POWERSTRIKE SERIES

Remote Power Supplies/ Battery Chargers
LS10227-005GE-E

Instruction Manual
LS10227-005GE-E
ECN: 00051463
Rev F|05-Dec-2024

FIRE ALARM & EMERGENCY COMMUNICATION SYSTEM LIMITATIONS

While a life safety system may lower insurance rates, it is not a substitute for life and property insurance!

An automatic fire alarm system—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control panel (FACP) with remote notification capability—can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

An emergency communication system—typically made up of an automatic fire alarm system (as described above) and a life safety communication system that may include an autonomous control unit (ACU), local operating console (LOC), voice communication, and other various interoperable communication methods—can broadcast a mass notification message. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire or life safety event. The Manufacturer recommends that smoke and/ or heat detectors be located throughout a protected premises following the recommendations of the current edition of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. This document can be found at http:/ / www.systemsensor.com/ appguides/ . A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire. Particles of combustion or “smoke” from a developing fire may not reach the sensing chambers of smoke detectors because:

• Barriers such as closed or partially closed doors, walls, chimneys, even wet or humid areas may inhibit particle or smoke flow.

• Smoke particles may become “cold,” stratify, and not reach the ceiling or upper walls where detectors are located.

• Smoke particles may be blown away from detectors by air outlets, such as air conditioning vents.

• Smoke particles may be drawn into air returns before reaching the detector.

The amount of “smoke” present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm. Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectronic sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

Heat detectors do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-ofrise feature of each detector should be tested at least once per year by a qualified fire protection specialist. Heat detectors are designed to protect property, not life.

IMPORTANT! Smoke detectors must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/ or power. If detectors are not so located, a developing fire may damage the alarm system, compromising its ability to report a fire.

Audible warning devices such as bells, horns, strobes, speakers and displays may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol, or medication. Please note that:

• An emergency communication system may take priority over a fire alarm system in the event of a life safety emergency.

• Voice messaging systems must be designed to meet intelligibility requirements as defined by NFPA, local codes, and Authorities Having Jurisdiction (AHJ).

• Language and instructional requirements must be clearly disseminated on any local displays.

• Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.

• Studies have shown that certain people, even when they hear a fire alarm signal, do not respond to or comprehend the meaning of the signal. Audible devices, such as horns and bells, can have different tonal patterns and frequencies. It is the property owner's responsibility to conduct fire drills and other training exercises to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.

• In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A life safety system will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

Equipment used in the system may not be technically compatible with the control panel. It is essential to use only equipment listed for service with your control panel.

Alarm Signaling Communications:

• **IP connections** rely on available bandwidth, which could be limited if the network is shared by multiple users or if ISP policies impose restrictions on the amount of data transmitted. Service packages must be carefully chosen to ensure that alarm signals will always have available bandwidth. Outages by the ISP for maintenance and upgrades may also inhibit alarm signals. For added protection, a backup cellular connection is recommended.

• **Cellular connections** rely on a strong signal. Signal strength can be adversely affected by the network coverage of the cellular carrier, objects and structural barriers at the installation location. Utilize a cellular carrier that has reliable network coverage where the alarm system is installed. For added protection, utilize an external antenna to boost the signal.

• **Telephone lines** needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup alarm signaling connections are recommended.

The most common cause of life safety system malfunction is inadequate maintenance. To keep the entire life safety system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of NFPA 72 shall be followed. Environments with large amounts of dust, dirt, or high air velocity require morefrequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled as required by National and/ or local fire codes and should be performed by authorized professional life safety system installers only. Adequate written records of all inspections should be kept.

INSTALLATION PRECAUTIONS

Adherence to the following will aid in problem-free installation with long-term reliability:

WARNING - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. Control unit and associated equipment may be damaged by removing and/ or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until manuals are read and understood.

CAUTION - System Re-acceptance Test after Software Changes:

To ensure proper system operation, this product must be tested in accordance with NFPA 72 after any programming operation or change in site-specific software. Re-acceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring. All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

This system meets NFPA requirements for operation at 0-49º C/ 32-120º F and at a relative humidity 93% ± 2% RH (non-condensing) at 32°C ± 2°C (90°F ± 3°F). However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15-27º C/ 60-80º F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning induced transients. Although no system is completely immune from lightning transients and interference, proper grounding will reduce susceptibility. Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes. Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, or printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Usestatic suppressive packaging to protect electronic assemblies removed from the unit.

Units with a touchscreen display should be cleaned with a dry, clean, lint free/ microfiber cloth. If additional cleaning is required, apply a small amount of Isopropyl alcohol to the cloth and wipe clean. Do not use detergents, solvents, or water for cleaning. Do not spray liquid directly onto the display.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACP operation and reliability depend upon proper installation.

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FCC REQUIREMENTS

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

Canadian Requirements

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada

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SOFTWARE DOWNLOADS

In order to supply the latest features and functionality in fire alarm and life safety technology to our customers, we make frequent upgrades to the embedded software in our products. To ensure that you are installing and programming the latest features, we strongly recommend that you download the most current version of software for each product prior to commissioning any system.

Contact Technical Support with any questions about software and the appropriate version for a specific application.

DOCUMENTATION FEEDBACK

Your feedback helps us keep our documentation up-to-date and accurate. If you have any comments or suggestions about our online Help or printed manuals, you can email us.

Please include the following information:



- Product name and version number (if applicable)
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Send email messages to:

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It is imperative that the installer understand the requirements of the Authority Having Jurisdiction (AHJ) and be familiar with the standards set forth by the following regulatory agencies:

- Underwriters Laboratories Standards
- NFPA 72 National Fire Alarm Code

Before proceeding, the installer should be familiar with the following documents.

NFPA Standards
NFPA 72 National Fire Alarm Code
NFPA 70 National Electrical Code

UL 464 Audible Signaling Appliances
UL 864 Standard for Control Units for Fire Protective Signaling Systems
UL 1638 Visual Signaling Appliances
UL 1971 Signaling Devices for Hearing Impaired
UL 2572 Standard for Mass Notification Systems

CAN/ULC - S524 Standard for Installation of Fire Alarm Systems
CAN/ULC - S527 Standard for Control Units for Fire Alarm Systems

Other:
NEC Article 250 Grounding
NEC Article 300 Wiring Methods
NEC Article 760 Fire Protective Signaling Systems
Applicable Local and State Building Codes
Requirements of the Local Authority Having Jurisdiction (LAHJ)
CSA C22.1 Canadian Electrical Code, Part 1

Other Documents:

Device Compatibility Document branded for the FACP	Document	#15378 (NOTIFIER), #15384 (Fire•Lite), #54399 (HPP), #52612 or #LS10167-004SK-E (Silent Knight), #LS10167-003FH-E (Farenhyt), #52195 or #9000-0427-L8 (Gamewell-FCI)
SLC Wiring Manual branded for the FACP	Document	#51253 or #LS10055-151NF-E (NOTIFIER), #51309 (Fire•Lite), #51932 (HPP), #LS10179-000SK-E (Silent Knight) #LS10179-000FH-E (Farenhyt) #9000-0427-L8 (Gamewell-FCI)
CHG-75 Manual	Document	#51315
CHG-120 Manual	Document	#50641

This product has been certified to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, 10th Edition. Operation of this product with products not tested for UL 864, 9th/10th Edition has not been evaluated. Such operation requires the approval of the local Authority Having Jurisdiction (AHJ).

SECTION 1: SYSTEM OVERVIEW

The PowerStrike Series features a 6 amp and a 10 amp remote power supply with battery charger. Both models provide ADA compatible strobe synchronization and a filtered 24 VDC output that can be configured to drive five (6 amp model) or seven (10 amp model) Class B NACs (Notification Appliance Circuits). NAC circuits can be configured for Class A wiring with the optional ZNAC-PS Class A converter module. NAC output circuits may be configured as 24 VDC resettable or non-resettable power outputs, or Class D door holder outputs. The input circuits, which control the power supply operation, are triggered by the reverse polarity of a NAC or by a 12 VDC or 24 VDC power source. The power supplies are compatible with 12 VDC and 24 VDC control panels.

A domestic black cabinet offering is available for the 6 amp and 10 amp units.

An export 6 amp and 10 amp unit are available for connection to 240 VAC. Unless otherwise specified, the information in this manual applies to both the 120 VAC and the 240 VAC models.

1.1 GENERAL

These power supplies can be used as remotely mounted power supplies and battery chargers to power non-coded or coded NACs. The Main FACP (Fire Alarm Control Panel) NAC(s) is connected to the remote power supply input circuit(s). When the command input circuit activates due to reverse polarity of the NAC from the FACP, the power supply will activate its Notification Appliance Circuits.

During the inactive or non-alarm state, the power supply supervises its NAC field wiring for short and open conditions. In Default Mode, AC fail, battery, charger and ground fault troubles will also be monitored by the power supply and will activate the AC Fail, General Trouble, and Ground Fault relay, respectively. In Retrofit Mode, AC fail, battery, charger, and ground fault troubles will activate the General Trouble relay and either the Input#1 (If Input#1 is configured as Non-Dedicated) or Input#2 (If Input#1 is configured as Dedicated Input). The retrofit mode also allows to further customize the AC fail and ground fault trouble indication, to be reported only at the AC fail and Ground fault relay (for Canadian applications) using S1 Global DIP Switch 8. In both default and retrofit modes, if a NAC fault is detected, the input end- of-line relay will open to indicate the fault to the main panel. However, in alarm state all input end-of-line relays are closed to allow input signal daisy-chaining. If an alarm condition occurs and the NAC is activated, the supervision is disabled and the Notification Appliance Circuit is no longer supervised (except for power-limited conditions).

1.2 FEATURES

- Operates in Default Mode (UL 864 10th Edition compliant) or Retrofit Mode (for use in existing, legacy installations)
- Self-contained in a lockable cabinet
- 24 VDC remote power supply
- Outputs are completely power-limited (Class 2)
- Three optically-isolated input/ command circuits, compatible with 12 VDC and 24 VDC control panel NACs
- Five (6 amp power supply) or seven (10 amp power supply) output circuits:
    - Fully filtered power
    - Five or seven 24 VDC Class B NACs
    - Optional ZNAC-PS Class A converter module for conversion to Class A NACs
    - Alternatively, all output circuits may be configured as 24 VDC special application power outputs or Class D door holder power outputs
    - Output circuits may be configured as resettable or non-resettable
- Individual NAC Power (red) and Trouble (yellow) LEDs for each output
- Maximum current available:
    - 6 amp power supply: TB8-TB9 – 1A Regulated, 3A special applications; TB10-TB12 – 0.3A Regulated, 3A special applications
    - 10 amp power supply: TB8-TB11 – 1.5A Regulated, 3A special applications; TB12-TB14 – 0.3A Regulated, 3A special applications
- Maximum total current available (alarm and standby):
    - 6 amps for 6.0 amp power supply alarm; 3.0 amps standby
    - 10 amps for 10.0 amp power supply alarm; 3.0 amps standby
- Integral supervised battery charger for lead acid batteries only
- Capable of charging 7.0 AH - 33.0 AH (Amp Hour) batteries (cabinet fits 7 or 18 AH batteries)
- Fully supervised power supply, battery and NACs
- Selectable Strobe Synchronization for NACs (System Sensor, Gentex, Wheelock, and Amseco)

• Coded signal synchronization
• Removable terminal blocks for field wiring capable of accepting 12 - 18 AWG wire
• Selectable Ground Fault detection by switch SW1
• LED trouble diagnostics and history
• Power supply trouble, AC Loss, and Ground Fault Form-C relay contacts (fail-safe)
• Optional delay of AC loss reporting for 0, 2, 12, or 30 hours
• Mounting location for optional addressable module
• Up to four power supplies can be cascaded

1.3 SPECIFICATIONS

Refer to Figure 1-1: 10 Amp Power Supply Board Layout for terminal locations.

NOTE: The 6 amp power supply uses the same PCB layout as the 10 amp power supply, however some terminals will be depopulated, leaving the 6 amp power supply with five output circuits and two input circuits.

Primary AC Power - TB4

• 6 amp power supply: 120 VAC, 50/60 Hz, 5.0 amps maximum
• 10 amp power supply: 120 VAC, 50/60 Hz, 6.2 amps maximum
• 6 amp power supply, Export variant: 240 VAC, 50/60 Hz, 2.7 amps maximum
• 10 amp power supply, Export variant: 240 VAC, 50/60 Hz, 3.5 amps maximum
• Wire size: #12-14 AWG wire with 600V insulation

Command Input Circuits - TB5, TB6, TB7

• Trigger Input Voltage: 9 - 32 VDC
• Input Current Draw in Alarm Polarity: 14.0 maximum per input

Output Circuits - TB8-TB14

• Supervised and power-limited
• Voltage Rating 24 VDC filtered, 19.72 – 26.40 VDC range;
• Special Application Selectable Strobe Synchronization for NACs: 19.2 – 26.4 VDC measured range
• Current:
    • 6 amp power supply: TB8-TB9 – 1A Regulated, 3A special applications; TB10-TB12 – 0.3A Regulated, 3A special applications (Regulated power is for industrial horn, strobes, and chimes not included in the Device Compatibility Document. Special application power is for NAC and Releasing devices included in Device Compatibility Document, aux power, and door holders.)
    • 10 amp power supply: TB8-TB11 – 1.5A Regulated, 3A special applications; TB12-TB14 – 0.3A Regulated, 3A special applications (Regulated power is for industrial horn, strobes, and chimes not included in the Device Compatibility Document. Special application power is for NAC and Releasing devices included in Device Compatibility Document, aux power, and door holders.)
    • Maximum total alarm current for all output:
        - 6 amp power supply: 6.0 amps
        - 10 amp power supply: 10.0 amps
• Output Circuit Types:
    • Class B NACs (require 2kΩ - 27kΩ End-of-Line Resistors) and/or Class A NACs using the optional ZNAC-PS Class A converter module. Use Listed ELRs supplied by the FACP or compatible equipment manufacturer.
    • Resettable or non-resettable outputs for 24 VDC power outputs or Class D door holder (max ripple voltage: 780mVRMS)
• Refer to the Device Compatibility Document for the brand of FACP for listed compatible devices.
• For wiring requirements, refer to " Wire Requirements" on page 45
• Special application power is for the NAC and door holder devices included in the Device Compatibility Document.
• The output voltage range of the special applications aux power is mentioned in the Device Compatibility Document.
• Special applications power can be used to power releasing devices documented in the Device Compatibility Document when used in conjunction with an addressable releasing module compatible with the control unit.

Trouble, AC Loss, and Ground Fault Relay Contact Rating - TB1-TB3

- Fail-safe Form-C relay (normally energized, transfers with loss of power) for AC Loss and Trouble
- 4.0 amps @30 VDC resistive

Secondary Power (battery) Charging Circuit - TB15

- Supervised, non-power-limited
- Supports lead acid type batteries only
- Maximum Nominal Charge Current: 1.5 A
- Maximum Battery Capacity: 33.0 AH (with onboard battery charger)
- Minimum Battery Capacity: 7.0 AH

NOTE: The power supply only supports 7AH or 18AH batteries in the cabinet. Other battery capacities up to 33AH will not fit in the cabinet due to physical dimensions and require a separate battery cabinet.

- Float Charge Voltage: 27.6 VDC
- Maximum Peak Charge Current: 2.47A

1.4 OPEN/SHORT/GROUND FAULT TRIP VALUES IN STANDBY

Table 1.1 lists the earth fault resistance detection in standby for each applicable terminal on the FACP.

Table 1.1 Earth Fault Trip Values

Output Circle	Terminal	Trip Resistance (in ohms)
NAC 1-5/ 7	+	9.9K or lower
NAC 1-5/ 7	-	9.2K or lower
ZNAC-PS 1-5/ 7	+	9.9K or lower
ZNAC-PS 1-5/ 7	-	9K or lower

Value of the resistance in between any circuit terminal to Earth, which will cause the Ground Fault detection, depends on the ELR chosen for inputs and output circuits. This resistance will vary from 9.9K down to 0 Ohm.

Table 1.2 lists the open/ short trip values and restoral values in standby for the NAC circuits on the FACP.

Table 1.2 NAC Open/Short Trip Values

Circuit	Fault	Trip Resistance (in ohms)	Restore Value
NAC 1-5/ 7	Short	1.6K or lower	1.7K or higher
NAC 1-5/ 7	Open	55K or higher	33K or lower
ZNAC-PS 1-5/ 7	Short	1.6K or lower	1.7K or higher
ZNAC-PS 1-5/ 7	Open	45K or higher	21K or lower

1.5 SWITCH SW1 - GROUND FAULT DETECTION

The Ground Fault Detection circuit monitors for ground faults. Switch SW1 is located on the lower left section of the power supply circuit board. Sliding SW1 to the left will disable ground fault detection by the power supply. This should only be done if ground faults are being monitored by an FACP connected to the power supply or in a cascading application as shown in 2.8.2 Cascading Multiple Units .

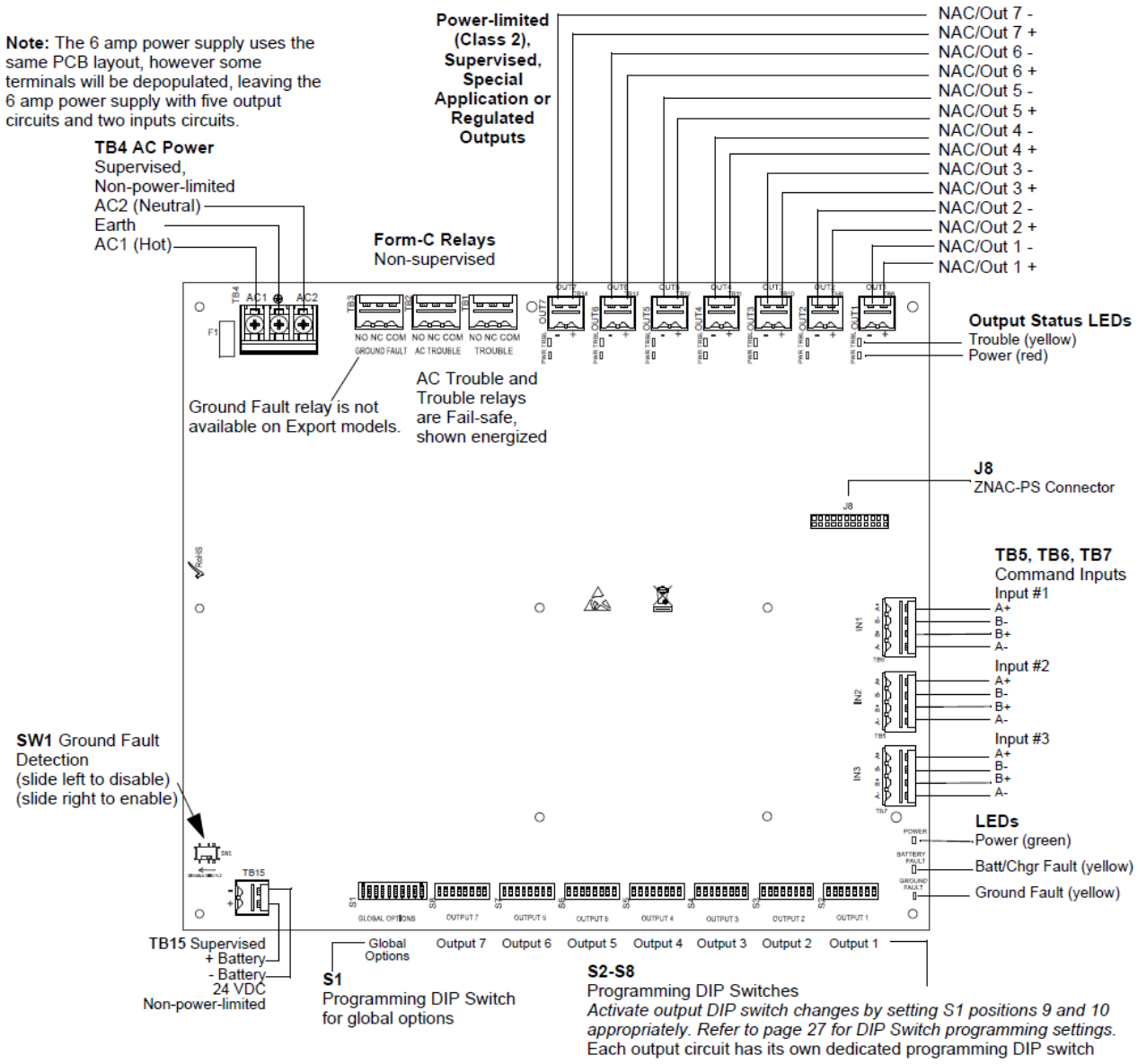


Figure 1-1: 10 Amp Power Supply Board Layout

1.6 MODEL NUMBERS

The PowerStrike Series consists of the following current and legacy model numbers:

Table 1.3 Model Numbers

Ratings	Current Models	Legacy Models		
120 VAC, 50/ 60 Hz, 5.0 amps max.	• HPF-PS6 (red) • HPF-PS6B (black)	• PSE-6 (black) • PSE-6C (black) • PSE-6R (red)	• FL-PS6 (red) • FL-PS6C (red)	• SK-PS6 (red)
120 VAC, 50/ 60 Hz, 6.2 amps max.	• HPF-PS10 (red) • HPF-PS10B (black)	• PSE-10 (black) • PSE-10C (black) • PSE-10R (red)	• FL-PS10 (red) • FL-PS10C (red)	• SK-PS10 (red)

Ratings	Current Models	Legacy Models		
240 VAC, 50/ 60 Hz, 2.7 amps max.	• HPF-PS6E (red)	• PSE-6E (black)		
240 VAC, 50/ 60 Hz, 3.5 amps max.	• HPF-PS10E (red)	• PSE-10E (black)		

1.7 APPLICATIONS

The power supply may be used in a number of different applications. It may be used as a remotely-mounted power supply and battery charger where it can provide up to seven coded or non-coded, synchronized or non-synchronized NACs (Notification Appliance Circuits). Alternatively, any output can be used as a door holder circuit which will provide a steady 24 VDC output until an alarm condition or AC fail condition causes it to drop to 0 VDC following a selectable delay. See the DIP switch settings for "S1 Global Options DIP Switch" on page 21. All outputs can also provide power.

One possible application for the remote power supply utilizes the NAC repeater feature. In this application, one or two NACs are connected from the main FACP to the remote power supply command input circuits. When the command input circuits are activated by the reverse polarity of the NACs, the power supply will activate its corresponding output circuits as programmed by its "Output Circuit Control DIP Switch Settings" on page 26.

During the inactive state, the remote power supply supervises its NAC field wiring for short and open conditions. If a fault is detected, the power supply will enter a trouble condition and illuminate the NAC Trouble LED. When the NACs are activated, the supervision is disabled and the circuits are no longer supervised (except for power-limited conditions). Supervision of other power supply faults such as low battery, battery charger trouble, ground fault and AC loss will continue and may be monitored via their respective trouble relay.

If an application requires that all outputs activate at the same time, only one NAC is required from the FACP. For this application, the NAC is connected to command input circuit #1 and the DIP switch is set for this operation.

1.8 START-UP PROCEDURE

01. Configure the power supply switch as described in "Switch SW1 - Ground Fault Detection" on page 3.
02. Install the power supply as described in "Installation" on page 6.
03. Program the power supply as described in "Programming Options" on page 20.
04. Wire the power supply circuits, referring to the options described in "Trouble Supervision" on page 35 and the application examples in "Application Examples" on page 46.
05. Connect primary power source wiring while observing the following:
    • Ensure the AC mains circuit breaker is off before making any wiring connections between the mains and the power supply.
    • Make certain primary power source is:
        • 120 VAC, 50/ 60 Hz, 5.0 (6 amp model) 6.2 amps (10 amp model) or
        • 240 VAC, 50/ 60 Hz, 2.7 (6 amp model) 3.5 (10 amp model)
    • Run a pair of wires (with ground conductor) from the protected premises main breaker box to TB4 of the power supply main circuit board.
    • Use #12-14 AWG gauge wire with 600V insulation.
06. Apply power to the power supply using the following procedure:
    • Apply AC power by turning on the AC mains circuit breaker connected to the power supply.
    • Connect a properly charged battery to connector TB15 on the power supply main circuit board.
07. Clear trouble history using global DIP switch S1 positions 9 and 10. See "Output Circuit Control DIP Switch Settings" on page 26.

SECTION 2: INSTALLATION

Carefully unpack the system and check for shipping damage. Select a location for the cabinet that is in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the power supply. With the hinge mounting on the left, determine the number of conductors required for the devices to be installed and determine the appropriate knockouts. All wiring must be in accordance with the National and/ or Local codes for fire alarm systems and power supplies.

