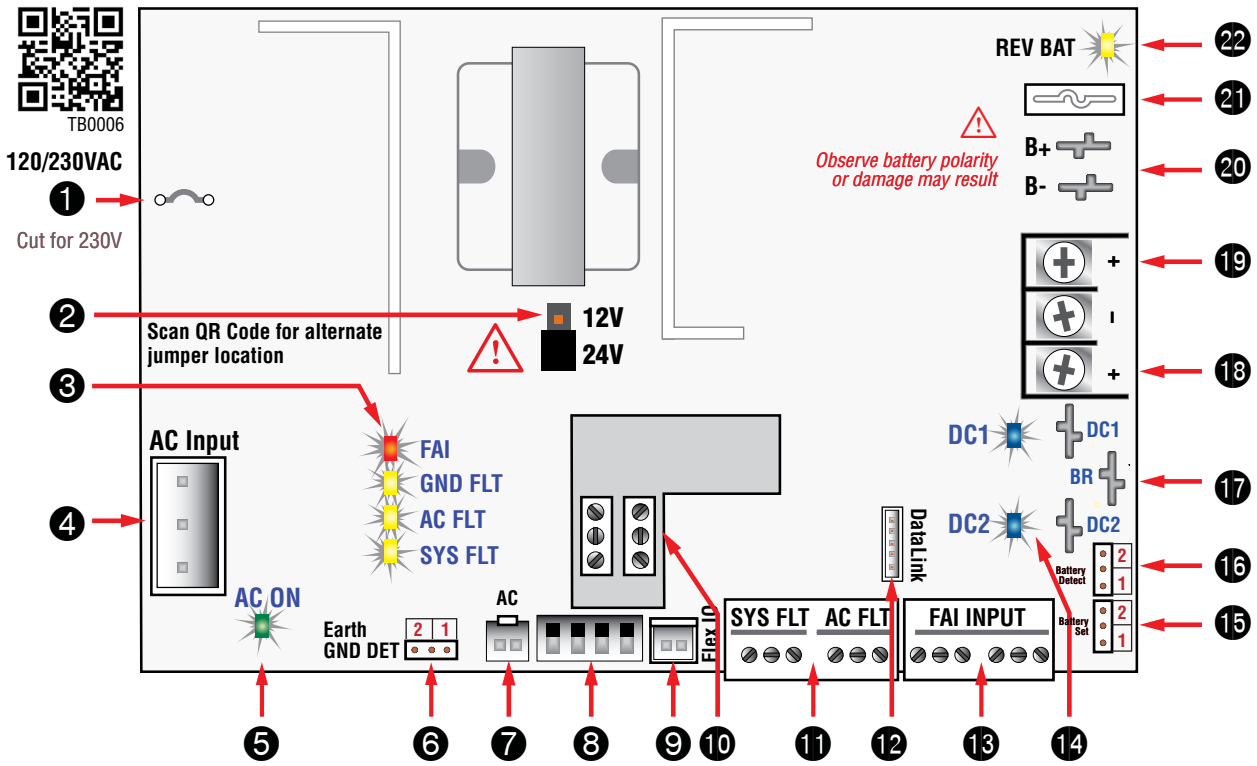


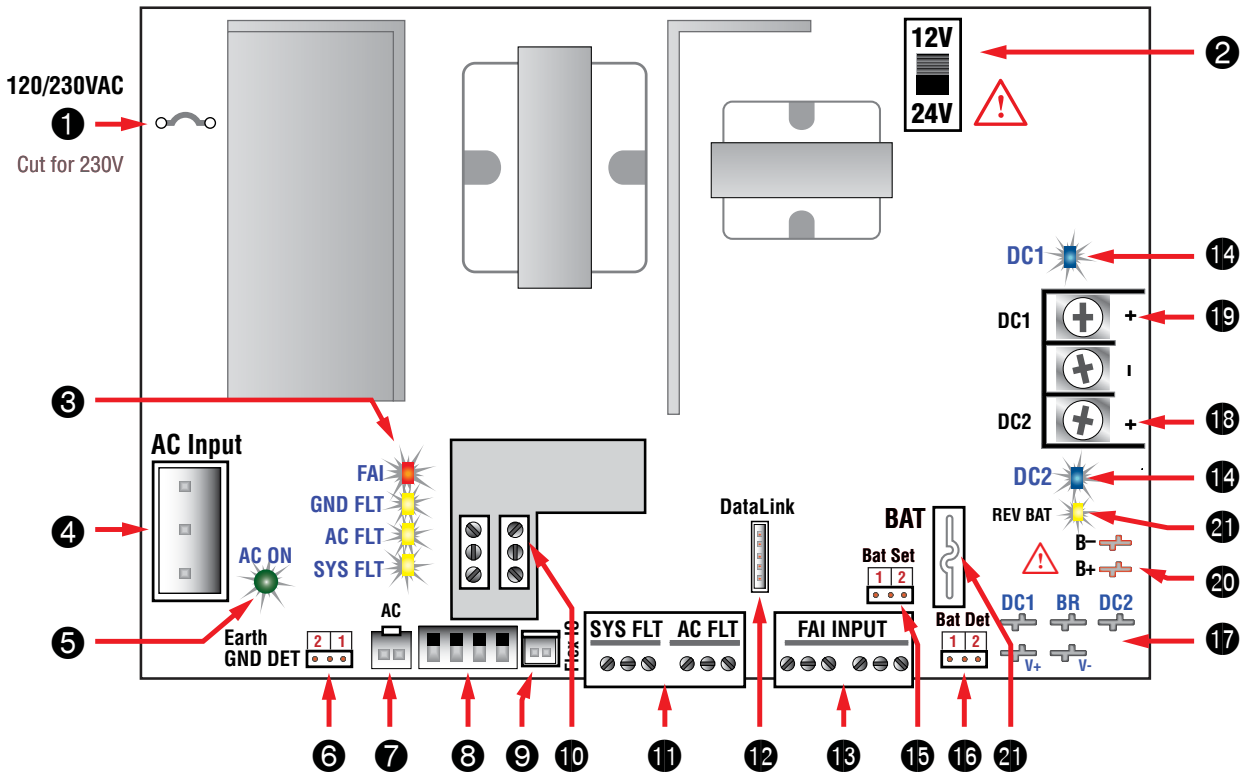
Figure 5

FP075



For UL compliance, the AC fault contact must be monitored by a Listed control panel

FP0150 / 250



For UL compliance, the AC fault contact must be monitored by a Listed control panel

1.2 Jumper / LED / Connector Descriptions

❶ AC Input Voltage Selection (JP1)

This jumper configures the FPO for the AC input voltage to be used.

- Leave jumper INTACT for 120V input
- CUT and remove jumper for 230V input

⚠ *Models ending in "/E" are preset for 230VAC*

⚠ *Failure to cut this jumper when using the FPO with a 230VAC input will result in damage to the system and void the warranty.*

❷ Output Voltage Selection (SW1)

This switch or jumper (depending on model) selects the output voltage of the FPO power supply. Voltage settings are labeled on the PC board as follows:

- ***12*** 12VDC nominal out • ***24*** 24VDC nominal out

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

⚠ *Scan QR CodeTB0006 for alternate jumper location*

❸ FAI and Fault LED Status Indicators

FAI (D22) – Red

This LED lights when a valid FAI signal is received on the FAI input terminals.

GND FLT (D42) – Yellow

This LED lights when an impedance is detected between earth ground and any voltage output or DC common. A Ground Fault will also light the System Fault LED.

AC FLT (D43) – Yellow

This LED lights when the AC input voltage is low or missing.

SYS FLT (D33) – Yellow

This LED lights when a system trouble is detected by the FPO. Trouble conditions indicated by the SYS FLT LED include:

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

❹ AC Input (J9)

J9 accepts the provided three-wire connector harness for connection to the AC Line. Cut jumper JP1 if powering the FPO with a 230VAC input. Connections are by wire nut as follows:

120VAC	**230VAC**
White – Neutral	White – Phase 2
Green – Earth Ground	Green – Earth Ground
Black – Hot	Black – Phase 1

⚠ *See FERRITE-BOXED footnote.*

⚠ *Models ending in "/E" have the JP1 jumper pre-cut for 230VAC operation only (see #1 above).*

❺ AC ON (D34) – Green

This LED lights when any AC voltage is present on the AC input. It does not indicate that the voltage is sufficient for proper operation. See the yellow AC FLT LED for AC voltage out of range indication.

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

❻ Earth Ground Fault Detection (JP2)

The EARTH GND DET jumper enables or disables Earth Ground (EG) fault detection as follows:

- ***Position 1*** Enable EG Fault Detection
- ***Position 2*** Disable EG Fault Detection (Default)

Earth Ground fault detection detects continuity between earth ground and any voltage output or DC common on the system.

⚠ *Only one component of an entire system should be enabled for earth ground detection to avoid conflicts.*

❼ External AC LED Connection

This connector allows connection of an external AC ON indicator in rack mount applications. Only a LifeSafety Power AC LED should be connected.

❽ RS485 Address Selection Switches

These switches select the RS-485 address for the FPO when using the RS485 connection. These switches are used only when the optional RS485 board is present (See #10). See section 1.6 for more information on these switches.

❾ FlexIO Connection

This connector supplies the fault and FAI status between the FPO 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.

❿ RS485 Board (Optional)

This board provides the RS485 terminals for connection to an NLX network board. See the NLX manual for connection information.

⓫ Fault Output Connections (TB3)

These terminals provide the System Fault and AC Fault contact outputs. The terminals are removable and are labeled on the PC board in the non-powered (fault) state. For UL2610 compliance, a tamper switch must be wired in series with the Sys Fault contact output. See Appendix 1 for tamper switch wiring information. These terminals accept AWG14 – AWG22 wire. Fault conditions reported include:

AC FLT

- Low AC
- Missing AC
- Internal Fault

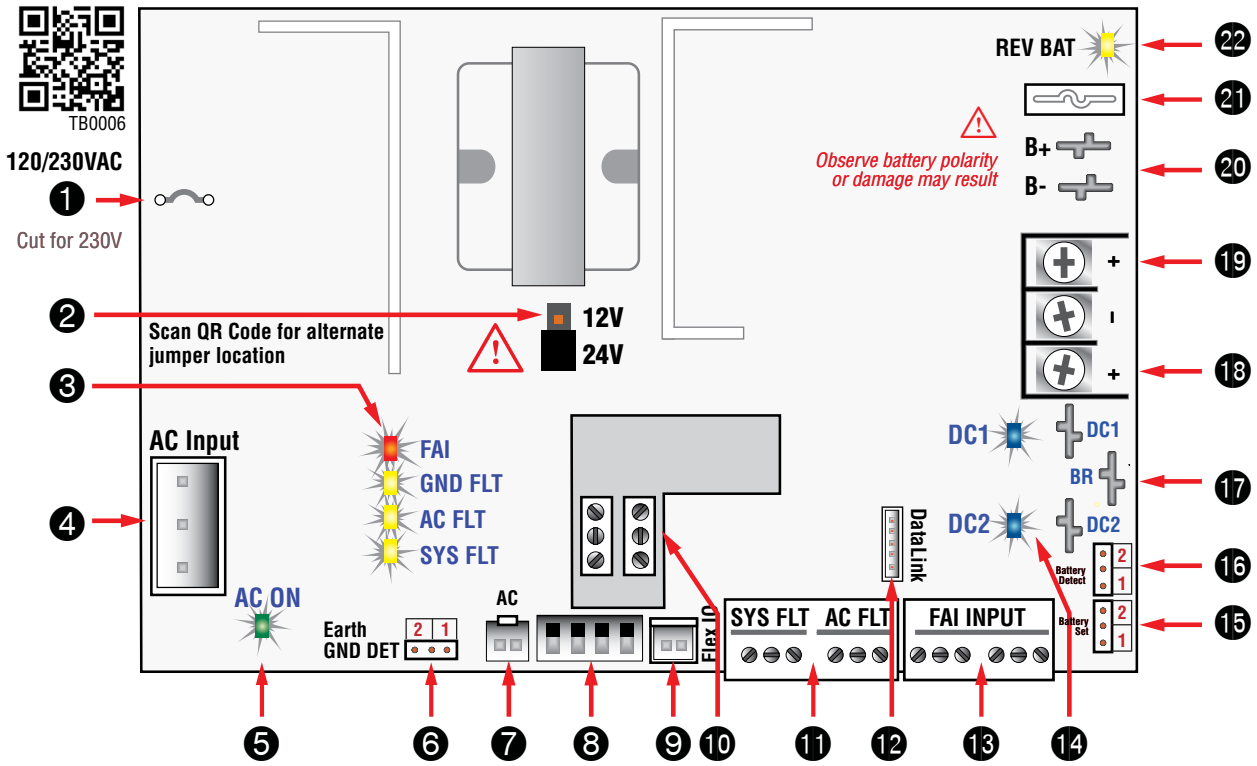
For UL compliance, the AC fault contact must be monitored by a Listed control panel

SYS FLT

- Missing Battery (If BAT DET jumper is ON)
- Earth Ground Fault (If EARTH GND DET jumper is ON)
- Battery voltage out of range
- DC output voltage out of range
- Ruptured fuse (DC1)
- Accessory Board Fault
- Internal Fault

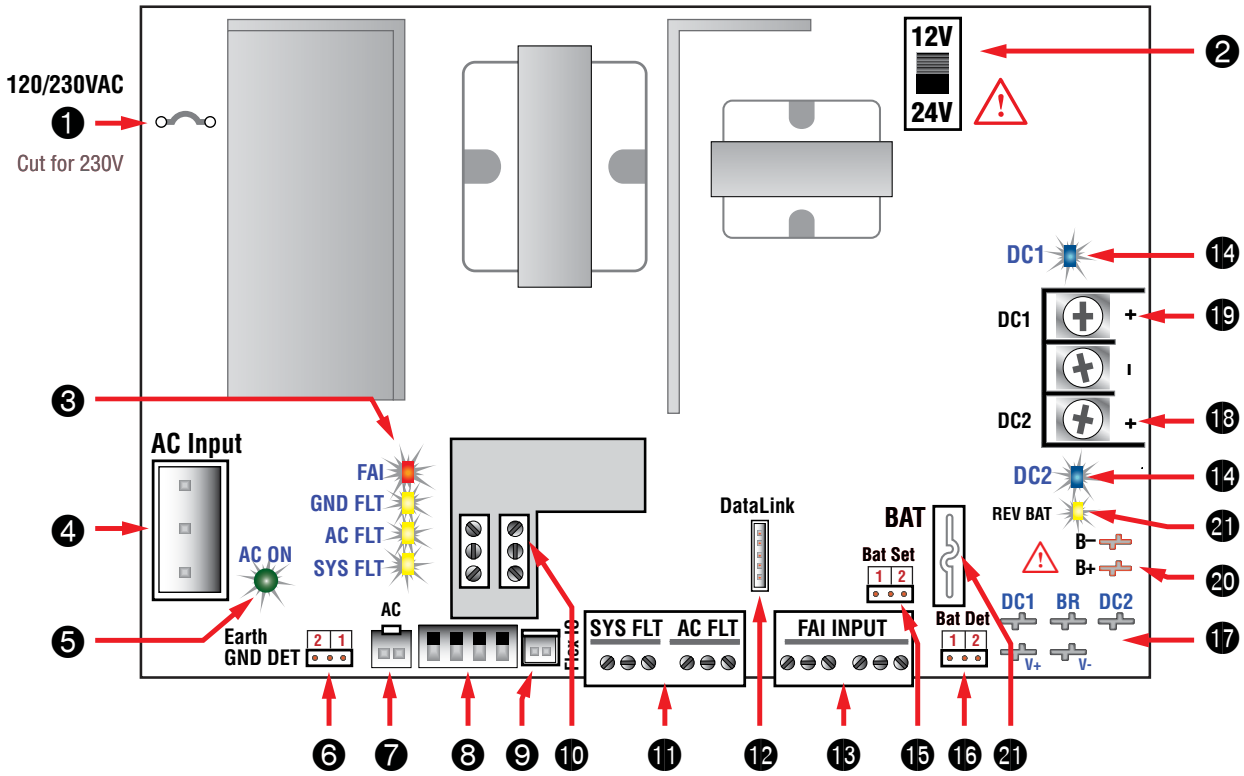
FERRITE-BOXED: When set for 230VAC, FPO150 and FPO250 power supplies are CE compliant when FERRITE-BOXED is installed, which includes two ferrites and one inductor. The inductor is installed in series to the AC input's hot wire while the ferrite must be installed over the AC input wiring and over any wiring on the DC1 or DC2 screw terminals. FERRITE-BOXED is included with models ending in /E. FPO75 models set for 230VAC do not require FERRITE-BOXED for CE compliance.

FP075



For UL compliance, the AC fault contact must be monitored by a Listed control panel

FP0150 / 250



For UL compliance, the AC fault contact must be monitored by a Listed control panel

⓬ DataLink (SPI) Connection

This is the connector for the DataLink connection. It allows optional programming and monitoring of the FPO power supply via an optional NetLink network module.

See the instructions for the Netlink module for more information.