2.1 BACKBOX MOUNTING

CAUTION: FOR STATIC SENSITIVE COMPONENTS, THE CIRCUIT BOARD CONTAINS STATIC-SENSITIVE COMPONENTS. ALWAYS GROUND YOURSELF WITH A PROPER WRIST STRAP BEFORE HANDLING ANY BOARDS SO THAT STATIC CHARGES ARE REMOVED FROM THE BODY. USE STATIC SUPPRESSIVE PACKAGING TO PROTECT ELECTRONIC ASSEMBLIES.

01. Mark and pre-drill holes for the top two keyhole mounting bolts.
02. Install two upper fasteners in the wall with the screw heads protruding approximately ¼".
03. Using the upper keyholes, mount the backbox over the two screws.
04. Mark the lower two holes, remove the backbox from the wall and drill the mounting holes.
05. Mount the backbox, install the remaining fasteners and tighten all screws.

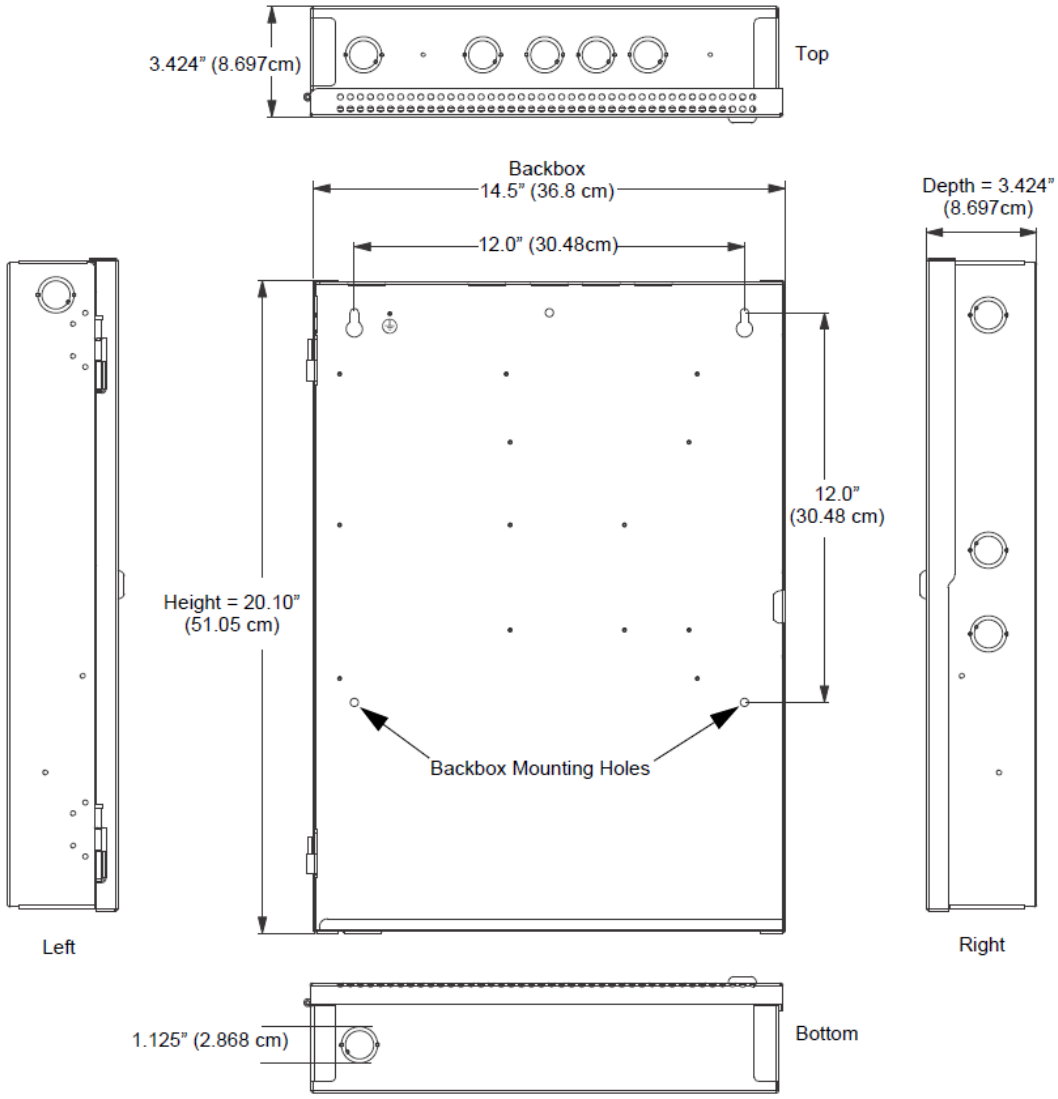


Figure 2-1: Backbox Mounting Dimensions

2.2 NAC CIRCUIT WIRING

2.2.1 CLASS B

The standard configuration for NACs is Class B as shown below. Use Listed ELRs supplied by the FACP or compatible equipment manufacturer.

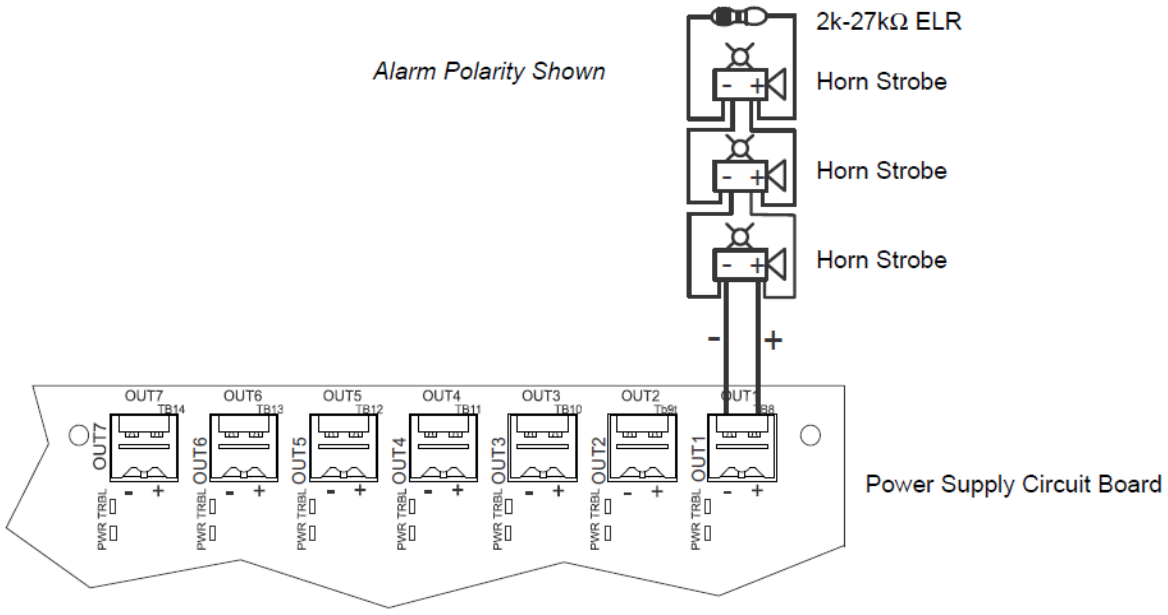


Figure 2-2: NAC Class B

2.2.2 ZNAC-PS CLASS A OPTION MODULE

The ZNAC-PS is an optional Class A conversion module which mounts to connector J8 on the upper right side of the circuit board. This module allows the 6 amp power supply or 10 amp power supply to support Class A Notification Appliance Circuits on all outputs. Class A power supervision is also supported on output circuits #1 and #2 when either of these outputs are configured as resettable or non-resettable auxiliary power. ZNAC-PS SW1 and SW2 settings must match the power supply's output 1 and 2 settings to ensure proper supervision.

Two slide switches are located on the right side of the ZNAC-PS module to properly configure output circuits #1 and #2 for either NAC or Auxiliary Power operation, as described below. Note that there are no slide switches for the remaining outputs as these outputs do not sup- port Class A power supervision.

- For output #1, set the upper switch to either "NAC1" or "AUX1" depending on the intended operation.
- For output #2, set the lower switch to either "NAC2" or "AUX2" depending on the intended operation.

NOTE: Class A supervision and the ZNAC-PS module are not intended for use with door holder operation

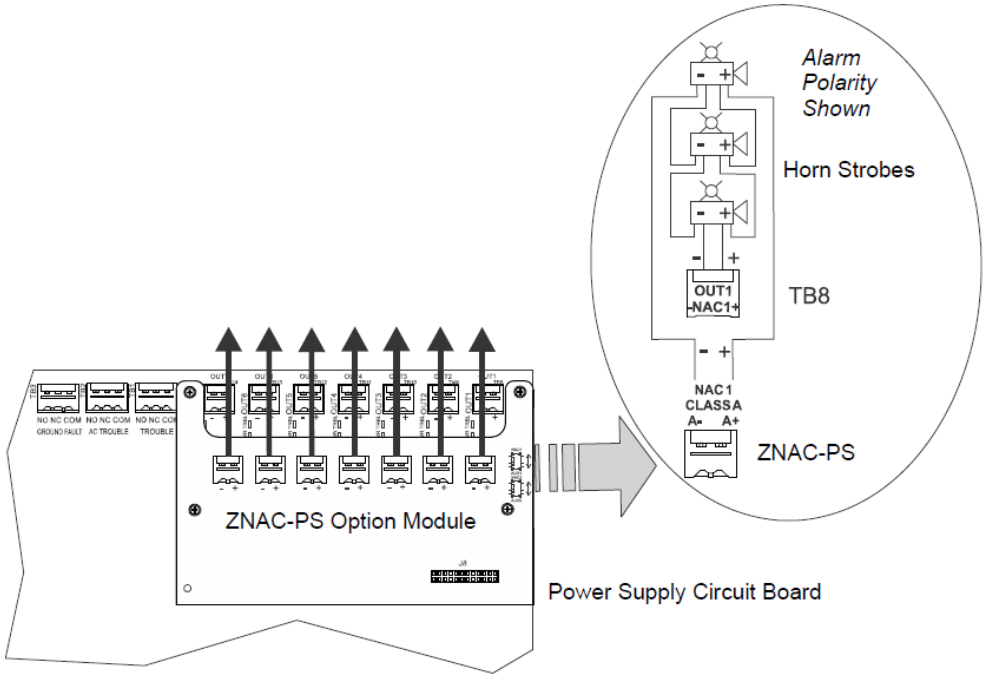


Figure 2-3: Class A NACs using ZNAC-PS Option Module

2.3 ADDRESSABLE MODULE MOUNTING

The power supply has been designed to allow the mounting of an addressable control, relay, or monitor module on the main circuit board inside the power supply cabinet. This allows power to be fed from the power supply's output cicuit directly to the module, if needed, without running the power wires outside the cabinet. Remove mounting screws from the positions indicated below and replace with standoffs (included in hardware kit). Mount the module over the standoffs and secure with screws.

Compatible modules include the System Sensor single and multi-point modules branded for the FACP. Refer to the SLC Wiring Manual for the brand of FACP.

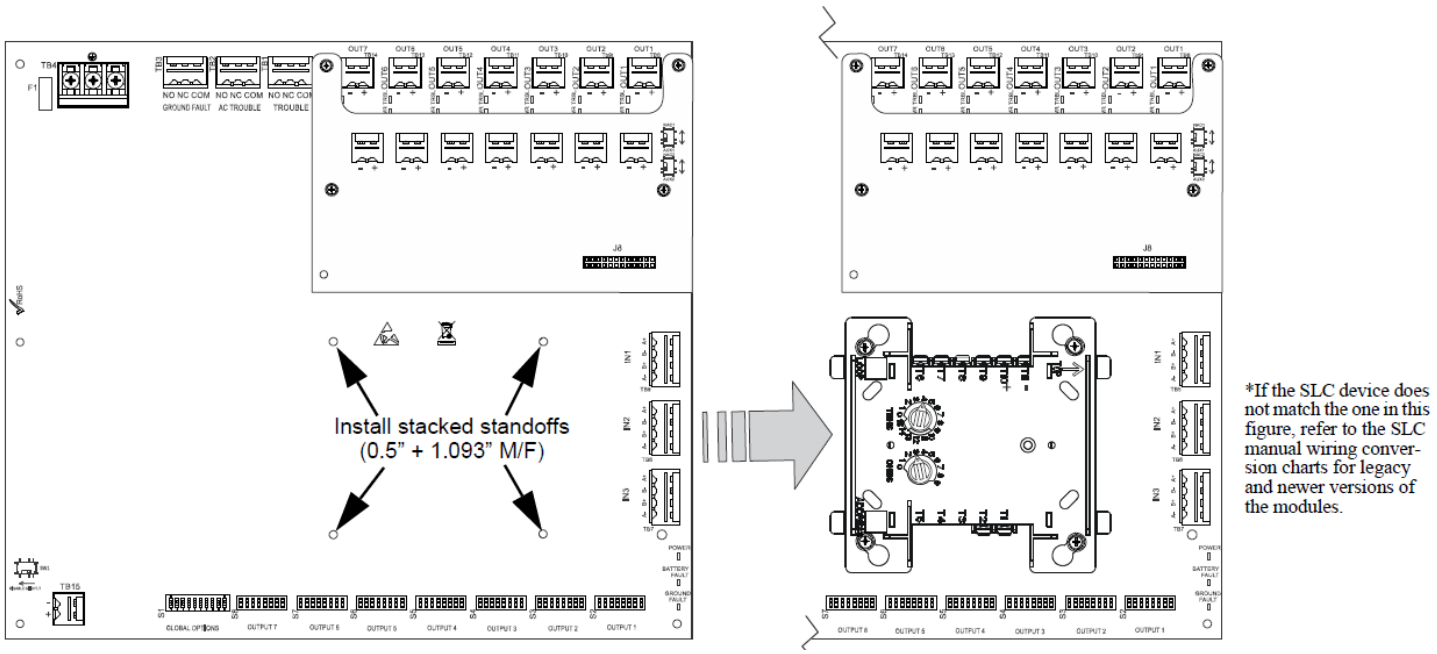
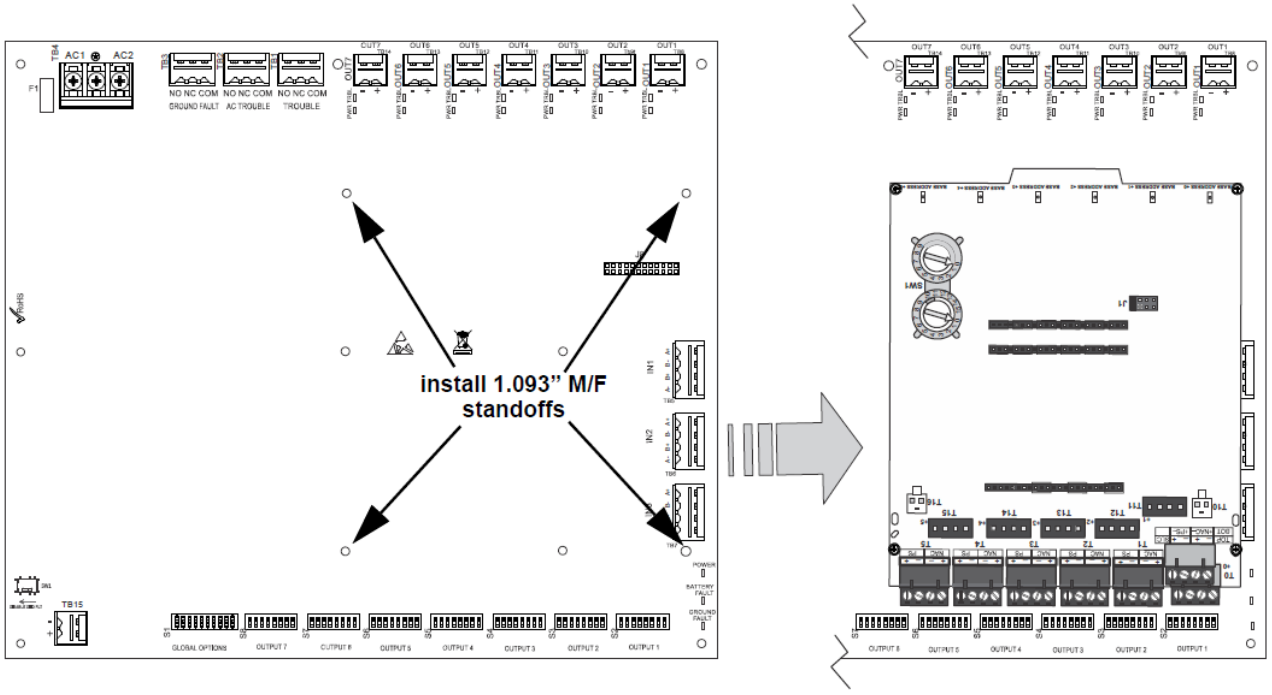


Figure 2-4: Mounting a Single Module in the Power Supply Cabinet



Note: For instructions on mounting a multi-module and a ZNAC-PS module, refer to the *ZNAC-PS Install Sheet #LS10228-000GE-E*.
The multi-module *must* be installed upside down when the ZNAC-PS is installed. If the ZNAC-PS is *not* installed, the multi-module may be mounted in either direction.

Figure 2-5: Mounting a Multi-Module in the Power Supply Cabinet

2.4 NEC POWER-LIMITED (CLASS 2) WIRING REQUIREMENTS

Power-limited (Class 2) and non-power-limited circuit wiring must remain separated in the cabinet. All power-limited (Class 2) circuit wiring must remain at least 0.25” away from any non-power-limited circuit wiring and all power-limited (Class 2) circuit wiring and non-power- limited circuit wiring must enter and exit the cabinet through different conduits. One such example of this is shown below. Any conduit knockouts may be used. For power-limited (Class 2) applications, use of conduit is optional.

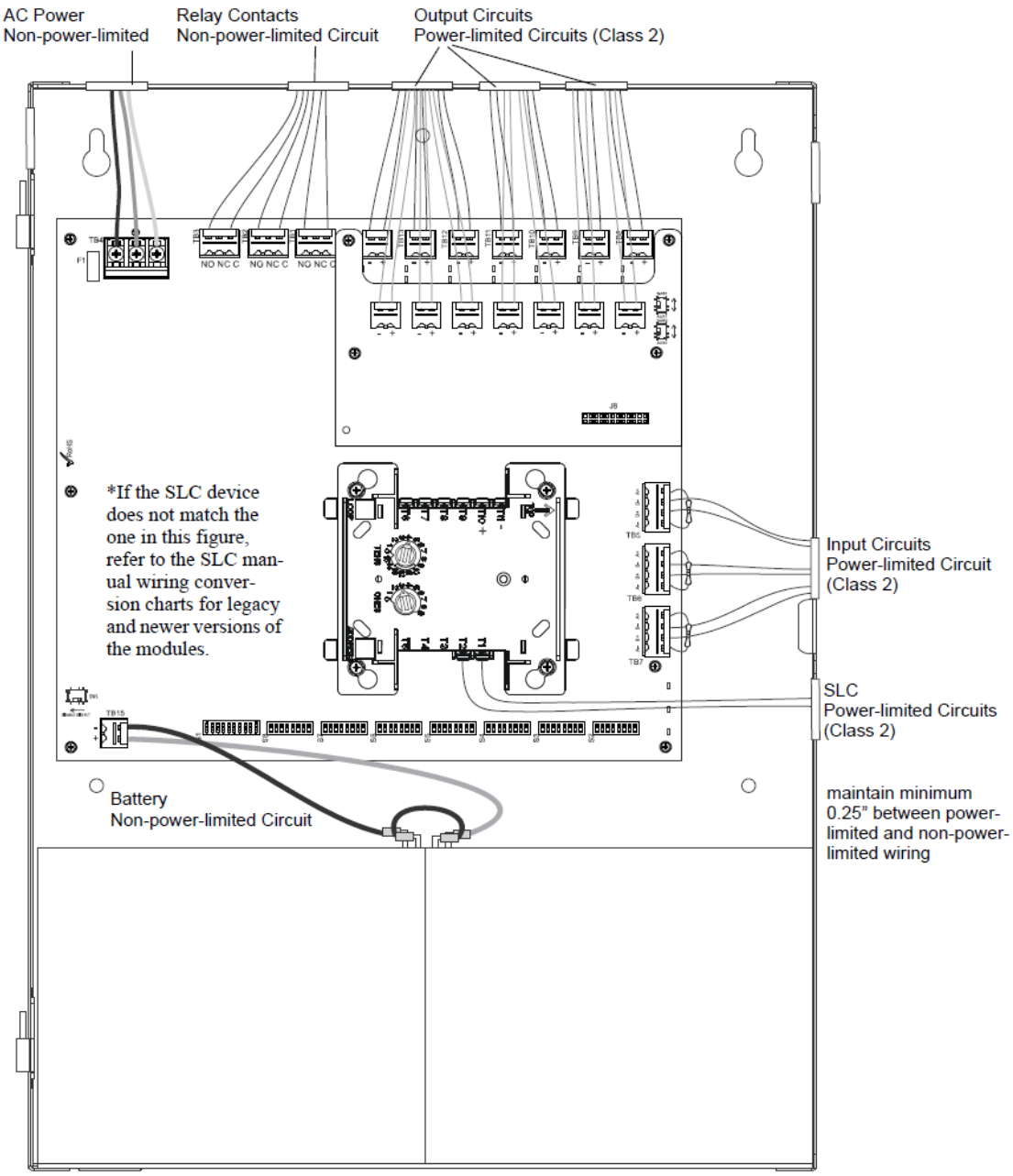


Figure 2-6: Power-limited (Class 2) Wiring Example

2.5 FACP WITH THE POWER SUPPLY IN SLAVE CONFIGURATION

In this application, the power supply is configured as a Slave unit and connected to a master FACP programmed for synchronized output.

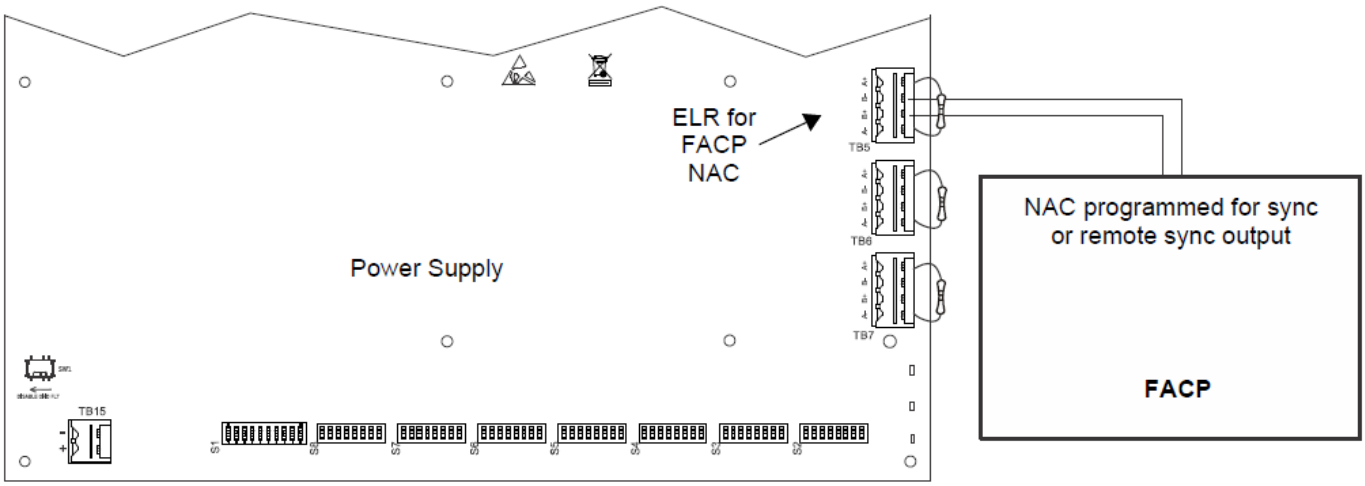


Figure 2-7: Supervised Master/ Slave Connections

The following notes apply to Figure 2-7: Supervised Master/ Slave Connections

01. Refer to NFPA 72, Chapter 4-4, Visible Characteristics, Public Mode.
02. Use only devices from the same manufacturer in each system.
03. Set Output DIP Switch: position 3=ON, 4 = OFF, 5 = ON, 6 = OFF.
04. If the FACP has a dedicated sync output connector, wire the remote sync output connector to Input #1 terminals 2 and 3.
05. In this example, the output is mapped to Input#1 in Slave Configuration, but it can programmed to another input using the DIP switches.
06. For NFPA 72 compliance, notification appliances cannot be installed on the FACP control circuit connecting to the power supply's input circuits.