⓭ FAI Input Connections (TB2)

These terminals accept the optional FAI / Access Control input for controlling the DC2 output and any FAI capable accessory boards connected to the FPO power supply. The terminals are removable and are labeled on the PC board. These terminals accept AWG14 – AWG22 wire. 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.

⓮ DC1 & DC2 – Blue/Green

These LEDs light when voltage is available on the DC1 and DC2 output terminals. The DC2 LED will extinguish if the output is disabled via the FAI input. This LED is dual color and indicates the output voltage as follows:

- ***Blue*** The output is set to 24V
- ***Green*** The output is set to 12V

⓯ Battery Type Selection

This jumper selects the type of battery being used. Select SLA for Sealed Lead Acid/Gel type batteries. Select LFP for Lithium Iron Phosphate batteries.

⓰ Battery Presence Detection (JP3)

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

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

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

Battery Presence fault detection indicates a fault when the backup battery is disconnected from the FPO power supply. If no backup battery is being used, this jumper should be placed in position 2.

⓱ FlexConnect Power Connections

Faston connectors for the power connection to any accessory boards to be connected. Pre-terminated power leads are provided with the accessory boards. For more information, see the instruction manual for any accessory boards used in the system. Connections are as follows:

- ***DC1*** This faston provides a constant voltage output for connection to the accessory boards.
- ***BR*** The DC Common (DC Ground) for the FPO power supply.
- ***DC2*** This faston provides an FAI controlled output that operates in conjunction with the DC2 output terminals. This connection is typically only used in single voltage systems with D8 accessory boards. See the sections on the FAI Input and DC2 Output Configuration for more information.
- ***V+/V- (FPO150/250 only)*** Faston connectors for powering a NetLink network module. Do not power the NetLink module from the DC1 or DC2 buss. See the NetLink module manual for more information.

⓲ DC2 Output (TB1)

The DC2 output may optionally be controlled by the FAI input. The full current of the FPO is available on this terminal. If not using the FAI input, the DC2 output may be used to provide continuous power. See the section on the FAI Input for more information. This terminal accepts AWG12 – AWG18 wire.

⚠ *See FERRITE-BOXED footnote.*

⚠ *When powering magnetic loads such as maglocks, door strikes, solenoids, etc, each of these loads must have a reverse protection diode either built-in or external to the device.*

⓳ DC1 Output (TB1)

The main DC output of the FPO power supply. The full current of the FPO is available on this terminal at all times and is unaffected by the FAI input. This terminal accepts AWG12 – AWG18 wire.

⚠ *See FERRITE-BOXED footnote.*

⚠ *When powering magnetic loads such as maglocks, door strikes, solenoids, etc, each of these loads must have a reverse protection diode either built-in or external to the device.*

⓴ Battery Connection (BAT+ & BAT–)

Faston connectors for connection of the backup battery set. Pre-terminated battery leads are provided. See the Specifications section for the maximum battery size. If no battery set is to be used, ensure the BAT DET jumper is off to prevent a fault condition from being annunciated. The generation 2 FPO power supply has built-in low battery disconnect to prevent deep discharge of the batteries and to prevent damage to sensitive equipment.

⚠ *Select the proper battery type before connecting a battery set to the FPO power supply. See #15*

⚠ *Note that FPO75 PCB and FPO150-250 PCB's have different battery connection layouts.*

⚠ *An FPO set for a 12V output requires a 12V battery set. An FPO supply set for a 24V output must use a 24V battery set (two 12V batteries in series).*

⚠ *Observe polarity or damage to the system will occur.*

⚠ *It is the installer's responsibility to determine the proper battery size for the installation. See the Specifications section for standby current requirements.*

㉑ Battery Fuse

This fuse is in series with the battery connection. Replace with only the same type and rating.

㉒ REV BAT (D20) – Yellow

This LED lights if the backup battery set is connected in the reverse polarity. The lighting of this LED will also be accompanied by the rupture of the battery fuse (F4) and the lighting of the SYS FLT LED.

FERRITE-BOXED: When set for 230VAC, FPO150 and FPO250 power supplies are CE compliant when FERRITE-BOXED is installed, which includes two ferrites and one inductor. The inductor is installed in series to the AC input's hot wire while the ferrite must be installed over the AC input wiring and over any wiring on the DC1 or DC2 screw terminals. FERRITE-BOXED is included with models ending in /E. FPO75 models set for 230VAC do not require FERRITE-BOXED for CE compliance.

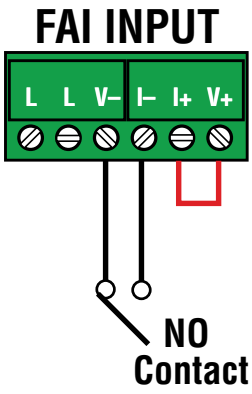
1.3 FAI Input Usage

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 CLOSES.

FAI Deactivates when the NO contact OPENS.

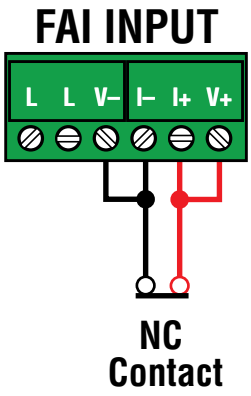


Activation with a Normally Closed Relay Contact

FAI Activates when the NC contact OPENS.

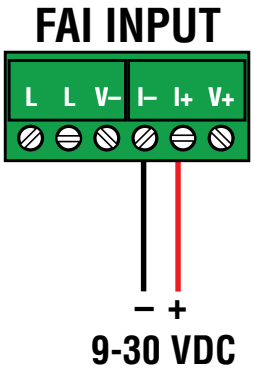
FAI Deactivates when the NC contact CLOSES.

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.*



Activation with a Voltage Input

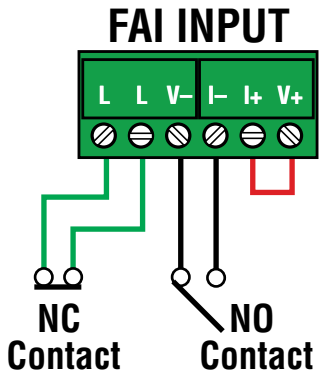
FAI Activates when voltage is APPLIED in the correct polarity. FAI Deactivates when voltage is REMOVED or the polarity of the voltage is REVERSED. Polarity shown in the ACTIVATED state



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

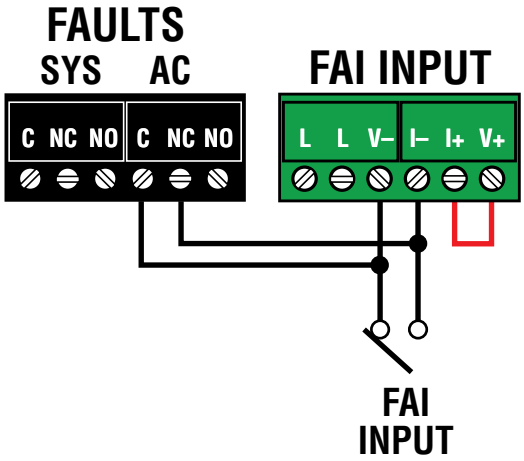


FAI Activates when the NO contact CLOSES. FAI Deactivates when the NO contact OPENS AND the NC contact momentarily OPENS.

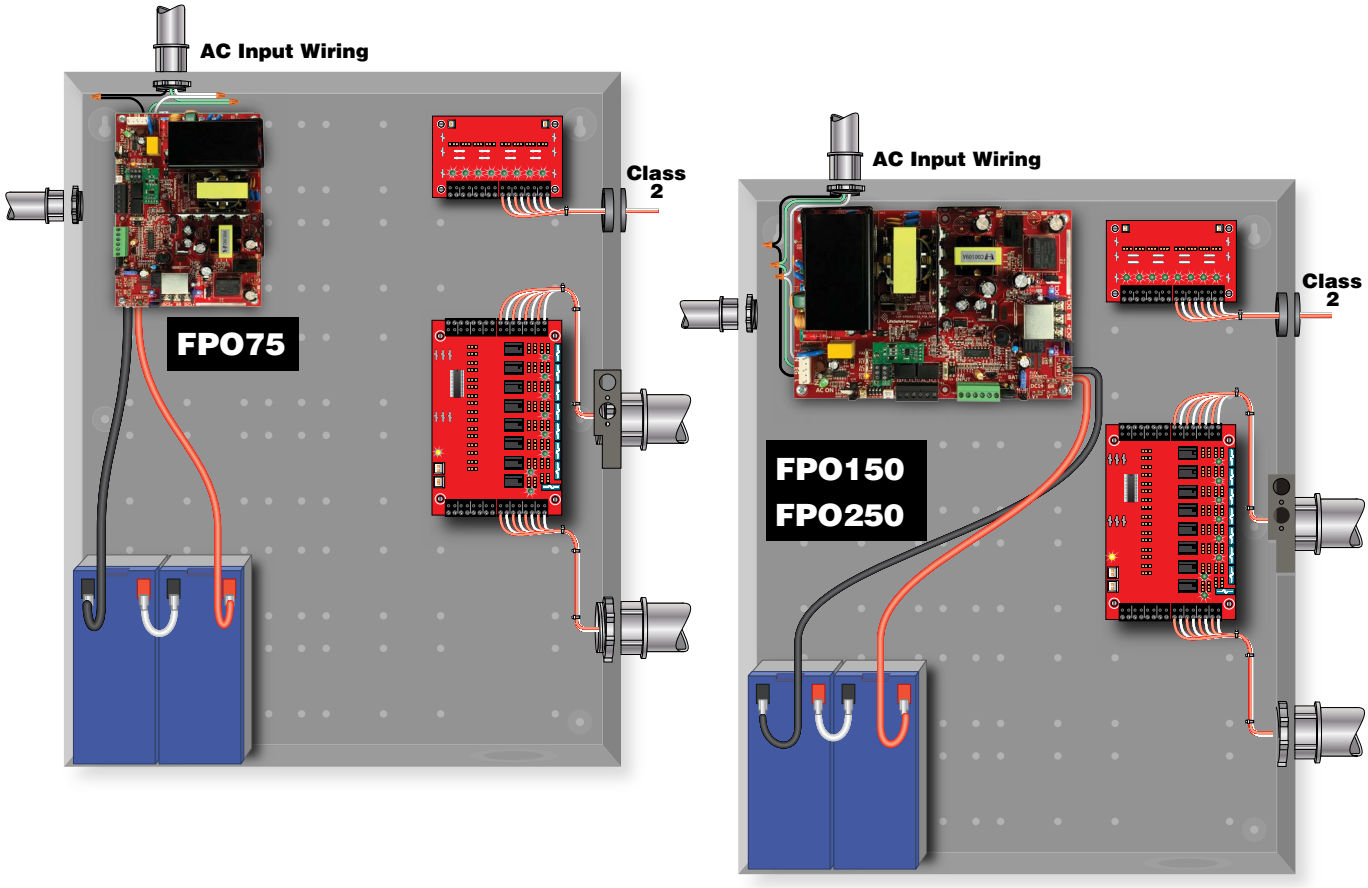
FAI Activation with a Normally Open Relay Contact and FPO AC Fault Lock Override

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

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



1.4 Typical Installation & Wire Routing



The drawing above shows a typical installation.

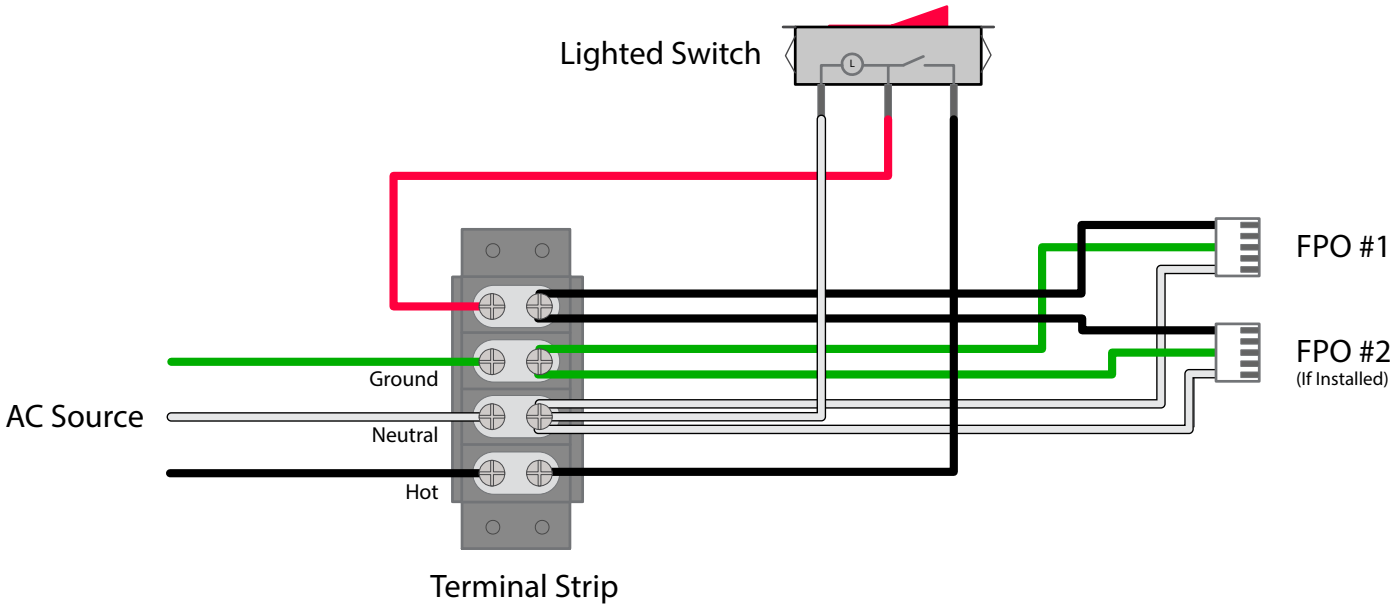
Actual configuration and wire routing will vary based on the components installed in your system.

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. For ULC S527 compliance, installation and all wiring methods shall be in accordance with the Canadian Electrical Code, C22.1, Part I, Section 32.
- 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 AC Terminal and Switch Wiring

Some LSP enclosures contain a lighted AC disconnect switch and a terminal strip for the primary AC connection. The diagram below shows the connections for the switch and AC Input terminal strip. See the instructions for FERRITE-BOXED for CE compliant installations.



1.6 RS485 Address Switch Settings

These switches set the RS485 address when using the optional RS485 module on the FPO power supply. The switches set the address as shown in the table below. See Section 2 and the NetLink manual for more information.

Address	Switch Settings	Address	Switch Settings
0	On | On | On | On	8	Off| On | On | On
1	On | On | On | Off	9	Off | On | On | Off
2	On | On | Off | On	10	Off | On | Off | On
3	On | On | Off | Off	11	Off | On | Off | Off
4	On | Off | On | On	12	Off | Off | On | On
5	On | Off | On | Off	13	Off | Off | On | Off
6	On | Off | Off | On	14	Off | Off | Off | On
7	On | Off | Off | Off	15	Off | Off | Off | Off

1.7 Power-Up and Basic System Verification Checklist

1. Ensure proper configuration of all jumpers and switches.

2. Apply AC power to the FPO power supply.

3. Ensure the “AC ON”, “DC1”, and "DC2" LEDs are lit.

4. Verify DC1 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 no yellow LEDs are lit on the FPO power supply.

7. If used, activate the FAI input and verify that the red “FAI” LED lights and that the DC2 output powers down. Deactivate the FAI input (and reset the input if configured for latching) and verify that the red FAI LED extinguishes and the DC2 output returns to normal.

8. If the battery presence jumper is enabled, remove one lead from the battery – verify that the yellow “SYS FLT” LED lights. Reconnect the battery and the “SYS FLT” LED should extinguish.

9. If the Earth Ground jumper is enabled, connect a wire from the ground stud on the enclosure to the DC1+ terminal – the “GND FLT” and “SYS FLT” LEDs should light. Remove the wire and the “GND FLT” and “SYS FLT” LEDs should extinguish. Repeat for the DC1- terminal.

10. When a standby battery set is used, remove AC power from the FPO power supply. Verify that the “DC1” LED remains lit and that the “AC FLT” LED lights. Reconnect AC power and verify that the “AC FLT” extinguishes.

Section 2 – Using an FPO Power Supply with a NetLink

When an FPO power supply is connected to a NetLink network communication module, the power supply can be monitored and controlled remotely through the NetLink's browser interface. To access the page for an FPO power supply, click on the device in the Netlink Connected Devices section of the home page. This section assumes the installer is familiar with using the NetLink module. See the NetLink manual for more information.

The FPO power supply page (Figure 2.1) contains the same Client ID, Site ID, Time, and Date information as the Home page of the Netlink; below that are five main sections.

2.1 Power Supply Parameters & History

The section at the top left of the screen will show the available parameters of the Power Supply.