2.6 POWER SUPPLY IN MASTER CONFIGURATION CONNECTED TO FACP

In this application, a master power supply, set for synchronization, is connected to an FACP with non-synchronized output.

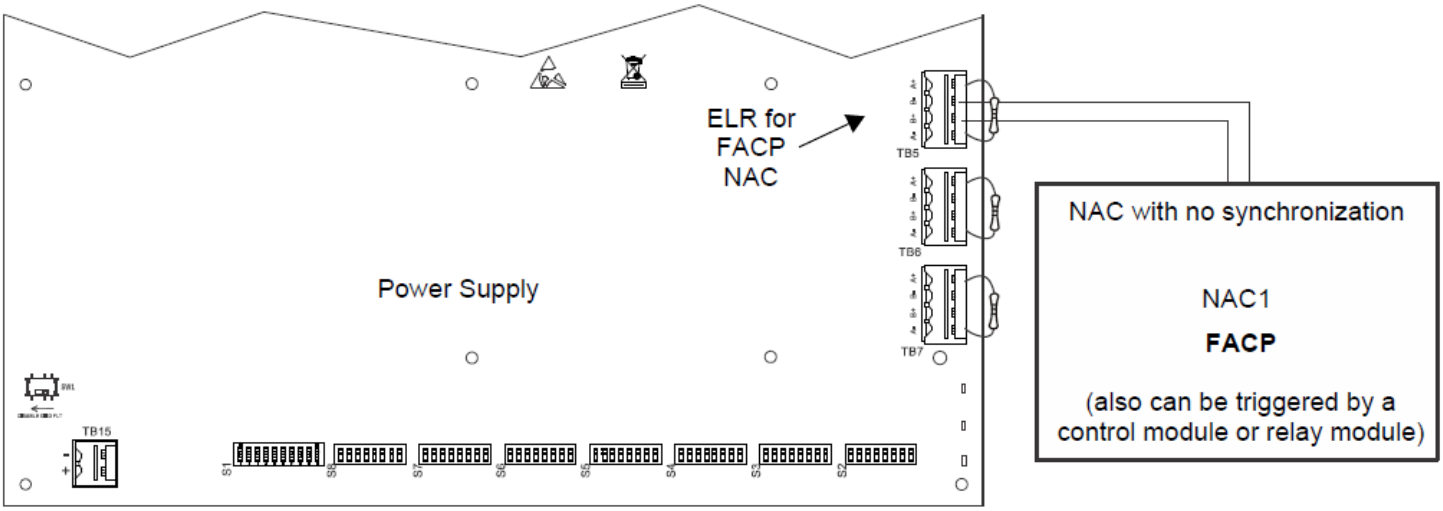


Figure 2-8: Supervised FACP to Master Connections (non-synchronized source)

The following notes apply to Figure 2-8: Supervised FACP to Master Connections (non-synchronized source) .

01. Refer to NFPA 72, Chapter 4-4, Visible Characteristics, Public Mode.
02. Set Output DIP switches to the desired sync protocol as described below. Refer to the Device Compatibility Document for devices.

DIP Switch Position				Synchronization Type
3	4	5	6	
OFF	**ON**	**ON**	OFF	Master Configuration - ANSI Temporal (Temporal 3)
ON	**ON**	**ON**	OFF	Master Configuration - CO Temporal (Temporal 4)
OFF	OFF	OFF	**ON**	Master Configuration - Amseco/Potter
OFF	**ON**	OFF	**ON**	Master Configuration - Gentex
OFF	OFF	**ON**	**ON**	Master Configuration - System Sensor
OFF	**ON**	**ON**	**ON**	Master Configuration - Wheelock
ON	OFF	OFF	**ON**	Master Configuration, Selective Silence - Amseco/Potter
ON	**ON**	OFF	**ON**	Master Configuration, Selective Silence - Gentex
ON	OFF	**ON**	**ON**	Master Configuration, Selective Silence & dynamic signaling - System Sensor
ON	**ON**	**ON**	**ON**	Master Configuration, Selective Silence - Wheelock

03. Use only devices from the same manufacturer in each zone or field of view.
04. In this example, the output is mapped to Input#1 in Master Configuration, but it can programmed to another input using the DIP switches.
05. For NFPA 72 compliance, notification appliances cannot be installed on the FACP control circuit connecting to the power supply's input circuits.

2.7 CONNECTING TO AN EXTERNAL CHARGER

The Power Supply can be connected to an external charger to charge systems requiring over 33AH batteries. Ensure all power has been disconnected before wiring. Observe polarity when making connections. Wiring must be in conduit within 20 feet (6.096m) in the same room.

2.7.1 CHG-120

01. Set S1 position 4 on the power supply to the OFF position to disable the onboard battery charger.
02. Connect the battery cables between TB15 (+ and –) on the power supply and the CHG-120 charger output circuit (TB2: Out 1+ and Out 1–) as shown in Figure 2.9. Be certain to observe polarity.
03. Connect the batteries to the charger.
04. Connect the battery interconnect cable only after AC power is applied and batteries are connected. Refer to the CHG-120 Manual for more information.
05. Cut and remove Jumper R104 on the CHG-120 to disable ground fault supervision.

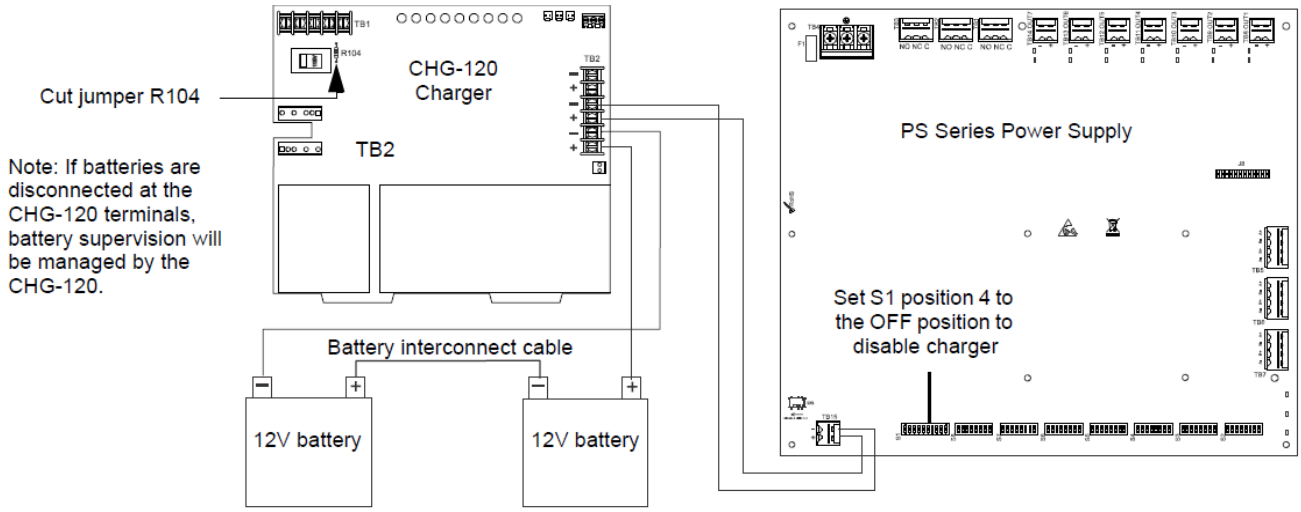


Figure 2-9: Connecting the Power Supply to a CHG-120 Charger

2.7.2 CHG-75

01. Set S1 position 4 on the power supply to the OFF position to disable the onboard battery charger.
02. Connect the battery cables between TB15 (+ and –) on the power supply and the CHG-75 charger output circuit (TB2: Out+ and Out–) as shown in Figure 2.10. Be certain to observe polarity.
03. Connect the batteries to the charger.
04. Connect the battery interconnect cable only after AC power is applied and batteries are connected. Refer to the CHG-75 Manual for more information.
05. Cut and remove Jumper JP2 on the CHG-75 to disable ground fault detection.

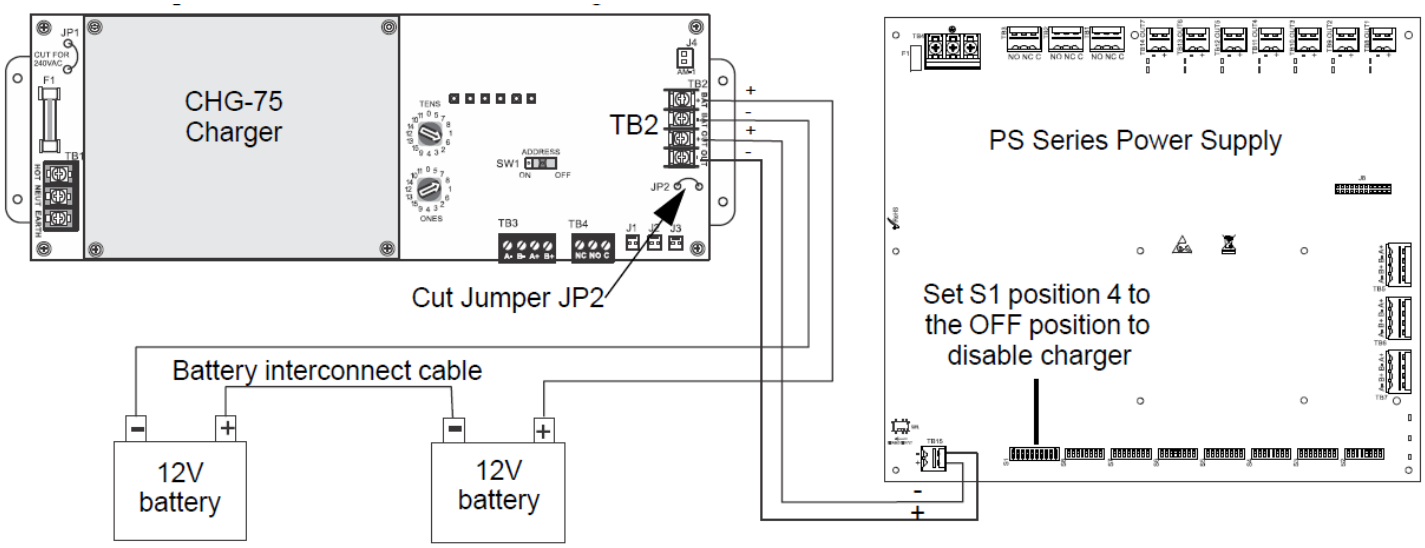


Figure 2-10: Connecting the Power Supply to a CHG-75 Charger

2.8 CONNECTING MULTIPLE POWER SUPPLIES

2.8.1 DAISY-CHAINING MULTIPLE UNITS

The number of power supplies which can be daisy-chained is limited by the line resistance and current draw limitations of the upstream module or NAC output circuit. Refer to the module, power supply, or fire alarm control panel manual to confirm these circuit specifications.

Maintain separation of power-limited and non-power-limited wiring as shown in Figure 2-6: Power-limited (Class 2) Wiring Example .

Figure 2-11: System Sync Connections Triggered by FACP - Daisy-chaining shows the controlling signal connected to Input 1 of power supply #1. However, typically any available Input of power supply #1 can be used.

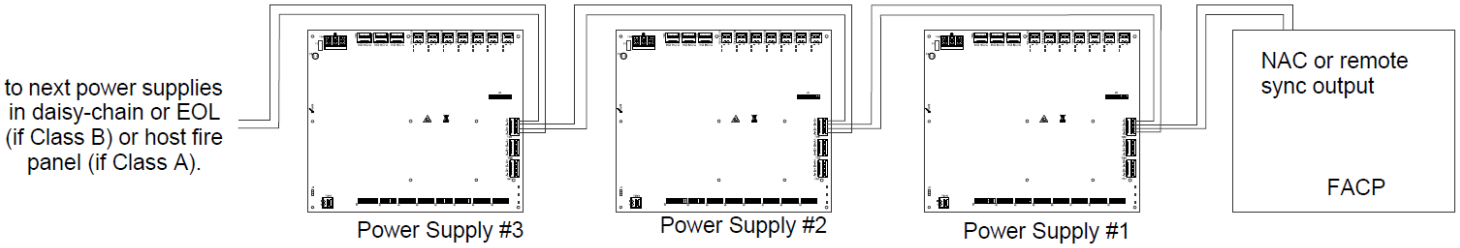


Figure 2-11: System Sync Connections Triggered by FACP - Daisy-chaining

The following notes apply to Figure 2-11: System Sync Connections Triggered by FACP - Daisy-chaining

01. The power supply units can be set to work in either Default or Retrofit modes. In standby condition, the input EOL relays are open when they are used to report troubles, depending on the configured operating mode. Refer to Table 5.1 Operating Mode Behavior for Trouble Supervision Using Input Circuits . In alarm condition, all inputs will close their EOL relays to allow the daisy-chaining of input signals.
02. The debounce/ dejitter setting must be set to a value that allows the correct detection of input signals. See Table 3.3 Debounce/ Dejitter Settings .
03. In Default mode, ground fault supervision is provided via the dedicated ground fault relay. For ground fault supervision in Retrofit mode, refer to Table 5.1 Operating Mode Behavior for Trouble Supervision Using Input Circuits . Refer to 2.10 Ground Fault Detection for different methods of ground fault monitoring of the power supply. The NAC circuit or remote sync output is to be monitored by the host FACP. For daisy-chaining power supplies in Canadian applications, Input #1 should be configured as a dedicated sync input with the trigger at Input #2 or #3 for proper ground fault supervision.

2.8.2 CASCADING MULTIPLE UNITS

Up to three power supplies can be cascaded together to provide additional NAC extenders for a system. Maintain separation of power-limited and non-power-limited wiring as shown in Figure 2-6: Power-limited (Class 2) Wiring Example .

Figure 2-12: System Sync Connections Triggered by FACP - Cascade and Figure 2-13: System Sync Connections Triggered by Control Module - Cascade show the controlling signal connected to Input 1 of power supply #1. However, typically any available Input of power supply #1 can be used.

Figure 2-12: System Sync Connections Triggered by FACP - Cascade and Figure 2-13: System Sync Connections Triggered by Control Module - Cascade show NAC7 of power supply #1- power supply #3 as the cascading output. However, any available Output of power supply #1 – power supply #3 can be used.

NOTE: Any configuration that requires an additional control signal (i.e. a trigger signal), such as Selective Silence or Input #1 Dedicated Sync Configuration, will affect which Inputs may be available on PSE1 for use with cascading. (Trigger signals are usually assigned to Input 2.) Refer to those sections of the manual for specifics.

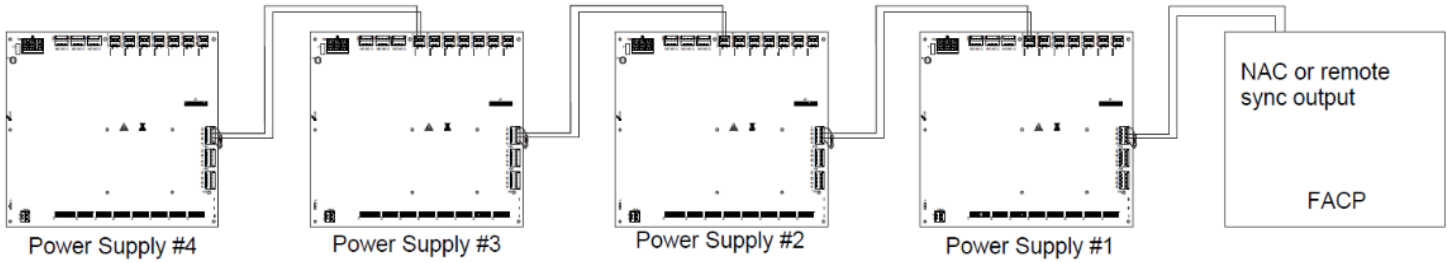


Figure 2-12: System Sync Connections Triggered by FACP - Cascade

The following notes apply to Figure 2-12: System Sync Connections Triggered by FACP - Cascade .

01. Set all power supply units to Slave (sync follower) Configuration.
02. The debounce/ dejitter setting must be set to 1 msec on all cascaded units. See Table 3.3 Debounce/ Dejitter Settings .
03. For NFPA 72 compliance, notification appliances cannot be installed on the interconnecting FACP control circuits wired to the power supply's input circuits.
04. The total line impedance for interconnected units cannot be such that it creates a voltage drop > 3.2 VDC.
05. In Default mode, ground fault supervision is provided via the dedicated ground fault relay. For ground fault supervision in Retrofit mode, refer to Table 5.1 Operating Mode Behavior for Trouble Supervision Using Input Circuits and 5.4 Ground Fault Relay . Refer to 2.10 Ground Fault Detection for different methods of ground fault monitoring for the power supply.

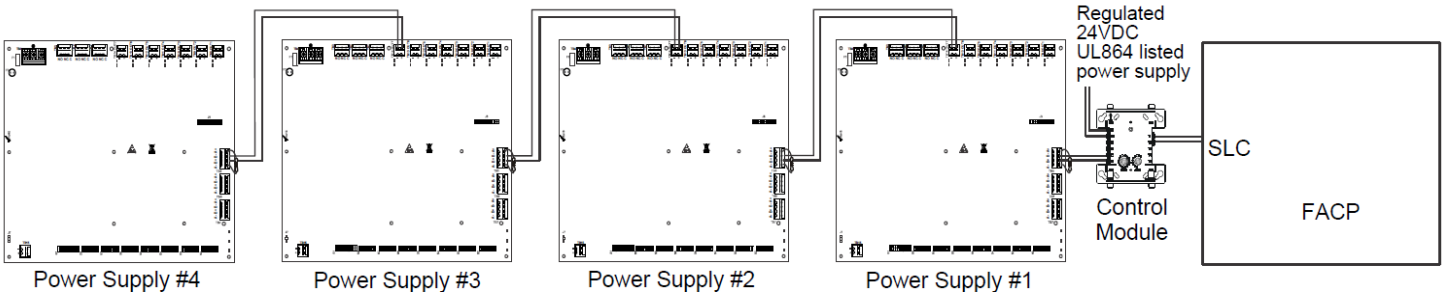


Figure 2-13: System Sync Connections Triggered by Control Module - Cascade

The following notes apply to Figure 2-13: System Sync Connections Triggered by Control Module - Cascade

01. Set Power Supply #1 to Master configuration, and the desired strobe/ horn type. Set remaining power supply units to Slave (sync follower) configuration.
02. The debounce/ dejitter setting must be set to 1 msec on units power supply #2 – power supply #3. See Table 3.3 Debounce/ Dejitter Settings .
03. Strobe/ Horn devices connected to the power supply units are not guaranteed to be in sync with FACP devices when using this configuration
04. For NFPA 72 compliance, notification appliances cannot be installed on the interconnecting FACP control circuits wired to the power supply's input circuits.
05. The total line impedance for interconnected units cannot be such that it creates a voltage drop > 3.2 VDC.
06. In Default mode, ground fault supervision is provided via the dedicated ground fault relay. For ground fault supervision in Retrofit mode, refer to Table 5.1 Operating Mode Behavior for Trouble Supervision Using Input Circuits and 5.4 Ground Fault Relay . Refer to 2.10 Ground Fault Detection for different methods of ground fault monitoring for the power supply.

2.9 CANADIAN APPLICATIONS

Installation shall be in accordance with ULC S524. Wiring methods shall be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part I, Section 32.

NOTE: Mass Notification is not for use in Canadian applications.

Canadian applications, per ULC, require the following:

• Using hardware kit #50152254-001, purchased separately, connect the AC ground wire to the Ground Stud located at the top left of the backbox as shown below. Connect the incoming earth ground wire to supplied cable #71073 with a wire nut. Position the ring terminal end over the grounding stud. Secure with one of the keps nuts. Place the ring terminal from the other supplied ground cable #71073 over the ground stud and secure with the second keps nut. Wire the ground cable to the middle position of TB4. Ensure that the ground for incoming AC mains is the first wire installed, closest to the backbox. This connection is vital in reducing the panel's susceptibility to transients generated by lightning and electrostatic discharge. Apply AC power to the panel only after the system is completely installed and visually checked. *Note that AC power must be applied to the panel before installing the battery interconnect cable.*

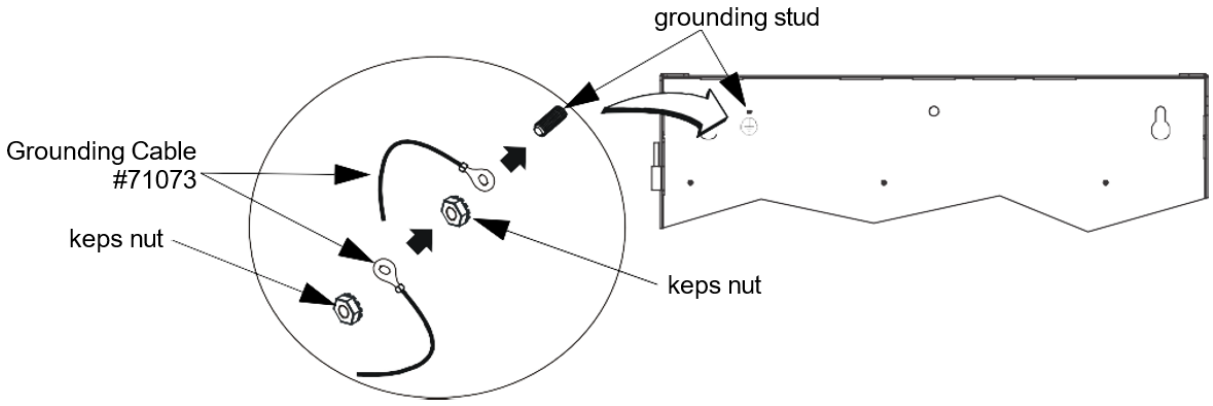


Figure 2-14: Earth Ground Connection

• Refer to 5.1 Trouble Supervision Using Input Circuits for instructions to meet ULC requirements for trouble monitoring of each zone.

2.10 GROUND FAULT DETECTION

When connected to an FACP, the host FACP must monitor for all ground fault conditions.

There are three ways to monitor for ground faults in the power supply when cascading (up to four) or daisy-chaining power supplies.

01. The negative (-) battery terminal of the power supply must be connected to the negative (-) battery terminal of the host FACP. Battery wiring is non-power-limited. Power-limited and non-power-limited wiring must be wired with a minimum of 0.25" spacing in between and enter/ exit through different knockouts. When cascading multiple power supply units, continue connecting the negative battery terminals, including FACP battery terminal. Ground faults must then be detected by the first power supply in the chain. Disable ground fault detection on other power supply units by sliding SW1 to the left. Ensure ground fault detection is enabled on power supply #1, the first power supply from the FACP, by sliding SW1 to the right. 18 AWG wire minimum must be used.