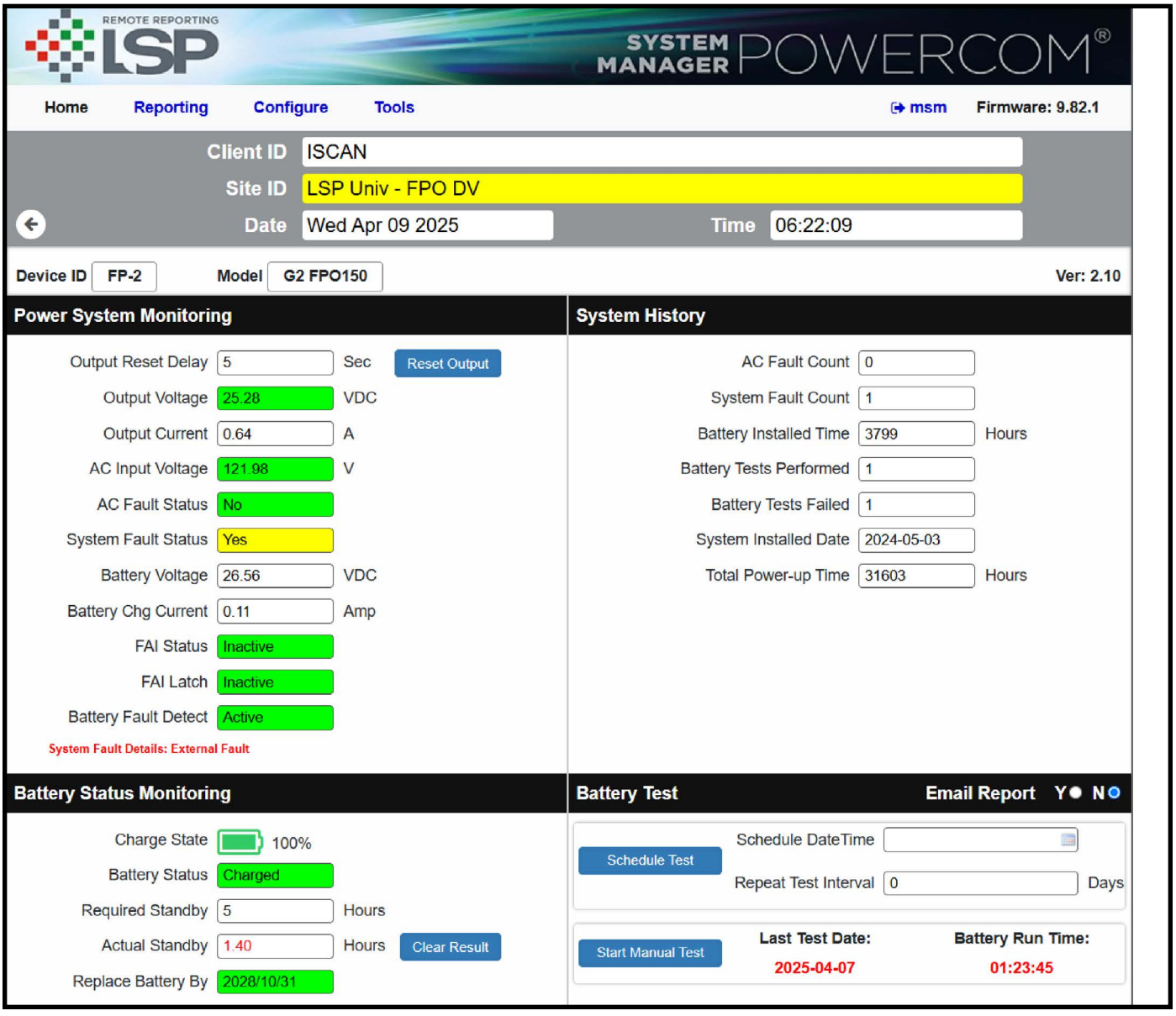


Figure 2.1 - Typical FPO Power Supply Page (top portion)

2.1.1 FPO Monitoring & System History

Any FPO power supply connected to a NetLink will provide the following parameters (Figure 2.1):

Device ID	This is the identifying label for the device. The FP-xx label is given by the Netlink and is not user settable. Also displayed is the model number of the power supply.
Output Voltage	This is the measured system output voltage (in Volts DC) of the supply, as measured directly out of the power supply engine within the power supply board. This voltage is distributed to the outputs of the supply.
Output Current	This field will display the total output current from the power supply.
AC Input Voltage	This field will display the measured AC input voltage.
AC Fault Status	Indicates whether the supply is reporting a low or missing AC voltage. "No" on a green background indicates that no problem is being reported. "Yes" on a yellow background indicates an AC Fault condition.
System Fault Status	Indicates whether the supply is reporting a System Fault condition. "No" on a green background indicates that no problem is being reported. "Yes" on a yellow background indicates a System Fault condition.
Battery Voltage	Indicates the measured battery voltage in Volts DC. This field only indicates the terminal voltage of the battery set and does not necessarily indicate the condition or state of charge of the battery set.
Battery Chg Current	This field indicates the charge current being applyied to the battery set (in Amps DC). This field only represents charge into the battery and does not show battery discharge current.
FAI Status	This field indicates the status of the FAI Input of the supply. "Inactive" on a green background indicates that the FAI input is not activated. "Active" on a red background indicates that the FAI input is activated.
FAI Latch	This field indicates the status of the FAI Latch Input of the supply. If the Latch Input is being used and the FAI Input is active and latched, this field will show "Active" on a red background. If FAI Latch is not being used this field will show "Inactive" on a green background.
Battery Fault Detect	This field indicates whether or not battery presence detection is enabled on the FPO. (See Section 1.2 #16)
System Fault Detail	If a system fault is present, this area will give basic details on the cause of the fault, causes include Earth Ground Fault, Output Short, Output Short Latched, Battery Fault, External Fault, Output Over Load, Output Over Load Latched, Power Supply Fault, Output Voltage Fault. (See Section 2.1.2)
AC Fault Count	This field shows the number of AC Faults detected since the last reset of the fault counter. When new, a supply may contain a number other than zero in this field. The counter should be reset (in the Power Supply Settings section) before being used.
System Fault Count	This field shows the number of System Faults detected since the last reset of the fault counter. When new, a supply may contain a number other than zero in this field. The counter should be reset (in the Power Supply Settings section) before being used
Battery Installed Time	This field displays the battery runtime in hours since the last reset of the battery runtime counter. When new, the battery runtime field may display a value other than zero. This field should be reset from the Power Supply Settings section before use. This Runtime is independent of the Battery End-of-Life / Bat. Replacement Date.
Batt Tests Performed	The total number of automated battery tests performed (See Section 2.2.2)
Battery Tests Failed	The number of failed battery tests that have occurred (See Section 2.2.2)
System Installed Date	This field allows the installer to enter the initial installation date for the power supply as a service record.
Total Power-up Time	This field displays the total power-up time in hours for the supply. This value cannot be reset. It is normal for several hours to show in this field on a new supply, due to burn-in testing at the factory.

2.1.2 FPO System Fault Details

Descriptions of the System Fault Detail messages are below.

Earth Ground Fault	The FPO had detected an Earth Ground Fault. (See Section 1.2 #6)
Output Short	The FPO has detected a short circuit condition on the output.
Output Short Latched	The FPO has detected a short circuit condition that did not recover, causing the FPO to latch off.
Battery Fault	The FPO has detected a fault with the battery, such as missing battery or low battery voltage.
External Fault	The FPO has received a fault signal through the FlexIO connector caused by another module in the system.
Output Over Load	The FPO has detected the output current above the maximum output rating.
Output Over Load Latched	The FPO has detected ther output current above the maximum that did not recover, causing the FPO to latch off.
Power Supply Fault	The FPO has detected an internal fault.
Output Voltage Fault	The FPO has detected a low or high output voltage condition.

2.2 Battery Status

The middle section of the screen shows detailed battery status and parameters. (Figure 2.1) This section will only be enabled if a battery is connected to the power supply (See Section 1.2 #20).

2.2.1 Battery Status Monitoring

This section provides details on the battery's conditiuon and state of charge. See Figure 2.2.

Battery State of Charge

If enabled, a bar graph will display indicating the estimated condition of the battery connected to the supply. The bar graph contains four segments with one end labeled "Full". Note that when a battery is first connected, it can take several minutes for an accurate indication of battery condition. The various possible levels of the Charge State display are as follows:

4 Green Bars	Battery is at 80% to 100% charge
3 Green Bars	Battery is at 60% to 79% charge
2 Green Bars	Battery is at 40% to 59% charge
1 Green Bar	Battery is at 20% to 39% charge
1 Yellow Bar	Battery is at 6% to 19% charge (an email alert will be sent, if enabled)
1 Red Bar	Battery is at 5% or lower charge

When the battery discharges to one yellow bar, an email alert will be sent if the Battery Condition checkbox on the Reporting page of the NetLink is enabled.

Battery Status

The Status field gives the state of the battery. Possible states are "Charging", "Charged", or "Discharging".

Required Standby

The required standby time as set set in the Battery Settings section (See section 2.2.3)

Actual Standby

The measured battery standby time as recorded during the Battery Test (See section 2.2.2)

Replace Battery By

This displays the scheduled battery replacement date, which is calculated based on the current date and the "Rated Battery Life" setting entered on the Configure page. If the battery is within its calculated life, the field will be green. Once the due date has passed, this field will change to blue and an email alert will be sent if enabled on the Reporting page. When a new battery is installed, the timer must be reset. (See Section 2.3)

Clear Result Button

This button will clear the battery standby test results (Figure 2.2).

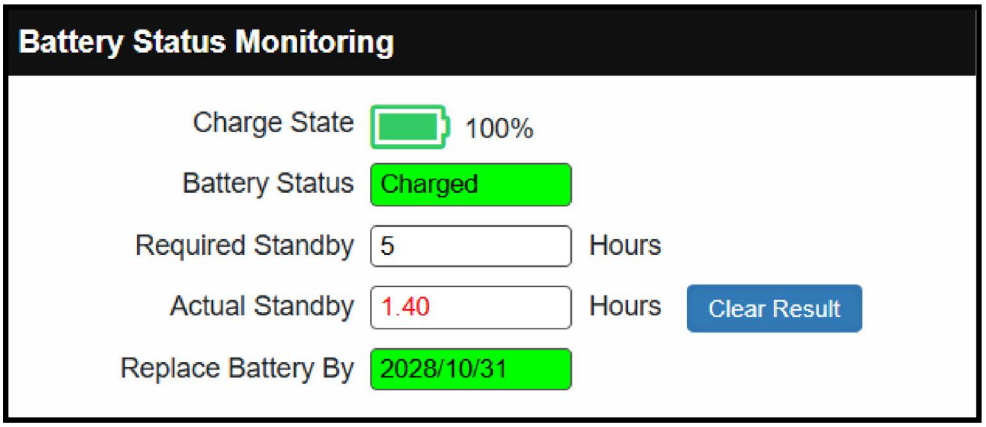


Figure 2.2 - Battery Status Monitoring Section

2.2.2 Battery Test

The Battery Test section allows the user to test the actual runtime of a system with the installed battery set. (Figure 2.3). This test may be run manually or may be scheduled for a one-time or repeating automated test. If email is configured on the Netlink, a report of the results can be emailed.

⚠ ***WARNING: During the Battery Run Time Test, the system battery will be discharged to 85% of the nominal voltage, leaving essentially 0% battery capacity should AC power be interrupted during or immediately after the test. Appropriate measures MUST be taken to ensure the security/safety of the building and its occupants during the Battery Run Time Test.***

To run a test manually

- Ensure a battery set is connected to the power supply. See Section 1.2 #20 for more information.
- Select whether or not you want a report emailed at the end of the test by selecting "Y" or "N" in the "Battery Test" header. Email parameters must be properly set up on the Configure page of the Netlink, or this selection will be unavailable.
- Click the "Start Manual Test" button.
- While the test is in progress, there will be two messages on the page - one indicating "Battery discharging..." in the Battery Test section, and one indicating "Caution Battery test in progress. System powered by battery" in the Power System Monitoring section (See Figure 2.4)
- At the conclusion of the test, the measured battery runtime and last test date will be displayed in the Battery Test section (See Figure 2.3). The results will also be emailed if emailing is enabled.
- If the tested battery standby time is less than the Required Battery Standby entered in the Battery Settings section, an alert will be generated. (See section 2.2.3)

To Schedule a Test

- Ensure a battery set is connected to the power supply. See Section 1.2 #20 for more information.
- Select whether or not you want a report emailed at the end of the test by selecting "Y" or "N" in the "Battery Test" header. Email parameters must be properly set up on the Configure page of the Netlink, or this selection will be unavailable.
- Enter the Year, Month, Day, Hour, Minute, and am/pm for when you want the test to begin.
- Enter the test interval (in days) for repeating the battery test. For example, to run the test yearly, enter 365. Set to 0 for a one-time test.
- Click the "Schedule Test" Button - the Scheduled Start Time will appear.
- At the conclusion of the test, the measured battery runtime and last test date will be displayed in the Battery Test section (See Figure 2.3). The results will also be emailed if enabled.
- If the tested battery standby time is less than the Required Battery Standby entered in the Battery Settings section, an alert will be generated. (See section 2.2.3)