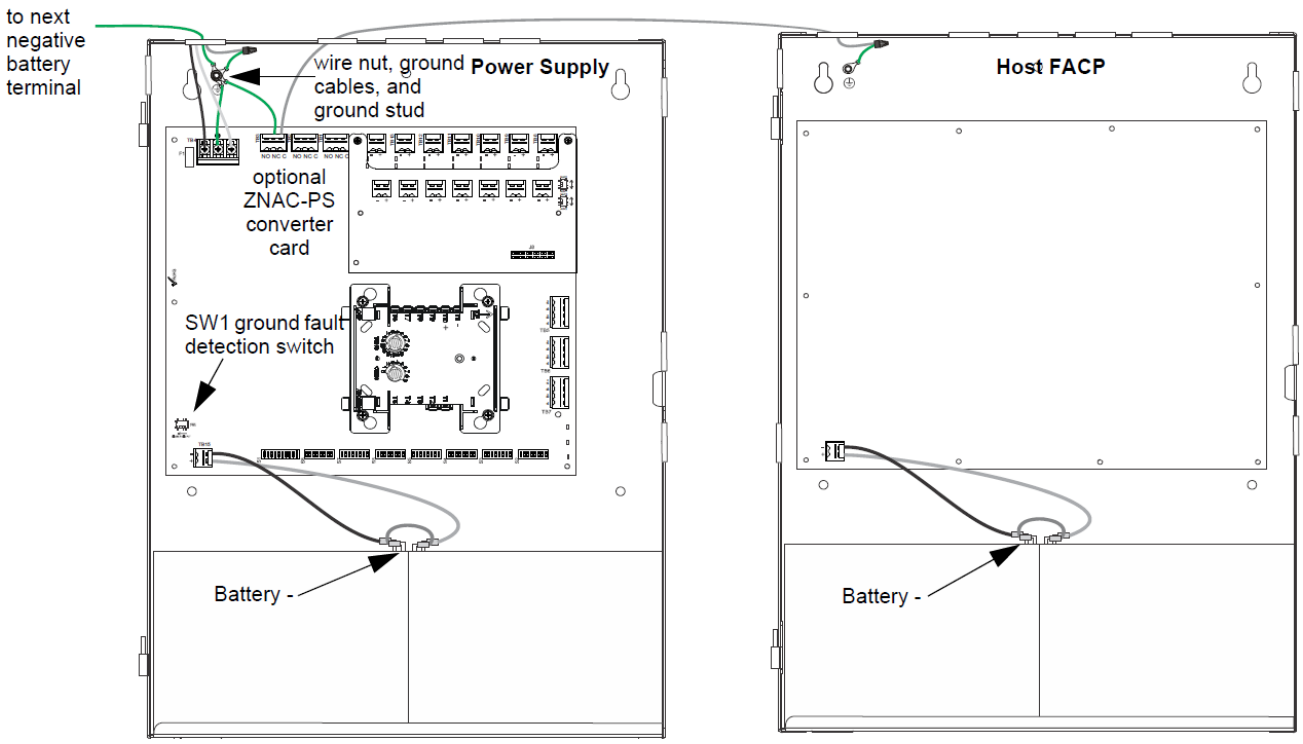


Figure 2-15: Ground Fault Detection Option 1

02. Ground fault monitoring may be accomplished by mapping an annunciator point on a UL 864-/ULC S527-listed FACP as ground fault. The annunciator shall be wired adjacent to the FACP so all displays are grouped for viewing and operation by one person. Addressable FACP: The FACP must be programmed to turn on the common trouble LED, trouble tone, and a separate yellow annunciator point when the monitor module connected to the power supply ground fault relay is initiated. The annunciator point must also be labeled as “XXX Ground Fault” where “XXX” describes ground fault origin.

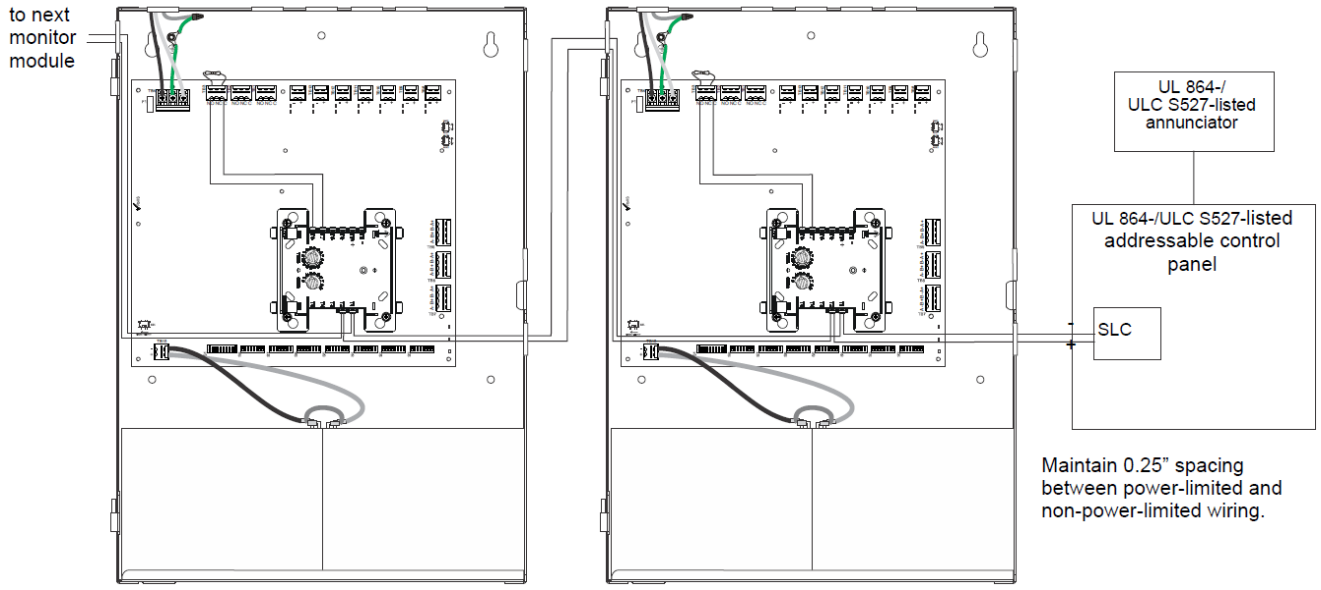


Figure 2-16: Ground Fault Detection Option 2 - Addressable FACP

03. Conventional FACP: The FACP must be programmed to turn on the common trouble LED, trouble tone, and a separate yellow annunciator point when the input connected to the power supply ground fault relay is initiated. Use one input per power supply.

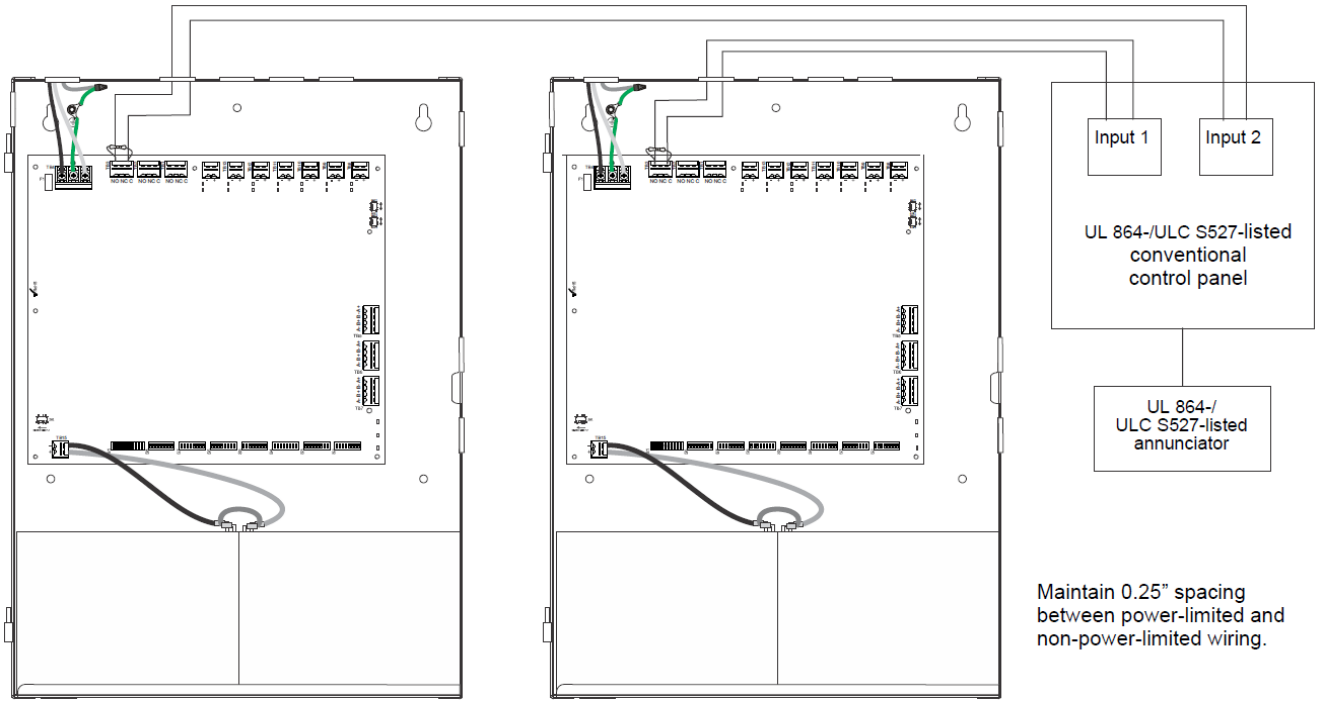


Figure 2-17: Ground Fault Detection Option 3 - Conventional FACP

SECTION 3: PROGRAMMING OPTIONS

Table 3.1 Agency-Permitted Programming Settings

NOTICE TO USERS, INSTALLERS, AUTHORITIES HAVING JURISDICTION AND OTHER INVOLVED PARTIES				
This product incorporates field-programmable software. In order for the product to comply with the requirements in the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864, certain programming features or options must be limited to specific values or not used at all as indicated below:				
Program feature or option	Permitted in UL864/ 2572 and ULC S527? (Y/ N)	Possible settings	Settings permitted in UL 864 / UL2572	Settings permitted in ULC S527
Door Holder Dropout Delay	Y	Refer to "AC Loss Door Holder Dropout Timer" on page 24. • Does not drop • 15 seconds • 5 minutes • 60 seconds	• Does not drop • 15 seconds • 60 seconds • 5 minutes	• Does not drop • 15 seconds • 60 seconds • 5 minutes
AC Loss Delay Timer	Y	Refer to "AC Loss Indication Delay" on page 24. • 30 hours • 12 hours • 2 hours • none	• 2 hours[1] • none	• 2 hours • none
Operating Mode	Y	Refer to "Operating Modes" on page 25. • Retrofit Mode • Change Output Circuit Configurations • Display Trouble History • Default Mode	• Default Mode[2]	• Default Mode

01. A two hour delay is only permitted on an addressable FACP.
02. For site compliance to UL864 10th Edition/ ULC-S527 4th Edition, all power supplies must be configured for Default Mode.

This section describes the programming options available via DIP switch settings. The power supply can be field programmed using DIP switches S1-S8 which are located at the bottom of the circuit board. S1 controls the global options of the power supply and S2-S8 control the functions of each output circuit, respectively. Refer to the following illustration for switch locations and DIP switch placement in the ON and OFF positions.

Important: *Activate output DIP switch changes by setting S1 positions 9 and 10 appropriately. Refer to 3.1.6 Operating Modes for DIP Switch programming settings.*

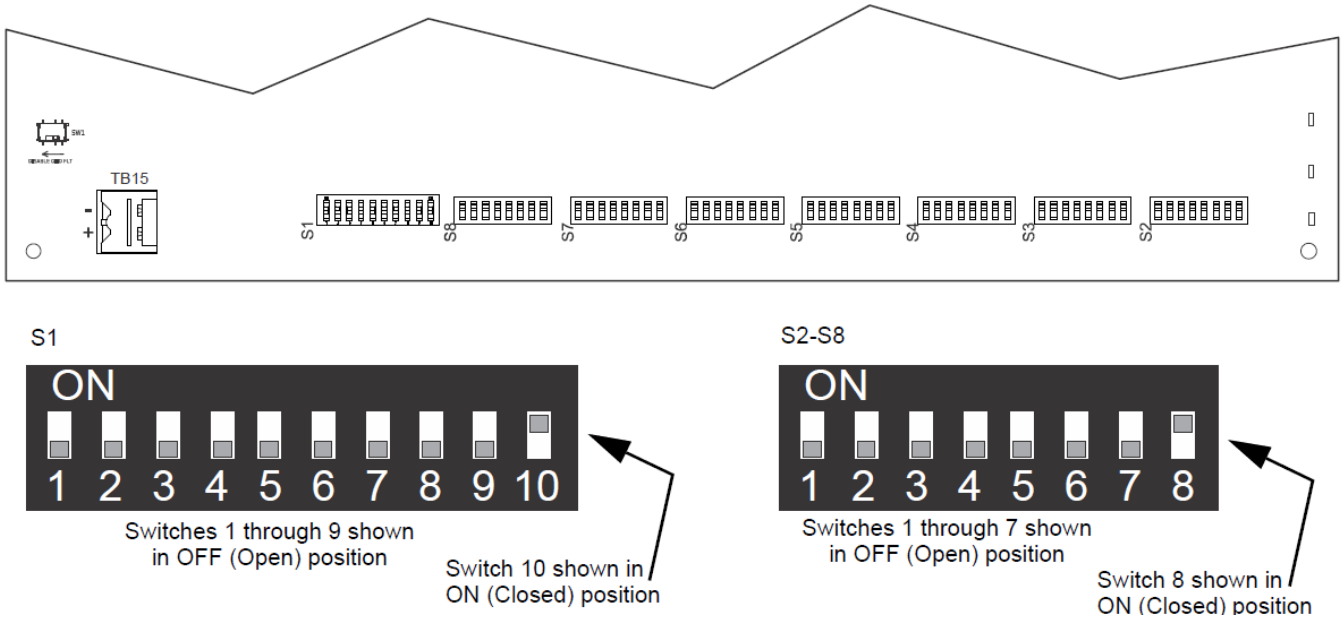


Figure 3-1: Field Programming DIP Switches

3.1 S1 GLOBAL OPTIONS DIP SWITCH

The following table lists the global control options for the power supply's programmable features and the switch settings required to select a particular feature. A detailed description of each feature is presented in the following pages. Refer to Table 3.1 Agency-Permitted Programming Settings for UL-compliant settings.

Table 3.2 Global Options DIP Switch Settings

S1 DIP Switch	Function	Subsection
1, 2	**Debounce/ Dejitter/ Delay** These switches determine the command input debounce/ dejitter setting (Setting applies to ALL inputs). 1 OFF, 2 OFF = Temporal (for ANSI temporal signals) 1 ON, 2 OFF = 50Hz (20 msec, for full wave rectified signals) 1 OFF, 2 ON = 6 msec (for strobe sync signals, control/ relay modules) 1 ON, 2 ON = 1 msec (for strobe sync signals, control/ relay modules)	3.1.1
3	**Command Input #1 Function** This switch determines the function for Command Input #1. 3 OFF = Command Input #1 dedicated as input point for external synchronization 3 ON = Command Input #1 as non-dedicated	3.1.2
4	**Charger** 4 OFF = Internal battery charger disabled 4 ON = Internal battery charger enabled	3.1.3
5, 6	**Door Holder Delay** These switches determine door holder dropout delay after AC power loss 5 OFF, 6 OFF= Power does not drop out 5 ON, 6 OFF = 5 minutes 5 OFF, 6 ON = 60 seconds 5 ON, 6 ON = 15 seconds	3.1.4

S1 DIP Switch	Function	Subsection
7,8	**AC Loss Delay** These switches determine AC Loss delay The Operating mode (Retrofit or Default) configuration provides additional options for AC Loss Delay and reporting.	3.1.5
9, 10	**Operation Mode** These switches determine the operating mode of the power supply. Return switches to Retrofit or Default Mode to exit change output circuit configurations and display trouble history modes! 9 OFF, 10 OFF = Retrofit Mode (existing, legacy installations) 9 ON, 10 OFF = change output circuit configurations 9 OFF, 10 ON = display trouble history 9 ON, 10 ON = Default Mode (UL 864 10th Edition/ ULC-S527 4th Edition compliant)	3.1.6

3.1.1 INPUT DEBOUNCE/DEJITTER/DELAY

Signals from electronic circuits or relay contacts can have a small unstable time when changing state (OFF to ON, or ON to OFF). This means the signal can briefly “bounce” between states before stabilizing to the desired state, causing signal “jitter” during this time. The power supply provides four “debounce/ dejitter” settings, as shown in the table below. These settings provide time for a NAC Input signal to stabilize before that NAC Input will recognize it as a valid signal, and not just “noise”, to prevent false activation of Output circuits. Input debounce settings can be used as needed. Unless the system experiences input “noise” issues, apply 1ms setting for general use.

Table 3.3 Debounce/Dejitter Settings

Position 1	Position 2	Setting	Notes
OFF	OFF	Temporal	Debounces ANSI temporal signals. Allows for a 0.5 second ON signal with an almost 2 second OFF signal to trigger a continuous ON input signal. Do not use for strobe sync signals.
ON	OFF	50Hz (20msec)	Debounces FWR (full wave rectified signals). Allows an input signal with 50Hz, 33% duty cycle to trigger a continuous (i.e. filters FWR input signal to appear constantly on) ON input signal. May apply to legacy panels. Do not use for strobe sync signals.
OFF	**ON**	6 msec	Input delay for strobe sync signals (i.e. Slave Configuration using external sync input), or control/ relay modules (i.e. Master or Aux. power Configuration using trigger input).
ON	**ON**	1 msec	Input delay for strobe sync signals (i.e. Slave Configuration using external sync input), or control/ relay modules (i.e. Master or Aux. power Configuration using trigger input). Must be the only one used when cascading power supplies. Refer to"Cascading Multiple Units" on page 15.

• In applications of strobe synchronization; when using the setting of 6 msec debounce (OFF, ON) only one input (command input #1, #2, or #3) may be used for the trigger input.

• When using the setting of 1msec debounce (ON,ON) both Input#2 and Input#3 may be used as trigger inputs.

3.1.2 COMMAND INPUT #1 FUNCTION

Power supply output circuits are individually configurable for operation based on the settings described in section 3.2 for each output. The Output Control Setting/ Operation of each NAC contains the option for “Slave Configuration (NAC follower)”. If any of the output circuits are configured for this operation; synchronization to an external signal is expected. The method and behavior of external synchronization is a global setting for the power supply described in this section.

Command input #1 configuration (switch position 3) is used to identify the method for which this power supply will receive a synchronization signal. Operation Mode (switch position 9 and 10) will alter the behavior of the power supply when the external synchronization signal is not detected at the source set by switch position 3.

If external synchronization is not used; Position 3 shall be placed in the “ON” position.

If external synchronization is used; Command Input #1 can be configured by DIP switch position 3 for a dedicated function as the synchronization input (OFF) or as a non-dedicated function as a Multi-purpose Command Input capable of receiving synchronization as part of the control signal (ON).

• A trigger signal between 9-32VDC is required for proper operation at the command inputs.

Refer to the table below for the detailed description of operation.

DIP 3	DIP 9	DIP 10	Mode	Description of Operation
OFF	OFF	OFF	Retrofit: Dedicated	Command Input #1 is dedicated to being the input for a synchronization signal. An output circuit will only output the Command Input #1 sync pattern when Command Input #2 or Command Input #3 on the power supply is receiving a valid (9V - 32V) trigger signal. • The sync signal is monitored continuously and is declared lost if the signal is off for 3 consecutive seconds. The sync signal is declared restored (after being previously lost) after it is back on. • If the trigger signal is activated while the sync signal is in lost state, the power supply will turn NACs on steady with no sync until the sync signal is restored. The NACs will turn off when the trigger input becomes inactive. • If the sync signal goes missing while the trigger signal is active, the power supply will turn NACs off until the sync goes into Sync Lost state (3 sec). After the three seconds, the power supply will turn NACs on steady with no sync. • If the sync signal goes into the restore state after being previously lost while the trigger signal is active, the outputs will follow the sync signal and NAC configurations.
OFF	ON	ON	Retrofit: Dedicated	Command Input #1 is dedicated to being the input for a sychronization signal. An output circuit will only output the Command Input #1 sync pattern when Command Input #2 or Command Input #3 on the power supply is receiving a valid (9V - 32V) trigger signal. • If there is no sync signal at Input #1, the NAC output circuits will be turned OFF immediately, even if there is a trigger signal at input #2 or Input#3. • If the sync signal is suddenly lost at Input #1 (due to wiring failure), the power supply will turn NACs OFF immediately, even if there is a trigger signal at input #2 or Input#3, until a sync signal appears. • If the sync signal becomes active after being previously lost, the outputs will immediately follow the Sync signal (provided the trigger is present at Input#2 or Input#3) and NAC configurations.

DIP 3	DIP 9	DIP 10	Mode	Description of Operation
ON	OFF	OFF	Retrofit; Non-Dedicated Sync Input	Command Input #1 is NOT dedicated to only a synchronization input. If required; synchronization shall be provided as part of the command signal to the selected command input. • The output NAC circuit will immediately follow the signal to the selected command input for the output operation of “Slave Configuration (NAC Follower)”.
ON	ON	ON	Default; Non-Dedicated Sync Input	Command Input #1 is NOT dedicated to only a synchronization input. If required; synchronization shall be provided as part of the command signal to the selected command input. • If there is no sync signal, the NAC output circuits will be turned OFF immediately. • If the sync signal is suddenly lost (due to wiring failure), the power supply will turn NACs OFF immediately until a sync signal appears. • If the sync signal becomes active after being previously lost (while the trigger signal is ON), the outputs will immediately follow the Sync signal and NAC configurations.

3.1.3 CHARGER ENABLE DISABLE

The power supply’s battery charger can be disabled to accommodate an external battery charger, such as the CHG-75 or CHG-120. Setting DIP switch position 4 to the OFF position will disable the charger. Setting DIP switch position 4 to the ON position will enable the charger. It should only be disabled if an external battery charger is being used for the power supply.

Table 3.4 Battery Charger Settings

Position 4	Charger
OFF	Internal battery charger disabled
ON	Internal battery charger enabled

3.1.4 AC LOSS DOOR HOLDER DROPOUT TIMER

Any output can be configured as a NAC, aux power, or door closer circuit. Configuring an output circuit as a door closer circuit will provide a steady 24 VDC to door holders until an alarm condition or an AC Loss condition. Upon an alarm condition, power to door holder circuits will be removed, causing doors to close immediately. During an AC Loss condition, the door holder will remain energized until the programmed AC Loss indication delay expires. Programmed delays are only applicable to AC loss conditions. Refer to Figure 3-1: Field Programming DIP Switches for UL-compliant settings.

DIP switch positions 5 and 6 are used to select the door holder dropout timer as listed below:

Table 3.5 Door Holder Dropout Settings

Position 5	Position 6	Door holder dropout delay after AC loss
OFF	OFF	Power does not drop out with AC loss
ON	OFF	5 minutes
OFF	**ON**	60 seconds
ON	**ON**	15 seconds

3.1.5 AC LOSS INDICATION DELAY

The AC Loss Indication Delay feature provides the option to delay generation of a trouble signal upon the loss of AC power. Refer to Figure 3-1: Field Programming DIP Switches for UL-compliant settings.

3.1.5.1 AC Loss Configurations in Default Mode

When using the power supply in Default Mode: DIP switch positions 7 and 8 are used to select the AC Loss Indication Delay as listed below:

Table 3.6 AC Loss Delay Settings: Default Mode

Position 7	Position 8	Position 9	Position 10	AC Loss Indication Delay
OFF	OFF	**ON**	**ON**	30 hours
ON	OFF	**ON**	**ON**	12 hours
OFF	**ON**	**ON**	**ON**	2 hours
ON	**ON**	**ON**	**ON**	none

3.1.5.2 AC Loss Configurations in Retrofit Mode

When using the power supply in Retrofit Mode:

- DIP switch position 7 is used to select the AC Loss Indication Delay.
- DIP switch position 8 is used to select which trouble relays will report any AC and ground faults.

Table 3.7 AC Loss Delay and Relay Settings: Retrofit Mode

Position 7	Position 8	Position 9	Position 10	AC Loss Indication Delay	AC Loss/ Ground Default Indication
OFF	OFF	OFF	OFF	2 hours	AC faults and ground faults are reported either by the Input #1 EOL relay or Input #2 EOL relay (if Input#1 is configured as sync) and by the General Trouble relay.
ON	OFF	OFF	OFF	none	
OFF	**ON**	OFF	OFF	2 hours	AC faults are reported only by the AC Trouble relay and ground faults will be reported only by the Ground Fault Trouble relay.
ON	**ON**	OFF	OFF	none	

3.1.6 OPERATING MODES

The power supply operates primarily in Default Mode or Retrofit Mode, depending on the installation. While in either mode, the power supply can be placed in two special, temporary operating modes per settings described in 3.1.6 Operating Modes . These modes are Change Output Circuit Configurations and Display Trouble History. Upon completion of either of these two modes, the system must be placed back in Default or Retrofit operating mode. Note that the current operation of all outputs will not be affected or disturbed while in either of these two special operating modes.

DIP switch positions 9 and 10 are used to select the type of operating mode as listed below:

Table 3.8 Operating Modes

Position 9	Position 10	Operating Mode
OFF	OFF	Retrofit Mode
ON	OFF	Change output circuit configurations
OFF	**ON**	Display Trouble History
ON	**ON**	Default Mode

NOTE: When switching between Default and Retrofit modes, go to Change Output Circuit Configurations mode first (and remain there for at least 1 second) and then move to the desired new mode (even if nothing is changed in the DIP switch settings). This will ensure that the operating mode is updated.

3.1.6.1 Default Mode

This is default operating mode of the power supply (the mode configured when the unit is shipped), and is compliant with UL 864 10th Edition standards. Operation of the power supply will be detailed in Default Mode unless otherwise specified.

3.1.6.2 Retrofit Mode

This mode is an alternative to Default Mode, to be used for legacy/ existing installations

Note that when the power supply is configured for use in Retrofit Mode, the FACP should be monitoring either Input #1/ Input #2 end-of-line relay or the General Trouble relay, but not both.

In Retrofit Mode, output 1 will blink as visual indication that the panel is operating in Retrofit Mode. See "LED Indicators" on page 33for details on LED patterns.

3.1.6.3 Change Output Circuit Configurations Mode

NOTE: DIP switch settings may be changed to the desired configuration either before or after entering Change Output Circuit Configurations Mode.

01. Enter this mode via the setting shown in 3.1.6 Operating Modes . Once entered, the Output trouble LEDs will continually flash from right to left to confirm the power supply is in Change Output Configuration Mode.
02. Configure settings on the Output DIP switches as needed (see Note above).
03. Return to Default or Retrofit Mode via DIP switches settings for 9 and 10 as shown in 3.1.6 Operating Modes . The output trouble LEDs will stop the flash pattern described above to confirm Default or Retrofit Mode has been restored.

3.1.6.4 Display Trouble History Mode

To see past troubles on the system, place position 9 to OFF and position 10 to ON. Refer to"LED Indicators" on page 33 for descriptions of troubles. Trouble history will be erased upon exiting the Display Trouble History operating mode.

The behavior of the Display Trouble History Mode with regard to the Input Configuration and Trouble reporting will depend on which was the last active (minimum 5 minutes) operating mode, Default or Retrofit, before entering Display Trouble History Mode.

3.2 OUTPUT CIRCUIT CONTROL DIP SWITCH SETTINGS

Each output circuit has its own programming DIP switch. DIP switches S2-S8 are labeled on the PCB to indicate which output circuit it is controlling. Output circuits are labeled at the top of the PCB, TB8-TB14.The following table applies to DIP Switches S2-S8.

Important! If an output circuit is overloaded, the output will shut off and generate a trouble signal. If this happens, the power supply will need to be reset manually. Either reset circuit configurations by toggling switch S1 position 9 and 10 to the ON, OFF position (“change output circuit configuration” operating mode) for a minimum of five seconds before restoring to the desired position or turn off primary and secondary power and reapply to the power supply.

Table 3.9 Output Control Switch Settings

S2-S8 Dip Switch Position	Function	Subsection
1,2	**Command Inputs/ NAC Circuit Activation** 1 OFF, 2 OFF = Command Input #1 1 ON, 2 OFF = Command Input #2 1 OFF, 2 ON = Command Input #3 1 ON, 2 ON = Any Command Input Note: exceptions apply; see section 3.2.1 for full details	3.2.1

S2-S8 Dip Switch Position	Function	Subsection
3,4,5,6	**Output Function and Protocol** 3 OFF, 4 OFF, 5 OFF, 6 OFF = Default - OFF (will not activate) 3 ON, 4 OFF, 5 OFF, 6 OFF = Reserved - OFF (will not activate) 3 OFF, 4 ON, 5 OFF, 6 OFF = Non-resettable (constant) aux power 3 ON, 4 ON, 5 OFF, 6 OFF = Door Holder 3 OFF, 4 OFF, 5 ON, 6 OFF = Resettable aux power 3 ON, 4 OFF, 5 ON, 6 OFF = Slave Configuration (NAC follower) 3 OFF, 4 ON, 5 ON, 6 OFF = Master Configuration – ANSI Temporal (Temp 3) 3 ON, 4 ON, 5 ON, 6 OFF = Master Configuration – CO Temporal (Temp 4) 3 OFF, 4 OFF, 5 OFF, 6 ON = Master Configuration – Amseco/ Potter 3 ON, 4 OFF, 5 OFF, 6 ON = Master Configuration, Selective Silence – Amseco/ Potter 3 OFF, 4 ON, 5 OFF, 6 ON = Master Configuration - Gentex 3 ON, 4 ON, 5 OFF, 6 ON = Master Configuration, Selective Silence - Gentex 3 OFF, 4 OFF, 5 ON, 6 ON = Master Configuration – System Sensor 3 ON, 4 OFF, 5 ON, 6 ON = Master Configuration, Selective Silence, Dynamic Signaling – System Sensor 3 OFF, 4 ON, 5 ON, 6 ON = Master Configuration - Wheelock 3 ON, 4 ON, 5 ON, 6 ON = Master Configuration, Selective Silence - Wheelock	3.2.2
7	**ZNAC-PS Wiring Configuration** 7 OFF = Class B 7 ON = Class A	3.2.3
8	**unused**	3.1.4

3.2.1 COMMAND INPUTS/NAC CIRCUIT ACTIVATION

The power supply allows for individual NAC circuit programming. Each NAC can be configured to activate based on the status of one or more of the three Command Inputs for the output functions that can dynamic during runtime.

The global settings for Command Position #1 (Switch S1 position 3) will influence the operation of the control signals. See table below for the operation based on the setting.

Set DIP switch positions 1 and 2 for each NAC according to which input circuit is used as the trigger input for the coordinating configuration as shown in the table below.

Table 3.10 Output to Command Input Assignment

		Default, non-dedicated	Default, Dedicated	Retrofit, non-dedicated	Retrofit, Dedicated
Pos 1	**Pos 2**	**Global Mode of Operation S1-P3, P9, P10 ON, ON, ON**	**Global Mode of Operation S1-P3, P9, P10 OFF, ON, ON**	**Global Mode of Operation S1 - P3, P9, P10 ON, OFF, OFF**	**Global Mode of Operation S1 - P3, P9, P10 OFF, OFF, OFF**
OFF	OFF	NAC output will activate when Command Input #1 is activated.	Do not use this combination[1].	NAC output will activate when Command Input #1 is activated.	Do not use this combination1
ON	OFF	NAC output will activate when Command Input #2 is activated[2].	NAC output will activate when Command Input #2 is activated provided the sync signal is present at Input #1.	NAC output will activate when Command Input #2 is activated[2].	NAC will activate when Input #2 is active regardless of sync input at Input #1. If Sync signal is present at Input #1, the output follows the sync. If the sync signal at Input #1 is deemed LOST, the outputs will turn on steady.

OFF	**ON**	NAC output will activate when Command Input #3 is activated[3].	NAC output will activate when Command Input #3 is activated provided the sync signal is present at Input #1.	NAC output will activate when Command Input #3 is activated[3].	NAC will activate when Input #3 is active regardless of sync input at Input #1. If Sync signal is present at Input #1, the output follows the sync. If the sync signal at Input #1 is deemed LOST, the outputs will turn on steady.
ON	**ON**	NAC will activate when any input (1, 2, or 3) activates[2].	NAC output will activate when Command Input #2 or #3 are activated provided the sync signal is present at Input #1.	NAC will activate when any input (1, 2, or 3) activates[2].	NAC will activate when Input #2 or Input #3 are active regardless of sync input at Input #1. If Sync signal is present at Input #1, the output follows the sync. If the sync signal at Input #1 is deemed LOST, the outputs are turned on steady.

[1] = Command input #1 is assigned as the synchronization input point when S1 position 3 is OFF. Command Input #1 is not available as a control point.

[2] = Do not use this setting when positions 3,4,5,6 (output protocol) for this output switch group are set to one of the Master Configurations with Selective Silence. Command input #2 is used for the selective silence input.

[3] = Do not use this setting when positions 3,4,5,6 (output protocol) for this output switch group are set to Master Configuration, Selective Silence, Dynamic Signaling – System Sensor. Command input #3 is used for the horn pattern selection.

3.2.2 OUTPUT FUNCTION AND PROTOCOL

3.2.2.1 Unused Outputs

The factory default setting for all output circuits is “unused/ unsupervised” where positions 3, 4, 5, and 6 are set to the OFF position. Any unused or disabled outputs in the system configuration must be set to OFF as shown below.

Table 3.11 Output Function - Unused

Position 3	Position 4	Position 5	Position 6	Output Function
OFF	OFF	OFF	OFF	Unused/ Unsupervised. Outputs will not activate. Factory default setting.
ON	OFF	OFF	OFF	Reserved- Outputs will not activate

3.2.2.2 Remote Supply with Resettable and Non-Resettable Power

Each output circuit on the power supply can be used as a remote stand-alone power supply to provide power to any devices that require filtered, resettable or non-resettable power. The power supply can provide up to 3 amps of continuous current. Non-resettable power is suitable for powering annunciators and other peripheral equipment. Resettable power is suitable for four-wire smoke detectors. Resettable outputs reset when the mapped input receives a negative pulse trigger signal from FACP or control module. There will be a three second delay prior to output reset. The output reset will last 10 seconds. Set DIP switches positions indicated in the table below.

Table 3.12 Output Function - Auxiliary Power Settings

Position 3	Position 4	Position 5	Position 6	Output Function
OFF	**ON**	OFF	OFF	Non-resettable (constant) aux power
OFF	OFF	**ON**	OFF	Resettable aux power

3.2.2.3 Door Holder

Each output circuit can be configured as a door holder circuit. Setting DIP switch positions according to Table 3.13 Output Function - Door Holder Power will configure the selected output circuit as a door holder circuit which will provide a steady 24 VDC to door holders until a mapped input activates an alarm or when an AC fail condition removes the power following a programmable delay. See "AC Loss Door Holder Dropout Timer" on page 24 for more information.

Table 3.13 Output Function - Door Holder Power

Position 3	Position 4	Position 5	Position 6	Ouptut Function
ON	**ON**	OFF	OFF	Set as door holder circuit

3.2.2.4 Synchronizing NACs - Slave Configurations (NAC follower)

Each of the power supply outputs can be independently configured for Slave Synchronization by setting DIP switches according to Table 3.14 Output Function - Slave Configuration Settings . Synchronization is a feature that controls the activation of notification appliances in such a way that all devices will turn on and off at exactly the same time. This is particularly critical when activating strobes which must be synchronized to avoid random activation and a potential hazard or confusion.

In some installations, it is necessary to synchronize the flash timing of al strobes in the system for ADA compliance. Strobes accomplish this by monitoring very short timing pulses on the NAC power which are created by an FACP with synchronization capability. If a NAC wire run from the host FACP or power supply is re-purposed as a control circuit to the input of a power supply, the power supply NAC output circuits can track (follow) the strobe synchronization timing pulses. This maintains the overall system flash timing of the additional strobes attached to this power supply. Note that strobe synchronization works only with non-coded NACs.

When the output circuit is configured as a sync follower (Slave Synchronization Configuration), the power supply's NAC outputs track the strobe synchronization pulses present at the supply's Input terminals (based on the settings selected from 3.2.1 Command Inputs/ NAC Circuit Activation). The pulses originate from an upstream FACP or other power supply. Some FACPs provide synchronization timing pulses from a dedicated sync output connector. Connect the power supply input terminals to the FACP sync output connector instead of the FACP NAC.

If circuits are configured for both Master and Slave Configuration, devices must be installed in different zones or field of view on a circuit basis.

Table 3.14 Output Function - Slave Configuration Settings

Position 3	Position 4	Position 5	Position 6	Output Function
ON	OFF	**ON**	OFF	Slave Configuration (NAC follower) - NAC outputs track Command Input Circuits

3.2.2.5 Synchronizing NACs – Master Configuration – Coded Audible

Each output circuit can be configured as a Notification Appliance Circuit for driving an audible device. Setting DIP switch positions according to Table 3.15 Output Function – Master Configuration – Coded Audible will configure the selected output circuit to provide a modulated 24 VDC to audible appliance devices while the assigned command input is active.

Table 3.15 Output Function - Master Configuration - Coded Audible

Position 3	Position 4	Position 5	Position 6	Output Function
OFF	ON	ON	OFF	Master Configuration – ANSI Temporal (Temporal 3)
ON	ON	ON	OFF	Master Configuration – CO Temporal (Temporal 4)

3.2.2.6 Synchronizing NACs – Master Configuration – No Selective Silence

Each output circuit can be configured as a Notification Appliance Circuit for driving strobe only or strobe and audible devices with specific brand compatibility. Setting DIP switch positions according to Table 3.16 Output Function – Master Configuration - No Selective Silence will configure the selected output circuit to provide a modulated 24 VDC to notification appliance devices while the assigned command input is active.

Table 3.16 Output Function - Master Configuration - No Selective Silence

Position 3	Position 4	Position 5	Position 6	Output Function
OFF	OFF	OFF	ON	Master Configuration – Amseco/ Potter
OFF	ON	OFF	ON	Master Configuration – Gentex
OFF	OFF	ON	ON	Master Configuration – System Sensor
OFF	ON	ON	ON	Master Configuration - Wheelock

3.2.2.7 Synchronizing NACs – Master Configuration – With Selective Silence, No dynamic Signaling

Each output circuit can be configured as a Notification Appliance Circuit for driving strobe only or strobe and audible devices with specific brand compatibility. Selective Silence allows the silencing of the sounder portion of a horn/ strobe combination device without turning off the strobe. Selective Silence without dynamic signaling is only supported while in Master Configuration setting for Amseco, Gentex, and Wheelock. Refer to "Synchronizing NACs – Master Configuration – With Selective Silence and dynamic Signaling" below for System Sensor.

Refer to Table 3.17 Output Function – Master Configuration - Selective Silence no dynamic signaling to select the desired Master Configuration, Selective Silence without dynamic signaling sync type.

Command inputs #1 and #2 are required for operation. Do not apply synchronization signals to Command Input #1 and #2. Only trigger signals are allowed (i.e. constant 9-32 VDC). Synchronization signal is internally generated by the system when in Master Configuration.

Table 3.17 Output Function - Master Configuration - Selective Silence no dynamic signaling

Position 3	Position 4	Position 5	Position 6	Output Function
ON	OFF	OFF	ON	Master Configuration – Amseco/ Potter
ON	ON	OFF	ON	Master Configuration – Gentex
ON	ON	ON	ON	Master Configuration – Wheelock

Input #1 is for activating the horn/ strobe devices, while Input 2 only controls sounding of the horns. Input #1 must be active for Input #2 to have any effect on NAC outputs set for Selective Silence. Input #3 is not used for Master Configuration with selective silence and no dynamic signaling. The table below provides additional detail.

Table 3.18 Master Configuration - Selective Silence Operation

Command Input #1	Command Input #2	Command Input #3	Output Operation
OFF	OFF	Ignored	Output Circuit will be OFF
ON	ON	Ignored	Strobes and horns will be activated
ON	OFF	Ignored	Only the strobes will be activated
OFF	ON	Ignored	Output Circuit will be OFF

3.2.2.8 Synchronizing NACs – Master Configuration – With Selective Silence and dynamic Signaling

Each output circuit can be configured as a Notification Appliance Circuit for driving strobe only or strobe and audible devices with specific brand compatibility. Selective Silence allows the silencing of the sounder portion of a horn/ strobe combination device without turning off the strobe. Dynamic signaling allows the transition between Temporal 4 (CO Alarm) and Temporal 3 (Fire Alarm) based on the active events in the system. Selective Silence with dynamic signaling is only supported while in Master Configuration setting for System Sensor and with System Sensor devices that support dynamic signaling.

Compatible System Sensor devices support a “Magnet Test” mode where the circuit will be energized, but each device will remain silent until a magnet is presented at the device. When the magnet is present the device will activate for light and sound. When the magnet is removed the device will turn off.

Refer to Table 3.19 Output Function – Master Configuration - Selective Silence (no dynamic signaling) to select the Master Configuration, Selective Silence with dynamic signaling for System Sensor.

Command inputs #1, #2, and #3 are required for operation. Do not apply synchronization signals to Command Input #1, #2, or #3. Only trigger signals are allowed (i.e. constant 9-32 VDC). Synchronization signal is internally generated by the system when in Master Configuration.

Table 3.19 Output Function - Master Configuration - Selective Silence (no dynamic signaling)

Postion 3	Position 4	Position 5	Position 6	Output Function
ON	OFF	ON	ON	Master Configuration – Selective Silence, Dynamic Signaling, and Magnet Test Mode - System Sensor

- Command Input #1 will turn on or off the NAC. The NAC will not turn on without a valid trigger at Command Input #1.
- Activating all three command inputs will result in the typical fire evacuation signaling (Temp 3 and Strobe).
- De-activating Command inputs #2 and #3 will result in the typical selective silence operation of strobe only.
- Activating command inputs #1 and #2 will result in the Carbon monoxide signaling (Temp 4 and Strobe).
- Activating command inputs #1 and #3 will result in the test mode operation of magnet test.

The table below provides additional detail:

Table 3.20 Master Configuration - Selective Silence Operation

Command Input #1	Command Input #2	Command Input #3	Ouput Operation
OFF	OFF	OFF	Output Circuit will be OFF
OFF	OFF	ON	Output Circuit will be OFF
OFF	ON	OFF	Output Circuit will be OFF
OFF	ON	ON	Output Circuit will be OFF
ON	OFF	OFF	Strobe Active – Silenced Audibles
ON	OFF	ON	Magnet Test Mode – Circuit Energized. Only devices with a magnet present will activate[1]
ON	ON	OFF	Strobe Active – Audible Active with Temporal 4 (CO Alarm)[2]
ON	ON	ON	Strobe Active – Audible Active with Temporal 3 (Fire Alarm)

[1] = System Sensor Devices that support Magnet test are required

[2] = System Sensor Devices that support TEMP 3 TEMP 4 are required

3.2.3 ZNAC-PS WIRING CONFIGURATION

NAC circuits (all outputs) and aux power circuits (outputs 1 and 2) can be converted to Class A wiring using the ZNAC-PS option card. Setting DIP switch position 7=ON when a selected output circuit is configured for Class A wiring. The default setting is OFF for Class B wiring.

Table 3.21 Class A Wiring

Position 7	Wiring Style
OFF	Class B
ON	Class A

3.3 MAXIMUM NUMBER OF STROBES FOR SYNCHRONIZATION

The total current draw for each Notification Appliance Circuit cannot exceed 3.0 amps special application, 1A (6 amp model) or 1.5A (10 amp model) regulated. Refer to the manufacturer's documentation supplied with the strobe to determine the maximum current draw for each strobe and ensure that the circuit maximum is not exceeded.

To ensure proper strobe and circuit operation, there is also a limit to the number of strobes that can be attached to each circuit. Following is a table of the strobes that have been tested with the power supply and the maximum number that can be connected to each NAC when using the lowest candela settings. Use the following tables to make sure that the NAC maximum current is not exceeded:

Table 3.22 Maximum Number of Strobes per Circuit - HPF-PS6/E

	HPF-PS6/E				
Number of Supported LED Strobes	NAC 1	NAC 2	NAC 3	NAC 4	NAC 5
	35	35	35		
	26	26	26	26	
	21	21	21	21	21

Table 3.23 Maximum Number of Strobes per Circuit - HPF-PS10/E

	HPF-PS10/E						
Number of Supported LED Strobes	NAC 1	NAC 2	NAC 3	NAC 4	NAC 5	NAC 6	NAC 7
	37	37	37	37			
	30	30	30	30	30		
	25	25	25	25	25	25	
	21	21	21	21	21	21	21

Table 3.24 Maximum Number of Xenon Strobes

Manufacturer	max. number of strobes[1]
System Sensor	69
Gentex	42
Wheelock	50
Amseco/ Potter	34

1 These values are for strobe-only devices at the minimum candela setting. Values will be different for strobe/ horn and horn-only devices. Refer to the manufacturer's installation documents for values on these devices.

SECTION 4: LED INDICATORS

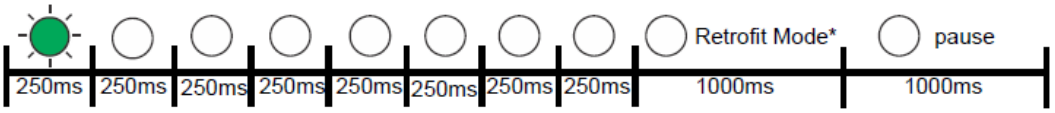
The power supply has 3 system LED indicators for Power, Batt/ Chgr Fault, and Ground Fault. In addition, each available output circuit also has 2 status LEDs. Refer to Figure 1-1: 10 Amp Power Supply Board Layout for LED locations. A description of each LED indication is given below.

Ground Fault LED (yellow)

No Fault	LED is OFF
Fault Condition: ground fault	LED is ON constant

Power LED (green)

No Fault	LED is ON constant
Fault Condition: AC power loss (or brownout) 1 short blink (250ms)	Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)



*Retrofit Mode will be indicated by an LED blink on the NAC1 Trouble LED only.

Battery fault LED (yellow)

No Fault	LED is OFF
Fault Condition: Charging path (FETs) failure 1 short blink (250ms)	Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)



Fault Condition: Charger voltage too low or Charger Diode Fault 2 short blinks (250ms)

Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)



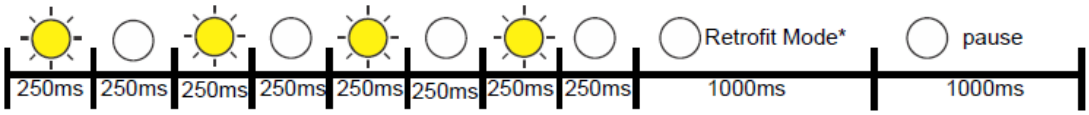
Fault Condition: Battery discharged/overcharged 3 short blinks (250ms)

Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)



Fault Condition: Battery disconnected/fully discharged 4 short blinks (250ms)

Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)

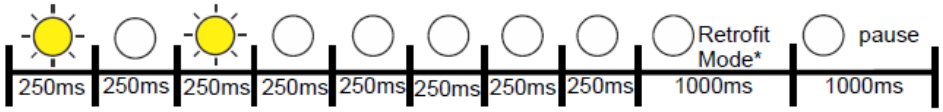
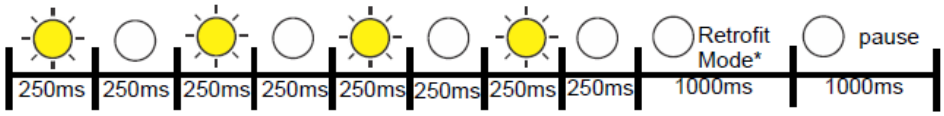


*Retrofit Mode will be indicated by an LED blink on the NAC1 Trouble LED only.

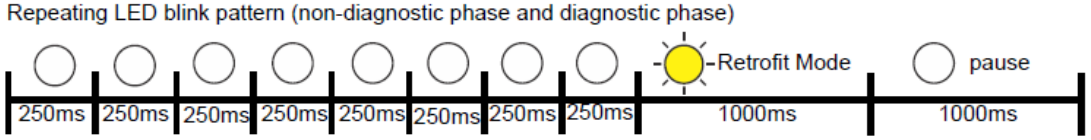
Output Circuit Status LEDs (red)

Output inactive	LED is OFF
Output active	LED is ON constant

Output Circuit Trouble LEDs (yellow)

No Fault	LED is OFF
Fault Condition: Wire Supervision Class A or B Open circuit 1 short blink (250ms)	Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)  *Retrofit Mode will be indicated by an LED blink on the NAC1 Trouble LED only
Fault Condition: Wire Supervision Class A or B Short Circuit 2 short blinks (250ms)	Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)  *Retrofit Mode will be indicated by an LED blink on the NAC1 Trouble LED only
Fault Condition: Aux Power Supervision Class A Open circuit (ZNAC-PS Circuit #1 and #2 only) 3 short blinks (250ms)	Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)  *Retrofit Mode will be indicated by an LED blink on the NAC1 Trouble LED only
Fault Condition: Power limit condition (individual ckt overload) 4 short blinks per individual circuit (250ms) Fault Condition: Power limit condition (panel overload) 4 short blinks on all output circuits (250ms)	Repeating LED blink pattern (non-diagnostic phase and diagnostic phase)  *Retrofit Mode will be indicated by an LED blink on the NAC1 Trouble LED only
Operating Mode Fault: Power Supply Change Output Config. Mode Set positions 9 and 10 on S1 to the correct position. Refer to “Operating Modes” on page 26.	Repeating LED blink pattern (non-diagnostic phase) Output circuit Trouble LEDs blink from right to left across all output circuits for 500ms.

Retrofit Mode Indication (yellow)

Retrofit Mode will be indicated by an LED blink on the NAC1 Trouble LED only. NAC outputs fault conditions will still be indicated by short 250ms blinks (where applicable).	Repeating LED blink pattern (non-diagnostic phase and diagnostic phase) 

SECTION 5: TROUBLE SUPERVISION

The FACP will detect power supply faults. Any of the following conditions will cause the trouble contact to open, provided the FACP Noti- fication Appliance Circuit is not in alarm.