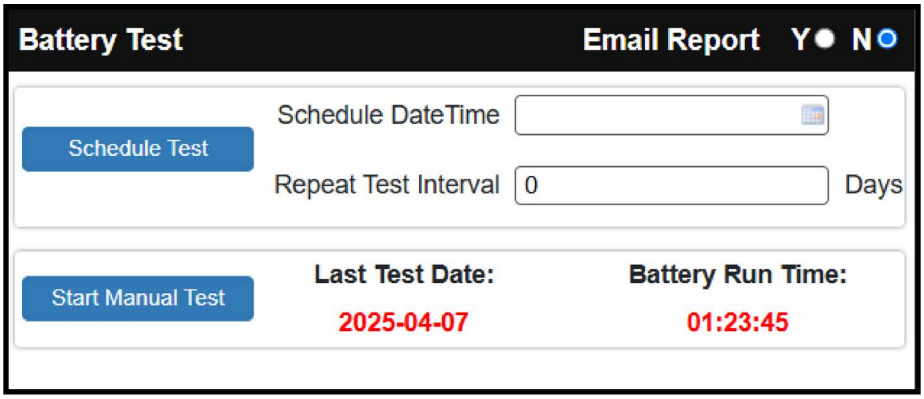


Figure 2.3 - Battery Test Results

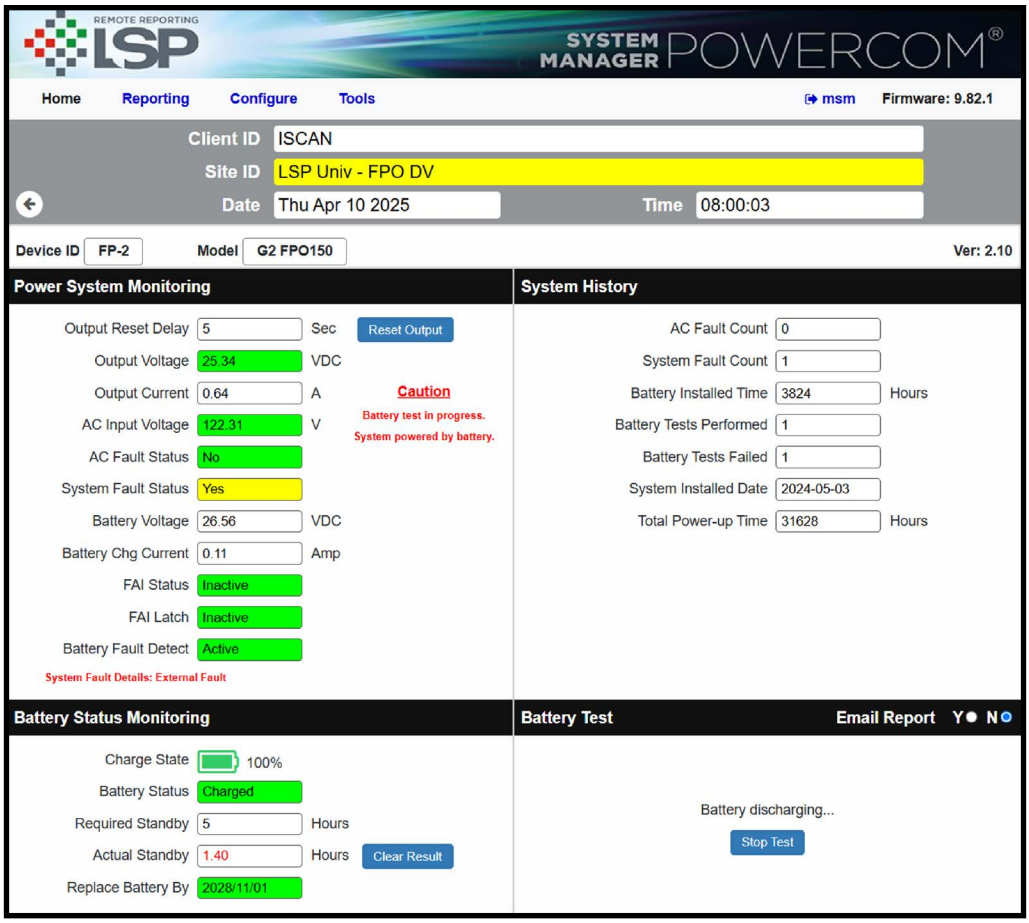


Figure 2.4 - Battery Test in Progress

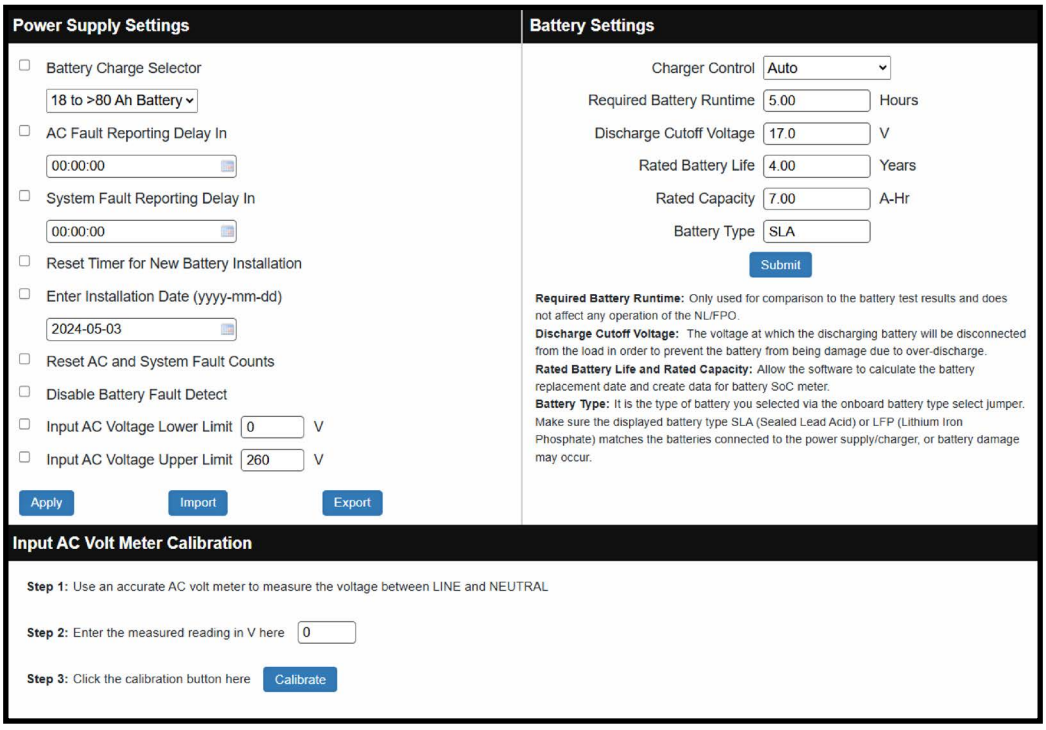


Figure 2.5 - Typical FPO Power Supply Page (bottom portion)

2.2.3 Battery Settings

The Battery Settings block is under the Battery Test block on the power supply page (See Figure 2.5). The available settings are as follows:

Required Battery Runtime	Enter the required standby time for the application. This number is only used for comparison to the measured standby time at the conclusion of a battery test.
Rated Battery Life	Enter the rated battery life or desired replacement period in years. This is used by the Netlink to calculate the Battery End-of-Life alert time. **Note:** ***The current time and date on the NetLink MUST be set BEFORE setting the rated battery life for proper Battery End-of-Life date calculation.***
Rated Capacity	Enter the battery capacity of the battery connected to the power supply. This rating is used by the Netlink to approximate how much capacity is remaining in the battery.
Battery Type	This field allows the NetLink to adjust the battery test as appropriate for the battery type selected.

⚠ **Note:** After setting the battery information, click the "Submit" button for the changes to take effect.

2.3 Power Supply Settings

The Power Supply Settings section shows the programmable settings available for the power supply.

The following parameters are available:

Battery Charge Selector	Select the proper battery size range for optimal charging rate.
AC Fault Reporting Delay	Select the desired delay for reporting an AC fault in hours, minutes, and seconds. Note that this delay will affect the AC Fault LED and relay as well as email reporting. Check your local codes regarding fault delays.
System Fault Reporting Delay	Select the desired delay for reporting System fault conditions in hours, minutes, and seconds. Note that this delay will affect the Sys Fault LED and relay as well as email reporting. This setting should be used with caution, as intermittent faults may be masked by a fault delay. System Fault delays should typically be kept to 5 seconds or less to prevent critical faults from being masked. Check your local codes regarding fault delays.
Reset Timer for New Battery Installation	Select this option after installing a new battery set in order to reset the battery replacement alert counter. The Netlink uses this counter along with the user-entered "Battery Rated Life" to calculate the next battery replacement date. See section 2.2.1.
Enter Installation Date	Enter the date the system was initially installed. This value is only for the user's information and is not used by the Netlink.
Reset AC and System Fault Counts	Selecting this option will reset the AC and System Fault counters. This is typically done after testing or servicing the system.
Disable Battery Fault Detect	This field disables reporting of battery faults by the NetLink (Note that the FPO will still show a system fault on a missing battery condition).
Input AC Voltage Lower Limit	Programmable lower limit for reporting low AC voltage
Input AC Voltage Upper Limit	Programmable upper limit for reporting low AC voltage
Location	User programmable field to indicate the location of the power supply board when remote from the NetLink via RS485. This helps to identify which enclosure the power supply board is located in for Distributed Power Monitoring (DPM) applications. This field only appears when connected via RS485

After entering the values or selecting the appropriate options, click the "Apply" button at the bottom of the Power Supply Settings area. These settings will take effect immediately without rebooting the Netlink.

2.4 Input AC Voltmeter Calibration

The Input AC Voltmeter Calibration block is located at the bottom of the power supply page. (Figure 2.5) To calibrate the measurement, follow the on-screen instructions.

Section 3 – Troubleshooting and Maintenance

3.1 Troubleshooting Table

Symptom	Possible Problem	Information / Possible Solution
SYS FLT LED lit and SYS FLT relay indicating a trouble condition	Battery Disconnected	• Verify that the battery is connected to the FPO. 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, remove the BAT DET jumper
	Earth Ground Fault	• This fault will be accompanied by the GND FLT LED being lit and will only display if the EARTH GND DET jumper is ON • An impedance exists between earth ground and a voltage output or DC Common connection on the FPO power supply, an accessory board, or any connected piece of equipment. Isolate the connection with the impedance by removing wires in groups or one at a time until the fault clears. Note that most accessory board terminal strips are removable • Ensure that no other equipment in the system is set to detect earth ground faults (including other FPO power supplies in the system). Enabling earth ground detection on more than one piece of equipment in a system will cause a conflict and may cause one or all pieces of equipment in the system to display an earth ground fault
	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 DC1 terminals. The voltage should be 12.50V for the 12V setting or 25.00V for the 24V setting (±10%). Contact LifeSafety Power if the voltage is outside of this range
	Blown Fuse	• Check the Battery fuse. • Verify the integrity of the output wiring and powered devices before replacing any ruptured fuses. Replace fuses only with the same type and rating
	Accessory Board Fault	• Verify that no fault conditions are present on any accessory board or other FPO power supplies in the enclosure. The FlexIO connectors may be disconnected to isolate the source of an accessory fault.
	Internal Problem	• Contact Lifesafety Power
AC FLT LED lit and AC FLT relay indicating a trouble condition	Primary AC Voltage Low or Missing	• Verify that the AC input voltage is 120V or 230V (±15%) with a meter. For safety, the green AC ON LED indicates the presence of any AC voltage on the input, but not the integrity of the voltage
	120/230 Jumper (JP1) Set Incorrectly	• Verify that JP1 is set correctly– intact for 120V input, cut for 230V input • Note: Models ending in "-E" are factory set for 230VAC operation and cannot be changed to 110VAC operation
	Internal problem	• Contact LifeSafety Power
No DC1 Output DC1 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 • If the FPO detects ten output faults within one minute, the supply will shut down, transfer to battery backup (if available), and generate a fault condition. Cycle AC power to reset the supply after determining the cause of the output fault condition