5.1 TROUBLE SUPERVISION USING INPUT CIRCUITS

The FACP (Fire Alarm Control Panel) supervises the connection between itself and the power supply via the control panel's NAC End-of-Line Resistor (ELR). To supervise the power supply, an ELR must be installed across terminals 1 & 4 (A+ & A-) of Command Inputs #1 and #2 (and #3 for the 10 amp models). A field wiring fault on the NAC output of the power supply will trigger a disconnection of the ELR at the related Command Input, causing a general NAC trouble at the FACP provided the FACP's NAC is not in alarm. All inputs in an alarm state will close their EOL relays to allow the daisy-chaining of input signals (both in Default Mode or Retrofit Mode). Refer to 3.2 Output Circuit Control DIP Switch Settings for input/ output configuration assignment. The following are exceptions.

01. Resettable Aux Power, Non-Resettable Aux Power, and Door Holder Aux Power outputs will trigger the General Trouble relay only during an output trouble regardless of the output to input relationship (i.e. mapping) when the Power supply is configured in the Default Mode. When configured in Retrofit Mode, they will be reported by either the Input#1 or Input#2 (if Input #1 is in Dedicated Sync Configuration) EOL relay, and in addition by the General Trouble relay 5.2 General Trouble Relay below.
02. Faults are only reported by Command Input #1 when Selective Silence Output Configuration is controlled by Command Input #1 and #2.
03. Faults are only reported by the trigger input when Command Input #1 is configured for Dedicated Sync Configuration operation controlled by a sync and trigger input.

    If the power supply is in alarm, only a power-limiting condition on the NAC will be detected as a trouble.

    If other trouble monitoring is required when the power supply is in alarm, the Trouble Relay at TB1 and AC Trouble at TB2, and Ground Fault Trouble at TB3 can be used for this purpose.

    The following table summarizes the trouble supervision using the input end-of-line relays in both Default Mode and Retrofit Mode.

    Note that when the power supply is configured for Retrofit Mode, the FACP should be monitoring either Input #1/ Input #2 end-of-line relay or the General trouble relay, not both.

Table 5.1 Operating Mode Behavior for Trouble Supervision Using Input Circuits

Panel Status	Default Mode	Retrofit Mode
Input #x end-ofline relays in standby	• Any new open, short, ZNAC faults, or existing power-limiting conditions of Slave or Master (non-selective silence) NAC outputs are reported at the mapped command input EOL relay (or Input #1 in case of outputs mapped to ALL inputs). • If Input #1 is configured as a dedicated sync input, outputs can be mapped only to trigger Inputs #2 or Input #3 or either. If there is a trouble on any output circuits, the Input #1 EOL relay is unaffected. Any new open, short, ZNAC faults, or existing power-limiting conditions of Slave or Master (non-selective silence) NAC outputs are, however, reported at respective mapped Command Input #2 or Input #3 EOL Relay or at Command Input #2 if outputs are mapped to either. • Any new open, short, ZNAC faults, or existing power-limiting conditions of Master selective silence NAC outputs are reported at the Input #1 EOL relay.	**If Input #1 is configured as Non-Dedicated (S1 DIP switch 3 =ON):** • Any new open, short, ZNAC faults, or existing power-limiting conditions of Slave or Master (non-selective silence) NAC outputs are reported at the Input #1 EOL relay (for any outputs mapped to either Input #1, Input #2, Input #3, or mapped to ALL inputs) • Any new open, short, ZNAC faults, or existing power-limiting conditions of Master selective silence NAC outputs are reported at the Input #1 EOL relay. • Any new or existing fault conditions of resettable aux power, non-resettable aux power, or door holder outputs are reported at the Input #1 EOL relay. • Any new or existing battery, charger, panel overload, or AC fuse trouble conditions are reported at the Input #1 EOL relay. **If S1 Global DIP switch 8 = OFF** • Any new or existing AC trouble or ground fault trouble are reported at Input #1 EOL Relay (with 0 or 2h AC trouble delay depending on S1 Global DIP switch 7 Configuration). If S1 Global DIP switch 8=ON • Any new or existing ground fault trouble will be reported at Input #1 EOL Relay. **If Input #1 is configured as Sync (S1 DIP switch 3 =OFF):** • Any new open, short, ZNAC faults, or existing power-limiting conditions of Slave or Master (non-selective silence) NAC outputs are reported at the Input #2 EOL relay (for any outputs mapped to either Input #2, Input #3, or mapped to ALL inputs). • Any new or existing fault conditions of resettable aux power, non-resettable aux power, or door holder outputs are reported at the Input #2 EOL relay. • Any new or existing battery, charger, panel overload, or AC fuse trouble conditions are reported at the Input #2 EOL relay. **If S1 Global DIP switch 8 = OFF** • Any new or existing AC trouble or ground fault trouble are reported at Input #2 EOL Relay (with 0 or 2h AC trouble delay depending on S1 Global DIP switch 7 Configuration) If S1 Global DIP switch 8=ON • Any new or existing ground fault troubles will be reported at Input #2 EOL Relay.
Input #x end-of- line relays in alarm	• All inputs in alarm state will close their EOL relays to allow the daisy-chaining of input signals.	• All inputs in alarm state will close their EOL relays to allow the daisy-chaining of input signals

5.2 GENERAL TROUBLE RELAY

The power supply has a fail-safe Form-C trouble relay located at TB1. The contacts can be monitored by an FACP input circuit or an addressable monitor module as illustrated in Figure 5-1: Monitoring the Trouble Relay . Note that any faults reported by Command Inputs are not repeated by the trouble relay in Default Mode, offering limited trouble reporting. For Retrofit Mode trouble reporting, refer to Table 5.1 Operating Mode Behavior for Trouble Supervision Using Input Circuits above and Table 5.2 Operating Mode Behavior for the General Trouble Relay below. When the power supply is configured for Retrofit Mode, the FACP should be monitoring either Input #1/ Input #2 end-of-line relay or the General Trouble Relay, but not both.

Trouble conditions that will cause the normally energized trouble relay to change states regardless of whether the panel is in alarm or standby:

• A battery fail condition at the power supply
• A battery charger fail on the power supply
• A ground fault condition on the power supply (in Retrofit Mode if S1 Global DIP switch 8 = OFF)
• An AC fail condition (only in Retrofit Mode, if S1 Global DIP switch 8 = OFF)
• A field wiring fault on the power supply outputs configured as resettable aux power, non-resettable aux power, or door holder aux power
• A total panel overload fault
• A blown AC fuse
• A field wiring fault on the NAC output configured as Slave, Master, or Master Selective Silence Outputs (only in Retrofit Mode) The following table summarizes the trouble supervision using the General trouble relay in both Default Mode and Retrofit Mode.

NOTE: When the power supply is configured in Retrofit Mode, the FACP should be monitoring either Input #1/ Input #2 end-of-line relay or the Internal trouble relay, but not both.

Table 5.2 Operating Mode Behavior for the General Trouble Relay

Panel Status	Default Mode	Retrofit Mode
General Trouble relay in Standby and Alarm	• Any new or existing battery, charger, panel overload, AC fuse, or ground trouble conditions are reported. • Any new or existing fault conditions of resettable aux power, non-resettable aux power, or door holder outputs are reported.	• Any new or existing battery, charger, panel overload, or AC fuse trouble conditions are reported. • Any new or existing fault conditions of resettable aux power, non-resettable aux power, or door holder outputs are reported. • Any new open, short, ZNAC faults, or power-limiting conditions of Slave or Master (non-selective silence) NAC outputs which are mapped to command Input 1, Input 2, Input 3, or mapped to ALL inputs are reported. • Any new open, short, ZNAC faults, or existing power-limiting conditions of Master selective silence NAC outputs are reported. **If S1 Global DIP switch 8= OFF** • Any new or existing AC trouble or ground fault trouble are reported (with 0 or 2h AC trouble delay depending on S1 Global DIP switch 7 Configuration). **If S1 Global DIP switch 8=ON** • Any new or existing ground fault trouble will be reported.

If trouble monitoring is required when the power supply is in alarm, the General Trouble Relay at TB1 can be used for this purpose. Refer to Figure 5-1: Monitoring the Trouble Relay below.

NOTE: The individual NAC Trouble LED will indicate which NAC circuit is in trouble.

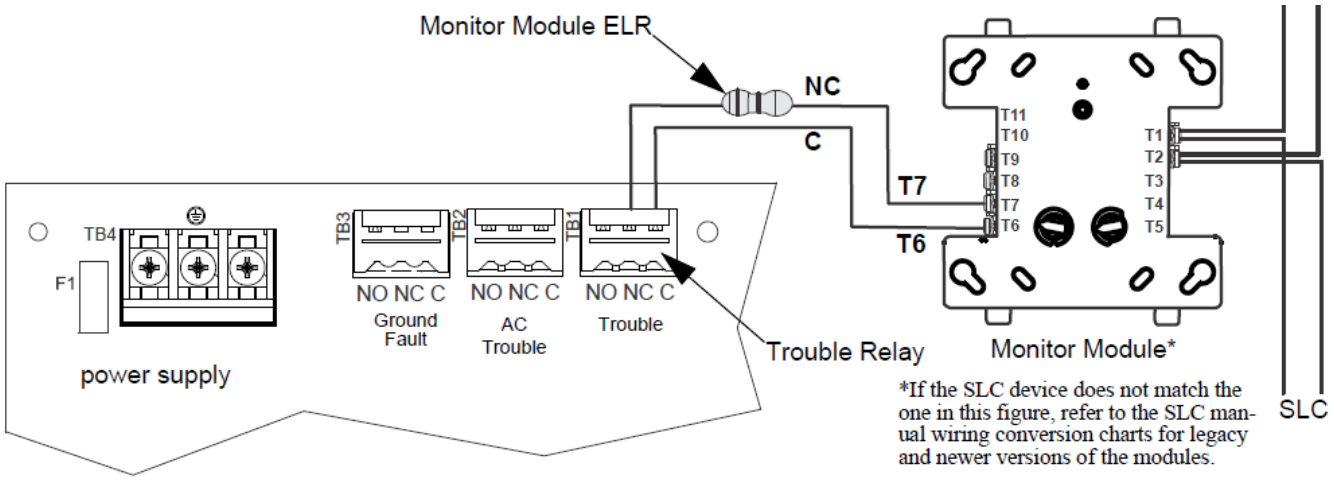


Figure 5-1: Monitoring the Trouble Relay

Figure 5-2: Monitoring the Trouble Relay (US Applications) illustrates how to wire for trouble monitoring in US applications where separate ground fault monitoring is not required.

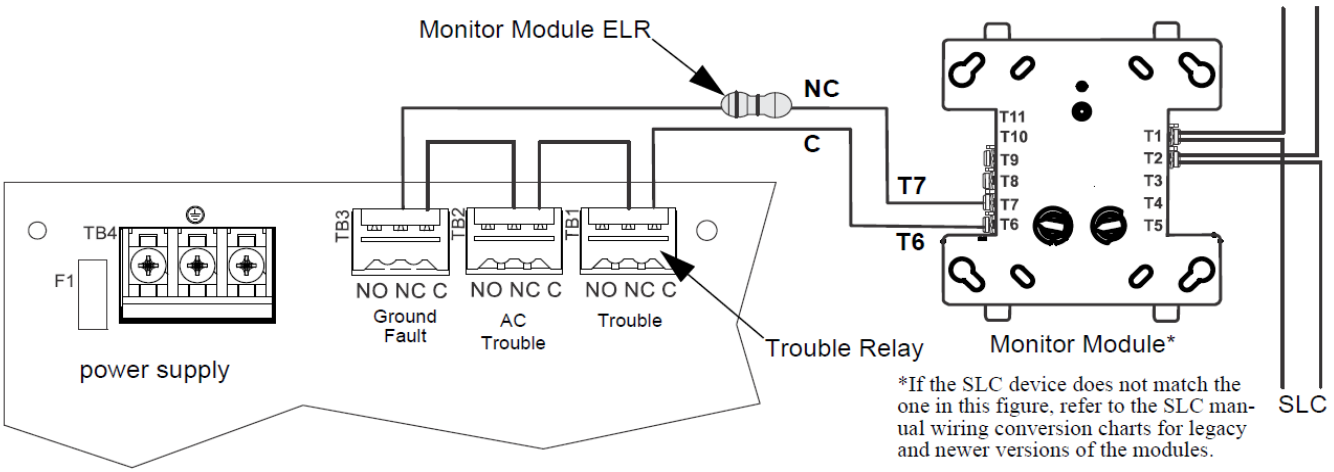


Figure 5-2: Monitoring the Trouble Relay (US Applications)

5.3 AC TROUBLE RELAY

The power supply has a fail-safe Form-C trouble relay located at TB2. The contacts can be monitored by an FACP input circuit or an addressable monitor module similar to the drawing illustrated in Figure 5-1: Monitoring the Trouble Relay . The AC Trouble Relay responds to an AC fail condition on the power supply immediately, or after a programmed delay time, depending on the setting of S1 switches 7 and 8.

The reporting of AC loss to a central station is usually delayed in order to prevent multiple transmissions of AC loss and restoral, allowing AC power to stabilize. When a host FACP is programmed to delay AC loss reporting, the power supply must be configured to delay the reporting of AC fail. This is accomplished by setting S1 positions 7 and 8. Refer to the DIP switch setting chart in 3.1.5 AC Loss Indication Delay . This will prevent AC loss from being reported as a trouble condition for 30, 12, 2, or 0 hours. (Only the 2 and 0 hours options are available in Retrofit Mode.) Note that only the no-delay and the 2-hour delay are acceptable per UL 864 and UL 2572.

NOTE: When the power supply is configured for Retrofit Mode, the S1 Global DIP switch 8 setting will determine how an AC power loss trouble condition is reported

- If S1 Global DIP switch 8 = OFF, an AC power loss trouble condition is reported by either Input #1 or Input #2 EOL relay and by the General Trouble relay.
- If S1 Global DIP switch 8 = ON, an AC power loss trouble condition is reported by the AC trouble relay only.

The following table summarizes the trouble supervision using the AC trouble relay in both Default Mode and Retrofit Mode.

Panel Status	Default Mode	Retrofit Mode
AC Trouble relay in Standby and Alarm	• Any new or existing AC trouble conditions are reported (with 0, 2, 12, or 30 hour delay depending on S1 Global DIP switch 7 and 8 configuration).	• IF S1 Global DIP switch 8 = ON, any new or existing AC trouble conditions are reported (with 0 or 2 hour delay depending on S1 Global DIP switch 7 configuration.)

5.4 GROUND FAULT RELAY

The power supply has a form-C trouble relay located at TB3. The contacts can be monitored by an FACP input circuit or an addressable monitor module similar to the drawing illustrated in Table 5.1 Operating Mode Behavior for Trouble Supervision Using Input Circuits . Ground fault conditions will cause the relay to change states regardless of whether the panel is in alarm or standby.

Note that when the power supply is configured for Retrofit Mode, the S1 Global DIP switch 8 setting will determine how a Ground fault trouble condition is reported.

• S1 Global DIP switch 8 = OFF, a ground fault trouble condition is reported by either Input #1 or Input #2 EOL relay, and by the General Trouble relay.
• S1 Global DIP switch 8 = ON, a ground fault trouble condition is reported by the Ground fault relay only.

The following table summarizes the trouble supervision using the Ground fault relay in both Default Mode and Retrofit Mode.

Panel Status	Default Mode	Retrofit Mode
Ground Fault relay in Standby and Alarm	• Any new or existing ground fault trouble conditions are reported (for Canadian applications only).	• S1 Global DIP switch 8 = ON, any new or existing ground fault trouble conditions are reported.

SECTION 6: POWER SUPPLY REQUIREMENTS

6.1 OVERVIEW

This section contains instructions and tables for calculating power supply currents in alarm and standby conditions. This is a four-step process, consisting of the following:

01. Calculating the total amount of AC branch circuit current required to operate the system
02. Calculating the power supply load current for secondary non-fire and fire alarm conditions
03. Calculating the size of batteries required to support the system if an AC power loss occurs
04. Selecting the proper batteries for your system

6.2 CALCULATING THE AC BRANCH CIRCUIT

The power supply requires connection to a separate, dedicated AC branch circuit, which must be labeled **FIRE ALARM**. This branch circuit must connect to the line side of the main power feed of the protected premises. No other non-fire alarm equipment may be powered from the fire alarm branch circuit. The branch circuit wire must run continuously, without any disconnect devices, from the power source to the power supply. Over-current protection for this circuit must comply with Article 760 of the National Electrical Codes as well as local codes. Use a minimum of 14 AWG (2.00 mm^2) wire with 600 volt insulation for this branch circuit.

Use Table 6.1 120/240 VAC Branch Circuit Requirements to determine the total amount of current, in AC amperes, that must be supplied to the system.

Table 6.1 120/240 VAC Branch Circuit Requirements

Device Type	Number of Devices		Current Draw (AC amps)		Total Current per Device
120V, 6 amp model or 120V, 10 amp model or 240V, 6 amp model or 240V, 10 amp model	1	x	5.0 or 6.2 or 2.7 or 3.5	=	
[ ]	[ ]	x	[ ]	=	
[ ]	[ ]	x	[ ]	=	
Sum Column for AC Branch Current Required				=	

6.3 CALCULATING THE SYSTEM CURRENT DRAW

6.3.1 OVERVIEW

The power supply must be able to power all internal and external devices continuously during a fire alarm condition. The secondary power source (batteries) must be able to power the system during a primary power loss.To calculate the non-fire alarm load on the power supply when secondary power is applied, use Calculation Column 1 in Table 6.3 System Current Draw Calculations . The power supply must support a larger load current during a fire alarm condition. To calculate the fire alarm load on the power supply as secondary power, use Calculation Column 2 in Table 6.3 System Current Draw Calculations .

When calculating current draw and the battery size, note the following:

- *Primary* refers to the main power source for the power supply.
- *Secondary* refers to the power supply's backup batteries.

• All currents are given in amperes (A). Table 6.2 Converting to Full Amperes shows how to convert milliamperes and microamperes to full amperes.

Table 6.2 Converting to Full Amperes

To convert...	Multiply	Example
Milliamperes (mA) to amperes (A)	mA x 0.001	3 mA x 0.001 = 0.003 A
Microamperes (mA) to amperes (A)	mA x 0.000001	300 mA x 0.000001 = 0.0003 A

6.3.2 HOW TO CALCULATE SYSTEM CURRENT DRAW

Use Table 6.3 System Current Draw Calculations to calculate current draws as follows and refer to the battery calculation tool on the fire panel brand's website.

01. Enter the quantity of devices in both columns.
02. Enter the current draw where required. Refer to the Device Compatibility Document for the brand of FACP for compatible devices and their current draws.
03. Calculate the current draws for each in both columns.
04. Sum the total current for each column.

Following are the types of current that can be entered into the table below.
• **Calculation Column 1 -** The secondary supply current load that the power supply must support during a non-fire alarm condition, with DC power applied
• **Calculation Column 2 -** The secondary supply current load the power supply must support during a fire alarm condition, with DC power applied

Table 6.3 System Current Draw Calculations contains two columns for calculating current draws. For each column, calculate the current and enter the total (in amperes) in the bottom row. When finished, use the data to select the proper size batteries in Table 6.4 Maximum Battery Standby Loads for 24 Hour Standby on the 6 Amp Power Supply and Table 6.5 Maximum Battery Standby Loads for 24 Hour Standby on the 10 Amp Power Supply .

Table 6.3 System Current Draw Calculations

Device Type	Calculation Column 1 Secondary, Non-Fire Alarm Current (amps)			Calculation Column 2 Secondary, Fire Alarm Current (amps)		
	Qty	X (current draw) =	Total	Qty	X (current draw) =	Total
Main Circuit Board - 6 amp power supply with all outputs 2k EOL	1	X [0.154] =		1	X [0.192] =	
Main Circuit Board - 6 amp power supply with 4.7k EOL	1	X [0.139] =		1	X [0.157] =	
Main Circuit Board - 6 amp power supply with 27k EOL	1	X [0.124] =		1	X [0.137] =	
Main Circuit Board - 6 amp power supply with all Outputs Aux Power Class B	1	X [0.132] =		1	X [0.132] =	

Main Circuit Board - 6 amp power supply with ZNAC-PS Class A option card with all outputs Aux Power	1	X [0.142] =		1	X [0.142] =	
Main Circuit Board - 10 amp power supply with all outputs 2k EOL	1	X [0.178] =		1	X [0.232] =	
Main Circuit Board - 10 amp power supply with 4.7k EOL	1	X [0.156] =		1	X [0.185] =	
Main Circuit Board - 10 amp power supply with 27k EOL	1	X [0.135] =		1	X [0.154] =	
Main Circuit Board - 10 amp power supply with all Outputs Aux Power Class B	1	X [0.149] =		1	X [0.149] =	
Main Circuit Board - 10 amp power supply with ZNAC-PS Class A option card with all outputs Aux Power	1	X [0.160] =		1	X [0.160] =	
NAC/ Output #1	[ ]	X [ ] =		[ ]	X [ ] =	
NAC/ Output #2	[ ]	X [ ] =		[ ]	X [ ] =	
NAC/ Output #3	[ ]	X [ ] =		[ ]	X [ ] =	
NAC/ Output #4	[ ]	X [ ] =		[ ]	X [ ] =	
NAC/ Output #5	[ ]	X [ ] =		[ ]	X [ ] =	
NAC/ Output #6	[ ]	X [ ] =		[ ]	X [ ] =	
NAC/ Output #7	[ ]	X [ ] =		[ ]	X [ ] =	

EOLR-1 Power Supervision Relay	[ ]	X [0.020] =		[ ]	X [0.020] =	
Sum each column for totals	**Secondary Non-Alarm =**			**Secondary Alarm =**		

6.4 SELECTING AND LOCATING BATTERIES

Select batteries that meet or exceed the total ampere hours determined in Tables 6.4 and 6.5. The power supply can charge batteries from 7 AH to 33 AH range. The power supply cabinet is capable of housing industry standard 7 AH or 18 AH batteries. Other ampere batteries (e.g. 12AH, 26AH, 33AH) will not fit physically inside the power supply cabinet and require a separate battery box.

6.4.1 NFPA BATTERY REQUIREMENTS

NFPA 72 Local and Proprietary Fire Alarm Systems require 24 hours of standby power followed by 5 minutes in alarm for normal operations, 15 minutes for mass notification systems, or 30 minutes for Canadian applications.

NOTE: When using carbon monoxide detection, the system must be monitored by a Supervising Station meeting the Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment, NFPA 720.

6.4.2 MAXIMUM BATTERY STANDBY LOAD

Table 6.4 Maximum Battery Standby Loads for 24 Hour Standby on the 6 Amp Power Supply and Table 6.5 Maximum Battery Standby Loads for 24 Hour Standby on the 10 Amp Power Supply show the standby load calculations for the power supply based on 24 hours of standby. The standby load calculations in Table 6.3 System Current Draw Calculations must be less than the number shown in Table 6.4 Maximum Battery Standby Loads for 24 Hour Standby on the 6 Amp Power Supply and Table 6.5 Maximum Battery Standby Loads for 24 Hour Standby on the 10 Amp Power Supply for the selected battery size, standby hour and alarm time. The numbers below have a built in 20% derating factor for the battery ampere capacity.

Table 6.4 Maximum Battery Standby Loads for 24 Hour Standby on the 6 Amp Power Supply

Battery Capacity (AH)	Alarm Time (min)				
	5	10	15	20	30
7	0.212 A	0.190 A	0.169 A	0.147 A	N/A
12	0.379 A	0.357 A	0.336 A	0.314 A	0.271 A
18	0.579 A	0.557 A	0.536 A	0.514 A	0.471 A
33	1.079 A	1.057 A	1.036 A	1.014 A	0.971 A
75	2.479 A	2.457 A	2.436 A	2.414 A	2.371 A
120	3.000 A	3.000 A	3.000 A	3.000 A	3.000 A

Table 6.5 Maximum Battery Standby Loads for 24 Hour Standby on the 10 Amp Power Supply

Battery Capacity (AH)	Alarm Time (min)				
	5	10	15	20	30
7	0.198 A	0.162 A	N/A	N/A	N/A
12	0.364 A	0.329 A	0.293 A	0.258 A	0.187 A
18	0.564 A	0.529 A	0.493 A	0.458 A	0.387 A
33	1.064 A	1.029 A	0.993 A	0.958 A	0.887 A
75	2.464 A	2.429 A	2.393 A	2.358 A	2.287 A
120	3.000 A	3.000 A	3.000 A	3.000 A	3.000 A

SECTION 7: TESTING AND MAINTENANCE

7.1 PERIODIC TESTING AND SERVICE

Periodic testing and servicing of equipment is essential to ensure proper and reliable operation. Test and service the power supply according to the schedules and procedures outlined in the following documents:

• NFPA Standard 72's section on Inspection, Testing and Maintenance
• All test and maintenance instruction codes and software necessary to provide test and inspection requirements of CAN/ ULC-S536, Standard for the Inspection and Testing of Fire Alarm Systems

7.2 BATTERY CHECKS AND MAINTENANCE

Maintenance-free sealed lead-acid batteries used in the system do not require the addition of water or electrolyte. These batteries are charged and maintained in a fully charged state by the main power supply's charger during normal system operation. A discharged battery typically reaches the voltage of 27.6 VDC within 48 hours;. Sealed lead-acid batteries must be replaced within at most 5 years from their date of manufacture. Minimal replacement battery capacity appears on the control panel marking label. Immediately replace a leaking or damaged battery. Replacement batteries are available from the manufacturer.

WARNING: SULFURIC ACID BATTERIES CONTAIN SULFURIC ACID WHICH CAN CAUSE SEVERE BURNS TO THE SKIN AND EYES AND DAMAGE TO FABRICS.

F1 Fuse Replacement	Not Allowed
Rechargeable Battery Replacement	Recommended Part Numbers: BAT-1270 (12V,7AH) BAT-12120 (12V, 12AH) BAT-12180 (12V 18AH) BAT-12260 (12V, 26AH) BAT-12330 (12V, 33AH)

APPENDIX A: WIRE REQUIREMENTS

Connecting external system accessories to the main circuits must be carefully considered to ensure proper operation. It is important to use the correct type of wire, gauge and run length for each circuit. The following table lists NAC wiring requirements for the 6 amp and 10 amp Power Supply.

The numbers documented in this chart are worst case numbers, based on the conditions listed below. The maximum voltage drop, maximum loop resistance, and wire length ratings can be increased with lower system current loading. Measurements are in feet.

01. The power supply is full capacity loaded at 6A/ 10A.
02. The power supply is running at the Low Battery voltage of 20.4VDC (at Battery Connector TB15). Wire lengths apply to Class B wiring, and to Class A wiring returned to the ZNAC-PS card.

Table A.1 Power Supply Wiring Requirements

Max Load (Amps)	Max Loop Resistance (Ohms)	AWG 12 (Solid)	AWG 14 (Solid)	AWG 16 (Solid)	AWG 18 (Solid)
0.25	12.804	3320	2087	1310	823
0.50	6.402	1660	1044	655	412
0.75	4.268	1107	696	437	274
1.00	3.201	830	522	327	206
1.25	2.561	664	417	262	165
1.50	2.134	553	348	218	137
1.75	1.829	474	298	187	118
2.00	1.601	415	261	164	103
2.25	1.423	369	232	146	91
2.50	1.280	332	209	131	82
2.75	1.164	302	190	119	75
3.00	1.067	277	174	109	69

Power Supply Wiring Requirements

NOTE: Calculations are based on Direct-Current Resistance data for uncoated copper wire, per National Electrical Code (2005 Edition) Table 8, Conductor Properties.

NOTE: These distances reflect the worst case scenario and are based on the correct draw of the highest candela strobes at the low end of the supported NAC voltage with the entire load at the end of the circuit. Further distances can be achieved by performing a point to point voltage calculation that more accurately reflects the specific devices used and how they are dispersed on the circuit.

A.1 CALCULATING WIRE RESISTANCE FOR RELEASING SOLENOIDS

Calculation of maximum allowable wiring resistance for releasing solenoids:

$$R_{max} = \frac{21.51 - 20.4}{I_s}$$

R_{max} = Maximum allowable resistance of wiring cable
I_s = Solenoid Current

- Typical voltage drop through Releasing Module: 0.6 V
- (See Device Compatibility Document and SLC Wiring Manual for list of compatible modules and solenoids)

APPENDIX B: APPLICATION EXAMPLES

B.1 CONTROLLING NACS FOR SELECTIVE SILENCE OPERATION USING A CONTROL MODULE

In this application, the power supply has been set as a master with synchronized outputs and selective silence (see DIP switch settings and Selective Silence Operation information in Section 3: Programming Options .) This application requires Input #1 to be controlled by the FACP. Input #2 is required for controlling selective silence via a control/ relay module, programmed as an alarm output and a silenceable point. Only Mass Notification, Fire, or combo Mass Notification/ Fire NACs are allowed in this configuration. The control module can be powered by one of the power supply output circuits, configured as aux power (24VDC). TB3 is unused.

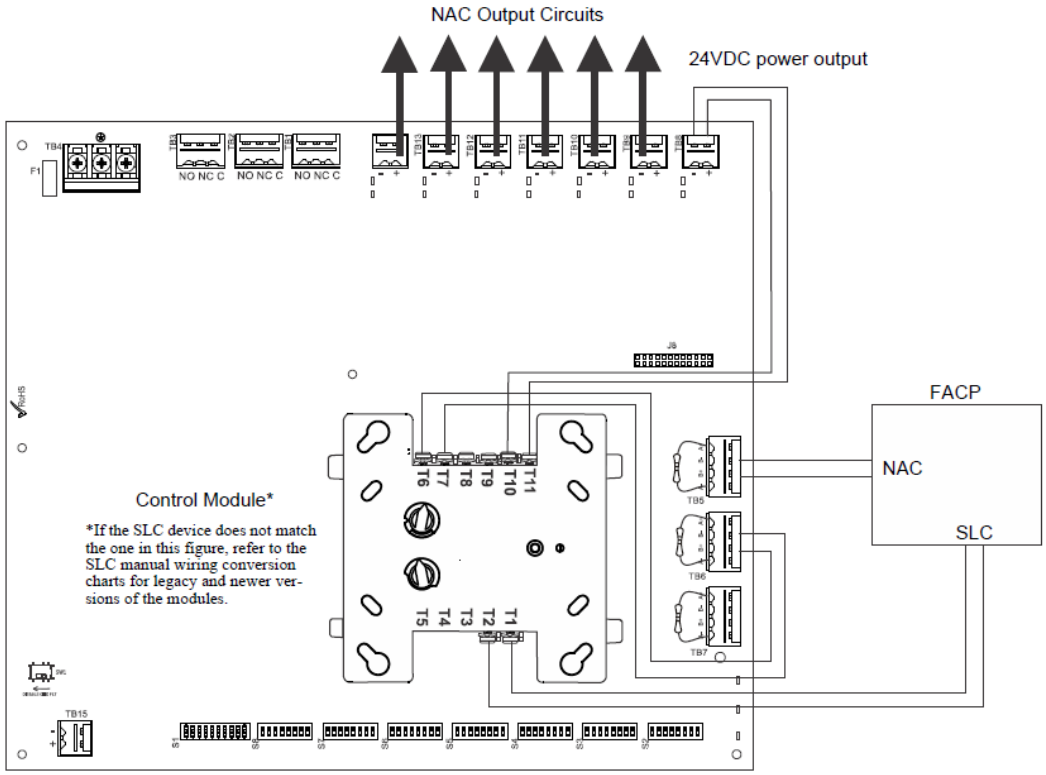


Figure B-1: Controlling Multiple Outputs with One Input

The following notes apply to Figure B-1: Controlling Multiple Outputs with One Input :

• When the power supply is in an inactive state (FACP NAC not active), a trouble on the NAC circuit will result in an open circuit condition on the FACP (monitored by End-of-Line Resistor across TB5, Terminals 1 and 4). As an alternative, the trouble contacts at TB1 of the power supply can also be used for limited trouble monitoring excluding Selective Silence output faults.
• Refer to Section 3: Programming Options for instructions on setting the DIP switches.
• Selective Silence output faults are only reported via Command Input #1 (not Command Input #2).
• Wire NACs as shown in 2.2 NAC Circuit Wiring
• Do not loop wires under screw terminals. Break wires to maintain proper supervision.
• An End-of-Line Resistor must be installed across all input circuits, Terminals 1 and 4, for control module wiring supervision (the ELR value is dependent on the module/ FACP employed).
• For a list of compatible devices, refer to the *Device Compatibility Document* for the brand of FACP.
• Refer to the *SLC Wiring Manual* for more information.

B.1.1 SELECTIVE SILENCE WITH DYNAMIC SIGNALING

In this application, the power supply has been set as a Master Configuration, Selective Silence & dynamic signaling (see DIP switch setting and Selective Silence Operation with Dynamic signaling in Section 3: Programming options.)

This application requires input #1 to be controlled by the FACP or Control/ Relay output programmed as a non-silenceable alarm output. Input #1 shall be configured to be active whenever the notification device needs to be on for any pattern. Either Fire Alarm, Carbon Monoxide Alarm, or Test mode. The output device(s) connected to the power supply will not activate if input #1 is not ON.

Input #2 is required for controlling selective silence via a Control/ Relay output, programmed as an alarm output and silence-able point. Input #2 shall activate for either a fire alarm or carbon monoxide alarm event. Input #2 shall go off when the system is partially silenced (turn off audible notification and maintain visual notification).

Input #3 is required for controlling the audible pattern via a control/ relay output, programmed as a fire alarm output and **silenceable** for the partial silence operation. Input #3 shall activate for Fire Alarms (not for CO alarms).

To use a test feature of the newer system sensor notification devices that will only activate the output when a magnet is placed on the test location of the AV device; create a user controlled general zone that will **activate input #1 and #3 ONLY. Inputs #2** shall remain off during the magnet test mode.

The Multi-Control module can be powered by one of the power supply outputs, configured as aux power (24VDC).

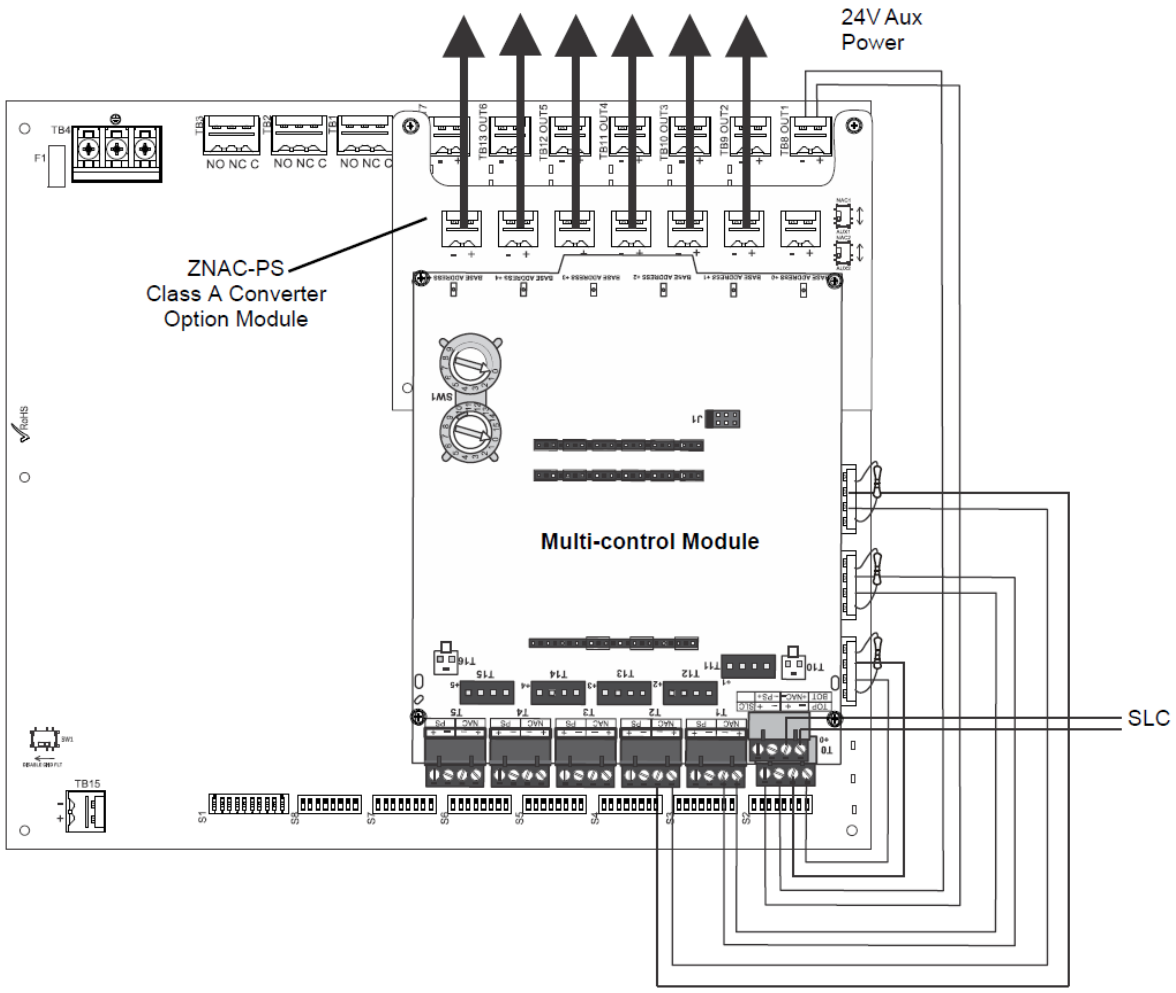


Figure B-2: Controlling Three Inputs with One Module

B.2 CONTROLLING NACS FOR SYNC FOLLOWER OPERATION USING A CONTROL MODULE (DEFAULT MODE CONFIGURATION ONLY)

In this application, the power supply has been set to operate in Slave Configuration and will follow the sync signal from the FACP. This application requires Input #1 to be controlled by the FACP sync output. Input #1 may be wired to the next power supply or terminate in and ELR. Input #2 (or Input #3, if available) will act as the trigger signal for the output circuits. The control module can be powered by one of the power supply output circuits, configured as aux power (24VDC). See Table 3.14 Output Function - Slave Configuration Settings for DIP switch settings.

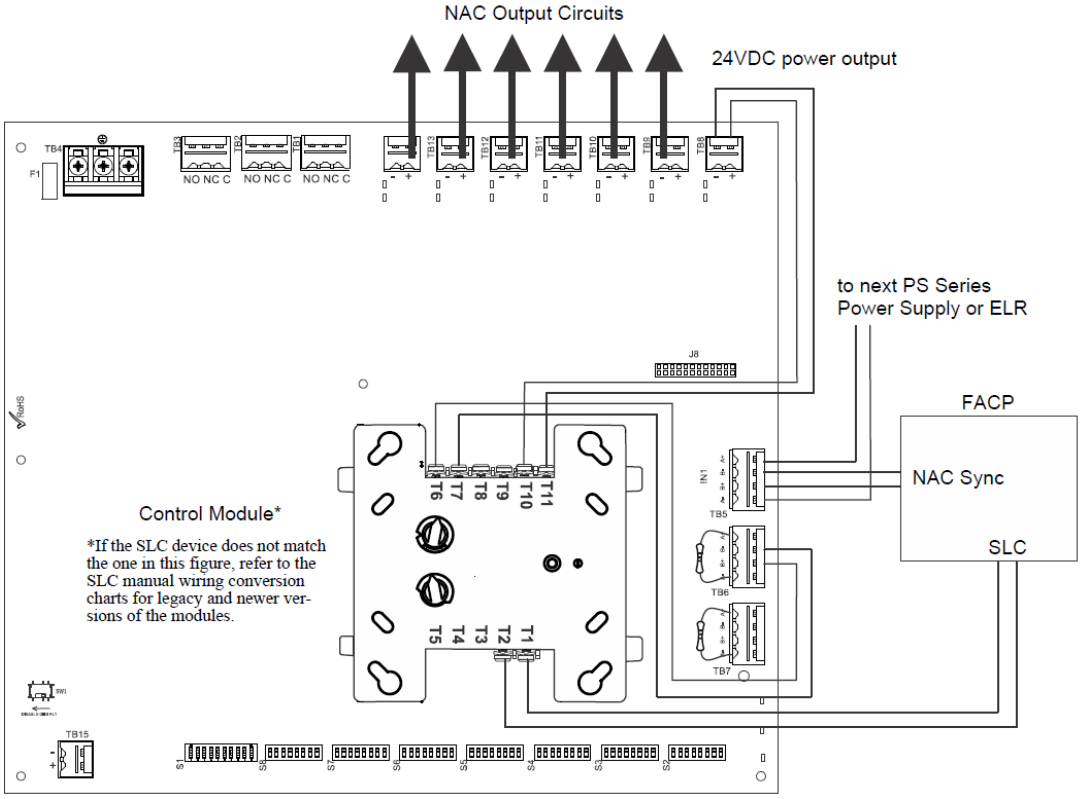


Figure B-3: Controlling Multiple Outputs with One Input as Sync Follower

The following notes apply to Figure B-3: Controlling Multiple Outputs with One Input as Sync Follower

• When the power supply is in an inactive state (control module not active), a trouble on the NAC circuits mapped to TB6 will result in an open circuit condition on the control module output circuit (monitored by End-of-Line Resistor across TB6, Terminals 1 and 4). As an alternative, the trouble contacts at TB1 of the power supply can also be used for limited trouble monitoring excluding faults reported by Command Input #2 related to Command Input#1 configured for Dedicated Sync Input Configuration. Refer to Section 5: Trouble Supervision for more information.
• Refer to Section 3: Programming Options for instructions on setting the DIP switches.
• Output faults are reported via Command Input#2 with Command Input#1 configured for Dedicated Sync Input Configuration operation.
• Refer to the FACP manual for load restrictions and line length limitations when wiring multiple power supplies at the input.
• Wire NACs as shown in 2.2 NAC Circuit Wiring .
• Do not loop wires under screw terminals. Break wires to maintain proper supervision.
• An End-of-Line Resistor must be installed across all input circuits, Terminals 1 and 4, for control module wiring supervision (the ELR value is dependent on the module/ FACP employed).
• For a list of compatible devices, refer to the *Device Compatibility Document* for the brand of FACP.
• Refer to the *SLC Wiring Manual* for more information

B.3 CONTROLLING NACS, AUX POWER, OR DOOR HOLDERS USING A CONTROL MODULE

All output circuits, NACs, aux power (non-resettable power – active regardless of control module state), or door holders, can be controlled from one input such as an addressable control module as illustrated in Figure B-4: Controlling NACs, Aux Power, and Door Holders with One Input . The control module can be powered from one of the power supply output circuits, as 24 VDC power. In this example, Output #1 will be configured as 24VDC non-resettable aux power.

The control module is shown to demonstrate the use of an internally mounted device associated with an addressable fire alarm control panel. The module could be replaced with any circuit capable of polarity reversal, such as an FACP Notification Appliance Circuit.

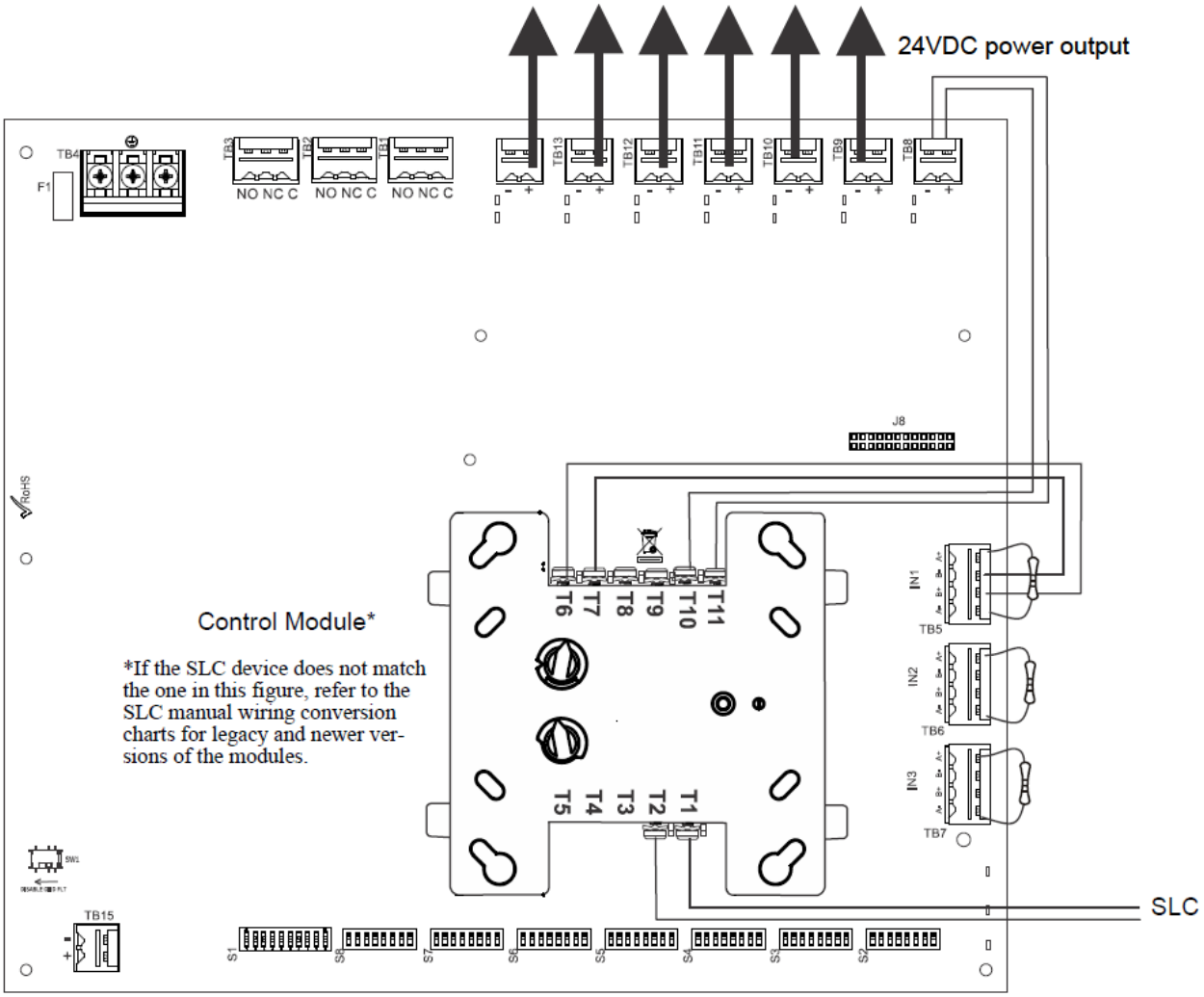


Figure B-4: Controlling NACs, Aux Power, and Door Holders with One Input

The following notes apply to Figure B-4: Controlling NACs, Aux Power, and Door Holders with One Input :

- Any output circuit can be configured as NAC, door holder, or 24VDC power.
- Wire NACs as shown in 2.2 NAC Circuit Wiring .
- Refer to Section 3: Programming Options for instructions on setting the DIP switches.
- When the power supply is in an inactive state (control module not active), a trouble on the NAC circuits mapped to TB5 will result in an open circuit condition on the control module output circuit (monitored by an End-of-Line Resistor across Terminals 1 and 4). Additionally, the trouble contacts at TB1 of the power supply can also be used for limited trouble monitoring excluding output faults reporting to Command Input #1. Refer to Section 5: Trouble Supervision for more information.
- Do not loop wires under screw terminals. Break wires to maintain proper supervision.

• An End-of-Line Resistor must be installed between terminals 1 and 4 for control module wiring supervision (the ELR value is dependent on the module/ FACP employed).
• For a list of compatible devices, refer to the Device Compatibility Document for the brand of FACP.
• Refer to the SLC Wiring Manual for more information.

B.4 CONTROLLING NACS, AUX POWER, AND DOOR HOLDERS WITH NAC SYNC

In this application, use of a sole dual relay/ monitor module mounted inside the cabinet can monitor the two power supply trouble relays and trigger two independent inputs via relay circuits. power supply outputs #1 and #2 are being used for 24 VDC aux power triggered by the module's relay circuits. Any power supply output circuit can be configured to follow any input circuit.