Section 3 – Troubleshooting and Maintenance

3.1 Troubleshooting Table (continued)

Symptom	Possible Problem	Information / Possible Solution
No DC2 Output DC2 LED Extinguished	Output disabled due to FAI	• The DC2 output is disabled when the FAI input is active. Verify the red FAI LED is extinguished.
	Power Supply Shut Down	• Verify DC output voltage, AC power, and backup battery voltage (if used) • Check output load integrity and current draw • If the FPO detects ten output faults within one minute, the supply will shut down, transfer to battery backup (if available), and generate a fault condition. Cycle AC power to reset the supply after determining the cause of the output fault condition
REV BAT LED lit	Battery connection reversed	• Check the polarity of the battery connections at both ends of the battery harness • This LED will be accompanied by a blown Battery Fuse
AC ON LED Extinguished	Missing or extremely low AC Input	• Verify that the AC input voltage is 120V or 230V (±15%) with a meter
	Blown AC Fuse	• The FPO power supply's AC input fuse is non-replaceable, as rupture of this fuse indicates a major malfunction within the FPO supply. Contact Life-Safety Power
Missing Battery Not Detected	Improper setting of BAT DETECT Jumper	• The BAT DETECT jumper must be ON to detect a missing battery
Earth Ground Fault Not Detected	Improper Setting of EARTH GND DETECT jumper	• The EARTH GND DETECT jumper must be ON to detect an earth ground fault
	Another device in the system has earth ground detection enabled	• Only one device in the system can have earth ground fault detection enabled or conflicts will occur

3.2 Maintenance Instructions

The following are the maintenance instructions for the FPO 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 4 – Specifications

4.1 Electrical Specifications

FPO Power Supplies

Specifications		FPO75	FPO150	FPO250
AC Input	Voltage	120VAC or 230VAC +10%/-15% at 50-60Hz	120VAC or 230VAC +10%/-15% at 50-60Hz	120VAC or 230VAC +10%/-15% at 50-60Hz
	Current	1.6A	2.5A	3.2A
Standby	Current	100mA	100mA	100mA
DC Output at 12V Setting	Voltage	11.3 -12.0V	11.3 -12.0V	11.3 -12.0V
	Max Current	6A*	12A	20A* (18A* if charging battery)
	* For UL2610 applications, FPO250 output current at 12V is derated to 12A max For UL2610 applications, FPO75 is derated to 4.5A at 12V output			
	Ripple	240mV	240mV	240mV
	Regulation	±2%	±2%	±2%
	Efficiency	80% (120VAC 60Hz In, Full Load, No Batt)	86% (120VAC 60Hz In, Full Load, No Batt)	88% (120VAC 60Hz In, Full Load, No Batt)
DC Output at 24V Setting	Voltage	23.5-24.0	23.5-24.0	23.5-24.0
	Max Current	3A	6A	10A**
	** For UL2610 applications, FPO250 output current at 24V is derated to 8A max			
	Ripple	120mV	120mV	120mV
	Regulation	±2%	±2%	±2%
	Efficiency	80% (120VAC 60Hz In, Full Load, No Batt)	86% (120VAC 60Hz In, Full Load, No Batt)	88% (120VAC 60Hz In, Full Load, No Batt)
Battery	Type	Lead Acid, Gel Cell, or Lithium Iron Phosphate	Lead Acid, Gel Cell, or Lithium Iron Phosphate	Lead Acid, Gel Cell, or Lithium Iron Phosphate
	Charge Current	1A (±10%) Maximum (Adjustable via PowerCom Software)	2A (±10%) Maximum (Adjustable via PowerCom Software)	2A (±10%) Maximum (Adjustable via PowerCom Software)
Fuse Ratings	Battery	ATM 7.5A	ATM 15A	ATM 30A
BTU Output	BTU	33	66	109
Fault Setpoints	Low AC	95V (±6%)	95V (±6%)	95V (±6%)
	Earth GND	2000 Ohms	2000 Ohms	2000 Ohms
	Output Voltage	±10% of nominal	±10% of Nominal	±10% of Nominal
	Batt Voltage	±10% of nominal	±10% of Nominal	±10% of Nominal
	Batt Presence	6–15V (12V Setting), 11–29V (24V Setting)	6–15V (12V Setting), 11–29V (24V Setting)	6–15V (12V Setting), 11–29V (24V Setting)
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 4 – Specifications

4.2 Temperature Specifications

All 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)

4.3 Mechanical Specifications

Visit www.lifesafetypower.com for AutoCAD files.

Power Supply Board - FP075

Size	6.00" L x 4.00" W x 2.00" H (152mm L x 102mm W x 51mm H)
Approximate Weight	0.75 lbs. (0.340 kg)

Power Supply Board - FP0150, FP0250

Size	8.25" L x 5.50" W x 2.5" H (210mm L x 140mm W x 64mm H)
Approximate Weight	1.38 lbs. (0a.626 kg)

Enclosure E1, E1x

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 E2, E2x

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 E5, E5x

Size	8.63" H x 11" W x 3" D (286mm H x 219mm W x 76mm D)
Approximate Weight (base cabinet)	4 lbs. (2.0 kg) empty

Enclosure E4, E4x

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 E6x

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 E8x

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 4 – Specifications

4.4 Replacement Parts

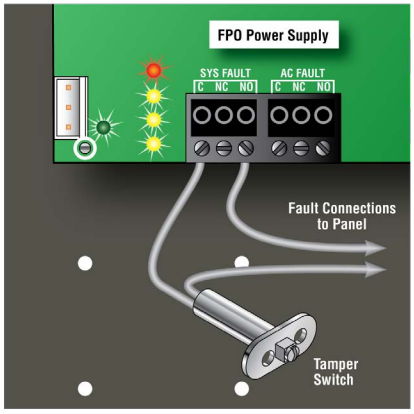
Board Kits	Description
FPO250	FPO250 replacement board
FPO150	FPO150 replacement board
FPO75	FPO75 replacement board
B100	DC-DC Convertor (12VDC or adjustable 5 to 18VDC) replacement board
D8	Simple distribution replacement board
D8P	Simple distribution (Class 2) replacement board
F8	FAI controlled distribution replacement board
F8P	FAI controlled distribution (Class 2) replacement board
C4	Four zone power control replacement board
C4P	Four zone power control (Class 2) replacement board
C8	Eight zone power control replacement board
C8P	Eight zone power control (Class 2) replacement board
M8	Eight zone managed power control replacement board
M8P	Eight zone managed power control (Class 2) replacement board
NL4	NetLink network communication board (used in FPO systems)

Hardware	Description
AC Cable	AC Input Cable for FPO Power Supply
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
Tamper Switch	Tamper Switch for 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 FPO supply as shown in the illustration.

Any UL2610 installation must use the tamper switch to indicate the opening or removal of the front door of the enclosure.



Appendix 2 – User Certificate

Below is a certificate required for UL2610 installations, to be cut out, framed and hung adjacent to the FlexPower Power Supply system after installation. It contains the required battery information, as specified in UL2610.

LifeSafetyPower®

Specifications for the following model numbers:

FPO150 / FPO250

Maximum Charging Current:	2A
Maximum Battery Capacity:	80AH
Battery Type:	Sealed Lead Acid or Gel Cell

Specifications for the following model numbers:

FPO75

Maximum Charging Current:	1A
Maximum Battery Capacity:	40AH
Battery Type:	Sealed Lead Acid or Gel Cell

Appendix 3 – Agency Compliance Requirements

General - All Applications:

1. The power supply must be installed within the protected area.

2. The LifeSafety Model EB-80 must be used to house the required battery set when capacites of 40 to 80Ah are required. The EB-80 shall be mounted within 6ft of the power supply and the wiring enclosed in conduit.

3. Connections to the SYS FLT, AC FLT, and FAI inputs shall be completed within the same room, not exceeding a length of 3m.

4. Do not connect equipment to an AC power source that is controlled by a switch.

5. Trouble contacts shall be monitored by a listed alarm system.

The following sections cover specific requirements based on application:

UL2610, Proprietary Burglar Alarm Applications

1. The LifeSafety Model TS-20 tamper switch must be employed to monitor the power supply and EB-80 enclosures.

2. To achieve four hours of standby at full load current, 80Ah min. battery capacity is required for the FPO150 or FPO250. To achieve four hours of standby at full load current, 40Ah min. battery capacity is required for the FPO75.

S319, Access Control Applications

The LifeSafety Model TS-20 tamper switch must be employed to monitor the power supply and EB-80 enclosures.

For UL Compliance

Any locking device shall be configured for fail safe operation upon occurrence of an alarm as shown in Activation with a Normally Closed Relay Contact in Sec. 1.3, FAI Input Usage.

For CE Compliance:

For CE Compliance of an FPO150 or FPO250 power supply set for 230VAC, model number FERRITE-BOXED includes both the necessary ferrites and inductor to be CE compliant. The inductor is installed in series to the AC input's hot wire while the ferrite must be installed over the AC input wiring and over any wiring on the DC1 or DC2 screw terminals. These components will improve the power supplies radiated emissions to meet CE requirements. FPO75 models do not require these components for CE compliance. LifeSafety Power FPO power supplies which are preset for 230VAC include FERRITE-BOXED in the accessory bag. FERRITE-BOXED is also available separately for purchase and includes two ferrites and one inductor. Applications not requiring CE compliance may omit installation of the ferrites and inductor.

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