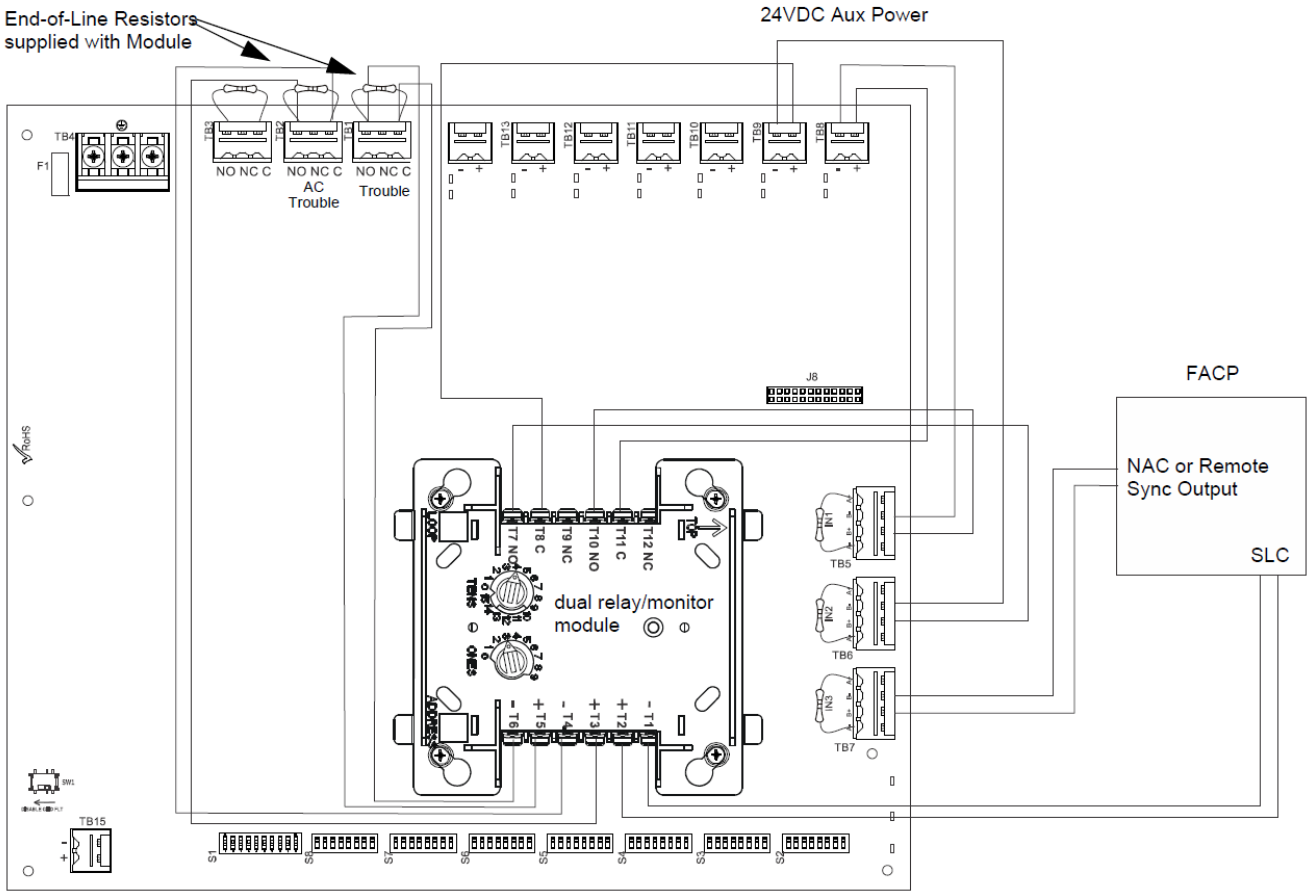


Figure B-5: Controlling NACs, Aux Power, and Door Holders with One Input and NAC Sync

The following notes apply to Figure B-5: Controlling NACs, Aux Power, and Door Holders with One Input and NAC Sync :

• Any output circuit can be configured as NAC, door holder, or 24VDC power.
• Refer to Section 3: Programming Options for instructions on setting the DIP switches.
• Do not loop wires under screw terminals. Break wires to maintain proper supervision.
• An End-of-Line Resistor must be installed between terminals 1 and 4 for module wiring supervision (the ELR value is dependent on the module/ FACP employed).
• An End-of-line Resistor on input circuits#1-2 (TB5-6) are optional for this particular application.
• Ensure that the dual relay/ monitor module is programmed appropriately at the FACP where the inputs are not mapped to the same zone as its outputs.
• For a list of compatible devices, refer to the *Device Compatibility Document* for the brand of FACP.
• Refer to the *SLC Wiring Manual* for more information.

B.5 CONTROLLING ALL THREE INPUTS WITH ONE CONTROL MODULE

In this application, all three command inputs are being controlled by one multi-control module mounted inside the cabinet. Output #1 is being used for 24 VDC aux power. Any output circuit may be configured to any input.

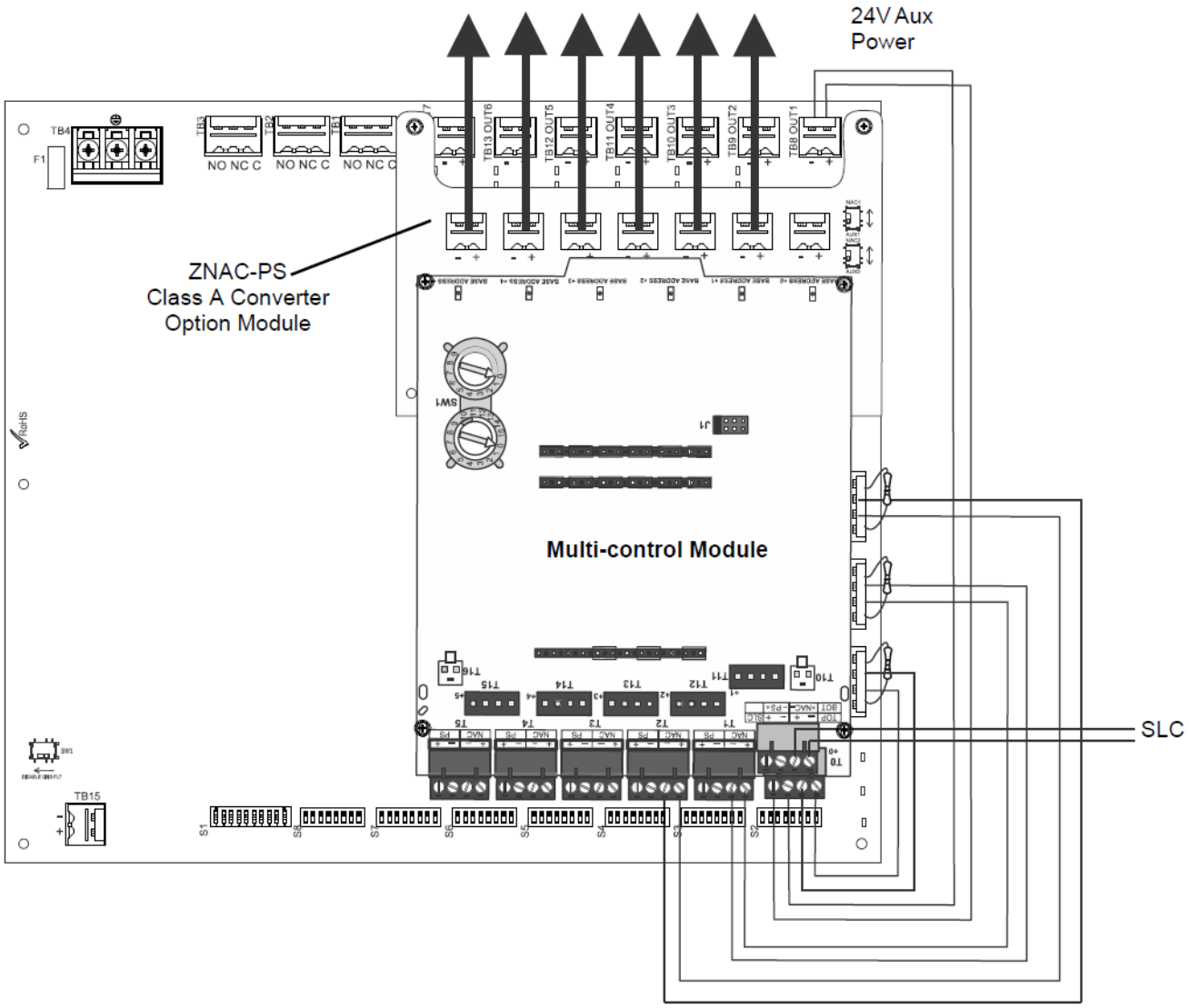


Figure B-6: Controlling Three Inputs with One Module

The following notes apply to Figure B-6: Controlling Three Inputs with One Module :

- An End-of-Line Resistor must be installed between terminals 1 and 4 for control module wiring supervision (the ELR value is dependent on the module/ FACP employed).
- Either disable the unused addresses or install ELRs across unused outputs on the Multi-Control Module.
- Refer to Section 3: Programming Options for instructions on setting the DIP switches.
- Do not loop wires under screw terminals. Break wires to maintain proper supervision.
- For a list of compatible devices, refer to the *Device Compatibility Document* for the brand of FACP.
- Refer to the *SLC Wiring Manual* for more information.

B.6 AC TROUBLE REPORTING WITH A CONVENTIONAL FACP

In this application, the power supply is being used with a conventional FACP that does not have a type-coded input zone for AC Power loss with a delay. The AC Trouble Delay on the power supply must be set to none (S1-7 ON, 8 ON). AC Fail delay timers must be set on the DACT. The DACT must be installed in close proximity to the conventional FACP so the audible and visual signaling can be given locally at the FACP as required by UL 864.

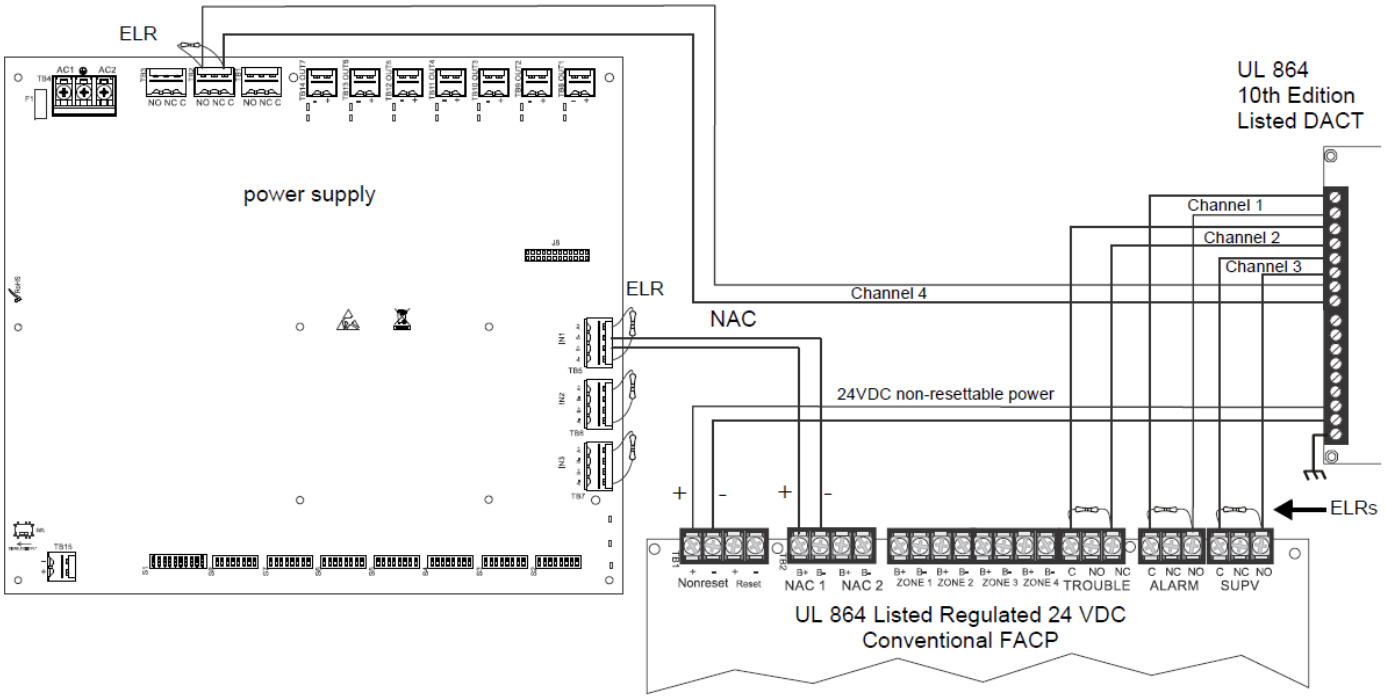


Figure B-7: AC Trouble Reporting with a Conventional FACP

The following notes apply to Figure B-7: AC Trouble Reporting with a Conventional FACP :

- Wiring from the power supply to the DACT must be in metal conduit within 20 feet of the FACP.
- Refer to Section 3: Programming Options for instructions on setting the DIP switches.
- Do not loop wires under screw terminals. Break wires to maintain proper supervision.
- An End-of-Line Resistor must be installed between terminals 1 and 4 on the input circuits that require wiring supervision. (The ELR value is dependent on the FACP employed).
- Refer to panel/ DACT documentation for programming information.

B.7 CANADIAN TWO-STAGE

In this application, NAC1 from the Host FACP is providing the Canada 2-stage audible pattern to the power supply and NAC. NAC2 is providing Master Sync or a Steady Output, depending on its capabilities

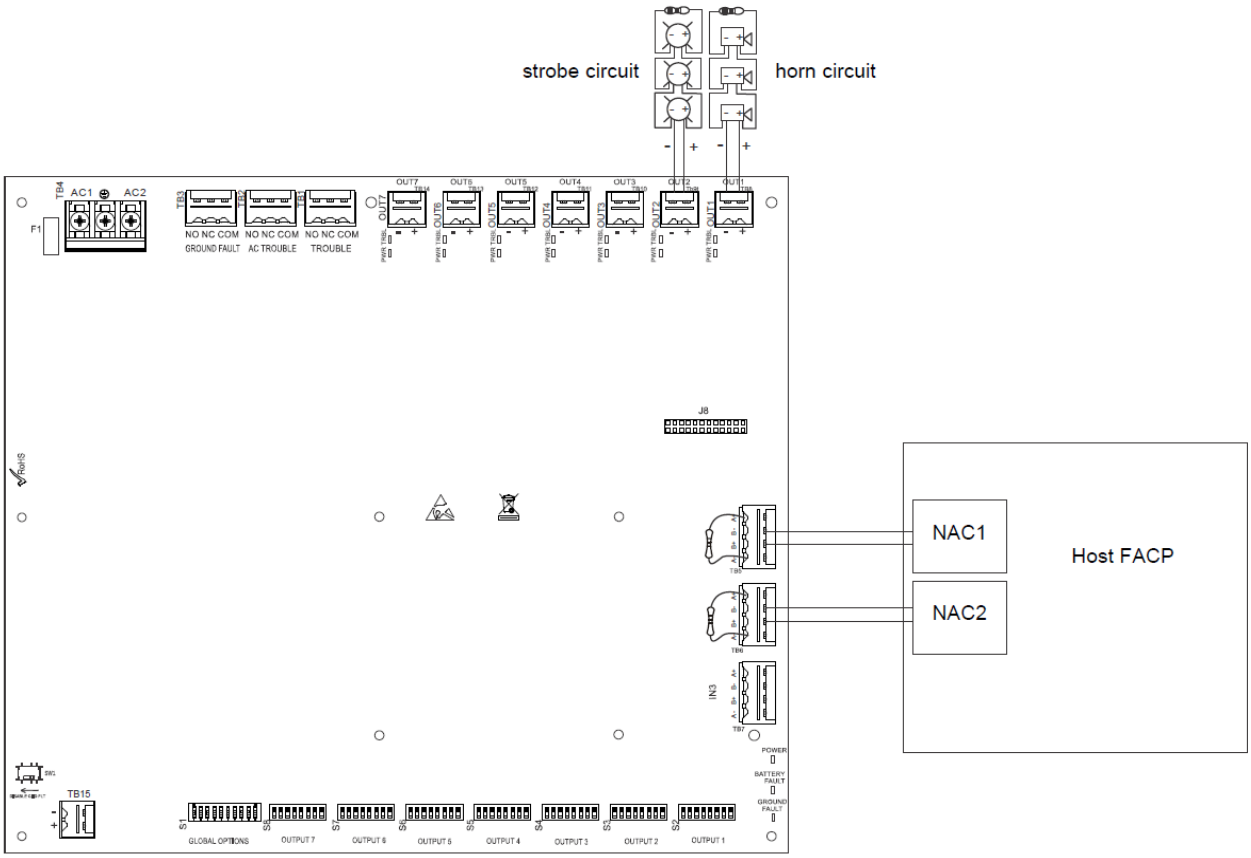


Figure B-8: Canadian Two-Stage Wiring

The following notes apply to Figure B-8: Canadian Two-Stage Wiring

- Power supply Output #1 is programmed to activate on Command Input #1 and Slave Configuration (NAC follower).
- Power supply Output #2 is programmed depending on the host FACP capabilities.
    - FACP NAC2 provides master sync: power supply Output #2 activate on Command Input 2, Slave Configuration (NAC follower)
    - FACP NAC2 provides steady output: power supply Output #2 activate Command Input 2, Master Configuration (select appropriate strobe manufacturer)
- Additional power supply outputs can be mapped to command inputs and used to drive additional visual/ audible or power supply units.

B.8 CANADA TWO-STAGE APPLICATION USING A MULTI-CONTROL MODULE

In this application, two outputs are being controlled by a multi-control inside the cabinet. NAC1 from the host FACP is providing the Canada two-stage audible pattern to the HPF-PS. NAC2 is providing master sync or a steady output, depending on its capabilities. Additional power supply outputs can be used to connect to multi-control modules outside the cabinet.

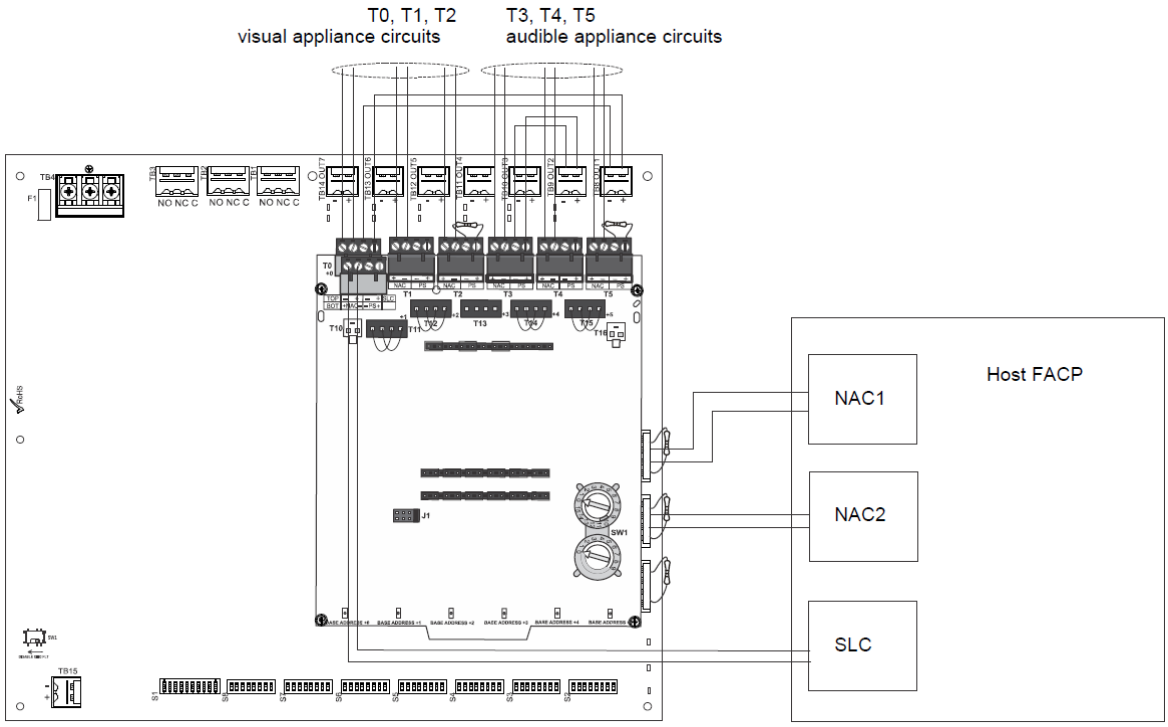


Figure B-9: Canadian Two-Stage Wiring Using a Multi-Control Module

The following notes apply to Figure B-9: Canadian Two-Stage Wiring Using a Multi-Control Module

- Power supply Output #1 is programmed to activate on Command Input #1 and Slave Mode (NAC Follower).
- Power supply Output #2 is programmed depending on host FACP capabilities:
    - FACP NAC2 provides master sync: power supply output #2 activate on Command Input 2, Slave Configuration (NAC follower)
    - FACP NAC2 provides steady output: power supply output #2 activate Command Input 2, Master Configuration (select appropriate strobe manufacturer)
- Jumpers must be installed on terminals T11, T12, T14, and T15 of the multi-control module.
- Unused control module NAC outputs need ELRs installed or must be disabled.
- Power supply outputs going to the multi-control module need ELRs installed.
- Due to the reverse-polarity supervision of the power supply outputs, the multi-control module points must have the type code, “Bell Circuit”, to prevent “Ext Power Loss” troubles.

B.9 RELEASING MODULE

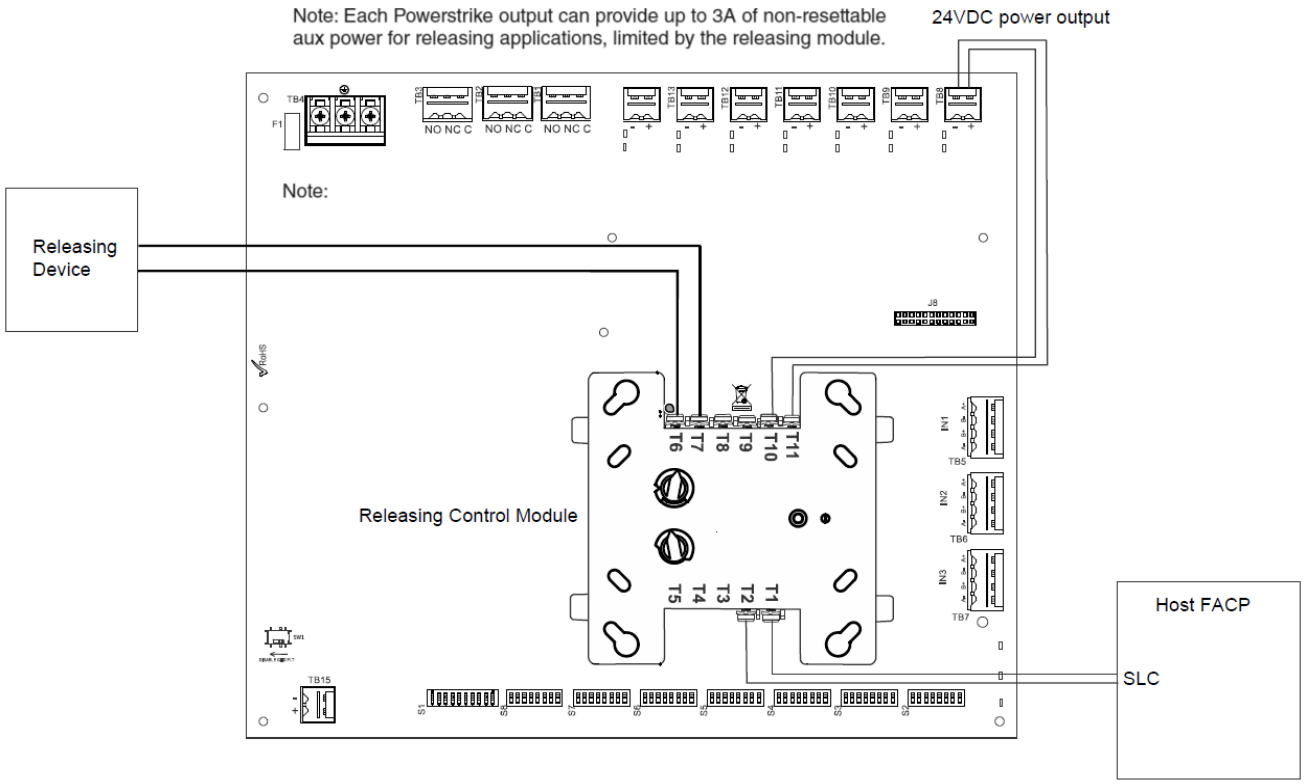


Figure B-10: Releasing Module

The following notes apply to Figure B-10: Releasing Module

• Program an output circuit for non-resettable auxiliary power and connect output to the AUX PWR terminals of the releasing module.
Any output circuit can be configured as NAC, door holder, or 24VDC power.
• Refer to Section 3: Programming Options for instructions on setting the DIP switches.
• Do not loop wires under screw terminals. Break wires to maintain proper supervision.
• For a list of compatible devices, refer to the *Device Compatibility Document* for the brand of FACP.
• Refer to the *SLC Wiring Manual* for more information.
• Refer to the *Releasing Module Manual* in compatible FACP for additional information.

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